

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0056	1	15

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CALDWELL
PROJECT DESCRIPTION SR 1514 (INDIAN GRAVE ROAD)
REPLACE BRIDGE NO.130 OVER YADKIN RIVER
SITE DESCRIPTION BRIDGE NO.130130 OVER YADKIN
RIVER ON SR 1514 (INDIAN GRAVE ROAD)
BETWEEN SR 1519 AND NC 268

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
2B, 2C	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4 - 13	BORE LOGS, CORE REPORTS, CORE PHOTOGRAPHS
14, 15	SITE PHOTOGRAPHS

PERSONNEL
HOWARD, J.

DUGGINS, W. T.

YOUNG, W.

INVESTIGATED BY HOWARD, J.

DRAWN BY ALMULLA, H.

CHECKED BY NASH, A. A.

SUBMITTED BY NASH, A. A.

DATE SEPTEMBER 2025

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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.

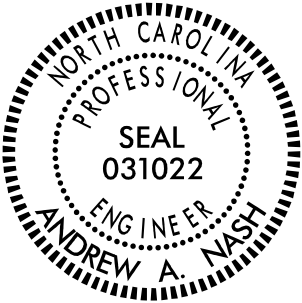
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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 ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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.

Prepared in the Office of:



3150 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27616
NC REGISTERED ENGINEERING FIRM P-0869
NC REGISTERED GEOLOGIC FIRM C-367



DocuSigned by:
Andrew A. Nash 7/19/2026
671DA68582C04F5 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REFERENCE: HB-0056

PROJECT: 50726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

(PAGE 1 OF 2)

SOIL DESCRIPTION SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										GRADATION WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL <table><tr><th>ORGANIC MATERIAL</th><th>GRANULAR SOILS</th><th>SILT - CLAY SOILS</th><th>OTHER MATERIAL</th></tr><tr><td>TRACE OF ORGANIC MATTER</td><td>2 - 3%</td><td>3 - 5%</td><td>TRACE 1 - 10%</td></tr><tr><td>LITTLE ORGANIC MATTER</td><td>3 - 5%</td><td>5 - 12%</td><td>LITTLE 10 - 20%</td></tr><tr><td>MODERATELY ORGANIC</td><td>5 - 10%</td><td>12 - 20%</td><td>SOME 20 - 35%</td></tr><tr><td>HIGHLY ORGANIC</td><td>> 10%</td><td>> 20%</td><td>HIGHLY 35% AND ABOVE</td></tr></table> GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP										ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																																																																																		
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F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE																																																																																																																																																																																																							
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK																																																																																																																																																																																																							
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL																																																																																																																																																																																																							
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO																																																																																																																																																																																																							
HI. - HIGHLY	V - VERY																																																																																																																																																																																																								
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																																																																																																																																																							
☐ CME-45C	☐ CLAY BITS	☒ AUTOMATIC ☐ MANUAL																																																																																																																																																																																																							
☐ CME-55	☐ 6" CONTINUOUS FLIGHT AUGER																																																																																																																																																																																																								
☐ CME-550	☐ 8" HOLLOW AUGERS	CORE SIZE:																																																																																																																																																																																																							
☐ VANE SHEAR TEST	☐ HARD FACED FINGER BITS	☐ -B ☐ -H																																																																																																																																																																																																							
☐ PORTABLE HOIST	☐ TUNG-CARBIDE INSERTS	☒ -N 0																																																																																																																																																																																																							
☒ MOBILE B-29 (TER-9003)	☒ CASING ☐ W/ ADVANCER	HAND TOOLS:																																																																																																																																																																																																							
	☒ TRICONE 2% STEEL TEETH	☐ POST HOLE DIGGER																																																																																																																																																																																																							
	☒ TRICONE TUNG-CARB.	☐ HAND AUGER																																																																																																																																																																																																							
	☒ CORE BIT	☐ SOUNDING ROD																																																																																																																																																																																																							
	☒ MUD ROTARY	☐ VANE SHEAR TEST																																																																																																																																																																																																							
PLASTICITY <table><tr><th></th><th>PLASTICITY INDEX (PI)</th><th>DRY STRENGTH</th></tr><tr><td>NON PLASTIC</td><td>0-5</td><td>VERY LOW</td></tr><tr><td>SLIGHTLY PLASTIC</td><td>6-15</td><td>SLIGHT</td></tr><tr><td>MODERATELY PLASTIC</td><td>16-25</td><td>MEDIUM</td></tr><tr><td>HIGHLY PLASTIC</td><td>26 OR MORE</td><td>HIGH</td></tr></table>											PLASTICITY INDEX (PI)	DRY STRENGTH	NON PLASTIC	0-5	VERY LOW	SLIGHTLY PLASTIC	6-15	SLIGHT	MODERATELY PLASTIC	16-25	MEDIUM	HIGHLY PLASTIC	26 OR MORE	HIGH	COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																																																																																																																																																
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PROJECT REFERENCE NO.	SHEET NO.
HB-0056	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 2 OF 2)

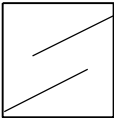
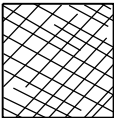
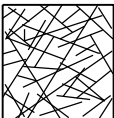
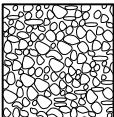
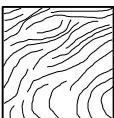
ROCK DESCRIPTION			TERMS AND DEFINITIONS		
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:					
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ALLUVIUM (ALLUV.)	- SOILS THAT HAVE BEEN TRANSPORTED BY WATER.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	AQUIFER	- A WATER BEARING FORMATION OR STRATA.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	ARENACEOUS	- APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	ARGILLACEOUS	- APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.	
WEATHERING			ARTESIAN	- GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.	
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		CALCAREOUS (CALC.)	- SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		COLLUVIUM	- ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.	
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		CORE RECOVERY (REC.)	- TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		DIKE	- A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.	
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>		DIP	- THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.	
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>		DIP DIRECTION (DIP AZIMUTH)	- THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.	
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>		FAULT	- A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.	
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		FISSILE	- A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.	
ROCK HARDNESS			FLOAT	- ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.	
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		FLOOD PLAIN (FP)	- LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		FORMATION (FM.)	- A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.	
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		JOINT	- FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		LEDGE	- A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.	
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		LENS	- A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.	
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.		MOTTLED (MOT.)	- IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.	
FRACTURE SPACING			PERCHED WATER	- WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.	
TERM	SPACING	TERM	RESIDUAL (RES.) SOIL	- SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.	
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	ROCK QUALITY DESIGNATION (RQD)	- A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	
WIDE	3 TO 10 FEET	THICKLY BEDDED	SAPROLITE (SAP.)	- RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.	
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	SILL	- AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.	
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	SLICKENSIDE	- POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.	
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)	- NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	
		THINLY LAMINATED	STRATA CORE RECOVERY (SREC.)	- TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.	
INDURATION			STRATA ROCK QUALITY DESIGNATION (SROD)	- A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.	
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.					
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.				
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				
BENCH MARK: BM-1: STA. 34+95-L-, 145.0' RIGHT			N:829089 , E:1250759		
			ELEVATION: 1197.54 FEET		
NOTES:					
FIAD - FILLED IMMEDIATELY AFTER DRILLING					

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 (PAGE 1 OF 2)

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

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.		SURFACE CONDITIONS				
STRUCTURE		DECREASING SURFACE QUALITY ➡				
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80				
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		70			
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity		60			
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces			50		
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes			40		
				30		
					20	
						10
		N/A	N/A			

HB-0056

2C

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 (PAGE 2 OF 2)

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

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 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.

SURFACE CONDITIONS OF
DISCONTINUITIES
(Predominantly bedding planes)

VERY GOOD - Very Rough, fresh
unweathered surfaces

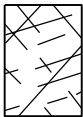
GOOD - Rough, slightly weathered
surfaces

FAIR - Smooth, moderately
weathered and altered surfaces

POOR - Very smooth, occasionally
slickensided surfaces with compact
coatings or fillings with angular
fragments

VERY POOR - Very smooth, slicken-
sided or highly weathered surfaces
with soft clay coatings or fillings

COMPOSITION AND STRUCTURE



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 instability.



B. Sandstone with thin inter-layers of siltstone



C. Sandstone and siltstone in similar amounts



D. Siltstone or silty shale with sandstone layers



E. Weak siltstone or clayey shale with sandstone layers

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**.



F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure

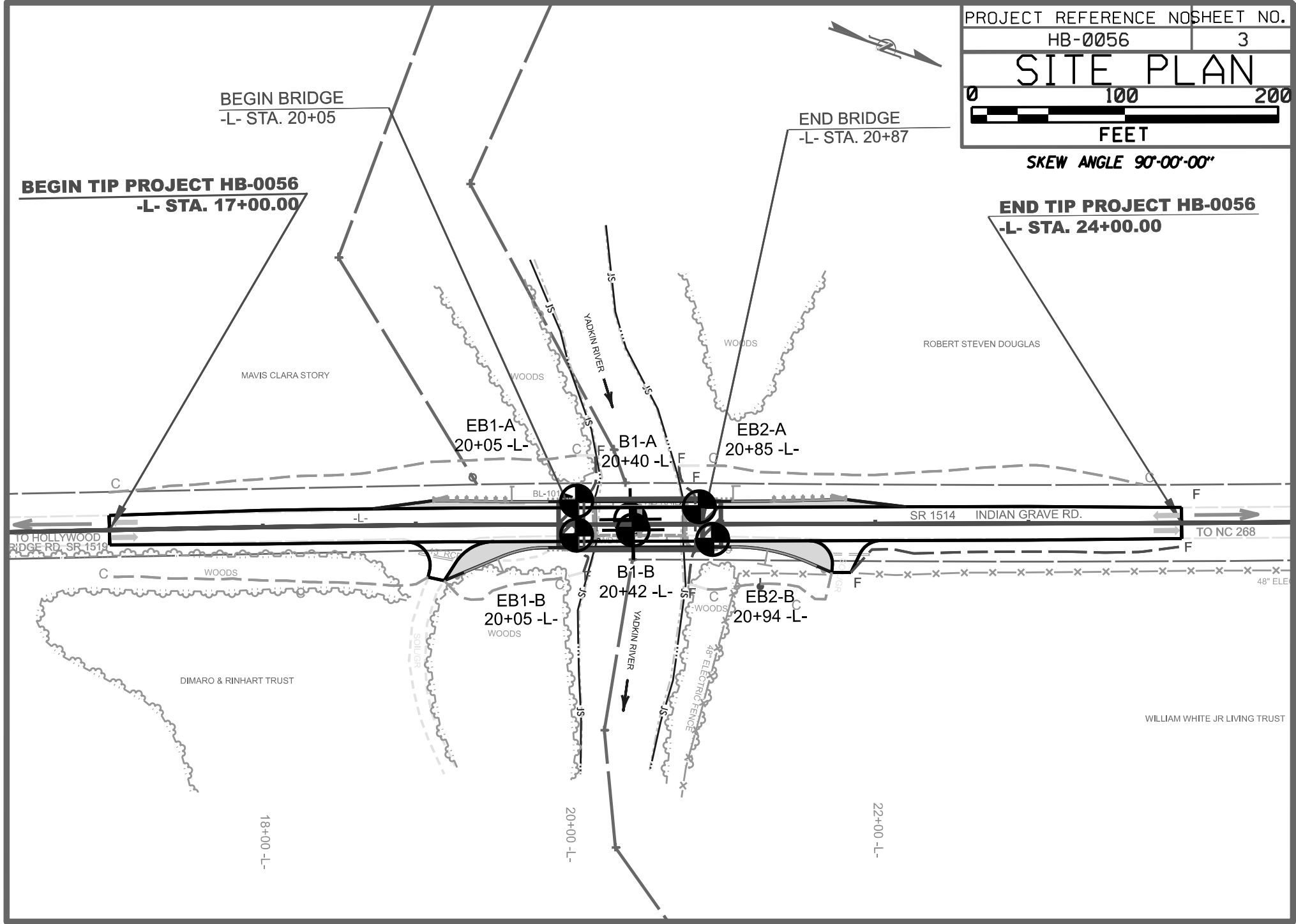


G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers



H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

➡ Means deformation after tectonic disturbance



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50726.1.1			TIP HB-0056			COUNTY CALDWELL			GEOLOGIST HOWARD, J.							
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)									GROUND WTR (ft)							
BORING NO. EB1-A			STATION 20+05			OFFSET 15 ft LT			ALIGNMENT -L-			0 HR.	3.2			
COLLAR ELEV. 1,178.9 ft			TOTAL DEPTH 34.1 ft			NORTHING 827,604			EASTING 1,251,177			24 HR.	5.0			
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025						DRILL METHOD Mud Rotary				HAMMER TYPE Automatic						
DRILLER DUGGINS, W.			START DATE 06/09/25			COMP. DATE 06/09/25			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		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
1180														1,178.9	GROUND SURFACE	0.0
1175	1,177.9	1.0	2	4	2							W		ALLUVIAL LOOSE TO DENSE, BROWN, GRAY, SILTY FINE TO COARSE SAND, WET TO SATURATED, LITTLE GRAVEL, LITTLE WOOD (A-2-4)		
	1,175.4	3.5	1	1	7											
1170	1,172.9	6.0	6	16	18							Sat.				
	1,170.4	8.5	19	52	44							M				1,170.9
1165	1,164.9	14.0	44	56/0.4										1,165.4	VERY DENSE, GREEN, GRAY, SILTY FINE SAND, MOIST, SAPROLITE (A-2-4)	13.5
																1,160.9
1160	1,159.9	19.0	61	16	15								M	RESIDUAL LOOSE TO DENSE, BROWN, GRAY, SILTY FINE SAND, MOIST (A-2-4)		
1155	1,154.9	24.0	4	5	95/0.3									1,153.9	WEATHERED ROCK (LIGHT GREEN, BROWN, GRAY, GNEISS)	25.0
1150	1,150.9	28.0	100/0.1													
1145	1,144.9	34.0	100/0.1											1,144.8	Boring Terminated at Elevation 1,144.8 ft IN WEATHERED ROCK (GNEISS)	34.1

NCDOT BORE SINGLE HB-0056 GEO BRDG_LOGS.GPJ NC DOT.GDT 8/21/25

WBS 50726.1.1		TIP HB-0056		COUNTY CALDWELL		GEOLOGIST HOWARD, J.								
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)							GROUND WTR (ft)							
BORING NO. EB1-B		STATION 20+05		OFFSET 7 ft RT		ALIGNMENT -L-		0 HR. N/A						
COLLAR ELEV. 1,179.8 ft		TOTAL DEPTH 24.8 ft		NORTHING 827,611		EASTING 1,251,198		24 HR. N/A						
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025				DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER DUGGINS, W.		START DATE 06/09/25		COMP. DATE 06/09/25		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)
1180													1,179.8	GROUND SURFACE
	1,178.8	1.0		9	29								1,179.4	PAVEMENT (0.4' ASPHALT)
	1,176.3	3.5		4	2	4							1,176.8	ROADWAY EMBANKMENT BROKEN ASPHALT, DEBRIS
1175	1,173.8	6.0		11	16	9							1,173.8	ALLUVIAL
	1,171.3	8.5		7	19	35							1,170.8	LOOSE, BROWN, GRAY, SILTY FINE TO COARSE SAND, SATURATED (A-2-4)
1170													1,170.8	MEDIUM DENSE, BROWN, GRAY, FINE TO COARSE SANDY GRAVEL, SATURATED (A-1-b)
													1,164.8	RESIDUAL DENSE, GREEN, GRAY, TAN, SILTY FINE TO COARSE SAND, MOIST, SAPROLITE (A-2-4)
1165	1,165.3	14.5		22	78/0.4					100/0.9				WEATHERED ROCK (GREEN, GRAY, BROWN, GNEISS)
1160	1,160.3	19.5		60	40/0.1					100/0.6				
1155	1,155.3	24.5								100/0.3			1,155.0	Boring Terminated at Elevation 1,155.0 ft IN WEATHERED ROCK (GNEISS)

NC DOT BORE SINGLE HB-0056 GEO BRDG LOGS.GPJ NC DOT.GDT 8/21/25

WBS 50726.1.1						TIP HB-0056						COUNTY CALDWELL						GEOLOGIST HOWARD, J.											
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)																		GROUND WTR (ft)											
BORING NO. B1-A						STATION 20+40						OFFSET 3 ft LT						ALIGNMENT -L-						0 HR. 4.5 N/A					
COLLAR ELEV. 1,169.2 ft						TOTAL DEPTH 45.4 ft						NORTHING 827,641						EASTING 1,251,177						24 HR. N/A					
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025												DRILL METHOD Mud Rotary						HAMMER TYPE Automatic											
DRILLER DUGGINS, W.						START DATE 06/11/25						COMP. DATE 06/11/25						SURFACE WATER DEPTH 4.5ft											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION															
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)														
1180																													
1175																													
1170																													
1165	1,168.2	1.0	11	22	24										1,168.2	0.0													
	1,165.7	3.5	15	27	22																								
	1,163.2	6.0	21	39	51																								
1160	1,160.7	8.5	24	30	35																								
1155	1,154.4	14.8	60	40/0.1											1,156.2	13.0													
1150	1,149.4	19.8	100/0.2																										
1145	1,144.4	24.8	100/0.2																										
1140	1,140.8	28.4	60/0												1,140.8	28.0													
1135																													
1130																													
1125																													
															1,123.8	45.4													

NC DOT BORE SINGLE HB-0056 GEO BRDG LOGS.GPJ NC DOT.GDT 9/2/25

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 50726.1.1				TIP HB-0056			COUNTY CALDWELL			GEOLOGIST HOWARD, J.			
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)										GROUND WTR (ft)			
BORING NO. B1-A				STATION 20+40			OFFSET 3 ft LT			ALIGNMENT -L-		0 HR. 4.5 N/A	
COLLAR ELEV. 1,169.2 ft				TOTAL DEPTH 45.4 ft			NORTHING 827,641			EASTING 1,251,177		24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025							DRILL METHOD Mud Rotary			HAMMER TYPE Automatic			
DRILLER DUGGINS, W.				START DATE 06/11/25			COMP. DATE 06/11/25			SURFACE WATER DEPTH 4.5ft			
CORE SIZE NQ2				TOTAL RUN 17.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS		
					REC. (ft) %	ROD (ft) %		REC. (ft) %	ROD (ft) %				
1140.84											Begin Coring @ 28.4 ft		
1140	1,140.8	28.4	2.0	N=60/0 2:45/1.0	(0.0) 0%	(0.0) 0%		(14.4) 85%	(1.8) 11%		1,140.8	28.4	
	1,138.8	30.4	5.0	2:45/1.0 3:00/1.0 2:00/1.0 2:00/1.0 2:15/1.0 1:30/1.0	(4.4) 88%	(0.4) 8%			CRYSTALLINE ROCK GREEN, GRAY, BROWN, GNEISS, MODERATELY TO SEVERE WEATHERED, MODERATE TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING GSI= 40				
1135													
	1,133.8	35.4	5.0	2:00/1.0 2:30/1.0 2:15/1.0 2:00/1.0 1:30/1.0	(5.0) 100%	(1.0) 20%					Joints: 32: 10°- 20° 25: 40°- 60° 12: 70°- 85° 4: 75°- 85° 1: 90°		
1130													
	1,128.8	40.4	5.0	2:00/1.0 1:45/1.0 2:15/1.0 2:00/1.0 1:35/1.0	(5.0) 100%	(0.4) 8%							
1125													
	1,123.8	45.4									1,123.8	45.4	
Boring Terminated at Elevation 1,123.8 ft IN CRYSTALLINE ROCK GNEISS													

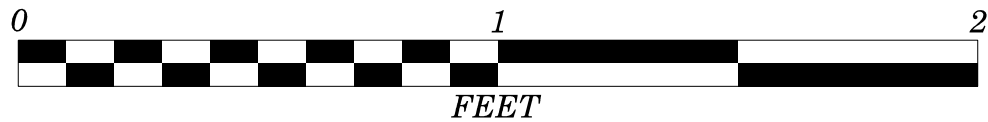
NCDOT CORE SINGLE HB-0056 GEO_BRDG_LOGS.GPJ NC_DOT.GDT 9/2/25

PROJECT REFERENCE NO.	SHEET NO.
HB-0056	8

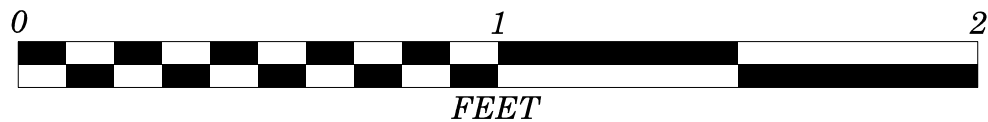
CORE PHOTOGRAPHS

BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)
BETWEEN SR 1519 AND NC 268

B1-A
BOX 1 OF 2
28.4 - 38.7 FEET



B1-A
BOX 2 OF 2
38.7 - 45.4 FEET



[illegible]

NC DOT BORE SINGLE HB-0056 GEO BRDG LOGS.GPJ NC DOT.GDT 9/2/25

WBS 50726.1.1			TIP HB-0056			COUNTY CALDWELL			GEOLOGIST HOWARD, J.					
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)									GROUND WTR (ft)					
BORING NO. B1-B			STATION 20+42			OFFSET 4 ft RT			ALIGNMENT -L-					
COLLAR ELEV. 1,171.6 ft			TOTAL DEPTH 42.1 ft			NORTHING 827,645			EASTING 1,251,183					
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER DUGGINS, W.			START DATE 06/10/25			COMP. DATE 06/10/25			SURFACE WATER DEPTH 2.6ft					
CORE SIZE NQ2			TOTAL RUN 17.0 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %		ROD (ft) %	SAMP. NO.	STRATA REC. (ft) %		ROD (ft) %	L O G	DESCRIPTION AND REMARKS	
													ELEV. (ft)	DEPTH (ft)
1146.48													Begin Coring @ 25.1 ft	
1145	1,146.5 1,144.5	25.1 27.1	2.0	4:00/1.0 4:00/1.0	(2.0) 100%	(0.0) 0%							CRYSTALLINE ROCK GREENISH GRAY, PINK, BROWN, GNEISS, SILGLTY TO SEVERE WEATHERED, MODERATE TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING GSI= 40	
1140	1,139.5	32.1	5.0	3:30/1.0 4:00/1.0 3:15/1.0 4:00/1.0	(5.0) 100%	(0.0) 0%							Joints: 14: 10°- 20° 6: 10°- 30° 14: 30° - 85° 25: 40°- 60° 4: 60°- 90° 4: 70°- 85° 2: 75° 3: 90° (<i>continued</i>)	
1135	1,134.5	37.1	5.0	5:00/1.0 3:45/1.0 3:00/1.0 3:45/1.0	(5.0) 100%	(2.3) 46%								
1130	1,129.5	42.1	5.0	4:45/1.0 4:15/1.0 4:15/1.0 4:45/1.0	(4.9) 98%	(2.1) 42%							Boring Terminated at Elevation 1,129.5 ft IN CRYSTALLINE ROCK GNEISS	

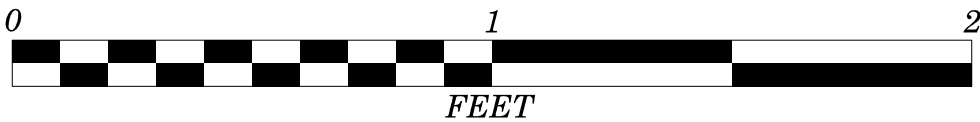
NC DOT CORE SINGLE HR-0056 GEO BRDG LOGS.GPJ NC DOT.GDT 9/2/25

PROJECT REFERENCE NO.	SHEET NO.
HB-0056	11

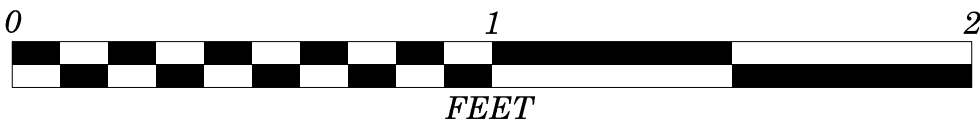
CORE PHOTOGRAPHS

BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)
BETWEEN SR 1519 AND NC 268

B1-B
BOX 1 OF 2
25.1 - 34.7 FEET



B1-B
BOX 2 OF 2
34.7 - 42.1 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50726.1.1			TIP HB-0056			COUNTY CALDWELL			GEOLOGIST HOWARD, J.						
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)									GROUND WTR (ft)						
BORING NO. EB2-A			STATION 20+85			OFFSET 11 ft LT			ALIGNMENT -L-						
COLLAR ELEV. 1,179.8 ft			TOTAL DEPTH 28.8 ft			NORTHING 827,681			EASTING 1,251,155						
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025									DRILL METHOD Mud Rotary			HAMMER TYPE Automatic			
DRILLER DUGGINS, W.			START DATE 06/10/25			COMP. DATE 06/10/25			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1180														1,179.8	0.0
	1,178.8	1.0											W	1,179.4	0.4
			4	2	1									PAVEMENT (0.4' ASPHALT)	
	1,176.3	3.5												ROADWAY EMBANKMENT	
1175			1	0	1								Sat.	1,174.3	5.5
	1,173.8	6.0												LOOSE, BROWN, GRAY, SILTY FINE TO COARSE SAND, WET TO SATURATED, LITTLE GRAVEL (A-2-4)	
			5	11	10								Sat.	1,171.8	8.0
	1,171.3	8.5												ALLUVIAL	
1170			12	16	18								D	MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND, SATURATED, LITTLE GRAVEL (A-2-4)	
														RESIDUAL	
	1,166.4	13.4											D	DENSE TO VERY DENSE, GREEN ,GRAY, BRWON, SILTY FINE SAND, DRY, SAPROLITE (A-2-4)	
1165			33	32	32									1,160.4	19.4
	1,161.4	18.4												WEATHERED ROCK (BROWN, ORANGE, GNEISS)	
1160			48	50	50/0.3										
	1,156.4	23.4												100/0.8	
1155			100/0.4											100/0.4	
	1,151.4	28.4												1,151.0	28.8
			100/0.4											Boring Terminated at Elevation 1,151.0 ft IN WEATHERED ROCK (GNEISS)	

NCDOT BORE SINGLE HB-0056 GEO_BRDG_LOGS.GPJ NC_DOT.GDT 8/21/25

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50726.1.1			TIP HB-0056			COUNTY CALDWELL			GEOLOGIST HOWARD, J.						
SITE DESCRIPTION BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)									GROUND WTR (ft)						
BORING NO. EB2-B			STATION 20+94			OFFSET 10 ft RT			ALIGNMENT -L-			0 HR. N/A			
COLLAR ELEV. 1,179.9 ft			TOTAL DEPTH 35.0 ft			NORTHING 827,696			EASTING 1,251,172			24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE TER9003 MOBILE-29 92% 06/25/2025						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic						
DRILLER DUGGINS, W.			START DATE 06/10/25			COMP. DATE 06/10/25			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1180														1,179.9	GROUND SURFACE 0.0
1175	1,178.9	1.0	5	5	3									1,176.9	ROADWAY EMBANKMENT 3.0
	1,176.4	3.5	6	10	7							W		MEDIUM STIFF, BROWN, SANDY SILT, WET, LITTLE GRAVEL (A-4)	
	1,173.9	6.0	8	7	16							Sat.		ALLUVIAL	
1170	1,171.4	8.5												1,171.9	MEDIUM DENSE, BROWN, GRAY, SILTY FINE TO COARSE SAND, SATURATED, LITTLE GRAVEL (A-2-4) 8.0
			9	19	20							Sat.		RESIDUAL	
1165	1,165.7	14.2	14	29	43							M		1,166.9	HARD, GREEN, GRAY, FINE SANDY, SILT, MOIST, SAPROLITE (A-4) 13.0
														VERY DENSE, GREEN, BROWN, SILTY FINE SAND, MOIST (A-2-4)	
1160	1,160.7	19.2	36	64/0.4								M		1,160.2	WEATHERED ROCK 19.7
														(TAN, ORANGE, GNEISS)	
1155	1,155.7	24.2	42	28	59									1,156.9	RESIDUAL 23.0
												M		VERY DENSE, ORANGE, BROWN, SILTY FINE SAND, MOIST (A-2-4)	
1150	1,150.7	29.2	51	49/0.2										1,151.9	WEATHERED ROCK 28.0
														(TAN, BROWN, ORANGE, GNEISS)	
1145	1,145.7	34.2	64	36/0.3										1,144.9	Boring Terminated at Elevation 1,144.9 ft IN WEATHERED ROCK (GNEISS) 35.0

NCDOT BORE SINGLE HB-0056 GEO BRDG_LOGS.GPJ NC DOT.GDT 8/21/25

PROJECT REFERENCE NO.	SHEET NO.
HB-0056	14

SITE PHOTOGRAPHS

BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)
BETWEEN SR 1519 AND NC 268



SOUTH APPROACH LOOKING NORTH
ALONG -L- ALIGNMENT

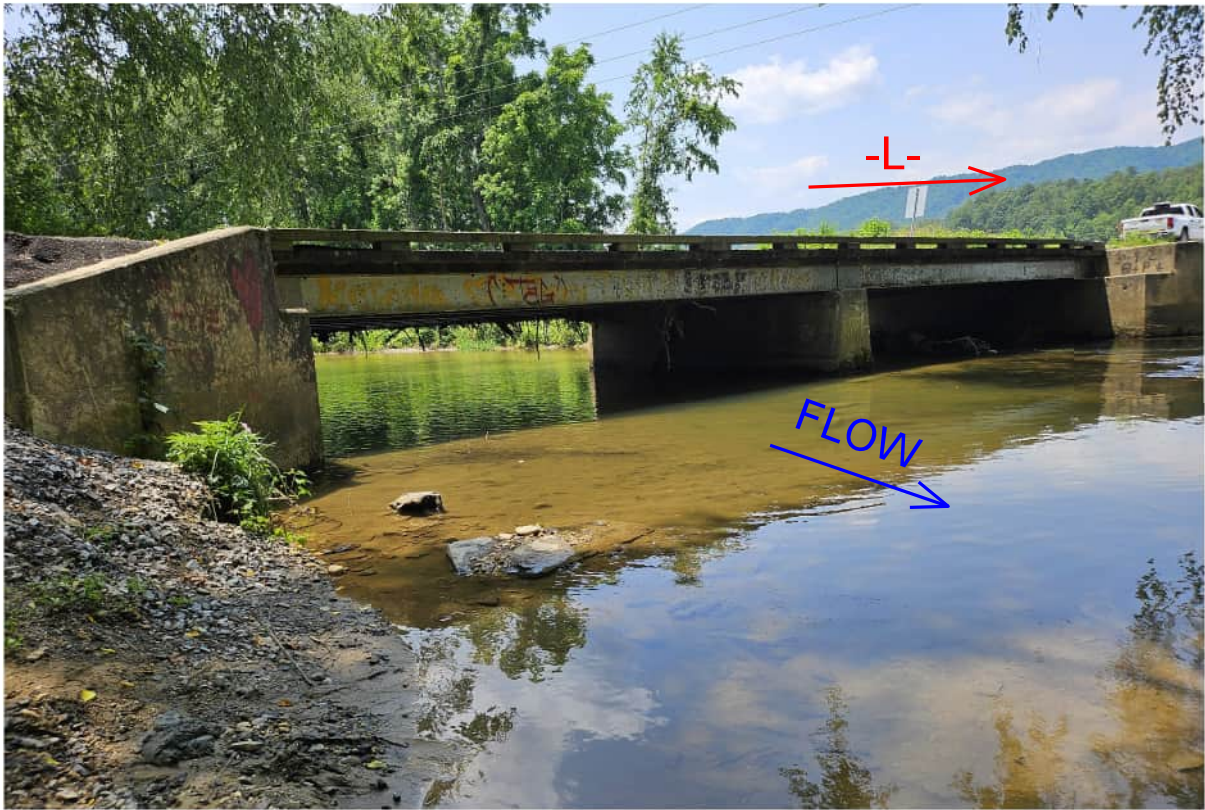


NORTH APPROACH LOOKING SOUTH
ALONG -L- ALIGNMENT

PROJECT REFERENCE NO.	SHEET NO.
HB-0056	15

SITE PHOTOGRAPHS

BRIDGE NO. 130130 OVER YADKIN RIVER ON SR 1514 (INDIAN GRAVE ROAD)
BETWEEN SR 1519 AND NC 268



SOUTH EAST SIDE BRIDGE LOOKING UPSTREAM



NORTH WEST SIDE BRIDGE LOOKING DOWNSTREAM

REFERENCE: HB-0061

PROJECT: 50731

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0061	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CALDWELL
PROJECT DESCRIPTION SR 1574 (C C CAMP ROAD)
REPLACE BRIDGE NO. 349 OVER JOES CREEK

SITE DESCRIPTION REPLACES BRIDGE NO. 130349
OVER JOES CREEK ON SR 1574 (C C CAMP ROAD)
BETWEEN SR 1501 AND DEAD END

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
2B, 2C	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4 - 9	BORE LOGS, CORE REPORT & CORE PHOTOS
10	SITE PHOTOGRAPHS

PERSONNEL
<u>HARTMAN, M.</u>
<u>MANOLUKAS, A.</u>
<u>TRUESDALE, S.</u>
<u>MATHER, T.</u>

INVESTIGATED BY HARTMAN, M.
DRAWN BY ALMULLA, H.
CHECKED BY RIGGS, JR., A. F.
SUBMITTED BY RIGGS, JR., A. F.
DATE DECEMBER 2025

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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:
1. 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.
2. 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.

Prepared in the Office of:



3150 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27616
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:

C2F6ACA84D274B1...
SIGNATURE

2/4/2026
DATE

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

HB-0061

2

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

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION																																																																																																																																																															
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.																																																																																																																																																															
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS																																																																																																																																																															
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
WEATHERED ROCK (WR)		AQUIFER - A WATER BEARING FORMATION OR STRATA.
CRYSTALLINE ROCK (CR)		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
NON-CRYSTALLINE ROCK (NCR)		ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
WEATHERING		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
ROCK HARDNESS		FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
FRACTURE SPACING		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
TERM	SPACING	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
VERY WIDE	MORE THAN 10 FEET	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
WIDE	3 TO 10 FEET	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
MODERATELY CLOSE	1 TO 3 FEET	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
CLOSE	0.16 TO 1 FOOT	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
VERY CLOSE	LESS THAN 0.16 FEET	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
BEDDING		STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TERM	THICKNESS	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
VERY THICKLY BEDDED	4 FEET	BENCH MARK: BM-1: N: 863,440, E: 1,252,434, SAT. -L- 15+34, 24.0' LT
THICKLY BEDDED	1.5 - 4 FEET	
THINLY BEDDED	0.16 - 1.5 FEET	ELEVATION: 1387.56 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET	
THICKLY LAMINATED	0.008 - 0.03 FEET	NOTES:
THINLY LAMINATED	< 0.008 FEET	
INDURATION		FIAD - FILLED IMMEDIATELY AFTER DRILLING
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

HB-0061

2B

**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 (PAGE 1 OF 2)

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

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.

SURFACE CONDITIONS

VERY GOOD
Very rough, fresh unweathered surfaces

GOOD
Rough, slightly weathered, iron stained surfaces

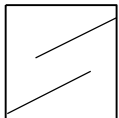
FAIR
Smooth, moderately weathered and altered surfaces

POOR
Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments

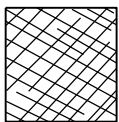
VERY POOR
Slickensided, highly weathered surfaces with soft clay coatings or fillings

STRUCTURE

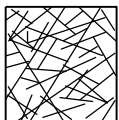
DECREASING SURFACE QUALITY →



INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities



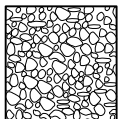
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



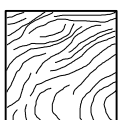
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity

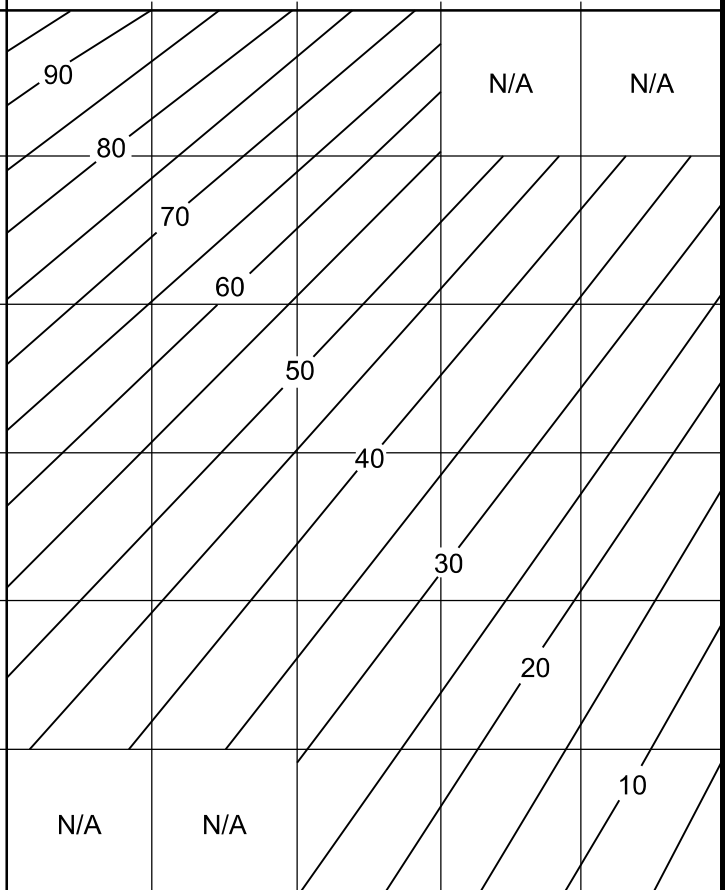


DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces



LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ↓



HB-0061

2C

**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 (PAGE 2 OF 2)

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

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 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.

SURFACE CONDITIONS OF DISCONTINUITIES
(Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces

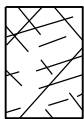
GOOD - Rough, slightly weathered surfaces

FAIR - Smooth, moderately weathered and altered surfaces

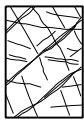
POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

COMPOSITION AND STRUCTURE



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 instability.



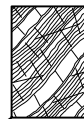
B. Sandstone with thin inter-layers of siltstone



C. Sandstone and siltstone in similar amounts



D. Siltstone or silty shale with sandstone layers



E. Weak siltstone or clayey shale with sandstone layers

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**.



F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure



G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers



H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

➡ Means deformation after tectonic disturbance

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 4 OF 10

WBS 50731.1.1			TIP HB-0061			COUNTY CALDWELL			GEOLOGIST MANOLUKAS, A.						
SITE DESCRIPTION REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)									GROUND WTR (ft)						
BORING NO. EB1-A			STATION 10+06			OFFSET 16 ft LT			ALIGNMENT -L-			0 HR. N/A			
COLLAR ELEV. 1,380.1 ft			TOTAL DEPTH 20.0 ft			NORTHING 862,967			EASTING 1,252,646			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TER4106 Geoprobe 3126GT 98% 01/24/2025						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic						
DRILLER TRUESDALE, S.			START DATE 12/17/25			COMP. DATE 12/17/25			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					
1385															
1380															
	1,379.1	1.0	20	19	17									1,380.1 GROUND SURFACE 0.0	
														1,379.1 PAVEMENT 1.0	
														(0.4' ASPHALT, 0.6' ABC)	
	1,376.6	3.5												1,377.1 ROADWAY EMBANKMENT 3.0	
1375			3	4	5									DENSE, BROWN, ORANGE, CLAYEY SAND, DRY (A-2-6)	
	1,374.1	6.0	7	12	19									1,374.6 ALLUVIAL 5.5	
														LOOSE, DARK GRAY, BROWN, SILTY SAND, MOIST (A-2-4)	
	1,371.6	8.5	12	14	22									RESIDUAL	
1370														DENSE, ORANGE, DARK BROWN, SILTY SAND, WET (A-2-4)	
	1,366.6	13.5	10	19	72									1,365.6 WEATHERED ROCK 14.5	
1365														1,365.2 14.9	
	1,365.2	14.9	60/0.0											1,365.1 15.0	
														1,364.6 15.5	
														1,360.1 CRYSTALLINE ROCK 20.0	
														CRYSTALLINE ROCK	
														WHITE TO GRAY, BIOTITE GRANITIC GNEISS, MODERATELY SEVERE WEATHERING, MEDIUM HARD, VERY CLOSE FRACTURE SPACING GSI=20-30	
														JOINTS: MULTIPLE	
														WHITE TO GRAY, BIOTIE GRANITIC GNEISS, VERY SLIGHT TO FRESH WEATHERING, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING GSI=75-85	
														JOINTS: NONE	
														Boring Terminated at Elevation 1,360.1 ft IN CRYSTALLINE ROCK (BIOTITE GRANITIC GNEISS)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 50731.1.1				TIP HB-0061			COUNTY CALDWELL			GEOLOGIST MANOLUKAS, A.						
SITE DESCRIPTION REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)										GROUND WTR (ft)						
BORING NO. EB1-A				STATION 10+06			OFFSET 16 ft LT			ALIGNMENT -L-		0 HR. N/A				
COLLAR ELEV. 1,380.1 ft				TOTAL DEPTH 20.0 ft			NORTHING 862,967			EASTING 1,252,646		24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE TER4106 Geoprobe 3126GT 98% 01/24/2025							DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic						
DRILLER TRUESDALE, S.				START DATE 12/17/25			COMP. DATE 12/17/25			SURFACE WATER DEPTH N/A						
CORE SIZE NQ				TOTAL RUN 5.0 ft												
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %		ROD (ft) %	SAMP. NO.	STRATA REC. (ft) %		ROD (ft) %	L O G	DESCRIPTION AND REMARKS		ELEV. (ft)	DEPTH (ft)
1,365.1	1,365.1	15.0	0.5	1:50/0.5	(0.3)	(0.0)			(0.3)	(0.0)			Begin Coring @ 15.0 ft		15.0	
	1,364.6	15.5		4:29/1.0 5:38/1.0 3:02/1.0 4:47/1.0 3:02/0.5	60%	0%			60%	0%			CRYSTALLINE ROCK		15.5	
													WHITE TO GRAY, BIOTITE GRANITIC GNEISS, MODERATELY SEVERE WEATHERING, MEDIUM HARD, VERY CLOSE FRACTURE SPACING GSI=20-30			
	1,360.1	20.0			(4.3)	(4.3)			96%	96%					20.0	
			4.5										JOINTS: MULTIPLE			
													WHITE TO GRAY, BIOTITE GRANITIC GNEISS, VERY SLIGHT TO FRESH WEATHERING, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING GSI=75-85			
	1,355.6	24.5											JOINTS: NONE			
													Boring Terminated at Elevation 1,360.1 ft IN CRYSTALLINE ROCK (BIOTITE GRANITIC GNEISS)			

HB-0061

6

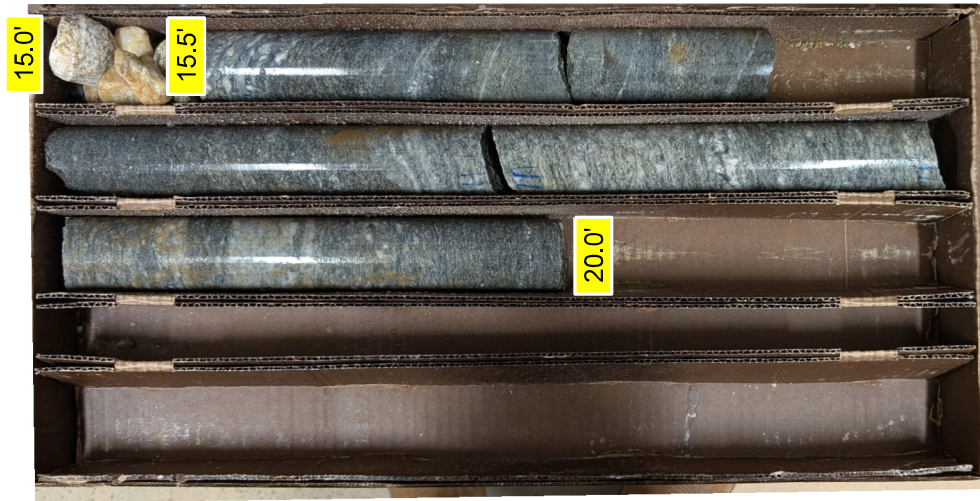
CORE PHOTOGRAPHS

REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)
BETWEEN SR 1501 AND DEAD END

EB1-A

BOX 1 OF 1

15.0 TO 20.0 FEET



SHEET 7 OF 10

NC DOT BORE SINGLE HB0061.GPJ NC_DOT.GDT 12/24/25

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 8 OF 10

WBS 50731.1.1			TIP HB-0061			COUNTY CALDWELL			GEOLOGIST MANOLUKAS, A.		
SITE DESCRIPTION REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)									GROUND WTR (ft)		
BORING NO. EB2-A			STATION 10+58			OFFSET 14 ft LT			ALIGNMENT -L-		
COLLAR ELEV. 1,379.5 ft			TOTAL DEPTH 11.6 ft			NORTHING 863,011			EASTING 1,252,617		
DRILL RIG/HAMMER EFF./DATE TER4106 Geoprobe 3126GT 98% 01/24/2025						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic		
DRILLER TRUESDALE, S.			START DATE 12/18/25			COMP. DATE 12/18/25			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						
1380																
	1,378.5	1.0													GROUND SURFACE	0.0
	1,376.0	3.5	7	8	8										ALLUVIAL VERY LOOSE, BROWN, FINE SAND, MOIST (A-3)	3.0
1375	1,373.5	6.0	6	8	9										RESIDUAL MEDIUM DENSE, BROWN, BLACK, COARSE SAND, WET (A-3)	5.5
	1,371.0	8.5	9	11	60										MEDIUM DENSE, BROWN, WHITE, COARSE SAND, WET, TRACE ROCK FRAGMENTS (A-3)	8.0
1370	1,368.0	11.5	60/0.1												VERY DENSE, BROWN, TAN, SILTY SAND, WET, SOME ROCK FRAGMENTS (A-2-4)	11.5
															CRYSTALLINE ROCK BLACK, BROWN (BIOTITE GRANITIC GNEISS)	11.6
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,367.9 ft IN CRYSTALLINE ROCK (BIOTITE GRANITIC GNEISS)																

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 9 OF 10

WBS 50731.1.1			TIP HB-0061			COUNTY CALDWELL			GEOLOGIST MANOLUKAS, A.		
SITE DESCRIPTION REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)										GROUND WTR (ft)	
BORING NO. EB2-B			STATION 10+66			OFFSET 17 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 1,380.0 ft			TOTAL DEPTH 13.0 ft			NORTHING 863,036			EASTING 1,252,638		
DRILL RIG/HAMMER EFF./DATE TER4106 Geoprobe 3126GT 98% 01/24/2025						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic		
DRILLER TRUESDALE, S.			START DATE 12/17/25			COMP. DATE 12/17/25			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				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
1380															1,380.0	GROUND SURFACE	0.0	
1375	1,379.0	1.0		WOH	2	1								M		1,377.0	RESIDUAL VERY LOOSE, BROWN, SILTY SAND, MOIST (A-2-4)	3.0
	1,376.5	3.5		4	16	7								W			MEDIUM DENSE TO VERY DENSE, BROWN, ORANGE, SILTY SAND, WET TO MOIST (A-2-4)	
	1,374.0	6.0		9	14	12								W				
1370	1,371.5	8.5												M				
	1,367.0	13.0		17	19	38										1,367.0	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,367.0 ft ON CRYSTALLINE ROCK (BIOTITE GRANITIC GNEISS)	13.0

SITE PHOTOGRAPHS

REPLACES BRIDGE NO. 130349 OVER JOES CREEK ON SR 1574 (CC CAMP ROAD)
BETWEEN SR 1501 AND DEAD END



WEST SIDE BRIDGE LOOKING EAST
(UPSTREAM)



EAST SIDE BRIDGE LOOKING WEST
(DOWNSTREAM)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0065	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY WILKES
PROJECT DESCRIPTION SR 1170 (CASPER HAWKINS ROAD) REPLACE BRIDGE NO. 691 OVER STONY FORK CREEK
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 BETWEEN DEAD END AND SR 1155

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
2B, 2C	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4 - 11	BORE LOGS, CORE REPORT & CORE PHOTOS
12	SITE PHOTOGRAPHS

PERSONNEL
HARTMAN, M.
HOWARD, J.
MARPLES, Z.
DUGGINS, W.
ROBINSON, C.

INVESTIGATED BY HARTMAN, M.
DRAWN BY ALMULLA, H.
CHECKED BY NASH, A. A.
SUBMITTED BY NASH, A. A.
DATE JANUARY 2026

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.

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Prepared in the Office of:



3150 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27616
NC REGISTERED ENGINEERING FIRM: E-0869
NC REGISTERED GEOLOGIC FIRM: C-367



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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION																			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.																			
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS																			
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										MINERALOGICAL COMPOSITION																			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										COMPRESSIBILITY																			
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										PERCENTAGE OF MATERIAL																			
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE										GROUND WATER																			
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP										MISCELLANEOUS SYMBOLS																			
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE																			
CONSISTENCY OR DENSENESS										RECOMMENDATION SYMBOLS																			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK																			
TEXTURE OR GRAIN SIZE										ABBREVIATIONS																			
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										AR - AUGER REFUSAL MED. - MEDIUM BT - BORING TERMINATED MICA - MICACEOUS CL - CLAY MOD. - MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC CSE. - COARSE ORG. - ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP. - SAPROLITIC e - VOID RATIO SD. - SAND, SANDY F - FINE SL. - SILT, SILTY FOSS. - FOSSILIFEROUS SLL. - SLIGHTLY FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HL - HIGHLY V - VERY										VST - VANE SHEAR TEST WEA. - WEATHERED γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:																			
LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										☐ CME-45C ☐ CLAY BITS ☒ AUTOMATIC ☐ MANUAL																			
PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										☐ CME-55 ☐ 6" CONTINUOUS FLIGHT AUGER ☐ -B ☐ -N																			
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										☐ CME-550 ☐ 8" HOLLOW AUGERS ☒ -N 02																			
SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										☐ VANE SHEAR TEST ☐ HARD FACED FINGER BITS																			
PLASTICITY										☐ PORTABLE HOIST ☐ TUNG-CARBIDE INSERTS																			
NON PLASTIC 0-5 VERY LOW										☒ CASING ☒ W/ ADVANCER																			
SLIGHTLY PLASTIC 6-15 SLIGHT										☒ TRICONE 2 5/16" STEEL TEETH																			
MODERATELY PLASTIC 16-25 MEDIUM										☒ TRICONE " TUNG-CARB.																			
HIGHLY PLASTIC 26 OR MORE HIGH										☒ CORE BIT																			
COLOR										☒ MUD ROTARY																			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										HAND TOOLS: ☐ POST HOLE DIGGER ☐ HAND AUGER ☐ SOUNDING ROD ☐ VANE SHEAR TEST																			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 2 OF 2)

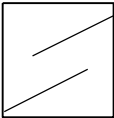
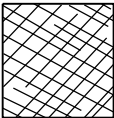
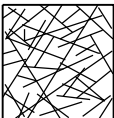
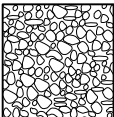
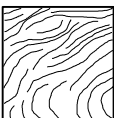
ROCK DESCRIPTION		TERMS AND DEFINITIONS	
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:			
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>		
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>		
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.		
FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		
BENCH MARK: BM-1: N: 873,939, E: 1,292,351, SAT. -L- 14+91, 332.0' LT		ELEVATION: 1163.49 FEET	
NOTES:			
FIAD - FILLED IMMEDIATELY AFTER DRILLING			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 1 OF 2)

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

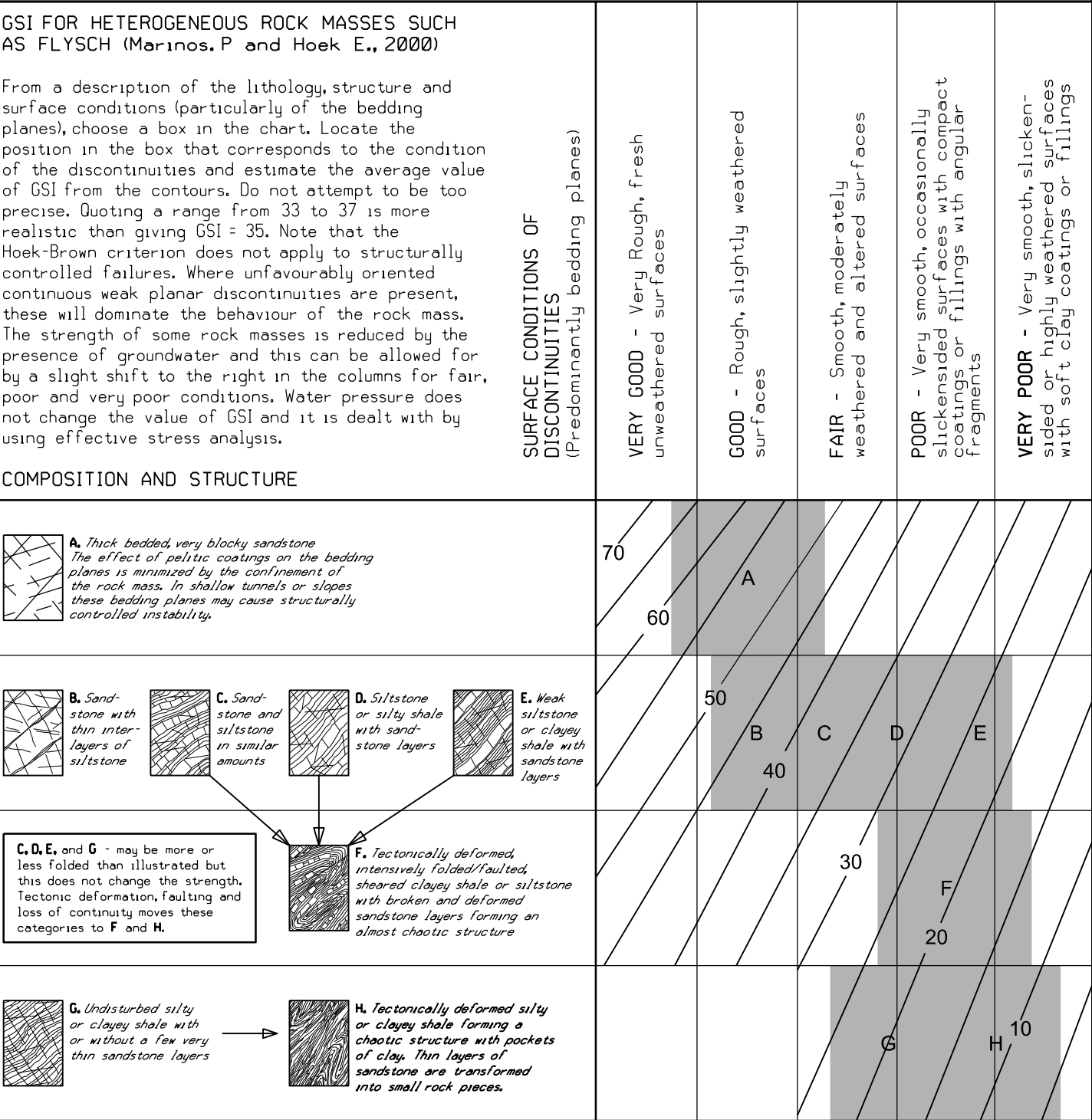
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS				
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating 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 GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained 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
		DECREASING SURFACE QUALITY →				
STRUCTURE		DECREASING INTERLOCKING OF ROCK PIECES ↓				
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities					
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	90	80	70	60	N/A
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets				50	
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity				40	
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				30	20
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10

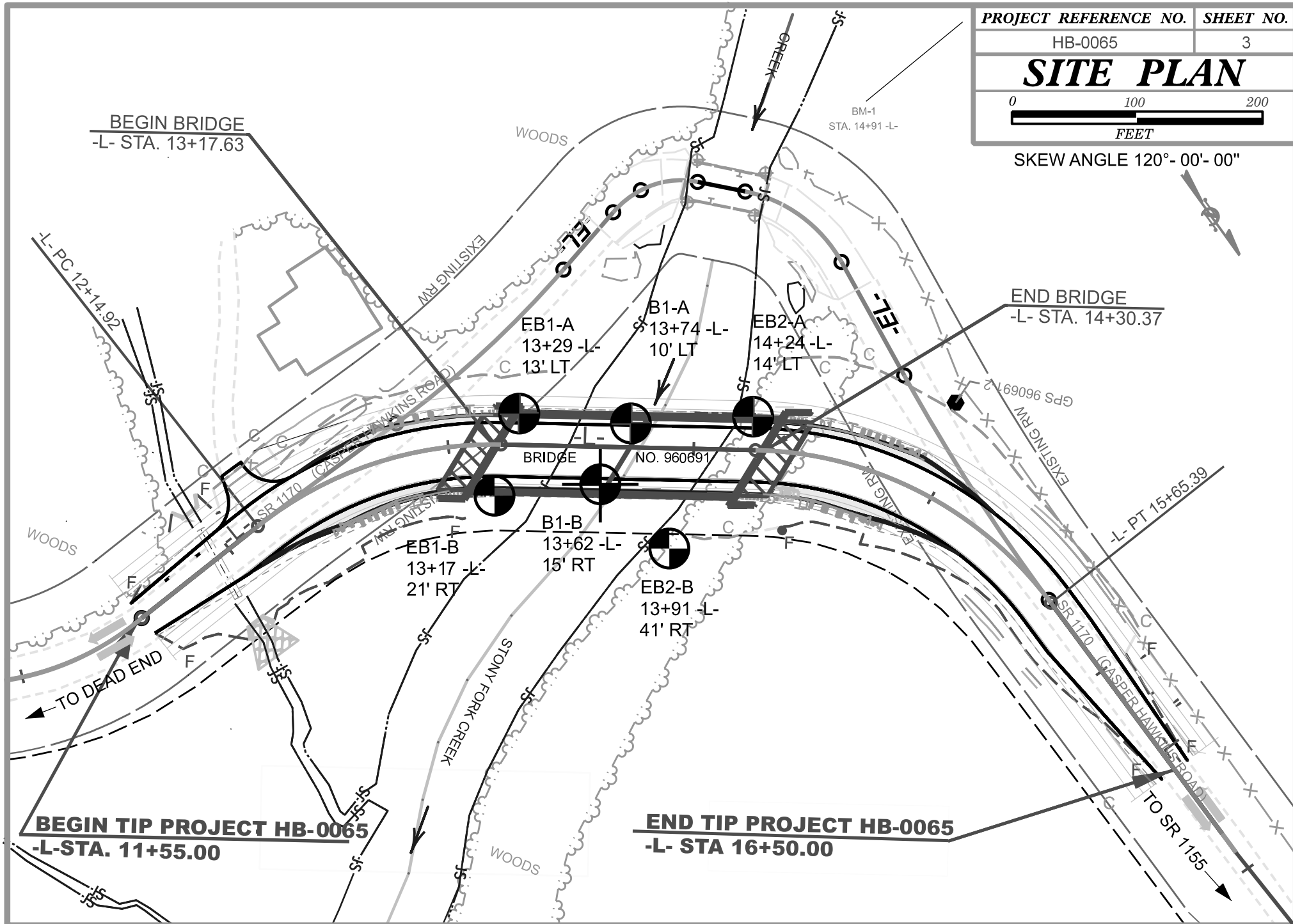
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SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 2 OF 2)

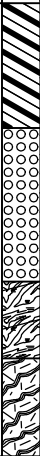
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)





GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50735.1.1			TIP HB-0065			COUNTY WILKES			GEOLOGIST M. HARTMAN						
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)									GROUND WTR (ft)						
BORING NO. EB1-A			STATION 13+29			OFFSET 13 ft LT			ALIGNMENT -L-			0 HR. N/A			
COLLAR ELEV. 1,159.9 ft			TOTAL DEPTH 23.6 ft			NORTHING 874,027			EASTING 1,292,746			24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025						DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic						
DRILLER W. DUGGINS			START DATE 12/04/25			COMP. DATE 12/04/25			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1160														1,159.9	GROUND SURFACE 0.0
1155	1,158.9	1.0	WOH	WOH	WOH							M		ALLUVIAL VERY SOFT TO SOFT, BROWN, SANDY CLAY (A-6)	
	1,156.4	3.5	WOH	1	1							M			
	1,153.9	6.0	WOH	11	20							W		1,153.4 6.5	
1150	1,151.4	8.5										W	DENSE, BROWN, FINE SAND AND GRAVEL (A-1-a)		
			22	40	23										
1145	1,146.4	13.5												1,145.4	14.5
			21	50	50/0.4								WEATHERED ROCK (BROWN, TAN , FELSIC MICA GNEISS)		
1140	1,141.4	18.5												1,141.4	18.5
			60/0.1										CRYSTALLINE ROCK (BROWN, MICA SCHIST)		
	1,136.4	23.5												1,136.3	23.6
			60/0.1											Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,136.3 ft IN CRYSTALLINE ROCK (MICA SCHIST)	

NCDOT BORE SINGLE CASPER HAWKINS.GPJ NC_DOT.GDT 1/19/26

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50735.1.1			TIP HB-0065			COUNTY WILKES			GEOLOGIST M. HARTMAN						
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)									GROUND WTR (ft)						
BORING NO. EB1-B			STATION 13+18			OFFSET 21 ft RT			ALIGNMENT -L-			0 HR.	N/A		
COLLAR ELEV. 1,160.0 ft			TOTAL DEPTH 31.5 ft			NORTHING 874,051			EASTING 1,292,772			24 HR.	N/A		
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025						DRILL METHOD NW Casing w/ SPT				HAMMER TYPE Automatic					
DRILLER W. DUGGINS			START DATE 12/03/25			COMP. DATE 12/03/25			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1160														1,160.0	GROUND SURFACE 0.0
1155	1,159.0	1.0	1	1	1							M		ALLUVIAL SOFT, BROWN, SANDY CLAY (A-6)	
	1,156.5	3.5	WOH	WOH	2							M		1,154.5	5.5
	1,154.0	6.0	14	10	13							W		MEDIUM DENSE, BROWN AND TAN, CLAYEY FINE TO COARSE SAND AND GRAVEL (A-1-a)	
1150	1,151.5	8.5										W	1,152.0	8.0	
			23	22	31								1,148.0	12.0	
1145	1,146.5	13.5	100/0.2											1,143.0	17.0
	1,141.5	18.5	14	10	53							M	RESIDUAL HARD, BROWN, GOLD, SANDY SILT, HIGHLY MICACEOUS (A-4)		
1135	1,136.5	23.5	53	47/0.2									1,138.0	22.0	
	1,131.5	28.5	37	63/0.2									WEATHERED ROCK (BROWN, MICA SCHIST)		
1130	1,128.6	31.4	60/0.1										1,128.6	31.4	
													1,128.5	31.5	
													CRYSTALLINE ROCK (BROWN, MICA SCHIST) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,128.5 ft IN CRYSTALLINE ROCK (MICA SCHIST)		

NCDOT BORE SINGLE CASPER HAWKINS.GPJ NC_DOT.GDT 1/19/26

WBS 50735.1.1						TIP HB-0065						COUNTY WILKES						GEOLOGIST M. HARTMAN							
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)																		GROUND WTR (ft)							
BORING NO. B1-A						STATION 13+74						OFFSET 10 ft LT						ALIGNMENT -L-						0 HR.	N/A
COLLAR ELEV. 1,152.2 ft						TOTAL DEPTH 38.5 ft						NORTHING 874,052						EASTING 1,292,708						24 HR.	N/A
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025												DRILL METHOD NW Casing W/SPT & Core						HAMMER TYPE Automatic							
DRILLER W. DUGGINS						START DATE 12/02/25						COMP. DATE 12/03/25						SURFACE WATER DEPTH 0.5ft							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION											
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)										
1155																									
1150	1,151.2	1.0	WOH	15	15											1,152.2 WATER SURFACE (12/02/25) 0.0									
	1,148.7	3.5		12	88/0.4											1,150.7 ALLUVIAL 1.5									
	1,146.2	6.0								100/0.9						1,149.2 VERY LOOSE, BROWN, FINE TO COARSE GRAVELLY SAND (A-1-b) 3.0									
1145	1,143.7	8.5								100/0.4						1,146.2 RESIDUAL HARD, BROWN, SANDY SILT, MICACEOUS (A-4) 6.0									
										60/0.1						1,144.2 WEATHERED ROCK (BROWN, MICA SCHIST) 8.0									
1140	1,138.7	13.5								60/0.1						CRYSTALLINE ROCK (BROWN, MICA SCHIST)									
1135	1,133.7	18.5								60/0.0						1,133.7 CRYSTALLINE ROCK 18.5									
1130																1,132.2 WHITE TO GRAY, FELSIC MICA GNEISS, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE FRACTURE SPACING 19.0									
																1,129.1 BLACK, MICA SCHIST, VERY SLIGHTLY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, INDURATED TO MODERATELY INDURATED, WITH FELSIC GNEISS INTRUSIONS 23.1									
1125																1,123.9 WHITE AND SILVER, FELSIC MICA GNEISS, FRESH TO VERY SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING 28.3									
																1,123.4 SEVERELY TO SEVERELY WEATHERED, SOFT, VERY CLOSE FRACTURE SPACING 28.8									
1120																									
1115																1,113.7 TAN, WHITE, AND GRAY, MASSIVE FELSIC GNEISS, FRESH TO VERY SLIGHTLY WEATHERED, SOFT TO VERY HARD, VERY CLOSE TO WIDE FRACTURE SPACING 38.5									
																Boring Terminated at Elevation 1,113.7 ft IN CRYSTALLINE ROCK GNEISS									
																BORING DRILLED IN CREEK USING MATS. WATER DEPTH 0.5'.									

NC DOT BORE SINGLE CASPER HAWKINS.GPJ NC DOT.GDT 1/15/26

CORE LOG

WBS 50735.1.1					TIP HB-0065			COUNTY WILKES			GEOLOGIST M. HARTMAN						
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)													GROUND WTR (ft)				
BORING NO. B1-A					STATION 13+74			OFFSET 10 ft LT			ALIGNMENT -L-			0 HR. N/A			
COLLAR ELEV. 1,152.2 ft					TOTAL DEPTH 38.5 ft			NORTHING 874,052			EASTING 1,292,708			24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025								DRILL METHOD NW Casing W/SPT & Core				HAMMER TYPE Automatic					
DRILLER W. DUGGINS					START DATE 12/02/25			COMP. DATE 12/03/25			SURFACE WATER DEPTH 0.5ft						
CORE SIZE NQ					TOTAL RUN 20.0 ft												
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS					DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %								
1133.68											Begin Coring @ 18.5 ft						
1130	1,133.7	18.5	5.0	1:20/1.0 1:05/1.0 2:10/1.0 2:40/1.0 2:51/1.0	(3.0) 60%	(1.6) 32%		(0.5) 100%	(0.3) 60%		1,133.2	CRYSTALLINE ROCK			19.0		
1125	1,128.7	23.5		2:14/1.0 2:33/1.0 2:15/1.0 2:02/1.0 2:07/1.0	(4.2) 84%	(3.1) 62%		(4.3) 83%	(3.3) 63%		1,129.1	BLACK, MICA SCHIST, VERY SLIGHTLY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, INDURATED TO MODERATELY INDURATED, WITH FELSIC GNEISS INTRUSIONS GSI=55			23.1		
			5.0														
1120	1,123.7	28.5		2:40/1.0 2:44/1.0 2:52/1.0 2:47/1.0 2:02/1.0	(3.7) 74%	(2.5) 50%		(0.5) 100%	(0.0) 0%		1,123.9	WHITE AND SILVER, FELSIC MICA GNEISS, FRESH TO VERY SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING			28.3		
			5.0					(7.2) 74%	(4.0) 41%		1,123.4	BLACK, MICA SCHIST, MODERATELY SEVERELY TO SEVERELY WEATHERED, SOFT, VERY CLOSE FRACTURE SPACING GSI=55			28.8		
1115	1,118.7	33.5		2:47/1.0 3:31/1.0 3:03/1.0 3:01/1.0 3:05/1.0 3:07/1.0	(3.6) 72%	(3.1) 62%					TAN, WHITE, AND GRAY, MASSIVE FELSIC GNEISS, FRESH TO VERY SLIGHTLY WEATHERED, SOFT TO VERY HARD, VERY CLOSE TO WIDE FRACTURE SPACING GSI=55						
	1,113.7	38.5								1,113.7	Boring Terminated at Elevation 1,113.7 ft IN CRYSTALLINE ROCK GNEISS			38.5			
BORING DRILLED IN CREEK USING MATS. WATER DEPTH 0.5'.																	

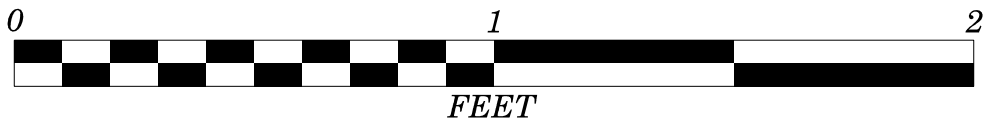
NCDOT CORE SINGLE CASPER HAWKINS.GPJ NC_DOT.GDT 1/15/26

PROJECT REFERENCE NO.	SHEET NO.
HB-0065	8

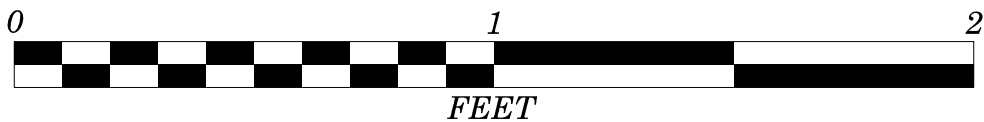
CORE PHOTOGRAPHS

BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170
BETWEEN DEAD END AND SR 1155

B1-A
BOX 1 OF 2
18.5 - 30.5 FEET



B1-A
BOX 2 OF 2
30.5 - 38.5 FEET



BORE LOG

WBS 50735.1.1			TIP HB-0065			COUNTY WILKES			GEOLOGIST M. HARTMAN							
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)									GROUND WTR (ft)							
BORING NO. EB2-A			STATION 14+24			OFFSET 14 ft LT			ALIGNMENT -L-			0 HR. N/A				
COLLAR ELEV. 1,158.4 ft			TOTAL DEPTH 23.6 ft			NORTHING 874,074			EASTING 1,292,664			24 HR. N/A				
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025						DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic							
DRILLER W. DUGGINS			START DATE 12/02/25			COMP. DATE 12/02/25			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
1160																
1155	1,157.4	1.0	WOH	WOH	1									1,158.4	GROUND SURFACE 0.0	
	1,154.9	3.5	WOH	WOH	2							M		ALLUVIAL VERY SOFT, BROWN, SANDY SILT (A-4)		
1150	1,152.4	6.0	100/0.3									M		1,152.9	5.5	
	1,149.9	8.5	40	60/0.3										WEATHERED ROCK (BROWN, MICA SCHIST)		
1145	1,144.9	13.5	100/0.4													
1140	1,139.9	18.5	100/0.2													
1135	1,134.9	23.5	60/0.1											1,134.9	23.5	
														1,134.8	23.6	
														CRYSTALLINE ROCK (BROWN, MICA SCHIST) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,134.8 ft IN CRYSTALLINE ROCK (MICA SCHIST)		

NCDOT BORE SINGLE CASPER HAWKINS.GPJ NC_DOT.GDT 1/19/26

BORE LOG

WBS 50735.1.1			TIP HB-0065			COUNTY WILKES			GEOLOGIST M. HARTMAN						
SITE DESCRIPTION BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170 (CASPER HAWKINS RD)									GROUND WTR (ft)						
BORING NO. EB2-B			STATION 13+91			OFFSET 41 ft RT			ALIGNMENT -L-			0 HR.	N/A		
COLLAR ELEV. 1,158.3 ft			TOTAL DEPTH 23.5 ft			NORTHING 874,104			EASTING 1,292,720			24 HR.	N/A		
DRILL RIG/HAMMER EFF./DATE TER9190 ACKER RENEGADE 84% 01/09/2025						DRILL METHOD NW Casing w/ SPT				HAMMER TYPE Automatic					
DRILLER W. DUGGINS			START DATE 12/02/25			COMP. DATE 12/02/25			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1160															
1155	1,157.3	1.0	1	0	0									1,158.3	GROUND SURFACE 0.0
	1,154.8	3.5	WOH	WOH	WOH							M		ALLUVIAL VERY SOFT, BROWN, SANDY SILT (A-4)	
	1,152.3	6.0	8	9	7							M		1,152.8	5.5
1150	1,149.8	8.5	18	82/0.4							M	1,150.3		8.0	
													RESIDUAL VERY STIFF, BROWN, SANDY SILT, WITH ROCK FRAGMENTS (A-4)		
1145	1,144.8	13.5	60/0.1											1,144.8	13.5
													WEATHERED ROCK (BROWN, MICA SCHIST)		
1140	1,139.8	18.5	60/0.1												CRYSTALLINE ROCK (BROWN, MICA SCHIST)
1135	1,134.8	23.5	60/0.0											1,134.8	23.5
														Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,134.8 ft IN CRYSTALLINE ROCK (MICA SCHIST)	

NCDOT BORE SINGLE CASPER HAWKINS.GPJ NC_DOT.GDT 1/19/26

HB-0065

12

SITE PHOTOGRAPHS

BRIDGE NO. 960691 OVER STONY FORK CREEK ON SR 1170
BETWEEN DEAD END AND SR 1155



LOOKING NORTHEAST
ALONG -L- ALIGNMENT



VIEW OF INTERIOR BENT
LOOKING SOUTH EAST