

PILING

**\*\*From Wallingford STP ST WALK(14)**

- xx. DESCRIPTION. This work shall consist of furnishing and driving piles of the size and type specified, making field splices and performing pile loading tests.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 505 of the Standard Specifications.

- xx. MATERIALS.

- (a) Steel Pipe Piling. Steel pipe piling shall be steel sections of the mass (weight) and shape shown on the Plans. Material for steel pipe piles to be filled with concrete and for splices shall conform to ASTM A 252 Grade 2 (Fy = 241 MPa (35 ksi)). Closure plates for closed-ended steel pipe piles shall conform to AASHTO M 270M/M 270, Grade 250 (Grade 36), while reinforced conical points for pipe closure as the tip shall conform to AASHTO M 103M/M 103, ASTM A 27, Grade 65/35.

The Contractor shall submit to the Engineer for approval a detail of the proposed conical point prior to use.

Certification. A Type C certification shall be furnished in accordance with Subsection 700.02.

Substitution of steel pipe piling with steel H-piling will not be allowed.

- (b) Concrete. Concrete shall meet the requirements of Section 501 for Concrete, High Performance Class B.

- xx. FURNISHING OF PILING. Steel pipe or steel shell piling shall be furnished in accordance with Subsection 505.03(a). Conical points for steel pipe or shell piling may be inside or outside of the shell. For bearing piles, high-carbon structural steel with a machined ledge or cast steel with a ledge designed for attachment with a simple weld shall be used.

- xx. DRIVING OF PILING.

- (a) General. When practicable, all steel pipe piles for a substructure unit shall be driven prior to placing concrete in any of the piles. Piles shall not be driven within 5 m (16 feet) of any concrete-filled steel pipe pile until the concrete has cured at least 7 days or until the concrete has attained 85% of its 28 day compressive strength, whichever is the greater duration. Steel pipe piles shall not be driven after they have been filled with concrete, unless authorized by the Engineer. Any steel pipe piles that are determined by the Engineer to be unacceptable for use due to breaks, bends, or kinks shall be removed and replaced.

The steel pipe sections shall be of watertight construction so that the concrete may be placed in the dry and of such thickness and rigidity as to show no signs of harmful distortion after being driven. For closed-ended pipe piles, the end closure shall be of adequate strength to resist driving damage and shall be tightly fastened to the pipe pile, to prevent water or soil infiltration. Neither the driving points nor the connection welds shall project more than 6 mm (1/4 inch) beyond the perimeter of the pile tips. If necessary after driving, the inside of the piles shall be cleaned by removing all loose material. The steel pipe pile shall be kept substantially free of water. The Contractor shall provide suitable equipment for inspecting the entire inside surface of the driven steel pipe pile just before placing concrete. Any water inside the steel pipe piles shall be removed prior to placing the structural concrete.

Dynamic monitoring, when required, shall begin after the first 3 m (10 feet) of pipe piling has been successfully driven.

After driving has been completed, the steel pipe piles shall be cut-off at the grades specified on the Plans. Piles shall not be cut-off until it is certain that further pile driving operations will have no effect on the driven piles. Temporary capping devices shall be installed for steel pipe piles immediately upon cut-off to prevent soil and water from entering the driven piles prior to concrete placement.

When reinforcing steel is required, the spacing between adjacent cage elements shall be at least five (5) times the maximum size of aggregate in the structural concrete. Concrete spacers or other approved spacers shall be securely tied at the fifth points around the perimeter of the reinforcing steel cage. Spacers shall be installed at intervals not to exceed 3 m (10 feet), measured along the length of the cage.

- (b) Concrete Placement. Concrete shall not be placed except in the presence of the Engineer. Concrete shall be deposited in the casing through a funnel having a neck not more than 450 mm (1.5 feet) long and not more than 200 mm (8 inches) in diameter. The funnel shall be provided with supports at the neck to permit air to escape during the concrete placement. Special care shall be exercised in filling the piles to prevent honeycombing, stone and air pockets, or other defects from forming in the concrete.

Concrete shall be placed in one continuous operation from the bottom to the top of the pile. Before the initial concrete set, consolidate the areas of the pile which contain steel reinforcement or a minimum of the upper 3 m (10 feet) of the pile, whichever is greater, using approved internal vibratory equipment. The forms shall be

overfilled, the surplus concrete struck-off, and the top surface finished to a uniform and even texture.

When reinforcing steel is required, the reinforcement cage shall be placed into the driven shell or pipe when the concrete reaches the planned bottom elevation of the reinforcement. Reinforcement shall be supported so it remains within 50 mm (2 inches) of the required vertical location. The cage shall be supported from the top until the concrete reaches the top of the pile.

During cold weather the pile heads and surrounding ground shall be covered with straw or other suitable protection to prevent frost from damaging the concrete itself or heaving the ground. Likewise, during hot weather pile heads should be covered with suitable covering material to prevent excessive loss of moisture and to promote adequate curing.

- xx. SPLICES. Where steel pipe piles have to be extended, the spliced connection shall be a continuous, full penetration, butt-weld. The butt-weld shall be made to develop the full strength of the pile, both in bearing and in bending. All splices and connections shall be watertight.

Butt-weld splicing of piles other than as shown on the Plans shall not be permitted without the written authorization of the Engineer. Welded splice connections shall be made with a welding or backup ring.

Preheat requirements for the welding shall be as specified for ASTM A 36 steel.

- xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Steel Piling, Concrete-Filled 12 3/4" O.D. X 3/8" Pipe) to be measured for payment will be the total number of meters (linear feet) for each pile driven, accepted, and left in place, measured to the nearest meter (linear foot).

- xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Steel Piling, Concrete-Filled 12 3/4" O.D. X 3/8" Pipe) will be paid for at the Contract unit price per meter (linear foot). Payment will be full compensation for furnishing, transporting, storing, handling, and placing the material specified, including metal collars, metal shoes, reinforcing material for ends of steel piling, concrete, reinforcing steel, and splices; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for pile loading tests will be made under the appropriate Section 505 pay item(s) in the Contract.

Preboring, jetting, or other methods used to facilitate the driving of piling will not be paid for separately but will be considered incidental to Special Provision (Steel Piling, Concrete-Filled 12 3/4" O.D. X 3/8" Pipe).

10/2/2012

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Steel Piling, Concrete-Filled 12 3/4" O.D. X 3/8" Pipe)	Meter (Linear Foot)