

REFERENCE: B-5703

PROJECT: 45657

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5703	1	11

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY CUMBERLAND/HARNETT  
PROJECT DESCRIPTION BRIDGE NO. 60 ON -L-  
(US 401) OVER LOWER LITTLE RIVER AT 16+93

**CONTENTS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE(S)
5-6	CROSS SECTION(S)
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**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. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

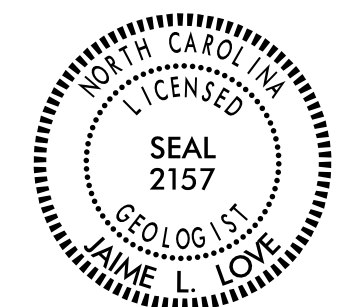
- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
A. N. KINTNER  
 \_\_\_\_\_  
N. O. MOORE  
 \_\_\_\_\_  
D. G. PINTER  
 \_\_\_\_\_  
J. HAIRE  
 \_\_\_\_\_

INVESTIGATED BY J. L. LOVE  
 DRAWN BY J. L. LOVE  
 CHECKED BY N. T. ROBERSON  
 SUBMITTED BY N. T. ROBERSON  
 DATE OCTOBER 2019

NOTE: BORINGS AT THE PROPOSED INTERIOR BENT LOCATIONS DO NOT MEET GROUNDLINE FROM TIN FILE DATED 12/13/2016 BECAUSE SCOUR FROM SEVERAL MAJOR FLOOD EVENTS CAUSED BY HURRICANES IN 2016 AND 2018 HAS AFFECTED THE ACTUAL SITE CONDITIONS.



DocuSigned by:  
Jaime L. Love 12/17/2019  
 \_\_\_\_\_  
 B93571039B88485 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

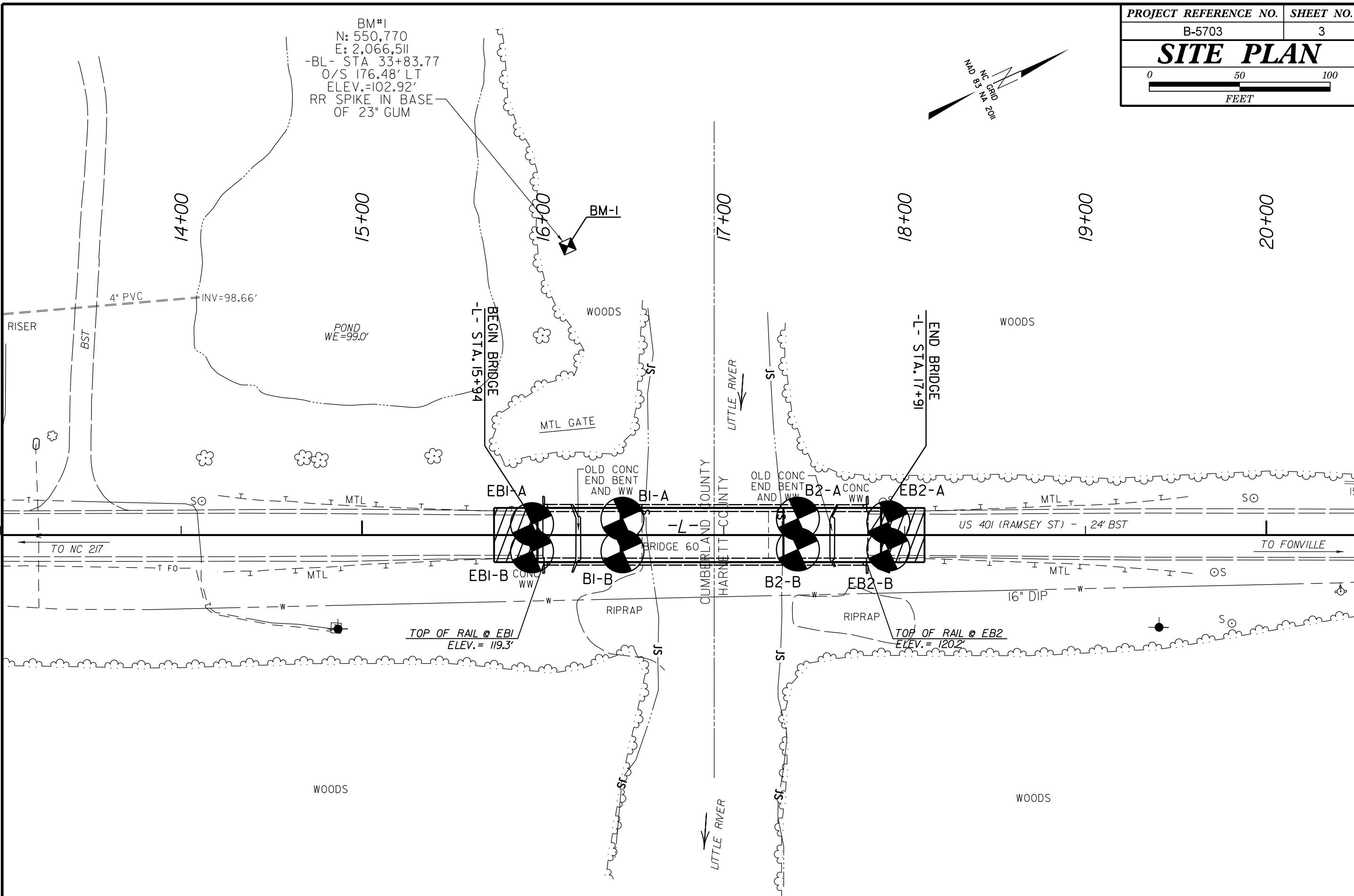
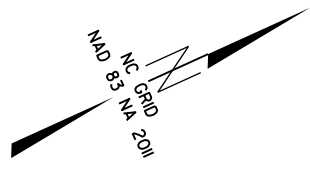
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, PLASTICITY, COLOR, and INDURATION.

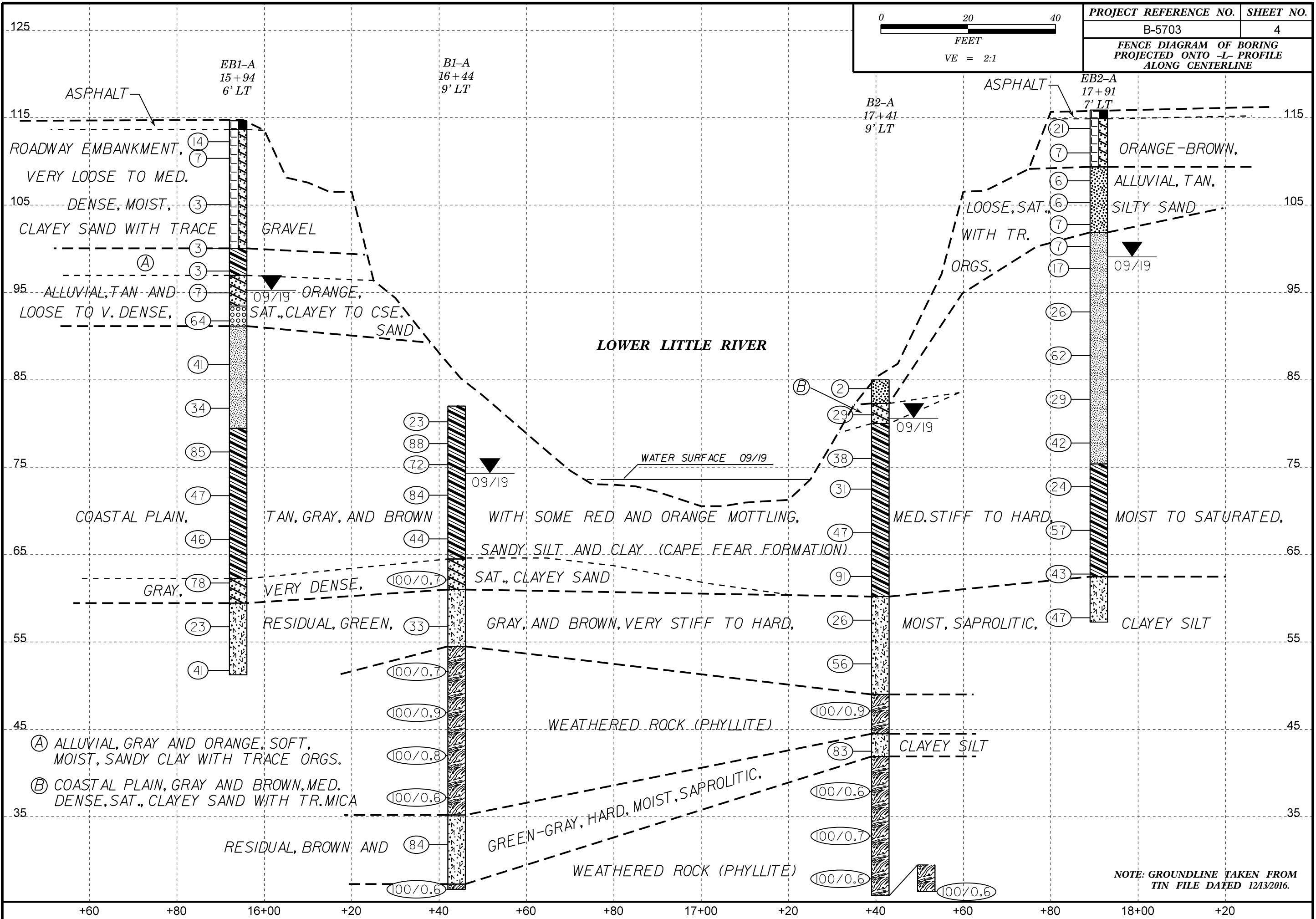
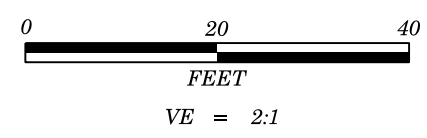
BM#1  
 N: 550,770  
 E: 2,066,511  
 -BL- STA 33+83.77  
 O/S 176.48' LT  
 ELEV.=102.92'  
 RR SPIKE IN BASE  
 OF 23" GUM



TOP OF RAIL @ EBI  
 ELEV. = 119.3'

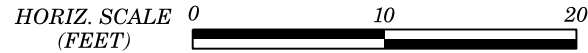
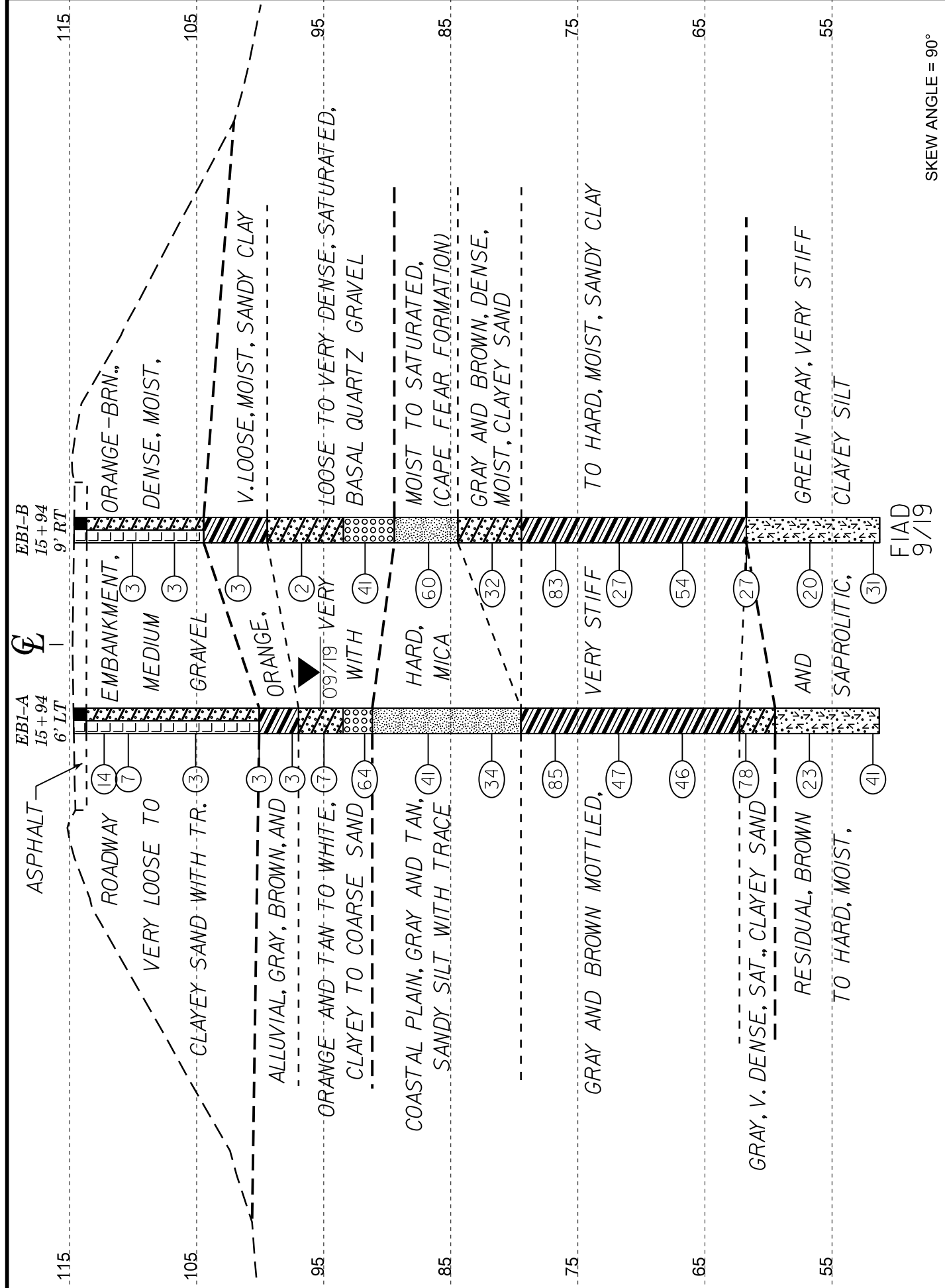
TOP OF RAIL @ EB2  
 ELEV. = 120.2'

SKEW ANGLE = 90°



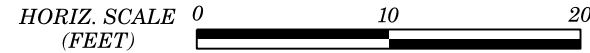
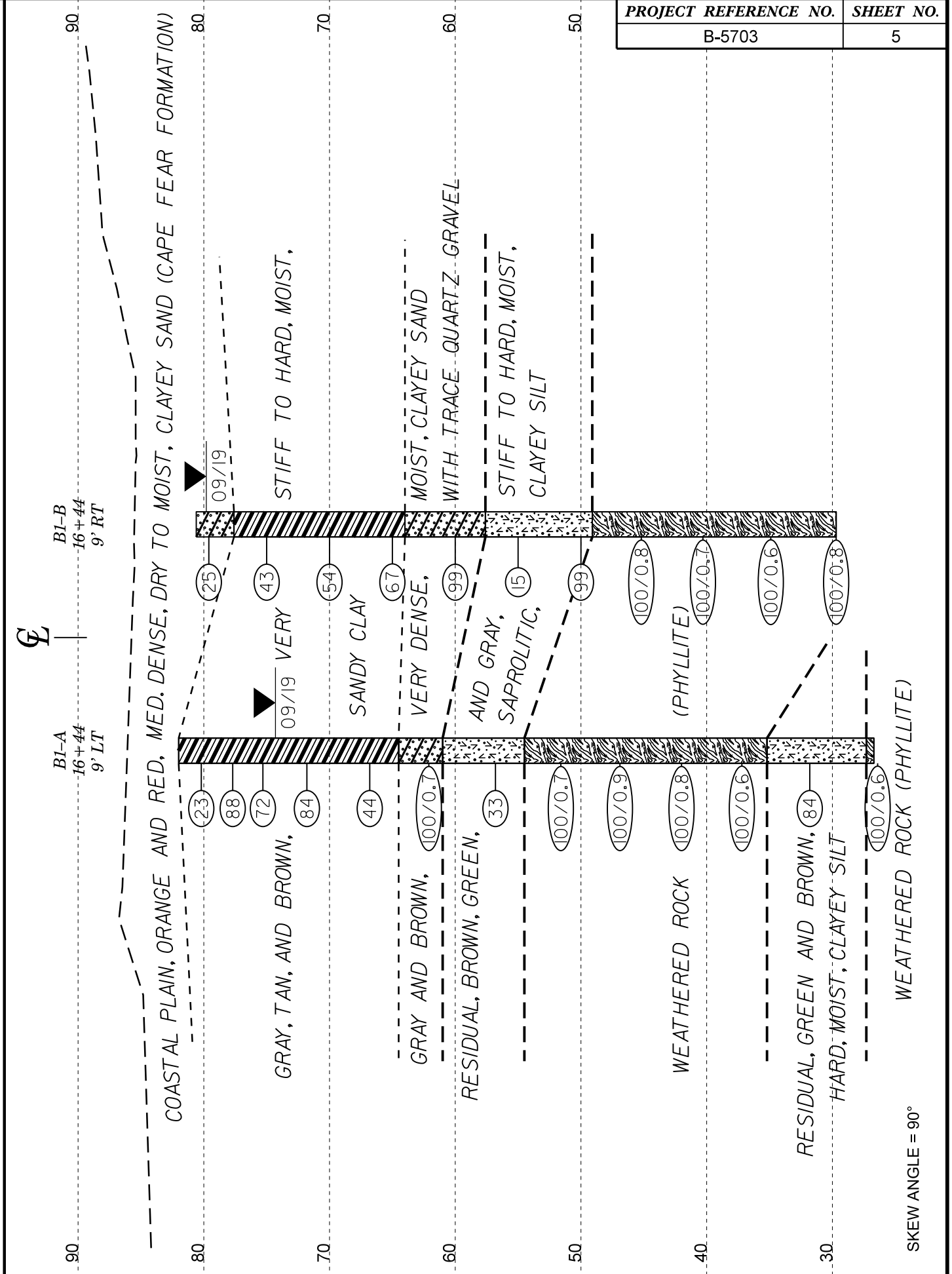
- Ⓐ ALLUVIAL, GRAY AND ORANGE, SOFT, MOIST, SANDY CLAY WITH TRACE ORGS.
- Ⓑ COASTAL PLAIN, GRAY AND BROWN, MED. DENSE, SAT., CLAYEY SAND WITH TR. MICA

NOTE: GROUNDLINE TAKEN FROM TIN FILE DATED 12/13/2016.



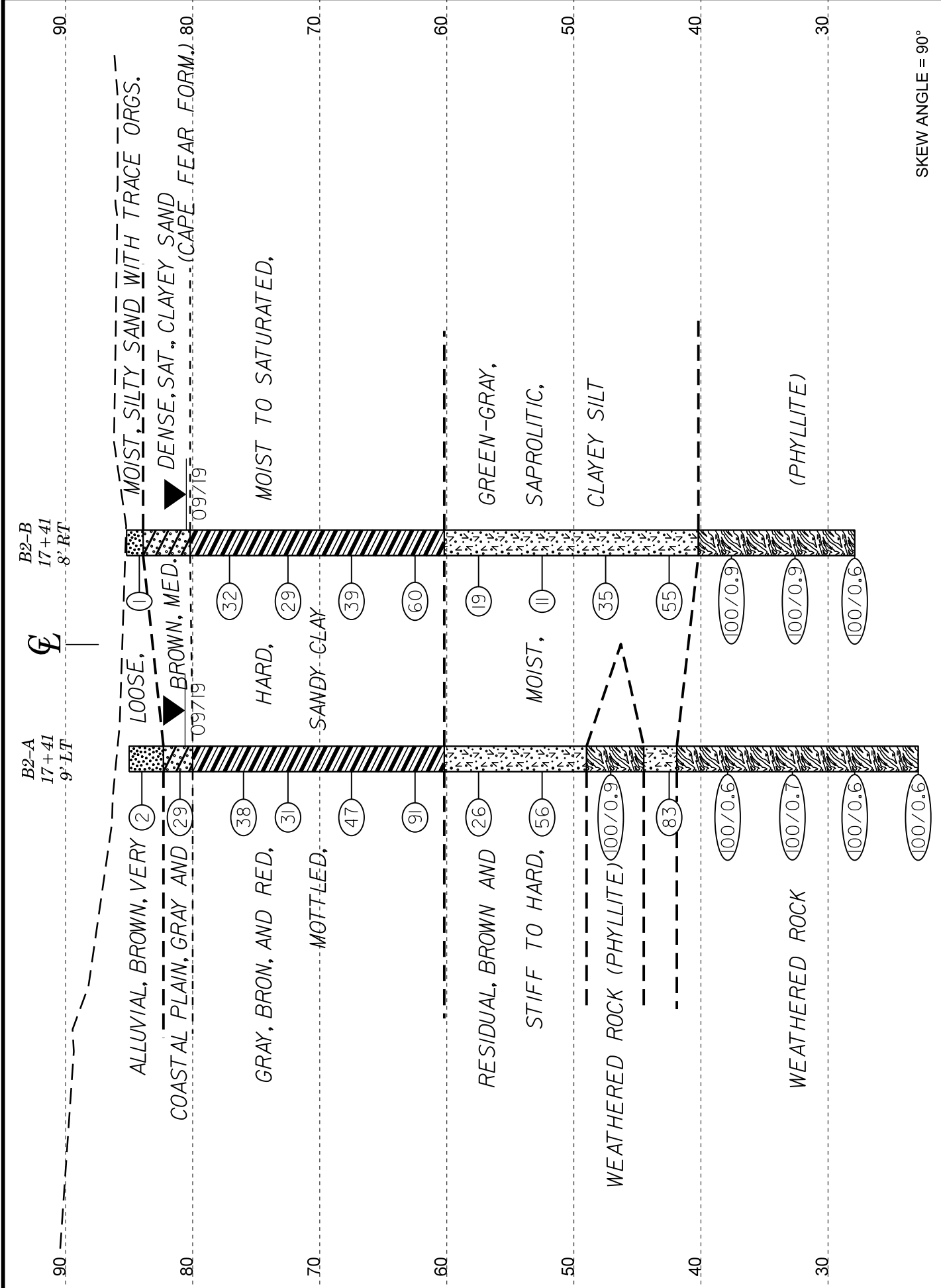
VE = 1:1

**CROSS SECTION THRU EBI**

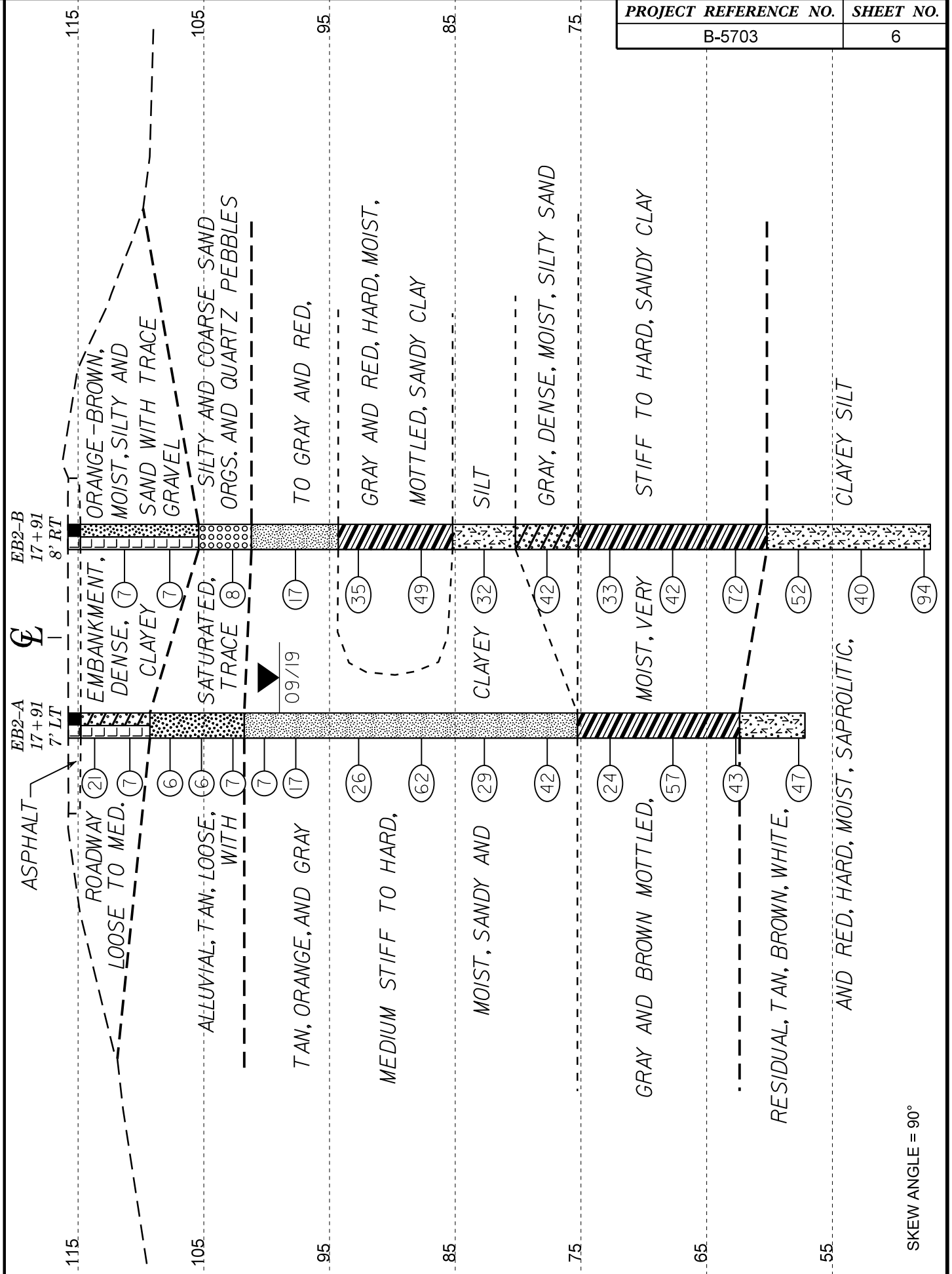


VE = 1:1

**CROSS SECTION THRU BENT 1**



HORIZ. SCALE 0 10 20 (FEET) VE = 1:1



HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 45657.1.1	<b>TIP</b> B-5703	<b>COUNTY</b> CUMBERLAND	<b>GEOLOGIST</b> Kintner, A. N.
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-A	<b>STATION</b> 15+94	<b>OFFSET</b> 6 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 114.7 ft	<b>TOTAL DEPTH</b> 63.4 ft	<b>NORTHING</b> 550,688	<b>EASTING</b> 2,066,643
<b>DRILL RIG/HAMMER EFF./DATE</b> RFO0074 CME-55 80% 03/08/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> Pinter, D. G.	<b>START DATE</b> 09/18/19	<b>COMP. DATE</b> 09/18/19	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
115														114.7	0.0	GROUND SURFACE
	113.3	1.4	5	8	6									113.7	1.0	ROADWAY EMBANKMENT ASPHALT
	111.4	3.3	6	4	3											ORANGE-BROWN, CLAYEY SAND WITH TRACE GRAVEL
110																
	106.1	8.6	3	2	1											
105																
	101.1	13.6	2	2	1											
100																
	98.5	16.2	1	1	2											
	96.0	18.7	1	3	4											
95																
	92.8	21.9	36	33	31											
90																
	87.8	26.9	13	21	20											
85																
	82.8	31.9	12	14	20											
80																
	77.8	36.9	35	42	43											
75																
	72.8	41.9	18	21	26											
70																
	67.8	46.9	16	18	28											
65																
	62.8	51.9	22	34	44											
60																
	57.8	56.9	6	10	13											
55																
	52.8	61.9	9	16	25											

NCDOT BORE DOUBLE\_B5703\_GEO\_BH.GPJ\_NC\_DOT.GDT 10/8/19

<b>WBS</b> 45657.1.1	<b>TIP</b> B-5703	<b>COUNTY</b> CUMBERLAND	<b>GEOLOGIST</b> Kintner, A. N.
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-B	<b>STATION</b> 15+94	<b>OFFSET</b> 9 ft RT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 114.6 ft	<b>TOTAL DEPTH</b> 63.4 ft	<b>NORTHING</b> 550,682	<b>EASTING</b> 2,066,657
<b>DRILL RIG/HAMMER EFF./DATE</b> RFO0074 CME-55 80% 03/08/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> Pinter, D. G.	<b>START DATE</b> 09/26/19	<b>COMP. DATE</b> 09/26/19	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
115														114.6	0.0	GROUND SURFACE
	113.6	1.0												113.6	1.0	ROADWAY EMBANKMENT ASPHALT
	111.0	3.6	2	2	1											ORANGE-BROWN, CLAYEY SAND
110																
	107.7	6.9	1	1	2											
105																
	102.7	11.9	2	1	2											
100																
	97.7	16.9	WOH	1	1											
95																
	92.7	21.9	17	20	21											
90																
	87.7	26.9	20	28	32											
85																
	82.7	31.9	10	15	17											
80																
	77.7	36.9	37	46	37											
75																
	72.7	41.9	9	13	14											
70																
	67.7	46.9	14	21	33											
65																
	62.7	51.9	14	12	15											
60																
	57.7	56.9	4	8	12											
55																
	52.7	61.9	7	11	20											

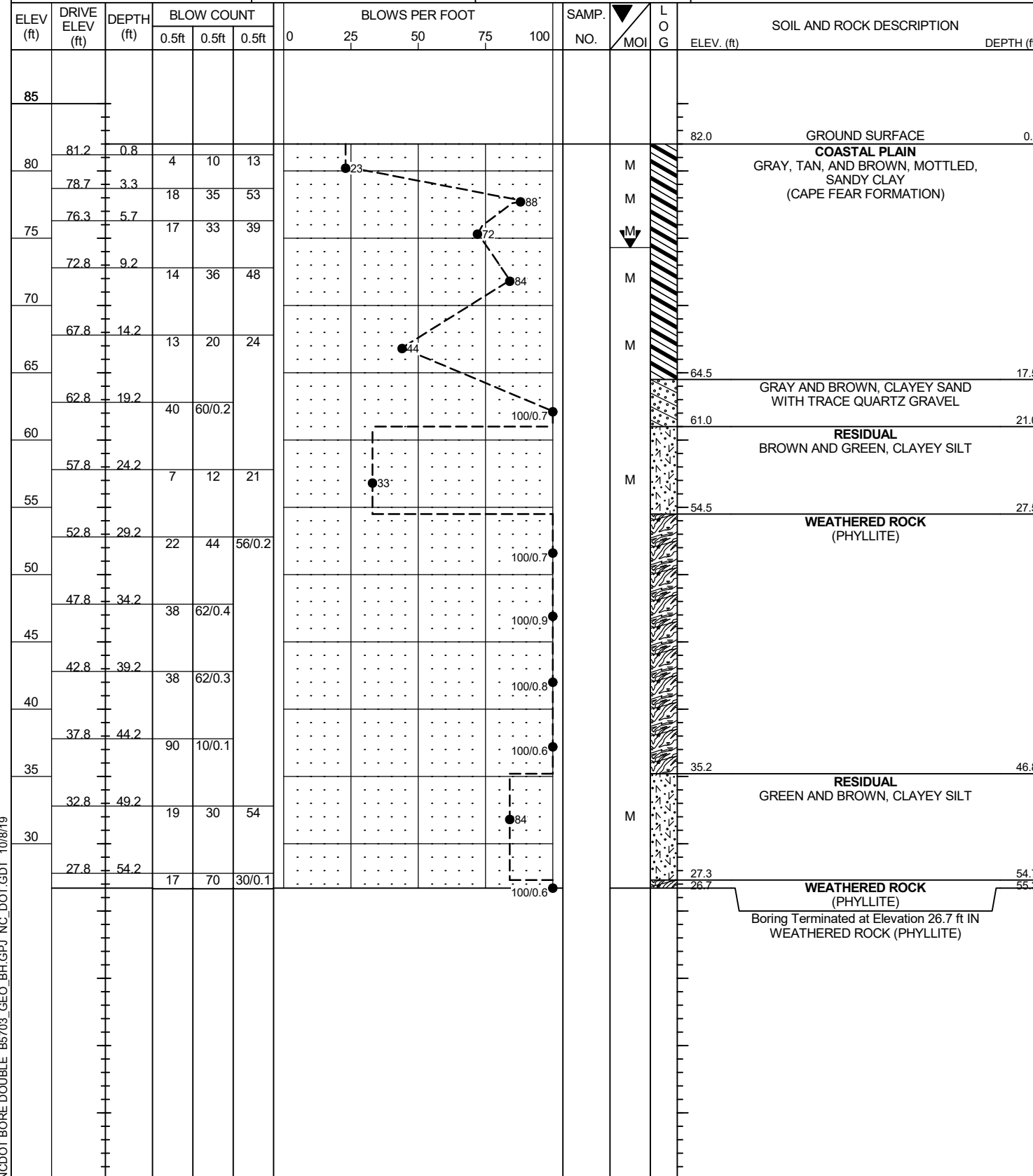
Boring Terminated at Elevation 51.3 ft IN RESIDUAL (CLAYEY SILT)

Boring Terminated at Elevation 51.2 ft IN RESIDUAL (CLAYEY SILT)

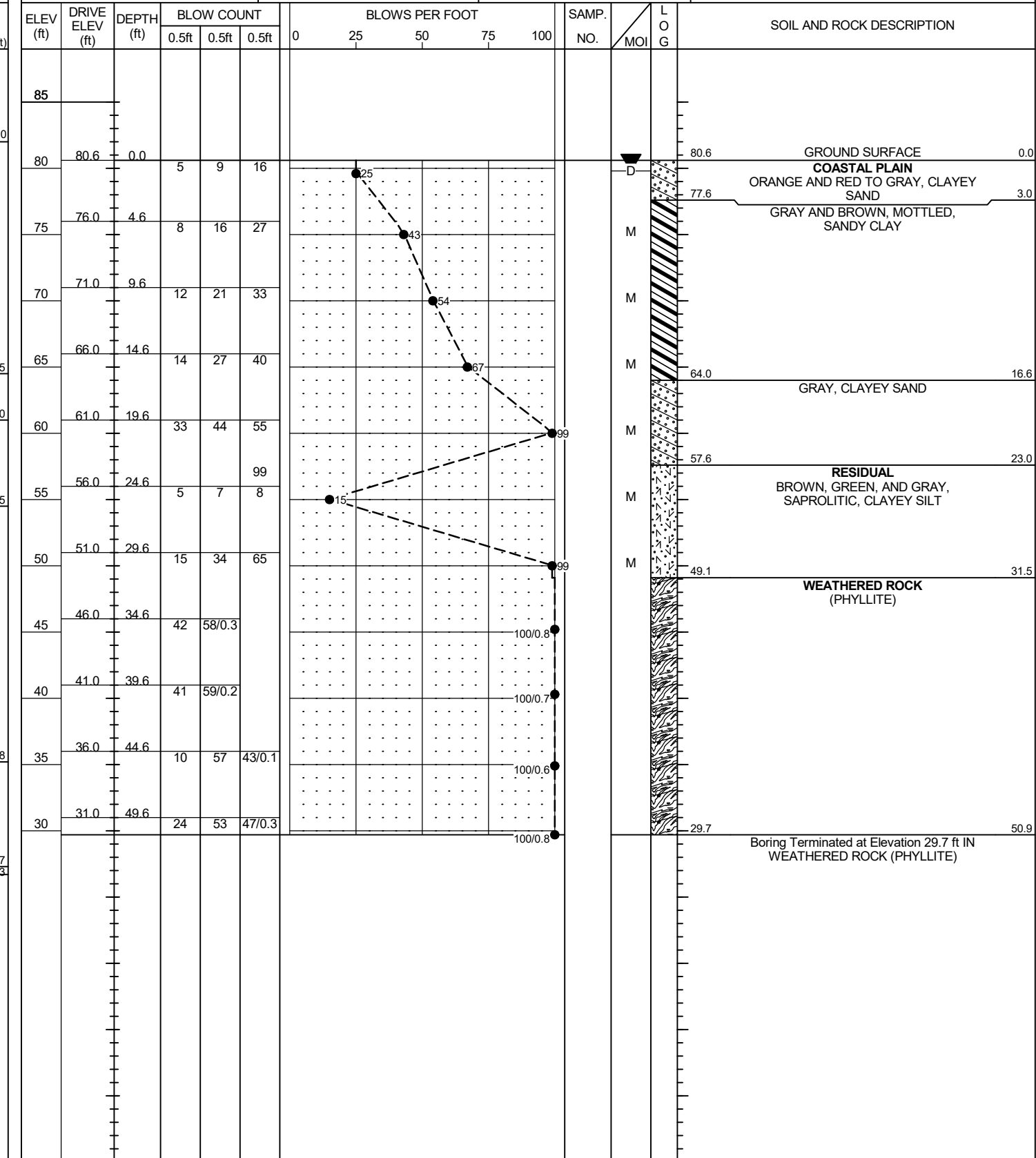
# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 45657.1.1		<b>TIP</b> B-5703		<b>COUNTY</b> CUMBERLAND		<b>GEOLOGIST</b> Kintner, A. N.	
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B1-A		<b>STATION</b> 16+44		<b>OFFSET</b> 9 ft LT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 82.0 ft		<b>TOTAL DEPTH</b> 55.3 ft		<b>NORTHING</b> 550,735		<b>EASTING</b> 2,066,661	
<b>DRILL RIG/HAMMER EFF./DATE</b> RFC0074 CME-55 80% 03/08/2019			<b>DRILL METHOD</b> Mud Rotary			<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Pinter, D. G.		<b>START DATE</b> 09/18/19		<b>COMP. DATE</b> 09/18/19		<b>SURFACE WATER DEPTH</b> N/A	



<b>WBS</b> 45657.1.1		<b>TIP</b> B-5703		<b>COUNTY</b> CUMBERLAND		<b>GEOLOGIST</b> Kintner, A. N.	
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B1-B		<b>STATION</b> 16+44		<b>OFFSET</b> 9 ft RT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 80.6 ft		<b>TOTAL DEPTH</b> 50.9 ft		<b>NORTHING</b> 550,728		<b>EASTING</b> 2,066,677	
<b>DRILL RIG/HAMMER EFF./DATE</b> RFC0074 CME-55 80% 03/08/2019			<b>DRILL METHOD</b> Mud Rotary			<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Pinter, D. G.		<b>START DATE</b> 09/25/19		<b>COMP. DATE</b> 09/25/19		<b>SURFACE WATER DEPTH</b> N/A	



NCDOT BORE DOUBLE B5703\_BH.GPJ NC\_DOT.GDT 10/8/19



# GEOTECHNICAL BORING REPORT BORE LOG

WBS 45657.1.1		TIP B-5703		COUNTY CUMBERLAND		GEOLOGIST Kintner, A. N.										
SITE DESCRIPTION BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER							GROUND WTR (ft)									
BORING NO. B2-A		STATION 17+41		OFFSET 9 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 85.0 ft		TOTAL DEPTH 62.1 ft		NORTHING 550,823		EASTING 2,066,701										
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 80% 03/08/2019			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Pinter, D. G.		START DATE 09/20/19		COMP. DATE 09/20/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
85	85.0	0.0	WOH	1	1							M		85.0	GROUND SURFACE	0.0
	82.0	3.0	8	13	16							Sat.		82.3	ALLUVIAL BROWN, SILTY SAND WITH TRACE ORGANICS	2.7
	80													80.0	COASTAL PLAIN GRAY AND BROWN, CLAYEY SAND WITH TRACE MICA (CAPE FEAR FORMATION)	5.0
	77.0	8.0	10	17	21							M			GRAY AND BROWN MOTTLED, SANDY CLAY	
	73.5	11.5	9	9	22							M				
	68.5	16.5	13	21	26							M				
	63.5	21.5	29	42	49							M		60.2	RESIDUAL BROWN AND GREEN-GRAY, SAPROLITIC, CLAYEY SILT	24.8
	58.5	26.5	6	11	15							M				
	53.5	31.5	8	21	35							M				
	48.5	36.5	18	36	64/0.4							M		49.0	WEATHERED ROCK (PHYLLITE)	36.0
	43.5	41.5	9	25	58							M		44.5	RESIDUAL BROWN AND GREEN-GRAY, SAPROLITIC, CLAYEY SILT	40.5
	38.5	46.5	60	40/0.1								M		41.9	WEATHERED ROCK (PHYLLITE)	43.1
	33.5	51.5	43	57/0.2												
	28.5	56.5	69	31/0.1												
	23.5	61.5	68	32/0.1												
														22.9	Boring Terminated at Elevation 22.9 ft IN WEATHERED ROCK (PHYLLITE)	62.1

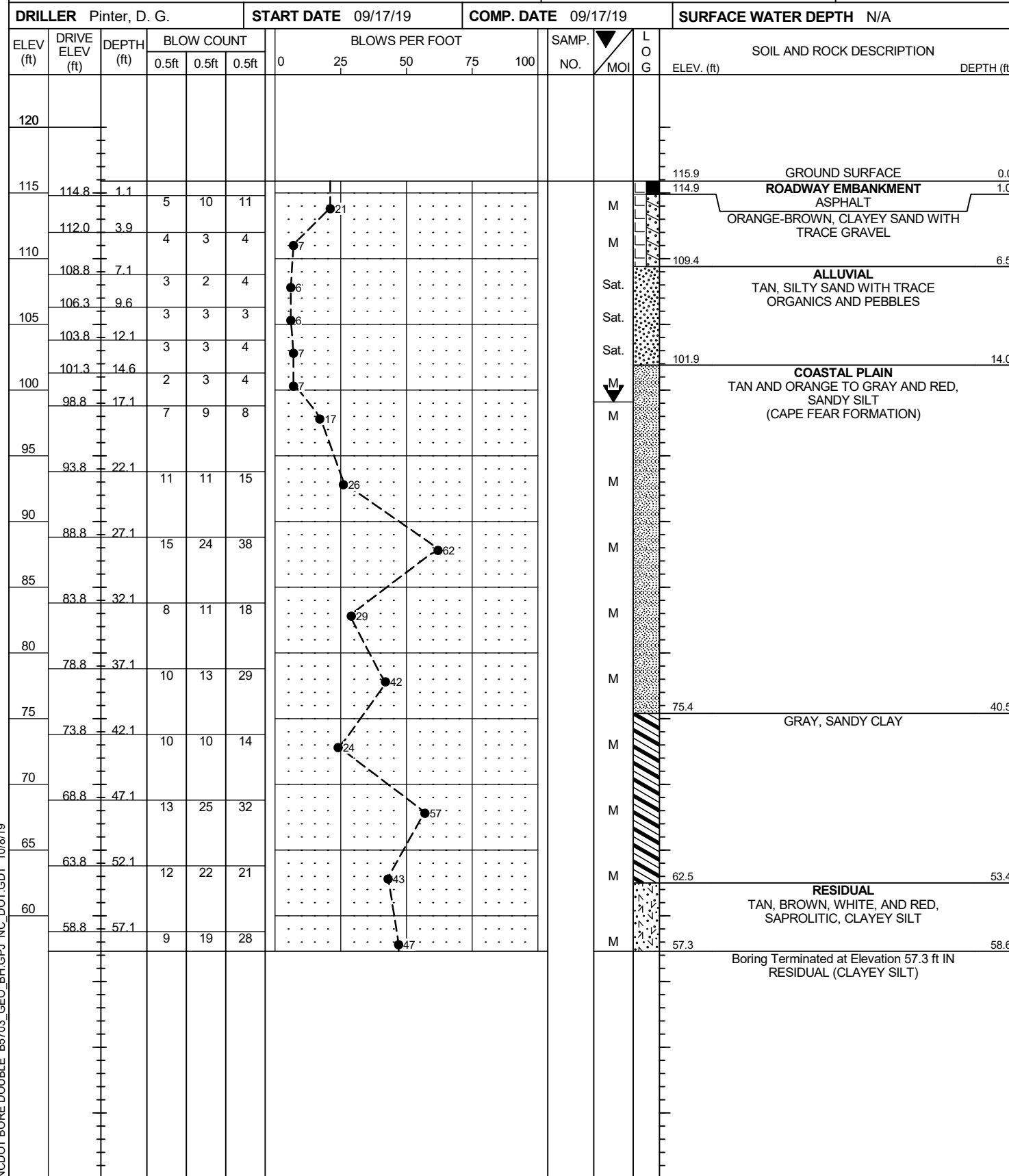
WBS 45657.1.1		TIP B-5703		COUNTY CUMBERLAND		GEOLOGIST Kintner, A. N.										
SITE DESCRIPTION BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER							GROUND WTR (ft)									
BORING NO. B2-B		STATION 17+41		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 85.2 ft		TOTAL DEPTH 57.3 ft		NORTHING 550,816		EASTING 2,066,717										
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 80% 03/08/2019			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Pinter, D. G.		START DATE 09/23/19		COMP. DATE 09/24/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
90																
	85.2	0.0	WOH	WOH	1							Sat.		85.2	GROUND SURFACE	0.0
	80													83.9	ALLUVIAL BROWN, SILTY SAND WITH TRACE ORGANICS	1.3
	78.1	7.1	7	15	17							Sat.		80.2	COASTAL PLAIN GRAY AND BROWN, CLAYEY SAND (CAPE FEAR FORMATION)	5.0
	75											M			GRAY, BROWN, AND RED, MOTTLED, SANDY CLAY	
	73.5	11.7	5	8	21							M				
	68.5	16.7	10	17	22							M				
	63.5	21.7	16	25	35							M		60.2	RESIDUAL BROWN AND GREEN, CLAYEY SILT	25.0
	58.5	26.7	4	8	11							M				
	53.5	31.7	3	4	7							M				
	48.5	36.7	8	15	20							M		40.2	WEATHERED ROCK (PHYLLITE)	45.0
	43.5	41.7	9	18	37							M				
	38.5	46.7	24	76/0.4												
	33.5	51.7	32	68/0.4												
	28.5	56.7	60	40/0.1												
														27.9	Boring Terminated at Elevation 27.9 ft IN WEATHERED ROCK (PHYLLITE)	57.3

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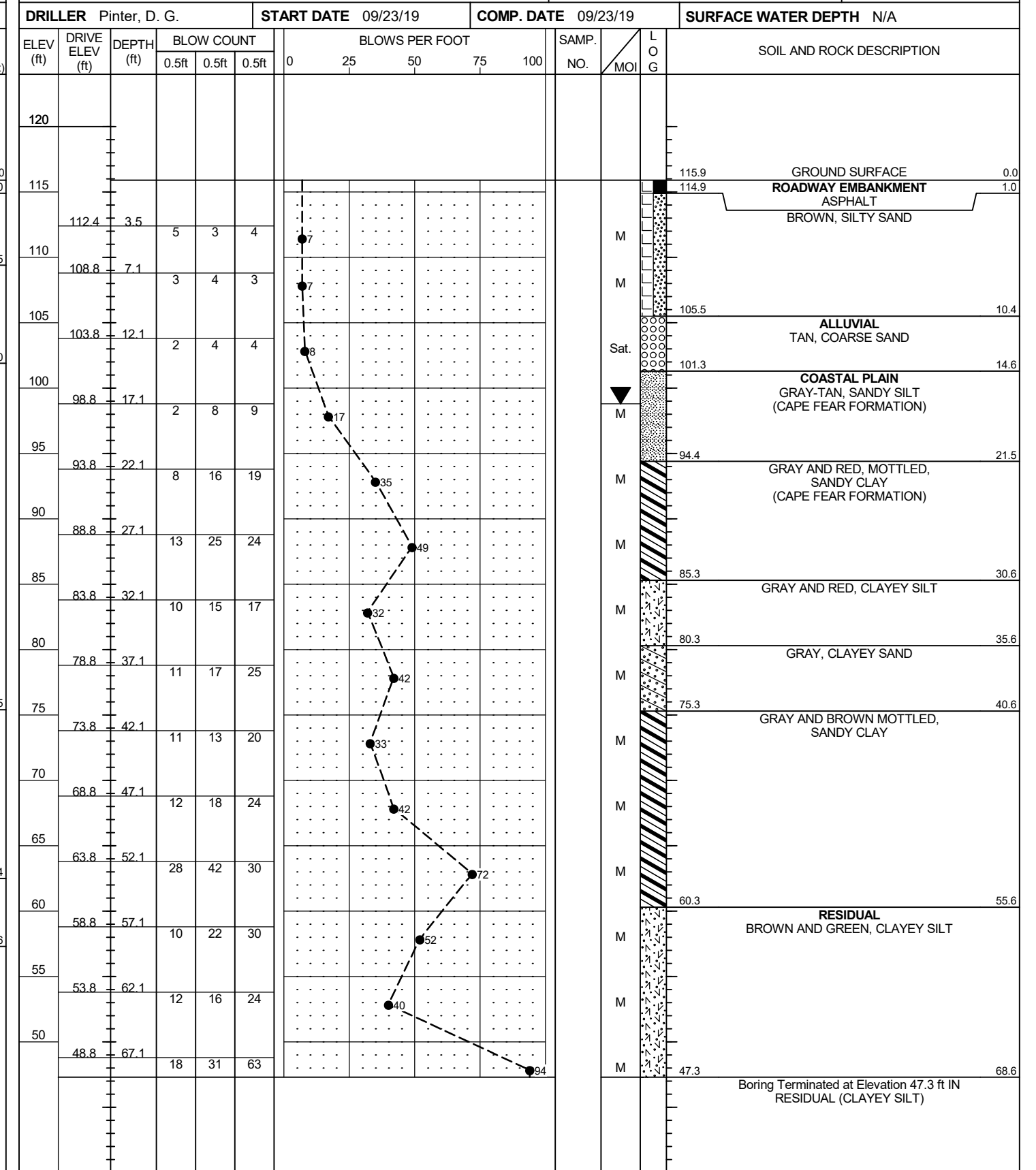
# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 45657.1.1	<b>TIP</b> B-5703	<b>COUNTY</b> CUMBERLAND	<b>GEOLOGIST</b> Kintner, A. N.
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB2-A	<b>STATION</b> 17+91	<b>OFFSET</b> 7 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 115.9 ft	<b>TOTAL DEPTH</b> 58.6 ft	<b>NORTHING</b> 550,868	<b>EASTING</b> 2,066,724
<b>DRILL RIG/HAMMER EFF./DATE</b> RFC0074 CME-55 80% 03/08/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> Pinter, D. G.	<b>START DATE</b> 09/17/19	<b>COMP. DATE</b> 09/17/19	<b>SURFACE WATER DEPTH</b> N/A



<b>WBS</b> 45657.1.1	<b>TIP</b> B-5703	<b>COUNTY</b> CUMBERLAND	<b>GEOLOGIST</b> Kintner, A. N.
<b>SITE DESCRIPTION</b> BRIDGE NO. 60 ON -L- (US 401) OVER LOWER LITTLE RIVER			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB2-B	<b>STATION</b> 17+91	<b>OFFSET</b> 8 ft RT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 115.9 ft	<b>TOTAL DEPTH</b> 68.6 ft	<b>NORTHING</b> 550,862	<b>EASTING</b> 2,066,737
<b>DRILL RIG/HAMMER EFF./DATE</b> RFC0074 CME-55 80% 03/08/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> Pinter, D. G.	<b>START DATE</b> 09/23/19	<b>COMP. DATE</b> 09/23/19	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE DOUBLE\_B5703\_GEO\_BH.GPJ NC\_DOT.GDT 10/8/19

## SITE PHOTOGRAPH

Bridge No. 60 on -L- (US 401) over Lower Little River



Looking North towards End Bent 2