V Ò REFERENCE

CONTENTS

DESCRIPTION

LEGEND (SOIL & ROCK)

SITE PHOTOGRAPHS

TITLE SHEET

SITE PLAN

BORE LOGS SOIL TEST RESULTS

PROFILE

SHEET NO.

5 - 8

5034 S STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY **DUPLIN**

PROJECT DESCRIPTION BRIDGE NO. 82 ON NC HIGHWAY 11/111 OVER BURNT COAT CREEK AT -L- STATION 21+68.5

STATE PROJECT REFERENCE NO. B-5534

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 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

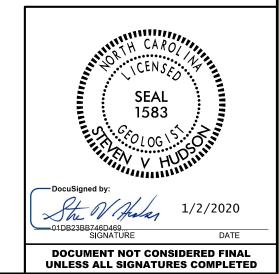
 1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.

 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.

INVESTIGATED BY S. V. HUDSON
DRAWN BY S. V. HUDSON
CHECKED BY J. L. STONE, LG
SUBMITTED BY S. V. HUDSON, LG
DATE AUGUST 2019

CATLIN PERSONNEL





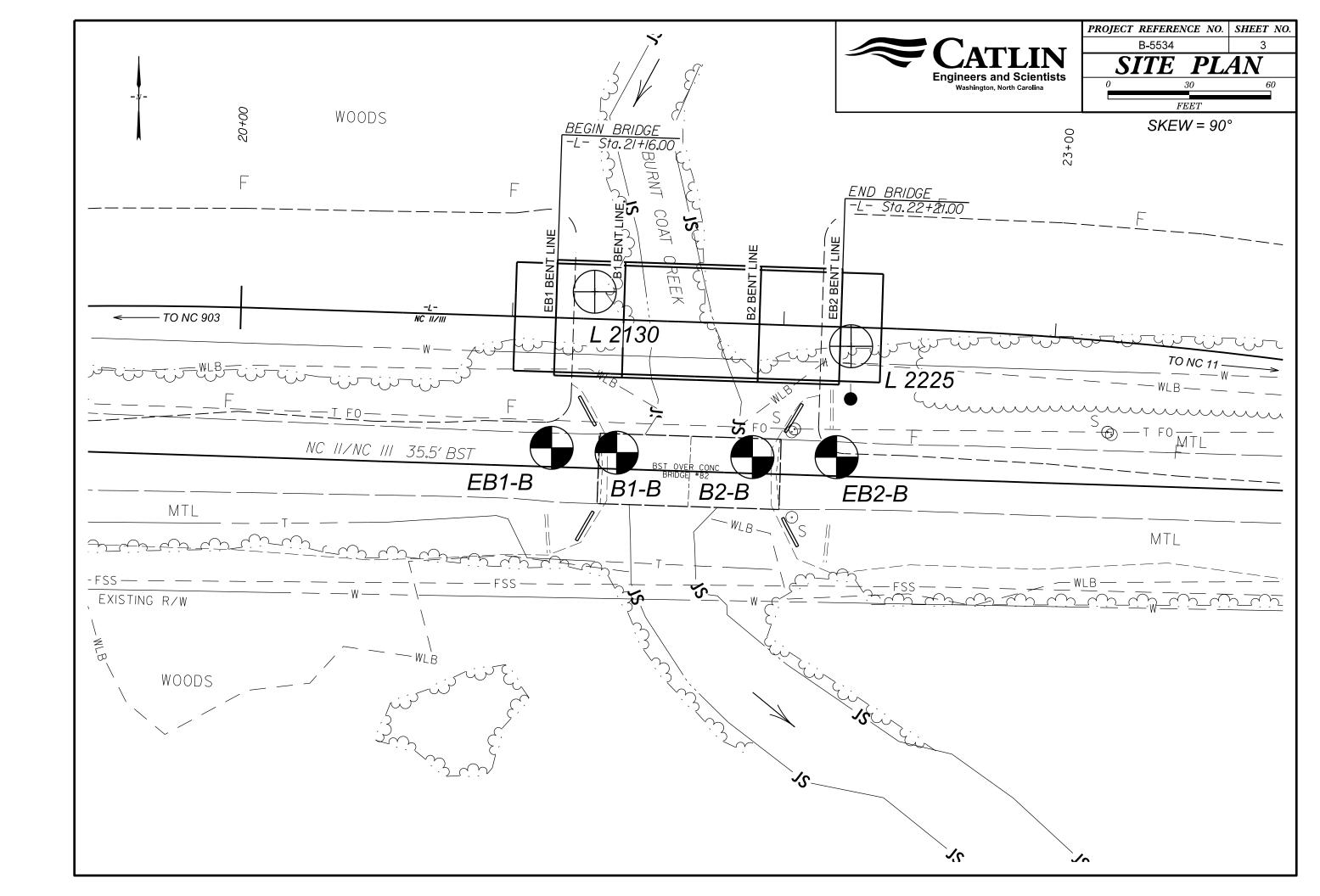
PROJECT REFERENCE NO. SHEET NO. 2

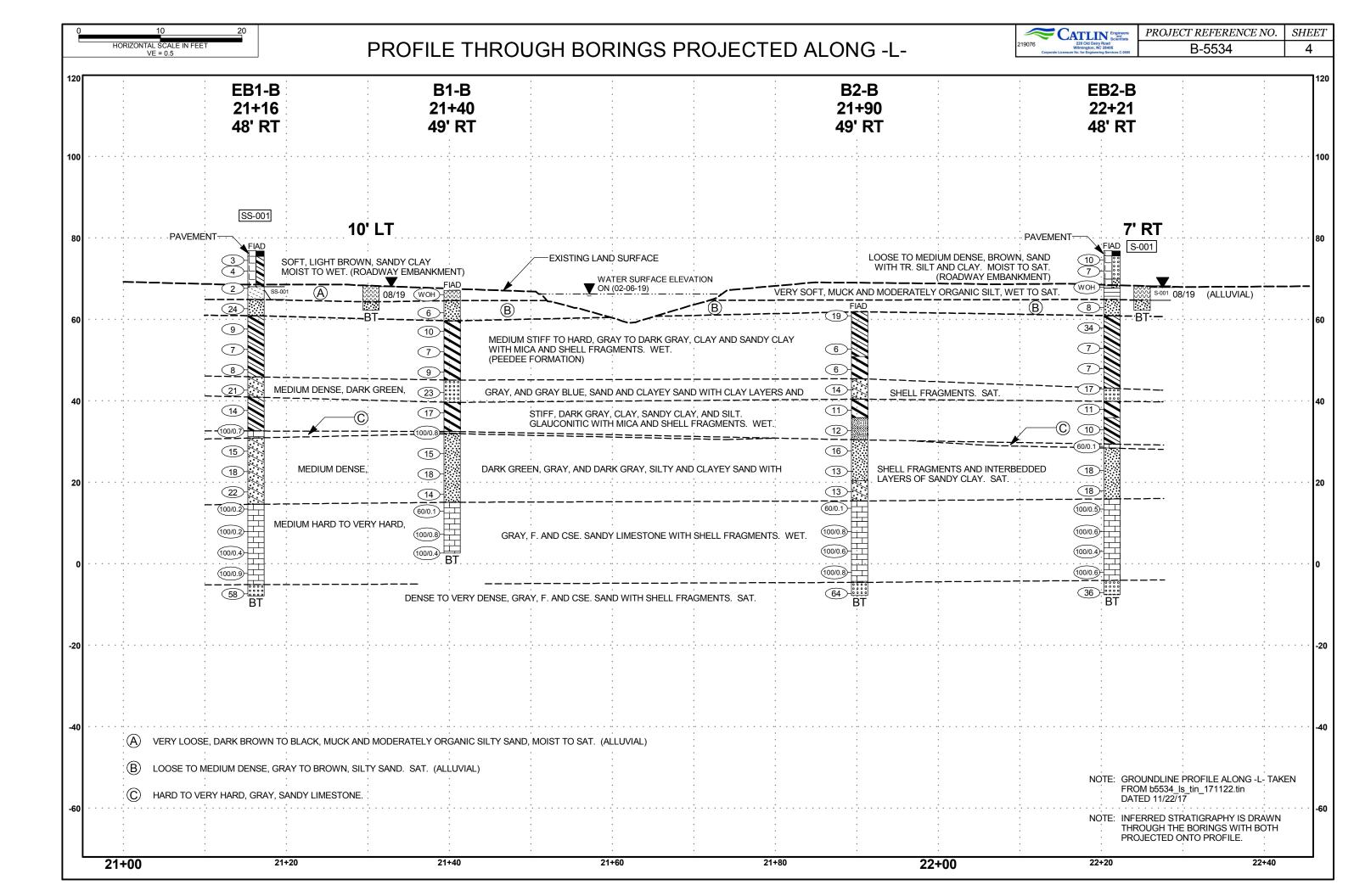
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS	
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). LCLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ADUIFER - A WATER BEARING FORMATION OR STRATA.	
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	51//61//A	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.	
SOIL LEGEND AND AASHTO CLASSIFICATION		ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT	
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS		CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.	
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROLK (CH) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NUN-CRYSTALLINE CEDIMENTARY POOK THAT WOULD VEILD ORT RECUCAL IS TECTED	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM	
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	HUCK TIPE INCLUDES PHILLIFE, SLATE, SANDSTONE, ETC.	OF SLOPE.	
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK STATE SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	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.	
110 50 MX UHANULAH CHAY MULK,		WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT	
2200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 36 MN 3	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	$\overline{ ext{DIP}}$ - The angle at which a stratum or any planar feature is inclined from the	
PASSING *40 40 MX 41 MN 50ILS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE	
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE	
USUAL TYPES STONE FRACS. OF MAJOR CRAVEL, AND CRAVEL, AND CRAVEL AND CRAVE	Many March 1997 1997			
MATERIALS SAND SAND CHAVEL AND SAND SUILS SUILS	₫	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS		
GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS			
PRIMARY SOIL TYPE CUMPACINESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH		IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO	
CENTED LLV VERY LOOSE < 4	SPT CLOSE INDICATOR			
GENERALLY LOOSE 4 TO 10		TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.		
MATERIAL MEDIUM DENSE 10 10 300 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER	<u>- </u>		
(NON-COHESIVE) VERY DENSE > 50		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK		
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	<u> </u>			
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2				
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.		
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS			
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION -			
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF		THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.	
		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.	
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3				
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY γ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL	
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS		
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY		PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL	
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.	
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL			
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE				
- MOIST - (M) COLID. AT OR NEAR ORTIMIN MOISTING	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET		
OM OPTIMUM MOISTURE		MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:	
- DRY - (D) REQUIRES ADDITIONAL WATER TO	<u> </u>	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET		
ATTAIN UPTIMUM MUISTURE	CMF-55 🖳 CORE SIZE:		U.C.P. = UNDIVIDED COASTAL PLAIN	
PLASTICITY				
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	I I I I I I I I I I I I I I I I I I I	RUBBING WITH FINGER FREES NUMEROUS GRAINS;		
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST V CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	PODTADLE LIGIEN 3 7/ LETEL TEETI			
COLOR		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	III	ORGANISM CONTROL OF PROPERTY OF STREET ONCY THE NEXULUS CONTROL OF STREET ONCY THE NEX		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			DATE: 8-15-14	





PROJECT REFERENCE NO. SHEET GEOTECHNICAL BORING REPORT CATLIN Engineers and Scientists B-5534 5 **BORE LOG TIP**: B-5534 COUNTY: DUPLIN GEOLOGIST: L. PUGH COUNTY: DUPLIN WBS: 55034.1.1 WBS: 55034.1.1 **TIP**: B-5534 GEOLOGIST: L. PUGH SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** OFFSET: 48 ft RT ALIGNMENT: -L-OFFSET: 48 ft RT **BORING NO.:** EB1-B **STATION**: 21+16 0 HR. 14.0 BORING NO.: EB1-B **STATION**: 21+16 ALIGNMENT: -L-0 HR. 14.0 **EASTING**: 2,352,402 COLLAR ELEV.: 76.9 ft TOTAL DEPTH: 84.8 ft **NORTHING:** 477,989 **EASTING**: 2,352,402 TOTAL DEPTH: 84.8 ft **NORTHING**: 477,989 24 HR. FIAD COLLAR ELEV.: 76.9 ft 24 HR. FIAD DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 94% 09/26/2018 **DRILL METHOD:** Mud Rotary HAMMER TYPE: AUTOMATIC DRILL METHOD: Mud Rotary DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 94% 09/26/2018 HAMMER TYPE: AUTOMATIC DRILLER: D.T. Chalmers, Jr. **START DATE:** 08/14/19 **COMP. DATE:** 08/14/19 SURFACE WATER DEPTH: N/A DRILLER: D.T. Chalmers. Jr. **START DATE:** 08/14/19 COMP. DATE: 08/14/19 SURFACE WATER DEPTH: N/A ELEV DRIVE DEPTH BLOW COUNT ELEV DRIVE DEPTH BLOW COUNT **BLOWS PER FOOT BLOWS PER FOOT** SAMP # SAMP SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION RESULT (ft) RESUL^{*} (ft) (ft) 0.5ft 0.5ft 0.5ft MOI G 0.5ft 0.5ft 0.5ft 75 100 75 100 (ft) ELEV. (ft) DEPTH (ft Match Line GRAY, SANDY LIMESTONE (continued) 53 47/0.4 Sat. **GROUND SURFACE** 100/0.9 PAVEMENT ROADWAY EMBANKMENT М GRAY, F. AND CSE. SAND WITH SHELL LIGHT BROWN, SANDY CLAY 25 FRAGS 33 Sat. M BORING TERMINATED AT ELEVATION -7.9 ft IN VERY DENSE F. AND CSE. 70 SAND (PEEDEE FORMATION) 68 6 W ALLUVIAL A-2-4(0) DARK BROWN, SILTY SAND WITH MOD. GRAY BROWN, SILTY, F. SAND 63.6 Sat. COASTAL PLAIN DARK GRAY, CLAY WITH SOME F. SAND (PEEDEE FORMATION) 58.6 4 536 ± 233 50 M DARK GREEN, CLAYEY, F. SAND WITH INTERBEDDED LAYERS OF SANDY 10 Sat. 40 DARK GRAY, SANDY CLAY, GLAUCONITIC WITH SHELL FRAGS. AT 38.6 BASE OF STRATUM W 33.6 4 96/0.2 W 100/0.7 LIMESTONE (NO RECOVERY; INFERRED FROM 30 CUTTINGS) DARK GRAY GREEN, CLAYEY, F. SAND 28 6 Sat. WITH INTERBEDDED LAYERS OF CLAY AT BASE OF STRATUM 23.6 8 Sat. 9 Sat. - - - . GRAY, SANDY LIMESTONE 13 6 Sat. 00/0. 100/0.2 63 100/0. Sat. 100/0.2 80 100/0.4 Sat. 100/0.4

GEOTECHNICAL BORING REF BORE LOG	PORT		CATLIN Engineers sold resident sold PROJECT REFERENCE NO. SHEET Sold Resident Sold Res
	GEOLOGIST: C. FUTRAL	WBS : 55034.1.1 TIP : B-5534 COUNTY : DU	PLIN GEOLOGIST: C. FUTRAL
SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 2		SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT CO	
BORING NO.: B1-B STATION: 21+40 OFFSET: 49 ft RT	` '		ET: 49 ft RT ALIGNMENT: -L- 0 HR. N/A
			THING: 477,986
DRILL RIG/HAMMER EFF./DATE: CAT1314 CME-45B 94% 09/26/2018 DRILL METHOD: Muc	HAMMER TYPE: AUTOMATIC	DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 94% 09/26/2018	DRILL METHOD: Mud Rotary HAMMER TYPE: AUTOMATIC
	SURFACE WATER DEPTH: N/A	DRILLER: S. BOWMAN START DATE: 08/22/19 COMP	P. DATE: 08/22/19 SURFACE WATER DEPTH: 4.0ft
ELEV DRIVE DEPTH BLOW COUNT BLOWS PER FOOT SAMP. #	SOIL AND ROCK DESCRIPTION	ELEV DRIVE DEPTH BLOW COUNT BLOWS PER FOOT	SAMP. # L SOIL AND ROCK DESCRIPTION
(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75 100 RESULT MOI G		(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75	100 RESULT MOI G
65 WOH WOH WOH WOH	67.1 GROUND SURFACE 0.0 ALLUVIAL 64.6 DARK GRAY TO BLACK, MUCK 2.5 GRAY, F. SAND WITH TR. WOOD FRAGS.	65 61.9 0.0 WOH 5 14 19	DARK GRAY, SILTY AND SANDY CLAY WITH MICA (PEEDEE FORMATION)
58.0 9.1 3 5 5 V V V V V V V V V V V V V V V V V	59.6 COASTAL PLAIN GRAY TO DARK GRAY, SANDY CLAY WITH MICA. (PEEDEE FORMATION)	55	w w w w w w w w w w w w w w w w w w w
50 53.0 14.1 2 3 4 5 1		45 437 182 2 3 3 3 46	:: w 📴
43.0 24.1 5 9 14	45.1 DARK GRAYISH BLUE, F. SAND WITH 22.0 MICA AND SHELL FRAGS.	38.7 - 23.2 3 5 6	1 - 1 - 21.5 - 1 - 1 - 1 - 21.5 - 1 - 1 - 1 - 21.5 - 2 - 21.5
38.0 29.1 5 8 9	39.6 DARK GRAY, SANDY CLAY WITH MICA. 27.5	35 337 282 3 5 7	DARK GRAY, SILT WITH SHELL FRAGS. U U U U U U U U U U U U U
30 28.0 39.1	32.5 SANDY WEATHERED LIMESTONE NO 34.6 32.1 NO DARK GRAY, SILTY, F. SAND WITH TR. SHELL FRAGS.	28.7 = 33.2	w
Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.		20	GRAY, SAND WITH SANDY CLAY LAYERS AND SHELL FRAGS. W 15.4 46.5
18.0 49.1 5 6 8	15.1 GRAY, LIMESTONE WITH LAYERS OF F 52.0	10	(NO RETURN: INFERRED FROM CUTTINGS) 10.4 GRAY AND LIGHT GRAY, SANDY
3.0 54.1 60/0.1 Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.	SAND	37 - 582	00/0.8 LIWESTONE
3.0 64.1 100/0.4 Sat.	2.6	-1.3 -63.2	BORING TERMINATED AT ELEVATION
SDOI BOOK E. C.			-7.8 ft IN VERY DENSE F. SAND (PEEDEE FORMATION)

PROJECT REFERENCE NO. SHEET GEOTECHNICAL BORING REPORT CATLIN Engineers and Scientists B-5534 **BORE LOG TIP**: B-5534 COUNTY: DUPLIN GEOLOGIST: L. PUGH COUNTY: DUPLIN WBS: 55034.1.1 WBS: 55034.1.1 **TIP**: B-5534 GEOLOGIST: L. PUGH SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** OFFSET: 48 ft RT ALIGNMENT: -L-OFFSET: 48 ft RT BORING NO.: EB2-B **STATION**: 22+21 0 HR. 10.2 BORING NO.: EB2-B **STATION**: 22+21 ALIGNMENT: -L-0 HR. 10.2 **EASTING**: 2,352,507 COLLAR ELEV.: 76.9 ft TOTAL DEPTH: 84.5 ft **NORTHING:** 477,986 **EASTING**: 2,352,507 COLLAR ELEV.: 76.9 ft TOTAL DEPTH: 84.5 ft **NORTHING**: 477,986 24 HR. FIAD 24 HR. FIAD DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 94% 09/26/2018 **DRILL METHOD:** Mud Rotary HAMMER TYPE: AUTOMATIC DRILL METHOD: Mud Rotary DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 94% 09/26/2018 HAMMER TYPE: AUTOMATIC DRILLER: D.T. Chalmers, Jr. **START DATE:** 08/13/19 **COMP. DATE:** 08/13/19 SURFACE WATER DEPTH: N/A DRILLER: D.T. Chalmers. Jr. **START DATE:** 08/13/19 COMP. DATE: 08/13/19 SURFACE WATER DEPTH: N/A ELEV DRIVE DEPTH BLOW COUNT ELEV DRIVE DEPTH BLOW COUNT **BLOWS PER FOOT BLOWS PER FOOT** SAMP # SAMP SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION RESULT (ft) RESUL^{*} (ft) (ft) 0.5ft 0.5ft 0.5ft MOI G 0.5ft 0.5ft 0.5ft 75 100 75 100 (ft) ELEV. (ft) DEPTH (ft Match Line LIGHT GRAY, SANDY LIMESTONE -1.1 **↓** 78.0 95 5/0.1 Sat. (continued) **GROUND SURFACE** 100/0.6 PAVEMENT LIGHT GRAY, F. AND CSE. SAND 75.6 + 1.3 ROADWAY EMBANKMENT ₹ 83.0 BROWN, F. SAND WITH TR. SILT AND Sat. CLAY AND CLAYEY, F. SAND M BORING TERMINATED AT ELEVATION -7.6 ft IN DENSE F. AND CSE. SAND 70 68.9 woн woн woн Sat. ALLUVIAL DARK BROWN, MOD. ORG. SILT GRAY BROWN, SILTY, F. SAND 63.9 13.0 Sat. COASTAL PLAIN 60 DARK GRAY, SANDY CLAY (PEEDEE FORMATION) 58.9 18 М 53.9 1 23.0 3 М 48.9 M 43.9 1 33.0 М DARK GREEN, F. SAND WITH SILT - - - -DARK GRAY, CLAY WITH TR. SAND. 38 9 1 38 0 М GLAUCONITIC. GRADING TO GRAY, SANDY CLAY WITH SHELL FRAGS. 41.0 33.9 W 28.9 T 48.0 LIMESTONE W (NO RECOVERY: INFERRED FROM CUTTINGS) DARK GREEN, CLAYEY, F. SAND WITH INTERBEDDED LAYERS OF SANDY 23.9 CLAY AT BASE OF STRATUM Sat. 18.9 \downarrow 58.0 Sat. - - - -LIGHT GRAY, SANDY LIMESTONE 13.9 \perp 63.0 Sat. 100/0. 100/0.5 75 25/0.1 Sat. 100/0.6 67 100/0.4 Sat. 100/0.4

PROJECT REFERENCE NO. SHEET GEOTECHNICAL BORING REPORT CATLIN Engineers and Scientists B-5534 8 **BORE LOG TIP**: B-5534 COUNTY: DUPLIN GEOLOGIST: L. PUGH **WBS**: 55034.1.1 WBS: 55034.1.1 **TIP**: B-5534 COUNTY: DUPLIN GEOLOGIST: L. PUGH SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** SITE DESCRIPTION: BRIDGE NO. 82 ON -L- (NC 11/111) OVER BURNT COAT CREEK AT -L- STA. 21+68.5 **GROUND WTR (ft)** OFFSET: 10 ft LT **STATION**: 21+30 ALIGNMENT: -L-OFFSET: 7 ft RT **BORING NO.:** L-2130 0 HR. N/A BORING NO.: L-2225 **STATION**: 22+25 ALIGNMENT: -L-0 HR. N/A **EASTING:** 2,352,512 COLLAR ELEV.: 68.3 ft TOTAL DEPTH: 6.0 ft **NORTHING:** 478,047 **EASTING**: 2,352,418 COLLAR ELEV.: 68.2 ft TOTAL DEPTH: 6.0 ft **NORTHING**: 478,026 24 HR. 24 HR. 0.3 0.4 DRILL RIG/HAMMER EFF./DATE: Hand Auger **DRILL METHOD:** Hand Auger HAMMER TYPE: N/A DRILL METHOD: Hand Auger DRILL RIG/HAMMER EFF./DATE: Hand Auger HAMMER TYPE: N/A DRILLER: N/A **START DATE**: 08/15/19 **COMP. DATE:** 08/15/19 SURFACE WATER DEPTH: N/A DRILLER: N/A **START DATE:** 08/15/19 **COMP. DATE:** 08/15/19 SURFACE WATER DEPTH: N/A ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.5ft **BLOWS PER FOOT BLOWS PER FOOT** SAMP. # SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION RESULT MOI G (ft) 0.5ft 0.5ft 0.5ft RESULT 0.5ft 0.5ft 0.5ft 75 100 50 75 100 ELEV. (ft) DEPTH (ft) 70 GROUND SURFACE GROUND SURFACE 68.3 F 68 2 ALLUVIAL DARK BROWN, MODERATELY ORGANIC ALLUVIAL MUCK. HIGHLY ORGANIC (30.9%) SILT S-001 SILTY SAND 65 65 A-4(0)GRAY BROWN, SILTY SAND GRAY BROWN, SILTY SAND BORING TERMINATED AT ELEVATION 62.3 ft IN VERY LOOSE SILTY SAND. (ALLUVIAL) BORING TERMINATED AT ELEVATION 62.2 ft IN VERY LOOSE SILTY SAND. (ALLUVIAL)

CATLIN Engineers and Scientists

PROJECT REFERENCE NO.

SHEET B-5534 9

LABORATORY **SUMMARY SHEET**

AASHTO Standard Specifications

(As modified by NCDOT, Material and Tests Unit, 2000.)

TEST RESULTS											
Proj. Sample Number	SS-001	S-001									
Lab Sample Number	SS-001	S-001									
Retained #4 Sieve %	1.1	10.1									
Passing #10 Sieve %	98.6	89.2									
Passing #40 Sieve %	96	91									
Passing #200 Sieve %	32	78									
MINUS NUMBER 10 FRACTION											
SOIL MORTAR - 100%											
Coarse Sand Ret#60 %	9.0	12.3									
Fine Sand Ret#270 %	63.4	11.3									
Silt 0.05 - 0.005mm %	13.6	55.7									
Clay <0.005mm %	14.1	20.7									
						·		•			
Liquid Limit (LL)	NP	NP									
Plasticity Index (PI)	NP	NP									
AASHTO Classification /Group Index	A-2-4(0)	A-4(0)									
Organic Content %	9.4	30.9									
Station	21+16	22+25									
Offset	48ft RT	7ft RT									
Alignment	-L-	-L-									
Boring Identification	EB1-B	L-2225									
Depth (FT)	8.9	0.0									
to	9.8	3.5									
Field Moist. Content %											
Tested By	MDM	MDM									
Submitted By	LGP	LGP									
Date Submitted	08/16/19	08/16/19									

NP = Non-Plastic

NEM = Not Enough Material for Analysis

N/A = Not Applicable / Not Analyzed

Muhaul D. Masan Laboratory Manager

Report Date: 8/26/2019

Laboratory Report Page 1 of 1

BRIDGE NO. 82 ON NC 11/111 OVER BURNT COAT CREEK

CATLIN Engineers Scientists
219074 220 Old Dairy Road Willimington, NC 28405
Corporate Licensure No. for Engineering Services C-0585

PROJECT REFERENCE NO. SHEET
B-5534 10



BURNT COAT CREEK FACING SOUTH (DOWNSTREAM)