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STATE OF NORTH CAROLINA

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

ROADWAY SUBSURFACE INVESTIGATION

MARTIN

BRIDGE NO. 570053 OVER PROJECT DESCRIPTION COLLIE SWAMP ON SR 1142 (PRISON CAMP

COUNTY_

ROAD)

INVENTORY

50. S Ŕ REFERENCE

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5003 S PROJEC

STATE PROJECT REFERENCE NO. STATE NO. SHEETS N.C**B-5503** 16 1

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, GEOTECHNCAL ENGINEERING UNIT AT (919) TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAIL

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARES 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 WETHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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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PERSONNEL

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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SUIL DESCRIPTION	GRADATION		TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD RUCK IS NUN-CUASIAL PLAIN MAIERIAL THAT WULD VIELD SPI REFUSAL IF TESTED. AN INFERRED ROCK INF INDICATES THE FVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOLLD VIELD SPI REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION	UNIFURMET GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES ARE ALL APPROXIMATELT THE SAME SIZE.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	ADUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	ANCH ARTICLE SIZES OF NO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CUNSISTENCY, CULCH, TEXTURE, MUISTURE, AASHTU CLASSITLATION, AND UTHER PERTINENT FACTORS SUCH AS MINERAL ORDERAL COMPOSITION ANGULARITY STRUCTURE PLASTICITY FIC FOR FXAMPLE		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:	WEATHERED NON-COASTAL READ MATERIAL THAT WOULD VIELD OF A VALUES N	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBRUUNDED, UR RUUNDED.	ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANIILAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GRUIP 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.	General Control Contro	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE ID COARSE GRAIN MEIAMORPHIC AND NON-COASIAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBUL 000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
% PASSING SUIT.	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY RUCK SHITE SPITEFUSAL. RUCK TYPE INCLUDES LIMESTUNE, SANDSTONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY MUCK,	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*4/0 30 MX 50 MX 51 MN #200 15 MX 25 MY 13 MY 35 MY 35 MY 35 MY 35 MY 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY		ROCKS OR CUTS MASSIVE ROCK.
	TRACE OF ORGANIC MATTER $2 - 37$ $3 - 57$ TRACE $1 - 107$	HRESH HOLK FRESH, CRYSTALS BRIGHT, FEW JUINTS MAY SHUW SLIGHT STAINING, ROLK KINGS UNDER HAMMED TE CRYSTALINE	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY CLOUD FOR A CONTRACT TO THE LIGHT CONTRACT OF A CONTR	HORIZONTAL.
LL 40 MX 41 MN	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VENT SLIDTT HOLK OBMERNELT FRESH, JUINTS STHINEL, SUINTS THINT SHOW THIN CENT CHATCHINGS IF OFEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF	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 EPACS		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SHIND UMAYEL AND SAND SUILS SUILS	▼ STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN, RATING FAIR TO COOP FAIR TO COOP	\bigtriangledown PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POUR POOR UNSUITABLE		UULL SUUNU UNDER HAMMER BLUWS AND SHUWS SIGNIFICANT LUSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	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	V-UU - SPRING UK SEEP		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KANI INIZATION. ROCK SHOWS SEVERE INSS OF STRENGTH	FIELD.
		(MOD.SEV.) 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.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION DF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
CENERALLY VERY LOOSE < 4		(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LOOSE 4 TO 10	UST ALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRUNG ROCK USUALLY REMAIN.	MOTTLED (MOTT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF IEJIED, WOULD HELD SFI N VHLUES / IUD DFF	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE 50	THAN ROADWAY EMBANKMENT U HOOLA DOWN TEST	VERY ALL ROCK EXCEPT QUARIZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE DIT MASS IS EFFECTIVELY REDUCED TO SOLL STATUS WITH OWLY ERACMENTS OF STRONG POOR	PERCHEN WATER - WATER MAINTAINEN ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
		(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5		VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>	RESIDUAL (RES.) SOLL - SOLL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	TEST BORING	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE OR DISCERNIBLE ONLY IN SMALL AND	RESIDER WEST SOLE SOLE A NEARINE OF DOCK ONALITY RECEIPTION FOR
MATERIAL STIFF 8 TO 15 1 TO 2		SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK SEGMENTS EQUAL TO DE GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY A INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
		ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE UR GRAIN SIZE	RECOMMENDATION SYMBULS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION -	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	LXXI CACCEPTABLE, BUT NOT TO BE	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
COARSE FINE CLAR	SHALLOW UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BUDDER CUBBLE GRAVEL SAND SAND SILI CLAY		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE, SD.) (F SD.) (CEU)	ABBREVIATIONS	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	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOU MOISTURE - CORRELATION OF TERMS	UL ULAY MUU MUURATELY / - UNIT WEIGHT	HARU UAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE	CSE COARSE ORG ORGANIC γ_d Drit UNIT WEIGHT		
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SUFI LAN BE GRUVED UR GUUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(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.
	FRAC FRACTURED, FRACTURES TOR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIA	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE C - WET - (W) SEMISOLID; REDDIRES DRVING TO	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK, SEE NOTES BELOW
	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: N/A FEET
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	
SL SHRINKAGE LIMIT		CLOSE 0.16 TO 1 FOOT VERY THINLY REDDED 0.16 - 1.5 FEEL	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
ATTAIN OPTIMUM MOISTURE	CME-55 6' CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8' HOLLOW AUGERS -B -H	INDURATION	TOP OF BORING ELEVATIONS FOR EBI-B, EB2-B, L2370 WERE SURVEYED
		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING HEAT. PRESSURE FTC.	USING BMI3 - RR SPIKE IN 30" PINE (N: 741133; E:2530859)
NON PLASTIC PLASTICITY INDEX (PI) DRY STRENGTH		RUBBING WITH FINGER FREES NUMEROUS GRAINS:	ELEVATION: J2.00
SLIGHTLY PLASTIC 6-15 SLIGHT		FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	TOP OF BORING ELEVATIONS FOR REMAINING BORINGHS ESTIMATED LISING
MODERATELY PLASTIC 16-25 MEDIUM		CRAINS CAN BE SEDADATED EDOM SAMDLE WITH STEEL BOODE.	PROVIDED PROJECT TIN FILE (B5503_Is_TIN.tin)
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.	
COL OR		CRAINS ARE DISCIPLIFY TO SERARATE WITH STEEL POORS	
	X D-50 (TER346)	INDURATED ORFINS HAE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X RENEGADE	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		Similar Disense Hended Chiento.	

PROJECT REFERENCE NO.



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Date:	June 2018
WBS Number:	55003.1.FR1
Federal Aid Number:	BRSTP-0125(6)
TIP Number:	B-5503
County:	Martin
Description:	Bridge No.570053 over Collie Swamp on SR 1142 (Prison Camp Road)

Subject: Roadway Geotechnical Report - Inventory

Project Description

The project is located south of Williamston in Martin County, North Carolina. The project will consist of replacing the existing bridge and the realignment of SR 1142 (Prison Camp Road) at the Collie Swamp crossing. The new bridge will have three spans (1@55', 2@41') cored slab with spill-through abutments. The total length of the project is 0.175 miles. The alignment will be shifted to the north of its existing location. Maximum fill heights for construction of the roadway embankments and approaches will be about 7.5 feet. The project corridor is in a rural setting and the adjacent areas are wetlands.

The geotechnical subsurface investigation was performed in October and November, 2017. Standard Penetration Test (SPT) borings were advanced using a Diedrich D-50 and an Acker Renegade rotary drill rigs, both equipped with a recently calibrated automatic hammer. Borings were advanced utilizing wash boring drilling techniques to the necessary depths. In addition to soil test borings performed along the corridor, ten hand auger borings were performed along the -L- alignment. Representative soil samples were collected in the field for visual classification and selected samples were submitted for laboratory analysis by Terracon's soil testing laboratory. Laboratory testing was performed in accordance with the AASHTO Soil Classification System.

The following alignment was investigated by soil testing and visual reconnaissance:

<u>Alignment</u>	Stations
-L-	18+10 to 27+30

Physiography and Geology

The site is located within the Inner Coastal Plain Physiographic and Geologic Province of North Carolina in Martin County. The Coastal Plain Province is characterized by subdued topographic features. The existing natural grade elevations along the investigated corridor range from approximately 35 to 50 feet. In general, the topography at this site is flat.

The project is located in the Inner Coastal Plain Physiographic Province with geology consisting of a wedge of unconsolidated sands, silt, marl, and other clays interbedded with occasional limestone strata, which rests atop crystalline basement rocks.

Based on previous mapping (N.C. Geologic Map 1985) and our knowledge of the local geology, the site falls within the Tertiary age Yorktown Formation. However, based on our site visit and subsurface conditions encountered, the near surface soils appear to be recent alluvial deposits and are consistent with interbedded sands, clayey sands and clays typical of alluvial deposits in the Coastal Plain. These near surface soils overlie the Yorktown Formation. The Yorktown Formation soils are described as fossiliferous clay with varying amounts of fine-grained sand and bluish-gray shell material commonly concentrated in lenses mainly in the area north of the Neuse River.

Under the Yorktown Formation soil, the Cretaceous age Black Creek Formation was encountered. The Black Creek Formation soils are described as gray to black lignitic clay with thin beds and laminae of fine-grained micaceous sand and thick lenses of cross-bedded sand. Glauconitic, fossiliferous clayey sand lenses are common in the upper part.

Soil Properties

Soils encountered during this investigation are separated into three categories based on their origin. The soils encountered consist of roadway embankment fill, alluvial deposits, and Formational soils.

Roadway Embankment soils were encountered at the following approximate locations:

Alignment -L--L-

Roadway embankment soils were encountered along the -L- alignment at the beginning through the end of the roadway work limits. Approximately 3 to 10 feet of roadway embankment fill soils were encountered along the -L- alignment and at the approaches to the existing bridge. Down-station from the existing bridge, soils consist of soft to medium stiff, moist to wet, fine sandy silt (A-4) and loose to medium dense, moist to wet, relatively clean to silty and clayey fine to coarse sands (A-2-4, A-2-6). Up-station of the existing bridge these soils also include very soft to medium stiff, moist to wet, fine sandy clays with a trace of gravel and organics (A-6).

Alluvial soils were encountered at the following approximate locations:

<u>Alignment</u>

-L-

Alluvial deposits are present at the surface and beneath some of the roadway embankment soils. The existing roadway appears to have been undercut during the original construction. The alluvial soils along the -L-alignment consist of silty to relatively clean very loose to dense, saturated, sands (A-2-4, A-3) and very soft to medium stiff, saturated to wet, fine sandy to silty clays (A-6, A-7-6) containing trace to little amounts of organic matter. The clay soils exhibited plastic indices of 11 to 28 percent and are considered to be slightly plastic soils with between 44 and 64 percent fines passing the No. 200 sieve. Organic content tests indicate the alluvial materials contain approximately 4 to 8 percent organic matter.

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PROJECT REFERENCE NO.	SHEET NO.
B-5503	ЗA

<u>Stations</u> 18+10 to 21+02 22+88 to 27+30

<u>Stations</u> 18+10 to 27+30

The Yorktown Formation soils consist of very soft to very stiff, wet, highly plastic silty clays (A-7-6), with trace shell fragments, extending to the surface of the underlying Black Creek Formation. The clay soils exhibited plastic indices of 43 percent and are considered to be highly plastic soils. These soils also had between 85 and 94 percent fines passing the No. 200 sieve.

Groundwater

The project crosses Collie Swamp which flows south through of the corridor. Groundwater was encountered above the surface to 3.5 feet below the existing the ground surface on the -L- alignment. The depth of groundwater, beneath the ground surface, will fluctuate with rising of the adjacent wetland areas during seasonal precipitation and may occur a higher levels at other times of the year and above less permeable near surface clayey soils. The normal water surface elevation of Collie Swamp was 29.1 feet on June 2017.

Areas of Special Geotechnical Interest

1) <u>Soft Wet Alluvial Organic Soils</u> – Soft, wet, near surface soils which have the potential to cause embankment stability/settlement problems occur throughout the following sections:

<u>Alignment</u>	<u>Station (±)</u>
-L-	18+10 to 21+67
-L-	22+92 to 27+30

<u>Closing</u>

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us at your convenience.

BULK SAMPLES

No bulk samples were collected.

UNDISTRUBED SAMPLES

No "Shelby" tube samples were taken.

Sincerely, Terracon Consultants, Inc.



Andrew A. Nash, PE Geotechnical Department Manager

- These soils contain trace to little organic matter. A discussion of these soft, wet, alluvial, near surface soils is located above in the section titled "Soil Properties".
- 2) <u>High Groundwater</u> Groundwater was encountered at the following locations within 6 feet of proposed grades:

Alignment -L- <u>Stations</u> 18+10 to 27+30

3) <u>Poor Drainage</u> – The following areas are delineated as wetland and were observed to hold standing surface water for periods during the investigation:

Alignment -L- <u>Stations</u> 18+10 to 27+30

PROJECT REFERENCE NO.	SHEET NO.
B-5503	3B

Matthew J. Alexander, PE Senior Geotechnical Engineer





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PROJECT REFERENCE NO.

B-5503

SHEET NO.

15

#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 55003.1.FR1

**TIP:** B-5503

COUNTY:

DESCRIPTION: BRIDGE NO. 570053 OVER COLLIE SWAMP ON SR 1142 (PRISON CAMP ROAD)

			<b>.</b>	Depth							% by V	leight		%	%	Passing (siev	/es)		0/
Sample No.	Alignment	Station	Offset (feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic		
S-1	-L-	19+50	19 LT	0 - 3.0	A-4 (0)	16	NP	5.1	64.0	16.6	14.3	0	100	98	37	23.4			
S-5	-L-	19+50	40' LT	0.0-1.0	A-4 (0)	33	9	8.0	60.1	17.7	14.2	0	100	96	38	47.1	7.1		
S-6	-L-	19+50	40' LT	1.5-3.0	A-6 (3)	24	11	3.2	50	21.2	25.6	0	100	99	53	17.6			
S-2	-L-	20+00	13 LT	0 - 1.5	A-2-4 (0)	17	NP	27.9	50.3	9.4	12.4	1	98	86	25				
S-7	-L-	20+00	40' LT	0.0-2.0	A-2-4 (0)	13	NP	2.2	79.2	10.5	8.1	0	100	100	24	19.1			
S-8	-L-	20+50	40' LT	0.0-2.0	A-2-4 (0)	13	NP	1.6	85.0	7.6	5.8	0	100	100	18	19.9			
SS-2	-L-	21+51	5 RT	48.5 - 50.0	A-7-6 (44)	60	43	0.0	12.2	24.9	62.9	0	100	100	94	45.2			
S-9	-L-	22+97	25' RT	1.0-2.0	A-6 (2)	29	14	27.2	35.5	14.2	23.1	0	98	84	40	40.3	4.2		
SS-11	-L-	22+97	25' RT	18.5 - 20.0												51.5			
SS-12	-L-	22+97	25' RT	23.5 - 25.0												54.3			
SS-13	-L-	22+97	25' RT	28.5 - 30.0												58.7			
SS-14	-L-	22+97	25' RT	33.5 - 35.0												55.9			
SS-15	-L-	22+97	25' RT	38.0 - 40.0												60.1			
SS-16	-L-	22+97	25' RT	43.5 - 45.0	A-7-6 (38)	58	43	0.0	22.8	24.1	53.1	0	100	100	85	45.6			
SS-17	-L-	22+97	25' RT	48.5 - 50.0												42.5			
SS-18	-L-	22+97	25' RT	53.5 - 55.0												40.0			
SS-19	-L-	22+97	25' RT	58.5 - 60.0												40.2			
SS-20	-L-	22+97	25' RT	63.5 - 65.0												35.7			
SS-21	-L-	22+97	25' RT	68.5 - 70.0												28.6			
S-10	-L-	23+00	65' RT	2.0-3.0	A-4 (1)	20	6	12.7	34.0	29.6	23.7	1	97	91	56	-			
SS-1	-L-	23+70	9 RT	1.0 - 2.5													8.1		
S-11	-L-	23+70	9' RT	1.0-2.0	A-7-6 (15)	45	28	1.9	38.3	16.9	42.9	0	100	99	64	44.6	6.6		
S-3	-L-	24+45	9 RT	0.7 - 1.4	A-6 (5)	28	14	0.8	46.2	22.9	30.1	0	100	100	59	20.2			
S-4	-L-	25+00	3 RT	1.0 - 1.7	A-6 (2)	30	13	2.9	59.1	11.7	26.3	0	100	100	44	23.0			

NP - NONPLASTIC

MARTIN

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number

#### **CONTENTS** SHEET NO.

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REFERENCE

**DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN PROFILE BORE LOGS LABORATORY TESTING SUMMARY

#### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

	MARTIN
PROJECT DESCRIPTIO	BRIDGE NO. 570053 OVER
COLLIE SWAM	P ON SR 1142 (PRISON CAMP
	ROAD)

5003 S ... PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5503	1	9

#### 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 1919) TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAIL

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 STIL UN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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 CALIFORED THAT TO THE DETAILS AND COMMENT ON CLIMATOR THE THE 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPNION 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 INVESTIGATION AS HE DEEMS NECESSART TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOM THE ACTUAL CONTENS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES: I. 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.

_____

PERSONNEL
NASH, A. A.
SCHLEMM, T. S.
ECKLUND, M. A.
STUDNICKY, R. T.
DUGGINS, W. T.
MASHBURN, S. R.
INVESTIGATED BY IERRACON_CONSULIANTS_
DRAWN BY <u>ALEXANDER, M. J.</u>
CHECKED BYNASH, A. A.
SUBMITTED BY
DATE <i>JUNE 2018</i>
Consulting Engineers and Scientists 2401 BRENTWOOD ROAD, SUITE 107 RALEICH, NORTH CAROLINA 27604 NC REGISTERED ENGINEERING FIRM: F-0689 NC REGISTERED GEOLOGIC FIRM: C-367
SEAL 031022
SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AUUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY ON OR TEXTURE MOISTURE AASHTO CLASSIFICATION AND OTHER PERTINENT FACTORS SUCH		BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OF ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAF, SILLY CLAY, MOIST WITH INTERBEDDED FINE SAND LATERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NUTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	REVEALANCE FILE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE LEVEL HI
CLASS.  (≤ 35% PASSING 200)  (> 35% PASSING 200)  URGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	RYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP  A-1  A-3  A-2  A-4  A-5  A-6  A-7  A-1, A-2  A-4, A-5    CLASS  A-1  A-3  A-2  A-4  A-5  A-6  A-7  A-1, A-2  A-4, A-5	COMPDECCIDI ITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREDUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	OF SLOPE.
	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
* PASSING SILT- *10 50 MX GRANULAR SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TUTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN	GRANULAR SILT - CLAY	WEATHERING	ROCKS OR CUTS MASSIVE ROCK.
MATERIAI	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.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HURIZUNIAL.
LL – – – 40 MX 41 MN LITTLE OR PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF	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 FRAGS. ETHE STUTY OF CLAYEY STUTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTORE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING FEFECTS. IN	FIGSTLE - H FROFERTT OF SELITING HEUNG CLUSELT SFHEED FHRHELEE FEHRES.
GEN. RATING	$\nabla PW$ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR ONSULTABLE		DULL SUUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LUSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD.SEV.) 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.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TONS/FT ² )	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOUSE C 4 CROANN AD LOOSE 4 TO 10	SOIL SYMBOL SOIL SYMBOL SLUPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD 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.
(NON-COHESIVE) VERY DENSE > 50		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0		COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2		SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK BEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF
HARD > 30 > 4	INSTALLATION		RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS		<u>SAPRULITE (SAP.)</u> - RESIDUAL SUIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL CUARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	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	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHFRED	DI MUUERAIE BLUWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIEF OR PICK POINT	SIANUARU 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
	CLCLAY MODMODERATELY $\gamma$ -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 MOISTORE - CORRELATION OF TERMS	LET - CONF PENETRATION TEST NP - NON PLASTIC 7/d - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	PUINT OF A GEOLOGIST'S PICK.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED RY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MUISIURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	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
(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	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BMI3 - RR SPIKE IN 30" PINE (N:74II33; E: 2530859)
		VERY WIDE MORE THAN 10 FEET VERY THICKNESS	ELEVATION: 32 RG EEET
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 15 FEET	
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY		INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC Ø-5 VERY LOW	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS:	
MODERATELY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	HAND TOOLS:	GRAINS FAN BE SEDADATED EDAM SAMDLE WITH STEEL BOODE.	
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X  RENEGADE (TER92-0)	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

## PROJECT REFERENCE NO.



2



	NOTE: INFERRED STRATIGRAPHY AT CENTERLIN PROJECTED ON TO THE -L- CENTERLINE TAKEN FROM ROADWAY PLANS DATED J	NE, BORING PROFILE JULY 11, 201	5 7.				
60				\$S-3 \$S-4	\$S-7 \$S-8		
50		SS-2		\$\$-6 BI-	85-10 B		
40	EXISTING GROUND	EBI-B 2I+5I -L-		21+98 30′			,
30	BEGIN BRIDCE STA. 21+60.69 -L-				$\blacksquare$ ASPHALT, ABC $\blacksquare$ NWSE (06/17)	22+57 36' F	-L-
				- WOH	ËLEV: 29.1		(
20	ALLUVIAL,		DWN AND GRAY,		LOOSE TO DENSE, SATURATE	D,	FINE TO
10							
0	COASTAL PLAIN,		UE-GRAY AND		GREEN-GRAY, VERY SOFT		TO HARD,
_10			SILTY CLAY,		CALCAREOUS, TRACE		SHELL
-20							
-30					(YORKTOWN FORMATION)		
-40				9			
-50		9- 5-	DARK GRAY,		VERY LOOSE TO VERY		DENSE,
-60			SATURATED,		FINE SAND TO CLAYEY		FINE SAND
-70		BT FIAD			(BLACK CREEK FORMATION)		
-80							SOFT TO
-90			DARK-GREEN	8	AND DARK-GRAT, VERT		SUFIIU
-100			STIFF,		WET,FINE SANDY CLAY,		SILTY CLAY,
110	(A) ROADWAY EMBANKMENT, GRAY, SOFT,		AND FINE		SANDY SILT, TRACE MICA		AND TRACE T
-110	B ALLUVIAL, GRAY, VERY SOFT TO ME	EDIUM			LITTLE GLAUCONITE		
-120	STIFF, WET TO SATURATED, FINE S CLAY, LITTLE ORGANICS AND FINE CLAY, TRACE GRAVEL	SANDY SANDY		BT FIA	AD 17)	FIAD (11/17	)
_130							





WB	<b>S</b> 55003	3.1.FR1			Т	TIP B-5503 COUNTY MARTIN							GEOLOGIST NASH, A. A.					WBS 55003.1.FR1					TIP B-5503 COUNTY			
SITE DESCRIPTION BRIDGE NO. 570053 OVER COLLIE SWAMP ON SR 1142 (PRISO							(PRISON	I CAM	P RC	OAD	0)		GROUND	WTR (ft)	SITE	DESCR	RIPTION	BRID	DGE N	0. 570	053 OVER	COLLIE S	WAMP ON			
BOF	RING NO	. EB1-E	3		S	TATION 2	1+51		OFFSET	5 ft RT				ALIGNMENT -L-		0 HR.	N/A	BOR	ING NC	). EB1-I	3		SI	ATION 2	+51	
COL	LAR EL	<b>EV.</b> 31	.0 ft		T	OTAL DEP	<b>TH</b> 95.0 ft		NORTHIN	<b>G</b> 741,2	212			EASTING 2,530,835		24 HR.	FIAD	COL	LAR EL	. <b>EV.</b> 31	.0 ft		т	DTAL DEPT	<b>H</b> 95.0 f	t
DRIL	l Rig/Hai	/MER EF	F./DATI	E TER	346 DI	EDRICH D-50	90% 03/10/2	017		DRILL	METHO	D M	Mud I	Rotary	HAMME	R TYPE A	utomatic	DRIL	L RIG/HAI	MMER EF	F./DATI	E TER	346 DI	EDRICH D-50	90% 03/10	)/2017
DRI	LLER E	CKLUN	D, M. /	A.	S	TART DAT	E 10/26/17		COMP. DA	<b>ATE</b> 10/	/27/17			SURFACE WATER DEPT	H N/A	4		DRIL	LER E	CKLUN	D, M. /	A.	S	ART DATE	10/26/1	7
ELEV	, DRIVE ELEV	DEPTH	BLC	W CO	JNT		BLOWS PI	ER FOO	T	SAMP	· 🔨			SOIL AND ROCK	< DESC	RIPTION		ELEV	DRIVE ELEV	DEPTH	BLC	W COU	JNT		BLOWS	PER FOOT
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#### SHEET 5 OF 9

MARTIN			GEOLOGIST NASH, A.	Α.		
I SR 1142 (PRIS		OAE	D)		GROUN	ID WTR (ft)
OFFSET 5 ft R	Т		ALIGNMENT -L-		0 HR.	N/A
NORTHING 74	1,212		EASTING 2,530,835		24 HR.	FIAD
DRIL	L METHOD	Mud	Rotary	HAMME	R TYPE	Automatic
COMP. DATE	10/27/17		SURFACE WATER DEP	TH N/A	4	
SA	MP.	.				
75 100 N	D. MOI G		SOIL AND ROC	CK DESC	RIPTION	
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	Sat.					
<u> </u>			- <u>55.0</u> — — — DARK GRAY, CI		INE SAN	D <u>86.0</u>
	Sat.					
	Sat.		-64.0			95.0
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;	SITE	DESCR		BRID	DGE N	O. 57(	0053	OVER	COLLIE	SWAI	MP ON	I SR 1142 (I	PRISON	CAN	/P RC	OAI	D)	GROUND	WTR (ft)	SITE	DESCR		BRID	DGE NO	0. 570	053 O\	/ER C	COLLIE S	
	BORI	NG NO.	. B1-B			S	TATI	<b>ON</b> 2	1+98			OFFSET	30 ft RT				ALIGNMENT -L-	0 HR.	N/A	BOR	ING NO	. B1-B			SI		<b>1</b> 21	+98	
	COLL	AR ELI	<b>EV.</b> 33	.5 ft		Т	ΌΤΑΙ	L DEP	<b>TH</b> 149.	2 ft		NORTHING	<b>3</b> 741,2	02			EASTING 2,530,888	24 HR.	FIAD	COL	AR EL	<b>EV.</b> 33	3.5 ft		тс	TAL C	DEPTI	<b>H</b> 149.2	ft
	DRILL	RIG/HAN	/MER EF	F./DATI	e tef	R92-0 A	CKER	RENEG	ADE 94%	)3/09/2	2017		DRILL	/ETH	OD N	Mud	Rotary HAMM	ER TYPE Au	tomatic	DRILL	RIG/HAM	/MER EF	F./DATE	e ter	92-0 AC	KER RE	NEGA	DE 94% 03	/09/2017
	DRIL	ER D	UGGIN	S, W. ⁻	Т.	S	TAR		E 11/09	/17		COMP. DA	<b>TE</b> 11/	10/17	7		SURFACE WATER DEPTH N/	'A		DRIL	LER D	UGGIN	S, W. ⁻	Т.	SI	ART D	DATE	11/09/1	7
E	ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT			BLOW	S PER	FOOT		SAMP.				SOIL AND ROCK DES	CRIPTION		ELEV	DRIVE	DEPTH	BLO	w col	JNT			BLOWS	PER FOOT
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		-	t					· · ·		: :							BLUE-GRAY AND GREEN	-GRAY, SILT	Y			t				. <i>l</i> .   . <i>f</i> .	::	· · · ·	
	10	10.8 -	22.7	1	2	2	-  ¦			:   :			55-3	560		ł	FRAGMENTS, TRAC			-70	-69.2	102.7	WOH	3	2	<i>i</i> .	•••		
		-	Ŧ		-	-							33-3	- 50%		Ł	(YORKTOWN FORM	/ATION)			-	Ŧ		Ŭ	-	•5-			
			ŧ				¦			:   :						5						Ŧ				11			
	5	5.8 -	+ 2/./ +	2	3	3	╡╞╧	 16					SS-4	69%	%	1				-75	-74.2	+ 107.7 +	WOR	8	7		• · ·		
		-	‡					· · ·	· · · ·	: :				1								‡					/: : 	· · · ·	
		- 0.8	32.7				<u>   :</u>	· · ·		: :	· · ·										-79.2	+				· / ./.	::	· · · · ·	
-	0	-	+	2	3	4		7	· · ·	<u>.   .</u>			SS-5	59%	%					-80	-	ŧ	2	2	3	•5			
		-	ł				{			:   :												ŧ				1:	•••		
	-5	-4.2 -	37.7	1	2	2	-   <del> </del>	• • •		-   -			- CC C							-85	-84.2	117.7	WOH	WOH	8	1.			
		-	Ŧ		-	-							33-0	027		Ł					-	Ŧ			Ŭ	· <b>1</b> ·			
		-	ŧ				į.			:   :						5						Ŧ				:[:			
_	-10	-9.2 -	+ 42.7 +	1	2	2	┤╎┟	 1					SS-7	57%	%	Ł				-90	-89.2	+ 122.7 +	WOH	2	4				
		-	‡				!	· · ·		· · ·	· · ·			1								‡					: :	· · · · ·	
		-14.2 -	47.7				] ¦:	: : :		:   :	: : :										-94.2	127.7				į :	::	· · · · ·	
18	-15	-	±	WOH	1	2	∳3		 	<u> </u>		+ • • • • • • •	SS-8	48%	%					-95	-	±	WOH	WOH	6	<b>4</b> 6			+ • • • •
6/12/		-	t				$\  \cdot \ $		<b> </b> • • •	·   ·												t				• \.	•••		· · · ·
DT	-20	-19.2	52.7	WOU	WOU	2	-  E			.   .			00.0			1				-100	-99.2	132.7		6	7	: <b>`</b>			
01.0		-	Ŧ			_	¢2 ⁻		· · · ·			· · · ·	55-9	41%	⁷⁰	5					-	Ŧ			· '		13		
о С		-	‡				!:	· · · · · ·		: :	· · · ·											‡					i:	· · · · ·	
Z G	-25	-24.2 -	- 57.7	wон	1	3	╡╠╧		· · ·				SS-10	319	%	ł				-105	-104.2	+ 137.7 +	5	6	9	···	► ·		
BH.G		-	t				Ŧ	• · · ·		: :				1								t					Ē :	· · · ·	
g		- 20 2	- 62 7				\	• • •		-   -											100.2	+				· ·			
BR	-30	-29.2 -	+ 02.7	2	3	4	14	7	+					w		Ӻ				-110	-109.2	+ 142.7	5	6	6		12		+ • • • •
GEC		-	Ŧ					····  ···								5						Ŧ					\. \.		
5503_	_25	-34.2 -	67.7			_	:	ļ: : :		:   :	· · · ·					1				.115	-114.2	147.7				::	.\:	· · · · ·	
Щ В	-00	-	‡	3	4	5		<b>•</b> 9	· · ·	.   .		<u> </u>		W		1				-115	-	<b>‡</b>	6	8	11		•19		+ • • • •
UBL		-	<b>t</b>				:	4	· · · ·	:   :												<b>‡</b>							
ЕDC	-40	-39.2 -	72.7	5	6	8	+Ŀ	<u>·i</u> ··	· · ·	-   -				1.0/		Ł					_	ŧ							
BOR		-	t			-	•	<b>♥</b> 14	· · ·	$\cdot \mid \cdot$							42.5		70.0			£							
DOT		-	Ŧ				:	: = =	- <u>1</u>	.   .					0 0 0		DARK GRAY, FINE	SAND	<u> </u>			Ŧ							
Ş	-45	-44.2 -	+		7	20			11	·   ·				1	000		(BLACK CREEK FOR	MATION)		1		t							

#### SHEET 6 OF 9

MARTIN				GEOLOGIST SCHLEMN	1, T. S.		
I SR 1142 (P	RISON	CAMP	ROA	AD)		GROUN	ID WTR (ft)
OFFSET 30	0 ft RT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	741,20	)2		EASTING 2,530,888		24 HR.	FIAD
	DRILL M	ETHOD	) Mu	d Rotary	HAMME	R TYPE	Automatic
COMP. DAT	E 11/1	0/17		SURFACE WATER DEPT	H N/A	۱	
	SAMP.		L				
75 100	NO.	мо	O G	SOIL AND ROC	K DESC	RIPTION	
		/	Ŭ				
T		Sat.	• • • • •		, FINE	SAND	
				DARK GRAY CI		INF SAN	<u>10ed) 81</u> .0
		Sat.	$\sim$				
			$\mathbb{N}$				
+ • • • •		Sat.	$\mathbb{Z}$	_			
			$\langle \rangle \rangle$				
		<b>.</b> .	$\langle / \rangle$				
		Sat.	//	-			
			/./				
		Sat.	$\langle / \rangle$	_			
			//				
			///				
<u> </u>		Sat.	$\langle \rangle \rangle$	_			
		Sat	$\langle / \rangle$				
		Sal.	$\langle / \rangle$	-			
				DARK GRAY, FINE S		CLAY, TR	1 <u>11.0</u> RACE
		w		MICA, TRACE	GLAUC	CONITE	
· · · ·		W		-			
		w		-			
+		W		-			400 -
				DARK GREEN-GRA	Y, FINE	SANDY S	SILT,
		141		I RACE MICA, TR	ACE GL	AUCONI	IE
· · · ·		VV		-			
				DARK GRAY AND D	DARK G	REEN, SI	1 <u>36.0</u> LTY
		w		CLAY, TRACE MICA	, TRAC	E TO LIT	TLE
			N	-107.5			141.0
				DARK GREEN-GRA	Y, SILT		AND,
		W		- GLAU			-
• • • •							
· · · ·		۱۸/		- 445 7			
		vv	10800 	Boring Terminated a	t Elevati	on -115.7	149.2 ft IN
				COASTAL PLAIN (BLACK CREE	SILTY F K FORM	FINE SAN /IATION)	D
			L				



WE	<b>3S</b> 550	03.1.FR1			Т	IP B-5503	3	COUNT	ry Martin				GEO	LOGIST SCHLEMM, T.	. S.		WBS	55003.1.FR	1		TI	P B-5503		COUNTY
SI	E DESC	RIPTION	BRID	DGE NC	). 570	0053 OVEF		WAMP C	ON SR 1142	PRISON		P RO	AD)		GR	ROUND WTR (ft)	SITE	DESCRIPTION	N BRI	DGE NO	). 570	053 OVER	COLLIE S	WAMP ON
BC	RING N	<b>O.</b> B2-B			S	TATION :	22+57		OFFSET	36 ft RT	-		ALIG	NMENT -L-	0	HR. N/A	BOR	ING NO. B2-E	3		ST	ATION 22	2+57	
CC	ILLAR E	<b>LEV.</b> 23	3.8 ft		Т	OTAL DEF	<b>PTH</b> 137.7	ft	NORTHIN	<b>G</b> 741,2	218		EAS	<b>FING</b> 2,530,947	24	HR. FIAD	COL	LAR ELEV. 2	3.8 ft		тс	TAL DEPT	<b>H</b> 137.7	ft
DR	ILL RIG/H	AMMER EF	F./DATI	E TER9	92-0 A	CKER RENE	GADE 94% 03	3/09/2017		DRILL	METHO	D Mu	ud Rotary	HAN	MMER T	YPE Automatic	DRILL	_ RIG/HAMMER E	FF./DAT	TE TER	92-0 AC	KER RENEGA	ADE 94% 03/	/09/2017
DR	ILLER	DUGGIN	S, W. ⁻	Т.	S	TART DAT	Γ <b>Ε</b> 11/11/΄	7	COMP. DA	<b>TE</b> 11/	/11/17		SUR	FACE WATER DEPTH	N/A		DRIL	LER DUGGIN	<b>I</b> S, W.	Т.	ST	ART DATE	E 11/11/1	7
ELE			BLC	W COU	NT		BLOWS	PER FOO	т	SAMP	. <b>▼</b> ∕			SOIL AND ROCK DI	ESCRIP	PTION	ELEV	DRIVE DEPTH		OW COL	JNT		BLOWS	PER FOOT
(π	) (ft)	(π)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	И	) G	ELEV. (	ft)		DEPTH (ft)	(π)	(ft) ^(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50
25	;	+											23.8	GROUND SU	IRFACE	0.0	-55	+ <b>+</b>		+	+		Matc	h Line
		+				·						000	-					-57.5 - 81.3						
20	)	Ŧ										0000	F	SAND	)	COARGE	-60	l Ŧ	4	4	5	. <b>9</b>		
		Ŧ								1		000	F					] _ <del>,</del>				1		
		<u> </u>										000	- 16.3			7.5		<u>-62.5 <del>+</del> 86.3</u> +	3	1	2	$\int_{\Theta_3} \cdot \cdot \cdot \cdot$		
15	5	Ŧ			Z	<b>4</b>					W		-	COASTAL P LIGHT GREEN-GRA	P <b>LAIN</b> AY AND I	LIGHT	-65							+ • • • •
	12.7	<u>,</u> <u> </u>	1	2	3								F	BLUE-GRAY, SIL CALCAREOUS, TR	LTY CLA RACE SH	AY, HELL		-67.5 - 91.3				<del> </del> · · · ·		
10	)	Ŧ	'		0	<b>•</b> 5							F	FRAGMEN (YORKTOWN FO	NTS DRMATIO	ON)	-70	Ŧ	'		3	<b>∮</b> 5 : :		
		Ŧ								1			-	(		- ,		Ŧ				<u>i</u>		
	7.5	<u>+ 16.3</u>	2	2	4	1					w		F					-72.5 + 96.3	WOH	н woн	2			
5		Ŧ						+ • • •					-				-75							+ • • • •
	2.5	21.3	2	2	1								F					-77.5 101.3						
0		Ŧ		2	4	•6							F				-80	Ē			2	<b>9</b> 2		
		Ŧ											F									$\frac{1}{1}$		
	-2.5	<u> </u>	1	1	3	4					w		E					<u>-82.5 T 106.3</u> I	WOH	1 1	4	<b>4</b> 5		
-5		Ŧ						+					-				-85	+ <del>-</del>						
	-7.5	31.3		2	2								F					-87.5 111.3						
-1(		Ŧ		2	2	<b>4</b>							F				-90	Ŧ			5	<b>•</b> 5		
		<u> </u>											F									<u>i</u>		
	-12.	5 <u>T 36.3</u> T	woн	1	2	<b>↓</b> 3					w		E					<u>-92.5 T 116.3</u> T	WOH	I WOH	1	<b>1</b> 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
-1:	5	Ŧ											-				-95	$+$ $\pm$						+
	-17.	5 + 41.3	WOH	WOH	3		.						L					-97.5 121.3			6	$\dot{\lambda}$		
-20	)	Ŧ		WOIT	5	<b>P</b> <u>3</u>							L				-100		'		Ĭ	. 10 .		
	22	+ 46.2				:	.						L									$  \cdot \cdot$		
	22.3	40.3	WOH	WOH	3	- <b> </b> <b>•</b> <u>3</u> :					w		Ł					-102.5 120.3	4	7	9	16		
<u>-2</u> ;	5	+						<u> </u>									-105	+ +						
6/12/	-27.	5 + 51.3	3	3	4	$\left  \left  \begin{array}{c} \mathbf{i} \\ i$	.											-107.5 - 131.3	5	5	7			
-30	)	‡		-													-110					· • • 12		· · · ·
DOT	-32	5 + 56 3					.   .	· · · ·	· · · · · ·									-112 5 + 136 3						
2 Z		1	3	4	4						w								4	6	7	 13		
-3: -3:	<u>&gt;</u>	+											<b>-</b>											
ᆸ	-37.	5 + 61.3	4	5	7		.   .		· · · · · ·									1						
0 2 2 2 3 -4	)	1			-																			
0 E D	-42	5 + 66 3					.   .	· · · ·	· · · · · ·									1						
203		1	4	5	5	10					w							1						
5월 -4년 의	2	‡				<del>           </del>				-			-46.2			70.0		‡						
OUBL	-47.	5 <del>+</del> 71.3	4	2	3	<b> </b>	·   · · · · ·	· · · ·	·   · · · ·		Sat	///	⊧ ⊧	DARK GRAY, CLAYE (BLACK CREEK FO	EY FINE ORMAT	SAND ION)		‡						
ŭ ⊮50	)	‡							·   · · · ·			///	⊧ ⊨-					‡						
T BOI	-52	5 + 76.3					·   · · · · ·	· · · ·	·   · · · · ·			///	⊧ ⊧					‡						
	_	+	4	3	2	]   <b>∮</b> 5]	:   : : : :				Sat.	$\langle / \rangle$	⊧ ⊧					‡						
<u></u> ;								1	1								1	1 I						

#### SHEET 7 OF 9

MARTIN				GEOLOGIST SCHLEM	M, T. S.		
I SR 1142 (P	RISON	CAMF	RO	AD)		GROUN	D WTR (ft)
OFFSET 3	6 ft RT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	741.21	8		EASTING 2.530.947		24 HR.	FIAD
	DRILL M	FTHOD	) Mu	d Rotary	HAMME	R TYPF	Automatic
	F 11/1	1/17			TH N/4		
	SAMP.		L			·	
75 100	NO.		0	SOIL AND ROO	CK DESC	RIPTION	
		7 10101					
T	+		$\sim$	DARK GRAY, CI	AYEY F	INE SAN	
		Sat	$\langle \rangle \langle$	BLACK CREEK FO	RMATIO	N) (CONTII	nuea)
· · · ·		out.	///	_			
			//				
		Sat.	//				
				_			
			//				
		Sat.					93.0
				- DARK GRAT, FINE	IICA	5LAT, TP	AUL .
		w					
				_			
		W					
				_ 			105.0
		14/	$\mathbf{N}$	DARK GRAY AND CLAY, TRAC	DARK G E MICA,	REEN, SI TRACE	LTY
		vv		GLAUĆONITE	, CALCA	REOUS	
			$\square$				
		w	$\square$				
			$\square$	_			
			$\square$				
		W	$\square$				
							120.0
		w		SANDY SILT, TR		CA, TRAC	E
· · · ·				GLAU			124.0
				DARK GRAY CALCAREOUS, T	r, SILTY RACE GI	LAUCON	ITE
		W	$\square$				
							130.0
		w/		DARK GRAY, FINE MICA, TRACI	SANDY E GLAUC	SILT, TR CONITE	ACE
· · · ·				_			
		W		-113.9			137.7
				Boring Terminated a COASTAL PLAIN	at Elevati I FINE S/	on -113.9 ANDY SIL	ft IN _T
				BLACK CREE	EK FORN	(ATION)	
			-				
				•			
				—			
				_			
				-			



COUNTY MARTIN GEOLOGIST NASH, A. A. WBS 55003.1.FR1 COUNTY WBS 55003.1.FR1 **TIP** B-5503 **TIP** B-5503 SITE DESCRIPTION BRIDGE NO. 570053 OVER COLLIE SWAMP ON SR 1142 (PRISON CAMP ROAD) **GROUND WTR (ft)** SITE DESCRIPTION BRIDGE NO. 570053 OVER COLLIE SWAMP ON BORING NO. EB2-B **STATION** 22+97 OFFSET 25 ft RT ALIGNMENT -L-**STATION** 22+97 0 HR. N/A BORING NO. EB2-B COLLAR ELEV. 32.0 ft TOTAL DEPTH 95.0 ft **NORTHING** 741,245 EASTING 2,530,981 24 HR. FIAD COLLAR ELEV. 32.0 ft TOTAL DEPTH 95.0 ft DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017 DRILL METHOD Mud Rotary HAMMER TYPE Automatic DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017 DRILLER ECKLUND, M. A. **START DATE** 10/26/17 COMP. DATE 10/26/17 SURFACE WATER DEPTH N/A DRILLER ECKLUND, M. A. **START DATE** 10/26/17 ELEV DRIVE DEPTH BLOW COUNT (ft) (ft) 0.5ft 0.5ft 0.5ft ELEV DRIVE DEPTH (ft) (ft) (ft) (ft) BLOWS PER FOOT SAMP. BLOW COUNT BLOWS PER FOOT SOIL AND ROCK DESCRIPTION 0 (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 25 50 75 100 NO. MOI G 25 50 ELEV. (ft) DEPTH (ft Match Line 35 -45 . . . . . . . . -46.5 + 78.5 15 41 55 . . . . 32.0 0.0 . . . . ROADWAY EMBANKMENT 31.0 I 1.0 . . . . . . . . . . . . 3 . .... 30 3 3 Μ GRAY, FINE SANDY CLAY, TRACE -50 GRAVEL . . . . . . . . . . . . 28.5 . . . -51.5 83.5 . . 4 4 . . . . . . . W . . . . . . . . . . . . . . . . . . . . . 26.5 <u>5.5</u> 26.0 ALLUVIAL . . . . . . . . . . . . . . . . . . . . . 25 WOH WOH WOH -55 Sat. GRAY, FINE SANDY CLAY, LITTLE . . . . . . . . . . . . . . 23.5 ORGANICS -56.5 + 88.5 · 1-NOH . . . . . . . . . . . Δ 9 . . . . Δ W . . . þ • . . . . . . . . . . . . . . . . . . . . . . 21.0 <u>11.0</u> . . . . . . . . . . - -GRAY, FINE SAND 20 -60 . . . . 18.5 . . . . . . . . . -61.5 + 93.5 . . . 13.5 15 18 . . . . 6 . . . . 3 4 4 . . . . . . Sat. **0**33 . . . . . . . - -. . . . . . . 15 15.0 . . . . 13.5 . . . . . . 18.5 BLUE-GRAY AND GREEN-GRAY, 4 2 4 . . . . . . . . . . SS-11 52% CALCAREOUS SILTY CLAY, TRACE . . . . . . . . . . SHELL FRAGMENTS . . . . . . . . . . 10 (YORKTOWN FORMATION) . . . . . . . . . . 85 23 5 Δ Δ . . . . 3 . . . . . . SS-12 54% . . . . . . . . . . . . . . . . . . . . . . . . 3.5 28.5 4 2 5 . . . . . . . . . . . SS-13 59% . . . . . . . . . . . . . . . . . . . . 0 . . . . . . . . . . . -1.5 33.5 5 3 6 . . . . . . SS-14 56% **0**11 . . . . . . . . . . . . . . . . . . . . . . -5 . . . . . . . . . . -6.5 38 2 4 4 . . . . . . . . . . SS-15 60% •8 . . . . . . . . . . . . . . . . . . . . -10 . . . . -11.5 43.5 -1 . . . . . . 3 5 8 . . . . . . . . . . . SS-16 46% 13 . . . . . . . . . . . . . . . . . -15 6/12/18 - 7 . . . . . . . . . -16.5 48.5 2 2 . . . . SS-17 43% . . . . . . . . . . .GDT . . . . . . . - - --20 DOT . . . . . . . . . . -21.5 + 53.5 2 3 3 . . . . . . . . SS-18 40% . . . Ŋ . . . . . . . . . . . . . . . . . BH.GPJ -25 . . . . -26.5 + 58.5 . . . . . . . . 5 8 10 . . . . . . . . . . SS-19 40% . . . . BRDG . . . . . . . . . . - - --30 GEO . . . . -31.5 + 63.5 Δ . . . . . . . . . . SS-20 36% . . . . . . . . . . . B5503 . . . . . . . . . . . -35 -36.5 + 68.5 . . . . . . . . . . Ш 5 . . . . . . . . . . . SS-21 29% **0**14 . . . . . . . . . . . - -. . . -40 . . . . . . . -41.5 13 55 74.5 . . . . Sat. -42.5 **~**68-DARK GRAY, FINE SAND . . . . . . . - - -(BLACK CREEK FORMATION)

#### SHEET 8 OF 9

MARTIN				GEOLOGIST NASH, A.	Α.		
SR 1142 (P	RISON	CAMF	ROA	AD)	(	GROUN	ID WTR (ft)
OFFSET 2	5 ft RT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	741,24	45		EASTING 2,530,981	2	24 HR.	FIAD
	DRILL M	ETHOD	) Mu	d Rotary	HAMMEF	R TYPE	Automatic
COMP. DAT	E 10/2	26/17		SURFACE WATER DEP	TH N/A		
	SAMP.		L				
75 100	NO.	моі	G	SOIL AND ROC	K DESCR		
					_		
· · · ·			0 0 0 0 0 0 0 0 0 0 0 0	DARK GRA	Y, FINE S	AND	— — — — — — nued)
		Sat.	0000	-49.0		•) (00//0	81.0
			$\sim$	DARK GRAY, CL	AYEY FI	NE SAN	5
		Sat.		•			
			$\mathbb{N}$				
			$\sim$	_			
		Sat.	$\mathbb{N}$				
			$\mathbb{N}$				
			$\langle \rangle$				
		Sat.	$\sim$	-63.0 Boring Terminated	at Elevatio	on -63.0	95.0 ft IN
				_ COASTAL PLAIN ( (BLACK CREE	CLAYEY I	FINE SA	ND
				-			
				-			
			F	-			
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				-			

#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 55003.1.FR1

**TIP:** B-5503

COUNTY:

#### DESCRIPTION: BRIDGE NO. 570053 OVER COLLIE SWAMP ON SR 1142 (PRISON CAMP ROAD)

Offse		0//	Depth	AASHTO				% by V	Veight		%	%	Passing (siev	/es)		0/	
Sample No.	Alignment	Station	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
SS-2	-L-	21+51	5 RT	48.5 - 50.0	A-7-6 (44)	60	43	0.0	12.2	24.9	62.9	0	100	100	94	45.2	
SS-3	-L-	21+98	30 RT	22.7 - 24.2												56.3	
SS-4	-L-	21+98	30 RT	27.7 - 29.2												69.1	
SS-5	-L-	21+98	30 RT	32.7 - 34.2												58.7	
SS-6	-L-	21+98	30 RT	37.7 - 39.2	A-7-6 (46)	73	55	0.0	12.7	26.0	61.3	0	88	88	81	61.9	
SS-7	-L-	21+98	30 RT	42.7 - 44.2												56.6	
SS-8	-L-	21+98	30 RT	47.7 - 49.2												47.6	
SS-9	-L-	21+98	30 RT	52.7 - 54.7												41.2	
SS-10	-L-	21+98	30 R I	57.7 - 59.2												31.0	
		00.07	10 DT	40 5 00 0												<b>545</b>	
<u>SS-11</u>	-L-	22+97	16 R I	18.5 - 20.0												51.5	
<u>SS-12</u>	-L-	22+97	16 R I	23.5 - 25.0												54.3	
<u>SS-13</u>	-L-	22+97	16 R I	28.5 - 30.0												58.7	
<u>SS-14</u>	-L-	22+97	16 R I	33.5 - 35.0												55.9	
55-15	-L-	22+97	16 R I	38.0 - 40.0												60.1	
00.40		00:07				50	40	0.0	00.0	04.4	50.4	0	100	100	05	45.0	
55-16	-L-	22+97	16 R I	43.5 - 45.0	A-7-6 (38)	58	43	0.0	22.8	24.1	53.1	0	100	100	85	45.6	
<u> </u>	1	22.07	16 DT	49.5 50.0												40.5	
SS-17 SS 19	-L-	22+97		40.3 - 50.0												42.5	
SS-10 SS 10	-L-	22+97		58.5 60.0												40.0	
<u> </u>	- <u>-</u> -	22+37	16 RT	63 5 - 65 0												35.7	
SS-20	- <u>_</u> -	22+97	16 RT	68 5 - 70 0												28.6	
00 21	L	22157		00.0 70.0												20.0	
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## Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number