# FOUNDATION NOTES

THE FOLLOWING FOUNDATION NOTES HAVE BEEN PROVIDED BY THE NCDOT GEOTECHNICAL UNIT:

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 295 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55,000 TO 65,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1 AND END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT, AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT 1 AND END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 800 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 4 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 5 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 6 ARE DESIGNED FOR A FACTORED RESISTANCE OF 495 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 7 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 8 ARE DESIGNED FOR A FACTORED RESISTANCE OF 495 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 9 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 10 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 11 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 12 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 13 ARE DESIGNED FOR A FACTORED RESISTANCE OF 520 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 14 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 15 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 16 ARE DESIGNED FOR A FACTORED RESISTANCE OF 520 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 17 ARE DESIGNED FOR A FACTORED RESISTANCE OF 600 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 18 ARE DESIGNED FOR A FACTORED RESISTANCE OF 600 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 19 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 20 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 21 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 22 ARE DESIGNED FOR A FACTORED RESISTANCE OF 450 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 23 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 24 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 25 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 26 ARE DESIGNED FOR A FACTORED RESISTANCE OF 800 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 27 ARE DESIGNED FOR A FACTORED RESISTANCE OF 665 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 28 ARE DESIGNED FOR A FACTORED RESISTANCE OF 665 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 28. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION -15.0, -23.0, -28.0, -23.0, -15.0, -22.0, -22.0, -22.0, -26.0, -26.0, -22.0, -22.0, -28.0, -40.0, -40.0, -28.0, -22.0, -29.0, -29.0, -29.0, -29.0, -15.0, -15.0, -15.0, -15.0, -15.0, -15.0, AND -15.0 FEET, RESPECTIVELY, WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL PERMANENT STEEL CASINGS AT BENTS 1 THROUGH 5, 10, 18 THROUGH 21, AND 23 THROUGH 28 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION -11.6, -11.6, -12.5, -12.4, -14.5, -25.5, -23.4, -17.1, -15.3, -17.2, -11.8, -11.3, -8.8, -10.1,-10.5, AND -10.4 FEET, RESPECTIVELY.

INSTALL DRILLED PIERS AT BENTS 1 THROUGH 28 TO A TIP ELEVATION NO HIGHER THAN -91.0, -92.0, -93.0, -97.0, -97.0, -87.0, -94.0, -93.0, -94.0, -96.0, -92.0, -93.0, -90.0, -104.0, -104.0, -90.0, -89.0, -89.0, -89.0, -93.0, -93.0, -96.0, -115.0, -106.0, -105.0, -98.0, -103.0, AND -103.0 FEET, RESPECTIVELY, WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1, BENT 2, BENT 23, AND BENT 24 IS ELEVATION -14.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 3 AND BENT 4 IS ELEVATION -15.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 5 IS ELEVATION -17.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 6 AND BENT 18 IS ELEVATION -26.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 7 AND BENT 8 IS ELEVATION -27.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 9 AND BENT 10 IS ELEVATION -28.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 11 AND BENT 16 IS ELEVATION -34.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 12 IS ELEVATION -36.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 13 IS ELEVATION -39.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 14 IS ELEVATION -47.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 15 IS ELEVATION -50.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 17 IS ELEVATION -30.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 19 AND BENT 21 IS ELEVATION -20.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 20 AND BENT 22 IS ELEVATION -18.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 25 IS ELEVATION -11.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 26, BENT 27, AND BENT 28 IS ELEVATION -13.0 FEET.

SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

POLYMER SLURRY IS REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 28.

SPT IS REQUIRED FOR DRILLED PIERS AT BENTS 14, 20 THROUGH 25, 27, AND 28. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT TESTING MAY BE REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 13, 15 THROUGH 19, AND 26. THE ENGINEER WILL DETERMINE THE NEED FOR SPT TESTING. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIER TIP ELEVATIONS MAY BE ADJUSTED HIGHER OR LOWER, A MAXIMUM OF 10 FEET BASED UPON THE RESULTS OF THE AXIAL LOAD TESTS ON THE DEMONSTRATION PIERS. SEE AXIAL LOAD TEST SPECIAL PROVISION.

CONSTRUCT DEMONSTRATION PIERS IN ACCORDANCE WITH THE GEOTECHNICAL SPECIAL PROVISIONS, STANDARD SPECIFICATIONS, AND AXIAL LOAD TEST SPECIAL PROVISION.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

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|---|---|---|---|
| DESIGNED BY: | J. DOUGHTY | DATE : | MAR 2016 |
| DRAWN BY: | K. WHITE | DATE : | MAR 2016 |
| CHECKED BY: | B. LOFLIN | DATE : | MAR 2016 |
| DESIGN ENGINEER OF RECORD: | J. DOUGHTY | DATE : | MAY 2016 |


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SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165


NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOUNDATION NOTES

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-17 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 278 |

5/9/2016
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