

DRACUT WATER SUPPLY DISTRICT  
59 Hopkins Street  
Dracut, Ma 01826

**“Water Mains and Service Installation Requirements”**

- **Section 1.1** All applications for the use of water shall be made in writing to the Board of Commissioners by the District or agent of the property for which the same is desired. No person shall connect, or cause to be connected any service pipe with the main or any distributing pipes, except by the order of the Water Commissioners, made on such application.
- **Section 1.2** No water mains shall be installed without a representative of the Dracut Water Supply District being present. The contractor shall pay for all costs of inspection.
- **Section 1.3** Work shall not begin until the Contractor has obtained the necessary permits from all town departments having jurisdiction over street openings and closings; (Police, Fire and Department of Public Works) and has a “Dig Safe” number for the Job. Prior to the commencement of the work, all fees (tie in fees, etc.) assessed by the Water District must be paid in full and an application to install water mains and/or services must be approved by the Board of Water Commissioners
- **Section 1.4 REFERENCE STANDARDS**
  - A. ANSI A21.4/AWWA C104 – Cement Mortar Lining for Ductile Iron Pipe.
  - B. ANSI A21.10/AWWA C110 – Ductile Iron Fittings, 3” through 48”, for Water and other liquids.
  - C. ANSI A21.11/AWWA C111 – Rubber Gasket Joints for Ductile Iron and Fittings.
  - D. ANSI A21.51/AWWA C151 – Ductile Iron Pipe.
  - E. ANSI B.16 – Cast Iron Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
  - F. ASTM B62 – Composition Bronze or Ounce Metal Castings
  - G. AWWA C502 – Dry Barrel Fire Hydrants
  - H. AWWA C601 – Disinfecting Water Main
  - I. AWWA C150 – Thickness Design for Ductile Iron Pipe
  - J. AWWA C504 – Rubber Seated Butterfly Valves
  - K. AWWA C500 – Gate Valves, 3” through 48”

- L. AWWA C509 – Resilient-Seated Gate Valves
- M. AWWA C550 – Protective Interior Coatings for Valves and Hydrants.
- N. ANSI A21.53/AWWA C153 – Ductile Iron Compact Fittings
- O. ASTM A536 – Ductile Iron Casting
- P. ASTM A126 – Gray Iron Castings
- Q. ASTM D2737 – Standard Spec for PE Plastic Tubing

➤ **Section 1.5 INSPECTION AND TESTING**

- A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. In addition, the District reserves the right to have any or all pipe, fittings and special casting inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Contractor's expense.
- C. Pipes and fittings shall be subjected to a careful inspection and a hammer test just before being laid or installed.

➤ **Section 1.6 PIPE AND FITTINGS**

- A. Ductile Iron Pipe: Pipe shall be designed in accordance with AWWA C150 and shall conform to ANSI A21.51/AWWA C151, Class 52 and shall have push-on joints or mechanical joints where specified. Pipe shall be double cement-lined with seal coat inside and out, conforming to ANSI A21.4/AWWA C104. Push-on joints and rubber gaskets shall be in accordance with ANSI A21.11/AWWA C111. Pipes shall be U.S. manufactured.

- Pipe Fittings: Fittings shall be cast iron, 250 psi pressure rating, or ductile iron, 350 psi pressure rating, conforming to ANSI A21.10/AWWA C110 with mechanical joints. Compact ductile iron fittings conforming to ANSI A21.53/AWWA C153 will be acceptable. Joints and gaskets shall conform to ANSI 21.11/AWWA C111. Joints shall be furnished with ductile iron follower glands. Fittings shall be double cement-lined and seal-coated inside and out in accordance with ANSI A21.4/AWWA C104. Tees for hydrant branches shall have mechanical joints on the run with a plain end having an integral-rotating gland on the branch. The gland will anchor mechanical joint pipe or valve ends to the plain end of the tee. Fittings shall be U.S. manufactured.

- B. Joint restraining devices shall be Mega-Lug Series 1100 by EBBA Iron or approved equal. Restraining glands using set screws will not be accepted.

- D. All ductile and cast iron pipe and fittings shall be clean, sound and without defects. The castings shall be smooth and free from Pinholes, excess iron, etc. The coatings shall be continuous, Smooth and neither brittle nor sticky.
- E. The pipe manufacturer shall supply the District with certification of compliance with these specifications and certification that each piece of ductile iron pipe has been tested at the foundry with the Ball Impression Test, Ring Bending or other approved test for ductility.
- F. Couplings to be used in connecting two plain ends of cast, ductile iron pipe shall be of cast or ductile iron with bolts and nuts complying with AWWA C111. Couplings shall be Dresser Style 38, Smith-Blair Style 441, Clow types F1208 or approved equal.

➤ **Section 1.7 RESILIENT SEATED GATE VALVES**

- A. Resilient seated gate valves shall be manufactured and tested to the requirements of AWWA C-509-87 AND C-509-86 AS applicable for a design working pressure of 200 psi. This pressure rating shall be cast on the outside of the valve.
- B. Valve body, bonnet and gate shall be Ductile Iron, conforming to ASTM A-536. Shell thickness of body and bonnet components shall conform to Table 2 Sec. 4.4 AWWA C-509. So called “Thinwall” valves, not included in this Standard, are not allowed.
- C. Valve body and bonnet shall be coated on all exterior and interior surfaces with a fusion bonded epoxy conforming to the requirements of AWWA Standard for Protective Epoxy Interior coatings for Valves and Hydrants; C-550-90. Manufacturer shall certify that the coating will conform to following sections of the Standard:
  - a. Section 2 – Materials. (Relating to the suitability of the coating for use in a potable water system)
  - b. Section 4 – Tested and inspection. (Relating to qualifications and production testing)
- D. The Valve shall be designed so that during operation, or cycling of the valve, there is no friction or abrasion or rubbing together of the gate and body that can wear away any rubber or epoxy and expose bear iron. Valve manufacturer shall provide evidence from an independent testing laboratory that its valve can operate through 1000 cycles or operation at 250 psi unbalanced closing pressure and flow to open discharge without causing damage to the epoxy coating in body and gate and/or rubber coating on gate.

- E. Gate shall be covered with rubber over all interior and exterior ferrous surfaces. The rubber shall be securely bonded to the gate body, including the part, which houses the stem nut. The stem hole through the gate shall be full opening top to bottom, and shall also be covered with rubber.
- F. "O" ring stem seal shall be furnished with factory installed stainless steel bolts.
- G. Valve body shall be furnished with factory installed stainless steel bolts.
- H. Valves shall open right (clockwise). An arrow indicating opening position shall be cast into the operating nut.
- I. Valves shall be Waterous Series 500, American Flow Control Model AFC-2500, Class 250, or M & H. Contractor shall therefore use the same.

➤ **Section 1.8 BUTTERFLY VALVES**

- A. Valves 12" or larger shall be butterfly type
- B. All butterfly valves shall be of the rubber-seated tight-closing type and shall meet or exceed AWWA Specification C-504-70, with the latest revisions. Valve bodies shall be cast iron conforming to ASTM A126 class B or Ductile Iron ASTM A536. Valves shall be designed for underground service. All bolts and fasteners shall be stainless steel.
- C. Valves shall have mechanical joint ends. Standard M. J. accessories are also to be provided.
- D. Valve shall be equipped with a 2" AWWA operating nut and shall open as specified below.
- E. All valves shall be rated at 200 psi minimum working pressure and hydrostatically tested at 400 psi. Valves shall be rated and tested for absolute, zero leakage shut off.
- F. Valves shall have thermosetting epoxy coating on the interior, and the vane. The coating shall meet all requirements of AWWA C-550 of the latest version. All bodies and vanes shall be factory coated prior to assembly and tested. All interior and exterior ferrous surfaces of the valve body waterway and vane shall receive an epoxy coating with a minimum dry film thickness of 8 mils.
- G. Rubber seat shall be a full circle, 360 degrees, seat not penetrated by the valve shaft. Rubber seat shall be mechanically retained in the valve body and shall be capable of being replaced. Seats vulcanized or bonded to the body are not accepted.
- H. All valves shall use full AWWA C-504 class 150-B valve shaft diameter. Valve shaft shall be one-piece for all valve sizes 4" through 12" and two-piece for valves 14" and larger. Shafts shall be made of stainless steel or hi-tensile steel. One-piece valve shafts shall extend full size through the entire

valve and operator with no neckdown, keyways or holes. Two-piece valve shafts shall be the stub types extending into the disc hubs for a distance of at least one and one-half (1-1 ½) shaft diameters.

- I. Valve shaft shall be sealed from waterway by means of stainless steel journals and “triple-seal” rubber packing designed for permanent duty in underground service. The valve disc shall be solid type ductile iron of streamlined design. The disc shall not have any external vanes, ribs, etc. to obstruct flow. The disc shall be fitted with a synthetic rubber seat ring, mechanically retained in position by shoulders on both the disc and retaining ring. The retaining ring shall be compressed against the rubber seat by stainless steel (18-8) cap screws that pan through the rubber seat for added retention. The rubber seat shall be adjustable and replaceable in the field without disassembly.
- J. The disc shaft connection shall be rigid and made with flat milled taper keys to provide positive wedging between the disc and shaft. Taper keys shall be heat-treated 416 stainless steel for added strength and shall be drawn and locked into position with (18-8) nuts. The taper key opening in the disc shall be sealed with an “O” ring.
- K. Valve operator shall be of the worm and gear or traveling-nut type and shall use full AWWA C-504 Class 150-B torque rating throughout entire travel.
- L. Valve operator shall be capable of withstanding an over load input torque of 450 ft. – lbs. at full open or closed position without damage to the valve operator.
- M. Valves shall open right (clockwise). Valves shall be the American Darling Class 150B or Mueller. The Contractor shall therefore use the same.

➤ **Section 1.9 TAPPING SLEEVE AND VALVE**

- A. Tapping sleeve can be mechanical joint or stainless steel for use on cast iron, ductile iron and AC pipe with ductile iron outlet. Flange conforming to AWWA C-110 Section 10-14.
- B. The mechanical joint sleeve shall have longitudinal compound rubber gaskets, which shall fit against the rubber, and gaskets thus effecting a totally enclosed rubber watertight seal.
- C. Tapping sleeve shall have a flange with “O” ring seal and drilled to correspond to that of the tapping sleeve to insure proper alignment. The outlet side shall be mechanical joint.
- D. Tapping sleeve shall meet or exceed provisions of AWWA C-500 specifications.

- E. Tapping sleeve shall be designed for 200 psi working pressure and 400 psi test pressure.
- F. Tapping valve shall be iron body, resilient seated gate valve with 2" operating nut.

➤ **Section 1.10 VALVE BOXES**

- A. Valve boxes shall be furnished for all valves manufactured in North America.
- B. Valve boxes shall be standard cast iron, asphalt coated, adjustable, sliding type, together with cast iron covers with the word "WATER" plainly cast in relief on the top surface.
- C. The bottom section shall have a minimum I.D. of 5 ¼ inches. The top section shall have a minimum diameter of 6 1/8 inches. There shall be a minimum 6" (inch) overlap between sections.
- D. The bottom section shall be 48" (inches) in length for all butterfly valves and 36" (inches) in length for all gate valves. The top sections be at least 26" (inches) in length and have a plain bottom. No three-piece combination shall be acceptable.
- E. Valve boxes shall be completely and thoroughly coated with bitumastic paint.

➤ **Section 1.11 HYDRANTS (refer to Section 7)**

➤ **Section 1.12 SERVICE CONNECTIONS**

- A. Corporation stops shall be brass compression-type with AWWA Taper (CC or CS) Thread. Corporations shall be supplied with pack-joint. Corporation stops shall be Ford Type F1000 or approved equal.
- B. Curb stops shall be of brass, and shall be Ford Ball Valve Curb Stops or approved equal. The inlet and outlet shall have compression connections.
- C. Each curb stop shall be provided with a cast iron box. The box shall be the extension type with arch pattern. Inside diameter of the upper section shall be at least 2 ½ inches. The boxes shall be furnished with a cast iron lid and heavy brass pentagon plug. Boxes shall be completely and thoroughly coated with bitumastic paint.
- D. Tubing for services and chlorine injection points shall be Type K Heavy Wall Annealed Seamless copper designed for buried water service. The name or trademark of the manufacturer and type shall be stamped at intervals along the pipe. Contractor must provide 100 foot coils for services less than 100 feet from the main. Fittings or unions are not allowed on services less than 100 feet in length.

- E. Adapter couplings may be required for fitting new services to existing service lines. Such fittings shall be compression connections and provide electrical continuity.
- F. Water Service Materials and Installation for Polyethylene (PE) Water Service Entrances
  - 1. General
    - a. Materials of Construction
      - I. Main to Stop - Materials for this portion of the service shall be 1" or greater approved Polyethylene Pipe (PE) as determined by the Dracut Water Supply District (DWSD).
      - II. Stop to House - All water services shall be of either 1" or greater approved 200 psi Copper tube size polyethylene meeting or exceeding the product specifications below. Size to be determined by the District, or their Engineer.
    - b. Materials sizing - All water services shall be sized by the District or their Engineer.
    - c. Utility Separation - All water services shall be separated from other utilities and septic fields in accordance with the Massachusetts Department of Environmental Protection Rules
    - d. DWSD or their engineer will be the final judge as to the acceptability of miscellaneous hardware used in the installation of water services.
  - 2. Product Specifications
    - Small diameter Polyethylene Service Line and Piping Material
    - a. Polyethylene Tubing: All polyethylene tubing shall conform to the latest revision of ASTM-D2737. Polyethylene tubing shall be "copper tube size - CTS" and shall carry a minimum rating of 200 psi at 73.4 F.
    - b. Stainless Steel Pipe Insert: Inserts shall be manufactured for use with CTS polyethylene service line material and shall be manufactured of 304 stainless steel.
    - c. Corporations: Acceptable Corporations are as manufactured by: Mueller brass 300 corporation with 110 compression couplings; Ford brass with "T" Compression nut; Cambridge brass series 202 compression coupling. Corporations shall have a Teflon coated ball stop. Corporations shall have a CC inlet thread and a compression outlet. Plug style corporations are not acceptable.
    - d. Curb Stop Valves: Acceptable Curb stop valves are as manufactured by: Mueller 300 Curb valve with 110 compression couplings; Ford with "T" Compression nut; Cambridge brass series 301 compression

coupling. Curb stops shall have a Teflon coated quarter turn ball stop. No drain holes are allowed on curb stops, unless approved by the District. Plug style curb stops are not acceptable.

- e. Tapping Saddles: Acceptable tapping saddles are: Mueller DE2s epoxy coated, double stainless steel strap; Ford FS202 epoxy coated, double stainless steel strap; Romac Style 202N nylon coated, double stainless steel strap; Smith Blair 317 nylon coated, double stainless steel strap
- f. Service Boxes: Service box shall be of an arch style pattern with a 5' to 6' slide type adjustable riser, unless otherwise specified on the plans. Minimum I.D. on the service box shall be 1.0". Buffalo box style service box shall be supplied. All service box components shall be coated with a bituminous coating in accordance with AWWA C110-87. Service Boxes for 2" curb valves shall be constructed and installed in accordance with DWSD Standard Details. Service boxes shall be manufactured in the U.S.A.
- g. Brass Goods: All brass goods shall be manufactured from 85-5-5-5 ASTM B62 brass. Brass goods shall be supplied with iron pipe threads or compression couplings. Acceptable compression brass goods are as manufactured by Mueller, Cambridge and Ford (T- style only). All other brass goods must be approved by the District through submittal of catalog cuts and examples of the actual goods to be used. All brass goods shall be rated for a minimum working pressure of 150 psig.

### 3 Product Installation:

- a. Polyethylene Tubing: Polyethylene tubing water services shall be bedded and installed in accordance with DWSD Standard Details A-1 to A-31. All polyethylene tubing shall be installed with a 10 gauge tracer wire as manufactured by BMS, Division of Ablestar Corp., Avon, MA or equivalent. Wire shall extend to 18" inside the foundation or area where the water meter will be installed, as per DWSD Standard Details. Polyethylene tubing shall be joined with stainless steel insert stiffeners and brass compression couplings that meet the specifications for these fittings as detailed in the Service pipe section of these specifications. The use of plastic friction inserts with stainless steel clamps is prohibited.
- b. Stainless steel inserts/Compression Couplings: Stainless steel inserts shall be sized for the pipe in which they are used. In no case shall an insert be inserted into a line by overlapping the steel ends of the insert. The insert shall be installed such that 1/2 of the insert is in each



section of the pipe being connected. The compression coupling shall be centered over the connection point of the pipes being joined. The coupling shall be tightened in accordance with the manufacturer's recommendations. Do not over tighten the coupling.

- c. Corporations: Corporations shall be installed on all water services at the service tap into the water main. Corporations may be direct tapped into ductile iron water main as follows:

**Tap Size DIP & PVC Main Sizes which may be direct tapped**

<b>1"</b>	<b>6" and up</b>
<b>2"</b>	<b>16" and up</b>

Corporations which cannot be direct tapped must be tapped through a tapping saddle or a brass compression tee with a threaded branch.

- d. Curb Valves: 1" valves shall be installed with a service box. 2" curb valves shall be installed in accordance with manufacturer's recommendations. Curb valves shall be installed as close as practicable to 1' of the edge of the District ROW within the District ROW, if possible. Curb valves shall be installed with the operator plumb and vertical. Curb valves shall be set on a 2"x6"x12" piece of pressure treated blocking or a flat rock of similar dimensions. If the water main is constructed of PVC, install Mueller 300 insulated curb stop in accordance DWSD Standard Details.

➤ **Section 1.13 EXECUTION**

- A. Pipe and accessories shall be handled and stored in such a manner as to insure that pipe is installed in sound, undamaged condition. Particular care shall be taken not to inure the pipe coating or lining.
- B. Ductile iron pipe and fittings and the cement linings are comparatively brittle. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or lining, scratching or marring machined surfaces and abrasion of the pipe coating or lining.
- C. Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cut off by and at the expense of, the Contractor before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12" (inches) from the visible limits of the crack.
- D. If authorized, cutting of the pipe shall be done so that the cut is square and clean, without causing damage to the pipe lining. Unless otherwise authorized by the District, all pipe cutting shall be done by means of an

approved type of power cutter. The use of a hammer and chisel, or any other method, which results in rough edges, chips and damaged pipes, is prohibited. All cut edges shall be field beveled by use of a power grinder, as required, prior to installation.

- E. Each pipe section shall be placed into position in the trench in such manner and by such means required to cause no damage to the pipe, person or to property.
- F. The Contractor shall furnish slings, straps and/or approved devices to provide satisfactory support of the pipe when it is lifted. Transportation from delivery areas to the trench shall be restricted to operations, which can cause no damage to the pipe units.
- G. Pipe shall not be dropped from trucks onto the ground or into the trench.
- H. The Contractor shall have on the job site, with each laying crew, all the proper tools to handle and cut the pipe.
- I. Damaged pipe coating and/or lining shall be restored before installation only as approved or directed by the District.

➤ **Section 1.14**

- A. As soon as excavation has been completed to required depth, place and compact bedding material to the elevation necessary to bring the pipe to grade.
- B. The compacted bed shall be rounded so that at least the bottom quadrant of the pipe shall rest firmly for the full length of the barrel. Suitable holes for bells or couplings shall be dug around the pipe joints to provide ample space for making tight joints.
- C. The trench bottom shall be straight, free of bumps or hollows and at the proper depth. Any irregularities in the trench bottom shall be leveled off or filled in with a selected gravel or sand thoroughly tamped.
- D. If determined by the District, the trench bottom shall be prepared by digging at least 6" (inches) deeper than pipe grade and backfill to proper grade with a selected gravel or sand backfill properly tamped.
- E. All unsuitable material shall be removed from the bottom of the trench excavation as directed by the District to the depths ordered. The trench shall be backfilled with an approved gravel backfill material, placed in 6" (inch) layers, to within 6 inches of proper pipe grade. Each gravel lift shall be thoroughly tamped. A 6" (inch) layer of selected gravel or sand shall be placed and tamped for proper pipe support.

➤ **Section 1.15 LAYING PIPE**

- A. Laying of pipe and fittings shall be in accordance with the requirements of AWWA Standard Specifications for Installation of Cast Iron Water Mains, C600, except as otherwise provided herein.
- B. Each pipe length shall be inspected for cracks, defects in coating or lining, and any other evidences of unsuitability. Contractor shall excavate a minimum amount of trench and shall backfill trench to within 2 lengths of pipe laying. All trenches shall be backfilled at night.
- C. Pipe shall be laid in the dry and at no time shall water in the trench be permitted to flow into the pipe.
- D. The pipe shall then be laid on the trench bedding, and the pipe pushed home. Jointing shall be in accordance with the manufacturer's instructions and appropriate ASTM Standards, and the Contractor shall have on hand for each pipe laying crew, the necessary tools, gauges, pipe cutters, etc. necessary to install the pipe in a workman like manner. Pipe laying shall proceed upgrade with spigot ends pointing in the direction of flow.
- E. Blocking under the pipe will not be permitted except where a concrete cradle is proposed, in which case pre-cast concrete blocks shall be used.
- F. If inspection of the pipe indicates that the pipe has been properly installed as determined by the District, the Contractor may then refill or backfill the remainder of the trench in accordance with the specifications.
- G. At any time that work is not in progress, the end of the pipe shall have a temporary plug to prevent the entry of animals, earth, water, etc.
- H. Acceptable alignment shall be preserved in laying. The deflection at joints shall not exceed 3 degrees, or 12 inches for an 18-foot length of pipe. Fittings shall be provided, if required, in crossing utilities, which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the District.
- I. Concrete thrust blocks shall be installed at all fittings and other locations as directed by the District. Joints must be protected by felt roofing paper prior to placing concrete. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Wooden side forms shall be provided for thrust blocks.
- J. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends on the upstream side. A rubber gasket shall be inserted in the groove of the bell end of the pipe and joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be jointed and pushed home with a jack or by other means. After jointing the pipe, a metal feeler shall be used to make certain that the rubber gasket is

located correctly. Brass wedges shall be installed at each joint (minimum: 2 per joint).

- K. Mechanical joints at valves, fittings and where designated shall be in accordance with the "Notes on Method of Installation" under ANSI Specification A21.11 and the instruction of the manufacturer. To assemble the joints in the field, the Contractor shall thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tight to the specified torque. Under no conditions shall extension wrenches or pipe over handle or ordinary ratchet wrench be used to secure greater leverage.
- L. Detectable Tracer Tape: The tape shall be a minimum of 3 inches wide. The upper face of the tape shall be of a highly visible color easily detectable when exposed by digging. The upper face shall carry the warning of the buried water main below. The tape shall have a metallic backing in order that it may be traced by metal or pipe locators. It shall be used over all non-metallic pipes.

➤ **Section 1.16 INSTALLATION OF VALVES AND FITTINGS**

- A. Valves and boxes shall be set with a stem vertical and box vertically centered over operating nut. Valves shall be set on a firm foundation and supported by tamping selected excavated material under and at the sides of the valve. The gate box shall be supported during backfilling and maintained in a vertical alignment with the top flush with finish grade.
- B. Valves shall be anchored to all tees or fittings with  $\frac{3}{4}$  inch threaded rods, wherever possible or as directed by the District.
- C. Install couplings and fittings in accordance with manufacturer's instructions.

➤ **Section 1.17 INSTALLATION OF HYDRANTS (refer to Section 7)**

➤ **Section 1.18 INSTALLATION OF CORPORATION AND SERVICES**

- A. The tapping machine shall be rigidly fastened to the pipe half way between the horizontal and vertical position. The length of travel of the tap should be so established that when the stop is inserted and tightened with a 14 inch wrench, not more than one to three threads will be exposed on the outside. When a wet tapping machine is used, the corporation stop shall be inserted with the machine while it is still in place. Stops shall be tightened only sufficiently to give water tightness, and care must be constantly exercised not to over tighten them.
- B. Care shall be exercised in the placing and laying of tubing to be sure that the pipe does not have kinks or sharp stones or ledge which would cause

damage to the pipe. Place at least 6 inches of sand adjacent to, above and below the tubing. No stone shall be dropped on the tubing until the depth of backfill above the tubing is in excess of one foot.

➤ **Section 1.19 INSTALLATION OF MANUAL AIR RELEASE/  
CHLORINATION INJECTION POINTS**

- A. Install each gate box vertically, centered over the operating key, with the elevation of the top adjusted to conform to the finished surface at the completion of construction.
- B. Installation of chlorinating taps shall be in accordance with paragraph 1.18, Installation of Services.

➤ **Section 1.20 DISINFECTION OF WATER MAINS**

- A. Chlorinating methods for disinfecting water mains shall conform to AWWA Standards Section C601.
- B. The Contractor under the supervision of the District shall disinfect the mains. The Contractor shall use a manually controlled, vacuum type solution feed chlorinate using a mixture of water and approved chlorine-bearing compound of known chlorine content, such as calcium hypochlorite. The chlorine shall be introduced into the main through a  $\frac{3}{4}$  inch corporation stop installed approximately one foot up stream from the valve at the beginning of the job and shall be tested for residual chlorine at a  $\frac{3}{4}$  inch corporation stop installed approximately one foot from the downstream valve at the end of the project.
- C. Water from an approved source shall be introduced slowly into the main during the application of chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the pipe that the chlorine dose entering the mains shall be at least 50 parts per million. When the pipeline has been completely filled with treated water, the main shall be sealed off. Treated water shall be retained in the main for a period of at least twenty-four (24) hours. At the end of the retention period, the chlorine residual at the extremities of the pipe and at other representative points shall be at least 5 parts per million.
- D. Should the first treatment fail to meet the above requirements, the procedure shall be repeated until tests show that, in the opinion of the District, effective disinfection has been accomplished.
- E. Following acceptance of the disinfection process, the chlorinated water shall be flushed from the newly laid main until such time as the replacement water throughout its entire length shall be equal in quality to that elsewhere in the system.

- F. A representative water sample shall be collected of the potable water now present in the new pipeline by the Contractor under the supervision of the District. This sample shall be taken to a Massachusetts DEP certified laboratory for a bacteria analysis. The Contractor shall pay for the cost associated with the collection and analysis of the sample.
- G. Special disinfecting procedures, such as soaking or swabbing, approved by the District, shall be used in connections to existing mains and where the method outlined above is not practicable.

➤ **Section 1.21 TESTING**

- A. The Contractor shall furnish all labor, pumps, taps chemicals, and other necessary equipment to conduct hydrostatic pressure tests and measured leakage test; and to disinfect thoroughly the mains laid under this contract in accordance with Section 4 AWWA C600-82, Installation of Ductile Iron Water Main.
- B. The tests shall be conducted at a time specified by and under the supervision and direction of the District who shall judge the success or failure of the work to meet the required standards.
- C. In the event that the work fails to meet the required standards as stated herein, the Contractor shall perform such excavation, repair, relaying of pipe, rechlorinating, and all other work necessary to correct the work; and shall repeat the tests or chlorinating as often as may be necessary and until such time as the required standards are met.

➤ **Section 1.22 PRESSURE TESTS**

- A. Before applying the specified test pressure, all air shall be expelled from the pipe. If suitable means of expelling air are not available at high places, the Contractor shall make all the necessary taps as the District may direct. After the tests have been completed, the corporation stops shall be left in place or removed and plugs inserted, as directed by the District.
- B. The newly laid pipe shall be tested in valved or plugged sections as determined by the District in the field. Water shall be slowly introduced into the section being tested by means of an approved power-driven high-pressure test pump.
- C. The newly laid pipeline shall be tested to a pressure equal to 150% of the minimum static pressure for the section being tested, measured at the lowest point of the section being tested corrected to the elevation of the test gauge. If the static pressure of any newly laid section of pipeline being tested is less than 100 psig measured at the lowest point of the pipeline section, then the minimum test pressure shall be 150 psig.

- D. The pressure shall be raised to the test pressure required for each section being tested as determined by the District. When the test pressure is reached, the time shall be recorded and the test shall begin. The duration of each pressure test shall be a minimum of two hours. During the test, pressure shall be maintained in the section of pipeline being tested by means of a recirculating by-pass type test pump. Water shall be added in measured amounts from a container of known volume if required to maintain pressure. The addition of excessive amounts of water shall constitute immediate test failure. The District will approve all gauges and test equipment.
- E. During the test, the line will be examined by the District for visible leaks and breaks. Any defects in the works shall be repaired, and any defective materials shall be removed and replaced by the Contractor as and where directed by the District.

➤ **Section 1.23 LEAKAGE TEST**

- A. Method of Testing: The leakage test shall be conducted concurrently with the pressure test. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. A drop in the pressure in a test section shall not measure leakage over a period of time.
- B. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD}{133,200} P$$

In which L is the allowable leakage, in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

- C. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/h/in. of nominal valve size shall be allowed.
- D. When hydrants are in the test section, the test shall be made against the closed hydrant.
- E. Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.
- F. All visible leaks are to be repaired regardless of the amount of leakage. At the end of the test period if the amount of water added to the main from the

calibrated vessel is less than the allowable leakage, and if the line shows no visible leaks or other failures, the District will approve that portion of the main tested.

➤ **Section 1.24 TESTING OF VALVES AND HYDRANTS**

- A. All valves and hydrants shall be pressure tested during the main pipeline test. Hydrant gate valves shall remain open during the main pressure test. After the pipeline has been pressure tested and accepted the hydrant gate valve shall be closed and the hydrant valve cracked open to release some pressure on the hydrant side of the gate valve. An acceptable test for each hydrant gate valve shall be no loss of pressure in the main line test pressure as each valve is closed.
- B. All main line butterfly or gate valves and control valves on any intersecting side streets shall also be tested by the same procedures outlined above as for as practical. The district shall decide if it is impractical to test any one particular valve location. No pressure test shall be considered acceptable until all possible control valves have been tested to insure proper closing and water tightness.

➤ **Section 1.25 CONNECTION TO EXISTING SYSTEM**

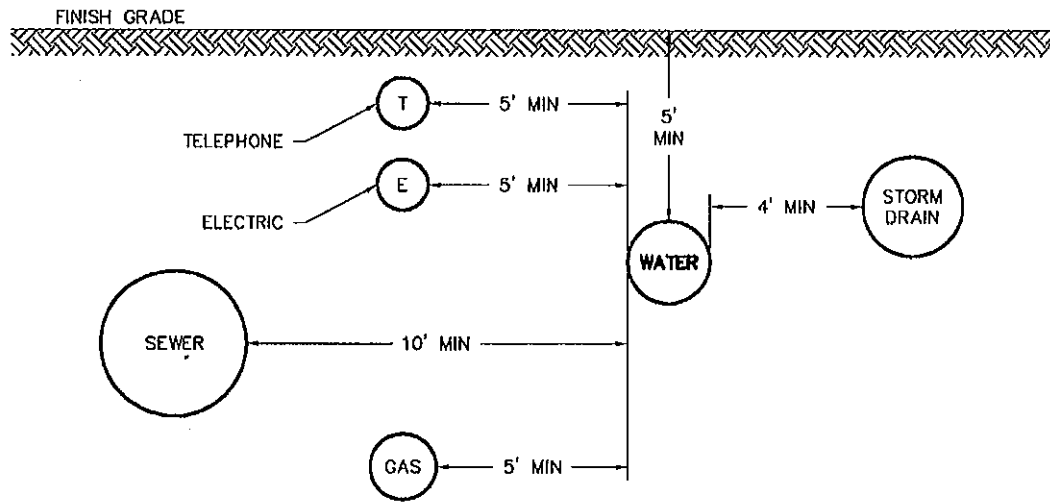
- A. The Contractor shall furnish all necessary labor, tools, joint materials, equipment, etc. to connect new water pipes to existing water pipes with the required proper fittings. Flexible transition couplings used to connect new water pipes to existing water pipes shall be as specified.
- B. All connections shall be made at such time and in such a manner as to cause a little interruption in water service as possible.
- C. Coordination of all such work shall be made with the District and Contractor who shall be present when the work is done. The Contractor shall notify the District 48 hours in advance of when he plans to connect into the existing water mains.
- D. All materials, equipment and labor necessary for the connection of the new water mains to the existing water mains shall be accomplished as shown on the plans or as directed by the District and shall be considered subsidiary to the pipe laying items.

➤ **Section 1.26 SEWER SERVICES & DRAIN LINES/  
MISCELLANEOUS REQUIREMENTS**

- A. Tools and Equipment: The Contractor must have the following equipment available at all times on the site.



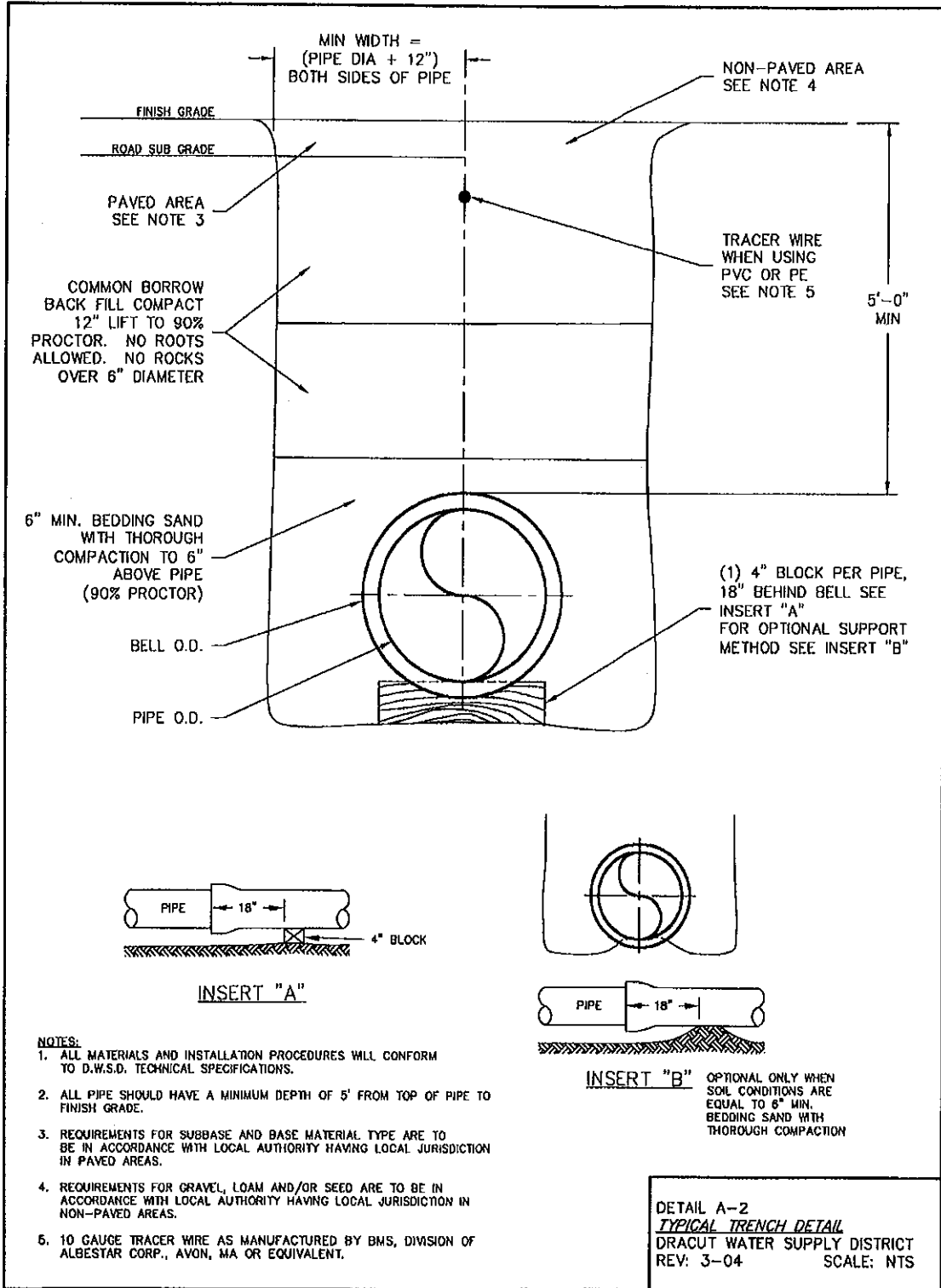
- Pipe wrenches: no wrenches longer than 14" or shorter than 12" will be allowed on 1" fittings or larger than 12" on ¾".
  - Taps and Tapping machines must be in good condition. Any cost to the District for the shutting down of mains because of Tapping Machine failure will be assessed to the Contractor.
  - Traffic Barricades with lights must be available to protect any open streets and obstructions to traffic.
- B. The Contractor shall exercise caution to properly protect the existing sewer services and drain pipes from construction damage. It shall be the Contractor's responsibility to demonstrate that all existing active sewer services and drains are functioning properly after the installation of the proposed water main to the satisfaction of the District.
- C. Damage to existing drains and sewer services shall be repaired and/or replaced with materials of the same size as the existing service. Existing slopes and inverts shall be maintained. Pipe joints shall be made using suitable flexible couplings, approved by the District. Fernco couplings are an acceptable coupling for sewer service repair. The Contractor shall use the same. Concrete mortar joints will not be acceptable.
- D. If damage occurs to existing house or business sewer services or storm drains and acceptable repairs are accomplished as outlined above, the Contractor shall be required to adequately demonstrate to the District that the repaired service is functioning normally before any backfill material shall be allowed to be placed.



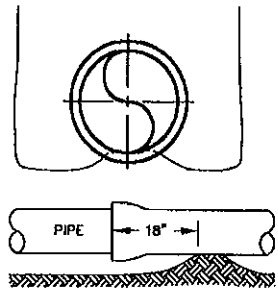
**NOTES:**

1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
2. ALL WATER MAIN SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. SEE DETAIL A-2 FOR TRENCH DETAIL.
4. SEE DETAIL A-11 FOR OUTSIDE SERVICE ENTRANCE DETAIL.

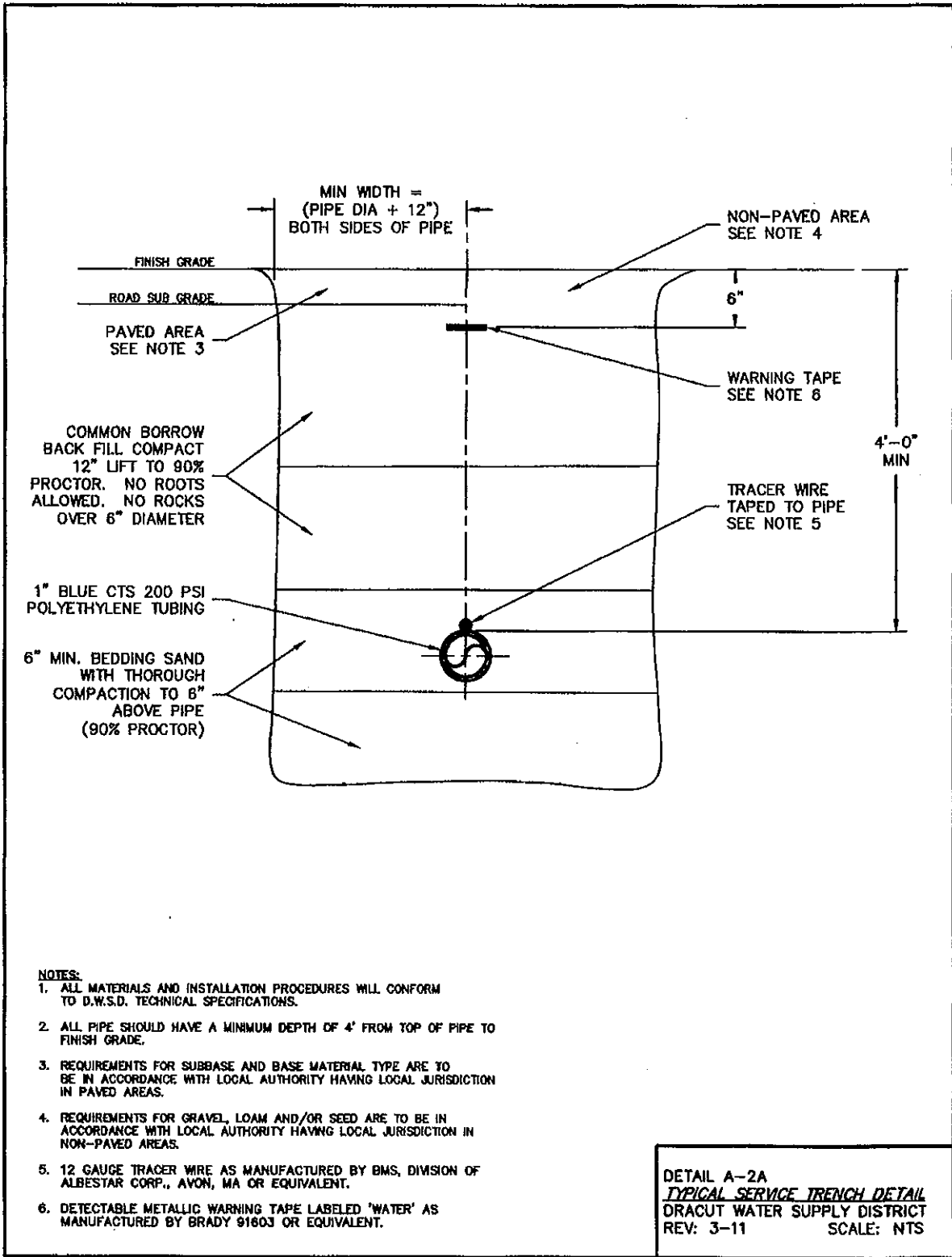
DETAIL A-1  
 TYPICAL UTILITY SEPARATION  
 (MAIN) DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS

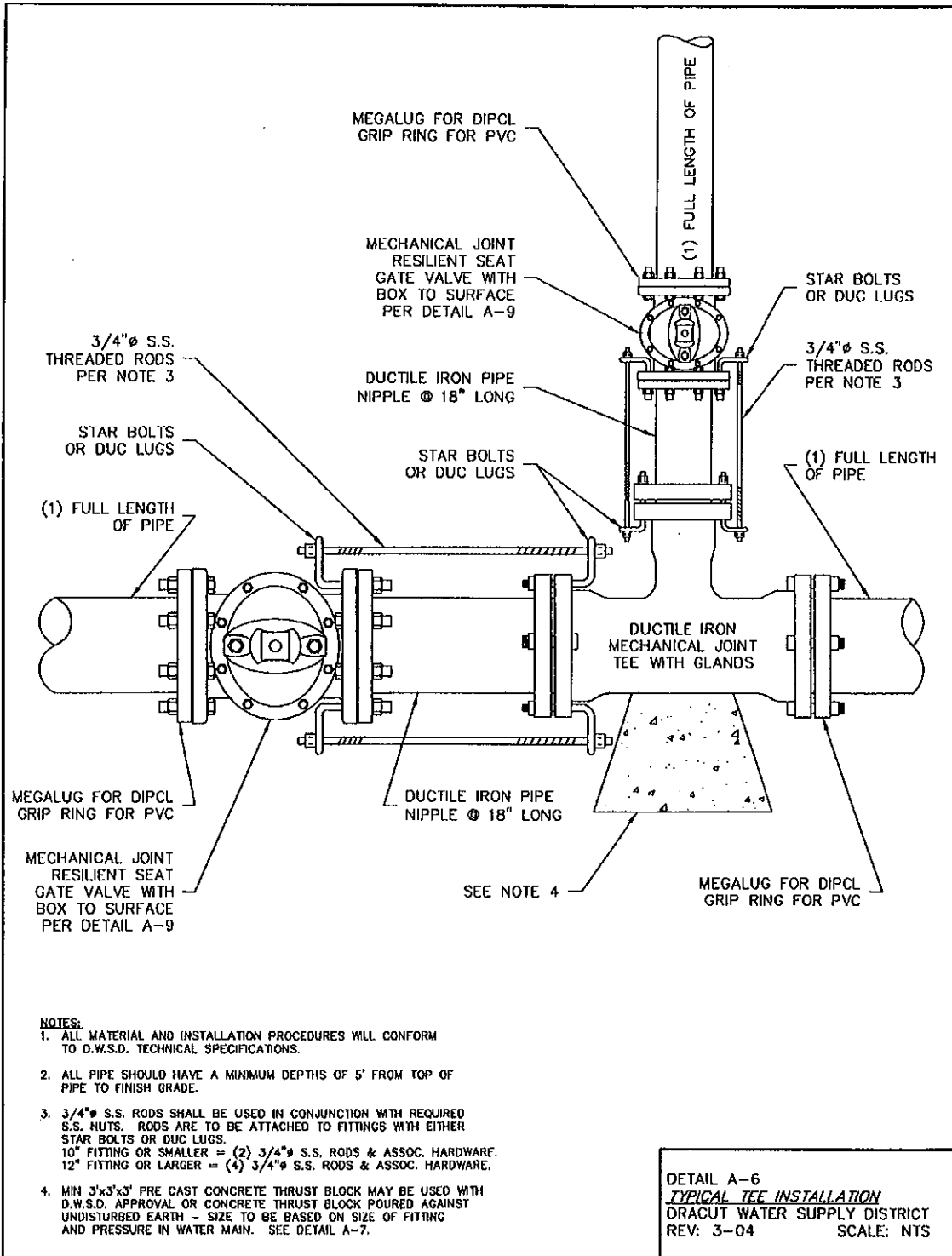


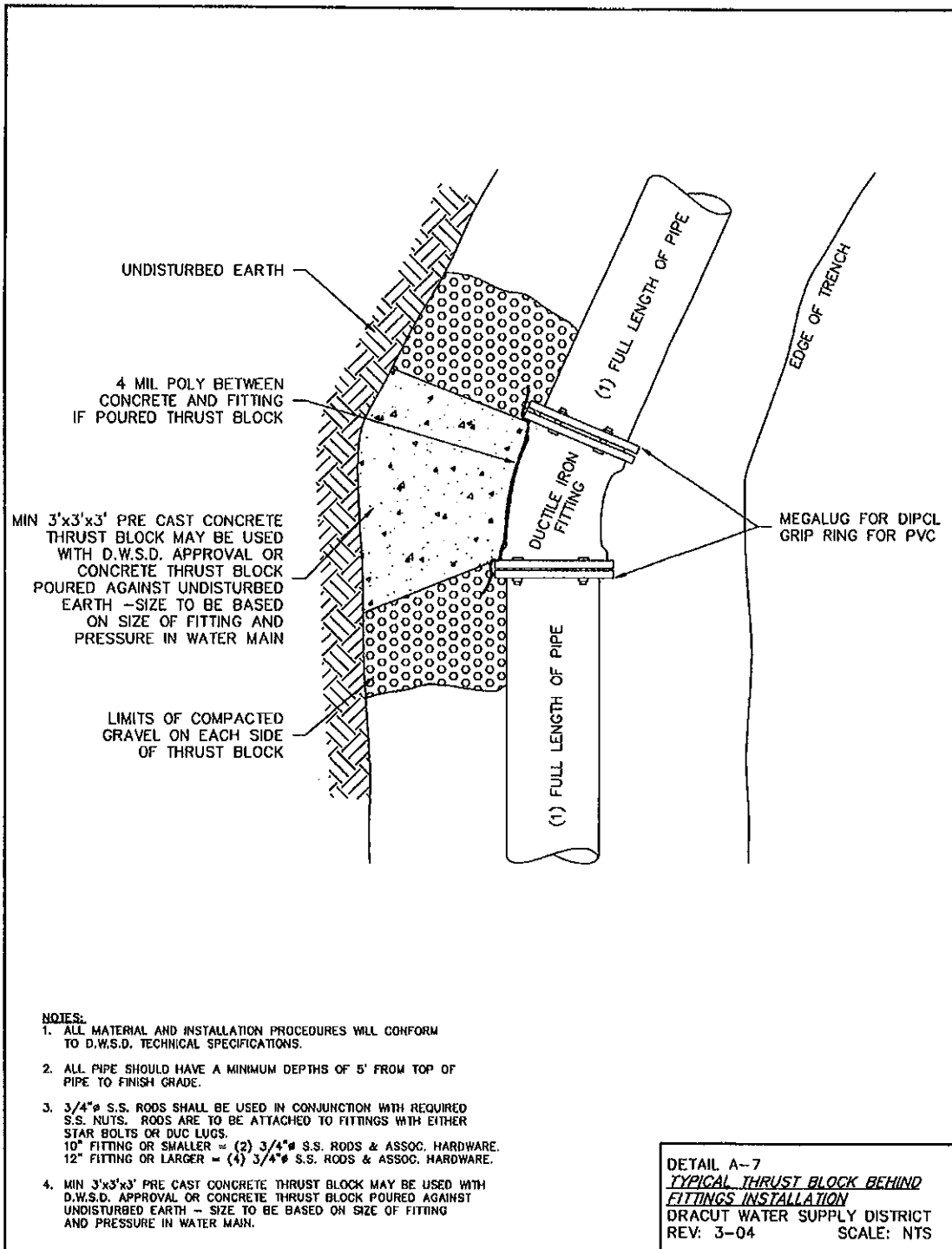
- NOTES:**
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
  2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
  3. REQUIREMENTS FOR SUBBASE AND BASE MATERIAL TYPE ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY HAVING LOCAL JURISDICTION IN PAVED AREAS.
  4. REQUIREMENTS FOR GRAVEL, LOAM AND/OR SEED ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY HAVING LOCAL JURISDICTION IN NON-PAVED AREAS.
  5. 10 GAUGE TRACER WIRE AS MANUFACTURED BY BNS, DIVISION OF ALBESTAR CORP., AVON, MA OR EQUIVALENT.

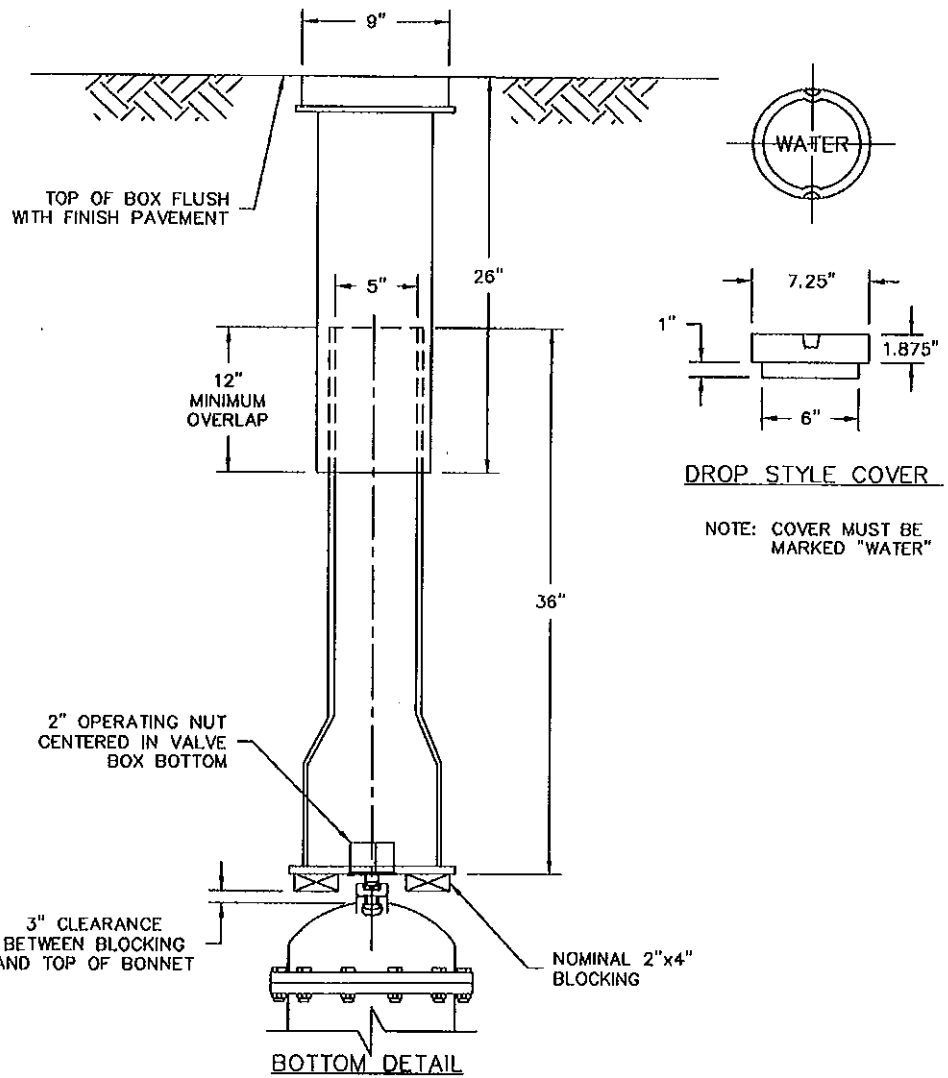


DETAIL A-2  
 TYPICAL TRENCH DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS



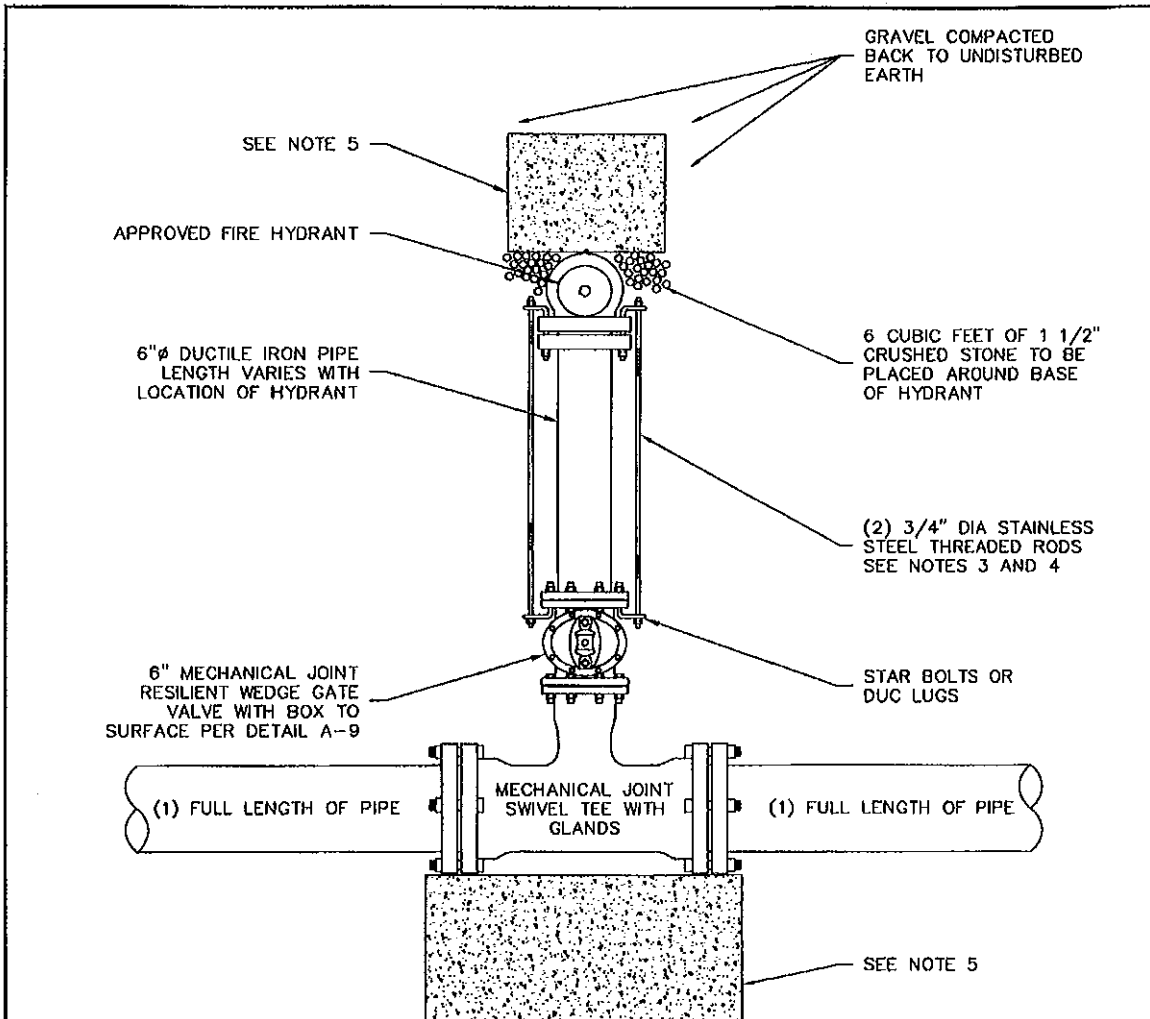






- NOTES:**
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
  2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.

DETAIL A--9  
 TYPICAL VALVE BOX DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS

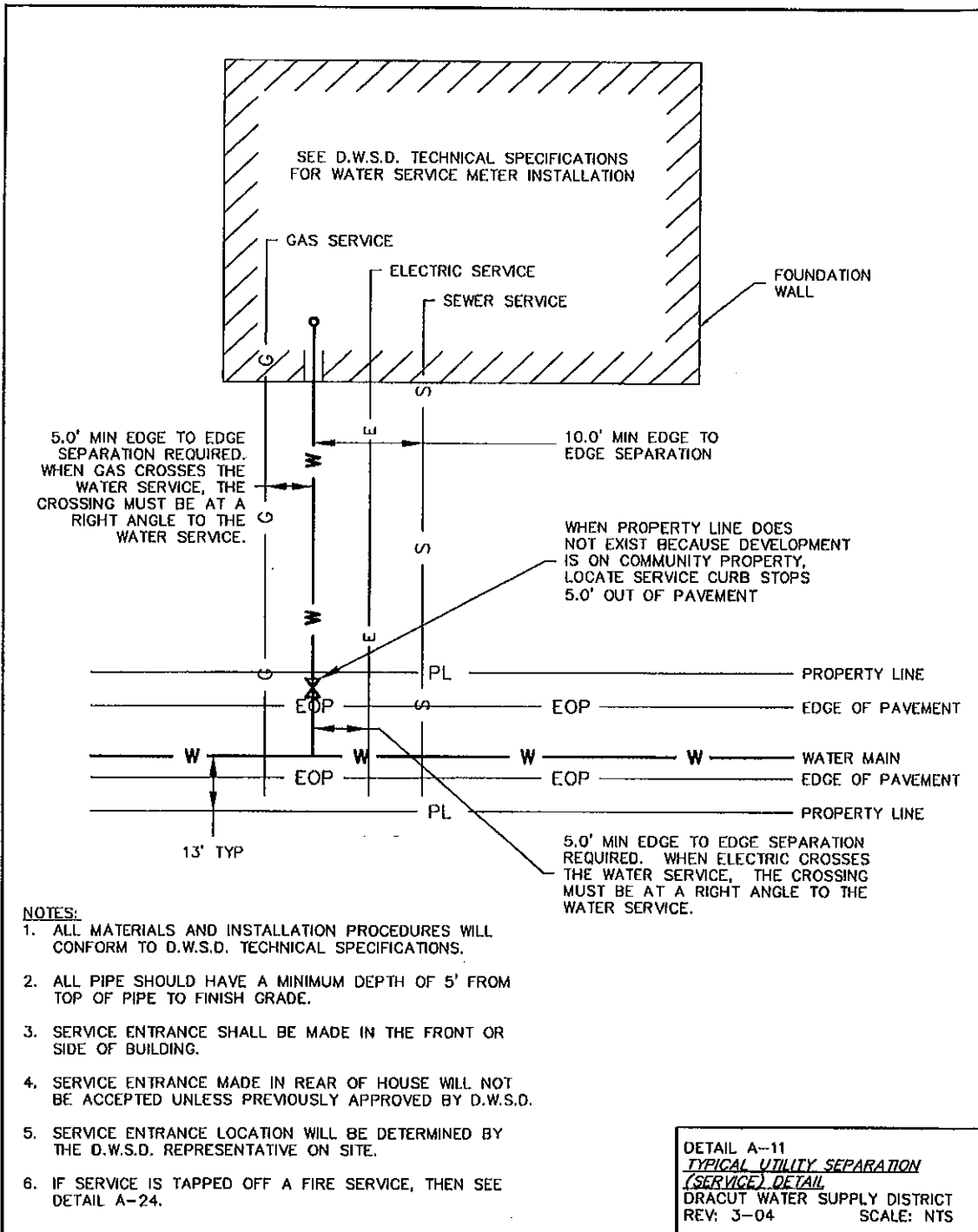


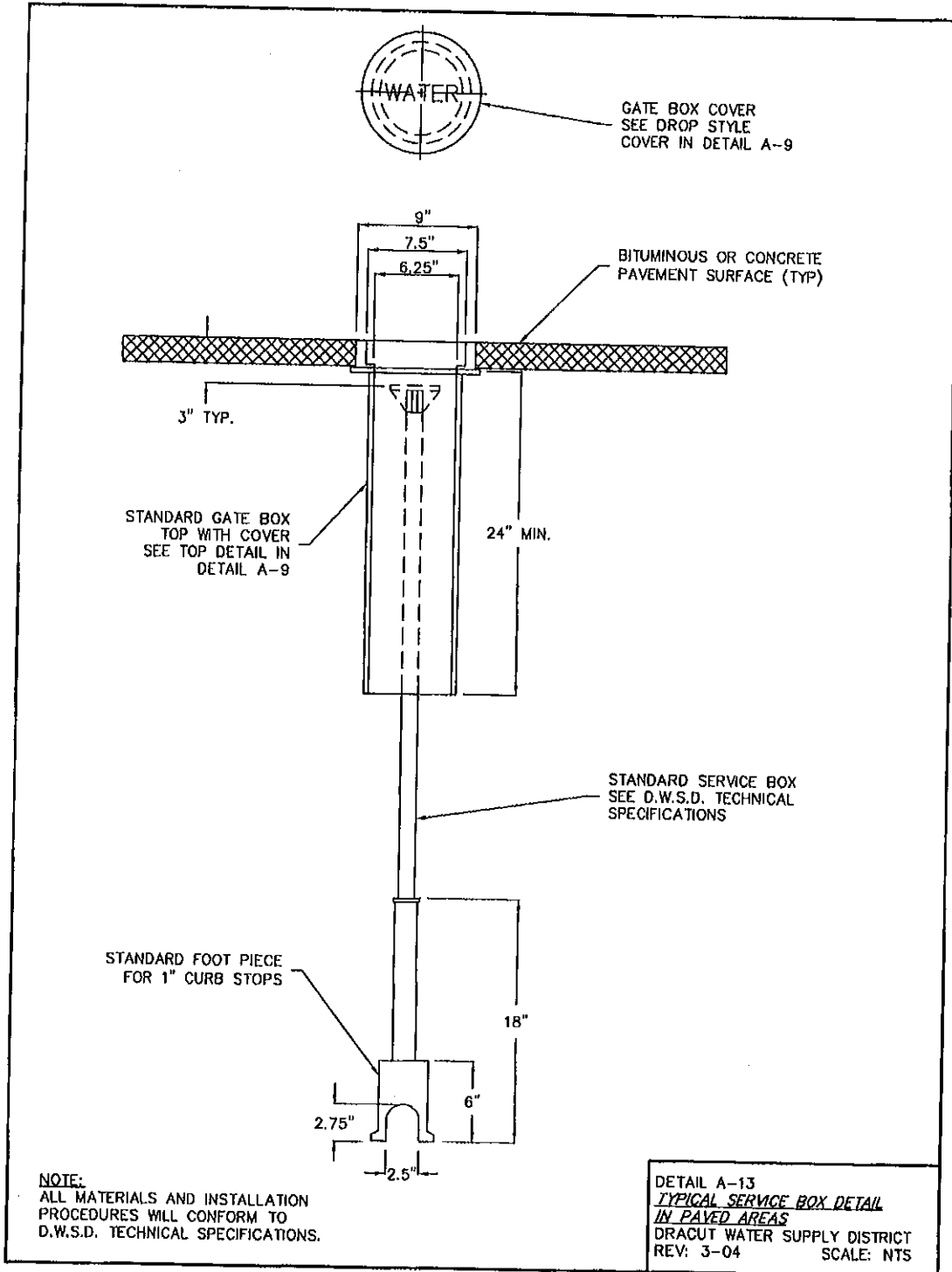
**NOTES:**

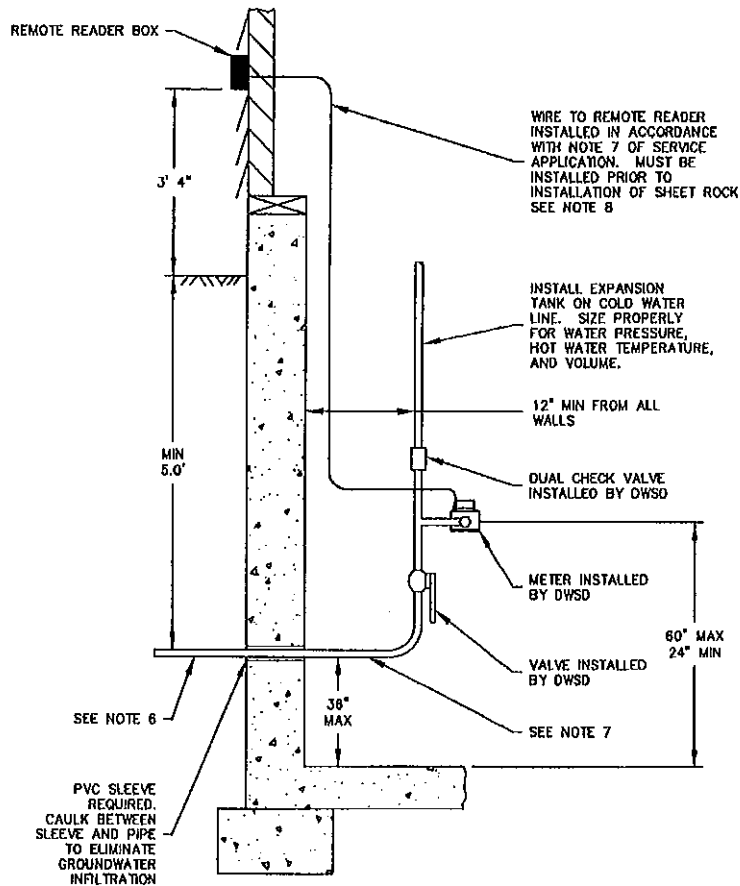
1. ALL MATERIAL AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTHS OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. 3/4" S.S. RODS SHALL BE USED IN CONJUNCTION WITH REQUIRED S.S. NUTS. RODS ARE TO BE ATTACHED TO FITTINGS WITH EITHER STAR BOLTS OR DUC LUGS.  
 10" FITTING OR SMALLER = (2) 3/4" S.S. RODS & ASSOC. HARDWARE.  
 12" FITTING OR LARGER = (4) 3/4" S.S. RODS & ASSOC. HARDWARE.
4. WHEN DISTANCE FROM WATER MAIN TO HYDRANT IS MORE THAN 10' SUBSTITUTE MEGALUGS (OR GRIP RINGS) IN LIEU OF THREADED RODS.
5. MIN 3'x3'x3' PRE CAST CONCRETE THRUST BLOCK MAY BE USED WITH D.W.S.D. APPROVAL OR CONCRETE THRUST BLOCK POURED AGAINST UNDISTURBED EARTH - SIZE TO BE BASED ON SIZE OF FITTING AND PRESSURE IN WATER MAIN. SEE DETAIL A-7.

DETAIL A-10  
 TYPICAL HYDRANT INSTALLATION  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS





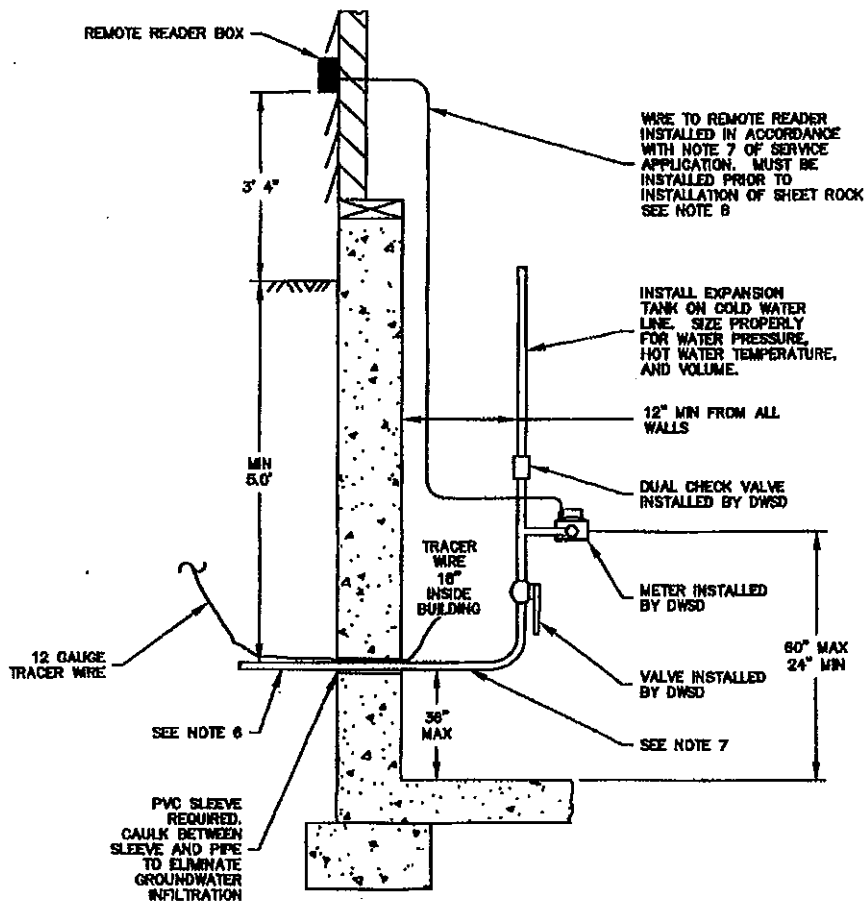




**NOTES:**

1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. SPECIFICATIONS.
2. SEE STEP 7 ON SERVICE APPLICATION.
3. INSTALLATION UNDER FOOTING OR THROUGH FOUNDATION WALL AT OWNER'S EXPENSE.
4. OWNER MUST PROVIDE A CLEAN, DRY ACCESSIBLE AND WARM (CONTINUALLY ABOVE 45°F) LOCATION FOR THE WATER METER.
5. OUTSIDE READER MUST BE LOCATED ADJACENT TO DRIVEWAY.
6. SERVICE LINE FROM STREET, SIZE & MATERIALS TO BE APPROVED BY D.W.S.D. ONLY TYPE "K" COPPER TUBING OR 200 PSIG RATED CTS POLYETHYLENE TUBING ARE ACCEPTABLE FOR SERVICE LINES. SAND TO BE USED FOR BACK FILL FOR A MINIMUM OF 6" ABOVE AND BELOW THE SERVICE LINE.
7. PROVIDE A MINIMUM OF 24" OF STRAIGHT COPPER AT SERVICE ENTRANCE INSIDE OF BUILDING TO ALLOW FOR INSTALLATION OF D.W.S.D. METER AND VALVES.
8. METER WIRE TO BE 22 AWG 3-STRAND (BLACK/RED/GREEN COLOR CODE) SOLID STRAND CABLE AVAILABLE FROM:  
ACT SERVICES, INC.  
916 PLEASANT STREET  
SUITE 3A  
NORWOOD, MA 02062  
TEL. (781) 255-0978

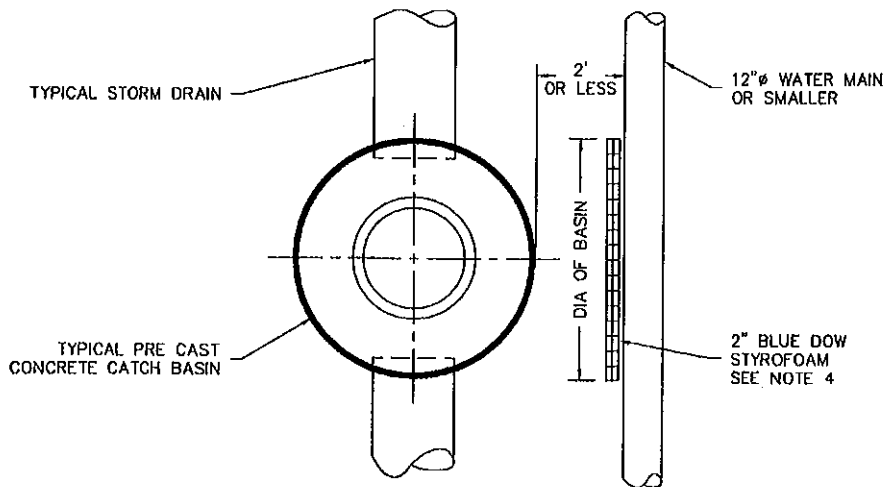
DETAIL A-14  
**TYPICAL SERVICE METER  
 INSTALLATION**  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS



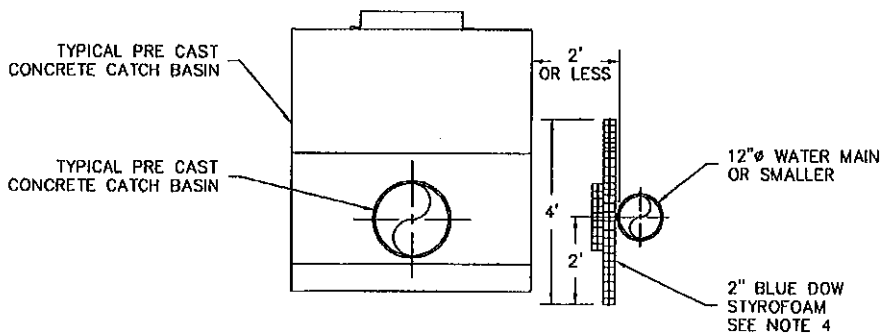
**NOTES:**

1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. SPECIFICATIONS.
2. SEE STEP 7 ON SERVICE APPLICATION.
3. INSTALLATION UNDER FOOTING OR THROUGH FOUNDATION WALL AT OWNER'S EXPENSE.
4. OWNER MUST PROVIDE A CLEAN, DRY ACCESSIBLE AND WARM (CONTINUALLY ABOVE 45°F) LOCATION FOR THE WATER METER.
5. OUTSIDE READER MUST BE LOCATED ADJACENT TO DRIVEWAY.
6. SERVICE LINE FROM STREET, SIZE & MATERIALS TO BE APPROVED BY D.W.S.D. ONLY 200 PSIG RATED CTS POLYETHYLENE TUBING IS ACCEPTABLE FOR P.E. SERVICE LINES. SAND TO BE USED FOR BACK FILL FOR A MINIMUM OF 6" ABOVE AND BELOW THE SERVICE LINE.
7. PROVIDE A MINIMUM OF 24" OF STRAIGHT COPPER AT SERVICE ENTRANCE INSIDE OF BUILDING TO ALLOW FOR INSTALLATION OF D.W.S.D. METER AND VALVES.
8. METER WIRE TO BE 22 AWG 3-STRAND (BLACK/RED/GREEN COLOR CODE) SOLID STRAND CABLE AVAILABLE FROM:  
 AOT SERVICES, INC.  
 9718 PLEASANT STREET  
 SUITE 3A  
 HDRWOOD, MA 02082  
 TEL. (781) 255-0978

**DETAIL A-14A**  
**TYPICAL SERVICE METER**  
**INSTALLATION**  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-11                      SCALE: NTS



**PLAN VIEW**



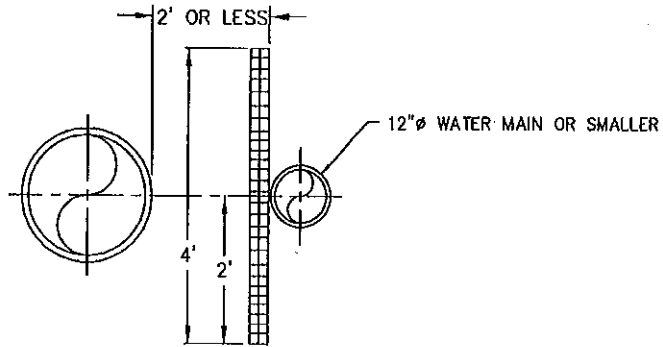
**ELEVATION VIEW**

**NOTES:**

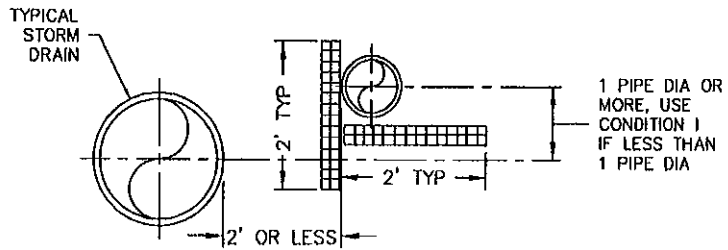
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. D.W.S.D. RESERVES THE RIGHT TO MODIFY INSULATION REQUIREMENTS AS NECESSARY BASED ON FIELD CONDITIONS, ETC.
4. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH 1' PIECE OF INSULATION CENTERED OVER SEAM.

DETAIL A-16  
**TYPICAL CATCH BASIN**  
**INSULATION DETAIL**  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS

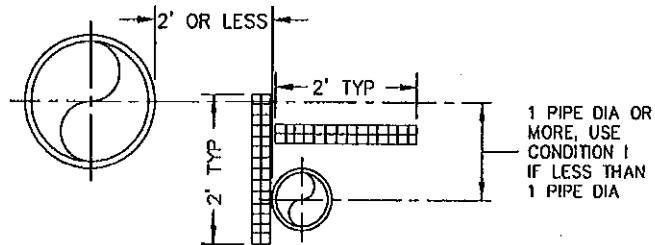
CONDITION I




CONDITION II



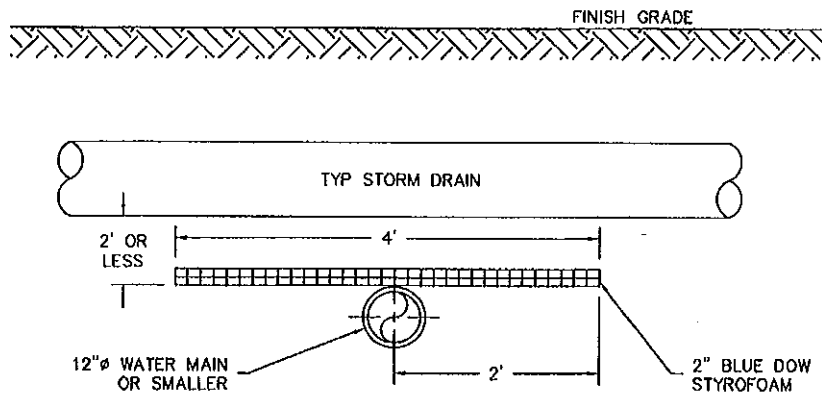
CONDITION III



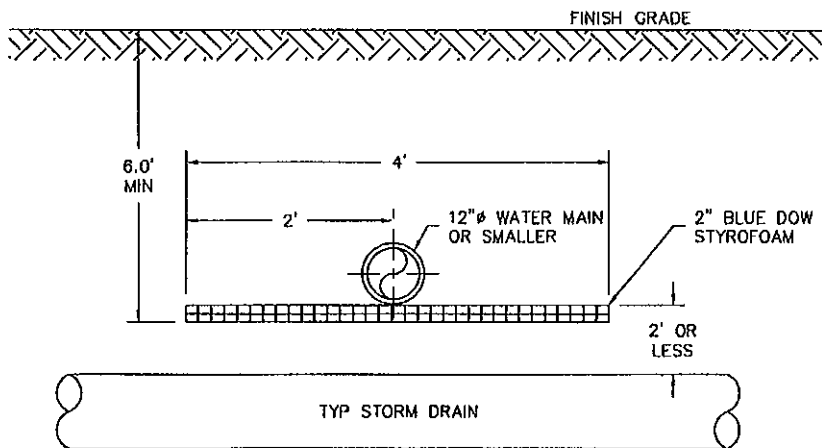
NOTES:

1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. D.W.S.D. RESERVES THE RIGHT TO MODIFY INSULATION REQUIREMENTS AS NECESSARY BASED ON FIELD CONDITIONS, ETC.
4. INSULATION TO BE RUN HORIZONTALLY AS LONG AS CONDITIONS I, II, OR III ABOVE EXIST. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH 1' PIECE OF INSULATION CENTERED OVER SEAM.
5.  - 1.5" (MIN) BLUE DOW STYROFOAM

DETAIL A-17  
STORM DRAIN / WATER MAIN  
PARALLEL RUNS - ELEVATION VIEW  
DRACUT WATER SUPPLY DISTRICT  
REV: 3-04 SCALE: NTS



**CONDITION I**

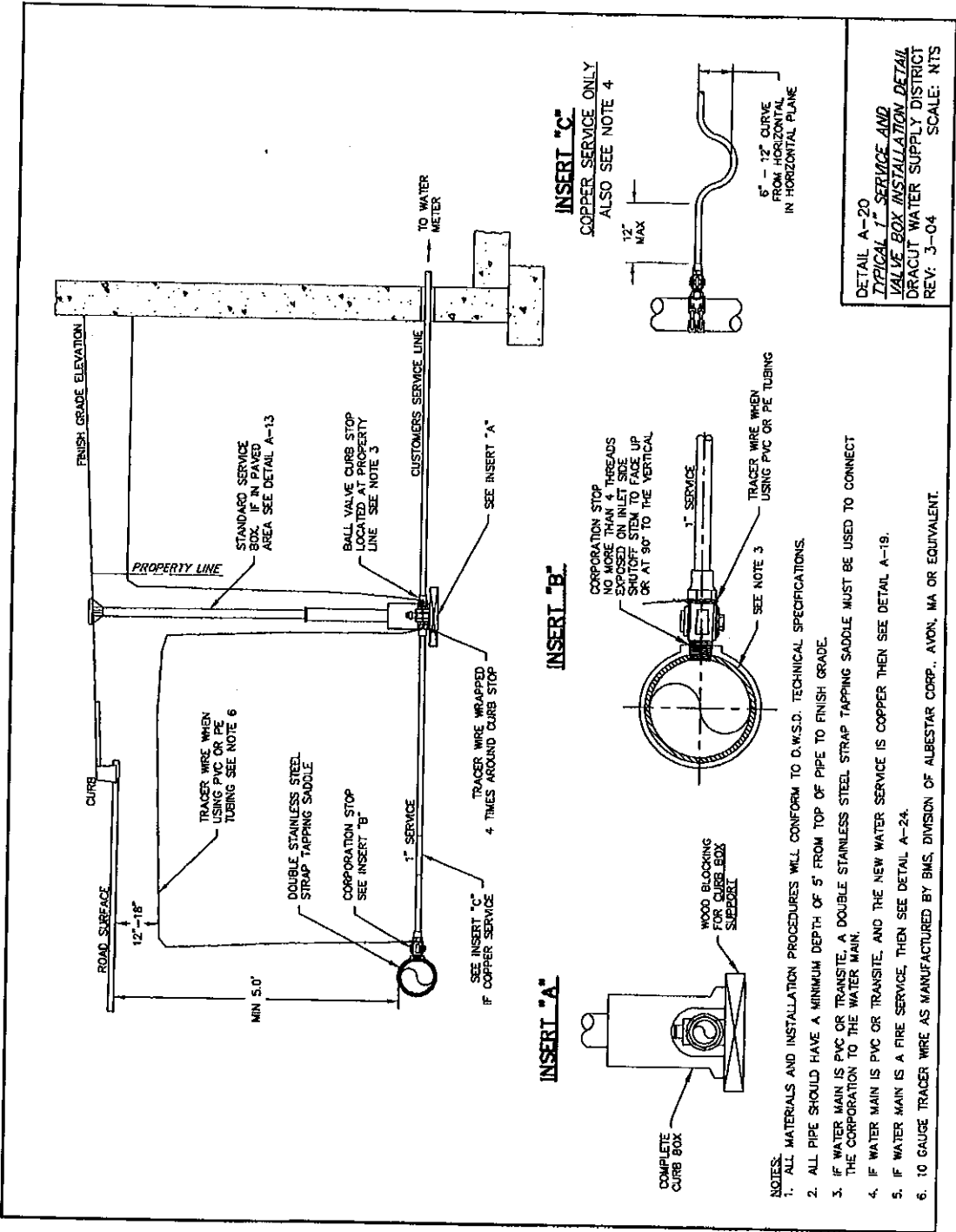


**CONDITION II**

**NOTES:**

1. DRACUT WATER SUPPLY DISTRICT RESERVES THE RIGHT TO MODIFY INSULATION REQUIREMENTS AS NECESSARY BASED ON FIELD CONDITIONS, ETC.
2. THE LENGTH OR WIDTH OF INSULATION SHALL EXTEND 1 STORM DRAIN PIPE DIAMETER BEYOND THE EDGE OF STORM DRAIN PIPE IN EACH DIRECTION OR A MINIMUM OF 2' BEYOND THE CENTERLINE OF THE STORM DRAIN PIPE, WHICHEVER IS GREATER.
3. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH A 1' PIECE OF INSULATION CENTERED OVER SEAM.

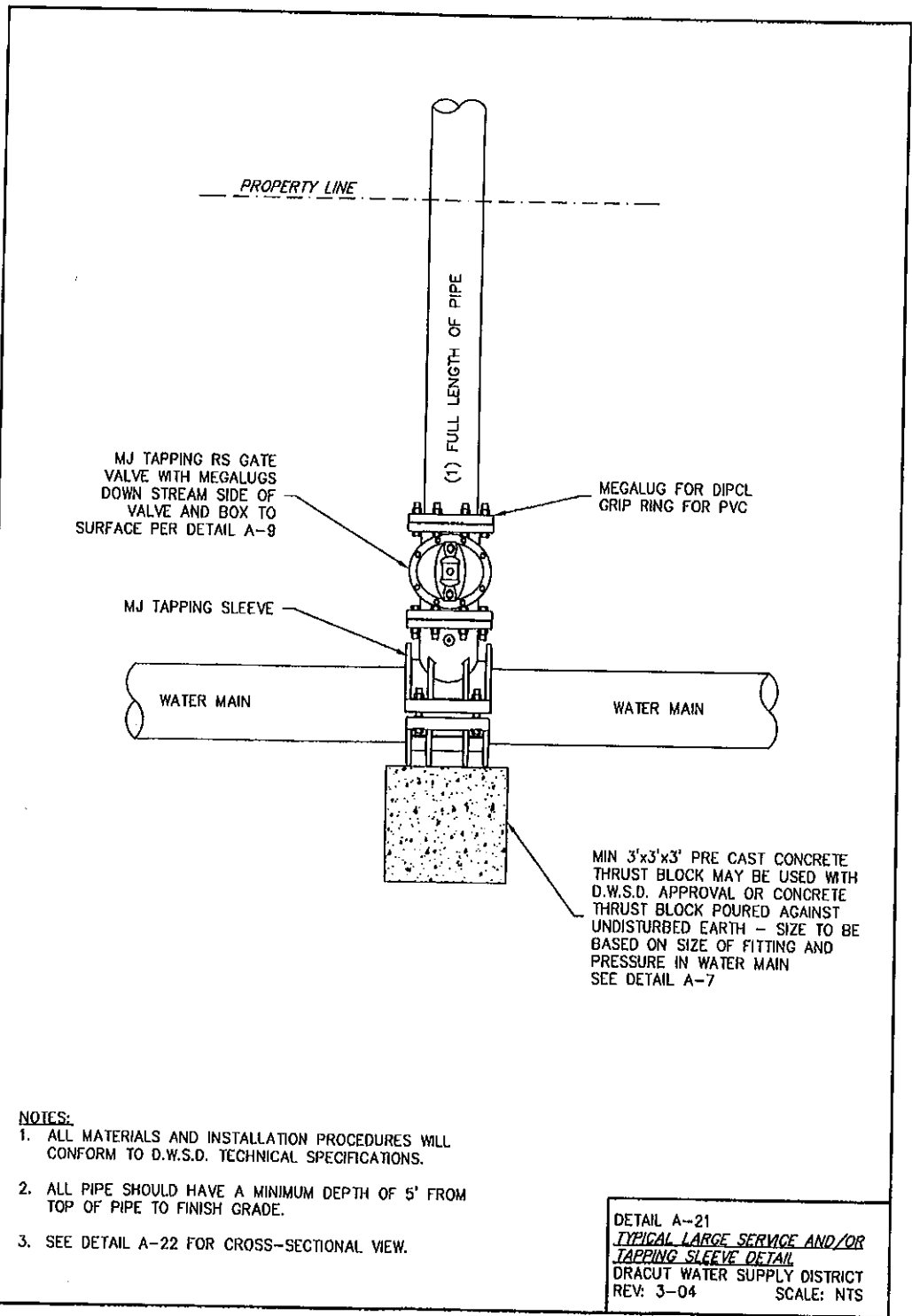
DETAIL A-18  
 STORM DRAIN / WATER MAIN  
 INTERSECTING RUNS - ELEV. VIEW  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS



DETAIL A-20  
 TYPICAL 1" SERVICE AND  
 VALVE BOX INSTALLATION DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV. 3-04 SCALE: NTS

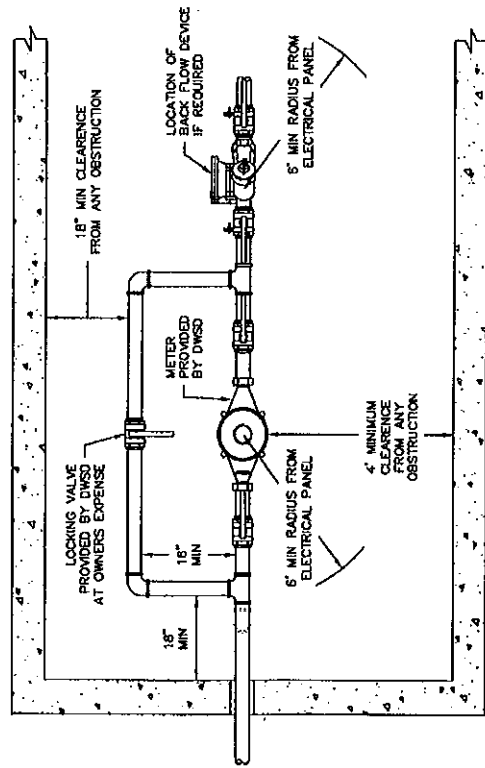
- NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
  2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
  3. IF WATER MAIN IS PVC OR TRANSITE, A DOUBLE STAINLESS STEEL STRAP TAPPING SADDLE MUST BE USED TO CONNECT THE CORPORATION TO THE WATER MAIN.
  4. IF WATER MAIN IS PVC OR TRANSITE, AND THE NEW WATER SERVICE IS COPPER THEN SEE DETAIL A-19.
  5. IF WATER MAIN IS A FIRE SERVICE, THEN SEE DETAIL A-24.
  6. 10 GAUGE TRACER WIRE AS MANUFACTURED BY BMS, DIVISION OF ALBESTAR CORP., AVON, MA OR EQUIVALENT.



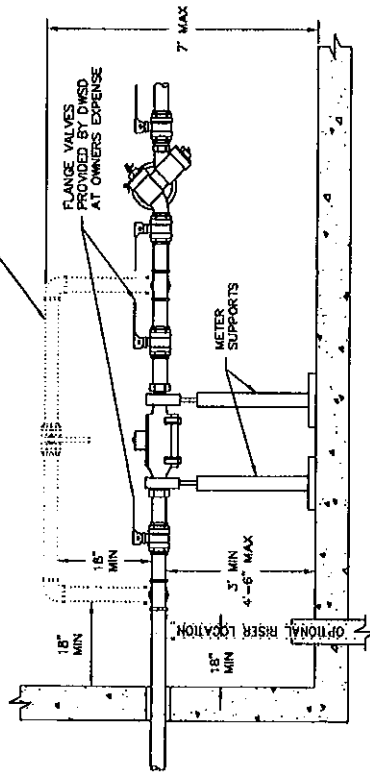


- NOTES:**
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
  2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
  3. SEE DETAIL A-22 FOR CROSS-SECTIONAL VIEW.

DETAIL A--21  
 TYPICAL LARGE SERVICE AND/OR  
 TAPPING SLEEVE DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS



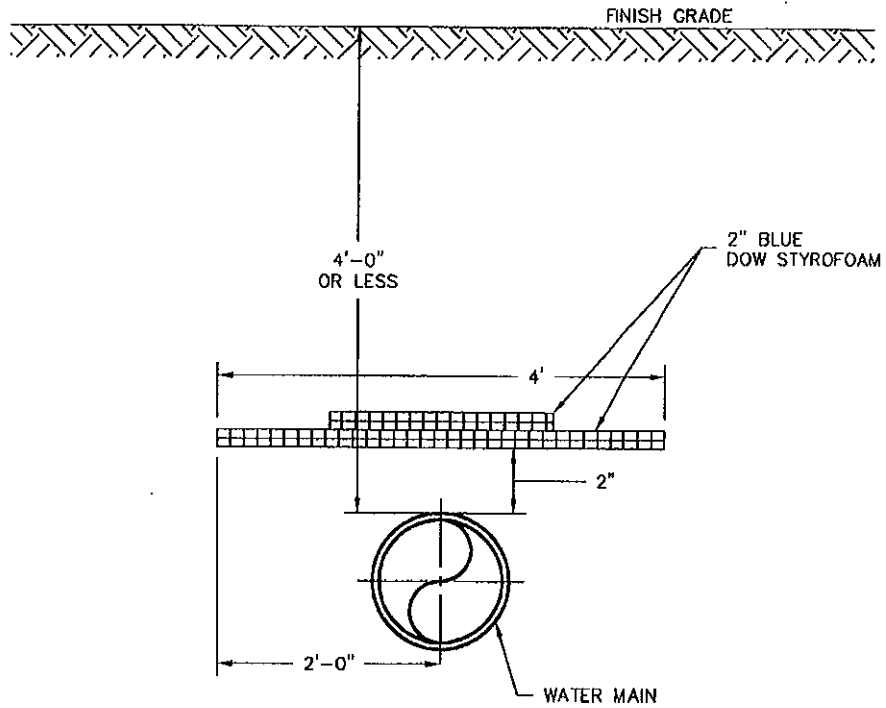
**TOP VIEW**



**SIDE VIEW**

- NOTES:**
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
  2. PRV WHEN NECESSARY WILL BE INSTALLED AND PURCHASED BY OWNER OR CONTRACTOR.
  3. 1 1/2" METER = 13" LAYING LENGTH.
  4. 2" METER = 17" LAYING LENGTH.
  5. SEE DETAIL A-27 FOR COMBINED FIRE AND DOMESTIC SERVICE ENTRANCE DETAIL.
  6. ANY ELECTRICAL PANEL MUST MAINTAIN A 6" MINIMUM RADIUS FROM METER AND BACK FLOW.

DETAIL A-25  
 1 1/2" THROUGH 2" SERVICE  
 ENTRANCE DETAIL  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04  
 SCALE: NTS



**NOTES:**

1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO D.W.S.D. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. D.W.S.D. RESERVES THE RIGHT TO MODIFY INSULATION REQUIREMENTS AS NECESSARY BASED ON FIELD CONDITIONS, ETC.
4. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH 2" PIECE OF INSULATION CENTERED OVER SEAM.

DETAIL A-31  
 TYPICAL INSULATION DETAIL FOR  
 LESS THAN 4'-0" OF COVER  
 DRACUT WATER SUPPLY DISTRICT  
 REV: 3-04 SCALE: NTS