



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

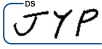
ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

March 30, 2023

MEMORANDUM TO: Chad Kimes, P.E.
Division Engineer

ATTENTION: Katie Hite, P.E.
Division Bridge Program Manager

FROM:  John Pilipchuk, L.G., P.E.
State Geotechnical Engineer

DocuSigned by:
John Pilipchuk
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STATE PROJECT: 46024.1.2 (B-5310)
FEDERAL PROJECT: BRZ-1817(001)
COUNTY: SAMPSON

DESCRIPTION: Replace Bridge No.188 over Ward Swamp on SR 1817

SUBJECT: Structure Foundation Recommendations

The Geotechnical Engineering Unit has completed the subsurface investigation and prepared the foundation design recommendations for the above structure and presents the following project data.

- Structure Inventory (7) pages
- Foundation Design Recommendation (2) pages
- Geotechnical Foundation Table (1) pages
- Design Scour Elevation Memorandum (1) pages

Please call Jinyoung Park, P.E. at (984) 920-8908 or Andrew Drda at (984) 920-8911 if there are any questions concerning this memorandum.

Attachment

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
EASTERN REGIONAL OFFICE
1570 MAIL SERVICE CENTER
RALEIGH, NC 27699-1570

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

FOUNDATION RECOMMENDATIONS

WBS: BP4-R027

DESCRIPTION : REPLACE BRIDGE NO. 188 OVER WARD

T.I.P. NO.: B-5310

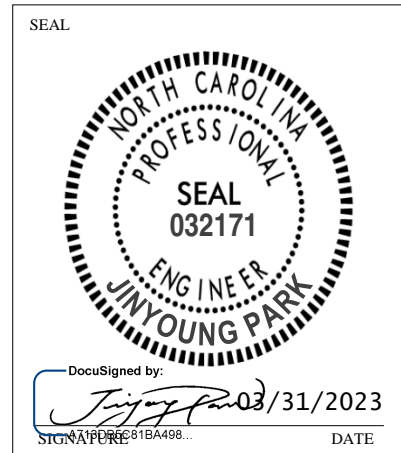
SWAMP ON SR 1817

COUNTY: Sampson

STATION: 17+25.5 -L-

CONTRACT: _____

	INITIALS	DATE
DESIGN	^{DS} AD	03/30/2023
CHECK	^{DS} JYP	03/31/2023
APPROVAL	^{DS} JYP	03/31/2023



BENT	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	16+69.31 -L-	Cap on HP 12x53 Steel Piles	71 Tons/Pile	Avg. Bottom of Cap El. = 125.84 ft ± Estimated Length of Pile = 50 ft Number of Piles = 7
BENT 1	17+25.50 -L-	Cap on HP 14x73 Steel Piles	125 Tons/Pile	Avg. Bottom of Cap El. = 127.42 ft ± Point of Fixity = 96 ft Tip Elevation No Higher than = 90 ft Estimated Length of Pile = 60 ft Number of Piles = 8
END BENT 2	17+81.69 -L-	Cap on HP 12x53 Steel Piles	71 Tons/Pile	Avg. Bottom of Cap El. = 125.81 ft ± Estimated Length of Pile = 55 ft Number of Piles = 7

NOTES ON PLANS & COMMENTS

See Following Pages

FOUNDATION RECOMMENDATION NOTES ON PLANS

1) FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOUNDATION RECOMMENDATION COMMENTS

- 1) 1.5:1 (H:V) SLOPE AT THE END BENTS IS OK WITH SLOPE PROTECTION.
- 2) USE TYPE II MODIFIED BRIDGE APPROACH FILL DETAILS AT EACH END BENT.
- 3) NO WAITING PERIOD IS REQUIRED BEFORE BEGINNING END BENT CONSTRUCTION.
- 4) USE A SINGLE ROW OF VERTICAL PILES AT ALL BENTS.
- 5) THE DESIGN SCOUR ELEVATIONS FOR BENT NO. 1 IS 109.5'

Prepared by AD^{DS} on 03/30/2023

Check by JYP^{DS} on 03/31/2023

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles			
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT	
End Bent 1, Piles 1-7	71	126.84	50	N/A	N/A	95	11							
Bent 1, Piles 1-8	125	128.42	60	107	90.0	175								
End Bent 2, Piles 1-7	71	126.81	55	N/A	N/A	95								

*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$**RDR = \frac{\text{Factored Resistance} + \text{Factored Downdrag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Downdrag Resistance} + \frac{\text{Nominal Scour Resistance}}{\text{Scour Resistance Factor}}$$

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
EB1	MAYBE	55	2		
B1	YES	65			
EB2	MAYBE	60			

*EST = Pile order lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-7	71			0.75			
Bent 1, Piles 1-8	125			0.75		8	1.00
End Bent 2, Piles 1-7	71			0.75			

*Factored Dead Load is factored weight of pile above the ground line.


PROJECT NO. B-5310

SAMPSON COUNTY

STATION: 17+25.5 -L-

NOTES:

- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jinyoung Park PE#032171) on 3/30/23.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing when PDAs may be required.

	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						PILE FOUNDATION TABLES	
	SIGNATURE _____	DATE _____	REVISIONS				SHEET NO.	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	NO. <u>1</u>	BY: _____	DATE: _____	NO. <u>3</u>	BY: _____	DATE: _____	TOTAL SHEETS	
	NO. <u>2</u>			NO. <u>4</u>				