STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4712	1	11

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 37912.1.1 (B-4712) F.A. PROJ. BRZ-1316(6)

COUNTY BLADEN

SITE DESCRIPTION BRIDGE NO. 189 ON SR 1316 OVER CAPE FEAR RIVER OVERFLOW AT -L- STA. 63+50

ID: B-4712

PROJECT: 37912.1.1

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PERSONNEL

C.M. WRIKE

S&ME PERSONEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2011

DRAWN BY: C.R. SUMNER

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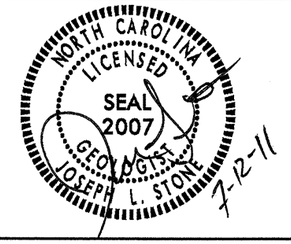

PROJECT REFERENCE NO.	SHEET NO.
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10 # 40 # 200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [-] CME-45B
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. 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 OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK 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*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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 PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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 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 INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM#2- RR SPIKE IN BASE OF CHESTNUT TREE 148 LT OF -BL- STA. 29+38.15

ELEVATION: 45.33 FT.

NOTES:

REVISED 09/23/09

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SITE PLAN

0 50 100
FEET

SKEW = 90°

NC GRID NAD 83/95

60+00

65+00

CAPE FEAR RIVER OVERFLOW

8' SOIL

WILDLIFE LANDING DR 12' GR

15' SOIL DR

BRIDGE NO. 189

SR 1316 TARHEEL FERRY RD 24' BST

B1-A

B2-A

B3-A

JS

-L-

TO NC 87

TO SR 1318

EB1-B

EB2-B

13' SOIL

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

EB2 BENT LINE

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ROADWAY DESIGN ENGINEER

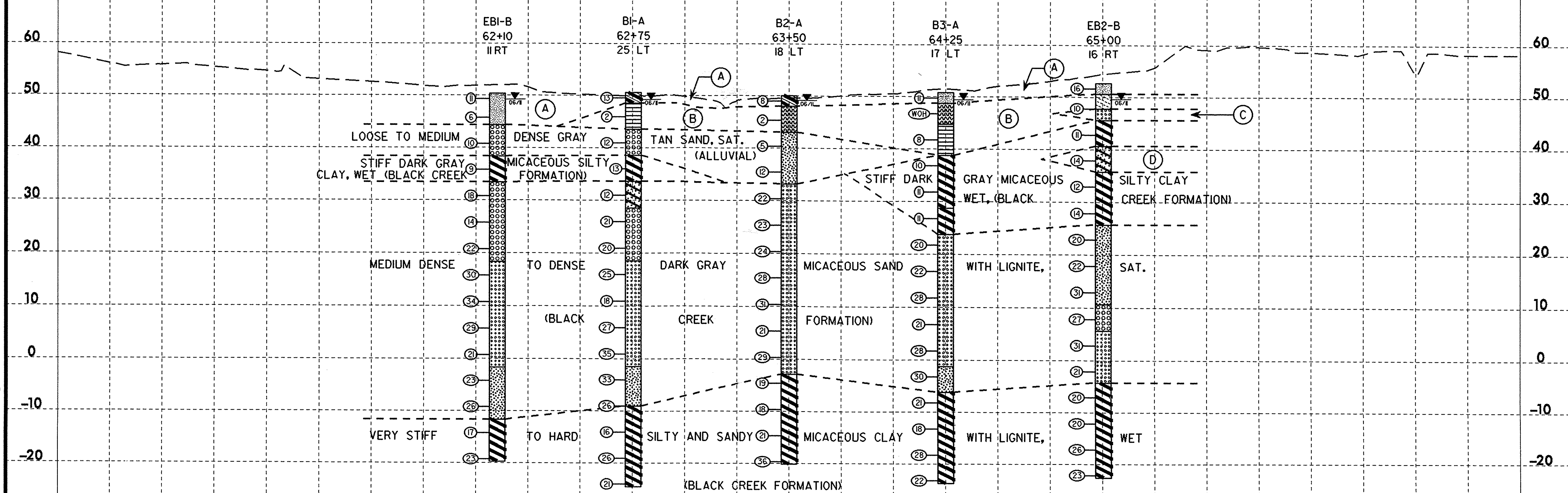
HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5



Ⓐ MEDIUM STIFF TO VERY STIFF TAN SANDY SILT AND SANDY CLAY, MOIST TO WET (ALLUVIAL)

Ⓑ VERY SOFT TO MEDIUM STIFF BROWN MUCK, SAT. AND SANDY SILTY CLAY WITH MODERATE TO LITTLE ORGANIC CONTENT, WET AND VERY LOOSE BROWN SAND WITH LITTLE ORGANIC CONTENT, MOIST TO SAT. (ALLUVIAL)

Ⓒ LOOSE TO MEDIUM DENSE TAN SAND, SAT. (ALLUVIAL)

Ⓓ MEDIUM DENSE DARK GRAY MICACEOUS SAND WITH LIGNITE SAT. (BLACK CREEK FORMATION)

NOTE: GROUNDLINE PROFILE -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 3/28/2011

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

60+50 61+00 61+50 62+00 62+50 63+00 63+50 64+00 64+50 65+00 65+50 66+00 66+50

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 62+10	**OFFSET** 11 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.2 ft	**TOTAL DEPTH** 70.1 ft	**NORTHING** 364,559	**EASTING** 2,065,707	**24 HR.** 1.1
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/14/11	**COMP. DATE** 06/14/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										50.2 GROUND SURFACE	0.0
	50.2	0.0	4	5	6	11	SS-32			**ALLUVIAL** TAN SANDY SILT, MOIST TO WET	
	46.6	3.6	2	2	4	6				44.2	6.0
	41.6	8.6	2	4	6	10	SS-33			**ALLUVIAL** GRAY SAND WITH GRAVEL, SAT.	
	36.6	13.6	3	4	5	9	SS-34	49%		38.2	12.0
	31.6	18.6	5	7	11	18	SS-35			**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	
	26.6	23.6	3	7	7	14				33.2	17.0
	21.6	28.6	5	9	13	22				**COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	
	16.6	33.6	6	12	18	30	SS-36			18.2	32.0
	11.6	38.6	7	15	19	34					
	6.6	43.6	7	12	17	29					
	1.6	48.6	7	8	13	21				-1.8	52.0
	-3.4	53.6	5	10	13	23	SS-37				
	-8.4	58.6	8	11	15	26				-11.8	62.0
	-13.4	63.6	6	8	9	17	SS-38			**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	
	-18.4	68.6	6	9	14	23				-19.9	70.1
										Boring Terminated at Elevation -19.9 ft IN VERY STIFF SILTY CLAY	

NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 62+75	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.4 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 364,633	**EASTING** 2,065,705	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/06/11	**COMP. DATE** 06/07/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
55											
50	50.4	0.0	5	5	8	13	SS-1			50.4 GROUND SURFACE	0.0
	46.8	3.6								48.4 **ALLUVIAL** TAN SANDY CLAY, MOIST TO WET	2.0
45			WOH	1	1	2	SS-2	36%		**ALLUVIAL** BROWN MODERATELY ORGANIC SANDY CLAY, WET	
	41.8	8.6								43.4 **ALLUVIAL** TAN SAND, SAT.	7.0
40			5	6	6	12	SS-3				
	36.8	13.6								38.4 **COASTAL PLAIN** GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	12.0
35			5	5	8	13	SS-4				
	31.8	18.6								33.4 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	17.0
30			3	4	8	12	SS-5				
	26.8	23.6								28.4	22.0
25			6	9	12	21	SS-6				
	21.8	28.6								18.4	32.0
20			5	8	12	20					
	16.8	33.6									
15			6	10	15	25					
	11.8	38.6									
10			7	8	10	18	SS-7				
	6.8	43.6									
5			9	10	17	27					
	1.8	48.6									
0			8	14	21	35					
	-3.2	53.6								-1.6	52.0
-5			7	10	23	33	SS-8				
	-8.2	58.6									
-10			10	12	14	26					
	-13.2	63.6									
-15			5	6	10	16	SS-9				
	-18.2	68.6									
-20			6	12	14	26					
	-23.2	73.6								-24.7	75.1
			8	9	12	21				**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 62+75	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.4 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 364,633	**EASTING** 2,065,705	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/06/11	**COMP. DATE** 06/07/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-25						Match Line				Boring Terminated at Elevation -24.7 ft IN VERY STIFF SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 63+50	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 49.9 ft	**TOTAL DEPTH** 70.2 ft	**NORTHING** 364,696	**EASTING** 2,065,745	**24 HR.** 0.9
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/07/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										49.9 GROUND SURFACE	0.0
	49.9	0.0	3	4	4	8				**ALLUVIAL** TAN SANDY CLAY, WET	
	46.2	3.7								47.9	2.0
45			1	1	1	2	SS-10	32%		**ALLUVIAL** BROWN MUCK, SAT.	
	41.2	8.7								42.9	7.0
40			1	2	3	5	SS-11			**ALLUVIAL** GRAY SAND, SAT.	
	36.2	13.7									
35			2	5	7	12	SS-12				
	31.2	18.7								32.9	17.0
30			4	9	13	22				**COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	
	26.2	23.7									
25			7	10	13	23	SS-13				
	21.2	28.7									
20			8	12	12	24					
	16.2	33.7									
15			7	12	16	28					
	11.2	38.7									
10			8	14	17	31	SS-14				
	6.2	43.7									
5			8	10	11	21					
	1.2	48.7									
0			7	12	17	29					
	-3.8	53.7								-3.1	53.0
-5			6	7	12	19	SS-15			**COASTAL PLAIN** DARK GRAY MICACEOUS SANDY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)	
	-8.8	58.7									
-10			5	8	10	18					
	-13.8	63.7									
-15			6	9	12	21	SS-16				
	-18.8	68.7									
-20			15	15	21	36				-20.3	70.2
										Boring Terminated at Elevation -20.3 ft IN HARD SILTY CLAY	

NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 64+25	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.6 ft	**TOTAL DEPTH** 74.5 ft	**NORTHING** 364,763	**EASTING** 2,065,780	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
55										
50	50.6	0.0	3	5	6	11	SS-17			50.6 / 0.0 GROUND SURFACE
	47.6	3.0	WOH	WOH	WOH	0	SS-18	343%		48.6 / 2.0 **ALLUVIAL** TAN ORANGE SANDY SILT, MOIST TO WET
45	42.6	8.0	3	4	4	8	SS-19	49%		44.6 / 6.0 **ALLUVIAL** BROWN MUCK, SAT.
40	37.6	13.0	3	4	6	10				38.6 / 12.0 **ALLUVIAL** BROWN SITLY CLAY WITH LITTLE ORGANIC MATTER, WET
35	32.6	18.0	3	5	6	11				**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)
30	27.6	23.0	4	5	6	11	SS-20			
25	22.6	28.0	5	8	12	20	SS-21			23.6 / 27.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT (BLACK CREEK FORMATION)
20	17.6	33.0	5	9	13	22				
15	12.6	38.0	10	13	15	28				
10	7.6	43.0	6	10	11	21				
5	2.6	48.0	5	11	17	28				
0	-2.4	53.0	5	13	17	30	SS-22			-1.4 / 52.0
-5	-7.4	58.0	6	9	12	21	SS-23			-6.4 / 57.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)
-10	-12.4	63.0	10	7	11	18				
-15	-17.4	68.0	9	12	16	28				
-20	-22.4	73.0	7	9	13	22				-23.9 / 74.5 Boring Terminated at Elevation -23.9 ft IN

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 64+25	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.6 ft	**TOTAL DEPTH** 74.5 ft	**NORTHING** 364,763	**EASTING** 2,065,780	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-25						Match Line				VERY STIFF SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 65+00	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 52.5 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 364,815	**EASTING** 2,065,843	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
55											
	52.5	0.0	3	7	9	16	SS-24			52.5 GROUND SURFACE	0.0
50	48.7	3.8	WOH	2	8	10	SS-25			50.5 **ALLUVIAL** TAN SANDY SILT, MOIST	2.0
45	43.7	8.8	3	4	7	11	SS-26			47.7 **ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATTER, MOIST TO SAT.	4.8
40	38.7	13.8	3	7	7	14	SS-27			45.5 **ALLUVIAL** TAN SAND, SAT.	7.0
35	33.7	18.8	4	4	8	12	SS-28			**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	
30	28.7	23.8	3	5	9	14				40.5 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	12.0
25	23.7	28.8	8	7	13	20	SS-29			35.5 **COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	17.0
20	18.7	33.8	11	10	12	22				25.5 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	27.0
15	13.7	38.8	7	14	17	31					
10	8.7	43.8	8	12	15	27	SS-30			10.5	42.0
5	3.7	48.8	5	14	17	31				5.5	47.0
0	-1.3	53.8	7	9	12	21					
-5	-6.3	58.8	6	9	11	20	SS-31			-4.5 **COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	57.0
-10	-11.3	63.8	7	9	11	20					
-15	-16.3	68.8	7	8	18	26					
-20	-21.3	73.8	8	11	12	23				-22.8 Boring Terminated at Elevation -22.8 ft IN VERY STIFF SILTY CLAY	75.3

NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

B-4712
37912.1.1
BRIDGE NO. 189 ON SR 1316 OVER CAPE FEAR RIVER OVERFLOW AT -L- STA. 63+50

EB1-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-32	11 RT	62+10	0.0-1.5	A-4(0)	19	3	42.4	24.2	17.2	16.2	100	84	36	-	-
SS-33	11 RT	62+10	8.6-10.1	A-1-b(0)	18	NP	89.8	5.9	0.2	4.1	87	18	4	-	-
SS-34	11 RT	62+10	13.6-15.1	A-7-5(44)	75	35	1.8	1.4	44.0	52.8	100	99	97	48.9	-
SS-35	11 RT	62+10	18.6-20.1	A-1-b(0)	25	5	80.4	8.5	1.9	9.1	98	49	12	-	-
SS-36	11 RT	62+10	33.6-35.1	A-3(0)	20	NP	74.3	16.6	2.9	6.1	100	88	10	-	-
SS-37	11 RT	62+10	53.6-55.1	A-2-4(0)	25	NP	42.4	41.9	5.5	10.2	98	80	17	-	-
SS-38	11 RT	62+10	63.6-65.1	A-7-6(42)	62	42	6.9	3.7	38.7	50.8	100	96	92	-	-

B1-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	25 LT	62+75	0.0-1.5	A-6(3)	30	14	28.1	31.7	15.8	24.4	100	87	44	-	-
SS-2	25 LT	62+75	3.6-5.1	A-7-5(11)	62	17	21.4	17.5	34.7	26.4	95	85	61	36.3	19.8
SS-3	25 LT	62+75	8.6-10.1	A-1-b(0)	21	NP	89.3	8.7	0.9	1.0	91	27	2	-	-
SS-4	25 LT	62+75	13.6-15.1	A-7-6(52)	76	47	4.7	2.4	37.9	54.9	100	97	94	-	-
SS-5	25 LT	62+75	18.6-20.1	A-2-6(0)	28	11	78.8	7.8	4.2	9.2	100	60	15	-	-
SS-6	25 LT	62+75	23.6-25.1	A-1-b(0)	18	NP	87.5	8.7	0.7	3.1	100	50	5	-	-
SS-7	25 LT	62+75	38.6-40.1	A-3(0)	17	NP	82.6	12.7	1.6	3.1	100	79	6	-	-
SS-8	25 LT	62+75	53.6-55.1	A-2-4(0)	22	NP	39.9	40.8	7.1	12.2	99	92	21	-	-
SS-9	25 LT	62+75	63.6-65.1	A-7-5(77)	97	65	0.8	1.0	20.9	77.3	100	99	99	-	-

B2-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-10	18 LT	63+50	3.7-5.2	NOT ENOUGH SAMPLE										31.7	29.7
SS-11	18 LT	63+50	8.7-10.2	A-2-4(0)	32	10	49.4	21.2	15.2	14.2	92	80	30	-	-
SS-12	18 LT	63+50	13.7-15.2	A-2-4(0)	23	NP	31.1	46.3	8.3	14.2	100	98	25	-	-
SS-13	18 LT	63+50	23.7-25.2	A-3(0)	20	NP	71.7	20.5	3.7	4.1	100	93	9	-	-
SS-14	18 LT	63+50	38.7-40.2	A-3(0)	20	NP	76.2	16.0	3.8	4.1	100	87	9	-	-
SS-15	18 LT	63+50	53.7-55.2	A-7-6(27)	58	41	10.0	22.6	22.7	44.8	100	98	70	-	-
SS-16	18 LT	63+50	63.7-65.2	A-7-6(22)	59	40	15.1	25.6	14.5	44.8	100	95	62	-	-

B3-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-17	17 LT	64+25	0.0-1.5	A-4(0)	26	9	32.1	32.3	15.2	20.3	100	87	40	-	-
SS-18	17 LT	64+25	3.0-4.5	A-5(3)	98	NP	40.7	12.0	22.9	24.4	100	77	49	342.8	26.2
SS-19	17 LT	64+25	8.0-9.5	A-7-6(29)	58	30	6.3	12.0	45.1	36.6	100	96	86	49.2	6.9
SS-20	17 LT	64+25	23.0-24.5	A-7-5(54)	81	50	3.7	6.1	29.2	61.0	100	99	92	-	-
SS-21	17 LT	64+25	28.0-29.5	A-3(0)	14	NP	68.7	23.4	3.9	4.1	100	94	9	-	-
SS-22	17 LT	64+25	53.0-54.5	A-2-4(0)	23	NP	20.6	54.8	15.4	9.1	100	94	26	-	-
SS-23	17 LT	64+25	58.0-59.5	A-7-6(35)	61	39	3.3	15.1	28.8	52.9	100	99	84	-	-

EB2-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-24	5 RT	65+00	0.0-1.5	A-4(1)	25	10	36.6	22.0	19.0	22.4	100	83	45	-	-
SS-25	5 RT	65+00	3.8-4.8	A-2-6(0)	33	12	70.6	7.9	7.2	14.2	99	58	22	-	4.7
SS-26	5 RT	65+00	8.8-10.3	A-7-6(31)	58	32	4.3	11.8	51.4	32.6	100	97	88	-	-
SS-27	5 RT	65+00	13.8-15.3	A-2-6(1)	37	17	56.2	13.7	10.8	19.3	99	62	32	-	-
SS-28	5 RT	65+00	18.8-20.3	A-7-6(30)	62	37	13.4	11.2	26.6	48.8	100	95	78	-	-
SS-29	5 RT	65+00	28.8-30.3	A-2-4(0)	21	NP	68.5	22.6	4.9	4.1	100	93	11	-	-
SS-30	5 RT	65+00	43.8-45.3	A-1-b(0)	18	NP	85.5	10.7	1.8	2.0	99	30	5	-	-
SS-31	5 RT	65+00	58.8-60.3	A-7-6(41)	68	39	2.4	8.7	25.7	63.1	100	99	91	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 37912.1.1 TIP: B-4712 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 189 ON SR 1316 OVER CAPE FEAR RIVER OVERFLOW

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) BSR REPORT

Bridge No.: 189 Length: 280' Total Bents: 9 Bents in Channel: 0 Bents in Floodplain: 9
Foundation Type: CONCRETE PILES

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE NOTED

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

EXISTING SCOUR PROTECTION

Type(3): CONCRETE END AND SIDE SLOPES

Extent(4): ENTIRE SLOPE TO 50' OUTSIDE EDGE OF BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE NOTED

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.

DESIGN INFORMATION

Channel Bed Material(7): SANDY SILT AND SANDY CLAY

Channel Bank Material(8): SANDY SILT AND SANDY CLAY

Channel Bank Cover(9): TREES

Floodplain Width(10): 4500'±

Floodplain Cover(11): TREES

Stream is(12): Aggrading ____ Degrading ____ Static X

Channel Migration Tendency(13): NONE

Observations and Other Comments: NO FLOW OR WATER IN CHANNEL AT TIME OF INVESTIGATION

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS										
B1	B2	B3								
45.3	45.0	46.5								

Comparison of DSE to Hydraulics Unit theoretical scour:
THE DSE AGREES WITH ALL OF THE MAXIMUM THEORETICAL SOUR ELEVATIONS AS OUTLINED IN THE BSR REPORT DATED 3/28/11.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank						
Sample No.						
Retained #4						
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

See Sheet 10
"Soil Test Results",
for samples:
SS- 1 & 17 (CHANNEL BED)
SS- 32 & 24 (CHANNEL BANK)

Template Revised 02/07/06

Reported by: [signature] Date: 7/11/2011

PROJECT REFERENCE NO.	SHEET
B-4712	3

SITE PLAN

0 50 100 FEET

SKEW = 90°

NC GRID NAD 83/95

60+00

65+00

8' SOIL

CAPE FEAR RIVER OVERFLOW

WILDLIFE LANDING DR 12' GR

15' SOIL DR

BRIDGE NO. 189

SR 1316 TARHEEL FERRY RD 24' BST

B1-A

B2-A

B3-A

JS

-L-

← TO NC 87

TO SR 1318 →

EB1-B

EB2-B

13' SOIL

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

EB2 BENT LINE

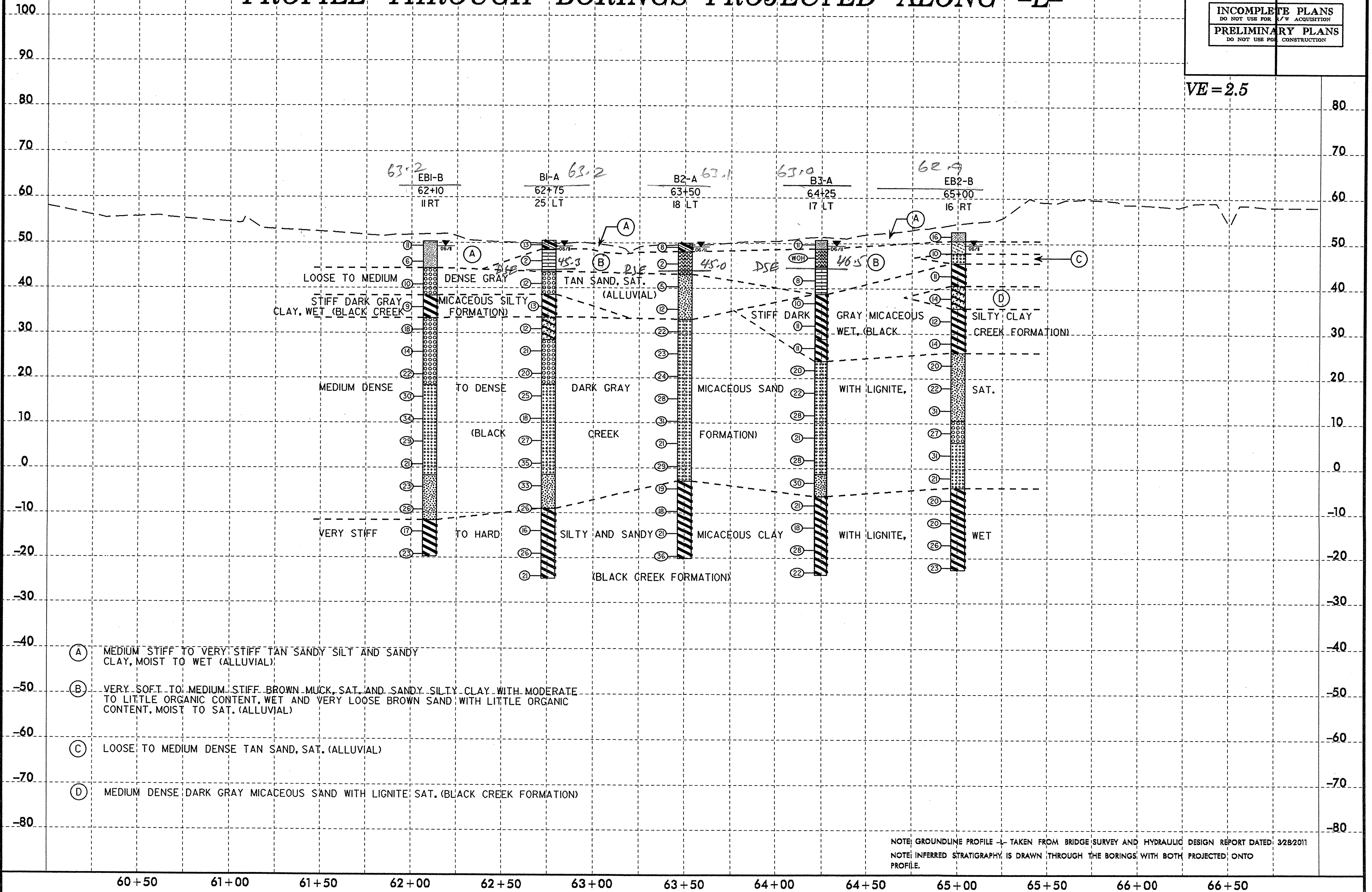
PROJECT REFERENCE NO.	SHEET NO.
B-4712	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5



(A) MEDIUM STIFF TO VERY STIFF TAN SANDY SILT AND SANDY CLAY, MOIST TO WET (ALLUVIAL)

(B) VERY SOFT TO MEDIUM STIFF BROWN MUCK, SAT. AND SANDY SILTY CLAY WITH MODERATE TO LITTLE ORGANIC CONTENT, WET AND VERY LOOSE BROWN SAND WITH LITTLE ORGANIC CONTENT, MOIST TO SAT. (ALLUVIAL)

(C) LOOSE TO MEDIUM DENSE TAN SAND, SAT. (ALLUVIAL)

(D) MEDIUM DENSE DARK GRAY MICACEOUS SAND WITH LIGNITE SAT. (BLACK CREEK FORMATION)

NOTE: GROUNDLINE PROFILE -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 3/28/2011

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

5/14/99

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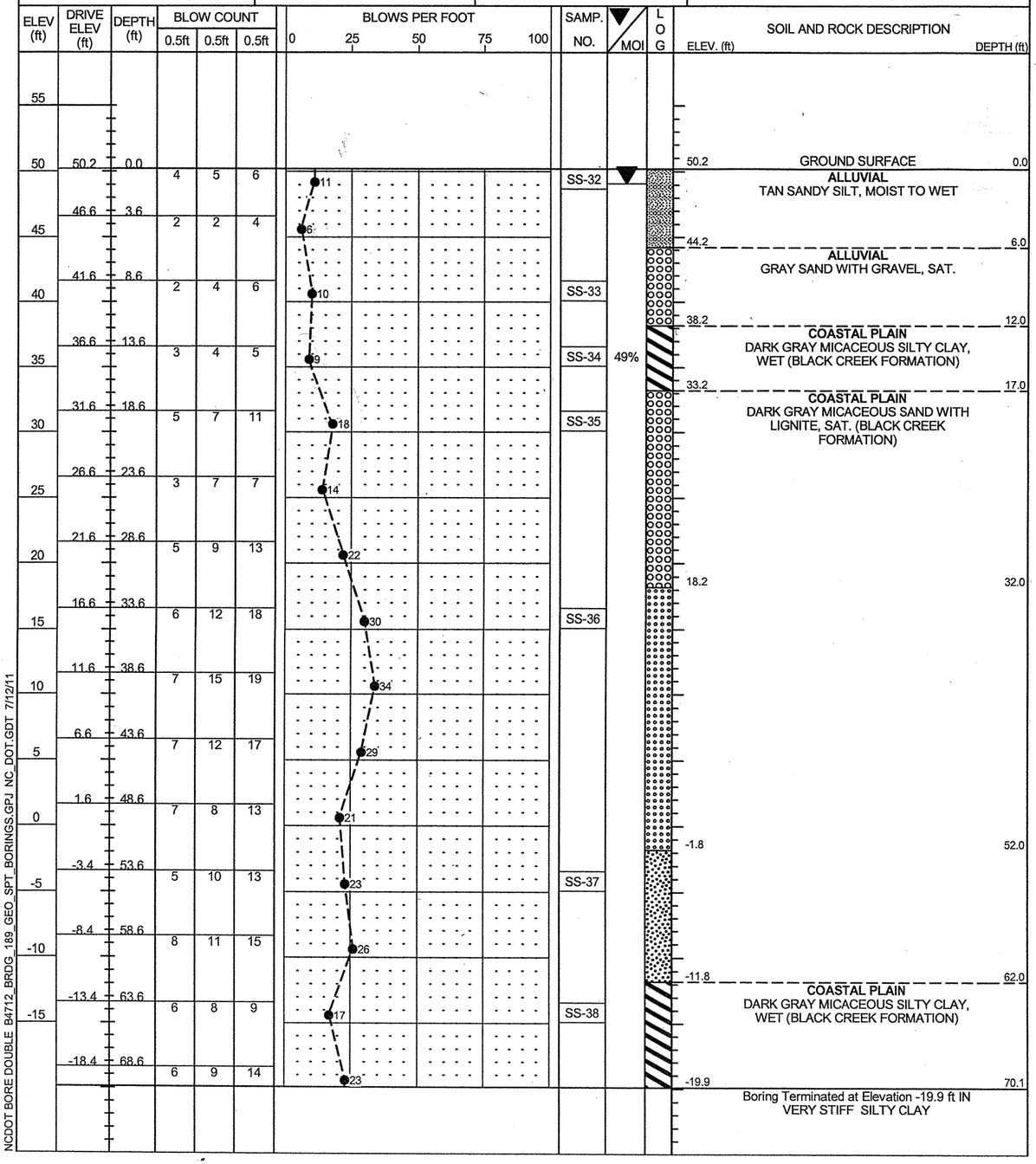
NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 62+10	**OFFSET** 11 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.2 ft	**TOTAL DEPTH** 70.1 ft	**NORTHING** 364,559	**EASTING** 2,065,707	**24 HR.** 1.1
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/14/11	**COMP. DATE** 06/14/11	**SURFACE WATER DEPTH** N/A	



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 62+75	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.4 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 364,633	**EASTING** 2,065,705	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/06/11	**COMP. DATE** 06/07/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
55												
50	50.4	0.0	5	5	8	13	SS-1			50.4	GROUND SURFACE	0.0
	48.4	2.0								48.4	**ALLUVIAL** TAN SANDY CLAY, MOIST TO WET	2.0
45	46.8	3.6	WOH	1	1	2 PSE 45.3	SS-2	36%			**ALLUVIAL** BROWN MODERATELY ORGANIC SANDY CLAY, WET	
	43.4	7.0								43.4	**ALLUVIAL** TAN SAND, SAT.	7.0
40	41.8	8.6	5	6	6	12	SS-3					
	38.4	12.0								38.4	**COASTAL PLAIN** GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	12.0
35	36.8	13.6	5	5	8	13	SS-4					
	33.4	17.0								33.4	**COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)	17.0
30	31.8	18.6	3	4	8	12	SS-5					
	28.4	22.0								28.4		22.0
25	26.8	23.6	6	9	12	21	SS-6					
20	21.8	28.6	5	8	12	20						
	18.4	32.0								18.4		32.0
15	16.8	33.6	6	10	15	25						
10	11.8	38.6	7	8	10	18	SS-7					
5	6.8	43.6	9	10	17	27						
0	1.8	48.6	8	14	21	35						
	-1.6	52.0								-1.6		52.0
-5	-3.2	53.6	7	10	23	33	SS-8					
-10	-8.2	58.6	10	12	14	26						
	-9.2	59.6								-9.2	**COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)	59.6
-15	-13.2	63.6	5	6	10	16	SS-9					
-20	-18.2	68.6	6	12	14	26						
	-23.2	73.6	8	9	12	21				-24.7		75.1

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 62+75	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 50.4 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 364,633	**EASTING** 2,065,705	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/06/11	**COMP. DATE** 06/07/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-25						Match Line				Boring Terminated at Elevation -24.7 ft IN VERY STIFF SILTY CLAY

NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 63+50	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 49.9 ft	**TOTAL DEPTH** 70.2 ft	**NORTHING** 364,696	**EASTING** 2,065,745	**24 HR.** 0.9
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/07/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
50	49.9	0.0	3	4	4	8				49.9 GROUND SURFACE 0.0
										ALLUVIAL
	47.9	2.0								TAN SANDY CLAY, WET
45	46.2	3.7	1	1	1	2	SS-10	32%		47.9 ALLUVIAL 2.0
										BROWN MUCK, SAT.
	42.9	7.0								42.9 7.0
40	41.2	8.7	1	2	3	5	SS-11			ALLUVIAL
										GRAY SAND, SAT.
35	36.2	13.7	2	5	7	12	SS-12			
	32.9	17.0								32.9 17.0
30	31.2	18.7	4	9	13	22	SS-13			COASTAL PLAIN
										DARK GRAY MICACEOUS SAND WITH
25	26.2	23.7	7	10	13	23				LIGNITE, SAT. (BLACK CREEK
										FORMATION)
20	21.2	28.7	8	12	12	24				
	16.2	33.7	7	12	16	28				
15										
	11.2	38.7	8	14	17	31	SS-14			
10										
	6.2	43.7	8	10	11	21				
5										
	1.2	48.7	7	12	17	29				
0										
	-3.1	53.0								-3.1 53.0
-5	-3.8	53.7	6	7	12	19	SS-15			COASTAL PLAIN
										DARK GRAY MICACEOUS SANDY CLAY
-10	-8.8	58.7	5	8	10	18				WITH LIGNITE, WET (BLACK CREEK
										FORMATION)
-15	-13.8	63.7	6	9	12	21	SS-16			
	-18.8	68.7								
-20	-20.3	70.2	15	15	21	36				-20.3 70.2
										Boring Terminated at Elevation -20.3 ft IN
										HARD SILTY CLAY

NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 64+25	**OFFSET** 17 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 50.6 ft	**TOTAL DEPTH** 74.5 ft	**NORTHING** 364,763	**EASTING** 2,065,780 / **24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft) / DEPTH (ft)
55										
50	50.6	0.0	3	5	6	11				50.6 / 0.0 GROUND SURFACE
	47.6	3.0	WOH	WOH	WOH	0 DSE 4613	SS-17			ALLUVIAL
45							SS-18	343%		48.6 / 2.0 TAN ORANGE SANDY SILT, MOIST TO WET
	42.6	8.0	3	4	4	8	SS-19	49%		ALLUVIAL
40										44.6 / 6.0 BROWN MUCK, SAT.
	37.6	13.0	3	4	6	10				ALLUVIAL
35										BROWN SITLY CLAY WITH LITTLE ORGANIC MATTER, WET
	32.6	18.0	3	5	6	11				38.6 / 12.0 COASTAL PLAIN
30										DARK GRAY MICACEOUS SILTY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)
	27.6	23.0	4	5	6	11				
25							SS-20			
	22.6	28.0	5	8	12	20				
20							SS-21			
	17.6	33.0	5	9	13	22				
15										
	12.6	38.0	10	13	15	28				
10										
	7.6	43.0	6	10	11	21				
5										
	2.6	48.0	5	11	17	28				
0										
	-2.4	53.0	5	13	17	30	SS-22			
-5										
	-7.4	58.0	6	9	12	21	SS-23			
-10										
	-12.4	63.0	10	7	11	18				
-15										
	-17.4	68.0	9	12	16	28				
-20										
	-22.4	73.0	7	9	13	22				

-1.4 / 52.0 COASTAL PLAIN
DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT (BLACK CREEK FORMATION)

-6.4 / 57.0 COASTAL PLAIN
DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)

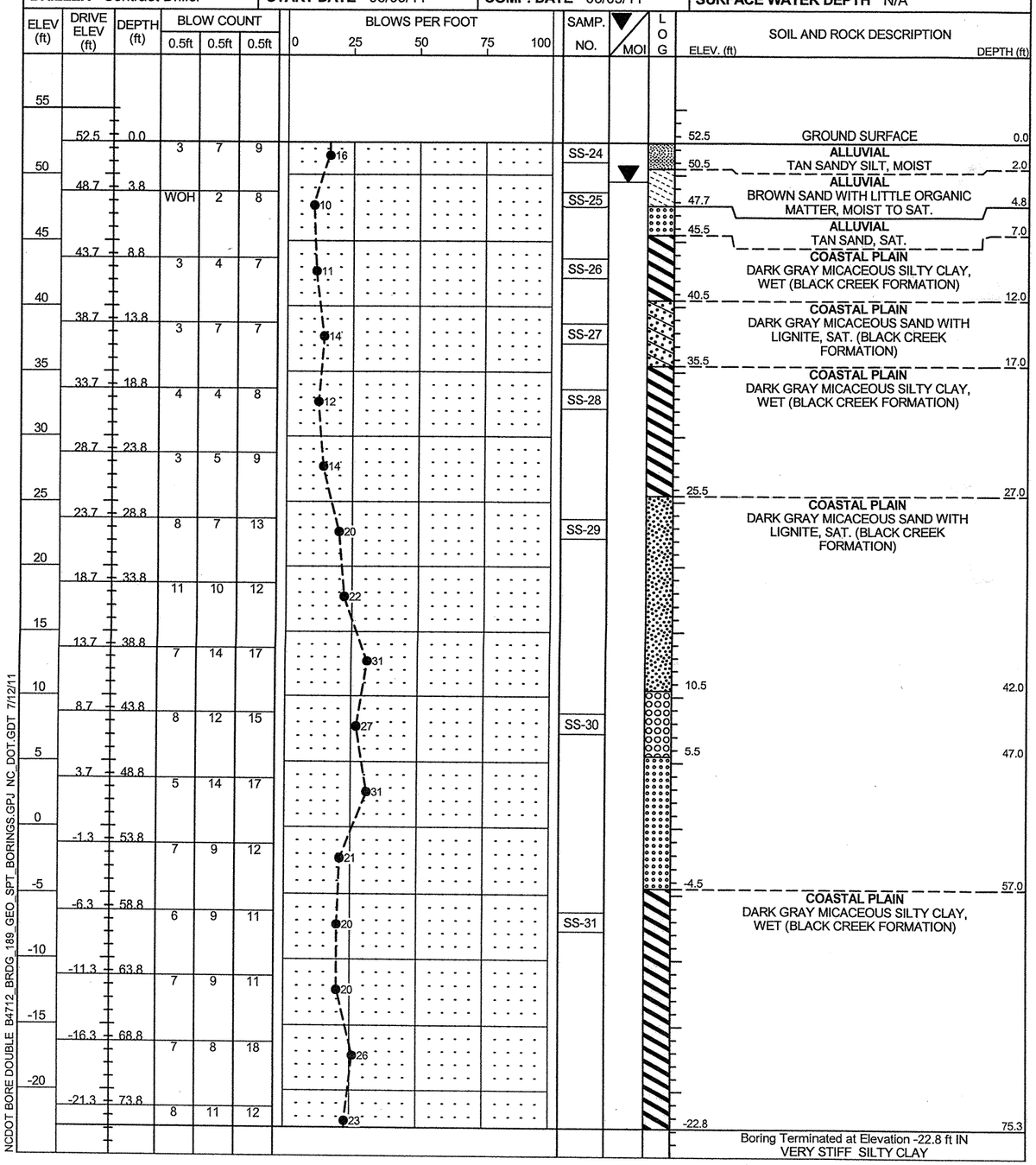
-23.9 / 74.5 Boring Terminated at Elevation -23.9 ft IN

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 64+25	**OFFSET** 17 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 50.6 ft	**TOTAL DEPTH** 74.5 ft	**NORTHING** 364,763	**EASTING** 2,065,780 / **24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-25						Match Line				VERY STIFF SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 189 ON -L- (SR 1316) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 65+00	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 52.5 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 364,815	**EASTING** 2,065,843	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE B4712_BRDG_189_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 7/12/11

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4712	1	27

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *37912.1.1 (B-4712)* F.A. PROJ. *BRZ-1316(6)*

COUNTY *BLADEN*

SITE DESCRIPTION *BRIDGE NO. 188 ON SR 1316 OVER CAPE FEAR RIVER AT -L- STA. 39+15*

ID: B-4712

PROJECT: 37912.1.1

CONTENTS

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 (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.

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PERSONNEL

C.M. WRIKE

S&ME PERSONEL

INVESTIGATED BY *J.L. STONE*

CHECKED BY *D.N. ARGENBRIGHT*

SUBMITTED BY *D.N. ARGENBRIGHT*

DATE *JULY 2011*

DRAWN BY: *C.R. SUMNER*

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.

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NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE 7-22-11

PROJECT REFERENCE NO.	SHEET NO.
B-4712	2 OF 27

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10 # 40 # 200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [X] CME-45B
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. 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 OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK 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*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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 PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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 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 INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM#2- RR SPIKE IN BASE OF CHESTNUT TREE 148 LT OF -BL- STA. 29+38.15

ELEVATION: 45.33 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
B-4712	3
SITE PLAN	

0 50 100 FEET

NC GRID NAD 83/95

SKEW = 90°

30+00

35+00

WOODS

CAPE FEAR RIVER

25' CONC BOAT RAMP

7' SOIL

BRIDGE NO. 188

TO NC 87

SR 1316 TAR HEEL FERRY RD.

-L-

-L-

EB1-A

B1-B

B2-A

B3-A

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

WOODS

WOODS

C

F

F

JS

PROJECT REFERENCE NO.	SHEET
B-4712	4

0 50 100
FEET

SITE PLAN

SKEW = 90°

NC GRID NAD 83/95

40+00

GR

WOODS

WILDLIFE LANDING DR 12' GR

B4–A B5–A B6–A B7–A B8–A B9–A B10–A B11–A

BRIDGE NO. 188

SR 1316 TAR HEEL FERRY RD.

8' SOIL DR

B4 BENT LINE

B5 BENT LINE

B6 BENT LINE

B7 BENT LINE

B8 BENT LINE

B9 BENT LINE

B10 BENT LINE

B11 BENT LINE

WOODS

PROJECT REFERENCE NO.	SHEET
B-4712	5
SITE PLAN	

0 50 100
FEET

NC GRID NAD 83/96

SKEW = 90°

45+00

WOODS

WILDLIFE LANDING DR 12' GR

12" SOIL

WOODS

B12-A

BRIDGE NO. 188

-EL-

SR 1316 TAR HEEL FERRY RD.

TO SR 1318

C

C

F

-L-

B12 BENT LINE

B13-B

B13 BENT LINE

EB2-B

EB2 BENT LINE

WOODS

F

F

5/14/99

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

(A) LOOSE TO MEDIUM DENSE TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)
(B) LOOSE TO MEDIUM DENSE DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
(C) DENSE LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)
(D) MEDIUM DENSE DARK GRAY MICACEOUS CLAYEY SAND, SAT. (BLACK CREEK FORMATION)
(E) VERY STIFF DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)

PROJECT REFERENCE NO.	SHEET NO.
B-4712	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

VE = 2.5

EBI-A
31+30
7 LT

B1-B
33+05
27 RT

B2-A
34+80
21 LT

B3-A
36+55
20 LT

B4-A
37+50
15 LT

SOFT TO STIFF GRAY, TAN, ORANGE SILT AND CLAY, MOIST (UNDIVIDED COASTAL PLAIN)

SANDY TO SANDY TO WET

DENSE TAN ORANGE SAND, SAT. (UNDIVIDED COASTAL PLAIN)

WATER SURFACE

MEDIUM DENSE TO DENSE DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)

VERY LOOSE TO VERY DENSE GRAY SAND AND GRAVEL, SAT. (ALLUVIAL)

VERY SOFT TO STIFF TAN SANDY CLAY, MOIST

GRAY SANDY SILT AND TO SAT. (ALLUVIAL)

VERY STIFF TO HARD DARK GRAY HARD LIGHT GRAY SILTY (CAPE FEAR FORMATION)

SANDY AND SILTY CLAY, WET AND SANDY CLAY, WET (BLACK CREEK FORMATION)

MEDIUM DENSE TO DENSE LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)

VERY STIFF TO HARD LIGHT GRAY SILTY AND SANDY CLAY, WET (CAPE FEAR FORMATION)

NOTE: GROUNDLINE PROFILE -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 3/28/2011

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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PROJECT REFERENCE NO.	SHEET NO.
B-4712	7

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

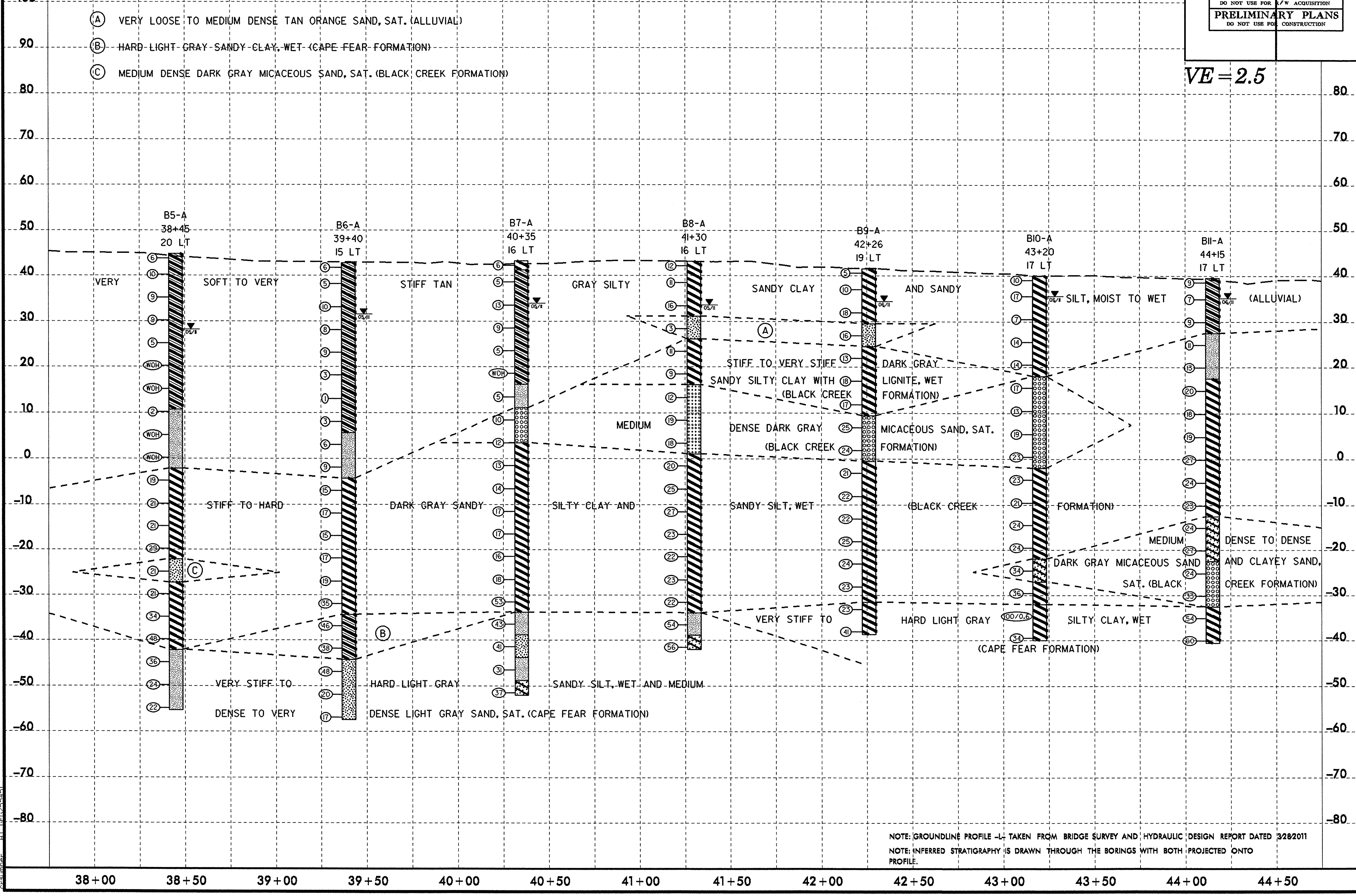
INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

5/14/99

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5



(A) VERY LOOSE TO MEDIUM DENSE TAN ORANGE SAND, SAT. (ALLUVIAL)
(B) HARD LIGHT GRAY SANDY CLAY, WET (CAPE FEAR FORMATION)
(C) MEDIUM DENSE DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
B5-A 38+45 20 LT
B6-A 39+40 15 LT
B7-A 40+35 16 LT
B8-A 41+30 16 LT
B9-A 42+26 19 LT
B10-A 43+20 17 LT
B11-A 44+15 17 LT
VERY SOFT TO VERY STIFF TAN GRAY SILTY SANDY CLAY AND SANDY SILT, MOIST TO WET (ALLUVIAL)
STIFF TO VERY STIFF SANDY SILTY CLAY WITH DARK GRAY LIGNITE, WET (BLACK CREEK FORMATION)
MEDIUM DENSE DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
STIFF TO HARD DARK GRAY SANDY SILTY CLAY AND SANDY SILT, WET (BLACK CREEK FORMATION)
MEDIUM DENSE TO DENSE DARK GRAY MICACEOUS SAND AND CLAYEY SAND, SAT. (BLACK CREEK FORMATION)
VERY STIFF TO HARD LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
VERY STIFF TO HARD LIGHT GRAY SANDY SILT, WET AND MEDIUM DENSE TO VERY DENSE LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)
100/0.6
38+00 38+50 39+00 39+50 40+00 40+50 41+00 41+50 42+00 42+50 43+00 43+50 44+00 44+50
100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80

NOTE: GROUNDLINE PROFILE -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 3/28/2011

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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5/14/99

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO.	SHEET NO.
B-4712	8

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

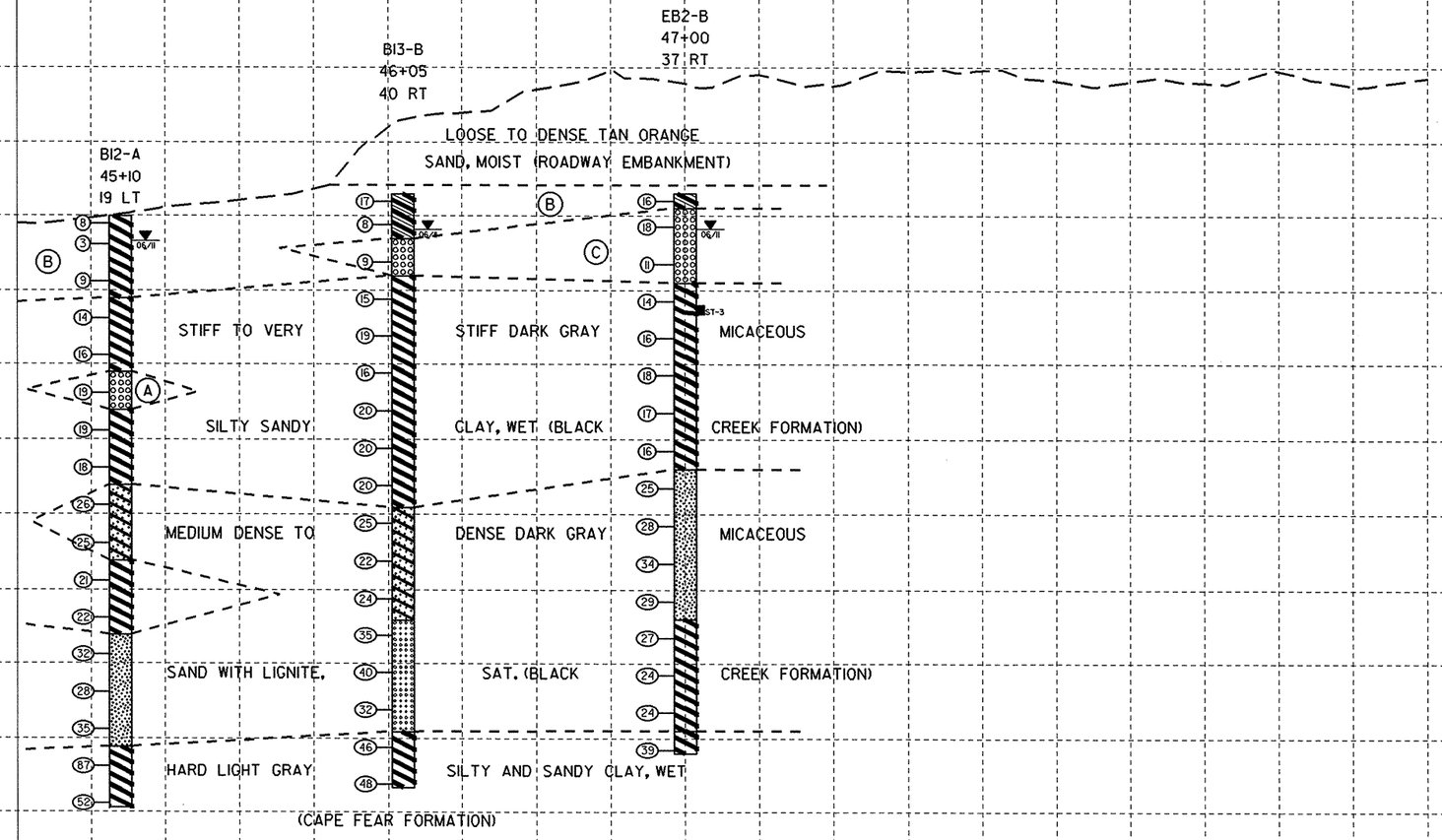
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

VE = 2.5

(A) MEDIUM DENSE DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)

(B) SOFT TO VERY STIFF TAN SILTY AND SANDY CLAY, MOIST TO WET (ALLUVIAL)

(C) LOOSE TO MEDIUM DENSE TAN ORANGE SAND AND GRAVEL, MOIST TO SAT. (ALLUVIAL)



NOTE: GROUNDLINE PROFILE -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 3/28/2011

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 31+30	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 83.7 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 361,821	**EASTING** 2,064,295	**24 HR.** 33.6
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/10/11	**COMP. DATE** 06/13/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
85											
	83.7	0.0	2	5	7	12	SS-83			83.7 GROUND SURFACE	0.0
80	80.2	3.5	2	3	4	7				**UNDIVIDED COASTAL PLAIN** TAN SAND, MOIST	
75	75.2	8.5	WOH	1	2	3	SS-84			76.7	7.0
70	70.2	13.5	1	3	3	6				**UNDIVIDED COASTAL PLAIN** GRAY SANDY CLAY, MOIST	
65	65.2	18.5	2	3	3	6				61.7	22.0
60	60.2	23.5	2	3	3	6	SS-85				
55	55.2	28.5	1	3	3	6					
50	50.2	33.5	5	7	6	13	SS-86			51.7 **UNDIVIDED COASTAL PLAIN** TAN SANDY SILT, MOIST TO WET	32.0
45	45.2	38.5	4	7	7	14				41.7	42.0
40	40.2	43.5	3	5	5	10	SS-87			**UNDIVIDED COASTAL PLAIN** TAN ORANGE SANDY CLAY, WET	
35	35.2	48.5	7	17	21	38	SS-88			36.7 **UNDIVIDED COASTAL PLAIN** TAN ORANGE SAND, SAT.	47.0
30	30.2	53.5	6	9	15	24	SS-89			31.7 **COASTAL PLAIN** DARK GRAY MICACEOUS CLAYEY SAND, SAT. (BLACK CREEK FORMATION)	52.0
25	25.2	58.5	6	8	12	20	SS-90			26.7 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	57.0
20	20.2	63.5	8	10	13	23	SS-91			21.7 **COASTAL PLAIN** GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)	62.0
15	15.2	68.5	9	12	16	28					
10	10.2	73.5	10	13	17	30					
5	5.2	78.5									

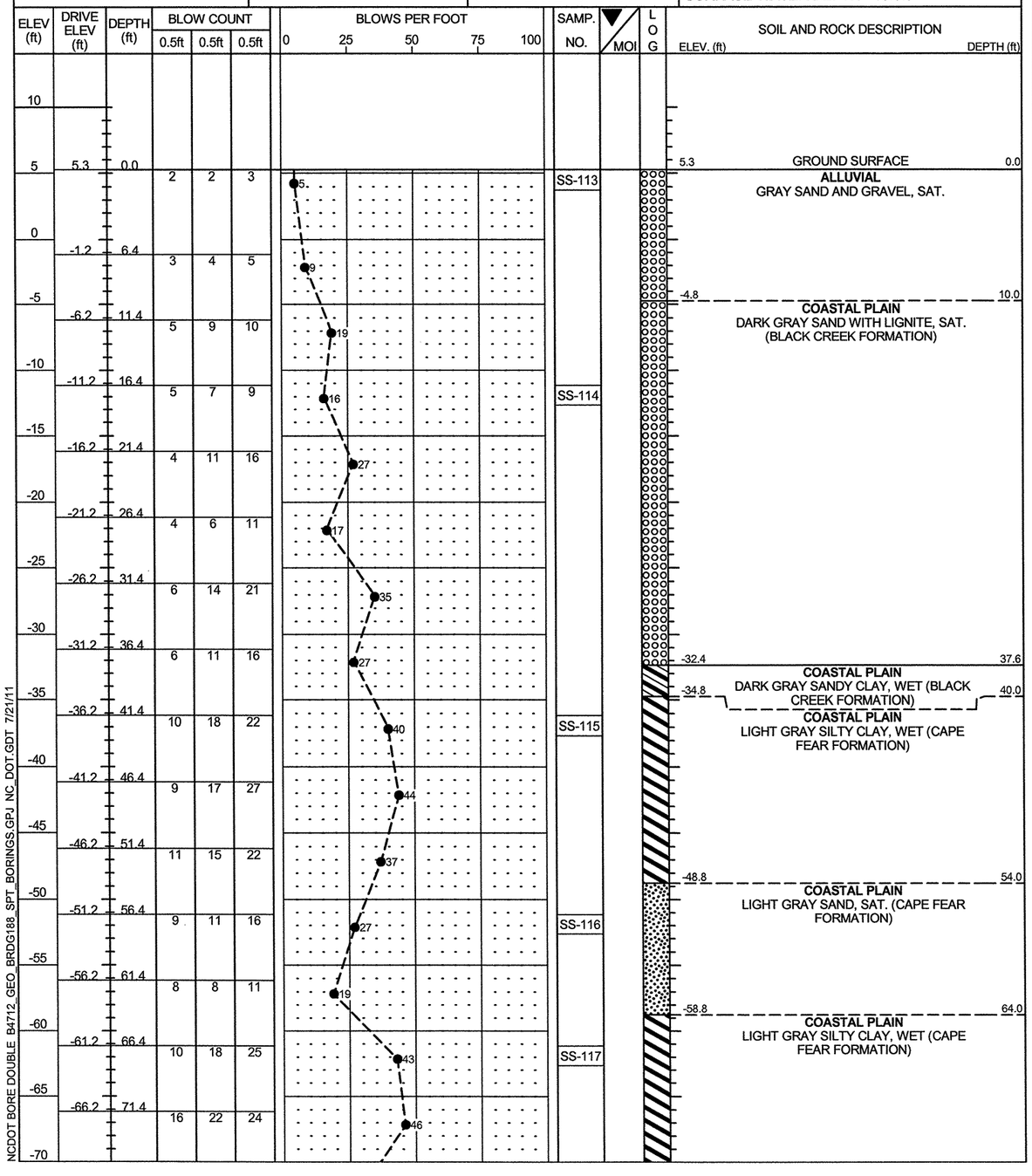
WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 31+30	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 83.7 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 361,821	**EASTING** 2,064,295	**24 HR.** 33.6
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/10/11	**COMP. DATE** 06/13/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
5						Match Line				
			10	13	17	30				**COASTAL PLAIN** GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION) *(continued)*
0	0.2	83.5	9	18	24	42				
-5	-4.8	88.5	10	16	25	41				-6.3 Boring Terminated at Elevation -6.3 ft IN DENSE SAND 90.0

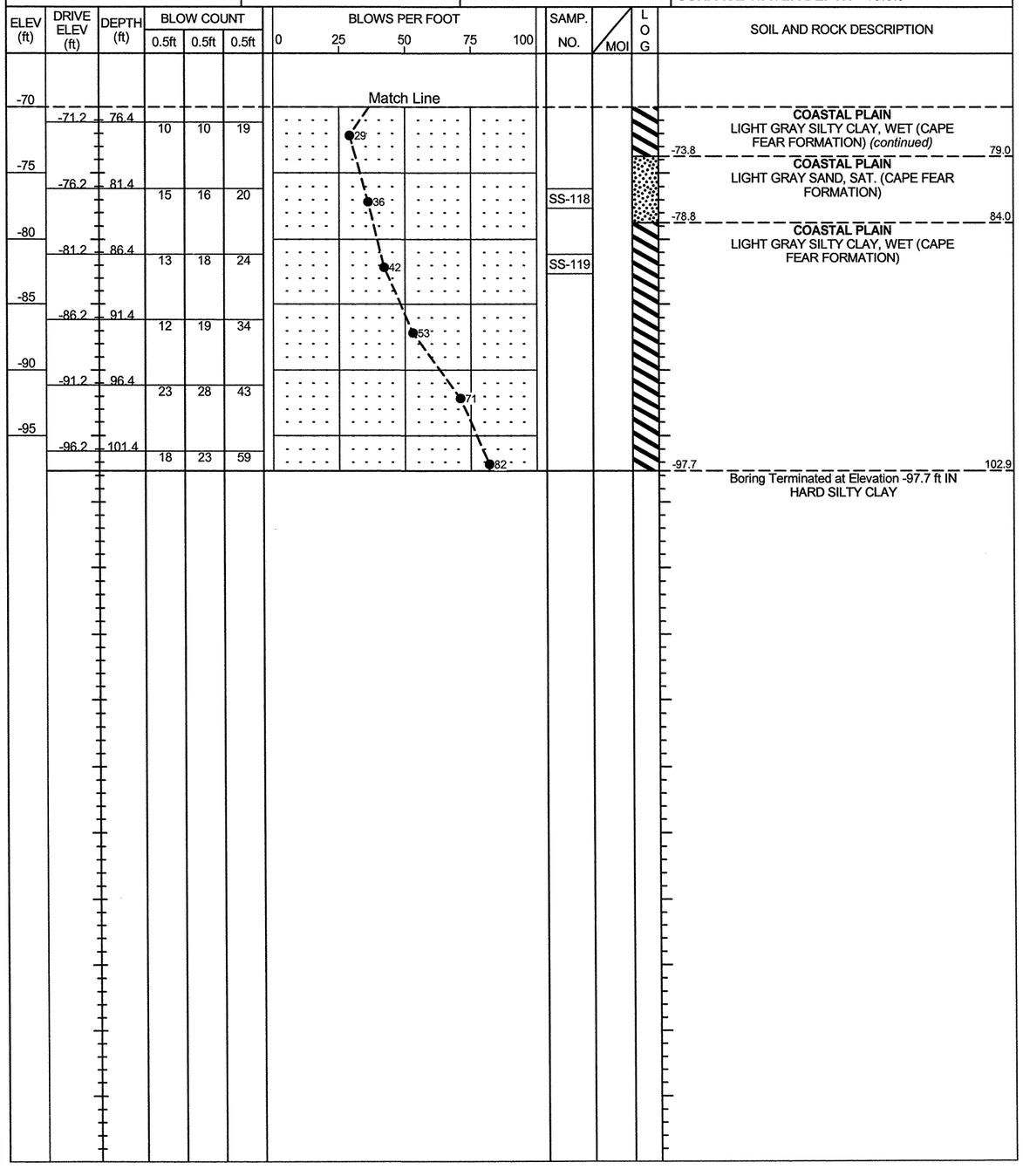
Other Samples:
ST-1 (10.0 - 11.8)
ST-2 (20.0 - 21.7)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 33+05	**OFFSET** 27 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 5.3 ft	**TOTAL DEPTH** 102.9 ft	**NORTHING** 361,962	**EASTING** 2,064,405 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/30/11	**COMP. DATE** 07/01/11	**SURFACE WATER DEPTH** 16.0ft



WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 33+05	**OFFSET** 27 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 5.3 ft	**TOTAL DEPTH** 102.9 ft	**NORTHING** 361,962	**EASTING** 2,064,405 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/30/11	**COMP. DATE** 07/01/11	**SURFACE WATER DEPTH** 16.0ft



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 34+80	**OFFSET** 21 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 14.5 ft	**TOTAL DEPTH** 107.1 ft	**NORTHING** 362,140	**EASTING** 2,064,441 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/29/11	**COMP. DATE** 06/30/11	**SURFACE WATER DEPTH** 6.8ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	WATER SURFACE (06/29/11) / SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
										14.5	0.0
										GROUND SURFACE	
										ALLUVIAL	
										GRAY SAND, SAT.	
15	14.5	0.0	3	1	1	2	SS-105				
10	9.0	5.5	3	2	4	6					
5	3.9	10.6	1	2	4	6					
0	-1.1	15.6	9	43	36	79				-3.5	18.0
-5	-6.1	20.6	5	9	13	22	SS-106				
-10	-11.1	25.6	3	7	11	18				-12.1	26.6
-15	-16.1	30.6	4	8	11	19	SS-107			**COASTAL PLAIN**	
-20	-21.1	35.6	7	10	12	22				DARK GRAY SAND WITH LIGNITE, SAT.	
-25	-26.1	40.6	7	11	11	22	SS-108			(BLACK CREEK FORMATION)	
-30	-31.1	45.6	6	10	14	24					
-35	-36.1	50.6	8	12	21	33	SS-109				
-40	-41.1	55.6	10	11	18	29					
-45	-46.1	60.6	9	14	18	32					
-50	-51.1	65.6	13	15	20	35	SS-110				
-55	-56.1	70.6	9	9	11	20					
-60	-61.1	75.6	10	15	25	40					
-65										-24.5	39.0
										COASTAL PLAIN	
										DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	
										-34.5	49.0
										COASTAL PLAIN	
										LIGHT GRAY SANDY CLAY, WET (CAPE FEAR FORMATION)	
										-49.5	64.0
										COASTAL PLAIN	
										LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)	
										-64.5	79.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 34+80	**OFFSET** 21 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 14.5 ft	**TOTAL DEPTH** 107.1 ft	**NORTHING** 362,140	**EASTING** 2,064,441 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 06/29/11	**COMP. DATE** 06/30/11	**SURFACE WATER DEPTH** 6.8ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
	-66.1	80.6	10	12	15	27	SS-111			**COASTAL PLAIN**
-70	-71.1	85.6	7	14	17	31				LIGHT GRAY SANDY AND SILTY CLAY, WET (CAPE FEAR FORMATION) *(continued)*
-75	-76.1	90.6	11	15	22	37				
-80	-81.1	95.6	11	15	21	36	SS-112			-79.5 94.0
-85	-86.1	100.6	23	100/0.2		100/0.2				
-90	-91.1	105.6	21	25	45	70				-92.6 107.1
										Boring Terminated at Elevation -92.6 ft IN HARD SANDY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 36+55	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 45.2 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 362,295	**EASTING** 2,064,521	**24 HR.** 25.4
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/16/11	**COMP. DATE** 05/17/11	**SURFACE WATER DEPTH** N/A	

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 36+55	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 45.2 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 362,295	**EASTING** 2,064,521	**24 HR.** 25.4
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/16/11	**COMP. DATE** 05/17/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
50											
45	45.2	0.0	5	7	8	SS-1			GROUND SURFACE **ALLUVIAL** TAN SILTY SANDY CLAY, MOIST	45.2	0.0
40	42.9	2.3	5	5	6						
35	36.4	8.8	WOH	2	2	SS-2					
30	31.4	13.8	2	2	2						
25	26.4	18.8	2	3	3	SS-3				29.2	16.0
20	21.4	23.8	2	3	3				**ALLUVIAL** TAN SANDY SILT, MOIST TO WET		
15	16.4	28.8	WOH	WOH	WOH	SS-4					
10	11.4	33.8	2	2	3						
5	6.4	38.8	2	2	4	SS-5				19.2	26.0
0	1.4	43.8	3	6	11				**ALLUVIAL** TAN SANDY CLAY, WET		
-5	-3.6	48.8	11	15	17	SS-6				13.2	32.0
-10	-8.6	53.8	6	11	17				**ALLUVIAL** TAN SANDY SILT, WET		
-15	-13.6	58.8	7	11	15	SS-7				4.2	41.0
-20	-18.6	63.8	5	9	10				**ALLUVIAL** GRAY SAND AND GRAVEL, SAT.		
-25	-23.6	68.8	7	14	12	SS-8				-5.8	51.0
-30	-28.6	73.8	16	18	21	SS-9			**COASTAL PLAIN** DARK GRAY MICACEOUS SANDY CLAY, WET (BLACK CREEK FORMATION)		
										-20.8	66.0
									COASTAL PLAIN DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)		
										-25.8	71.0
									COASTAL PLAIN DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-30									Match Line
-35	-33.6	78.8	18	26	39				
-40	-38.6	83.8	21	33	39				
-45	-43.6	88.8	22	25	32				
									COASTAL PLAIN LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
									Boring Terminated at Elevation -45.1 ft IN HARD SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 37+50	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 45.4 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 362,378	**EASTING** 2,064,569	**24 HR.** 21.1
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/17/01	**COMP. DATE** 05/18/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
45	45.4	0.0	4	5	5	10	SS-10			45.4 GROUND SURFACE 0.0 **ALLUVIAL** TAN SILTY SANDY CLAY, MOIST TO WET
	43.2	2.2	2	3	3	6				
40	36.9	8.5	2	2	3	5	SS-11			
35	31.9	13.5	1	3	4	7				
30	26.9	18.5	WOH	2	4	6				
25	21.9	23.5	WOH	WOH	WOH	0	SS-12			
20	16.9	28.5	WOH	2	0	2				
15	11.9	33.5	1	1	0	1	SS-13			
10	6.9	38.5	1	1	1	2				
5	1.9	43.5	WOH	WOH	WOH	0				
0	-3.1	48.5	1	4	5	9	SS-14			13.4 32.0 **ALLUVIAL** GRAY SANDY SILT, WET
-5	-8.1	53.5	7	9	11	20	SS-15			-3.6 49.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
-10	-13.1	58.5	7	10	11	21				-6.6 52.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
-15	-18.1	63.5	9	11	13	24				
-20	-23.1	68.5	7	11	12	23	SS-16			
-25	-28.1	73.5	10	11	14	25				
-30										

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 37+50	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 45.4 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 362,378	**EASTING** 2,064,569	**24 HR.** 21.1
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/17/01	**COMP. DATE** 05/18/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-30						Match Line				
-35	-33.1	78.5	11	18	29	47	SS-17			-31.6 77.0 **COASTAL PLAIN** LIGHT GRAY MICACEOUS SAND, SAT. (CAPE FEAR FORMATION)
-40	-38.1	83.5	12	18	19	37				
-45	-43.1	88.5	14	16	17	33	SS-18			-41.6 87.0
-50	-48.1	93.5	10	12	15	27				
	-53.1	98.5	10	10	11	21				-54.6 100.0 Boring Terminated at Elevation -54.6 ft IN MEDIUM DENSE SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B5-A	**STATION** 38+45	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 44.8 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 362,465	**EASTING** 2,064,607	**24 HR.** 16.6
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/18/11	**COMP. DATE** 05/19/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
45										
	44.8	0.0	2	3	3	6	SS-19			44.8 GROUND SURFACE 0.0
	41.2	3.6								**ALLUVIAL** TAN SILTY SANDY CLAY, MOIST TO WET
40			3	3	7	10				
	36.2	8.6								
35			2	4	5	9				
	31.2	13.6					SS-20			
30			3	4	5	9				
	26.2	18.6								
25			1	2	3	5				
	21.2	23.6					SS-21			
20			WOH	WOH	WOH	0				
	16.2	28.6								
15			WOH	WOH	WOH	0				
	11.2	33.6								
10			WOH	WOH	2	2				
	6.2	38.6					SS-22			
5			WOH	WOH	WOH	0				
	1.2	43.6								
0			WOH	WOH	WOH	0				
	-3.8	48.6					SS-23			
-5			6	8	11	19				
	-8.8	53.6								
-10			7	10	11	21				
	-13.8	58.6								
-15			7	9	12	21				
	-18.8	63.6								
-20			9	12	17	29	SS-24			
	-23.8	68.6								
-25			4	8	13	21	SS-25			
	-28.8	73.6								
-30			6	8	13	21	SS-26			
	-33.8	78.6								
-35			10	13	21	34				

10.8 — 34.0 **ALLUVIAL** GRAY SANDY SILT, WET

-2.2 — 47.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)

-22.2 — 67.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)

-27.2 — 72.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B5-A	**STATION** 38+45	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 44.8 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 362,465	**EASTING** 2,064,607	**24 HR.** 16.6
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/18/11	**COMP. DATE** 05/19/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				
	-38.8	83.6	18	23	25	48				**COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION) *(continued)*
-40										
	-43.8	88.6	14	17	19	36	SS-27			
-45										
	-48.8	93.6	9	11	13	24				
-50										
	-53.8	98.6	10	11	11	22				
-55										

-42.2 — 87.0 **COASTAL PLAIN** LIGHT GRAY SANDY SILT, WET (CAPE FEAR FORMATION)

-55.3 — 100.1 Boring Terminated at Elevation -55.3 ft IN VERY STIFF SANDY SILT

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 39+40	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 42.7 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 362,547	**EASTING** 2,064,655	**24 HR.** 11.2
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/19/11	**COMP. DATE** 05/23/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
45										
	42.7	0.0	3	3	3	6	SS-28			42.7 GROUND SURFACE 0.0 **ALLUVIAL** TAN GRAY SILTY CLAY, MOIST TO WET
40	39.1	3.6	WOH	2	3	5				
35	34.1	8.6	3	4	6	10				
30	29.1	13.6	2	3	5	8	SS-29			
25	24.1	18.6	2	4	5	9				
20	19.1	23.6	WOH	WOH	3	3				
15	14.1	28.6	WOH	WOH	1	1	SS-30			
10	9.1	33.6	WOH	1	2	3				
5	4.1	38.6	WOH	1	5	6	SS-31			
0	-0.9	43.6	3	4	5	9				
-5	-5.9	48.6	5	6	9	15	SS-32			
-10	-10.9	53.6	4	7	10	17				
-15	-15.9	58.6	7	6	9	15				
-20	-20.9	63.6	7	7	10	17	SS-33			
-25	-25.9	68.6	7	8	11	19				
-30	-30.9	73.6	11	15	20	35				
-35										5.7 37.0 **ALLUVIAL** GRAY SANDY SILT, WET
										4.3 47.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
										-34.3 77.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 39+40	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 42.7 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 362,547	**EASTING** 2,064,655	**24 HR.** 11.2
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/19/11	**COMP. DATE** 05/23/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35	-35.9	78.6	17	20	26	46	SS-34			**COASTAL PLAIN** LIGHT GRAY SANDY CLAY, WET (CAPE FEAR FORMATION) *(continued)*
-40	-40.9	83.6	10	16	22	38				
-45	-45.9	88.6	14	25	23	48	SS-35			-44.3 87.0 **COASTAL PLAIN** LIGHT GRAY SAND, SAT (CAPE FEAR FORMATION)
-50	-50.9	93.6	8	11	9	20	SS-36			
-55	-55.9	98.6	8	8	9	17				-57.4 100.1 Boring Terminated at Elevation -57.4 ft IN MEDIUM DENSE SAND

Match Line

NCDOT BORE DOUBLE B4712_GEO_BRDG188_SPT_BORINGS.GPJ NC_DOT.GDT 7/21/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Swartley, J. R.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 40+35	**OFFSET** 16 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 43.2 ft	**TOTAL DEPTH** 95.2 ft	**NORTHING** 362,632	**EASTING** 2,064,697 / **24 HR.** 9.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/26/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
45										
	43.2	0.0								43.2 / 0.0 GROUND SURFACE
40	39.5	3.7	2	3	3	6	SS-37			41.2 / 2.0 **ALLUVIAL** TAN GRAY SILTY AND SANDY CLAY, MOIST TO WET
			1	2	3	5	SS-38			
35	34.5	8.7								
			3	6	7	13				
30	29.5	13.7								
			4	4	5	9	SS-39			
25	24.5	18.7								
			WOH	2	3	5				
20	19.5	23.7								
			WOH	WOH	WOH	0	SS-40			
15	14.5	28.7								16.2 / 27.0 **ALLUVIAL** TAN SANDY SILT, WET
			1	2	3	5	SS-41			
10	9.5	33.7								11.2 / 32.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
			3	3	7	10	SS-42			
5	4.5	38.7								
			5	5	7	12				
0	-0.5	43.7								3.5 / 39.7 **COASTAL PLAIN** DARK GRAY MICACEOUS SILTY CLAY, WET (BLACK CREEK FORMATION)
			3	5	8	13	SS-43			
-5	-5.5	48.7								
			5	6	8	14				
-10	-10.5	53.7								
			5	7	10	17				
-15	-15.5	58.7								
			6	7	10	17				
-20	-20.5	63.7								
			6	6	10	16				
-25	-25.5	68.7								
			6	8	10	18	SS-44			
-30	-30.5	73.7								
			8	23	30	53				
-35										-33.8 / 77.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Swartley, J. R.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 40+35	**OFFSET** 16 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 43.2 ft	**TOTAL DEPTH** 95.2 ft	**NORTHING** 362,632	**EASTING** 2,064,697 / **24 HR.** 9.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/26/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				
	-35.5	78.7	13	18	25	43	SS-45			**COASTAL PLAIN** LIGHT GRAY SANDY SILT, MOIST (CAPE FEAR FORMATION) *(continued)*
-40	-40.5	83.7	13	16	25	41	SS-46			38.8 / 82.0 **COASTAL PLAIN** LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)
-45	-45.5	88.7	12	13	18	31				43.8 / 87.0 **COASTAL PLAIN** LIGHT GRAY SANDY SILT, WET (CAPE FEAR FORMATION)
-50	-50.5	93.7	10	16	21	37	SS-47			48.8 / 92.0 **COASTAL PLAIN** LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)
										52.0 / 95.2 Boring Terminated at Elevation -52.0 ft IN DENSE SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 41+30	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 43.1 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 362,717	**EASTING** 2,064,740	**24 HR.** 9.5
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/25/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
45										
	43.1	0.0	3	6	6	12				43.1 / 0.0 GROUND SURFACE **ALLUVIAL** TAN SILTY CLAY, MOIST TO WET
40	39.4	3.7	3	5	6	11	SS-48			
35	34.4	8.7	4	7	9	16				
30	29.4	13.7	1	1	2	3	SS-49			31.1 / 12.0 **ALLUVIAL** TAN SAND, SAT.
25	24.4	18.7	4	4	7	11	SS-50			26.1 / 17.0 **COASTAL PLAIN** DARK GRAY SANDY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)
20	19.4	23.7	4	4	5	9				
15	14.4	28.7	3	5	7	12	SS-51			16.1 / 27.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
10	9.4	33.7	5	8	11	19				
5	4.4	38.7	6	7	11	18				
0	-0.6	43.7	6	8	12	20	SS-52			1.1 / 42.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
-5	-5.6	48.7	10	11	14	25				
-10	-10.6	53.7	6	10	17	27				
-15	-15.6	58.7	7	10	13	23				
-20	-20.6	63.7	8	10	12	22	SS-53			
-25	-25.6	68.7	9	10	13	23				
-30	-30.6	73.7	7	10	12	22				
-35										-33.9 / 77.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 41+30	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 43.1 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 362,717	**EASTING** 2,064,740	**24 HR.** 9.5
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/25/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				
	-35.6	78.7	13	21	33	54				**COASTAL PLAIN** LIGHT GRAY SANDY SILT, WET (CAPE FEAR FORMATION) *(continued)*
-40	-38.9	82.0								-38.9 / 82.0 **COASTAL PLAIN** LIGHT GRAY SAND, SAT. (CAPE FEAR FORMATION)
	-40.6	83.7	18	22	34	56	SS-54			-42.1 / 85.2 Boring Terminated at Elevation -42.1 ft IN VERY DENSE SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B9-A	**STATION** 42+26	**OFFSET** 19 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 41.5 ft	**TOTAL DEPTH** 80.2 ft	**NORTHING** 362,804	**EASTING** 2,064,781 — **24 HR.** 7.2
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/27/11	**COMP. DATE** 05/31/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
45											
	41.5	0.0								41.5 GROUND SURFACE	0.0
40			1	2	3	5				**ALLUVIAL** GRAY ORANGE SLTY CLAY, MOIST TO WET	
	37.8	3.7									
35			3	5	5	10	SS-55				
	32.8	8.7									
30			5	8	10	18					
	27.8	13.7								29.5	12.0
25			10	8	8	16	SS-56			**ALLUVIAL** TAN ORANGE SAND AND GRAVEL, SAT.	
	22.8	18.7								24.5	17.0
20			3	6	7	13	SS-57			**COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	
	17.8	23.7									
15			4	7	11	18					
	12.8	28.7									
10			4	5	12	17					
	7.8	33.7									
5			6	10	15	25	SS-58				
	2.8	38.7									
0			7	9	15	24					
	-2.2	43.7									
-5			7	9	12	21					
	-7.2	48.7									
-10			7	10	12	22					
	-12.2	53.7									
-15			8	9	13	22					
	-17.2	58.7									
-20			8	12	13	25	SS-59				
	-22.2	63.7									
-25			9	10	14	24					
	-27.2	68.7									
-30			9	10	13	23					
	-32.2	73.7									
-35			8	9	14	23					
										9.5 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)	32.0
										-0.5 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)	42.0
										-31.5 **COASTAL PLAIN** LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)	73.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B9-A	**STATION** 42+26	**OFFSET** 19 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 41.5 ft	**TOTAL DEPTH** 80.2 ft	**NORTHING** 362,804	**EASTING** 2,064,781 — **24 HR.** 7.2
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/27/11	**COMP. DATE** 05/31/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				
	-37.2	78.7	13	17	24	41				**COASTAL PLAIN** LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION) *(continued)*
										-38.7 80.2 Boring Terminated at Elevation -38.7 ft IN HARD SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B10-A	**STATION** 43+20	**OFFSET** 17 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 40.0 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 362,887	**EASTING** 2,064,826 — **24 HR.** 4.5
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/01/11	**COMP. DATE** 06/02/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
40										
	40.0	0.0	4	5	5	10	SS-60			40.0 / 0.0 GROUND SURFACE **ALLUVIAL** TAN SILTY CLAY, WET
	36.5	3.5								
35			5	7	10	17				
	31.5	8.5								
30			3	3	4	7				
	26.5	13.5								
25			4	6	8	14	SS-61			
	21.5	18.5								18.0 / 22.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
20			3	6	8	14				
	16.5	23.5								
15			6	7	10	17	SS-62			
	11.5	28.5								
10			3	6	7	13				
	6.5	33.5								
5			5	8	11	19				
	1.5	38.5								
0			6	10	13	23	SS-63			
	-3.5	43.5								
-5			6	9	14	23	SS-64			
	-8.5	48.5								
-10			6	9	12	21				
	-13.5	53.5								
-15			6	11	13	24				
	-18.5	58.5								
-20			7	11	13	24				
	-23.5	63.5								
-25			9	14	20	34	SS-65			
	-28.5	68.5								
-30			8	14	22	36	SS-66			
	-33.5	73.5								
-35			23	66	34/0.1	100/0.6	SS-67			
	-38.5	78.5								
-40			13	15	19	34				-2.0 / 42.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION) -22.0 / 62.0 **COASTAL PLAIN** DARK GRAY MICACEOUS CLAYEY SAND, SAT. (BLACK CREEK FORMATION) -27.0 / 67.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION) -32.0 / 72.0 **COASTAL PLAIN** LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION) -40.0 / 80.0

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B10-A	**STATION** 43+20	**OFFSET** 17 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 40.0 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 362,887	**EASTING** 2,064,826 — **24 HR.** 4.5
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/01/11	**COMP. DATE** 06/02/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-40						Match Line				Boring Terminated at Elevation -40.0 ft IN HARD SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B11-A	**STATION** 44+15	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 39.5 ft	**TOTAL DEPTH** 80.1 ft	**NORTHING** 362,971	**EASTING** 2,064,869	**24 HR.** 4.4
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
40	39.5	0.0	2	4	5	9	SS-68			39.5 / 0.0 GROUND SURFACE **ALLUVIAL** TAN SANDY CLAY, MOIST TO WET
35	35.9	3.6	2	3	4	7				
30	30.9	8.6	2	4	5	9				
25	25.9	13.6	3	4	7	11	SS-69			27.5 / 12.0 **COASTAL PLAIN** DARK GRAY SANDY SILTY, WET (BLACK CREEK FORMATION)
20	20.9	18.6	4	6	7	13				
15	15.9	23.6	5	9	11	20	SS-70			17.5 / 22.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
10	10.9	28.6	3	7	11	18				
5	5.9	33.6	4	6	13	19				
0	0.9	38.6	5	13	14	27	SS-71			
-5	-4.1	43.6	6	10	14	24				
-10	-9.1	48.6	7	9	14	23				
-15	-14.1	53.6	8	11	13	24	SS-72			
-20	-19.1	58.6	6	13	14	27				
-25	-24.1	63.6	6	10	14	24	SS-73			
-30	-29.1	68.6	6	9	24	33				
-35	-34.1	73.6	9	21	33	54	SS-74			-12.5 / 52.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT. (BLACK CREEK FORMATION)
-40	-39.1	78.6	17	26	34					-22.5 / 62.0 -32.5 / 72.0 **COASTAL PLAIN** LIGHT GRAY SANDY CLAY, WET (CAPE FEAR FORMATION)

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B11-A	**STATION** 44+15	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 39.5 ft	**TOTAL DEPTH** 80.1 ft	**NORTHING** 362,971	**EASTING** 2,064,869	**24 HR.** 4.4
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-40						Match Line 60				-40.6 / 80.1 Boring Terminated at Elevation -40.6 ft IN HARD SANDY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B12-A	**STATION** 45+10	**OFFSET** 19 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 39.9 ft	**TOTAL DEPTH** 79.2 ft	**NORTHING** 363,057	**EASTING** 2,064,910 — **24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/02/11	**COMP. DATE** 06/03/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft) / DEPTH (ft)
40										39.9 / 0.0 GROUND SURFACE
	39.9	0.0	3	4	4	8	SS-75			**ALLUVIAL** TAN SILTY CLAY, MOIST TO WET
	37.2	2.7	WOH	1	2	3				
35										
	32.2	7.7	2	4	5	9				
30										
	27.2	12.7	4	5	9	14	SS-76			28.9 / 11.0 **COASTAL PLAIN** DARK GRAY SANDY CLAY, WET (BLACK CREEK FORMATION)
25										
	22.2	17.7	3	7	9	16				
20										
	17.2	22.7	3	8	11	19	SS-77			18.9 / 21.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND, SAT (BLACK CREEK FORMATION)
15										
	12.2	27.7	5	8	11	19	SS-78			13.9 / 26.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
10										
	7.2	32.7	6	8	10	18				
5										
	2.2	37.7	7	9	17	26	SS-79			3.9 / 36.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)
0										
	-2.8	42.7	6	11	14	25				
-5										
	-7.8	47.7	7	9	12	21	SS-80			-6.1 / 46.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
-10										
	-12.8	52.7	7	11	11	22				
-15										
	-17.8	57.7	9	12	20	32	SS-81			-16.1 / 56.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)
-20										
	-22.8	62.7	4	10	18	28				
-25										
	-27.8	67.7	7	15	20	35				
-30										
	-32.8	72.7	16	26	61	87	SS-82			-31.1 / 71.0 **COASTAL PLAIN** LIGHT GRAY SANDY CLAY, WET (CAPE FEAR FORMATION)
-35										
	-37.8	77.7	11	21	31	52				-39.3 / 79.2

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B12-A	**STATION** 45+10	**OFFSET** 19 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 39.9 ft	**TOTAL DEPTH** 79.2 ft	**NORTHING** 363,057	**EASTING** 2,064,910 — **24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/02/11	**COMP. DATE** 06/03/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-40						Match Line				Boring Terminated at Elevation -39.3 ft IN HARD SANDY CLAY

NCDOT BORE DOUBLE B4712_GEO_BRDG188_SPT_BORINGS.GPJ NC_DOT.GDT 7/21/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B13-B	**STATION** 46+05	**OFFSET** 40 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 42.9 ft	**TOTAL DEPTH** 79.6 ft	**NORTHING** 363,115	**EASTING** 2,065,006 / **24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/15/11	**COMP. DATE** 06/16/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
45										
	42.9	0.0								42.9 / 0.0 GROUND SURFACE
			7	8	9	17	SS-92			**ALLUVIAL** TAN SANDY CLAY, MOIST TO WET
40	39.8	3.1								
			4	3	5	8				
35	34.8	8.1								36.9 / 6.0 **ALLUVIAL** TAN ORANGE SAND AND GRAVEL, SAT.
			4	3	6	9	SS-93			
30	29.8	13.1								31.9 / 11.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
			4	6	9	15	SS-94			
25	24.8	18.1								
			5	8	11	19				
20	19.8	23.1								
			4	7	9	16				
15	14.8	28.1								
			7	9	11	20	SS-95			
10	9.8	33.1								
			5	9	11	20				
5	4.8	38.1								
			5	10	10	20				
0	-0.2	43.1								0.9 / 42.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)
			7	11	14	25	SS-96			
-5	-5.2	48.1								
			6	8	14	22				
-10	-10.2	53.1								
			3	10	14	24				
-15	-15.2	58.1								-14.1 / 57.0
			8	13	22	35	SS-97			
-20	-20.2	63.1								
			10	15	25	40				
-25	-25.2	68.1								
			10	10	22	32				
-30	-30.2	73.1								-29.1 / 72.0 **COASTAL PLAIN** LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
			10	19	27	46	SS-98			
-35										

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B13-B	**STATION** 46+05	**OFFSET** 40 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 42.9 ft	**TOTAL DEPTH** 79.6 ft	**NORTHING** 363,115	**EASTING** 2,065,006 / **24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000	**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/15/11	**COMP. DATE** 06/16/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				
	-35.2	78.1	11	16	32	48				-36.7 / 79.6 Boring Terminated at Elevation -36.7 ft IN HARD SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 47+00	**OFFSET** 37 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 43.0 ft	**TOTAL DEPTH** 75.0 ft	**NORTHING** 363,201	**EASTING** 2,065,046	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/16/11	**COMP. DATE** 06/17/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
45										
	43.0	0.0								43.0 / 0.0 GROUND SURFACE
40			5	7	9	16	SS-99			**ALLUVIAL**
	39.5	3.5								41.0 / 2.0 TAN SILTY CLAY, MOIST
			4	7	11	18	SS-100			**ALLUVIAL** TAN ORANGE SAND AND GRAVEL, MOIST TO SAT.
35	34.5	8.5								
			7	7	4	11	SS-101			
30	29.5	13.5								31.0 / 12.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
			4	5	9	14	SS-102			
25	24.5	18.5								
			4	8	8	16				
20	19.5	23.5								
			5	8	10	18				
15	14.5	28.5								
			4	8	9	17				
10	9.5	33.5								
			3	6	10	16				
5	4.5	38.5								
			6	12	13	25	SS-103			
0	-0.5	43.5								
			8	13	15	28				
-5	-5.5	48.5								
			10	15	19	34				
-10	-10.5	53.5								
			7	12	17	29				
-15	-15.5	58.5								-14.0 / 57.0 **COASTAL PLAIN** DARK GRAY SILTY CLAY, WET (BLACK CREEK FORMATION)
			9	11	16	27	SS-104			
-20	-20.5	63.5								
			7	10	14	24				
-25	-25.5	68.5								
			8	10	14	24				
-30	-30.5	73.5								
			9	15	24	39				-29.0 / 72.0 **COASTAL PLAIN** LIGHT GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
										-32.0 / 75.0 Boring Terminated at Elevation -32.0 ft IN HARD SILTY CLAY
										6.0 / 37.0 **COASTAL PLAIN** DARK GRAY MICACEOUS SAND WITH LIGNITE, SAT. (BLACK CREEK FORMATION)

NCDOT BORE DOUBLE B4712_GEO_BRDG188_SPT_BORINGS.GPJ NC_DOT.GDT 7/21/11

WBS 37912.1.1	**TIP** B-4712	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 188 ON -L- (SR 1316) OVER CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 47+00	**OFFSET** 37 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 43.0 ft	**TOTAL DEPTH** 75.0 ft	**NORTHING** 363,201	**EASTING** 2,065,046	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE SME R-6 CME-550X 77% 00/00/0000		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 06/16/11	**COMP. DATE** 06/17/11	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-35						Match Line				Other Samples: ST-3 (15.0 - 16.2)

B-4712
37912.1.1
BRIDGE NO. 188 ON SR 1316 OVER CAPE FEAR RIVER AT -L- STA. 39+15

EB1-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-83	7 LT	31+30	0.0-1.5	A-3(0)	17	NP	43.0	49.0	3.9	4.1	98	77	9	-	-
SS-84	7 LT	31+30	8.5-10.0	A-7-6(5)	47	21	36.1	24.8	22.8	16.2	100	77	42	-	-
SS-85	7 LT	31+30	23.5-25.0	A-6(5)	36	21	14.4	42.2	12.9	30.5	98	91	45	-	-
SS-86	7 LT	31+30	33.5-35.0	A-4(0)	16	1	25.4	42.6	17.8	14.2	100	88	37	-	-
SS-87	7 LT	31+30	43.5-45.0	A-6(7)	32	17	11.4	37.0	23.2	28.4	100	96	59	-	-
SS-88	7 LT	31+30	48.5-50.0	A-2-4(0)	21	NP	68.3	21.1	0.4	10.2	99	59	12	-	-
SS-89	7 LT	31+30	53.5-55.0	A-2-6(2)	37	19	50.5	14.9	8.2	26.4	98	78	35	-	-
SS-90	7 LT	31+30	58.5-60.0	A-7-5(60)	82	50	0.4	2.0	70.2	27.4	100	100	99	-	-
SS-91	7 LT	31+30	63.5-65.0	A-2-4(0)	21	NP	75.2	12.4	3.2	9.1	100	79	14	-	-

B1-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-113	27 RT	33+05	0.0-1.5	A-1-b(0)	23	NP	86.4	8.1	1.4	4.1	95	24	6	-	-
SS-114	27 RT	33+05	16.4-17.9	A-1-b(0)	21	NP	81.1	13.2	1.6	4.1	100	49	7	-	-
SS-115	27 RT	33+05	41.4-42.9	A-7-6(21)	48	27	9.9	16.4	45.2	28.4	99	93	79	-	-
SS-116	27 RT	33+05	56.4-57.9	A-2-4(0)	30	7	57.2	21.8	14.9	6.1	94	63	22	-	-
SS-117	27 RT	33+05	66.4-67.9	A-7-6(12)	44	18	6.7	32.9	46.3	14.1	100	97	71	-	-
SS-118	27 RT	33+05	81.4-82.9	A-2-4(0)	23	1	9.4	64.1	17.4	9.1	100	99	29	-	-
SS-119	27 RT	33+05	86.4-87.9	A-7-6(32)	51	37	4.4	14.1	32.9	48.5	100	98	86	-	-

B2-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-105	21 LT	34+80	0.0-1.5	A-2-4(0)	22	NP	40.5	50.7	4.8	4.1	99	87	11	-	-
SS-106	21 LT	34+80	20.6-22.1	A-1-b(0)	23	NP	90.3	7.2	1.5	1.0	78	12	3	-	-
SS-107	21 LT	34+80	30.6-32.1	A-1-b(0)	22	NP	91.7	6.6	0.7	1.0	99	20	2	-	-
SS-108	21 LT	34+80	40.6-42.1	A-7-6(43)	71	43	9.5	3.0	28.6	58.8	100	93	88	-	-
SS-109	21 LT	34+80	50.6-52.1	A-7-5(6)	43	12	13.4	40.0	34.5	12.2	100	94	60	-	-
SS-110	21 LT	34+80	65.6-67.1	A-2-4(0)	34	NP	64.9	22.2	8.8	4.1	98	64	16	-	-
SS-111	21 LT	34+80	80.6-82.1	A-6(7)	32	12	2.6	42.0	43.2	12.2	100	99	70	-	-
SS-112	21 LT	34+80	95.6-97.1	A-7-6(34)	56	40	3.2	20.9	33.3	42.6	100	98	84	-	-

B3-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	20 LT	36+55	0.0-1.5	A-6(14)	37	17	2.2	18.3	45.0	34.5	100	99	86	-	-
SS-2	20 LT	36+55	8.8-10.3	A-6(9)	33	15	4.7	32.9	34.0	28.4	100	99	70	-	-
SS-3	20 LT	36+55	18.8-20.3	A-4(0)	21	3	13.4	51.6	18.8	16.2	100	99	42	-	-
SS-4	20 LT	36+55	28.8-30.3	A-6(4)	29	11	5.9	40.8	28.9	24.4	100	100	61	-	-
SS-5	20 LT	36+55	38.8-40.3	A-4(0)	23	5	11.6	55.4	16.8	16.2	100	99	39	-	-
SS-6	20 LT	36+55	43.8-45.3	A-3(0)	19	NP	69.7	22.6	4.6	3.0	94	69	9	-	-
SS-7	20 LT	36+55	53.8-55.3	A-7-6(28)	62	41	14.8	16.0	22.4	46.7	96	89	70	-	-
SS-8	20 LT	36+55	68.8-70.3	A-1-b(0)	22	NP	82.1	11.2	2.6	4.1	100	37	8	-	-
SS-9	20 LT	36+55	73.8-75.3	A-7-6(27)	57	33	9.7	13.8	37.9	38.6	100	95	79	-	-

B4-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-10	15 LT	37+50	0.0-1.5	A-6(9)	33	12	7.1	18.9	43.6	30.5	99	95	81	-	-
SS-11	15 LT	37+50	8.5-10.0	A-6(15)	38	17	0.4	24.6	38.5	36.5	100	100	88	-	-
SS-12	15 LT	37+50	23.5-25.0	A-6(8)	32	14	4.3	34.5	30.8	30.5	100	100	70	-	-
SS-13	15 LT	37+50	33.5-35.0	A-4(2)	26	8	10.4	38.8	28.5	22.3	100	99	58	-	-
SS-14	15 LT	37+50	49.0-50.0	A-2-4(0)	21	NP	30.5	46.1	15.3	8.1	100	97	28	-	-
SS-15	15 LT	37+50	53.5-55.0	A-7-5(46)	74	42	2.6	6.9	35.6	54.8	100	99	93	-	-
SS-16	15 LT	37+50	68.5-70.0	A-7-5(50)	82	47	8.5	3.0	35.6	52.8	100	95	89	-	-
SS-17	15 LT	37+50	78.5-80.0	A-2-4(0)	25	8	35.1	38.6	20.2	6.1	100	86	33	-	-
SS-18	15 LT	37+50	88.5-90.0	A-2-6(0)	33	13	60.2	21.8	8.8	9.1	94	61	19	-	-

B5-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-19	20 LT	38+45	0.0-1.5	A-6(13)	37	15	3.0	16.4	46.0	34.5	100	98	88	-	-
SS-20	20 LT	38+45	13.6-15.1	A-6(9)	32	15	2.2	35.5	31.8	30.5	100	100	72	-	-
SS-21	20 LT	38+45	23.6-25.1	A-6(10)	34	16	5.1	29.0	35.4	30.5	100	100	74	-	-
SS-22	20 LT	38+45	38.6-40.1	A-4(1)	25	6	5.3	48.5	27.9	18.3	100	100	56	-	-
SS-23	20 LT	38+45	48.6-50.1	A-7-5(51)	78	45	1.6	6.1	29.3	62.9	100	100	94	-	-
SS-24	20 LT	38+45	63.6-65.1	A-7-6(13)	53	33	37.8	11.6	18.2	32.5	100	72	52	-	-
SS-25	20 LT	38+45	68.6-70.1	A-2-4(0)	23	NP	29.4	57.0	5.5	8.1	100	98	15	-	-
SS-26	20 LT	38+45	73.6-75.1	A-7-5(55)	82	49	4.5	2.4	36.2	56.9	100	97	94	-	-
SS-27	20 LT	38+45	88.6-90.1	A-4(2)	30	10	27.6	34.5	29.7	8.1	100	84	48	-	-

B-4712
37912.1.1
BRIDGE NO. 188 ON SR 1316 OVER CAPE FEAR RIVER AT -L- STA. 39+15

B6-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-28	15 LT	39+40	0.0- 1.5	A-6(13)	39	15	8.9	10.6	44.0	36.5	100	95	85	-	-
SS-29	15 LT	39+40	13.6- 15.1	A-6(12)	36	16	0.8	26.2	36.4	36.5	100	100	82	-	-
SS-30	15 LT	39+40	28.6- 30.1	A-6(8)	31	12	4.5	25.6	39.5	30.5	100	100	79	-	-
SS-31	15 LT	39+40	38.6- 40.1	A-4(1)	24	8	17.9	37.4	26.5	18.3	99	96	49	-	-
SS-32	15 LT	39+40	48.6- 50.1	A-7-6(58)	80	51	0.6	3.2	23.0	73.1	100	100	97	-	-
SS-33	15 LT	39+40	63.6- 65.1	A-7-5(61)	89	50	1.0	1.6	28.3	69.0	100	99	98	-	-
SS-34	15 LT	39+40	78.6- 80.1	A-6(8)	34	20	15.0	33.7	26.9	24.4	100	96	57	-	-
SS-35	15 LT	39+40	88.6- 90.1	A-2-4(0)	22	NP	68.4	19.3	6.2	6.1	98	63	13	-	-
SS-36	15 LT	39+40	93.6- 95.1	A-2-4(0)	29	8	46.9	31.1	12.9	9.1	97	66	24	-	-

B9-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-55	19 LT	42+26	3.7- 5.2	A-7-6(22)	44	21	1.0	8.8	43.3	46.9	100	100	95	-	-
SS-56	19 LT	42+26	13.7- 15.2	A-2-4(0)	26	9	72.8	13.3	1.7	12.2	56	25	9	-	-
SS-57	19 LT	42+26	18.7- 20.2	A-7-6(40)	63	42	2.9	11.6	24.4	61.2	100	99	88	-	-
SS-58	19 LT	42+26	33.7- 35.2	A-1-b(0)	22	3	78.6	10.6	1.6	9.2	97	40	12	-	-
SS-59	19 LT	42+26	58.7- 60.2	A-7-5(67)	90	57	0.8	2.4	26.7	70.1	100	100	98	-	-

B7-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-37	16' LT	40+35	0.0- 1.5	A-7-6(19)	47	21	9.0	8.2	48.2	34.7	100	95	85	-	-
SS-38	16' LT	40+35	3.7- 5.2	A-6(18)	40	18	2.9	11.0	45.4	40.8	100	98	92	-	-
SS-39	16' LT	40+35	13.7- 15.2	A-6(4)	32	16	15.3	40.6	17.6	26.5	100	99	48	-	-
SS-40	16' LT	40+35	23.7- 25.2	A-6(8)	35	19	5.7	40.4	25.4	28.5	100	100	58	-	-
SS-41	16' LT	40+35	28.7- 30.2	A-4(0)	27	8	13.9	53.8	9.9	22.4	99	98	36	-	-
SS-42	16' LT	40+35	33.7- 35.2	A-1-b(0)	21	NP	81.1	11.3	3.5	4.1	98	43	9	-	-
SS-43	16' LT	40+35	43.7- 45.2	A-7-6(80)	97	70	1.0	3.1	26.6	69.3	100	99	98	-	-
SS-44	16' LT	40+35	68.7- 70.2	A-7-5(49)	81	41	4.1	2.0	42.9	51.0	100	96	95	-	-
SS-45	16' LT	40+35	78.7- 80.2	A-4(3)	28	8	14.9	36.3	36.6	12.2	100	92	60	-	-
SS-46	16' LT	40+35	83.7- 85.2	A-2-4(0)	29	9	61.3	21.0	12.6	5.1	97	66	20	-	-
SS-47	16' LT	40+35	93.7- 95.2	A-2-6(0)	35	13	57.6	25.2	12.1	5.1	93	60	19	-	-

B10-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-60	17 LT	43+20	0.0- 1.5	A-7-6(18)	44	18	5.8	8.8	43.3	42.1	100	97	88	-	-
SS-61	17 LT	43+20	13.5- 15.0	A-7-5(46)	91	33	1.6	4.2	20.0	74.1	100	99	95	-	-
SS-62	17 LT	43+20	23.5- 25.0	A-1-b(0)	20	1	79.4	10.2	8.4	2.0	99	47	11	-	-
SS-63	17 LT	43+20	38.5- 40.0	A-1-b(0)	23	NP	82.8	9.8	5.4	2.0	99	37	8	-	-
SS-64	17 LT	43+20	43.5- 45.0	A-7-6(50)	73	44	0.6	7.8	31.5	60.1	100	100	96	-	-
SS-65	17 LT	43+20	63.5- 65.0	A-2-6(2)	39	23	60.3	9.6	10.0	20.0	100	70	31	-	-
SS-66	17 LT	43+20	68.5- 70.0	A-7-5(58)	89	48	1.8	3.4	26.7	68.1	100	99	96	-	-
SS-67	17 LT	43+20	73.5- 74.6	A-7-6(17)	43	24	17.0	14.2	38.7	30.1	100	90	74	-	-

B8-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-48	16' LT	41+30	3.7- 5.2	A-7-6(21)	45	20	0.8	10.8	41.5	46.9	100	100	93	-	-
SS-49	16' LT	41+30	13.7- 15.2	A-2-4(0)	27	7	22.0	48.9	10.7	18.3	100	99	32	-	-
SS-50	16' LT	41+30	18.7- 20.2	A-7-6(22)	53	30	8.0	20.8	22.3	48.9	100	98	74	-	-
SS-51	16' LT	41+30	28.7- 30.2	A-3(0)	21	NP	80.9	12.7	0.2	6.1	100	53	8	-	-
SS-52	16' LT	41+30	43.7- 45.2	A-7-5(58)	84	50	1.2	4.3	23.1	71.4	100	99	96	-	-
SS-53	16' LT	41+30	63.7- 65.2	A-7-5(71)	98	60	1.6	2.4	26.6	69.3	100	99	97	-	-
SS-54	16' LT	41+30	83.7- 85.2	A-2-6(1)	36	19	57.3	18.6	11.9	12.2	93	57	25	-	-

B11-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-68	17 LT	44+15	0.0- 1.5	A-6(7)	33	14	9.0	28.1	30.9	32.1	100	96	67	-	-
SS-69	17 LT	44+15	13.6- 15.1	A-4(1)	31	10	14.2	51.9	15.8	18.0	100	97	41	-	-
SS-70	17 LT	44+15	23.6- 25.1	A-7-5(50)	83	46	3.8	7.6	32.5	56.1	100	98	90	-	-
SS-71	17 LT	44+15	38.6- 40.1	A-7-6(44)	70	41	3.8	7.2	28.9	60.1	100	98	93	-	-
SS-72	17 LT	44+15	53.6- 55.1	A-2-6(0)	30	13	59.9	18.2	7.8	14.0	100	78	23	-	-
SS-73	17 LT	44+15	63.6- 65.1	A-1-b(0)	18	NP	81.6	11.8	4.6	2.0	99	50	8	-	-
SS-74	17 LT	44+15	73.6- 75.1	A-7-6(14)	51	30	35.1	11.2	27.7	26.1	100	76	57	-	-

B-4712
37912.1.1
BRIDGE NO. 188 ON SR 1316 OVER CAPE FEAR RIVER AT -L- STA. 39+15

B12-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-75	19 LT	45+10	0.0-1.5	A-7-6(19)	48	20	8.6	9.6	37.7	44.1	100	96	84	-	-
SS-76	19 LT	45+10	12.7-14.2	A-7-6(14)	45	25	7.0	35.9	21.0	36.1	100	98	65	-	-
SS-77	19 LT	45+10	22.7-24.2	A-1-b(0)	23	3	80.0	8.6	7.4	4.0	95	41	12	-	-
SS-78	19 LT	45+10	27.7-29.2	A-7-5(47)	77	43	2.8	12.8	32.3	52.1	100	99	92	-	-
SS-79	19 LT	45+10	37.7-39.2	A-2-7(2)	53	20	57.9	11.4	12.6	18.0	100	52	33	-	-
SS-80	19 LT	45+10	47.7-49.2	A-7-5(61)	87	51	0.8	3.8	27.3	68.1	100	100	97	-	-
SS-81	19 LT	45+10	57.7-59.2	A-2-4(0)	25	4	75.4	10.6	6.0	8.0	100	62	15	-	-
SS-82	19 LT	45+10	72.7-74.2	A-7-6(18)	55	30	29.3	7.4	33.3	30.1	99	78	65	-	-

B13-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-92	40 RT	46+05	0.0-1.5	A-6(6)	30	12	10.6	26.4	30.6	32.5	100	99	66	-	-
SS-93	40 RT	46+05	8.1-9.6	A-1-b(0)	23	NP	87.8	6.8	1.3	4.1	77	32	4	-	-
SS-94	40 RT	46+05	13.1-14.6	A-7-5(43)	75	42	6.9	8.3	48.2	36.5	100	96	87	-	-
SS-95	40 RT	46+05	28.1-29.6	A-7-5(46)	76	41	5.3	4.5	49.6	40.6	100	96	92	-	-
SS-96	40 RT	46+05	43.1-44.6	A-2-6(0)	34	15	71.6	12.4	4.9	11.2	95	40	16	-	-
SS-97	40 RT	46+05	58.1-59.6	A-3(0)	23	NP	66.2	25.9	3.9	4.1	100	83	9	-	-
SS-98	40 RT	46+05	73.1-74.6	A-7-6(31)	59	33	7.7	9.3	42.3	40.6	100	95	86	-	-

EB2-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-99	37 RT	47+00	0.0-1.5	A-6(12)	37	16	4.5	19.1	35.8	40.6	100	99	80	-	-
SS-100	37 RT	47+00	3.5-5.0	A-1-b(0)	21	NP	58.1	28.0	2.7	11.2	61	48	9	-	-
SS-101	37 RT	47+00	8.5-10.0	A-1-a(0)	20	2	80.3	9.9	1.6	8.1	47	17	5	-	-
SS-102	37 RT	47+00	13.5-15.0	A-7-5(51)	79	46	1.8	7.1	38.5	52.6	100	99	93	-	-
SS-103	37 RT	47+00	38.5-40.0	A-2-4(0)	22	NP	53.6	31.4	4.9	10.1	98	65	16	-	-
SS-104	37 RT	47+00	58.5-60.0	A-7-6(41)	71	42	3.4	12.3	35.7	48.5	100	99	86	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 37912.1.1 TIP: B-4712 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 189 ON SR 1316 OVER CAPE FEAR RIVER OVERFLOW

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) BSR REPORT, BRIDGE MAINT. DATABASE

Bridge No.: 188 Length: 1473' Total Bents: 25 Bents in Channel: 0 Bents in Floodplain: 22
Foundation Type: CONCRETE PILES

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: SLUMPING ALONG EB1 END SLOPE

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: SLUMPING ALONG BOTH CHANNEL BANKS, SLUMPING ALONG CUT BANK AT END BENT 1

EXISTING SCOUR PROTECTION

Type(3): CONCRETE END AND SIDE SLOPES AT END BENT 2

Extent(4): ENTIRE SLOPE TO 50' OUTSIDE EDGE OF BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE NOTED

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.

DESIGN INFORMATION

Channel Bed Material(7): SAND

Channel Bank Material(8): CLAYEY SAND, SILTY SANDY CLAY, SANDY SILT

Channel Bank Cover(9): TREES

Floodplain Width(10): 4500'±

Floodplain Cover(11): TREES

Stream is(12): Aggrading ____ Degrading X Static ____

Channel Migration Tendency(13): MODERATE TO THE SOUTH WEST

Observations and Other Comments: ____

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS

B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
-9.8	-5.2	41.5	41.5	40.0	38.8	38.8	38.8	37.5	35.8	35.0

B12	B13
35.9	40.5

Comparison of DSE to Hydraulics Unit theoretical scour:
THE DSE AGREES WITH ALL BUT ONE OF THE MAXIMUM THEORETICAL SCOUR ELEVATIONS AS OUTLINED IN THE BSR REPORT DATED 3/28/11. THE DSE AT BENT ONE HAS BEEN RAISED 7.3 FEET.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank						
Sample No.						
Retained #4						
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

See Sheet 24-26
"Soil Test Results",
for samples:
(CHANNEL BED): SS-113, SS-105
(CHANNEL BANK):SS-88, SS-89, SS-90,
SS-1, SS-3

Reported by: ____ Date: 7/22/2011