

**Section 02417****AUGERING PIPE OR CASING FOR WATER LINES****1.0 GENERAL****1.01 SECTION INCLUDES**

- A Installation of pipe and casing for water lines by methods of augering.
- B References to Technical Specifications:
  - 1. Section 01570 – Trench Safety System
  - 2. Section 01200 – Measurement and Payment Procedures
  - 3. Section 01350 – Submittals
  - 4. Section 01500 – Temporary Facilities and Controls
  - 5. Section 02635 – Steel Pipe and Fittings
  - 6. Section 02318 – Excavation and Backfill for Utilities
  - 7. Section 01140 – Contractor’s Use of Premises
- C Referenced Standards:
  - 1. American Association of State Highway and Transportation Officials (AASHTO)

**1.02 MEASUREMENT AND PAYMENT UNIT PRICES**

- A Measurement for augered casing with water pipe will be on a linear foot basis measured from end to end of the casing.
- B Payment of augered casing with water pipe will be full compensation for all labor, equipment, casing, water pipe, materials and supervision for construction complete in place including dewatering, augering, joints, spoil removal, pipe installation, grouting, utility adjustments, testing, and cleanup, and other work necessary for construction as shown on the Plans and as specified.
- C Measurement of augered water pipe will be on a linear foot basis along the axis of the pipe from auger pit to auger pit.
- D Payment of augered water pipe will be full compensation for labor, pipe, equipment, materials, and supervision for construction complete in place including dewatering, jacking, utility adjustments, testing, cleanup, and other work necessary for construction as shown on the Plans and as specified.
- E No separate payment will be made for auger pits and other excavations under this section. Include cost of excavation, surface restoration, pavement repair, etc., for auger pits or observation pits in Sections related to the open-cut utility installation portion of the Work. Include cost of trench safety for auger pits or observation pits in Section 01570 – Trench Safety Systems.
- F Refer to Section 01200 - Measurement and Payment Procedures.

**1.03 SUBMITTALS**

- A Submit product data in accordance with requirements of Section 01350 - Submittals.
- B Submit product data for casing insulators for approval.
- C Prior to commencement of work, furnish for the Engineer's approval, a plan showing pit locations. Approval of this plan will not relieve Contractor from responsibility to obtain specified results.
- D Show actual pit locations dimensioned on as-built drawings so that they can be identified in field.

**1.04 REGULATORY REQUIREMENTS**

- A Conform to Texas Department of Transportation for installations under state highways. Owner will obtain required permits for State Highway crossings. City will make submittal to TxDOT. Contractor will supply Traffic Control Plans.
- B Installations under railroads:
  - 1. Secure and comply with requirements of right-of-entry for crossing railroad company's easement or right-of-way from railroad companies affected. Comply with railroad permit requirements. Submit copy to the Engineer.
  - 2. Use dry auger method only.
  - 3. No extra compensation for damages due to delays caused by the railroad requesting work to be done at hours which will not inconvenience the railroad.
  - 4. Maintain minimum 35-foot clearance from centerline of tracks.

**1.05 PROTECTION OF PEOPLE AND PROPERTY**

- A Contractor shall conduct all construction operations under this Contract in conformance with the practices described in Section 01500 – Temporary Facilities and Controls.

**1.06 CRITERIA FOR DETERMINING INSTALLATION LOADS**

- A Pipes and casings shall be selected by the Contractor to carry overburden pressure and applicable surcharge and installation loads.
- B The criteria to be used for truck loading shall be HS-20 vehicle loading distributions in accordance with AASHTO.
- C The Contractor shall be responsible for the selection of the casing, pipe, and pipe joints to carry the thrust of the jacks or loads due to the pulling mechanism.
- D The Contractor shall select the diameter of the casing to meet the minimum dimensions defined in the Plans, and to permit practical installation (including skids, pipe spiders and shims, if applicable) and grouting, where required.

## **2.0 PRODUCTS**

### **2.01 MATERIALS**

- A Piping and Fittings: As required by Plans.
- B Casings: Where required by Plans, in accordance with Section 02635 - Steel Pipe and Fittings.
- C Insulators: Where casings are required by Plans, casing insulator width 8 inches for pipe sizes 4 to 14 inches; 12 inches for pipe sizes 16 to 30 inches.
  - 1. For welded steel pipe 12 inches and smaller, use Pipeline Seal & Insulator Model PE, or approved equal.
  - 2. For other pipe materials, use Pipeline Seal & Insulator Model C8G-2 or approved equal for pipe sizes up to 12 inches.
  - 3. For all pipe sizes above 12 inches, use Pipeline Seal & Insulator Model C12G-2 or approved equal.
- D Casing End Seals: Provide Pipeline Seal & Insulator Model C or approved equal.

## **3.0 EXECUTION**

### **3.01 GENERAL**

- A Do not exceed 100 feet for length of auger hole for uncased PVC pipe less than 12 inches in diameter without intermediate pit.
- B Do not exceed 75 feet for length of auger hole for uncased PVC pipe 12 inches to 16 inches in diameter without intermediate pit.
- C Do not exceed 80 feet for length of auger hole for uncased PVC pipe greater than 16-inches in diameter without intermediate pit.

### **3.02 PREPARATION**

- A Secure right-of-entry for crossing railroad company's easement or right-of-way.

### **3.03 JACKING**

- A Comply with Section 01570 - Trench Safety Systems for all pits, access shafts, end trenches and other excavations relating to work required by this specification.
- B If grade of pipe at jacking end is below ground surface, excavate suitable pits or trenches for conducting jacking operations and for placing end joints of pipe. Wherever end trenches are cut in sides of embankment or beyond it, sheath securely and brace such work to prevent earth caving.
- C No more than one joint shall be made-up in pit or trench prior to jacking.

- D Construction shall not interfere with operation of railroad, street, highway, or other facility, nor weaken or damage embankment or structure.
- E During construction operations, furnish and maintain barricades and lights to safeguard traffic and pedestrians as directed by the Engineer, until such time as backfill has been completed and removed from site.
- F Provide heavy-duty jacks suitable for forcing pipe through embankment. Use suitable jacking head, usually of timber, and suitable bracing between jacks and jacking head and suitable jacking frame or backstop so that jacking pressure will be applied to pipe uniformly around ring of pipe. Set pipe to be jacked on guides, properly braced together, to support section of pipe and to direct it in proper line and grade. Place jacking assembly in line with direction and grade of pipe. Excavate embankment material just ahead of pipe and remove material through pipe. Force pipe through embankment with jacks, into space thus provided.
- G Conform excavation for underside of pipe to contour and grade of pipe, for at least one third of circumference of pipe. Provide clearance of not more than 2 inches for upper half of pipe. Taper off upper clearance to zero at point where excavation conforms to contour of pipe.
- H Distance that excavation shall extend beyond end of pipe depends on character of material, but it shall not exceed 2 feet in any case. Decrease distance on instructions from the Engineer, if character of material being excavated makes it desirable to keep advance excavation closer to end of pipe.
- I Jack pipe from low or downstream end. Lateral or vertical variation in final position of pipe from line and grade established by the Engineer will be permitted only to extent of 1 inch in 10 feet, provided such variation is regular and only in one direction and that final grade of flow line is in direction indicated on plans.
- J Use cutting edge of steel plate around head end of pipe extending short distance beyond end of pipe with inside angles or lugs to keep cutting edge from slipping back onto pipe.
- K Once jacking of pipe is begun, carry on without interruption to prevent pipe from becoming firmly set in embankment.
- L Remove and replace any pipe damaged in jacking operations.
- M Backfill pits or trenches excavated to facilitate jacking operations immediately after completion of jacking of pipe.
- N Grout annular space when loss of embankment occurs or when clearance of two inches is exceeded.

**3.04 AUGERING (BORING)**

- A Auger from approved pit locations. Excavate for pits and install shoring as outlined above under "Jacking." Auger mechanically with use of a pilot hole entire length of crossing and check for line and grade on opposite end of bore from work pit. The large hole is to be no more than 2 inches larger than diameter of bell. Place excavated material outside working pit and dispose of as required. Use water or other fluids in connection with boring operation only to lubricate cuttings; jetting will not be permitted.
- B In unconsolidated soil formations, a gel-forming colloidal drilling fluid may be used. Fluid is to consist of at least 10 percent of high-grade processed bentonite and shall consolidate cuttings of bit, seal walls of hole, and shall furnish lubrication for subsequent removal of cuttings and installation of pipe.

**3.05 PIPE IN CASING**

- A Pipes shall be installed in augered casings in accordance with this Section, as applicable.
- B Bottom of trench adjacent to each end of casing should be graded to provide firm, uniform, and continuous support for carrier pipe. If trench requires some backfill to establish final trench bottom grade, backfill material should be placed in 6-inch lifts and each layer properly compacted.
- C Install casing end seals in accordance with manufactures specifications.

**3.06 INSULATOR INSTALLATION**

- A Casing spacers and/or insulators should be installed in accordance with manufacturer's instructions. Special care should be taken to ensure that all subcomponents are correctly assembled and evenly tightened, and that no damage occurs during tightening or carrier pipe insertion.
- B Spacing of spacers or insulators should ensure that carrier pipe is adequately supported throughout its length, particularly at ends, to offset settling and possible electrical shorting. End spacer must be within 6 inches of end of casing pipe, regardless of size of casing and carrier pipe or type of spacer used. Casing spacers are designed to withstand much greater loads than can be safely applied to most coatings. Therefore, spacing between spacers depends largely on load bearing capabilities of pipe coating and flexibility of pipe.
  - 1. Spacing shall be as shown on Plans with maximum distance between spacers to be 10 feet for pipe sizes 4 to 14 inches and 8 feet for pipe sizes 16 to 30 inches.
  - 2. For ductile iron pipe, flanged pipe, or bell-and-spigot pipe, spacers should be installed within one foot on each side of bell or flange and one in center of joint when 18- to 20-foot-long joints are used.
  - 3. If casing or carrier pipe is angled, bent, or dented, spacing should be reduced.

- C Where metallic carrier pipe is to be placed in metallic casing, provide electric insulating type spacers to ensure no contact between carrier pipe and casing.

### **3.07 FILLING ANNULAR SPACE**

- A Allowable variation from line and grade shall be as specified under "Jacking." Block void space around pipe in augered hole with approximately 12 inches of packed clay or similar material approved by the Engineer, to prevent bedding or backfill from entering the void around the pipe in the augered hole when compacted. For pipe diameters 4 inches through 8 inches use minimum 1/2 cubic foot clay for pipe diameters 12 inches through 16 inches use minimum 3/4 cubic foot clay.

### **3.08 AUGER PITS**

- A Locate auger pits where there is minimum interference with traffic or access to property.
- B Pit Size: Provide minimum 6-inch space between pipe and walls of bore pit. Maximum allowable width of pit shall be 5 feet unless approved by the Engineer. Width of pit at surface shall not be less than at bottom. Maximum allowable length of pit shall be no more than 5 feet longer than one full joint of pipe and shall not exceed 25 feet unless approved by the Engineer.
- C Excavate bore pits to finished grade at least 6 inches lower than grade indicated by stakes or as approved by the Engineer.
- D Backfill in accordance with Section 02318 – Excavation and Backfill for Utilities.

### **3.09 CLEAN UP AND RESTORATION**

- A Perform clean up and restoration in and around construction zone in accordance with Section 01140 – Contractor's Use of Premises.

### **3.10 PROTECTION OF THE WORK**

- A Protect and maintain all pipe and casing augering in good condition until completion of Work.

END OF SECTION