2518

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CORE PHOTOGRAPHS

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

PROJECT DESCRIPTION US 19 FROM 1-26 TO 0.8 km EAST OF

SITE DESCRIPTION NEW BRIDGE ON SR 1524 (-Y2-)

THE YANCEY CO. LINE

OVER MIDDLE FORK CREEK

CONTENTS

| DESCRIPTION | Annual Control of the | |
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| GEOTECHNICAL REPORT | CIIRCIIREACE | INVESTIGATION |
| SITE PLAN | SUBSURFACE | INVESTIGATION |
| CROSS SECTIONS | *************************************** | |
| BORE LOG & CORE REPORTS | PROJ. REFERENCE NO. 34445.1.1 | F.A. PROJ |
| SCOUR REPORT | COUNTY MADISON | |
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CAUTION NOTICE

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

| | M. M. HAGE |
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| INVESTIGATED BY | J. C. KUHNE |
| | W. D. FRYE |
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| ZORWILLED BATT | W. D. FRYE |
| DATE | |

DRAWN BY:

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT



PROJECT REFERENCE NO. SHEET NO. 34445.I.I 2 OF I3

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND TERMS SYMBOLS AND ABBREVIATIONS

| | SOIL AND ROCK LEGEND, TERM | S, SYMBOLS, AND ABBREVIATIONS | |
|---|--|--|--|
| SOIL DESCRIPTION | GRADATION | ROCK DESCRIPTION | TERMS AND DEFINITIONS |
| SOUL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR VEATHERED EARTH MATERIALS | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. |
| THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 180 BLOWS PER 30 CM ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL | POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. | SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 3 CM PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| I CLASSIFICATION IS RASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: | ANGULARITY OF GRAINS | OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS. |
| CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: | THE ANGULARITY OR ROUNDRESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, | WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 190 | OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. |
| VERY STIFF, GRAY, SUTY CLAY, WOST WITH INTERBEDDED FAME SAND LIVERS, HIGHLY PLASTIC, A-7-6 | SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION | ROCK (WR) BLOWS PER 30 CM IF TESTED. | ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DDES NOT NECESSARILY RISE TO DR ABOVE THE |
| SOIL LEGEND AND AASHTO CLASSIFICATION | MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS | CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, | GROUND SURFACE. |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS | WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. | UNEISS, BABBRU, SCHIST, ETC. | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. |
| GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 | COMPRESSIBILITY | NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. |
| CLASS. A-1-b A-1-b A-2-4 A-2-5 A-2-6 A-2-7 | SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIDUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIDUID LIMIT GREATER THAN 50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. |
| Z PASSING SILT- | PERCENTAGE OF MATERIAL | (CP) SHELL BEDS, ETC. WEATHERING | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT |
| • 10 50 MX | ORGANIC MATERIAL GRANULAR SILT - CLAY OTHER MATERIAL SOILS SOILS TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 18% | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | ROCKS OR CUTS MASSIVE ROCK. <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. |
| - 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 36 MX 36 MX 36 MX 36 MX 36 MX 16 MX 17 MX 18 MX | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF | DIP_DIRECTION (DIP_AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. |
| PLASTIC INDEX 6 MX NP 10 MX 10 MX 10 MX 11 MN 11 MN 18 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY | HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE GROUND WATER | OF A CRYSTALLINE NATURE. | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE |
| GROUP INDEX 9 9 9 4 MX 8 MX 12 MX 10 MX 10 MX | GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SAND GRAVEL AND SAND SOILS SOILS MATTER | STATIC WATER LEVEL AFTER 24 HOURS | CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. |
| MATERIALS SAND STATE | | MODERATE MOD | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. |
| AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE | E | UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY |
| SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 | SPRING OR SEEP | MODERATELY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH | THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN |
| CONSISTENCY OR DENSENESS | MISCELLANEOUS SYMBOLS | MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. | THE FIELD. |
| PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PRETABLE COMPRESSIVE STRENGTH (kN/m²) | RDADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION PST CPT ONT TEST BORING SAMPLE DESIGNATIONS | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| UT THEOLY | S - BULK SAMPLE | (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO |
| GENERALLY VERY LOOSE | SOIL SYMBOL AUGER BORING SS - SPLIT SPOON | IF TESTED, YIELDS SPT N VALUES > 100 BLOWS PER 30 CM | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| MATERIAL DENSE 20 TO 50 | ARTIFICIAL FILL (AF) OTHER SAMPLE THAN ROADWAY EMBANKMENT - CORE BORING ST - SHELBY TUBE | VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN |
| VERY DENSE >50 | INFERRED SOIL BOUNDARY SAMPLE | REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. | SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN |
| VERY SOFT <2 <25 GENERALLY SOFT 2 TO 4 25 TO 50 | MONITORING WELL RS - ROCK SAMPLE | IF TESTED, YIELDS SPT N VALUES < 100 BLOWS PER 30 CM | INTERVENING IMPERVIOUS STRATUM. |
| SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 MATERIAL STIFF 8 TO 15 100 TO 200 | PIEZOMETER INSTALLATION RT - RECOMPACTED TRIAXIAL SOIL BOUNDARY | COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF |
| (COHESIVE) VERY STIFF 15 TO 30 200 TO 400 | SLOPE INDICATOR | ALSO AN EXAMPLE. | ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CM DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND |
| TEXTURE OR GRAIN SIZE | ROCK STRUCTURES RATIO SAMPLE | ROCK HARDNESS | EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE |
| | SOUNDING ROD REFUSAL | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | PARENT ROCK. |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.063 | ABBREVIATIONS | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL |
| BOULDER COBBLE GRAVEL SAND SAND (SL.) (CD.) (GR.) (CSE, SD.) (F SD.) (F SD.) | AR - AUGER REFUSAL HI HIGHLY ## - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. COUGES OR GROOVES TO 6 MM DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED | TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | CL CLAY MIC MICACEOUS VST - VANE SHEAR TEST CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED | BY MODERATE BLOWS. | SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF |
| SIZE IN. 12 3 | CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT | MEDIUM CAN BE GROOVED OR GOUGED 13 MM DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 25 MM MAXIMUM SIZE BY HARD BLOWS OF THE | A 63.5 KG HAMMER FALLING 0.76 M REQUIRED TO PRODUCE A PENETRATION OF 30 CM INTO SOIL WITH A 5 CM OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS |
| SOIL MOISTURE - CORRELATION OF TERMS | DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST | POINT OF A GEOLOGIST'S PICK. | THAN 3 CM PER 60 BLOWS. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION | F - FINE SD SAND, SANDY | SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE | FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 25 MM | STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CM DIVIDED BY THE |
| LL_ LIQUID LIMIT | FRAGS FRAGMENTS TCR - TRICONE REFUSAL | SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. | TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. |
| PLASTIC SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | EQUIPMENT USED ON SUBJECT PROJECT | FRACTURE SPACING BEDDING | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| PL PLASTIC LIMIT | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: | IERM SPACING IERM IHICKNESS VERY THICKLY BEDDED > 1 M | BENCH MARK: BM #3 CHISELED SOUARE ON TOP OF WEST SIDE PARAPET N, END OF SAM COX BRIDGE BEHIND P&E GROCERY |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURI | 5.422 5.415 | VERY WIDE MURE IMAN 3 M THICKLY BEDDED 0.5 - 1 M | N. END OF SAM COX BRIDGE BEHIND FAE GROCENT ELEVATION: 658.44 M |
| OM OPTIMUM MOISTURE MOIST WITH SEL SHRINKAGE LIMIT | MORITE 8- | MODERATELY CLOSE 30 TO 100 CM VERY THINLY BEDDED 10 - 50 MM | |
| REQUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE | 1 [] | VERY CLOSE LESS THAN 5 CM THICKLY LAMINATED 2.5 - 10 MM THINLY LAMINATED < 2.5 MM | NOTES: |
| HITHIN OF THOS TOLE | Zesama Hollow Hobers | INDURATION | |
| PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH | | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | |
| NONPLASTIC 0-5 VERY LOW | TUNGCARBIDE INSERTS | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | |
| LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM | LASING A WARRER HAND TOOLS: | DOLLAR ON DE CERADATED EDON CAMPLE VITTU CTEEL DOOD. | |
| HIGH PLASTICITY 26 OR MORE HIGH | PORTABLE HOIST TRICONE mm STEEL TEETH POST HOLE DIGGER | MODERATELY INDURATED GRAINS CAN BE SEPARABLE FROM SAMPLE WITH STEEL PRODES BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | TITOTO CHILDE | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). | CORE BIT SOUNDING HIGH | DIFFICULT TO BREAK WITH HAMMER. EYTECMELY INDIDATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; | |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | |
| | | | REVISED 02/23/06 |



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippett Secretary

1 May, 2007

STATE PROJECT:

R-2518A, 34445.1.1, New Bridge on -Y2-

COUNTY:

Madison

DESCRIPTION:

New Bridge on SR 1524 over Middle Fork Creek

SUBJECT:

Geotechnical Report – Foundation Investigation

Introduction

This is a 90.5 meter long single span replacement of an existing structure that was ceded to the private property owner many years ago. The site is being reclaimed for Line –Y2-of the subject roadway Project, R-2518A. According to the Hydraulics Report the skew is 60°. The investigation borings were advanced using a CME 550 ATV rig using NW casing and advancer. Standard Penetration Tests (SPT) were performed at intervals of 5.0 feet using an automatic drop hammer. Scour is not predicted at the end bents and stream flow is controlled by a three barreled culvert located 25 meters upstream.

The bridge is located to one side of a 20 meter wide floodplain with alluvial deposits over shallow saprolite or immediately grading into weathered rock and rock.

Foundation Materials

End Bent One

EB-1 will be constructed through fill in the existing roadway. Alluvium and roadway fill (very similar material in this case) are 4 meters deep in boring EB1-A. They rest directly on crystalline biotite/amphibolite gneiss which showed core recoveries averaging nearly 80% and RQD's averaging a dismal 35% to a total depth of 13.29 m. The alluvium and roadway fill is loose to med. dense micaceaous silt with layers of sandy silt, sand and gravel. EB1-A terminated in rock at elevation 643.33 m. EB1-B was advanced primarily to determine depth to rock. Loose alluvium and fill exist to 2.4 m with 0.3 m of weathered rock overlying crystalline biotite/amphibolite gneiss. EB1-B was terminated on rock at elevation 652.31.

3413

End Bent Two

EB-2 will be constructed on existing embankment overlying alluvium. Boring EB2-A was advanced to the top of rock and consists of loose alluvium to a depth of 2.28 m, 0.45 m. of micaceous silty saprolite and approximately 0.4 m of weathered rock overlying crystalline feldspathic/biotite gneiss. The boring was terminated at elevation 651.7 m. in rock. EB2-B was advanced through 2.4 m. of sandy silt embankment and 2.0 m of sandy silt alluvium. This abruptly rests on 2.6 m. of weathered felsic/biotite gneiss. Rock coring began at 7.04 m. with recovery average of nearly 80% and RQD average of a dismal 26.5% consistently over 6.25 m. The boring was terminated at elevation 642.71 in crystalline felsic/biotite gneiss.

Groundwater

Water level was noted in EB1-A only at a depth of 2.74 m. This is generally the base flow elevation of Middle Fork Creek and matches the Hydraulic Report stream elevation of 653.5. The water elevation is expected to be consistent at this elevation in the alluvial strata across both end bents.

Respectfully submitted,

Jody C. Kuhne

- TRICE

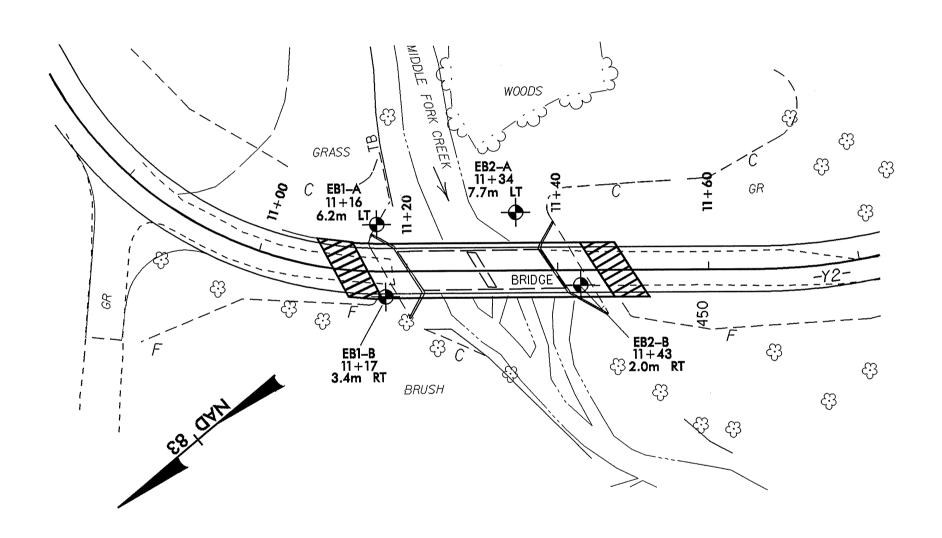
PROJECT REFERENCE NO. SHEET 34445.1.1 R-2518A -Y2-

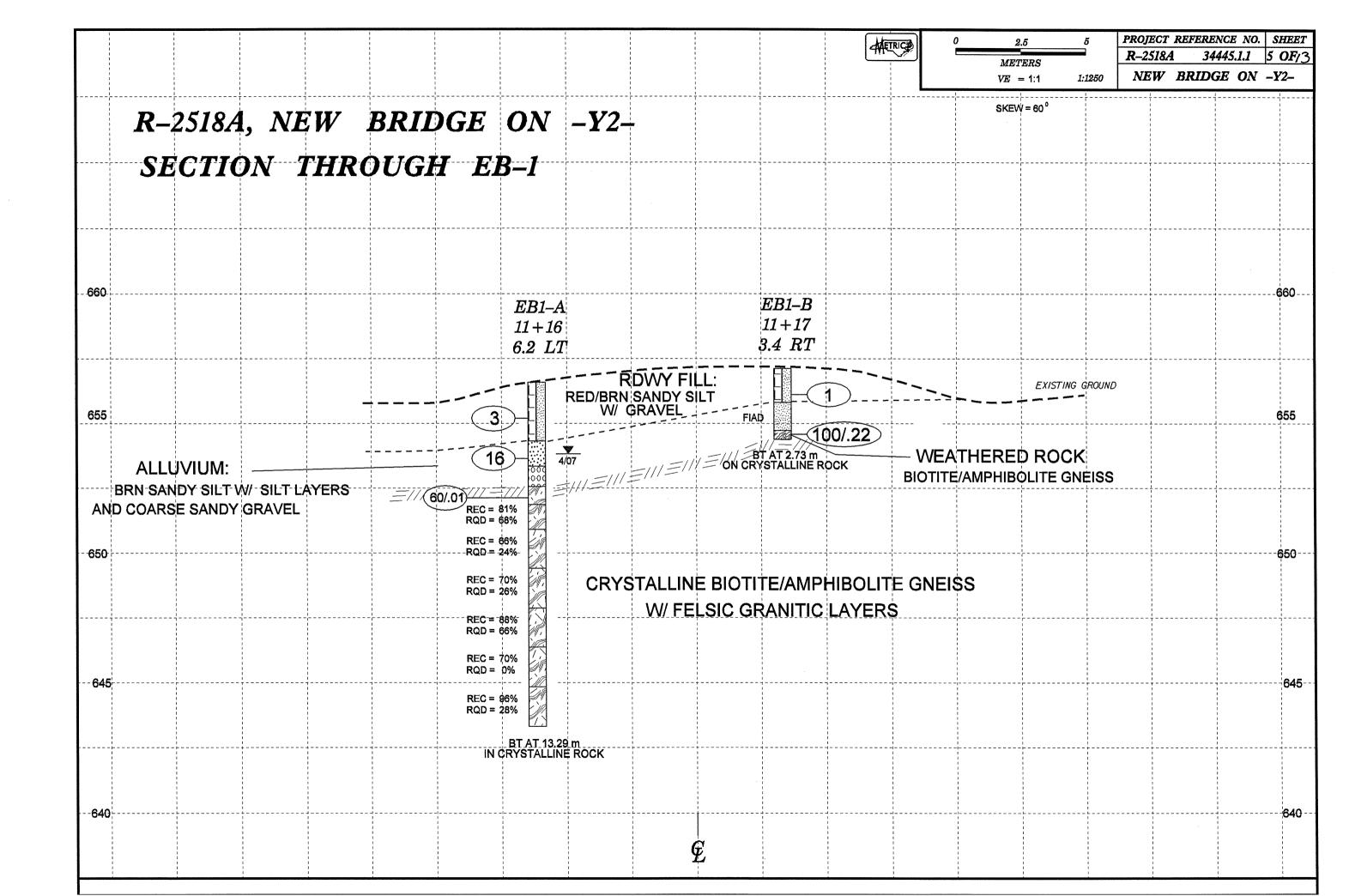
4 OF / 3

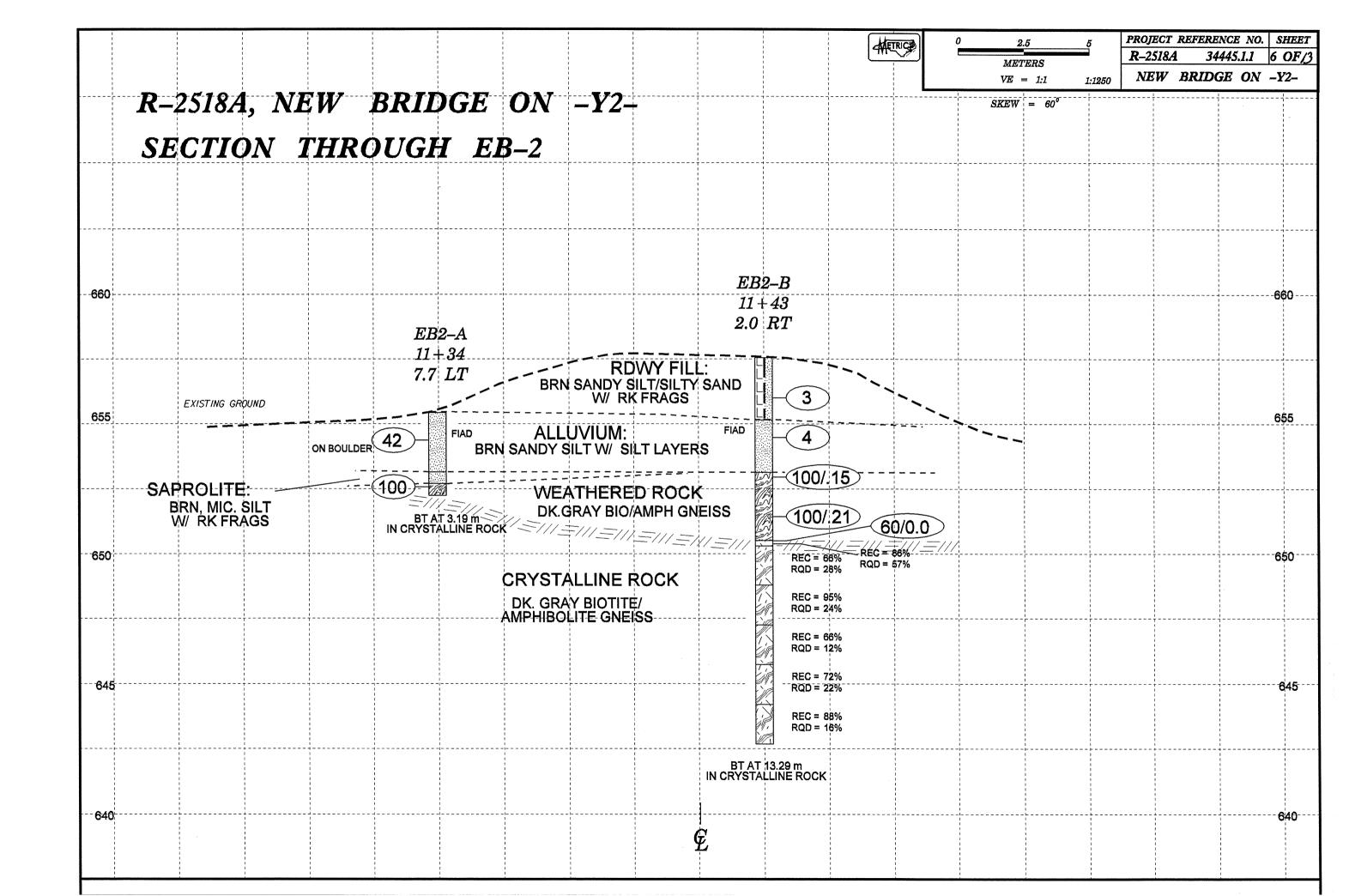
SKEW = 60°

20 **METERS**

1:500







SHEET 1 OF 4

NCDOT GEOTECHNICAL ENGINEERING UNIT

| STATE DESCRIPTION N/A STATION 11+16.0 OFFSET 6.2m LT ALIGNMENT 12-2 2 4 4.5 60.01 1 1 1 5 | | er, M. M. | GEOLOGIST Hage | | | | SON | MADI | COUNTY | GE | Y2 BRIDO | R-2518A \ | ΙD | 5.1.1 | 3444 | CT NO. | PROJE |
|--|-------|-------------------------|---|------------|----------|------------|----------------|--------|---------------|--------------|--------------|-----------------------|------|---------|--------|----------|--------|
| COLLAR ELEV. 656.62 m | WTR (| GROUND V | | | | | | | | at . | | | | N/A | TION | ESCRIP | SITE D |
| DRILL MACHINE CME-550 DRILL METHOD NW Casing w/ SPT Core HAMMER TYPE Automatic START DATE 04/02/07 COMP. DATE 04/03/07 SURFACE WATER DEPTH N/A DEPTH TO ROCK 4.0 m ELEV DEPTH ELOW COUNT BLOWS PER 30 CM N/S SAMP. N/O SOIL AND ROCK DESCRIPTION 667 1 15cm 15cm 0 25 50 75 100 N/O M/O G ELEV (m) SOIL AND ROCK DESCRIPTION 657 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 2 1 | N | 0 HR. | IT -Y2- | GNMEN | ALIC | | Т. | 6.2m l | OFFSET | | 1+16.0 | TATION 1 | | | EB1-A | G NO. | BORIN |
| START DATE | 2. | 24 HR. | 292,478.2 | STING : | EAS | | ,828.4 | G 236 | NORTHIN | 9 m | TH 13.2 | OTAL DEP | | 62 m | . 656. | R ELEV | COLLA |
| ELEV (m) BLOW COUNT (m) 15cm 15cm 15cm 15cm 0 25 50 75 100 NO. MOI G ELEV (m) SOIL AND ROCK DESCRIPTION 657 657 658 62 GROUND SURFACE RODWAY EMBANKMENT BRN SANDY SILT WATERS OF RED/BI SILT AND GRAVEL 658 62 1.40 1 2 1 1 15 | С | Automatic | HAMMER TYPE | | | | | | SPT Core | / Casing w/ | IOD NW | RILL METH | | E-550 | IE CM | MACHIN | DRILL |
| ELEV (m) (m) 15cm 15cm 15cm 15cm 0 25 50 75 100 NO. MOI G ELEV (m) SOIL AND ROCK DESCRIPTION 657 657 658 658 659 75 75 75 75 75 75 75 75 75 | | K 4.0 m | DEPTH TO ROCK | | N/A | TH | R DEF | WATE | SURFAC | 07 | 04/03/ | OMP. DATE | | 07 | 04/02/ | DATE | START |
| (m) (m) 15cm 15cm 15cm 0 25 50 75 100 NO. MOI G ELEV (m) 657 657 658 658 658 658 658 658 | | RIPTION | OIL AND ROCK DESCR | sc | | | lacksquare | SAMP. | | | | | ١T | ow coul | BLC | DEPTH | ELEV |
| 655.22 1.40 1 2 1 | DEPTH | | | | ELEV. (m | | MOI | NO. | 100 | 50 75 L L | 5 | 0 25 | 15cm | 15cm | 15cm | (m) | (m) |
| 655.22 1.40 1 2 1 | | | | | | | | | | | | | | | | | |
| ROADWAY EMBANKMENT BRN SAND SILT WILVEARS OF RED/BI SILT AND GRAVEL M 653.69 2.93 1 1 1 15 652.17 4.45 600.01 ROADWAY EMBANKMENT BRN SAND SILT WILVEARS OF RED/BI SILT AND GRAVEL 858.39 ALLUVIAL BRN FINE TO COARSE SAND 653.39 GRAY COARSE SAND WI ROUNDED PEBBLES CRYSTALLIBE ROCK WHITELT. GRAY FELSIC GRIESS LATER WIDK GRAY FELSIC GRIES LATER WIDK GRAY FELSIC GRIE | | | | | | | | | | | | | | | | | 657 |
| BRN SANDY SILT W LAYERS OF RED/BI SILT AND GRAVEL M 654.36 ALLUVIAL BRN FINE TO COARSE SAND 652.60 GRAY COARSE SAND W ROUNDED PEBBLES CRYSTALLINE ROCK WHITELT. GRAY FELSIC GNEISS LATER W/DK. GRAY BIOTITE/AMPHBOLITE GNEISS CRYSTALLINE ROCK WHITELT. GRAY FELSIC GNEISS LATER W/DK. GRAY BIOTITE/AMPHBOLITE GNEISS 654.33 Boring Terminated at Elevation 643.33 m | | | | | 656.62 | - 1 399 | | | | 1 | | | | | | | ; |
| 355.22 1.40 1 2 1 | RN | OF RED/BRN | ANDY SILT W/ LAYERS | | - | EFE | | | | | | | | | | | |
| 1 2 1 1 15 16 15 16 16 16 | | | 5,2,,,,,, | | | EE | | | | | | | | | | F | : |
| ALLUVIAL BRN FINE TO COARSE SAND Sat. Sa | | | | | | E | м | | :::: | : : : : | : : : : | 3 | 1 | 2 | 1 | - 1.40 | 355.22 |
| BRN FINE TO COARSE SAND BRN FILE TO COARSE SA | | | | | 654.36 | EE | | | | : : : : | | $\tilde{\lambda}$::: | | | | | |
| Sat. 653.39 ALLUVIAL GRAY COARSE SAND W. ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS GREISS CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS GRAY COARSE SAND W. ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GRAY FELSIC GREISS ALLUVIAL GRAY COARSE SAND W. ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS GRAY COARSE SAND W. ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS GRAY COARSE SAND W. ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT, GRAY FELSIC GREISS LATER W. DK. GRAY BIOTITE/AMPHIBOLITE GREISS GRAY COARSE SAND W. ROUNDED FEBBLES GRAY COARSE GRAY COA | | E SAND | | | - | E | \blacksquare | | | | | : / : : | , | | | Ē | - |
| ALLUVIAL GRAY COARSE SAND W ROUNDED PEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES CRYSTALLINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GRAY COARSE SAND W ROUNDED FEBBLES GRAY COARSE SAND FEBBLES GRAY COARSE SAND W ROUNDED FEBBLES GRAY COARSE SAND W | | | | | 653.39 | E | Sat. | | :::: | :::: | | | 15 | 1 | 1 | 2.93 | 353.69 |
| 552.17 4.45 60/.01 6 | | ROUNDED | | GRA | | 000 | | | | | `~~ <u>.</u> | 010. | | | | E | - |
| SPT REF. SPT | | OCK. | | | 652.60 | | | | 100+ | 1:::7 | | | | | | Ė | |
| GREISS CRYSTALINE ROCK WHITE/LT. GRAY FELSIC GNEISS LATER W/ DK. GRAY BIOTITE/AMPHIBOLITE GNEISS GNEISS GRISS 643.33 Boring Terminated at Elevation 643.33 m | | EISS LATEREI | LT. GRAY FELSIC GNE | | -651.90 | | | | _SPT ŘEF. | | | | | | 60/.01 | 4.45 | 552.17 |
| WHITE/LT. GRAY FELISIC GNEISS LATER W/ DK. GRAY BIOTITE/AMPHIBOLITE GNEISS 843.33 Boring Terminated at Elevation 643.33 m | | | GNEISS | VV/ L | | 对 | | | | | | | | | 1 | Ė | |
| GNEISS GNEISS 643.33 Boring Terminated at Elevation 643.33 m | | EISS LATEREI | /LT. GRAY FELSIC GNE | | • | | | | | | | | | | | ‡ . | - |
| Boring Terminated at Elevation 643.33 m | | PHIBOLITE | | W/ D | | M | | | | | | | | | | Ē | |
| Boring Terminated at Elevation 643.33 m | | | | | - | | | | | | | | | | | - | - |
| Boring Terminated at Elevation 643.33 m | | | • • | | | 爱 | | | | | | | | | | Ė | |
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| Boring Terminated at Elevation 643.33 m | | | | | | | | | | | | | | | | Ē | |
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| Boring Terminated at Elevation 643.33 m | | | | | | | | | | | | • • • • • | | | | | _ |
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| + Boring Terminated at Elevation 643.33 m | | | | | | 对 | | | | | : : : : | :::: | | | | F | |
| + Boring Terminated at Elevation 643.33 m | | | | , | - | | | | | | | | | | | Ė | - |
| CRYSTALLINE ROCK (GNEISS) | 1 | | | | 643.33 | | | | <u>::::</u> l | <u> </u> | <u> </u> | :::: | | | | | |
| | a | ion 643.33 m GNEISS) | ng Terminated at Elevation CRYSTALLINE ROCK (C | Borin C | - | E | | | | | | | | - | | E | - |
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SHEET 7 OF 13

| | | | | | | | SHEET OF |
|------------------|---------|--------------|------------|-----------|--------------------|----------|---|
| | | | , | | | IDE | BORING REPORT |
| | | | | | | | BURING REPURI |
| PROJECT | Γ: | 34445 | .1.1_ | I. D. NO: | R-2518. | A -Y2- | BORING NO: <u>EB1-A</u> GEOLOGIST: <u>MM HAGER</u> |
| DESCRIP | 'TION: | | NEW | BRIDGE (| <u> </u> | SR 1524 | 4) OVER MIDDLE FORK CREEK |
| COUNTY | : | MADISO | N . | • | COLLA | R ELEV | VATION: <u>656.62</u> m TOTAL DEPTH: <u>13.29</u> m |
| | | DRILL | | REC. | RQD. | | |
| ELEV. | DEPTH | RATE | RUN | METERS | METERS | SAMP. | FIELD CLASSIFICATION AND REMARKS |
| (m) | (m) | MIN./.3 m | (m) | % | % | # | |
| 651.90 | 4.72 | 0:00 | 1 | | | | · |
| | | <u> </u> | 1 ' | 0.76 | 0.64 | ! | WHITE/LT. GRAY FELSIC GNEISS LAYERED |
| | | | 0.95 | 1 1 | | , | W/ DK GRAY BIOTITE/AMPHIBOLITE GNEISS |
| | | <u> </u> | 1. 1 | 80 | 67 | 1 | |
| 650.95 | | | | <u> </u> | <u> </u> | ļ | |
| 650.95 | 5.67 | | 1 ' | 101 | 0.27 | • | |
| | | | 1.52 | 1.01 | 0.37 | | SAME AS ABOVE |
| | | | 1.02 | 66 | 24 | | SAME AS ABOVE |
| 649.43 | 7.19 | | 1 | | 27 | | |
| 649.43 | 7.19 | | | ļ | | ļ | |
| 040.40 | ' | | ! | 1.07 | 0.40 | | |
| | | | 1.53 | 1 1 | 0.15 | | SAME AS ABOVE |
| | | | | 70 | 26 | | Si Wile 1.5. 125 12 |
| 647.90 | 8.72 | | | | ļ ' | | |
| 647.90 | 8.72 | | | | | | |
| | | | | 1.34 | 1.01 | | |
| | | | 1.52 | | ! | | SAME AS ABOVE |
| | 1 1 | | ! ' | 88 | 66 | | |
| 646.38 | | | | ļ | <u> </u> | <u> </u> | |
| 646.38 | 10.24 | | ' | | | | |
| | | <u> </u> | | 1.07 | 0.00 | | |
| | ' | | 1.53 | I : | | | SAME AS ABOVE |
| C44.0E | 44 77 | | ' | 70 | . 0 | | |
| 644.85 644.85 | 11.77 | | ' | 1 | | <u> </u> | |
| 044.00 | 11.77 | | | 1.46 | 0.43 | | |
| | | | 1.52 | 1 | 0.45 | | SAME AS ABOVE |
| | | | 1.02 | 96 | 28 | | SAIVIE AS ABOVE |
| 643.33 | 13.29 | | ' | | 20 | | |
| | | taina e | · . | · | | L | CORING TERMINATED AT |
| | | | a | | | | ELEVATION 643.33 m |
| | | | | | Manager Commission | | |
| DF | RILLER: | DO CH | IEEK | | | CORI | E SIZE: NXWL EQUIPMENT: ME-451 CME-550 |
| | | | | | | | • |

NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 1 OF 4

| OJECT NO | . 3444 | 5.1.1 | II | D. R-2518 | A Y2 BR | IDGE | COUNTY | MADI | SON | | A CONTRACTOR OF THE PROPERTY O | GEOLOGIST H | lager, M. M. | |
|---|---------|--------|------------|-----------|------------|-------------|---------|--------|--------|-------------|--|--|---------------|---------|
| TE DESCRI | PTION | N/A | | | | | | | | | | | GROUND V | VTR (n |
| RING NO. | EB1-B | | | STATION | 11+17. | 0 | OFFSET | 3.4m l | ₹T | | ALIGNME | NT -Y2- | 0 HR. | N/A |
| LLAR ELE | V. 655. | 04 m | | TOTAL DE | PTH 2 | .73 m | NORTHIN | IG 236 | ,821.9 |) | EASTING | 292,471.1 | 24 HR. | FIAI |
| ILL MACHI | NE CM | 1E-45C | | DRILL ME | THOD | H.S. Augers | | | | | | HAMMER TYP | E Automatic | |
| ART DATE | 03/15/ | 05 | | COMP. DA | TE 03/ | 15/05 | SURFAC | E WATE | R DE | PTH | N/A | DEPTH TO RO | OCK N/A | |
| EV DEPTH | BL0 | OW COU | NT 15cm | | BLOW 25 | S PER 30 CM | 75 100 | SAMP. | MOI | L O G | ELEV. (m) | SOIL AND ROCK DES | | DEPTH (|
| 56 | | | | | | | | | | | | GROUND SUR | | 0 |
| 1.02 1.02 | 1 | 0 | 1 | 11 | | | | | | | RE | ALLUVIAI ED/ORANGE/BRN, SO ANDY SILTY W/ GRA | ME MICA, FINE | |
| 2.50 2.54 | | | | : \ | 1 | | ÷÷;100 | | | -// | 652.65 | WEATHERED I | 2004 | 2 |
| = | 18 | 82/.07 | | 11 | <u> </u> | <u> </u> | 100+ | - | | | 652.31 | SOME MICA, FELDS | S. GNEISS | |
| *** **** **** **** **** *** | | | | | | | | | | | | vation 652.31 m CRYS (AMPH. GNE | | |
| 111111111111111111111111111111111111111 | | | | | | | | | | | | | | |
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NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 8 OF 13

| ROJE | CT NO. | 3444 | 5.1.1 | 10 | D. R-2518 | A Y2 BRID | GE | COUNTY | MADI | SON | | | C | GEOLOGIST Hag | er, M. M. | |
|-------|----------|--------------|--------|------|---------------------|---------------------------------------|---------------|---------|--------------|------------|-----|------------------|---------------------|--|----------------------------|----------|
| ITE D | ESCRIP | TION | N/A | | | | | | | | | | | | GROUND V | VTR (m |
| ORIN | G NO. | EB2-A | | | STATION | 11+34.0 | | OFFSET | 7.7m l | T | | Α | LIGNMENT | -Y2- | 0 HR. | N/A |
| OLLA | RELEV | 654. | 89 m | | TOTAL DE | PTH 3.19 | 9 m | NORTHIN | G 236 | ,814.3 | } | E | ASTING 2 | 92,490.2 | 24 HR. | FIAD |
| RILL | MACHIN | IE CM | IE-45C | | DRILL ME | THOD H. | S. Augers | | | | | Y | | HAMMER TYPE | Automatic | |
| TART | DATE | 03/15/ | 05 | | COMP. DA | TE 03/15 | /05 | SURFACE | E WATE | R DE | PTH | N/A | | DEPTH TO ROCI | < 3.0 m | |
| LEV | DEPTH | | ow cou | | 11 | | PER 30 CM | | SAMP. | lacksquare | L | | SOI | L AND ROCK DESCR | IPTION | |
| (m) | (m) | 15cm | 15cm | 15cm | 10 | 25 1 | 50 7 | 5 100 | NO. | MOI | | ELEV | | | | DEPTH (m |
| | | | | | | | | | | | | | | | | |
| 655 _ | | | | | | · · · · · · · · · · · · · · · · · · · | , | | | ļ | | 654.89 | 9 | GROUND SURFAC | DE | 0.0 |
| - | - | | | | | : : : : | | | | | | • | BRN., | ALLUVIAL SOME MICA, FINE S | ANDY SILT | |
| 53.83 | 1.06 | | | 40 | <u> </u> | + : : : : : : | + : : : : | | | | | | | | | |
| - | | 1 | 2 | 40 | | : : ★42 | ↓ :::: | :::: | | w | | • | | | | |
| - | - | | | | | +:::: | 1 | | | | | - - 652.6 | 4 | | | 2.2 |
| 52.31 | 2.58 | 25 | 36 | 64 | . : : : : | 1:::: | | | | | | 652.16 | | SAPROLITE BRN., SOME MICA, | CII T | 2.7 |
| | <u>-</u> | 20 | 30 | | 1 4 | <u> </u> | <u> </u> | 100 | | | | 651.88 651.70 | | WEATHERED RO | CK | 3.0 |
| | | | | | | | | | | | | | -1 | CRYSTALLINE RO TITE/AMPHIBOLITE | | |
| 1 | | | | | | | | | | | | • | Boring Elevation | Terminated by Auge on 651.70 m CRYSTA | r Refusal at LLINE ROCK | |
| - | - | | | | | | | | | | F | | | (AMPH. GNEISS | | |
| - | | | | | | | | | | | | - | | | | |
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SHEET 1 OF 4

NCDOT GEOTECHNICAL ENGINEERING UNIT

| PROJECT NO. | 3444 | 5.1.1 | 10 | D. R-2518A Y2 BRIDGE | COUNTY M | ADISON | | 1 | GEOLOGIST Ha | ger, M. M. | |
|--------------------------|----------------|---------|--------|--|------------|-----------|------------|---------------|--|---------------|--------|
| SITE DESCRIF | PTION | N/A | | | | | | | | GROUND W | /TR (m |
| BORING NO. | EB2-B | | | STATION 11+43.0 | OFFSET 2.0 | m RT | | ALIGNMENT | -Y2- | 0 HR. | N/A |
| COLLAR ELE\ | / . 657 | .58 m | | TOTAL DEPTH 14.87 m | NORTHING | 236,801.7 | | EASTING 2 | 92,487.4 | 24 HR. | FIAD |
| DRILL MACHII | NE CM | 1E-550 | | DRILL METHOD NW Casing v | / SPT Core | | - | | HAMMER TYPE | Automatic | |
| START DATE | 04/03/ | 07 | | COMP. DATE 04/04/07 | SURFACE W | ATER DEPT | TH N/A | \ | DEPTH TO ROC | K 7.0 m | |
| ELEV DEPTH | BL | ow cor | INT | BLOWS PER 30 CM | SA | | L | 50 | IL AND ROCK DESC | RIPTION | |
| (m) (m) | 15cm | 15cm | 15cm | 0 25 50 | 75 100 N | O. MOI | | EV. (m) | IL AND ROOK DEGO | | EPTH (|
| 658 | | | | | | | | | | | |
| *** <u> </u> | | | | .[] | | | 657 | | GROUND SURFA | | 0. |
| ‡ | | | | | :::: | | # | | ROADWAY EMBANI /BRN SLI. CLAYEY S | | 3 |
| Ī | | | | | | | E | C | F FINE SAND AND (| GRAVEL | |
| 656.06 + 1.52 | | | | <u> </u> | :::: | | <u> </u> | | | | |
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| ‡ | | | | | :::: | | 655 | .18 | ALLUVIAL | | 2 |
| 654.53 3.05 | | | | | | | Æ | BRN | SANDY SILT W/ SI | LT LAYERS | |
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| 653.01 4.57 | - | <u></u> | | | 100 | | 653 653 | .16 | WEATHERED RO | OCK | 4 |
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| | | | | <u> </u> | ···· | | 642 | .71 Boring | Terminated at Eleva | tion 642.71 m | 14 |
| Ξ. | | | ٠ | and the state of t | | - | E | CRYS | Terminated at Eleva TALLINE ROCK (AM | PH. GNEISS) | |
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SHEET 9 OF 13

| | | • | | | CC | RE | BORING REPORT |
|---------------------|-------------------------|----------------------------|------------|---------------------|---------------------|---------|---|
| PROJECT | Г: _ | 34445 | .1.1 | I. D. NO: | R-2518 | A -Y2- | BORING NO:EB2-B GEOLOGIST:MM HAGER |
| DESCRIP | TION: | | NEW | BRIDGE (| ON -Y2- (S | SR 1524 | OVER MIDDLE FORK CREEK |
| COUNTY | | MADISO | N . | • | COLLA | R ELEV | ATION: <u>657.58</u> m TOTAL DEPTH: <u>14.87</u> m |
| ELEV. (m) | DEPTH (m) | DRILL RATE MIN./.3 m | RUN (m) | REC. METERS % | RQD. METERS % | SAMP. | FIELD CLASSIFICATION AND REMARKS |
| 650.54 650.33 | 7.04 | 0:00 | 0.21 | 0.18 86 | 0.12 57 | | DK. GRAY, MODERATELY FOLIATED BIOTITE/AMPHIBOLITE GNEISS |
| 650.33 | 7.25 | | 1.53 | 1.01 66 | 0.43 | | SAME AS ABOVE |
| 648.80 | 8.78 | : | 1.52 | 1.37 90 | 0.37 | | SAME AS ABOVE |
| 647.28 647.28 | 10.30 10.30 11.82 | | 1.52 | 1.01 66 | 0.18 | | SAME AS ABOVE |
| 645.76 644.23 | 11.82 | | 1.53 | 1.10 72 | 0.34 | | SAME AS ABOVE |
| 644.23 642.71 | 13.35 14.87 | | 1.52 | 1.34 | 0.24 16 | | SAME AS ABOVE |
| V 1 2.11 | 17.01 | | | | | | CORING TERMINATED AT ELEVATION 642.71 m |
| DI | RILLER: | DO CH | IEEK | | | COR | E SIZE: NXWL EQUIPMENT: ME-45I CME-550 |



FIELD SCOUR REPORT

DESCRIPTION(1):

WBS: 33830.1.1 TIP:

B-4675

COUNTY: WILKES

| | EX | ISTING BRIDG | E | | |
|---|--|---|--|---|----------|
| Information from: | Field Inspection XX Other (explain) | Microfilm | (reel p | oos:) | |
| Bridge No.: NEW Foundation Type: TIMBE | Length: 30.5m Total R COLUMNS ON CONC. | Bents: 2 Bent SPREAD FOOTIN | ts in Channel: 0 GS | Bents in Flood | olain: 2 |
| EVIDENCE OF SCOUR Abutments or End Ber | (2) nt Slopes: NONE NOTED | | | | |
| Interior Bents: NA | | | | | |
| Channel Bed: NONE | NOTED | | | | |
| Channel Bank: NONE | NOTED | | | | |
| EXISTING SCOUR PRO Type(3): CONC | OTECTION RETE WING WALLS | , | W. F. C. | | |
| Extent(4): 10' EA | CH DIRECTION FROM EN | ND BENTS | (87 | | |
| Effectiveness(5): ADEQU | UATE | 1100 Na. 200 Na | | *************************************** | |
| Obstructions(6): DEBRI | S ON EXIST. INT. BENT | | <u> </u> | . j. 2000. in 1877. | |

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

| | <u>DESIGN IN</u> | FORMATION | | |
|--|----------------------------------|----------------------|-------------|---|
| Channel Bed Material(7): | FINE TO COARSE SAND | W/ COBBLES AND BOU | LDERS | |
| Channel Bank Material(8): | SANDY SILT/SILTY SAN BOULDERS | D W/ ALLUVIAL COBBLE | S AND | |
| Channel Bank Cover(9): | WOODED W/ BRUSH | | | |
| Floodplain Width(10): | 18.5 m | • | | |
| | GRASS AND PAVED/GR | |)PFRTY | |
| | | | | |
| Stream is(12): | Aggrading | Degrading | Static XX | |
| channel Migration Tendency(13): | CULVERT 20m UPSTRE | AM PREVENTS CHANNE | L MIGRATION | |
| Observations and Other Comm | nents: | | | |
| | | | | |
| | | | | <i>*</i> |
| DESIGN SCOUR ELEVATION | IS(14) | Feet | Meters XX | |
| BENTS EB1 NA | EB2 | | | |
| Comparison of DSE to Hydraul SCOUR ENVELOPE DOES NO SOIL ANALYSIS RESULTS FI | OT REACH PROPOSED E | | | • •••••••••••••••••••••••••••••••••••• |
| Bed or Bank Sample No. Retained #4 Passed #10 | ROW CHANNEL BED AN | D BANK MATERIAL | | |
| Passed #40 Passed #200 Coarse Sand Fine Sand Silt | | | | |
| Clay LL Pl | | | | |
| AASHTO Station Offset Depth | | | | |

Template Revised 02/07/0

Reported by: Chil

Date: 5/1/05

R-2518A, 34445.1.1 NEW BRIDGE ON -Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB1-A

DEPTH: 4.7m - 8.7m



R-2518A, 34445.1.1 NEW BRIDGE ON -Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB1-A

DEPTH: 8.7m - 11.8m



R-2518A, 34445.1.1 NEW BRIDGE ON –Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB2-B

DEPTH: 7.04m - 10.30m



R-2518A, 34445.1.1 NEW BRIDGE ON -Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB1-A

DEPTH: 11.8m - 13.3m



R-2518A, 34445.1.1 NEW BRIDGE ON -Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB2-B

DEPTH: 10.3m - 14.47m



13 of 13

R-2518A, 34445.1.1 NEW BRIDGE ON -Y2-, SR 1524 OVER MIDDLE FORK CREEK BORING EB2-B

DEPTH: 14.47m - 14.87m



Γ ID. R-2518A

CONTENTS:

$IECT: \ 6.8690051$

DRAWN BY: _

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

INVESTIGATION OF RET. WALL ALONG -L-

STRUCTURE SUBSURFACE INVESTIGATION

| STATE PROJECT 6.869005T I.D. NO. R-2518A |
|---|
| F.A. PROJECTCOUNTYMADISON |
| PROJECT DESCRIPTION US 19 FROM 1-26 TO 0.8 KM EAST OF THE YANCEY CO. LINE |
| SITE DESCRIPTION RETAINING WALL STATIONS 112+30 - 112+70 17 M LT |



| - | | | | P.E. CONST. | |
|----------------|----------|-----------------|-------|----------------|--------|
| | | | | | |
| STATE PROJ.NO. | | F. A. PROJ. NO. | | DESCRIPTION | |
| N.C. | | | | 1 | 4 |
| STATE | STATE PR | OJECT REFERENC | B NO. | SHEET NO. | SHEETS |

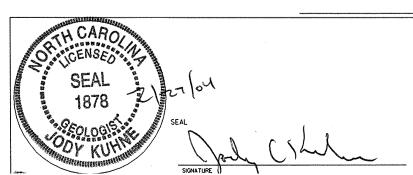
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 RALEICH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (199) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELIABILITY INNERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

| INVESTIGATED BYJC_KUHNE | PERSONNEL |
|-------------------------|----------------------|
| CHECKED BY WD FRYE | M. JOHNSON, J CARVER |
| SUBMITTED BY JC KUHNE | F&H ENGINEERING |
| DATE | |
| | |
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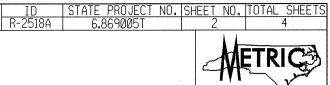
JC KUHNE

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DIVISION OF HIGHWAYS

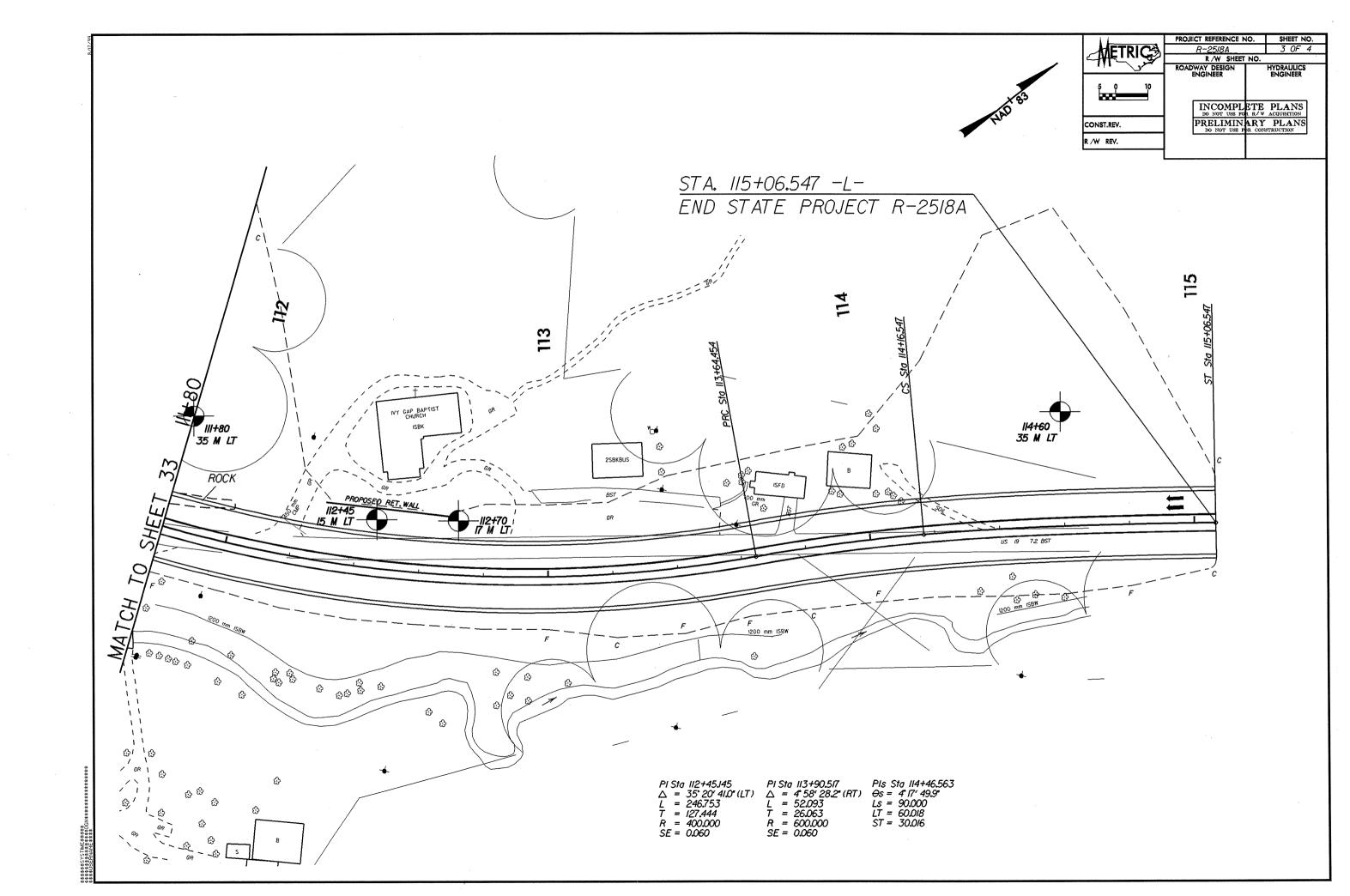
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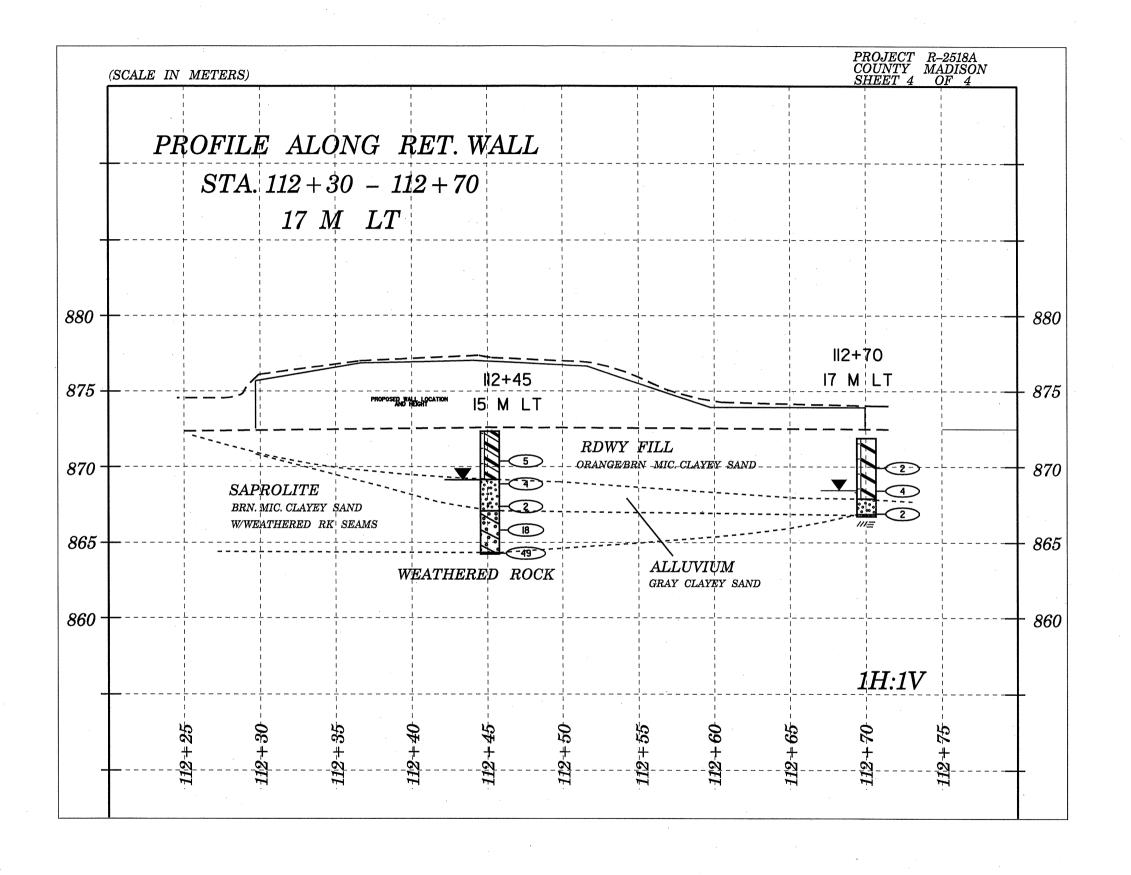


SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| | SOID MIND ROOM DISCINE | , i bittio, of thoobs, fitto fitbotto fittions | |
|---|--|--|--|
| SOIL DESCRIPTION | GRADATION | ROCK DESCRIPTION | TERMS AND DEFINITIONS |
| SDIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH | WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. | ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. |
| CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER | UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY G GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. | SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 om PER 50 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, | ANGULARITY OF GRAINS | OF WEATHERED ROCK. | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. |
| TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: | | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS: | ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. |
| VERY STIFF, GRAY SILTY CLAY, WOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGUI SUBROUNDED, OR ROUNDED. | | ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS |
| SOIL LEGEND AND AASHTO CLASSIFICATION | MINERALOGICAL COMPOSITION | a para a | ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS | MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHE | NEVER BOCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE. | CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. |
| CLASS. (⊴5% PASSING *200) (≫5% PASSING *200) | THEY ARE CONSIDERED OF SIGNIFICANCE. | ONEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN FINE TO COARSE GRAIN | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. |
| 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-p A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-1-A-1-b A-2-4 A-5 A-6, A-7 | COMPRESSIBILITY | NON-CRISTALLINE SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SANDSTONE, ETC. | 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. |
| 000000000000000000000000000000000000000 | SLIGHTLY COMPRESSIBLE LIOUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS |
| SYMBOL BOOODBOOOD SOOD SOOD SOOD SOOD SOOD SOO | HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 | SEDIMENTARY SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC. | MASSIVE ROCK. |
| Z PASSING 10 50 MX SILT- MUCK, | PERCENTAGE OF MATERIAL GRANULAR SILT- CLAY | WEATHERING | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. |
| # 40 30 MX 50 MX 51 MN SOILS COILS PEAT | ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER | DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. |
| # 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% | HAMMER IF CRYSTALLINE. | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES |
| LIQUID LIMIT 40 MX41 MN 40 MX41 MN 40 MX41 MN 40 MX41 MN SOILS WITH | MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V. SLI,) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF | RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. |
| PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY | HIGHLY ORGANIC >10% >20% HIGHLY 35% AND AB | OVE (V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL |
| GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANI SOILS | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. |
| USUAL TYPES STUNE THRUS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC | water level in Bore Hole immediately AFTER DRILLING. | (SLI.) 2.5 cm. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. |
| OF MAJOR GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER | STATIC WATER LEVEL AFTER 24 HOURS. | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN | |
| GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR TO POOR UNSUITABLE AS A EXCELLENT TO FOOR FAIR FAIR FAIR FAIR FAIR FAIR FOOR FAIR FAIR FAIR | PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA | (MDD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS |
| AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAB | ··· | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. | LEDGE - A SHELF-LIKE RIDGE OF PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO TIS |
| P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30 | SPRING OR SEEPAGE | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| CONSISTENCY OR DENSENESS | 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. | MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY |
| PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH | ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SPT CPT DET DMT TEST BORING SAMPLE WITH SOIL DESCRIPTION PEGGRAPHICAL | IF TESTED, WOULD YIELD SPT REFUSAL | INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN |
| CONSISTENCY (N-VALUE) (kN/m²) | WITH SOIL DESCRIPTION ST PMT DESIGNATIONS | SEVERE HEE MOCKS EXCELL ADMITTS DISCOUNTED ON STHERED THOSE CHEEN MIND EXIDERLY DOT MEDICED | INTERVENING IMPERVIOUS STRATUM. |
| GENERALLY VERY LOOSE | SOIL SYMBOL AUGER BORING S- BULK SAMPI | IN STRENGTH TO STRONG SDIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| MATERIAL MEDIUM DENSE 10 TO 30 N/A | ARTIFICIAL FILL OTHER THAN ASS- SPLIT SPOO | TE TECTED WITH DO ODT 11 WALLED 1 100 DED 00 | ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF |
| (NON-COHESIVE) DENSE 30 TO 50 | ROADWAY EMBANKMENTS - CORE BORING SAMPLE | VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT | ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN |
| | ST- SHELBY TU | | SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. |
| VERY SOFT <2 | THEEDED BOCK LINE BS- BOCK SAMP | ODICINAL DOCK CARRIE DEMAIN AS TECTED VICI DE COT NI VALUES (188 DI DUC DER 28 | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN |
| SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 MATERIAL STIFF 8 TO 15 100 TO 200 | △ INSTALLATION DT. BECCMBACT | COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND | COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY |
| MATERIAL STIFF 8 TO 15 100 TO 200 (CDHESIVE) VERY STIFF 15 TO 30 200 TO 400 | ALLUVIAL SOIL BOUNDARY SLOPE INDICATOR TRIAXIAL S | | OF THE INTRUDED ROCKS. |
| HARD >30 >400 | 25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAM | | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. |
| TEXTURE OR GRAIN SIZE | SPT N-VALUE | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REDUIRES | STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 | SOUNDING ROD REF— SPT REFUSAL | SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK. | FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION |
| OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053 | ABBREVIATIONS | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED | WITH 50 BLOWS. |
| BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY | AR - AUGER REFUSAL PMT - PRESSUREMETER TEST | TO DETACH HAND SPECIMEN. | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH |
| (BLDR,) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.) | BT - BORING TERMINATED SD SAND, SANDY | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 6 mm DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED | OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | CL CLAY CPT - CONE PENETRATION TEST SLI SLIGHTLY | BY MODERATE BLOWS. | TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED |
| SIZE IN. 12" 3" | CSE COARSE TCR - TRICONE REFUSAL | MEDIUM CAN BE GROOVED OR GOUGED I mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE | BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. |
| SOIL MOISTURE - CORRELATION OF TERMS | DMT - DILATOMETER TEST OPT - DYNAMIC PENETRATION TEST OVER 1 OF THE PROPERTY | POINT OF A GEOLOGISTS PICK. | TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION | 9 - VOID RATIO 7d - DRY UNIT WEIGHT | SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS | BENCH MARK: |
| | F FINE W - MOISTURE CONTENT FOSS FOSSILIFEROUS V VERY | FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | |
| - SATURATED - USUALLY LIDUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE | FRAC FRACTURED VST - VANE SHEAR TEST | VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 mm | ELEVATION: |
| LL_ LIQUID LIMIT | FRAGS FRAGMENTS MED MEDIUM | SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. | NOTES: |
| PLASTIC SEMISOLID; REQUIRES DRYING TO STAND ORTHON MORE UP. | EQUIPMENT USED ON SUBJECT PROJECT | FRACTURE SPACING BEDDING | - |
| (PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE | HAMMED TYPE. | TERM SPACING IERM THICKNESS | 1 |
| | DRIED DAILS: HDANGING LODES: | VERY THICKLY BEDDED > 1 m | |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | MOBILE B- CLAY BITS | MODERATELY CLOSE 20 TO 100 cm THINLY BEDDED 0.05 - 0.5 m | |
| SL _ SHRINKAGE LIMIT | 152 mm CONTINUOUS FLIGHT AUGER CORE SIZE: | CLOSE 5 TO 30 Cm VERY HINLY BEDDED 10 - 50 mm | |
| - DRY - (D) REDUIRES ADDITIONAL WHIER TO ATTAIN OPTIMUM MOISTURE | ☐ BK-51 ☐ 293 mm HOLLOW AUGERS ☐ -B | VERY CLOSE LESS THAN 5 cm THICKLY LAMINATED 2.5 - 10 mm THINLY LAMINATED < 2.5 mm | |
| PLASTICITY | | INDURATION | |
| PLASTICITY INDEX (PI) DRY STRENGTH | | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | |
| NONPLASTIC 0-5 VERY LOW | X CME-550 TUNG,-CARBIDE INSERTS -H | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: | |
| LOW PLASTICITY 6-15 SLIGHT | CASING W/ ADVANCER HAND TOOLS: | GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | |
| MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH | PORTABLE HOIST TRICONEmm STEEL TEETH POST HOLE | DIGGER MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | OTHER TRICONE | | |
| | OTHER CORE BIT X SOUNDING RE | OD INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | OTHER OTHER VANE SHEAR | | |
| 1002 IEIG COOK NO EIGHT, STRENG OTHERWES, ETG. BILL COLD TO DESCRIBE BITERINGE | OTHER | SAMPLE BREAKS ACROSS GRAINS. | |
| | | | REVISED 09/15/00 |





STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ALL DIMENSIONS ARE IN METERS AND /OR MILLIASTERS UNLESS OTHERWISE NOTED

| | | | CON | ST. |
|-------|-----------|---------------------|--------------|--------|
| 6.86 | T300¢ | | P.E. | |
| STATE | PROJ. NO. | F. A. PROJ. NO. | DESCRI | PTION |
| N.C. | R | -2518A | 1 | 4 |
| STATE | STATE PRO | DIECT REFERENCE NO. | SHEET NO. | SHEETS |

CONTENTS:

INVESTIGATION OF RET. WALL ALONG -L-

STRUCTURE SUBSURFACE INVESTIGATION

| STATE PROJECT 6.869005T I.D. NO. R-2518A |
|--|
| F.A. PROJECT |
| COUNTY MADISON |
| PROJECT DESCRIPTION US 19 FROM 1-26 |
| TO 0.8 KM EAST OF THE YANCEY CO. LINE |
| |
| SITE DESCRIPTION |
| RETAINING WALL |
| STATIONS 102+00 - 103+60 38 M LT |

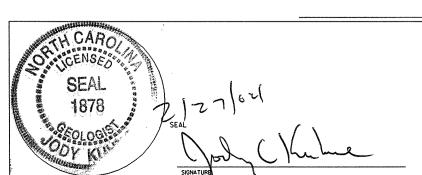
CAUTION NOTICE

THE SUBSURFACE INFORNATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOCS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOCK, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNESS 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 STRANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

| INVESTIGATED BYJC_KUHNE | _ PERSONNEL |
|-------------------------|----------------------|
| CHECKED BY WD FRYE | M. JOHNSON, J CARVER |
| SUBMITTED BYJC_KUHNE | F&H ENGINEERING |
| DATE | |
| | |
| | |



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

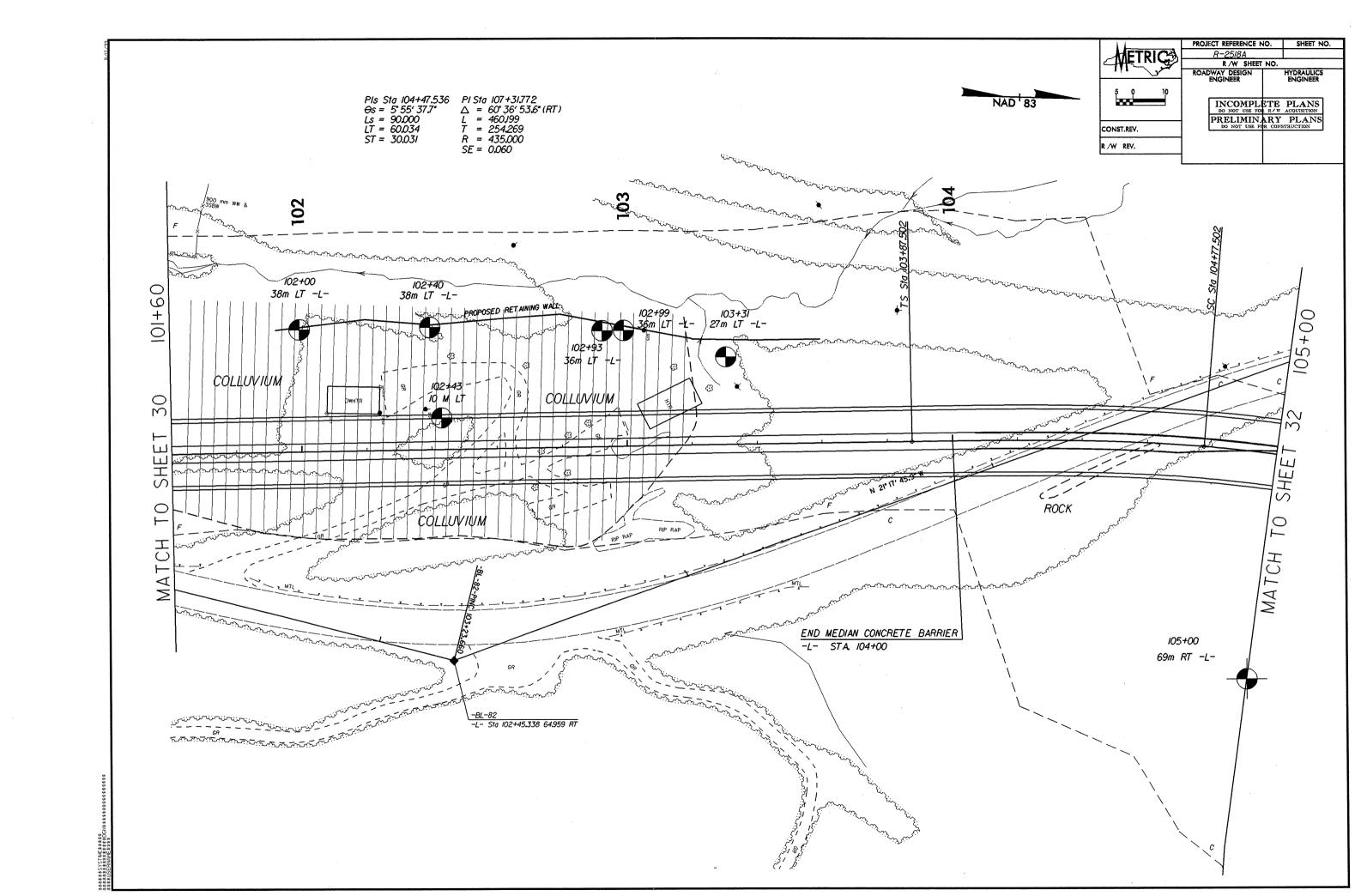
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

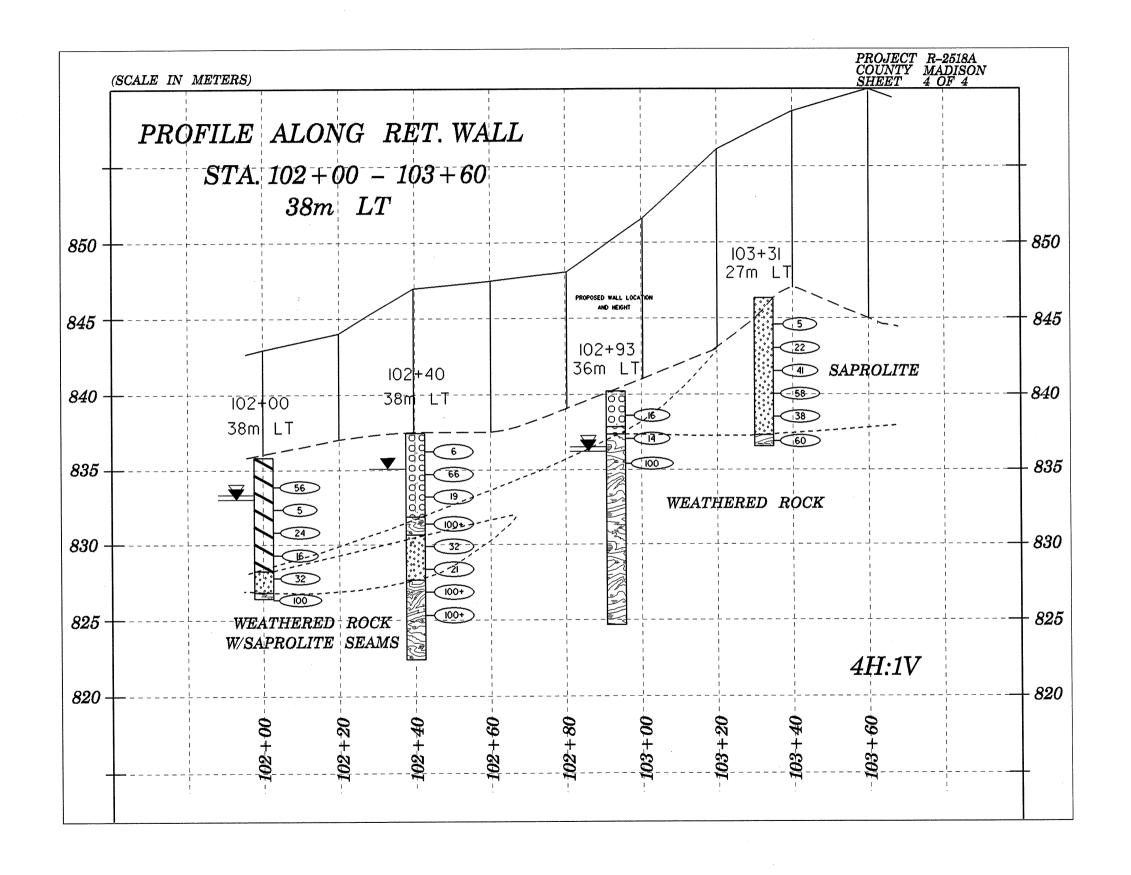
DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

| Fig. 1.5 | | SOIL AND ROCK LEGEND, TERM | IS, SYMBOLS, AND ABBREVIATIONS | |
|--|--|---|---|---|
| The content of the | SOIL DESCRIPTION | GRADATION | | TERMS AND DEFINITIONS |
| Application Continue Contin | SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH | | | |
| The content is a proper with the content of the c | | | | 1 — — — — — — — — — — — — — — — — — — — |
| March Marc | BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL | ANGULARITY OF GRAINS | | · · |
| | COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: | | 555 | PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. |
| March Marc | | | ROCK (WR) PER 30 cm. | |
| April Company Compan | CONTROL CONTROL OF MATERIAL OF CONTROL OF CO | | POCK (CP) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, | |
| March Marc | | | GREISS, GABRO, SCHIST, ETC. | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. |
| The content of the | | | NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE | |
| Mary | DOOOODOOO | MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS |
| Company Comp | 500005000000000000000000000000000000000 | *** | | |
| 1 | # 10 50 MX GRANULAR CLAY MUCH | ORGANIC MATERIAL GRANULAR SILT- CLAY | - WEATHERING | |
| March Marc | # 40 BU MXDU MXDI MN | SUILS SUILS | | MEASURED CLOCKWISE FROM NORTH. |
| Windows Wind | TAND 1107 | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% | | |
| March Park | PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHL | HIGHLY ORGANIC 1187 1287 HIGHLY SEY AND ADOME | | |
| Property | GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGAN | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | |
| Second Control Contr | USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC | WATER LEVEL IN BURE HULE IMMEDIATELY AFTER DRILLING. | | |
| The column The | MATERIALS SAND SAND GRAVEL AND SAND SUILS SUILS | | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN | |
| F. C. Of 1.7 1.1 | AS A EVERY TO COOR FAIR TO POOR FAIR TO POOR INSUITA | BLE PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA | | |
| CANAGE Process Proce | SUBGRADE | SPRING OR SEEPAGE | | |
| Processing Pro | | MISCELLANEOUS SYMBOLS | SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH | |
| WITH CONTROL 1 | PRIMARY SOULTIVE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED | T ROADWAY EMBANKMENT SPT CPT POT TEST RORING SAMPLE | | INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. |
| ## ALL SPACE 1.00 1 | | WITH SOIL DESCRIPTION VST PHT DESIGNATIONS | | |
| WHITE ALL AND ADDRESS 1 | GENERALLY LOOSE 4 TO 10 | SOIL SYMBOL AUGER BORING S- BULK SAMPLE | | RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| Part | MATERIAI MEDIUM DENSE 10 TO 30 N/A | | | |
| Part | | ST- SHE RY TIRE | | |
| Authors 11 12 13 13 13 13 13 13 | 1 "- "- "- | MONITORING WELL SAMPLE | SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE | |
| ## CHESTON OF THE PROPERTY OF | SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 | PIEZUME IER | | |
| ## 15 15 15 15 15 15 15 15 | | THE SUIL BOUNDARY | SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERB, SAPROLITE IS | OF THE INTRUDED ROCKS. |
| The content | | 25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE | | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. |
| Secretary Secr | TEXTURE OR GRAIN SIZE | | | STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER |
| COUNTY C | | SOUNDING ROD REF SPT REFUSAL | SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK. | |
| ## SOLICA COUNTY | | ABBREVIATIONS | | |
| SOLI | BOULDER COBBLE GRAVEL SAND SAND SILT CLAY | | | |
| STREE 10. 12 2 5 5 5 5 5 5 5 5 | (CSE, SBD) (F, SBD) | | | |
| SOIL MOISTURE - CORRELATION OF TERMS DUTE FOR FILED MOISTURE (SCOPING) DUTE FOR FILED MOISTURE (SCOPING) SCORING FURLY MOISTURE (SCORING FURLY MOISTURE (SCOPING) SCORING FURLY MOIST | | | MEDIUM CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. | |
| SOUR MOSTER SEALE OTTER PRODUCTION OF ATTERN POST CONTROL OF ATTERN | SOIL MOISTURE - CORRELATION OF TERMS | DMT - DILATOMETER TEST | | TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| SATURATED USUALLY LIDUID_VERY MET, USUALLY FROM ELOW WHEN TABLE FROM ST. FROM STREET ST. FROM ST. FRO | | ON e - VOID RATIO 7d - DRY UNIT WEIGHT | | BENCH MARK: |
| FROM SELOV THE ORDUNO WATER TABLE COULD LIMIT | | | | |
| MEDI-MEDIUM MOISTURE PLASTIC LIMIT MOISTURE MOISTURE MOISTURE MOIST NEW PLASTIC LIMIT M | (SAT.) FROM BELOW THE GROUND WATER TAB | | | ELEVATION: |
| RANGE OF PLASTIC LINIT ON OFTIMAL MOISTURE SHINKAGE LINIT ON OFTIMAL MOISTURE SHINKAGE LINIT PLASTIC LINIT PLASTICITY PLA | PL OSTIC T | | | NOTES: |
| PLASTICITY PREDUBLY POPTHALM MOISTURE POPTHALM PORT THAN BELL PROBE POPTHALM PORT THAN BELL PROBE POPTHAL PROBLE POPTHAL PARTICITY POPTHAL PARTICITY POPTHAL PROBLE POPTHAL PARTICITY PO | RANGE < - WET - (W) SEMISOLIDI, REGUIRES DISTING TO ATTAIN OPTIMUM MOISTURE | EQUIPMENT USED ON SUBJECT PROJECT | | |
| OPTIMUM MOISTURE SL. SHRINKAGE LIMIT OPTIMUM MOISTURE SS. SHRINKAGE LIMIT OPTIMUM MOISTURE OP | PLL PLASTIC LIMIT | DRILL UNITS: HDVANCING TOOLS: | VERY TUTOU V PEDDED 11 m | |
| SHRINKAGE LIMIT - DRY - (II) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE - DRY - (II) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE - DRY - (III) BK-51 DRY - (III) DRY - (III) DRY - (III) DRY STRENGTH STRENGTH DRY - (III) DRY - | OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTU | | WIDE 1 TO 3 m THINK V BEDDED 0.5 - 1 m | |
| PLASTICITY PLASTICITY PLASTICITY MODERANCE MEDIUM MODERANCE MEDIUM MEDIU | | MORITE 8- | MUDERAGELY CLUSE. 30 (U 1200 cm VERY THINLY BEDDED 10 - 50 mm | |
| PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 2 COR MORE DESCRIPTIONS MAY INCLUDE COLOR CONDINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE. ARD FACED FINGER BITS | | | VERY CLOSE LESS THAN 5 cm HICKLY LAMINATED 2.5 - 10 mm | |
| PLASTICITY INDEX (P]) DRY STRENGTH NONPLASTIC 0-5 VERY LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DRRK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. TUNG, CARBIDE INSERTS TO CASING W/ ADVANCER HAND TOOLS: HAND TOOLS: POST HOLE DIGGER HAND TOOLS: BRAINS CAN BE YEARANTED ISTREMED INTO SAMPLE WITH STEEL PROBE; BRAINS CAN SELY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SERAK WITH HAMMER. TO SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; | PLASTICITY | | INDURATION | |
| NONPLASTIC 9-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NONPLASTICITY 6-5 VERY LOW PLASTICITY 16-25 MEDIUM PORTABLE HOIST TRICONEmm STEEL TEETH POST HOLE DIGGER HAND TOOLS: HAND TOOLS: POST HOLE DIGGER MODERATELY INDURATED GRAINS (AR BE DIFFICULT TO SEPARATE WITH STEEL PROBE; BEAKS EASILY WITH HAMMER. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFIERS SUCH AS LIGHT, DARK STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFICATION OF THE SUMMER SUCH AS LIGHT, DARK STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. NODIFICATION OF THE SUMER SUMMER | | | | |
| HAND TOOLS: MEDI IMMED. PLASTICITY 16-25 MED. PLA | 10.11 2.10 1.2 | X CME-550 | | |
| HIGH PLASTICITY 26 OR MORE HIGH TRICONE | MED. PLASTICITY 16-25 MEDIUM | HAND TOOLS: | CONTROL ON DE SERVICIO ESCUE CAMPI E METIL CONTROL | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE, OTHER CORE BIT OTHER OTHER OTHER OTHER OTHER OTHER OTHER OTHER OTHER SOUNDING ROD INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER, SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; | | TRICONE mm TING-CARE HAND AUGER | | |
| MODIFIERS SUCH AS LIGHT DARK, STREAKED, ETC. ARE USED TO BREAKED, ETC. ARE USED TO BREAK SAMPLE; OTHER OTHER EXTREMELY INDURATED SHARP HAMMER BLOWS REDUIRED TO BREAK SAMPLE; | | | | |
| | | OTHER OTHER VANE SHEAR TEST | DUADA WARES DI DIGITALE TO DESIGNATION OF | |
| | South to Early bridge of the stage for the obby to become the Edithole | OTHER | | |





9

CONTENTS:

ALONG -L-

INVESTIGATION OF RET. WALL

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

| STATE PROJECT 6.869005T I.D. NO. R-2518A |
|--|
| F.A. PROJECT |
| COUNTY MADISON |
| PROJECT DESCRIPTION US 19 FROM 1-26 |
| TO 0.8 KM EAST OF THE YANCEY CO.LINE |
| |
| SITE DESCRIPTION RETAINING WALL |
| STATIONS 100+70 - 101+20 48 M LT |
| |



| | | | CONST. | |
|-----------------------------|-----------|---------------------|--------------|-------|
| | | | P.E. | |
| STATE PROJ.NO. F.A.PROJ.NO. | | DESCRIPTION | | |
| N.C. R-2518A | | 1 | 5 | |
| STATE | STATE PRO | DIECT REFERENCE NO. | SHEET NO. | SHEET |

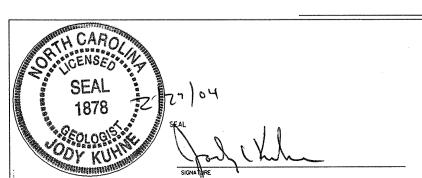
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS NAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

| INVESTIGATED BY | JC KUHNE | PERS | SONNEL |
|-----------------|----------|------|----------------------|
| CHECKED BY | WD FRYE | | M. JOHNSON, J CARVER |
| SUBMITTED BY | JC KUHNE | | F&H ENGINEERING |
| DATE | | - | |
| | | | |
| | | | |



DRAWN BY: JC KUHNE

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

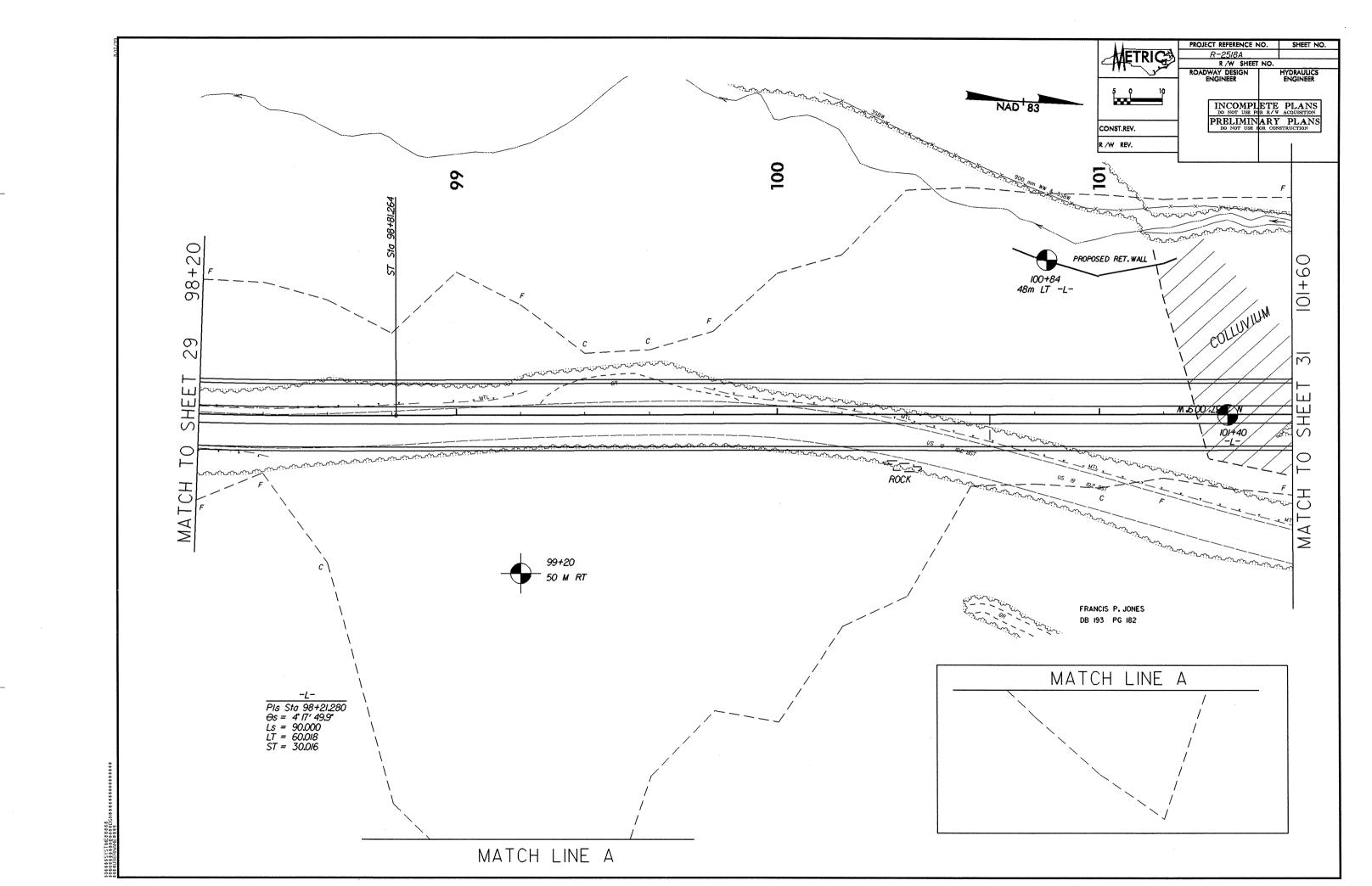
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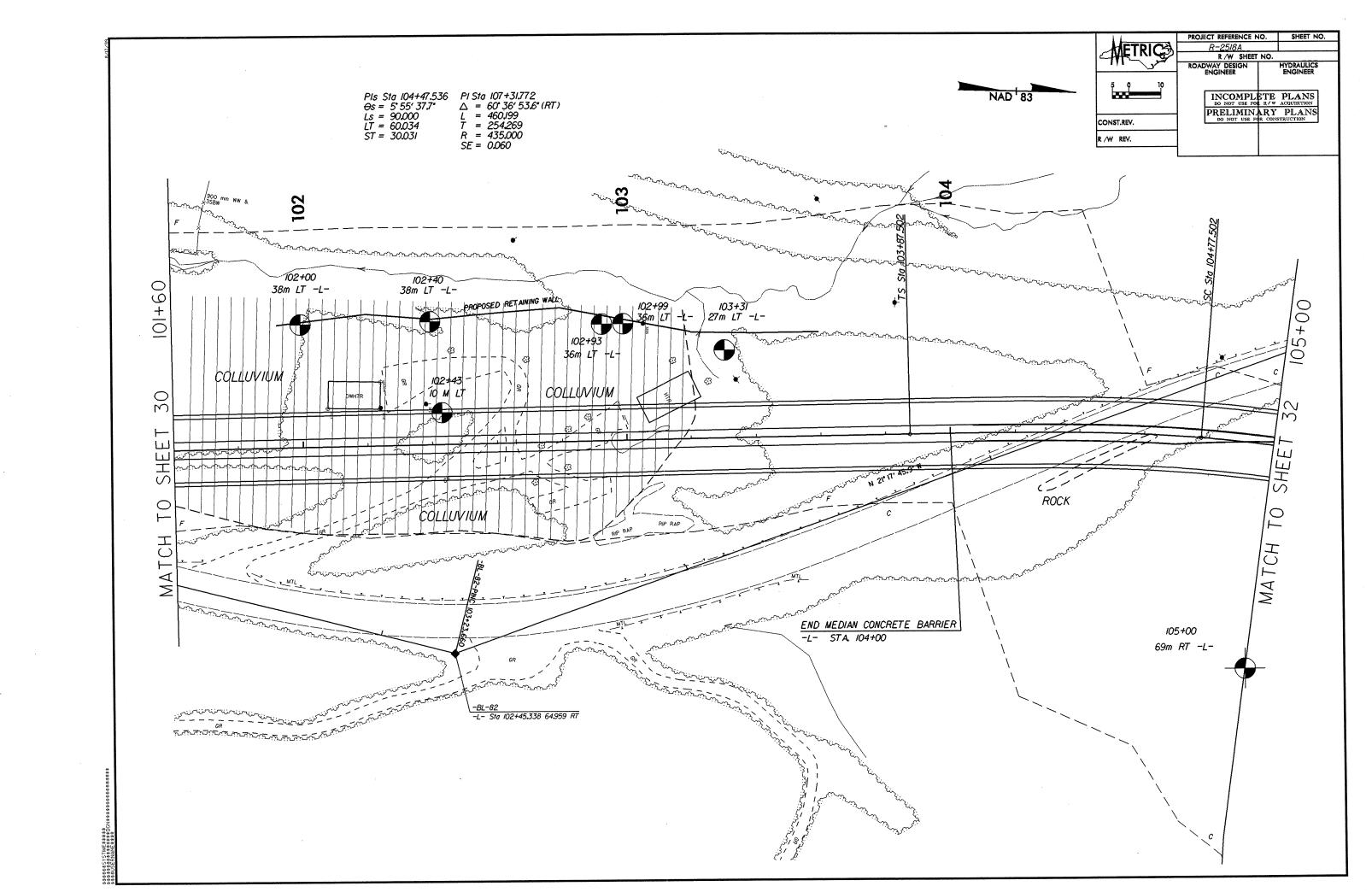
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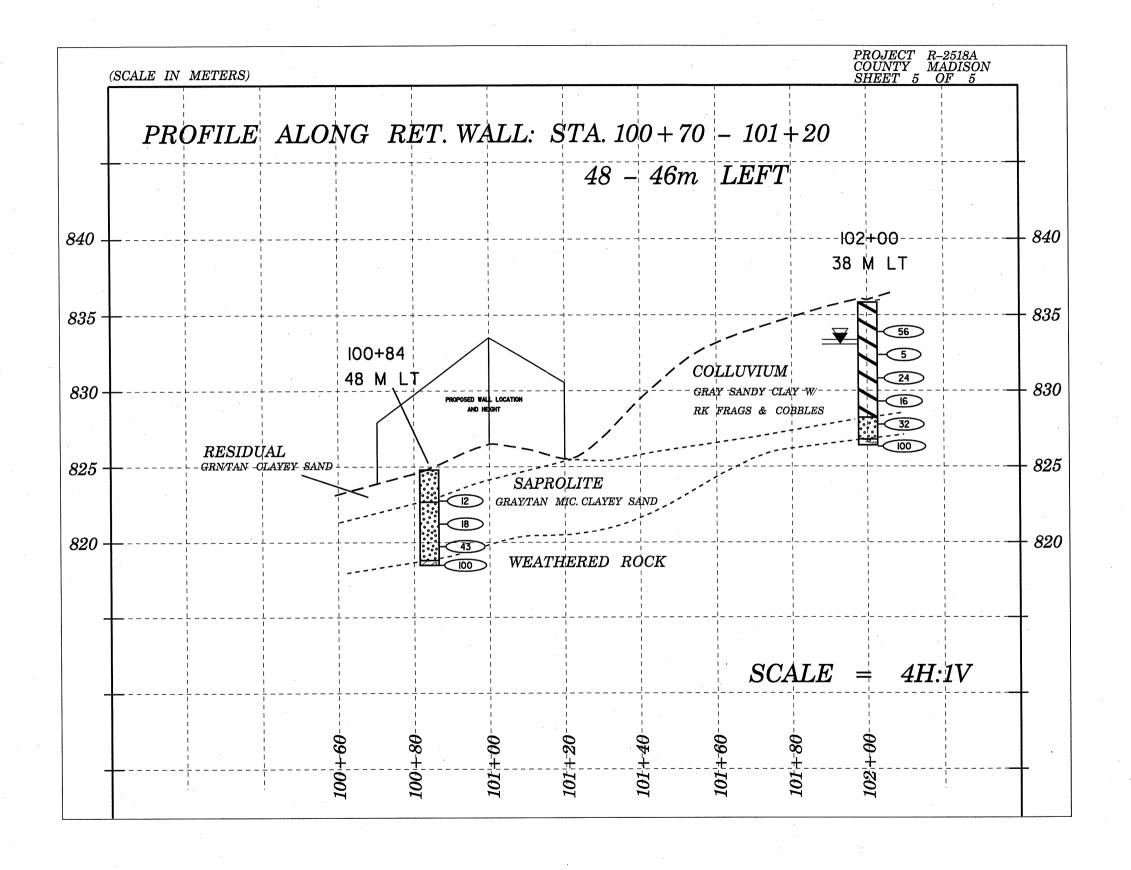
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| | SOIL AND ROCK LEGEND, TEND | | |
|--|--|---|--|
| SOIL DESCRIPTION | GRADATION | ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED | TERMS AND DEFINITIONS |
| SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED). | | ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIM MATERIAL WOULD VIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 om PER 50 BLOWS. | ADUIFER - A WATER BEARING FORMATION OR STRATA. |
| 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586), SOIL CLASSIFICATION IS | GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. | 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. |
| BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPONED AND ACTURED TO COLOR OF T | ANGULARITY OF GRAINS | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS: | ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE |
| COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDGED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. | WEATHERED NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLDWS PER 30 cm. | PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS |
| SOIL LEGEND AND AASHTO CLASSIFICATION | MINERALOGICAL COMPOSITION | CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT | ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (\$5% PASSING *200) (>85% PASSING *200) | MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. | ROCK (CR) WOULD TIELD SET REPUSHE IF TESTED, ROCK TIPE INCEDDES GRANTE, | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. |
| GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 | COMPRESSIBILITY | NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL |
| 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 | SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD | DIKE - A TABULAR BODY OF JONEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS |
| SYMBOL 000000000000000000000000000000000000 | HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 | SEDIMENTARY SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC. | MASSIVE ROCK. |
| PASSING SILT- * 10 50 MX GRANULAR CLAY MUCK, | PERCENTAGE OF MATERIAL ODCANG MATERIAL GRANULAR SILT- CLAY | WEATHERING | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, |
| # 40 30 MX50 MX51 MN SOILS SOILS PEAT SOILS SOILS SOILS PEAT SOILS S | ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES |
| 1000 1007 | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, | RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| LASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY | HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE | (V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. |
| FROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE AMOUNTS OF SOILS | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM PARENT MATERIAL FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. |
| FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC FEMAJOR GRAVEL AND CAND CRAVEL AND SAND SOILS MATTER | ✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. ▼ STATIC WATER LEVEL AFTER 24 HOURS. | (SLI.) 2.5 cm. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. |
| MATERIALS SANU TO SERVICE SANU TO SERVICE SANU SANU SERVICE SANU SERVI | —————————————————————————————————————— | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE SUBGRADE | E | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. |
| P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30 | SPRING OR SEEPAGE | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED | 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. | MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. |
| PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (kN/m²) | ROADWAY EMBANKMENT Per out TEST BORING SAMPLE VITH SOIL DESCRIPTION OESIGNATIONS | IF TESTED, WOULD YIELD SPT REFUSAL | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN |
| GENERALLY VERY LOOSE 44 | AUGER POPING | SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME | INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| GRANULAR LUUSE 4 TO 10 N/A | S- BULK SAMPLE ARTIFICIAL FILL OTHER THAN SS- SPLIT SPOON | EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm. | ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF |
| MATERIAL DENSE 30 TO 50 VERY DENSE >50 | ROADWAY EMBANKMENTS CORE BORING SAMPLE | VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V. SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAININ | ROCK SEGMENTS EDUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN |
| VERY SOFT | ST- SHELBY TUBE ST- SHELBY TUBE MONITORING WELL SAMPLE | SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE | SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. |
| GENERALLY SOFT 2 TO 4 25 TO 50 SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 | INFERRED ROCK LINE PIEZOMETER RS- ROCK SAMPLE | ORIGINAL ROCK FABRIC REMAIN. <i>IF. TESTED, YIELDS SPT. N. VALUES < 100 BLOWS PER 30 cm.</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY |
| MATERIAL STIFF 8 TO 15 100 TO 200 (COHESIVE) VERY STIFF 15 TO 30 200 TO 400 | ALLUVIAL SOIL BOUNDARY INSTALLATION RT- RECOMPACTED SLOPE INDICATOR TRIAXIAL SAMPLE | SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. | OF THE INTRUDED ROCKS. |
| HARD >30 >400 | 25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE ROCK STRUCTURES | ROCK HARDNESS | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. |
| TEXTURE OR GRAIN SIZE | SPT N-VALUE | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES | STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 8,76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053 | SOUNDING ROD REF SPT REFUSAL | SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED | A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION |
| COARSE FINE | ABBREVIATIONS | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | WITH 50 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH |
| BOULDER COBBLE GRAVEL SAND SAND SILT CLAY CL | AR - AUGER REFUSAL PMT - PRESSUREMETER TEST BT - BORING TERMINATED SD SAND, SANDY | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 6 mm DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED | OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | CL CLAY SL SILT, SILTY CPT - CONE PENETRATION TEST SLI SLIGHTLY | BY MODERATE BLOWS. | TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. |
| SIZE IN. 12" 3" SOIL MOISTURE - CORRELATION OF TERMS | CSE COARSE TCR - TRICONE REFUSAL | MEDIUM CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE | TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION | DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST o - VOID RATIO DMT - DILATOMETER TEST 7 - UNIT WEIGHT DMT - DILATOMETER TEST 7 - UNIT WEIGHT | POINT OF A GEOLOGISTS PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS | |
| (ATTERBERG LIMITS) DESCRIPTION | F FINE W - MOISTURE CONTENT | FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | BENCH MARK: |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE | FOSS FOSSILIFEROUS V VERY FRAC FRACTURED VST - VANE SHEAR TEST | VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 mm | ELEVATION: |
| LL LIQUID LIMIT | FRAGS FRAGMENTS MED MEDIUM | SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. | NOTES: |
| RANGE < - WET - (W) SEMISULID; REGUIRES DITING TO | EQUIPMENT USED ON SUBJECT PROJECT | FRACTURE SPACING BEDDING | <u></u> |
| (PI) PL PLASTIC LIMIT | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: | IERM SPACING IERM THICKNESS VERY THICKLY BEDDED > 1 m | |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | CLAY BITS | WIDE 170 3 m THICKLY BEDDED 0.5 - 1 m | |
| SL SHRINKAGE LIMIT | MOBILE B- CLAY BITS 152 mm CONTINUOUS FLIGHT AUGER CORE SIZE: | MUDERATELY CLUSE 30 10 100 cm VERY THINLY BEDDED 10 - 50 mm | |
| - DRY - (D) ATTAIN OPTIMUM MOISTURE | BK-51 | VERY CLUSE LESS THAN 5 cm THINLY LAMINATED < 2.5 mm | |
| PLASTICITY | X CME-45 HARD FACED FINGER BITS | INDURATION | - |
| PLASTICITY INDEX (PI) DRY STRENGTH | TUNG,-CARBIDE INSERTS | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS: | |
| NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT | CASING W/ ADVANCER HAND TOOLS: | FRIABLE GENTLE BLDW BY HAMMER DISINTEGRATES SAMPLE. | |
| MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH | PORTABLE HOIST TRICONEmm STEEL TEETH POST HOLE DIGGER | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | OTHER TRICONEmm TUNG,-CARB. TV average ass | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) | CORE BIT NAME SUBSPITED | DIFFICULT TO BREAK WITH HAMMER. | |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | OTHER OTHER OTHER OTHER | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: SAMPLE BREAKS ACROSS GRAINS. | |
| | | | REVISED 09/15/00 |







CONTENTS:

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INVESTIGATION OF RET. WALL

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

| STATE PROJECT 34445.1.1 I.D. NO. R-2518A |
|--|
| F.A. PROJECT |
| COUNTY MADISON |
| PROJECT DESCRIPTION US 19 FROM 1-26 |
| TO 0.8 KM EAST OF THE YANCEY CO. LINE |
| |
| SITE DESCRIPTIONRETAINING WALL |
| STATIONS 38+45 - 38+75 |



| | | | | CONS | т |
|----------------|----------|-----------------|-----|-------------|------|
| 344 | 611 | | | P.E. | |
| STATE PROJ.NO. | | F. A. PROJ. NO. | | DESCRIPTION | |
| N.C. | R | -2518A | | 1 | 4 |
| STATE | STATE PR | OJECT REFERENCE | NO. | NO. | SHEE |

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS. ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INNERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS MICRATED AND RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS ABBREVIATIONS TERMS AND DEFINITIONS GRADATION SOIL DESCRIPTION WELL GRADED: INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO PL - PLASTIC LIMIT SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED BLDR. - BOULDER ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. WITH A CONTINUOUS FLIGHT POWER AUGER. AND WHICH YIELDS LESS THAN 188 BLOWS ACCORDING TO STANDARD PENETRATION CL. - CLAY PI - PLASTICITY INDEX APPARENT DIP - THE DIP OF ROCK STRATA NOT PERPENDICULAR TO STRIKE. CAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. TEST (ASTH D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: COB. - COBBLE n - POROSITY ADUTEER - A WATER BEARING FORMATION OR STRATA. ANGULARITY OF GRAINS CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION AND OTHER PERTIMENT FACTORS, SUCH AS, MINERALOGICAL CSE. - COARSE SD. - SAND ALIGER REFLISAL (A.R.) - POINT AT WHICH POWER AUGERS WILL NOT PENETRATE. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR. COMPOSITION. ANGULARITY STRUCTURE. PLASTICITY. ETC. EXAMPLE: VERY STIFF, GRAV SUTY CLAY, MOIST WITH INTERBEDDED FINE SAND BEDDED - SOIL OR ROCK LYING IN A POSITION ESSENTIALLY PARALLEL. EST. - ESTIMATED SAT. - SATURATED SUBANGULAR. SUBROUNDED. OR ROUNDED. LAYERS, HIGHLY PLASTIC, A-7-6. BEDROCK - ROCK OF RELATIVELY GREAT THICKNESS AND EXTENT IN ITS ORIGINAL LOCATION. F. - FINE SL. - SILT, SILTY MINERALOGICAL COMPOSITION CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. SOIL LEGEND AND AASHTO CLASSIFICATION FOSS. - FOSSILIFEROUS MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN SLI. - SLIGHTLY COHESIVE SOIL - A SOIL THAT WHEN UNCONFINED HAS CONSIDERABLE DRY STRENGTH AND SILT-CLAY MATERIALS GENERAL GRANULAR MATERIALS DRGANIC MATERIALS FRAC. - FRACTURED DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. Gs - SPECIFIC GRAVITY > 35% PASSING •200 IGNIFICANT COHFSION WHEN SUBMERGED. CLASS. GR. - GRAVEL COMPRESSIBILITY qu - UNCONFINED COMPRESSIVE STRENGTH COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-A-2 GROUP A-1 A-3 LL - LIQUID LIMIT LIQUID LIMIT LESS THAN 30 A-3 SI TOUTLY COMPRESSIBLE BOTTOM OF SLOPE. γ - UNIT WEIGHT (WET UNIT WEIGHT) 1-AA-1-B A-2-4A-2-5A-2-6A-2-7 CLASS. LIQUID LIMIT 31-50 CORE RECOVERY (% REC.) - TOTAL LENGTH OF ALL ROCK DIVIDED BY TOTAL LENGTH OF CORE MODERATELY COMPRESSIBLE MFD. - MEDIUM LIQUID LIMIT GREATER THAN 50 $\gamma_{
m d}$ - DRY UNIT WEIGHT RUN AND EXPRESSED AS A PERCENTAGE. SYMBOL HIGHLY COMPRESSIBLE w - MOISTURE CONTENT ROCK DESCRIPTION COQUINA - A ROCK TYPE COMPOSED ESSENTIALLY OF MARINE SHELLS CEMENTED BY CALCIUM CARBONATE. 7SAT - SATURATED UNIT WEIGHT % PASSING MOT. - MOTTLED SILT-IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED THAT MATERIAL WHICH CANNOT BE DIKE - IGNEOUS ROCK INTRUSION WHICH IS NARROW COMPARED WITH ITS OTHER DIMENSIONS. e - VOID RATIO CLAY OM - OPTIMUM MOISTURE SOILS PEAT 30 MX50 MX51 MN SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN 40 DIP - THE ANGLE BETWEEN A BEDDING PLANE, JOINT PLANE OR FAULT PLANE AND THE SOILS ORG. - ORGANIC V. - VERY • 200 5 MX125 MX110 MX135 MX135 MX135 MX136 MX136 MX136 MX136 MX136 SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED HORIZONTAL, MEASURED PERPENDICULAR TO THE STRIKE. BY A ZONE OF "WEATHERED ROCK", FOR THE PURPOSE OF THIS INVESTIGATION, THESE DUMPS - UNCOVERED DEPOSITS OF WASTE MATERIAL SUCH AS WOOD, MASONRY DEBRIS OR GARBAGE. 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 M זאד ו חוומד ו SDILS WITH FAULT - A BREAK IN THE CONTINUITY OF A BODY OF ROCK, ATTENDED BY A MOVEMENT ON MATERIALS ARE DIVIDED AS FOLLOWS: N.P. 10 MX 10 MX 11 MN11 MN 10 MX 10 MX 11 MN11 M PLASTIC INDEX LITTLE OR HIGHLI EITHER OR BOTH SIDES OF THE BREAK. MATERIAL THAT CAN BE PENETRATED WITH SOME CAUTION NOTICE : MODERATE 4 MX | 8 MX | 12 MX | 16 MX | NO M GROUP INDEX Ø Ø 0 DIFFICULTY USING POWER AUGERS AND YIELDS AMOUNTS OF WEATHERED FINES - PORTIONS OF A SOIL FINER THAN NO. 200 U.S. STANDARD SIEVE. SOLIS USUAL TYPES STONE FRAGS. FINE SPT VALUES > 100 BLOWS BUT < SPT REFUSAL SILTY OR CLAYEY DRGANIC BUCK ROCK FISSILITY OR FISSILE - A PROPERTY OF SPLITTING EASILY ALONG CLOSELY SPACED PARALLEL THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE 122 GRAVEL AND MATERIAL THAT CAN BE PENETRATED WITH GREAT PLANES. SOILS SOILS (SWR) FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. SOME DATA OBTAINED MAY BE OMITTED FROM THIS RELEASE. GRAVEL AND SAND SAND MATER]ALS DIFFICULTY USING POWER AUGERS AND YIELDS FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED SPT REFUSAL.* WEATHERED GEN. RATIN POOR NSUITAR FAIR TO POOR ADDITIONAL INFORMATION MAY BE AVAILABLE, INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: EXCELLENT TO GOOD POOR MATERIAL THAT CANNOT BE PENETRATED BY POWER FLOODPLAIN - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. INFERRED ROCK SUBGRADE LINE "" AUGERS, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING A SAMPLE. FIFLD BORING LOGS P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30 FORMATION - A MAPPABLE UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. ROCK CORES CONSISTENCY OR DENSENES

MPACTNESS OR RANGE OF STANDARD FRACTURE - A CRACK LARGE ENOUGH TO BE VISIBLE TO THE UNAIDED EYE. SPT REFUSAL ≤2.5cm OF PENETRATION PER 50 BLOWS. SOIL & ROCK TEST DATA BANCE OF LINCONFINED COMPACTNESS OR COMPRESSIVE STRENGTH "AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER FRIABLE - EASY TO BREAK OR CRUMBLE. PRIMARY SOIL TYPE PENETRATION RESISTENCE CONSISTENCY PENETRATE, THE HARD ROCK SYMBOL IS SHOWN WHEN ROCK IS CORED AND ONLY TO THAT GRANULAR MATERIAL - SOIL THAT WHEN UNCONFINED HAS LITTLE OR NO DRY STRENGTH AND HAS (BLOWS) THIS INFORMATION MAY BE VIEWED BY APPOINTMENT BY CONTACTING THE N. C. DEPARTMENT OF DEPTH CORED. A DESCRIPTION OF ROCK IS GIVEN INCLUDING: LITTLE OR NO COHESION WHEN SUBMERGED. VERY LOOSE CORE RECOVERY (REC.)- TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED ROUNDWATER (G.W.) - WATER THAT IS FREE TO MOVE THROUGH SOIL MASS UNDER THE INFLUENCE NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT. GENERALL Y LOOSE 4 TO 10 BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%. MEDIUM DENSE GRANULAR GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GROUNDWATER LEVEL - LEVEL OF WATER WITH RESPECT TO EXISTING GROUND SURFACE. MATERIAL DENSE 30 TO 50 ROCK QUALITY DESIGNATION (ROD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY VERY DENSE >50 HARDPAN - A GENERAL TERM USED TO DESCRIBE A HARD CEMENTED SOIL LAYER WHICH DOES NOT SOFTEN WHEN WET. THAT ARE LONGER THAN OR EQUAL TO 0.1m DIVIDED REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA VERY SOFT BY THE TOTAL LENGTH OF THE CORE BUN TIMES 100%. INDURATED - EARTH MATERIAL HARDENED BY HEAT, PRESSURE OR CEMENTATION. 2 TO 4 25 TO 50 50 TO 100 SOFT GROUND WATER RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. MEDIUM STIFF 4 TO 8 WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. INTERBEDDED - ALTERNATING LENSES OR LAYERS OF SOIL AND/OR ROCK MATERIALS. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE SILT-CLAY STIFF 100 TO 200 200 TO 400 MATERIAL JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. 15 TO 30 VERY STIFF \blacksquare STATIC WATER LEVEL AFTER___ HOURS. LAMINATED - VERY THIN ALTERNATING LAYERS LESS THAN 1cm. HARD TEMPERATURES, PRECIPITATION AND WIND. AS WELL AS OTHER NON-CLIMATIC FACTORS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA LAYER - SUBJECT MATERIAL GREATER THAN 10m IN THICKNESS. TEXTURE OR GRAIN SIZE THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLAN LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED SPRING OR SEEPAGE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING U.S. STD. SIEVE SIZE 40 60 200 D ITS LATERAL EXTENT. 4.76 2.0 0.42 0.25 0.075 OPENING (MM) MISCELLANEOUS SYMBOLS AND ABBREVIATIONS LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. OR ACCURACY OF THE INVESTIGATION MADE. NOR THE INTERPRETATIONS MADE OR OPINIONS OF THE COARSE FINE SAMPLE MARL - A NON-INDURATED, CALCAREOUS DEPOSIT OF CLAYS, SILTS AND SANDS, OFTEN GRAVEI SILT BOLL DER COBBLE BOADWAY EMBANKMENT DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR DPT TEST BORING SAND SAND DESIGNATIONS ONTAINING SHELLS. WITH SOIL DESCRIPTION CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE S- BULK SAMPLE MICACEOUS SOIL (MIC.) - A SOIL OR ROCK TYPE CONTAINING AN APPRECIABLE AMOUNT OF MICA. 0.05 0.005 2.0 0.25 AUGER BORING 305 GRAIN MM SIZE IN. 12 MUCK (MK.) - A HIGHLY ORGANIC SOIL OF VERY SOFT CONSISTENCY, GENERALLY FOUND ON SS- SPLIT SPOON ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM ARTIFICIAL FILL OTHER THAN TIDAL FLATS, LAKE OR STREAM FLOODPLAINS. SOIL MOISTURE - CORRELATION OF TERMS THOSE INDICATED IN THE SUBSURFACE INFORMATION. ROADWAY EMBANKMENTS ST-SHELBY TUBE PEAT (PT) - A FIBROUS MASS OF ORGANIC MATTER IN VARIOUS STAGES OF DECOMPOSITION. SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. SAMPLE DESCRIPTION (ATTERBERG LIMITS: MONITORING WELL OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, ******O INFERRED SOLI BOUNDARIES RS- ROCK SAMPLE SPECIFICATIONS, OR CONTRACT FOR THE PROJECT. USUALLY LIQUID: VERY WET, USUALLY SATURATED - - ALLUVIAL/RESIDUAL BOUNDARIES RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. PIEZOMETER FROM BELOW THE GROUND WATER TABLE Λ (SAT.) INSTALLATION NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS ROCK - SEE LEGEND LIQUID LIMIT DIP DIRECTION AND DIP OF STRUCTURES FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE ROCK QUALITY DESIGNATION (R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL SLOPE INDICATOR . - SOUNDING ROD PLASTIC SEMISOLID: REQUIRES DRYING TO VIDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. - WET - (W INSTALLATION FIRSTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN OJ METER DIVIDED BY THE TOTAL RANGE ATTAIN OPTIMUM MOISTURE (PI) PLL LENGTH OF CORE RUN EXPRESSED AS A PERCENTAGE. PLASTIC LIMIT APPARENT DIP SANITARY LANDFILLS - COMPACTED AND/OR COVERED LAYERS OF SOIL AND WASTE PRODUCTS. SPT N-COUNT (NORMAL TO_ NOTES: SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF SOLID: AT OR NEAR OPTIMUM MOISTUR MOIST - (M) OPTIMUM MOISTURE EQUIPMENT USED ON SUBJECT PROJECT L SHRINKAGE LIMIT SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A DRILL UNITS: AUGER TOOLS: HAMMER TYPE REQUIRES ADDITIONAL WATER TO FAULT OR SLIP PLAIN. - DRY - (D) ATTAIN OPTIMUM MOISTURE AUTOMATIC MANUAL SILL - AN IGNEOUS SHEET OF INTRUSIVE ROCK WHOSE THICKNESS IS SLIGHT COMPARED TO 6º (152 mm) CONTINUOUS FLIGHT MOBILE B ITS LATERAL EXTENT. 8 (203 mm) HOLLOW AUGERS CORE BORING TOOLS BK-51 SOME - PRESENCE OF 5% TO 30% OF SUBJECT MATERIAL. DRY STRENGT PLASTICITY INDEX - AX -BX STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg
HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A HARD FACED FINGER BITS VERY LOW CME-45 NONPLASTIC SLIGHT OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION RESISTANCE OF LESS LOW PLASTICITY 6-15 TUNG. - CARBIDE INSERTS HAND TOOLS: CME-550 MEDIUM 16-25 THAN 2.5 cm WITH 50 BLOWS. MED. PLASTICITY POST HOLE DIGGER HIGH HIGH PLASTICITY 26 OR MORE STRIKE - THE DIRECTION OR BEARING OF A HORIZONTAL LINE IN THE PLANE OF AN CLAY BITS PORTABLE HOIST INCLINED STRATUM, JOINT, FAULT OR OTHER STRUCTURAL PLANE. HAND AUGER SUBGRADE - THE SOIL PREPARED TO SUPPORT A STRUCTURE OR A PAVEMENT SYSTEM. OTHER: OTHER SOUNDING ROD DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN. RED. YEL-BRN. BLUE-GRAY) TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. MODIFIERS SUCH AS LIGHT, DARK, MOTTLED, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE, OTHER . VANE SHEAR TEST TRACE - PRESENCE OF LESS THAN 5% OF SUBJECT MATERIAL

STATE PROJECT NO. SHEET NO. ITOTAL

TRANSPORTATION, GEOTECHNICAL UNIT & (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS,

WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTHIRE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING

AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN NFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR

REVISED NOVEMBER II. 1998

