

SECTION 02235 DIRECTIONAL BORING

A. General

The pipe shall be Ductile Iron pipe with T/R Flex, or superlock, or approved equal restrained joint system with Tyton™ joint gasket and cement lining as described and manufactured in accordance with ANSI/AWWA C151/A21.51. Gaskets must properly match bell configuration. Where radius of curvature is less than that achieved by ductile iron pipe, pipe may be HDPE, DR 11, when approved, and in accordance with AWWA C906. HDPE, DR 9 may be required when static pressures exceed 150 psi. Other pipe materials and methods may be considered as specific situations require at the direction and approval of the VCU Distribution Manager.

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work.

The Contractor shall be prepared to attend all meetings and provide any necessary data, reports, information, details, and construction schedules as requested by the Department Representative, including, but not limited to the Manufacturer's Certificate of Compliance certifying compliance with the referenced specifications and standards, certified copies of reports of factory tests, and details of equipment to be used and drilling fluid to be used.

All work shall be done in a careful, workmanlike manner to the satisfaction of the Department Representative and Owner.

B. Pipe Handling and Inspection

Pipe handling and installation shall be in accordance with manufacturers' recommendations and appropriate AWWA standards and manuals of practice, including M 41 & M 55.

All materials furnished by the Contractor shall be delivered and distributed at the site by the Contractor. All pipe, fittings, valves, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

Pipe shall be handled in such a way that the coating and lining will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by the Contractor at its expense in a manner satisfactory to the Department Representative.

Proper implements, tools, and facilities satisfactory to the Department Representative shall be provided and used by the Contractor for the safe and convenient performance of the work.

If damage occurs to any pipe, fitting, valve, or water main accessories in handling or in installation, the damage shall be immediately brought to the VCU Distribution Manager's attention. The VCU Distribution Manager may reject any of the damaged items.

All lumps, blisters and excess coating shall be removed from the bell-and-spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire brushed and wiped clean, dry and free from oil and grease before the pipe is laid.

C. Pipe Installation

At times when pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Department Representative.

The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or coatings and so as to leave a smooth end at right angles to the axis of the pipe. Flame cutting of pipe by means of an oxyacetylene torch shall not be allowed.

Whenever it is necessary to join ductile iron pipe with pipe of dissimilar metal, a method of insulating against the passage of electrical current shall be provided and shall be approved by the VCU Distribution Manager.

There is only one nominal dimension of the spigot outside diameter for each size of push-on joint pipe. Similar dimensions of the lead joint bell-and-spigot pipe may vary with the class of pipe for each size in existing lines. Therefore, care should be taken that the outside diameter of the existing line is the same as the outside diameter of the push-on joint pipe being installed; otherwise a special adapter to join the two lines may be necessary.

All pipe joints shall be thrust restrained using T/R Flex pipe, or superlock, or approved equal.

All ductile iron pipe installed by directional boring shall be double polyethylene encased. Each piece of pipe shall be encased with an 8-mil linear low-density polyethylene film first and a 4-mil high-density, cross-laminated polyethylene film over the 8-mil polyethylene.

Where HDPE or other plastic pipe is installed in the open cut condition it shall be installed in compacted select fill material. All HDPE or plastic pipe installations shall have two continuous different colored #8 copper tracer wires. The continuity of these wires shall be field verified prior to project final acceptance.

D. Surface and Subsurface Conditions

The contractor shall verify the location of all known and unknown utilities and structures by test pitting prior to any boring. These utilities and structures include underground utilities such as, but not limited to storm drains, electric cables, water mains, sewer lines,

septic systems, gas lines, telephone lines, fiber optic lines, cable television lines, wells, and field drain tiles. These utilities and structure also include above ground utilities such as, but not limited to electric and telephone poles, buildings, trees, and existing road signs.

E. Experience

The Contractor shall demonstrate experience and expertise in trenchless excavation methods by providing a list of six utility references for whom similar work has been performed prior to commencing any work. These references shall include a name and telephone number for contact so Owner/Department Representative may verify claims.

The Contractor shall also provide documentation showing successful completion of at least 50,000 lineal feet of directional boring or shall obtain the services of an experienced directional boring subcontractor to supervise the installation prior to commencing any work. Conventional trenching shall not to be considered as applicable experience.

All supervisory personnel shall be adequately trained and shall have at least four years' experience in directional boring. The Contractor shall also submit the names and resumes of all supervisory field personnel for review by the Department Representative prior to commencing any work.

F. Directional Boring System Requirements

The system shall be remotely steerable and permit electronic monitoring of tunnel depth and location. The system shall be able to control the depth and direction of the pipe and must be accurate to a window of ± 2 inches.

The system will utilize a fluid-cutting process, using a drilling fluid such as bentonite and/or a polymer. This fluid shall be totally inert and contain no risk to the environment.

The drilling fluid shall remain in the tunnel to increase the stability of the tunnel and to provide a lubricant to reduce frictional drag when the pipe is installed.

The spoils shall be recovered by use of a vacuum system mounted on a vehicle for removal of the spoils. Spoils are not to be discharged into sewers or storm drains. The Contractor is responsible for disposal of all spoil material in accordance with all federal, state and local requirements.

G. Safety Requirements

Mechanical, pneumatic or water-jetting methods shall not to be acceptable due to the risk of surface subsidence and damage.

Upon completion of boring and pipe installation, the Contractor shall remove all spoils from all starting and termination pits. The pits shall to be restored to their original condition.

Because directional boring may to be performed while existing buried electrical cable is energized, the following safety requirements shall to be met:

1. All drilling equipment must have a permanent, inherent alarm system capable of detecting an electrical current. The ground system shall to be equipped with an audible alarm to warn the operator when the drill head nears electrified cable within a safe operating distance.
2. All crews shall to be provided with grounded safety mats, heavy gauge ground cables with connectors, hot boots and gloves.
3. All supervisor personnel shall to be adequately trained and have direct supervisory experience in directional boring. Refer to paragraph 3.3.C.

END OF SECTION