

Date: August 1, 2025

Memorandum to: Ronyell Thigpen, PE
Vice President – Raleigh Civil Group Lead
WSP

From: Andrew A. Nash, PE
Senior Geotechnical Engineer
Terracon Consultants

State Project: BP6.R013

County: Columbus

Description: Replace Bridges No. 324 and No. 325 on SR 1158 (Chair Factory Rd)
Over Beaver Dam Swamp and Monie Swamp

Subject: Geotechnical Report - Design and Construction Recommendations

Terracon Consultants has completed a subsurface investigation for this project and presents the following recommendations.

I. Slope and Embankment Stability

A. Slope Design

All permanent slopes should be constructed at a ratio of 3:1 (H:V) or flatter except the rock plating locations listed in Section 1.D.

B. Undercut for Embankment Stability

We recommend that 200 cubic yards of Undercut Excavation be included in the contract as a contingency to be used at the discretion of the engineer.

C. Geotextile for Soil Stabilization

A quantity of 200 square yards of Geotextile for Soil Stabilization is recommended for inclusion in the contract as a contingency item in section I.B to be used at the discretion of the engineer.

D. Rock Plating

Rock Plating is recommended for fill slopes constructed steeper than a ratio of 3:1 (H:V) and flatter than a ratio 1.5:1 (H:V) at the following locations:



Alignment	Stations	LT/RT	Area (yd ²)
-L-	18+00 to 20+36.50	LT	152
-L-	19+50 to 20+36.50	RT	70
-L-	21+15.50 to 22+00	LT	87
-L-	21+15.50 to 22+00	RT	78
-L-	26+00 to 27+19.94	LT	84
-L-	28+39.06 to 28+50	LT	15

Construction of Rock Plating shall follow Standard Specifications, Section 275, "Rock Plating" (Roadway Standard Drawing No. 1802.01). Use Detail No. 1 for the new embankment construction. We recommend 486 square yards of Rock Plating be included in the contract for Embankment Stabilization.

II. Subgrade Stability

A. Grade Point Undercut

We recommend 50 cubic yards of Undercut Excavation be included in the contract as a contingency item, for undercut at Grade Points to be used at the discretion of the Engineer.

B. Undercut for Subgrade Stability

A quantity of 200 cubic yards of Undercut for Soil Stabilization is recommended for inclusion in the contract as a contingency item, to be used in areas for undercut at the discretion of the Engineer.

C. Aggregate Subgrade

For Aggregate Subgrade , see Section 505 of 2024 Standard Specifications.

Shallow Undercut

A quantity of 100 cubic yards of Shallow Undercut for Aggregate Subgrade is recommended for inclusion in the contract as a contingency item, to be used at the discretion of the Engineer.

Geotextile for Subgrade Stabilization

A quantity of 300 square yards of Geotextile for Subgrade Stabilization is recommended for inclusion in the contract as a contingency item to be used at the discretion of the Engineer.

Class IV Subgrade Stabilization

We recommend a quantity of 200 tons of Class IV Subgrade Stabilization for inclusion in the contract as a contingency item, to be used at the discretion of the Engineer.

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D. Geotextile for Soil Stabilization

A quantity of 200 square yards of Geotextile for Soil Stabilization is recommended for inclusion in the contract as a contingency item in section II.B to be used at the discretion of the engineer.

III. Borrow Specifications

A. Borrow Criteria

Common borrow for embankment construction to subgrade shall meet Coastal Plain criteria as described in Section 1018-2(B) of the Standard Specifications.

B. Shrinkage Factor

A shrinkage factor of 25 percent is recommended for calculation of earthwork quantities on this project.

C. Select Granular Material

We recommend 400 cubic yards of Select Granular Material, Class II or III be included in the project as a contingency item in conjunction with Section I.B and Section II.B to be used at the discretion of the Engineer. Follow Standard Specifications, Section 265, "Select Granular Material".

IV. Miscellaneous

A. Reduction of Unclassified Excavation – Clearing and Grubbing

Loss of 230 cubic yards is estimated on the project due to Clearing and Grubbing of cut sections.

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Sincerely,
Terracon Consultants, Inc.



Kelly R. Plummer, PG
Project Geologist

Andrew A. Nash, PE
Senior Geotechnical Engineer

Attachments: Summary of Quantities

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
 Summary of Quantities

WBS Number: BP6.R013
 TIP Number: BP6.R013
 Description: REPLACE BRIDGES NO. 324 AND NO. 325 ON SR1158 OVER MONIE SWAMP

County: COLUMBUS
 Field Office / PEF: _____

Project Engineer: A. NASH
 Project Geologist: K. PLUMMER

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	200	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	50	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. B	Contingency	N/A	N/A	200	CY
Total Quantity of Undercut Excavation =							450	CY
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	400	CY
Total Quantity of Select Granular Material =							400	CY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	200	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. D	Contingency	N/A	N/A	200	SY
Total Quantity of Geotextile for Soil Stabilization =							400	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	18+00.00	20+36.50	152	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	19+50.00	20+36.50	70	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	21+15.50	22+00.00	87	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	21+15.50	22+00.00	78	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	26+00.00	27+19.94	84	SY
0223000000-E	Rock Plating	275 - Rock Plating	I. D	-L-	28+39.06	28+50.00	15	SY
Total Quantity of Rock Plating =							486	SY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. C	Contingency	N/A	N/A	100	CY
Total Quantity of Shallow Undercut =							100	CY
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. C	Contingency	N/A	N/A	200	TON
Total Quantity of Class IV Subgrade Stabilization =							200	TON
1112000000-E	Geotextile for Subgrade Stabilization	505 - Aggregate Subgrade	II. C	Contingency	N/A	N/A	300	SY
Total Quantity of Geotextile for Subgrade Stabilization =							300	SY

These Items Only Impact Earthwork Totals								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	230	CY
N/A	Shrinkage Factor	235 - Embankments	III. B	N/A	N/A	N/A	25	%