

Bid Doc #5: Specifications and Drawings

PORT OF BROOKINGS HARBOR – Dock Pile Replacement Project

The Port wishes to remove 41 (forty-one) corroded or fallen piles (12” diameter, 30-60’ long) that are at present located as shown at the encircled locations on the below-attached drawings entitled “Pile Removal-Installation, Vicinity & Location Maps”. Discovery (e.g. encountering unstable piles during the project) may result in adjustments of locations encircled on the cited drawing. The piles planned for removal are broken, not of adequate length or corroded. In addition to removing the old piles as described within this RFQ, their replacement with new, coated steel piles as described in this RFQ is also planned. Installation of must be via vibratory hammer. Completed pile lengths will be dependant on shear load testing, or by pile-driving refusal. Estimated vertical location of the desired soil resistance is as shown in the below attached sketch entitled “Typical Pile Profile”. Refusal for this pile-driving equipment is herein estimated at a pile advancement rate of 0.3”/second (contractor must take care to avoid a false refusal assumption, most often as a result of increased soil strength caused by pore under-pressure (suction) induced by pile-driving). If additional piles are determined by the engineer-of-record to be required, the contractor will be compensated for any additional time and materials requested by the Port of Brookings Harbor, via change order. Change order charges must be exacted by the contractor at a reasonable rate, commensurate with those used to calculate the original proposal budget.

Contractor activities are described as the installation of steel piles via a crane-mounted vibratory hammer, welding as needed on floating dock(s), operating an adequately sized crawler crane, and extracting of corroded or damaged piles. No grubbing, excavation (except for footing as described in this application), grading, seedbed preparation, demolition, culvert installation, roadway obliteration, disposal sites, detour construction or related work are planned for this project. No dewatering, water-line flushing, pavement wash waters or irrigation water discharges are planned for this project. In-water work will be accomplished during the in-water work window.

Hammer will have up to about 4400 in-lb eccentric moment & driving force of up to 170 tons, with a 0-1800 oscillations/minute (OPM) range. Hydro-acoustic effects are generally expected not to exceed 177 decibels at 10 meters. Jetting will not be used for piling installation.

Note: General descriptions of operations and materials are provided below. Please do not hesitate to contact the Engineer of Record (Jack Akin, referred to below as “EMC”) with questions specific to this Bid Document, using the email address: emc@emcengineersscientists.com.

STEEL PIPE PILES INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section describes the fabrication and installation, by driving of steel pipe piling, including cut-offs and dowels.
- B. “Driving piles” refers to installation by vibratory hammers.

1.2 REFERENCES

- A. AISC: American Institute of Steel Construction.
- B. ASTM: American Society for Testing and Materials.
 - 1. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 2. ASTM A252: Standard Specification for Welded and Seamless Steel Pipe Piles
 - 3. ASTM A500: Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - 4. ASTM A501: Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
 - 5. ASTM A706: Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
- C. AWS: American Welding Society.
 - 1. AWS D1.1: Structural Welding Code – Steel, 2010
- D. IBC: International Building Code.
 - 1. IBC Chapter 17: Structural Tests and Special Instructions

1.3 SUBMITTALS

- A. Prior to mobilization at the site, submit data fully describing all proposed pile installation equipment to the Port
- B. Submit certification of yield strength and weldability of steel products by process acceptable to the Port, mill certificates of chemical and physical properties, or equivalent.
- C. Submit pile driving template.
- D. Prepare and submit to the Port full length installation records for each pile installed. The records shall be submitted within 24 hours after installation is completed for the pile. The records shall include the following minimum information:

1. Final tip elevation.
 2. Cut-off elevation.
 3. Description of unusual installation behavior or conditions.
 4. Pile material and dimensional properties.
 5. Elevations at welded joints.
 6. Other data which may be useful in evaluating the pile.
- E. Submit prequalified welding procedure specification (WPS) for all welding processes.
- F. Provide minimum 48-hour notification to the Port of any activity (i.e., crane heights, excessive noise and vibrations, etc.) that may potentially impact Port operations.
- G. DELIVERY, STORAGE, AND HANDLING
- H. Deliver materials to the project site in such quantities and at such times to assure the continuity of pile driving operations in keeping with the project schedule.
- I. Store piles in orderly groups above ground and blocked during storage to minimize possible distortion of members. Piles exhibiting variations beyond tolerance limits will be considered distorted and may not be used in the work.
- 1.4 PROJECT CONDITIONS
- A. Protect existing structures from damage caused by pile driving operations.

PART 2 - PRODUCTS

- 2.1 OPEN-END PIPE AND SPLICE SECTIONS
- A. Pipe Piles: Shall meet the requirements of ASTM A53, Grade B, Type E or S, $F_y = 35$ ksi; ASTM A501, welded, $F_y = 36$ ksi; ASTM A500, welded, Grade D, $F_y = 36$ ksi.
- B. Piles installed with vibratory hammers shall be open-ended.
- C. Steel Reinforcing: ASTM A706, Grade 60, weldable.
- D. Fabrication: Provide backing bar and pile caps of the same steel as the piling. Fasten to piles with welded connections as shown on the drawings.
1. Welds joining piles shall be complete penetration groove welds.
 2. See Section 051200, Structural Steel Framing, for additional fabrication requirements.

2.2 PILE-DRIVING EQUIPMENT

- A. Driving equipment shall be of a type generally used in standard pile-driving practice and shall be operated at the manufacturer's specified rate to develop the required rated energy. Drop hammers will not be allowed.
- B. Vibratory hammers shall be of sufficient size and energy to install piles to the required tip elevation.
- C. Driving caps shall be capable of protecting pile head and providing uniform distribution of energy to pile head.

PART 3 - EXECUTION

3.1 PILE-DRIVING PLANT

- A. Pipe piles shall be driven with a vibratory hammer which is capable of advancing the piles to the desired tip elevation without damage.
- B. Provide equipment of adequate size and capacity to handle, place, drive, and hold the piles to the required penetration and alignment. This equipment shall be able to maintain the alignment of pile and hammer without damage to either.
- C. Driving equipment shall be in good repair and operating condition and shall be capable of being operated as recommended by the manufacturer.
- D. Maintain all pile-driving equipment in safe operating condition at all times.
- E. Any equipment or method which results in regular or repeated damage to piles during driving, or is detrimental to the bearing capacity of piling already driven, will be rejected by the Port.
- F. Pile driving operations shall be performed within the constraints created by Port operations.

3.2 PILE INSTALLATION AND DRIVING CRITERIA

- A. Locate each pile accurately in accordance with the drawings. Reference cut-off elevation of each pile to bench marks established by the Port.
- B. Mark each pile with horizontal lines at 1-foot intervals, and mark the number of feet from pile point at 5-foot intervals. Place marks prior to the start of driving. Marks and numbers shall be readily seen from a minimum distance of 15 feet.
- C. Care shall be exercised in the first 10 to 12 feet of pile penetration where foreign objects in the fill may be present.

- D. Continuously drive each pile to tip elevation as shown on the drawings, and to satisfactory embedment and driving resistance as directed by the Port.
 - 1. Drive piles to embedment lengths or blow counts that achieve pile capacity in accordance with the contract documents.
 - 2. The Port reserves the right to modify driving criteria depending on the equipment used, field conditions encountered, and observations made during pile installation.
- E. Carefully maintain the center of gravity for each group of piles to conform to the locations shown on the drawings.
- F. Carefully plumb the pile before driving. Take care during driving to prevent and to correct any tendency of piles to twist or rotate.
- G. Jetting for installation of piling is prohibited.
- H. Avoid excessive driving, as established by the Port.
- I. Fasten a PVC 12” round cone piling cap to the top of the pile.
- J. Maintain a minimum distance to the first welded splice, a minimum length for pipe sections, and a maximum number of splices for each pile as directed by the Port.

3.3 TOLERANCES

- A. Deviation of pile head of pipe piles under the pile cap may be 6 inches from plan position in any direction, and $\pm 1/4$ inch from the cut-off elevation shown on the drawings.
- B.
 - 1. Piles out of tolerance will be rejected, and shall be removed and replaced with new piles.
 - 2. Plumb piles shall not exceed a deviation from the vertical alignment of more than 1 inch in 10 feet.
 - 3. Battered piles shall not exceed a deviation from the required batter alignment of more than 1 inch in 10 feet.
 - 4. Piles exceeding these deviations may be pulled into position only upon prior approval by the Port.
- C. Tolerances shall be measured when piles are released from the driving template, unless the template is used to form the pile cap.
- D. The Contractor shall employ a competent field person to:
 - 1. Survey the location and alignment of each pile to verify that it meets contract requirements. Field notes shall be submitted to the Port on the same day as the work.
 - 2. Survey and verify the alignment of joined pile sections before and after driving.

3.4 WELDING

- A. Fabricate accurately to lines and dimensions shown on the drawings.
- B. Make no more than one field splice and one shop splice per pile unless permitted otherwise by the Port. Splice piles by complete joint penetration weld. Carefully align and hold pieces firm and concentric until welding is complete. Provide backing bar (minimum 1/4 inch thick) for all splices. Underwater welding for pile splicing is prohibited. Splices shall develop the full strength of the pile in tension, bending, and bearing.
- C. Workmanship and technique shall be of the same standard as for structural steel assembly.

3.5 PIPE PILE ASSEMBLY AND FIT-UP

- A. Pipe pile assembly shall follow the applicable sections of AWS D1.1-10, Chapter 5, Fabrication, and as modified below.
 - 1. Articles 5.22.1.1 through 5.22.3.1 shall be used as noted for butt joints. Article 3.3.3 shall be modified as noted in the following: In the second sentence, delete "...or 1/8 inch (3 mm), whichever..."; also delete the second to the last sentence, which reads, in part, "In correcting . . . in 12 inches (305 mm)."
 - 2. Joint root offset shall not exceed 10 percent of the joined material thickness or 1/16 inch for butt joints landing on backing bars (Article 5.22.31).
- B. All piling, piling assembly, and fit-up shall meet the requirements of ASTM A252 for welded and seamless pile, Article 12.
- C. Permissible Variations in Weights and Dimensions, Article 13, Straightness, and Article 14, Workmanship, Finish, and Appearance.
- D. All joining sections shall be field-matched and marked for verification to minimize outside diameter differences and shall meet a maximum of 1/16 inch landing difference on each side (total of 1/8 inch).
- E. No pressure tests are required for ASTM A53 pipe.
- F. Pile assembly alignment shall be measured and recorded by the Contractor according to ASTM A252, Article 14, Workmanship, Finish, and Appearance, and verified before calling for acceptance testing by the Port. Each joint shall be checked and recorded according to ASTM A252 and AWS, Chapter 6.
- G. Dents, gouges, or arc strikes in the piling greater than 1/8 inch shall be removed or repaired as required under AWS. Pile deficiencies greater than 1/8 inch will be rejected and pipe shall be removed from the site and replaced by the Contractor at no additional cost to the Port.

- H. The Contractor shall align field splices by means that will hold both the receiving end and adjoining end in concentric alignment without deflections due to pile dead load or construction techniques or equipment. Alignment measurements shall be taken and recorded after tack welding and after final joining weld. Any out-of-tolerance assembly will be rejected. The Contractor shall remove sections and repair or replace sections and reassemble at no additional cost to the Port. If misalignment of pile sections is found either by the Contractor's inspection or the Port's inspection, work will be stopped, the Contractor shall submit to the Port a work plan for correcting alignment and for eliminating future alignment problems, including equipment modifications, installation procedural changes, and labor practices before work may be started again. The Port will not grant either a contract time extension or additional compensation for the Contractor's delays in production due to pile and joint misalignment.

3.6 CUTTING OF PILES

- A. Cut off tops of piles square with the pile axis and at the elevations indicated.

3.7 OBSTRUCTIONS DURING DRIVING

- A. Minor obstructions are obstructions encountered within 10 feet of mud line.
- B. An obstruction at any greater depth will still be classed as a minor obstruction unless the same obstruction also stops the advancement of a second pile adjacent to the first. No extra payment will be made for the removal of a minor obstruction.
- C. Major obstructions are obstructions not classed as minor. Additional work directed by the Port to acceptably complete the installation of the pile after encountering a major obstruction will be considered extra work under the terms of the General Conditions. A major obstruction will be determined as such after engineering review of pertinent field conditions and driving data. In addition, the Port reserves the right to require the Contractor to demonstrate, at no additional cost to the Port, that the pile cannot be driven by conventional means.

3.8 REJECTED PILES

- A. The Contractor will not be granted time extensions or additional compensation for work that fails inspection and is rejected.
- B. Associated remedial work necessary to acceptably complete the pile installation shall be performed as required by the applicable code. Such remedial work may include, but is not limited to, installation of additional piling, construction of additional framing, and removal and reinstallation of piling. No extra payment or time extensions will be made for remedial work required to acceptably complete pile installation.

- C. No payment or time extension for furnishing, driving, cut-off, or extending will be made for any piling installed by the order of the Port to correct or replace piles which are out of tolerance, misaligned, broken, incorrectly oriented, or otherwise violate these specifications, or for removing and reinstalling any piling incorrectly installed.
- D. All work within the active channel will be completed in accordance with the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife resources (ODFW 2000, or the most recent version).

PART 4 - PILE COATING

A description of product and application procedures for an approved coating epoxy (DEVRON 261 QC) are attached to this bid document. This or similar coating product, suitable for marine environments (not toxic to aquatic life, etc.), must be used for pile coating for this Project.

PART 5 - EROSION, SEDIMENTATION AND POLLUTION CONTROL BMPS

4.1 BEST MANAGEMENT PRACTICES (BMP) TO BE USED

- A. Offsite Vehicle Tracking and Dust Prevention – Measures will be taken to prevent offsite tracking of materials, including sweeping pavements, covering loads and wetting soil to prevent dust. There will be no aggregate construction.
- B. Material Management and Spill Prevention - All on site fuels will be delivered, handled, stored, used, and applied so as not to be released into the waters of the State/US. Fueling will be accomplished away from the work area. A spill cleanup kit will be available if deemed by EMC to be required.
- C. Waste Management - The handling, storage and disposal of solid waste must conform to federal, state & local law.
- D. Inspection and Maintenance – Inspection and maintenance for all controls included in the Pollution Control Plan and the ESCP will be performed by EMC or his designee.
- E. Employee and Subcontractor Training - Employee and subcontractor education at a minimum will include informing personnel of the posted locations of the Pollution Control Plan/Erosion and Sediment Control Plan/MSDS's and important emergency phone numbers. Education will also include informing personnel of revised material management procedures following a spill.

- F. (Criteria 15) Preconstruction activity - Before alteration of the action area, flag the boundaries of clearing limits associated with site access and construction to minimize soil and vegetation disturbance, and ensure that all temporary erosion controls are in place and functional.
- G. (Criteria 16) Site preparation - During site preparation, conserve native materials for restoration, including large wood, vegetation, topsoil and channel materials (gravel, cobble and boulders) displaced by construction.
- H. Whenever practical, leave native materials where they are found and in areas to be cleared, clip vegetation at ground level to retain root mass and encourage reestablishment of native vegetation. Building and related structures may not be constructed inside the riparian management area.
- I. (Criteria 17) Heavy equipment - Heavy equipment will be selected and operated as necessary to minimize adverse effects on the environment (e.g., minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils); and all vehicles and other heavy equipment will be used as follows:
 1. Stored, fueled and maintained in a vehicle staging area placed 150 feet or more from any waterbody, or in an isolated hard zone such as a paved parking lot, or lined surface.
 2. Inspected daily for fluid leaks before leaving the vehicle staging area for operation within 50 feet of any waterbody.
 3. Steam-cleaned before operation below ordinary high water, and as often as necessary during operation to remain free of all external oil, grease, mud, seeds, organisms and other visible contaminants.
 4. Generators, cranes and any other stationary equipment operated within 150 feet of any waterbody will be maintained and protected as necessary to prevent leaks and spills from entering the water.
- J. (Criteria 17) Heavy equipment - Heavy equipment will be selected and operated as necessary to minimize adverse effects on the environment (e.g., minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).

PART 6 – SAFETY

5.1 ON-SITE SAFETY

- A. Contractor shall take all necessary precautions for the safety of all personnel on the Project site, and shall comply with the Contract Documents and all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises or Project site where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for protection of workers and the public against any hazards created by construction.

- B. Contractor shall designate a responsible employee or associate on the Project site, whose duty shall be the prevention of accidents. The name and position of the person designated shall be reported to the Owner. The Owner has no responsibility for Project site safety. Project site safety is the responsibility of the Contractor.

- C. Contractor will have on-site a Safety Plan that complies with all federal, state, and municipal safety laws and building codes.

Drawings & Coating Description and Procedures Below