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## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33752.1.1 (B-4533) \_\_ F.A. PROJ. **BRZ-1432(3)** COUNTY **GREENE** / LENOIR PROJECT DESCRIPTION BRIDGE NO. 48 ON SR 1432 AND SR 1705 OVER WHEAT SWAMP CREEK AT -L- STA. 17+00

STATE STATE PROJECT REFERENCE NO. N.C. 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 LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN PALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 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 BORNOS OR BETWEEN SAMPLED STRATA
WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACE! TEST DATA CAN BE
RELIED ON ONLY TO THE DECREE OF RELABLITY INNERENT IN THE STANDARD TEST METHOD.
THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS INDICATED IN THE SUBSURFACE
RIVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATION, THESE WATER LEVELS OR SOIL
MOISTURE CONDITIONS MAY 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 TO THE OF DIFFERENT FOR BIDDING AND CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION 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 RECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE 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.

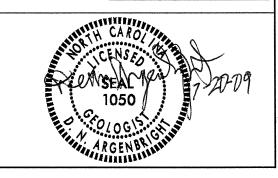
 R.E. S.	MITE	ī	
 J.M. E.	DMO	NDSO	N

PERSONNEL J.R. SWARTLEY

INVESTIGATED BY T.C. BOTTOMS

D.N. ARGENBRIGHT SUBMITTED BY \_\_\_\_\_ D.N. ARGENBRIGHT

JULY 2009



#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

#### DIVISION OF HIGHWAYS

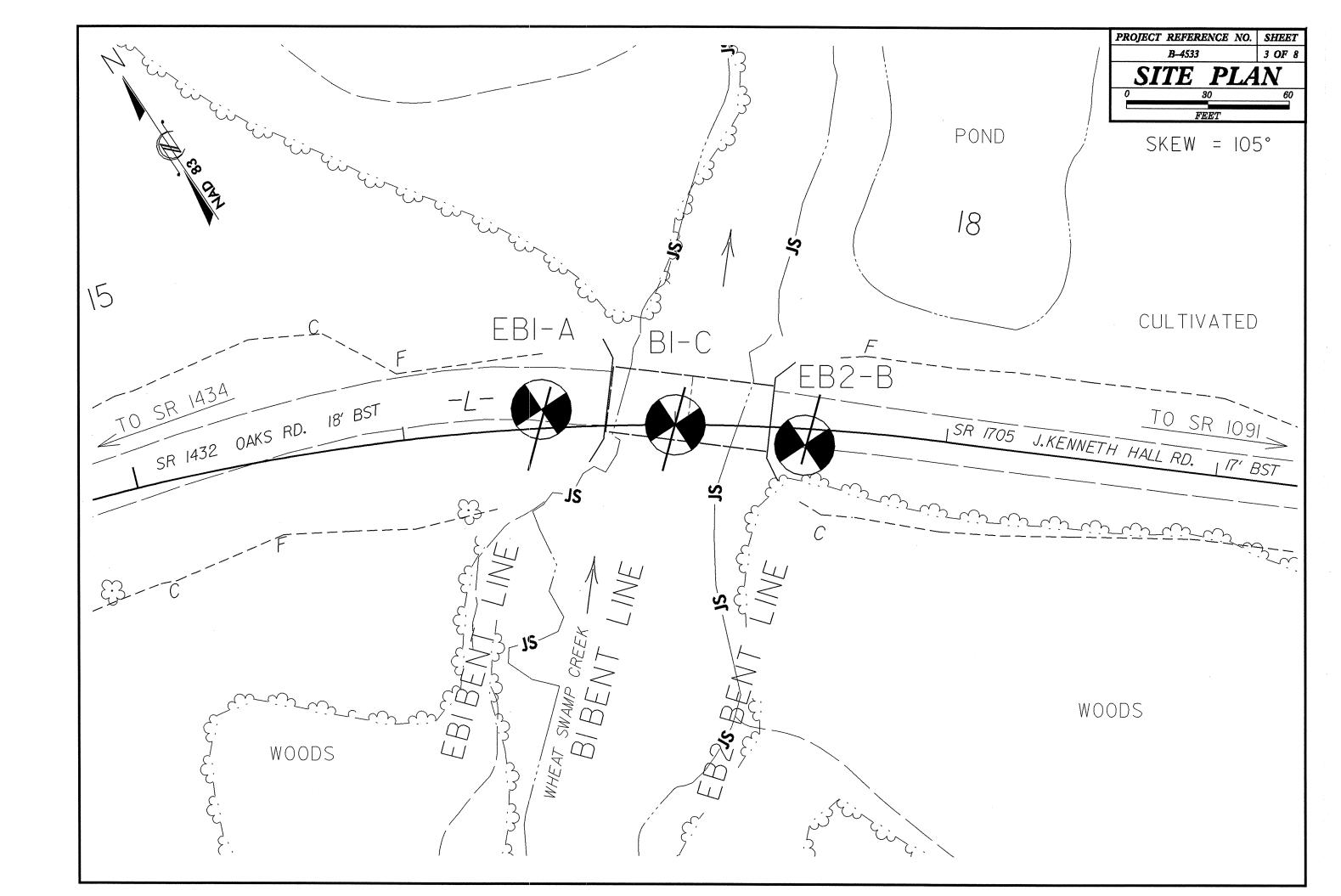
#### GEOTECHNICAL ENGINEERING UNIT

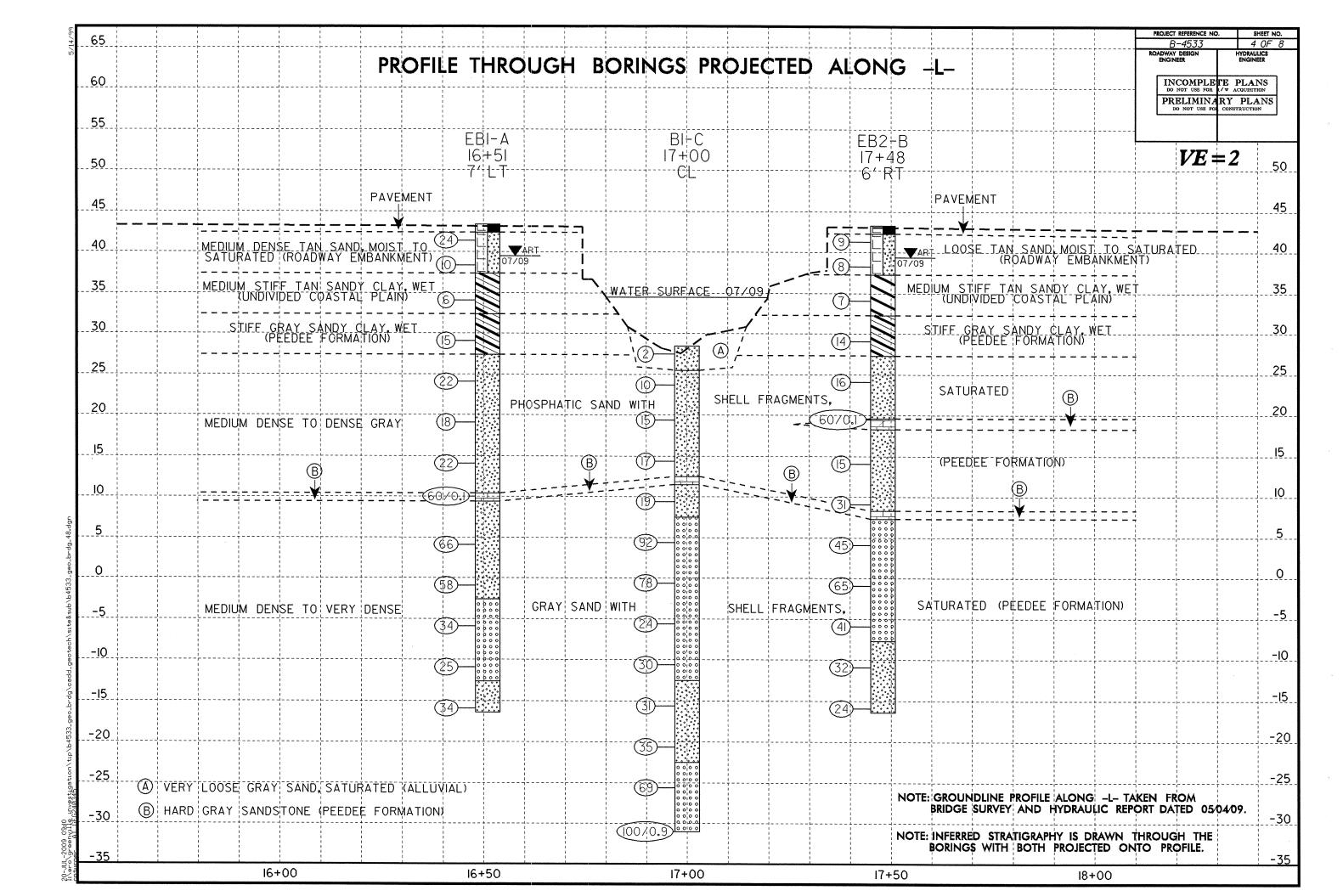
# SUBSURFACE INVESTIGATION

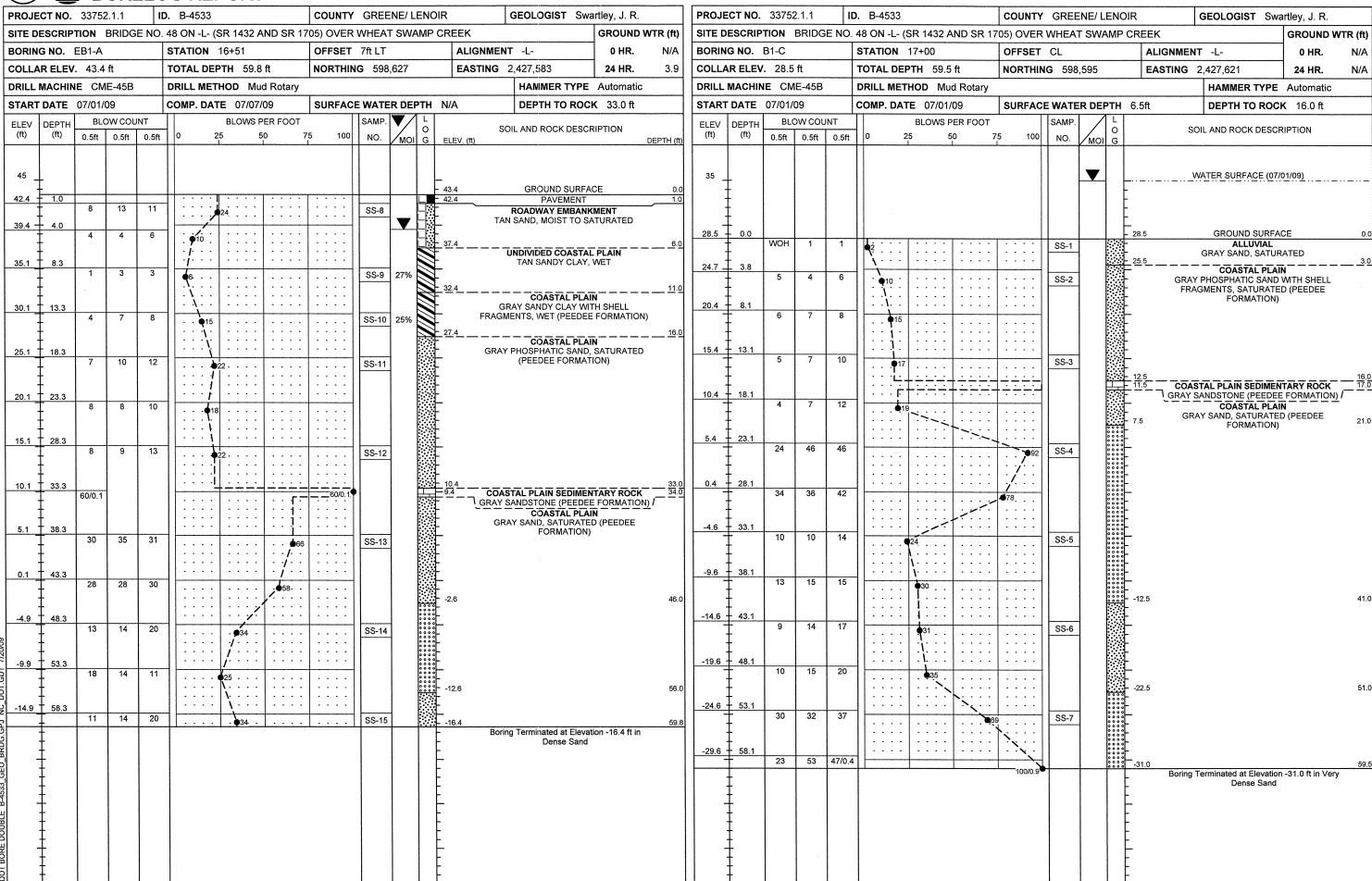
		SOIL AND ROC	K LEGEND, TERM	is, symbols,	AND ABBREVI	ATIONS	
SOIL DESCRIPTION		GRADATION				DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERI	UNIFORM - INDICATES THAT	A GOOD REPRESENTATION OF PARTICLE SIZES FR SOIL PARTICLES ARE ALL APPROXIMATELY THE		ROCK LINE INDICAT	ES THE LEVEL AT WHICH NON-C	T IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL,	ALLUVIUM (ALLUV.) - SDILS 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 D-1586). SOIL	POORLY GRADED) GAP-GRADED - INDICATES A	MIXTURE OF UNIFORM PARTICLES OF TWO OR MC	DRE SIZES.	SPT REFUSAL IS P IN NON-CDASTAL P	ENETRATION BY A SPLIT SPOON LAIN MATERIAL, THE TRANSITIO	SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. ON 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 SUI		ANGULARITY OF GRAINS		OF WEATHERED ROO	CK. RE TYPICALLY DIVIDED AS FOLL		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:		ONESS OF SOIL GRAINS IS DESIGNATED BY THE T	ERMS: ANGULAR.	WEATHERED	SUZERIZA		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 STUFF, GRAY, SULTY CLAY, MOST WITH INTERBEDOED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED,		NI	ROCK (WR)	BLOWS PER FOO	LAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 IT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERAL NAMES SUCH AS D	MINERALOGICAL COMPOSITION UARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE US		CRYSTALLINE		E GRAIN IGNEOUS AND METAMORPHIC ROCK THAT PT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATE	WHENEVER THEY ARE CONSI		IN DESCRIPTIONS	ROCK (CR)	GNEISS, GABBRO,	SCHIST, ETC.	CALCAREDUS (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-		COMPRESSIBILITY		NON-CRYSTALLINE	FINE TO COARSE	GRAIN METAMORPHIC AND NON-COASTAL PLAIN OCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-	SLIGHTLY COMPRI		LESS THAN 31 EQUAL TO 31-50	ROCK (NCR) COASTAL PLAIN	INCLUDES PHYLL	.ITE, SLATE, SANDSTONE, ETC. SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
SYMBOL popogogod popogogod popogogod	HIGHLY COMPRES		GREATER THAN 50	SEDIMENTARY ROCK	SPT REFUSAL, R	OCK 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.
Z PASSING  * 10 50 MX SILT-	MUCK,	PERCENTAGE OF MATERIAL		(CP)	SHELL BEDS, ETC	STHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40 30 MX 50 MX 51 MN SOILS SOILS SOILS	PEAT UNGANIC MATERIAL		OTHER MATERIAL	EDEON BOCK E		DINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
* 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 LITTLE ORGANIC MATTER	- I I I I I			R IF CRYSTALLINE.	DINTS MAT SHOW SCIGHT STAINING, RUCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIGUID LIMIT	MODERATELY ORGANIC	5 - 10% 12 - 20% SOME	E 20 - 35%			ED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE	HIGHLY ORGANIC ORGANIC	>10% >20% HIGH	ILY 35% AND ABOVE		RYSTALLINE NATURE.	CE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
AMOUNTS OF	SOILS -	GROUND WATER				ED 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 CAND GRAVEL AND SAND SOLIS SOLIS MATTER	l	LEVEL IN BORE HOLE IMMEDIATELY AFTER DE	RILLING			AY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SARU		WATER LEVEL AFTER 24 HOURS		MODERATE SIGNIFI	CANT 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	INSUITABLE PERCHI	ED WATER, SATURATED ZONE, OR WATER BEARIN	IG STRATA			RE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS  ID SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE   FOUR   PI OF A-7-5 SUBGROUP IS \( \leq \text{LL} - 30 \); PI OF A-7-6 SUBGROUP IS \( \leq \text{LL} - 3 \)	SPRING	OR SEEP		WITH F	RESH ROCK.		FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS				O OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL WW 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 RANGE OF STANDARD RANGE OF UNCO			SAMPLE	(MOD. SEV.) AND CA	N BE EXCAVATED WITH A GEOLG	DGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.
CONSISTENCY (N-VALUE) CONSISTENCY (N-VALUE) (TONS/FT	WITH SOIL DES			1	TED, WOULD YIELD SPT REFUSAL	O OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LODSE <4	SOIL SYMBOL	AUGER BORING	S - BULK SAMPLE	(SEV.) IN STR	ENGTH TO STRONG SOIL. IN GRA	ANITOID 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	ARTIFICIAL FIL	I (AF) DTHER I	SS - SPLIT SPOON SAMPLE		. SOME FRAGMENTS OF STRONG TED. YIELDS SPT N VALUES > 1		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50	THAN ROADWAY		ST - SHELBY TUBE			O OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
	- INFERRED SOIL	BOUNDARY	SAMPLE			O SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 6	INFERRED ROCK	MONITORING WELL	L RS - ROCK SAMPLE			RIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1   MATERIAL   STIFF   8 TO 15   1 TO 2	ALLUVIAL SOIL	A PIEZUMETER	RT - RECOMPACTED TRIAXIAL	COMPLETE ROCK R	EDUCED 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	SAMPLE	ALSO A	RED CONCENTRATIONS. QUARTZ   N EXAMPLE.	MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
	25/025 DIP & DIP DIR ROCK STRUCTU		CBR - CALIFORNIA BEARING RATIO SAMPLE		· · · · · · · · · · · · · · · · · · ·	HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AN EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE		SPT N-VALUE		VERY HARD CANNO	T 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
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	REF SPT REFUSAL		SEVER	AL HARD BLOWS OF THE GEOLO	GIST'S PICK.	PARENT ROCK.
COOPEE FINE		ABBREVIATIONS			E SCRATCHED BY KNIFE OR PIC	K ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER CUBBLE GRAVEL SAND SAND SILT	CLAY AR - AUGER REFUSAL (CL.) BT - BORING TERMINATE	HI HIGHLY D MED MEDIUM	<pre># - MOISTURE CONTENT V - VERY</pre>			K. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(CSE, SDJ) (F SDJ)	CL CLAY	MICA MICACEOUS	VST - VANE SHEAR TEST	HARD EXCAV	ATED BY HARD BLOW OF A GEO	LOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.0 SIZE IN. 12 3	CPT - CONE PENETRATIO	ON TEST MOD MODERATELY  NP - NON PLASTIC	WEA WEATHERED	1	DERATE BLOWS. RE GROOVED OR GOUGED 0.05 IN	CHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) ~ NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TE	ST ORG ORGANIC	To DRY UNIT WEIGHT	HARD CAN E	BE EXCAVATED IN SMALL CHIPS	TO PEICES 1 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 A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE CUIDE FOR FIELD MOISTURE D	DPT - DYNAMIC PENETRA RIPTION • - VOID RATIO	ATION TEST PMT - PRESSUREMETER TEST SAP SAPROLITIC	-	1	OF A GEOLOGIST'S PICK.	BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTORE D	F - FINE	SD SAND, SANDY		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 OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIDUID; VERY WET, U		SL SILT, SILTY CTURES SLI SLIGHTLY		1	S CAN BE BROKEN BY FINGER P		STRATA ROCK DUALITY DESIGNATION (SRDD) - A MEASURE OF ROCK DUALITY DESCRIBED BY
LL_ LIOUID LIMIT (SAT.) FROM BELOW THE GROUND WA	FRAGS FRAGMENTS	TCR - TRICONE REFUSAL				EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH EN BY FINGER PRESSURE, CAN BE SCRATCHED READILY 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.
PLASTIC   SEMISOLID; REQUIRES DRYING   PANGE   PROPERTY   SEMISOLID; REQUIRES DRYING   SEMISOLID; REQUI		DUIPMENT USED ON SUBJECT PI	DOTECT	FINGE		T	TOPSOIL (TS,) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	E(	JOIPMENT USED ON SUBJECT PI	***************************************		JRE SPACING	BEDDING IERM THICKNESS	
	DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	TERM VERY WIDE	SPACING MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET	BENCH MARK: -BL- 2, NCDOT L&S MONUMENT, -L- STA. 16+63.88 27.77'LT
DM DPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM SL SHRINKAGE LIMIT	MOBILE B	CLAY BITS	X AUTOMATIC MANUAL	WIDE	3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 43.37 FT.
REQUIRES ADDITIONAL WATER	MUBILE B	6° CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATELY CLOSE	SE 1 TO 3 FEET 0.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51	8" HOLLOW AUGERS		VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTES:
PLASTICITY	X CME-45B	HARD FACED FINGER BITS			IND	URATION	<u> </u>
PLASTICITY INDEX (PI) DRY STRENGTH		TUNGCARBIDE INSERTS	□- <sup>n</sup>	FOR SEDIMENTARY ROO	CKS, INDURATION IS THE HARDEN	ING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	]
NONPLASTIC 9-5 VERY LOW	CME-550	X CASING W/ ADVANCER		FRIABLE		WITH FINGER FREES NUMEROUS GRAINS:	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST		HAND TOOLS:	1		BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY 26 OR MORE HIGH	PURTABLE HOIST	X TRICONE 2 15/6 STEEL TEETH	POST HOLE DIGGER	MODERATEL		CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; EASILY WHEN HIT WITH HAMMER,	
COLOR		TRICONE' TUNGCARB.	HAND AUGER	INDURATED		ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLU	RAY).	CORE BIT	SDUNDING ROD VANE SHEAR TEST	INDOMED		LT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		-	T TRING OILERN IEST	EXTREMELY		HAMMER BLOWS REQUIRED TO BREAK SAMPLE; BREAKS ACROSS GRAINS.	
·				<u> </u>	SHITLE	SHERING HUMOS OTHERS	PENERD 00/07/06

PROJECT REFERENCE NO. B-4533

SHEET NO. 2 OF 8







PROJECT NO	····			D. B-4533			NE/ LENO		GEOLOGIST Sw		
		BRIDGE	——т	. 48 ON -L- (SR 1432 AND SR			SWAMP (	<del></del>		GROUND W	•
BORING NO.	EB2-B			STATION 17+48	OFFSET			ALIGNMEN		0 HR.	N/A
COLLAR ELE	<b>V.</b> 43.3	ft		TOTAL DEPTH 59.7 ft	NORTHIN	<b>G</b> 598	,563	EASTING	2,427,657	24 HR.	3.9
DRILL MACHI	NE CM	IE-45B		DRILL METHOD Mud Rotary	····				HANIMER TYPE	Automatic	
START DATE	07/07/	09	l	COMP. DATE 07/07/09	SURFACE	E WATE	R DEPTH	N/A	DEPTH TO ROO	<b>K</b> 23.7 ft	
ELEV DEPTH	0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50	75 100	NO.	MOI G	S ELEV. (ft)	OIL AND ROCK DESC		EPTH (
45 42.3 7 1.0				<u>                                     </u>		·		43.3	GROUND SURFA	ACE	0
72.0	3	4	5	9	.	SS-16			ROADWAY EMBAN		
39.3 + 4.0				<u> </u>				_ TA	N SAND, MOIST TO S	ATURATED	
35.1 + 8.2	3	4	4	. • 6				37.3	UNDIVIDED COASTA TAN SANDY CLAY		6
Ŧ	2	3	4	47		SS-17		<del>-</del>			
‡								32.3	COASTAL PLA		11
30.1   13.2	4	6	8	-		SS-18	24%	GF	RAY SANDY CLAY, WE FORMATION		
Ŧ				1		100-10	24%	· _ 27.3			16
25.1 18.2								GRA	COASTAL PLA Y SAND WITH SHELL		
-	6	8	8	•16		SS-19			TURATED (PEEDEE F		
‡								•			
20.1 23.2	45	60/0.1						_ 19.6			23
‡	143	00/0.1		: : ; -:   -: -: -: -: -: -: -: -: -: -: -: -: -:	60/0.1				STAL PLAIN SEDIME SANDSTONE (PEEDE		25
15.1 7 28.2									COASTAL PLA RAY SAND, SATURATE	IN	
15.1 7 28.2	5	7	8	15		SS-20			FORMATION		
<u>†</u>											
10.1 33.2				_   ` \				<del>-</del>			
İ	6	6	25	31	:			8.3 7.3 <b>COA</b>			<u>35</u> 36
							0000		STAL PLAIN SEDIME SANDSTONE (PEEDE	E FORMATION)	
5.1 7 38.2	13	21	24	45		SS-21	0000	- GF	COASTAL PLA RAY SAND, SATURATE	D (PEEDEE	
±							0000	•	FORMATION	)	
0.1 43.2							0000	•			
Ŧ	30	35	30		55	SS-22	0000	-			
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-4.9 <del>†</del> 48.2	14	21	20				0000	-			
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-9.9 + 53.2				:::: :;/:: ::::				•			
7	15	15	17	32		SS-23		<del>-</del>			
‡	ŀ							<del>.</del> -			
-14.9	8	12	12	+							
	+-	<del> </del> -		24	<u>-                                    </u>	<del>                                     </del>		16.4 - Bori	ng Terminated at Eleva		59
‡								<del>-</del> -	Medium Dense S	Sand	
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*B–4533* 33752.1.1

# BRIDGE NO. 48 ON SR 1432 AND SR 1705 OVER WHEAT SWAMP CREEK AT -L- STA. 17+00

# EB1-A

				SOII	L 1	TES	STR	ESUI	LTS						
SAMPLE	OFFSET STATION												%		
NO.	OFFSEI	SIATION	INTERVAL	CLASS.	L.L.	F.1.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-8	7' LT	16 +5 1	1. 0- 2. 5	A-2-4(0)	19	NP	8.7	71.9	6.3	13. 1	100	97	24	-	-
SS-9	7' LT	16 +5 1	8. 3- 9. 8	A-6(2)	33	15	18.6	46.0	13. 2	22. 2	100	94	40	27.0	-
SS- 10	7' LT	16 +5 1	13. 3- 14. 8	A-6(2)	33	14	19.2	48.6	10.0	22. 2	100	90	41	25.0	-
SS- 11	7' LT	16 +5 1	18. 3- 19. 8	A-2-4(0)	21	NP	43.2	45.6	<i>3.</i> 1	8. 1	100	88	13	-	-
SS- 12	7' LT	16 +5 1	28. 3- 29. 8	A-2-4(0)	22	NP	14.5	68.4	4.9	12. 1	97	90	20	-	-
SS- 13	7' LT	16 +5 1	<i>38. 3- 39. 8</i>	A-2-4(0)	22	NP	15.5	75. 3	1. 1	8. 1	100	98	11	-	-
SS- 14	7' LT	16 +5 1	48. 3- 49. 8	A- 3( 0)	19	NP	68.7	23. 4	1.8	6. 1	100	67	9	-	-
SS- 15	7' LT	16 +5 1	58. 3- 59. 8	A- 2- 4( 0)	22	NP	26.0	<i>63. 2</i>	2.7	8. 1	100	94	12	-	-

*B1–C* 

				SOII	L 1	TES	STR	ESUI	LTS						
SAMPLE	OFFSET $STATION$														%
NO.	OFFSEI	STATION	INTERVAL	CLASS.	Lı,Lı,	P.1.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 1	CL	17 +00	1.0-1.5	A-2-4(0)	26	8	39.4	39.4	7.2	14. 1	98	81	24	-	-
<i>SS-2</i>	CL	17 +00	<i>3.</i> 8- 5. 3	A-2-4(0)	19	NP	43.4	43.8	4.7	8. 1	100	90	15	-	-
SS- 3	CL	17 +00	13. 1- 14.6	A-2-4(0)	23	NP	5. 4	76. 1	6.4	12. 1	100	98	23	-	-
SS- 4	CL	17 +00	23. 1-24.6	A- 3( 0)	24	NP	17.0	76.8	2. 2	4.0	100	99	7	-	-
SS- 5	CL	17 +00	33. 1-34.6	A- 3( 0)	18	NP	70.5	21.9	<i>2.</i> 5	5.0	100	61	8	-	-
SS-6	CL	17 +00	43. 1-44.6	A-2-4(0)	24	NP	20.4	66.4	<i>3. 1</i>	10. 1	100	95	14	-	-
SS-7	CL	17 +00	53. 1-54.6	A- 3( 0)	17	NP	75.9	16.0	2.0	6. 1	100	60	9	_	-

EB2-B

				SOII	L I	TES	ST R	ESUI	LTS						
SAMPLE	OFFSET	STATION	DEPTH	AASHTO % BY WEIGHT % PASSING (SIEVES) %											%
NO.	OFFSEI	BIATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 16	6′ RT	17 +48	<i>1. 0- 2. 5</i>	A- 2- 4( 0)	19	NP	20.2	56. 1	7.6	16. 1	99	90	28	-	-
SS- 17	6′ RT	17 +48	8. 2- 9. 7	A-7-6(4)	41	20	19.6	41.0	11.2	28.3	100	93	43	-	-
SS- 18	6′ RT	17 +48	13. 2- 14. 7	A-6(1)	32	12	22. 2	49.6	8.0	20.2	99	88	36	24.0	-
SS- 19	6′ RT	17 +48	18. 2- 19. 7	A-2-4(0)	22	NP	46.6	41.6	1. 7	10. 1	100	85	13	-	-
SS- 20	6′ RT	17 +48	28. 2- 29. 7	A-2-4(0)	26	NP	4.0	76.7	5. <i>1</i>	14. 1	100	99	25	-	-
SS-21	6′ RT	17 +48	<i>38. 2- 39. 7</i>	A- 3( 0)	23	NP	21.3	70.3	1. 3	7.1	100	97	9	-	-
SS- 22	6′ RT	17 +48	43. 2- 44. 7	A- 3( 0)	24	NP	45.7	49. 1	1. 1	4.0	100	92	6	-	-
SS- 23	6′ RT	17 +48	53. 2- 54. 7	A-2-4(0)	25	NP	24.2	64.4	<i>3. 3</i>	8. 1	100	97	13	-	-

# FIELD SCOUR REPORT

WBS:	33752.1.1 TIP:	B-4533	COUNTY: GREENE/LENOIR
DESCRIPTION(1): BI	RIDGE NO. 48 ON SR 1	432 OVER WHI	EAT SWAMP CREEK
Information from:	Field Inspection Other (explain)	EXISTING X Mic	BRIDGE           rofilm (reel pos:)
Bridge No.: 48 Foundation Type: Ti		Total Bents:	Bents in Channel: 1 Bents in Floodplain: 2

Channel Bank: I	NONE NOTED	,
EXISTING SCOU	IR PROTECTION	
Type(3): <u>\</u>	WOODEN WING WALLS	· · · · · · · · · · · · · · · · · · ·
Extent(4):	12 FEET OUTSIDE BRIDGE	
Effectiveness(5): I	EFFECTIVE	
Obstructions(6): I	NONE NOTED	

#### **INSTRUCTIONS**

**EVIDENCE OF SCOUR(2)** 

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Abutments or End Bent Slopes: NONE NOTED

- 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).
- 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.

			DES	SIGN IN	<b>IFORM</b>	<u>ATIOI</u>	N					
Channel E	ed Material(7)	: SAND										
Channel Ba	ank Material(8)		***************************************									
Channel	Bank Cover(9)											
Floodp	lain Width(10)	: APPRO	X. 500'									
Floodp	lain Cover(11)	: TREES	AND SH	IRUBS						· · · · · · · · · · · · · · · · · · ·		
	Stream is(12)	: A	ggrading	-	Degr	ading _	X		Sta	itic	-	
Channel Migration	Tendency(13)	: SLIGHT	TENDE	NCY TO	MIGRA	TE WE	ST TO	WARE	EB1			
Observations a	nd Other Com	ments:										
		PACALANTA STATE OF THE STATE OF										
DESIGN SCOL	IR ELEVATIO	NS(14)				Fee	et X	-	Mete	ers	-	
	BENTS	<u> </u>										
	<b>B1</b> 18.0	T	1	<u> </u>	T					<u> </u>	1	I
	10.0						-					
									***************************************			
		1		<u> </u>	<u> </u>					<u></u>	<u> </u>	
Comparison of	DSE to Hydra	ulics Unit	theoretic	al scour	· ·							
Design Scour E						al 100	year so	cour				
SOIL ANALYS	IS RESULTS	FROM CH	HANNEL	BED A	ND BAN	< MATI	ERIAL					
Bed or Bank					T	T T						
Sample No.												
Retained #4				***************************************								
Passed #10								1				
Passed #40												
Passed #200				<b>0</b> 1								
Coarse Sand				Sheet 7,								
Fine Sand			1	Test Re	suits",							]
Silt				amples:	. CC 4							
			l Chai	nnel Bed								
Clay			1	anal Da-	L. CC A							
Clay LL			1	nnel Ban	k: SS-9							
Clay LL Pl			1	nnel Ban	k: SS-9							
Clay LL PI AASHTO			1	nnel Ban	k: SS-9	•						
Clay LL PI AASHTO Station			1	nnel Ban	k: SS-9							
Clay LL PI AASHTO			1	nnel Ban	k: SS-9							

Template Revised 02/07/06

ported by: 2 Lu Ett

**Date:** 7/20/2009