SECTION 316223

COMPOSITE PILES

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***NOTE TO SPECIFIER***

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

***Use this section where pile and grade beam foundation system is required and Composite Piles are a part of the Work. Before editing this Section, obtain the "Report of Subsurface Investigation" prepared by the Geotechnical Engineer. Read the report and incorporate the recommendations included in the report into this Section.***

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Wood concrete composite piles.
			2. Pile inspection and load tests.
		2. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
		3. Related Sections:
			1. Section 012200 - Unit Prices: Procedures related to Work performed under unit price method.
			2. Section 033000 - Cast-In-Place Concrete: Pile caps, grade beams and concrete pile section.
		4. Unit Prices:
			1. Base proposals on number and spacing of piles and on length from point to cut‑off as indicated on Structural Drawings. Provide test piles two feet longer than pile lengths indicated on Structural Drawings.
			2. Determine number and length of piles based on Project Record Documents.
			3. Adjustment in price due to changes in number or length of piles will be based on unit prices established as specified in Section 012200 – Unit Prices.
	2. REFERENCES
		1. American Society for Testing and Materials (ASTM):
			1. ASTM D25 - Specification for Round Timber Piles.
	3. DEFINITIONS
		1. Refusal: 12 blows per foot or more as specified by project structural engineer.
		2. Non-Conforming Piles: Piles that fail field tests, are driven out of position, are driven below cut-off elevation, or are damaged.
	4. DESIGN REQUIREMENTS
		1. Load Carrying Capacity: Indicated on Structural Drawings.
	5. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Procedures for submittals.
			1. Product Data: Connector and drive shoe.
			2. Shop Drawings:
				1. Details and schedule of pile installation sequence and testing.
				2. Pile lengths and diameters.
				3. Reinforcing quantities, sizes, and lengths for each pile.
			3. Assurance/Control Submittals:
				1. Mix Design: Pile concrete as specified herein for Section 033000 mix design.
				2. Qualification Documentation: Submit installer documentation of experience indicating compliance with specified qualification requirements.
		2. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
			1. Project Record Documents: Submit log of the following, recorded at time of pile placement.
				1. Sizes, lengths, and locations of piles.
				2. Sequence of placing.
				3. Number of blows per foot for entire length of pile and measured set for last 10 blows.
				4. Final base and top of pile elevations.
				5. Driving force of each hammer blow.
				6. Time and load settlement measurements of load tested piles.
				7. Difficulties encountered during pile driving.
				8. Type and size of equipment.
				9. Alignment deviations.
	6. QUALITY ASSURANCE
		1. Installer Qualifications: Company specializing in performing Work of this Section with minimum 10 years documented experience.
		2. Pile Component Selection: Under supervision of professional Structural Engineer experienced in pile design licensed in State where project is located.
		3. Pre-Installation Meeting:
			1. Convene a pre-installation meeting at site, one week prior to commencing Work of this Section.
			2. Require attendance of parties directly affecting Work of this Section.
			3. Review conditions of installation, installation procedures and coordination with related work.
			4. Agenda:
				1. Tour, inspect, and discuss condition of soil substrate, pile locations, and other preparatory work.
				2. Review structural loading requirements.
				3. Review pile system requirements (drawings, specifications, and other contract documents).
				4. Review pile driving methods and equipment.
				5. Review and finalize construction schedule related to pile work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
				6. Review required inspections, testing and certifying procedures.
				7. Review weather and forecasted weather conditions, and procedures for resolving unfavorable conditions.
				8. Review safety precautions relating to composite pile installation.
2. PRODUCTS
	1. MATERIALS
		1. Wood‑concrete composite type consisting of concrete upper section untreated Southern Pine, ASTM D2 5, timber lower section.
		2. Untreated Timber Section: Round timber piles, rough peeled, Southern Pine, with minimum butt diameter and minimum tip diameter as indicated on Structural Drawings. Splices not permitted.
		3. Concrete Section Casing: Steel of strength and gage to prevent distortion during driving of pile and adjacent piles; water tight to exclude water and foreign matter during placing of concrete. Minimum inside diameter as indicated on Structural Drawings.
		4. Connector; Drive-Shoe:
			1. Structural grade steel with drive‑shoe minimum 12 gage or material firmly attached to steel casing.
			2. Drive‑shoe penetrating capability: Minimum of 4 inches into timber section.
			3. Other connector requirements: Conform to local building code.
			4. Design splice to withstand minimum moment capacity of 4 foot kips, with no applied axial load, and to withstand minimum tensile force of 20 tons.

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**NOTE TO SPECIFIER**

Select concrete type, aggregate size, strength, and slump requirements as required by project site conditions.

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* + 1. Concrete Materials and Mix: Specified in Section 033000 using Type [I] [ \_\_\_ ] cement, [3/4] [ \_\_\_ ] inch aggregate size, [3000] [ \_\_\_\_\_ ] psi 28 day strength, [6] [ \_\_\_ ] inch slump.
	1. SOURCE QUALITY CONTROL
		1. Certification: Provide shop inspection and certification of timber pile sections.
		2. Timber Section Inspection: Inspect at source of supply and hammer mark in the butt to indicate conformance with specified requirements.
1. EXECUTION
	1. EXAMINATION
		1. Section 017300 - Execution Requirements: Verification of existing conditions before starting work.
		2. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
			1. Verify site conditions will support pile driving equipment for performance of pile driving operations and testing.
			2. Verify that survey benchmark and intended elevations for the Work are as indicated on Drawings and are not located in an area that may be damaged.
		3. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
		4. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.
	2. PREPARATION
		1. Obtain Contracting Officer approval for pile driving hammer.
		2. Use driving method which will not cause damage to existing adjacent structures, and site improvements.
		3. Notify adjacent property owners with written notice, approved by Contracting Officer, prior to start of Work.
		4. Protect adjacent structures and site improvements from damage.
		5. Clean casing of debris and dry casing prior to placing concrete.
	3. INSTALLATION
		1. Protect pile head during driving, using cushion cap. Provide full bearing on piles for distribution of hammer blow. Do not damage piles during driving operations.
		2. Deliver hammer blows to central axis of pile.
		3. Drive piles to length indicated on Structural Drawings. Avoid damaging piles by overdriving.
		4. Refusal: Contact Contracting Officer for instructions when refusal is encountered.
		5. If driving is interrupted before refusal, drive pile an additional 6 inches before resuming recording of performance data.
		6. Re‑drive piles which have lifted due to driving adjacent piles, or by soil uplift.
		7. Cut off tops of piles to elevations indicated on Structural Drawings and prepare pile top to receive pile cap or grade beams.
		8. Prevent surface damage to piles.
	4. CONSTRUCTION
		1. Site Tolerances:
			1. Maximum Variation From Vertical For Plumb Piles: 1 in 48.
			2. Minimum Variation From Required Angle for Batter Piles: 1 in 24.
			3. Maximum Variation From Top of Pile Elevation: 2 inches.
			4. Maximum Out-of Position: 4 inches.
	5. FIELD QUALITY CONTROL
		1. Section 014000 - Quality Control: Inspection and testing procedures.
		2. Inspection: Obtain Contracting Officer inspection of pile installations, locations, and elevations.
		3. Site Tests:

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**NOTE TO SPECIFIER**

Select appropriate ASTM testing specifications for specific site conditions. Indicate number of test piles required to determine acceptability of pile and grade beam foundation system for the specific site conditions. Select loading factor for tests.

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* + - 1. Perform testing using equipment, load carrying device, load, and instrumentation in conformance with [ASTM D 1143] [and] [ASTM D 3689, and ASTM D 3966].
			2. Verify site conditions will support cribbing and load for testing purposes.
			3. Establish stable working elevation for test equipment.
			4. Provide materials and equipment for testing except hydraulic jack.
			5. Provide test piles same diameter and type specified for piles, constructed in same manner.
			6. Test [6] [ \_\_\_\_ ] indicator piles at locations as directed by Contracting Officer.
			7. Subject piles to [1-3/4] [ 2] [ \_\_\_\_ ] times design load.
			8. Document test equipment used and method of calibrating and recording.

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**NOTE TO SPECIFIER**

Select acceptable permanent set.

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* + 1. Acceptable Permanent Set of Piles After Load Testing: [1/8] [1/4] [ \_\_\_ ] inch.
		2. Accepted test piles may be used in Work.
		3. Non-Conforming Piles: Provide additional piles or supplement piles to conform to specified requirements at non-conforming piles.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022