

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33599.1.1 (B-4257)	1	10

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STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33599.1.1 (B-4257) F.A. PROJ. BRSTP-1004(15)

COUNTY ROWAN

PROJECT DESCRIPTION BRIDGE NO. 143 ON SR 1004 OVER
CHURCH CREEK

SITE DESCRIPTION BRIDGE NO. 143 ON SR 1004 OVER
CHURCH CREEK

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) 250-4086. 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

J. K. STICKNEY

C. L. SMITH

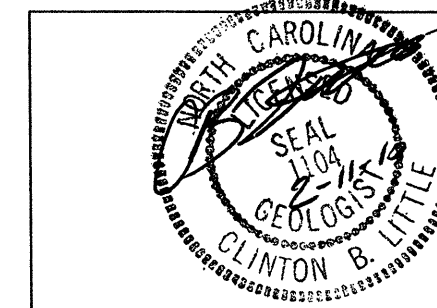
J. E. ROLFSMEYER

INVESTIGATED BY J. E. BEVERLY

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE FEBRUARY 2010



PROJECT: 33599.1.1 ID: B-4257

DRAWN BY: J. E. ROLFSMEYER / E. BEVERLY

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

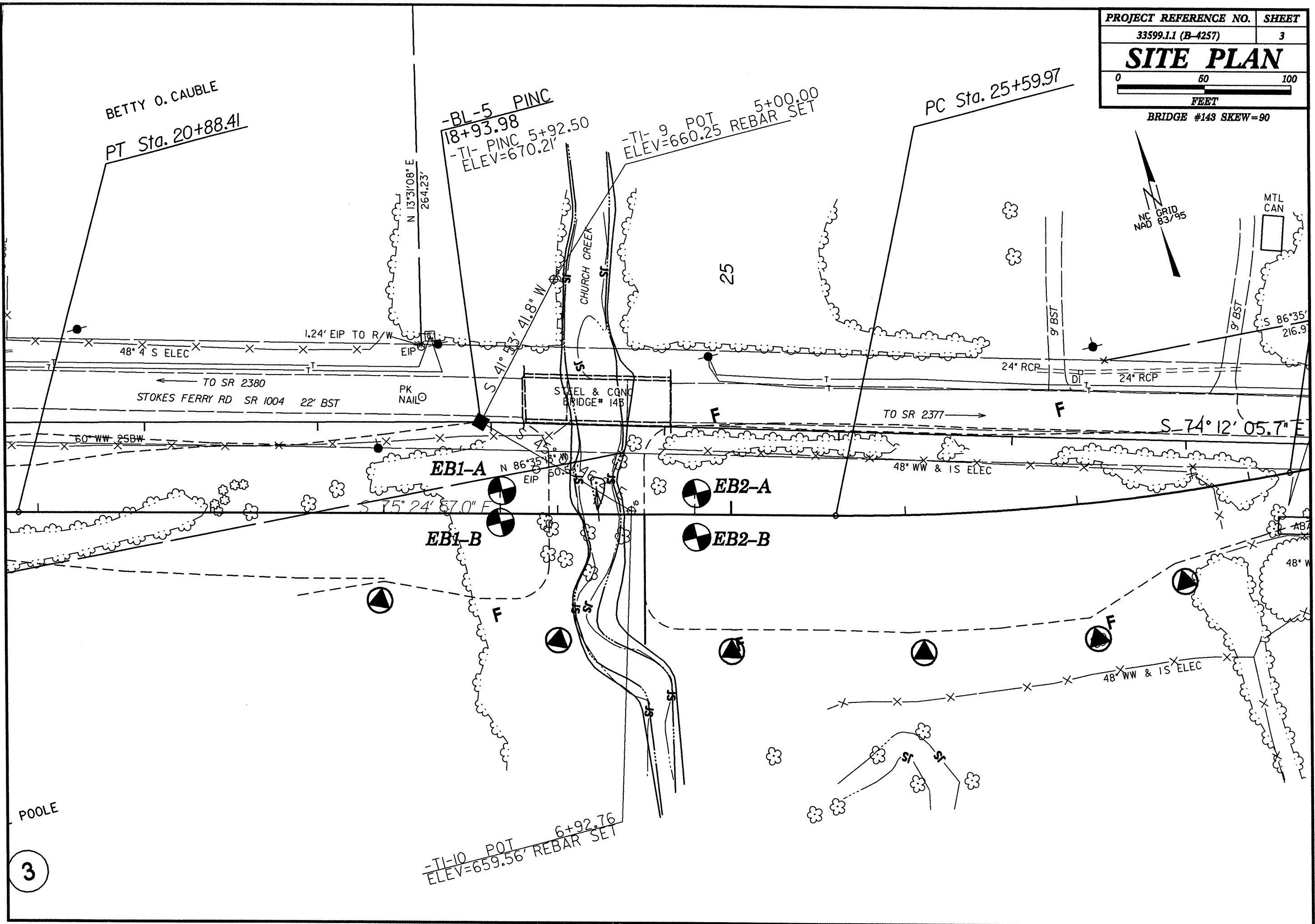
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

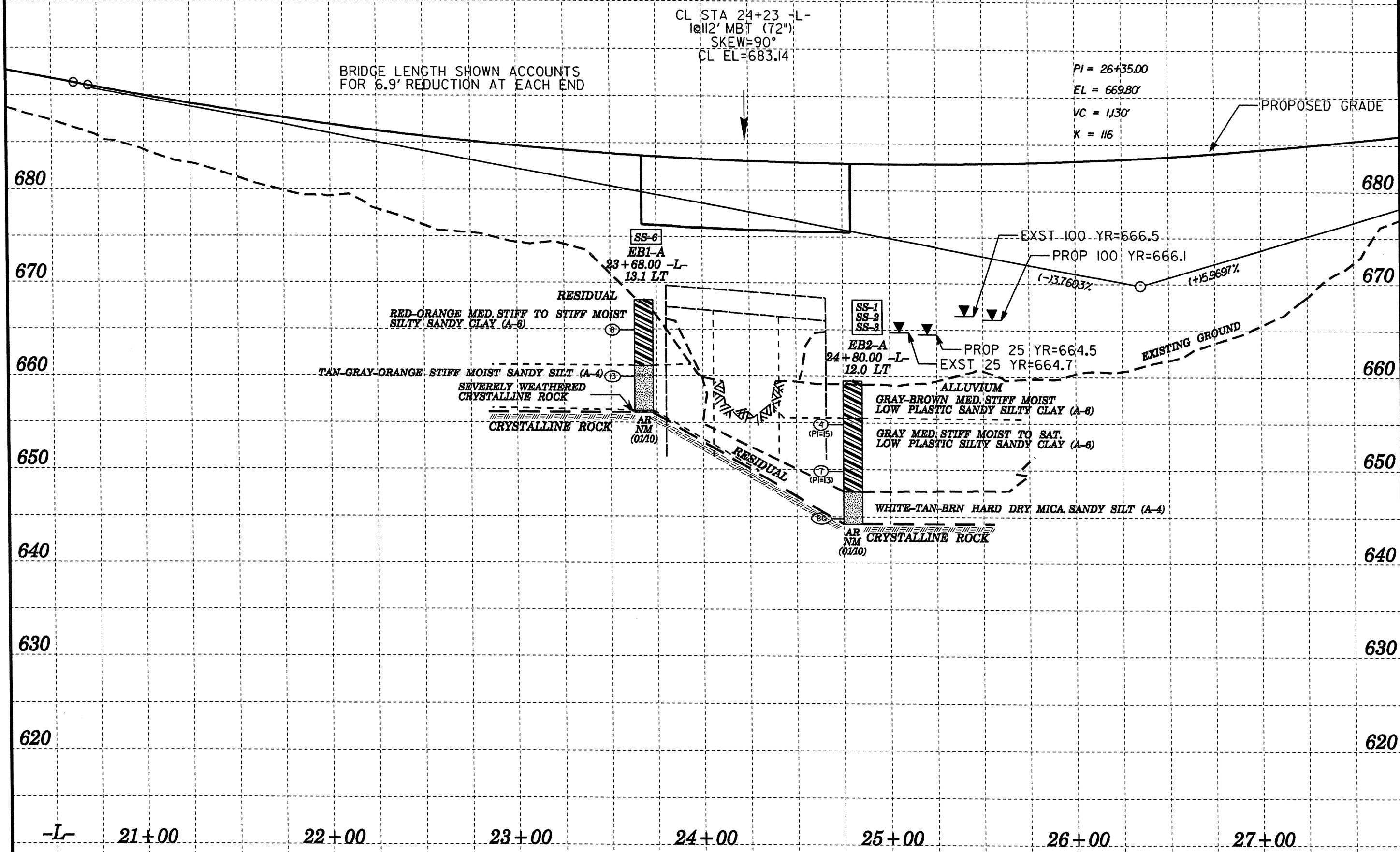
SUBSURFACE INVESTIGATION

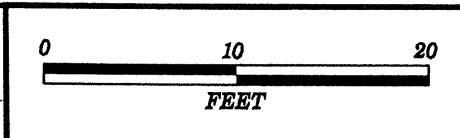
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 33599.II(B-4257) SHEET NO. 2

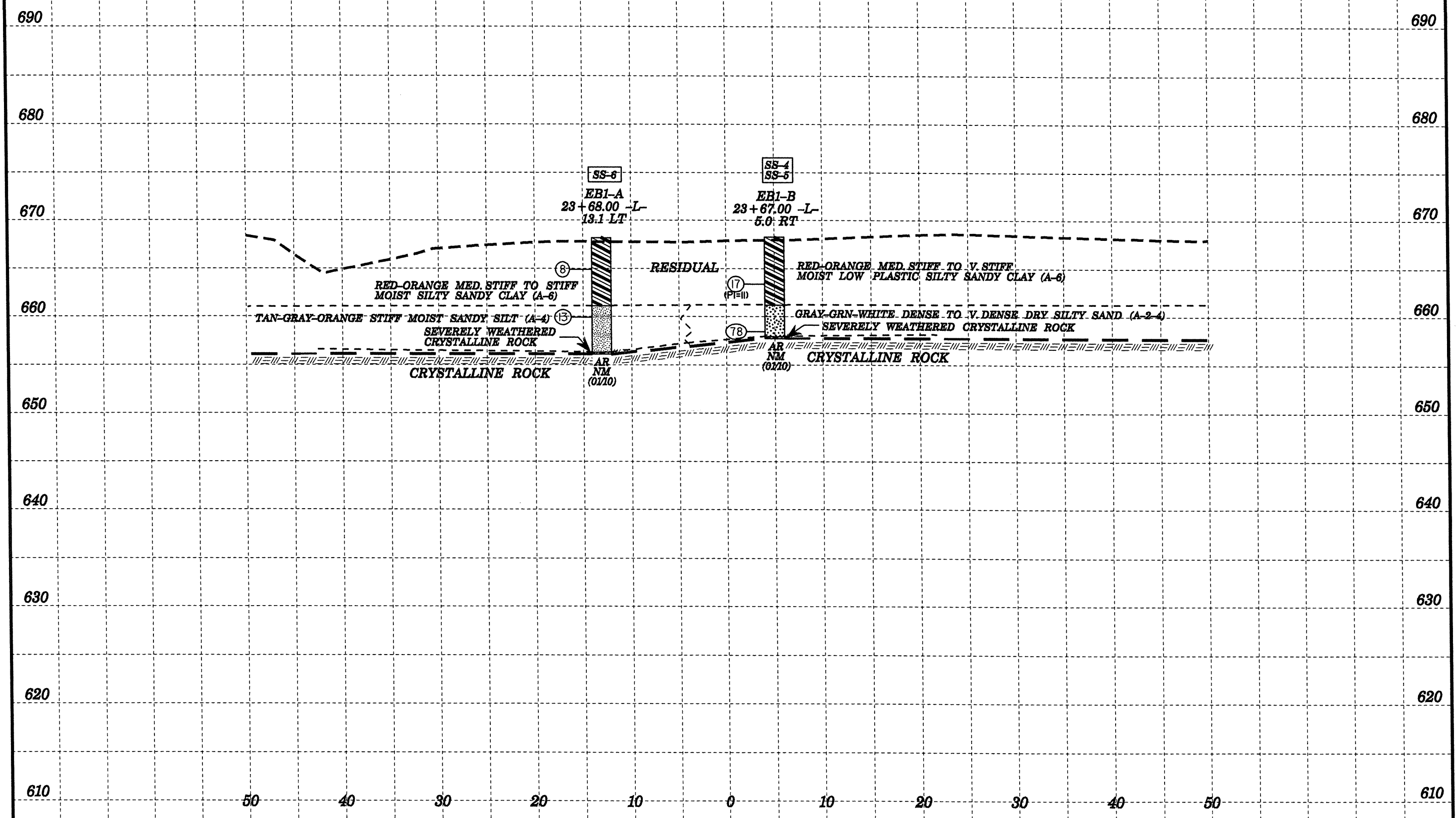
Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE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

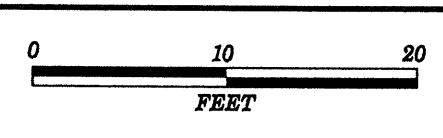




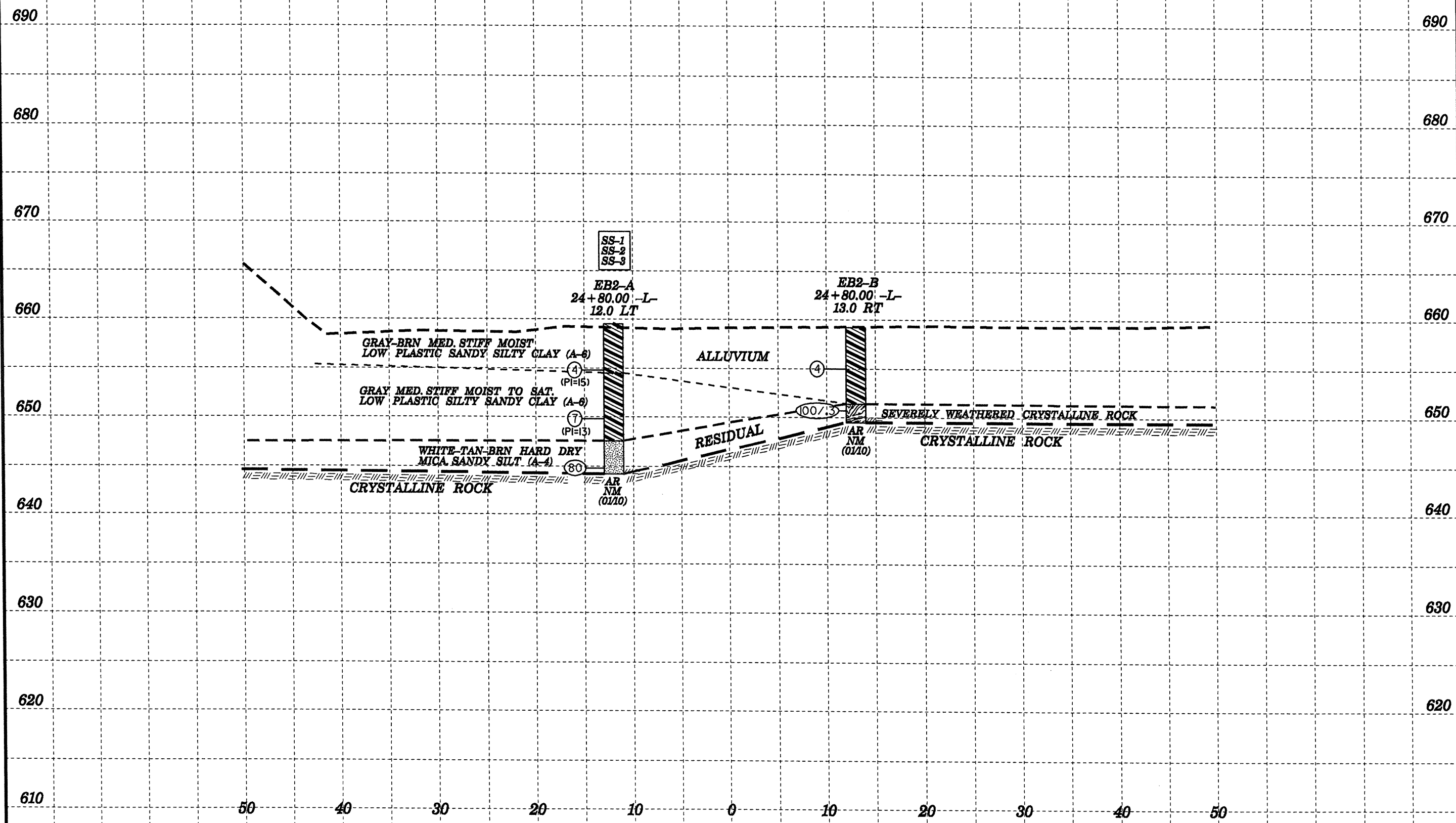


PROJECT REFERENCE NO.	SHEET
33599.1.1 (B-4257)	5
SECTION THRU END BENT ONE	
STA. 23+68 -L-	
SKEW=90	





PROJECT REFERENCE NO.	SHEET
33599.1.1 (B-4257)	6
SECTION THRU END BENT TWO	
STA. 24+79 -L- SKEW=90	



PROJECT NO. 33599.1.1		ID. B-4257		COUNTY Rowan		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 143 on SR 1004 over Church Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 23+68		OFFSET 13ft LT		ALIGNMENT -L-										
COLLAR ELEV. 668.1 ft		TOTAL DEPTH 12.0 ft		NORTHING 682,252		EASTING 1,586,436										
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
START DATE 01/20/10		COMP. DATE 01/20/10		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 12.0 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
670															668.1	0.0
	665.9	2.2														
665			3	3	5								M			
	660.9	7.2														
660			4	6	7							SS-6	M		661.1	7.0
655															656.3	11.8
															656.1	12.0
<p>WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK</p> <p>Boring Terminated by Auger Refusal at Elevation 656.1 ft On Crystalline Rock</p>																

PROJECT NO. 33599.1.1		ID. B-4257		COUNTY Rowan		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 143 on SR 1004 over Church Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 23+67		OFFSET 5ft RT		ALIGNMENT -L-										
COLLAR ELEV. 668.2 ft		TOTAL DEPTH 10.5 ft		NORTHING 682,235		EASTING 1,586,430										
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
START DATE 01/20/10		COMP. DATE 01/20/10		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 10.5 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
670															668.2	0.0
	664.4	3.8														
665			4	7	10							SS-4	M			
	659.4	8.8														
660			7	32	46							SS-5	D		661.2	7.0
655															657.9	10.3
															657.7	10.5
<p>RESIDUAL RED-ORANGE MED. STIFF TO V. STIFF MOIST LOW (PI=11) PLASTIC SILTY SANDY CLAY (A-6)</p> <p>RESIDUAL TAN-GRAY-ORANGE STIFF MOIST SANDY SILT (A-4)</p> <p>RESIDUAL GRAY-GRN-WHITE DENSE TO V. DENSE DRY SILTY SAND (A-2-4)</p> <p>WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK</p> <p>Boring Terminated by Auger Refusal at Elevation 657.7 ft On Crystalline Rock</p>																

NCDOT BORE SINGLE B4257_BORINGS.GPJ NC DOT.GDT 02/09/10

NCDOT BORE SINGLE B4257_BORINGS.GPJ NC DOT.GDT 02/09/10

PROJECT NO. 33599.1.1		ID. B-4257		COUNTY Rowan		GEOLOGIST Stickney, J. K.								
SITE DESCRIPTION Bridge No. 143 on SR 1004 over Church Creek							GROUND WTR (ft)							
BORING NO. EB2-A		STATION 24+80		OFFSET 12ft LT		ALIGNMENT -L-								
COLLAR ELEV. 659.5 ft		TOTAL DEPTH 15.3 ft		NORTHING 682,223		EASTING 1,586,544								
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
START DATE 01/20/10		COMP. DATE 01/20/10		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 15.3 ft								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
660													659.5	0.0
655	655.8	3.7	2	2	2								654.5	5.0
650	650.8	8.7	1	3	4								647.6	11.9
645	645.8	13.7	11	27	53								644.2	15.3
Boring Terminated by Auger Refusal at Elevation 644.2 ft On Crystalline Rock														

NCDOT BORE SINGLE B4257_BORINGS.GPJ NC_DOT.GDT 02/10/10

PROJECT NO. 33599.1.1		ID. B-4257		COUNTY Rowan		GEOLOGIST Stickney, J. K.								
SITE DESCRIPTION Bridge No. 143 on SR 1004 over Church Creek							GROUND WTR (ft)							
BORING NO. EB2-B		STATION 24+80		OFFSET 13ft RT		ALIGNMENT -L-								
COLLAR ELEV. 659.2 ft		TOTAL DEPTH 9.7 ft		NORTHING 682,199		EASTING 1,586,538								
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
START DATE 01/20/10		COMP. DATE 01/20/10		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 9.7 ft								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
660													659.2	0.0
655	656.0	3.2	1	2	2								651.4	7.8
650	651.0	8.2											649.5	9.7
WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK Boring Terminated by Auger Refusal at Elevation 649.5 ft On Crystalline Rock														

NCDOT BORE SINGLE B4257_BORINGS.GPJ NC_DOT.GDT 02/09/10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. B-4257REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 335991 County ROWAN Owner _____
 Date: Sampled 1/20/10 Received 1/25/10 Reported 1/27/10
 Sampled from BRIDGE By J E BEVERLY
 Submitted by N WAINAINA 1995 Standard Specifications

761711 TO 761716
2/11/10

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	761711	761712	761713	761714	761715	761716
Retained #4 Sieve %	-	2	-	-	-	-
Passing #10 Sieve %	98	90	96	100	80	100
Passing #40 Sieve %	91	75	75	97	60	82
Passing #200 Sieve %	76	54	36	67	26	39

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	10.9	23.6	35.6	8.9	40.4	30.3
Fine Sand Ret - #270 %	17.4	20.4	33.3	33.1	32.7	39.4
Silt 0.05 - 0.005 mm %	43.4	31.7	23.0	35.8	20.8	22.2
Clay < 0.005 mm %	28.3	24.2	8.1	22.2	6.1	8.1
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

L. L.	39	28	27	38	22	29
P. I.	15	13	NP	11	4	2
AASHTO Classification	A-6(11)	A-6(4)	A-4(0)	A-6(7)	A-2-4(0)	A-4(0)
Station						
OFFSET	L	L	L	L	L	L
LOCATION	EB2-A	EB2-A	EB2-A	EB1-B	EB1-B	EB1-A
Depth (Ft)	4.20	9.20	14.20	4.30	9.30	7.70
to	5.20	10.20	15.20	5.30	10.30	8.70

cc: J E BEVERLY
Soils File

Soils Engineer



FIELD
 SCOUR REPORT

WBS: 33599.1.1 TIP: B-4257 COUNTY: Rowan

DESCRIPTION(1): Bridge No. 143 on SR 1004 over Church Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 143 Length: 85.6' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 4
 Foundation Type: Concrete encased piles on steel I-beams

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Abutments and wingwalls are concrete

Interior Bents: None observed

Channel Bed: None observed

Channel Bank: Undercutting of banks, trees lean toward channel

EXISTING SCOUR PROTECTION

Type(3): None

Extent(4):

Effectiveness(5):

Obstructions(6): Tree limbs, branches, debris

DESIGN INFORMATION

Channel Bed Material(7): silt and sand

Channel Bank Material(8): Sandy silty clay (Ref SS-1)

Channel Bank Cover(9): Mature trees and grass

Floodplain Width(10): Appx sta. 23+75 - 27+25 (350')

Floodplain Cover(11): Grass fields

Stream is(12): Aggrading Degrading _____ Undetermined _____

Channel Migration Tendency(13): Moderate

Observations and Other Comments: Area very prone to flooding

DESIGN SCOUR ELEVATIONS(14)

Feet _____ Meters _____

BENTS

No interior bents

Comparison of DSE to Hydraulics Unit theoretical scour:
 Single span - no interior bents - no abutment scour anticipated.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank																				
Sample No.																				
Retained #4																				
Passed #10																				
Passed #40																				
Passed #200																				
Coarse Sand																				
Fine Sand																				
Silt																				
Clay																				
LL																				
PI																				
AASHTO																				
Station																				
Offset																				
Depth																				

See Sheet # 9 for
 "Soil Test Results"

INSTRUCTIONS

- Describe the specific site's location, including route number and body of water crossed.
- Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- Note existing scour protection (e.g. rip rap).
- Describe extent of existing scour protection.
- Describe whether or not the scour protection appears to be working.
- Note obstructions such as dams, fallen trees, debris at bents, etc.
- Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- Determine the approximate floodplain width from field observation or a topographic map.
- Describe the material covering the floodplain (e.g. grass, trees, crops).
- Use professional judgement to specify if the stream is degrading, or aggrading.
- Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

Reported by:

JKS
 JKS / JEB

Date: 2/10/2010