

SECTION 02178

STEEL SHEET PILE BORING AND JACKING PITS/COFFERDAMS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavation and Support Systems.
- B. Dewatering.
- C. Backfill.
- D. Steel Sheet Pile.
- E. Cofferdams.
- F. Jacking Pit and Receiving Pit.
- G. Utility Protection.

1.2 RELATED SECTIONS

- A. Section 01010 – Summary of Work.
- B. Section 01039 – Coordination of Meetings.
- C. Section 01300 – Submittals.
- D. Section 01500 – Temporary Controls.
- E. Section 02160 – Excavation Support Systems.
- F. Section 02279 – Filter Fabric.
- G. Section 02320 – Utilities Installed in a Boring and Jacking Operation.

1.3 REFERENCES

- A. ASTM A6 – General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use.
- B. ASTM A36 – Structural Steel.
- C. ASTM A328 – Steel Sheet Piling.
- D. ASTM A325 – High Strength Bolts.
- E. ASTM A572 – Grade 50.
- F. AWS A5.1 – Class EX70XX Welding Electrodes.
- G. AWS D1.1 – Structural Welding Code.

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Jacking Pit/Cofferdam and Receiving Pit/Cofferdam:
 - 1. Basis of Measurement: Included in the 54" steel casing pipe and 36" C 76-V R.C.P. storm sewer pay item as stated in the proposal.
 - 2. Basis of Payment: Includes all labor, material, and equipment necessary to install sheet piling, welding, excavate pits, install bracing, removal, backfilling, and any other Work necessary to comply with this Section and Section 02320.

- B. Temporary Steel Sheet Piling– Division VI:
 - 1. Basis of Measurement: Included in other pay items (Inlet Works and Outlet Works) as stated in the proposal.
 - 2. Basis of Payment: Includes all labor, materials, and equipment necessary to install and remove steel sheet piling. This includes the welding, bracing, excavation, cutting, removing, and dewatering as necessary for constructing excavation support and cofferdam sheet piling.

- C. Temporary Steel Sheet Piling:
 - 1. Basis of Payment: Included in other bid items as stated in the proposal.
 - 2. Basis of Payment: Includes all labor, material, and equipment necessary to install and remove steel sheet piling. This includes the welding, bracing, and dewatering.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.

- B. Submit shop drawings and product data for all items to be installed and/or constructed within this Section. The shop drawings shall be sealed by a registered professional engineer with experience in structural design.

- C. Submit Qualifications of Contractor - as identified in Part 1.6 of this Section - for review by the Owner's Representative prior to initiation of any construction.

- D. Shop Drawings Shall Include:
 - 1. Retaining Wall Layout: Submit shop drawings illustrating detailed layout of steel sheet piling in plan view including all corner, connection, and bracing details.
 - 2. Installation Method: Submit detailed procedures of the installation methods, including type and number of driving rigs, hammers, and other equipment.
 - 3. Proposed Dewatering Plan: Submit shop drawings illustrating proposed dewatering systems required to comply with this Section.
 - 4. Excavation Plan: Submit shop drawings with a detailed sequence of below ground construction including; illustrations and positions of dewatering systems, methods of excavations, bracing systems, connections, sealing of proposed penetrations, etc. Plan should show proposed modifications to any as designed elements furnished on the plans.

1.6 QUALIFICATIONS

- A. Contractor shall be solely responsible for installing, maintaining, and removing temporary structures required to comply with this Section. Contractor shall also be solely responsible for adequacy of design for dewatering systems and method of permanently sealing the permanent jacking casing to the planned penetration in the receiving pit/cofferdam. Contractor shall also be solely responsible for design of all elements needed to comply with this Section if modifications to any as designed elements furnished on the plans are made.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements and survey benchmarks are as indicated on the plans.
- B. Verify alignment of proposed cofferdams and jack and bore casing prior to installing sheet piling.

1.8 SCHEDULING

- A. Schedule work under the provision of Section 01010 – Summary of Work, and Section 01300 – Submittals.

2. PART 2 MATERIALS

2.1 STRUCTURAL STEEL: All sheet piling, shall conform to ASTM A-572 (Grade 50). All walers, struts, plates, etc. shall conform to ASTM A-36 unless otherwise indicated on the plans.

- A. Jacking Pit/Cofferdam: Steel sheet piling shall consist of PZ-27 section, or equivalent hot rolled section.
- B. Receiving Pit/Cofferdam: Steel sheet piling shall consist of PZ-22 section, or equivalent hot rolled section.

2.2 WELDS: All welds shall be in accordance with AWS D1.1 using EX70XX welding electrodes.

2.3 Other materials as indicated on the plans.

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039 – Coordination and Meetings.

3.2 PREPARATION

- A. Locate and flag existing utilities.
- B. Protect utilities and structures near the Work from damage during installation of sheeting or excavation.

3.3 INSTALLATION

- A. Installation Work and procedures shall conform to the plans and approved shop drawings submitted as part of this Section.

- B. Sequence work as summarized below:
1. Drive sheet piling to required embedment depth while maintaining continuous interlocks along each adjoining sheet. Piling driven out of interlock with adjacent piling or piling damaged during installation shall be removed and replaced at the Contractor's expense.
 2. Excavate to required levels. Excavation within the jacking pit cofferdam shall terminate not more than 5 feet below the specified bracing level prior to installing bracing.
 3. Install bracing for jacking pit/cofferdam as specified on the plans and install any other bracing as necessary.
 4. Complete excavations.
 5. Place filter fabric and aggregate as specified on the plans. Filter fabrics shall be placed continuously over the base of excavations. Seams shall include a minimum overlap of 18 inches continuously along each seam.
 6. Dewater as required to complete penetrations and maintain dry and stable excavation bottoms. Dewatering shall continue until cofferdams are backfilled and penetrations are permanently sealed watertight to prevent water seepage and piping of soils.
 7. Backfill jacking pit cofferdam after the Work necessary to install the jack and bore section and the diversion chamber are completed and accepted. Remove bracing after backfill within the jacking pit cofferdam has reached a level within 5 feet of the specified bracing level. After removing bracing, backfill jacking pit cofferdam to design grades.
 8. Remove temporary sheeting after Work has been completed and accepted.
 9. Cut off permanent sheeting after Work in the receiving pit cofferdam – outfall structure - has been completed and accepted. Holes cut into sheeting for handling and installation shall either be cut off or repaired by welding sections of steel to infill holes. See Section 2160 - Excavation Support Systems.
 10. Remove all excess material, debris and obtain Owner's Representative's approval of completion of work specified in this Section.

3.4 FIELD QUALITY CONTROL

- A. Perform field observation and testing under provisions of Section 01400 – Quality Control.

END OF SECTION