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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

#### **DESCRIPTION** TITLE SHEET LEGEND GEOTECHNICAL REPORT SITE PLAN PROFILE BORE LOGS SOIL TEST RESULTS SCOUR REPORT

## **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33442.1.1 (B-4080) F.A. PROJ. BRSTP-1437(2) COUNTY COLUMBUS PROJECT DESCRIPTION BRIDGE NO. 148 ON SR 1437 OVER PINE LOG SWAMP AT -L- STATION 15+27.5

STATE STATE PROJECT REPERENCE NO. N.C. 33442.1.1 (B-4080) 1 | 11

#### **CAUTION NOTICE**

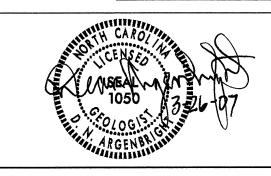
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOLL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTHENT 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 SUBSUPFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORRHOLE. THE LABORATIORY SAMPLE DATA AND THE IN STU UN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE CASREY OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL 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 PPELIMINARY 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 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 INCESSARY TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THE ACTUAL CONDITIONS.

J.R. SWARTLEY W.N. CHERRY R.E. SMITH L.W. DAIL INVESTIGATED BY F.M. WESCOTT III D.N. ARGENBRIGHT SUBMITTED BY \_\_\_\_ D.N. ARGENBRIGHT MARCH, 2007

PERSONNEL F.M. WESCOTT III



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.

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## PROJECT REFERENCE NO. SHEET NO. 33442.I.I (B-4080) 2 OF II

### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

#### DIVISION OF HIGHWAYS

#### GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

				SOIL AND RO	CK LEGEND, TERM	is, symboi	LS, AND ABBR	EVIATIONS		
SC	OIL DESCRIPTION			GRADATION		1	R	OCK DESCRIPTION	<del></del>	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLID			WELL GRADED - INDICATES A CUNIFORM - INDICATES THAT SO	GOOD REPRESENTATION OF PARTICLE SIZES DIL PARTICLES ARE ALL APPROXIMATELY TH	FROM FINE TO COARSE. E SAME SIZE.(ALSO	HARD ROCK IS	NON-COASTAL PLAIN MATERIA	AL THAT IF TESTED, WOULD YIELD SPT H NON-COASTAL PLAIN MATERIAL WOULD	REFUSAL. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUO 100 BLOWS PER FOOT ACCORDING TO STANDA	ARD PENETRATION TEST (AASHTO T206, AS	STM D-1586), SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MI	XTURE OF UNIFORM PARTICLES OF TWO OR	MORE SIZES.	SPT REFUSAL	IS PENETRATION BY A SPLIT	SPOON SAMPLER EQUAL TO OR LESS T ANSITION BETWEEN SOIL AND ROCK IS	HAN Ø.1 FOOT PER 60 BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO S CONSISTENCY, COLOR, TEXTURE, MOISTURE, AAS	SHTO CLASSIFICATION, AND OTHER PERTIN	NENT FACTORS SUCH		ANGULARITY OF GRAINS		OF WEATHERED	ROCK.		UPTEN REPRESENTED BY A ZUNE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY	Y, STRUCTURE, PLASTICITY, ETC. EXAMPLE: NST WITH INTERBEDOED FINE SAND LAYERS HIGHLY PLASTIC		THE ANGULARITY OR ROUNDNESSUBANGULAR, SUBROUNDED, OR	SS OF SOIL GRAINS IS DESIGNATED BY THE	TERMS: ANGULAR.		RUMUM	is fullows: STAL PLAIN MATERIAL THAT WOULD YIE	2 D ODT 14 VALUES > 100	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.
	AND AASHTO CLASSIFICAT		SOBRIOGERIA, SOBROSINDED, OR	MINERALOGICAL COMPOSITION	NN .	WEATHERED ROCK (WR)	BLOWS P	ER FOOT IF TESTED.		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
GENERAL GRANULAR MATERIALS		***************************************		TZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE		CRYSTALLINE ROCK (CR)	FINE TO	COARSE GRAIN IGNEOUS AND METAMORF IELD SPT REFUSAL IF TESTED. ROCK T	PHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200)		ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDER				GNEISS, C	ABBRO, SCHIST, ETC. COARSE GRAIN METAMORPHIC AND NON-		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A		-1, A-2   A-4, A-5   A-3   A-6, A-7	CLICITI V COMPETOS	COMPRESSIBILITY		NON-CRYSTALLINE ROCK (NCR)	SEDIMENT	ARY ROCK THAT WOULD YEILD SPT REF	FUSAL IF TESTED. ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COORDINATION OF THE PROPERTY OF THE PRO	A77.	7777	SLIGHTLY COMPRESS: MODERATELY COMPRE	SSIBLE LIQUID LIMIT	LESS THAN 31 EQUAL TO 31-50	COASTAL PLAIN	COASTAL	PHYLLITE, SLATE, SANDSTONE, ETC. PLAIN SEDIMENTS CEMENTED INTO ROC		CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
2 PASSING			HIGHLY COMPRESSIBL	PERCENTAGE OF MATERIA	GREATER THAN 50	SEDIMENTARY ROC (CP)	K SPT REFL SHELL BE	JSAL. ROCK TYPE INCLUDES LIMESTONE. DS. ETC.	, SANDSTONE, CEMENTED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
* 10 50 MX		RANULAR SILT- MUCK,	ORGANIC MATERIAL	GRANULAR SILT - CLAY	DTHER MATERIAL			WEATHERING		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
	35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	SOILS SOILS PEAT	TRACE OF ORGANIC MATTER	SOILS SOILS 2 - 3% 3 - 5% TR	ACE 1 - 10%		CK FRESH, CRYSTALS BRIGHT, MMER IF CRYSTALLINE.	FEW JOINTS MAY SHOW SLIGHT STAINI	ING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIQUID LIMIT 40 MX 41 MN 4	40 MX 41 MN 48 MX 41 MN 40 MX 41 MN	SOILS WITH	LITTLE ORGANIC MATTER MODERATELY ORGANIC		TTLE 10 - 20%	1		S STAINED, SOME JOINTS MAY SHOW TH	IN CLAY COATINGS IF OPEN	HORIZONTAL.
		LITTLE OR HIGHLY	HIGHLY ORGANIC		GHLY 35% AND ABOVE	(V SLI.) CR	YSTALS ON A BROKEN SPECIM	EN FACE SHINE BRIGHTLY. ROCK RINGS		<u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 9	4 MX 8 MX 12 MX 16 MX No MX	MODERATE ORGANIC SOILS		GROUND WATER		1	A CRYSTALLINE NATURE.  CK GENERALLY FRESH. JOINTS	STAINED AND DISCOLORATION EXTENDS	S INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND GRAVEL AND		ORGANIC MATTER		VEL IN BORE HOLE IMMEDIATELY AFTER	DRILLING	(SLI.) 1 II	NCH. OPEN JOINTS MAY CONT	AIN CLAY. IN GRANITOID ROCKS SOME ( DLORED. CRYSTALLINE ROCKS RING UND	OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAIND STATE HE	ND SHID SOLES			ATER LEVEL AFTER 24 HOURS	•	MODERATE SIG	SNIFICANT PORTIONS OF ROCK	SHOW DISCOLORATION AND WEATHERIN	IG EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD SUBGRADE	FAIR TO POOR P	AIR TO POOR UNSUITABLE	<u> </u>	WATER, SATURATED ZONE, OR WATER BEAR	ING STRATA	(MOD.) GR	ANITOID ROCKS, MOST FELDSP LL SOUND UNDER HAMMER BL	ARS ARE DULL AND DISCOLORED, SOME DWS AND SHOWS SIGNIFICANT LOSS OF	SHOW CLAY, ROCK HAS STRENGTH AS COMPARED	PARENT MATERIAL.
	LL - 30 ; PI OF A-7-6 SUBGROUP	P IS > LL - 30	OM SPRING OF	R SEEP		WIT	TH FRESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM,
CONSIS	STENCY OR DENSENESS			MISCELLANEOUS SYMBOLS	5	SEVERE AND	D DISCOLORED AND A MAJORI	OLORED OR STAINED. IN GRANITOID RO TY 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 CONSISTENCE	PENETRATION RESISTENCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH	ROADWAY EMBANKI		NG SAMPLE		D CAN BE EXCAVATED WITH A TESTED, WOULD YIELD SPT R	GEOLOGIST'S PICK. ROCK GIVES "CLUN <i>EFUSAL</i>	K'SOUND WHEN STRUCK.	THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS DCCURRED.
VERY LOOSE	(N-VALUE)	(TONS/FT <sup>2</sup> )	WITH SOIL DESCRI	IPTION VST PHIT	DESIGNATIONS S - BULK SAMPLE	SEVERE ALI	L ROCK EXCEPT QUARTZ DISC	COLORED OR STAINED. ROCK FABRIC CLE		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANIII AR LOOSE	4 TO 10		SOIL SYMBOL	AUGER BORING	SS - SPLIT SPOON			IN GRANITOID ROCKS ALL FELDSPARS STRONG ROCK USUALLY REMAIN.	ARE KADLINIZED TO SOME	ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE	30 TO 50	N/A	ARTIFICIAL FILL ( THAN ROADWAY EN		SAMPLE		TESTED, YIELDS SPT N VALU			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			INFERRED SOIL BO	DUNDARY	ST - SHELBY TUBE SAMPLE	(V SEV.) THE	E MASS IS EFFECTIVELY RED	OLORED OR STAINED. ROCK FABRIC ELE UCED TO SOIL STATUS, WITH ONLY FRA	GMENTS OF STRONG ROCK	SOILS USUALLY INDICATES PODR AERATION AND LACK OF GOOD DRAINAGE,
VERY SOFT GENERALLY SOFT	2 2 TO 4	<0.25 0.25 TO 0.50	INFERRED ROCK L	"" MONITORING WE	ILL RS - ROCK SAMPLE			XAMPLE OF ROCK WEATHERED TO A DEC CK FABRIC REMAIN. <i>IF TESTED YIELD</i>		PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIF MATERIAL STIFF	FF 4 TO 8 8 TO 15	Ø.5 TO 1.Ø		△ PIEZOMETER	RT - RECOMPACTED TRIAXIAL	COMPLETE ROO	CK REDUCED TO SOIL. ROCK F	ABRIC NOT DISCERNIBLE, OR DISCERNIB	BLE ONLY IN SMALL AND	RESIDUAL (RES.) SDIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF		2 TO 4	▼▼▼▼ ALLUVIAL SOIL BO	SLOPE INDICATE	SAMPLE OR	SC4	ATTERED CONCENTRATIONS. OU SO AN EXAMPLE.	JARTZ MAY BE PRESENT AS DIKES OR	STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
<u> </u>	URE OR GRAIN SIZE	>4	DIP & DIP DIRECT ROCK STRUCTURES		CBR - CALIFORNIA BEARING RATIO SAMPLE			ROCK HARDNESS		ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
			SOUNDING ROD	SPT N-VALUE				FE 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 OPENING (MM) 4.76		270 0.053	• SOONDING NOD	REF — SPT REFUSAL		_]	EVERAL HARD BLOWS OF THE			PARENT ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVE	COARSE FINE	SILT CLAY	AR - AUGER REFUSAL	ABBREVIATIONS HI HIGHLY	# - MOISTURE CONTENT		D DETACH HAND SPECIMEN.	OR PICK ONLY WITH DIFFICULTY. HARD	HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.)		(SL.) (CL.)	BT - BORING TERMINATED	MED MEDIUM	V - VERY			OR PICK. GOUGES OR GROOVES TO 0.25		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 CPT - CONE PENETRATION 1	MICA MICACEOUS TEST MOD MODERATELY	VST - VANE SHEAR TEST WEA WEATHERED		Y MODERATE BLOWS.	A GEOLOGIST'S PICK. HAND SPECIMENS	S CAN BE DETACHED	SLIP PLANE.
SIZE IN. 12 3	CORDEL ATION OF TE	5146	CSE COARSE DMT - DILATOMETER TEST	NP - NON PLASTIC ORG ORGANIC	7 - UNIT WEIGHT			0.05 INCHES DEEP BY FIRM PRESSURE CHIPS TO PEICES I INCH MAXIMUM SIZE		STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (6PT) - 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
	E - CORRELATION OF TEF		DPT - DYNAMIC PENETRATIO	ON TEST PMT - PRESSUREMETER TEST	$\gamma_{ m d}$ - DRY UNIT WEIGHT	Pi	DINT 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.
	DESCRIPTION GUIDE FOR FIELD	ELD MOISTURE DESCRIPTION	• - VOID RATIO F - FINE	SAP SAPROLITIC SD SAND, SANDY				EADILY BY KNIFE OR PICK. CAN BE EXC ES IN SIZE BY MODERATE BLOWS OF A		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
-		ID; VERY WET, USUALLY	FOSS FOSSILIFEROUS FRAC FRACTURED, FRACTU	SL SILT, SILTY RES SLI SLIGHTLY		PI	ieces can be broken by fi	NGER PRESSURE.		OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL_ LIQUID LIMIT	(SAT.) FROM BELOW T	THE GROUND WATER TABLE	FRAGS FRAGMENTS	TCR - TRICONE REFUSAL		VERY CA	AN BE CARVED WITH KNIFE. C R MORE IN THICKNESS CAN B	AN BE EXCAVATED READILY WITH POIN E BROKEN BY FINGER PRESSURE. CAN E	T OF PICK. PIECES 1 INCH BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC   RANGE <		QUIRES DRYING TO	FOU	PMENT USED ON SUBJECT F	200 FOOT	FI	NGERNAIL.			TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	ATTAIN OPTIME	UM MOISTURE	EGU	IPMENT USED UN SUBJECT F	T		CTURE SPACING	TERM BEDI	DING THICKNESS	
	- MOIST - (M) SOLID; AT OR	R NEAR OPTIMUM MOISTURE	DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:  X AUTOMATIC MANUAL	TERM VERY WIDE	<u>SPACING</u> MORE THAN 10 FEE	VERY THICKLY BEDDED	> 4 FEET	BENCH MARK: BL-3 -L- STATION 14+85.24, 14.83' RT
OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT	110131 (1) 300225,777 (3)	· NEW OF THIS PROPERTY	MOBILE B	CLAY BITS	X HOTOMHTIC MINORC	WIDE MODERATELY	3 TO 10 FEET	THICKLY BEDDED THINLY BEDDED	1.5 - 4 FEET 0.16 - 1.5 FEET	ELEVATION: 59.3 FT.
		ITIONAL WATER TO		6 CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE	0.16 TD 1 FEET	VERY THINLY BEDDED THICKLY LAMINATED	0.03 - 0.16 FEET 0.008 - 0.03 FEET	NOTES:
	HITHIN OF IIML	IUM MOISTURE	BK-51	8 HOLLOW AUGERS		VERY CLOSE	LESS THAN 0.16 F	THINLY LAMINATED	< 0.008 FEET	_
	PLASTICITY		X CME-45B	HARD FACED FINGER BITS		FOR SEDIMENTARY	POCKS INDUDATION IS THE	INDURATION  HARDENING OF THE MATERIAL BY CEME	NTING HEAT DESCRIPT FTO	4
NONPLASTIC PL	LASTICITY INDEX (PI) D 0-5	DRY STRENGTH VERY LOW	CME-550	TUNGCARBIDE INSERTS				HARDENING OF THE MATERIAL BY CEME UBBING WITH FINGER FREES NUMEROUS		
LOW PLASTICITY MED. PLASTICITY	6-15	SLIGHT MEDIUM		X CASING W/ ADVANCER	HAND TODLS:	FRIABL		ENTLE BLOW BY HAMMER DISINTEGRATE		
HIGH PLASTICITY	16-25 26 OR MORE	HIGH	PORTABLE HOIST	X TRICONE 2 15/6 STEEL TEETH	POST HOLE DIGGER	MODERA		RAINS CAN BE SEPARATED FROM SAMPL REAKS EASILY WHEN HIT WITH HAMMER		
	COLOR		П	TRICONE TUNGCARB.	HAND AUGER	Tarmy m a		REAKS EASILY WHEN HIT WITH HAMMER RAINS ARE DIFFICULT TO SEPARATE W		
DESCRIPTIONS MAY INCLUDE COLOR OR				CORE BIT	SOUNDING ROD  VANE SHEAR TEST	INDURA		RAINS ARE DIFFICULT TO SEPARATE W. IFFICULT TO BREAK WITH HAMMER.	IIII SIEEL FRODE;	
MODIFIERS SUCH AS LIGHT, DARK, STE	REAKED, ETC. ARE USED TO DESCRIBE	APPEARANCE.	Ц		AHIAC SUEHK LEST	EXTREM		HARP HAMMER BLOWS REQUIRED TO BRI HAMPLE BREAKS ACROSS GRAINS.	EAK SAMPLE:	
						,	-			1



Subsurface conditions at the site are relatively uniform. Surficial alluvial soils generally consist of 11± feet of loose to medium dense sand (A-2-4, A-3). Soils belonging to the Pliocene age Duplin Formation underlie the alluvial deposits at elevations ranging from 42± to 44± feet. Soils of the Duplin Formation consist of 19 to 25 feet of loose to dense sand (A-2-4) underlain by 10 to 14 feet of stiff to very stiff sandy and silty clay (A-6, A-7-6). Shell fragments were noted throughout the Duplin deposits. The Peedee Formation underlies the Duplin deposits at elevations ranging from 8± to 9± feet. Soils of the Peedee Formation consist of medium dense to very dense sand (A-1-b, A-2-4, A-3) and clayey sand (A-2-6). A hard clay (A-7-6) layer was encountered below the sands in End Bent 2.

Based on the proposed design, the existing grade will be raised  $1\pm$  foot at the bridge site. The existing roadway embankment at the end bents consists of  $5\pm$  to  $7\pm$  feet of very loose to loose sand (A-2-4) and medium stiff to very stiff clayey sandy silt (A-4). The proposed end bent slopes will be mainly constructed within the existing embankment. Some additional fill will be required for construction of the end bent and side slopes. Borrow meeting Coastal Plain criteria is available in nearby areas.

#### Note

The Geotechnical foundation report is based on the Bridge Survey and Hydraulic Design Report dated March 2, 2007. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Prepared By

Fred M. Wescott III

Project Geological Engineer



# STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 26, 2007

STATE PROJECT:

33442.1.1 B-4080

F. A. PROJECT:

BRSTP-1437(2)

COUNTY:

Columbus

**DESCRIPTION:** 

Bridge No. 148 on SR 1437 over Pine Log Swamp

SUBJECT:

Geotechnical Report - Bridge Foundation Investigation for

SR 1437 over Pine Log Swamp at -L- Station 15+27.5

#### **Site Description**

The proposed bridge site is located at the existing SR 1437 bridge over Pine Log Swamp in Whiteville. The replacement structure will be constructed along the existing alignment. Based on the proposed design, the new structure will have three spans with a total length of 125 feet. The bents will have a skew of 90 degrees.

One Standard Penetration Test (SPT) boring was made at or near each proposed bent location to provide subsurface information relative to foundation design. The borings were made with ATV mounted CME-45B drill machine and were advanced by rotary drill methods using bentonite drilling fluid.

The bridge site is located in the Coastal Plain Physiographic Province and is underlain by Recent alluvial deposits, Pliocene age soils of the Duplin Formation and Cretaceous age soils of the Peedee Formation. Topography at the site is nearly flat to gentle sloping. Elevations at the site range from 51± feet along the channel bed to 60± feet along the existing SR 1437 roadway. During this investigation, water levels within the boreholes and the surface of Pine Log Swamp were measured at an elevation of 54± feet.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER

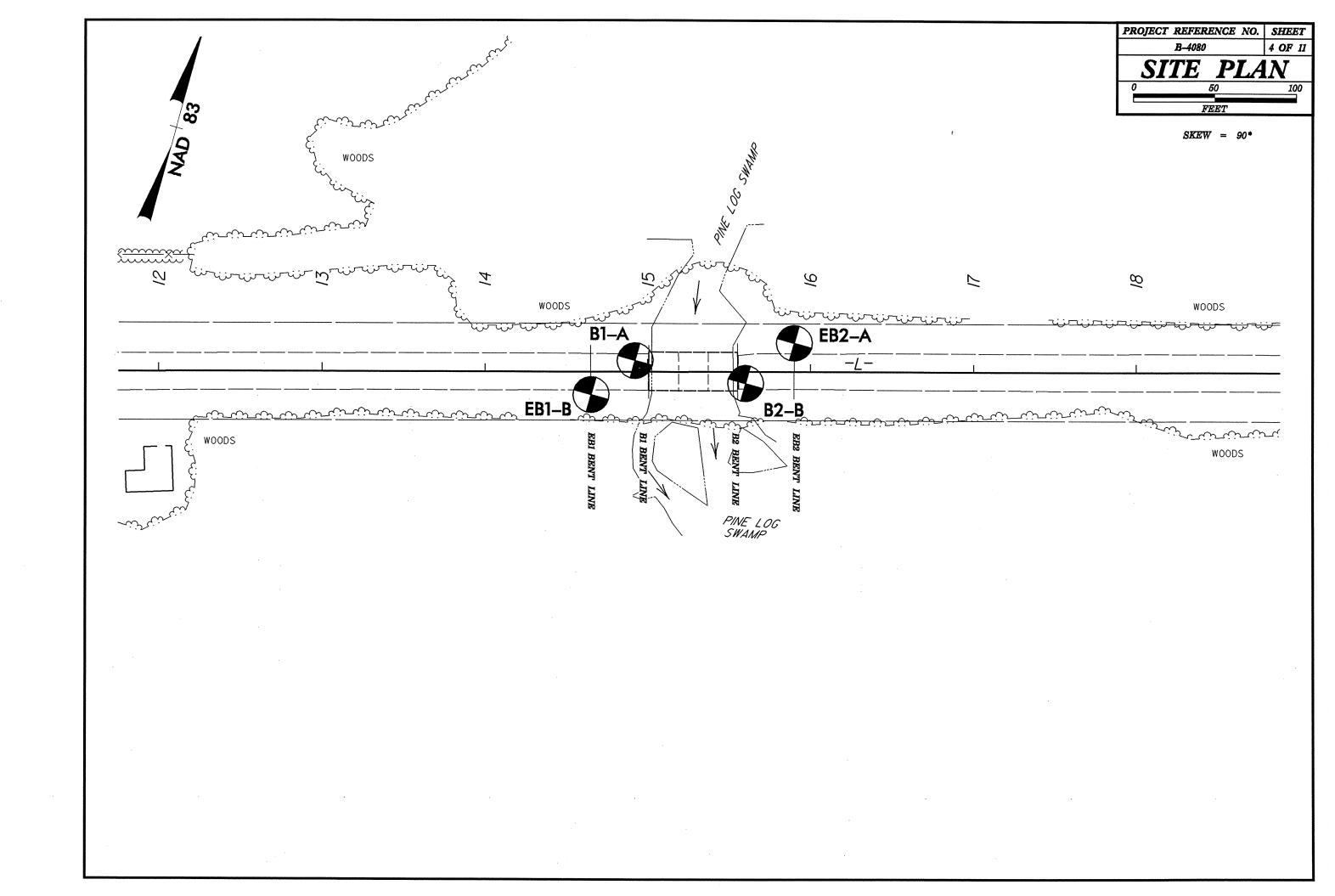
RALEIGH NC 27699-1589

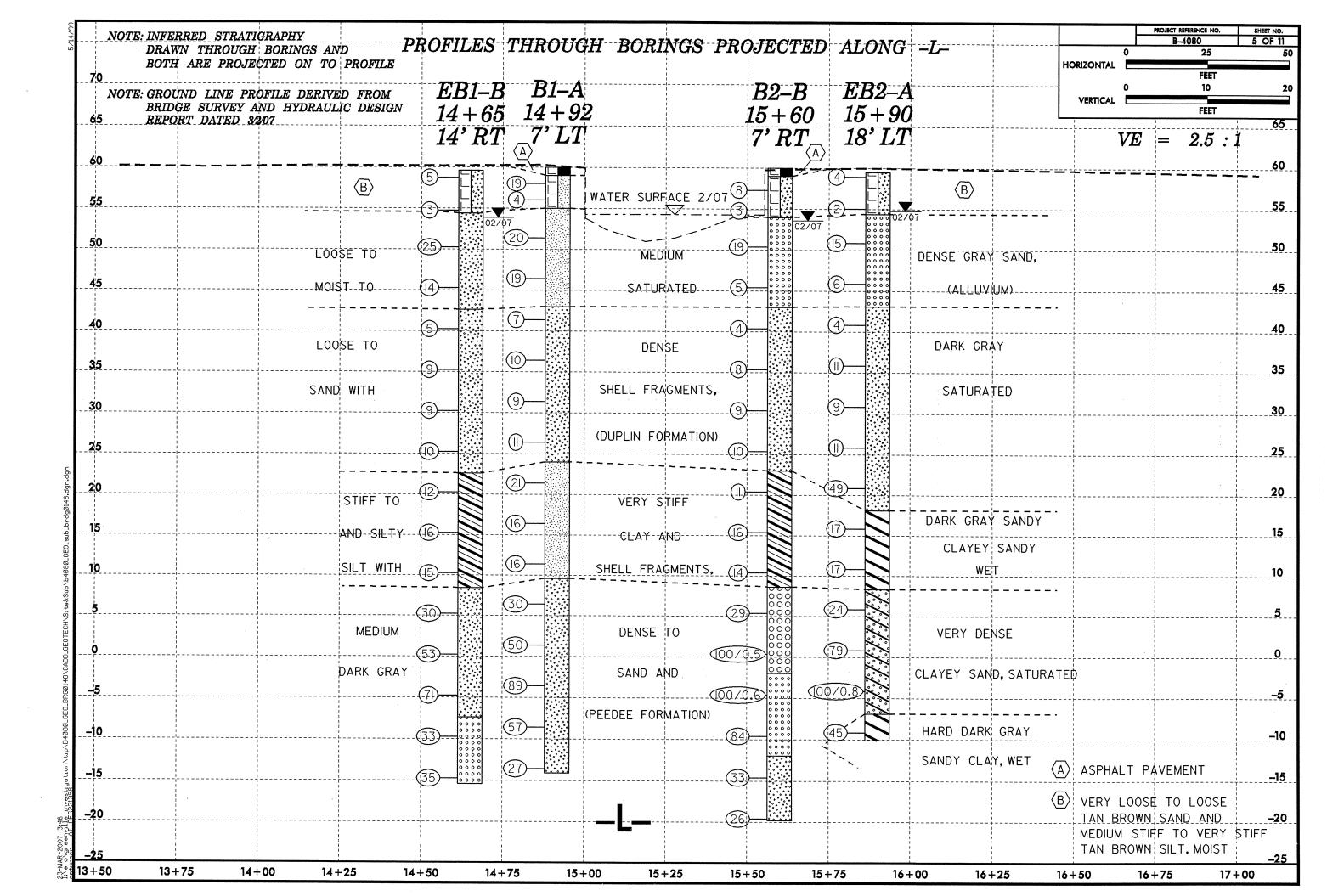
TELEPHONE: 919-250-4088 FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Sheet 3







	<u>u</u>				JG RE	PUK	<u> </u>								
PROJEC	T NO.	. 3344	2.1.1	11	D. B-4080	• • • • • •		COUNTY	Colum	nbus			GEOLOGIST \	Wescott, F. M.	
SITE DE	SCRIF	PTION	BRIDG	E NO.	148 ON SF	1437 OV	ER PINE L	OG SWAN	1P					GROUND	WTR (ft)
BORING	NO.	EB1-B			STATION	14+65		OFFSET	14ft R	Γ		ALIGNMEN	T -L-	0 HR.	N/A
COLLAR	ELE\	<b>/.</b> 59.6	ft		TOTAL DE	PTH 75.0	) ft	NORTHII	NG 208	,673		EASTING 2	2,082,093	24 HR.	5.9
DRILL M	IACHII	NE CM	IE-45B		DRILL ME	THOD M	ıd Rotary						HAMMER TY	PE Automatic	:
START D	DATE	02/20/	07		COMP. DA	TE 02/20	/07	SURFAC	E WAT	ER DEI	PTH N/	Α	DEPTH TO R	OCK N/A	
ELEV D	EPTH	BL	ow cor	JNT		BLOWS	PER FOOT		SAMP.	$\mathbf{V}/$	L		OIL AND ROCK DE	CODIDTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 :	25	50 7	5 100	NO.	моі	- I	.EV. (ft)	IL AND ROCK DE	ESCRIPTION	DEPTH (ft)
60											59	16	GROUND SU	REACE	0.0
59.6	0.0	1	2	3	<b>6</b> 5		· · · ·		SS-8		-MF				0.0
55.6	4.0				;::::					ן נ	<b>                                     </b>	IAI	N BROWN SILTY (ROADWAY EMB.	SAND, MOIST ANKMENT)	
55.6	4.0	1	2	1	1 3							.4			5.2
‡							: : : :	: : : :							
51.1	8.5	3	10	15	<b>-   ∷ ∴``</b> ``		: : : :	: : : :			**				
. ‡			10	"	/	25	1		SS-9		-	GRA	Y SAND, MOIST T ALLUVIU)		
46.1	13.5				:::/.		: : : :						(ALLOVIO	ivi)	
<del></del>	10.5	2	5	9	14	<u> </u>	<u> </u>				土				
1					:/::		: : : :	: : : :			42	.6	•		17.0
41.1	18.5				<u> </u>	1::::	: : : :								
+		2	2	3	5	1	1		SS-10						
±					$\prod_{i \in I} i = i$				1.		**				
36.1	23.5	4	4	5	1				SS-11		<b>#</b>				
Ŧ									-		<b>#</b>		ARK GRAY SAND FRAGMENTS, SA		
31.1	28.5					::::	: : : :				**		(DUPLIN FORM		
7		3	4	5	9						<b></b>				
‡						: : : :		::::			**				
26.1	33.5	4	5	5	<u> </u>	: : : :		: : : :			**				
‡		-	ľ	ľ	10						<b>**</b>				
21.1	38.5				:::::	: : : :	::::	::::			- 22	.6	·	······································	37.0
+ +	00.0	4	5	7	12-	<u> </u>			SS-12	16%					
‡.					::i::	: : : :		: : : :							
16.1	43.5				11::1:			: : : :							
+		5	7	9	16	<del>                                     </del>	<del> </del>					DARK	GRAY SANDY C		.L
44.4 ‡	40.5				::!:	• • • •	: : : :	: : : :					FRAGMENTS	S, VVE I	
11.1 T	48.5	4	6	9	15.				SS-13						
ł					: <u>L</u>	Hi : : :					8.4	1			51.2
6.1	53.5				]] :						¥.				
Ŧ		9	15	15	1	30	<del>                                     </del>		SS-14		WF.				
Ŧ							::::	: : : :			∰				
1.1	58.5	11	23	30		: : : >					<b>#</b>				
Ŧ							53								
-3.9	63.5	2											RK GRAY SAND		
		21	36	35	1	<u> </u>	7	1			鮏		FRAGMENTS, SA (PEEDEE FORI		
‡					::::	: : : :	1	::::			-7.	4		,	67.0
-8.9	68.5	1.			11::::	1:://	1::::	: : : :	<u></u>	000					07.0
+		10	15	18	1	₩33	<del> </del>		SS-15	000					
Ŧ								: : :		000					
-13.9	73.5	9	15	20	::::		: : : :	::::	,	000	-15	- 4			
<del>‡</del> -					<del>                                     </del>	<b>—</b> 55	J.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			. s		5.4 Boring	Terminated at El		75.0 1
‡											ţ.		dense sa	nd	
<u> </u>				<u> </u>							r				

	U V	J E	BOR	ELC	OG RE	POF	₹ <i>T</i>														•					•			
	JECT NO				D. B-4080			COUNT	Y Colur	nbus		GEOLOGIST S	tone, J. L.	PROJ	ECT N	O. 3344	42.1.1	10	D. B-4080	)		COUNT	Y Colu	mbus		T	GEOLOGIST S	tone, J. L.	<del></del>
SITE	DESCR	PTION	BRIDO	SE NO.	148 ON SF	R 1437 O	VER PINE	LOG SWA	MP				GROUND WTR (f	SITE	DESCR	IPTION	BRID	GE NO.	148 ON S	SR 1437 C	VER PINE	LOG SWAI	MP		·		-	GROUND V	<b>NTR</b>
BOR	NG NO.	B1-A			STATION	14+92		OFFSE	T 7ft LT		A	ALIGNMENT -L-	0 HR. N/A	BORII	NG NO	B1-A			STATION	14+92		OFFSET	7ft LT	-		ALIGNMEN	IT -L-	0 HR.	N
COL	AR ELE	<b>V.</b> 60.	1 ft		TOTAL DE	EPTH 74	4.1 ft	NORTH	ING 208	3,701	E	EASTING 2,082,113	24 HR. FIAD	COLL	AR ELI	EV. 60.	.1 ft		TOTAL D	EPTH 7	4.1 ft	NORTH	NG 20	8,701		EASTING	2,082,113	24 HR.	FIA
DRIL	L MACH	INE CI	ИЕ-45B		DRILL ME	THOD N	Mud Rotary					HAMMER TY	PE Automatic	DRILL	MACH	IINE C	ME-45E	В	DRILL M	ETHOD I	Mud Rotary	•					HAMMER TY	PE Automatic	
STA	RT DATE	02/23	/04		COMP. DA	ATE 02/2	23/04	SURFA	CE WAT	ER DEF	PTH N/A	DEPTH TO RO	OCK N/A	STAR	T DATI	≡ 02/23	3/04		COMP. D	ATE 02/	23/04	SURFA	CE WA	TER DE	PTH N/	A	DEPTH TO R	OCK N/A	
ELE\	DEPTH	·	OW CO		1,	BLOW 25	'S PER FOOT 50	Г 75 100	SAMP.	レント	0	SOIL AND ROCK DE		(ft)	DEPT (ft)	' '	LOWCO	OUNT 0.5ft		BLOW 25	S PER FOOT		SAME	1/1	L O	S	OIL AND ROCK DE	SCRIPTION	
<u> </u>	<del>  ``</del>	0.511	0.510	0.511	#	<u> </u>		., .,	I NO.	MOI	G ELEV	/. (ft)	DEPTH (		+ (-,	0.510	0.510	0.510	+		<u> </u>	75 100	NO.	MOI	G				
70																					stale I to a	•							
70	‡										-			<u> -10</u>	‡		<del>                                     </del>	+	<del>                                      </del>		atch Line	T	<del> </del>	+					
	‡					•					ţ			-12.5	72.6	10	12	15	-  :::			: : : :			<b>*</b>				
	‡									•					‡		<del>                                     </del>	+	1	<b>Q</b> 21		<u> </u>	Н—	+	-14		g Terminated at Ele	evation -14.0 ft in	
	‡ .										-	•			‡										<u> </u>		medium dense	sand	
	‡										60.1	GROUND SUR	RFACE 0.		‡										<b> </b>				
59.1	1.0	4	9	10	1	J		1		L	_ <b>5</b> 9.1			╡   ・	‡										F				
57.1	3.0	3	1	3	أعبرنه				SS-1	1 E	-	TAN BROWN CLAYEY SA (ROADWAY EMBA	NDY SILT, MOIST		‡										þ				
	Ŧ				1	<del>                                     </del>		1	1100		55.1	(ROADVAT EIVIDA	5.	의 .	‡			·			•				F	ż		, '	
52.5	7.6	3	<u> </u>	14	11:50						F		·		Ŧ										F				
	Ī	"	9	11	•	20			SS-2	- 8	E				Ŧ										F				
47.5	12.6				: : : }		:   : : : :				Æ	TAN GRAY SANDY SILT, (ALLUVIUM			Ŧ										F				
11.0	<del>                                     </del>	6	9	10	1 : : : •	19		1::::			E	( 133 113	/		Ŧ				i.						E				
	<b>†</b>				<del>  / .</del>	1	<del>.  </del>	<del> </del>	1		<u> </u>			]]] :	t				1.						E				
42.5	17.6	2	3	4	: // : :	: : :	:   : : : :		SS-3		43.1		17.	9	‡				1						E				
	‡	-				<u> </u>			1 33-3		<u></u>				‡							•			Ł				
37.5	22.6	1			]]:\;::	: : :									‡			1.							Ł			· .	
	‡	2	4	6	10	: : :						•			‡										t				
	<b>‡</b>							1			**				‡										F				
32.5	<del>+</del> 27.6	2	4	5	1				SS-4			DARK GRAY SAND I FRAGMENTS, SA	TURATED		‡										F				
	Ŧ	Ì	ĺ		1			<u> </u>	$\prod$		-	(DUPLIN FORM	ATION)	11 .	‡										F			*	٠.
27.5	32.6	<b> </b>		<u> </u>							<b>#</b>				Ŧ										F	•		•	
	Ξ.	3	5	6	. 11			1				1			Ŧ								.		F				
22.5	37.6	1			: : \;	: : :	i	1 :	.		24.1			9   -	Ŧ										F				
	1	10	10	11	1 :::}	121	.		SS-5		<b>E</b>	•			Ī										F				
	‡				<del>  /</del> .	1		<del>                                     </del>						-	$\pm$										F				
17.5	42.6	5	7	9	: : : <u>/</u> :	::::	1	: : : :				DARK GRAY CLAYEY SA SHELL FRAGMEN	ANDY SILT WITH NTS, WET		‡										E				
F 03	‡ .				16	• • •		<u> </u>			ZŁ.	•			‡							:			Ł				
당 - 12.5	47.6			<u></u>	] :: <b>:</b> ::	: : :		::::							†							. •	1		Ŀ				
00	‡	4	7	9	16		1	::::	.		XI .	·			‡										ţ	•			
ž - ·	‡				<del>! .</del>	<del>                                      </del>		<b>†</b>			9.7 -		50.	4   -	‡				1						F				
5 7.5	+ 52.6 +	6	12	18		30			SS-6	- 8	*				‡										ţ				
BRI	‡					·/·		-		] [	<b>*</b> -				‡										F				
2.5	57.6	<u> </u>	<u> </u>	<u> </u>	] ::::	: : .\					**				‡										F				
34080	Ξ.	21	25	25		: : :	50	: : : :	.		<b>#</b>	DARK GRAY SAND I	WITH SHELL		‡										ļ				
8 -2.5	62.6						1		1		WF	FRAGMENTS, SA (PEEDEE FORM	TURATED		Ŧ						•	÷.			F				
- <u>2.5</u>	1 02.0	26	38	51	1 : : : :		.	<b>≥</b> 89	SS-7		<b>#</b>	,	,		Ŧ.							•			F			•	
ORE	<del>-</del>					+			-		<b>-</b>				Ŧ										F				
5 -7.5	67.6	17	27	30	: : : :		: المرد ا		.		<b>*</b>				I							5.7			F				
NC NC	<u> </u>	<u>L''</u>	"			<u> </u>	. 57	1			<u></u>				Ŧ				1,						F				

		<b>J</b> E	BOR	ELC	G RE	POR	T																					**			•
	ECT NO				. B-4080			COUNT	Y Colu	mbus			GEOLOGIST We	scott, F. M.		PROJ	ECT NO	. 3344	2.1.1	ID	D. B-408	30		COUNT	Y Colur	nbus			GE	OLOGIST W	escott, F. M.
SITE	DESCRI	PTION	BRIDG		148 ON SR		ER PINE							GROUND	WTR (ft)	SITE	ESCRI	PTION	BRIDG	E NO.	148 ON	SR 1437 O\	/ER PINE	LOG SWA	MР						GROUND WTR (ft
BORI	NG NO.	B2-B			STATION	15+60		OFFSE	<b>T</b> 7ft R	Γ		ALIGNI	MENT -L-	0 HR.	N/A	BORIN					STATIO	<b>N</b> 15+60		OFFSET	7ft RT	-		ALIG	NMENT	·L-	0 HR. N/A
COLI	AR ELE	<b>V.</b> 60.0	0 ft		TOTAL DE	PTH 79.	9 ft	NORTH	ING 20	8,706		EASTIN	NG 2,082,183	24 HR.	6.2	COLL	AR ELE	<b>V.</b> 60.0	) ft		TOTAL	DEPTH 79.	9 ft	NORTHI	NG 208	3,706		EAS	TING 2,0	32,183	<b>24 HR.</b> 6.2
DRIL	MACHI	NE C	ИЕ-45B		DRILL ME	THOD M	ud Rotary						HAMMER TYPE	E Automatic		DRILL	MACHI	NE CN	/IE-45B		DRILL I	METHOD M	ud Rotary						ŀ	IAMMER TYP	E Automatic
STAF	T DATE				COMP. DA			SURFA	<del></del>			N/A	DEPTH TO RO	CK N/A		STAR	DATE	02/20	07		COMP.	<b>DATE</b> 02/20	0/07	SURFAC	CE WAT	ER D	EPTH	N/A		EPTH TO RO	CK N/A
ELEV (ft)	DEPTH		ow cou				PER FOOT		11	`. ▼/	0		SOIL AND ROCK DESC	CRIPTION			DEPTH		OW COL		_		PER FOOT		SAMP				SOIL	AND ROCK DES	CRIPTION
(11)	(ft)	0.5ft	0.5ft	0.5ft	0	25 L	50 	75 100	NO.	MOI	G	ELEV. (ft)			DEPTH (ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МО	l G				***************************************
																				.											
65	+ .										-	-				-15_	<del> </del>		<del> </del>		<del>                                     </del>		ch Line	1		<b>∔</b>		<del></del>			
	Ŧ										F					10.4	78.4				:::							•			
	Ŧ.										F	60.0	GROUND SURF	ACE	0.0	-10.4	70.4	- 8	11	15	:::	26						-19.9			79.9
58.5	1.5						T : : : :	1 : : : :				59.0	ASPHALT PAVEN		1.0												F		Boring Te	erminated at Elev	ration -19.9 ft in
56.0	4.0	4	4	4	.∲8				1 1 33-1	릭	HÆ		TAN BROWN SAND (ROADWAY EMBAN	, MOIST		-	Ŧ										F	•			
	<u> </u>	1	2	1	<b>4</b> 3		-		$\parallel \parallel$			54.0	(NOADVAT EWBAIV	IXIVILIVI)	6.0	-	-										F	_			
51.6	8.4				:\::	1::::	1::::	1::::	1 6								Ŧ										F				
	<u> </u>	6	7	12	· · · · • • 1	9	1					_	÷		,		E							•			1 F				•
	<u> </u>				: : <i>f</i> : :	1 : : : :	1 : : : :	1::::					GRAY SAND WITH WOO SATURATED	D, MOIST TO			ł										1 F				•
46.6	13.4	4	3	2	1 2 ::		: : : :		SS-1	7			(ALLUVIUM)				ł										1 E		-		. •
	‡	•			<del>  •</del> •	1	<del> </del>	<del>                                     </del>	1 33-1							-	t										1 E	_			
41.6	18.4						: : : :					43.0	· · · · · · · · · · · · · · · · · · ·		17.0		<u> </u>										1 E	· .			
	1	2	2	2	4 · · ·	1	1		SS-1	В		-				:	t								-		1 E				
	‡				<b>\</b>	: : : :	: : : :				*						‡							i si			<u> </u>				
36.6	23.4	3	4	4	7		: : : :				*		DARK GRAY SAND W			1.	‡										1				
	‡				1		1	<b>†</b>	11			-	FRAGMENTS, SATU (DUPLIN FORMA)			-											1	<del></del>			
31.6	28.4				: : ::						w t						‡											•			
	‡	3	4	5	. ∳9.		<del>                                     </del>	1			*	-				-	‡											• . •			
00.0	‡				:;::	: : : :					*					:	‡														
20.0	33.4	3	4	6	• •10		: : : :				*						‡														
	Ŧ						1 : : : :	::::	]		F	23.0			37.0		Ŧ									1	F				· • · · · · · · · · · · · · · · · · · ·
21.6	38.4	3	4	7					00.4						,		Ŧ										F	•			v *
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16.6	43.4				: :    :								. •				Ī										F				
	1	4	7	9	16	1						_					Ŧ										l E	· -			
20,	<u> </u>				:: :	: : : :	1::::	1::::					DARK GRAY SANDY (	CLAY, WET		1.	ŧ									1	1 E	•			
97/20	48.4	4	5	9		: : : :	1::::	: : : :									<u> </u>										1 E	-			
GDT (	‡				14		<del> </del>	<del> </del>				- 8.6			51.4	-	<u> </u>							٠			1 E	<del>-</del>			:
6.6	53.4				::==	$\prod_{i=1}^{n} \cdots i$	: : : :				000						‡										<u> </u>				
NC	‡	5	11	18		29	<u> </u>	<u> </u>	SS-2	2	000 000 000	-				-	‡										1 E	<u>.</u>			
GPJ	‡				::::		77.44.	]::::		1.	000 000 000						‡										1 t				
9.1 1.6	58.4	25	100/0.5		::::	: : : :					000 000 000						<u>†</u>				2						1 E				•
GEO_BI	‡	j .					<del> </del>	100/0.5	<b>*</b>		000 000 000	-				-	‡										<u> </u>	<b>-</b>			
ol -3.4	63.4				::::	: : : :	: : : :				000	-2.0	DARK GRAY SAND W		62.0		‡										1	• . •			
B408	‡	23	73	27/0.1		• • • •	1	100/0.6	SS-2	1		_	FRAGMENTS, SATU (PEEDEE FORMA	TION)			‡		1								<u> </u>	<del>-</del>			
BLE	‡					::::	::::	1:: /:						•			‡														
-8.4	68.4	38	46	38	: : : :		: : : :	1:20:							-		‡				·						<u> </u>				
BORE DOI	‡	ŀ				1			11		-	- 40.0				-	‡				ľ							-			•
-13.4	73.4				::::	 ز · · · :	<b>∤</b> ∻′.∵	: : : :				-12.0			72.0	· :	‡							s 1							
ğ	†	6	10	23	<u> </u>	●33	• • • •		SS-2:	2							t									1	1 +	<del>-</del> .			

PROJE	ECT NO	. 3344	2.1.1	10	D.	B-4080	:		COUNTY	Colun	nbus			GEOLOGIST We	scott, F. M.	
SITE D	ESCRI	PTION	BRIDG	E NO.	. 14	48 ON SR 1	437 OVE	ER PINE L	OG SWAN	/IP					GROUND	WTR (f
BORIN	IG NO.	EB2-A			S	TATION 1	5+90		OFFSET	18ft L	Γ ·		ALIGNMEN	T -L-	0 HR.	N/A
COLLA	AR ELE	<b>V.</b> 59.5	ft		T	OTAL DEP	<b>TH</b> 69.6	ft	NORTHI	NG 208	3,738		EASTING 2	2,082,205	24 HR.	5.2
DRILL	MACHI	NE CN	1E-45B		D	RILL METH	OD Mu	d Rotary						HAMMER TYPE	E Automatic	
START	DATE	02/21/	07		C	OMP. DATE	02/21/	07	SURFAC	E WAT	ER DE	EPTH 1	N/A	DEPTH TO ROO	CK N/A	
ELEV	DEPTH	BL	ow co	JNT			BLOWS F	PER FOOT		SAMP.	<b>V</b> /	L	90	IL AND ROCK DESC	PRIDTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ш	0 25	5	0 7	5 100	NO.	MOI		ELEV. (ft)	TE AND ROCK DESC		DEPTH (
60													59.5	GROUND SURFA	ACE.	c
59.5	<del>- 0.0 -</del>	2	1	3	$\dagger \dagger$	<b>4</b> 4			: : : :	SS-23		H		ONO ONE CONT	TOL	
55.6 -	3.9					<u>                                     </u>								TAN BROWN SAND		
		1	1	1	1	2					V		54.4	(ROADWAY EMBAN	KMENI)	5
- 51.4 -	8.1					\						0000				
51.4	- 0.1	4	5	10	11	15				SS-24						
	F					· · /· · ·							GRA'	Y SAND, MOIST TO	SATURATED	
16.4	13.1					: <i> </i> : :								(ALLUVIUM)		
_	F	3	3	3		6										
-													43.1			16
11.4 -	18.1	2	1	3	$\ \cdot\ $					SS-25						
-	<b>F</b> .					<b>T</b>							•			
6.4 -	23.1					\.\\										
		3	5	6	$\rceil  $	111				F		L.				
													DA	RK GRAY SAND WI	TH SHELL	
31.4 -	28.1	3	4	5	$\  \ $									FRAGMENTS, SATU (DUPLIN FORMA)	JRATED	
-			7	ľ		<b>9</b> 9							•	(DOI ENTI OTANIA	11014)	
- 26.4 -	- - 33.1												• *			
		4	5	6	11	11			• • • •	SS-26	]	Ł				
-												M±				
21.4 -	- 38.1	11	37	12	$\  \ $							M±				
-	-	''	37	12				49								
- 16.4 -	43.1						·/· ·						18.1			41
	43.1	6	7	10	11	· · · •17				SS-27		J				
•												F	DARK	GRAY SILTY CLAY	WITH SHELL	
11.4 -	48.1				$\  \ $								5,	FRAGMENTS, V		
_	-	5	7	10		<b>4</b> 17										
	[ 												8.3			5*
6.4	<u> 53.1</u>	6	8	16	$\parallel$	24			: : : :	SS-28	1					
-							```\				1		DARK	GRAY CLAYEY SAN	D WITH SHELL	L
1.4 <b>-</b>	- 58.1	<u></u>			$\ $	: : : :		~;					27 (17)	FRAGMENTS, SATU (PEEDEE FORMA	JRATED	_
_		17	44	35				,	79					(I ELDEL I ORWA	11011)	
-																
·3.6 -	63.1	20	65	35/0.3	$\  \ $			: : : :				$\nearrow$		F		
-	-								100/0.8	1			-6.9			
- -8.6 -	- - 68.1				$\ $				·			D		DI OD W O	N AN	66
-		23	27	18	$\downarrow \downarrow$		•4	ابر 5	• • • •	SS-29	<u> </u>	1	-10.1	RK GRAY SANDY C		69
-	-											I E	Boring T	erminated at Elevation sandy clay	on -10.1 ft in ha	
	<u> </u>								٠			E	Note: 4	9 BPF at elevation 21	.4 due to shells	S.
-	-								·			l F	.1010. 4	Coloradon Zi	duo to onelli	
-	_											F		€.		
1		1		l		1,27										

B-4080 Bridge No. 148 on SR 1437 over Pine Log Swamp

HOLE#	SAMPLE#	PASS 10	PASS 40	<b>PASS 200</b>	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
B1-A	SS-1	100	99	55	2.6	52.5	24.7	20.1	24	3	A-4(0)	3.0-4.5		
	SS-2	100	100	48	2.6	56.3	33.0				A-4(0)	7.6-9.1		
	SS-3	100	95	24	26.0	51.9	10.1	12.1	22	NP	A-2-4(0)	17.6-19.1		
	SS-4	100	89	27	39.8	34.4	7.6					27.6-29.1		
	SS-5	100	91	43	22.7	38.6	12.5				A-4(0)	37.6-39.1		
	SS-6	92	66	13	55.7	31.2	3.0	10.1	26	NP	A-2-4(0)	52.6-54.1		
	SS-7	93	85	12	36.0	52.3	5.6					62.6-64.1		
EB1-B	SS-8	100	97	19	8.2	77.8	12.4	1.6	16	NP	A-2-4(0)	1.0-1.5		
	SS-9	100	100	11	2.8	90.4	5.2	1.6	14	NP	A-2-4(0)	8.5-10.0		
•	SS-10	100	95	22	27.5	52.1	10.8	9.6	18	NP	A-2-4(0)	18.5-20.0		
	SS-11	100	87	22	42.5	37.1	14.8	5.6	20	NP	A-2-4(0)	23.5-25.0		
	SS-12	100	91	37	24.0	41.7					A-6(1)	38.5-40.0	15.9	
	SS-13	100	95	40	21.0	42.3	19.0				A-6(3)	48.5-50.0		
	SS-14	88	65	13	53.7	33.1						53.5-55.0		
	SS-15	. 88	54	7	66.1	27.5	4.8	1.6	13	NP	A-3(0)	68.5-70.0		
B2-B	SS-16	100	99	12	3.0	88.4	8.6	0.0	24	NP	A-2-4(0)	1.5-3.0		•
	SS-17	95	76	5	53.5	42.3	4.2	0.0	20	NP	A-3(0)	13.4-14.9		
	SS-18	100	94	22	27.7	52.9	11.8	7.6	25	NP	A-2-4(0)	18.4-19.9		
	SS-19	100	92	40	23.4	39.9	27.1	9.6	37	13	A-6(2)	38.4-39.9		
	SS-20	62	28	8	71.9	16.6	9.8					53.4-54.9	;	•
	SS-21	100	87	6	43.5	52.1	4.4	0.0	20	NP	A-3(0)	63.4-64.5		
	SS-22	100	88	23	43.5	36.7	14.2	5.6	24	NP	A-2-4(0)	73.4-74.9		
EB2-A	SS-23	100	97	29	7.3	70.9	9.6	12.2	19	NP	A-2-4(0)	1.0-1.5		
•	SS-24	100	100	10	5.1	87.3	3.6	4.1	24	NP	A-3(0)	8.1-9.6		
	SS-25	100	95	23	26.8	51.2	4.7	17.3	27	7	A-2-4(0)	18.1-19.6		
	SS-26	99	90	21	32.8	47.8						33.1-34.6		
	SS-27	100	99	86	3.4	14.0	59.3	23.4	65	41	A-7-6(39)	43.1-44.6		
	SS-28	92	64	23	46.6	30.4	5.6	17.3	35	12	A-2-6(0)	53.1-54.6		
	SS-29	100	89	56	19.6	28.3	11.4	40.7	51	29	A-7-6(13)	68.1-69.6		

# FIELD SCOUR REPORT

WBS:	33442.1.1	_ TIP:	B-4080	COUNTY: Columbus	
DESCRIPTION(1): B	ridge No. 148	on SR 143	7 over Pine Log	g Swamp	
			EXISTING	BRIDGE	
Information from:	Field In Other	nspection _ (explain) _	X Mi	crofilm (reel po	os:)
Bridge No.: 14 Foundation Type: W	8 Length	55	Total Bents:	4 Bents in Channel: 2	
	OUD/2\				
EVIDENCE OF SO Abutments or En		None not	ed		
, 1541.101.10 01 =11					
Interior Bents: N	one noted				
***************************************					
Channel Bed: N	one noted				
***************************************					
Channel Bank: N	one noted				
EVICTING COOLIE	DOSTECTIO	NA.			
EXISTING SCOUR Type(3): W	ooden wing w				
1 ) po(0): <u>11</u>	roodon wing w				
Extent(4): 10	0'-15' from out	side edge	of bridge		
Effectiveness(5): A	ppears satisfa	ctory	<del></del>		
Obstructions(6): N	one Noted	and an experience and a second a second and the sec			

#### **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).
- 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	FORM	ATIO	<u>N</u>							
Channel	Bed Mate	erial(7):	Loose to	mediun	n dense g	gray sand	and v	ery stiff gr	ay sandy	silt					
Channel E	Bank Mate	erial(8):	Loose to												
Channe	l Bank Co	over(9):	Wooded	l swamp	i		***************************************		- <del> </del>						
Flood	dplain Wid	dth(10):	1000+/-	feet	<del> </del>	, p. 1									
Flood	Iplain Cov	ver(11):	Wooded	l swamp	l	· · · · · · · · · · · · · · · · · · ·					<del></del>				
	Stream	n is(12):	Αç	ggrading	-	Degra	ading_		Sta	atic <u>X</u>					
Channel Migratio	n Tenden	тсу(13):	Not likel	y but ma	y migrate	e west to	ward E	nd Bent 1		.,					
Observations															
Observations	and Othe	r Comm	nents:									· ·			
						transferator and the contract of the contract				1,		<del></del>			
									_						
DESIGN SCO	UR ELE	MOITAN	IS(14)				Fe	et <u>X</u>	Met	ers	-				
•	B1 B2 B3														
	B1 B2 B3 43 43														
	-														
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					***************************************		<u> </u>						
	1				<u> </u>							<b> </b>			
	Ļ	<del>,</del>	L		<u> </u>		L			L					
Comparison o	f DSE to	Hvdrau	lics Unit t	heoretica	al scour:										
Based on the						our Eleva	tion is	13 and 14	feet high	er at ber	nt 1 and 2	2,			
respectively, tl	han the 10	00 yr the	eoretical	scour pr	oposed b	y the Hy	drualid	cs Unit.							
000 4514134	010 BE01		DOM 011		DED 41	ID DANIE	7 84 AT	EDIAL							
SOIL ANALYS Bed or Bank	SIS KES	UL 13 F	KUN CH	MINEL	DEU AN	D DANK	I AIVI	LRIAL			T				
Sample No.						<b> </b>									
Retained #4				<u> </u>		-			$\neg H$	·····					
Passed #10			<del> </del>	$\dashv \dashv$					I						
Passed #40				$\top$	One Oh	-140				<u>, , , , , , , , , , , , , , , , , , , </u>					
Passed #200					See She	et 10, st Results	<b>,</b> 11								
Coarse Sand		t-			for samp		,								
Fine Sand						S-17 Cha	nnel h	ed							
Silt						annel ba		-Cu	<b></b>						
Clay S3-9 Charmer bank															
LL									Ц		ļ				
PI															
AASHTO															
	Station														
Offset						ļ					<del> </del>				
Depth	,					<u> </u>					1				

Template Revised 02/07/06

Date: 3-26-0