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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT: 33446.1.1	I.D. NO.: B-4088
F.A. PROJECT: BRSTP-1615(2)	
COUNTY: CRAVEN	
PROJECT DESCRIPTION: BRIDGE	74 OVER
MORGAN SWAMP RUN ON SR 161	5
	,
SITE DESCRIPTION:	

CAUTION NOTICE

THE SUBSURFACE INFORMATIONAND THE SUBSURFACE INVESTIGATION OWHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORNING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH SCONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-408. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 SAMPLEDATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELLABILITY ININERENT 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.

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For Letting

INVESTIGATED BY:
CATLIN ENGINEERS AND SCIENTISTS
SUBMITTED BY:
STEVEN V. HUDSON, P.G., CWD

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DATE:
July 21, 2005, Rev. August 23, 2005

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STATE OF STA

ED BY THE N. C. DEPARTMENT BE PART OF THE PLANS,

SIGNATURE SIGNATURE

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

NOTE - 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.

DRAWN BY: STEVEN V. HUDSON, P.G., CWD

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT



SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

	SOIL AND ROCK LEGEND, TERNIO,		
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.
AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD	UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	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	AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS ADDITIED TO POCKS THAT HAVE BEEN DEDIVED EROM SAND OR THAT CONTAIN SAND
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERD EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	POORLY GRADED) <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	<u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
SUCH AS MINERAL OGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC.	ANGULARITY OF GRAINS	ROCK MATERIALS ARE TYPICALLY AS FOLLOWS:	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR SUBANGULAR SUBROUNDED OR ROUNDED	WEATHERED NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES >100 BLOWS PER FOOT	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. (< 35% PASSING #200) (>35% PASSING #200) (ORGANIC WATERIOLS GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2, A-4, A-5,	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE FINE TO COARSE GRAIN METANORPHIC AND NON-COASTAL PLAIN CEDIMENTARY ROCK THAT MOULD VIELD SET DEFLISAL IS TESTED. BOOK	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A.1-a A.1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	S COMPRESSIBILITY	ROCK (NCR) SEDIMENTARY ROCK THAT WOOLD FILLD SET RESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
SYMBOL BOOK BOOK BOOK BOOK BOOK BOOK BOOK B	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30	COASTAL PLAIN SEDIMENTARY SEDI	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.
% PASSING GRANULAR SILT-	MODERATELY COMPRESSIBLE LIQUID LIMIT 31 - 50 HIGHLY COMPRESSIBLE LIQUID LIMIT GRATER THAN 50	RÖCK (CP) CEMENTED SHELL BEDS, ETC. WEATHERING	$\underline{\rm DIKE}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
= 10	PERCENTAGE OF MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN SOILS WITH	GRANULAR SILT-CLAY ORGANIC MATERIAL SOILS OTHER MATERIAL	VERY SLIGHT (V. SLI.) COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK	DIP DIRECTION (DIP AZIMUTH)- THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP 0 0 0 4 MX 8 MX 12 MX16 MX NO MX MODERATE ORGANI	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC MATTER	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK (SLI.) UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE GROUND WATER	RING UNDER HAMMER BLOWS.	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A SUBGRADE PLIC OF A T-5 L.L 30 : P.I. OF A-7-6 > L.L 30	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	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	
CONSISTENCY OR DENSENESS	STATIC WATER LEVEL AFTER 24 HOURS	OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTANCE COMPRESSIVE STRENGT	H VPW PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL SEVERE FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK	
CONSISTENCY (N-VALUE) (TONS/FT)	OM- SPRING OR SEEPAGE	(MOD. SEV.) SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE 4 TO 10 GRANULAR LOOSE 4 TO 10	MISCELLANEOUS SYMBOLS	IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL DENSE 30 TO 50	CAMPLE	(SEV.) EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-CORESIVE) VERY DENSE >50 VERY SOFT <2	ROADWAY EMBANKMENT STEST BORING DESIGNATIONS WITH SOIL DESCRIPTION	USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	SOIL SYMBOL AUGER BORING S - BULK SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE (V. SEV.) DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIFF 8 TO 15 1 TO 2	ARTIFICIAL FILL OTHER THAN CORE BORING SS - SPLIT SPOON SAMPLE	FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
HARD >30 >4	ROADWAY EMBANKMENTS SAMIFLE SA	FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	ROCK QUALITY DESIGNATION (R.Q.D.)- 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
TEXTURE OR GRAIN SIZE	NFERRED SOIL BOUNDARIES SAMPLE PIEZOMETER	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR	CORE RUN AND EXPRESSED AS A PERCENTAGE.
U.S STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (mm) 4.76 2.0 0.42 0.25 0.075 0.053	INSTALLATION RS - ROCK SAMPLE	STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	202 DIP/DIP DIRECTION OF SECTE INDICATION RI - RECOMPACTED INSTALLATION TRIAXIAL SAMPLE	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.)	ROCK STRUCTURES — SPT N-VALUE CBR - CBR SAMPLE	REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	SOUNDING ROD REF SPT REFUSAL	REQUIRED TO DETACH HAND SPECIMEN.	
SOIL MOISTURE - CORRELATION OF TERMS	ABBREVIATIONS AR - ALIGER REFLISAL NM - NOT MEASURED Y - UNIT WEIGHT	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) NUMBER OF BLOWS (N OR B.P.F.) 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 LESS THAN 0.1
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR (ATTERBERG LIMITS) DESCRIPTION FIELD MOISTURE DESCRIPTION	BT - BORING TERMINATED PMT - PRESSUREMETER TEST 7 - DRY UNIT WEIGHT		FOOT PENETRATION WITH 60 BLOWS.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER	CPT - CONE PENETRATION TEST SAA - SAME AS ABOVE	HARD PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.	STRATA CORE RECOVERY (SREC.)- TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL LIQUID LIMIT (SAT) TABLE	CSE COARSE SD SAND, SANDY DMT - DILATOMETER TEST SL SILT, SILTY DPT - DYNAMIC PENETRATION TEST SL SLIGHTLY	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	STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.)- A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES
PLASTIC - WET - SEMISOLID; REQUIRES DRYING TO RANGE - ATTAIN OPTIMI IM MOISTURE	e - VOID RATIO TCR - TRICONE REFUSAL F - FINE W - MOISTURE CONTENT	POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK.	DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	FOSS FOSSILIFEROUS V VERY	SOFT PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOP SOIL (1.5.) - SOIN AND SOILED SOUNDED SOUNDED SOUNDED SOUND MINITED.
- MOIST - SOLID; AT OR NEAR OPTIMUM OM - OPTIMUM MOISTURE (M) MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	
SL + SHRINKAGE LIMIT - DRY - REQUIRES ADDITIONAL WATER TO	MED MEDIUM N/A - NOT APPLICABLE	TERM SPACING TERM SPACING	BENCH MARK: NCDOT SURVEY POINT "BL-2" N:525234 E:2596831
(D) ATTAIN OPTIMUM MOISTURE	N/E - NOT ENCOUNTERED EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE	ELEVATION: 17.53
PLASTICITY	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
PLASTICITY INDEX (PI) DRY STRENGTH	DIEDRICH D-50 CLAY BITS AUTOMATIC MANUAL	THICKLY I AMINATED 0.009 0.03 EEET	
NONPLASTIC 0 - 5 VERY LOW LOW PLASTICITY 6 - 15 SLIGHT	6" CONTINUOUS FLIGHT AUGER CORE SIZE:	INDURATION	
MED. PLASTICITY 16 - 25 MEDIUM	☐ DIEDRICH D-25 ☐ 8" HOLLOW AUGERS ☐ - B ☐ - H ☐ - H ☐ - H ☐ - N ☐ - N ☐ -	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT,	
HIGH PLASTICITY 26 OR MORE HIGH	TUNGCARBIDE INSERTS HAND TOOLS:	PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
COLOR	CASING WADVANCER POST HOLE DIGGER	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE	PORTABLE HOIST TRICONE 2 7/8" STEEL TEETH HAND AUGER TRICONE _ " TUNGCARBIDE SOUNDING ROD	BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	AMS POWER PROBE CORE BIT VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
AFFEARAINUE.	OTHER OTHER OTHER OTHER	SAMPLE BREAKS ACROSS GRAINS.	ADAPTED FROM NCDOT SOILS AND ROCK LEGEND - REVISED 09/15/1

BRIDGE FOUNDATION INVESTIGATION

Description:

Bridge 74 Over Morgan Swamp Run on SR 1615

Project Number: 33446.1.1
TIP Number: B-4088
F.A. Number: BRSTP-1615(2)
County: Craven

July 21, 2005 Rev.: August 23, 2005

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CATLIN Project No. 205-049

Project N	o.: 33446.1.1	Sheet No.:	03
TIP No.:	B-4088	Total Sheets:	25
County:	Craven		

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NCDOT; 205049_STRUCTURE RPT (REV) CATLIN Project No. 205-049 CATLIN Engineers and Scientists
August 2005

BRIDGE FOUNDATION INVESTIGATION

Description:

Bridge 74 Over Morgan Swamp Run on SR 1615

Project Number: 33446.1.1 TIP Number: B-4088 F.A. Number: BRSTP-1615(2)

County: Craven

July 21, 2005 Rev. August 23, 2005

1.0 PROJECT DESCRIPTION

1.1 PURPOSE

CATLIN Engineers and Scientists (CATLIN) was retained by the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit to conduct geotechnical investigations for bridge and roadway projects under an Annual Limited Services Agreement (Agreement) dated December 6, 2004. The primary purpose of this Bridge Foundation Investigation was to collect subsurface information with respect to construction design to allow NCDOT to design and ultimately construct a safe, cost effective foundation.

1.2 SITE DESCRIPTION

The proposed bridge is located in central Craven County at the site of existing NCDOT Bridge Number 74 on SR 1615 where it crosses Morgan Swamp Run, approximately four miles north of Bridgeton, North Carolina. A Site Vicinity Map is provided on the attached Sheet 08.

1.3 PROPOSED STRUCTURE

According to the site plan provided by NCDOT and personal communication, the proposed structure appears to be a three-bent, two-span configuration oriented along alignment -L- with an estimated width of 33.0 feet. The structure has been proposed with the following dimensions:

SPAN	LENGTH	BENT	SKEW
A	45.0 Feet	EB1	90°00'00"
В	45.0 Feet	B1	90°00'00"
		EB2	90°00'00"

A site plan depicting the proposed bridge layout is provided on the attached Sheet 09.

NCDOT; 205049_STRUCTURE RPT (REV)

CATLIN Project No. 205-049

1

CATLIN Engineers and Scientists
August 2005

Project N	o.: 33446.1.1	Sheet No.:	04	
TIP No.:	B-4088	Total Sheets:	25	
County:	Craven			

1.4 FIELD METHODS

CATLIN personnel utilized a Central Mining Equipment (CME) 45B drill rig mounted on an Ardco articulating all-terrain vehicle (ATV) to perform the drilling investigation in June of 2005. Six test borings were advanced during this investigation. Boring depths ranged from 45.0 feet (ft) to 50ft. below land surface (BLS). Collar elevations ranged from 7.8 ft. to 17.6 above mean sea level (MSL). Borings were advanced along the exterior edges of the three proposed bents. Two of the six boring were advanced through the existing Bridge 74 bridge deck within access holes cut by local NCDOT Bridge Maintenance personnel. While drilling activities were conducted, traffic control and lane closure was conducted by NCDOT Bridge Maintenance personnel to facilitate field activities.

Proposed boring locations were horizontally located in the field by CATLIN personnel utilizing a Trimbel Global Positioning System (GPS) in conjunction with a TSC1 data logger. Traditional surveying techniques were used to established vertical control in addition to substantiating the boring locations as determined with the GPS. The North Carolina Geodetic Survey (NCGS) monument "ROWES AS MK" was utilized as a temporary benchmark and subsequently referenced to NCDOT survey point "BL-2" located at northing 525234.4 and easting 2596830.7 with an elevation of 17.5 (17.53 stated elevation) feet.

Borings were advanced using mud rotary drilling techniques. While mud rotary drilling techniques were implemented, the field geologist routinely checked the viscosity, density, and temperature of the drilling fluid. Viscosity was checked using a Marsh funnel viscometer, and density was checked using a mud balance. Viscometer times ranged from 50 to 60 seconds, while densities averaged 9.43 pounds per gallon (lbs/gal). Standard Penetration Testing (SPT) was performed in accordance with American Association of State Highway and Transportation Officials (AASHTO) Standard Method T206-87 using a 140-pound manually advanced hammer. The project geologist visually described soil samples in the field using AASHTO Designation M145-91. All SPT results and sample descriptions were recorded in the field on modified NCDOT field boring logs.

Two undisturbed soil samples were collected using three-inch inner diameter thin-walled sampling tubes (Shelby tubes) in accordance with AASHTO Standard Method T 207. One sample, ST-01 was collected from the creek bottom in boring B1-B from 0.0 to 2.0 feet below the mud line (elevation 8.0ft to 6.0ft MSL). The second sample, ST-02, was collected from a depth of 20.0 to 22.0 feet BLS (elevation –2.7ft to –0.7ft MSL) from boring EB2B.

Two additional hand-augered borings were advanced to approximately one foot BLS to obtain representative samples of the stream bank and bed material.

Where possible, water level measurements were taken in open boreholes a minimum of 24 hours after completion of the borings. Unless otherwise noted, fieldwork was conducted in accordance with NCDOT Geotechnical Unit Guidelines and Procedures Manual for Subsurface Investigations

1.5 LABORATORY TESTING

To confirm the field geologist's observations and to assist in soil classifications, laboratory testing was performed on 18 soil samples collected from the split-spoon samplers in addition to the two samples collected via hand-auger. Atterberg limits (when applicable), moisture content, grain size analysis, and AASHTO Classification (as modified by NCDOT) were completed by the CATLIN Geotechnical Laboratory. Results of the laboratory analysis of site soils are provided on Sheets 22 and 23. Selection of samples for laboratory analysis was based on representation of the predominant, unconsolidated, lithologic units encountered. The analyses performed on the selected soil samples are listed as follows:

AASHTO Method	Description of Test
T 87-86	Dry Preparation of Disturbed Soil*
T 88-90	Particle Size Analysis*
T 89-90	Liquid Limit*
T 90-87	Plastic Limit*

^{*} as modified by NCDOT

Laboratory analysis of the Shelby tube samples was completed by NCDOT Materials and Testing Unit located in Raleigh, North Carolina. Sample ST-01 was laboratory analyzed by an Erosion Function Apparatus (EFA). Sample ST-02 was analyzed for consolidation per AASHTO T-216.

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2.0 PHYSIOGRAPHY AND GEOLOGY

2.1 REGIONAL GEOLOGY

The area of investigation lies within the Coastal Plain physiographic province. The North Carolina Coastal Plain is approximately 90 to 150 miles wide from the Atlantic Ocean westward to its boundary with the Piedmont Province. Two natural subdivisions of the Coastal Plain were described by Stuckey (1965): The Tidewater region and the Inner Coastal Plain. The project area is located within the Tidewater region, which consists of the Coastal area where large streams and many tributaries are affected by ocean tides. The Tidewater region generally exhibits low relief and is often swampy in low-lying areas.

The Coastal Plain comprises a wedge shaped sequence of stratified marine and non-marine sedimentary rocks deposited on crystalline basement. The sedimentary sequences range in age from Recent to lower Cretaceous.

The crystalline basement rocks in the New Bern area are overlain by 700 to 1,800 feet of unconsolidated sediments. The surficial Quaternary age deposits range from 23 to 80 feet. These deposits are underlain by Pliocene age sediments of the Yorktown Formation and Oligocene age materials of the River Bend Formation. Underlying Cretaceous age rocks range in thickness from 700 to more than 1,400 feet and include the Peedee, Black Creek, and upper and lower Cape Fear Formations (Winner Jr., and Coble, 1989).

2.2 SITE TOPOGRAPHY AND GEOMORPHOLOGY

The project site is located within a flood plain associated with Morgan Swamp Run. The flood plain is approximately 900 feet wide, extending approximately 500 feet to the north-northeast and 400 feet to the south-southwest of Bridge 74. Relief in the immediate area is limited to the roadway embankment along existing SR 1615. The land surface within the flood plain is vegetated with lowland hardwoods and brush. Predominant land use beyond the flood plain consists of rural residential and agricultural. A beaver dam was identified approximately 45 feet west-northwest (upstream) of the project site. The dam appeared too be approximately three to five feet in height. Water depth within Morgan Swamp Run at the time of the investigation was approximately three feet deep and the water surface was located 10 feet below the bridge deck. Water velocity was very low to stationary during the length of the field investigation. No visible evidence suggested that there are great fluctuations in velocity. However, due to the width of the flood plain with relation to the bridge width, increases in velocity are likely during times of increased rainfall and flooding.

FOUNDATION MATERIALS 3.0

Sample descriptions along with laboratory soil analysis of SPT samples collected during the advancement of the soil borings were utilized in compiling the subsurface geologic descriptions. The following is a bent-by-bent description of the lithologic units encountered during the field investigation. Boring logs are included on Sheets 13 through 19. A geologic profile constructed 17 feet right of -L- is included on Sheet 10.

END BENT 1

Borings EB1A and EB1B were installed within the floodplain at the location of the proposed End Bent 1. Borings were advanced to 50ft BLS to an elevation of approximately -32.5ft MSL. Three feet of roadway embankment consisting of fine-grained, medium stiff sandy silt (A-4) extended from the ground surface (EB1A collar elevation of 17.6ft and EB1B collar elevation of 17.5ft) to an average elevation 14.5ft. Alluvial material consisting of loose to very loose, silty to clayey, fine to coarse grained sand (A-2-4) was encountered beneath the roadway embankment to an average elevation of 10.8ft. A fine-grained, medium stiff to soft, sandy silt (A-4) was identified beneath the A-2-4 material to an average elevation of 5.5ft. Loose to medium dense, poorly graded fine sand (A-2-4) with trace clay and little coarse sand underlie the A-4 material to an average elevation of -0.5ft. Sediments of the Pliocene age Yorktown Formation were identified at an average elevation of -0.5ft. This material consisted of approximately 6.5ft of very soft to soft silty clay (A-6) with medium plasticity and fine to coarse sand. Three feet of very loose silty, fine-grained sand (A-2-4) extended from the base of the clay to an elevation of -10.0ft. Medium dense to dense sand (A-3) was revealed from beneath the silty sand to an average elevation of -24ft. Silty to clayey, medium dense to dense shell fragments with fine-grained sand (A-1-b) and medium dense poorly graded fine-grained sand with shell fragments (A-3) lie beneath the A-3 sediments to the boring terminations. A geologic section through End Bent 1 is presented on Sheet 11.

BENT 1

Borings B1A (collar elevation 7.8 ft) and B1B (collar elevation 8.0ft) were advanced through the creek bed to an average elevation of -37.1ft. Alluvial sediments consisting of medium dense to loose fine sand and silty fine to coarse sand (A-2-4) were encountered from the mud line to an elevation of 3.0ft in B1B and medium stiff fine-grained sandy silt with clay (A-4) were identified from the mud line to an elevation of 0.2ft in B1B. Very soft to stiff clays (A-6) of the Yorktown Formation, similar to those beneath End Bent 1, were identified from elevation 3.0ft to -6.5ft in B1A and 0.2ft to -8.2ft in B1B. Sand ranging from loose, silty, fine-grained clayey sand (A-2-4) to medium dense to dense, coarse to fine-grained sand with trace clay (A-3 and (A-1-b) extended from below the clay layer to an elevation of approximately -25ft. Medium dense to dense sand with varying amounts of shell fragments underlie the sand to an elevation of -32.2ft in boring B1A and -34.0ft in B1B. Stiff silty clay (A-7) with medium plasticity was identified beneath the shelly sand layer to the borings termination at elevations of -37.2ft and -37.0ft in B1A and B1B, respectively. A geologic section through Bent 1 is presented on Sheet 11.

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END BENT 2

Borings EB2A (collar elevation 17.1ft) and EB2B (collar elevation 17.3ft) were advanced within the floodplain at the proposed location of End Bent 2. Roadway embankment consisting of medium stiff sandy silt (A-4) extended from land surface to an average elevation of 14.2ft. The embankment material is underlain by alluvial sandy silt (a-4) material that appears to have been the source for the embankment material. Loose to medium dense clayey to silty fine-grained sand (A-2-4) was encountered beneath the alluvial sandy silt in borings EB2A and EB2B to elevations of -0.9ft and -0.7ft, respectively. Very soft to soft silty, fine-grained sandy clay with medium plasticity (A-6) of the Yorktown Formation was documented beneath the alluvium. The clay was approximately ten feet thick in EB1A and eight feet thick in EB2B. Dense to medium dense, fine to coarse-grained sand (A-3) extended to an approximate average elevation of -24ft in both borings. Loose to medium dense, clayey, coarse-grained shell fragments with fine sand (A-1-b) was identified beneath the A-3 material to the boring termination elevation of -27.9ft in boring EB2A and to an elevation of -29.7ft in EB2B. Fine to coarse-grained sand with some shell fragments (A-3) extended beneath the A-1-b material in boring EB2B to the boring termination elevation of -32.7ft. A geologic section through End Bent 2 is presented on Sheet 12.

ROCK PROPERTIES

No indurated or semi-indurated rock was encountered during the investigation.

GROUNDWATER

NCDOT; 205049_STRUCTURE RPT (REV)

CATLIN Project No. 205-049

Groundwater beneath the subject site was measured at the 24-hour gauging events at an average elevation of approximately four feet beneath proposed End Bent 1 and seven feet beneath End Bent 2. Based on the lithology encountered beneath the site and the geomorphology of the immediate surrounding area, two aquifers appear to be present with the depth of the investigation. The unconfined surficial aquifer which extends from land surface to an elevation of approximately zero to three feet, and the Castle Hayne Aquifer which includes the Yorktown Formation. The clay unit identified at an elevation ranging from approximately zero to three feet is believed to be the confining unit that designates the upper portion of the Castle Hayne Aquifer in the area. The elevation of Morgan Swamp Run water level at the time of the investigation was approximately 11.5 feet. The elevation of the Run surface as compared to the 24-hour groundwater measurements within the borings indicates that the clay layer identified beneath the site at an average elevation of zero is an active confining unit or aquitard to the underlying Castle Hayne Aquifer. The difference in hydraulic head between the Run surface and 24-hour depth to water measurements in the borings additionally indicates a negative vertical gradient between the two aquifers. A negative vertical gradient suggests the potential for downward migration of surficial groundwater to the underlying aquifers.

6.0 CONSTRUCTION CONSIDERATIONS

A beaver dam is located approximately 45 feet west-northwest (upstream) of the existing bridge. No beavers were observed during the filed investigation. However, based on the condition of the dam, the beavers appear to be actively maintaining the structure.

7.0 CLOSING STATEMENTS

The geotechnical foundation investigation, analysis, and conclusions included in this report are based on verbal communication with NCDOT personnel and a proposed bridge layout drawing supplied by NCDOT.

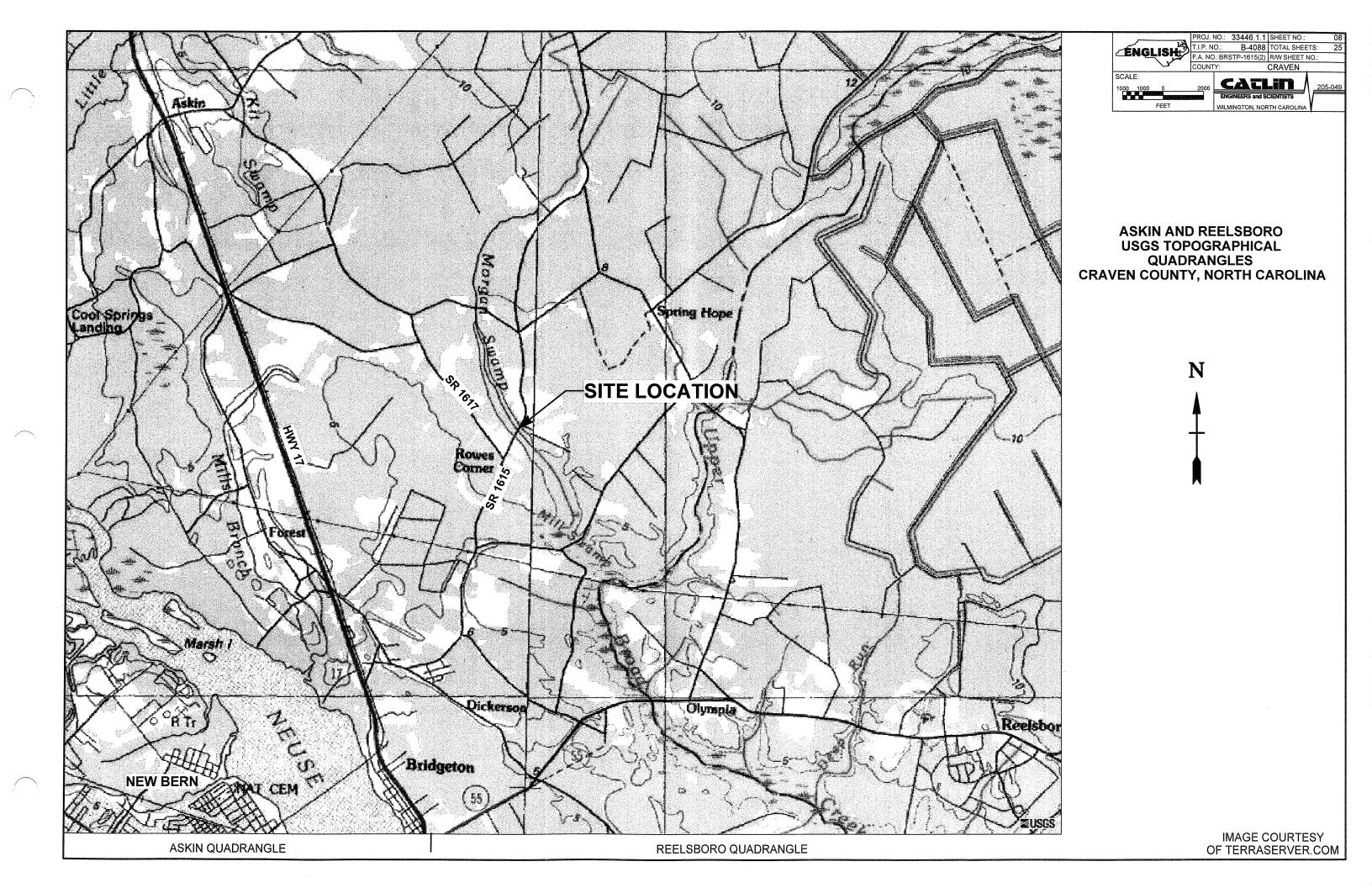
If any significant changes are made in the design or location of the proposed structure, the subsurface information and conclusions will have to be reviewed and modified as necessary.

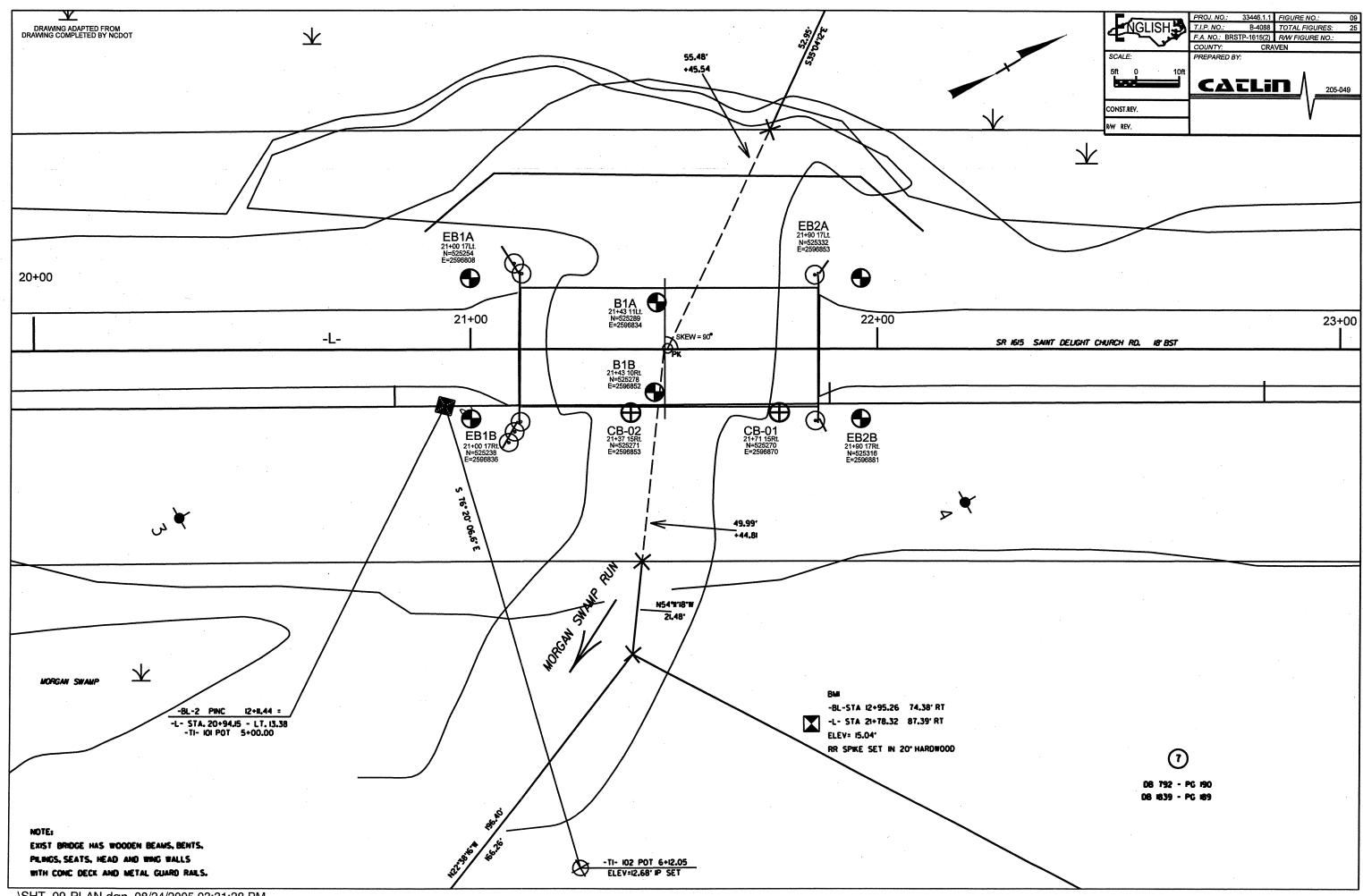
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TIP No.:	B-4088	Total Sheets:	25
County:	Craven		

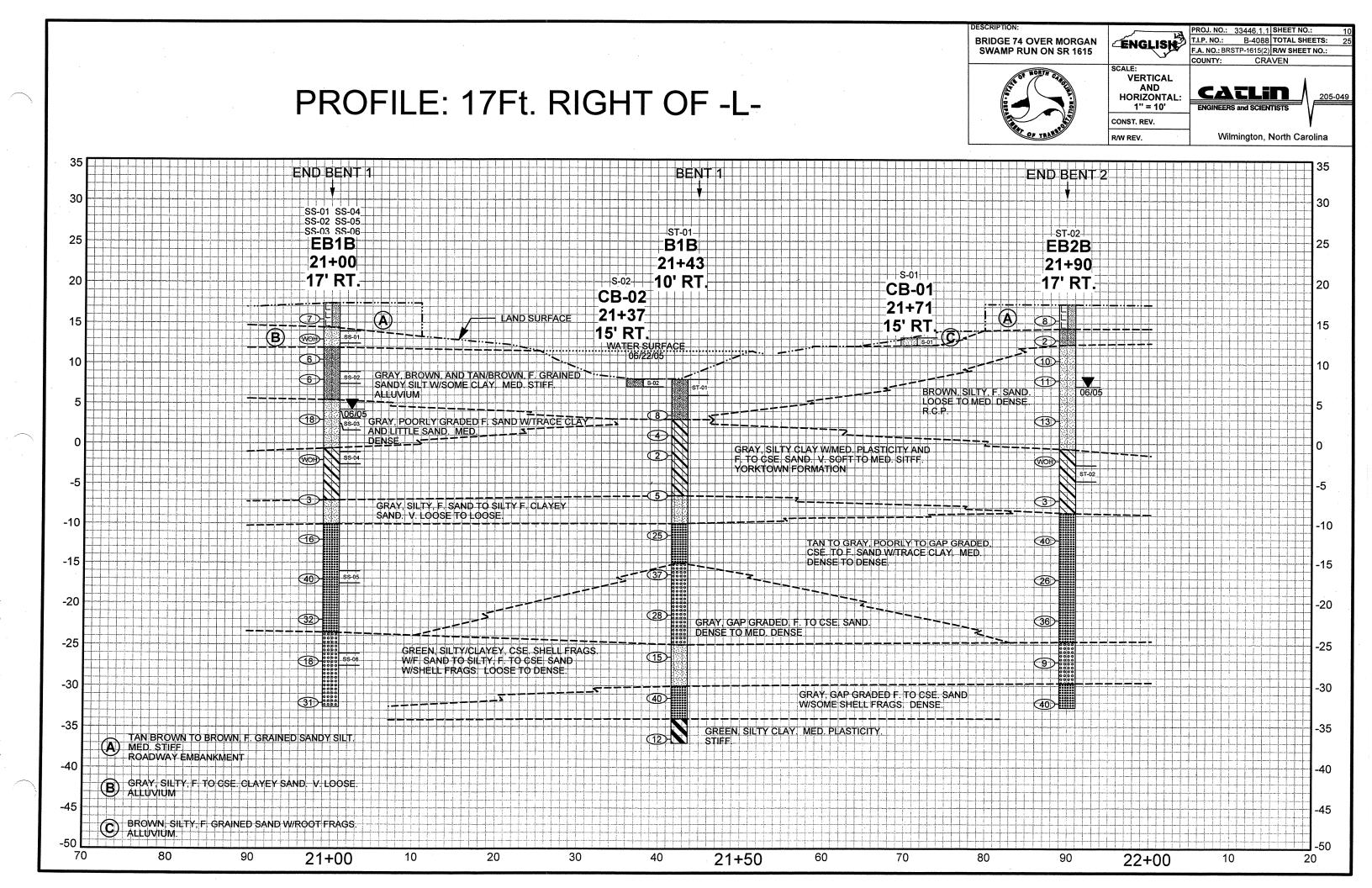
8.0 REFERENCES

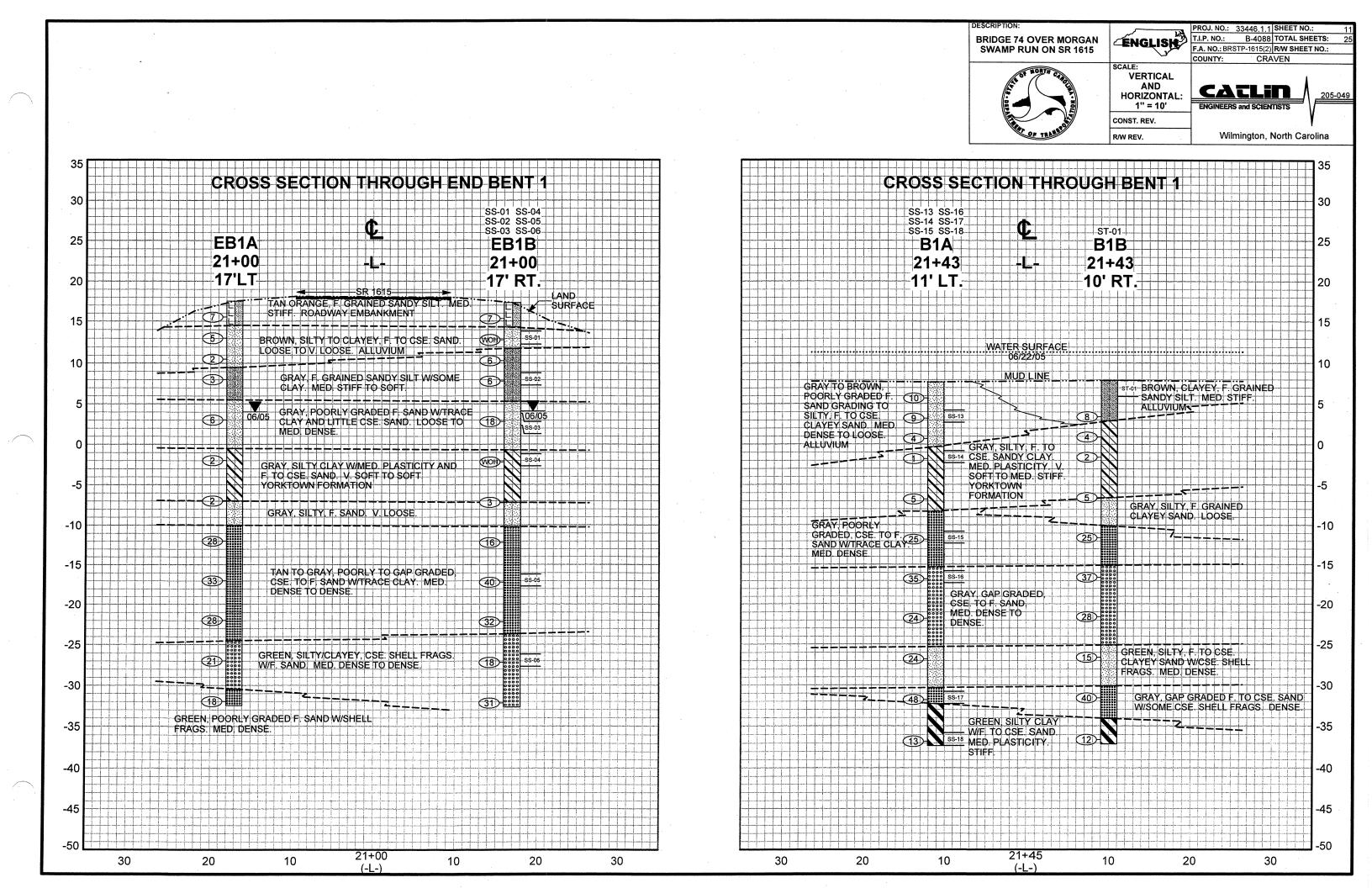
- American Association of State Highway and Transportation Officials, <u>The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes</u>, AASHTO Designation M145-91.
- American Association of State Highway and Transportation Officials, <u>Standard Specifications for Transportation Materials and Methods for Sampling and Testing</u>, <u>17th Ed.</u>, <u>Penetration Test and Split-Barrel Sampling of Soils</u>, AASHTO Designation T206-87.
- American Association of State Highway and Transportation Officials, <u>Thin-walled Tube Sampling of Soils</u>, AASHTO Designation T207.
- Horton, J. Wright Jr., and Victor A. Zullo, 1991, An Introduction to the Geology of the Carolinas *in* Horton J.W., Jr., and Zullo, V.A., eds., <u>The Geology of the Carolinas</u>; Carolina Geological Society Fiftieth Anniversary Volume, pp. 58 59.
- State of North Carolina Department of Transportation, <u>Geotechnical Unit Guidelines and Procedures Manual for Subsurface Investigations</u>, Revised March 1994, Volume No. 203.
- Stuckey, J.L., 1965, North Carolina: Its Geology and Mineral Resources: North Carolina Department of Conservation & Development, Raleigh, North Carolina, 550 pp.
- Winner, Jr., M.D., and Coble, R.W., 1989, <u>Hydrogeologic Framework of the North Carolina Coastal Plain Aquifer System</u>: US Geological Survey, Open File Report 87-690, 150 pp.

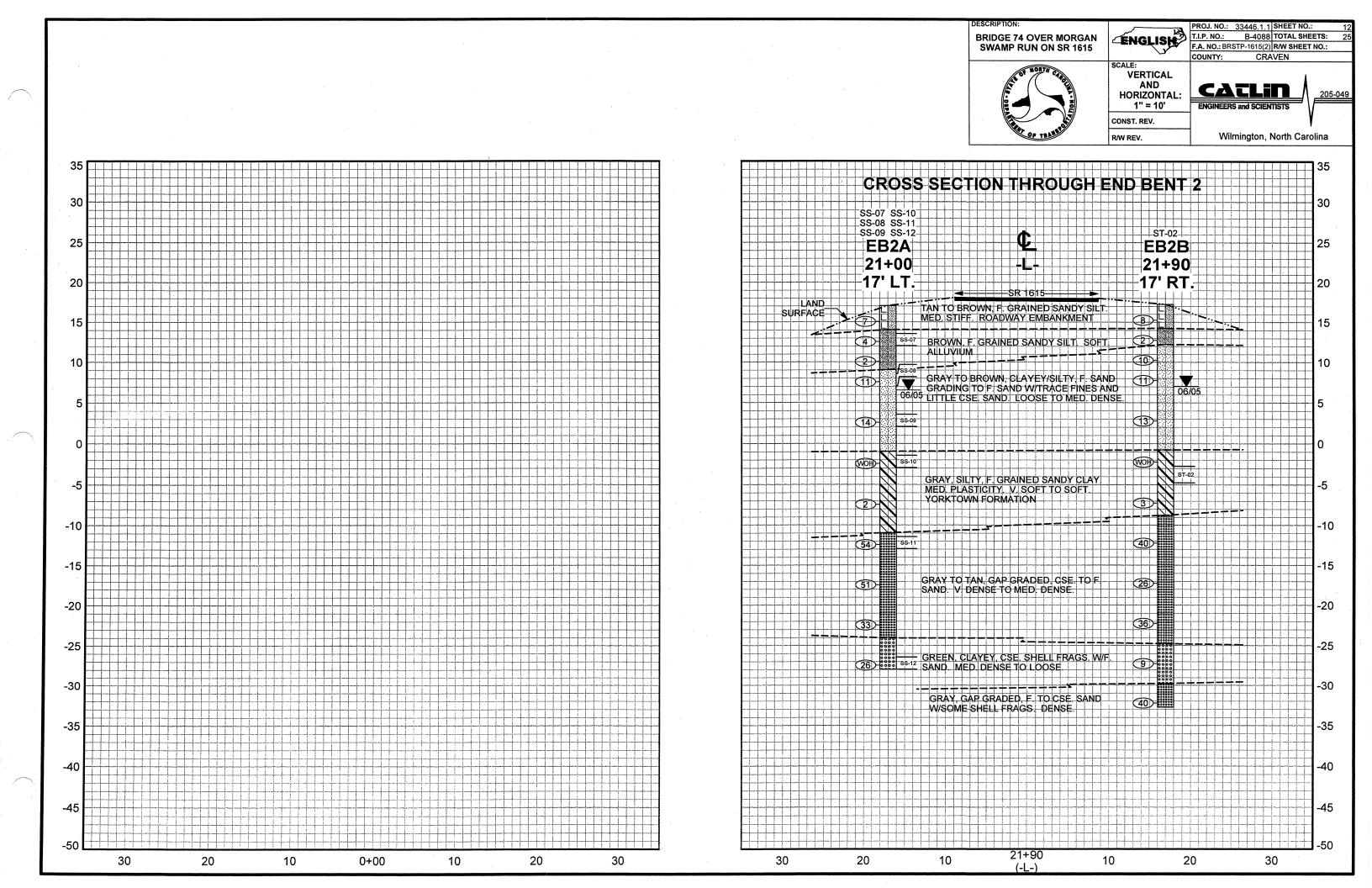
7















NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

ENGINEERS and SCIENTISTS

PROJ. NO.: 33446.1.1 SHEET NO.: 13
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.:BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO.: 205-049 SHEET 2 OF 2 PROJECT NO. 33446.1.1 ID. B-4088 COUNTY CRAVEN GEOLOGIST Charles Ray SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 GROUND WATER (ft) **BORING NO.** EB1A **BORING LOCATION** 21+00 OFFSET 17ft Lt ALIGNMENT -L-**0 HR.** 10.0 **COLLAR ELEV. 17.6 NORTHING** 525,254 **EASTING** 2,596,808 **24 HR.** 13.5 TOTAL DEPTH 50.0 ft DRILL MACHINE CME 45B ATV DRILL METHOD Mud Rotary **HAMMER TYPE** Manual DATE STARTED 6/29/05 COMPLETED 6/29/05 **CORE BARREL TYPE** NA SURFACE WATER DEPTH NA ELEV. DEPTH **BLOW COUNT BLOWS PER FOOT** SAMP. SOIL AND ROCK DESCRIPTION 40 60 80 (ft) 0.5ft 0.5ft 0.5ft NO. (ft) Continued from previous page SAT 12 16. -15.9 33.5 SAT 10 14 19 Gray, poorly to gap graded, f. SAND grading to f. to cse. sand. Med. dense to dense. (continued) -20.9 9 14 14 SAT SAT -32.4 -25.9 43.5 8 13 Green, SILTY/CLAYEY, cse. SHELL FRAGS w/f. sand. Med. dense. -30.9 48.5 Green, poorly graded f. SAND w/shell frags. Med. dense. 8 10 Boring Terminated at Elevation -32.4 ft in green, poorly graded f. SAND w/shell frags. Med. dense. YORKTOWN FORMATION

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BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJ. NO.: 33446.1.1 SHEET NO.:

T.I.P. NO.: B-4088 TOTAL SHEETS:

F.A. NO.:BRSTP-1615(2) RW SHEET NO.:

COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

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BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHEET 1 OF 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

ENGINEERS and SCIENTISTS

PROJ. NO.: 33446.1.1 SHEET NO.: 15
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.:BRSTP-1615(2) RW SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

								R MORGAN SWAMP RUN ON SR 1615 FNO.: 205-049	SHEET 1 OF 2							CA-	LIN PROJECT NO.		EET 2 OF 2
	ECT NO				ID. B-4088		CRAVEN	GEOLOGIST Chai	•		ECT NO.					COUNTY CRA	AVEN	GEOLOGIST Charles	•
SITE	DESCR	PTION	BRID	GE 74	OVER MORGAN SWAMP RU				GROUND WATER (ft)	<u> </u>			BRIDG	3E 74 O	OVER MORGAN SWAMP RUN				GROUND WATER (ft)
BORII	NG NO.	B1A			BORING LOCATION 21+4	3	OFFSET 11ft	t Lt ALIGNMENT -L-	0 HR. NM	BORIN	NG NO.	B1A		·····	BORING LOCATION 21+43		SET 11ft Lt	ALIGNMENT -L-	0 HR. NM
COLL	AR ELE	V. 7.8		NORT	HING 525,289	EAST	ING 2,596,834	4	24 HR. NM	COLLA	AR ELE	7. 7.8			HING 525,289	EASTING			24 HR. NM
TOTA	L DEPT	H 45.0) ft	DRILL	MACHINE CME 45B ATV D	RILL METH	HOD Mud Rota	ary HAMME	R TYPE Manual	TOTAL	L DEPTH	45.01	ft	DRILL	MACHINE CME 45B ATV DRI			HAMMER T	PE Manual
DATE	START	ED 6	29/05		COMPLETED 6/29/05	CORE	BARREL TYP	PE NA SURFACE	WATER DEPTH 3.0	<u> </u>	STARTE	ED 6/29	9/05		COMPLETED 6/29/05	CORE BAR	REL TYPE	NA SURFACE WA	TER DEPTH 3.0
ELEV.	DEPTI	l BL	ow co	UNT	BLOWS PER FOOT		SAMP.	SOIL AND ROCK I	DESCRIPTION	ELEV.	DEPTH		w cou		BLOWS PER FOOT	1	· \	SOIL AND ROCK DES	CRIPTION
. (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60	80 100	NO. MOI	G GOIL AND ROOK L		(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 8	0 100 NO.	MOI G		
6.8	1.0	0.01	0.51		MUD LINE		Z MIOII		0.00	-15.7	23.5	9	18	17	Continued from previous pa		SAT	- - - - Gray, gap graded, cse. to	(continued)
4.3	3.5	3 5	3	6	9		SAT SAT SAT SAT	Gray to brown, poorly grading to SILTY, f. to SAND. Med. dense to ALLUVIUM	graded f. SAND cse. CLAYEY o loose.	-25.7	33.5	7	9	15	•24		SAT	Green, SILTY, f. to cse. C - w/cse. shell frags. Med. c -	LAYEY SAND ense.
-0.7	8.5	WOH	WOH	1 1			SAT	0.2	8,0	-30.7	38.5	13	18	30	48	SS-1	SAT	- Green, f. SAND w/cse. sh trace clay. Dense.	ell frags and
-5.7	13.5	1	2		1		SS-14	Gray, SILTY, f. to cse Med. plasticity. V. sof YORKTOWN FORMA	ft. TION	-35.7 	43.5	4	6	7	•13	SS-1	SAT	Green, SILTY CLAY w/f. t Green, SILTY CLAY w/f. t Med. plasticity. Stiff. Boring Terminated at Elevin green, SILTY CLAY w/f Med. plasticity. Stiff. YORKTOWN FORMATIO	ation -37.2 ft
- -10 7	18.5			and the second s				Gray, poorly graded, o w/trace clay. Med. de	cse. to f. SAND	-	<u></u>								



BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHEET 1 OF 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJ. NO.: 33446,1.1 SHEET NO.: 16
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.:BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO : 205-049

							201 110 200	I SWAMP RUN ON SR 1615 049 SHE	EET 1 OF 2									HEET 2 OF 2
PROJEC					ID. B-4088	COUNTY CRAVEN		GEOLOGIST Charles R	•	PROJECT NO					DUNTY CRA	VEN	GEOLOGIST Charle	•
SITE DE	SCRIP	TION	BRIDG	3E 74 C	VER MORGAN SWAMP R	JN ON SR 1615			GROUND WATER (ft)			BRIDO	GE 74 C	OVER MORGAN SWAMP RUN O	·		,	GROUND WATER (ft)
BORING	NO.	B1B			BORING LOCATION 21+	43 OFFSET 1	Oft Rt	ALIGNMENT -L-	0 HR. NM	BORING NO.	B1B			BORING LOCATION 21+43	OFFS	SET 10ft	t Rt ALIGNMENT -L-	0 HR. NM
COLLAR	RELEV	8.0		NORTH	ING 525,278	EASTING 2,596,	352		24 HR. NM	COLLAR ELE	V. 8.0				EASTING 2			24 HR. NM
TOTAL D	DEPTH	45.0	ft	DRILL	MACHINE CME 45B ATV	RILL METHOD Mud R	otary	HAMMER TY	PE Manual	TOTAL DEPT	H 45.0	ft	DRILL	MACHINE CME 45B ATV DRILL	METHOD N	/lud Rota	ary HAMMER	TYPE Manual
DATE ST	TARTE	D 6/2	8/05		COMPLETED 6/28/05	CORE BARREL T		NA SURFACE WAT	TER DEPTH 3.0	DATE START				COMPLETED 6/28/05	CORE BAR	REL TYP	PE NA SURFACE V	ATER DEPTH 3.0
ELEV. D			ow cou		BLOWS PER FOOT	1 1/	L	SOIL AND ROCK DESC	CRIPTION	ELEV. DEPTH		w cou		BLOWS PER FOOT		· V / !	SOIL AND ROCK DE	SCRIPTION
, (ft)	(ft)	0.5ft	0.5ft	0.5ft) 20 40 60 	80 100 NO. MO) G	00/2/11/2/10011/2/201		(ft) (ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80	100 NO.	MOI C	G	
+						1.	 				-			Continued from previous page		000		
1									,	1 1				• • • • • • • • • • • • • • • • • • • •		000 000 000 000		
																000 000 000 000	Gray, poorly graded f. S.	AND. Med.
†																000 000 000 000	dense. (continued)	
+							-			 					• • •	000 000 000 000		
+						.	-			-15.5 23.5						000	-15.0	
1					•						9	15	22			SAT	000	
														37		000	Gray, poorly graded f. S. dense. (continued) -15.0 Gray, gap graded, f. to o Dense to med. dense.	
†					•					I						0000	0 0 0 0 0 0 0 0 0 0 0 0	
+	l									1 +						000	000 000 000	
+	l						1	•	· .	+						000		
1										1 1						000	Gray, gap graded, f. to c	se. SAND.
T										-20.5 28.5	6	14	14			SAT	Dense to med. dense.	
t					•					1 1				∮ 28		000		
+	ĺ						1 +			l †						000	000	
8.0	0.0				MUD LINE		8.	0	0.00	+						000	000	
.]	ļ					ST-01		,		1 1						000	000	
l						31-01		D. OLANEN C	041/2/							00	-25.0	
†								Brown, CLAYEY, f. grained SILT. Med. Stiff.	SANDY	-25.5 33.5	2	5	10			SAT		
4.5	3.5							ALLUVIUM			-	J	"	• 15				
+		3	4	4		SAT	-			1 +					• • •		Green, SILTY, f. to cse.	CLAYEY SAND
1					∱8		3.	0	5.0	1 +							w/shell frags. Med. dens	se.
2.0	6.0				.]					1 1							**************************************	
Ţ		3	2	2		SAT											-30.0	
†					• • • • • • • • • • • • • • • • • • • •		17			-30.5 38.5	12	17	23			SAT	10000 10000 10000 10000 10000	
-0.5	8.5			<u>]</u>	.		17			†	12	17	23	40		800	Gray, gap graded f. to co w/some shell frags. Der	- CAND
+		WOH	WOH	2		SAT		Gray, SILTY CLAY. Low to	med.	1 +						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Gray, gap graded f. to co w/some shell frags. Der	se. Sand ise.
1	.]				●2 			plasticity. Soft to med. stiff. YORKTOWN FORMATION						/		000 000 000 000	- 00000 00000 00000	
								TURKTUWN FURWATION	·					/		000 000 000 000	-34.0	-
Ť		l					17										N	
t	1						17			-35.5 43.5			<u> </u>	/		SAT	Green, SILTY CLAY. M	ed. plasticity.
.5.5 +	13.5	l			• • • • • • • • • • • • • • • • • • • •		1			+	4	5	7	412		SAT	SUIT.	
~~		1	2	3		SAT		_						T 12			-37.0 Boring Terminated at Ele	evation -37 0 ft
	***************************************				\dagger 5		→	5.5	14.5								in green, SILTY CLAY.	Med. plasticity.
Ť		l													ľ		Stiff.	
†								Gray, SILTY, f. grained CLA Loose.	AYEY SAND.	†							<u> </u>	
+					\			LUUSO.		1 +							.	
1					\ <i></i>		-1	0.0	18.0	-							-	
-10.5 1	18.5		10		\	SAT	000000 000000 000000 000000	Gray, poorly graded f. SAN dense.	D. Med.									



BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHEET 1 OF 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

ENGINEERS and SCIENTISTS

PROJ. NO.: 33446.1.1 SHEET NO.: 1
T.I.P. NO.: B-4088 TOTAL SHEETS: 2
F.A. NO.:BRSTP-1615(2) RW SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

<u></u>							CATLI	N PROJECT	T NO.: 205-049		EET 1 OF	2						I		205-049	SHEET 2 OF 2
	CT NO					OUNTY		VEN		GEOLOGIST Charles F	•		<u> </u>	ECT NO				ID. B-4088	COUNTY CRAVEN	GEOLOGIST C	•
SITE D	ESCRIF	MOIT	BRID	GE 74 (OVER MORGAN SWAMP RUN (GROUND WATER (f		ļ				GE 74	4 OVER MORGAN SWAMP RU			GROUND WATER (ft)
BORIN	G NO.	EB2A			BORING LOCATION 21+90	C	OFFSI	ET 17ft	t Lt	ALIGNMENT -L-	0 HR. 10.0		BORI	NG NO.	EB2A	١ .		BORING LOCATION 21+9	O OFFSET 17ft Lt	ALIGNMENT -L-	0 HR. 10.0
COLLA	R ELE	/. 17.	1	NORTI	HING 525,332	EASTIN	IG 2,	596,853	3		24 HR. 10.5		COLL	AR ELE	V. 17.	1		RTHING 525,332	EASTING 2,596,853		24 HR. 10.5
ΓΟΤΑΙ	DEPTH	45.0) ft	DRILL	MACHINE CME 45B ATV DRIL	L METHO	D M	ud Rota	ary	HAMMER TY	PE Manual	•	TOTA	L DEPTI	H 45.0) ft	DRIL	L MACHINE CME 45B ATV DI	RILL METHOD Mud Rotary	HAMI	MER TYPE Manual
DATE	STARTE	D 6/	29/05		COMPLETED 6/29/05	CORE E	BARR	EL TYP	PE N	A SURFACE WA	TER DEPTH N	A	DATE	START	ED 6/	29/05		COMPLETED 6/29/05	CORE BARREL TYPE	NA SURFA	CE WATER DEPTH NA
ELEV.	DEPTH	BL	ow co	UNT	BLOWS PER FOOT	S	AMP.	lacktriangleright	L	SOIL AND ROCK DES	CRIPTION	·	ELEV.	DEPTH	BL	ow co		BLOWS PER FOOT	SAMP. V L	SOIL AND ROCK	CDESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80	100	NO.	MOI	Ğ	——————————————————————————————————————			(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60	80 100 NO. MOI G	- OOIE / NO NO OI	
_									L					20.5	<u> </u>		ļ	Continued from previous p	page		
													-11.4	28.5	10	22	32	┨	SAT		
•									Ī		•			Ţ				• 54	SS-11		
-	-				•				F					†					000000 000000 000000 000000 000000		*
	_		ļ		LAND SURFACE				17.1			0.00	l	+							
16.1	1.0		<u> </u>							Tan to brown, f. grained SA	ANDY SILT.			1					SS-11 SAT SAT SAT SAT SAT	-	
	-	4	4	3				MOI		Med. stiff to soft. ROADWAY EMBANKMEN									000000 000000 000000 000000 000000		
_	-				• •					MONDANA! EINIDHINVINIEIN	1	20	-16.4	33.5	15	24	27	-	SAT		
13.6	3.5								14.1			3.0	1	†	"		"	•51		Gray, gap graded, o	se. to f. SAND. V.
_		1	2	2			SS-07	WET	-	•				+						dense to dense. (co	ontinued)
_	_				•4		,0~01			Brown, f. grained SANDY S	SILT. Med.			1					000000 000000 000000 000000 000000	. •	
11.1	6.0									stiff to soft. ALLUVIUM											
•		WOH	WOH	2				WET	Ī	ALLOVION		į	Ì	T					000000 000000 000000 000000 000000	-	
-	-				4 2 · · · · · · · · · · · · · · · · · · ·				+				-21.4	38.5		<u> </u>	<u> </u>]			
	- 0.5								9.1			8.0	ĺ	+	7	14	19		SAT		
8.6	8.5	1	4	7		🖯		SAT						1				•33			
-	-				• 11	s	SS-08	∇				1.		T					90000 90000 90000 90000 90000	-23.9	
-	-							Ť						†					0000		
-	-								% -				.	+ '							¥*
	_								L				26.4	43.5						Green, CLAYEY, cs w/f. sand. Med. der	se. SHELL FRAGS.
										Gray, CLAYEY, f. SAND gr SAND w/trace fines and litt	rading to f.		-26.4	45.5	6	11	15	 	SAT		
3.6	13.5		-			-		SAT		Med. dense.	ne ose. sand.			T				∮ 26	SS-12	-27.9	
	-	4	6	8	14	s	SS-09	J	-					t						Boring Terminated	at Elevation -27.9 ft cse. SHELL FRAGS.
-	-								<u> </u>					+						w/f. sand. Med. der	nse.
	_								<u></u>					+						YORKTOWN FORM	MATION
-	-								-0.9			18.0		T							
1.4	18.5							S	-0.9			10.0		†	1					• ,	
-		WOH	WOH	WOH	1		SS-10	SAT	7					+							
					•WOH		,0-,0		77		•			1							
										Gray, SILTY, f. grained SA	NDY CLAY.									_	
1									7	Med. plasticity. V. soft to s YORKTOWN FORMATION	oft.	1		T						_	
+	-								/	101411044141 OUMNITION	•			†							
6.4	23.5								1					+							
0.4	∠ა.5	1	1	1				SAT	7					1							
t					2	-			7												
†					\				7					†							
1	.	-							3					+						-	
_	_								7					1							
7									-10.9			28.0									



BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHFFT 1 OF 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJ. NO.: 33446.1.1 SHEET NO.:
T.I.P. NO.: B-4088 TOTAL SHEETS:
F.A. NO.:BRSTP-1615(2) RW SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO.: 205-049

											O.: 205-049	WP RUN ON SR 1615	SHEET 1 OF	2							·····				HEET 2 OF 2
l	ECT NO					B-4088			TY CRA	VEN		GEOLOGIST Cha	-			ECT NO				<u></u>	COUNTY		VEN	GEOLOGIST Charles	
SITE	ESCRI	PTION	BRID	GE 74			WAMP RU						GROUND WATER (fi		<u> </u>			BRIDO	GE 74 C	OVER MORGAN SWAMP RUN					GROUND WATER (ft)
BORIN	IG NO.	EB2E	3		BORIN	IG LOCA	TION 21+9	00	OFFSI	ET 17ft F	₹t	ALIGNMENT -L-	0 HR. 10.0	1		IG NO.				BORING LOCATION 21+90		OFFS	ET 17ft	t Rt ALIGNMENT -L-	0 HR. 10.0
COLL	AR ELE	/. 17.	3	NORT	HING 52	5,316		EAS	STING 2,	596,881			24 HR. 10.2		COLL	AR ELE	/. 17.3			HING 525,316			596,881		24 HR. 10.2
TOTA	DEPT	1 50.0	O ft	DRILL	MACHINE	CME 4	5B ATV D	RILL MET	THOD M	ud Rotary	/	HAMME	R TYPE Manual		TOTA	L DEPTI	1 50.0	ft	DRILL	MACHINE CME 45B ATV DRIL	LL METH	OD M	ud Rotai	ary HAMMER	TYPE Manual
DATE	START	E D 6	/28/05		CON	IPLETED	6/28/05	COF	RE BARR	EL TYPE	: N	A SURFACE	WATER DEPTH N	A	DATE	STARTI	E D 6/2	8/05		COMPLETED 6/28/05	CORE	BARR	EL TYP	PE NA SURFACE W	ATER DEPTH NA
ELEV.	DEPTH	BL	ow co	UNT		BLOWS	PER FOOT		SAMP.	V L		SOIL AND ROCK [DESCRIPTION		ELEV.	DEPTH	ļ	wcou		BLOWS PER FOOT		SAMP.	▼/ L	SOIL AND ROCK DE	SCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20	40	60 L	80 10	00 NO.	MOI G		SOIL AND NOOK I			(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80 1 1 1 1 1	100	NO.	MOI G	G GOIL AND NOOK BE	
									.						L				·	Continued from previous pag	ge				
												•			-11.2	28.5	6	16	24				SAT		
	-		.]			. *					†		•			t				•40			0000		
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			 	 		LAND S	SURFACE			L	17.3			0.00		1							0000 0000 0000 0000 0000	••••••••••••••••••••••••••••••••••••••	
16.3	1.0		_	 					.	MOI H		Tan brown, f. grained	SANDY SILT.							·			0001 0001 0001 0001	Tan, gap graded, f. to cse Dense to med. dense. (c	
		3	4	4								Med. stiff. ROADWAY EMBANK	MENT										2000 2000 2000 2000 2000		
-	- ,		ľ								14.3	NONDVVII LINDININI		3.0	-16.2	33.5	12	14	12	/			SAT		•
13.8	- 3.5			<u> </u>	• • • •				•		- 14.3	Tan brown, f. grained	SANDY SILT	J.U		+	'		'-	•26			0000 0001 0001 0000	**************************************	
]] .		1	1	1	. <i> </i>				.	MOI		Med. stiff.	CAND! CIET.			1							0000	Tan, gap graded, f. to cso Dense to med. dense. (c	e. SAND.
					. \2				.		12.3	ALLUVIUM		5.0									0000 0000 0000 0000	Bense to med. dense. (c.	onunaea)
11.3	6.0				 											T							9000 9000 9000		
 .	_	1	4	6	(моі	}		•			†							200		
-	-				· · •10 ·		• .• • • •		•		<u>_</u>				-21.2	38.5							200	-	
8.8	- 8.5								-		4					1	13	18	18				SAT	-	
"	0.0	3	5	6	1				.	WET													000	**************************************	
	-				♦ 11	*				¥			•	1		Ī							000 000 000 000		
[] ·	_								•		1					†							000 000 000 000	-24.7	
] .	_				• • • •						1	Brown, SILTY, f. SAN	D. Loose to med.			+				· · · · ·/· · · · · · · · · · · · ·			00	9898 -24./ 600 000	42.0
												dense.			-26.2	43.5				 			000	000 000	
					ll. <i>.</i>										20.2	10.0	3	4	5	_: /					
3.8 -	- 13.5	5	5	8						WET	1					†				• 9			000	Green, CLAYEY, cse. Sh w/f. sand. Loose.	HELL FRAGS.
.	-	J		"	•13				•		1		e e			+							000	-	
	_								.		1					ļ.							00	500 500 500	
2005				1	/				.					- 1		1				, \			00 00 555	-29.7	47.0
2770											T			.		T				\ <i>.</i>			900 900 900 900	0000 10000 10000	
-	_										-0.7			18.0	-31.2	48.5	5	15	25				SAT	Gray, gap graded, f. to co w/some shell frags. Den	se. SAND se.
-1.2	- 18.5				· /· · · ·				•		+/			10.0		+			-	40			000 000 000 000	-29.7 - Gray, gap graded, f. to cs w/some shell frags. Den	
	-	WOH	WOH	WOH	<u> </u>				.	SAT	1					 	 		-					E Boring reminated at Ele	50.0 evation -32.7 ft
a -2.7	20.0				♦ WOH				.		3													in gray, gap graded, f. to w/some shell frags. Den YORKTOWN FORMATIO	cse. SAND
)E 74	-										1					T								YORKTOWN FORMATIC	ON.
	-								ST-02		1	Gray, SILTY, f. graine	d SANDY CLAY.	.		†									
	-								·		1	Med. plasticity. V. sof YORKTOWN FORMA	ft to soft.			+								-	
NC C	22.5				.				.			1 OKK I OVVIN FORIVIA	VI IOI4			1			.						
6-6.2 -	- 23.5	1	2	1	.					SAT	1														
20	-				4 3						1		•			† .								†	
Tan -					/				.		+					+								<u>}</u>	
ğ		-			/						-8.7 -			26.0		+								-	
									.			Tan, gap graded, f. to Dense to med. dense.	cse. SAND.	ł		L									
	-									50000 50000 50000 50000		Dense to med. dense.				T									
<u>a</u>			<u></u>		L		· · · · · ·		<u>. </u>		8								1			L			



BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHEET 1 OF

	DEPARTMENT	TH CAROLINA OF TRANSPORTA CAL UNIT BORING L	
T NO.	33446.1.1	ID . B-4088	COUNT
SCRIPT	TION BRIDGE 74 OV	ER MORGAN SWAMP RUI	ON SF
NO C	CB-02	BORING LOCATION 21+37	,



PROJ. NO.: 33446.1.1 SHEET NO.: 19
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.:BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

SHEET 1 OF 1

	CATLIN PROJECT NO.: 205-049		PROJECT NO. 33446.1.1	ID. B-4088 COUNTY	CATLIN PROJECT NO.: 205-0	
PROJECT NO. 33446.1.1 ID. B-4088	COUNTY CRAVEN	GEOLOGIST Steven Hudson GROUND			CRAVEN	GEOLOGIST Steven Hudson
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMI		GROUND WATER (ft)		E 74 OVER MORGAN SWAMP RUN ON SR		GROUND WATER (ft)
BORING NO. CB-01 BORING LOCATION		ALIGNMENT -L- 0 HR. NE	BORING NO. CB-02		OFFSET 15ft Rt	ALIGNMENT -L- 0 HR. NM
COLLAR ELEV. 12.3 NORTHING 525,300	EASTING 2,596,870	24 HR. NE			ING 2,596,853	24 HR. NM
TOTAL DEPTH 1.0 ft DRILL MACHINE Hand Auger	DRILL METHOD Hand Auger	HAMMER TYPE NA			OD Hand Auger	HAMMER TYPE NA
DATE STARTED 6/22/05 COMPLETED 6/22/0		NA SURFACE WATER DEPTH NA	DATE STARTED 6/22/05		BARREL TYPE	NA SURFACE WATER DEPTH NA
ELEV. DEPTH BLOW COUNT BLOWS PER FO.	1 1 / 101	SOIL AND ROCK DESCRIPTION	ELEV. DEPTH BLOW COUNT (ft) (ft) 0.5ft 0.5ft 0		SAMP. L O O MOI G	SOIL AND ROCK DESCRIPTION
12.3 0.0 LAND SURFA	- - - - - -	Brown, SILTY, f. grained SAND w/some	8.1 _ 0.0	LAND SURFACE	- - - - - - - - - - - - - - - - - - -	1 0.0 Dark brown, f. to cse. grained SANDY
					S-02 7.1	ALLUVIUM Boring Terminated at Elevation 7.1 ft in dark brown, f. to cse. grained SANDY SILT. ALLUVIUM

GEOTECHNICAL ENGINEERING UNIT FIELD SCOUR REPORT

PROJECT: 33446.1.1 ID: B-4088 COUNTY: CRAVEN
DESCRIPTION(1): BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection microfilm(Reel:Pos: _) X other Preliminary Geotech Report
COUNTY BRIDGE NO. 74 BRIDGE LENGTH 70 NO. BENTS IN: CHANNEL 3 FLOOD PLAIN 2
FOUNDATION TYPE: Wooden piles with wooden seats and wing walls
EVIDENCE OF SCOUR(2):
ABUTMENTS OR END BENT SLOPES: No evidence
INTERIOR BENTS: General Scour
CHANNEL BED: No evidence
CHANNEL BANKS: General Scour
EXISTING SCOUR PROTECTION:
TYPE(3): Wooden wing walls on each endbent. No protection other than wing walls.
EXTENT(4): Extends approximately 5ft. Beyond width of bridge deck from ground surface to base of bridge deck.
EFFECTIVENESS(5): Appears effective.
OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Beaver dam located approximately 45ft. West-northwest (upstream) of bridge
Some timber debris located sporadically around interior bents.
DESIGN INFORMATION
CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Dark brown, fine to coarse-grained SANDY SILT. (A-4)
Grab sample S-02 collected at -L- 21+37 15Rt from elevation of 8.1' to 7.1' ST-01 collected at -L- 21+43 10Rt.
CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Brown, SILTY, fine-grained SAND (A-2-4) w/root frags.
Grab sample S-01 collected at -L- 21+71 15Rt from elevation of 12.3'-11.3'.
CHANNEL BANK COVER(9): Vegetative cover consisting of grass and brush.
FLOOD PLAIN WIDTH(10): Approximately 900 feet. 500ft north-northeast & 400ft south-southwest.
FLOOD PLAIN COVER(11):

SHEET NO.: 20 TOTAL SHEETS: 25

PROJ. NO.: 33446.1.1 TIP NO.: B-4088 F.A. NO.: BRSTP-1615(2)

DE:	SIGN INFORMAT	ION CONT.			•		
		DEGRADII	Х	_ AGGRADING (12)		
ОТ	HER OBSERVATI	ONS AND C	ОММ	El Stream appears	to be stable. I	low within chann	el is very low.
	Creek depth	ı is approxima	tely 4ft	. deep and stream	bed is approxin	nately 10ft. below	existing deck.
CH.	IANNEL MIGRATION	ON TENDEN	ICY (1	3 Low to no migra	tion potential a	t bridge.	
D	REPORTED BY:	Ct.	ovon V	. Hudson, P.G., C\	MD	DATE:	6/22/2005
٠.	ILI OITILD DI.						0/22/2003
GE	OTECHNICALLY			IGINEERS AND SCIEN JR ELEVATION (
	The new structure						
. 1	will have a hydrau	lic opening la	arger t	han the existing	structure. Th	erefore the pote	ential for scour
ī	with the new struc	ture will be le	ower t	han with the exis	ting structure	. Since the histo	orical scour dep
	is at an elevation of						
					<u> </u>		
						•	
_	REPORTED BY:	011	n.	6 . 01.		DATE.	0/47/0005
Н	REPORTED BY:	Class 1	m	While		DATE: _	8/17/2005
		NO	DOT GE	OTECHNICAL UNIT			
		NO	DOI GE	OTECHNICAL UNIT			
			INSTE	RUCTIONS			
(1)	GIVE THE DESCRIPT	ION OF THE SP		SITE GIVING ROUTE N	UIMBER AND BO	DY OF WATER CRO	SSED
(2)				XISTING END BENTS			OCLD.
'	SLOUGHING, SCOU					,	
'(3)	NOTE ANY EXISTING	SCOUR PROTI	ECTION	(RIP RAP, ETC.)			
'(4)		ENT OF ANY EX	ISTING :	SCOUR PROTECTION	1.		
'(5)				R PROTECTION APPE	ARS TO BE WOR	KING.	
'(6)							
(7)			ERIAL:	A SAMPLE SHOULD	BE TAKEN FOR G	IRAIN SIZE DISTRIBU	JIION,
(8)	ATTACH LAB RESUL		ATERIAL	.: A SAMPLE SHOULD) BE TAKEN FOR	GRAIN SIZE	
'	DISTRIBUTION, ATT			/ ()	, DE WILLIAM ON		
'(9)				REES, RIP RAP, NON	IE, ETC.		
'(10)) GIVE THE APPROXI						
'(11)				GRASS, TREES, CRO			
(12)				WHETHER THE STRE			
'(13) '	,			OF WATER TO MIGRA	ALE LATERALLY L	JUHING THE LIFE OF	r IME
'/4./\	BRIDGE (APPROXIM			COUR ELEVATION EX	YPECTED OVER 1	HE LIEE OF THE BR	IDGE
'(14) '	,			BE GIVEN AS AN ELE			
1	Y	,		S EXIST. DISCUSS R		·	
				NICALLY ADJUSTED S			
	ADJUSTED SCOUR	ELEVEVATION IS	SBASE	ON THE ERODABILI	TY OF MATERIAL	S WITH CONSIDERA	TION
				NTATION AND FREQU			
1				HERING, SHEAR STR	•		
1	STRUCTURES: OTH	ER TESTS DEEM	MED APP	PROPRIATE: AND OV	ERALL GEOLOGIC	C CONDITIONS AT T	HE SITE.

PROJECT #: 33446.4.4 T.I.P. #: B-4088

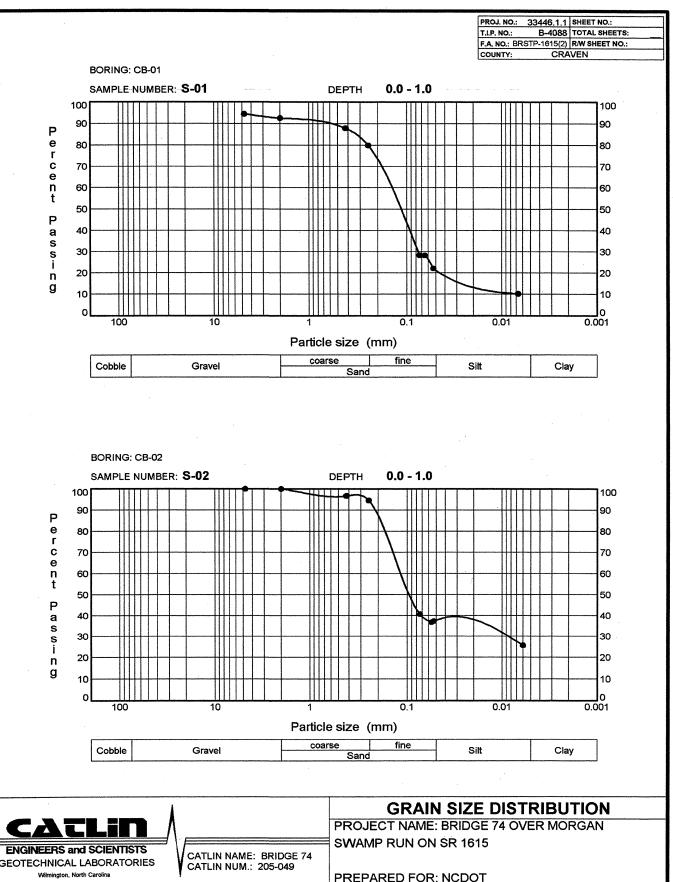
COUNTY: CRAVEN

DESCRIPTION: Bridge 74 Over Morgan Swamp Run on SR 1615

	CH	ANNEL B	ED	CHA	NNEL BA	NK MATE	RIAL
	r	MATERIA	L				
SAMPLE #	S-02	ST-01		S-01		·	
RETAINED #4	0			6			
PASSING #10	100			93			
PASSING #40	97			88		<u> </u>	
PASSING #200	41			28			
COARSE SAND	5.4			20.1			ļ
FINE SAND	57.3			57.9			
SILT	11.7	·		11.9			
CLAY	25.6			10.1			
LL PL	37			22			
PL	NP			NP			
AASHTO	A-4(0)	7		A-2-4(0)			
CLASSIFICATION	A-4(0)			A-2-4(0)			
							ļ
STATION	21+37	21+43		21+71			
OFFSET	15Rt	10Rt	,	15Rt			·
DEPTH	0.0 - 1.0	0.0 - 2.0		0.0 - 1.0			· [

SHEET NO.: 21 TOTAL SHEETS: 25 PROJ. NO.: 33446.1.1 TIP NO.: B-4088

F.A. NO.: BRSTP-1615(2)



NCDOT LABORATORY SUMMARY SHEET

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

ENGLISH

CATLIN PROJECT:

205-049

T.I.P. NO.: B-4088 TOTAL SHEETS: F.A. NO.:BRSTP-1615(2) R/W SHEET NO.:

GEOTECHNICAL LABORATORY
Wilmington, North Carolina

AASHTO Standard Specifications

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

							•	TEST RESUI	_TS						•	
Field Sample Numb	er	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Lab Sample Numbe	r	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Retained #4 Sieve	%	0	0	0	0	0	14	0	0	0	0	0	8	0	0	0
Passing #10 Sieve	%	98	100	100	100	99	79	100	100	100	100	100	91	99	100	100
Passing #40 Sieve	%	73	100	95	97	60	44	99	100	93	97	62	56	97	94	70
Passing #200 Sieve	%	26	39	11	83	4	16	55	23	16	86	6	31	23	79	6
			-				MINUS	NUMBER 10	FRACTION							
SOIL MORTAR - 10	0%															
Coarse Sand Ret#60	%	44.6	0.6	13.6	6.1	64.8	74.2	2.1	1.5	18.8	5.2	70.1	61.6	6.2	12.4	55.0
Fine Sand Ret#270	%	31.9	69.6	80.0	15.2	32.4	11.7	55.5	81.4	69.9	14.0	25.1	9.3	77.1	13.4	40.5
Silt 0.05 - 0.005mm	%	5.4	18.4	4.5	48.3	1.9	6.2	22.1	7.0	7.3	50.3	0.8	19.0	10.7	60.0	3.5
Clay <0.005mm	%	18.1	11.4	1.9	30.4	0.9	7.9	20.3	10.1	4.0	30.5	4.0	10.1	6.0	14.2	1.0
		,												. "		
Liquid Limit	(LL)	22	25	22	38	15	29	23	19	21	36	18	29	23	35	20
Plasticity Index	(PI)	9	NP	NP	20	NP	NP	6	NP	NP	18	NP	NP	NP	17	NP
AASHTO Classificat /Group Index	ion	A-2-4(0)	A-4(0)	A-2-4(0)	A-6(16)	A-3(0)	A-1-b(0)	A-4(1)	A-2-4(0)	A-2-4(0)	A-6(15)	A-3(0)	A-2-4(0)	A-2-4(0)	A-6(12)	A-3(0)
Station		21+00	21+00	21+00	21+00	21+00	21+00	21+90	21+90	21+90	21+90	21+90	21+90	21+43	21+43	21+43
Offset		17ft RT	17ft LT	17ft LT	17ft LT	17ft LT	17ft LT	17ft LT	11ft LT	11ft LT	11ft LT					
Alignment		-L-	· _L_	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-
Boring Identification		EB1B	EB1B	EB1B	EB1B	EB1B	EB1B	EB2A	EB2A	EB2A	EB2A	EB2A	EB2A	B1A	B1A	B1A
Depth	from	1.0	8.5	13.5	18.5	33.5	43.5	3.5	8.5	13.5	18.5	28.5	43.5	3.5	8.5	18.5
	to	2.5	10.0	15.0	20.0	35.0	45.0	5.0	10.0	15.0	20.0	30.0	45.0	5.0	10.0	20.0
Field Moisture Cont	ent	7	23	23	43	19	25	35	25	27	48	17	28	29	42	21
Tested By		MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM						
Submitted By		SVH	SVH	SVH	SVH	SVH	SVH	CWR	CWR	CWR	CWR	CWR	CWR	CWR	CWR	CWR
Date Submitted		06/29/05	06/29/05	06/29/05	06/29/05	06/29/05	06/29/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05

NP = Non-Plastic

Report Date: 7/18/2005

Laboratory Report Page 1 of 2

NCDOT LABORATORY SUMMARY SHEET

RIPTION:	
RIDGE 74 OVER MORGAN WAMP RUN ON SR 1615	ENGLI

T.I.P. NO.: B-4088 TOTAL SHEETS: F.A. NO.:BRSTP-1615(2) R/W SHEET NO.

205-049 GEOTECHNICAL LABORATORY
Wilmington, North Carolina

AASHTO Standard Specifications

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

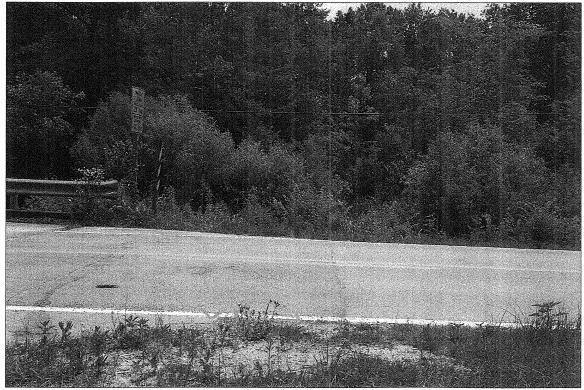
	TEST RESULTS			÷		
Field Sample Number		SS-16	SS-17	SS-18	S-01	S-02
Lab Sample Number		SS-16	SS-17	SS-18	S-01	S-02
Retained #4 Sieve %		1	0	0	6	0
Passing #10 Sieve %		93	99	99	93	100
Passing #40 Sieve %		41	79	94	88	97
Passing #200 Sieve %		3	4	77	28	41
	MINUS NUMBER 10 FRACTION					
SOIL MORTAR - 100%						
Coarse Sand Ret#60 %		78.3	51.0	9.8	20.1	5.4
Fine Sand Ret#270 %		18.9	45.2	22.5	57.9	57.3
Silt 0.05 - 0.005mm %		2.8	1.8	43.0	11.9	11.7
Clay <0.005mm %		. 0.0	2.0	24.7	. 10.1	25.6
				T		T
Liquid Limit (LL)		21	20	46	. 22	37
Plasticity Index (PI)		NP	NP	23	NP	NP
AASHTO Classification /Group Index		A-1-b(0)	A-3(0)	A-7-6(18)	A-2-4(0)	A-4(0)
Station		21+43	21+43	21+43	21+71	21+37
Offset		11ft LT	11ft LT	11ft LT	15ft RT	15ft RT
Alignment		-L-		-L-	-L-	-L-
Boring Identification		B1A	B1A	B1A	CB-01	CB-02
Depth ()		23.5	38.5	43.5	0.0	0.0
to		25.0	40.0	45.0	1.0	1.0
Field Moisture Content		23	25	43	32	58
Tested By		MDM	MDM	MDM	MDM	MDM
Submitted By		CWR	CWR	CWR	SVH	SVH
Date Submitted		06/30/05	06/30/05	06/30/05	06/29/05	06/29/05

NP = Non-Plastic

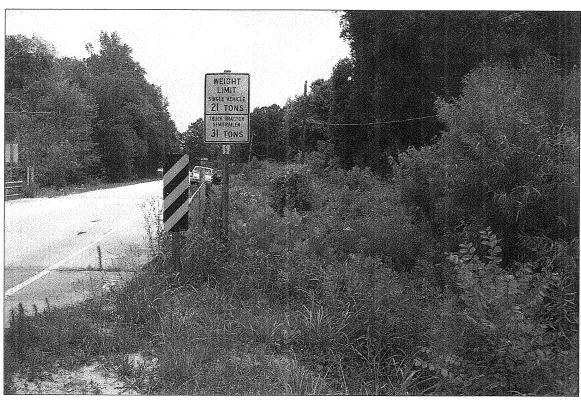
Report Date: 7/18/2005 Laboratory Report Page 2 of 2



PROFILE ALONG A FACING SOUTHWEST EB2A IN FOREGROUND



SECTION ACROSS END BENT 1 FACING SOUTHEAST EB1A IN FOREGROUND



PROFILE ALONG B FACING NORTHEAST EB1B IN FOREGROUND



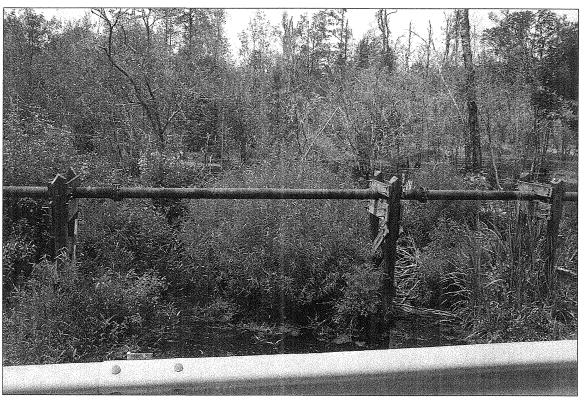
SECTION ACROSS END BENT 2 FACING SOUTHEAST EB2A IN FOREGROUND



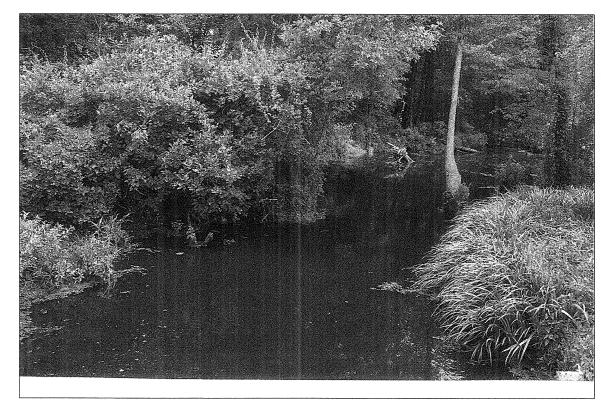
CENTERLINE OF -L-END BENT 1 IN FOREGROUND FACING NORTHEAST



CENTERLINE OF -L-END BENT 2 IN FOREGROUND FACING SOUTHWEST



BENT 1 FACING UPSTREAM TO THE NORTHWEST



BENT 1 FACING DOWNSTREAM TO THE SOUTHEAST