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SCOUR REPORT

STATE OF NORTH CAROLINA

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

CONTENTS DESCRIPTION

SHEET TITLE SHEET **STRUCTURE** LEGEND SITE PLAN SUBSURFACE INVESTIGATION **PROFILES** CROSS SECTIONS BORE LOG & CORE REPORT(S) 13-15 SOIL TEST RESULTS

PROJ. REF	FERENCI	E NO	33783	3.1.1	(B-458	3)	— F.A.	PROJ. B	RZ-11	105(11	<u>()</u>
COUNTY									***************************************		
PROJECT	DESCR	IPTION	BR	<i>176</i>	OVER	ABER	<u>DEEN</u>	CREEK	ON	SR	<u> 11</u> 0
(PINEB	LUFF .	<u>LAKE</u>	ROA	D)							

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CAUTION NOTICE

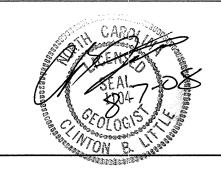
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (9/9) 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 SUBSUBFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUPFACE CONDITIONS BETWEEN BORNIOS 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 RELIABLITY INMERENT IN THE STANDARD TEST METHOD, THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND VARY CONSIDERABLE 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 THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMBARY 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 INTERPRETATIONS MADE, OR PORINON 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 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 THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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CHECKED BY	C. B. LITTLE
SUBMITTED BY_	C. B. LITTLE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

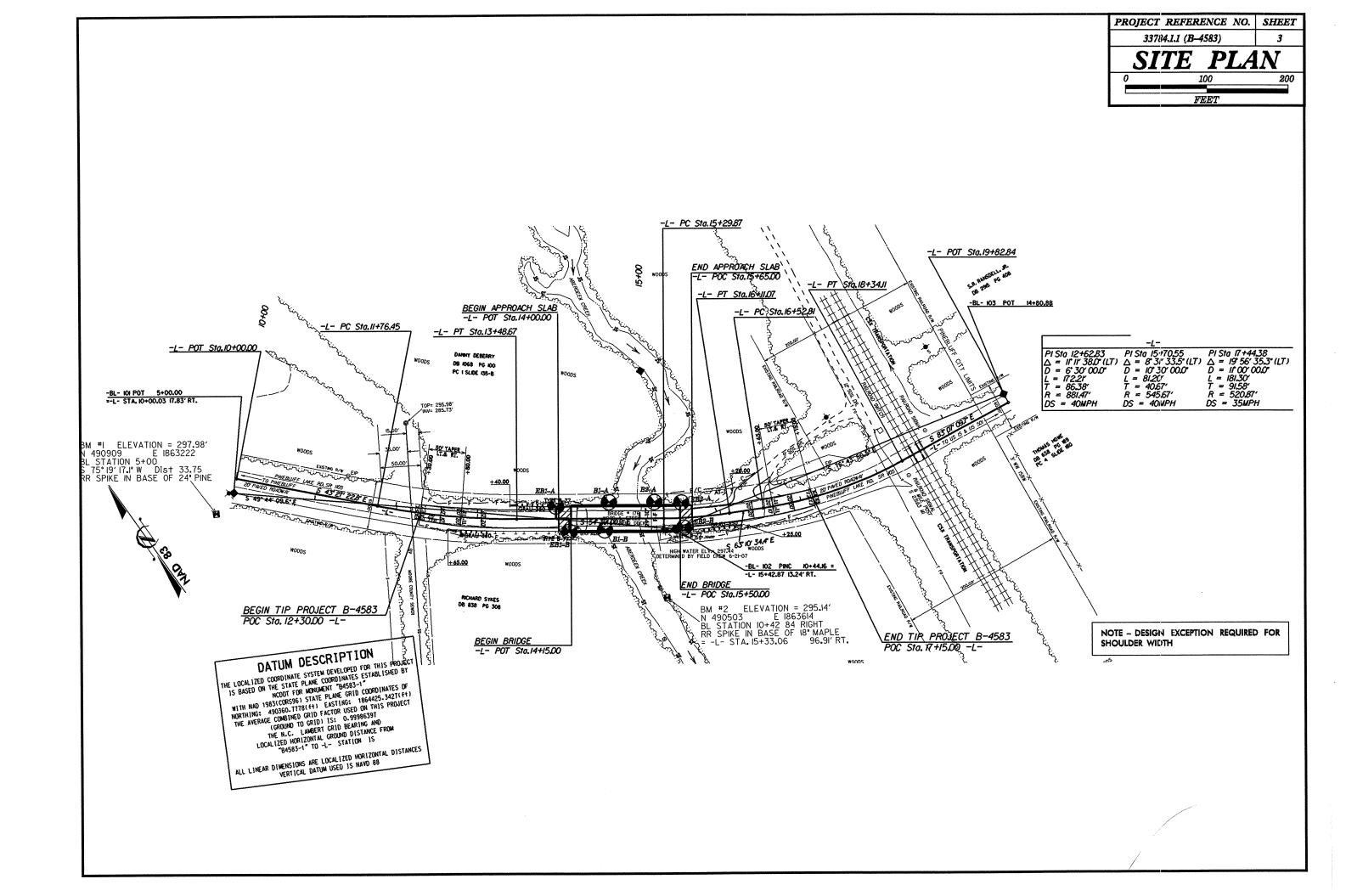
DIVISION OF HIGHWAYS

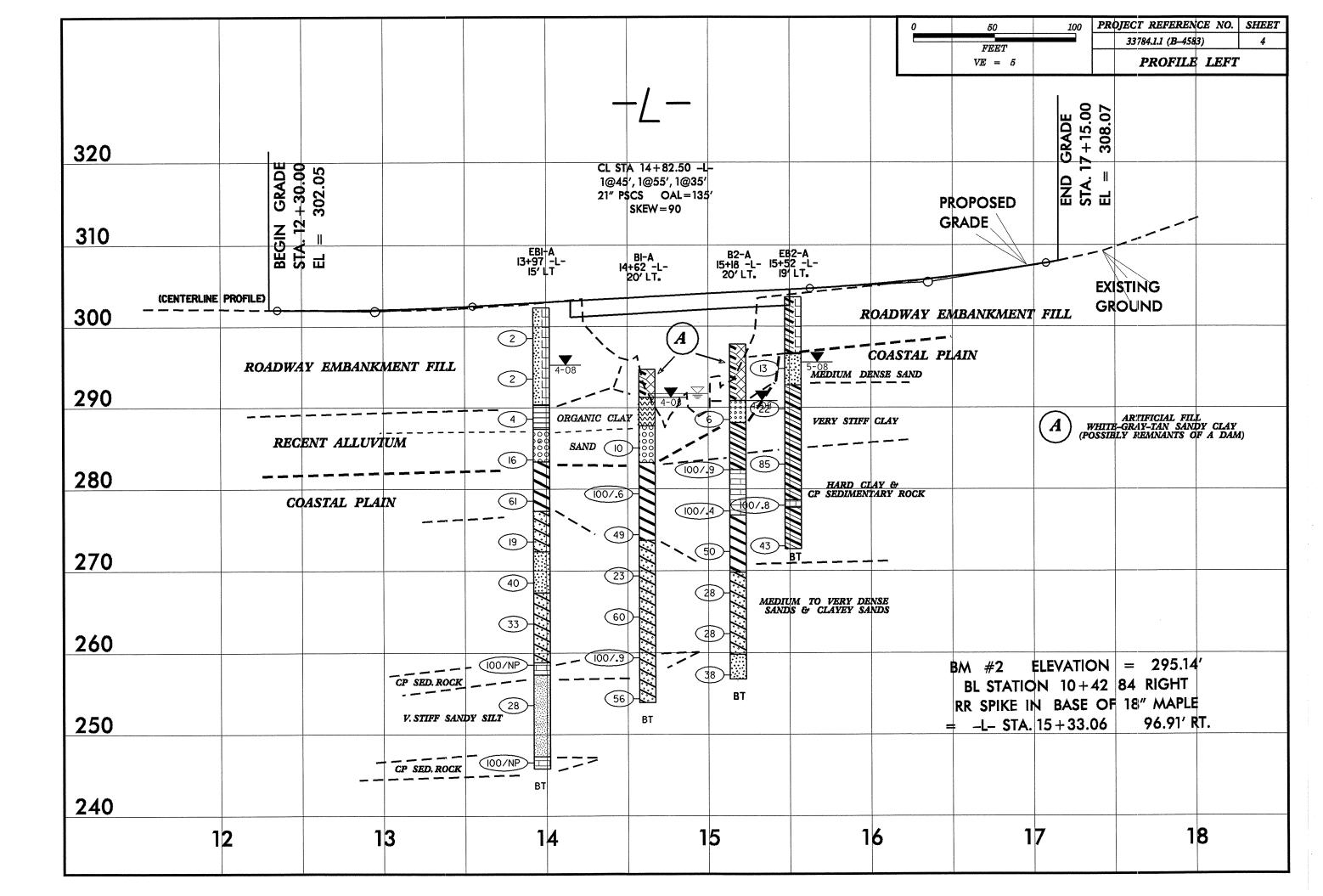
GEOTECHNICAL ENGINEERING UNIT

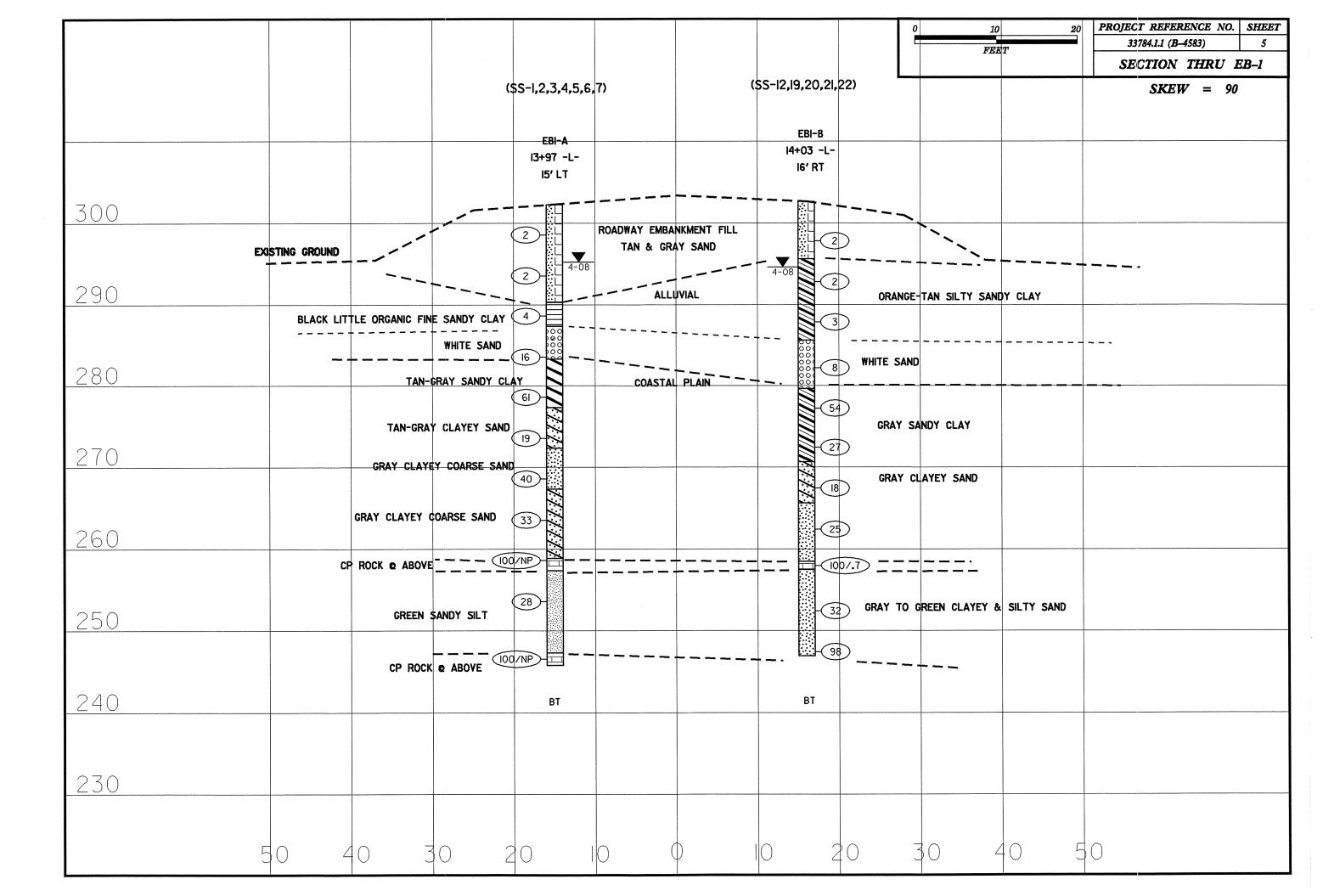
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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SOIL DESCRIPTION	GRADATION WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	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	UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-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.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF GOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR.	NU/AU/A	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY, SIETY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR) BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
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. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	GROUND SURFACE.
	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	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-3 A-6, A-7	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.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COCOGCOCC	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
6555365556	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
X PASSING	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 40 30 MX 50 MX 51 MN SOILS PEAT	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	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	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	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
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 ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
AMOUNTS OF SOILS		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 MODE CRAVEL AND FINE SILTY OR CLAYEY SILTY CLAYEY DRGANIC	₩ATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND GRAVEL AND SAND SOILS MATTER MATERIALS SAND GRAVEL AND SAND SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR INSUITABLE OUT OF THE POOR INSUITABLE POOR IN	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MDD.) 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.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITAB		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	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) WITH SOIL DESCRIPTION PROPERTY TEST BORING DESIGNATIONS SAMPLE STATE TO STATE TO SAMPLE STATE TO STATE TO SAMPLE DESIGNATIONS	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL	THE FIELD.
CONSISTENCY (N-VALUE) (TONS/FT2)		SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE 4	S - BULK SAMPLE AUGER BORING	(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.
GRANULAR LUUSE 4 TO 10 N/A	SS - 9PLIT SPOON	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. 1F TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
VERT DENSE >50	INFERRED SOIL BOUNDARY SAMPLE	(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	"" MONITORING WELL BS - BOOK 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 < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.50 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	PIEZOMETER DI DECOMPACTED TOTAL		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	SAMPLE SAMPLE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	25/025 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR - CALIFORNIA BEARI	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 RATIO SAMPLE	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
	SOUNDING ROD GEEL SPT REFLICAL	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	THE OSTE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
COARSE FINE	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER CUBBLE GRAVEL SAND SAND SILI CLAY	AR - AUGER REFUSAL HI HIGHLY ## - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(USE, SD.) (F SD.)	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAY RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
	CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT DMT - DILATOMETER TEST ORG ORGANIC 7 - DRY 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 I 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
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE COURSE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST	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) OESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	F - FINE SD SAPROLITIC SD SANDY	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 SL SILT, SILTY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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
LL LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID: REQUIRES DRYING TO SEMISOLID: REQUIRES	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE		TERM SPACING TERM THICKNESS	BENCH MARK: BM#2 BL STATION IO+42 84' RIGHT
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	VERY THICKLY BEDDED > 4 FEET	RR SPIKE IN BASE OF 18'MAPLE
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B CLAY BITS X AUTOMATIC MANUA	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET THICKLY BEDDED 0.15 - 15 FEET	= -L- STA, 15+33.06 96.91' RT ELEVATION: 295.14 FT.
SL _ SHRINKAGE LIMIT	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	MUDERATELY CLUSE 1 10 3 FET VERY THINLY BEDDED 0.03 - 0.16 FEET	
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 4.008 - 0.03 FEET THINLY LAMINATED 4.008 FEET	NOTES:
DI ACTICITY		INDURATION	
PLASTICITY	CME-45C	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI). DRY STRENGTH NONPLASTIC 0-5 VERY LOW	X TUNGCARBIDE INSERTS -H	DUDDING WITH EINEED FORCE AUMEDING COATNO	
LOW PLASTICITY 6-15 SLIGHT	X CASING X W/ ADVANCER HAND TODLS:	FRIABLE 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;	
	X TRICONE 215/6 TUNG,-CARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	



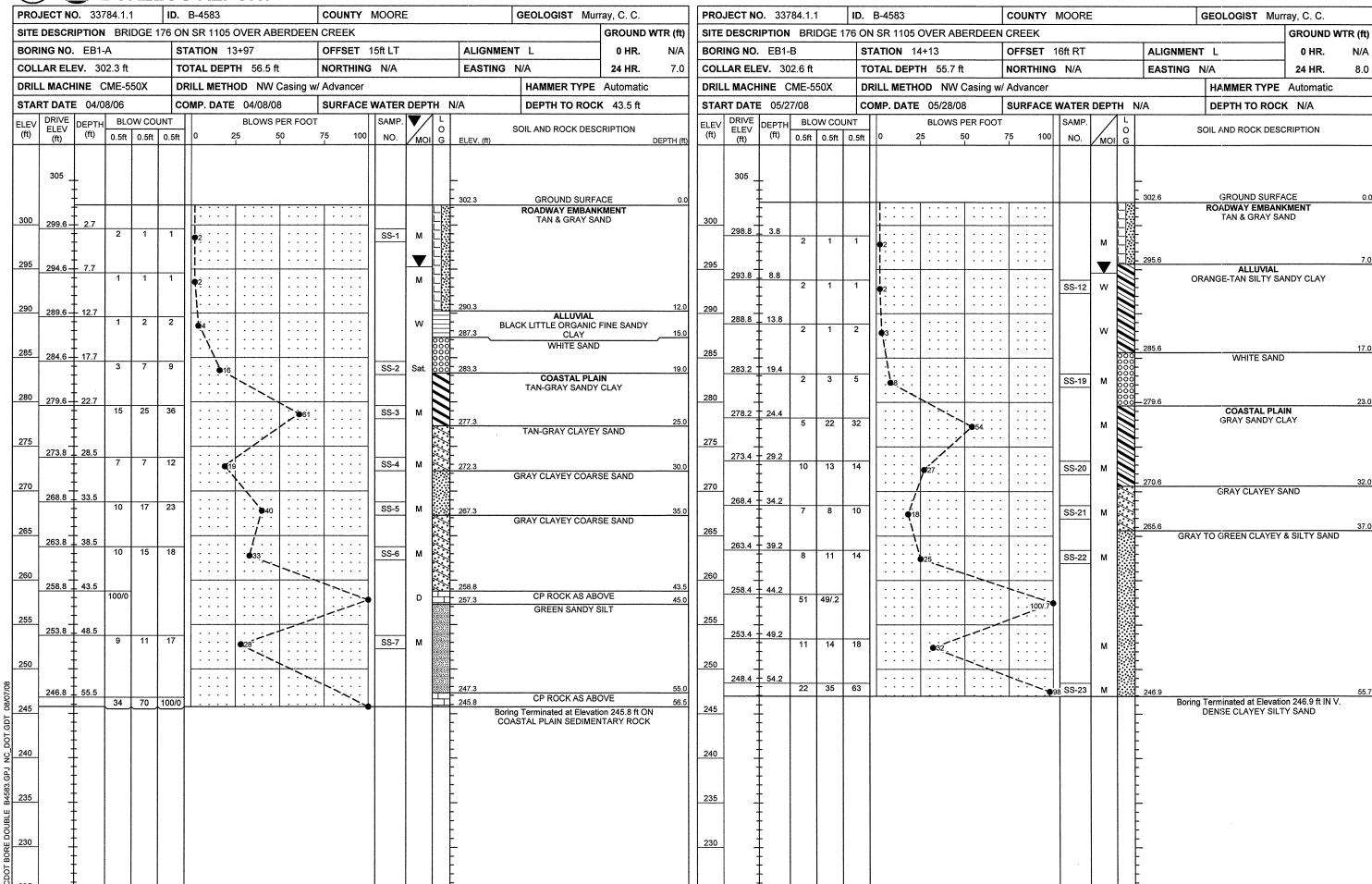




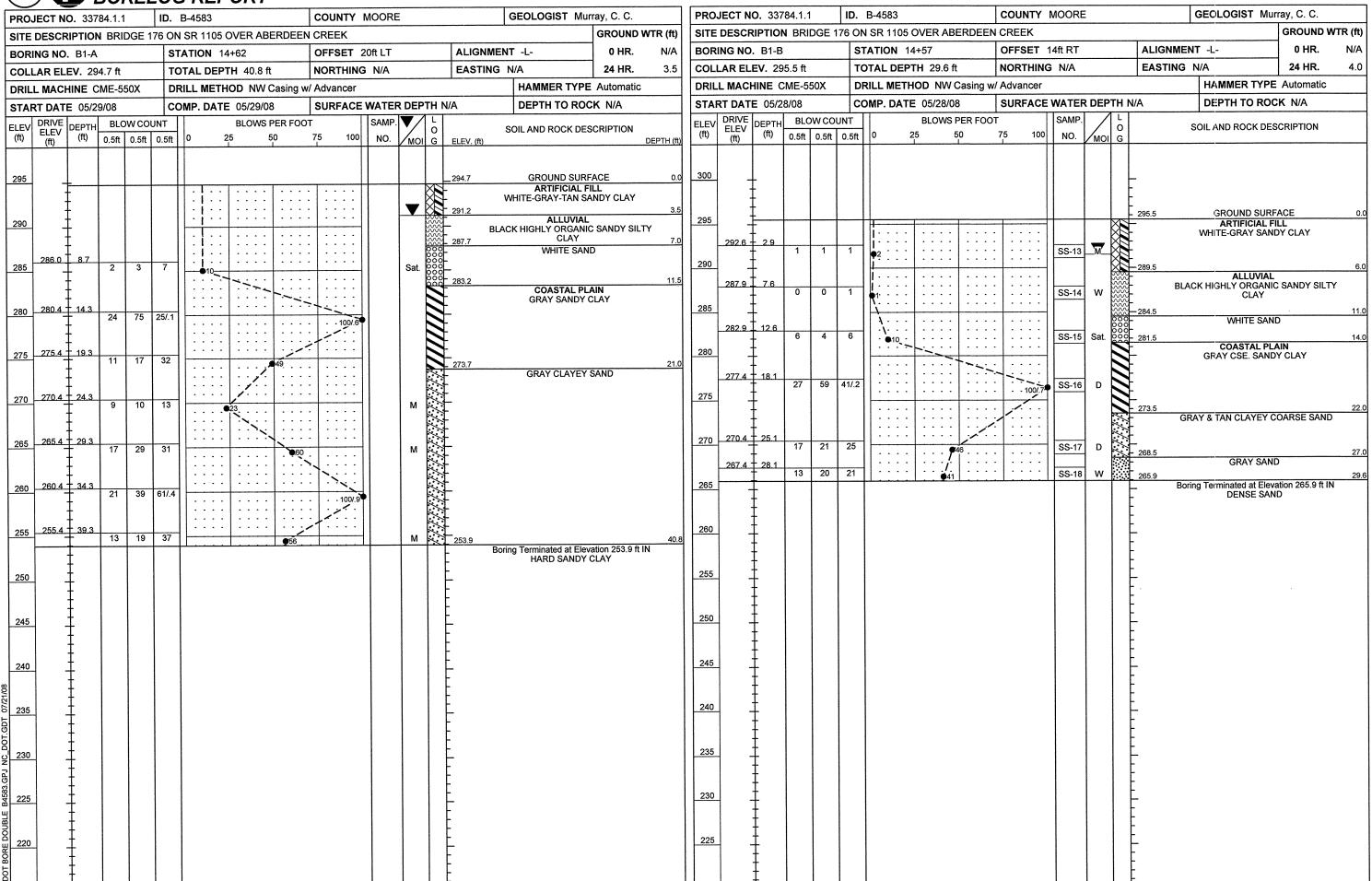
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		20' LT.	·	14' RT.		
	EXISTING GR	ROUND				
		· 	ARTIFICIAL FILL WHITE-GRAY SANDY CLAY			
290		4-08		4-08 2		
		MUCK 4-08	ALLUVIAL	2 BLAC	MUCK K HIGHLY ORGANIC (24%) SANDY SILITY CLAY	
	WH	IITE SAND 10			SANDY SILTY CLAY	
	\ <u> </u>			W	HITE SAND	
280			COASTAL PLAIN			
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	EVIETING COATING	20' LT.					
	EXISTING GROUND						
		_ GI	ARTIFICIAL FILL RAY-TAN SANDY CLAY				
290		4-08	ALLUVIAL WH	TE CAND W/ LENGTE OF DIA	CK ODCANIC CLAY		
		6	COASTAL PLAIN	TE SAND W/ LENSES OF BLA	ICN UNUANIC CLAT		
			GR	AY SILTY FINE SANDY CLAY			
280						_	
200			COAS	(AL PLAIN SEDIMENTARY ROCK RAY CLAYEY SANDY SILT)			
		1007.4		RAY CLAYEY SANDY SILT)			
				AV CANDY OLAY			
270		50	GRA	AY SANDY CLAY			
210							
		28					
			GRAY C	LAYEY SAND & SAND	·		
260		28					
		38					
		(38)					
			<u> </u>				·
250							
0.40							
240							
	40	30 20			20 30	40	
1			. -				

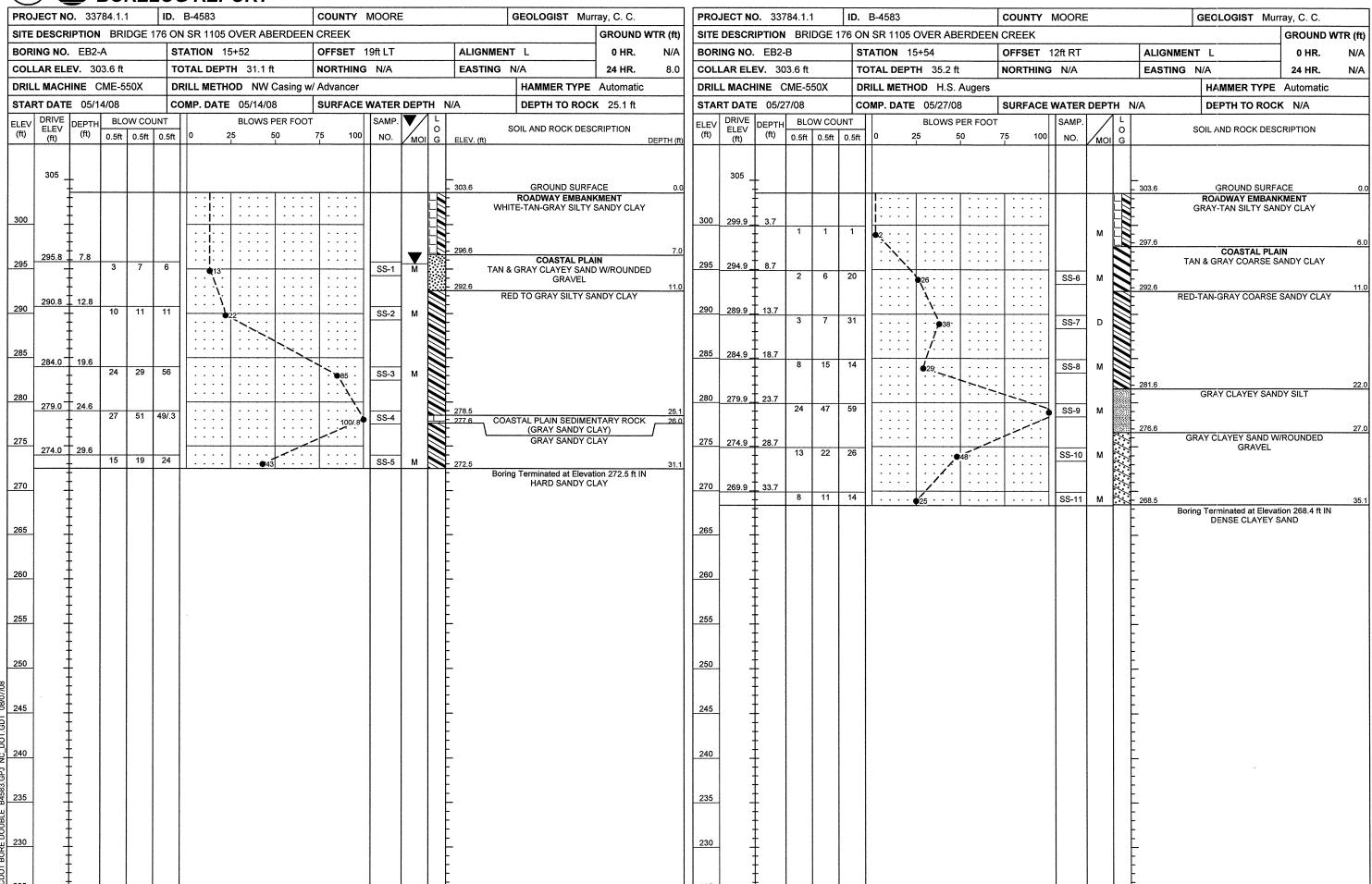
				10 20	PROJECT REFERENCE NO. SHEET
				0 10 2 FEET	33'84.1.1 (B-4583) 8
				FEET	SECTION THRU EB-2
					SKEW = 90
					SKEW - 30
·			S-6,7,8,9,IO,II		
	SS-I,2,3,				
	EB2- <i>I</i> 15+52 - 19' LT	L-	EB2-B 15+54 -L- 12' RT.		
	13 21	•			
			†EH		
		ROADWAY EMBANKMENT FILL GRAY-TAN SILTY SANDY CLAY	2		
			2		
	(3)	5-08 TAN & GRAY CLAYEY CSE SAND			
		5-08 TAN & GRAY CLAYEY CSE, SAND	26		
290	22				
		RED-TAN-GRAY COARSE SANDY CLAY	38		
		NED THE GRAT COMES SANDT CEAT			
	85		29		
280		COASTAL DI AIN SEDIMENTARY POCK			
	100/.8	COASTAL PLAIN SEDIMENTARY ROCK & HARD GRAY SANDY SLT/CLAY			
	43)	GRAY SANDY CLAY/CLAYEY SAND	48		
270					
	ВТ		25		
			ВТ		
			NM		
260					
250					
240					
	40 30 20	Ιρ Φ	10 20	30 40	



NCDOT GEOTECHNICAL ENGINEERING UNIT



SHEET



1995 Standard Specifications

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No.

Project

Date: Sampled

Sampled from

Submitted by

B-4583

N WAINAINA

 REPORT ON SAMPLES OF SOILS FOR QUALITY

 3378411
 County
 MOORE
 Owner

 5/27/08
 Received
 6/2/08
 Reported
 6/4/2008

 By
 C C MURRAY

746357 TO 746380 6/5/08

TEST RESULTS

Proj. Sample No.	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11
Lab. Sample No.	746357	746358	746359	746360	746361	746362
Retained #4 Sieve %	-	-	-	-	-	-
Passing #10 Sieve %	98	100	100	100	98	93
Passing #40 Sieve %	67	98	96	83	62	53
Passing #200 Sieve %	38	62	72	40	32	28

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	49.0	4.4	8.2	32.3	52.7	59.3
Fine Sand Ret - #270	%	13.3	41.8	26.9	32.7	16.0	11.9
Silt 0.05 - 0.005 mm	%	3.6	19.7	28.7	14.9	6.2	4.6
Clay < 0.005 mm	%	34.1	34.1	36.1	20.1	25.1	24.1
Passing #40 Sieve	%	_	-	-	-	-	-
Passing #200 Sieve	%	-	100	-	-	-	-

L. L.		44	33	33	23	34	38
P. I.		20	15	15	8	14	19
AASHTO Classification		A-7-6(3)	A-6(7)	A-6(9)	A-4(0)	A-2-6(1)	A-2-6(1)
Station		15+54	15+54	15+54	15+54	15+54	15+54
OFFSET		12 RT	12 RT	12 RT	12 RT	12 RT	12 RT
ALIGNMENT		L	L	L	L	L	L
Depth (Ft)		8.70	13.70	18.70	23.70	28.70	33.70
	to	10.20	15.20	20,20	25.20	30.20	35.20
%ORGANIC			•			·	

cc: C C MURRAY Soils File

Soils Engineer

Page 1.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No.

B-4583

REPORT ON SAMPLES OF SOILS FOR OUALIT	REPORT	ON SAMPLE	ES OF	SOILS FOR	QUALITY
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Project	3378311	County	MOORE		Owner
Date: Sampled	5/14/08	Received	5/21/08		Reported 5/23/08
Sampled from				Ву	C C MURRAY
Submitted by	N WAINAINA				1995 Standard Specifications

746260 TO 746264 6/2/08

TEST RESULTS

Proj. Sample No.		SS-1	SS-2	SS-3	SS-4	SS-5	
Lab. Sample No.		746260	746261	746262	746263	746264	
Retained #4 Sieve	%	3	-	-	-	-	
Passing #10 Sieve	%	90	98	98	98	98	
Passing #40 Sieve	%	64	84	84	69	76	
Passing #200 Sieve	. %	23	58	48	36	. 39	

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	30.7	22.8	21.6	44.8	24.2	
Fine Sand Ret - #270	%	47.4	22.0	36.5	21.8	36.9	
Silt 0.05 - 0.005 mm	%	5.8	18.9	15.6	13.2	6.6	
Clay < 0.005 mm	%	16.1	36.3	26.2	20.2	32.3	
Passing #40 Sieve	%	-	-	-	-	-	
Passing #200 Sieve	%	-	-	-	-	-	

L. L.	24	40	31	29	37	
P. I.	7	20	11	14	19	
AASHTO Classification	A-2-4(0)	A-6(9)	A-6(2)	A-6(1)	A-6(3)	
Station	15+52	15+52	15+52	15+52	15+52	
OFFSET	19 LT	19 LT	19 LT	19 LT	19 LT	
ALIGNMENT	L	L	L	L	L	
Depth (Ft)	7.80	12.80	19.60	24.60	29.60	
to	9.30	14.30	21.10	26.10	31.10	
		·				·

cc: C C MURRAY
Soils File

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No. B-4583

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 3378411 County MOORE Owner

Date: Sampled 5/27/08 Received 6/2/08 Reported 6/4/2008

Sampled from By C C MURRAY

Submitted by N WAINAINA 1995 Standard Specifications

746357 TO 746380 6/5/08

TEST RESULTS

Proj. Sample No.	SS-18	SS-19	SS-20	SS-21	SS-22	SS-23
Lab. Sample No.	746369	746370	746371	746372	746373	746374
Retained #4 Sieve %	_	-		-	-	-
Passing #10 Sieve %	98	99	96	96	97	98
Passing #40 Sieve %	54	35	73	63	53	67
Passing #200 Sieve %	16	1	39	31	16	31

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	67.9	88.7	41.4	50.1	65.7	45.4
Fine Sand Ret - #270	%	17.6	10.3	19.7	18.8	19.0	27.5
Silt 0.05 - 0.005 mm	%	5.5	0.0	7.8	6.0	3.3	19.1
Clay < 0.005 mm	%	9.0	1.0	31.1	25.1	12.0	8.0
Passing #40 Sieve	%	-	-	-	-		-
Passing #200 Sieve	%	-	-	-	-	-	_

L. L.		33	23	30	35	38	37
P. I.		9	NP	13	14	10	4
AASHTO Classification		A-2-4(0)	A-1-b(0)	A-6(1)	A-2-6(1)	A-2-4(0)	A-2-4(0)
Station		14+57	14+13	14+13	14+13	14+13	14+13
OFFSET		14 RT	16 RT	16 RT	16 RT	16 RT	16 RT
ALIGNMENT		L	L	L	L	L	L
Depth (Ft)		28.10	19.40	29,20	34.20	39.20	54.20
	to	29.60	20,90	30.70	35.70	40.70	55.70
%ORGANIC							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No. B-4583

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	3378411	County	MOORE		Owner	
Date: Sampled	5/27/08	Received	6/2/08		Reported	6/4/2008
Sampled from				Ву	C C MURI	RAY
Submitted by	N WAINAINA				1995	Standard Specifications

746357 TO 746380 6/5/08

TEST RESULTS

Proj. Sample No.		SS-12	SS-13	SS-14	SS-15	SS-16	SS-17
Lab. Sample No.		746363	746364	746365	746366	746367	746368
Retained #4 Sieve	%	-	-	_	-	· -	-
Passing #10 Sieve	%	97	97	100	95	99	93
Passing #40 Sieve	%	76	71	94	45	69	51
Passing #200 Sieve	%	41	38	· 64	15	43	31

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							-
Coarse Sand Ret - #60	%	35.7	40.4	13.9	68.2	43.6	60.8
Fine Sand Ret - #270	%	24.9	23.5	27.5	16.8	14.9	11.0
Silt 0.05 - 0.005 mm	%	11.2	8.0	40.6	6.0	11.4	4.0
Clay < 0.005 mm	%	28.1	28.1	18.1	9.0	30.1	24.1
Passing #40 Sieve	%	-		-	-	-	_
Passing #200 Sieve	%	-	1		-	-	-

L. L.	32	33	80	19	48	39
P. I.	14	15	15	2	23	17
AASHTO Classification	A-6(2)	A-6(2)	A-7-5(14)	A-1-b(0)	A-7-6(6)	A-2-6(1)
Station	14+13	14+57	14+57	14+57	14+57	14+57
OFFSET	16 RT	14 RT	14 RT	14 RT	14 RT	14 RT
ALIGNMENT		L	L	L	L	L
Depth (Ft)	8.80	2.90	7.60	12.60	18.10	25.10
to	10.30	4.40	9.10	14.10	20.60	26.60
%ORGANIC			23.7			i

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No. B-4583

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	3378411	County	MOORE		Owner
Date: Sampled	5/27/08	Received	6/2/08		Reported 6/4/2008
Sampled from				Ву	C C MURRAY
Submitted by	N WAINAINA				1995 Standard Specifications

746357 TO 746380 6/5/08

TEST RESULTS

Proj. Sample No.	SS-24	SS-25	SS-26	SS-27	SS-28	SS-29
Lab. Sample No.	746375	746376	746377	746378	746379	746380
Retained #4 Sieve	6 -	-	· -	_	-	_
Passing #10 Sieve	6 99	100	100	98	94	100
0	6 61	97	75	70	59	55
Passing #200 Sieve	6 9	47	37	39	27	14

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	68.5	8.8	41.9	51.0	53.3	75.0
Fine Sand Ret - #270	%	23,9	48,6	24.6	10.7	18.6	12.7
Silt 0.05 - 0.005 mm	%	3.6	15.5	15.5	5.1	5.0	5.3
Clay < 0.005 mm	%	4.0	27.1	18.1	33.1	23.1	7.0
Passing #40 Sieve	%	-	-	-	-	-	_
Passing #200 Sieve	%	-	-	-	-	-	-

L. L.	24	34	23	41	33	36
P. I.	NP	12	8	20	14	NP
AASHTO Classification	A-3(0)	A-6(3)	A-4(0)	A-7-6(3)	A-2-6(0)	A-2-4(0)
Station	15+18	15+18	15+18	15+18	15+18	15+18
OFFSET	20 LT	20 LT	20 LT	20 LT	20 LT	20 LT
ALIGNMENT	L	·L	L.	L	Ļ	L
Depth (Ft)	8.30	4.50	9.50	24.50	29.50	19.60
to	9.80	6.00	10.00	26.00	30,00	21.10
%ORGANIC	1.9				,	

Soils Engineer

Page 4



FIELD SCOUR REPORT

WBS:	33784	TIP:	B-4583	co	UNTY: Moore	•		
DESCRIPTION(1): Brid	ge 176 over /	Aberdeen	Creek on SR	1105				
			EXISTIN	G BRIDGI	<u> </u>	***************************************		
Information from:	Field Ins Other (spection _ explain) _	X N	licrofilm	(reel	pos:)	
Bridge No.: 176 Foundation Type:	Length:	108'	Total Bents:	6 Bents	s in Channel: _	1 Bents	in Floodplain: _	5
EVIDENCE OF SCO Abutments or End I	UR(2)							
Interior Bents: No								
Channel Bed: Non								
Channel Bank: Non	е							
EXISTING SCOUR F Type(3): Tim								
Extent(4):								
Effectiveness(5): Goo								
Obstructions(6): Larç	ge pieces of o	oncrete u	nder existing l	bridge.				

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- **9** Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

<u>DESIGN INFORMATION</u>											
Channel	Bed Material(7):	Sand					-				
					····			······			
Channel I	Bank Material(8): Alluvial silty clay with some organics.										
Channe	Channel Bank Cover(9): Trees										
Floodplain Width(10): 1000'									····		
Floor	dplain Cover(11):	Trees									
	Stream is(12):	Aggrading Degrading Static _							tic X	-	
Channel Migratio	on Tendency(13):	Minor. T	o east ju	st upstre	am; to w	est unde	er bridge.				
Observations	and Other Comm	nents: Co	ncrete ir	n channe	l is report	tedly the	remains	of a dan	1.		
		1011101		1 011011110	no roport	iouly alo	Tomano	or a darr			

DESIGN SCC	OUR ELEVATION	IS(14)				Feet	X	Mete	ers	-	
	25/50	_									
р	25/50 yr sent One 287	[T			T				
	ent Two 291										
	251										

	L	<u> </u>		<u> </u>					<u> </u>		L
Comparison o	f DSE to Hydraul	ics Unit tl	heoretica	al scour:							
DSE is equiva	lent to theoretica	l <u> </u>									
	SIS RESULTS F	ROM CH	ANNEL	BED AN	D BANK	MATER	RIAL				
Bed or Bank		1.1.0									
Sample No. Retained #4											
Passed #10											
Passed #40			_	*							
Passed #200											
Coarse Sand				***************************************							
Fine Sand											
Silt									***************************************		
Clay											
LĹ				*							
PI											
AASHTO											
Station											
Offset											
Depth					<u> </u>			L		l	

Template Revised 02/07/06

Reported by:

C. Murray / C. Little

Date: 7/31/2008