

SECTION 33 05 23.16
UTILITY PIPE JACKING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Jacking casing pipe and installing carrier pipe.
 - 2. Jack carrier pipe.

- B. Related Sections
 - 1. Section 33 05 05 - Trenching and Backfilling.
 - 2. Section 33 10 00 - Water Utilities.
 - 3. Section 33 31 00 - Sanitary Utility Sewer Piping.
 - 4. Section 33 34 00 - Sanitary Utility Sewer Force Mains.

1.02 PRICE AND PAYMENT PROCEDURES

- A. Measurement and Payment
 - 1. Jack Steel Casing Pipe: Measurement will be based on units of lineal feet of specified size of steel casing pipe installed by jacking. The cost to provide the required steel casing, including excavation, all shoring, bulkheading and filling of annular space between carrier and casing pipe shall be included in the Bid Unit Price with no additional payment being made, regardless of the size of casing installed or the method of installation selected by the Contractor. Casing pipe installed beyond the limits surveyed shall not be paid for.
 - 2. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

1.04 SUBMITTALS

- A. Submit the following items consistent with Section 01 33 00:
 - 1. A description of proposed construction methods for each jacking.
 - 2. Shop Drawings and Product Data For: Proposed sheeting or shoring, and details of the equipment.
 - 3. Qualifications and training of the key personnel, including field supervisor and operators, responsible for specialized work.
 - 4. Daily Reports Showing:
 - a. Jacking advance with beginning and ending stations.
 - b. Any departures from specified line and grade.
 - c. Descriptions of unusual conditions or incidents.

PART 2 PRODUCTS

2.01 MATERIALS

- A. STEEL CASING PIPE FOR JACKING-BORING
 - 1. Steel casing pipe for jacking-boring shall conform to ASTM Designation A252, Grade 2 or ASTM Designation A139, Grade B. The casing pipe shall have minimum thickness as follows:

<u>Nominal Casing Size</u>	<u>Outside Diameter (in)</u>	<u>Minimum wall thickness (in)</u>
12	12-3/4	0.250
14	14	0.282
16	16	0.282
18	18	0.312
20	20	0.343
22	22	0.375
24	24	0.403
26	26	0.438
28	28	0.469
30	30	0.469
32	32	0.500
34	34	0.532
36	36	0.532
38	39	0.563
40	40	0.563
42	42	0.563

- B. Annular Space Fill Material
 1. Granular material with 100% passing the 3/8" sieve and no more than 20% passing the #200 sieve or approved equal.
- C. Carrier Pipe (Within Jacked Pipe Casing)
 1. Conform to the requirements of Section 33 10 00.
 2. Conform to the requirements of Section 33 31 00.
 3. Conform to the requirements of Section 33 34 00.
 4. Use plastic or steel casing insulator skids as manufactured by Pipeline Seal and Insulator, Inc., stainless steel casing spacers by Cascade Waterworks Manufacturing Company, or non-timber skids, or approved equal.

2.02 EQUIPMENT

- A. Certified by manufacturer for intended purpose, diameter pipe, and expected loading.

PART 3 EXECUTION

3.01 GENERAL

- A. Notify the Engineer, roadway, railway, and utility owners in advance of the planned start of Work within the right-of-way or as required by the applicable permit, which is more stringent.
- B. Water Control
 1. Keep jacking pit subgrades continuously free from ground and surface water during operations.
 2. Direct discharge from dewatering operations into approved receiving basins.
 3. Maintain dry conditions within casing until grouting operations are complete and grout has cured.
- C. Jacking pits, entry pits, exit pits, and miscellaneous trenching shall be in conformance with Section 33 05 05.

- D. It is not necessary to complete jacking work in 1 continuous, non-stop operation. If Work is interrupted or stopped prior to completion at the Contractor's discretion, Contractor bears all costs related to the stoppage and restart operations.
- E. Prevent any settlement, movement, or cracking of roadways, roadbeds, railways, surface structures, utilities, or adjacent structures. If any movement or settlement occurs which cause or might cause damage over, along, or adjacent to the Work, stop jacking operations immediately, except for those activities which will assist in making the Work secure.

3.02 INSTALLATION

- A. Examination
 - 1. Engineer may enter the tunnel pits at any time for the purpose of inspecting the ground conditions, monitoring ground response, and inspecting the materials or the workmanship. Contractor shall cooperate in such inspections.
 - 2. Notify Engineer to inspect casing prior to placing piping within the tunnel.
- B. Place sheeting, shoring, or bracing as necessary to maintain the pit slopes and protect adjacent structures. Sheeting, shoring, or bracing shall be considered incidental to the jacking with no additional compensation allowed.
- C. Installation of Casing Pipe
 - 1. Provide means for guiding jacked pipe accurately into position.
 - 2. Maintain accurate line and grade.
 - 3. Use full butt penetration welds on the outside to connect all sections of the casing pipe. Butt weld joints prior to the jacking operation.
 - 4. After pipe has been completely installed, thoroughly clean the interior of the casing pipe and remove all excess material leaving a smooth interior throughout.
 - 5. Any water in the casing shall be pumped out prior to installation of carrier pipe.
- D. Tolerances
 - 1. Maintain alignment and elevation of the casing pipe consistently throughout the jacking operation.
 - 2. Maximum Deviations Permitted
 - a. Horizontal: 0.5 feet.
 - b. Vertical: Plus or minus 0.1 foot.
- E. Grade Corrections
 - 1. If an excavation method is used that does not have the ability to make corrections in line and grade of the carrier pipe, place an oversized casing pipe so the carrier pipe can be installed to the required tolerance.
- F. Pressure Grouting
 - 1. The Contractor is also required to set up the jacking with piping that permits pressure grouting around the outside perimeter of the steel carrier pipe when the jacking is complete. The purpose of this procedure is to completely fill any possible voids around the pipe that may have been caused by the jacking procedure.

3.03 CARRIER PIPE INSTALLATION

- A. Install the carrier pipe within the casing using skids as specified herein. Secure skids with straps. Install carrier pipe from the jacking pit end of the casing. Thoroughly inspect each joint prior to insertion into the casing. Support carrier pipe within the casing pipe so that pipe bells do not rest

directly on the casing. Distribute the load of the carrier pipe along the casing with an adequate method of support.

- B. Install permanent vertical and lateral bracing to prevent carrier pipe from floating either vertically or laterally during testing and placement of annular space filler.
- C. Construct an 8 inches thick brick and mortar bulkhead in the annular space between the carrier pipe and casing pipe after the carrier pipe has been installed. Wrap the portion of the carrier pipe passing through the brick bulkhead with 3 layers of 15-pound asphalt impregnated felt before constructing the bulkhead. Block and brick shall conform to requirements of ASTM C90.
- D. After the carrier pipe has been inspected and tested, fill the annular space between casing pipe and carrier pipe completely
 - 1. Place cellular concrete grout or silica sand in lifts in a manner approved by the carrier pipe manufacturer that prevents damage and in a manner to prevent the occurrence of any voids between the casing pipe and the carrier pipe. If material is pumped, pump at a pressure below that which may cause damage of the casing or carrier pipe. Vent casing to ensure that annular space is completely filled with grout.

END OF SECTION

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