CONTENTS

-0070

BR

REFERENCE

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SHELL NO.	<u>DESCRIPTION</u>
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3	SITE PLAN
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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CASWELL

PROJECT DESCRIPTION REPLACEMENT OF BRIDGE NO. 61 OVER HOGAN'S CREEK ON NC 86 BETWEEN SR 1300 AND SR 1500 AND CONSTRUCT CONNECTOR ROADS FOR NEW BRIDGE

SITE DESCRIPTION BRIDGE NO. 61 OVER HOGANS CREEK ON HWY NC 86

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0070	1	17

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 SOLT TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-8050. 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 BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-FLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE ONSERVED WATER LEVELS OR SOL MOISTURE CONDITIONS MOLATED IN THE SUBSURFACE RELIVESTIGATIONS AND REAS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOISTURE CONDITIONS MAY LARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS NICLUDING 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 CUARANTEE THE 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.

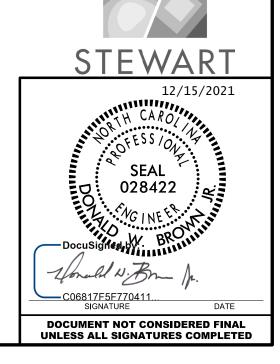
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PERSONNEL

E. FERREIRA, EI CATLIN T. THOMAS T. PARK P. MCCAIN

- INVESTIGATED BY <u>E. FERREIRA, EI</u>
- DRAWN BY _____E. FERREIRA, EI
- CHECKED BY ______ D. BROWN, PE
- SUBMITTED BY _D. BROWN, PE

DATE _____ DECEMBER 2021

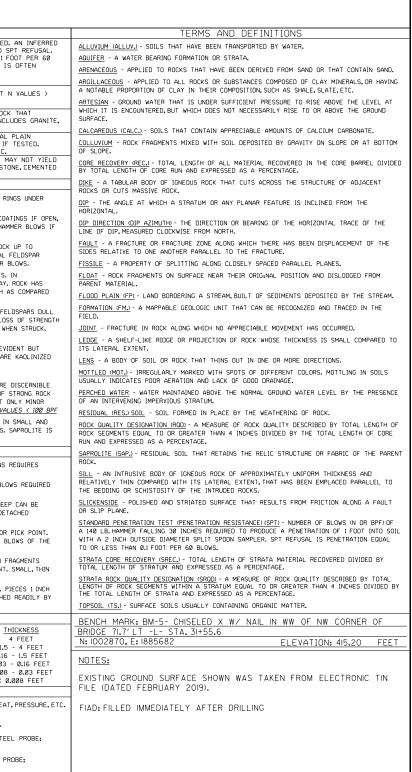


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

		ESCRIPTION				GRADATION					ROCK DES	
BE PENETRATED WITH ACCORDING TO THE S	UNCONSOLIDATED, SEMI-CONS A CONTINUOUS FLIGHT POW STANDARD PENETRATION TES E AASHTO SYSTEM. BASIC D	ER AUGER AND YIELD LESS T (AASHTO T 206, ASTM DIS	THAN 100 BLOWS PER 586). SOIL CLASSIFIC	R FOOT ATION	UNIFORMLY GRADED - IN	ES A GOOD REPRESENTATION OF PARTIC IDICATES THAT SOIL PARTICLES ARE ALL S A MIXTURE OF UNIFORM PARTICLE SIZ	APPROXIMATELY THE SAME SIZE.	ROCK LINE IN SPT REFUSAL BLOWS IN NO	DICATES IS PENE N-COASTA	THE LEVEL TRATION BY AL PLAIN MA	AT WHICH NON-COAS A SPLIT SPOON SA ATERIAL, THE TRAM	OULD YIELD SPT REFUSAL IF TESTE STAL PLAIN MATERIAL WOULD YIELD MPLER EOUAL TO OR LESS THAN 0.1 NSITION BETWEEN SOIL AND ROCK
	TEXTURE, MOISTURE, AASHTO ICAL COMPOSITION, ANGULAR			5 SUCH		ANGULARITY OF GRAIN		REPRESENTED ROCK MATERIA			HERED ROCK. DIVIDED AS FOLLOW	5:
	ray. <i>silty clay.moist with inte</i> DIL LEGEND AND A					Y OR ROUNDNESS OF SOIL GRAINS IS DE IGULAR, SUBROUNDED, OR ROUNDED.		WEATHERED ROCK (WR)	111223		NON-COASTAL PLAI 100 BLOWS PER FO	N MATERIAL THAT WOULD YIELD SPT NOT IF TESTED.
	GRANULAR MATERIALS ≤ 35% PASSING ≢200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIA	LS		MINERALOGICAL COMPOSI	ALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR)		I'M I'M	FINE TO COARSE G WOULD YIELD SPT GNEISS, GABBRO, SC	RAIN IGNEOUS AND METAMORPHIC ROO REFUSAL IF TESTED. ROCK TYPE INC
CLASS. A-1-o A-1-b	A-3 A-2 A-2-4 A-2-5 A-2-6 A-2-7	7 4-7-5.	A-1, A-2 A-4, A-5 A-3 A-6, A-7		ARE USED IN	DESCRIPTIONS WHEN THEY ARE CONSIDE	ERED OF SIGNIFICANCE.	NON-CRYSTALL ROCK (NCR)	INE .		FINE TO COARSE G SEDIMENTARY ROCK	RAIN METAMORPHIC AND NON-COASTA THAT WOULD YEILD SPT REFUSAL I
SYMBOL 000000000000000000000000000000000000					MODE	ITLY COMPRESSIBLE RATELY COMPRESSIBLE LY COMPRESSIBLE	LL < 31 LL = 31 - 50 LL > 50	COASTAL PLAI SEDIMENTARY			COASTAL PLAIN SE	ES PHYLLITE, SLATE, SANDSTONE, ETC DIMENTS CEMENTED INTO ROCK, BUT K TYPE INCLUDES LIMESTONE, SANDS
% PASSING #10 50 MX			GRANULAR SILT-	MUCK,		PERCENTAGE OF MATER		(CP)			SHELL BEDS, ETC.	
*40 30 MX 50 MX 5 *200 15 MX 25 MX 1	51 MN 10 MX 35 MX 35 MX 35 MX 35 MX	x 36 mn 36 mn 36 mn 36 mn	SOILS SOILS	PEAT	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL	- FRECU				HERING TS MAY SHOW SLIGHT STAINING. ROCK F
MATERIAL PASSING 40			SOILS WITH		TRACE OF ORGANIC MAT LITTLE ORGANIC MAT MODERATELY ORGANIC	ATTER 2 - 3% 3 - 5%	TRACE 1 - 10% LITTLE 10 - 20% SOME 20 - 35%	VERY SLIGHT	HAMMER I ROCK GEN	IF CRYSTALLI NERALLY FRES	NE. SH, JOINTS STAINED,	SOME JOINTS MAY SHOW THIN CLAY CO
	NP 10 MX 10 MX 11 MN 11 MN	40 MX 41 MN 40 MX 41 MN 10 MX 10 MX 11 MN 11 MN	LITTLE OR MODERATE	HIGHL Y ORGANIC	HIGHLY ORGANIC	> 10% > 20%	HIGHLY 35% AND ABOVE			S UN A BRUKE YSTALLINE NA		HINE BRIGHTLY. ROCK RINGS UNDER HA
GROUP INDEX Ø USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND	Ø Ø 4 MX FINE SILTY OR CLAYEY	8 MX 12 MX 16 MX NO MX SILTY CLAYEY	AMOUNTS OF ORGANIC MATTER	SOILS		GROUND WATER	TELY AFTER DRILLING	(SLI.)	1 INCH. O	PEN JOINTS M	MAY CONTAIN CLAY.	AND DISCOLORATION EXTENDS INTO ROC IN GRANITOID ROCKS SOME OCCASIONAL YSTALLINE ROCKS RING UNDER HAMMER
MATERIALS SAND	SAND GRAVEL AND SAND	SOILS SOILS				STATIC WATER LEVEL AFTER 24 H						COLORATION AND WEATHERING EFFECTS
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR POOR	UNSUITABLE		PERCHED WATER, SATURATED ZONE, OR SPRING OR SEEP	WATER BEARING STRATA			JND UNDER HA		HOWS SIGNIFICANT LOSS OF STRENGTH
P	1 OF A-7-5 SUBGROUP IS ≤ LL -	30; PI OF A-7-6 SUBGROUP IS >	·LL - 30			MISCELLANEOUS SYMBO	1 9					STAINED. IN GRANITOID ROCKS, ALL FI
PRIMARY SOIL TYPE	COMPACTNESS OR	RANGE OF STANDARD PENETRATION RESISTENCE	RANGE OF UNCO COMPRESSIVE ST	RENGTH	ROADWAY EMBI	ANKMENT (RE) 25/025 DIP & DIP DIRE	ECTION		AND CAN	BE EXCAVATE		T'S PICK. ROCK GIVES "CLUNK" SOUND W
GENERALLY	CONSISTENCY VERY LOOSE	(N-VALUE) < 4	(TONS/FT ²	2)	WITH SOIL DE	SCRIPTION OF ROCK STRUC	ING SLOPE INDICATOR	(SEV.)	REDUCED	IN STRENGTH	H TO STRONG SOIL. I	R STAINED. ROCK FABRIC CLEAR AND EN IN GRANITOID ROCKS ALL FELDSPARS A
GRANULAR	LOOSE MEDIUM DENSE	4 TO 10 10 TO 30	N/A		A A A A A A A A A A A A A A A A A A A						1E FRAGMENTS OF ST TLD SPT N VALUES >	TRONG ROCK USUALLY REMAIN. <u>100 BPF</u>
MATERIAL (NON-COHESIVE)	DENSE VERY DENSE	30 TO 50 > 50	(0.05				CONE PENETROMETER TEST	SEVERE	BUT MASS	S IS EFFECTI	VELY REDUCED TO S	R STAINED. ROCK FABRIC ELEMENTS AR OIL STATUS, WITH ONLY FRAGMENTS OF ROCK WEATHERED TO A DEGREE THAT
GENERALLY SILT-CLAY	VERY SOFT SOFT MEDIUM STIFF	<pre>< 2 2 TO 4 4 TO 8</pre>	< 0.25 0.25 TO 0 0.5 TO 1.				TEST BORING		VESTIGES	OF ORIGINAL	ROCK FABRIC REMA	AIN. <u>IF TESTED, WOULD YIELD SPT N V</u> I DISCERNIBLE, OR DISCERNIBLE ONLY I
MATERIAL (COHESIVE)	STIFF VERY STIFF	8 TO 15 15 TO 30	1 TO 2 2 TO 4	0	TTTTT ALLUVIAL SOI		SPT N-VALUE		SCATTERE			BE PRESENT AS DIKES OR STRINGERS.
	TEXTURE (> 30 DR GRAIN SIZE	> 4			RECOMMENDATION SYMB	DLS					ARDNESS
U.S. STD. SIEVE SIZE	4 10	40 60 200	270				UNCLASSIFIED EXCAVATION -				D BY KNIFE OR SHAR OF THE GEOLOGIST"	RP PICK. BREAKING OF HAND SPECIMENS S PICK.
OPENING (MM) BOULDER COB	4.76 2.00	0.42 0.25 0.075 COARSE FINE	0.053 SILT	CLAY	SHALLOW UNDERCUT	✓ UNSUITABLE WASTE ↓ UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK	ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL			SCRATCHED BY		LY WITH DIFFICULTY. HARD HAMMER BL
(BLDR.) (CC	08.) (GR.)	SAND SAND (CSE. SD.) (F SD.)	(SL.)	(CL.)		ABBREVIATIONS		HARD	EXCAVATE			DUGES OR GROOVES TO 0.25 INCHES DE ST'S PICK. HAND SPECIMENS CAN BE DE
GRAIN MM 305 SIZE IN. 12	75 2.0 3	0.25	0.05 0.005		AR - AUGER REFUSAL BT - BORING TERMINATED - CL CLAY	MED MEDIUM MICA MICACEOUS MOD MODERATELY	VST - VANE SHEAR TEST WEA WEATHERED 🏹 - UNIT WEIGHT	MEDIUM	CAN BE C	GROOVED OR C		DEEP BY FIRM PRESSURE OF KNIFE O EICES 1 INCH MAXIMUM SIZE BY HARD
SOIL MOISTURE S	OIL MOISTURE - C	ISTURE			CPT - CONE PENETRATION		$\gamma_{\rm d}$ - DRY UNIT WEIGHT		POINT OF	A GEOLOGIS	T'S PICK.	NIFE OR PICK. CAN BE EXCAVATED IN
(ATTERBERG LIM	IITS) DESCRIP	TION	IELD MOISTURE DESC		DMT - DILATOMETER TES DPT - DYNAMIC PENETRA	TION TEST SAP SAPROLITIC	S - BULK		FROM CH	IPS TO SEVER		BY MODERATE BLOWS OF A PICK POINT
	- SATURA (SAT.)		UID; VERY WET, USUA THE GROUND WATER		e - VOID RATIO F - FINE - FOSS FOSSILIFEROUS	SD SAND, SANDY SL SILT, SILTY SLI SLIGHTLY	SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK	SOFT		IN THICKNES		AVATED READILY WITH POINT OF PICK. Y FINGER PRESSURE. CAN BE SCRATCH
PLASTIC RANGE <	- WET - (EQUIRES DRYING TO MUM MOISTURE		FRAC FRACTURED, FRAC FRAGS FRAGMENTS	TURES TCR - TRICONE REFUSAL W - MOISTURE CONTENT	RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING			JRE SPAC	CING	BEDDING
	LIMIT				HI HIGHLY	V - VERY	RATIO	TERM VERY WIDE			SPACING THAN 10 FEET	TERM VERY THICKLY BEDDED
OM OPTIMUM SL SHRINKA		(M) SOLID; AT OR	NEAR OPTIMUM MOI	STURE	DRILL UNITS:	JIPMENT USED ON SUBJECT ADVANCING TOOLS: CLAY BITS	HAMMER TYPE:	WIDE MODERATEL CLOSE		3 TI 1 T	0 10 FEET 0 3 FEET TO 1 FOOT	THICKLY BEDDED 1. THINLY BEDDED 0.1 VERY THINLY BEDDED 0.0
	- DRY - ()		DITIONAL WATER TO 4UM MOISTURE		CME-55	6' CONTINUOUS FLIGHT AUGER	CORE SIZE:	VERY CLOS	δE		HAN Ø.16 FEET	THICKLY LAMINATED 0.00 THINLY LAMINATED <
	PLA	STICITY				X 8" HOLLOW AUGERS	Вн					ATION
NON PLASTIC SLIGHTLY PLAST		DITY INDEX (PI) 0-5 6-15	DRY STRENGT VERY LOW SLIGHT	н	X CME-550	HARD FACED FINGER BITS	HAND TOOLS:	FOR SEDIMENT		KS, INDURATI	RUBBING WITH	ING OF MATERIAL BY CEMENTING,HEA FINGER FREES NUMEROUS GRAINS: BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY PL HIGHLY PLASTIC	ASTIC	16-25 OR MORE	MEDIUM HIGH		PORTABLE HOIST	X CASING W/ ADVANCER X TRICONE 2. 15/16 STEEL TEETH	POST HOLE DIGGER	MODERA	ATELY IN	DURATED		SEPARATED FROM SAMPLE WITH STI WHEN HIT WITH HAMMER.
	С	OLOR				TRICONE' TUNGCARB.	X HAND AUGER SOUNDING ROD	INDURA	TED			FFICULT TO SEPARATE WITH STEEL I BREAK WITH HAMMER.
	NCLUDE COLOR OR COLOR CH AS LIGHT, DARK, STREAK						VANE SHEAR TEST	EXTREM	MELY INDU	URATED	SHARP HAMMER	BLOWS REQUIRED TO BREAK SAMPLE 5 ACROSS GRAINS.

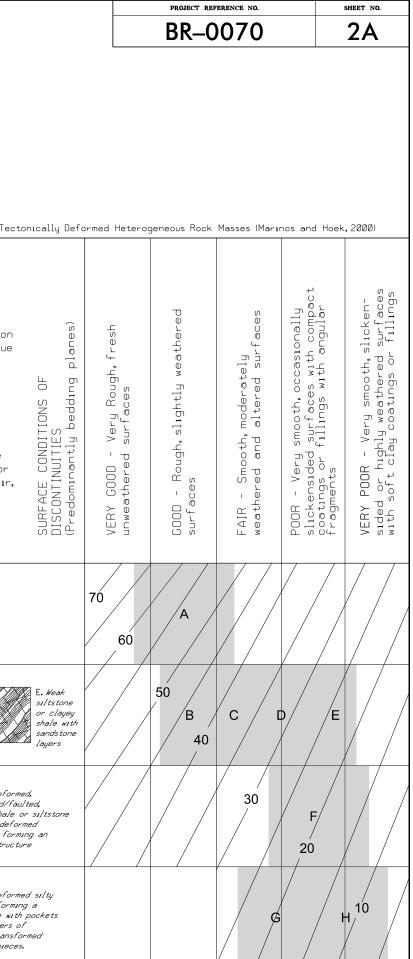


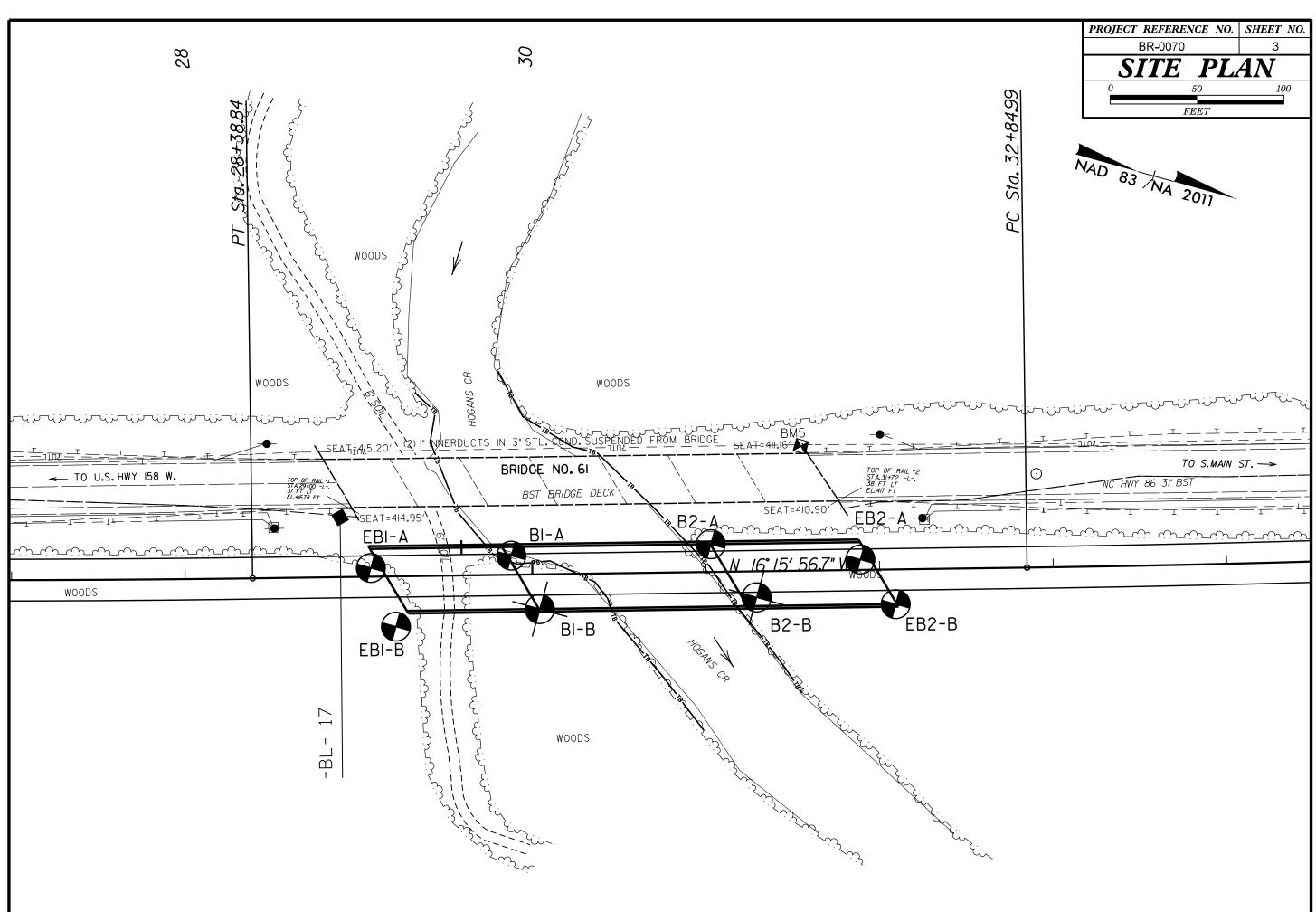


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

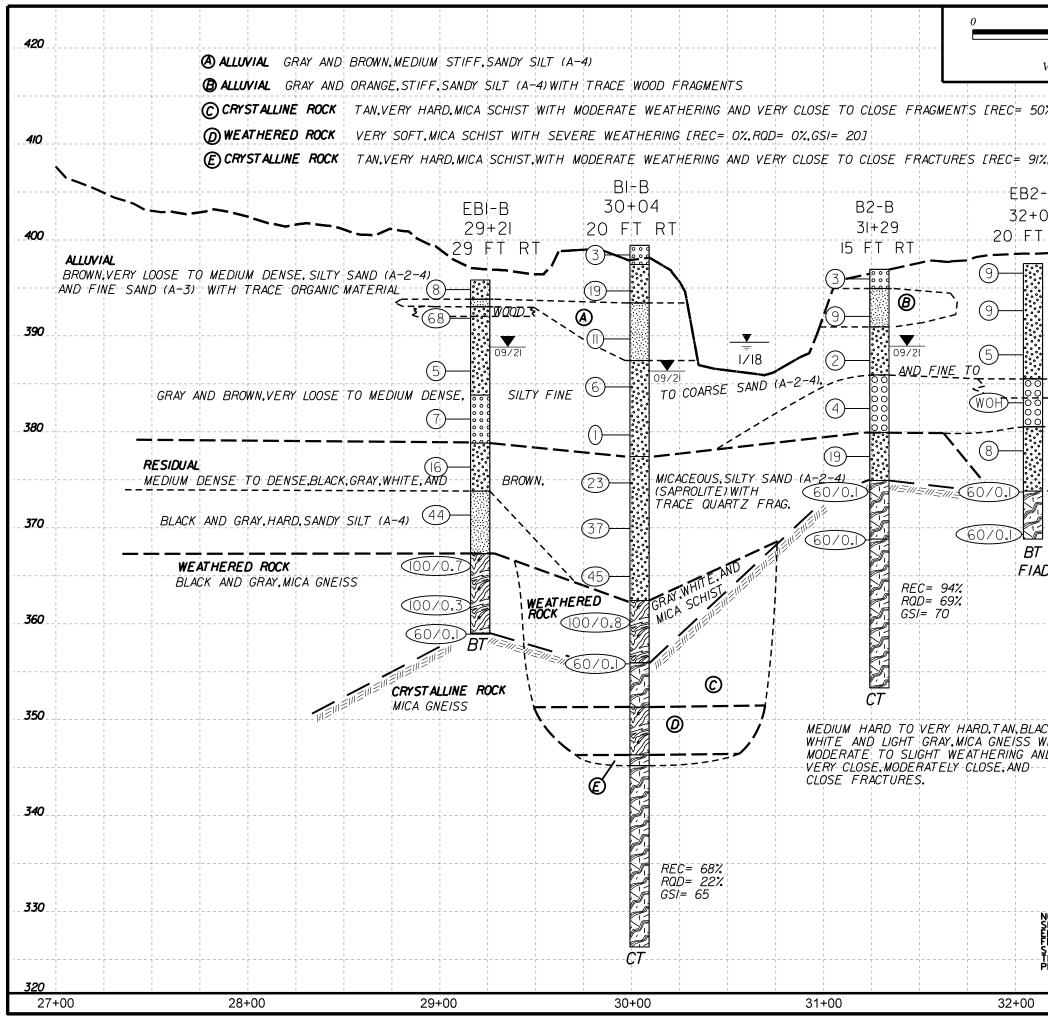
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed	Rock Mass (Marı	nos and Hoek, 2	2000)			AASHTO LRFD Figure 10.4.6.4–2 $-$ Determination of GSI for T
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) 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.	VERY 600D Very rough, fresh unweathered surfaces	B B 600D M Rough, slightly weathered, iron stained S surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) 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 fail poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
				ALIIY 💳		COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A	A. 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 instabulity.
BLOCKY - well interlocked un- disturbed rock mass consisting X of cubical blocks formed by three intersecting discontinuity sets		70 60				B. Sand- stone with stone and the or silty shale
VERY BLOCKY - interlocked, O partially disturbed mass with Z multi-faceted angular blocks Y formed by 4 or more joint sets O		Ę	50			thun inter- layers of siltstone siltstone with sand- stone layers amounts
BLOCKY/DISTURBED/SEAMY - H folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40	30		C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.
discontinuity sets. Persistence of bedding planes or schistosity				20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10	sandstone are tra into small rock pi Means deformation after tectonic disturbance

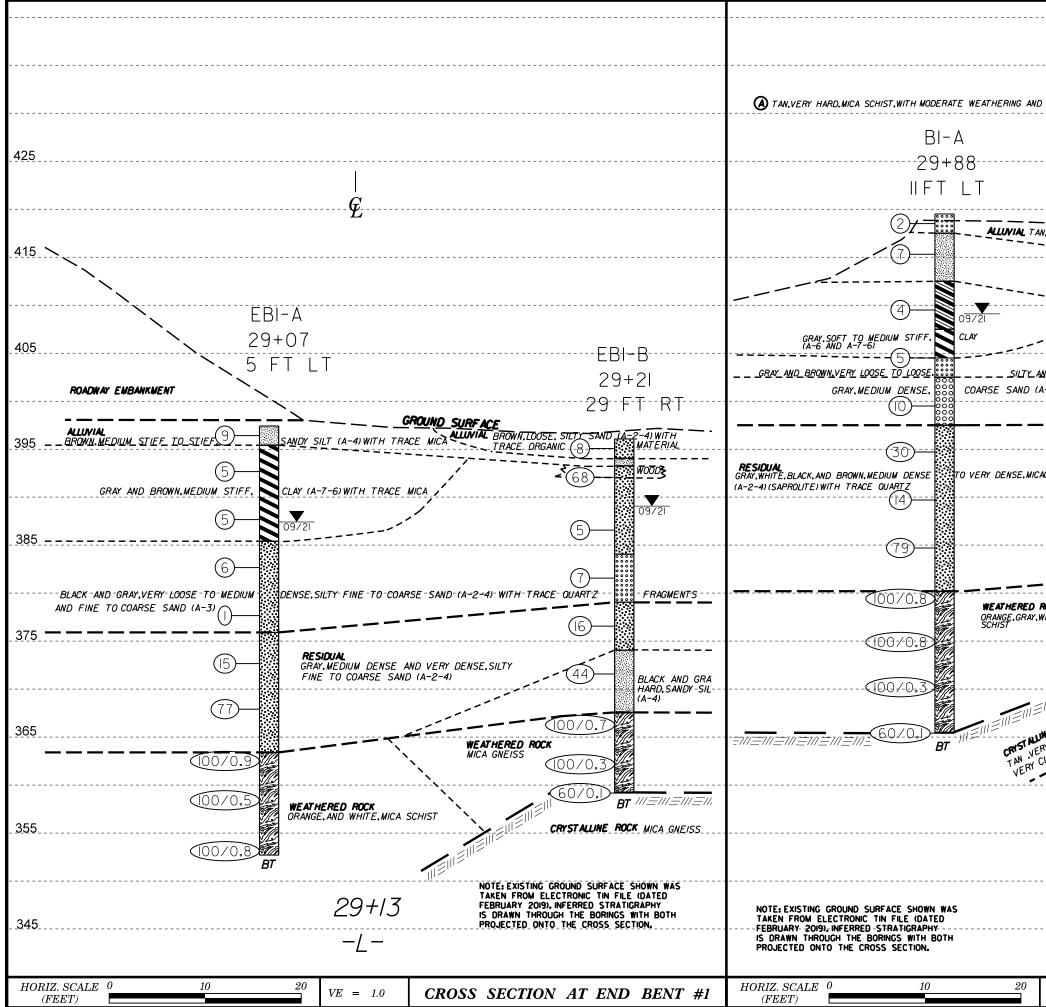




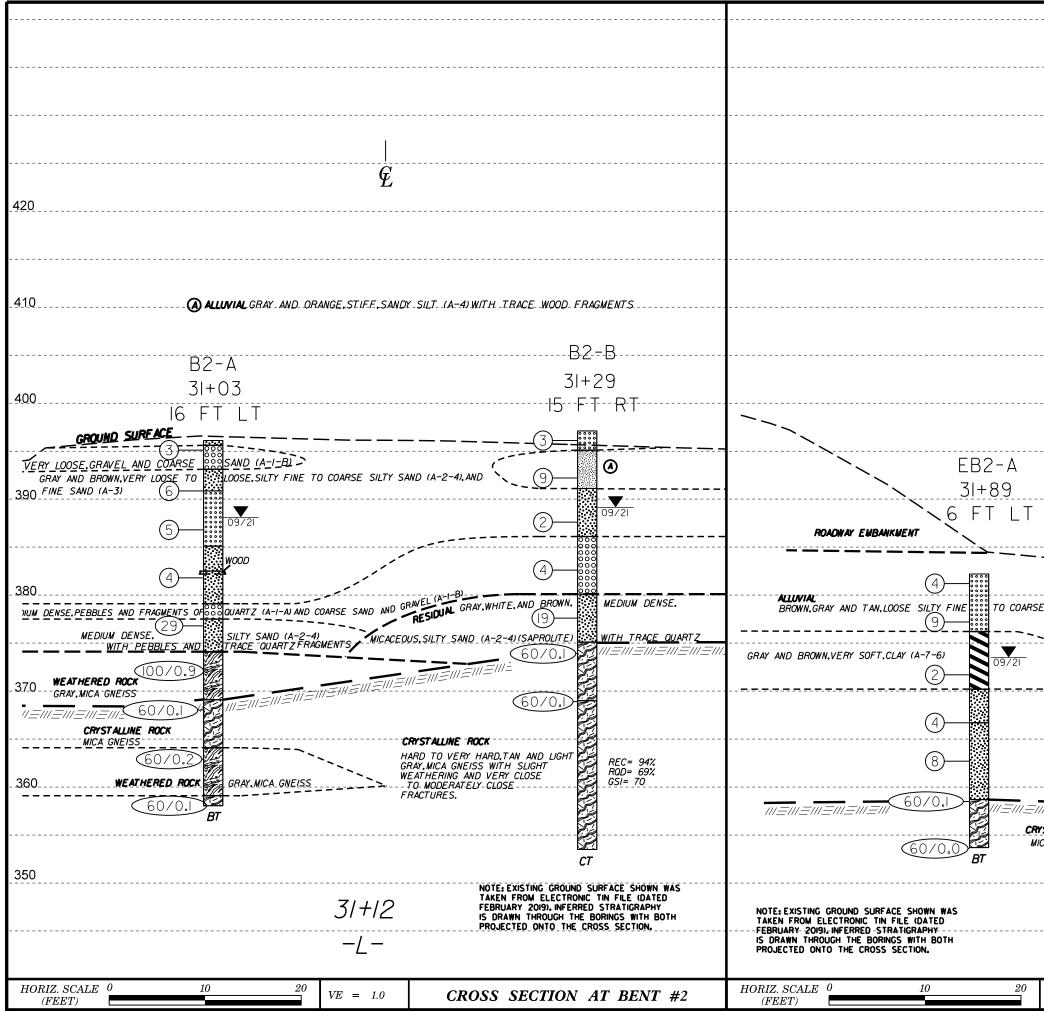
SKEW =60°



50 10	00	PROJEC		RENCE NO.	
FEET	•		BR-007	0	4
VE = 5		PRO	FILE ALC	ONG -L- CE	NTERLINE
1%,RQD= 20%,GSI= 5	50]				
					410
45%, GSI= 55%,GSI= 55%	5]				
-B				· 1	
RTGROUNDS	URF ACL				400
					.390
COADCE CAND (A	- 71				
COARSE SAND (A- WOOD VERY	LOOSE				
WITH GRAVEL,QUA					380
LOOSE GRAY, SILT	r FIN	ETUC	UARSE	SANDIA	<u>~</u> +)
	ν <u>Ξ</u>				
					370
0					
					360
СК,		- - - - - - - - - - - - - - - - - - -			
VITH ID					
					340
NOTE: EXISTING CROUND SHOWN WAS TAKEN FRO	SURF A	CE			330
NOTE: EXISTING GROUND SHOWN WAS TAKEN FRO LECTRONIC TIN FILE (D EBRUARY 2019), INFERRI STRATIGRAPHY IS DRAWI THE BORINGS WITH BOTH PROJECTED ONTO THE	ATED ED N THRO)UGH			
-RUJELIED UNTO THE					320
	3	33+00			34+00

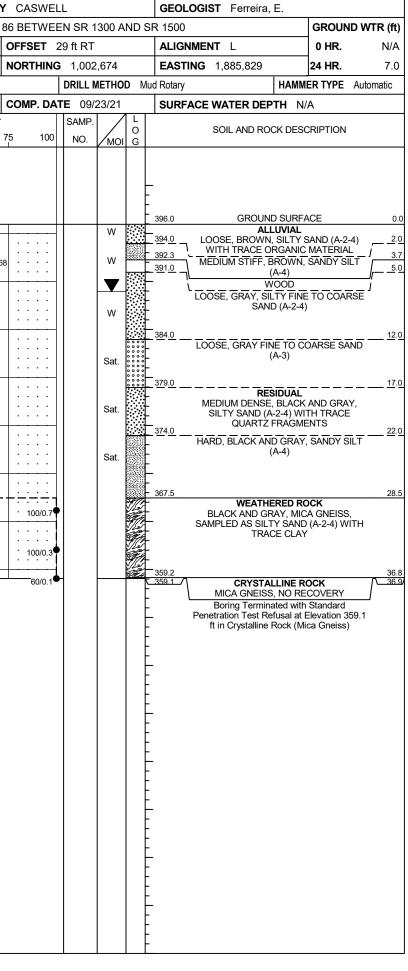


N. AND BROWN.VERY LOOSE TO MEDI FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM ST) ND_FINE TO COARSE SAND (A-2-4)	20 3 20 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SAWL (11) 6 	BI- 0+(F	= 55 B	SURF ACE	405. 395. -
N. AND BROWN. VERY LOOSE TO MEDI A. AND BROWN. VERY LOOSE TO MEDI FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN. MEDIUM STI WD_FINE TO COARSE SAND (A-2-4. A-1-B)	3 20 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	BI- 0+(F	B O4 T RT <i>GROUND</i> SAND (A-3), AND SILT (A-4), 09/21	SURF ACE	- 395. -
N.AND BROWN.VERY LOOSE TO MEDI FINE SAND (A-2-4) WITH TRA GRAY, RED. AND BROWN, MEDIUM ST/ MD_FINE TO COARSE SAND (A-2-4.	3 20 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	BI- 0+(F	B O4 T RT <i>GROUND</i> SAND (A-3), AND SILT (A-4), 09/21	SURF ACE	- 395. -
N. AND BROWN.VERY LOOSE TO MEDI FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM ST) ND_FINE TO COARSE SAND (A-2-4)	3 20 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	BI- 0+(F	B O4 T RT <i>GROUND</i> SAND (A-3), AND SILT (A-4), 09/21	SURF ACE	- 395. -
N. AND BROWN.VERY LOOSE TO MEDI FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM ST) ND_FINE TO COARSE SAND (A-2-4)	3 20 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	BI- 0+(F	B O4 T RT <i>GROUND</i> SAND (A-3), AND SILT (A-4), 09/21	SURF ACE	- 395. -
N.AND BROWN.VERY LOOSE TO MEDIU FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM STI	3 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1)	0+(F ⁻	04 TRT <i>GROUND</i> 5AND (A-3), AND 51LT (A-4) 09/21	SURF ACE	- 395. -
N.AND BROWN.VERY LOOSE TO MEDIU FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM STI	3 UM DENSE, FINE ACE ROOTS IFF TO STIFF, SANL (1)	0+(F ⁻	04 TRT <i>GROUND</i> 5AND (A-3), AND 51LT (A-4) 09/21	SURF ACE	- 395. -
N.AND BROWN.VERY LOOSE TO MEDIU FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM STI	20 UM DENSE.FINE ACE ROOTS IFF TO STIFF.SAND IFF TO STIFF.SAND IFF TO STIFF.SAND	F	T RT GROUND SAND (A-3), AND SILT (A-4). 09/21	D SILTY	-
N.AND BROWN.VERY LOOSE TO MEDIU FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM STI	UM DENSE, FINE ACE ROOTS IFF TO STIFF, SAND		GROUND SAND (A-3), AND SILT (A=4).	D SILTY	-
N.AND BROWN.VERY LOOSE TO MEDIU FINE SAND (A-2-4) WITH TRA GRAY, RED, AND BROWN, MEDIUM STI	IFF TO STIFF.SAN		SAND (A-3), AND SILT (A-4), 09/21	D SILTY	-
GRAY, RED, AND BROWN, MEDIUM ST,	IFF TO STIFF.SAN		<i>S/LT (A=4)</i> 09/21		-
GRAY, RED, AND BROWN, MEDIUM ST	IFF TO STIFF. SANL		09/21		-
ND_FINE TO COARSE SAND (A-2-4.	 6		09/21		- - <u>385</u>
ND_FINE TO COARSE SAND (A-2-4.	 6		09/21		- <u>385</u>
N			09/21		- <u>385</u>
N),FINE TO COARSE				<u>-</u> <u>385</u>
N),FINE TO COARSE				<u></u>
N),FINE TO COARSE		SAND (A-3)		1
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· <u>`</u>			+		
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ACEOUS, SILTY FINE TO COARSE SAN	\sim				
	37)	- ::			
		_			<u>365</u>
			 =		
					-
ROCK					
WHITE AND BROWN, MICA					
IIII = III = IIII = III = IIII = III	60/0.1		-///==///==///==	-///-=-///-=-/	<u>,3</u> 55
NE ROCK HARD NICA SCHIST WITH NODERATE WITH ARD NICA SCHIST FRAGMENTS AN HARD NICA SCHIST FRAGMENTS TO SE TO CLOSE FRAGMENTS NUTH SEV	THERING AND	R	REC= 50% ROD= 20 GSI= 50		
	WEAT -				-
WITH NODER	WICA SCHIST RING		REC= 0% ROD= 0% GSI= 20		
ROCK ICA SCHIST RAGNEN OV SOFT	ERE WEAT	-	<u> </u>		
NE ROCK AND ADDER ATE NE ROCK AND ADDER ATE SCHIST WITH NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NODERATE NOT NODERATE NOT NOT NOT NOT NOT NOT NOT NOT	MICA SCHIST NICA WEATHERING	R			-345
UDSE WENTHERED					
		- 8	REC= 68% ROD=_ 22%		
CRYSTALIN			GSI= 65		
MEDIUM HARD TO VER WHITE,MICA GNEISS WI SLIGHT WEATHERING A CLOSE FRACTURES	RY HARD BLACK AND TH MODERATE TO WD VERY CLOSE T	, 2			335
CLOSE FRACTURES		P			<u></u>
20+02					
29+92		کیکتا CT			-330
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VF = 10	055 5507	ייסז	<i>AT</i> DF	J Т 4 1	
$VE = 1.0 \qquad CR($	OSS SECT	UN	AI BEN	×1 #1	



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	EB2		
	32+0		400
— <u>GROUND SURFACE</u>	<u>20</u> F	<u> </u>	
E SAND (A-2-4), FINE SAND (A	A-3)		
			390
	(5)————————————————————————————————————		
·····			<u></u>
	WOH 600	VERY LOOSE.GRA (A-I-B)WITH TF MATTER	Y,COARSE SAND RACE ORGANIC
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<u>"=""=""=""=""=""</u> "	, <u> </u>	<u> </u>	<u></u>
I STALLINE ROCK CA GNEISS	60/0.1		
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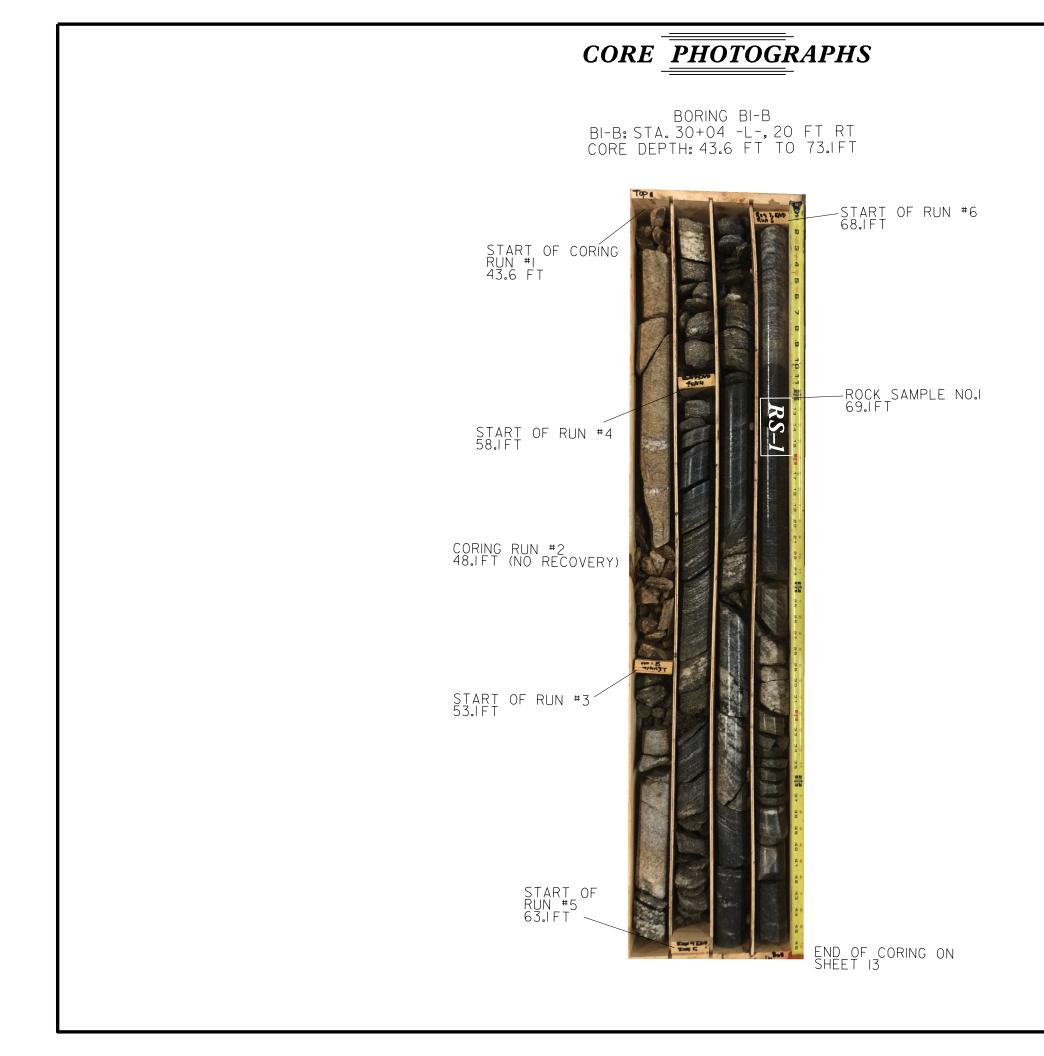
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	67070						BR-007				CASWE					DLOGIST Ferreira, E.			┥┢───	6 707					BR-0070		COUNT	
				DGE					EK ON		6 BETWE		1300 /	AND				GROUND WTR (ft)					DGE 61	-	R HOGAN'S		ON NC	-
BOR	ING NO.	EB1-	A			STAT	FION 2	9+07			OFFSET	5 ft LT			ALI	GNMENT L		0 HR. N/A	BOR	RING NO). EB1	-В		STA	ATION 29+	21		0
COLI	LAR ELE	IV. 39	97.4 ft		-	τοτ	AL DEP	TH 44.	7 ft	1	NORTHIN	G 1,002	2,650		EAS	STING 1,885,815	2	24 HR. 6.1	COL	LAR E	_EV. 3	96.0 ft		ТОТ	TAL DEPTH	36.9 ft		N
DRILL	RIG/HAN	MMER E	FF./DA	TE C	AT130)3 CM	E-550 86	.8% 03/12	2021			DRILL I	METHO	DD N	Mud Rota	ry H	HAMME	R TYPE Automatic	DRIL	L RIG/H	AMMER	EFF./DA	TE CAT1	1303 C	ME-550 86.8%	o 03/12/202	21	
DRIL	LER M	cCain,				STAF	RT DAT	E 09/24	/21	0	COMP. DA	TE 09/	24/21		SUF	RFACE WATER DEPTH	H N/A		DRII		McCain			· · · ·	ART DATE			C
	DRIVE ELEV	DEPTH			-				S PER I			SAMP.				SOIL AND ROCK	DESCF	RIPTION	ELEV	DRIVE ELEV		· — — — — — — — — — — — — — — — — — — —	W COUN			BLOWS P		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.51	t 0		25	50	1	75 100 I	NO.	Имо) G	ELEV.	(ft)		DEPTH (fi) (ft)	(ft)	(ft)	0.5ft	0.5ft 0.	.5ft	0 25	50	0	75
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395	-	-	3	3	6		. 9						M		395.4	ALLU STIFF, BROWN, SAN	IDY SILT	Г (А-4) WITH <u>2</u> .0	395	396.0	<u> </u>	0	4	4				
	393.7	3.8	2	2	3	40	1						Cat		E	SOFT, GRAY AND BR	ROWN, O	CLAY (A-7-6)		393.0	Ŧ 3.0					*		•
	-	_	_				₽ ⁵						Sat.		E	WITH TRA	ACE MIC	A			ł	24	24 4	44			<u>``</u> >	68
390		- 8.8					<u> </u>	+	<u></u>						Ł				390	-	Ŧ						· · · ·	+
		- 0.0	WOH	2	3	 •	∮ 5` : :	· · ·		· · ·			Sat.		Ł					387.5	8.5	2	3	2		· · · ·		•
385	-	-					1	· · ·							385.4	VERY LOOSE TO LO			385		1				• 5			•
	383.7 -	- 13.8	3	3	3			· · ·		· · ·			Sat.			FINE TO COARS	SE SAND) (A-2-4)		382.5	+ 13.5						· · ·	:
	-	-						· · ·		· · · ·										362.3	-	3	3	4		· · · ·	· · ·	:
380	378.7 -	- - 18.8					I <u></u>	+							<u> </u>				380	-	+							+
	-	-	3	1	0	│ ∳1	1		: :	· · · ·			Sat.		• •					377.5	+ 18.5	10	10	6	· · · · ·	· · · ·	· · ·	
375	-	-					1.								<u>375.9</u>	RESID		21.5	375		1				•••••••••			·
	373.7 -	- 23.8	4	7	8				: :	· · · ·			М			MEDIUM DENSE AN GRAY, SILTY FINE 1				372.5	+ 23.5				· · ! +-		· · ·	
070	-	-						<u> </u>	· · ·	· · · ·						(A-2	2-4)		070		1 20.0	4	10 3	34		· · ·		
370	368.9	28.5						<u> </u>							<u> </u>				370	-	+					<u></u>		+
	-	-	31	31	46		· · · ·		: :		•77 · · ·		M							367.5	28.5	78	22/0.2			: : : <u> </u>	-:-:	
365	-	-							· ·		1				ļ.				365		±							·
	363.9	33.5	22	41	59/0.	4	· · · ·		: :	· · · ·	l÷÷÷÷			<i>411</i>	<u> </u>	WEATHER		34.0	<u>)</u>	262.4	+ 33.6					· · · ·	· · ·	
200	-	_					· · · · ·			· · ·	. 100/0.9	T				WHITE AND ORANO SAMPLED AS SILTY	GE, MIC	A SCHIST,		302.4	+ 33.0	100/0.3			· · · ·	· · · ·	· · · ·	•
360	358.9	- 38.5	100/0					<u> </u>								TRACE	E MICA	~~2- 4) WIIII	360	359.2	36.8	60/0.1						
	-	-	100/0.5				· · · · · · · ·		· · ·	· · · · · ·	· 100/0.5	r									‡	00/0.1						
355	-	-						· · ·	· ·						-						‡							
	353.9	43.5	100/0.8				 		· ·	· · · · · ·	100/0.8				- 352.7			44.7	,		‡							
	-	-													Ę	Boring Terminated at Weathered Rock	Elevation k (Mica	on 352.7 ft in Schist)			‡							
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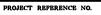


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WBS	67070).1.1			Т	I P BR-00)70	COUNT	Y CASWE				GEOLOGI	ST Ferreira	, E.		
SITE	DESCR		BR	IDGE (61 OV	ER HOGA	N'S CREE		86 BETWE	EN SR 1	300 AI	ND S	R 1500			GROUN	D WTR (ft
BOR	NG NO	. B1-A	A		S	TATION	29+88		OFFSET	11 ft LT			ALIGNME	NT L		0 HR.	N/A
COLI	AR ELI	EV. 39	99.5 ft		Т	OTAL DE	PTH 54.1	ft	NORTHIN	G 1,002	,726		EASTING	1,885,787		24 HR.	10.4
DRILL	RIG/HA	MMER E	FF./DA	TE C	AT1303	CME-550 8	6.8% 03/12/2	021		DRILL	IETHO	D M	ud Rotary		HAMM	ER TYPE	Automatic
DRIL	LER M	lcCain,	Ρ.		S	TART DA	FE 09/23/2	21	COMP. DA	TE 09/2	23/21		SURFACE	WATER DE	PTH N/	A	
ELEV	DRIVE ELEV	DEPTH	BLO	ow co	UNT		BLOWS	PER FOOT	-	SAMP.		L O	-	SOIL AND RO			
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	моі	G	ELEV. (ft)				DEPTH (
400	399.5											Ļ	- 399.5	GROUI	ND SURFA	ACE	C
			WOH	WOH	2	4 2	· · · · · ·				М	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	397.5 V	AI ERY LOOSE, 1	LUVIAL AN. FINE	. SAND (A-	3) 2
395	396.3	3.2	4	3	4		· · · · · ·				м		·		RACE RO	OTS	
395	-	ŧ											_ '		Y SILT (A		,
	-	ŧ					 						392.5	SOFT, GRAY	SANDY (CLAY (A-6)	7
390	390.5	9.0	0	2	2		· · · · ·		• • • • •		Sat.		—	- , - ,		(-)	
	-	ŧ					. .				Jat.		· 387.5				12
205	385.5 -	+					. .					S	N	EDIUM STIFF	, GRAY, C	LAY (A-7-6	5)
385		14.0	WOR	2	3	4 5					Sat.		- 384.5	OSE. GRAY. F		OARSE SA	
	-	ŧ				<u>\</u> :::	. .					000	382.5	DIUM DENSE,	(A-3)		<u> </u>
380	380.5	19.0	3	5	5						Set		. IVIE _		(A-1-B)	UARSE SA	ND
	-	ŧ				• • • • • • • • • •					Sat.		· 377.5				22
	375.7 -	- 23.8				. <u>-</u>	:+1										
375		1 20.0	7	16	14	1	30	+	<u> </u>		w			DIUM DENSE	TY FINE	TO COARS	
	-	ł					/							SA	ND (A-2-4)		
370	370.7	28.8	5	5	9												
	-	Ŧ									W						
		Ŧ					.						•				
365	365.7 -	+ 33.8 -	20	40	39				1 79		w		_				
	-	Ŧ											•				
360	360.7	38.8	28	56	44/0.3								360.2				39
	-	Ŧ	20	50	44/0.3				- 100/0.8		W		– OF	WEATH RANGE, MICA	IERED RO SCHIST. S		AS
		Ŧ												LTY FINE TO			
355	355.7 -	+ 43.8 +	69	31/0.3	1				100/0.8	•	w		_				
	-	Ŧ		1			.					Ø					
350	350.5 -	49.0	100/2				.				w						
	-	Ŧ	100/0.3	3					100/0.3	T		19	_				
		Ŧ					.					14					
	345.5	<u>+ 54.0</u> +	60/0.1				• • • • •		60/0.1	┝┤		<i>\$677</i>	- 345.5 - 345.4_/		ALLINE R		<u>5</u>
	-	Ŧ		1								F		ORANGE Boring Termi	MICA SC		
	-	ŧ										F	Pen	etration Test F	efusal at E	Elevation 34	15.4
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WBS 67070.1.1		NTY CASWELL	GEOLOGIST Ferreira, E.	WBS 67070.1.1		Y CASWELL	GEOLOGIST Ferreira, E.
		IC 86 BETWEEN SR 1300 AND S	.,		1 OVER HOGAN'S CREEK ON NC		
BORING NO. B1-B	STATION 30+04	OFFSET 20 ft RT	ALIGNMENT L 0 HR. N/A	BORING NO. B1-B	STATION 30+04	OFFSET 20 ft RT	ALIGNMENT L 0 HR. N/A
COLLAR ELEV. 399.6 ft	TOTAL DEPTH 73.1 ft	NORTHING 1,002,750	EASTING 1,885,812 24 HR. 13.1	COLLAR ELEV. 399.6 ft	TOTAL DEPTH 73.1 ft	NORTHING 1,002,750	EASTING 1,885,812 24 HR. 13.1
DRILL RIG/HAMMER EFF./DATE CA		DRILL METHOD M		DRILL RIG/HAMMER EFF./DATE CA			, , , , , , , , , , , , , , , , , , , ,
DRILLER McCain, P.	START DATE 09/24/21	COMP. DATE 09/27/21	SURFACE WATER DEPTH N/A	DRILLER McCain, P.	START DATE 09/24/21	COMP. DATE 09/27/21	SURFACE WATER DEPTH N/A
ELEV DRIVE DEPTH BLOW COU (ft) (ft) (ft) 0.5ft 0.5ft		75 100 NO 0	SOIL AND ROCK DESCRIPTION		TOTAL RUN 29.5 ft RUN STRATA		
(ft) (ft) 0.5ft 0.5ft		75 100 NO. MOI G	ELEV. (ft) DEPTH (ft)	ELEV RUN (ft) ELEV (ft) (ft) (ft) (ft) (ft)	REC. RQD SAMP. REC. RQD		DESCRIPTION AND REMARKS
						G	Dente Ordene O 40.04
400	1 4	· · · · · ·	_ 399.6 GROUND SURFACE 0.0 - ALLUVIAL	356.04 355 356.0 43.6 4.5 0:53/1.	0 (2.3) (0.9) (2.3) (0.9) 0 50% 20% 50% 20%	VERY HARD. TAN	Begin Coring @ 43.6 ft CRYSTALLINE ROCK
			<u></u>	0:59/1		r	, MICA SCHIST WITH MODERATE WEATHERING AND ERY CLOSE TO CLOSE FRAGMENTS
<u>395 395.9 3.8</u> 7 9			FINE,SAND (A-2-4)	<u>351.5 48.1</u> 1:55/1. 1:29/0.	0 5 0 (0.0) (0.0) (0.0)	VI - 351.5 VERY SOF	[GSI=50] 48.1 WEATHERED ROCK
	$\left \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \end{array} \right \right \cdot \cdot \cdot \cdot \cdot \cdot \cdot \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \end{array} \right \cdot \cdot \cdot \cdot \cdot \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \end{array} \right \cdot $			350 - 5.0 0.46/1 - 1.21/1 - 0.59/1	0 0% 0% 0% 0% 0%	VERY SOF	T, MICA SCHIST WITH SEVERE WEATHERING [GSI=20]
390 390.9 8.8 5 6	$- \left \begin{array}{c c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right \cdot $		SANDY SILT (A-4)	- 1:00/1. 346.5 - 53.1 1:13/1.		- 346.5	53.1
390 5 6	5	Sat.	_	345 5.0 0:53/1. 0:50/1	0 (2.2) (0.6) (1.0) (0.5) 0 43% 12% 91% 45%	VERY HARD TAN	CRYSTALLINE ROCK 54.2 MICA SCHIST, WITH MODERATE WEATHERING AND
			- 387.6 VERY LOOSE TO LOOSE, BROWN, SILTY, 12.0		0 RUN 3 (12.8) (4.2) 0 88% 22%	V	ERY CLOSE TO CLOSE FRACTURES [GSI=55]
<u>385.9 13.8</u> 2 3	3		FINE TO COARSE SAND (A-2-4)	<u>341.5 + 58.1 0:49/1.</u> 5.0 1:01/1.			TO VERY HARD, BLACK AND WHITE, MICA GNEISS
	$\left \left \int_{V}^{V} \cdot \cdot \cdot \cdot \right \cdot \cdot \cdot \cdot \cdot \cdot \right \cdot \cdot \cdot \cdot \cdot \cdot \cdot$			<u>340</u> - 0:54/1. - 2:04/1.	0 58% 8% 0 RUN 4	WITH MODERAT	TO SLIGHT WEATHERING AND VERY CLOSE TO CLOSE FRACTURES
380.9 - 18.8 WOH 1				336.5 + 63.1 1:22/1.			[GSI=65]
380 WOH 1		Sat.	-	335 5.0 1:15/1. 1:22/1.	0 (3.8) (1.7) 0 75% 34%		
			<u>. 377.6</u> 22.0 RESIDUAL 22.0		0 RUN 5		
<u>375 375.9 23.8</u> 7 10	13		 MEDIUM DENSE, GRAY, WHITE, AND BROWN, MICACEOUS, SILTY SAND 	331.5 - 68.1 3:37/1.	0 (5.0) (2.1)		
		· · · · · ·	(A-2-4) (SAPROLITE) WITH TRACE QUARTZ	<u>330</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u>	0 100% 43% RS-1 0 RUN 6		
371.1 28.5 14 17	$-\frac{1}{20} \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right $			2:04/1. 326.5 - 73.1 2:05/1.		326.5	73.1
		Sat.	-			- Boring Terminated	at Elevation 326.5 ft in Crystalline Rock (Mica Gneiss)
366.1 33.5	$\left \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \\ \cdot \cdot \\ \\ \\ \cdot \\ \\ \\ \\ \cdot \\ \\ \\ \cdot \\ \\ \\ \\ \cdot \\ \\ \\ \\ \\ \cdot \\$						
365 15 21	24	M	-				
	· · · · · · · · ·		<u>. 362.6 37.0 37.0 37.0</u>				
361.1 38.5 61 39/0.3			WEATHERED ROCK GRAY, WHITE, AND BROWN, MICA				
			- SCHIST, SAMPLED AS MICACEOUS, - SILTY SAND (A-2-4)				
356.1 + 43.5			356.1 43.5				
355 60/0.1		·····60/0.1	CRYSTALLINE ROCK				
²			MODERATE WEATHERING AND VERY				
			[REC=50%, RQD=20%, GSI=50]				
			WEATHERED ROCK VERY SOFT, MICA SCHIST WITH SEVERE				
			WEATHEREING 				
			345.4 CRYSTALLINE ROCK 54.2 VERY HARD, TAN, MICA SCHIST, WITH				
			MODERATE WEATHERING AND VERY CLOSE TO CLOSE FRACTURES				
			[REC=91%, RQD=45%, GSI=55] – MEDIUM HARD TO VERY HARD, BLACK				
			AND WHITE, MICA GNEISS WITH				
			MODERATE TO SLIGHT WEATHERING AND VERY CLOSE TO CLOSE				
			- FRACTURES - [REC=68%, RQD=22%, GSI=65]				
		· · · · · · 6					
			-				
			- 326.5 73.1				
			- Boring Terminated at Elevation 326.5 ft in - Crystalline Rock (Mica Gneiss)				
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GEOTECHNICAL BORING REPORT CORE LOG

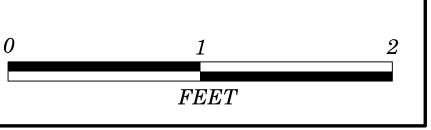




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BR-0070

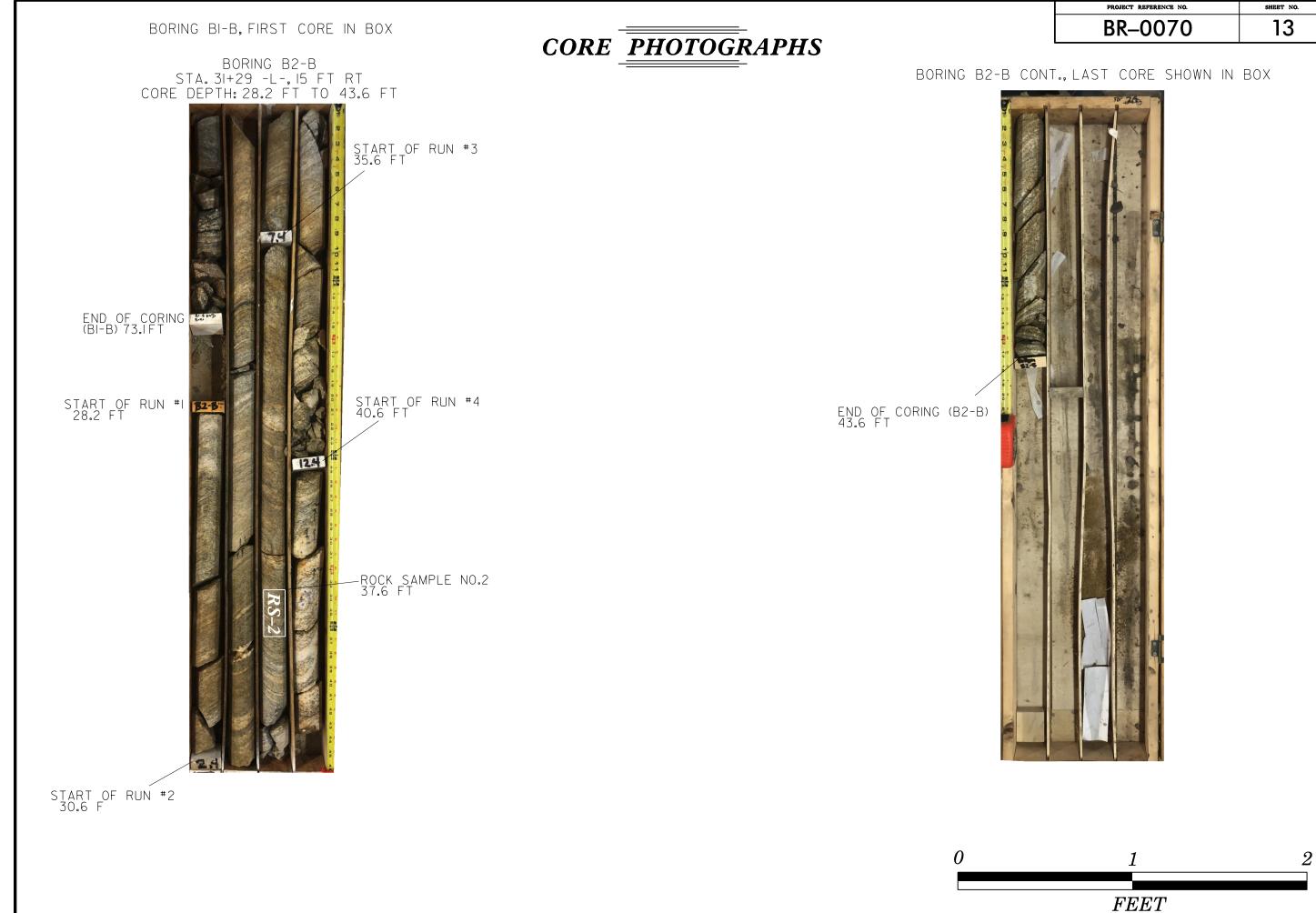
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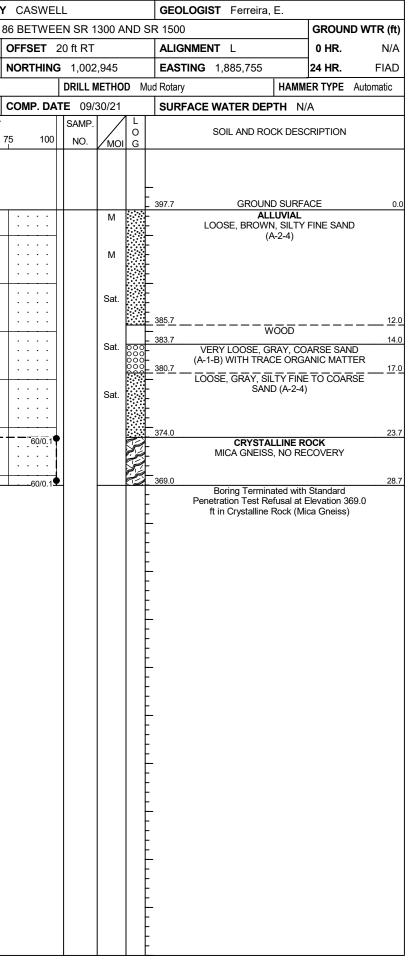
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WBS	67070	.1.1			TI	P E	BR-C	070)		С	OUN	ΤY	CA	SWE	L			GEOLO	OGIS	ST Fer	reira,	E			
SITE	DESCR	IPTION	BRI	DGE 6	61 OV	ER H	IOG	AN	'S C	REE	ко	N N	C 86	BE	TWE	EN SR	1300	AND	SR 1500					GROL		TR (ft)
BOR	NG NO.	B2-A			S	ΤΑΤΙ	ON	31	+03				C	FFS	ET	16 ft LT			ALIGN	MEN	IT L			0 HR		N/A
COLI		EV. 39	96.1 ft		т		L DE	EPT	нз	8.11	ft		N	IOR	THING	3 1,002	2,835		EASTI	NG	1,885,	750		24 HR		8.0
DRILL	. RIG/HAI	MMER E	FF./DA	TE C/	AT1303	CME	-550	86.8	% 03	/12/20	021		- 1			DRILL	METH	DD M	Iud Rotary				HAMN	LIER TYPI	E Autor	matic
DRIL	LER M	cCain.	Ρ.		S	TAR	T DA	ATE	09	/29/2	21		C	OMI	P. DA	TE 09/	29/21		SURFA		WATER		TH N	/A		
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	-	OW CO 0.5ft	UNT	0		2	BLC	ows		RFOC			100	SAMP. NO.	_	L	ELEV. (ft)					CRIPTIO		EPTH (f
400		-																								
395	396.1	0.0	1	1	2	- q 3	<u> </u>				+:	<u> </u>		<u> </u>	· · ·		w	000	- 396.1 - 395.6 - 393.1		y loose	ALL E, GRA		Y SAND		0.
390	391.9 - -	- - 4.3 -	3	3	3		 06 [.] .		· · ·	· · · ·		· · ·		· · · ·	· · · ·		w	000	- <u>390.9</u> ' 390.9 '	- <u>-</u>	DOSE, G	SANE RAY, S) (A-1-E SILTY S	AND COA) SAND (A-2 SAND (A		<u>3.</u> 5.
385		- <u>8.3</u> -	2	3	2		· · · · 5 [·] · ·	• • •	· · · · ·	· · · · · ·	- - -	· · · · · ·		· · · · · ·	••• ••• •••		Sat.	0 0	- - - - 385.1		,			, ,	,	11.
		- - 13.3	woн	2	2		· · ·		· · ·	· · ·		· · ·		· · ·	· · · ·		Sat.		- 382.5 - 382.2		,	SANE W	0 (A-2-4		/	13. 13.
380	377.8 -	 	9	15	14			· · · ·		· · · · ·		· · · · ·		· · ·	· · · · ·		Sat.	000	<u>379.1</u> 3 <u>77.5</u>	— — F		DENS	E, PEB	BLES AN RTZ (A-1	ID -A) /	<u> 17</u> . <u>18</u> .
375	373.0	23.1	100/0.9	5			· · ·		Ĭ 	· · ·	·	· ·		· · ·	· ·			<i>M</i>	<u>374.1</u>	ME WI		BLES A	SILTY ND FR/ IARTZ RED R	SAND (A AGMENT	-2-4) S OF /	<u> 22</u> .
370		- 28.0					· · ·	· · ·	· · ·	· · ·	· · ·	· · ·		· · ·	00/0.9				- <u>369.1</u>	GRA1	CR	SANE) (A-2-4			<u> 27</u> .
365	-	-	60/0.1				· · · · ·		· · · · ·	· · ·		· · · · ·		· · ·	60/0.1				<u>364.1</u>						Y	<u> 32</u> .
360	363.1	33.0	60/0.2				· · · · ·		· · · · ·	· · ·	. . .	· · ·			60/0.2	•				GRA۱		GNEIS	RED R S, SAM D (A-2-4	PLED AS	SILTY	37.
	358.1	38.0	60/0.1			·					-		•	· ·	60/0.1				358.1		RAY, MI SI	CA GN	AND (A	SAMPLED		38
		- - - -																		Pene	etration T	est Re	fusal at	Elevation lica Gneis	n 358.1	
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	i	BORE LOG	,			ORE LOG	
WBS 67070.1.1	TIP BR-0070 COUN	NTY CASWELL	GEOLOGIST Ferreira, E.	WBS 67070.1.1	TIP BR-0070 COUN	TY CASWELL	GEOLOGIST Ferreira, E.
SITE DESCRIPTION BRIDGE 61	OVER HOGAN'S CREEK ON N	IC 86 BETWEEN SR 1300 AND S	R 1500 GROUND WTR (ft)	SITE DESCRIPTION BRIDGE 61	OVER HOGAN'S CREEK ON NO	C 86 BETWEEN SR 1300 AND S	GROUND WTR (ft)
BORING NO. B2-B	STATION 31+29	OFFSET 15 ft RT	ALIGNMENT L 0 HR. N/A	BORING NO. B2-B	STATION 31+29	OFFSET 15 ft RT	ALIGNMENT L 0 HR. N/A
COLLAR ELEV. 397.1 ft	TOTAL DEPTH 43.6 ft	NORTHING 1,002,868	EASTING 1,885,772 24 HR. 8.0	COLLAR ELEV. 397.1 ft	TOTAL DEPTH 43.6 ft	NORTHING 1,002,870	EASTING 1,885,777 24 HR. 8.0
DRILL RIG/HAMMER EFF./DATE CATI	303 CME-550 86.8% 03/12/2021	DRILL METHOD Mu	d Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE CAT	1303 CME-550 86.8% 03/12/2021	DRILL METHOD M	Iud Rotary HAMMER TYPE Automatic
DRILLER McCain, P.	START DATE 09/28/21	COMP. DATE 09/28/21	SURFACE WATER DEPTH N/A	DRILLER McCain, P.	START DATE 09/28/21	COMP. DATE 09/28/21	SURFACE WATER DEPTH N/A
ELEV DRIVE DEPTH BLOW COUNT	BLOWS PER FOO		SOIL AND ROCK DESCRIPTION	CORE SIZE NQ	TOTAL RUN 15.4 ft		•
$\begin{array}{c cccc} (ft) & \begin{array}{c} LLL \\ (ft) \\ (ft) \end{array} & \begin{array}{c} (ft) \\ 0.5ft \\ 0.5f$	5ft 0 25 50	75 100 NO. MOI G		ELEV RUN DEPTH RUN DRILL	RUN REC. RQD SAMP. STRATA REC. RQD		DESCRIPTION AND REMARKS
				(ft) ELEV (ft) (ft) (Min/ft)	(ff) (ff) NO (ff) (ff)	G	
400				368.91			Begin Coring @ 28.2 ft
				368.9 28.2 2.4 2:36/1.0 366.5 30.6 3:27/1.0		HARD TO VERY I	CRYSTALLINE ROCK HARD, TAN AND LIGHT GRAY, MICA GNEISS WITH
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	M	397.1 GROUND SURFACE 0.0 ALLUVIAL	365 5.0 <u>1:44/0.4</u> 3355 5.0 <u>3:34/1.0</u>	(4.4) RUN 1 88% (3.9) 78% RUN 2	- SLIGHT WEATHE	RING AND VERY CLOSE TO MODERATELY CLOSE FRACTURES.
395			395.1 VERY LOOSE, BROWN, FINE, SAND (A-3)2.0 STIFF, GRAY AND ORANGE, SANDY SILT		78%		[GSI=70]
393.2 3.9 5 5 4	$4 \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot $		(A-4) WITH TRACE WOOD FRAGMENTS	301.5 + 35.0 4:05/1.0			
390 -			- <u>391.1</u>	7:42/1.0	(5.0) (3.7) 100% 73%		
388.6 + 8.5			COARSE SAND (A-2-4)	2:47/1.0	RUN 3 RS-2	SLIGHT WEATHE	
	$\left \begin{array}{c} \P^2 \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot $	Sal	386.1 11.0	356.5 + 40.6 $3:04/1.0$	(3.0) (1.7)		
385 +			MEDIUM DENSE, GRAY, COARSE SAND WITH QUARTZ FRAGMENTS AND	<u>353.5 - 43.6</u> <u>2:25/1.0</u> <u>2:10/1.0</u>	100% 56% RUN 4	- 353.5	43.6
383.6 + 13.5 + 2 2 2	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	· · · · · · 000- · · · · · · W 000-	GRAVEL (A-1-B)			Boring Terminated	at Elevation 353.5 ft in Crystalline Rock (Mica Gneiss)
	$\left \begin{array}{c c c c c c c c c c c c c c c c c c c $	· · · · · ·	290.1				
380 7 18.5		000					
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	· · · · · · w	MEDIUM DENSE, GRAY, WHITE, AND BROWN, MICACEOUS, SILTY SAND				
375	[. []		(A-2-4) (SAPROLITE) WITH TRACE				
374.1 23.0 60/0.1		· · · · · · · · · · · · · · · · · · ·					
			GRAY, MICA GNEISS, SAMPLED AS ROCK FRAGMENTS				
370 369.028.1			369.0 28.1				
369.0 28.1 60/0.1		60/0.1	CRYSTALLINE ROCK				
365			HARD TO VERY HARD, TAN AND LIGHT GRAY, MICA GNEISS WITH SLIGHT				
			- WEATHERING AND VERY CLOSE TO MODERATELY CLOSE FRACTURES.				
			[REC=94%, RQD=69%, GSI=70]				
360 -		BS-2					
		RS-2					
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355						I E	
	· · · · · · · · · · ·		Boring Terminated at Elevation 353.5 ft in				
			Črystalline Rock (Mica Gneiss)			-	
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GEOTECHNICAL BORING REPORT



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	67070					P BR				ry CASW					OLOGIST Ferreira, E.	1		6 7070					P BR-007		COUNTY
				DGE 6					K ON NC	86 BETW		1300	AND S			GROUND WTR (ft)					DGE 6		ER HOGAN		ON NC 8
BOR	NG NO	. EB2	-A		S	TATIO	N 31	+89		OFFSET	6 ft LT			AL	GNMENT L	0 HR. N/A	BOF	RING NO.	EB2	-В		ST	ATION 32	2+09	
COL	AR ELI	EV. 39	98.2 ft		Т	OTAL D	DEPT	H 28.5	ft	NORTHIN	IG 1,00	2,921		EA	STING 1,885,738	24 HR. 8.7	COL	LAR ELE	EV. 39	97.7 ft		тс	TAL DEPT	H 28.7 ft	
DRILL	RIG/HA	MMER E	FF./DA	TE C/	AT1303	CME-55	50 86.8	% 03/12/2	021	•	DRILL	METH	OD M	lud Rot	ary HAMM	IER TYPE Automatic	DRIL	L RIG/HAI	MMER E	EFF./DA	TE CA	AT1303 (CME-550 86.8	3% 03/12/202	21
DRIL	LER M	/IcCain,	Ρ.		S	TART [DATE	09/29/2	21	COMP. D	ATE 09	/29/21	1	SU	RFACE WATER DEPTH N	/A	DRII	LER M	cCain,	, P.		ST	ART DATE	09/30/2	1
ELEV	DRIVE	DEPTH	BLC	W CO	UNT			BLOWS	PER FOO	T	SAMP	. 🗸					ELEV	DRIVE	DEPTH	BLC	ow cou			BLOWS F	PER FOOT
(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	0	25	5	50	75 10	NO.	Имс	O DI G	ELEV	SOIL AND ROCK DES	CRIPTION DEPTH (ft)	(ft)	ELEV (ft)	(ft)	·	0.5ft		0 2	5 5	0 7
							1		1	l		1													•
400																	400								
400		±												- - 398.2	GROUND SURF	ACE 0.0		-	-						
	398.2	<u> </u>	WOH	2	2	4						D	0000	390.2	ALLUVIAL			397.7 -	0.0	2	3	6			
395	-	Ŧ											0000	F	VERY LOOSE TO LOOSE, TAN, FINE SAND	BROWN AND (A-3)	395	-	F				• • • • • • • • • • • • • • • • • • •		
	394.2	4.0	3	5	4	.\.					11	Sat.	0000	-		()		393.8 -	3.9						
	-	‡				. ₽ 9 . / .	9	· · · ·		· · · · · ·		Jai.		392.2	VERY SOFT, GRAY AND B			-	-	3	4	5	. • 9∶.	· · · ·	
390	-	t				<u> i ·</u>	• •							_	(A-7-6)	ROWN, CLAT	390	-	L						
1	388.7 -	9.5	2	1	1	/								F				389.2	8.5	3	2	3	j		
	-	Ŧ		'		● ² .						Sat.		386.2		12.0		-	-						
385	-	‡				 	•••	· · · ·	· · ·	· · · · ·				F	VERY LOOSE, GRAY, SIL SAND (A-2-4	TY COARSE	385	384.2	- 12 -				į		
	383.7 -	+ 14.5 +	WOH	2	2		· ·	· · · · ·		· · · · · ·		Sat.		- 382.7) 15.5		304.2	13.5	WOH	WOH	WOH	•0	· · · · ·	
		t				\	•••			· · · · · ·				381.2	WOOD	17.0		-					$\left[\begin{array}{cccc} & & & & \\ & & & & \\ & & & & \\ & & & & $		
380	379.7 -	18.5	WOH	3	5	-+-			+ · · ·					\vdash	LOOSE, GRAY, SILTY FINE SAND (A-2-4)	E TO COARSE)	380	379.2	18.5				<u> </u>		
1	-	Ŧ					3					Sat.		F				-	F	2	3	5			
375	-	ŧ				: :		· · · · ·		· · · · · · ·							375	-	-						· · · · ·
5/5	374.7 -	+ 23.5 +	60/0.1			│ │ . ╹ ═	-:-:+	÷ ÷ ÷ ÷ ;	+	60/0.	ī 🔶			374.7 	CRYSTALLINE R	23.5		374.0	23.7	00/0.4			·		
	-	t					· · ·				!			L	MICA GNEISS, NO RE	ECOVERY		-		60/0.1				· · · ·	
370	369.7 -	28.5									1			_ 369.7		28.5	370	-	00.4						
		<u>+ 20.5</u> +	60/0.0				•••			60/0.	•			-	Boring Terminated with	n Standard		369.6	- 28.1	60/0.1					
	-	‡												-	Penetration Test Refusal at ft in Crystalline Rock (M			-	-						
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UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMEN ASTM D7012

WBS No.:	67070.1.1
TIP No.:	BR-0070
County:	Caswell

Test Date:	10/14/2021						
Tested By:	J. Evans						

Description: Bridge No. 0061 over Hogan's Creek on NC 86 between SR 1300 and SR 1500

Test No.	1	2	
Boring ID	B1-B	В2-В	
Station	30+04	31+28	
Sample ID	RS-1	RS-2	
Sample Depth, ft	69.1	37.6	
Core Length #1, in.	3.980	3.980	
Core Length #2, in.	3.980	3.980	
Core Length #3, in.	3.970	3.990	
Avg. Core Length, in.	3.977	3.983	
Core Dia. #1, in.	1.975	1.975	
Core Dia. #2, in.	1.975	1.975	
Avg. Core Dia., in.	1.975	1.975	
Length/Dia. Ratio	2.02	2.02	
X-Sectional Area, in ²	3.06	3.06	
Weight, lb	1.20	1.15	
Unit Weight, pcf	170.2	162.8	
Break Type	2	2	
Load at Failure, lb	18,735	25,528	
Correction Factor	1.00	1.00	
Comp. Strength, psi	6,120	8,340	
Comp. Strength, ksf	880	1,200	

Rock Descriptions:

Test 1: Black and white, mica gneiss Test 2: Tan and light gray, mica gneiss

rest 2. run und light gruy, fined greiss

Break Types:

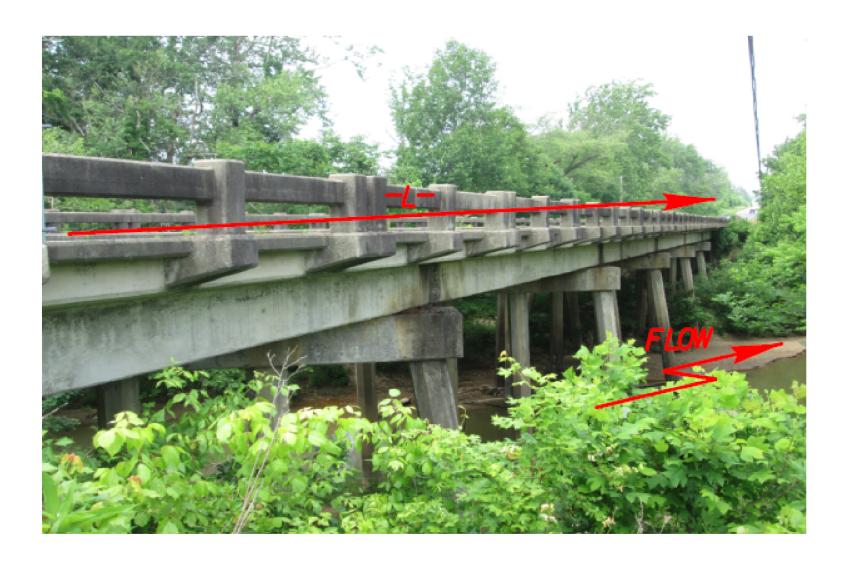




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BRIDGE NO. 61 OVER HOGANS CREEK ON HWY NC 86





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