



February 21, 2017

**STATE PROJECT:** 17BP.8.R.115 (SF-750128)  
**PROJECT ID:** 29453  
**COUNTY:** Randolph  
**DESCRIPTION:** Bridge No. 128 on SR 2442 (Ramseur Julian Rd.) over Sandy Creek

**SUBJECT:** GEOTECHNICAL REPORT - INVENTORY

**PROJECT DESCRIPTION**

This project consists of the reconstruction of SR 2442 (-L-) which is a two-lane roadway as part of the replacement of Bridge No. 128 over Sandy Creek.

The geotechnical investigation was conducted during December of 2016 and January of 2017. Standard Penetration Test borings were advanced with a CME 55 utilizing an automatic hammer. Hand auger borings were also completed. Representative soil samples were collected for visual classification in the field.

The following alignment, totaling 600 feet, was investigated.

<u>LINE</u>	<u>STATIONS</u>
-L-	14+50 to 20+50

**PHYSIOGRAPHY AND GEOLOGY**

The project is located in the Piedmont Physiographic Province. The project corridor is comprised primarily of residential and undeveloped properties. The topography along the project is generally rolling hills with flat to moderate slopes along the existing roadway.

Geologically, the site is located within the Carolina Slate Belt. Soils are derived from the underlying metamorphic bedrock. The bedrock primarily consists of Metavolcanic Rock and Metamorphosed Granite.

**SOIL PROPERTIES**

Materials encountered during this investigation are separated into four categories based on origin. They consist of roadway embankment, artificial fill, alluvial, and residual.

Roadway Embankment soils are present along the existing roadway (-L-) on the project. These soils consist of moist, soft to medium stiff, moderately to slightly plastic, fine to coarse sandy clays (A-6), dry, medium dense, non plastic, fine to coarse sandy gravels (A-1), and moist, stiff, non plastic, fine sandy silts (A-4).

Artificial Fill soils are present along the existing roadway (-L-) on the project. These soils consist of moist, medium dense, slightly plastic, clayey, fine to coarse sands (A-2-6).

Soils identified as alluvial consist of moist to wet, very soft to medium stiff, slightly plastic to potentially highly plastic, fine to coarse sandy clays and silty clays (A-6, A-7), moist, loose, slightly plastic, clayey, fine to coarse sands (A-2-6), and moist, loose, non plastic, fine to coarse sandy gravels (A-1).

Soils identified as residual consist of moist to wet, loose to dense, non plastic to slightly plastic, clayey, coarse to fine sands and silty, coarse to fine sands (A-2-6, A-2-4), moist, soft to hard, non plastic to slightly plastic, fine to coarse sandy silts (A-4), and moist, medium stiff to stiff, slightly plastic, fine to coarse sandy clays (A-6).

**ROCK PROPERTIES**

Weathered rock was encountered along the existing roadway (-L-) at elevations ranging from 579.9 to 591.2 feet (MSL). The weathered rock consists of gray metavolcanic rock. Crystalline rock was encountered along the existing roadway (-L-) at elevations ranging from 556.9 to 586.3 feet (MSL). The crystalline rock consists of metavolcanic rock and metamorphosed granite.

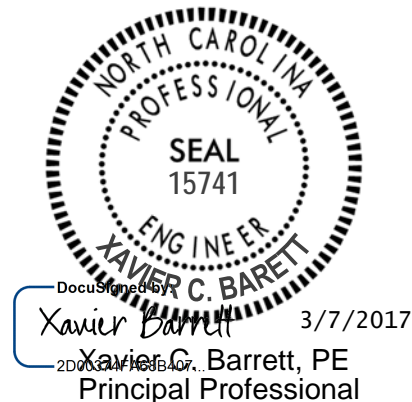
**GROUNDWATER**

Groundwater was encountered at elevations ranging from 594.7 to 596.1 feet MSL along the proposed roadways of the project. Some fluctuation in groundwater levels can occur with climatic and seasonal variations. Therefore, subsurface water conditions at other times may be different from those described in this report.

Prepared by,  
**KLEINFELDER**

Benjamin A. Johnson, EI  
Staff Professional

BAJ/XCB:cas  
Attachment



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115		TIP SF-750128		COUNTY RANDOLPH		GEOLOGIST B. Johnson										
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							GROUND WTR (ft)									
BORING NO. L_1563		STATION 15+63		OFFSET 56 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 617.7 ft		TOTAL DEPTH 15.0 ft		NORTHING 774,431		EASTING 1,809,109										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 12/30/16		COMP. DATE 12/30/16		SURFACE WATER DEPTH N/A										
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						
620																
	617.7	0.0													617.7	GROUND SURFACE 0.0
615	614.2	3.5	2	3	4	7							M	RESIDUAL Reddish Brown to Red, Fine to Coarse Sandy CLAY		
	610.7	7.0	3	5	5	10							M			
610	609.2	8.5	3	3	3	6							M	White, Orange, and Brown, Fine to Coarse Sandy SILT		
	607.7	10.0	3	5	7	12							M			
605	604.2	13.5	3	5	7								M		602.7	15.0
															Boring Terminated at Elevation 602.7 ft in RESIDUAL: Sandy SILT	
															Topsoil 0.0 to 0.2 foot	

NCDOT BORE SINGLE SF750128\_GEO\_BRD.G0128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115		TIP SF-750128		COUNTY RANDOLPH		GEOLOGIST B. Johnson										
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 16+67		OFFSET 14 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 609.8 ft		TOTAL DEPTH 23.5 ft		NORTHING 774,555		EASTING 1,809,096										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 12/30/16		COMP. DATE 12/30/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
610	609.8	0.0	2	2	3								609.8	GROUND SURFACE	0.0	
605	606.3	3.5	2	4	4						M		606.8	ROADWAY EMBANKMENT Red, Fine Sandy CLAY	3.0	
	601.3	8.5	2	3	16						M		600.3	Red, Fine to Coarse, Sandy CLAY with Trace Gravel	9.5	
595	596.3	13.5	WOH		3						5	D		597.8	White, Fine to Coarse Sandy GRAVEL	12.0
	591.3	18.5	4	15	35						W		592.8	ALLUVIAL Gray, Fine Sandy CLAY with Trace Wood Fragments	17.0	
590	586.3	23.5	60/0.0								60/0.0					M
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 586.3 ft on CRYSTALLINE ROCK: METAVOLCANIC ROCK																

NCDOT BORE SINGLE SF750128\_GEO\_BRD.G0128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 17BP.8.R.115		<b>TIP</b> SF-750128		<b>COUNTY</b> RANDOLPH		<b>GEOLOGIST</b> B. Johnson	
<b>SITE DESCRIPTION</b> Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-B		<b>STATION</b> 16+64		<b>OFFSET</b> 14 ft RT		<b>ALIGNMENT</b> -L-	<b>0 HR.</b> 15.4
<b>COLLAR ELEV.</b> 609.5 ft		<b>TOTAL DEPTH</b> 28.6 ft		<b>NORTHING</b> 774,540		<b>EASTING</b> 1,809,119	<b>24 HR.</b> 14.8
<b>DRILL RIG/HAMMER EFF./DATE</b> TRI0055 CME-55 77% 02/22/2016				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> R. Toothman		<b>START DATE</b> 12/30/16		<b>COMP. DATE</b> 12/30/16		<b>SURFACE WATER DEPTH</b> N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
610	609.5	0.0												GROUND SURFACE	0.0
	606.0	3.5	3	3	3	6						M		<b>ROADWAY EMBANKMENT</b> Red to Red-Dark Gray, Fine to Coarse Sandy CLAY	
605			2	2	3	5						M			
600	601.0	8.5	2	3	2	5						M			
595	596.0	13.5	1	0	1	1						W		<b>ALLUVIAL</b> Gray, Fine Sandy, Silty CLAY	12.0
	592.5	17.0												White and Gray, Fine to Coarse Sandy GRAVEL	17.0
590	591.0	18.5	6	3	3	6						M			
	588.5	21.0												<b>RESIDUAL</b> Brown, Fine Sandy SILT	21.0
585	586.0	23.5	7	6	4	10						M			
	581.0	28.5												<b>CRYSTALLINE ROCK</b> METAVOLCANIC ROCK	28.5
	580.9	28.6												Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 580.9 ft in CRYSTALLINE ROCK: METAVOLCANIC ROCK	28.6
		60/0.1													

NCDOT BORE SINGLE SF750128\_GEO\_BRD00128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115		TIP SF-750128		COUNTY RANDOLPH		GEOLOGIST B. Johnson												
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							GROUND WTR (ft)											
BORING NO. B1-A		STATION 17+04		OFFSET 6 ft LT		ALIGNMENT -L-												
COLLAR ELEV. 598.9 ft		TOTAL DEPTH 40.0 ft		NORTHING 774,584		EASTING 1,809,120												
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016				DRILL METHOD Mud Rotary/NQ Core		HAMMER TYPE Automatic												
DRILLER R. Toothman		START DATE 12/29/16		COMP. DATE 12/29/16		SURFACE WATER DEPTH N/A												
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								
600															598.9	GROUND SURFACE	0.0	
595	595.4	3.5	2	1	1								M		591.9	ALLUVIAL Orange and Gray, Fine to Coarse Sandy, Silty CLAY with Trace of Organic Matter	7.0	
590	591.9	7.0	50	100/0.5												WEATHERED ROCK Gray METAVOLCANIC ROCK		
585	586.9	12.0	100/0.2															
580	581.9	17.0	14	19	41								M		582.9	RESIDUAL Brown, Fine Sandy SILT	16.0	
575	576.9	22.0	100/0.5												579.9	WEATHERED ROCK Brown METAVOLCANIC ROCK	19.0	
570	573.9	25.0	60/0.0												573.9	CRYSTALLINE ROCK Dark Gray METAVOLCANIC ROCK	25.0	
565															565.4		33.5	
															564.5	WEATHERED ROCK Dark Gray METAVOLCANIC ROCK	34.4	
560															561.2	CRYSTALLINE ROCK Dark Gray METAVOLCANIC ROCK	37.7	
															558.9	Brown and White METAMORPHOSED GRANITE	40.0	
																Boring Terminated at Elevation 558.9 ft in CRYSTALLINE ROCK: METAMORPHOSED GRANITE		

NCDOT BORE SINGLE SF750128\_GEO\_BRD0128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115		TIP SF-750128		COUNTY RANDOLPH		GEOLOGIST B. Johnson	
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							GROUND WTR (ft)
BORING NO. B1-B		STATION 17+06		OFFSET 6 ft RT		ALIGNMENT -L-	0 HR. Caved
COLLAR ELEV. 599.2 ft		TOTAL DEPTH 42.4 ft		NORTHING 774,581		EASTING 1,809,132	24 HR. 3.3
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 12/28/16		COMP. DATE 12/29/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	
600														599.2	GROUND SURFACE	0.0
595	595.7	3.5	2	1	1									593.2	<b>ALLUVIAL</b> Red and Gray, Fine to Coarse Sandy, Silty CLAY	6.0
590	591.9	7.3	13	13	15									586.4	Gray, Clayey, Fine to Coarse SAND with Some Gravel	12.8
585	586.9	12.3	23	60	40/0.1										<b>WEATHERED ROCK</b> Brown to Brown-Tan and Gray METAVOLCANIC ROCK	
580	581.9	17.3	100/0.3													
575	576.9	22.3	100/0.4													
570	571.9	27.3	100/0.4													
565	566.9	32.3	100/0.2													
560	561.9	37.3	100/0.2													
	556.9	42.3	60/0.1											556.9	<b>CRYSTALLINE ROCK</b> METAVOLCANIC ROCK	42.3
														556.8	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 556.8 ft in CRYSTALLINE ROCK: METAVOLCANIC ROCK	

NCDOT BORE SINGLE SF750128\_GEO\_BRD.G0128.GPJ\_NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 17BP.8.R.115	TIP SF-750128	COUNTY RANDOLPH	GEOLOGIST B. Johnson
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION 17+78	OFFSET 13 ft LT	ALIGNMENT -L-
0 HR. Caved			24 HR. FIAD
COLLAR ELEV. 609.8 ft	TOTAL DEPTH 30.0 ft	NORTHING 774,653	EASTING 1,809,149
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. Toothman	START DATE 01/04/16	COMP. DATE 01/04/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
610	609.8	0.0	2	3	3	6						M	GROUND SURFACE	0.0
	606.3	3.5	1	2	1	3						M	<b>ROADWAY EMBANKMENT</b> Red-Brown, Fine to Coarse SANDY CLAY with Trace of Organic Matter and Trace Gravel	
605														6.0
	601.3	8.5	2	3	3	6						M	<b>ALLUVIAL</b> Dark Gray-Black, Fine to Coarse SANDY CLAY with Trace of Organic Matter	
600														12.0
	596.3	13.5	2	2	4	6						M	Yellowish, Brown-Gray, Clayey, Fine to Coarse SAND	
595														17.0
	591.3	18.5	5	10	14	24						M	<b>RESIDUAL</b> Brown-Black, Fine SANDY SILT	
590														22.0
	586.3	23.5	11	24	9	33						W	Brown-White, Silty, Fine to Coarse SAND	
585														26.0
	582.0	27.8	100/0.2			100/0.2							<b>WEATHERED ROCK</b> Gray METAVOLCANIC ROCK	
580														30.0
	579.8	30.0	60/0.0			60/0.0							Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 579.8 ft on CRYSTALLINE ROCK: METAVOLCANIC ROCK	
													Topsoil 0.0 to 0.4 foot	

NCDOT BORE SINGLE SF750128\_GEO\_BRD.G0128.GPJ\_NC\_DOT.GDT 2/21/17



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115			TIP SF-750128			COUNTY RANDOLPH			GEOLOGIST B. Johnson							
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek										GROUND WTR (ft)						
BORING NO. EB2-B			STATION 17+78			OFFSET 10 ft RT			ALIGNMENT -L-							
COLLAR ELEV. 610.2 ft			TOTAL DEPTH 25.9 ft			NORTHING 774,642			EASTING 1,809,169							
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER R. Toothman			START DATE 12/30/16			COMP. DATE 12/30/16			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
615																
610	610.2	0.0												610.2	GROUND SURFACE	0.0
			5	6	3										<b>ROADWAY EMBANKMENT</b>	
	606.7	3.5	2	3	3									608.2	Dark Brown, Fine Sandy SILT with Trace of Organic Matter	-2.0
605															Red, Fine Sandy CLAY	
														603.2	<b>ALLUVIAL</b>	7.0
	601.7	8.5	3	3	5										Dark Brown to Gray, Fine to Coarse Sandy CLAY	
600																
	596.7	13.5	3	3	3											
595																
	591.7	18.5	32	68/0.4										593.2	<b>WEATHERED ROCK</b>	17.0
590															Brown METAVOLCANIC ROCK	
	586.7	23.5	100/0.3													
585																
	584.3	25.9	60/0.0											584.3	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 584.3 ft on CRYSTALLINE ROCK: METAVOLCANIC ROCK	25.9
															Topsoil 0.0 to 0.3 foot	

NCDOT BORE SINGLE SF750128\_GEO\_BRD0128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115		TIP SF-750128		COUNTY RANDOLPH		GEOLOGIST B. Johnson										
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek							GROUND WTR (ft)									
BORING NO. L_1800		STATION 18+00		OFFSET 40 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 600.5 ft		TOTAL DEPTH 6.0 ft		NORTHING 774,648		EASTING 1,809,206										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016				DRILL METHOD Hand Auger		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 12/28/16		COMP. DATE 12/28/16		SURFACE WATER DEPTH N/A										
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						
605																
600														600.5	GROUND SURFACE	0.0
											M				<b>RESIDUAL</b>	
											M				Dark Brown to Brown, Fine Sandy SILT	
595											M			596.5	Light Brown, Silty, Fine SAND	4.0
														594.5	Boring Terminated at Elevation 594.5 ft in RESIDUAL: Silty SAND	6.0
															Topsoil 0.0 to 0.3 foot	

NCDOT BORE SINGLE SF750128\_GEO\_BRD0128.GPJ NC\_DOT.GDT 2/21/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.8.R.115	TIP SF-750128	COUNTY RANDOLPH	GEOLOGIST B. Johnson
SITE DESCRIPTION Bridge No. 128 on SR 2442 (Ramseur Julian Road) over Sandy Creek			GROUND WTR (ft)
BORING NO. L_1975	STATION 19+71	OFFSET 27 ft LT	ALIGNMENT -L-
COLLAR ELEV. 622.9 ft	TOTAL DEPTH 15.0 ft	NORTHING 774,830	EASTING 1,809,226
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. Toothman	START DATE 12/28/16	COMP. DATE 12/28/16	SURFACE WATER DEPTH N/A

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							
625																	
	622.9	0.0													622.9	GROUND SURFACE	0.0
			8	9	9									M	620.9	ARTIFICIAL FILL Brown, Clayey, Fine to Coarse SAND	2.0
620	619.4	3.5	5	8	10									M		RESIDUAL Reddish Brown to Dark Brown, Fine Sandy SILT	
615	614.4	8.5	6	10	11									M			
610	609.4	13.5	10	15	18									M	608.9 607.9	White and Tan, Silty, Fine to Coarse SAND	14.0 15.0
																Boring Terminated at Elevation 607.9 ft in RESIDUAL: Silty SAND	
																Topsoil 0.0 to 0.3 foot	

NCDOT BORE SINGLE SF750128\_GEO\_BRD.G0128.GPJ NC\_DOT.GDT 2/21/17