

SECTION 02910**BORING AND/OR JACKING PIPE****02910.01 GENERAL****A. Description**

Boring and/or jacking pipe shall include, but not necessarily be limited to, furnishing and installing carrier pipe without a casing pipe, or casing pipe beneath railways, roadways, or other locations indicated on the Plans and in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Structure excavation; Section 02220.
2. Trench excavation, backfill, and compaction; Section 02250.
3. Excavation support; Section 02400.
4. Dewatering; Section 02512.
5. Storm drain installation; Section 02520.
6. Water main installation; Section 02551.
7. Sanitary sewer installation; Section 02561.
8. Sanitary sewer force main installation; Section 02563.

C. Quality Assurance

1. Materials

a. General

The Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents. When specific materials test are required by the referenced standards and specifications, the Engineer will have the option of requiring that any or all of these test be performed for materials furnished for a specific project. When testing is required, it will be specified in the "Special Provisions".

b. Steel Pipe

Steel pipe shall be free from any visible defects or surface imperfections such as kinks, scars, or bends which may impair the performance or life of the pipe. Defects shall be considered injurious when the depth of the defect is greater than 12.5% of the nominal wall thickness. The pipe shall be

substantially round. The outside circumference of the pipe shall not vary more than $\pm 1\%$ from the nominal outside circumference based upon the diameter specified. The pipe shall not deviate by more than 1/8 inch from a 10 foot long straightedge held against the pipe. Defective or damaged coatings may be repaired in accordance with the coating manufacturer's written recommendations.

c. Reinforced Concrete Pipe

Reinforced concrete pipe shall be free from fractures or cracks that extend through the wall of the pipe; surface defects indicating honeycomb or open texture; defects that indicate imperfect proportioning, mixing, and molding; damaged or cracked ends where such damage would prevent making a satisfactory joint; or any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more.

Materials and finished product testing shall be in accordance with AASHTO M 170 as detailed in AASHTO T 33, and as specified herein. Acceptability of pipe through 54 inch diameter and classes produced in accordance with design tables found in AASHTO M 170, or the modified and special designs permitted therein, shall be determined by results of a three edge bearing test for a load to produce a 0.01 inch crack. If the load exceeds the requirements before the 0.01 inch crack is reached, the load may be relieved and the pipe accepted for use. For pipe 60 inch diameter and larger, acceptance will be based on materials tests specified in AASHTO M 170.

2. Field Tests

a. General

No testing will be conducted on bored and/or jacked casing pipe, installed in accordance with this Section, however the work will be visually inspected after installation by the Engineer prior to the installation of the carrier pipe.

b. Bored and/or Jacked Carrier and Casing Pipe

- 1) Bored or jacked carrier pipe shall be installed to the line and grade indicated on the Plans to within a tolerance of 2 inches.
- 2) Bored or jacked casing pipe shall be installed so as to provide a minimum concrete cradle thickness of 4 inches for the carrier pipe as indicated in the Contract Documents.

c. Carrier Pipe

Carrier pipe will be inspected and/or tested in accordance with the applicable section or sections under which the remainder of the pipeline was installed.

- 1) Storm drain pipe will be inspected as specified in Section 02520.01.
- 2) Water mains will be inspected and tested as specified in Section 02551.01.
- 3) Sanitary sewers will be inspected and tested as specified in Section 02561.01.
- 4) Sanitary sewer force main will be inspected and tested as specified in Section 02563.01.

D. Submittals

1. Shop Drawings

- a. Shop drawings shall be submitted as specified in the "General Provisions" for the various types of pipe specified in Section 02910.02. The shop drawings shall include: product information; material strength, type, or class; and joint details.
- b. The Contractors shall also submit detailed drawings including proposed method of boring and advancing casing or proposed method of preparing bored hole for installation of carrier pipe; size, capacity, and arrangement of equipment; method of dewatering; size and location of pit including configuration, backstop, pit base material, and type of cutter head; proposed method of monitoring and controlling line and grade; and proposed method of anchoring the carrier pipe within the casing to prevent flotation. Boring/jacking work shall not proceed until drawings have been reviewed and returned by the Engineer.

2. Certificates of Compliance

Certificates of compliance shall be submitted in accordance with the "General Provisions" for pipe and bituminous coatings specified in Section 02910.02. The certificate shall state that the item furnished has been manufactured in accordance with, and meets the requirements of the standard referenced.

02910.02 MATERIALS**A. Materials Furnished by the County**

The County will not furnish any materials for boring and/or jacking pipe.

B. Contractor's Options

None.

C. Detailed Material Requirements

1. Portland Cement Concrete

Portland cement concrete for inverts or cradles shall be Mix No. 2 as specified in Section 03310.

2. Mortar for Grout

Mortar used for grouting voids outside the casing or carrier pipe shall conform to the requirements of Section 04100 except that it shall be composed of one part Portland cement and three parts sand.

3. Steel Casing Pipe

a. Steel casing pipe shall be smooth walled and have a minimum yield strength of 36,000 psi. Minimum wall thickness shall be as specified in the Contract Documents.

b. The pipe shall be fabricated and field connected in accordance with Section 02551. Joints shall be fully welded around the circumference of the pipe.

c. The exterior of the pipe including field connections shall be bituminous coated before installation. Bituminous coating shall meet the requirements of MIL P 23236 P, Class 2.

4. Reinforced Concrete Casing Pipe

Reinforced concrete casing pipe shall meet the requirements of AASHTO M 170 except the pipe shall be Class V, Wall B.

5. Carrier Pipe

Carrier pipe shall be as specified in the Contract Documents and meet the requirements specified in Sections 02520.02, 02551.02, 02561.02, or 02563.02 as appropriate.

02910.03 EXECUTION**A. Preparation**

Preliminary work shall consist of excavating and sheeting a suitable shaft on the lower side of the crossing and installation of a backstop and guide timbers. The guide timbers shall be long enough to hold at least two lengths of pipe and shall be carefully checked for line and grade before any pipe is placed on them.

B. Boring and/or Jacking

1. When augers or similar devices are used for pipe emplacement, the front of the pipe shall be provided with mechanical arrangements or devices 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. The arrangement shall be removable from within the pipe in the event an obstruction is encountered. The excavation by the cutting head shall not exceed the outside diameter of the pipe by more than 1/2 inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft material.
2. The use of water or other liquids to facilitate casing emplacement and spoil removal is prohibited.
3. If an obstruction is encountered during installation that stops the forward action of the pipe, and it becomes evident that it is impossible to advance the pipe, operations shall cease and the pipe abandoned in place and filled completely with grout.
4. Bored or jacked installations shall have a bored hole essentially the same as the outside diameter of the pipe plus the thickness of the protective coating. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than approximately 1 inch, grouting or other methods approved by the Engineer shall be employed to fill such voids.
5. When water is known or expected to be encountered, pumps of sufficient capacity to handle the flow shall be maintained at the site. The pumps shall be in constantly attended operation on a 24 hour basis until, in the sole judgment of the Engineer, their operation can be safely halted. When dewatering, close observation shall be maintained to detect any settlement or displacement of surface facilities. Should settlement or displacement be detected, the Contractor shall notify the Engineer immediately and take such action as necessary to maintain safe conditions and prevent any further damage.
6. All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of traffic, or damage, destroy, or endanger the integrity of any surface facilities.
7. The procedure outlined above will also apply to installations where excavation with mechanical augers are used in smaller steel casings except there is no overcutting or grouting required under normal circumstances.

C. Installation of Carrier Pipe

1. Carrier pipe shall be installed within the casing pipe as shown in the Contract Documents and as specified in Sections 02520.03, 02551.03, 02561.03, and 02563.03.

2. Where shown or specified in the Contract Documents, the annular space between the casing and carrier pipes shall be filled with Portland cement concrete or grout. Materials shall be as specified in Sections 03310 and 03600.

02910.04 METHOD OF MEASUREMENT**A. Casing Pipe**

1. Measurement for bored and/or jacked casing pipe will be made of the length of casing pipe satisfactorily installed. Measurement will be made horizontally along the centerline of the pipe between the inside faces of the boring pit.
2. Carrier pipe will be measured as specified in Sections 02520.04, 02551.04, 02561.04, and 02563.04 as appropriate.

B. Carrier Pipe

Measurement for bored and/or jacked carrier pipe will be made of the length of carrier pipe satisfactorily installed. Measurement will be made horizontally along the centerline of the pipe between the limits shown on the Plans or as directed by the Engineer.

02910.05 BASIS OF PAYMENT**A. General**

Payment will be made at the unit prices bid. The prices bid shall include the excavation, support, backfill, compaction, and restoration of the boring and receiving pits; removal and disposal of excess excavated material; dewatering; settlement monitoring; furnishing and placing Portland cement concrete and/or grout; and the furnishing of all labor, equipment, tools, and incidentals necessary to complete the installation as shown, and as specified in strict accordance with the Contract Documents, and accepted by the Engineer.

B. Casing Pipe

1. Payment for bored and/or jacked casing pipe will be made per linear foot for the various diameters of pipe furnished and installed by boring and/or jacking.
2. Payment for carrier pipe installed within the casing pipe will be made as specified in Sections 02520.05, 02551.05, 02561.05, and 02563.05 as appropriate and will include furnishing and attaching anti-floatation device.

C. Carrier Pipe

Payment for bored and/or jacked carrier pipe will be made per linear foot for the various diameters of pipe installed by boring and/or jacking.