

Pre-Pile Driving Conference

2019 NMDOT Standard Specifications for Highway and Bridge Construction

State Materials Bureau Geotechnical Engineering/Exploration Section

File Driving Submittals and Design Documents:

- Approved Pile Driving Equipment Submittals (Geotechnical Foundation Design Engineer)
- Preliminary Wave Equation Analysis Acceptance Chart (Section 504: Load Testing of Bearing Piles, Department or Consultant)
- Foundation Design Report and/or Geotechnical Design Report (BidX)

Other submittals:

Material Certifications (PM + Optional Structural Engineer)
Welder Certifications (PM + Optional Structural Engineer)
Class G Concrete Mix Design (PM)
Class A Concrete Mix Design (PM)

Recommended List of Attendees:

- NMDOT Project Manager
- NMDOT Pile Driving Inspector
- Prime Contractor
- Pile Driving Superintendent
- Geotechnical Foundation Engineer of Record (NMDOT or Consultant)
 - If Consultant EOR, then include the NMDOT Geotechnical Engineer
- Integrity Testing (PDA and CAPWAP) Personnel





Conference Date:		Control Number:	
Project Name:		Bridge Number(s):	
Project Location:			

I. Meeting Objectives

- Review specifications and project specific plan requirements.
- Review Foundation and/or Geotechnical Design Reports.
- Review Contractor's construction sequence, work schedule and equipment for driven pile construction.
- Discuss pile driving construction procedures.
- Discuss Load Testing of Bearing Piles (Section 504) including sequencing, scheduling, etc.
- Discuss inspection procedure and acceptance criteria.
- Discuss Pile Driving Analyzer (PDA) and CAsE Pile Wave Analysis Program (CAPWAP) Testing requirements.
- Other items:

NOTE: NONE OF THE FOLLOWING DISCUSSIONS SHALL BE CONSTRUED AS ADDITIONAL REQUIREMENTS OR CHANGES IN THE CONTRACT.



II. Roles and Responsibilities

- ❖ NMDOT Project Manager is responsible for interpretation and administration of the Contract. Other Authority and Duties are included in Section 106.8 of the NMDOT Standard Specifications.
- ❖ Pile Driving Superintendent is responsible for providing oversight of all aspects of pile driving construction covered in Section 501 and 504, including testing and inspecting all aspects of the driven pile construction.
- ❖ NMDOT Inspector is responsible for monitoring the contractor's driven pile operations to ensure construction, testing, and inspection procedures are performed in accordance with the NMDOT specifications. The inspector is also responsible for setting up and operating the saximeter stroke measurement device.
- ❖ Engineer of Record (EOR) will provide final acceptance of the driven piles based on a review of the *NMDOT Driven Pile Inspection Reports* and results of the integrity tests. The EOR may either be the NMDOT Foundation Engineer or a consultant hired through Phase III services.
- ❖ NMDOT Geotechnical Engineer or Section Personnel will represent the State Geotechnical Engineer and is available to provide technical assistance to the NMDOT Project Manager.

III. Startup and General Plan Review

- Pile certification has been reviewed by the Bridge Bureau and approved by the Project Manager.

(Date Approved)
- Pile driving equipment submittal has been reviewed by the Geotechnical Foundation Engineer of Record and approved by the Project Manager. _____
(Date Approved)
- Class G Concrete Mix Design has been approved by the State Concrete Engineer (including slump loss test results). _____
(Date Approved)
- Class A Concrete Mix Design has been approved by the State Concrete Engineer (including slump loss test results). _____
(Date Approved)
- Welder Certifications have been reviewed by the Bridge Bureau and approved by the Project Manager.

(Date Approved)



Driving Systems meeting the requirements of 501.3.2.4 shall be approved by the Project Manager. However, final approval will be contingent upon dynamic test results (PDA and CAPWAP analysis).
_____ (Date Approved)

Preliminary Wave Equation Analysis Acceptance Charts (504.3.4.1) have been submitted to the Project Manager. _____ (Date Approved)

Inspector's saximeter stroke measurement device is available and set up for this project.
_____ and _____
Date Completed *name of operator and contact information*

Anticipated Work Schedule (Days, Hours):		Mobilization Date:	
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Driven Pile Construction Start date and duration:	
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Site Conditions: <i>Discuss conditions that could affect pile driving operations. Equipment access, earthwork, soil, groundwater.</i>	
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IV. Proposed Construction Sequence

Discussion of driven pile construction and testing sequence:	
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V. Construction of Driven Piles:

- Review *Pile Driving Field Inspection Form* and required signatures.

- **Minimum Manufacturer's-Rated Hammer Energy (Section 501.3.2.3)**
Does Contract specify minimum hammer energy? Yes____ No____
Amount? _____
- **Recommended hammer fuel setting based on Pre-Construction Wave Equation Analysis (Section 504.3.4.1)**

- **Pre-Boring (Section 501.3.4.2)**
Do plans call for pre-boring? Yes____ Depth? _____, No ____
- **Rock Sockets (Section 501.3.4.2.4)**
Does Contract require the Contractor to drive piles in rock sockets? Yes____ No____
- **Do Plans call for Minimum (501.3.6.2) or Estimated (501.3.6.3) Penetration Elevations?** _____
- Pile cut-offs (501.4.3) shall be calculated by the Project Manager.

Review the following Sections:

- Minimum Penetration Elevation (501.3.6.2)
- Application of Pre-Bored Holes (501.3.4.2.3)
- Estimated Penetration Elevation (501.3.6.2)

VI. Pile Acceptance (501.3.7)

- PDA Department Testing
- CAPWAP Department Analysis
- PDA Consultant Testing
- CAPWAP Consultant Analysis



Pile Load Capacity and Penetration (501.3.7.1)

- Drive piles to the required nominal capacity in accordance **Section 501.3.3**, “Driven Pile Capacity.”
- If specified, install piles to the penetration elevation in accordance with **Section 501.3.6.2**, “Minimum Penetration Elevation.”

Location and Alignment Tolerances (501.3.7.2)

- Department will accept driven piles if the construction tolerances are satisfied in accordance with **Section 501.3.7.2**.

VII. Damaged Pile Limitation (Section 501.3.7.3)

The Department will reject damaged piles based on the following criteria:

- Piles that are broken, cracked, or split;
- Pre-cast concrete piles that show signs of crushing and spalling of the concrete, splitting, or visible cracks that affect the strength or service life of the pile;
- Steel piles bent or deformed during installation and exceed mill tolerances for sweep and camber; or
- Closed-end pipe piles that show evidence of groundwater infiltration, or breaks or deformation that would impair the strength of the completed piles.
- **This is performed at no additional cost to the Department.**

VIII. Correcting Rejected Piles (501.3.7.4)

Correct piles damaged during driving because of internal defects or improper driving with methods approved by the Project Manager, at no additional cost to the Department.

- If the Contractor exceeds the location or alignment tolerances, and the Foundation Engineer determines that corrective measures are necessary, the Contractor shall design and construct corrective measures at no additional cost to the Department. The State Geotechnical Engineer will approve the design.
- Corrective methods may include the following:
 - Removing and replacing the pile with a new, and when necessary, longer pile;
 - Driving additional piles next to the defective piles; or
 - Extending the footing to properly embed the pile.



IX. Index of Applicable Specifications

Section 501 Driven Bearing Piles

- **Materials (501.2)**
 - Standards
 - Steel Piles (Pipe and HP Piles)
 - Spiral Weld Pipe Piles
 - Pre-cast Pre-stressed Concrete Piles
 - Pile Splices
 - Cut-Off Lengths
- **Submittals (501.2.3)**
 - Materials
 - Pile Driving Equipment
 - Class G Concrete Mix
 - Pile Driving Equipment Request Form
 - Welder Certification
- **Equipment (501.3.2)**
 - Pile Hammers
 - Driving Apparatus
 - Required Hammer Energy
 - Approval of Driving System
 - Driven Pile Capacity
 - Determine Pile Capacity with Impact Hammer
 - Preparing for Driving
 - Pile and Hammer Cushion Preparation
 - Conditions to Proceed
 - Pile Driving Operations
 - Minimum Penetration Elevation
 - Estimated Penetration Elevation
 - Pile Acceptance
- **Preparations for Driving (501.3.4)**
 - Abutment Piles
 - Pre-Boring
 - Application of Pre-Bored Holes
 - Diameter of Pre-Bored Holes
 - Obstructions
 - Rock Sockets
 - Temporary Casing
- **Pile Acceptance (501.3.7)**
 - Location and Alignment Tolerances
 - Damaged Pile Limitations
 - Correcting Rejected Piles

Section 504 Load Testing of Bearing Piles

- **Description (504.1.)**
- **Testing Requirements (504.3.4)**
 - PDA
 - CAPWAP
- **Dynamic Pile Testing (504.3.4.1.1)**
 - Pile Driving Analyzer
 - Pile Dynamic Test
 - Consultant Testing
 - Department Testing
- **CAPWAP (504.3.4.1.5)**
 - Case Pile Wave Analysis Test
 - Consultant Analysis
 - Department Analysis
- **Pile Load and Pile Pullout Testing Requirements (504.3.4.2) Completion of Dynamic Testing of Driven Piles (504.3.4.3)**
- **Completion of Dynamic Testing of Cast-in-Place Piles (504.3.4.4)**
- **Completion of Load Testing (504.3.4.5)**
- **Method of Measurement (504.4)**

Section 509 Portland Cement Concrete Mix Designs

Section 541 Welding Certifications



X. Pile Driving Field Inspection Form (Section)

Contractor shall not drive piles until the following conditions are met.

Pre-Construction Checklist:

- Driven Pile Preconstruction Meeting has been held.
- NMDOT inspector has the approved Pile Driving Equipment Data Request Form.
- NMDOT inspector has Wave Equation Analysis Acceptance Charts.
- NMDOT inspector has a saximeter stroke measurement device.
- Hammer specifications match the data included on the Pile Driving Equipment Data Request Form.
- NMDOT inspector has copy of approved Material certifications.
- NMDOT inspector has copy of approved Equipment submittal.
- NMDOT inspector has copy of approved Class G Concrete Mix Design submittal.
- NMDOT inspector has copy of Welder Certifications submittal.

Onsite Construction Checklist:

- Inspect drive head for plumb (plane and perpendicular) with the piles.
- Inspect hammer cushion condition.
- Load testing is ready by Department or Consultant.
- Hammer and leads are aligned with pile plan in vertical or battered position.
- NMDOT Inspector completes the Pile Driving Field Inspection Form.
- Project Manager approves the Pile Driving Field Inspection Form.
- Inspector has prepared and is able to operate saximeter stroke measurement device.

NMDOT Construction Inspector Comments/Signature: