



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION


PAT MCCRORY
GOVERNOR

ANTHONY J. TATA,
SECRETARY

September 16, 2014

MEMORANDUM TO: Jerry Jennings, P.E.
Division Engineer

ATTENTION: John Abel
Division Bridge Program Manager

FROM: Kyung Kim, Ph.D., P.E. 
Eastern Regional Geotechnical Manager

STATE PROJECT: 17BP.1.R.68 (SF-140007)
COUNTY: Camden
DESCRIPTION: Bridge No. 7 on SR 1200 over Sawyer Creek

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following recommendations.

I. Slope/Embankment Stability

A. Slope Design

Recommend all roadway cut and fill slopes be constructed at a ratio of 3:1 (H:V) or flatter.

B. Undercut

Recommend 300 cubic yards of undercut be included in the contract as a contingency item to be used at the discretion of the Engineer.

C. Geotextile for Soil Stabilization

Recommend 300 square yards of geotextile for soil stabilization be included in the contract as a contingency item to be used at the discretion of the Engineer.

MAILING ADDRESS:
EASTERN REGIONAL OFFICE
GEOTECHNICAL ENGINEERING UNIT
1570 MAIL SERVICE CENTER
RALEIGH NC 27699-1570

TELEPHONE: 919-662-4710
FAX: 919-662-3095

WEBSITE: WWW.NCDOT.GOV

LOCATION:
3301 JONES SAUSAGE RD., SUITE 100
GARNER, NC 27529-9489

D. Geotextile for Embankment Stabilization

A quantity of 1800 square yards of high strength geotextile for embankment stabilization meeting the attached Project Special Provision will be required at the following locations to be placed on the existing embankment as shown on the attached layout plan:

<u>Line</u>	<u>Station (±)</u>	<u>Location</u>
-L-	12+00 to 12+90	from left to right
-L-	13+70 to 14+70	from left to right

Place geotextile for embankment stabilization sections on the existing ground extended between embankment side-slopes stake line toes with machine direction (MD) perpendicular to -L- line. No geotextile splice or joint is allowed in machine direction (MD). All joints in the cross machine direction must be overlapped a minimum of 18 inches. See the attached Layout Plan and Project Special Provision, "Geotextile for Embankment Stabilization" for details.

Please include the attached Layout Plan and Project Special Provision, "Geotextile for Embankment Stabilization" in the roadway contract. Also, please include the following pay item and quantity in the roadway contract:

Geotextile for Embankment Stabilization	1800 Square Yard
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Please note that the anticipated long term embankment settlement caused by the consolidation of the existing thick layer of muck and organic soft soils below the embankment at the above listed locations would result in some extra roadway maintenance work.

II. Subgrade Stability

A. Undercut for Subgrade Stability

Recommend 500 cubic yards be included in the contract as a contingency item to be used at the discretion of the Engineer.

B. Geotextile for Soil Stabilization

Recommend 500 square yards of geotextile for soil stabilization be included in the contract as a contingency item to be used at the discretion of the Engineer.

Recommend an additional quantity of 1,500 square yards of geotextile for soil stabilization as a contingency item for use in shallow undercut outlined in Section II. D.

C. Subsurface Drainage - Subsurface Drain

Recommend 1,000 linear feet of subsurface drain (roadway standard drawing 815.02) be included in the contract as a contingency item to be used at the discretion of the Engineer.

D. Aggregate Subgrade

Recommend 500 cubic yards of shallow undercut for aggregate subgrade should be included in the contract as a contingency item 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 specifications outlined in the Standard Specifications, Article 1018-2(B).

B. Select Granular Material

Recommend 1000 cubic yards of Select Granular Material, Class II and/or III be included in the contract for backfill in the undercut areas listed in Section I. B. and II. A. Select granular material for embankment/backfill for geotextile for soil stabilization if required, or backfill in water shall meet the criteria outlined in the Standard Specifications, Article 1016-3, Class II and/or III.

C. Shrinkage Factor

A shrinkage factor of 30 percent is recommended for calculation of earthwork on this project.

D. Borrow Reconnaissance and Availability

Sandy soils with good to excellent engineering properties are available in nearby areas.

E. Class IV Subgrade Stabilization Material

A quantity of 265 tons of Class IV subgrade stabilization material should be included in the project contract as backfill for the Aggregate Subgrade. The material should meet the requirement of Standard Specifications, Article 10-16-3 Class IV.

IV. Miscellaneous

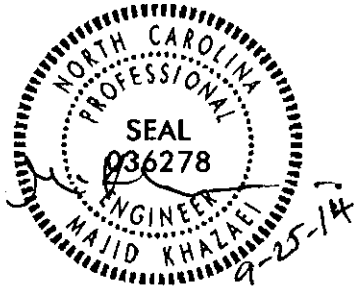
A. Reduction of Unclassified Excavation - Loss Due to Clearing and Grubbing

No significant loss of unclassified excavation is anticipated due to clearing and grubbing.

B. Reduction of Unsuitable Unclassified Excavation - Unsuitable Waste

Based on the current roadway plans, unclassified excavation along this project will be primarily derived from shallow subgrade cuts and ditch excavation. The majority of this material is granular in nature, estimate 100% suitable for embankment construction.

Prepared By:



Majid Khazaei
Geotechnical Design Engineer

Prepared By:



Joseph L. Stone, L.G.
Project Geological Engineer

KJK/JLS/CAK/MK



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL ENGINEERING UNIT
 Summary of Quantities**

WBS No.: I7BP.1.R.68

County: CAMDEN

Project Engineer: MAJID KHAZAEI

TIP No.: SF-140007

Field Office: Greenville

Project Geologist: JL STONE

Description: BRIDGE NO. 7 ON SR 1200 OVER SAWYER CREEK

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	300	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	500	CY
Total Quantity of Undercut Excavation =								
0195000000-E	Select Granular Material	265 - Select Granular Material	III. B	Contingency	N/A	N/A	1,000	CY
Total Quantity of Select Granular Material =								
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	300	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. B	Contingency	N/A	N/A	2,000	SY
Total Quantity of Geotextile for Soil Stabilization =								
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. D	Contingency	N/A	N/A	500	CY
Total Quantity of Shallow Undercut =								
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	III. E	Contingency	N/A	N/A	265	TON
Total Quantity of Class IV Subgrade Stabilization =								
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. C	Contingency	N/A	N/A	1,000	LF
Total Quantity of 6" Perforated Subdrain Pipe =								

These Items Only Impact Earthwork Totals								
N/A	Shrinkage Factor	235 - Embankments	III. C	N/A	N/A	N/A	30	%

CONTRACT: ID: SF-140007

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-140007	1	7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+75 TO 15+80	4	5

CROSS SECTIONS

LINE	STATION	PLAN
-L-	12+72	6
-L-	13+65	7

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.1.R.68 (SF-140007) F.A. PROJ. _____

COUNTY CAMDEN

PROJECT DESCRIPTION BRIDGE NO. 7 ON SR 1200
(SAWYERS CREEK RD) OVER SAWYERS CREEK

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

R.E. SMITH

A.A. MOORE

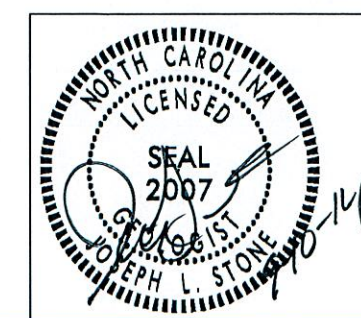
SUMMIT PERSONNEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE SEPTEMBER 2014



DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.1.R.68	2A	7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.1.R.68		PE	
		RW & UTIL.	

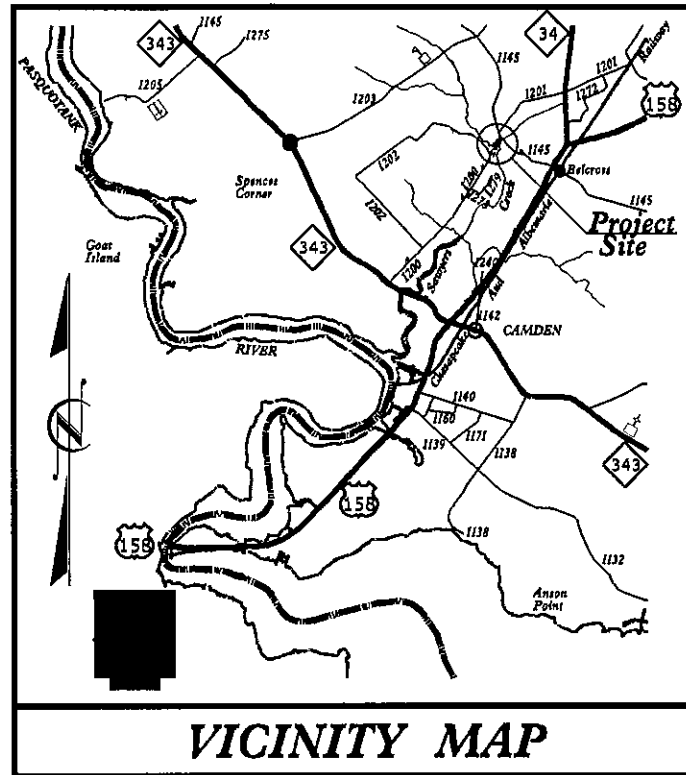
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CAMDEN COUNTY

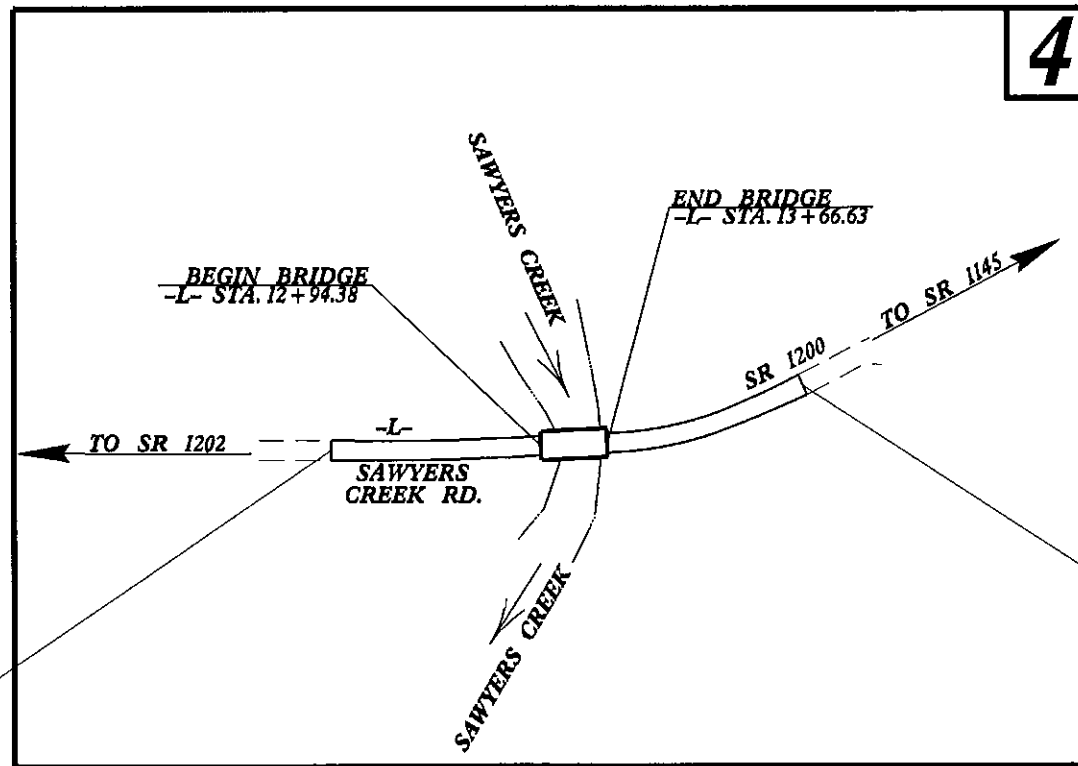
LOCATION: BRIDGE NO. 7 OVER SAWYERS CREEK ON SR 1200
(SAWYERS CREEK RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Plan Sheet Symbols



VICINITY MAP

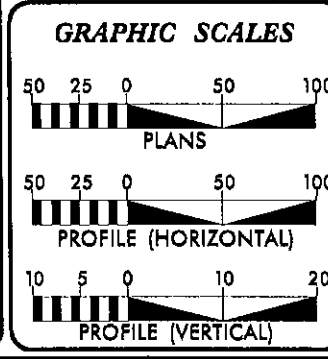


BEGIN TIP PROJECT 17BP.1.R.68
-L- STA. 10 + 75.00

END TIP PROJECT 17BP.1.R.68
-L- STA. 15 + 80.00

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DESIGN DATA

ADT 2010 =	750
ADT 2034 =	955
DHV =	10 %
D =	60 %
T =	6 % *
V =	30 MPH
* TTST = 2% DUAL 4%	
FUNC CLASS =	LOCAL SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT 17BP.1.R.68	=	0.082 MILES
LENGTH STRUCTURE TIP PROJECT 17BP.1.R.68	=	0.014 MILES
TOTAL LENGTH TIP PROJECT 17BP.1.R.68	=	0.096 MILES

Prepared for the North Carolina Department of Transportation in the Office of:

WETHERILL ENGINEERING
259 JONES FARM RD. SUITE 304
RAVENNA, N.C. 27854
PHONE NO. 833-9777
FAX NO. 833-8377
TEL. NO. 833-8377

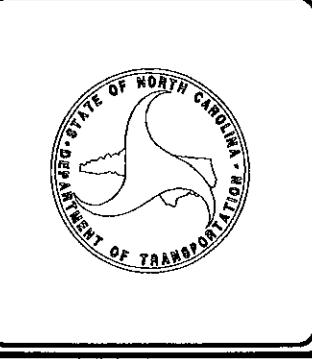
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	EDWARD G. WETHERILL, PE PROJECT ENGINEER
LETTING DATE:	BOB A. MAY, PE PROJECT DESIGN ENGINEER
NCDOT CONTACT:	JOHN S. ABEL, JR. DIVISION 1 BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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CONTRACT: TIP PROJECT: 17BP.1.R.68

CONTRACT:



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA,
SECRETARY

September 10, 2014

STATE PROJECT: 17BP.1.R.68 (SF-140007)
F.A. PROJECT: N/A
COUNTY: Camden
DESCRIPTION: Bridge No. 7 on SR 1200 over Sawyer Creek
SUBJECT: Geotechnical Inventory Report

Project Description

This project is located at the existing bridge over Sawyer Creek. Proposed construction consists of raising the grade of SR 1200 to accommodate the new bridge. The total length of this project is approximately 0.096 miles. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in July 2014. Hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station(±)</u>
-L-	10+75 to 15+80

Areas of Special Geotechnical Interest

- 1) The entire project was found to exhibit seasonal high ground water.
- 2) The entire project contains cohesive soils which have the potential to cause embankment/subgrade and or slope stability problems during construction.

- 3) The entire project was found to contain organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

Physiography and Geology

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Ground elevations ranged from -5± in the bed of Sawyer Creek to to 4± feet above sea level along the existing SR 1200 embankment.

Surficial soils in this area are generally classified as alluvial.

Ground Water

Ground water data was collected in August 2014, during a time of normal precipitation. Ground water elevations tended to be near at sea level.

Soils

Soils encountered within this project area have been divided into four categories, alluvial, undivided coastal plain, formational, and roadway embankment.

Alluvial soils were comprised of 4± to 16 feet of very soft muck with 3± to 5± feet of organic sand (A-2-4) and 4± feet of organic silty clay (A-7-6). Organic samples taken within these soils returned organic percentages ranging from 5.2% to 44.4% and had a natural moisture content ranging from 48.8% to 157.2%. It should be noted that a significant amount of wood was encountered in these organic soils.

Soils identified as undivided coastal plain are composed of 5± to 15± feet of very soft to soft sandy silt and silty clay (A-4, A-7-6), with 5± to 30± feet of loose to dense sand (A-2-4, A-3).

Formational soils belonging to the Yorktown Formation were encountered beneath the Undivided Coastal Plain soils. They are comprised of 5± to 10± feet of medium stiff to stiff sandy clay (A-6), with 5 or more feet of medium dense to dense sand (A-2-4).

Roadway embankment soils were found within the existing SR 1200 embankment. Where encountered it is composed of 3.5± feet of soft to medium stiff sandy silt (A-4) and 2± to 3± feet of loose sand (A-2-4).

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

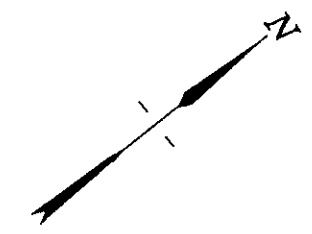
TELEPHONE: 919-707-6850
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

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

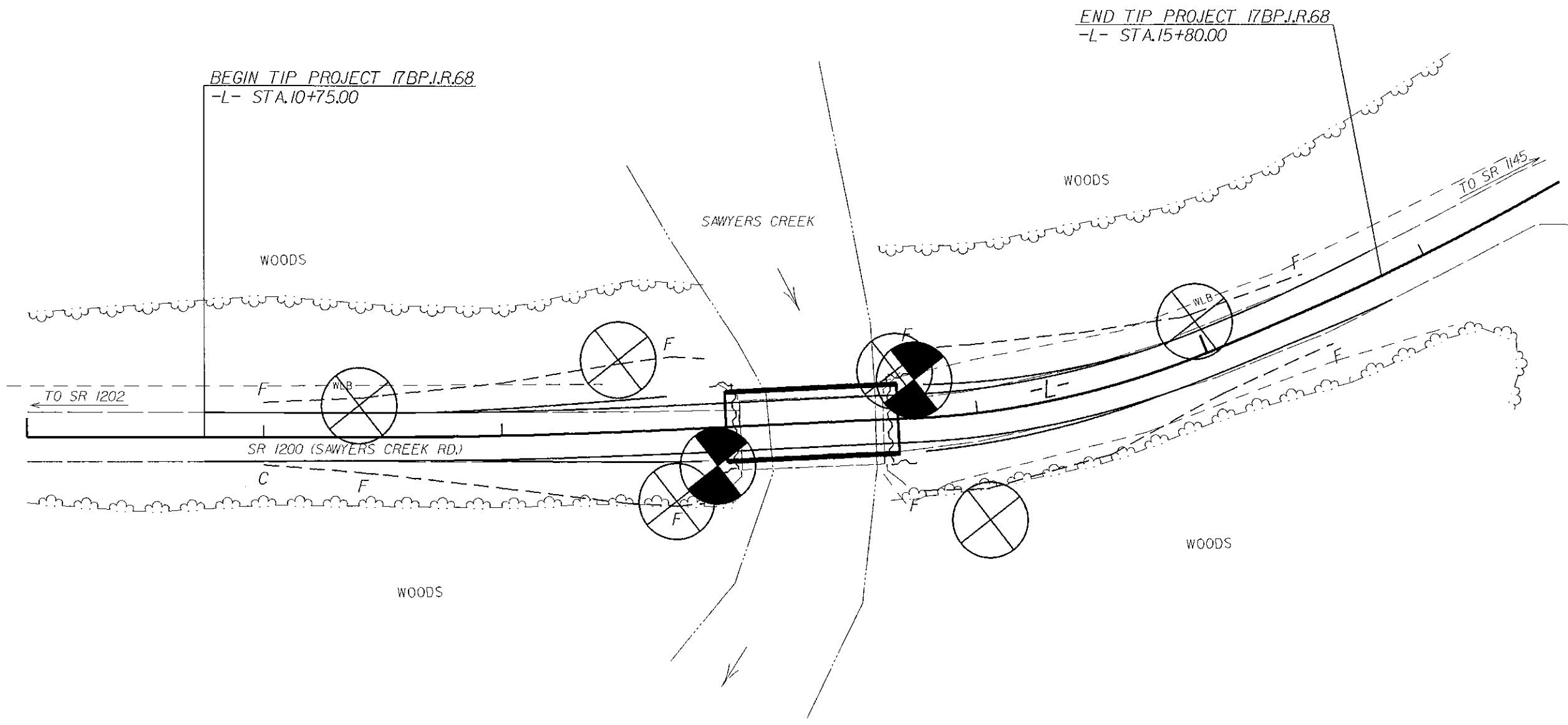
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 8/17/99

PROJECT REFERENCE NO. <i>SF-140007</i>		SHEET NO. <i>4</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 2px; text-align: center;"> INCOMPLETE PLANS <small>DO NOT USE FOR A/C ACQUISITION</small> </div>		<div style="border: 1px solid black; padding: 2px; text-align: center;"> PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small> </div>	



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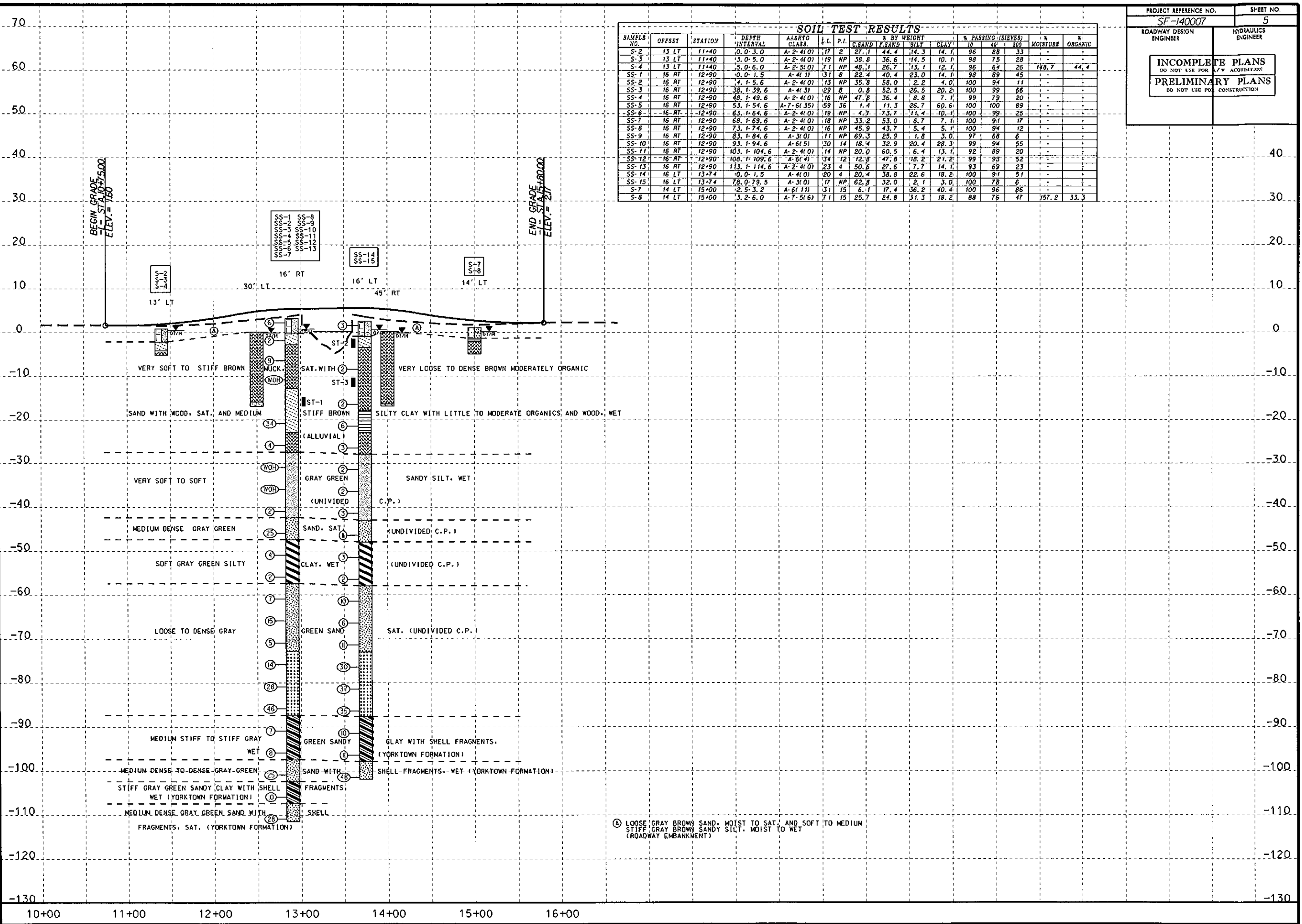
REVISIONS

5/14/94

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PROJECT REFERENCE NO. SF-140007	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							CLAY	SILT	SAND	#10	#20	#40		
S-2	13 LT	11+40	0.0-3.0	A-2-4(0)	17	2	27.1	44.4	14.3	14.1	96	88	33	
S-3	13 LT	11+40	3.0-5.0	A-2-4(0)	19	NP	38.8	36.6	14.5	10.1	98	75	28	
S-4	13 LT	11+40	5.0-6.0	A-2-5(0)	7	NP	48.1	26.7	13.1	12.1	96	64	26	146.7
SS-1	16 RT	12+90	0.0-1.5	A-4(1)	31	8	22.4	40.4	23.0	14.1	98	89	45	
SS-2	16 RT	12+90	1.5-5.6	A-2-4(0)	13	NP	35.8	58.0	2.2	4.0	100	94	11	
SS-3	16 RT	12+90	38.1-39.6	A-4(3)	29	8	0.8	52.5	26.5	20.2	100	99	66	
SS-4	16 RT	12+90	48.1-49.6	A-2-4(0)	16	NP	47.8	36.4	8.8	7.1	99	79	20	
SS-5	16 RT	12+90	53.1-54.6	A-7-6(35)	59	36	1.4	11.3	26.7	60.6	100	100	89	
SS-6	16 RT	12+90	63.1-64.6	A-2-4(0)	19	NP	4.7	73.7	11.4	10.1	100	98	25	
SS-7	16 RT	12+90	68.1-69.6	A-2-4(0)	18	NP	33.2	53.0	6.7	7.1	100	91	17	
SS-8	16 RT	12+90	73.1-74.6	A-2-4(0)	16	NP	45.9	43.7	5.4	5.1	100	94	12	
SS-9	16 RT	12+90	83.1-84.6	A-3(0)	11	NP	69.3	28.9	1.8	3.0	97	88	6	
SS-10	16 RT	12+90	93.1-94.6	A-6(5)	30	14	18.4	32.9	20.4	28.3	99	94	55	
SS-11	16 RT	12+90	103.1-104.6	A-2-4(0)	14	NP	20.0	60.5	6.4	13.1	92	89	20	
SS-12	16 RT	12+90	108.1-109.6	A-6(4)	34	12	12.8	47.6	18.2	21.2	99	93	52	
SS-13	16 RT	12+90	113.1-114.6	A-2-4(0)	23	4	50.6	27.6	7.7	14.1	93	69	23	
SS-14	16 LT	13+74	0.0-1.5	A-4(0)	20	4	20.4	38.8	22.6	18.2	100	91	51	
SS-15	16 LT	13+74	78.0-79.5	A-3(0)	17	NP	62.8	32.0	2.1	3.0	100	78	6	
S-7	14 LT	15+00	2.5-3.2	A-6(11)	31	15	6.1	17.4	36.2	40.4	100	96	85	
S-8	14 LT	15+00	3.2-6.0	A-7-5(6)	7	15	25.7	24.8	31.3	18.2	88	76	47	157.2
														33.3



40

30

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

-100

-110

-120

-130

10+00

11+00

12+00

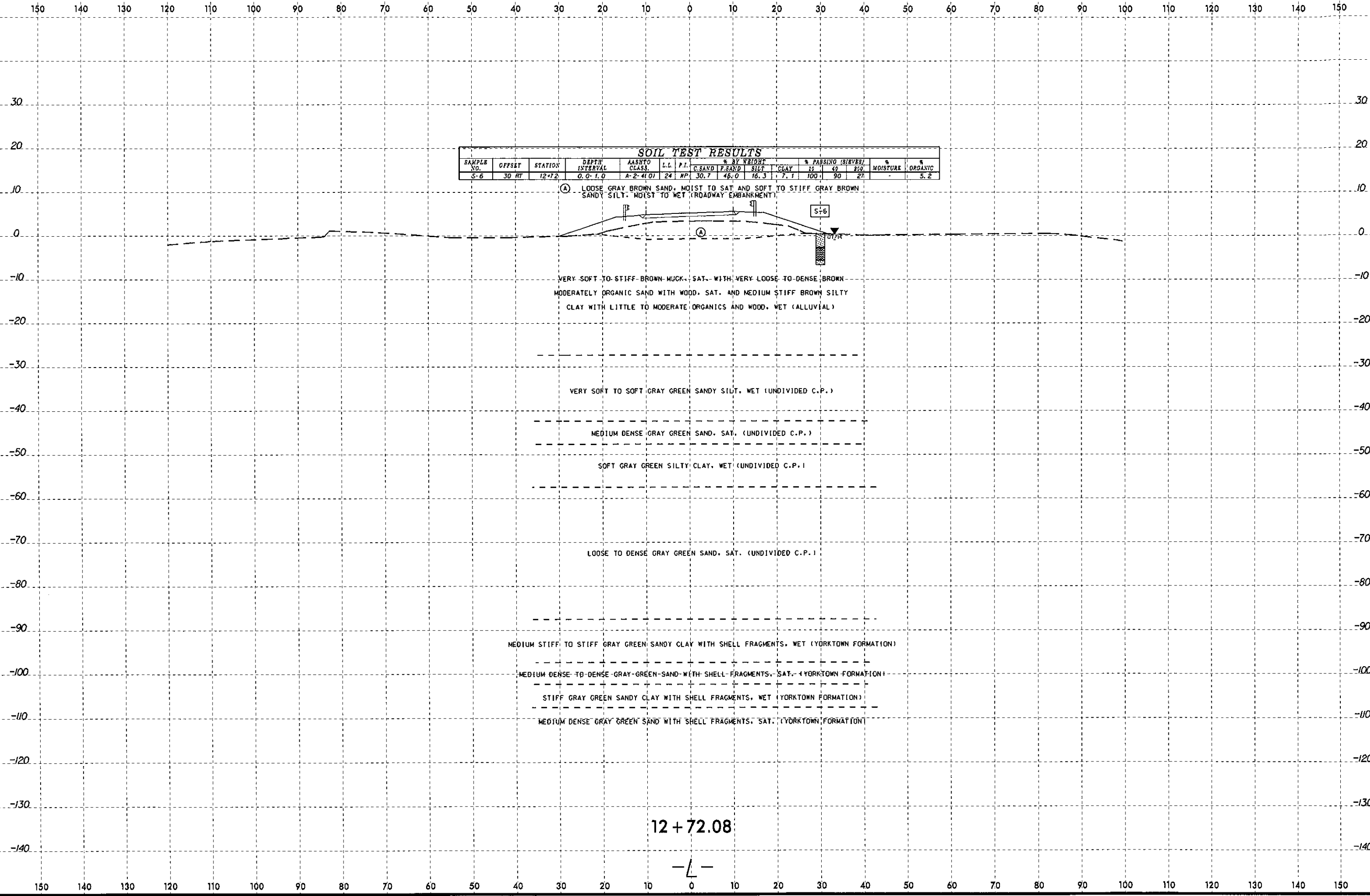
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14+00

15+00

16+00

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SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASHTO CLASS	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
S-6	30 RT	12+72	0.0-1.0	A-2-4(0)	24	NP	30.7	46.0	16.3	7.1	100	90	27	5.2

(A) LOOSE GRAY BROWN SAND, MOIST TO SAT AND SOFT TO STIFF GRAY BROWN SANDY SILT, MOIST TO WET (ROADWAY EMBANKMENT)

VERY SOFT TO STIFF BROWN MUCK, SAT. WITH VERY LOOSE TO DENSE BROWN MODERATELY ORGANIC SAND WITH WOOD, SAT. AND MEDIUM STIFF BROWN SILTY CLAY WITH LITTLE TO MODERATE ORGANICS AND WOOD, WET (ALLUVIAL)

VERY SOFT TO SOFT GRAY GREEN SANDY SILT, WET (UNDIVIDED C.P.)

MEDIUM DENSE GRAY GREEN SAND, SAT. (UNDIVIDED C.P.)

SOFT GRAY GREEN SILTY CLAY, WET (UNDIVIDED C.P.)

LOOSE TO DENSE GRAY GREEN SAND, SAT. (UNDIVIDED C.P.)

MEDIUM STIFF TO STIFF GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)

MEDIUM DENSE TO DENSE GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)

STIFF GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)

MEDIUM DENSE GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)

12 + 72.08

-L-

GEOTEXTILE FOR EMBANKMENT STABILIZATION
(SPECIAL)

DESCRIPTION:

This work consists of furnishing and installing synthetic geotextile for stabilizing embankment in accordance with this provision and as directed by the Engineer. The work shall include maintaining the geotextile in the required configuration until completion and acceptance of overlying work items. The geotextile for embankment stabilization shall be placed at the following locations:

<u>Line</u>	<u>Station (\pm)</u>	<u>Location</u>
-L-	12+00 to 12+90	from left to right
-L-	13+70 to 14+70	from left to right

or as directed by the Engineer.

MATERIAL:

The geotextile for embankment stabilization shall be made of high-tenacity polyester in the machine direction with a plain or straight-warp weave pattern and polyester or polypropylene in the cross machine direction or approved equal. The geotextile shall be composed of strong rot-proof synthetic fibers formed into a geotextile of the woven type. The geotextile shall be free of any treatment or coating which might significantly alter its physical properties after installation.

The geotextile shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration resulting from ultraviolet or heat exposure. The geotextile shall be a pervious sheet of synthetic fibers oriented into a stable network so that the fibers retain their relative positions with respect to each other. The edges of the geotextile shall be finished to prevent the outer yarn from pulling away from the geotextile. The geotextile shall be free of defects or flaws which significantly affect its physical and/or filtering properties. Sheets of geotextile shall be either overlapped a minimum of 18 inches or sewn together with a seam that furnishes the required minimum strengths. The seam thread shall be made of synthetic fibers which are resistant to deterioration, as are the geotextile fibers. No seams or joints are permitted perpendicular to machine direction (MD). Lamination of geotextile sheets to produce the physical requirements of a geotextile layer will not be accepted.

During all periods of shipment and storage, the geotextile shall be wrapped in a heavy duty protective covering to protect the geotextile from direct sunlight ultraviolet rays, mud, dust, dirt, and debris. The geotextile shall not be exposed to temperatures greater than 140°F. After the protective wrapping has been removed, the geotextile shall not be left uncovered under any circumstances for longer than one (1) week.

The geotextile shall meet the following physical requirements:

All values represent minimum average roll values (MARV) as defined by ASTM D4439 for geotextile properties (any roll in a lot (a single day's production) should meet or exceed the minimum values in this table). Machine direction (MD) and cross-machine direction (CD) are as defined by ASTM D4439.

Provide Type 1 Certified Mill Test Report in accordance with Article 106-3 of the *Standard Specifications* with minimum average roll values (MARV) as defined by ASTM D4439 for geotextile properties. For testing geotextiles, a lot is defined as a single day's production. The Engineer reserves the right to inspect or test the geotextiles at any time. If requested by the Engineer, provide a sample of the geotextile for testing.

Use woven polyester or polypropylene geotextiles with properties meeting the following requirements.

Property	ASTM Test Method	Requirement (MARV)
Wide Width Tensile Strength @ 5% Strain (MD)	D4595	5000 lbs/ft
Wide Width Tensile Strength @ Ultimate (MD)	D4595	10000 lbs/ft
Ultraviolet Stability (% strength retained) ²	D4355	60 %
Ultimate Seam Strength	D4884	1500 lbs/ft

¹US Sieve No. per AASHTO M92
²After 250 hours of exposure

CONSTRUCTION METHODS:

The geotextile for embankment stabilization shall be placed at the locations shown on plans or as directed by the Engineer.

The locations should be cleared and free of obstructions, debris and pockets. Stumps shall be cut smooth at the ground elevation with the root system left intact. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, or storage.

The geotextile for embankment stabilization shall be placed on the existing ground with machine direction (MD) laid perpendicular to --L-- line and sections are extended between embankment side-slopes toes or as directed by the engineer. Geotextile shall be laid smooth and free from tension, stress fold, wrinkles or creases without any joint, seam, or overlapping in the machine (warp) direction. All joints in the cross machine direction must be either overlapped a minimum of 18 inches or sewn by an approved method to develop the required seam strength. All sewn seams must be placed upward to allow for inspection. All geotextile which is damaged as a result of installation shall be replaced or repaired at the discretion of the

Engineer with no additional cost to the Department. Compaction equipment must be operated such that it will not damage the geotextile.

Any geotextile which is left uncovered for longer than one week after placement shall be replaced at no additional cost to the Department.

METHOD OF MEASUREMENT

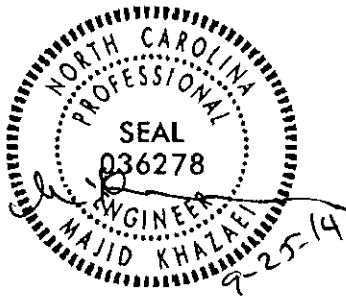
The quantity of geotextile to be paid for will be the number of square yards of "Geotextile for Embankment Stabilization" measured along the surface of the ground, which has been placed and accepted by the engineer. No separate measurement for payment will be made of overlapping geotextile.

BASIS OF PAYMENT:

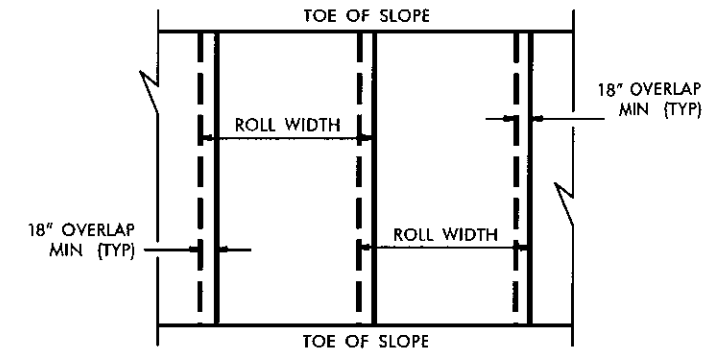
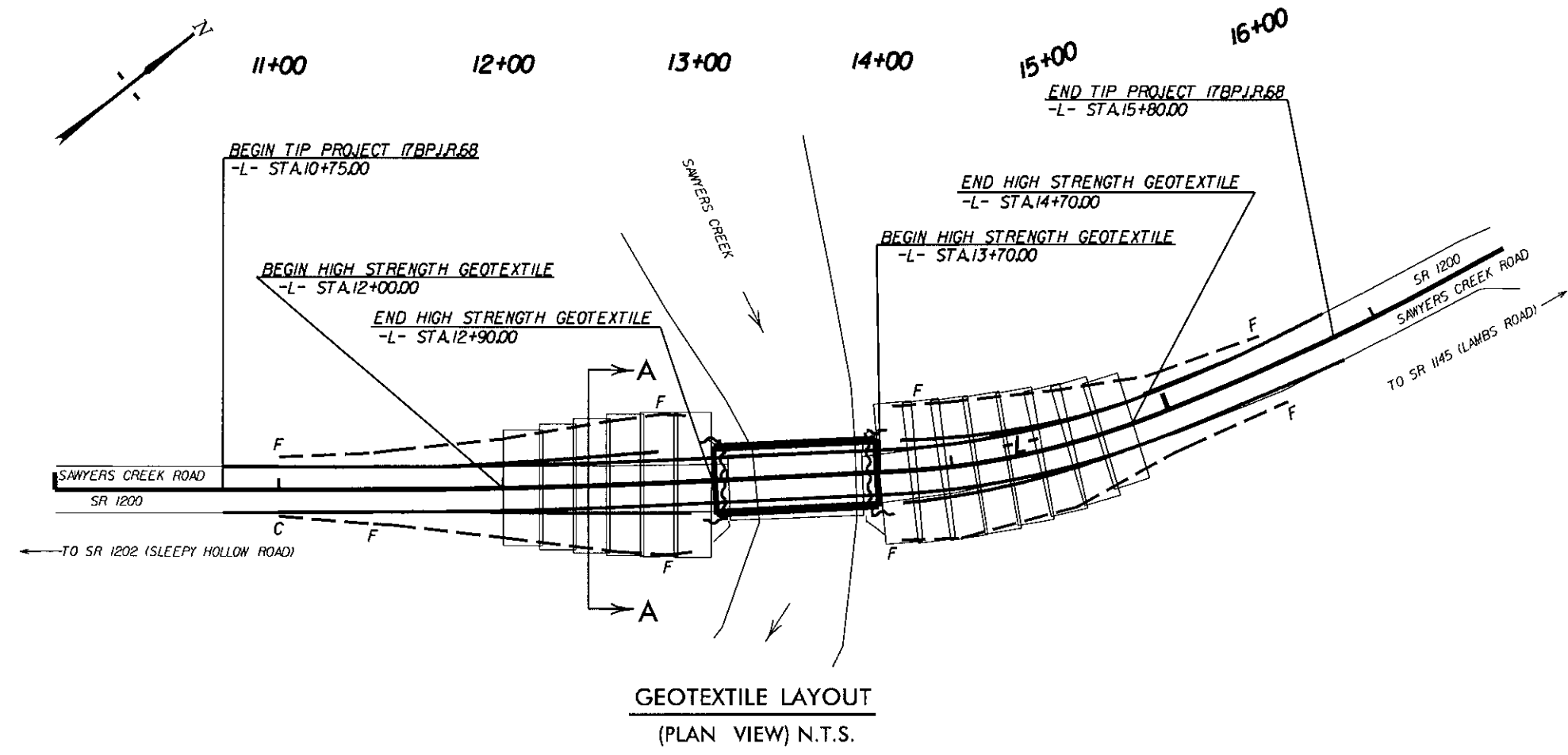
The quantity of geotextile, measured as provided above, will be paid for at the contract unit price per square yard for "Geotextile for Embankment Stabilization". Such price and payment will be full compensation for furnishing, transporting, placing, sewing, testing, and all incidentals necessary to complete the work as described in this provision and the plans.

Pay Item: Geotextile for Embankment Stabilization Square Yard

Prepared By:



Majid Khazaei
Geotechnical Design Engineer

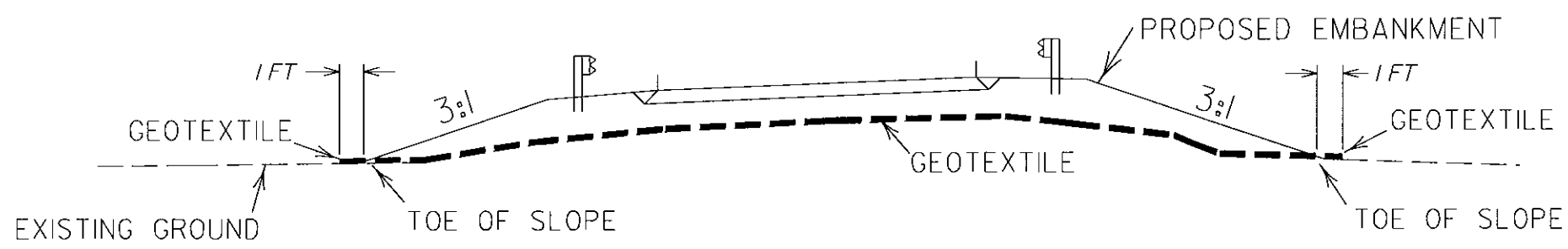


GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW)

NOTES:

- 1. INSTALL ALL HIGH STRENGTH GEOTEXTILE IN ACCORDANCE WITH THIS PLAN AND THE GEOTEXTILE FOR EMBANKMENT STABILIZATION SPECIAL PROVISION.

ESTIMATED QUANTITIES	
GEOTEXTILE FOR EMBANKMENT STABILIZATION.....	1800 SY



TYPICAL SECTION A-A
N.T.S.

PROJECT NO.: 17BP.1.R.68 (SF-140007)
 CAMDEN COUNTY
 STATION: 13+30.5 -L-
 SHEET 1 OF 1

PREPARED BY: MK
 REVIEWED BY: CAK
 DATE: 09-24-14
 DATE: 09-24-14

GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

Bridge No. 7 on SR 1200
 over Sawyer Creek
GEOTEXTILE FOR EMBANKMENT STABILIZATION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			
2			4			