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LEGEND (SOIL & ROCK)

SUPPLEMENTAL LEGEND (GSI)

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SHEET NO.

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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY MECKLENBURG

PROJECT DESCRIPTION NORTHCROSS DRIVE EXTENSION FROM EXISTING END OF NORTHCROSS DRIVE TO WESTMORELAND DRIVE

SITE DESCRIPTION BRIDGE NO. 591403 ON NORTHCROSS DRIVE EXTENSION OVER MCDOWELL CREEK -L-STA.74+01

STATE PROJECT REFERENCE NO. U-5108

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE, INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS, THE LABORATORY SAMPLED 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

- NOTES:

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

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

PERSONNEL P.M. WEAVER C.R. PASTRANA D.M. NANCE B.R. LONG **HPC** HDR

INVESTIGATED BY ESP Associates, Inc.

DRAWN BY __C.R. PASTRANA

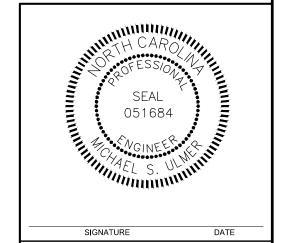
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SUBMITTED BY ESP Associates, Inc.

DATE November 2023



ESP ASSOCIATES, INC. 7011 ALBERT PICK RD SUITE F GREENSBORO, NC 27409 FIRM # C-0587 WWW.ESPASSOCIATES.COM



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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

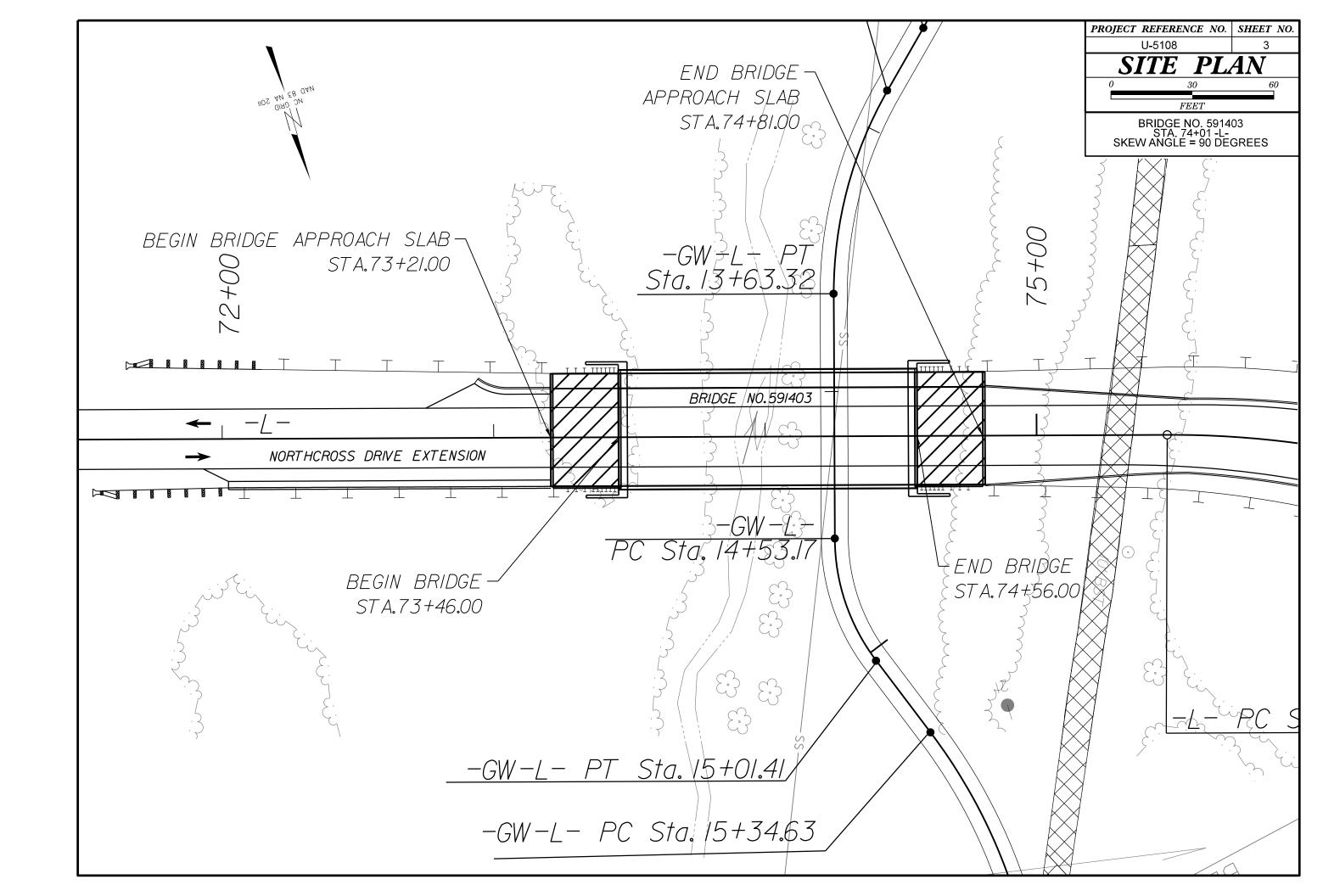
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	UNEISS, GABBRU, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	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.
#10 50 MX GRANULAR CLAY MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN PEAT ** *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 SOILS WITH	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,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 40 MX 41 MN LITTLE OR HIGHLY PI 6 MX NP 10 MX 10 MX 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN HIGHLY H	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.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
CROUP INDEX	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE CHANGE	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND CAND SAND SAND SOULS SOULS	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 SANU	VPW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	E	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	─────────────────────────────────────	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	TT 25/025	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 237023 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SPIT TEST BORING SLOPE INDICATOR	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	VST PMT INSTREEMTION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50 (NON-COHESIVE)	ARTIFICIAL FILL (AF) OTHER AUGER BORING ONE PENETROMETER H THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE 7 30		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A ALLUMIA SOIL BOUNDARY A PIEZOMETER COST NUMBER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTRUCTION —	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	USED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	$oldsymbol{\bot}$ CPT - CONE PENETRATION TEST NP - NON PLASTIC $oldsymbol{\gamma}_{\! extsf{d}}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FRACTURE SPACING BEDDING	
PLASTIC SEMISOLID: REQUIRES DRYING TO			BENCH MARK: FILE "u5I08_Is_tin.tin" WAS USED TO DETERMINE
RANGE - WET - (W) SEMISOLID; REGUIRES DRYING TO	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO		
RANGE - WET - (W) SEMISOLIDI RECORRES DATING TO ATTAIN OPTIMUM MOISTURE - WET - (W) SEMISOLIDI RECORRES DATING TO ATTAIN OPTIMUM MOISTURE - WET - (W) SEMISOLIDI RECORRES DATING TO ATTAIN MOISTURE	FRAGS FRAGMENTS	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	GROUND ELEVATION AT BORINGS
RANGE - WET - (W) SEMISOLID; RECORRES DATING TO ATTAIN OPTIMUM MOISTURE PLASTIC LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	FRAGS FRAGMENTS HI HIGHLY V - VERY CBR - CALIFORNIA BEARING RATIO CBUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS	GROUND ELEVATION AT BORINGS ELEVATION: FEET
RANGE (PI) PL PLASTIC LIMIT - WET - (W) ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING RATIO EQUIPMENT USED ON SUBJECT PROJECT	TERM	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE - WET - (W) SEMISOLID; RECORRES DATING TO ATTAIN OPTIMUM MOISTURE PLASTIC LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING RATIO HI. + HICHLY	TERM SPACING IERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	GROUND ELEVATION AT BORINGS ELEVATION: FEET
RANGE { (P1) PL	FRAGS FRAGMENTS HI HIGHLY EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: X CME-45C CLAY BITS CME-55 CME-55 CME-55 ADVANCING TOOLS: CORE SIZE:	TERM	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE { (P1) PL	FRAGS FRAGMENTS HI HIGHLY EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: ADVANCING TOOLS: CME-45C CME-55 M* HOLLOW AUGERS CME-55 CME-55 ADVANCING TOOLS: CME-55 CORE SIZE: CME-56 ADVANCING TOOLS: CORE SIZE: CME-56 ADVANCING TOOLS: CME-56 ADVANCING TOOLS: CME-57 ADVANCING TOOLS: CME-57 ADVANCING TOOLS: CME-58 ADVANCING TOOLS: CME-55	TERM	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE (P1) PL PLASTIC LIMIT OM OPTIMUM MOISTURE SHRINKAGE LIMIT OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE PLASTICITY PLASTICITY INDEX (P1) DRY STRENGTH NON PLASTIC O-5 VERY LOW	FRAGS FRAGMENTS HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: X CME-45C CLAY BITS AUMATIC MANUAL G*CONTINUOUS FLIGHT AUGER CME-55 X 8* HOLLOW AUGERS CME-550 HARD FACED FINGER BITS X -N Q TUNGCARBIDE INSERTS	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.003 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED 0.008 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS;	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE { (P1) PL	FRAGS FRAGMENTS HI HIGHLY	TERM SPACING THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.06 - 1.5 FEET VERY CLOSE LESS THAN 0.16 FEET THINLY BEDDED 0.083 - 0.16 FEET THINLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED 0.008 FE	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE (P1) PL PLASTIC LIMIT OM OPTIMUM MOISTURE SHRINKAGE LIMIT OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE PLASTICITY PLASTICITY INDEX (P1) DRY STRENGTH NON PLASTIC O-5 VERY LOW	FRAGS FRAGMENTS HI HIGHLY	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.003 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED 0.008 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS;	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE { (P1) PL	FRAGS FRAGMENTS HI HIGHLY EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: CME-45C CLAY BITS G'CONTINUOUS FLIGHT AUGER CME-55 AB *HOLLOW AUGERS CME-550 HARD FACED FINGER BITS VANE SHEAR TEST CASING VANE SHEAR TEST TRICONE STEEL TEETH TRICONE TR	TERM SPACING THAN 10 FEET VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THICKLY BEDDED 1.5 - 4 FEET THICKLY BEDDED 1.5 - 4 FEET THICKLY BEDDED 0.16 - 1.5 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINAT	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE { (P1) PL	FRAGS FRAGMENTS HI HIGHLY	TERM SPACING TERM THICKLYSS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.3 - 0.16 FEET THINLY LAMINATED 0.000 FEET THINLY LAMINATED 0.000 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:
RANGE 2 (P1) PL PLASTIC LIMIT OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE PLASTICITY PLASTICITY NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC 26 OR MORE - WET - (W) ATTAIN OPTIMUM MOISTURE PLASTICITY INDEX (PI) ORY STRENGTH VERY LOW SLIGHTLY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE - WET - (W) ATTAIN OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES DOITING 10 - MOIST	FRAGS FRAGMENTS HI HIGHLY EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: CME-45C CLAY BITS G'CONTINUOUS FLIGHT AUGER CME-55 AB *HOLLOW AUGERS CME-550 HARD FACED FINGER BITS VANE SHEAR TEST CASING VANE SHEAR TEST TRICONE STEEL TEETH TRICONE TR	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.20 - 0.16 FEET THICKLY BEDDED 0.36 - 1.5 FEET THINLY BEDDED 0.36 - 1.5 FEET VERY THINLY BEDDED 0.30 - 0.16 FEET THICKLY LAMINATED 0.008 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	GROUND ELEVATION AT BORINGS ELEVATION: FEET NOTES:

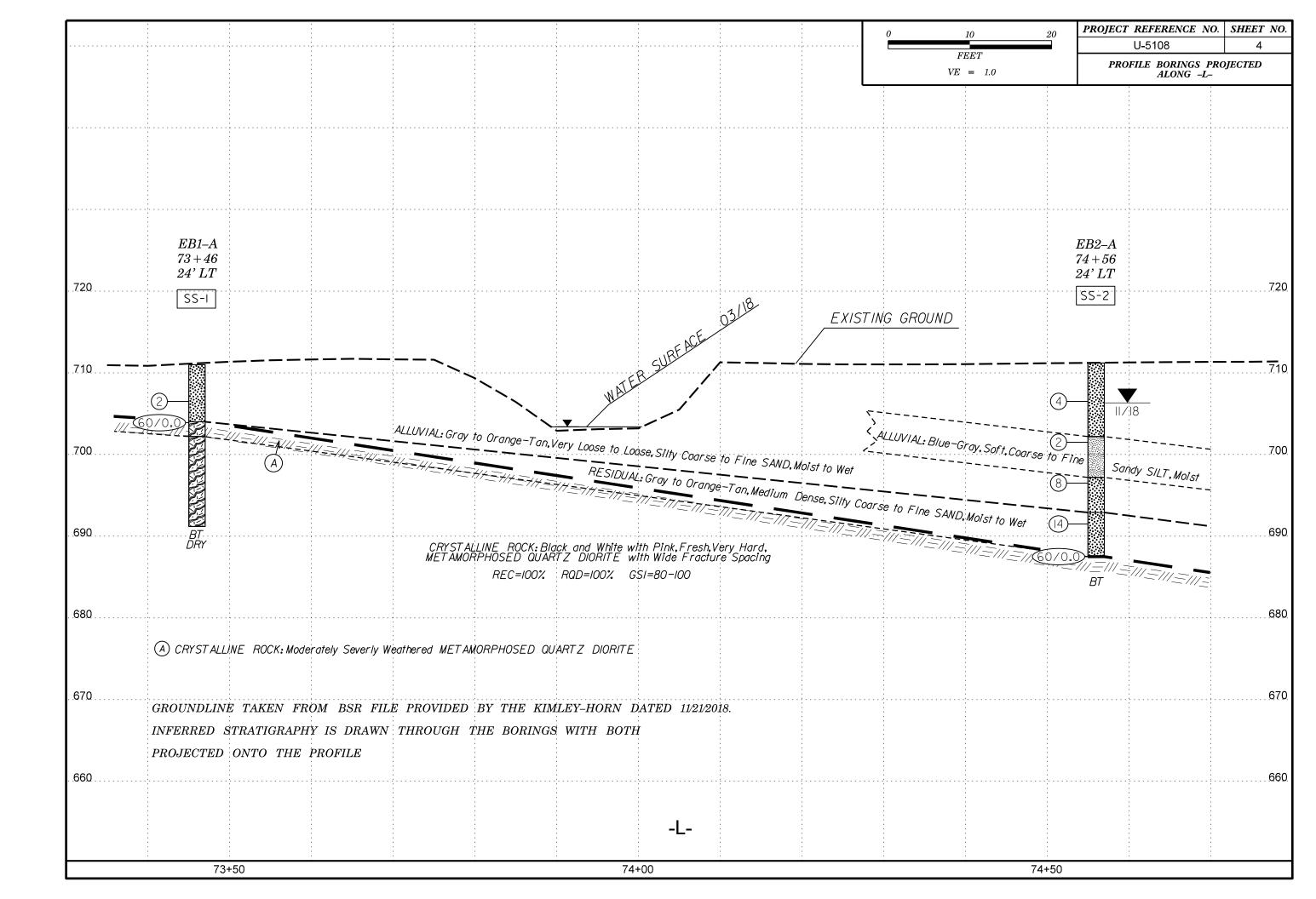
PROJECT REFERENCE NO.	SHEET NO.
U-5108	2A

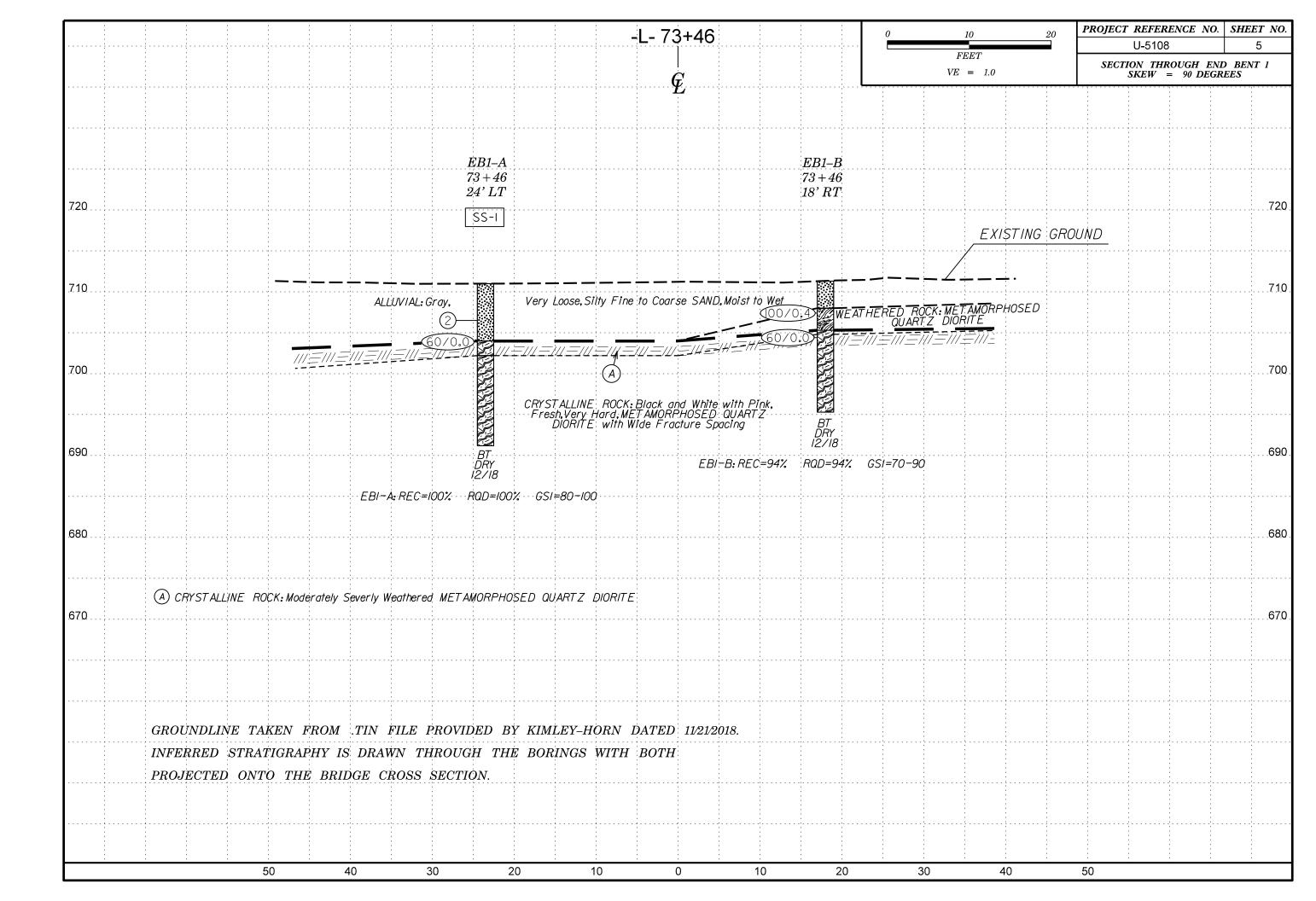
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

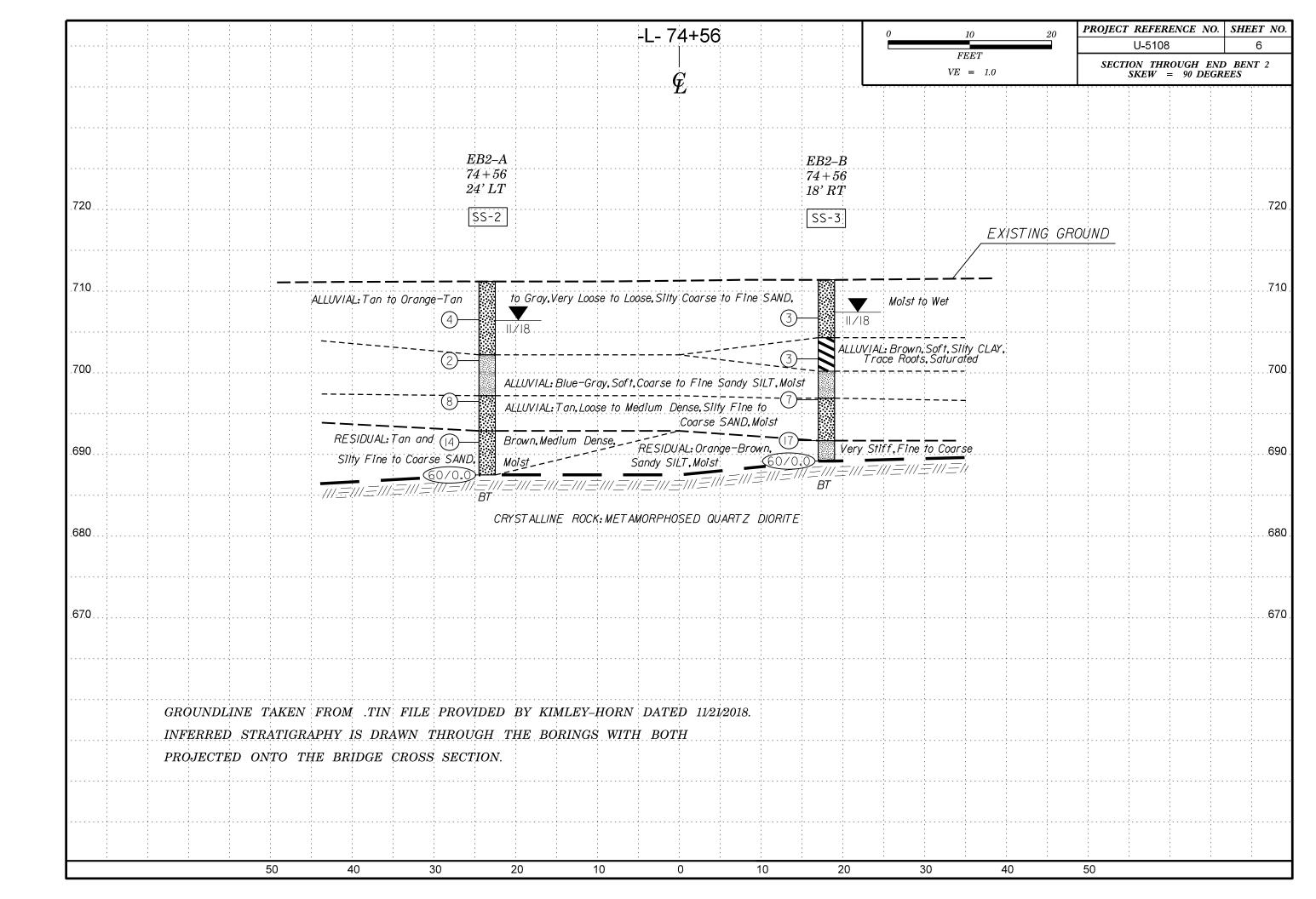
SUBSURFACE INVESTIGATION

	SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS														
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Join	AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000) OLI OGICAL STRENGTH INDEX (GSI) FOR GSI FOR HETEROGENEOUS ROCK MASSES SUCH														
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		g g g g		aces	s O O	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)									
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	SURFACE CONDITIONS	VERY GOOD Very rough, fresh unweathered surf COOD Rough, slightly weathered, iron stai	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surf with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfa with soft clay coatings or fillings	Erom a description of the lithology, structure and surface conditions (barticularly of the bedding planes), choose a box in the chart. Focate the position in the pox that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not abply to structurally controlled failures. Where infavourably oriented continuous weak planar discontinuities are present; these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very box of change of the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor probability. **REAK COOD - New poor the poor that the poor is a subject to the right in the columns for fair, poor and very poor and very poor and very poor probability poor probability poor probability poor probability poor probability poor probability probabili									
STRUCTURE		DECREASING S	URFACE QU		>	COMPOSITION AND STRUCTURE									
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	PIECES -	90		N/A	N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.									
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	OF ROCK P	70 60				B. Sand- stone with thin inter- stone and siltstone siltstone or silty shale with sand- with sand- B. Weak siltstone or clayey B. C. D E. Weak siltstone or clayey									
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets	OCKING		50			thin inter-layers of siltstone in similar amounts with sand-stone layers amounts amounts and stone layers									
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity	 		40	30		C.D.E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure									
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces	 DECRE			20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers G. Undisturbed silty or clayey shale formed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed									
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	Ÿ	N/A N/A			10 /	Means deformation after tectonic disturbance DATE: 8-19									









GEOTECHNICAL BORING REPORT BORE LOG

SHEET

MDC 12																<u>UU</u>			1		
VD3 42	2370.1.1	1			Т	ΊP	U-5	108			С	OUN	TY	ME	CKLE	NBURG	}		GEOLOGIST Pastrana, C.R.		
SITE DES	SCRIPT	TION	Brid	ge No	. 5914	403	on l	North	ncro	ss D	rive	Exte	nsio	ı Ov	er Mo	Dowell	Creek			GROUND WTF	R (ft)
ORING	NO. E	EB1-/	4		s	TAT	ION	1 73	3+46	6			0	FFS	ET 2	24 ft LT			ALIGNMENT -L-	0 HR.	Dry
OLLAR	ELEV.	71	1.0 ft		Т	OTA	AL D	EPT	Н	19.8	ft		N	ORT	HING	626,3	327		EASTING 1,440,901	24 HR.	Dry
RILL RIG	/HAMME	ER EF	F./DA	re Hi	PC0279	9 Die	edrich	n D50	84%	6 01/1	0/201	18				DRILL I	ИЕТНО	D C	ore Boring HAM	MER TYPE Automa	atic
RILLER	Kiker	r, Z./	Bowlir	ng, W.	S	TAF	RT D	ATE	<u> </u>	1/14	/18		С	ОМЕ	P. DA	TE 12/	17/18		SURFACE WATER DEPTH	I/A	
EV DRI ft) (ft	EV DE	PTH (ft)	BLO 0.5ft	W CO	UNT 0.5ft	0		2	BL 25	_OWS	S PEF 50	R FOC	75 75		100	SAMP.	MOI	L O I G	SOIL AND ROCK DES		PTH (i
707	7.5 + 3	3.5											:						711.0 GROUND SURI ALLUVIAL Gray, Silty Fine to Co		0.
703 	3.9 - 7	7.1	60/0.0	1	1	• i	2 .								60/0.0	SS-1	22%		704.0 - 702.2 Moderately Severely METAMORPHOSED QU Black and White with Pink, METAMORPHOSED QUAR	Weathered ARTZ DIORITE Fresh, Very Hard.	7. 8.
95	+ + + + + + + + + + + + + + + + + + + +								-		-								Wide Fracture S REC=100% RQD=100%	pacing GSI=80-100	19
																			Crystalline Rock: METAI QUARTZ DIOF Boulders are common above rock at End Better that the second sec	RITE re the crystalline	

SHEET 7 SHEET

GEOTECHNICAL BORING REPORT CORE LOG

WBS 42370.1.1			GEOLOGIST Pastrana, C.R.										
SITE DESCRIPTION Bridge No. 5	591403 on Northcross Drive Exten	sion Over McDowell Creek		GROUND WTR (ft)									
BORING NO. EB1-A	STATION 73+46	OFFSET 24 ft LT	ALIGNMENT -L-	0 HR. Dry									
COLLAR ELEV. 711.0 ft	TOTAL DEPTH 19.8 ft	NORTHING 626,327	· · · · · · · · · · · · · · · · · · ·	24 HR. Dry									
DRILL RIG/HAMMER EFF./DATE HPC	0279 Diedrich D50 84% 01/10/2018	DRILL METHOD Cor	re Boring HAMMI	ER TYPE Automatic									
DRILLER Kiker, Z./Bowling, W.	START DATE 11/14/18	COMP. DATE 12/17/18	SURFACE WATER DEPTH N/A	A									
CORE SIZE NQ	TOTAL RUN 11.0 ft												
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	RUN SAMP. STRATA REC. RQD (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)	L O C C C C C C C C C C C C C C C C C C	ESCRIPTION AND REMARKS	DEPTH (ft)									
CLEV DEPTH ROIN RATE	REC. RQD (ft) % NO. (ft) (ft) (ft) (ft) % - (1.0) (1.0) (1.0) (11.0) (11.0) (100% (5.0) (5.0) 100% (5.0) 100% (5.0) 100%	G ELEV. (ft) 702.2 Black and White with In Direction Control of the Control of t	Begin Coring @ 8.8 ft Pink, Fresh, Very Hard, METAMORPHO DRITE with Wide Fracture Spacing one natural fracture at 45 degrees C=100% RQD=100% GSI=80-100 mated at Elevation 691.2 ft in Crystalline rAMORPHOSED QUARTZ DIORITE ommon above the crystalline rock at End	DSED QUARTZ 8.8 19.8 Rock:									

CORE PHOTOGRAPHS

WBS No. 42370.1.1 TIP No. U-5108

Project Description: Bridge No. 591403 on Northcross Drive Extension
Over McDowell Creek

Mecklenburg County, North Carolina

EB1-A

Box 1: 8.8 Feet to 16.0 Feet





CORE PHOTOGRAPHS

WBS No. 42370.1.1 TIP No. U-5108

Project Description: Bridge No. 591403 on Northcross Drive Extension
Over McDowell Creek

Mecklenburg County, North Carolina

EB1-A

Box 2: 16.0 Feet to 19.8 Feet





GEOTECHNICAL BORING REPORT BORE LOG

SHEET

											INC L	.00					
WBS	42370	.1.1			TI	P U-5	108		COU	NTY	MECKLI	ENBURG	}		GEOLOGIST Pastrana, C.R.		
SITE	DESCR	IPTION	Brid	ge No	. 5914	03 on N	Northo	ross Di	rive Ext	ensio	n Over M	cDowell	Creek			GROUN	ID WTR (ft)
BORI	NG NO.	EB1-	В		S.	TATION	I 73+	+ 46			OFFSET	18 ft RT			ALIGNMENT -L-	0 HR.	Dry
COLL	AR ELE	EV . 71	1.3 ft		T	OTAL D	EPTH	1 16.0	ft		ORTHIN	3 626,3	367		EASTING 1,440,912	24 HR.	Dry
	RIG/HAN			TF HE										D C			Automatic
											OMP DA						ratomatio
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC	OW COL	_	0	25		PER FC	_	COMP. DA	SAMP.	MOI	L O G	SOIL AND ROCK DESC		DEPTH (f
715		- - -														ACE	0.
710	- 4	-				• •									ALLUVIAL Gray, Silty Fine to Coa	rse SAND	
	707.8 -	- - 3.5				i									708.0		3.
	+		100/0.4			: :	: :				· 100/0.4				WEATHERED RO METAMORPHOSED QUA		ITE .
705	705.3	6.0	60/0.0			 	+				60/0.0				CRYSTALLINE R		6.
	- 1	-					: :					:			Black and White, Fresh, METAMORPHOSED QUART	Very Hard	, = with
700	1					• •						i			Wide Fracture Sp	acing	
700	-	-				 						!			Note: First 0.5' is Modera Weathered	tely Severe	ely
	- 1						: :			: :		i			REC=94% RQD=94%	GSI=70-9	0
	1	Ė					: :					!			- - 695.3		16
		-													Penetration Test Refusal at ft in Crystalline Rock: META QUARTZ DIOR! Boulders are common above rock at End Bent 1 beginning above the top of crystalline above the crystall	MORPHO TE the crystang up to 1 to	SED
		-															

SHEET 9 SHEET

GEOTECHNICAL BORING REPORT CORE LOG

									<u></u>	<u>U</u>	RE LUG				
WBS	42370.1.	1			TIP	U-510	8	С	OUNT	Y [MECKLENBURG	GEOLOGIS	T Pastrana,	C.R.	
SITE	DESCRIPT	ION B	Bridge 1	No. 59	91403	on No	rthcross	Drive	Extens	sion	Over McDowell Creek			GRO	OUND WTR (ft)
BOR	ING NO. E	B1-B			STAT	TION	73+46			OF	FSET 18 ft RT	ALIGNMEN	IT -L-	0 HI	R . Dry
COLI	LAR ELEV.	711.3	ft		TOT	AL DE	PTH 16	.0 ft		NC	PRTHING 626,367	EASTING	1,440,912	24 H	R. Dry
DRILL	RIG/HAMME	ER EFF./	DATE	HPC0	279 Die	edrich D	50 84% 01	/10/201	8		DRILL METHOD Cor	e Boring	1	HAMMER TY	PE Automatic
DRIL	LER Kike	r, Z./Bo	wling, \	W.	STAF	RT DA	TE 11/1	4/18		CC	OMP. DATE 12/17/18	SURFACE	WATER DEPT	H N/A	
COR	E SIZE NO	Q			TOTA	AL RU	N 10.0 f	t							
ELEV	RUN DE	PTH RL	JN DF	RILL ATE	REC.	JN RQD	SAMP.	REC.	ATA RQD	L	_	ESCRIPTION .	AND REMARKS		
(ft)	(ft) (ft) (f		lin/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (ft)	ESCRIF HON /	AND REWARKS		DEPTH (ft)
7 95, 29	705.0 6												ng @ 6.0 ft		
	705.3 + 6	5.0 4.	7:0)8/1.0)6/1.0	(3.4) 85%	(3.4) 85%					Black and White, Fres	h, Very Hard, M		ED QUARTZ	DIORITE
	701:3 T 701:3 T	0.0	I 10:2)8/1.0 25/1.0							Note: Fir	with Wide Fr st 0.5' is Mode	acture Spacing rately Severely W	/eathered	
700	/01.3 11	0.0 5.	2:0)1/1.0 /)7/1.0	(5.0) 100%	(5.0) 100%							10 degrees to 20 GSI=70-90 (co		
	l Ŧ		1:5	5/1.0 6/1.0							F		,	,	
	696.3 † 19 695.3 † 10	5.0 6.0 1.	2:1 0 2:2	2/1.0	(1.0)	(1.0)					695.3				16.0
	Ŧ		_		\100%/	100%					Boring Terminated v 695.3 ft in Crystalli	with Standard I ne Rock: MET.	Penetration Test AMORPHOSED	Refusal at Ele QUARTZ DIO	evation PRITE
	‡										Boulders are common	above the crys	stalline rock at En	nd Bent 1 begi	nning up
	‡										to 1	foot above the	top of crystalline	rock.	
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SHEET 10

CORE PHOTOGRAPHS

WBS No. 42370.1.1

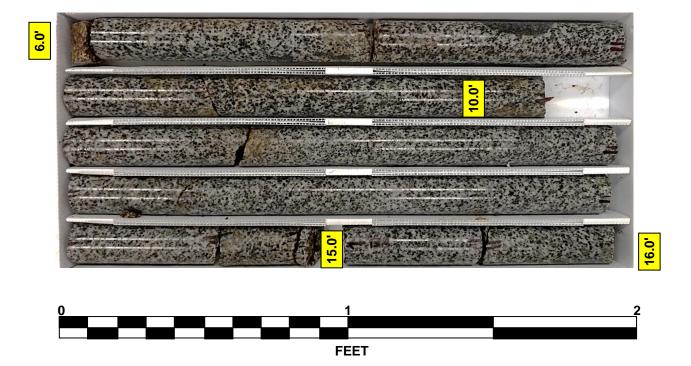
TIP No. U-5108

Project Description: Bridge No. 591403 on Northcross Drive Extension Over McDowell Creek

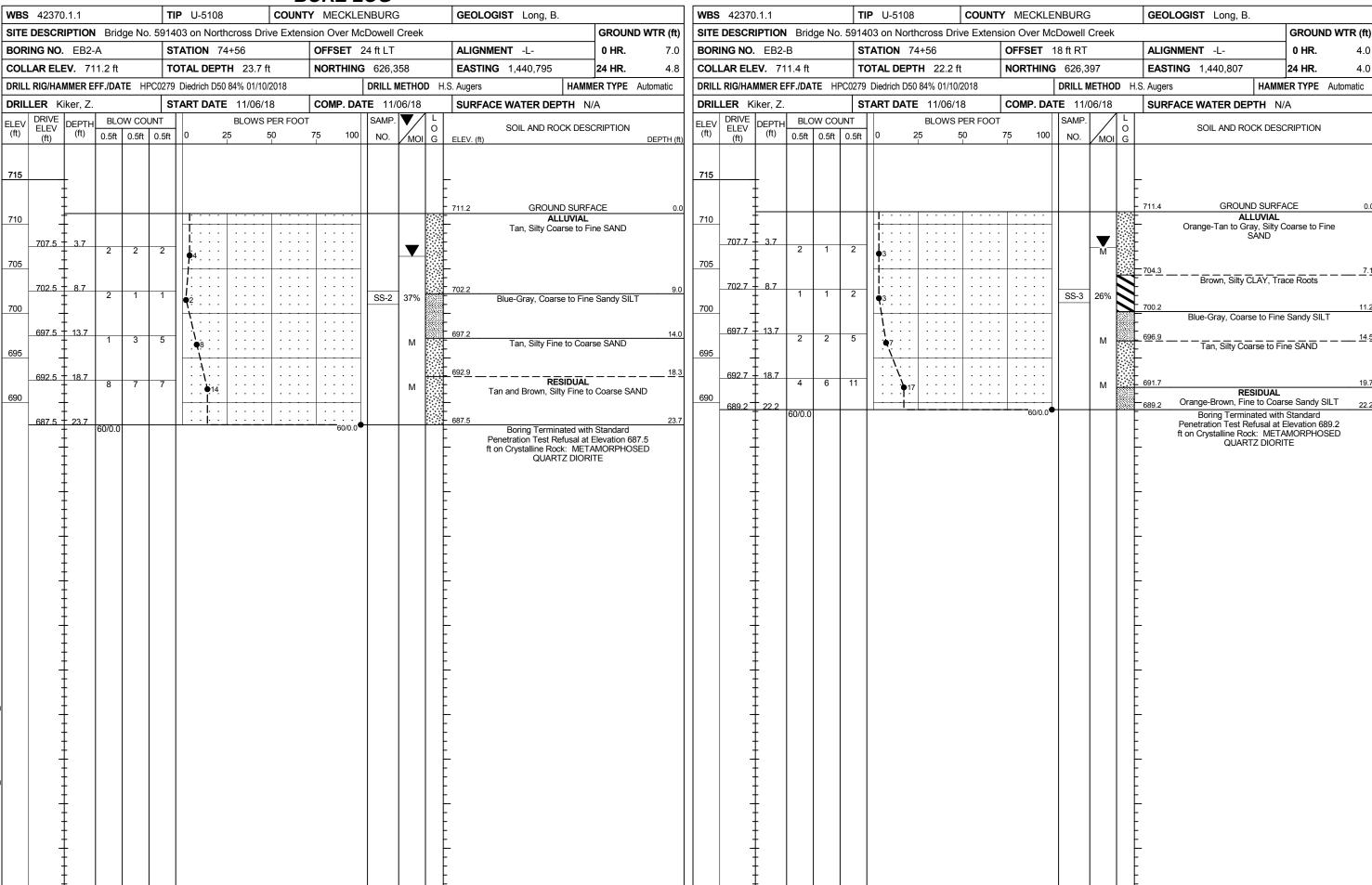
Mecklenburg County, North Carolina

EB1-B

Box 1: 6.0 Feet to 16.0 Feet



GEOTECHNICAL BORING REPORT BORE LOG



SOILS LABORATORY TESTS RESULTS

WBS NO.: 42370.1.1

TIP NO.: U-5108

COUNTY: Mecklenburg

SITE DESCRIPTION: Bridge No. 591403 on Northcross Drive Extension Over McDowell Creek

BORING	SAMPLE	BORING	DEPTH	AASHTO	N	L.L	P.I.	% BY WEIGHT					ASSING SII	EVES	%	%
NO.	NO.	LOCATION	INTERVAL (FT)	CLASS				CSE. SAND	CSE. SAND F. SAND SILT		CLAY	10	40	200	MOISTURE	ORGANIC
EB1-A	SS-1	-L- STA. 73+46, 24' LT	3.5-5.0	A-2-4 (0)	2	NP	NP	61	26	5	8	99	57	16	22.3	-
EB2-A	SS-2	-L- STA. 74+56, 24' LT	8.7-10.2	A-4 (1)	2	31	7	19	41	21	19	100	93	49	36.6	-
EB2-B	SS-3	-L- STA. 74+56, 18' RT	8.7-10.2	A-7-6 (6)	3	41	20	28	28	17	27	95	80	47	26.2	-

Signed:

NCDOT Certification No.

129-04-0411

Show F. Janu