## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE PROJECT NO. SHEET NO. TOTAL SHEETS
6.469002T 2 10

ID R- 0513A

## DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

## SUBSURFACE INVESTIGATION

				SOIL AND	O ROCK LEGEND, T	ERMS, SYMBOLS, AND ABBREVIATIONS		
	COLL DECEDIDATION		GRADATION			TERMS AND DEFINITIONS	ABBREVIATIONS	
SOIL DESCRIPTION  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 COARSE.				BLDR BOULDER	PL - PLASTIC LIMIT
1	AUGER, AND WHICH YIELDS LESS THAN 189 BLOWS ACCORDING		UNIFORM- INDICATES THA	T SOIL PARTICLES ARE ALL APPR	ROXIMATELY THE SAME SIZE. (ALSO		CL CLAY	PI - PLASTICITY INDEX
1	IFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRI		GAP-GRADED - INDICATES	A MIXTURE OF UNIFORM PARTICLE		APPARENT DIP - THE DIP OF ROCK STRATA NOT PERPENDICULAR TO STRIKE.  AQUIFER - A WATER BEARING FORMATION OR STRATA.	COB COBBLE	n - POROSITY
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION AND OTHER PERTINENT FACTORS, SUCH AS, MINERALOGICAL			ANGULARITY OF GRAINS			AUGER REFUSAL (A.R.) - POINT AT WHICH POWER AUGERS WILL NOT PENETRATE.	CSE COARSE	SD SAND
COMPOSITION, ANGULARITY STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDGED FINE SAND			THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.			BEDDED - SOIL OR ROCK LYING IN A POSITION ESSENTIALLY PARALLEL.	EST ESTIMATED	SAT SATURATED
LAYERS, HIGHLY PLASTIC, A-7-6.			MINERALOGICAL COMPOSITION			BEDROCK - ROCK OF RELATIVELY GREAT THICKNESS AND EXTENT IN ITS ORIGINAL LOCATION.	F FINE	
	LEGEND AND AASHTO CLASSIF	ICATION	MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN			CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	FOSS FOSSILIFEROUS	SL SILT, SILTY
	AR MATERIALS SILT-CLAY MATERIALS PASSING •200) (> 35% PASSING •200)	ORGANIC MATERIALS		THEY ARE CONSIDERED OF SIGNIF		COHESIVE SOIL - A SOIL THAT WHEN UNCONFINED HAS CONSIDERABLE DRY STRENGTH AND	FRAC FRACTURED	SLI SLIGHTLY
GROUP A-1 A-3		A-1, A-2 A-4, A-5		COMPRESSIBILITY	,	ISIGNIFICANT COHESION WHEN SUBMERGED.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT	GR GRAVEL	G <sub>S</sub> - SPECIFIC GRAVITY  QU - UNCONFINED COMPRESSIVE STRENGTH
011001	A-2-4A-2-5A-2-6A-2-7 A-7-6	A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE		LIQUID LIMIT LESS THAN 30	BOTTOM OF SLOPE.	LL - LIQUID LIMIT	→ UNIT WEIGHT (WET UNIT WEIGHT)
SYMBOL 000000000000000000000000000000000000			MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE	.E	LIQUID LIMIT 31-50 LIQUID LIMIT GREATER THAN 50	CORE RECOVERY (% REC.) - TOTAL LENGTH OF ALL ROCK DIVIDED BY TOTAL LENGTH OF CORE	MED MEDIUM	/
% PASSING			×	ROCK DESCRIPTION		RUN AND EXPRESSED AS A PERCENTAGE.  COQUINA - A ROCK TYPE COMPOSED ESSENTIALLY OF MARINE SHELLS CEMENTED BY CALCIUM CARBONATE.	W - MOISTURE CONTENT	$\gamma_d$ - DRY UNIT WEIGHT
• 10 50 MX		GRANULAR SILT- MUCK.	IN THE BROADEST MEANIN	IG. HARD ROCK IS CONSIDERED TH	HAT MATERIAL WHICH CANNOT BE	DIKE - IGNEOUS ROCK INTRUSION WHICH IS NARROW COMPARED WITH ITS OTHER DIMENSIONS.	MOT MOTTLED	7SAT - SATURATED UNIT WEIGHT - VOID RATIO
40 30 MX 50 MX 51 MN     200 15 MX 25 MX 10 MX	N	SOILS SOILS PEAT			HNIQUES. THE BOUNDARY BETWEEN	DIP - THE ANGLE BETWEEN A BEDDING PLANE, JOINT PLANE OR FAULT PLANE AND THE	OM - OPTIMUM MOISTURE	
				RARY. TRANSITION BETWEEN SUIT ED ROCK'. FOR THE PURPOSE OF T	L AND ROCK IS OFTEN REPRESENTED	PROTECTION ACTION ACTION AND ACTION AND ACTION AND ACTION	ORG ORGANIC	V VERY
LIQUID LIMIT   PLASTIC INDEX 6 MX N.P.	40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN  - 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	SOILS WITH	MATERIALS ARE DIVIDED		mes intestion ton mese	DUMPS - UNCOVERED DEPOSITS OF WASTE MATERIAL SUCH AS WOOD, MASONRY DEBRIS OR GARBAGE.		
GROUP INDEX Ø Ø	0 4 MX 8 MX 12 MX 16 MX NO MX	LITTLE OR HIGHLY MODERATE ORGANIC	K5 /6C5 /6C5 /			FAULT - A BREAK IN THE CONTINUITY OF A BODY OF ROCK, ATTENDED BY A MOVEMENT ON EITHER OR BOTH SIDES OF THE BREAK.	CAUTION NOTICE :	
LIGHAL TYPES CTONE EDAGS	AMOUNTS OF SOILS			WEATHERED DIFFICULTY	USING POWER AUGERS AND YIELDS	FINES - PORTIONS OF A SOIL FINER THAN NO. 200 U.S. STANDARD SIEVE.	CAUTION NOTICE	
OF MAJOR GRAVEL AND FINE	E SILTY OR CLAYEY SILTY CLAYEY D GRAVEL AND SAND SOILS SOILS	ORGANIC MATTER	ROCK SPT VALUES > 100 BLOWS BUT < SPT REFUSAL  (SWR)  (HWR)  ROCK SPT VALUES > 100 BLOWS BUT < SPT REFUSAL  MATERIAL THAT CAN BE PENETRATED WITH GREAT  DIFFICULTY USING POWER AUGERS AND YIELDS			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	
MATERIALS SHIND	501E5 501E5					T PLANES.   FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED	FOR THE PURPOSE OF STUDY, PLANNING AND D SOME DATA OBTAINED MAY BE OMITTED FROM	ESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES.
GEN. RATING AS A EXCELLEN	NT TO GOOD FAIR TO POOR	FAIR TO POOR UNSUITABLE		ROCK SPT REFUSA	L·"	FROM PARENT MATERIAL.		
SUBGRADE		POOR	HARD CORED ROCK		HAT CANNOT BE PENETRATED BY POWER	R FLOODPLAIN - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	AUDITIONAL INFORMATION MAY BE AVAILABLE,	NCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
P.I. OF A	A-7-5 ≤ L.L 30 : P.I. 0F A-7-6 >		(HR)	LINE III AUGERS, EXT	G TOOLS FOR OBTAINING A SAMPLE.	FORMATION - A MAPPABLE UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.	FIELD BORN	
	CONSISTENCY OR DENSENESS	RANGE OF UNCONFINED	*SPT REFUSAL ≤2.5cm	OF PENETRATION PER 50 BLOWS	•	FRACTURE - A CRACK LARGE ENOUGH TO BE VISIBLE TO THE UNAIDED EYE.	ROCK CO SOIL & ROCK	
PRIMARY SOIL TYPE	COMPACTNESS OR PENETRATION RESISTENCE	COMPRESSIVE STRENGTH	"" AN INFERRED ROCK LI	INE INDICATES THE LEVEL AT WHI	ICH AUGERS COULD NO LONGER	FRIABLE - EASY TO BREAK OR CRUMBLE.	SUBSURFACE	
	(BLOWS)	(kN/m <sup>2</sup> )		D ROCK SYMBOL IS SHOWN WHEN RO CRIPTION OF ROCK IS GIVEN INCL	OCK IS CORED AND ONLY TO THAT	GRANULAR MATERIAL - SOIL THAT WHEN UNCONFINED HAS LITTLE OR NO DRY STRENGTH AND HAS	THIS INFORMATION MAY BE VIEWED BY APPOINT	MENT BY CONTACTING THE N. C. DEPARTMENT OF
GENERALLY	VERY L00SE					LITTLE OR NO COHESION WHEN SUBMERGED.    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 REPORTS,
GRANULAR	MEDIUM DENSE 10 TO 30	N/A	CORE RECOVERY (REC.	BY THE TOTAL LENGTH OF THE		OF GRAVITY. WATER THAT IS FREE TO MOVE THROUGH SOIL MASS UNDER THE INFLUENCE	NOR THE FIELD BORING LOGS, ROCK CORES, OF	R SOIL TEST DATA IS PART OF THE CONTRACT.
MATERIAL	DENSE 30 TO 50 VERY DENSE >50		ROCK QUALITY DESIGN	NATION (RQD)- TOTAL LENGTH OF	SOUND ROCK SEGMENTS RECOVERED	GROUNDWATER LEVEL - LEVEL OF WATER WITH RESPECT TO EXISTING GROUND SURFACE.	GENERAL SOIL AND ROCK STRATA DESCRIPTION	S AND INDICATED BOUNDARIES ARE BASED ON A
					THAN OR EQUAL TO 0.1m DIVIDED	HARDPAN - A GENERAL TERM USED TO DESCRIBE A HARD CEMENTED SOIL LAYER WHICH DOES		BLE SUBSURFACE DATA AND MAY NOT NECESSARILY
	VERY SOFT <2 SOFT 2 TO 4	<25 25 TO 50			NGTH OF THE CORE RUN TIMES 100%			S BETWEEN BORINGS OR BETWEEN SAMPLED STRATA LE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE
GENERALLY SILT-CLAY	MEDIUM STIFF 4 TO 8	50 TO 100	7	GROUND WATER		INDURATED - EARTH MATERIAL HARDENED BY HEAT, PRESSURE OR CEMENTATION,	RELIED ON ONLY TO THE DEGREE OF RELIABILE	
MATERIAL	STIFF 8 TO 15 VERY STIFF 15 TO 30	100 TO 200 200 TO 400	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.			INTERBEDDED - ALTERNATING LENSES OR LAYERS OF SOIL AND/OR ROCK MATERIALS.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	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	
			▼ STATIC WATER LEVEL AFTER 24 HOURS.			LAMINATED - VERY THIN ALTERNATING LAYERS LESS THAN I om.	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.		
U.S. STD. SIEVE SIZE	4 10 40 60 200	270	i _			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	
OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053						TO ITS LATERAL EXTENT.	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	
	COARSE FINE		MISCEL	LLANEOUS SYMBOLS AND		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.	INFORMATION ON THIS PROJECT. THE DEPARTM	ENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY
BOULDER COBBLE	E GRAVEL SAND SAND	SILT CLAY	ROADWAY EMBA		SAMPLE EST BORING DESIGNATIONS	MARL - A NON-INDURATED, CALCAREOUS DEPOSIT OF CLAYS, SILTS AND SANDS, OFTEN		OR THE INTERPRETATIONS MADE OR OPINIONS OF THE AND CONDITIONS TO BE ENCOUNTERED, THE BIDDER OR
1	75	2.05	WITH SOIL DE	SCRIPTION vst		CONTAINING SHELLS.	CONTRACTOR IS CAUTIONED TO MAKE SUCH IN	DEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS
GRAIN MM 305 SIZE IN, 12	75 2.0 0.25 3*	0.05 0.005	SOIL SYMBOL	⊕ Al	UGER BORING S- BULK SAMPLE	MICACEOUS SOIL (MIC.) - A SOIL OR ROCK TYPE CONTAINING AN APPRECIABLE AMOUNT OF MICA.		ITIONS TO BE ENCOUNTERED ON THIS PROJECT, THE TIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR
SOIL MOISTURE - CORRELATION OF TERMS			SS- SPLIT SPOON ARTIFICIAL FILL OTHER THAN SSS- SPLIT SPOON SAMPLE			MUCK (MK,) - A HIGHLY ORGANIC SOIL OF VERY SOFT CONSISTENCY, GENERALLY FOUND ON	ANY REASON RESULTING FROM THE ACTUAL C	ONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM
SOIL MOISTURE SCAL	LE ETELD MOTOTUDE		ROADWAY EMBAI		ORE BORING ST- SHELBY TUBE	TIDAL FLATS, LAKE OR STREAM FLOODPLAINS. PEAT (PT) - A FIBROUS MASS OF ORGANIC MATTER IN VARIOUS STAGES OF DECOMPOSITION.	THOSE INDICATED IN THE SUBSURFACE INFORMA	ATION.
(ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION	SAMPLE SAMPLE			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 L	.IQUID: VERY WET, USUALLY	INFERRED SOIL	L BUONDHRIES	RS - ROCK SAMPLE	OF AN INTERVENING IMPERVIOUS STRATUM.	OF TRANSPORTATION AS BEING ACCURATE NOR SPECIFICATIONS, OR CONTRACT FOR THE PROJECT	
	(SAT.) FROM BELC	W THE GROUND WATER TABLE	ALLUVIAL/RES	^ -	IEZOMETER NSTALLATION	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.		
PLASTIC LIQUID LIM			25° DID DIDECTION AND			ROCK - SEE LEGEND  ROCK GUALITY DESCRIPTION (R.O.D.) - A MEASURE OF ROCK GUALITY DESCRIPED BY: TOTAL		TON THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS OF TIME BASED ON DIFFERENCES BETWEEN THE
RANGE <		REQUIRES DRYING TO	DIE DIRECTION AND		OPE INDICATOR ●- SOUNDING ROD STALLATION	ROCK QUALITY DESIGNATION (R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN O.I METER DIVIDED BY THE TOTAL	CONDITIONS INDICATED HEREIN AND THE ACTO	
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE			ADDADENT DID			LENGTH OF CORE RUN EXPRESSED AS A PERCENTAGE.		
	NOTET - /M\ COLID- AT	T OR NEAR OPTIMUM MOISTURE	(NORMAL TO		PT N-COUNT	SANITARY LANDFILLS - COMPACTED AND/OR COVERED LAYERS OF SOIL AND WASTE PRODUCTS.	NOTES: BENCHMARK RI30 AT -I -	STA 68+24-600 (FLEVATION 50.90 m)
OM OPTIMUM MO	JISTONE TOTAL	. S. HERR OF LENOR MOISTORE		PMENT USED ON SUBJEC	CT PROJECT	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.	NOTES: BENCHMARK - BL-30 AT -L- STA. 68+24.600 (ELEVATION 50.90 m)	
SE T SULLINAMOE		ADDITIONAL WATER TO	DRILL UNITS:	AUGER TOOLS:	HAMMER TYPE:	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A		
		PTIMUM MOISTURE	<b> </b>	1_	MANUAL COMPANIES	FAULT OR SLIP PLAIN.		
<u> </u>	PLASTICITY	- Annual Company Compa	MOBILE B	6° (152 mm) CONTINUOUS FLIGH		SILL - AN IGNEOUS SHEET OF INTRUSIVE ROCK WHOSE THICKNESS IS SLIGHT COMPARED TO		
	PLASTICITY INDEX	DRY STRENGTH	BK-51	8º (203 mm) HOLLOW AUGERS	CORE BORING TOOLS:	SOME - PRESENCE OF 5% TO 30% OF SUBJECT MATERIAL.		
NONPLASTIC	0-5	VERY LOW	CME-45	HARD FACED FINGER BITS	S -AX -BX -NX	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg		
LOW PLASTICITY	6-15	SLIGHT				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 HIGH PLASTICITY	16-25	MEDIUM HIGH	X CME-550	TUNG CARBIDE INSERT	I	THAN 2.5 cm WITH 50 BLOWS.		
HIGH FEMOLICITY	26 OR MORE	116.411	PORTABLE HOIST	CLAY BITS	POST HOLE DIGGER	STRIKE - THE DIRECTION OR BEARING OF A HORIZONTAL LINE IN THE PLANE OF AN		
COLOR			OTHER	HAND AUGER		INCLINED STRATUM, JOINT, FAULT OR OTHER STRUCTURAL PLANE.  SUBGRADE - THE SOIL PREPARED TO SUPPORT A STRUCTURE OR A PAVEMENT SYSTEM.		
I	DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)			OTHER:	SOUNDING ROD	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.		
MODIFIERS SUCH AS LIGH	MODIFIERS SUCH AS LIGHT, DARK, MOTTLED, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE				VANE SHEAR TEST	TRACE - PRESENCE OF LESS THAN 5% OF SUBJECT MATERIAL.		REVISED NOVEMBER II, 1998
L						THE PARTY OF LEGS THAT OF STREET STREET		