

REFERENCE: BR-0115

PROJECT: 67115

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY Iredell  
 SITE DESCRIPTION Bridge No. 166 on SR 1595  
(Coolbrook Rd.) over Rocky Creek

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0115	1	16

**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**

J.K. Stickney

C.L. Smith

B.E. Foster

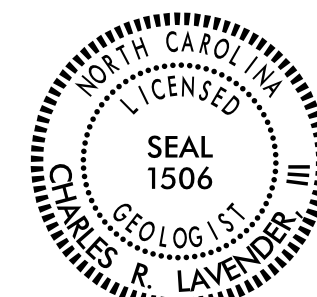
INVESTIGATED BY J.K. Stickney

DRAWN BY T.T. Walker, F&R Inc.

CHECKED BY K.B. Miller

SUBMITTED BY C.R. Lavender, III

DATE November 2019



Digitally signed by: Charles R. Lavender  
 8EEA8D1BBA2E438  
 11/26/2019

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 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, and COLOR.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

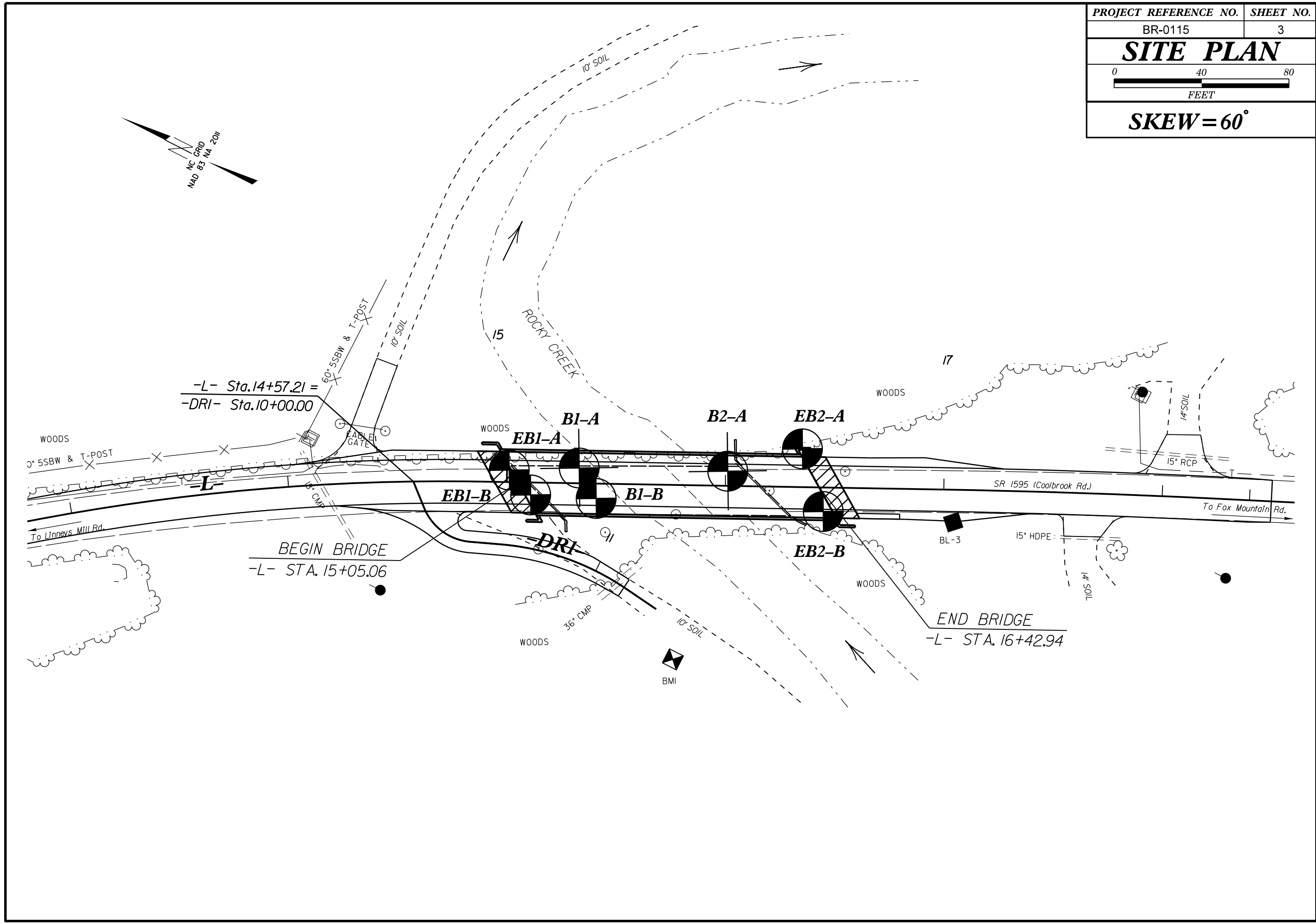
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

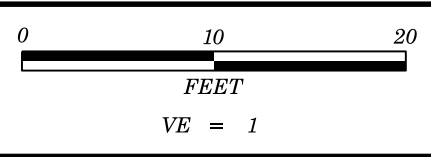
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)				
<p>From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.</p>		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	<p>From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.</p>	VERY GOOD	GOOD	FAIR	POOR	VERY POOR	
		Very rough, fresh unweathered surfaces	Rough, slightly weathered, iron stained surfaces	Smooth, moderately weathered and altered surfaces	Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	Slickensided, highly weathered surfaces with soft clay coatings or fillings		Very Rough, fresh unweathered surfaces	Rough, slightly weathered surfaces	Smooth, moderately weathered and altered surfaces	Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings	
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE						
<p>INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities</p>	90			N/A	N/A	<p><b>A.</b> Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.</p>	70						
<p>BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets</p>	80	70				<p><b>B.</b> Sandstone with thin inter-layers of siltstone</p>	60						
<p>VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets</p>		60				<p><b>C.</b> Sandstone and siltstone in similar amounts</p>	50						
<p>BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity</p>			50			<p><b>D.</b> Siltstone or silty shale with sandstone layers</p>	40						
<p>DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces</p>			40			<p><b>E.</b> Weak siltstone or clayey shale with sandstone layers</p>	30						
<p>LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes</p>			30			<p><b>F.</b> Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure</p>	20						
			20			<p><b>G.</b> Undisturbed silty or clayey shale with or without a few very thin sandstone layers</p>	10						
			10			<p><b>H.</b> Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.</p>							
			N/A										
			N/A										

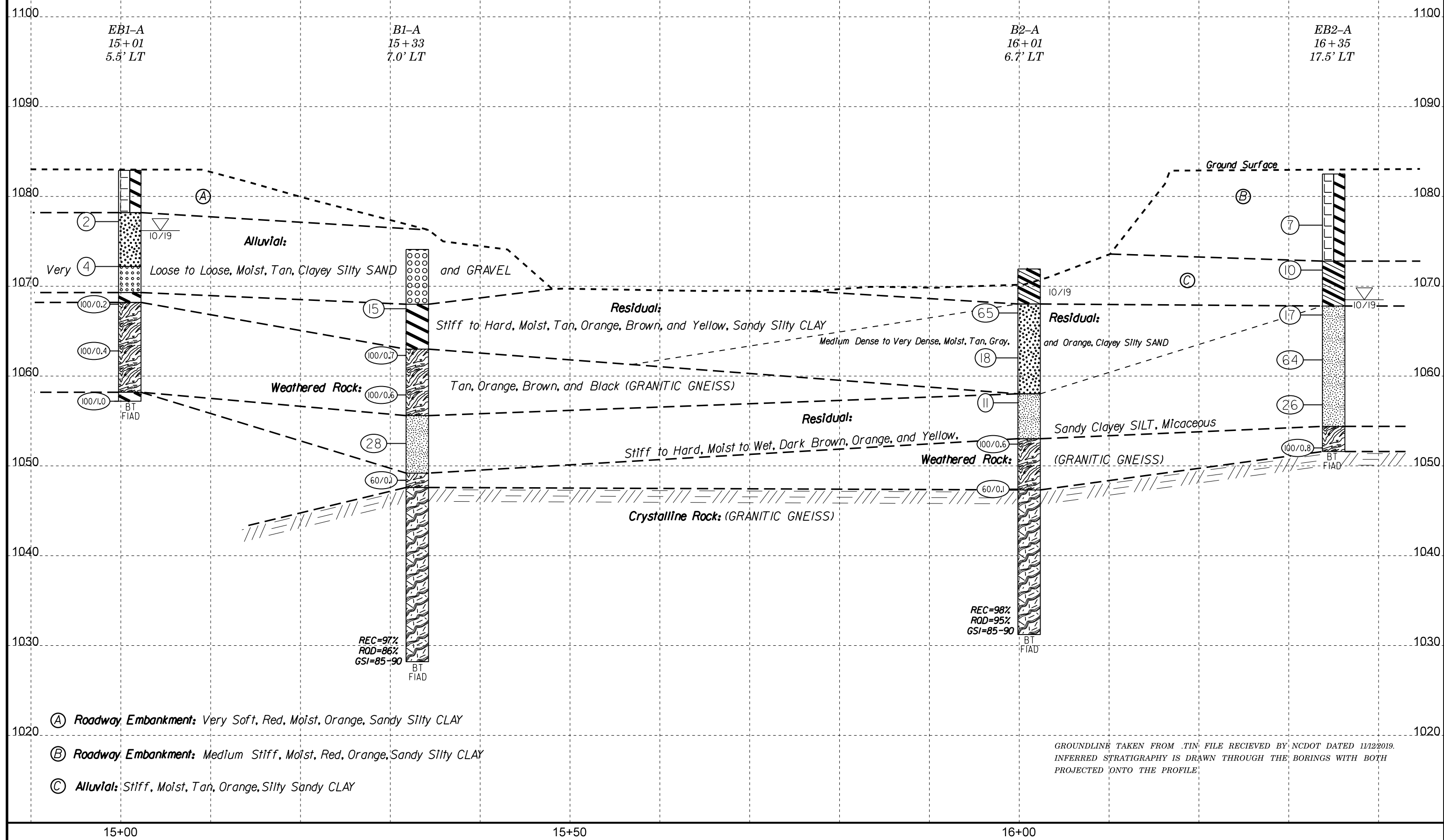
→ Means deformation after tectonic disturbance

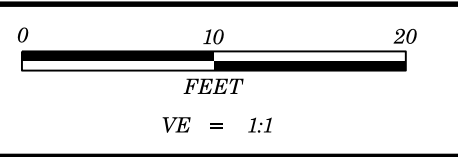
PROJECT REFERENCE NO.	SHEET NO.
BR-0115	3
<b>SITE PLAN</b>	
 0 40 80 FEET	
<b>SKEW = 60°</b>	



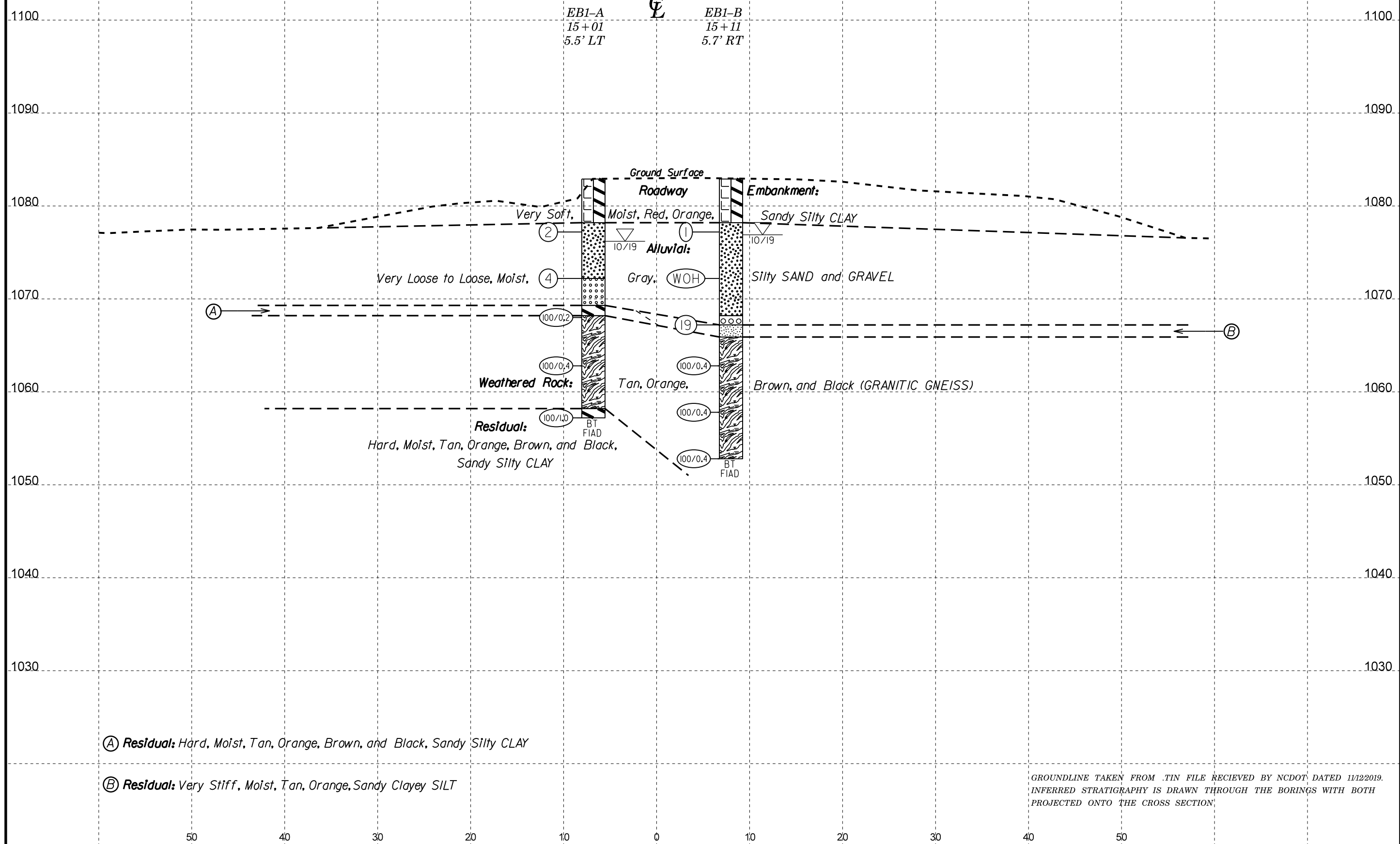


<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0115	4
<b>PROFILE BORING PROJECTED ALONG -L-</b>	

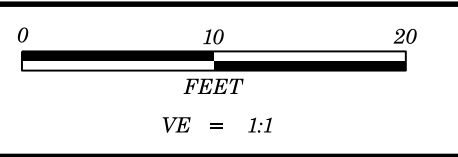




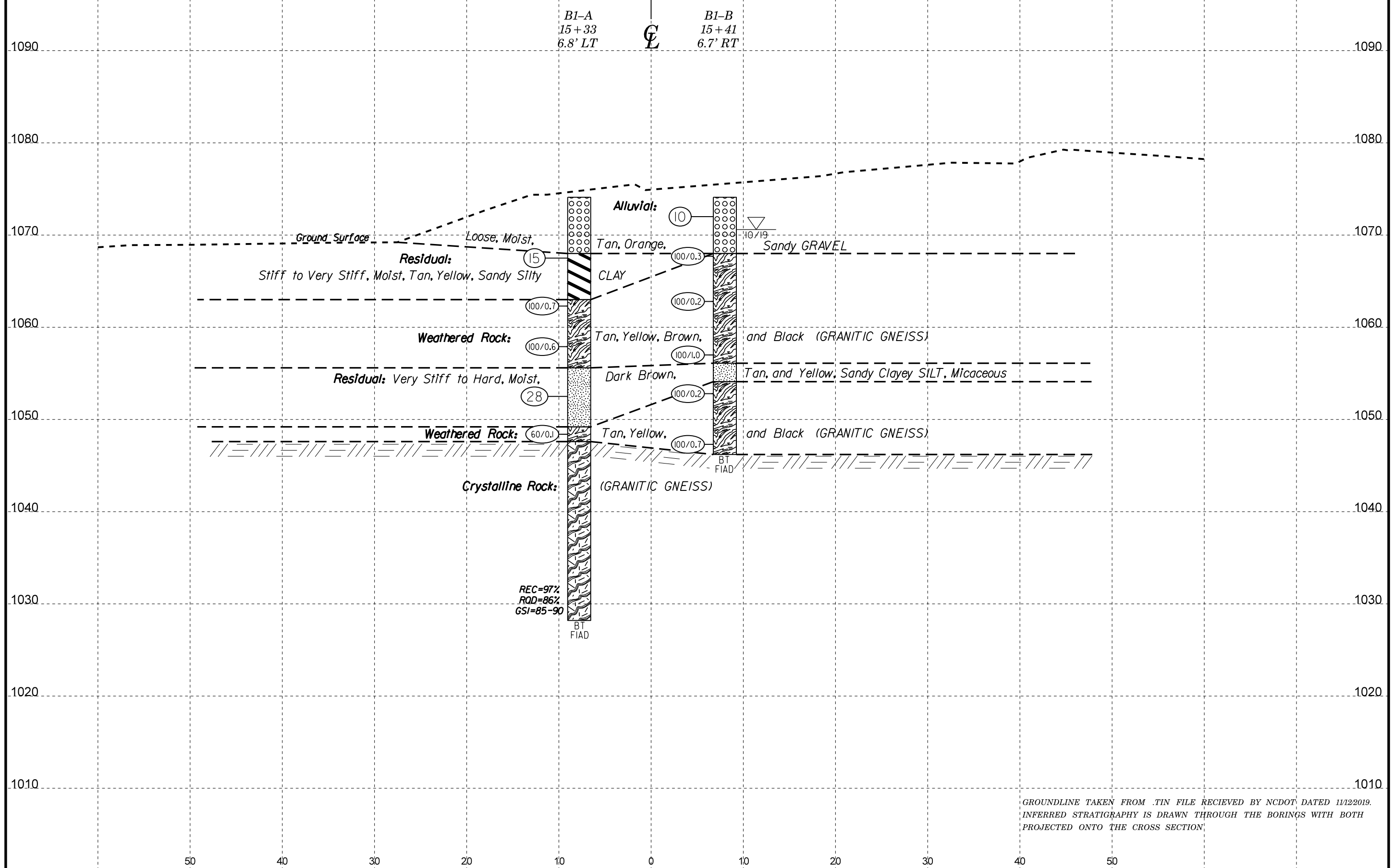
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0115	5
<b>CROSS SECTION THROUGH END BENT 1</b>	
AT -L- STATION 15+05.06	
SKEW=60°	



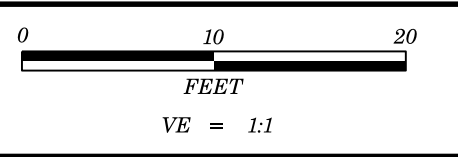
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 11/22/2019.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION



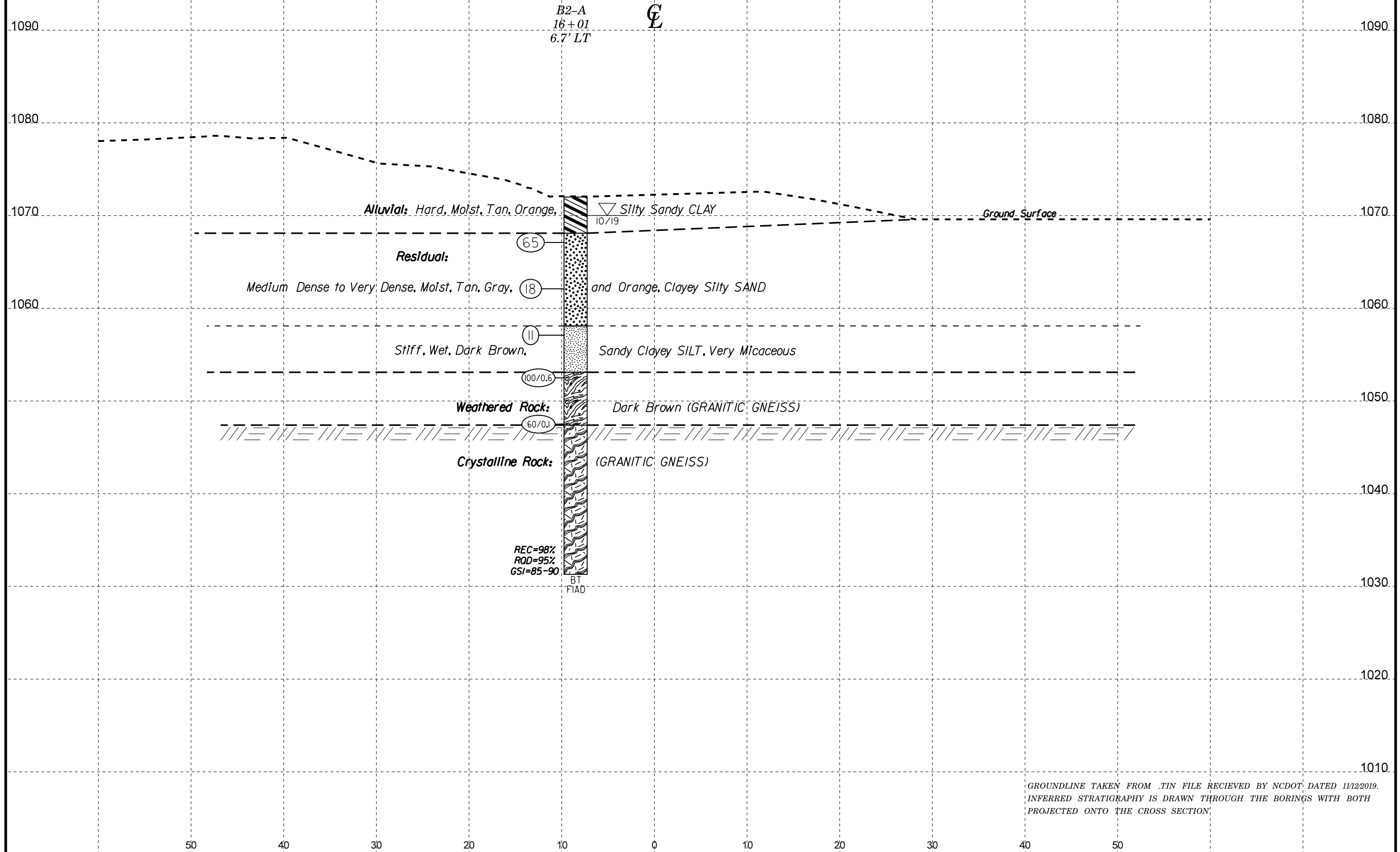
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0115	6
<b>CROSS SECTION THROUGH BENT 1</b>	
AT -L- STATION 15+36.43	
SKEW=60°	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 11/22/2019.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0115	7
<b>CROSS SECTION THROUGH BENT 2</b> AT -L- STATION 16+05.57 SKEW=60°	



B2-A  
16+01  
6.7' LT



1090

1090

1080

1080

1070

1070

1060

1060

1050

1040

1030

1020

1010

50 40 30 20 10 0 10 20 30 40 50

GROUNDLINE TAKEN FROM .TIN FILE RECIEVED BY NCDOT DATED 11/22/2019.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION

REC=98%  
ROD=95%  
GSI=85-90

BT  
FIAD

65

18

100/0.6

60/0.1

10/19

Alluvial: Hard, Moist, Tan, Orange,

Silty Sandy CLAY

Ground Surface

Residual:

Medium Dense to Very Dense, Moist, Tan, Gray,

and Orange, Clayey Silty SAND

Stiff, Wet, Dark Brown,

Sandy Clayey SILT, Very Micaceous

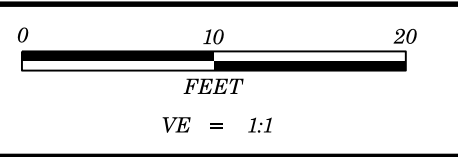
Weathered Rock:

Dark Brown (GRANITIC GNEISS)

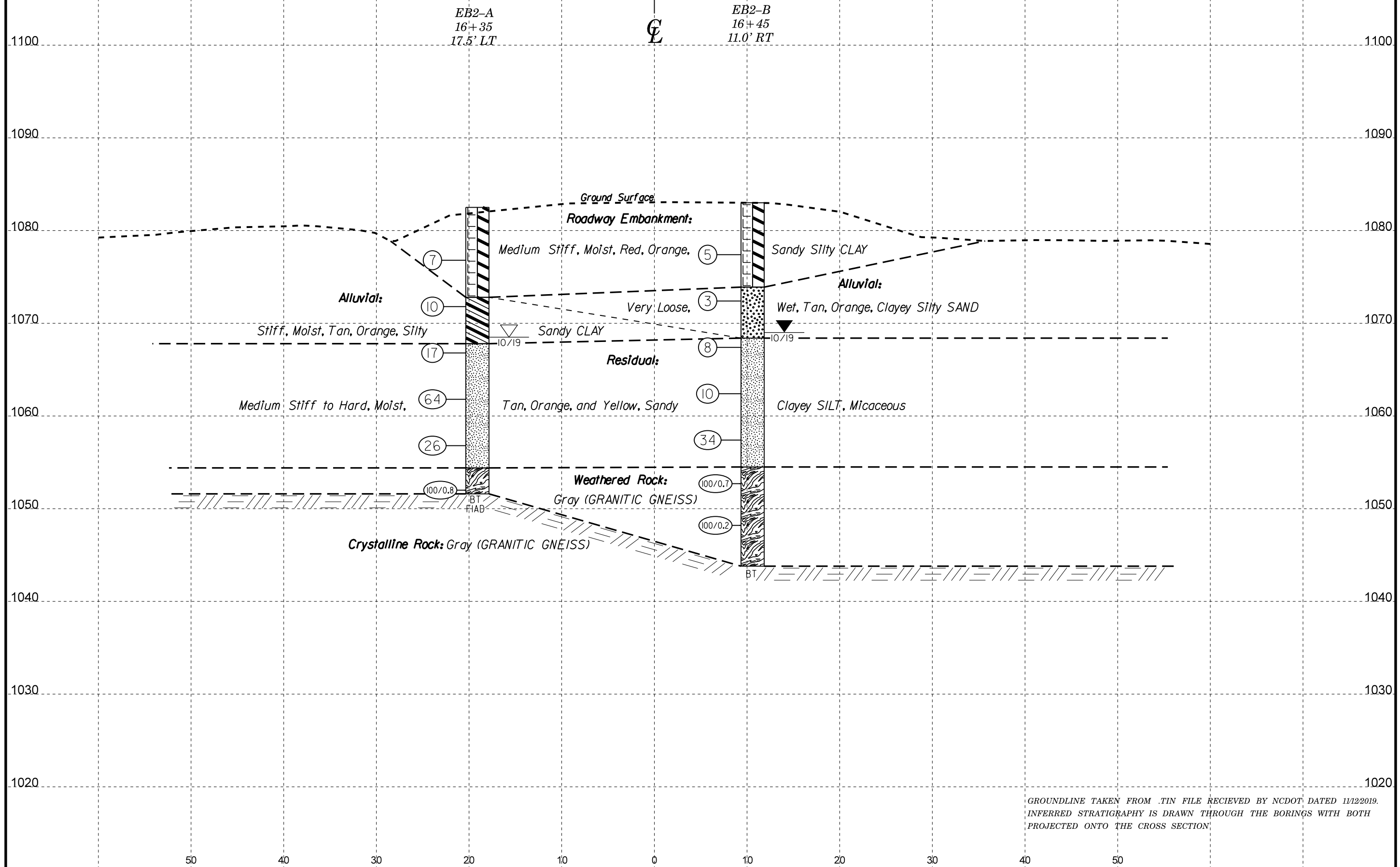
Crystalline Rock:

(GRANITIC GNEISS)





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0115	8
<b>CROSS SECTION THROUGH END BENT 2</b>	
AT -L- STATION 16+42.94	
SKEW=60°	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 11/12/2019.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 15+01		OFFSET 6 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 1,082.9 ft		TOTAL DEPTH 25.7 ft		NORTHING 830,092		EASTING 1,407,438										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 92% 08/15/2018			DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/17/19		COMP. DATE 10/17/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1085														1,082.9	0.0	GROUND SURFACE
1080	1,078.2	4.7	1	1	1									1,078.2	4.7	ROADWAY EMBANKMENT Red, orange, sandy, silty, CLAY
1075	1,073.2	9.7	WOH	WOH	4									1,072.2	10.7	ALLUVIAL Gray, clayey, silty, SAND
1070	1,068.2	14.7	100/0.2											1,069.3	13.6	Gray, clayey, silty, sandy, GRAVEL
1065	1,063.2	19.7	100/0.4											1,068.2	14.7	RESIDUAL Tan, orange, brown, and black, sandy, silty, CLAY
1060	1,058.2	24.7	42	58/0.5										1,058.2	24.7	WEATHERED ROCK Tan, orange, brown, and black, (Granitic Gneiss)
														1,057.2	25.7	RESIDUAL Tan, orange, brown, and black, sandy, silty, CLAY
																Boring Terminated at Elevation 1,057.2 ft in sandy, silty CLAY

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 15+11		OFFSET 6 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 1,082.9 ft		TOTAL DEPTH 30.1 ft		NORTHING 830,078		EASTING 1,407,432										
DRILL RIG/HAMMER EFF./DATE HFC0070 CME-550X 81% 06/04/2018			DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/17/19		COMP. DATE 10/17/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1085														1,082.9	0.0	GROUND SURFACE
1080	1,078.2	4.7	1	0	1									1,078.2	4.7	ROADWAY EMBANKMENT Red, orange, sandy, silty, CLAY
1075	1,073.2	9.7	WOH	WOH	4									1,072.2	10.7	ALLUVIAL Gray, clayey, silty, SAND
1070	1,068.2	14.7	7	6	13									1,068.2	14.7	Gray, clayey, silty, sandy, GRAVEL
1065	1,063.2	19.7	100/0.4											1,067.2	15.7	RESIDUAL Tan, orange, brown, and black, sandy, silty, CLAY
1060	1,058.2	24.7	100/0.4											1,065.9	17.0	RESIDUAL Tan, orange, sandy, clayey, SILT
1055	1,053.2	29.7	100/0.4											1,052.8	30.1	WEATHERED ROCK Tan, brown, orange, black (Granitic Gneiss)
																Boring Terminated at Elevation 1,052.8 ft in Weathered Rock (Granitic Gneiss)

NCDOT BORE DOUBLE BR0115\_GEO\_BRDG166\_BL.GPJ NC\_DOT.GDT 11/24/19

## GEOTECHNICAL BORING REPORT BORE LOG

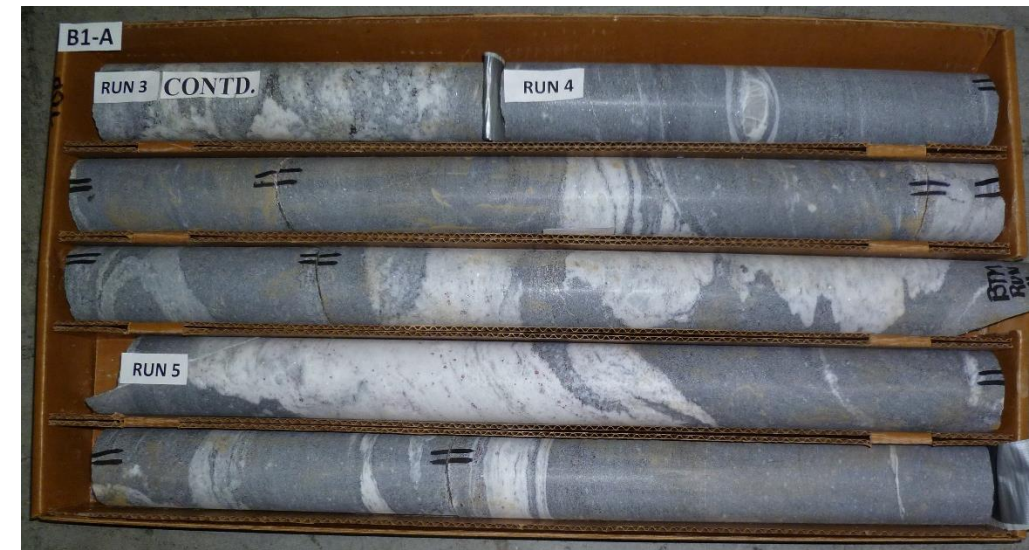
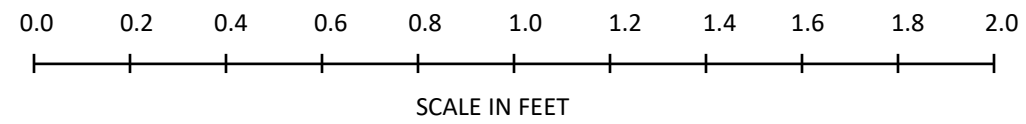
## GEOTECHNICAL BORING REPORT CORE LOG

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. B1-A		STATION 15+33		OFFSET 7 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 1,074.1 ft		TOTAL DEPTH 45.9 ft		NORTHING 830,064		EASTING 1,407,453										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 92% 08/15/2018				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/09/19		COMP. DATE 10/09/19		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)		
1075														1,074.1	GROUND SURFACE	0.0
1070														1,068.0	<b>ALLUVIAL</b> Tan, orange, silty, sandy, GRAVEL	6.1
1065	1,068.5	5.6	17	8	7									1,063.0	<b>RESIDUAL</b> Tan, yellow, sandy, silty, CLAY	11.1
1060	1,063.5	10.6	8	32	68/0.2									1,055.6	<b>WEATHERED ROCK</b> Tan, yellow, brown, and black (Granitic Gneiss)	18.5
1055	1,058.5	15.6	53	47/0.1										1,049.2	<b>RESIDUAL</b> Dark brown, sandy, clayey, SILT, very micaceous	24.9
1050	1,053.5	20.6	14	16	12									1,047.6	<b>WEATHERED ROCK</b> (Granitic Gneiss)	26.5
1045	1,048.5	25.6	60/0.1											1,028.2	<b>CRYSTALLINE ROCK</b> (Granitic Gneiss)	45.9
1040																
1035																
1030																

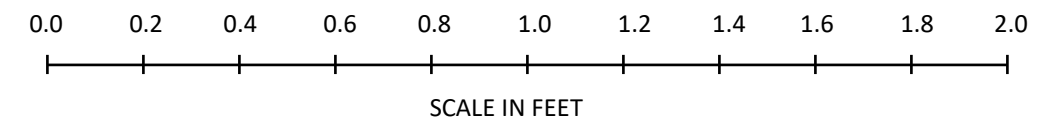
WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.					
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)				
BORING NO. B1-A		STATION 15+33		OFFSET 7 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 1,074.1 ft		TOTAL DEPTH 45.9 ft		NORTHING 830,064		EASTING 1,407,453					
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 92% 08/15/2018				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic					
DRILLER Smith, C. L.		START DATE 10/09/19		COMP. DATE 10/09/19		SURFACE WATER DEPTH N/A					
CORE SIZE NWL-2				TOTAL RUN 19.4 ft							
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
1047.6	1,047.6	0.4	0.4		(0.4) 100%	(0.0) 0%		(18.9) 97%	(16.7) 86%		Begin Coring @ 26.5 ft
1045	1,047.2	26.9	5.0		(5.0) 100%	(3.2) 64%					<b>CRYSTALLINE ROCK</b> Gray, white, fresh, hard to very hard Granitic Gneiss, moderately close to wide fracture spacing. GSI 85 - 90.
1040	1,042.2	31.9	5.0		(4.8) 96%	(4.8) 96%					
1035	1,037.2	36.9	5.0		(5.0) 100%	(5.0) 100%					
1030	1,032.2	41.9	4.0		(3.7) 93%	(3.7) 93%					
	1,028.2	45.9									Boring Terminated at Elevation 1,028.2 ft in Crystalline Rock (Granitic Gneiss)

### CORE PHOTOGRAPHS: Bridge No. 166 on SR1595 (Coolbrook Rd.) over Rocky Creek, B1-A 15+33, 7.0' LT

Begin  
26.5 feet



End  
41.9 feet



# GEOTECHNICAL BORING REPORT BORE LOG

WBS 67115.1.1	TIP BR-0115	COUNTY IREDELL	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek			GROUND WTR (ft)
BORING NO. B1-B	STATION 15+41	OFFSET 7 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,074.1 ft	TOTAL DEPTH 27.9 ft	NORTHING 830,051	EASTING 1,407,444
DRILL RIG/HAMMER EFF./DATE HFC0070 CME-550X 81% 06/04/2018		DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 10/17/19	COMP. DATE 10/17/19	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)
														1,074.1	0.0	GROUND SURFACE
	1,073.0	1.1		2	5	5										ALLUVIAL Tan, orange, silty, sandy, GRAVEL
	1,068.0	6.1												1,068.0	6.1	WEATHERED ROCK Tan, yellow, and black (Granitic gneiss)
	1,063.0	11.1														
	1,058.0	16.1		35	57	43/0.5								1,056.1	18.0	RESIDUAL Tan, yellow, and black, sandy, clayey, SILT
	1,053.0	21.1												1,054.1	20.0	WEATHERED ROCK Tan, yellow, and black, alternating layers of hard and soft (Granitic gneiss)
	1,048.0	26.1		53	47/0.2									1,046.2	27.9	Boring Terminated at Elevation 1,046.2 ft on Crystalline Rock (Granitic Gneiss)

NCDOT BORE DOUBLE BR0115\_GEO\_BRDG166\_BL.GPJ NC\_DOT.GDT 11/24/19

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

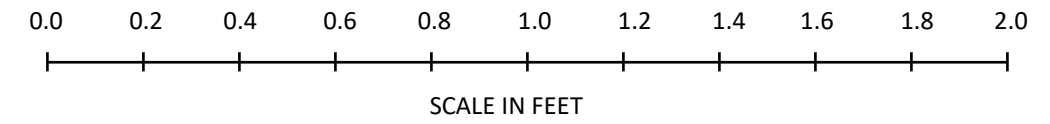
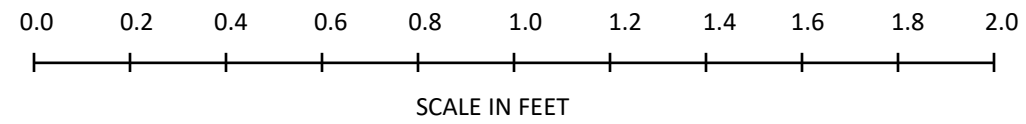
WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. B2-A		STATION 16+01		OFFSET 7 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 1,072.0 ft		TOTAL DEPTH 40.7 ft		NORTHING 830,003		EASTING 1,407,483										
DRILL RIG/HAMMER EFF./DATE HFC0070 CME-550X 81% 06/04/2018				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/10/19		COMP. DATE 10/10/19		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						
1075																
														1,072.0	GROUND SURFACE	0.0
1070														1,068.1	ALLUVIAL Tan, orange, silty, sandy, CLAY	3.9
1065	1,068.1	3.9	12	35	30									1,068.1	RESIDUAL Tan, gray, orange, clayey, silty, SAND	3.9
1060	1,063.1	8.9	15	10	8									1,058.1	WEATHERED ROCK Dark brown, sandy, clayey, SILT, very micaceous	13.9
1055	1,058.1	13.9	5	4	7									1,053.1	WEATHERED ROCK Dark brown (Granitic Gneiss)	18.9
1050	1,053.1	18.9	42	58/0.1										1,048.1	CRYSTALLINE ROCK (Granitic Gneiss)	24.6
1045	1,048.1	23.9	60/0.1											1,047.4	CRYSTALLINE ROCK (Granitic Gneiss)	24.6
1040																
1035														1,031.3	Boring Terminated at Elevation 1,031.3 ft in Crystalline Rock (Granitic Gneiss)	40.7

NCDOT BORE DOUBLE BR0115\_GEO\_BRD0166\_BL.GPJ NC\_DOT.GDT 11/24/19

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.					
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)				
BORING NO. B2-A		STATION 16+01		OFFSET 7 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 1,072.0 ft		TOTAL DEPTH 40.7 ft		NORTHING 830,003		EASTING 1,407,483					
DRILL RIG/HAMMER EFF./DATE HFC0070 CME-550X 81% 06/04/2018				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic					
DRILLER Smith, C. L.		START DATE 10/10/19		COMP. DATE 10/10/19		SURFACE WATER DEPTH N/A					
CORE SIZE NWL-2			TOTAL RUN 16.1 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	ROD (ft) %	REC. (ft) %	ROD (ft) %			
1047.4	1,047.4	24.6	0.8		(0.8)	(0.8)	(15.8)	(15.3)		Begin Coring @ 24.6 ft	
1045	1,046.6	25.4	5.0		100%	100%	98%	95%		CRYSTALLINE ROCK Gray, white, fresh, hard to very hard Granitic Gneiss, wide fracture spacing. GSI 85 - 90.	24.6
1040	1,041.6	30.4	5.2		(5.2)	(4.9)					
1035	1,036.4	35.6	5.1		(5.0)	(5.0)					
	1,031.3	40.7								Boring Terminated at Elevation 1,031.3 ft in Crystalline Rock (Granitic Gneiss)	40.7

NCDOT CORE DOUBLE BR0115\_GEO\_BRD0166\_BL.GPJ NC\_DOT.GDT 11/24/19

### CORE PHOTOGRAPHS: Bridge No. 166 on SR1595 (Coolbrook Rd.) over Rocky Creek, B2-A 16+01, 7.0' LT



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 16+35		OFFSET 18 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 1,082.5 ft		TOTAL DEPTH 30.9 ft		NORTHING 829,977		EASTING 1,407,507										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 92% 08/15/2018				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/11/19		COMP. DATE 10/11/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1085														1,082.5	GROUND SURFACE	0.0
1080	1,077.8	4.7	3	3	4								M	ROADWAY EMBANKMENT Red, orange, sandy, silty, CLAY		
1075	1,072.8	9.7	3	6	4								M	ALLUVIAL Tan, orange, silty, sandy, CLAY	9.7	
1070	1,067.8	14.7	6	7	10								M	RESIDUAL Tan, orange, yellow, sandy, clayey, SILT, to Dark brown clayey sandy SILT, micaceous	14.7	
1065	1,062.8	19.7	25	26	38								M			
1060	1,057.8	24.7	33	16	10								M			
1055	1,052.8	29.7	50	50/0.3									M	WEATHERED ROCK (Granitic gneiss)	28.1	
														1,051.6	Boring Terminated at Elevation 1,051.6 ft on Crystalline Rock (Granitic Gneiss)	30.9

WBS 67115.1.1		TIP BR-0115		COUNTY IREDELL		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 16+45		OFFSET 11 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 1,083.0 ft		TOTAL DEPTH 39.2 ft		NORTHING 829,955		EASTING 1,407,486										
DRILL RIG/HAMMER EFF./DATE HFC0070 CME-550X 81% 06/04/2018				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 10/11/19		COMP. DATE 10/11/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1085														1,083.0	GROUND SURFACE	0.0
1080	1,078.4	4.6	2	3	2								M	ROADWAY EMBANKMENT Red, orange, sandy, silty, CLAY		
1075	1,073.4	9.6	WOH	1	2								W	ALLUVIAL Tan, orange, clayey, silty, SAND	9.1	
1070	1,068.4	14.6	2	4	4								M	RESIDUAL Tan, orange, yellow, clayey, sandy, SILT, with thin layers of gray, orange, and tan, clayey, sandy, SILT, micaceous	14.6	
1065	1,063.4	19.6	3	4	6								M			
1060	1,058.4	24.6	10	10	24								M			
1055	1,053.4	29.6	19	81/0.2									M	WEATHERED ROCK Gray, alternating layers of hard and soft (Granitic Gneiss)	28.5	
1050	1,048.4	34.6	100/0.2											1,043.8	Boring Terminated at Elevation 1,043.8 ft on Crystalline Rock (Granitic Gneiss)	39.2

NCDOT BORE DOUBLE BR0115\_GEO\_BRDG166\_BL.GPJ NC\_DOT.GDT 11/24/19



# Bridge No. 166 on SR 1595 (Coolbrook Rd.) over Rocky Creek

## SITE PHOTOGRAPHS



**Photograph No. 1:** Looking at End Bent 1 toward End Bent 2



**Photograph No. 2:** Looking Downstream