SECTION 02310

TREATED-WOOD PILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. **The extent of the work** is shown on the drawings including number, location, size and length of the piling.

B. **The work includes** furnishing and driving required piling. The layout will be by the General Contractor.

C. **This section includes** the following type of piling:
1. Treated timber piling.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. **Related Sections**:
1. Field Engineering
2. Shop Drawings and Submittals
3. Materials and Equipment
4. Quality Control Services
5. Testing Laboratory Services
6. Temporary Facilities
7. Soil Borings
8. Clearing and Preparing Site
9. Cast-In-Place Concrete

1.4 DAMAGE TO EXISTING PROPERTY

A. **Contractor shall investigate** the existing adjacent buildings, sewers, and utilities and shall take proper and necessary precautions to protect same from damage due to the execution of the piling work. Should damage occur due to Contractor's negligence, the cost and responsibility for repairing or replacing the work in its original condition shall be borne by the Contractor at no cost to the Owner.

B. **If conditions should warrant**, the Contractor shall have photographs taken of walls and interior of adjacent building, showing in full any damages that now exist.

1.5 NOTIFICATION

A. **Contractor shall** notify Architect forty-eight (48) hours prior to driving the initial pile. Pile driving must not commence without the Architect's representative and the testing laboratory being present.

B. **Regulatory Agency:** In accordance with the applicable Building Code, the Contractor shall notify the Director of the responsible regulatory agency at least 24 hours in advance of pile driving.

1.6 PROJECT CONDITIONS

A. **No payment** will be made for rejected piles including piles driven out of place, imperfect piles, or piles damaged in driving or handling.

B. **Site Information**: Data for subsurface conditions is available through the Owner and is not intended as a representation or warranty of continuity of conditions. It is expressly understood that the Owner, the Architect, and the Architect's consultants will not be responsible for interpretations or conclusions drawn by Contractor from the data, which is made available for the information and convenience of Contractor.

C. **Protection**: Protect structures, utilities, and other improvements and construction from damage caused by pile driving operations.

D. **Control**: Establish surveyed elevation benchmarks on structures where directed by Architect before commencing work when structures are within 10-feet of pile driving operations. Record and report elevation of each benchmark at least twice a day while pile driving is in progress and at completion of driving. If benchmark readings indicate displacement, halt driving operations until corrective action has been provided and is acceptable to Architect.

E. **Test Pile Program:** The Contractor shall drive Six (6) probe piles and load test one (1) probe pile. The load shall be applied by means of hydraulic jack acting directly on the head of the pile. All materials required for testing, with the exception of the hydraulic jack, shall be furnished and installed by the Contractor. The furnishing and installing of the hydraulic jack and the actual load testing will be performed by the independent testing laboratory. Testing shall not be started until the pile has been in place for a minimum of fourteen (14) days. Pile design load is nine (8) tons.

1. Load test piles to the yield point of the soil in accordance with the requirements of the International Building Code.

F. **Basis for Bids:** Bids shall be based on indicated number of piles and dimensions from point to cut-off, plus not less than 1 foot of extra length for cutting piles at required cut-off elevations.

G. **Cost Adjustment:** In order to fix the cost to the Owner no longer or shorter piles, if conditions should require change in pile lengths, the Contractor shall submit in his proposal the following unit cost:

1. Treated Timber Foundation Piles.
    a. Cost per pile for added or deleted piles.
    b. Cost per foot in 1'-0" increments for increase or decrease in pile length up to 5'-0" for small base piles (open circle piles on plan) and cost per foot in 1'-0" increments for increase or decrease in pile length up to 5'-0" for piles.

2. No payment will be made for rejected piles including piles driven out of place, imperfect piles, or piles damaged in driving or handling.

PART 2 - PRODUCTS

2.1 TYPE OF PILES

A. **Piles** shall be treated timber.

2.2 MATERIALS

A. **Large Piles:** Southern Pine smooth peeled conforming to ASTM D 25 with dimensions as follows:
1. Minimum tip diameter 8".
2. Minimum butt diameter measured 3'-0" from the butt is 11".
3. Minimum length of piles is 32'-0" from finish floor.

B. **Preservative Treatment:** Comply with AWPA Standards C1 and C3 for foundation piles using Grade 1 creosote (AWPA P1) with a minimum wet retention of 12 lbs. per cu. foot of wood or chromated copper arsenate (CCA) with a minimum wet retention of .80 lbs. per cu. foot. Testing of retention by the gauge method will be acceptable.

C. **Brush Treatment**: Comply with WPA M4 and P9.

D. **Identification:** Every treated pile shall be identified in accordance with AWPA M1 by branding or aluminum tag.

E. **Pile Length Markings:** Mark each pile with horizontal lines at 1'-0" intervals, and the number of feet from pile point at 5'-0" intervals.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. **Delivery:** Deliver materials to Project site in such quantities and at such times to ensure continuity of pile driving operations.

B. **Storage**: Store piles in orderly groups above ground and blocked to prevent distortion of piles.

C. **Handling:** Handle piles carefully without dropping, breaking, or abrading the surface. Repair damage or replace with new material.
1. Brush treat all cut or damaged surfaces of treated piles, including the tops of piles after cut-off. Treatment complying with AWPA M4 and P9 to fill all shakes and splits and thoroughly penetrate the cut surfaces.

3.2 DRIVING

A. **Driving Equipment:** All driving equipment shall be subject to the Architect's review, and if at any time, in the Architect's opinion, does not perform its intended task adequately, it shall be rejected.

B. **Hammer for Piles:** Hammer for piles shall be Vulcan 01 hammer delivering 15,000 ft./lb. of energy per blow.

C. **PREPUNCHING OR PREDRILLING:** To a depth of 5 to 10 feet may be required and should be assumed.

D. **Driving Procedure:** Driving shall be done with fixed leads that shall hold the pile firmly in position and in alignment with the hammer. The butt of each timber pile before driving shall be cut at right angles to the longitudinal axis of the pile, and shall be taper trimmed. The top of the pile shall be protected with a standard steel hood or similar type device, which will prevent damage to the pile during driving. Driving shall progress continuously until proper penetration is obtained. Should refusal be reached prior to reaching the specified tip embedment or some other reason occurs to prevent such driving, pile driving operations shall be terminated and the Architect shall be notified at once.

E. **Location:** Piles shall be driven plumb and accurately into positions shown on drawings: a maximum variation not exceeding 3" will be accepted as fulfillment of contract. Should the variation from true center exceed the above, the piles in each cluster shall be plotted by the Contractor and the center of gravity of said cluster determined. If required, sufficient piles shall then be added at locations determined by the Architect. Contractor shall, at his own cost, drive such additional piling and/or alter pile caps as may be required to compensate for or to rectify the conditions brought about by failure to preserve proper spacing, whether this defect is discovered before or after the conclusion of driving.

F. **Over-Driving:** Any piles driven too low to permit proper cut-off must be corrected without extra charge. Any pile, which is damaged, defected, or broken, or any pile which cannot be driven to proper tip penetration because of interference by stumps or other underground obstructions, shall be immediately removed and replaced with an acceptable substitute pile at the location determined by the Architect. Solidly fill spaces left by withdrawn piles that will not be filled by new piles using cohesion less soil material such as gravel, broken stone, and gravel-sand mixtures. Place and compact throughout length of space in lifts not exceeding 6-feet. In the event that such removal should prove impossible the defective pile shall be abandoned and a suitable pile shall be driven close to the worthless one, where the Architect directs. Payment will be made to the Contractor in accordance with the terms of the contract unless the defect is due to the Contractor's negligence.

3.3 CUT OFF

A. **Piles shall be cut-off** on a neat horizontal plane and the cut-off portions shall be removed from the job site.

B. **Treat tops** of timber piles, after cut off, with 2 brush coats of preservative treatment.

3.4 MISSING PILES

A. **Contractor** shall be held responsible for any pile omitted; and missing piles at whatever stage of work discovered shall be provided without extra cost.

3.5 FIELD QUALITY CONTROL

A. **General:** The Owner will select and pay for a testing laboratory to perform the following tests and to submit test reports.

B. **All piles** shall be inspected prior to driving and shall be hammer marked or aluminum tagged on the butt to indicate conformance with requirements of these specifications.

C. **Log the driving of all piling**. Recording the date driven, type of hammer, pile description, including actual tip, length and butt dimension as measured immediately prior to driving, and driving resistance with blows per foot for all length of the pile. Driving records shall be submitted daily.

D. **Perform pile load test** as specified in article 1.6 E.

E. **Measure vibrations** with a seismograph during all probe pile driving operations to prevent damage to adjacent structures or utilities. For sustained peak particle velocity levels in excess of .25 an inch per second, pile driving operations shall be terminated and the Architect advised.

END OF SECTION