Section 02415

AUGERING PIPE OR CASING FOR SEWERS

1.0 G E N E R A L

1.01 SECTION INCLUDES

A Installation of pipe and casing for sanitary sewer 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 01563 – Control of Ground Water and Surface Water
5. Section 01500 – Temporary Facilities and Controls
6. Section 02530 – Gravity Sanitary Sewers
7. Section 02430 – Tunnel Grout
8. Section 02318 – Excavation and Backfill for Utilities
9. Section 01140 – Contractor's Use of Premises

C Referenced Standards:
1. American Railway Engineering Association (AREA) Manual for Railway Engineering
2. American Association of State Highway and Transportation Officials (AASHTO)
3. American Water Works Association (AWWA)
   a. AWWA C200, Steel Water Pipe - 6 in. (150 mm) and Larger

D Definitions:
1. Dry Augering - installation of steel casing by excavating the soil at the advancing end of casing and transporting the spoil through the casing by an otherwise uncased auger, while advancing the casing by jacking at the same rate as the auger excavation progresses.
2. Slurry Augering - installation of casing or sewer pipe by first drilling a small diameter pilot hole from auger pit to auger pit, followed by reaming the bore to full diameter by augering with slurry, and installing the casing or pipe by a pull-back or jacking method.
3. Augered Pipe - the Contractor's installed water or sewer pipe in augered hole.
4. Augered Casing with Pipe - the Contractor's installed water or sewer pipe in augered casing.

1.02 MEASUREMENT AND PAYMENT

A Measurement for augered casing with sewer pipe will be on a linear foot basis measured from end to end of the casing.

B Payment of augered casing with sewer pipe will be full compensation for all labor, equipment, casing, sewer 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 sewer pipe will be on a linear foot basis along the axis of the pipe from auger pit to auger pit.

D Payment of augered sewer 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 sewer 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 Review. Submittal shall be made in accordance with Section 01350 – Submittals. The Engineer will review submitted plans, details and data for compliance with specifications. Contractor shall not commence work on any items requiring pipe and casing augering work plan, or other submittal until the submittal have been reviewed and accepted by the Engineer. Such review by the Engineer shall not be construed in any way of relieving the Contractor of his responsibilities under the Contract, shall not be construed by the contractor as an endorsement by the Engineer that such methods are constructable or will work for the specific subsurface soils encountered. Structural designs and other engineered components shall be signed and sealed by a Professional Engineer registered in the State of Texas.

B Pipe and Casing Augering Operation.

1. Submit for review a Pipe and Casing Augering Work Plan with complete drawings and written description identifying details of the proposed method of construction and the sequence of operations to be performed during construction, as required. The drawings and descriptions shall be sufficiently detailed to demonstrate to the Engineer whether the proposed materials and procedures will meet the requirements of this Section.
2. Depending on the Contractor's method of construction, the Pipe and Casing Augering Work Plan shall be submitted on the following items:
   a. Arrangement drawings and technical specifications of the augering equipment and experience record of the Contractor.
   b. Method of controlling line and grade of augering operation.

c. Method of spoil and slurry removal, including surface storage and disposal.
d. Details of the pipe or casing installation.
e. Grouting techniques to be used for filling annular void between casing and sewer pipe, where required, and for filling over excavation, if any, including equipment, pumping and injection procedures, pressure grout types, and mixtures.
f. Location and construction of auger pits, including details for all required ground support installation not included in the Trench Safety Plan.
g. Groundwater control system per requirements in this section and in accordance with Section 01563 – Control of Ground Water and Surface Water, as required by construction method.

3. Casing and pipe fabrication drawings, including joint details.

C Trench Safety

1. Shall be in accordance with Section 01570 – Trench Safety System.
2. To the extent that excavation for pipe and casing augering involves work not covered by Contractor's Trench Safety Plan, the safety provisions of these excavations shall be addressed in the Pipe and Casing Augering Work Plan.

D Quality Control Methods. At least 30 days prior to the start of augering, the Contractor shall submit a description of the quality control methods proposed for use in this operation to the Project Manager. The submittal shall include:

1. Supervision. Supervisory control to ensure that work is performed in accordance with the Plans and Specifications, and Pipe and Casing Augering Work Plan.
2. Line & Grade. Procedures for surveying, controlling and checking line and grade, including field forms.
3. Augering Observation and Monitoring. Procedures for preparing and submitting daily logs of augering operations, including field forms.
4. Products and Materials. A plan for testing and submittal of test results to demonstrate compliance with the specification and Contractor's design criteria for permanent products, material and installations. The plan shall identify applicable standards and procedures for testing and acceptance.
5. Monitoring Settlement. Submit a settlement Monitoring Plan if requested by the Engineer.

1.04 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.

1.05 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 P R O D U C T S

2.01 MATERIALS

A Casing shall be provided where shown on Plans or indicated in Technical Specifications and be new, uncoated welded steel pipe, manufactured in accordance with AWWA C200. The design stress in the pipe wall shall be 50 percent of the minimum yield point of the steel or 18,000 psi, whichever is less, when subjected to the loading conditions. The design deflection to be used in determining wall thickness shall not exceed 3 percent of nominal casing pipe size.

B Sewer pipe shall be provided in accordance with Section 02530 – Gravity Sanitary Sewers. The sewer pipe shall be selected by the Contractor and verified by the Contractor's engineer to safely withstand all service loads, including overburden pressures and surcharge loads together with all forces and pressures induced in pipe and joints during installation.

C For grouting materials refer to Section 02430 – Tunnel Grout.

D 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.

E Casing End Seals: Provide Pipeline Seal & Insulator Model C or approved equal.

3.0 E X E C U T I O N

3.01 DRY AUGERING (CASING ONLY)

A Provide horizontal augering equipment of sufficient capacity for the diameter and length of the casing to be installed and the anticipated ground conditions.

B Provide heavy-duty jacks of a capacity suitable for forcing the excavating auger and casing through the ground and a suitable jacking frame or backstop. Use operating jacks constructed so that even pressure is applied to all jacks used.

C Provide steerable front section of casing to allow vertical grade adjustments. A water level or other means shall be provided to allow monitoring of the grade elevation of the auger casing.

D Set casing to be jacked on guides, properly braced together, to support the section of pipe and direct it to proper line and grade. Place the whole jacking assembly so as to line up with the direction and grade of the pipe.

E In unconsolidated soil formations, bentonite may be used to seal the voids outside the wall and furnish lubrication for the installation of casing. The use of water to assist in lubrication to facilitate the removal of spoil is permitted, however, water jetting of the soil is not allowed when jacking the casing.

F Insofar as practical and depending on the character of the soil encountered during the augering operation, conduct operations without interruption to prevent the pipe from seizing up in the hole before the installation is complete.

G Repair casing damaged in augering operations by method acceptable to the Engineer or remove and replace it.

3.02 SLURRY AUGERING

A Provide horizontal boring equipment for drilling of pilot hole, slurry augering equipment for excavating the full-sized hole for casing or pipe installation.

B Drill a small diameter pilot hole for the entire length of the augered pipe. Check the pilot hole for line and grade at the receiving end to determine if the larger diameter casing hole will comply with this Specification. The pilot hole shall be redrilled if the installed pipe would not meet the specified tolerances.

C Auger the large-diameter hole by mechanical means for reaming the pilot hole. The diameter of the augered hole shall be not more than 1 inch greater than the outside diameter of the installed pipe measured from the barrel of the pipe. Place excavated material outside the working pit and dispose of it, as specified in Section 01500 – Temporary Facilities and Controls. Jetting is not permitted. Augered holes which do not meet the specified tolerances shall be grouted.

D In unconsolidated soil formations, use a bentonite slurry to maintain a stable hole and furnish lubrication for the installation of the pipe. Install the pipe or casing in one

operation with the displacement of cuttings and slurry from the hole in potentially unstable soils to prevent casing and settlement of the ground surface.

E Depending on the character of the soil encountered during the augering operation, conduct operations without interruption, insofar as practical, to prevent the pipe from seizing up in the hole before the installation is complete.

F Repair casing or sewer pipe damaged in augering operations by method acceptable to the Engineer or remove and replace it.

3.03 AUGER PITS

A Contractor's Pipe and Casing Augering Work Plan shall identify the location, size, depth and layout, and ground support design of all augering and observation pits, as well as a schedule of dates that each pit is expected to be open.

B Auger pits that are excavated as a part of open-cut sewer construction shall be in accordance with Section 02318 – Excavation and Backfill for Utilities.

C Install sheeting, lining, shoring, and bracing required for the protection of the workmen and the public in accordance with Section 01570 – Trench Safety Systems.

3.04 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.

3.05 SPACER AND 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.

3.06 TOLERANCES

A Acceptance criteria for Augered Casing, as defined in this Section, 1.01D, shall be ±6 inches in horizontal alignment from theoretical at any point between manholes, including the receiving end, and ±1-1/2 inches in elevation from the theoretical.

B Acceptance criteria for Augered Pipe, as defined in this Section, 1.01D, shall be ±6 inches in horizontal alignment from theoretical at any point between manholes, including the receiving end, and ±1/8 inch in elevation from the theoretical.

C If a deviation exceeds these tolerances, the Contractor may be required to re-auger the casing or sewer pipe at no additional cost to the City, including any backfilling or grouting of the abandoned hole. Any redesign of the sewer and manholes made necessary by out-of-tolerance casing or sewer pipe shall be at the Contractor's expense and shall be signed by a Professional Engineer registered in the State of Texas. The installed pipe must be capable of meeting the design flow and velocities for a full pipe condition. Contractor is responsible for final selection of casing diameter to assure these tolerances.

3.07 FIELD QUALITY CONTROL

A Sewer pipes installed under this Section shall be tested under the provisions of the applicable Technical Specification for the type of sewer pipe installed.

3.08 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.

3.09 PROTECTION OF THE WORK

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

END OF SECTION