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27071

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REFERENCE

## **CONTENTS** SHEET NO.

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TITLE SHEET
LEGEND
SITE PLAN
PROFILE
CROSS SECTIONS
BORE LOGS

**DESCRIPTION** 

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_CLEVELAND

PROJECT DESCRIPTION US 74, SHELBY BYPASS FROM EXISTING US 74 WEST OF SR 2238 (LONG BRANCH ROAD) TO WEST OF SR 1001

SITE DESCRIPTION <u>STRUCTURE</u> #7 - BRIDGE NO. 494 OVER US 74 (DIXON BLVD.) ON -Y42- BETWEEN SR 2041 (WILLIAMS RD.) AND US 74 BUSINESS (E. MARION ST.)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707E	1	12

#### **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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6860. THE SUBSIFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUFFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUFFACE 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 RELIBULITY INHERENT IN THE SUBSUFFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES SUBJERACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOSTUFE CONDITIONS MAY VARY CONSDERABLY WITH THE ACCOMPING OL CUMUTIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

NOTES:

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

HPC

GOODNIGHT, D.J.

INVESTIGATED BY \_\_\_\_\_GOODNIGHT, D.J.

DRAWN BY \_\_\_\_\_CROCKETT, S.C.

CHECKED BY HAMM, J.R.

SUBMITTED BY \_\_\_\_\_\_ FALCON ENG.



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

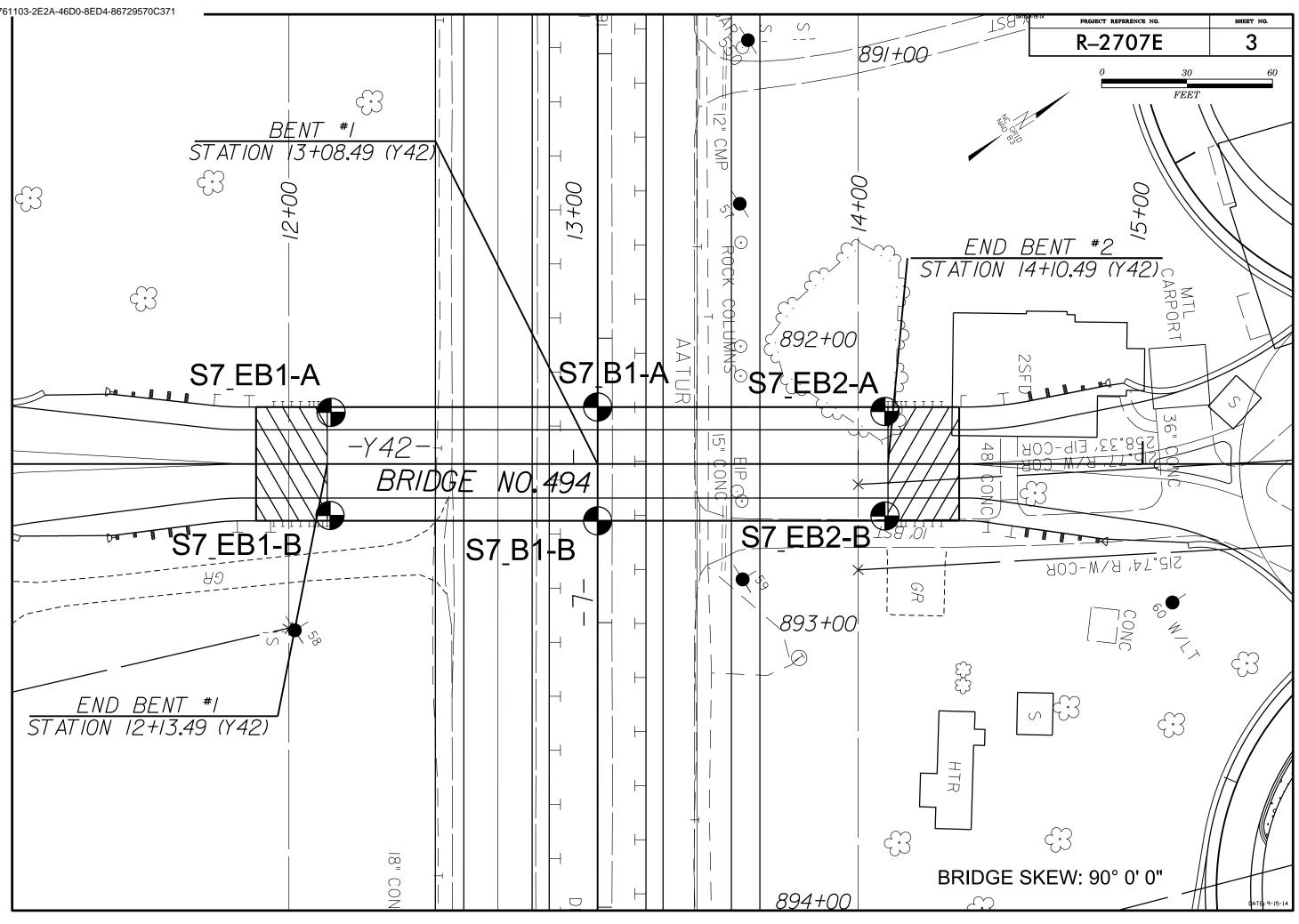
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION				
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0,I BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK				
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:				
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, <u>SUBANGULAR, SUBROUNDED</u> , OR <u>ROUNDED</u> .	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT				
SOIL LEGEND AND AASHTO CLASSIFICATION		ROCK (WR) 100 BLOWS PER FOOT IF TESTED.				
GENERAL         GRANULAR MATERIALS         SILT-CLAY MATERIALS         ORGANIC MATERIALS           CLASS.         (≤ 35% PASSING *200)         (> 35% PASSING *200)         (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC RO ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC RO				
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         A-1-b         A-2-5         A-2-6         A-2-7         A-2-7         A-3         A-5, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	I SINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA				
	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR)				
	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDS				
7. PASSING 10 50 MX CLAY	PERCENTAGE OF MATERIAL					
*40 30 MX 50 MX 51 MN *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK				
MATERIAL PASSING *40 LL 40 MX 41 MN 48 MX 41 MN 40 MX 41 MN 48 MX 41 MN 50ILS WITH LL 40 MX 11 MN 18 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	TRACE OF ORGANIC MATTER         2         - 3%         3         - 5%         TRACE         1         10%           LITTLE ORGANIC MATTER         3         - 5%         5         - 12%         LITTLE ORGANIC         10         - 20%           MODERATELY ORGANIC         5         - 10%         2         - 20%         SOME         20         - 35%           HIGHLY ORGANIC         5         - 10%         2         - 20%         HIGHLY         35%         AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY C (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER H				
	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO				
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SAND GRAVEL AND SAND	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS				
	$\nabla$ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA				
AS SUBGRADE EXCELLENT TO GOUD FAIR TO POUR POOR POUR UNSUTTABLE	· · · · · · · · · · · · · · · · · · ·	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.				
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F				
	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE L (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND				
PRIMARY SOIL TYPE         CUMPALINESS OR CONSISTENCY         PENETRATION RESISTENCE (N-VALUE)         COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )           CENERALLY         VERY LOOSE         < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A				
GRANULAR LUUSE 4 IU IØ GRANULAR MEDIUM DENSE 10 TO 30 N/A		TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</u>				
MATERIAL (NON-COHESIVE)         DENSE VERY DENSE         30 TO 50 >50         10 KH           VERY DENSE         >50	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT ON AUGER BORING ON TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF <u>TESTED</u> , WOULD YIELD SPT N Y				
GENERALLY         SOFT         2 TO 4         0.25 TO 0.5           SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2           (COMESIVE)         VERY STIFF         15 TO 30         2 TO 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TIEVE ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTANCE TO SPT N-VALUE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.				
HARD > 30 > 4		ROCK HARDNESS				
TEXTURE OR GRAIN SIZE		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMEN:				
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BI				
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.				
GOLDER,         CORD,         COR,         SAND         SAND         SAND         CL,         CL,           (BLDR,)         (COB,)         (GR,)         (GS,)         (CS, SD,)         (F SD,)         (SL,)         (CL,)           GRAIN         MM         305         75         2,0         0.25         0.05         0.005	ABBREVIATIONS AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DI BY MODERATE BLOWS.				
	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 2 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD				
SOIL         MOISTURE         - CORRELATION         OF         TERMS           SOIL         MOISTURE         SCALE         FIELD         MOISTURE         GUIDE         FOR         FIELD         MOISTURE         DESCRIPTION         FOR         FIELD         MOISTURE         DESCRIPTION         FOR         FIELD         MOISTURE         DESCRIPTION         FOR         FIELD         MOISTURE         DESCRIPTION         FOR         FIELD         FOR         FIELD         FOR         FIELD         FOR         FIELD         FOR         FIELD         FOR         FIEL	$\begin{array}{c} \mbox{CPI - CONE PRETRATION TEST} & \mbox{NP - NON PLASTIC} & \mbox{$\mathcal{N}_{d}$- DRY UNIT WEIGHT} \\ \mbox{CSE COARSE} & \mbox{ORGANIC} \\ \mbox{DMT - OLLATOMETER TEST} & \mbox{PMT - PRESSUREMETER TEST} & \mbox{SAMPLE ABBREVIATIONS} \\ \end{array}$	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN				
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT,) FROM BELOW THE GROUND WATER TABLE	DPT         O'NNAMIC PENETRATION TEST         SAP SAPROLITIC         S - BULK           e         - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F         - FINE         SL SLIT, SLITY         ST - SHELBY TUBE	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH				
LL LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.				
RANGE - WET - (W) SCHIBGEDIALES DATION TO (PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS         w - MOISTURE CONTENT         CBR - CALIFORNIA BEARING           HI HIGHLY         V - VERY         RATIO	FRACTURE SPACING BEDDING				
	EQUIPMENT USED ON SUBJECT PROJECT	T <u>ERM SPACING</u> T <u>ERM</u> VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED				
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. MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.1				
- DRY - (D) REQUIRES ADDITIONAL WATER TO		CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.0 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00				
AITAIN UPTIMUM MUISTURE	CME-55	THINLY LAMINATED <				
		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE				
PLASTICITY INDEX (P)         DRY_STRENGTH           NON_PLASTIC         Ø-5         VERY_LOW           SLIGHTLY_PLASTIC         6-15         SLIGHT		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.				
COLOR	TRICONE TUNGCARB.	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.				
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT         VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.				

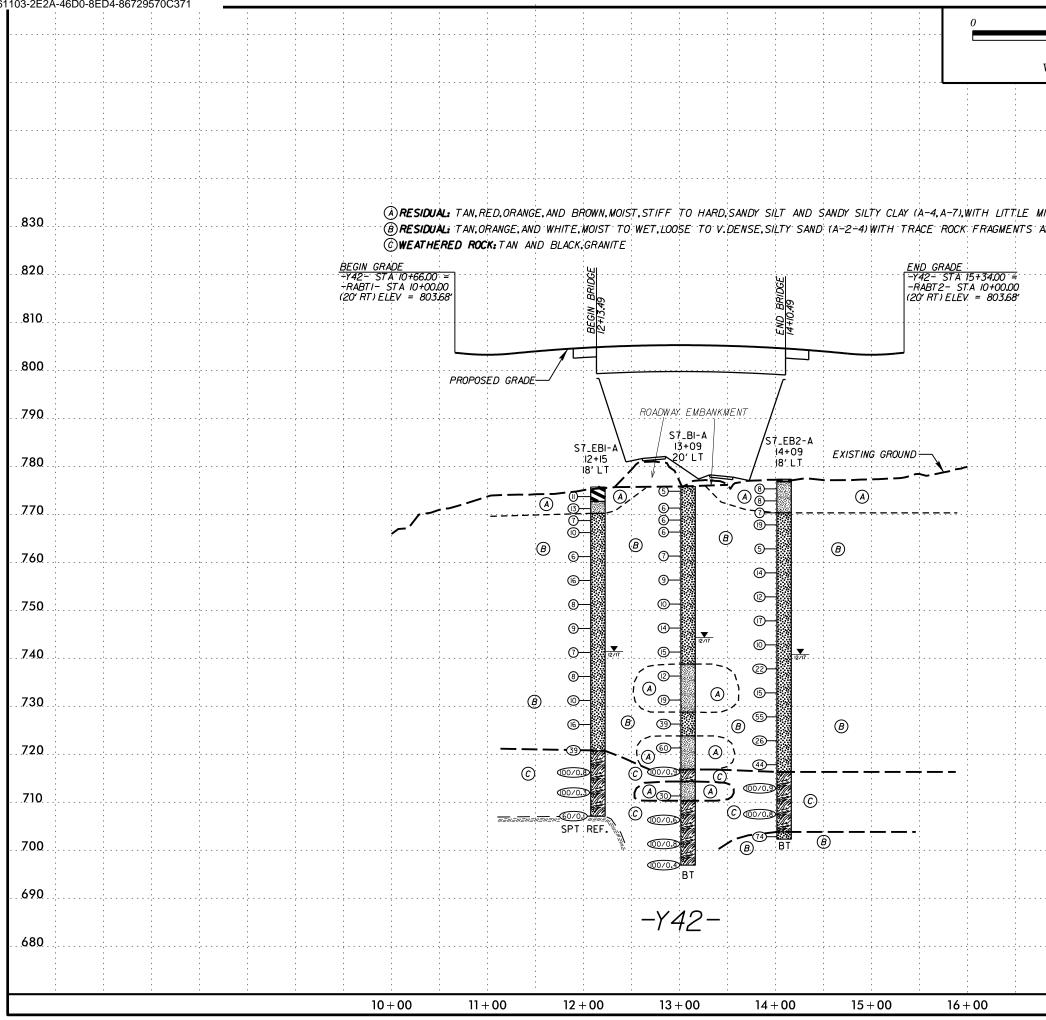
#### PROJECT REFERENCE NO.

## R-2707E

2

.1 FOOT PER 60 AQUIFER - A WATER BEARING FORMATION OR STRATA.	
D SPT REFUSAL. .1 FOOT PER 60 AQUIFER - A WATER BEARING FORMATION OR STRATA.	
IS OFTEN	
ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY	
ARTICLEMENT A POTALE PROPERTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLA A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLA ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE A	TE, ETC.
OCK THAT WICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR A SURFACE.	
AL PLAIN	IM CARBONATE.
IF TESTED. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON IC. OF SLOPE.	SLOPE OR AT BOTTOM
TMAY NOT YIELD STONE, CEMENTED CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	CORE BARREL DIVIDED
DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTUR ROCKS OR CUTS MASSIVE ROCK.	
DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINE HORIZONTAL.	D FROM THE
AMMER BLOWS IF DIPCTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONT LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.	AL TRACE OF THE
OCK UP TO AL FELDSPAR FACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISU	
R BLOWS. <u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLA	
IS. IN FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND I AY, ROCK HAS PARENT MATERIAL.	
H AS COMPARED <u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSIT	
FELDSPARS DULL LOSS OF STRENGTH FIELD.	D TRACED IN THE
WHEN STRUCK. <u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OU	CCURRED.
EVIDENT BUT LATERAL EXTENT.	SMALL COMPARED TO
ARE KAOLINIZED LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTI	ONS.
MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS.	MOTTLING IN SOILS
RE DISCERNIBLE USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.	
DF STRONG ROCK PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEV T ONLY MINOR OF AN INTERVENING IMPERVIOUS STRATUM.	EL BY THE PRESENCE
VALUES < 100 BPF RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK	
IN SMALL AND IS, SAPROLITE IS ROCK SECMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOT. RUN AND EXPRESSED AS A PERCENTAGE.	
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR I	FABRIC OF THE PARENT
NS REQUIRES INC. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM TH RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPI THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.	
DEEP CAN BE SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICT	ION ALONG A FAULT
DETACHED OF SLIP FLARE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF E OR PICK POINT. A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION D BLOWS OF THE WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS F	OF 1 FOOT INTO SOIL
TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS. N FRAGMENTS <u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOV	RED DIVIDED BY
NT. SMALL, THIN TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DE	ESCRIBED BY TOTAL
ILENGTH OF ROCK SECMENTS WITHIN A STRATUM EQUAL TO OR GRATER THAN THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOLS USUALLY CONTAINING ORGANIC MATTER.	4 INCHES DIVIDED BY
BENCH MARK: BY34-214	
4 FEET N: 554966 L F: 1269217.6 FL EVATION	I: 770.37 FEET
.16 - 15 EEFT	
03 - 0.16 FEET NUTES:	
008 - 0.03 FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING < 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE:	
E;	
	DATE: 8-15-14





PEET         R-2707E         4           VE = 5:1         STRUCTURE #7,BRIDGE OVER US 74 ON -Y42- BETWEEN 2041 AND US 74 BUS.           MCA         830           MD LITTLE WICA         830           ROD         820           BIO         820           ROD         800           ROD         790           ROD         790           ROD         780           ROD         720           ROD         720 <th>j</th> <th>100</th> <th></th> <th>200</th> <th>PROJECT</th> <th></th> <th>ENCE NO</th> <th>. SHE</th> <th>ET NO.</th>	j	100		200	PROJECT		ENCE NO	. SHE	ET NO.
IICA AND LITTLE WICA 830 820 810 800 790 780 780 780 780 770 760 760 760 770 760 770 760 770 760 770 760 770 760 770 760 770 760 770 760 770 760 770 77	F	EET		╸┞	0				4
AND LITTLE WICA         830           AND LITTLE WICA         820           810         810           800         800           790         780           780         780           770         760           760         750           760         750           720         760           720         720           720         720           720         720           720         720           720         720           720         720           720         720           720         720           720         720           800         720           720         720           800         720           720         720           800         720           800         720           800         720           800         720           800         720           800         720           800         720           800         720           800         700           800         700 <tr< th=""><th>VE</th><th>= 5:1</th><th></th><th>•</th><th>STRUCTU -Y42- B</th><th>RE #7, B ETWEEN</th><th>RIDGE OV 2041 AND</th><th>VER US US 74</th><th>5 74 ON BUS.</th></tr<>	VE	= 5:1		•	STRUCTU -Y42- B	RE #7, B ETWEEN	RIDGE OV 2041 AND	VER US US 74	5 74 ON BUS.
AND LITTLE WICA         830           AND LITTLE WICA         820           810         810           800         800           790         780           780         780           770         760           760         750           760         750           720         760           720         720           720         720           720         720           720         720           720         720           720         720           720         720           720         720           720         720           800         720           720         720           800         720           720         720           800         720           800         720           800         720           800         720           800         720           800         720           800         720           800         720           800         700           800         700 <tr< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr<>									
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#### DocuSign Envelope ID: 91761103-2E2A-46D0-8ED4-86729570C371 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 . . . . . . . . . . . . . 850 . 840 . . 830 . 820 810. 800 . 790. . S7\_EB2-B 14+09 18' RT S7-EB2-A 14+09 . 780. . 8 RESIDUAL, RED. ORANGE, BROWN, AND TAN, MOIST, MED. STIFF TO STIF CLAYEY SANDY SILT AND SANDY SILTY CLAY (A-4, A-7) . 770. . €.-<u>(</u>)– \_ \_ **()**– 5– . 760. . **\_** (4) · (5)-12-RESIDUAL TAN AND WHITE MOIST TO WET LOOSE TO V. DENSE. WITH TRACE ROCK FRAGMENTS AND LITTLE MICA . 750. . 10-**RESIDUAL:** TAN AND WHITE, MOIST TO WET, LOOSE TO V.DENSE, SILTY SAND (A-2-4) WITH TRACE ROCK FRAGMENTS AND LITTLE MICA $\bigcirc$ @\_ $\bigcirc$ . . 7.40 . 0-2 **\_** (5<u>-</u> .730 RESIDUAL: TAN. MOIST. STIFF. SANDY SILT (A-4) (5)-65-RESIDUALS TAN AND WHITE MOIST TO WET LOOSE TO V.DENSE SILTI WITH TRACE ROCK FRAGMENTS AND LITTLE MICA 37-20-. 720 . 65-RESIDUAL: TAN, MOIST, HARD, SANDY SILT (A-4) <u>(44)</u> 34-00/0.9 710. RESIDUAL TAN AND WHITE MOIST TO WET, LOOSE TO V.DENSE, SILT WITH TRACE ROCK FRAGMENTS AND LITTLE MICA WEATHERED ROCK: TAN. GRANITE 62-00/0.8 74 (47)-RESIDUAL: TAN. MOIST.V. DENSE. SILTY SAND (A-2-4) 700. <del>. , .</del> . <del>. .</del> BT-00/0.0 WEATHERED ROCK: TAN.GRANITE ΒT NOTE 690 GROUN FROM RECEN END BENT #2 14+10.49 INFER 680 THROU PROJE -Y42-BRIDG 670 . . . . . . . . 150 140 130 120 100 70 20 20 30 50 70 110 90 80 60 50 30 10 40 60 40 0

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#### GEOTECHNICAL BORING REPORT BOREIOG

NBS	34497	7.1.1			Т	<b>P</b> R-2707E	COUNTY	DRE L			GEOLOGIST Goodnight, D. J.		
SITE DESCRIPTION Bridge No. 4							on -Y42- B	etween SR	2041 and	JS 74 E			OWTR (ft)
	NG NO.					TATION 12+15		DFFSET 1			ALIGNMENT -Y42-	0 HR.	Dry
	LAR EL					OTAL DEPTH 68.6 ft		ORTHING			EASTING 1,269,385	24 HR.	34.3
				= HP(		CME-550 92% 12/09/2015			DRILL MET	нор н		MER TYPE A	
	LER C					<b>TART DATE</b> 12/05/1		OMP. DAT					atomatic
			BLO	w co					SAMP.			/A	
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		0.5ft		4	50 75	5 100		/ 0	SOIL AND ROCK DES	SCRIPTION	
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		‡									<ul> <li>PENETRATION TEST</li> <li>Elevation 707.1 ft IN CRYS</li> </ul>		
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WBS	34497	7.1.1			TI	P R-2707E		COUNT	CLEVELA	ND			GEOLOG	<b>ST</b> Goodnigh	nt, D. J.		
SITE	DESCR	IPTION	Bridg	ge No.	494 ov	/er US 74 (D	xon Blvd.)	on -Y42-	Between SR	2041 a	nd US	74 Bu	us. (E. Marior	n St.)		GROUN	ID WTR (ft
BOR	NG NO.	S7_E	B1-B		S	TATION 12	+14		OFFSET <sup>2</sup>	18 ft RT			ALIGNME	<b>NT</b> -Y42-		0 HR.	N/A
COLI	AR ELE	EV. 77	'6.0 ft		т	OTAL DEPT	H 69.0 ft		NORTHING	554,5	99		EASTING	1,269,410		24 HR.	Dry
DRILL	RIG/HAN	IMER EF	F./DATI	E HPO	C2473 C	CME-550 92%	2/09/2015			DRILL N	IETHO	D H.S	S. Augers		HAMME	ER TYPE	Automatic
DRIL	LER C	ain, J <b>.</b>			ST	TART DATE	12/05/17	,	COMP. DA	<b>TE</b> 12/	05/17		SURFACE	WATER DEP	• • TH N/#	٩	
ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT		BLOWS P			SAMP.	▼∕			SOIL AND RO	CK DESC	CRIPTION	
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775	-	<u> </u>											776.0		TOPSOIL		0
775	775.0	1.0	3	5	5	· • 10 ·			· · · · ·		м		– REC	<b>RE</b> D AND TAN, SA	<b>SIDUAL</b> NDY SIL	TY CLAY	(A-7)
	772.5 -	3.5	3	4	6		· · · ·	· · · ·					773.0	N, BROWN, A			3.
770	770.0	6.0				. • <sup>10</sup> .					M		-	()	A-2-4)		
	-	1	3	5	6	• • •11 •					М						
	767.5 -	8.5	3	5	5	10					м		•				
765	_	Ŧ											_				
	762.5 -	13.5															
760	-	Ŧ	3	4	4	.•8					М						
	-	Ŧ				· + · ·							-				
	757.5 -	<u>† 18.5</u> †	4	6	5						м						
755	-	‡							· · · ·				-				
	- 752.5 -	+ 23.5					· · · · ·	· · · · ·									
750	-	ţ	4	5	5	↓ ↓10	· · · · ·	· · · · ·			М		-				
750	-	ŧ											<u>-</u>				
	747.5 -	28.5	5	6	6	· · · · ·	· · · ·	· · · ·			м						
745	-	t				• <sup>12</sup>					111		-				
	- 742.5 <sup>-</sup>	- 22 5				$\left  \begin{array}{c} \cdot l \\ \cdot l \end{array} \right $											
	- 142.5	1 33.5	3	3	4	i   : <b>∳</b> ; : :	· · · ·				w						
740	-	ł						<u></u>	<u>  · · · · ·</u>				-				
	737.5	38.5	3	3	4								-				
735	-	Ł				<b>•?</b> <sup>7</sup> • •					W						
	-	Ŧ				·							-				
	732.5 -	+ 43.5 	3	6	9						w		-				
730	-	Ŧ											-				
	- 727.5 -	48.5											-				
725	-	Ŧ	3	4	6	. ↓10 <u>.</u>					W	-	-				
120	-	ŧ						· · · · · · ·					-				
	722.5 -	<u>+ 53.5</u> +	21	45	55/0.4		· · · · · · · ·		÷			in the second	722.0		ERED RO		54.
720	-	‡							* 100/0.9				719.0		GRANITI		57
	- 717.5 -	- 58 5						· · · · ·							SIDUAL		57.
745	-	+	8	14	55	$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right  \right $	· · · ·		1 · · · ·	1	М		. IAI -	N AND BROWI	N, SILTY	SAND (A-	∠-4)
715		‡							<u> </u>	1			-				
	712.5 -	63.5	100/0.2				· · · · ·	· · · ·	- 100/0.2	,		9777	- 712.5	WFATH	ERED RO	ОСК	63.
710	-	ŧ								1			-		GRANITI		
	- 707.5 <sup>-</sup>	69 5					· · · · ·	· · · ·		1							
	- 107.5	00.5	100/0.5						100/0.5	Н		V/L=Z	Bor	ing Terminated	at Elevat	tion 707.0	69. ft IN
730 725 720 715 710	_	Ŧ								1		[	-	WEATHERED	ROCK: (	GRANITE	
	-	£								1							
	-	Ŧ								1			-				
		-								1			-				

#### GEOTECHNICAL BORING REPORT PODEIOC

#### **GEOTECHNICAL BORING REPORT** BORF I OG

**TIP** R-2707E

10

**STATION** 13+09

. . . . . . . .

TOTAL DEPTH 78.9 ft

**START DATE** 12/12/17

25

SITE DESCRIPTION Bridge No. 494 over US 74 (Dixon Blvd.) on -Y42-

**DRILL RIG/HAMMER EFF./DATE** HPC2473 CME-550 92% 12/09/2015

(ft) 0.5ft 0.5ft 0.5ft

100/0.4

WBS 34497.1.1

DRILLER Cain, J.

700

BORING NO. S7\_B1-A

COLLAR ELEV. 775.8 ft

697.3 78.5

 ELEV (ft)
 DRIVE ELEV (ft)
 DEPTH (ft)
 BLOW COUNT

 (ft)
 0.5ft
 0.5ft
 0.5ft

	24407	7 1 1			<b></b>		_									
WBS         34497.1.1         TIP         R-2707E         COUNT           SITE DESCRIPTION         Bridge No. 494 over US 74 (Dixon Blvd.) on -Y42								Y CLEVELA			74 D	GEOLOGIST Goodnig	jnt, D. J.	1		
BORING NO. S7_B1-A STATION 13+09								i on - 142-	OFFSET		iu US	14 BL	ALIGNMENT -Y42-			<b>D WTR (ft)</b> 23.5
BORING NO.         S7_B1-A         STATION         13+09           COLLAR ELEV.         775.8 ft         TOTAL DEPTH         78.9 ft								NORTHING		01		EASTING 1,269,427	24 HR.			
						ME-550 92%				DRILL N		N M				31.5
	LER C							7	COMP. DA			, iviu				Automatic
			BLC	w cc				PER FOOT		SAMP.		L	JORFACE WATER DE		A	
(ft)	ELEV (ft)	(ft)	0.5ft		-	0 2		50	75 100	NO.	мо	O G	SOIL AND R	OCK DES	CRIPTION	DEPTH (ft)
								1								
780																
		Ī											_			
	775.8 ·	L 0.0											775.8 0.3	TOPSOI	L	0.0
775	-	ţ	2	2	3	•5 <u>····</u>					М		- R TAN AND ORAN	ESIDUAL GE, SILT	Y SAND (A-	-2-4)
	772.3	3.5	4	3	3									,	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	_ ,
770	769.8-	- - 6.0				<b>●</b> 6	· · · ·				М	-	_			
	767.3	+	3	3	3	<b>∳</b> 6∵ ∶ ∶					М					
765		+ 0.0	3	2	4	• • 6	- · · · ·				М	-				
765	-	ŧ										-	-			
	762.3	13.5	3	3	4	$  \cdot   \cdot \cdot \cdot \cdot  $					м	-				
760		‡				••••••					171	-	-			
	757.3	+ T 18 5										-				
755		+	3	4	5	. <b>•</b> 9	- · · · ·				м	-				
100		ŧ										-	-			
	752.3	<u>† 23.5</u>	3	5	5	. <b>i</b> . ●10 .					м	-				
750		Ŧ										-	-			
	747.3	28.5										ŀ				
745		Ŧ	4	7	7	14.					м	F				
		Ī				· · • • ·						E	-			
	742.3	<u>  33.5</u> 	4	8	7	• 15					м	E				
740	-	ł				<u> </u>		· · · · ·					- 738.8			37.0
	737.3	38.5	4	5	7		 						TAN, SA	NDY SIL <sup>-</sup>	Г (А-4)	
735		ŧ	4	5		12.					м	Ľ	_			
		1														
700	/32.3	<u>  43.5</u> 	5	9	10	<b>\.</b>	9				м					
730		ŧ				· · · · ·	<u> </u>						728.8			47.0
	727.3	48.5	10	18	21	· · · · ·						-	TAN, SIL	FY SAND	(A-2-4)	
725		‡									W	-	_			
	722 3	+ - 53.5					· · · · ·						723.8 TAN, SANDY S	LT (A-4)	WITH LITT	52.0 LE
720		+	20	28	32			60			М			MICA		
120	-	ŧ					· · · · ·	· · · `				<b>      </b>	-			
	717.3	<u>† 58.5</u>	20	40	60/0.4								716.8	HERED R		59.0
715		Ŧ							100/0.9	•			-714.3 TAN	, GRANIT	ΓE	61.5
	712.3	- 63.5						· · · · ·				<b>F</b>	TAN AND BRO	E <b>SIDUAL</b> WN, SAN	DY SILT (A	
710		Ŧ	9	11	19		•30	<u></u>			М	<b>K</b>	710.3			65.5
		Ŧ											TAN AND	<b>HERED R</b> BLACK, G		
	707.3	<u>T 68.5</u> T	27	60	40/0.1									·		
705		Ŧ						· · · ·	100/0.6				-			
	702.3	73.5														
700		Ŧ	39	47	53/0.3				100/0.8							

## **GEOTECHNICAL BORING REPORT**

Е		COUNTY		٧D			GEOLOGIST Goodnight, D. J.
Dix	(on Blvd.)	on -Y42-	Between SR	2041 ar	nd US	74 Bu	s. (E. Marion St.) GROUND WTR (ft)
3+	+09		OFFSET 2	0 ft LT			ALIGNMENT -Y42- 0 HR. 23.5
۲ŀ	<b>I</b> 78.9 ft		NORTHING	554,69	91		EASTING 1,269,427 24 HR. 31.5
1	2/09/2015			DRILL M	ethod	Mud	Rotary HAMMER TYPE Automatic
Ε	12/12/17	7	COMP. DAT	<b>E</b> 12/1	2/17		SURFACE WATER DEPTH N/A
	BLOWSF	PER FOOT	-	SAMP.	▼∕	L	SOIL AND ROCK DESCRIPTION
25	. 5	50	75 100	NO.	Лиог		ELEV. (ft) DEPTH (ft)
	Matc	h Line					
							TAN AND BLACK, GRANITE (continued)
	<u></u>		100/0.4				696.9 78.9 Boring Terminated at Elevation 696.9 ft IN
							WEATHERED ROCK: GRANITE
						F	
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#### **GEOTECHNICAL BORING REPORT** ROREIOG

								ORE L				1			
	34497					<b>P</b> R-2707E		Y CLEVELA				GEOLOGIST Goodnig	ht, D. J.		
				ge No.		er US 74 (Dixon Bl	vd.) on -Y42-			dUS	74 Bı			1	ND WTR (ft)
	NG NO.					TATION 13+09		OFFSET 2				ALIGNMENT -Y42-		0 HR.	35.6
	LAR ELE					DTAL DEPTH 83.		NORTHING				<b>EASTING</b> 1,269,461		24 HR.	FIAD
			F./DAT	E HPC		CME-550 92% 12/09/20			DRILL ME		) Mu				Automatic
DRIL	LER C	ain, J <b>.</b>	1			ART DATE 12/0		COMP. DA	1	7/17		SURFACE WATER DE	PTH N/	A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		0.5ft		BLOV 0 25	/S PER FOO <sup>-</sup> 50	Г 7 <u>5</u> 100	SAMP NO	моі	L O G	SOIL AND RO	OCK DES	CRIPTION	l DEPTH (ft)
							·								
780												_			
	-	Ē										-			
	-										-		TOPSOI		0.0
775	775.1	1.0	2	4	5					М	N N V	TAN AND RED,	SANDY (	CLAYEY S	ILT
	772.6 -	3.5	2	3	3	. <b>T</b> .°					7	0RANGE AND TA			-2-4) 3.0
770	770.1	F 6.0				<b>1</b> <sup>6</sup>				М			, OILT I	0/110 (/	2 1)
		F	2	4	4	. • 8				М	F	-			
	767.6 -	<u>+ 8.5</u> 	2	4	4					М	-				
765		ŧ									-	_			
	- 762.6 -	- 13.5													
760	-	ŧ	7	8	5	13				М					
100		ŧ										759.1 ORANGE AND T	AN SAN		17.0 A_4)
	757.6 -	<u>- 18.5</u> -	4	4	5					М			/, 0/		( +)
755		ŧ.					· · · · ·					754.1			22.0
	- 752.6 -	- 23.5										TAN, SILT	Y SAND	(A-2-4)	22.0
750	-	ŧ	3	5	6	111				М					
750		ŧ				<u>; ; ;   ; ;</u>						749.1			27.0
	747.6 -	28.5	3	4	4	$\begin{vmatrix} \cdot \mathbf{l} & \cdot \cdot \mathbf{l} \\ \cdot \mathbf{d}_{0} & \cdot \cdot \mathbf{l} \end{vmatrix} = \cdot \cdot$				М		RED AND TAN	N, SAIND I	SILT (A-4	+)
745	-	Ł								IVI					
	- 742.6 -	335											Y SAND	(A-2-4)	32.0
			4	4	4					$\nabla$					
740	-	÷						<u> </u>				-			
	737.6 -	38.5	5	5	8	$ \cdot,\cdot,\cdot $				w					
735	-		Ű		Ŭ					vv					
	-	425													
	732.6 -	4 <u>3.5</u>	5	7	7	<b>•</b> 14				W					
730		É										- 			
	727.6 -	48.5	7	10	10										
725	-	Ŧ	'							W					
	-	F										_ ·			
	722.6 -	<u>- 53.5</u>	6	6	10	$\begin{vmatrix} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \\ \bullet \\ \bullet \\ \bullet \\ \bullet \\ \bullet \\$				М					
720	-	Ŧ				<b>-</b>	<u>.  </u>								
	717.6 -	58.5		20											
715	-	ŧ	20	38	48			●86		М	977A	716.1 WEATH	IERED R	оск	60.0
. 10	-	ŧ										TAN AND B			
	712.6 -	+ 63.5 -	70	30/0.2				100/0.7							
710		‡										709.6			66.5
	- 707.6 -	68.5						+				· <b>Re</b> · TAN, SA	E <b>SIDUAL</b> NDY SILT	(A-4)	
705	-	‡	8	13	17	●30	·			М		· ·			
705	-	<b>†</b>													
	702.6 -	73.5	30	37	55			` ····		М					
700	-	t									<b>1</b>				

## **GEOTECHNICAL BORING REPORT**

WBS	34497	.1.1				<b>P</b> R-2707E	Ξ	COUNTY	CLEVELA	ND			GEOLOGIST Goodnight, D. J.		
SITE	DESCR	PTION	Bridg	e No.	494 ov	er US 74 (E	)ixon Blvd.	) on -Y42-	Between SF	2041 ar	nd US	74 B	us. (E. Marion St.)	GROUI	ND WTR (ft)
BOR	NG NO.	S7_B	1-B		ST	TATION 13	3+09		OFFSET	20 ft RT			ALIGNMENT -Y42-	0 HR.	35.6
COLI	AR ELE	<b>V.</b> 77	'6.1 ft		тс	DTAL DEPT	<b>H</b> 83.5 f	t	NORTHING	554,66	69		EASTING 1,269,461	24 HR.	FIAD
DRILL	RIG/HAM	MER EF	F./DATE	E HPC	2473 C	ME-550 92%	12/09/2015	•		DRILL M	ETHOD	<b>)</b> Mu	ud Rotary HAMN	ER TYPE	Automatic
DRIL	LER Ca	ain, J.			ST	ART DATE	E 12/07/1	7	COMP. DA	TE 12/0	07/17		SURFACE WATER DEPTH N	A	
ELEV	DRIVE ELEV	DEPTH	BLO	w col	JNT			PER FOOT		SAMP.	▼∕	L O	SOIL AND ROCK DES	CRIPTION	N
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25	50	75 100	NO.	Иог		ELEV. (ft)		DEPTH (ft)
700							Mato	h Line				1	<u> </u>		· — — — <u>—</u>
	- 697.6 -	- - 78.5	_	_			· · · · ·		· · · · ·				TAN, SILTY SAND	(A-2-4)	
695	-	-	5	1	13	<b>.</b> •2	0				W		- - 695.6		80.5
000	-	-											- WEATHERED R - TAN, GRANIT		
	692.6 -	- 83.5 -	60/0.0						60/0.0	H		77/12	- 692.6 - Boring Terminated WIT⊢	STANDA	83.5 RD
	-	-											PENETRATION TEST F     Elevation 692.6 ft ON CF	YSTALLI	at NE
	-	-											- ROCK: GRAN	TE	
	-	-											-		
	-	-											-		
	-	-											-		
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#### **GEOTECHNICAL BORING REPORT** BORF I OG

**TIP** R-2707E

0

**STATION** 14+09

TOTAL DEPTH 75.0 ft

**START DATE** 12/04/17

25

SITE DESCRIPTION Bridge No. 494 over US 74 (Dixon Blvd.) on -Y42-1

**DRILL RIG/HAMMER EFF./DATE** HPC2473 CME-550 92% 12/09/2015

(ft) 0.5ft 0.5ft 0.5ft

WBS 34497.1.1

DRILLER Cain, J.

700

BORING NO. S7\_EB2-A

COLLAR ELEV. 777.3 ft

 ELEV (ft)
 DRIVE ELEV (ft)
 DEPTH (ft)
 BLOW COUNT

 (ft)
 0.5ft
 0.5ft
 0.5ft

WRS	34497	711			<b>т</b>	<b>P</b> R-2707E		CLEVELA				GEOLOGIST Goodnight, D.	.1	
			Dela							4110 -	74 D.	-		
				ye NO.		rer US 74 (Dixon Blvd.)	on - 142-			u US 1	4 Bu	1	_	D WTR (ft)
	NG NO.				_	<b>TATION</b> 14+09		OFFSET 1				ALIGNMENT -Y42-	0 HR.	37.5
	LAR EL					DTAL DEPTH 75.0 ft		NORTHING				<b>EASTING</b> 1,269,483	24 HR.	36.5
DRILL	. Rig/han	IMER EF	F./DAT	E HPC		CME-550 92% 12/09/2015			DRILL ME		H.S	1 · · · · · · · · · · · · · · · · · · ·	MMER TYPE	Automatic
DRIL	LER C	ain, J <b>.</b>	1			TART DATE 12/04/17		COMP. DAT		4/17		SURFACE WATER DEPTH	N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		OW CO 0.5ft		BLOWS P 0 25 50		75 100	SAMP. NO.	моі	L O G	SOIL AND ROCK D	ESCRIPTION	DEPTH (fi
<u>780</u>		-									-	- 777.3 0.5' TOPS		_,0.
775	776.3	† <u>1.0</u>	3	3	5					м	- -	0.5' TOPSOIL WITH T RESIDU		L_/
	773.8	3.5	3	4	4			· · · ·			∭‡	RED AND TAN, CLAY (A-4)		LT
	771.3	+ - 6.0	3	4	4					М	88 -	(A-4)		
770		L 0.0	3	3	4					м	-	770.3 TAN AND WHITE, S		7.
	768.8	8.5	7	10	9					м	Ľ	COARSE SAND (A-2-4	I) WITH TRAC	ЭE
		+									-	ROCK FRAGMENTS A (LARGE FL/		CA
765	700.0	<b>T</b> 10 F									-	-		
	763.8	<u> </u>	3	2	3	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				м	Ļ			
700		‡				$\left \begin{array}{c} \tilde{\lambda} \cdots \\ \tilde{\lambda} \cdots \\ \cdots \\ \tilde{\lambda} \cdots \\ \tilde{\lambda} \end{array}\right $	· · · ·				Ĺ			
760	- 758.8	18.5						+			Ŀ	-		
		+	5	7	7	· · • • 14 <sup>:</sup> · · · · ·				м	-			
755		Ŧ				· · · · · · · · · · · ·				-	-			
100	753.8	23.5				· · · · · · · · · · · · · · · ·				•	-	-		
		1	4	5		· •12 · · · · ·				м	Ľ			
750		+				· · <u>\</u> ·   · · · ·					-			
	748.8	28.5	6	8	9						-	-		
	· ·	‡	0	0	9	· · • ●17 · · · · · · ·	· · · · ·			м	Ļ			
745		ŧ									Ŀ	_		
	743.8	33.5	5	5	5					м	-			
		Ŧ	_								F			
740		<b>‡</b>				··· · · · · · · · · · · · · · · · · ·			-	_	-	-		
	738.8	38.5	4	9	13		· · · · ·			м	-			
		ł				<b>•••••</b>					-			
735	733.8	 									Ē	-		
	133.0	+ 43.5	5	6	9	· · • •15				w	-			
700		‡									Ľ			
730	728.8	48.5						+ • • • • • •			L	-		
		±	12	23	32	: : : :   : : : : 1	•55			м	ł			
725		╞				/					-			
	723.8	53.5	12	10	16			· · · ·			-	-		
		‡	12			26	· · · · ·			М				
720		±									t	-		
	718.8	58.5	13	13	31	$   \cdot \cdot \cdot \cdot   \cdot \cdot \cdot \cdot \cdot  $				м	-			
		Ŧ	-					·+]		IVI .	Ē	716.3		61.
715		‡					· · · ·	····]				- WEATHERED - TAN, GRA		
	713.8	- 63.5 -	35	65/0.4	-		· · · · ·	· · · ·		м	Ø	1744, 0104		
		t						100/0.9			M.			
710	708.8	T 68.5						+ • • • • •				-		
	108.8	+ 08.5 +	22	48	52/0.3	$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right $	· · · · ·			м				
705		‡					· · · · ·	. 100/0.8						
705	703.8	73.5						+ • • • • •				703.8		73.
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## GEOTECHNICAL BORING REPORT

	COUNT	Y CLEVELA	ND			GEOLOG	ST Goodnight	t, D. J.		
ixon Blvd.)	on -Y42-	Between SR	2041 ai	nd US	74 Bı	us. (E. Marior	n St.)		GROUN	ND WTR (ft)
+09		OFFSET 1				ALIGNME			0 HR.	37.5
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#### GEOTECHNICAL BORING REPORT POPEIOC

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SITE	DESCR	RIPTION	Bridg	ge No.	494 ov	er US 74 (Dixo	on Blvd.) on -Y42-	Between SR	2041 ar	nd US :	74 Bu	is. (E. Marion St.)		GROU	ND WTR (ft)
		. S7_E				TATION 14+0		OFFSET				ALIGNMENT -Y42-		0 HR.	N/A
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## GEOTECHNICAL BORING REPORT

T١	CLEVEL/	41	ND			GEOLOG	ST Goodnight	, D. J.		
2-	Between SF	२	2041 ar	nd US	74 Bu	s. (E. Marior	n St.)		GROUN	D WTR (ft)
	OFFSET	1	8 ft RT			ALIGNME	<b>NT</b> -Y42-		0 HR.	N/A
	NORTHING	3	554,7	55		EASTING	1,269,514		24 HR.	36.0
			DRILL M	ETHOD	H.S.	Augers		HAMME	R TYPE	Automatic
	COMP. DA	T	E 12/0	04/17		SURFACE	WATER DEPT	TH N/A	4 <u> </u>	
DT			SAMP.	▼∕	L O		SOIL AND ROC	K DESC		
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REFERENCE

#### **CONTENTS** SHEET NO. 2 3 4 - 10

**DESCRIPTION** 

TITLE SHEET

BORE LOGS

SITE PLAN AND PROFILE

LEGEND

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY CLEVELAND

PROJECT DESCRIPTION US 74, SHELBY BYPASS FROM EXISTING US 74 WEST OF SR 2238 (LONG BRANCH RD.) TO WEST OF SR 1001

SITE DESCRIPTION NOISE WALL 10a FROM -NW10a-STA. 10+00.00 (-L- STA. 935+69.92, 61.76'LT) TO -NW10a STA. 23 + 95.00 (-L STA. 949 + 50.07, 72.5' LT)

# 3449 PROIEC

STATE PROJECT REFERENCE NO. STATE SHEETS NO. 10 N.C R-2707E 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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICL ENCINEERING UNIT AT (1991 707-686). THE SUBSIFICATE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUFFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUFFACE 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 DECREE OF RELIBULITY INHERENT IN THE SUBSUFFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES SUBJERACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOSTUFE CONDITIONS MAY VARY CONSDERABLY WITH THE ACCOMPING OL CUMUTIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

NOTES.

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

TRIGON

GOODNIGHT, D.J.

INVESTIGATED BY \_\_\_\_\_GOODNIGHT, D.J.

DRAWN BY \_\_\_\_\_CROCKETT, S.C.

CHECKED BY \_\_\_\_\_HUNSBERGER, W.S.

SUBMITTED BY \_\_\_\_\_\_ FALCON ENG.

DATE JANUARY 2023



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

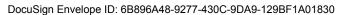
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING;	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD VIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAKERS, HIGHLY PLASTIC, A-7-6 SOIL LEGEND AND AASHTO CLASSIFICATION	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS		CRYSTALLINE
CLASS.         (≤ 35%         PASSING *200         (> 35%         PASSING *200         Otomac         Otomac	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE IN
CLASS. A-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-75 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA ROCK (NCR) SEDIMENTARY ROCK THAT WOULD SPT REFUSAL DOCK (NCR)
	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN
7 PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDS
100 50 MX GRANULAR SILT- MUCK, 400 30 MX 50 MX 51 MN SILT - MUCK,	PERCENTAGE OF MATERIAL	WEATHERING
■200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 56 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50ILS WITH LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR	TRACE OF ORGANIC MATTER         2         - 3%         3         - 5%         TRACE         1         10%           LITTLE ORGANIC MATTER         3         - 5%         5         - 12%         LITTLE         10         - 20%           MODERATELY ORGANIC         5         - 10%         12         - 20%         SOME         20         - 35%           HIGHLY ORGANIC         5         10%         2         20%         HIGHLY         35%         AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CO (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER H
PI         6         MX         NP         18         MX         11         MN         11         MN </td <td>GROUND WATER</td> <td>OF A CRYSTALLINE NATURE.</td>	GROUND WATER	OF A CRYSTALLINE NATURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER OF MAJOR CRAVEL. AND SAND CRAVE AND SAND SOLIS SOLIS	✓     WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING       ✓     STATIC WATER LEVEL AFTER 24 HOURS	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROC (SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER
MATERIALS SANU	$\nabla PW$ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA'
GEN.RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE L( (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND V
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE) (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND E
GENERALLY         VERY LODSE         < 4           GRANULAR         LODSE         4 TO 10           MATERIAL         MEDIUM DENSE         10 TO 30         N/A	SUDPE INDICATOR SUDPE INDICATOR INSTALLATION ARTIFICIAL FILL (AF) OTHER AUTOR DODING CONE PENETROMETER	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. I <u>F TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</u>
(NON-COHESIVE)         DENSE VERY DENSE         30 10 50 > 50           VERY SOFT         < 2	THAN ROADWAY EMBANKMENT $-$ AUGER BORING $\triangle$ TEST INFERRED SOIL BOUNDARY $-$ CORE BORING • SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD VIELD SPT N V</u>
GENERALLY         SOFT         2 TO 4         0.25 TO 0.5           SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2           (COMESIVE)         VERV STIFF         15 TO 30         2 TO 4		COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS
(COHESIVE)         VERY STIFF         15 TO 30         2 TO 4           HARD         > 30         > 4	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	ALSO AN EXAMPLE. ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF UNDERCUT UNCLASSIFIED ECGRADABLE ROCK EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BU TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE
(BLDR.)         (COB.)         (GR.)         (GR.)         (F SD.)         (F SD.)         (SL.)         (CL.)           GRAIN         MM         305         75         2.0         0.25         0.05         0.005	ABBREVIATIONS AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVERED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACECOUS WEA WEATHERED CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC $\chi$ - DRV UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEOLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) FIELD MOISTURE OUDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	DPT - DYNAMIC PENETRATION TEST         SAP SAPROLITIC         S - BULK           e - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F - FINE         SL SLT, SLLTY         ST - SHELBY TUBE	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READLY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
LL LIOUID LIMIT PLASTIC RANCE - WET - (W) SEMISOLID; REQUIRES DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
	FRAGS FRAGMENTS     W - MOISTURE CONTENT     CBR - CALIFORNIA BEARING       HI HIGHLY     V - VERY     RATIO	FRACTURE SPACING BEDDING
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EOUIPMENT         USED         ON         SUBJECT         PROJECT           DRILL UNITS:         ADVANCING TOOLS:         HAMMER TYPE:         HAMMER TYPE:	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 1. WIDE 3 TO 10 FEET THICKLY BEDDED 1. MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C CLAY BITS X AUTOMATIC MANUAL 6' CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.00 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	CME-55         X         8* HOLLOW AUGERS	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550X HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC         0-5         VERY LOW           SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM	VANE SHEAR TEST CASING V ADVANCER	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
	X MOBILE B-57	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT         VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

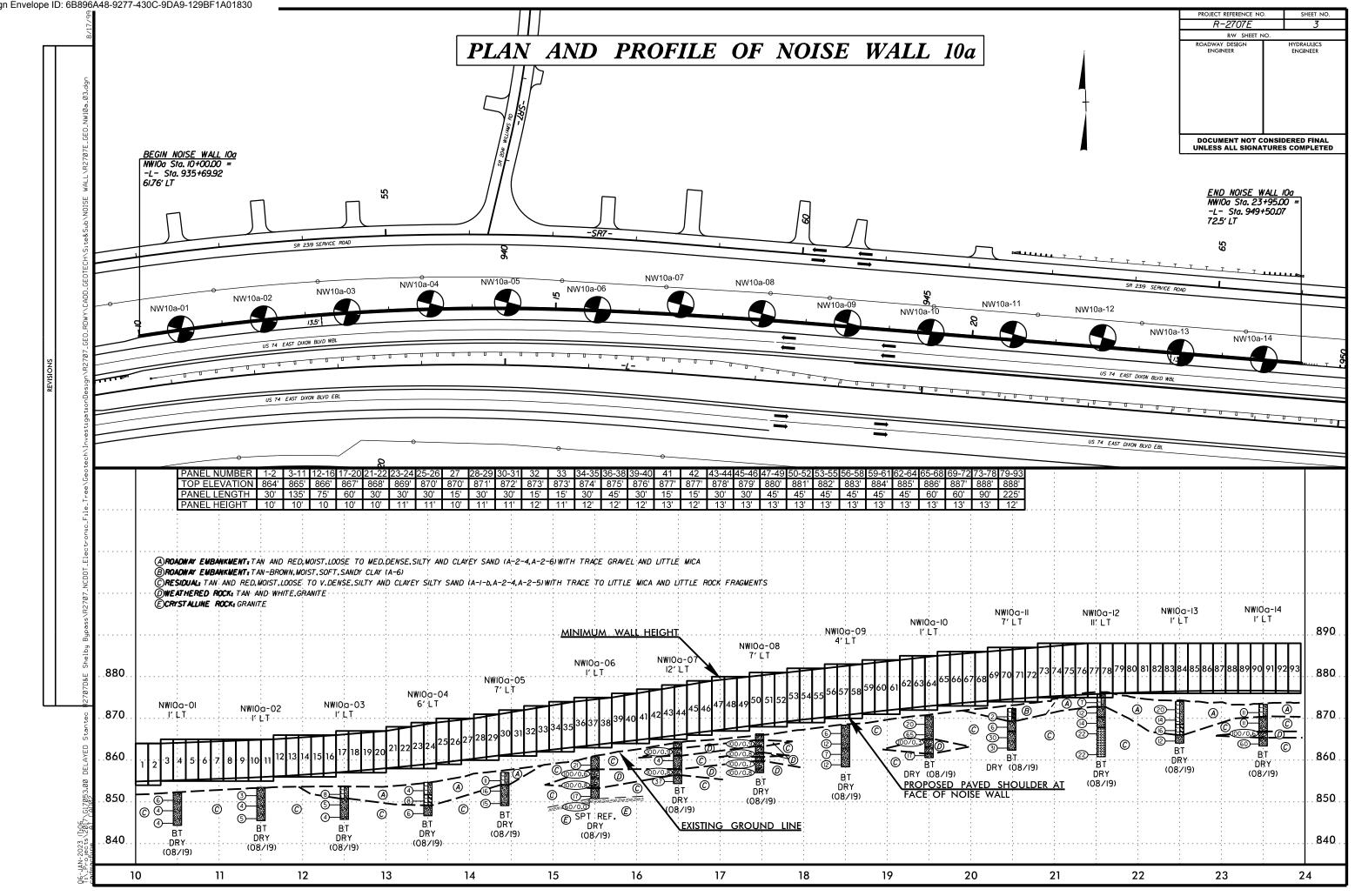
#### PROJECT REFERENCE NO.

## R-2707E

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	TERMS AND DEFINITIONS
ED. AN INFERRED ) SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60 IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
10 0. 12.0	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
T N VALUES >	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
DCK THAT NCLUDES GRANITE,	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. C.	$\underline{\text{COLLUVIUM}}$ - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	$\overline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN, HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ock up to Al Feldspar	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
OF STRONG ROCK T ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND S. SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
S REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
N FRAGMENTS NT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
HED READILY BY	TOPSOL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: ELEVATIONS OBTAINED FROM TIN FILE
THICKNESS 4 FEET	R2707_LS_TNL_180309 DATED MARCH, 2018 ELEVATION: FEET
1.5 - 4 FEET	
.16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
EAT, PRESSURE, ETC.	
• TEEL PROBE;	
PROBE:	
E;	DATE: 8-15-14
	DATE: 0-10-14



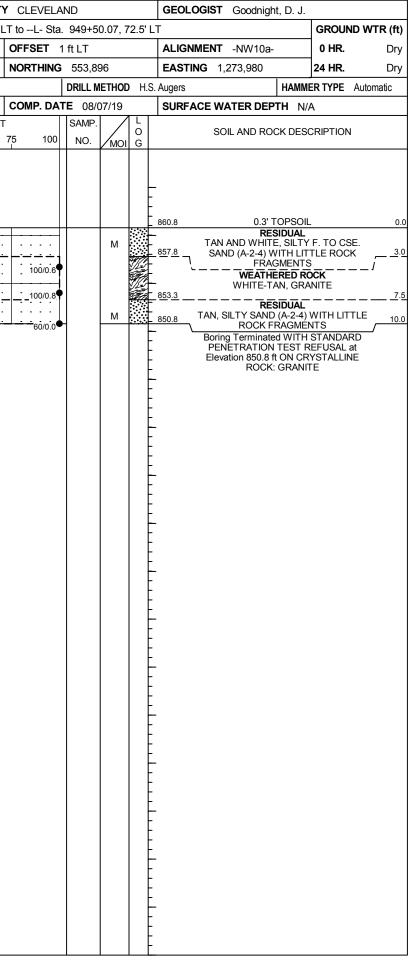


WBS 34497.1.1         TIP R-2707E         COUNTY	CLEVELAND	GEOLOGIST Goodnight, D. J.		WE	<b>S</b> 34497.1.	1		<b>TIP</b> R-2707E	COUNTY	CLEVELA	ND	GI	EOLOGIST Goodnight, D. J.		
SITE DESCRIPTION Noise Wall 10a from -L- Sta. 935+69.92, 61.76' LT	Г toL- Sta. 949+50.07, 72.5' LT	Г	GROUND WTR (ft)	SIT	E DESCRIPT	ION No	ise Wall	10a from -L- Sta. 935	5+69.92, 61.76' L	T toL- Sta	. 949+50.07,	72.5' LT		GROUND W	/TR (ft)
BORING NO.         NW10a-01         STATION         10+50         0	OFFSET 1 ft LT	ALIGNMENT -NW10a-	0 HR. Dry	во	RING NO. N	IW10a-02	2	STATION 11+50	0	OFFSET	1 ft LT	AL	LIGNMENT -NW10a-	0 HR.	Dry
COLLAR ELEV. 852.4 ft TOTAL DEPTH 8.0 ft I	Northing 553,887	EASTING 1,273,481	24 HR. Dry	со	LLAR ELEV.	853.5 f	ť	TOTAL DEPTH	8.0 ft	NORTHING	553,896	EA	<b>ASTING</b> 1,273,580	24 HR.	Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 97% 02/24/2017	DRILL METHOD H.S.	Augers HAMM	ER TYPE Automatic	DRI	LL RIG/HAMME	R EFF./DA	TE TRI	8016 MOBILE B-57 97%	02/24/2017		DRILL METHO	D H.S. Aug	gers HAMN	IER TYPE Autor	matic
DRILLER Estep, J. E. START DATE 08/07/19	COMP. DATE 08/07/19	SURFACE WATER DEPTH N//	Α		LLER Este			START DATE 0	8/07/19	COMP. DA	<b>TE</b> 08/07/19	SL	URFACE WATER DEPTH N	/A	
ELEV (ft)         DRIVE ELEV (ft)         DEPTH (ft)         BLOW COUNT         BLOWS PER FOOT           0         25         50         7	75 100 NO. MOI G I	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)		V DRIVE ELEV (ft) DE	PTH BL (ft) 0.5f	LOW CO	UNT BI 0.5ft 0 25	LOWS PER FOOT 50		SAMP. NO. MO	L O I G	SOIL AND ROCK DES	CRIPTION	
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	M	852.4 0.3' TOPSOIL RESIDUAL TAN, SILTY SAND (A-2-4) MICA		850	852.5 850.0 847.0	$\frac{1}{3.5}$		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		· · · · ·	M		<b>RESIDUAL</b> TAN, SILTY SAND		
		841.4 Boring Terminated at Eleval RESIDUAL: SILTY	8.0 SAND			3.5 <u>2</u>	2	3     '			<u>M</u>		5 Boring Terminated at Eleva RESIDUAL: SILTY		8.0

WBS	34497	.1.1			TI	P R-2707	E	COUNT	Y CLEVELA	ND			GEO	LOGIST Goodnigh	nt, D. J.		WE	<b>S</b> 3449	7.1.1			TIF	<b>R</b> -2707	E	COUNTY
SITE	DESCR	IPTION	Noise	e Wall	10a fro	om -L- Sta	. 935+69.9	2, 61.76	LT toL- Sta	. 949+5	0.07, 7	2.5'	LT			GROUND WTR (ff	SIT	E DESCF	RIPTION	Nois	e Wall 1	10a fro	m -L- Sta	. 935+69.9	2, 61.76' L
BORI	NG NO.	NW10	)a-03		ST	TATION 1	2+50		OFFSET	1 ft LT			ALIG	NMENT -NW10a-		0 HR. Dr	во	ring no	. NW1	0a-04		ST	ATION 1	3+50	
COLI	LAR ELI	<b>EV.</b> 85	3.8 ft		тс	DTAL DEP	TH 8.0 ft		NORTHING	553,9	02		EAS	<b>FING</b> 1,273,680		24 HR. Dr	со	LLAR EL	. <b>EV.</b> 85	54.7 ft		тс	TAL DEP	TH 8.0 ft	
DRILL	. RIG/HAN	IMER EF	F./DATE	TRI8	016 M	OBILE B-57	97% 02/24/2	2017	I	DRILL N	IETHOD	) Н.:	S. Augers		HAMM	ER TYPE Automatic	DRI	LL RIG/HA	MMER EF	F./DAT	E TRI80	016 MC	BILE B-57	97% 02/24/2	017
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(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	мо	O G	ELEV. (	SOIL AND RO	CK DES	CRIPTION DEPTH	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50
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850	850.3	3.5	2	2	3	<u>ل</u> ار کار					м		<u>850.8</u>	RE	SIDUAL		850	0.01.2	+	3	4	4			
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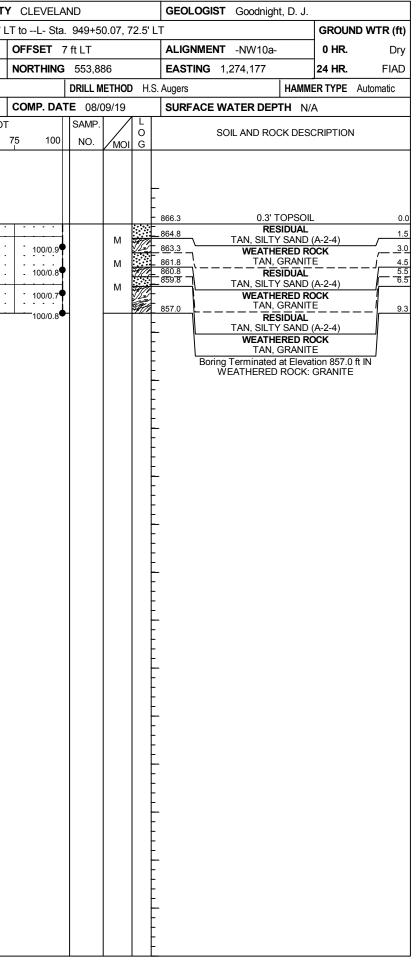
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SI	TEC	DESCR	IPTION	Nois	e Wall	10a fro	om -	L- Sta.	935+	69.92	, 61.76	' LT 1	toL- Sta	. 949+5	0.07,	72.5	' L1	Γ				GROUND WTR (ft)	SITE	E DES	SCRIPTION	Noi	se Wall	10a fro	om -L-	Sta. 93	35+69.9	2, 61.76'
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C	OLL	AR ELE	<b>EV.</b> 85	57.1 ft		т	DTAL	DEPT	<b>FH</b> 8.	.0 ft		N	ORTHING	553,9	08			EASTIN	<b>IG</b> 1,27	73,873		24 HR. Dry	COL	LAR	ELEV. 86	50.8 ft	:	т		DEPTH	10.0 f	ť
DF	RILL F	rig/ham	IMER EF	F./DAT	E TRI8	8016 M	OBILE	B-57 9	97% 02	2/24/20	17			DRILL N	IETHO	D ⊢	I.S.	Augers			HAMM	IER TYPE Automatic	DRIL	l Rig/	HAMMER EI	F./DA	TE TRI	3016 M	OBILE B	-57 97%	6 02/24/2	2017
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### GEOTECHNICAL BORING REPORT BORE LOG

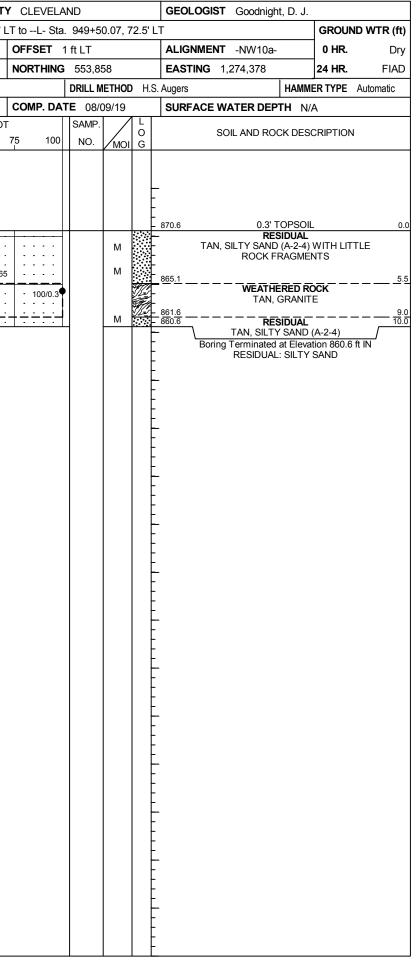
WB	<b>S</b> 344	97.1.1			TI	P R-27	707E		COU	NTY	CLEVEL	AND			0	GEOLOGIST	Goodnigh	nt, D. J.		WB	<b>S</b> 34497	7.1.1			Т	I <b>P</b> R-2	707E		COUNT
SIT	e desc	RIPTION	Nois	e Wall	10a fro	om -L- :	Sta. 9	35+69.9	92, 61.7	'6' LT	toL- Sta	a. 949+5	50.07,	72.5'	'LT				GROUND WTR (f	) SITI	E DESCR	RIPTION	Nois	se Wall	10a fr	om -L-	Sta. 93	35+69.9	92, 61.76'
BO	ring no	<b>D.</b> NW1	0a-07		ST	TATION	16+	49		C	OFFSET	12 ft LT			4	ALIGNMENT	-NW10a-		0 HR. Dr	BOF	ring no.	. NW1	0a-08		S	TATION	<b>I</b> 17+4	47	
CO	LLAR E	LEV. 8	64.4 ft		тс	DTAL D	EPTH	10.0	ft	N	ORTHING	<b>5</b> 53,9	00		E	EASTING 1	,274,080		24 HR. Dr	COL	LAR EL	<b>EV.</b> 86	6.3 ft		Т	OTAL [	DEPTH	9.3 ft	
DRIL	.L RIG/H/	AMMER EI	F./DATE	E TRI8	016 M	OBILE B-	57 97%	% 02/24/2	2017			DRILL	NETHC	DD H	I.S. Au	ugers		HAMM	ER TYPE Automatic	DRIL	l rig/hai	MMER EF	F./DAT	E TRI	3016 M	OBILE B	-57 97%	6 02/24/	2017
DRI		Estep, J.				ART D	ATE	08/07/	19	C	COMP. DA	<b>TE</b> 08/	07/19	)	5	SURFACE W	ATER DEP	TH N/	A	DRI	L <b>LER</b> E	step, J.	E.		S	TART [	DATE	08/09/	19
ELE			I BLO	W COI	JNT			BLOWS				SAMP.				S	OIL AND RO	CK DES	CRIPTION	ELE\		DEPTH	BLO	ow co					PER FOO
(ft)	(ft)	′ (ft)	0.5ft	0.5ft	0.5ft	0	25		50	75	5 100	NO.	Имс	) G	EL	.EV. (ft)			DEPTH	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50
865		4													-86	4.4	0.4' -	TOPSOIL	L	.0 870		Ļ							
	863.4	1 1.0	5	15	85/0.4								м	40	86	2.9	RE TAN, SILT	SIDUAL Y SAND	(A-2-4)	5		‡							
860	860.9	) = 3.5		2		<u>-</u> -	· · ·			· · 	100/0.9				86	<u>1.1</u> _	WEATH	ERED RO	OCK	<u>3</u> 865	865 3	+					• • •		
000		+ 6.0	5	2	2	<b>●</b> 4							M		- -	`	RE	SIDUAL	/			Ţ	9	12	88/0.4	1			
		1	3	6	94/0.3	 		<u> </u>		<u></u>	100/0.8			T.	a –	<u>7.9</u> — 6.4 _	TAN, SILT		<u>`</u>	5 0	862.8	+ 3.5 +	5	8	92/0.3			· · · ·	
855	855.9	) <u> </u>	50	27	10			•• <b>-</b> ••37-	<u> </u>				м		85	1	TAN,	GRANIT	Е /——	860	860.3	<u> </u>	8	19	82/0.2				
		+													F		SILTY SAND		WITH TRACE		857.8	+ - 8.5						· · · ·	
		ţ													Ę	Boring	Terminated	at Eleva	ition 854.4 ft IN			<u>†</u>	10	90/0.3					
		+													F		RESIDUAL	_: SILTY	SAND		-	ŧ							
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### GEOTECHNICAL BORING REPORT BORE LOG

ſ	WBS	34497	.1.1			TI	<b>P</b> R-270	)7E		COUN	TY (	CLEVELA	4ND			G	EOLOG	<b>IST</b> Go	oodnigh	t, D. J.			WBS	3449	7.1.1			ТІ	P R-2	707E		COUNT
	SITE	DESCR	IPTION	Noise	Wall	10a fro	om -L- St	ta. 935	5+69.92	2, 61.76	' LT to	oL- Sta	. 949+5	50.07,	72.5'	LT					GROUN	ND WTR (ft)	SITE	DESCR	IPTION	Nois	e Wall	10a fro	om -L-	Sta. 93	5+69.9	2, 61.76'
	BORI	NG NO.	NW10	)a-09		ST	TATION	18+50	0		OF	FFSET 4	4 ft LT			A	LIGNME	ENT -N	IW10a-		0 HR.	Dry	BOR	ING NO.	NW1	0a-10		S		<b>I</b> 19+5	50	
	COLL	AR ELE	<b>EV.</b> 86	8.4 ft		тс	OTAL DE	PTH	10.0 ft		NC	ORTHING	553,8	72		E/	ASTING	1,274	,279		24 HR.	FIAD	COL	LAR EL	<b>EV.</b> 87	70.6 ft		т	OTAL D	EPTH	10.0 f	t
	DRILL	RIG/HAN	IMER EF	F./DATE	TRI8	016 M	OBILE B-57	7 97%	02/24/20	017			DRILL N	<b>IETHO</b>	DH.	.S. Aug	gers			HAMM	ER TYPE	Automatic	DRIL	L RIG/HAN	MMER EF	F./DAT	E TRI	3016 M	OBILE B	.57 97%	02/24/2	017
	DRIL	LER E	step, J.	E.		ST	TART DA	<b>TE</b> 0	08/09/19	9	CC	omp. Da	<b>TE</b> 08/	09/19		SI	URFACI	E WATE	R DEP	TH N//	A		DRIL	LER E	step, J.	E.		S	TART D	ATE	08/09/1	9
	ELEV	DRIVE ELEV	DEPTH	BLO	w cou			BL		PER FO			SAMP.		L			SOIL A			CRIPTION	I	ELEV	DRIVE		BLC	ow co			B		PER FOO
	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	50	75	100	NO.	Имо	ΙĞ	ELE	EV. (ft)	00.27				DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50
-	870		+													L			0 2' T	.00601			875		+							
		867.4	1.0	2	2	4	1	: :					+	<u> </u>		- 868			RES			0.0			Ŧ							
	865	864.9	3.5			-	<b>4</b> 6.	· ·						M		-		TAN, CL	LATET S	DLIY SA	AND (A-2-5	5)	870	869.6-	- 1.0							
		- 862.4	60	1	5		: <b>)</b> 12	2	· · · · · ·	- · · ·		 		M		862	2 <u>.9</u>					5.5			3.5	10	11	9	· · ·	. ∳20 ,		
	860	-	t	5	3	4	<b>.</b> 7	: :	· · · · · ·	· · ·	-	· · · ·		м		-		IAI	N, SILTY	SAND (	(A-2-4)		865	867.1	Ŧ	3	23	42	· ·   · ·	· ·   ·		► - • •6
	000	859.9	8.5	5	5	7	• •12	2			•			м		- 858	3.4					10.0	000	864.6-	+ 6.0 +	100/0.	3					· · ·
		-	+													F	Bo	ring Terr RE	minated SIDUAL	at Elevat : SILTY	tion 858.4 SAND	ft IN		862.1	8.5	58	12	5	· ·   · ·		<u> </u>	 _ <u></u> _
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W	<b>35</b> 34	4497.1.	1			TIP	R-27	07E		COUN	NTY (	CLEVE	LAND				GEOI	LOGIST	Goodnig	ht, D. J.			<b>١</b>	WBS	34497	7.1.1			т	IP R-27	707E		CO	UNTY	CLEVEL	AND			GI	EOLO	GIST	Goodni	ght, D	-		
SI	E DE	SCRIPT	PTION         Noise Wall 10a from -L- Sta. 935+69.92, 61.76' LT to -           NW10a-11         STATION 20+49         OFF										ta. 94	9+50.0	)7, 72	2.5' L	Т				GROU	ND WTR (	ft) S	SITE	DESCR	RIPTION	Nois	se Wall	l 10a fr	rom -L-	Sta. 9	35+69.9	92, 61	.76' LT	toL- St	a. 949+	50.07	7, 72.5	'LT					GRO	UND W	/TR (ft)
BC	RING	NO. N	IW10a-	11		ST	ATION	20+4	19		OF	FFSET	7 ft L	.T			ALIG	NMENT -	-NW10a	-	0 HR.	C	ry E	BORI	NG NO.	. NW1	0a-12		s	TATION	<b>1</b> 21+	56		C	FFSET	11 ft LT	•		AL		IENT -	-NW10a	a-	0 HF	ર.	Dry
CC	LLAF	ELEV	872.4	l ft		то	TAL DE	PTH	10.0 ft		NC	ORTHIN	<b>IG</b> 55	3,853			EAST	<b>TING</b> 1,27	74,477		24 HR.	FIA	J	COLL	AR EL	<b>EV.</b> 87	75.8 ft		т	OTAL D	DEPTH	15.0	ft	N	IORTHIN	<b>G</b> 553,8	846		E/	ASTIN	<b>IG</b> 1,27	74,584		24 HF	ર.	FIAD
DR	LL RIG	/HAMME	R EFF./D	DATE	TRI80	16 MC	BILE B-5	57 97%	02/24/2	017			DRI	LL ME1	HOD	H.S.	Augers			HAMM	ER TYPE	Automatic	[	DRILL	RIG/HAM	MMER EF	FF./DAT	E TRI	18016 N	IOBILE B-	-57 979	% 02/24/	2017			DRILL	METH	IOD H	I.S. Aug	jers			HAM	MER TYP	E Auto	matic
DR	ILLEF	R Este	o, J. E.			ST	ART DA	ATE (	08/09/1	9	CC	omp. D	ATE	08/09	/19		SURF		TER DEF	TH N/	A		1		LER E	•				TART D	ATE	08/09/	19	C	OMP. DA	TE 08	/09/1	9	รเ	JRFA		TER DE	HTA	I∕A		
ELE		EV DE		BLOW	COU	NT			BLOWS		ОТ			MP.		L		SOIL	AND RC	CK DES	CRIPTIO	N	E	LEV	DRIVE ELEV	DEPTH	H BL	ow co	DUNT			BLOWS				SAMP	1 /				SOIL	AND R	OCK DE	SCRIPTI	ON	
(ft	) (	ft)	(ft) 0.	5ft C	).5ft	0.5ft	0	25	Į	50	75	10	0 N	0.	моі	G	ELEV. (f	<u>t)</u>				DEPTH	(ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50	75	5 100	NO.	_/м	IOI G							-	
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		8.9	3.5	2	2	4	Ľ										869.4			SIDUAL	·		3.0	0.0		+	4	4	3							11	N	1	872.	T	TAN, CLA	AYEY SI	LTY SAM	ND (A-2-5		3.0
	86	6.4	3.0				•6								М		866.9		CLAYEY			-5)	5.5		872.3	Ť	2	6	6	┤╵└╸					· · · · · · · ·		N			<u> </u>		R	CE GRA			<u></u>
86		3.9		36	20	10			30				-11		М	-				I GAND	(/2+)		-	870	869.8-	<u> </u>	5	6	8	· · · · · · · · · · · · · · · · · · ·			· · · ·	· · ·					<u>870.</u>	<u>.3</u> — T				) (A-2-4) ΈΥ SILT		<u>5.5</u>
		<u></u>	1	5	19	12			31 · ·			· · · ·			М		862.4						0.0		867.3	+ + 8.5					14	· · · ·			· · · · · · · ·			000	867.	.8	(A AN, SLI.	-2-5) W	ITH LITT	LE MICA	۱	8.0
		Ŧ														F		Boring Te	erminateo RESIDUA	l at Eleva L: SILTY	tion 862.4 SAND	4 ft IN		865		Ŧ	5	9	13						· · · · ·		N			17	WITH L	ITTLE (	QUARTZ	FRAGM	ENTS	
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		Ŧ														F								-	862.3	<u>† 13.5</u> †	5	8	14	$\left\{ \left  \begin{array}{c} \cdot \\ \cdot \end{array} \right\rangle \right\}$					· · · · · · · ·		N		0- 0- 860.	18						15.0
		Ŧ														F									-	+	1			+		<u></u>	-		<u></u>				- <u>000</u> .	E	Boring Te	erminate	ed at Ele DUAL: S	/ation 86	0.8 ft IN	
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١	NBS	34497	.1.1			ТІ	<b>P</b> R-	2707E			COUN	ΤY	CLEVEL	AND				GEOLO	OGIST	Good	dnight,	D. J.				WB	<b>S</b> 344	197.1. <sup>-</sup>	l			Т	PR-	2707E		С	OUNT
;	SITE	DESCR	IPTION	Nois	e Wall	10a fro	om -L	Sta. 9	935+6	69.92	61.76	5' LT t	ioL- St	a. 949+	50.07	, 72.	5' L	T					GRO	UND V	/TR (ft)	SITE	E DES	CRIPT	ION	Nois	e Wall	10a fr	om -L	- Sta.	935+69	.92, 6	51.76
I	BORI	NG NO.	NW1	0a-13		S	ΓΑΤΙΟ	<b>N</b> 22	+50			0	FFSET	1 ft LT				ALIGN	MENT	-NW	10a-		0 HF	ર.	Dry	BOF	ring n	<b>IO</b> . N	W10	)a-14		S	TATIC	<b>DN</b> 23	\$+50		
(	COLL	AR ELI	<b>EV</b> . 87	74.1 ft		т	DTAL	DEPTI	<b>H</b> 10	).0 ft		N	ORTHIN	<b>G</b> 553,8	326			EASTI	<b>NG</b> 1	,274,67	77		24 HF	ર.	FIAD	COL	LAR E	ELEV.	87	3.4 ft		Т	OTAL	DEPT	<b>H</b> 10.0	) ft	
I	RILL	RIG/HAN	IMER EF	F./DAT	E TRI8	8016 M	OBILE	B-57 97	7% 02/	/24/20	17			DRILL	METH	OD	H.S.	Augers			H	IAMME	ER TYP	E Auto	omatic	DRIL	L RIG/H	IAMME	R EFF	F./DATI	E TRI	8016 N	OBILE	B-57 9	7% 02/24	4/2017	
I		ER E					TART	DATE	08/0	09/19		С	omp. D <i>i</i>	<b>TE</b> 08	/09/19	9		SURFA	CE W	ATER	DEPTH	<b>I</b> N/A	4			DRI	LER	Estep	), J. I	E.		S	TART	DATE	08/09	9/19	
E	LEV	DRIVE ELEV	DEPTH	BLC	w co	JNT					ER FO			SAMP	. <b>V</b>		5		S	DIL AND	ROCK	DESC	CRIPTI	ON		ELEV			ртн	BLC	w co	-			BLOW		₹ FOO
	(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0	2	5	50	)	75	100	NO.	/м	SI G		ELEV. (ft)							DEPTH (ft)	(π)	(ft)		π)	0.5ft	0.5ft	0.5ft	0	2	5	50	
E R2707_GEO_BORINGS CURRENT.GPJ_NC_DOT.GDT_1/6/23		DRIVE ELEV	DEPTH (ft) - 1.0 - 3.5 - 6.0	BLC	DW COU	JNT	0	2	BLO	WS PI 50         	ER FO	DT 75 - - - - - - - - - -		SAMP				ELEV. (ft) 874.1 868.6 866.1 864.1	TAN, C	DIL AND	0.3' TO 0.3' TO VAY EN SILTY RACE ( CLAYE RESIE AYEY S lated at		CRIPTIO (MENT (A-2-5 EL ND (A-2 SAND SAND tion 864	- 5) WITH  (A-2-5) 4.1 ft IN	0.0 5.5 8.0 10.0		/ DRIN ELE (ft) 		PTH ft) .0	BLC	0.5ft 5 3	UNT 0.5ft 6 8 59/0.1				S PEF 50	
NCDOT BORE DOUBL		- - - - - - - - - - - - - - - - - - -	- - - - - -															-																			

