# 4007A 35008.1.

SHEET

5-7

# STATE OF NORTH CAROLINA

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

# **CONTENTS DESCRIPTION**

AT - L - STA. 21 + 47

TITLE SHEET

**LEGEND** SITE PLAN

PROFILE

**BORE LOGS** 

SOIL TEST RESULTS

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007A) \_\_\_ F.A. PROJ. <u>STPNHF-17(31)</u> COUNTY ONSLOW PROJECT DESCRIPTION SR 1702 (WHITE STREET EXTENSION) FROM SR 1808 (BELL FORK ROAD) TO SR 1470 (WESTERN BOULEVARD) SITE DESCRIPTION BRIDGE ON -L- (WHITE ST. EXT.) OVER US 17

# **INVENTORY**

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#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORNING LOGS, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 250-0408. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUBFACE 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 STU (IN-PLACE) TEST DATA CAN BE RELIED ON GINLY TO THE DEGREE OF RELIABLITY INHERENT IN THE STANDARD TEST METHOD, THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE RIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS TO CONDITIONS AND 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 PRELMMARY OALLY 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 OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED, THE BIDDER OR DEPARTMENT AS TO THE TIPLE OF MATERIALS AND CONDITIONS TO BE ENCOUNTED. THE BUDGEN ON CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY 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.

PERSONNEL

CMW

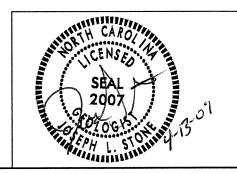
F&R PERSONNEL

INVESTIGATED BY J.L. STONE

D.N. ARGENBRIGHT

SUBMITTED BY\_\_\_\_D.N. ARGENBRIGHT

APRIL 2009



## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

## DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

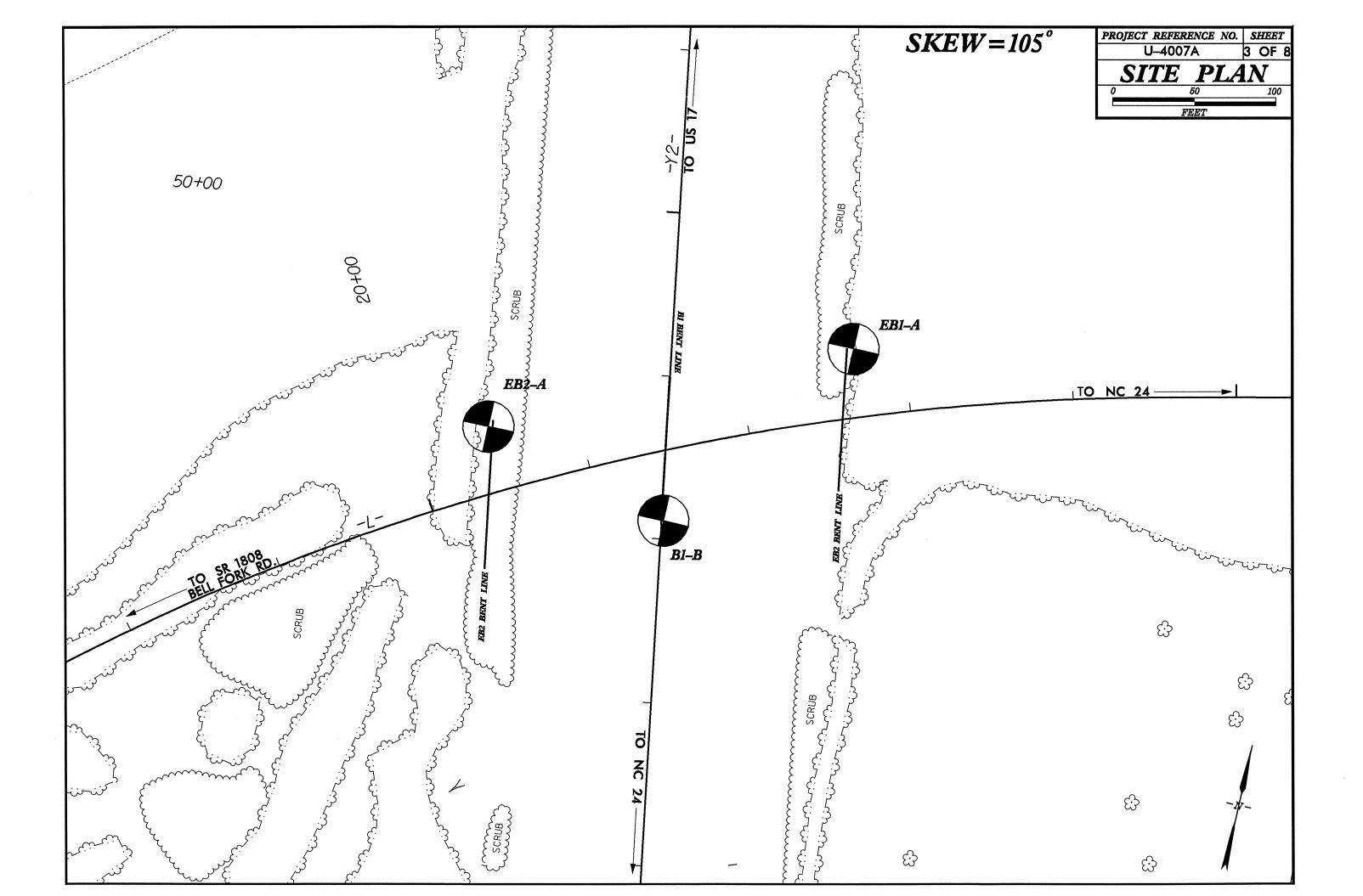
# SUBSURFACE INVESTIGATION

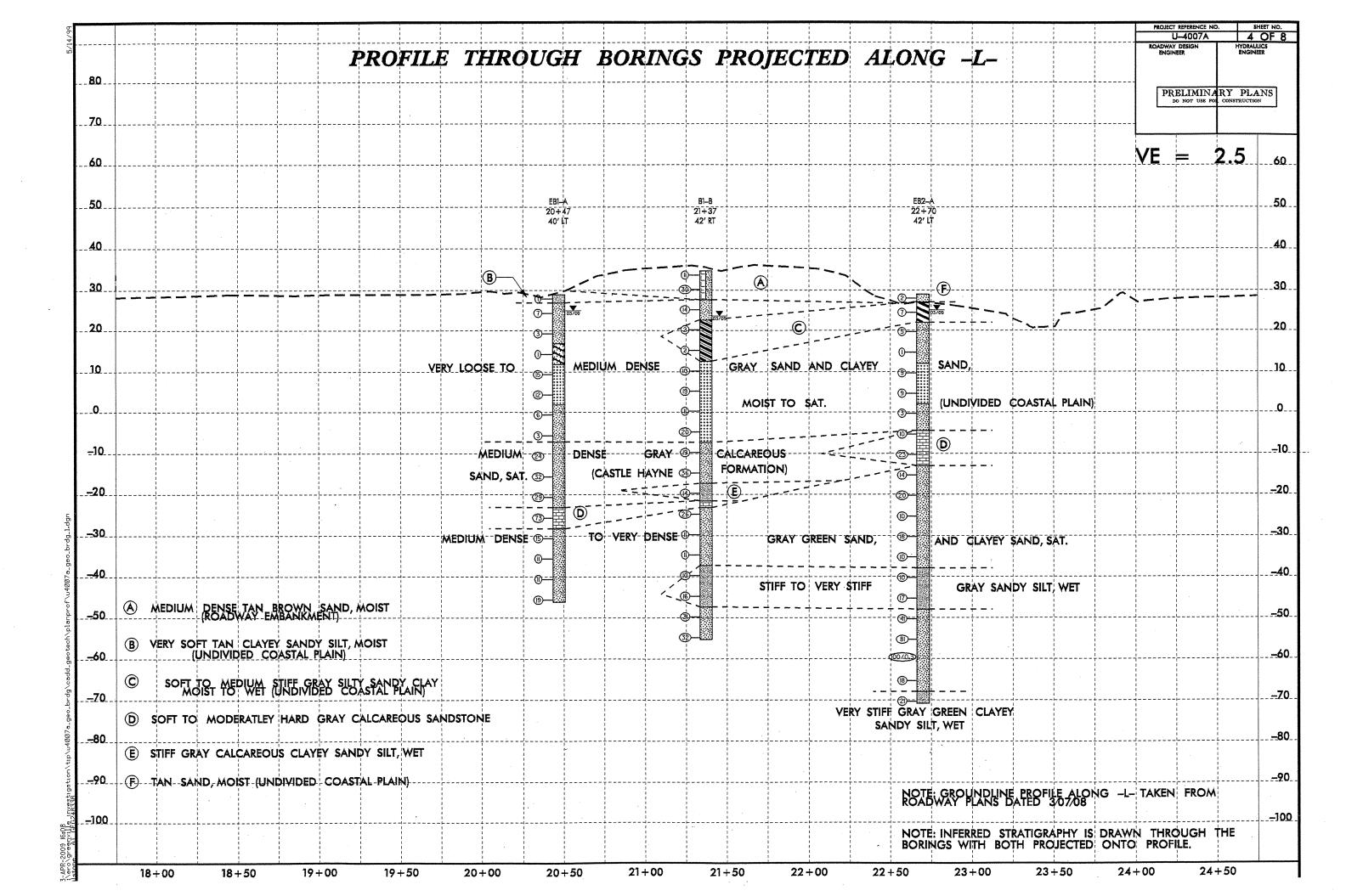
	SOIL AND ROCK LEGEN	D, TERMS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 180 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1506), SOIL	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARS UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	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 0.1 FOOT PER 60 BLOWS	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AGAITO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A Z  OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STEF, GRASSITY CLAS, MOST WITH INTERBEDDED FINE SAND LINERS, MARKEY, PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF GOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR)  BLOWS PER FOOT IF TESTED.  COVETALLING  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	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 DR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTION WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	GROUND SURFACE.  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 CLASS, C-1-1 A-1-1 A-2 A-4, A-5 A-6 A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYP	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A1-a A-1-b A-2-4 A-2-5 A-2-7 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31  MODERATELY COMPRESSIBLE LIQUID LIMIT GOVAL TO 31-50  HIGHLY COMPRESSIBLE LIQUID 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.
2 PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.  WEATHERING	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40 30 MX 50 MX 51 MN   GRANULAR CLAY PEAT	ORGANIC MATERIAL GRANULAR SILT - CLAY 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
= 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 50 MN	TRACE OF ORGANIC MATTER   2 - 3%   3 - 5%   TRACE   1 - 10%	HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
PLASTIC INDEX 6 MX NP 18 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 A	IN CALL CONCLAIR ON A DOCKEN EDECTMENT FACE CHIME DOTOLET V DOCK DINCE (MIDED HANNED DIOUS TE	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC USUAL TYPES SIDNE FRAGS.  USUAL TYPES SIDNE FRAGS.  ORGANIC ORGANIC ORGANIC	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 SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUME FRAND.  OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER  MATERIALS SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING  OS A EVEN TO COOD FAIR TO POOR FAIR TO POOR INICIPIARIES	✓ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT DUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL 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,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE (N-YALUE) (TONS/F1? )		NATIONS  IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE (4	S - BULK SA  AUGER BORING  S - BULK SA	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
CRANULAR   LOOSE	SS - SPLIT S  ARTIFICIAL FILL (AF) OTHER  THAN BRADWAY EMBANIMENT  CORE BORING	IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS DUT IN ONE OR MORE DIRECTIONS.
VERY DENSE >50	ST - SHELBY SAMPLE SAMPLE	(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 SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	MONITORING WELL RS - ROCK SI	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINO VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED. YIELDS SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY	ALLUVIAL SOIL BOUNDARY  ART - RECOMP SAMPLE	ACTED TRIAXIAL 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
HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR - CALIF(		ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	— SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REDUIRES	SAPPOLITE (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 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SUUNDING HUD RED— SPT REFUSAL  ABBREVIATIONS	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK DNLY 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 HI HIGHLY # - MOISTUR	TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.)         (COB.)         (GR.)         (CSE. SD.)         (F SD.)         (SL.)         (CL.)           GRAIN         MM         305         75         2.0         0.25         0.05         0.005	BT - BORING TERMINATED MED MEDIUM V - VERY  CL CLAY MICA MICACEOUS VST - VANE  CPT - CONE PENETRATION TEST MOD MODERATELY WEA, - WEATH		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT REGULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SIZE IN. 12 3  SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE NP - NON PLASTIC 7 - UNIT WE DMT - DILATOMETER TEST ORG ORGANIC 7 - DRY UNI	IGHT MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE SCALE FIELD MOISTURE CLUDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATID SAP SAPROLITIC	POINT OF A GEOLOGIST'S PICK.  SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)  DESCRIPTION  - SATURATED - USUALLY LIQUID; VERY WET, USUALLY	F - FINE SD SAND, SANDY FOSS FOSSILIFEROUS SL SILT, SILTY	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.
CSAT.) FROM BELOW THE GROUND WATER TABLE PLASTIC SEMISOLID; REDUIRES DRYING TO	FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICDNE REFUSAL	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNALL.	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 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE - WET - (W) SEMISOLIDIT REDURES DATING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING TERM CRACING TERM THICKNESS	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
MOTEST OF SOLITOR AT DO NEAD OUTSMILM MOTESTIDE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BL-2 -L- STA. 2I+56 I6' RT
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B- CLAY BITS	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 35.2 FT.
REQUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS FLIGHT AUGER CORE SIZE:  BK-51 S' HOLLOW AUGERSB	CLOSE 0.16 TO 1 FEET THICK DECUDED 0.008 - 0.00 FEET THICKLY LAMINATED 0.008 - 0.00 FEET THICKLY LAMINATED 4.000 FEET	NOTES:
PLASTICITY	BK-51	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 9-5 VERY LOW	TUNG-CABRIDE 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           MED. PLASTICITY         16-25         MEDIUM	X CASING W/ ADVANCER HAND TODIS	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH POST HOLE	RREAKS FASTLY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNGCARB. HAND AUGE  CORE BIT SOUNDING	ADDATES AND DESCRIPTION TO DEPARATE LITTLE OFFICE PROPE	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEA	R TEST  EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	

PROJECT REFERENCE NO.

U-4007A

SHEET NO. 2 OF 8





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BORIN	NG NO.	EB1-	A		S <sup>-</sup>	TATION	20+4	47		OFF	SET 4	Oft LT			ALIGNMEN	Γ -L-	0 HR.	N/A
COLL	AR ELE	<b>V</b> . 28	.9 ft		TO	OTAL DEF	PTH	75.0 ft		NOF	RTHING	371,9	37		EASTING	2,481,915	24 HR.	3.8
DRII I	. MACH	INE C	MF-5	5	D	RILL MET	HOD	) Mud F	Rotary	<u> </u>					<u>- I</u>	HAMMER TYPE	Automatic	
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-10	-9.6	38.5				· · ›				-   -		<u></u>				RAY CALCAREOUS S (CASTLE HAYNE FOR		
	-	‡	8	10	14		. 24	١		.   .		SS-29			<del>-</del>	(OASTELTIATIVE) ON	WATION)	
		<u> </u>				:::	: \			:   :	:::				<u>-</u>			
-15	-14.6	43.5			<u> </u>	]	$\cdot \mid \cdot$	ι		-   -	• • •				<u>-</u>			
	-	F	10	18	14			●32		.   .					-			
		‡						1:::		:   :					<del>-</del> -			
-20_	-19.6	48.5	4	6	22	<u> </u>		!	• • •	<u>:   :</u>	• • • •				<del>-</del>			
	-	+	"	"	23	• • •	.	29		·   ·	• • • ]	SS-30	1		<b>-</b>			
		Ŧ				:::	.			:   :		1		μď	-23.1	COASTAL PLA		52
-25	-24.6	53.5	25	55	18	<u> </u>			37.					田	- G	RAY CALCAREOUS S		
-		╁	23	33	"	• • •	-			<b>7</b> 3.				井	_			
l		Ŧ					:	 سرز		:   :					-28.1	COASTAL PLA		57
-30	-29.6	58.5	6	7	8	<u> </u>		·/-··	• • •	<u> </u>		SS-31	1		_	GRAY SAND, S	AT.	
		t		'		$  ::_{l}^{1}$	5			:   :	:::	33-31	1		_			
		+								·   -					-			
-35	-34.6_	63.5	4	5	6	1 -1	4	· · · ·	ļ · · · ·	<u> </u>		1			_			
		<b>†</b>	'			· • • • • • • • • • • • • • • • • •	:		: : :	:   :	:::				<b>-</b> '			
ĺ		+				$  \cdot  $	- [			-   -		-			-			
-40	-39.6	68.5	4	5	6	1		· · · ·	<u> </u>	<u>.   .</u>		SS-32	1		<del>-</del>			
		‡	'	1		1 : 311				:   :	:::	00-02	1		_			
		+	1			$  \cdot\cdot\rangle$	-		• • •	·   ·					<b>_</b>			
-45	-44.6	<del>† 73.5</del>	6	8	11	· · · · · · · · · · · · · · · · · ·	19		<b> </b> -	<del> </del>					- -46.1			75
			1	1	1		213		1						L -40.1			<del>v /3</del>

				<del></del>	i KE		<u> </u>	—т					T								T		1							
PROJECT N					U-4007A				COUNTY				GEOLOGIST Wri	<del></del>			DJECT N					U-4007A	COUNTY					GEOLOGIST W		
SITE DESC			DGF (		<del></del>		ELEXIE		N) OVER - OFFSET	·····	<u>-</u>	ALICANA	NT I	GROUND W	1					DGE (		· ( WHITE STREET EXTENS			<u></u>		T		GROUND V	
BORING NO					ATION		0.0.0					ALIGNME		0 HR.	N/A		RING NO					<b>TATION</b> 21+37	OFFSET				ALIGNMENT		0 HR.	N/
COLLAR EL					OTAL DEI				NORTHING	3/1,9		EASTING	2,482,032	24 HR.	11.0	<b> </b>	LAR EL					OTAL DEPTH 89.9 ft	NORTHING	G 371,9	905		EASTING 2	<u></u>	24 HR.	11.
DRILL MAC	·····		5		RILL MET				01105405				HAMMER TYPE				LL MACI			<del></del>		RILL METHOD Mud Rotary						HAMMER TYPE		
START DAT			)W COI		OMP. DAT		24/09 DWS PER I		SURFACE	SAMP.	T	N/A T	DEPTH TO ROC	Κ 56.2 π			RT DAT			144 001		OMP. DATE 03/24/09	SURFACE			TH N	i/A	DEPTH TO RO	CK 56.2 ft	
ELEV DRIVE (ft) ELEV (ft)	DEPT	H BLC	0.5ft	0.5ft	0	25	50		75 100	11	1710	ELEV. (ft)	SOIL AND ROCK DES			ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	W COL		BLOWS PER FOO 0 25 50	וכ 7 <u>5</u> 100	SAMP.	MOI	0	s	SOIL AND ROCK DES	SCRIPTION	
1 (19	1	1				1		<del></del>	1		IVIOI	ELEV. (III)			EPTH (ft)		1 (10)		0.0.0	- Olon	0.0.0			H	/ MOI	G				<del> </del>
40																1,0						Match Line								
40	‡											<b>F</b>				<u>-40</u> .	<del> </del>	<del> </del>	11			IVIALCIT LITTE		<del>                                     </del>	╁			COASTAL PL	AIN	
	‡											<b>‡</b>					_/13.7	78.4				::\:: :::: :::					, GR/ -	AY SANDY SILT, WE	ET (continued)	
35 34.7	<u>‡ 00</u>											34.7	GROUND SURF		0.0	-45		‡	6	6	10	16	<u> </u>	]			<del>-</del>			
	‡.	1	5	6	11	: ::		: : :	::::	SS-14		<b>-</b>	ROADWAY EMBAN TAN BROWN SAND	KMENT , MOIST				‡				::::\ :::: :::					47.3			8
31.2	3.5	13	14	16	:::`			: : :	::::							-50		83.4	7	10	21	::::  <u>\:</u> ::: :::		SS-23	-			GRAY SAND, S	AIN SAT.	
	‡	"	'	'`	<b></b>	30.				11		-				-50	1 -	‡		١٠	-	31		35-23	1		<u>-</u> -	<b>,</b> .		
26.3	‡ <sub>84</sub>				: : : ,	<b>/</b> ] ::	:: :	: : :				27.7	UNDIVIDED COASTA				-52.7	88.4				:::: :::: ::::				獻	, •			
25	‡	1	6	8	14	4				SS-15		<u>*</u> _	GRAY CLAYEY SAN			-55		-00.4	10	13	19	32.		<u> </u>			- 55.2			8
	‡				1:/:		:: :	: : :	::::			22.7			12.0			‡									Borine	g Terminated at Elev DENSE SAN	ration -55.2 ft IN ND	
21.3	‡ 13.4 ‡	WOH	1	1	<i>i</i>	:   : :	:: :	: : :		SS-16		<b>}</b>	UNDIVIDED COASTA GRAY SANDY CLA	NL PLAIN Y, WET		-60		‡								-	•			
	‡				1	-				1   55-10		<b>}</b>				-00	1 -	‡								-	- •			
16.3	‡ <sub>18.4</sub>				::::			: : :	: : : :			<b>*</b>						‡								<b> </b>	•			
15	‡	2	1	1	2							<b>*</b>				-65		‡					•							
	‡				7			: : :				12.7			22.0			‡									•			
10	† 23.4	3	5	5	. 7.	:   : :		: : :		SS-17			UNDIVIDED COASTA GRAY SAND, S	AL PLAIN AT.		-70		‡									<u>.</u>			
	‡				\.	-	-			1						1-70	1 •	‡									<u>-</u>			
6.3	‡ <sub>28.4</sub>							: : :			000	0 0						‡									•			
5	‡	7	9	10	···)	19			• • • •	-	000					-75	┨ -	‡								ΙF	· —			
	‡				: : /				: : : :		000	• • •						‡								<b> </b>	•			
0 1.3	<del>† 33.4</del>	5	5	6	/.	: ::		: : :		SS-18						-80		‡								<b> </b>	•			
	Ŧ				/.	.	-					0 0 <del></del>					1 -	‡								F	<del>-</del> -			
-3.7	I 38.4				: : \				: : : :		000	0 0 0 0 0 0						Ŧ								ŀ	•			
-5	$\pm$	6	10	10		20				1	00					-85	┨ ・	Ŧ								F	<del></del>			
	İ					<u> </u>	$\cdot \cdot   \cdot  $				000000000000000000000000000000000000000	-7.3	COASTAL PLA		42.0			Ŧ				27				F				
<u>-8.7</u>	<del>1 43.4</del>	9	8	11		19	· ·   ·		: : : :	SS-19		<u>.</u>	GRAY CALCAREOUS S (CASTLE HAYNE FOR	SAND, SAT,		-90		Ī								F				
	‡					:\/::	:: :		1::::			<u>#</u>	(ON THE INTINE POP	(1 IOI4)				‡								F				
	48.4	14	17	19	: : :	: \\:	:: :				🛭	<b>#</b>						‡								E				
-15	‡	14	''	19	<del> </del>	.   <i> </i>	36		<del> </del>	H		<u>_</u>				-95	-	<u> </u>								E	<del>-</del>			
40-	‡					/::	:: :				🖺	<u></u> -17.3	COASTAL PLA		<u>52.0</u>			‡			·					E	-			
-20 -20	53.4	5	5	9			<u> </u>			SS-20	j 📗	E G	RAY CALCAREOUS CL SILT, WET	AYEY SANDY		-100		‡								E				
	‡				: : :	:   : :	::   :		<del> </del>			21.5	COASTAL PLA		<u>56.2</u>			‡								E				
	58.4	11	12	14		:   : :	· ·   · 	 	+	1		-23.1	CALCAREOUS SAN	DSTONE	<u> 57.8</u>			‡								E				
-25	‡	''	'4	14	<b></b>	./ 26-			<del> </del>	1		<b>*</b>	GRAY SAND, S	AIN AT.		-105		‡								E	<u>-</u> -			
20.7	† 63.4				1::7		:: :		: : : :			<u> </u>						‡								<u> </u>				
-30	+ 03.4	4	4	7	11.	<u>.  </u>	<u> </u>		• • • •	SS-21		<u>#</u> _				-110	┨ .	‡								E	<u>.</u>			
	‡				•    •	:   : :	:: :	: : :	::::			<u>;;</u>						‡									-			
	± 68.4	4	4	7	::::	:   : :						*				,		‡								<u> </u>	• •			
-35	‡	-		'	11.		-:   -	<del></del>	1	11		<b>*</b>				-115	+ -	‡									_			
20.7	† † <sub>73.4</sub>				: :	: ::	:: :	: : :	::::			-37.3	COASTAL PLA	AIN	<u>72.0</u>			‡								E	-			
-40 <u>-38.7</u>	+ 13.4	4	4	6	10	•   • •	.			SS-22	1 🏻	1	COASTAL PLA GRAY SANDY SIL	Γ, WET		-120		+								1 F	-			

	LOG REPORT	COLINETY ONICLOW	CEOLOGICE Melles C. M.	<b>¬г</b>		ECT NO	2500	20.4.4		A 11 4007A	COUNTY ONGLOW	OFOLOGIOT, WA	:l O M
PROJECT NO. 35008.1.1	ID. U-4007A ON -L- ( WHITE STREET EXTENS	COUNTY ONSLOW	GEOLOGIST Wrike, C. M. GROUND WTR (ft	— I —		DESCRIE				). U-4007A	COUNTY ONSLOW	GEOLOGIST Wr	GROUND WTR (f
BORING NO. EB2-A	STATION 22+70	OFFSET 42ft LT	ALIGNMENT -L- 0 HR. N/A	1 ⊢		NG NO.				STATION 22+70	OFFSET 42ft LT	ALIGNMENT -L-	O HR. N/
COLLAR ELEV. 29.0 ft	TOTAL DEPTH 99.8 ft	NORTHING 372,033	EASTING 2,482,122 24 HR. 3.9	_ I		AR ELE				TOTAL DEPTH 99.8 ft	NORTHING 372,033	EASTING 2,482,122	24 HR. 3.
DRILL MACHINE CME-55	DRILL METHOD Mud Rotary	<del> </del>	HAMMER TYPE Automatic	<b>⊣</b> ⊢		. MACHII				DRILL METHOD Mud Rotary	NORTHING 372,033	HAMMER TYPE	
START DATE 03/18/09	COMP. DATE 03/19/09	SURFACE WATER DEPTH N				T DATE				COMP. DATE 03/19/09	SURFACE WATER DEPTH		
		OT SAMP.		— I –		DDIVE I			COUNT			- I	
ELEV CHIP CONTROL OF THE CONTROL OF	<del></del>	75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (	11	(ft)	(ft)	· · · · · ·		.5ft 0.5f		75 100 NO. MOI C	SOIL AND ROCK DES	CRIPTION
				$\Box \Gamma$									
30			**** ODOUND OUDEAGE		-50					Match Line			
29.0 0.0 WOH 1	1 2	SS-1 SS	UNDIVIDED COASTAL PLAIN	0.0		‡		9	15 26		SS-11	COASTAL PL/ GRAY GREEN SAND, SA	
25.5 + 3.5			TAN SAND, MOIST2	2.0	-55	-54.3	83.3			_  :::: :::: :``:	: ::::	<b>*</b>	
25 25.5 + 3.5 1 3	4	SS-2	- GRAY SILTY SANDY CLAY, MOIST TO WET		-55	‡		8 7	13 68	3		<b>#</b> -	
		SS-3	22.0 UNDIVIDED COASTAL PLAIN 7	7.0		<u> </u>					: ::\:		
20 20.7 + 8.3 WOH 2	3 6	SS-3	GRAY SAND SAT.	11	-60	-59.3 +	88.3	5	7 100/0	0.3	SS-12		
						Ŧ							
15 15.7 13.3			<del>-</del>		-65	-64.3 I	93.3	7	8 10		<u> </u>	<u>-</u>	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					‡				· · · • · · · · · · · · · · · · · · ·	: ::::		
10 10.7 + 18.3		0000	12.0 17		-70	-69.3	98.3			_  ::::  :::: :::		COASTAL PL	AIN
10   3   3	6   9	SS-4	<u>-</u>		-70	‡		7	9 12	21	SS-13	GRAY GREEN CLAYEY SA  Boring Terminated at Eleva	99
						‡						VERY STIFF CLAYEY S	SANDY SILT
5 5.7 + 23.3 4 4	5		- -	-    -	-75	+						-	
			· · 2.0 27	27.0		ŧ	l					F	
0 0.7 28.3 2 2	1 1				-80	Ŧ						F	
	3	SS-5	<del>-</del>			Ŧ						E	
-4.3 <del>-4.3</del> 33.3				32.0		Ŧ						-	
-5 1 1 4		SS-6 T	GRAY CALCAREOUS SANDSTONE, (CASTLE HAYNE FORMATION)		-85	+						-	
						‡						-	
<u>-10</u> <u>-9.3</u> + 38.3 8 11	12 23	SS-6	<del>-</del>		-90	#						<u> </u>	
	::::/[::::: :::		i e e e e e e e e e e e e e e e e e e e	12.0		‡						-	
-15 -14.3 + 43.3		·· ···  [ [ [ ] ]	COASTAL PLAIN GRAY SAND AND CLAYEY SAND, SAT.	-7 I	-95	‡						-	
10 8	6 14	SS-7	- CIVI ONIND AND OLATET OAND, OAT.			‡						F	
19.3 + 48.3						Ŧ						E	
-20 -19.3 + 48.3 4 5	15	SS-8	- - -	<del> </del>	-100	Ŧ						F	
‡						‡						‡	
<u>-25</u> <u>-24.3</u> <u>+ 53.3</u> <u>3</u> <u>5</u>	5 10	·· ····	<del>-</del>		-105		.					<u>-</u>	
13/09			• •			‡	1					-	
+ -30 -29.3 + 58.3 5 5					-110	‡	1					ļ	
9 -30 + 5 5	11 1 16	SS-9 SS-9	<del>-</del> -			+						F	
			• •			‡						E	
-35 -34.3 + 63.3 3 4	6 010		<u>.</u> 	<del> </del>	-115	+	.					F	
				57.0		<u> </u>						[	
2 -40 -39.3 -68.3 3 4	6	SS-10	COASTAL PLAIN GRAY SANDY SILT, WET	- <b>-  </b> [	-120	$\pm$						<u>-</u>	
	10		·			Ī						‡	
-44 3 + 73 3     -73 3			<u>.</u>		105	Ŧ						‡	
3 -45 -45 5 7	10	<del>    </del>	_ -		-125	+						-	
	::::\::: ::	· ·   · · · ·	<u>-48.0</u>	77.0		‡						-	
9 -50 -49.3 + 78.3	<del>                                     </del>		COASTAL PLAIN GRAY GREEN SAND, SAT.		-130							<del>-</del>	

# *U–4007A 35008.1.1*

# BRIDGE ON WHITE ST. EXT. OVER US17

			Ā	SOIL T	ES'	T .	RESU	JLTS	EB	1–A					
SAMPLE	OFFICE/M	OM ARTON	DEPTH	AASHTO	7.7			% BY 1	WEIGHT		% PAS	SSING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 24	40 LT	20+47	1.0-1.5	A- 4( 0)	23	7	9.8	50. 1	14.0	26. 1	100	97	44	-	-
SS- 25	40 LT	20+47	3. 5- 5. 0	A-2-4(0)	21	3	16.8	58. 1	5.0	20.0	100	97	29	-	-
SS- 26	40 LT	20+47	13. 6- 15. 1	A-2-6(0)	33	17	53.7	24.6	1.6	20.0	92	65	20	-	-
SS- 27	40 LT	20+47	18.5-20.0	A- 3( 0)	22	NP	15.8	78.4	1. 8	4.0	100	99	7	-	-
SS- 28	40 LT	20+47	28. 5- 30. 0	A-2-4(0)	23	NP	7.8	81.8	2. 4	8.0	100	98	12	_	-
SS- 29	40 LT	20+47	38. 5- 40. 0	A-2-4(0)	23	NP	26.7	62.9	2. 4	8.0	94	81	11	-	-
SS- 30	40 LT	20+47	48, 5- 50, 0	A-2-4(0)	20	4	17.2	49.7	9.0	24.0	93	84	33	-	-
SS- 31	40 LT	20+47	58. 5- 60. 0	A-2-4(0)	20	NP	1.8	79.2	5.0	14.0	100	100	21	-	-
SS- 32	40 LT	20+47	68, 5-70, 0	A-2-4(0)	22	NP	0.4	73.3	10.2	16.0	100	100	32	-	-

				SOIL T	res	ST	RES	ULTS	S B1-	-B					
SAMPLE	OFFICE	CONTRACTOR	DEPTH	AASHTO	7.7	DI		% BY 1	WEIGHT		% PAS	SSING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 14	42 RT	21+37	1, 0- 1, 5	A-2-4(0)	21	NP	36.7	47.3	2.0	14.0	84	70	15	-	-
SS- 15	42 RT	21+37	8.4-9.9	A-2-4(0)	21	4	10.4	59.3	10.2	20.0	99	95	34	17.3	-
SS- 16	42 RT	21+37	13. 4- 14. 9	A-6(4)	27	14	32. 1	14. 4	17.4	36. 1	100	91	56	-	-
SS- 17	42 RT	21+37	23. 4- 24. 9	A- 3( 0)	19	NP	34.3	59. 1	0.6	6.0	100	94	8	-	-
SS- 18	42 RT	21+37	33. 4- 34. 9	A-3(0)	23	NP	6.6	86.0	1. 4	6.0	100	99	9	-	-
SS- 19	42 RT	21+37	43. 4- 44. 9	A-2-4(0)	23	NP	24.0	64.5	3. 4	8.0	97	86	12	-	-
SS- 20	42 RT	21+37	53. 4- 54. 9	A-4(0)	22	6	15. 4	49. 1	11.4	24.0	97	88	37	-	-
SS-21	42 RT	21+37	63. 4-64. 9	A-2-4(0)	20	NP	3. 4	81.2	1. 4	14.0	100	99	18	-	-
SS- 22	42 RT	21+37	73. 4-74. 9	A-4(0)	24	NP	0.2	71.9	9.8	18.0	100	100	36	-	-
SS- 23	42 RT	21+37	83. 4-84. 9	A-2-4(0)	21	NP	0.6	86.4	1. 0	12.0	100	100	15	-	-

			S	SOIL T	ES'	T	RESU	JLTS	EB2	2–A					
SAMPLE	OFFCER	OF LETON	DEPTH	AASHTO		n.7		% BY	WEIGHT	****	% PAS	SSING (S	SIEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 1	42 LT	22+70	1.0-1.5	A-2-4(0)	17	NP	6.2	72.5	9.2	12.0	100	99	27	-	-
SS- 2	42 LT	22+70	3, 5-5, 0	A-7-6(26)	52	32	1.6	21.4	20.8	56. 1	100	100	81	-	-
SS- 3	42 LT	22+70	8. 3- 9. 8	A-2-4(0)	19	5	20.6	51.9	5. 4	22.0	100	93	32	-	-
SS- 4	42 LT	22+70	18. 3- 19. 8	A-3(0)	24	NP	18.4	76.2	1. 4	4.0	100	98	7	-	-
SS- 5	42 LT .	22+70	28.3-29.8	A-2-4(0)	23	NP	5.6	84.2	4.2	6.0	100	99	12	-	-
SS-6	42 LT	22+70	33. 3- 34. 8	A-2-4(0)	24	NP	44.5	34.5	11.0	10.0	95	68	22	-	-
SS-7	42 LT	22+70	43. 3- 44. 8	A-2-4(0)	18	3	34. 3	35. 1	12.6	18.0	75	57	24	-	-
SS-8	42 LT	22+70	48. 3- 49. 8	A-2-4(0)	18	2	12.8	54.5	10.6	22.0	92	86	32	-	-
SS- 9	42 LT	22+70	58. 3- 59. 8	A-2-4(0)	21	NP	1.0	81.2	5.8	12.0	100	100	21	~	-
SS- 10	42 LT	22+70	68. 3-69. 8	A-4(0)	22	NP	0.2	71.7	10.0	18.0	100	100	36	-	-
SS- 11	42 LT	22+70	78.3-79.8	A-2-4(0)	23	NP	1.0	88.4	0.6	10.0	100	100	12	_	-
SS- 12	42 LT	22+70	88.3-89.6	A-2-4(0)	21	NP	0.8	76.6	6.6	16.0	100	100	26	-	-
SS- 13	42 LT	22+70	98. 3- 99. 8	A-4(4)	31	9	0.6	48.9	24.4	26. 1	100	100	63	-	-

35008.I.

59' LEFT

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

STATE OF NORTH CAROLINA

## **CONTENTS**

#### SHEET

**DESCRIPTION** TITLE SHEET

LEGEND

- 2
- SITE PLAN 3

PROFILE

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REI	FERENCE	NO. <u>35</u>	008.1.1	(U-400	7A)	F.	A. PROJ.	STPNE	HF-14(31)
COUNTY	ONSLO	W							
PROJECT	DESCRIP	TION S	R 1702	(WHI	TE S	CREET	EXTEN	(SION)	FROM
SR 1808	(BELL )	FORK	ROAD	) TO 5	SR 14	70 (WI	STERN	BOUL	EVARD)
•									•
SITE DES	CRIPTION	RETA	<b>AINING</b>	WAL	L NO	. 1 AT	-L- STA	1.59 + 0	0,

STATE STATE PROJECT REFERENCE NO. U-4007A 1

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES, THE VARIOUS FIELD BORING LOOS, 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 (1919) 250-4088, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 ADMINISO 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 RELABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTUME CONDITIONS INDICATED IN THE SUBSURFACE INVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATION. THESE WATER LEVELS OR SOIL MOISTUME CONDITIONS AND 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 GLIDARNET THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR DPINON OF THE DEPARTMENT AS TO THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR DPINON OF THE DEPARTMENT AS TO THE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HINSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPRENATION 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.

	PERSONNEL
,	J.R. SWARTLEY
· 	J.P. DELOATCH
_	
•••	
	Y J.L. STONE
CHECKED BY	D.N. ARGENBRIGHT
SUBMITTED BY_	D.N. ARGENBRIGHT
NATE	DECEMBER 2010



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.

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

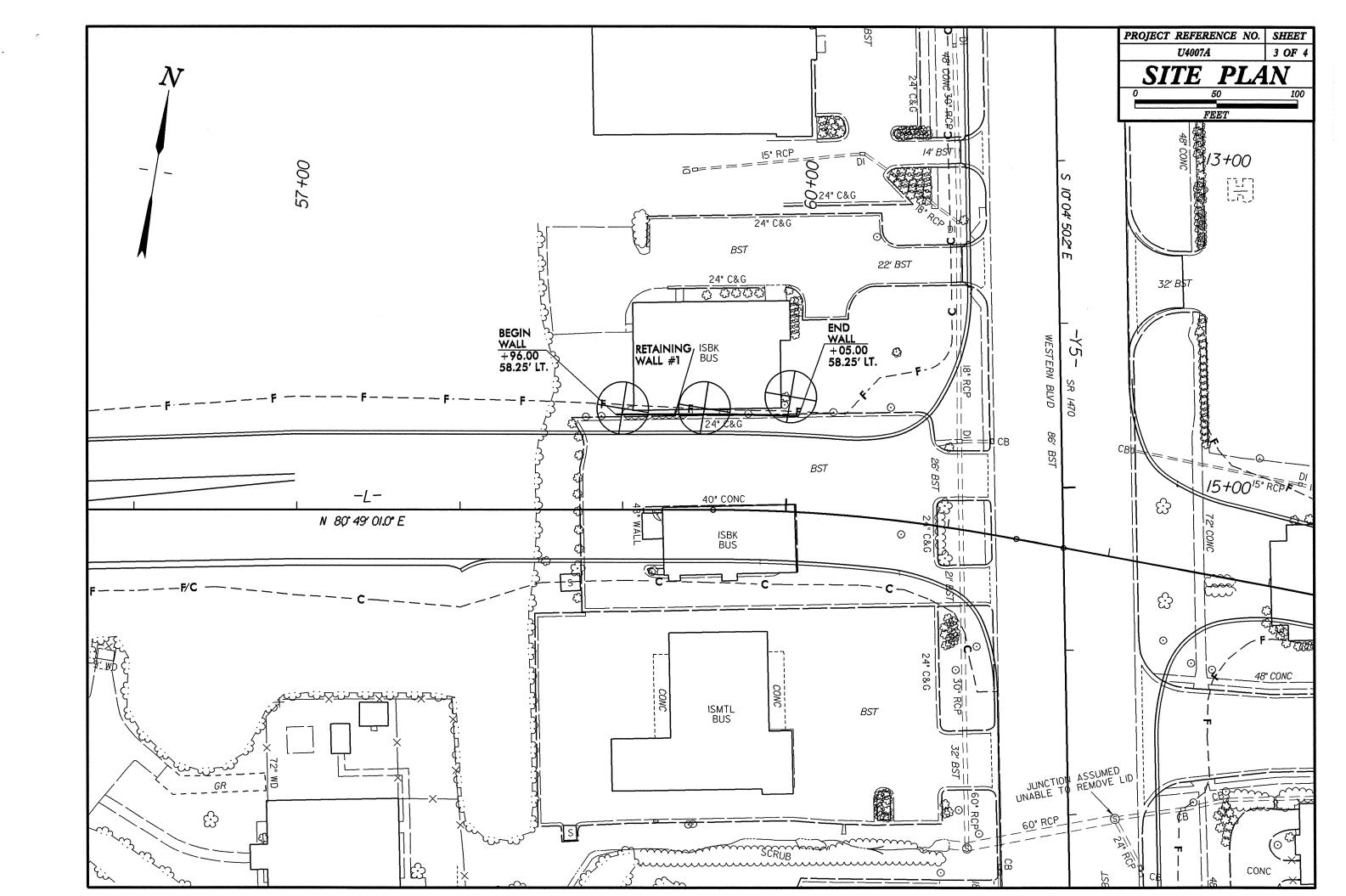
#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

# 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
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. LINFORM - 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 FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM 0-1586). 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 0.1 FOOT PER 60 BLOWS.  IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	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,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STAFF, GRAS, SUTY CLAS, MOST WITH INTERSEDCED FINE SAND LITERS, HOWEY PLASTIC, 4-7-6	THE ANGULARITY OR ROUNDNESS OF SDIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CONCAUSE MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, 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.
CLASS. (\$ 35% PASSING *200) (> 35% PASSING *200)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ONEISS, GABBRO, SCHIST, ETC.  NON-CRYSTALLINE  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN  PORT OF THE PROPERTY OF	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 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR)  SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	CDLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDED LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
Y PASSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 56 MX   GRANULAR   SILT   MUCK,   CLAY    Organic Material Granular Silt - Clay Soils Soils Other Material	WEATHERING	ROCKS OR CUTS MASSIVE ROCK.	
# 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	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.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIGUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN SDILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT POCK 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
PLASTIC INDEX 6 MX NP 18 MX 18 MX 18 MX 11 MN 11 MN 12 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	IV SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SMINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
UCUAL TYPES STANE EPAGE		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 SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL AND GR	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  STATIC WATER LEVEL AFTER 24 HOURS	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND SAND SAND SAND SAND SAND SAN		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 PAIR TO POOR UNSUITAR	1	(MDD.) 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.
SUBGRADE   FOUR   PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)  POPT DIST. BORING  TEST BORING  W.C. CORE	(MDD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,  IF TESTED, WOULD YIELD SPT. REFUSAL	THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
CUNSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	- U Will soil best with the	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY VERY LOOSE 4 GRANULAR LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING SPT N-VALUE	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30	ARTIFICIAL FILL (AF) OTHER - CORE BORING REF SPT REFUSAL THAN ROADWAY EMBANKMENT	IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY DENSE >50	INFERRED SOIL BOUNDARY MONITORING WELL	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	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT         <2         <0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.50	DIETOMETED	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 < 100 BPF	<u>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</u>
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INSTALLATION	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATOR INSTALLATION	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/825 DIP & DIP DIRECTION OF  ROCK STRUCTURES  CONE PENETROMETER TEST	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	-  ' · · · · · · · · · · · · · · · · · ·	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 OPENING (MM) 4.76 2,00 0.42 0.25 0.075 0.053	SOUNDING ROD	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
DOUBLE CORRE COARSE FINE STATE CLAY	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REDUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE.SD.) (FSD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	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 OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN. 12 3	CSE COARSE ORG ORGANIC	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	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE SCALE FIELD MOISTURE COURSE FOR EVEL D. MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)  ATTERBERG LIMITS)  ATTERBERG LIMITS  ATTERBERG LIMITS  (ATTERBERG LIMITS)  ATTERBERG LIMITS  ATTERBE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	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
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL LIQUID LIMIT	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC SEMISOLID; REQUIRES DRYING TO	HI HIGHLY V - VERY RATIO	FINGERNAJL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  IOPSOIL (15.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING  TERM SPACING IERM IHICKNESS	
COLID AT OD AT AD ADTAIN MOTOTUDE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	VERY WIDE MORE THAN 10 FFFT VERY THICKLY BEDDED > 4 FEET	BENCH MARK:
OM DPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - MOIST - (M)	MOBILE B- CLAY BITS AUTOMATIC MANUAL	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FT.
REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 B* HOLLOW AUGERS	VERY CLUSE LESS THAN 6.16 FEET THINLY LAMINATED < 0.008 FEET	
PLASTICITY	CME-45C HARD FACED FINGER BITS -N	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	TUNGCARBIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 9-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	CASING V/ ADVANCER HAND TOOLS:	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; 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	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
COLOR	TRICONE TUNG,-CARB. X HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR DR COLOR COMBINATIONS (TAN. RED. YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	
			REVISED 09/23/09



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