## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

## GEOTECHNICAL UNIT

## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	TERMS AND DEFINITIONS	ABBREVIATIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARS	E.	
WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS ACCORDING TO STANDARD PENETRATION	UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)		
TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	APPARENT DIP - THE DIP OF ROCK STRATA NOT PERPENDICULAR TO STRIKE.	CL CLAY PI - PLASTICITY INDEX
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION AND OTHER PERTINENT FACTORS, SUCH AS, MINERALOGICAL	ANGULARITY OF GRAINS	AQUIFER - A WATER BEARING FORMATION OR STRATA.	COB COBBLE n - POROSITY
COMPOSITION, ANGULARITY STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR,	AUGER REFUSAL (A.R.) - POINT AT WHICH POWER AUGERS WILL NOT PENETRATE.	CSE COARSE SD SAND
LAYERS, HIGHLY PLASTIC, A-7-6.	SUBANGULAR, SUBROUNDED, OR ROUNDED.	BEDDED - SOIL OR ROCK LYING IN A POSITION ESSENTIALLY PARALLEL.  BEDROCK - ROCK OF RELATIVELY GREAT THICKNESS AND EXTENT IN ITS ORIGINAL LOCATION.	EST ESTIMATED SAT SATURATED
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	F FINE SL SILT, SILTY FOSS FOSSILIFEROUS
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	COHESIVE SOIL - A SOIL THAT WHEN UNCONFINED HAS CONSIDERABLE DRY STRENGTH AND	SLI SLIGHILY
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	SIGNIFICANT COHESION WHEN SUBMERGED.	FRAC FRACTURED  G <sub>S</sub> - SPECIFIC GRAVITY  GR GRAVEL
CLASS. A-1-AA-1-B A-2-4A-2-5A-2-6A-2-7 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 3Ø	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.	qu - UNCONFINED COMPRESSIVE STRENGTH
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50	CORE RECOVERY (% REC.) - TOTAL LENGTH OF ALL ROCK DIVIDED BY TOTAL LENGTH OF CORE	MED MEDIUM  7 - UNIT WEIGHT (WET UNIT WEIGHT)
	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	RUN AND EXPRESSED AS A PERCENTAGE.	W - MOISTURE CONTENT
% PASSING GRANULAR SILT- MUCK	ROCK DESCRIPTION	COQUINA - A ROCK TYPE COMPOSED ESSENTIALLY OF MARINE SHELLS CEMENTED BY CALCIUM CARBONATE.	MOT MOTTLED SAT - SATURATED UNIT WEIGHT
# 40 30 MX 50 MX 51 MN             SOILS   CLAY   PEAT	IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED THAT MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN	DIKE - IGNEOUS ROCK INTRUSION WHICH IS NARROW COMPARED WITH ITS OTHER DIMENSIONS.	OM - OPTIMUM MOISTURE e - VOID RATIO
# 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED	DIP - THE ANGLE BETWEEN A BEDDING PLANE, JOINT PLANE OR FAULT PLANE AND THE HORIZONTAL, MEASURED PERPENDICULAR TO THE STRIKE.	ORG ORGANIC V VERY
LIQUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50 ILS WITH	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.	
PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	MATERIALS ARE DIVIDED AS FOLLOWS:	FAULT - A BREAK IN THE CONTINUITY OF A BODY OF ROCK, ATTENDED BY A MOVEMENT ON	
GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX NO MX MODERATE ORGAN	C SOFT MATERIAL THAT CAN BE PENETRATED WITH SOME		CAUTION NOTICE:
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	ROCK Programmed BOCK CDT VALUES > 100 DI OVE DUT / CDT DEFUSAL		CHUITOR ROTTOL.
OF MAJOR GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER	(SWR) HARD MATERIAL THAT CAN BE PENETRATED WITH GREA	<u>FISSILITY OR FISSILE</u> - A PROPERTY OF SPLITTING EASILY ALONG CLOSELY SPACED PARALLEL AT PLANES.	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.
GEN. RATING	- (HWR) WEATHERED DIFFICULTY USING BOWER AUGERS AND VIELDS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED	SOME DATA OBTAINED MAY BE OMITTED FROM THIS RELEASE.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAL		FROM PARENT MATERIAL.	ADDITIONAL INFORMATION MAY BE AVAILABLE, INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
P.I. OF A-7-5 ≤ L.L 3Ø : P.I. OF A-7-6 > L.L 3Ø	ROCK >>>>>>> LINE ** AUGERS, EXCEPT IN THIN LEDGES, AND REQUIRE	FLOODPLAIN - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	
CONSISTENCY OR DENSENESS	- (HR) DONN STATING A SAMPLE.		FIELD BORING LOGS  ROCK CORES
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	*SPT REFUSAL ≤2.5cm OF PENETRATION PER 50 BLOWS.	FRACTURE - A CRACK LARGE ENOUGH TO BE VISIBLE TO THE UNAIDED EYE.	SOIL & ROCK TEST DATA
PRIMARY SOIL TYPE COMMITTEESS ON CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (BLOWS) (KN/m²)	**AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE. THE HARD ROCK SYMBOL IS SHOWN WHEN ROCK IS CORED AND ONLY TO THAT	FRIABLE - EASY TO BREAK OR CRUMBLE.	SUBSURFACE REPORT
VERY LOOSE <4	DEPTH CORED. A DESCRIPTION OF ROCK IS GIVEN INCLUDING:	GRANULAR MATERIAL - SOIL THAT WHEN UNCONFINED HAS LITTLE OR NO DRY STRENGTH AND HAS LITTLE OR NO COHESION WHEN SUBMERGED.	THIS INFORMATION MAY BE VIEWED BY APPOINTMENT BY CONTACTING THE N. C. DEPARTMENT OF
GENERALLY LOOSE 4 TO 10	CORE RECOVERY (REC.) - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDE	D GROUNDWATER (G.W.) - WATER THAT IS FREE TO MOVE THROUGH SOIL MASS UNDER THE INFLUENCE	TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORT
GRANULAR MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50	BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.	OF GRAVITY.	NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.
VERY DENSE >50	ROCK QUALITY DESIGNATION (RQD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED	GROUNDWATER LEVEL - LEVEL OF WATER WITH RESPECT TO EXISTING GROUND SURFACE.	GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A
VERY SOFT <2 <25	THAT ARE LONGER THAN OR EQUAL TO Ø.1m DIVIDED  BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%		GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA
GENERALLY SOFT 2 TO 4 25 TO 50 MEDIUM STIFF 4 TO 8 50 TO 100	GROUND WATER	INDURATED - EARTH MATERIAL HARDENED BY HEAT, PRESSURE OR CEMENTATION.	WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE
SILT-CLAY STIFE 8 TO 15	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.	INTERBEDDED - ALTERNATING LENSES OR LAYERS OF SOIL AND/OR ROCK MATERIALS.	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
VERY STIFF 15 TO 30 200 TO 400	STATIC WATER LEVEL AFTERHOURS.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL
		LAMINATED - VERY THIN ALTERNATING LAYERS LESS THAN ICM.	MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND. AS WELL AS OTHER NON-CLIMATIC FACTORS.
TEXTURE OR GRAIN SIZE	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	LAYER - SUBJECT MATERIAL GREATER THAN ICM IN THICKNESS.	TEMPERATURES, TREE TATION AND WIND, AS WELL AS STILL NOW CEIMANIC TACTORS.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SPRING OR SEEPAGE	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED	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
OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	MISCELLANEOUS SYMBOLS AND ABBREVIATIONS	TO ITS LATERAL EXTENT.	AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	CPT CAMPLE	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.	INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	ROADWAY EMBANKMENT  WITH SOIL DESCRIPTION  SPT  DPT TEST BORING  DESIGNATIONS  VST	MARL - A NON-INDURATED, CALCAREOUS DEPOSIT OF CLAYS, SILTS AND SANDS, OFTEN CONTAINING SHELLS.	OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINIONS OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED, THE BIDDER OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	VST		CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS
SIZE IN. 12" 3"	SOIL SYMBOL HOUER BURING	MICACEOUS SOIL (MIC.) - A SOIL OR ROCK TYPE CONTAINING AN APPRECIABLE AMOUNT OF MICA.	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
SOIL MOISTURE - CORRELATION OF TERMS	SS- SPLIT SPOON ARTIFICIAL FILL OTHER THAN CORE BORING SAMPLE	MUCK (MK.) - A HIGHLY ORGANIC SOIL OF VERY SOFT CONSISTENCY, GENERALLY FOUND ON TIDAL FLATS, LAKE OR STREAM FLOODPLAINS.	ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM
SOIL MOISTURE SCALE FIELD MOISTURE GLIDE FOR FIELD MOISTURE DESCRIPTION	TO BOADWAY EMBANKMENTS TO TOOKE BOATING	PEAT (PT) - A FIBROUS MASS OF ORGANIC MATTER IN VARIOUS STAGES OF DECOMPOSITION.	THOSE INDICATED IN THE SUBSURFACE INFORMATION.
(ATTERBERG LIMITS) DESCRIPTION OF THE MOISTONE DESCRIPTION	SAMPLE MONITORING WELL	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE	NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	RS- ROCK SAMPLE	OF AN INTERVENING IMPERVIOUS STRATUM.	OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.
(SAT.) FROM BELOW THE GROUND WATER TABLE	PIEZOMETER  INSTALLATION	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.	
PLASTIC CEMICOLIDA DECULIDAD DE PROVINCITO	DIP DIRECTION AND DIP OF STRUCTURES / SLOPE INDICATOR . SOUNDING ROD	ROCK - SEE LEGEND  ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL	NOTE – BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
- WEI - (W) ATTAIN OPTIMUM MOISTURE	INSTALLATION	LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN ON METER DIVIDED BY THE TOTAL	CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
'F' PLL   PLASTIC LIMIT	✓ APPARENT DIP	LENGTH OF CORE RUN EXPRESSED AS A PERCENTAGE.	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTUR	(NORMAL TO)  SPT N-COUNT	SANITARY LANDFILLS - COMPACTED AND/OR COVERED LAYERS OF SOIL AND WASTE PRODUCTS.	NOTES:
SL SHRINKAGE LIMIT	EQUIPMENT USED ON SUBJECT PROJECT	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.	
REQUIRES ADDITIONAL WATER TO	DRILL UNITS: AUGER TOOLS: HAMMER TYPE:	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	MOBILE B 1 6" (152 mm) CONTINUOUS FLIGHT 1 AUTOMATIC MANUAL	FAULT OR SLIP PLAIN. SILL - AN IGNEOUS SHEET OF INTRUSIVE ROCK WHOSE THICKNESS IS SLIGHT COMPARED TO	
PLASTICITY	— MOBILE B VISZIMII/ CONTINOUS TEIGHT	ITS LATERAL EXTENT.	
PLASTICITY INDEX DRY STRENGTH	BK-51 8" (203 mm) HOLLOW AUGERS CORE BORING TOOLS:	SOME - PRESENCE OF 5% TO 30% OF SUBJECT MATERIAL.	
NONPLASTIC Ø-5 VERY LOW	CME-45B HARD FACED FINGER BITS -AX -BX -NX	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg	
LOW PLASTICITY 6-15 SLIGHT	CME-550 TUNG CARBIDE INSERTS HAND TOOLS:	HAMMER 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 PENETRATION RESISTANCE OF LESS	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	POST HOLE DIGGER	THAN 2.5 cm WITH 50 BLOWS.	
COLOR	PORTABLE HOIST   LV CLAY BITS	STRIKE - THE DIRECTION OR BEARING OF A HORIZONTAL LINE IN THE PLANE OF AN INCLINED STRATUM, JOINT, FAULT OR OTHER STRUCTURAL PLANE.	
	OTHER: TRICONE 7 HOME	SUBGRADE - THE SOIL PREPARED TO SUPPORT A STRUCTURE OR A PAVEMENT SYSTEM.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, MOTTLED, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE	E SOUNDING ROD	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
THOUSE SELECTION OF THE PROPERTY OF THE MALE APPEARANT	OTHER CASING VANE SHEAR TEST	TRACE - PRESENCE OF LESS THAN 5% OF SUBJECT MATERIAL.	REVISED NOVEMBER II, 1998
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STATE PROJECT NO. SHEET NO. TOTAL SHEETS