NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS			
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
CONT. IS CONSIDERED TO BE THE INCOMEN WATER SEMI-CONSOLUTATED OR MEATHERED FARTH MATERIALS	WELL GRADED: INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO CDARSE UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, VALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	ALLUYIUM (ALLUY) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.
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	POORLY GRADED	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 8.1 FOOT PER 60 BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
188 Blows per foot according to Standard Penetration test (Aashto T286, ASTM D-1585). 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. ANGULARITY OF GRAINS	IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF VEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR,	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:	ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
VENY STEF, GAM SICT CLAY, MOST WITH INTERRECIDED FINE SIND LAYERS, MIGHT PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	NEATHERED ROCK (NR) PR. FOOT.	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEYEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	RICK ITE	GROUND SURFACE.
CLASS. (35% PASSING *288) (35% PASSING *288)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GREISS, GREISPAL, STANDER CHAIR AND	CALCAREOUS ICALC.) - SOILS WHICH 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 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-5 A-2-7	COMPRESSIBILITY	NON-CRYSTALLINE SEDIMENTARY ROCK THAT YOULD YELLO SHE FLUSAL IF TESTED, ROCK TYPE ROCK INCRU INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	<u>Colluyium</u> - rock fragments mixed with soil deposited by gravity on slope or at bottom of slope,
SYMBOL SECTION OF THE PROPERTY	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 38 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-58	COASTAL PLAIN COASTAL BLAIN SERIMENTS CEMENTED INTO POCK BUT MAY NOT WISLIN	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
80000000000	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 58	SEDIMENTARY ROCK SPT REFUSAL ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SPELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
2 PASSING GRANULAR SILT- MUCI	PERCENTAGE OF MATERIAL GRANULAR SILT- CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 48 38 MOSS MOSS MOSS MN SOILS SOILS PEAT	SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 18% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 18 - 28%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LIDUXD LIMIT 48 HOME HOME HOME HOME HOME HOME HOME HOME	MODERATELY ORGANIC 5 - 18X 12 - 28X SOME 28 - 35X	YERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, IV. SLIJ 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
GROUP INDEX 8 8 8 4 NX 8 MX 12 MX NS NO. MX MODERATE ORGAN	THORE SON PRO PROFE	OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKVISE FROM NORTH,
INCIDENT THREE COMME EDAGE SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL AND CAMP CAMP CAMP CAMP CAMP CAMP CAMP		(SLL) I INCH. OPEN JUINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME DCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SWO	77%	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITY	RLE PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	(MODL) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SLEGRADE P.L. OF A-7-5 ≤ L.L 30 : P.L. OF A-7-6 > L.L 30	O-MA SPRING OR SEEPAGE	WITH FRESH ROCK.	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	Moderately all rock except quartz discolored or stained. In granitoid rocks, all felospars dull severe and discolored and a majority show kaglinization, rock shows severe loss of strength	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
RANGE OF STANDARD RANGE OF UNCONFINED		MOD. SEY.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,	THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR COMPRESSIVE STRENGTH CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/F1/2)	ROADWAY EMBANKMENT OF OUT TEST BORING SAMPLE DESIGNATIONS	IF TESTED WOLD YIELD SPT REFUSAL	<u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE <4	COT SYMPON AUTOE PROTECT	SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAQLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANULAR LOUSE 4 TO 18	5° BULK SHATLE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL DENSE 38 TO 58	ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS ARTIFICIAL FILL OTHER THAN CORE BORING SAMPLE SAMPLE	IF TESTED, YIELDS SPI N VALUES > 100 BPF YERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	<u>Lens</u> - a Body of Soil or rock that thins out in one or more directions. <u>Mottled Omotj</u> - irregularly marked with spots of different colors, mottling in
YERY DENSE >59	ST- SHELBY TUBE	(V. SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AFRATION AND LACK OF GOOD DRAINAGE.
YERY SOFT <2 <8.25 GENERALLY SOFT 2 TO 4 9.25 TO 9.5	MONITORING WELL SAMPLE	REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN, IF TESTED, YIELDS SPT. N. VALUES & 1889 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 8.5 TO 1	INFERRED ROCK LINE PIEZOMETER RS- ROCK SAMPLE	COMPLETE ROCK REDUCED TO SDIL. ROCK FABRIC NOT DISCERNIBLE OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK,
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 38 2 TO 4	STREET TRIANGE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF
HARD >38 >4	25/925 DIP/DIP DIRECTION OF INSTALLATION FRR - FRR SAMPLE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES SPT N-VALUE	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 16 48 68 298 278	SOUNDING ROD SPT REFUSAL	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.	SAPROLITE ISAPJ - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING 0H0 4.76 2.8 8.42 8.25 8.875 8.853	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL NM - NOT MEASURED	TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS
(BLDRJ) (COBJ (GRJ (CSE, SD.) (F, SD.) (SLJ) (CLJ	BT - BORING TERMINATED PMT - PRESSUREMETER TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 8.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 365 75 2.8 8.25 6.85 8.895	CL CLAY SD SAND, SANDY CPT - CONE PENETRATION TEST SL SILT, SILTY	BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN. 12° 3°	CSE COARSE SLL - SLIGHTLY	MEDIUM CAN BE GROOVED OR GOUGED QUES INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) ISPT) - NUMBER OF BLOWS ON OR B.P.F.) OF A 148 LB. HAMMER FALLING 38 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS	OMT - DILATOMETER TEST TO THE TREDUCE REPUSAL OPT - DYNAMIC PENETRATION TEST 7 - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 8.1 FOOT PENETRATION
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	*	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	WITH 68 BLOWS.
- SATURATED - USUALLY LIQUID, VERY WET, USUALLY	F FINE FOSS FOSSILIFEROUS W - MOISTURE CONTENT	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	<u>Strata core recovery (spec.)</u> - total length of strata material recovered divided by total length of stratum and expressed as a percentage.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED V VERY FRACS FRACMENTS VST - VANE SHEAR TEST	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH PDINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (S.R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY:
PLASTIC LIQUID LIMIT	FRAGS FRAGMENTS YST - YAME SHEAR TEST MED MEDIUM	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	Total length of rock segments within a stratum equal to or greater than 4 inches divided by the total length of strata and expressed as a percentage.
RANGE - WET - ON) SEMISULIDE REQUIRES DRYING TO	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PL PLASTIC LIMIT		TERM SPACING TERM THICKNESS	BENCH MARK: BM *3:-BL- STA.15+57.9.178.8*LT
ON OPTIMUM MOISTURE - MOIST - 040 SOLIDEAT OR NEAR OPTIMUM MOISTUR	Towns town	VERY WIDE MORE THAN 18 FEET VERY THICKLY BEDDED > 4 FEET	DENCT MANKS DIM "35" GL." G(Mc10*07:3: 170;8 L.)
SL SHRINKAGE LIMIT	X MOBILE B- 57 CLAY BITS	MODERATELY CLOSE 1 TO 3 EFET THINLY BEDDED 8.16 - 1.5 FEET	ELEVATION: 250.58'
- DRY - (D) REQUIRES ADDITIONAL WATER TO	X S'CONTINUOUS FLIGHT AUGER CORE SIZE	CLOSE 9.16 TO 1 FEET VERY THANKY BEDDED 8.93 - 8.16 FEET	NOTES:
WITHIN OFTENDE HOISTONE	B-HOLLOW AUGERS	YEAT CLUSE LESS INNER BLID FEE! THIRLY LAMINATED < 8.668 FEET	
PLASTICITY	CME-45 HARD FACED FINGER BITS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 8-5 VERY LOW	TUNG-CARRIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
LOW PLASTICITY 6-15 SLIGHT	X CASING H/ ADVANCED	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS4 GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED, PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	NODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
	TEL TOUCHE THE STATE CARD HAND ANTED	BREAKS EASILY WIEN HIT WITH HAMMER.	
COLOR	X OTHER CHE-650 X CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROSE;	
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.	X OTHER CHE-BSEX OTHER VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INCURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE.	
THE PROPERTY OF THE PROPERTY O	OTHER	EXTREMELY INDURATED SHARP HAMMER BLOWS REDUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
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