July 16, 2019

MEMORANDUM TO:	John L. Pilipchuk, L.G., P.E. State Geotechnical Engineer
STATE PROJECT:	I-5877
F.A. NUMBER:	N/A
COUNTY:	Cumberland and Harnett Counties
DESCRIPTION:	I-95 from SR 1811 (Bud Hawkins Road) (Exit 70) to SR 1002 (Long Branch Road) (Exit 81) - Widen to eight lanes. -L- Station 776+00 to 946+00
SUBJECT:	Geotechnical Report – Design and Construction Recommendations 776+00 to 790+00 (SUPPLEMENTAL)

S&ME Inc. has completed a subsurface investigation for stations 776+00 to 790+00 for this project and submits the following recommendations. **Please note that this report is an addendum to the report previously submitted report dated March 7, 2019**.

I. Slope and Embankment Stability

A. Slope Design

Recommend that all slopes be constructed at a ratio of 3:1 (H:V) or flatter.

B. Undercut

A quantity of 200 cubic yards of Undercut Excavation for embankment stability should be included in the project contract as a contingency item 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 should be included in the project contract as a contingency item to be used at the discretion of the Engineer.

II. Subgrade Stability

A. Undercut for Subgrade Stability

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

B. Aggregate Subgrade
Soft, saturated and highly plastic soils were encountered at the following locations:

Line	Stations	Location
-L-	776+00 to 790+00	LT and RT

A quantity of 3,800 cubic yards of Shallow Undercut is recommended for inclusion in the contract to be used for the above locations.

C. Geotextile for Soil Stabilization
A quantity of 13,000 square yards of Geotextile for Soil Stabilization should be included for the project to be used in the undercut areas discussed in Section II A and II B.

D. Subsurface Drainage – Subsurface Drain
Groundwater was encountered within 6 feet of proposed grade in several places along the project as noted below. A quantity of 5,600 linear feet of 6" Perforated Subdrain Pipe for subsurface drain (Roadway Standard Drawing No. 815.02) should be included for the project.

Recommend that subsurface drains be installed near these stations.

Line	Stations	Location
-L-	776+00 to 790+00	LT/RT

III. Borrow Specifications

A. Borrow Criteria
Common borrow for embankment construction to subgrade shall meet Coastal Plain criteria outlined in the Standard Specifications, Article 1018-2(B).

B. Select Granular Material
Select Granular Material for embankment construction on geotextile for soil stabilization and/or backfill shall meet the criteria outlined in Standard Specifications, Article 1016-3 Class II or III. A quantity of 400 cubic yards of Select Granular Material is recommended for inclusion in the contract as a contingency item, to be used at the discretion of the Engineer.

C. Class IV Subgrade Stabilization
A quantity of 7,700 tons Class IV Subgrade Stabilization is recommended for inclusion in the contract to be used for the areas discussed in Section II B.

D. Shrinkage Factor
A shrinkage factor of 25% is recommended in the calculation of all earthwork quantities.

IV. Miscellaneous

A. Reduction of Unclassified Excavation – Clearing and Grubbing
A loss of 400 cubic yards is estimated on the project due to clearing and grubbing.

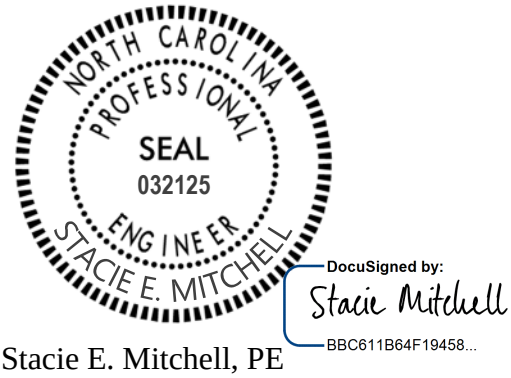
B. Reduction of Unclassified Excavation –Acceptable but not to be used in the top 3 feet of embankment or backfill

The following areas of excavation contains plastic clays with plasticity indices (PI) greater than 15 and less than 20 and unclassified excavation that is marginally acceptable but not in the top three feet of embankment or backfill.

Line	Stations	Location
-L-	778+25 to 781+25	LT and RT
-L-	782+25 to 786+75	LT and RT

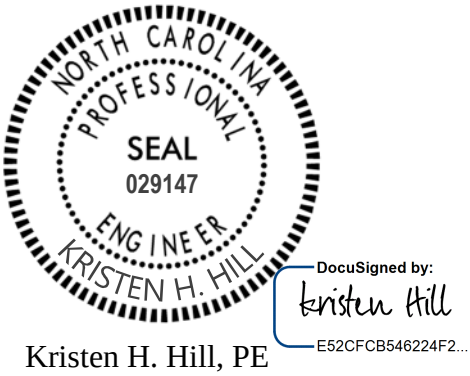
These soils are shown by the asterisk hatch pattern (***) on cross-sections and are marginal and should not be used in the top three feet of embankment or backfill. Calculated quantity of moderately plastic unclassified excavation is 1,400 cubic yards.

Prepared by,



Stacie E. Mitchell, PE
Project Engineer

Prepared by,



Kristen H. Hill, PE
Senior Engineer

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: N/A
TIP Number: I-5986B (I-5877)
Description: I-95 Widening from Station 776+00 to 790+00

County: Cumberland/Harnett
Field Office: Charlotte

Project Engineer: Stewart Laney
Project Geologist: N/A

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	200	CY
						Total Quantity of Undercut Excavation =	**400**	**CY**
0195000000-E	Select Granular Material	265 - Select Granular Material	III. B	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. C	-L-	776+00.00	790+00.00	13,000	SY
						Total Quantity of Geotextile for Soil Stabilization =	**13,200**	**SY**
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. B	-L-	776+00.00	790+00.00	3,800	CY
						Total Quantity of Shallow Undercut =	**3,800**	**CY**
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	III. C	-L-	776+00.00	790+00.00	7,700	TON
						Total Quantity of Class IV Subgrade Stabilization =	**7,700**	**TON**
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. D	-L-	776+00.00	790+00.00	5,600	LF
						Total Quantity of 6" Perforated Subdrain Pipe =	**5,600**	**LF**
N/A	Unclassified Excavation - Acceptable, but not to be used in top 3 ft of embankment or backfill	225 - Roadway Excavation	IV. B	-L-	778+50.00	786+50.00	1,400	CY
						Total Quantity of Unclassified Excavation - Acceptable, but not to be used in top 3 ft of embankment or backfill =	**1,400**	**CY**

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	400	CY
N/A	Shrinkage Factor	235 - Embankments	III. D	N/A	N/A	N/A	25	%