III. TECHNICAL SPECIFICATIONS

DIVISION 56

BORED PIPE

PART I - GENERAL

56.01 SCOPE: The Contractor shall furnish all labor, material, equipment and supplies and shall perform all work necessary for the complete installation of bored pipe and associated items. The bored pipe shall be constructed to the alignment and inverts shown on the construction plans as well as size and type shown or specified.

56.02 QUALITY ASSURANCE:

A. WORKMEN QUALIFICATIONS:

1. Use only personnel thoroughly trained and experienced in the skills required. The field supervisor of boring operations and the boring machine operator shall have not less than 12 months experience in the operations of the equipment being used.

2. Welds shall be made only by welders, tackers and welding operators who have been previously qualified by tests as prescribed **by** the Structural Welding Society to perform the type of work required. Show proof of certification when requested by the Engineer.

B. REQUIREMENTS OF RAILROAD AGENCIES:

1. Materials and methods of construction used on railroad company property shall be subject to the approval of the railroad company and the Contractor shall at all times conduct his work and operations fully within the railroad company's rules, regulations and requirements. The contractor must ascertain from the railroad company its rules, regulations and requirements, and what, if any, delays may be encountered. If required by the railroad company, the Contractor must submit for approval specific details of the methods of construction he intends to utilize together with any sketches or drawings.

2. See Division 57 - Work on Railroad Property, for additional requirements.

C. SOURCE QUALITY CONTROL:

1. Inspection and certification by Manufacturer:

a. Ductile Iron Pipe: Per Division 34.

b. Steel Pipe: The manufacturer of the steel pipe shall furnish a sworn statement that the inspection and all of the specified tests have been made on the steel pipe as required by ASTM A-139 and the results thereof comply with the requirements of that standard.

D. REFERENCE STANDARDS:

1. American Railway Engineering Association:

a. Specifications, Part 5; Pipelines - Crossings Under Tracks or Located on Railroad Property - For Flammable and Nonflammable Substances, 1972 (included herein).

2. American Society for Testing and Materials:

a. ASTM A 120, Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.

b. ASTM A 123, Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressured and Forged Steel Shapes, Plates, Bars and Strips.

c. ASTM A 139, Electric-Fusion (Arc)-Welded Steel Pipe (Sizes 4 inches and over).

3. American Welding Society: AWS D1.1 Structural Welding Code.

56.03 SUBMITTALS:

A. Shop Drawings and Product Data: Furnish completely dimensioned shop drawings, catalog cuts or other data as required to provide a complete description of products to be installed.

B. Certificates: Certified records or reports of results of shop tests, such records or reports to contain a sworn statement that shop tests have been made as specified.

56.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

Transport handle and store materials and products specified herein in a manner recommended by the respective manufacturers of such to prevent damage and defects.

56.05 JOB CONDITIONS:

A. Scheduling: Contractor shall not start work within railroad right-of-way until he has received authorization from the railroad company to do so. Boring operations, once started, shall be continuous until completed.

B. Environmental Requirements: As specified in Division 34.

C. Protection: As specified in Division 34 and such added requirements included herein.

1. Adequately support and protect utilities and facilities that are encountered or may be affected by the work.

2. If the railroad company requires the installation of track supports, the Contractor shall install such supports. If the supports are not furnished by the railroad company, the Contractor shall be responsible for fabricating the track supports in accordance with the requirements of the Railroad Company's Chief Engineer. It should be noted, however, that railroad companies usually require that any work involving rails, ties, or other track material be performed by their own forces. The cost of such work, even though carried out by the railroad company, is at the expense of the Contractor.

3. The Contractor must observe all necessary and appropriate safety precautions when working on railroad right-of-way or property. To this end, the Contractor shall provide a qualified watchman to warn workmen of the approach of any train or other moving equipment upon the tracks of the railroad, and to keep all workmen or other persons, equipment and materials from the tracks including any power, communication, and signal wires, so that there will be no contacts with trains, rolling equipment, or wires.

4. Whenever equipment or personnel are required to work closer than 15 feet to the centerline of an adjacent track, the railroad company will consider that track as being obstructed or fouled. If required to work closer than 15 feet to a track notify the railroad company.

5. Blasting will not be permitted under or near railroad tracks and facilities.

6. All excavations shall be sheeted, shored and braced as required to prevent

subsurface subsidence.

7. Boring pits shall be kept dewatered, and pumps shall be attended on a 24-hour basis, if conditions so require. Close observation shall be maintained to detect any settlement or displacement of railroad embankment, track, and facilities during dewatering operations. Dewater into a sediment trap and comply with applicable environmental protection criteria specified elsewhere in these Contract Documents.

8. Maintain the air in the pipe, when hand excavating in a condition suitable for the health of workmen at all times.

PART II - PRODUCTS

56.06 ENCASING CONDUIT:

A. Steel Pipe: ASTM A 139, Grade B

1. Minimum diameter and wall thickness as shown on the Drawings.

56.07 UTILITY MAIN PIPE:

A. Ductile Iron Pipe: See Division 34.

56.08 MISCELLANEOUS MATERIAL:

A. Sand:

1. Virginia Department of Transportation, Road and Bridge Specifications, Section 202, Fine Aggregate.

B. Brick: Commercially manufactured brick made from clay or shale and burned, meeting requirements of ASTM 32, Grade MS.

C. Mortar:

1. Portland Cement: ASTM C50, Type 1

2. Sand: Clear, Sharp, graded from fine to coarse, ASTM C-144.

3. Water: Clean and potable.

4. Mixture: One (1) part cement, two (2) parts sand.

56.09 CONTRACTOR OPTIONS IN PRODUCTS:

The Contractor may install a larger diameter encasing conduit than is shown on the Drawings, provided that the Contractor has secured the prior written approval of the railroad company or other agencies having jurisdiction. If the Contractor elects to install a larger diameter encasing conduit than is shown on the drawings, all necessary clearances under the railroad tracks, roadways, pipe lines or other structures shall be maintained. Substitution of a larger diameter encasing conduit will be made without additional compensation over the price bid.

PART III - EXECUTION

56.10 GENERAL:

The Drawings indicate the smallest diameter casing which is acceptable for the installations. The Contractor may elect to use a larger diameter casing. If the Contractor elects to utilize the casing diameter called for on the Drawings, and the installation must be abandoned due to the non-ability of the Contractor to hand mine in the casing, the installation will be abandoned at the Contractor's expense.

56.11 INSPECTION:

A. Inspect Materials and Products before installing in conformance with the inspection requirements of the appropriate referenced standard.

B. Remove rejected Materials and Products from the Project Site.

56.12 PREPARATION:

A. As specified in Division 34.

56.13 PERFORMANCE:

A. Excavation and Backfill: As specified in Division 34 and such added requirements included herein.

1. Cut the end of the boring pit away from the boring face perpendicular to the axis of the boring operation to provide a bearing surface for the back stop and blocking.

2. Construct the back stop of heavy timber or steel rails capable of withstanding the jacking force during the boring operation.

3. Should the Contractor excavate below the required subgrade for the **utility** main, he will be required to backfill the area below the subgrade with aggregate backfill at his own expense and at no additional cost to the City.

4. Sheet and shore the boring pit as required. Provide all required dewatering to maintain a dry excavation.

B. Boring:

1. Encase **utility main** pipe crossing under railroad track in a steel encasing pipe. Install all steel casing pipes by the boring method. If the Contractor wishes to utilize another method of installing the casing pipe the alternate method of installation must be approved by the Engineer and the Chief Engineer of the railroad company in writing. No additional payment over the bid price for each particular crossing will be made.

2. Install the casing pipe true to line grade without hand mining ahead of the pipe. Bored hole to be essentially the same as the outside diameter of the casing pipe, and over-cutting by the cutting head is not to exceed the outside diameter of the casing pipe by more than one-half inch. If voids should develop, or if the bored hole diameter is greater than the outside diameter of the casing pipe by more than approximately one-inch, employ grouting or other methods approved by the railroad company to fill such voids, at the Contractor's expense.

3. The front of the pipe shall be provided with a mechanical arrangement or device that will positively prevent the auger and cutting head from leading the pipe, so that there will be no unsupported excavation ahead of the pipe. Design the equipment such that the auger and mechanical stop is removable from within the pipe in the event an obstruction is encountered. Arrange the face of the cutting head to provide reasonable obstruction to the free flow of soft or poor material.

4. The use of water or liquids to facilitate casing emplacement and spoil removal is prohibited.

5. If field conditions so require, the boring operation shall be continued without interruption, except to install new lengths of casing pipe. Join the lengths of casing pipe by welding. Completely weld the joints around the circumference of the pipe.

C. Installation and Testing Carrier Pipe:

1. After completion of the casing pipe, the harnessed utility main shall be installed by an approved method.
2. Care shall be taken to prevent undue disturbances of the joints and to prevent damage to the liner plate.

3. The **utility main** shall be laid on the line and grade shown on the Plans.

4. The Contractor shall be responsible for all bad joints including all joints disturbed by placing of the utility main in the casing.

5. The Contractor shall repair, replace or take whatever action is deemed necessary by the Engineer to correct all disturbed joints at no additional cost to the City.

D. Closing Casing Pipe:

1. After the utility main is installed in the encasing pipe construct brick and mortar bulkheads as shown on the plans and as specified herein.

2. Prior to the closing operation, the utility main shall be properly and sufficiently secured against all movement which would disturb joints.

a. The Contractor shall be responsible for all bad joints.

b. The Contractor shall repair, replace, or take whatever action is deemed necessary by the Engineer to correct all disturbed joints at no additional expense to the City.

E. Cleanup: **Disturbed work area** shall be restored to condition equal to or better than that which existed prior to the start of the work.

56.14 METHOD OF MEASUREMENT AND BASIS OF PAYMENT:

This work will be measured and paid for on the unit basis noted below:

	Unit Basis
Boring/jacking (including all preparation and all necessary pre-testing restoration, and security protection:	Each (plan quantity)
Casing pipe (complete in place, jacked, bored, tunnelled, including necessary grouting, dequantity) watering, or other related work);	Line Foot (plan)
Carrier pipe (complete in place to the designated points beyond the casing pipe, including any necessary blocking wedges and or skids, sealing, the furnishing and installation of a leak detector; or other related work).	Lineal Foot (in place)