STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	6

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION US 17 FROM SR 1430 (CEDAR HILL ROAD) TO US 421 NORTH OF WILMINGTON

SITE DESCRIPTION BRIDGE ON -RPB4- OVER -EY13- AT -RPB4- STATION 21+47.09

CONTENTS

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1	TITLE SHEET
2	LEGEND
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5-6	BORE LOG(S)

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN, INC.

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE DECEMBER 2011

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE 12-6-11

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 6

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT				40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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	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
- P.W. 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-458
- [ ] 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 IN DR 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: -BY-12

ELEVATION: 14.85 FT.

NOTES:

PROJECT REFERENCE NO.	SHEET
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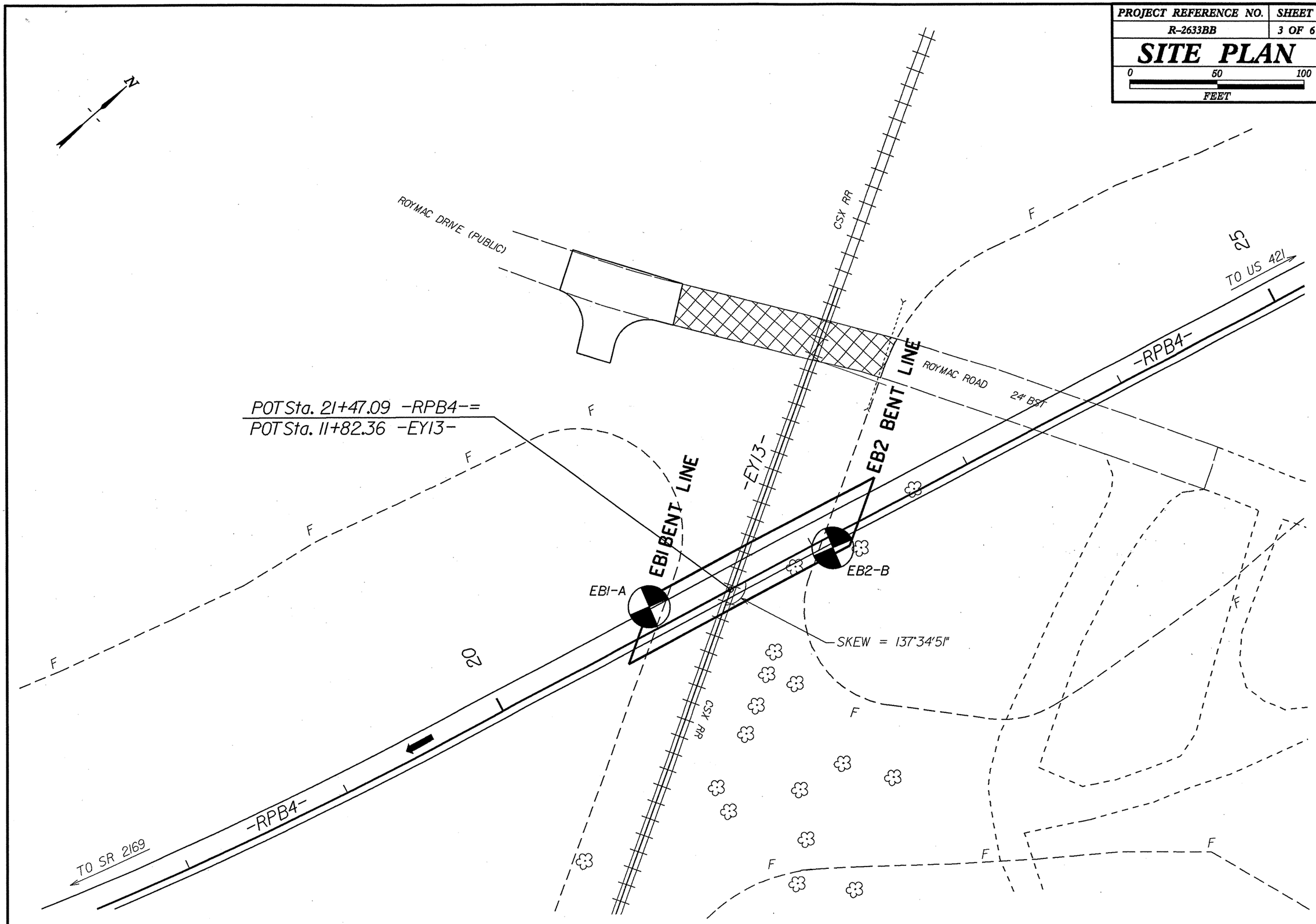
SITE PLAN

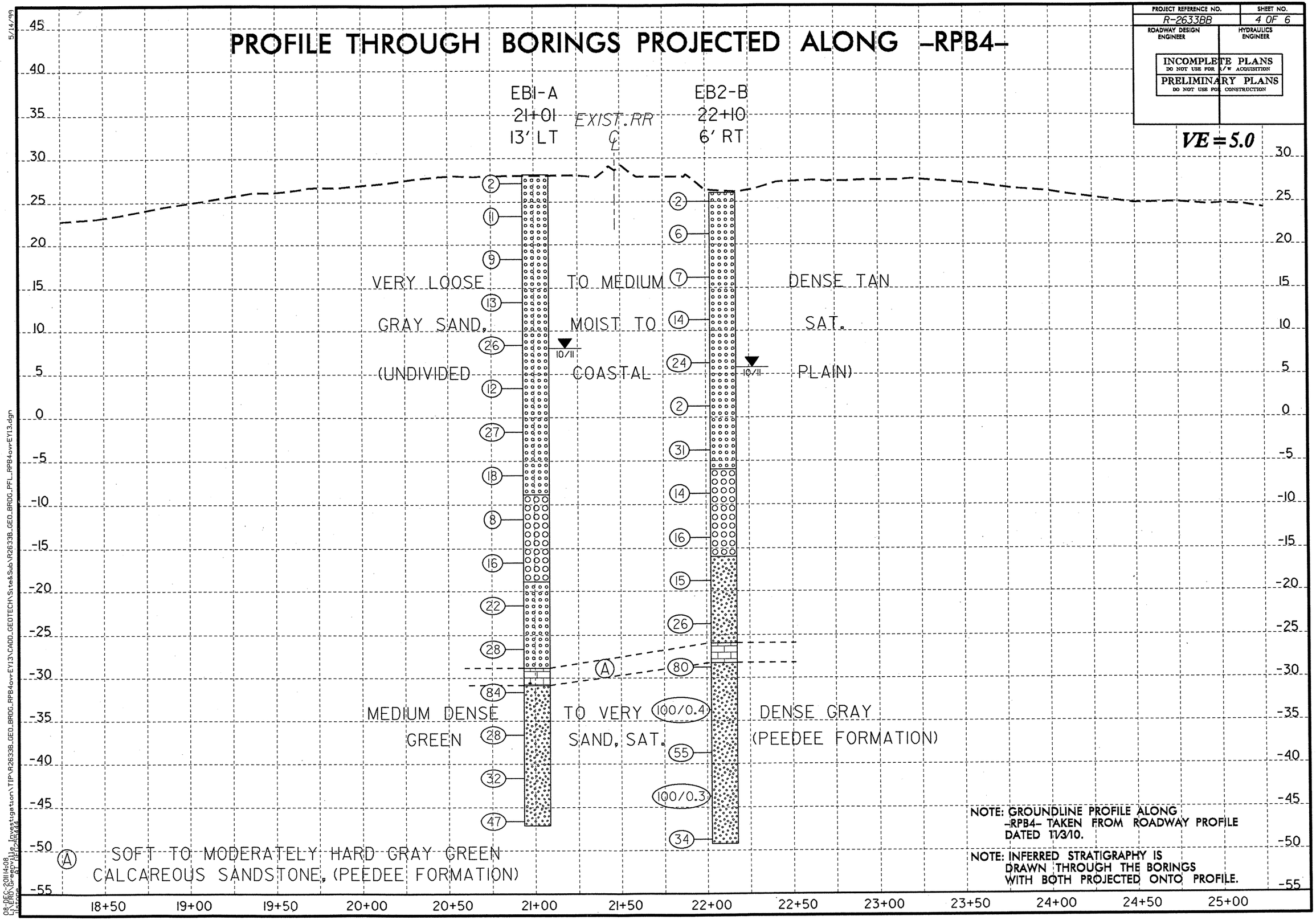
0 50 100
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	4 OF 6
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 -RPB4-



NOTE: GROUNDLINE PROFILE ALONG -RPB4- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

5/14/99

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L:\ERO\Greenville Investigation\TIP\R2633B_GEO_BRDG_RPB4ovr-EY13\CADD_GEOTECH\Site&Sub\R2633B_GEO_BRDG_PFL_RPB4ovr-EY13.dgn

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPB4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 21+01	**OFFSET** 13 ft LT	**ALIGNMENT** -RPB4-	**0 HR.** N/A
COLLAR ELEV. 28.2 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 197,285	**EASTING** 2,310,730	**24 HR.** 20.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/21/11	**COMP. DATE** 10/21/11	**SURFACE WATER DEPTH** N/A

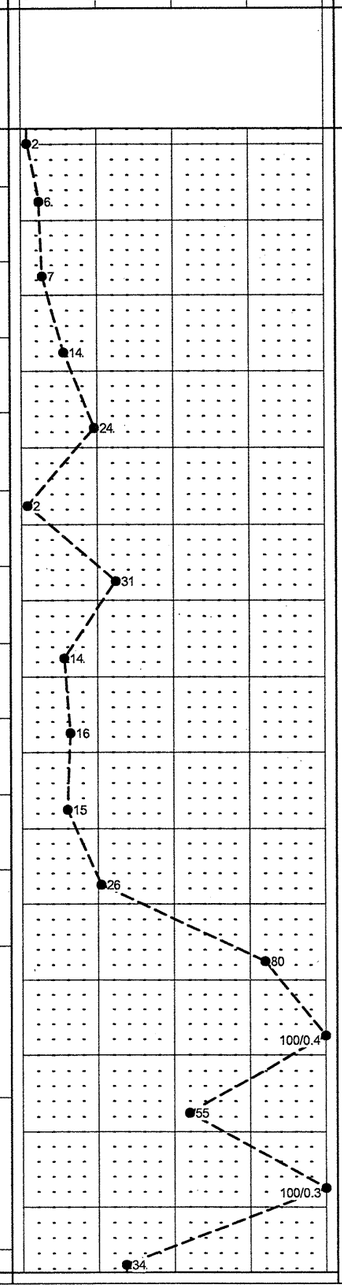
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
	28.2	0.0								28.2 GROUND SURFACE	0.0
			1	1	1	2				UNDIVIDED COASTAL PLAIN TAN AND GRAY SAND, MOIST TO SAT.	
	24.4	3.8	4	5	6	11					
	19.4	8.8	4	4	5	9					
	14.4	13.8	3	6	7	13					
	9.4	18.8	10	13	13	26		▼			
	4.4	23.8	5	6	6	12					
	-0.7	28.8	7	12	15	27					
	-5.7	33.8	6	8	10	18					
	-10.7	38.8	3	4	4	8				-8.9	37.0
	-15.7	43.8	5	7	9	16					
	-20.7	48.8	6	10	12	22				-18.9	47.0
	-25.7	53.8	11	15	13	28					
	-30.7	58.8	36	51	33	84				-28.9	57.0
	-35.7	63.8	24	12	16	28				-30.9 COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE (PEEDEE FORMATION)	59.0
	-40.7	68.8	12	18	14	32				COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
	-45.7	73.8	16	23	24	47				-47.2	75.3
										Boring Terminated at Elevation -47.2 ft IN DENSE SAND	

NCDOT BORE DOUBLE R2633B_GEO_BRDG_RPB4OVREY13_SPT_BORINGS.GPJ NC_DOT.GDT 12/8/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPB4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 22+10	**OFFSET** 6 ft RT	**ALIGNMENT** -RPB4- — **0 HR.** N/A
COLLAR ELEV. 26.1 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 197,386	**EASTING** 2,310,773 — **24 HR.** 20.3
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/24/11	**COMP. DATE** 10/24/11	**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))
	26.1	0.0	WOH	1	1				26.1 GROUND SURFACE 0.0 — UNDIVIDED COASTAL PLAIN TAN GRAY SAND, MOIST TO SAT.
	22.3	3.8	2	3	3				
	17.3	8.8	3	4	3				
	12.3	13.8	4	5	9				
	7.3	18.8	7	11	13				
	2.3	23.8	2	1	1				
	-2.8	28.8	11	15	16				
	-7.8	33.8	6	7	7				
	-12.8	38.8	6	7	9				
	-17.8	43.8	7	8	7				
	-22.8	48.8	9	12	14				
	-27.8	53.8	72	39	41				
	-32.8	58.8	100/0.4						
	-37.8	63.8	34	27	28				
	-42.8	68.8	66	100/0.3					
	-47.8	73.8	63	15	19				
									-6.0 / 32.0 — COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE (PEEDEE FORMATION)
									-16.0 / 42.0
									-26.0 / 52.0 — COASTAL PLAIN GRAY GREEN SAND, SAT (PEEDEE FORMATION)
									-28.3 / 54.3
									-49.3 / 75.3



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPB4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
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DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/24/11	**COMP. DATE** 10/24/11	**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
-50									Match Line
									Boring Terminated at Elevation -49.3 ft IN DENSE SAND

NCDOT BORE DOUBLE R2633B_GEO_BRDG_RPB4OVREY13_SPT_BORINGS.GPJ NC_DOT.GDT 12/8/11

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	11

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION BRIDGE ON -L- (US 17) OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

ADDENDUM

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	CROSS SECTIONS
6-9	BORE LOGS & CORE REPORTS
10-11	CORE PHOTOGRAPHS

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN

MAD

J.P. DELOATCH

R.E. SMITH

J.M. EDMONDSON

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE DECEMBER 2012

NORTH CAROLINA LICENSED SEAL 2240 GEOLOGIST TYLER C. BOTTOMS

2/20/12

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT: 34491.1.2

ID: R-2633BB

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 11

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	50 MX		51 MN									GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	10 MX											
# 200	15 MX	25 MX		35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
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 PODRLY 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-___
- [X] DIEDRICH D-50
- [X] CME-45B
- [X] CME-55
- [ ] 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: SEE NOTES BELOW

ELEVATION: FT.

NOTES:

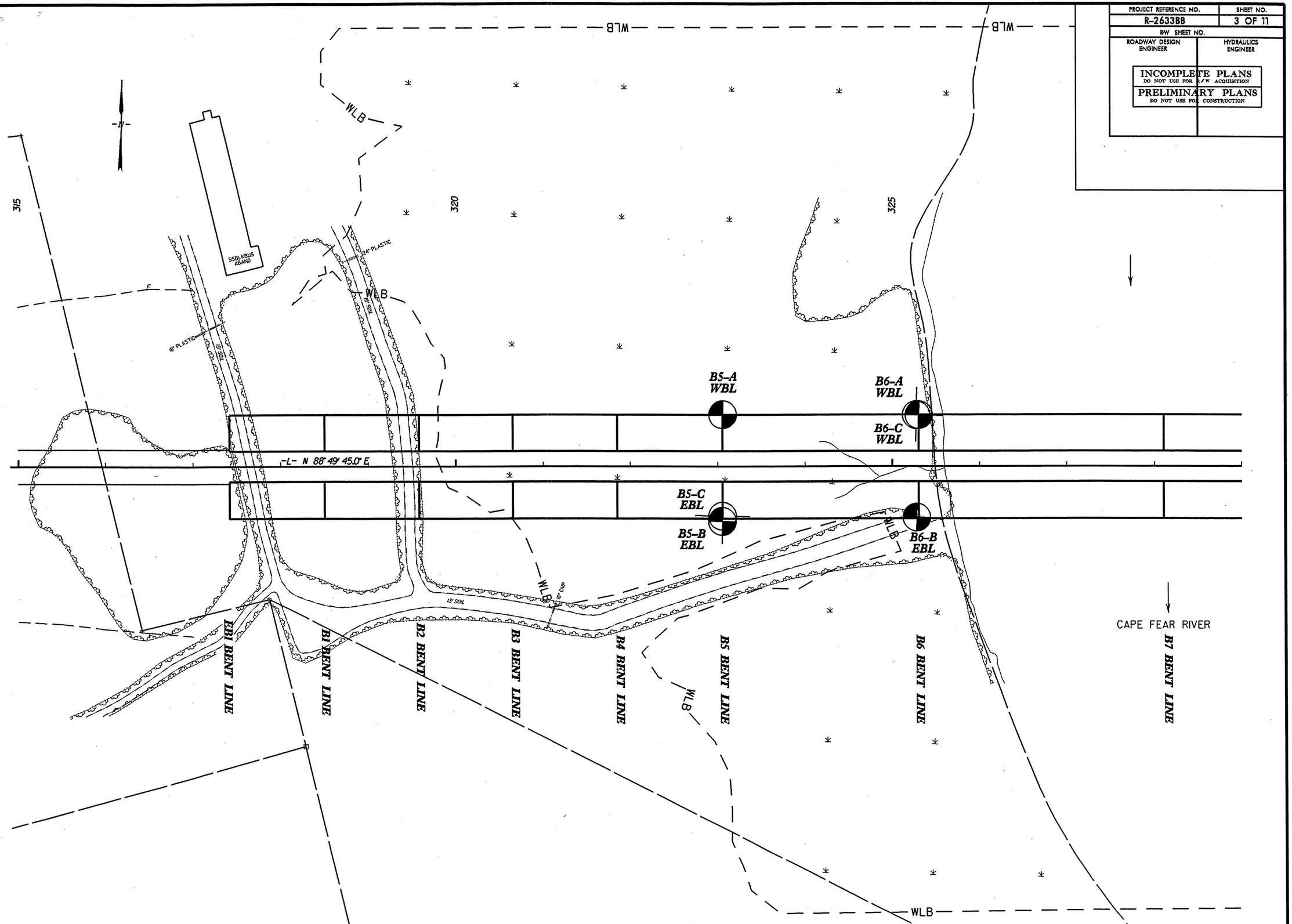
COLLAR ELEVATIONS COLLECTED USING A TIMBLE 5800 GPS WITH A TRIMBLE TSC2 DATA COLLECTOR

Coordinate System :	US State Plane 1983
Zone :	North Carolina 3200
Datum :	NAD 1983 (Conus)
Ellipsoid Name :	Geodetic Ref System 1980
Geoid Model :	GEOID03 (Conus)

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	3 OF 11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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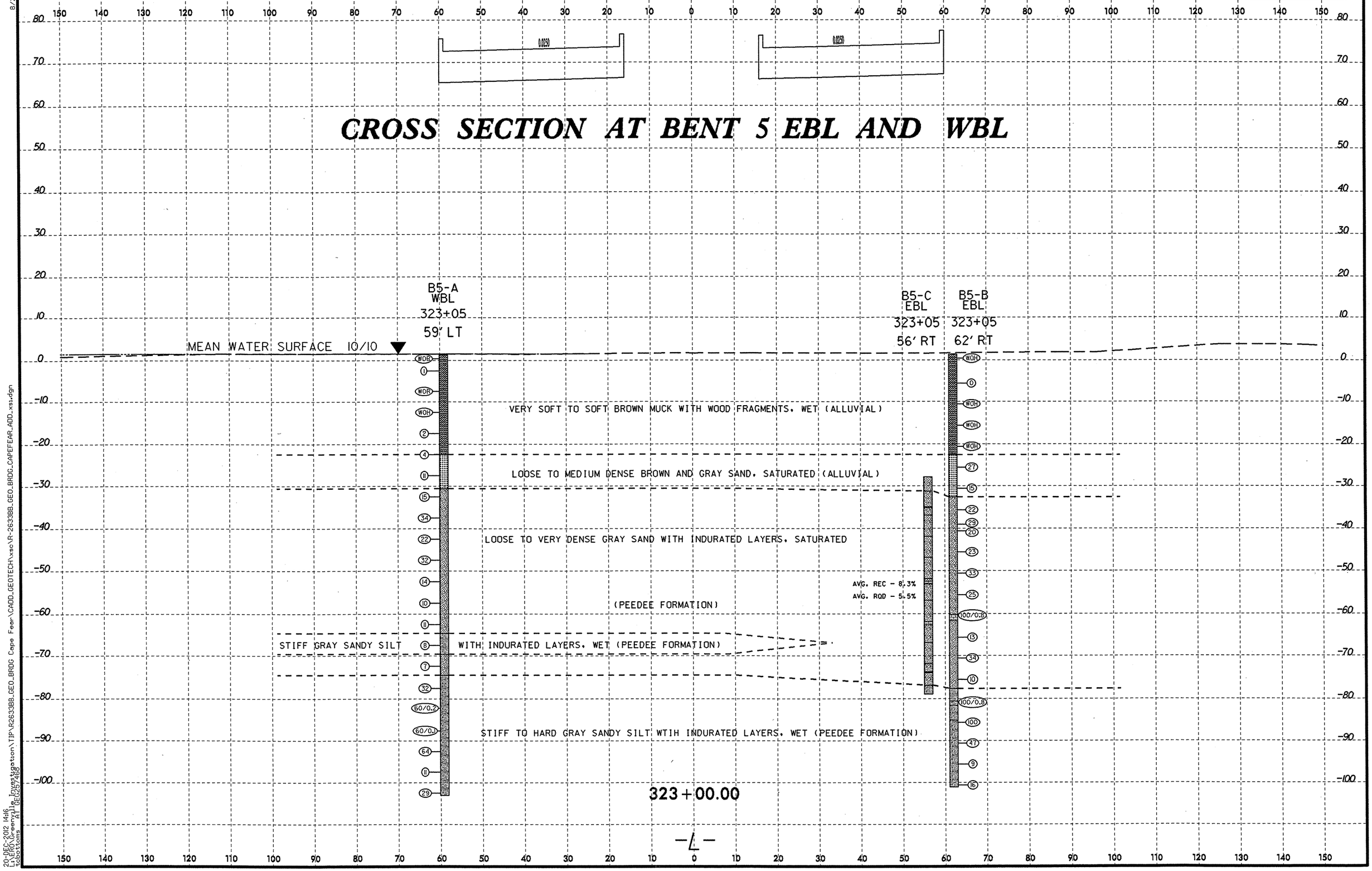
PROJ. REFERENCE NO.	SHEET NO.
R-2633BB	4 OF 11

CROSS SECTION AT BENT 5 EBL AND WBL



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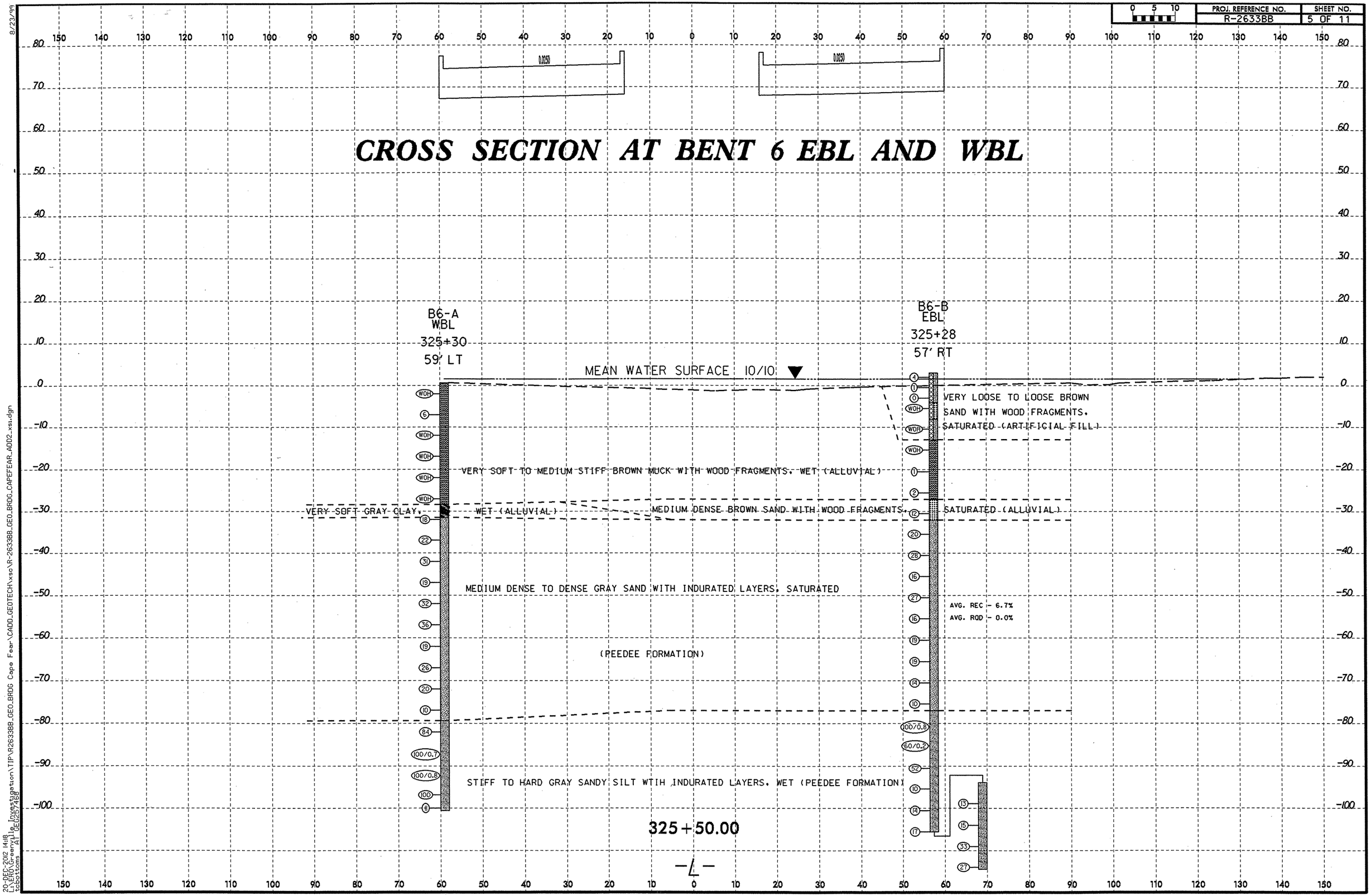


PROJ. REFERENCE NO.
R-2633BB
SHEET NO.
5 OF 11
CROSS SECTION AT BENT 6 EBL AND WBL
B6-A
WBL
325+30
59' LT
B6-B
EBL
325+28
57' RT
MEAN WATER SURFACE 10/10
VERY LOOSE TO LOOSE BROWN SAND WITH WOOD FRAGMENTS, SATURATED (ARTIFICIAL FILL)
VERY SOFT TO MEDIUM STIFF BROWN MUCK WITH WOOD FRAGMENTS, WET (ALLUVIAL)
VERY SOFT GRAY CLAY, WET (ALLUVIAL)
MEDIUM DENSE BROWN SAND WITH WOOD FRAGMENTS, SATURATED (ALLUVIAL)
MEDIUM DENSE TO DENSE GRAY SAND WITH INDURATED LAYERS, SATURATED
(PEEDEE FORMATION)
AVG. REC - 6.7%
AVG. RQD - 0.0%
STIFF TO HARD GRAY SANDY SILT WTIH INDURATED LAYERS, WET (PEEDEE FORMATION)
325+50.00
-L-

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-B EBL	**STATION** 323+05	**OFFSET** 62 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 102.5 ft	**NORTHING** 191,844	**EASTING** 2,301,066
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** 0.5ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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))
5										
	1.4	0.0								-1.4 / 0.0 WATER SURFACE (11/14/12)
0			WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET
-5	-4.6	6.0	1	0	0	0				
-10	-9.6	11.0	WOH	WOH	WOH	0				
-15	-14.6	16.0	WOH	WOH	WOH	0				
-20	-19.6	21.0	WOH	WOH	WOH	0				
-25	-24.6	26.0	13	15	12	27				
-30	-29.6	31.0	6	7	8	15				
-35	-34.6	36.0	6	9	13	22				
	-38.1	39.5	7	13	16					
-40	-39.6	41.0	22	9	11	29 / 20				
-45	-44.6	46.0	8	11	12	23				
-50	-49.6	51.0	11	11	22	33				
-55	-54.6	56.0	9	10	15	25				
-60	-59.6	61.0	5	95/0.3		100/0.8				-22.6 / 24.0 **ALLUVIAL** BROWN SAND, SATURATED
-65	-64.6	66.0	6	5	8	13				-32.6 / 34.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-70	-69.6	71.0	6	15	19	34				
-75	-74.6	76.0								-60.3 / 61.7 **COASTAL PLAIN** GRAY SANDSTONE (PEEDEE FORMATION) -61.6 / 63.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-B EBL	**STATION** 323+05	**OFFSET** 62 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 102.5 ft	**NORTHING** 191,844	**EASTING** 2,301,066
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** 0.5ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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
-75						Match Line				
			4	4	6	10				-77.6 / 79.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-80	-79.6	81.0	14	28	72/0.3	100/0.8				-80.6 / 82.0; -81.6 / 83.0
-85	-84.6	86.0	7	24	76	100				-85.1 / 86.5
-90	-89.6	91.0	13	20	27	47				
-95	-94.6	96.0	3	4	5	9				
-100	-99.6	101.0	6	7	9	16				-101.1 / 102.5 Boring Terminated at Elevation -101.1 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R-2633BB_GEO_BRDG_ADD.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-C EBL	**STATION** 323+05	**OFFSET** 56 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 191,850	**EASTING** 2,301,066 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/16/12	**COMP. DATE** 11/19/12	**SURFACE WATER DEPTH** 1.0ft
CORE SIZE NQ	**TOTAL RUN** 50.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
-27.9											Begin Coring @ 29.0 ft
-30	-27.9	29.0	5.0	00:12/1.0 00:18/1.0 00:17/1.0 00:37/1.0 00:09/1.0	(0.0) 0%	(0.0) 0%					ALLUVIAL BROWN SAND, SATURATED -31.3 / 32.4
	-32.9	34.0									COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -32.9 / 34.0
	-33.9	35.0									-33.9 / 35.0
-35			3.0	00:07/1.0 00:56/1.0 00:06/1.0	(0.1) 3%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-34.9 / 36.0 -35.1 / 36.1 COASTAL PLAIN GRAY SANDSTONE (PEEDEE FORMATION)
	-36.9	38.0									-36.9 / 38.0
-40			5.0	00:35/1.0 00:12/1.0 00:08/1.0 00:10/1.0 00:10/1.0	(0.0) 0%	(0.0) 0%					COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
	-41.9	43.0									-41.9 / 43.0
-45			5.0	00:08/1.0 00:11/1.0 00:10/1.0 00:09/1.0 00:06/1.0	(0.0) 0%	(0.0) 0%					
	-46.9	48.0									-46.9 / 48.0
-50			5.0	00:05/1.0 00:10/1.0 00:23/1.0 00:04/1.0 00:07/1.0	(0.0) 0%	(0.0) 0%					
	-51.9	53.0									-51.9 / 53.0 -52.5 / 53.6
-55			5.0	04:21/1.0 02:38/1.0 00:07/1.0 00:08/1.0 00:16/1.0	(0.6) 12%	(0.6) 12%	RS-1	(0.6) 100%	(0.6) 100%		-53.1 / 54.2 COASTAL PLAIN GRAY SANDSTONE (PEEDEE FORMATION)
	-56.9	58.0									-56.9 / 58.0 COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-60			5.0	00:12/1.0 00:09/1.0 00:08/1.0 00:05/1.0 00:19/1.0	(0.0) 0%	(0.0) 0%					
	-61.9	63.0									-61.9 / 63.0 -62.6 / 63.7
-65			5.0	03:56/1.0 00:06/1.0 00:07/1.0 00:21/1.0 00:09/1.0	(0.7) 14%	(0.5) 10%		(0.7) 100%	(0.5) 71%		COASTAL PLAIN GRAY SANDSTONE (PEEDEE FORMATION) COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
	-66.9	68.0									-66.9 / 68.0
-70			5.0	00:10/1.0 00:11/1.0 00:09/1.0 00:08/1.0 00:11/1.0	(0.0) 0%	(0.0) 0%					
	-71.9	73.0									-71.9 / 73.0
-75			5.0	00:08/1.0 00:10/1.0 00:24/1.0 00:08/1.0 00:11/1.0	(0.2) 4%	(0.0) 0%		(0.2) 100%	(0.0) 0%		-73.9 / 75.0 -74.1 / 75.2 COASTAL PLAIN GRAY SANDSTONE (PEEDEE FORMATION)
	-76.9	78.0									-76.9 / 78.0 COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
	-78.9	80.0	2.0	00:08/1.0 00:08/1.0	(0.0) 0%	(0.0) 0%					-78.9 / 80.0 COASTAL PLAIN GRAY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) Boring Terminated at Elevation -78.9 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-A WBL	**STATION** 325+30	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 191,969	**EASTING** 2,301,289
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/26/12	**COMP. DATE** 11/28/12	**SURFACE WATER DEPTH** 0.2ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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)
0.6										WATER SURFACE (11/26/12)	0.0
-1.0		1.6	WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
-6.0		6.6	WOH	1	5	6					
-11.0		11.6	WOH	WOH	WOH	0					
-16.0		16.6	WOH	WOH	WOH	0					
-21.0		21.6	WOH	WOH	WOH	0					
-26.0		26.6	WOH	WOH	WOH	0					
-28.4											29.0
-31.0		31.6	WOH	7	11	18				**ALLUVIAL** GRAY CLAY, WET	
-31.5											32.1
-36.0		36.6	14	11	11	22				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-41.0		41.6	16	14	17	31					
-46.0		46.6	5	8	11	19					
-51.0		51.6	17	14	18	32					
-56.0		56.6	29	17	19	36					
-61.0		61.6	9	8	11	19					
-66.0		66.6	24	14	12	26					
-71.0		71.6	5	7	13	20					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-A WBL	**STATION** 325+30	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 191,969	**EASTING** 2,301,289
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/26/12	**COMP. DATE** 11/28/12	**SURFACE WATER DEPTH** 0.2ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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
-75						Match Line				
-76.0		76.6	4	4	6	10				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-79.4										80.0
-81.0		81.6	18	31	53	84				**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-86.0		86.6	14	38	62/0.2	100/0.7				
-91.0		91.6	21	39	61/0.3	100/0.8				
-96.0		96.6	13	26	74	100				
-99.0		99.6	4	5	6	11				
-100.5										101.1
										Boring Terminated at Elevation -100.5 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R-2633BB_GEO_BRDG_ADD.GPJ NC_DOT.GDT 12/20/12

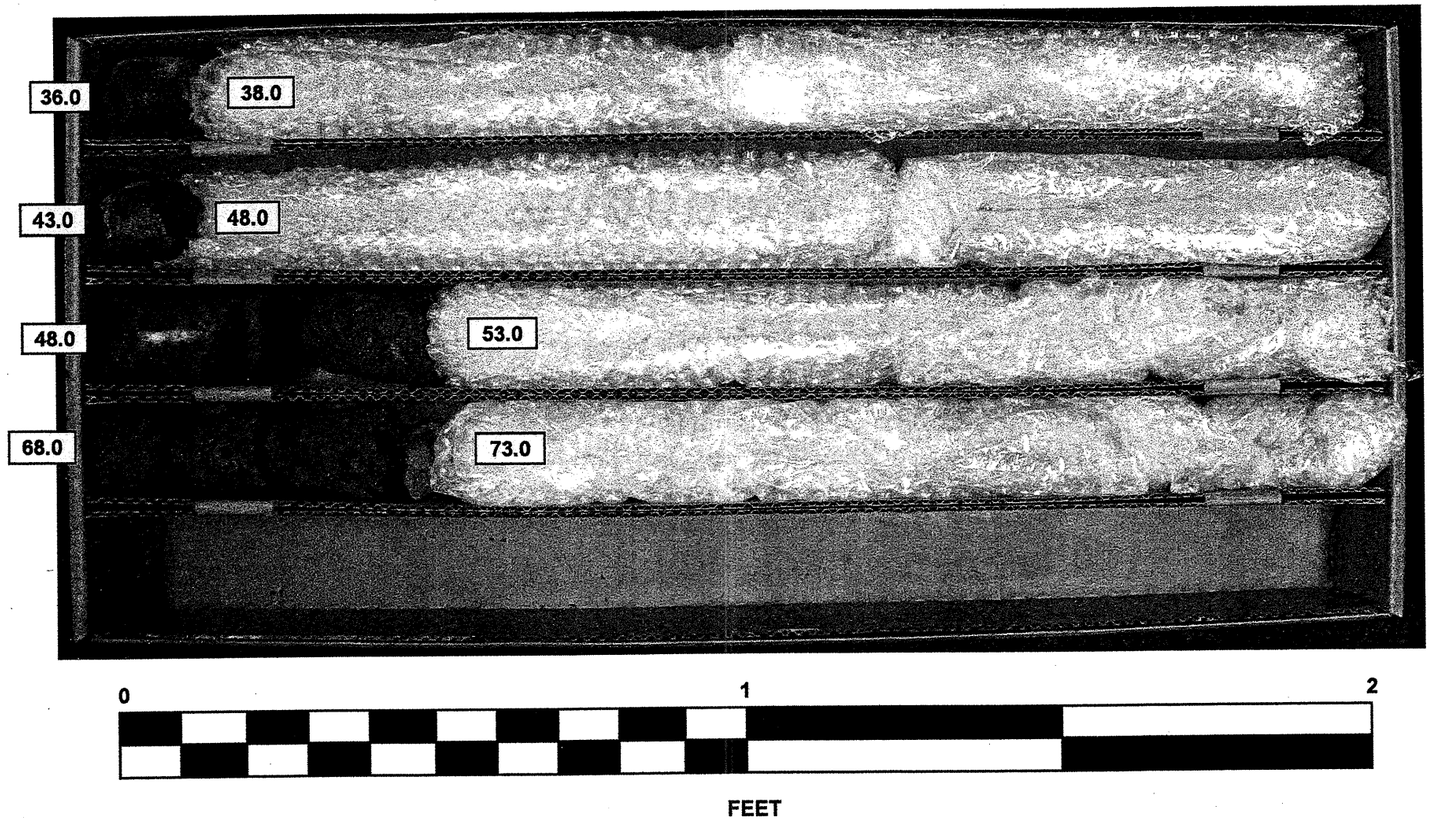
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-C WBL	**STATION** 325+27	**OFFSET** 59 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 83.0 ft	**NORTHING** 191,969	**EASTING** 2,301,286 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/29/12	**COMP. DATE** 11/29/12	**SURFACE WATER DEPTH** 0.2ft
CORE SIZE NQ	**TOTAL RUN** 47.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
-35.4											Begin Coring @ 36.0 ft	
	-35.4	36.0	2.0	04:36/1.0 00:35/1.0	(0.1) 5%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-35.5 GRAY SANDSTONE (PEEDEE FORMATION)	36.1
	-37.4	38.0	5.0	00:36/1.0 00:26/1.0 03:26/1.0 00:23/1.0 02:31/1.0	(0.0) 0%	(0.0) 0%					-37.4 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	38.0
-40												
	-42.4	43.0	5.0	00:26/1.0 00:28/1.0 04:40/1.0 07:45/1.0 00:11/1.0	(0.1) 2%	(0.0) 0%					-42.4	43.0
-45											-44.9	45.5
	-47.4	48.0	5.0	00:08/1.0 01:29/1.0 03:35/1.0 08:07/1.0 00:08/1.0	(0.5) 10%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-45.0 GRAY SANDSTONE (PEEDEE FORMATION) GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	45.6
-50											-50.4	51.0
	-52.4	53.0	5.0	00:09/1.0 00:09/1.0 03:56/1.0 02:31/1.0 00:08/1.0	(0.0) 0%	(0.0) 0%		(0.5) 100%	(0.0) 0%		-50.9 GRAY SANDSTONE (PEEDEE FORMATION) -52.4 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	51.5 53.0
-55												
	-57.4	58.0	5.0	00:08/1.0 00:09/1.0 00:14/1.0 00:11/1.0 00:07/1.0	(0.0) 0%	(0.0) 0%					-57.4	58.0
-60												
	-62.4	63.0	5.0	00:07/1.0 00:15/1.0 02:34/1.0 05:31/1.0 00:14/1.0	(0.0) 0%	(0.0) 0%					-62.4	63.0
-65												
	-67.4	68.0	5.0	00:45/1.0 00:13/1.0 00:22/1.0 02:52/1.0 00:24/1.0	(0.5) 10%	(0.0) 0%					-67.4	68.0
-70											-70.6	71.2
	-72.4	73.0	5.0	00:15/1.0 00:23/1.0 00:17/1.0 00:15/1.0 00:13/1.0	(0.0) 0%	(0.0) 0%		(0.5) 100%	(0.0) 0%		-71.1 GRAY SANDSTONE (PEEDEE FORMATION) -72.4 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	71.7 73.0
-75												
	-77.4	78.0	5.0	00:13/1.0 00:27/1.0 00:27/1.0 00:30/1.0 00:18/1.0	(0.0) 0%	(0.0) 0%					-77.4	78.0
-80												
	-82.4	83.0									-82.4	83.0
											Boring Terminated at Elevation -82.4 ft in Very Dense Sand	

CORE PHOTOGRAPH
B5-C EBL
Box 1 of 1 (35.0' to 38.0', 53.0' to 58.0', 63.0' to 68.0', 73.0' to 78.0')

CORE PHOTOGRAPH
B6-C WBL
Box 1 of 1 (36.0' to 38.0', 43.0' to 48.0', 48.0' to 53.0', 68.0' to 73.0')



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	11

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION BRIDGE ON -L- (US 17) OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

ADDENDUM

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (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

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J.P. DELOATCH

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J.M. EDMONDSON

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE DECEMBER 2012

NORTH CAROLINA LICENSED SEAL 2240 GEOLOGIST TYLER C. BOTTOMS

2/20/12

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

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NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 11

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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	COBBLE	GRAVEL	COARSE SAND	FINE SAND	SILT	CLAY
(BLDR.)	(COB.)	(GR.)	(CSE. SD.)	(F SD.)	(SL.)	(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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
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
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-___
- [X] DIEDRICH D-50
- [X] CME-45B
- [X] CME-55
- [ ] 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: SEE NOTES BELOW

ELEVATION: FT.

NOTES:

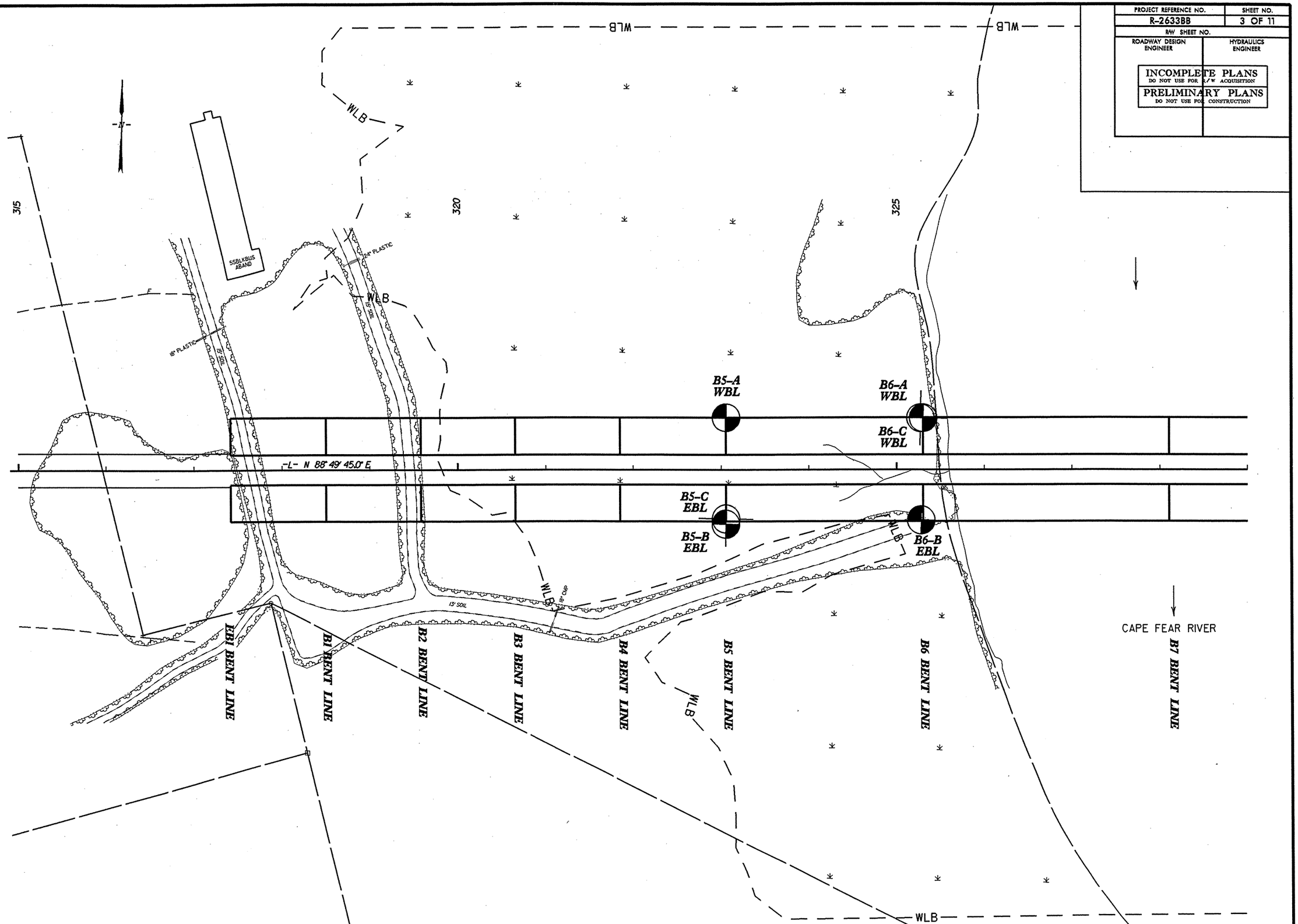
COLLAR ELEVATIONS COLLECTED USING A TIMBLE 5800 GPS WITH A TRIMBLE TSC2 DATA COLLECTOR

Coordinate System :	US State Plane 1983
Zone :	North Carolina 3200
Datum :	NAD 1983 (Conus)
Ellipsoid Name :	Geodetic Ref System 1980
Geoid Model :	GEOID03 (Conus)

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	3 OF 11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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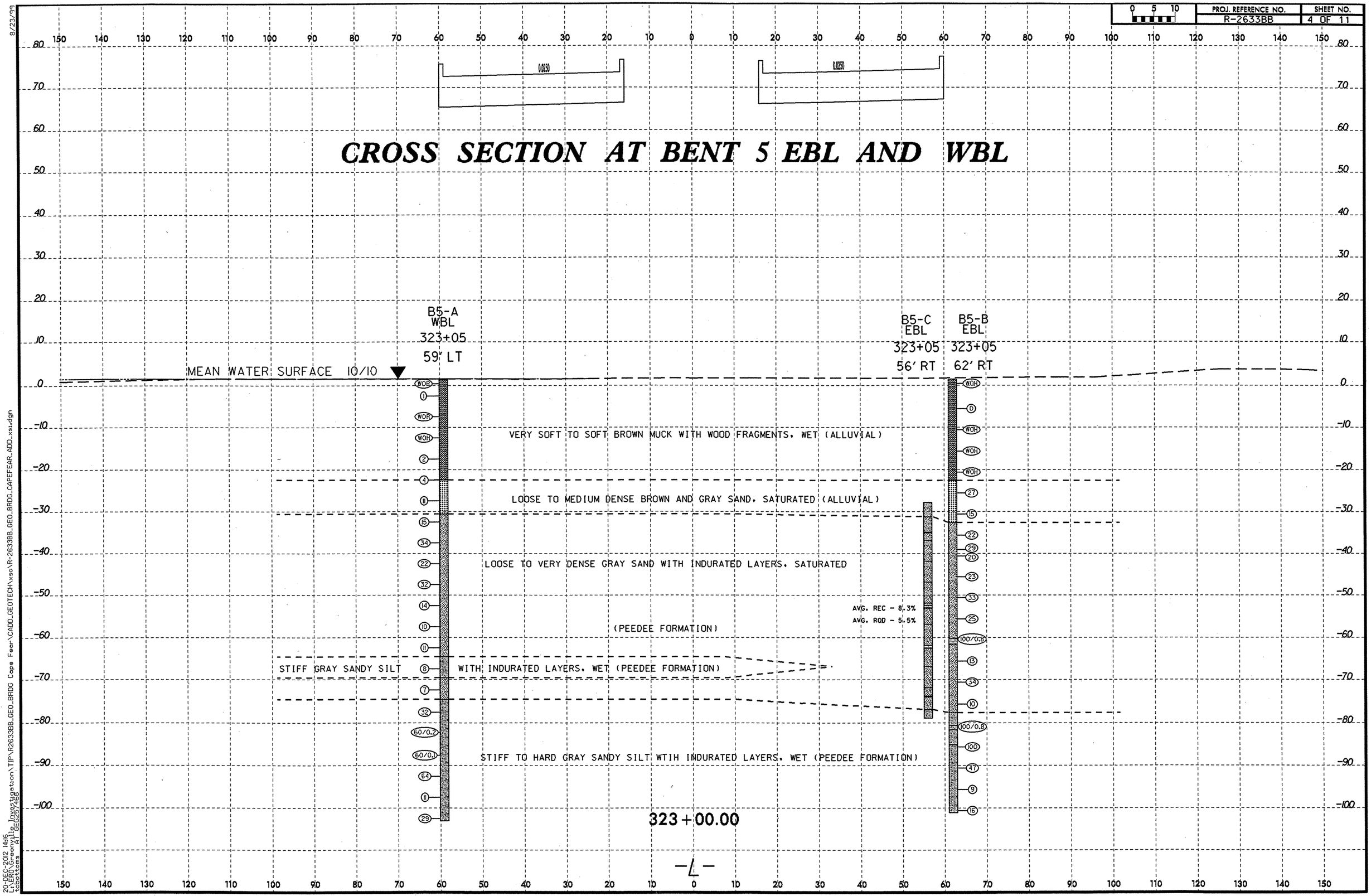
CROSS SECTION AT BENT 5 EBL AND WBL



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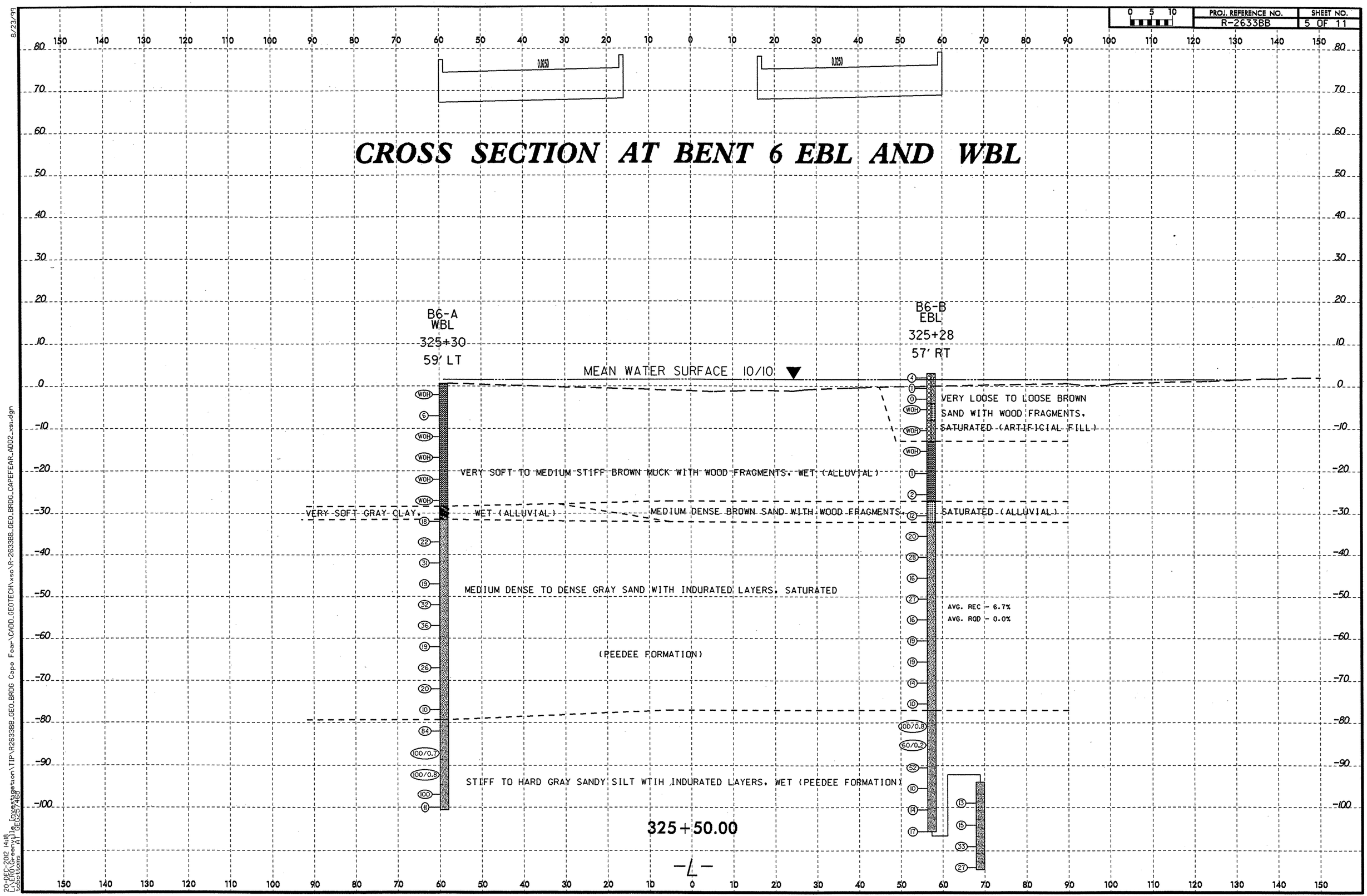
CROSS SECTION AT BENT 6 EBL AND WBL



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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-B EBL	**STATION** 323+05	**OFFSET** 62 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 102.5 ft	**NORTHING** 191,844	**EASTING** 2,301,066
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** 0.5ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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)
5											
	1.4	0.0								-1.4 WATER SURFACE (11/14/12)	0.0
0			WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
-5	-4.6	6.0	1	0	0	0					
-10	-9.6	11.0	WOH	WOH	WOH	0					
-15	-14.6	16.0	WOH	WOH	WOH	0					
-20	-19.6	21.0	WOH	WOH	WOH	0					
-25	-24.6	26.0	13	15	12	27					
-30	-29.6	31.0	6	7	8	15					
-35	-34.6	36.0	6	9	13	22					
	-38.1	39.5	7	13	16						
-40	-39.6	41.0	22	9	11	29 20					
-45	-44.6	46.0	8	11	12	23					
-50	-49.6	51.0	11	11	22	33					
-55	-54.6	56.0	9	10	15	25					
-60	-59.6	61.0	5	95/0.3		100/0.8					
-65	-64.6	66.0	6	5	8	13					
-70	-69.6	71.0	6	15	19	34					
-75	-74.6	76.0									

ELEV (ft)	DEPTH (ft)
-22.6	24.0
ALLUVIAL BROWN SAND, SATURATED	
-32.6	34.0
COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-60.3	61.7
-61.6	63.0
COASTAL PLAIN GRAY SANDSTONE (PEEDEE FORMATION)	
COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-B EBL	**STATION** 323+05	**OFFSET** 62 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 102.5 ft	**NORTHING** 191,844	**EASTING** 2,301,066
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** 0.5ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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
-75						Match Line				
-80	-79.6	81.0	4	4	6	10				
-85	-84.6	86.0	14	28	72/0.3	100/0.8				
-90	-89.6	91.0	7	24	76	100				
-95	-94.6	96.0	13	20	27	47				
-100	-99.6	101.0	3	4	5	9				
			6	7	9	16				

ELEV (ft)	DEPTH (ft)
-77.6	79.0
COASTAL PLAIN GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)	
-80.6	82.0
-81.6	83.0
-85.1	86.5
-101.1	102.5
Boring Terminated at Elevation -101.1 ft in Very Stiff Sandy Silt	

NCDOT BORE DOUBLE R-2633BB_GEO_BRDG_ADD.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-C EBL	**STATION** 323+05	**OFFSET** 56 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 191,850	**EASTING** 2,301,066 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/16/12	**COMP. DATE** 11/19/12	**SURFACE WATER DEPTH** 1.0ft
CORE SIZE NQ	**TOTAL RUN** 50.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. ft / DEPTH ft)
-27.9											Begin Coring @ 29.0 ft
-30	-27.9	29.0	5.0	00:12/1.0 00:18/1.0 00:17/1.0 00:37/1.0 00:09/1.0	(0.0) 0%	(0.0) 0%					**ALLUVIAL** BROWN SAND, SATURATED -31.3 / 32.4 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -32.9 / 34.0 -33.9 / 35.0 -34.9 / 36.0
-35	-32.9 -33.9	34.0 35.0	3.0	00:07/1.0 00:56/1.0 00:06/1.0	(0.1) 3%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-35.1 / 35.1 **COASTAL PLAIN** GRAY SANDSTONE (PEEDEE FORMATION) -36.9 / 38.0
-40	-36.9	38.0	5.0	00:35/1.0 00:12/1.0 00:08/1.0 00:10/1.0 00:10/1.0	(0.0) 0%	(0.0) 0%					**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -41.9 / 43.0
-45	-41.9	43.0	5.0	00:08/1.0 00:11/1.0 00:10/1.0 00:09/1.0 00:06/1.0	(0.0) 0%	(0.0) 0%					-46.9 / 48.0
-50	-46.9	48.0	5.0	00:05/1.0 00:10/1.0 00:23/1.0 00:04/1.0 00:07/1.0	(0.0) 0%	(0.0) 0%					-51.9 / 53.0
-55	-51.9	53.0	5.0	04:21/1.0 02:38/1.0 00:07/1.0 00:08/1.0 00:16/1.0	(0.6) 12%	(0.6) 12%	RS-1	(0.6) 100%	(0.6) 100%		-52.5 / 53.6 -53.1 / 54.2 **COASTAL PLAIN** GRAY SANDSTONE (PEEDEE FORMATION) **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -56.9 / 58.0
-60	-56.9	58.0	5.0	00:12/1.0 00:09/1.0 00:08/1.0 00:05/1.0 00:19/1.0	(0.0) 0%	(0.0) 0%					-61.9 / 63.0
-65	-61.9	63.0	5.0	03:56/1.0 00:06/1.0 00:07/1.0 00:21/1.0 00:09/1.0	(0.7) 14%	(0.5) 10%		(0.7) 100%	(0.5) 71%		-62.6 / 63.7 **COASTAL PLAIN** GRAY SANDSTONE (PEEDEE FORMATION) **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -66.9 / 68.0
-70	-66.9	68.0	5.0	00:10/1.0 00:11/1.0 00:09/1.0 00:08/1.0 00:11/1.0	(0.0) 0%	(0.0) 0%					-71.9 / 73.0
-75	-71.9	73.0	5.0	00:08/1.0 00:10/1.0 00:24/1.0 00:08/1.0 00:11/1.0	(0.2) 4%	(0.0) 0%		(0.2) 100%	(0.0) 0%		-73.9 / 75.0 -74.1 / 75.2 **COASTAL PLAIN** GRAY SANDSTONE (PEEDEE FORMATION) -76.9 / 78.0
	-76.9	78.0	2.0	00:08/1.0 00:08/1.0	(0.0) 0%	(0.0) 0%					**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -78.9 / 80.0 **COASTAL PLAIN** GRAY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) Boring Terminated at Elevation -78.9 ft in Very Stiff Sandy Silt
	-78.9	80.0									

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-A WBL	**STATION** 325+30	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 191,969	**EASTING** 2,301,289
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/26/12	**COMP. DATE** 11/28/12	**SURFACE WATER DEPTH** 0.2ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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))
5										
0										0.6 / 0.0 WATER SURFACE (11/26/12)
	-1.0	1.6	WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET
-5	-6.0	6.6	WOH	1	5	6				
-10	-11.0	11.6	WOH	WOH	WOH	0				
-15	-16.0	16.6	WOH	WOH	WOH	0				
-20	-21.0	21.6	WOH	WOH	WOH	0				
-25	-26.0	26.6	WOH	WOH	WOH	0				
-30	-31.0	31.6	WOH	7	11	18				
-35	-36.0	36.6	14	11	11	22				
-40	-41.0	41.6	16	14	17	31				
-45	-46.0	46.6	5	8	11	19				
-50	-51.0	51.6	17	14	18	32				
-55	-56.0	56.6	29	17	19	36				
-60	-61.0	61.6	9	8	11	19				
-65	-66.0	66.6	24	14	12	26				
-70	-71.0	71.6	5	7	13	20				
-75										

-28.4 / 29.0 **ALLUVIAL** GRAY CLAY, WET

-31.5 / 32.1 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-A WBL	**STATION** 325+30	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 191,969	**EASTING** 2,301,289
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/26/12	**COMP. DATE** 11/28/12	**SURFACE WATER DEPTH** 0.2ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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
-75						Match Line				
	-76.0	76.6	4	4	6	10				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-81.0	81.6	18	31	53	84				-79.4 / 80.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85	-86.0	86.6	14	38	62/0.2	100/0.7				
-90	-91.0	91.6	21	39	61/0.3	100/0.8				
-95	-96.0	96.6	13	26	74	100				
-100	-99.0	99.6	4	5	6	11				-100.5 / 101.1 Boring Terminated at Elevation -100.5 ft in Very Stiff Sandy Silt

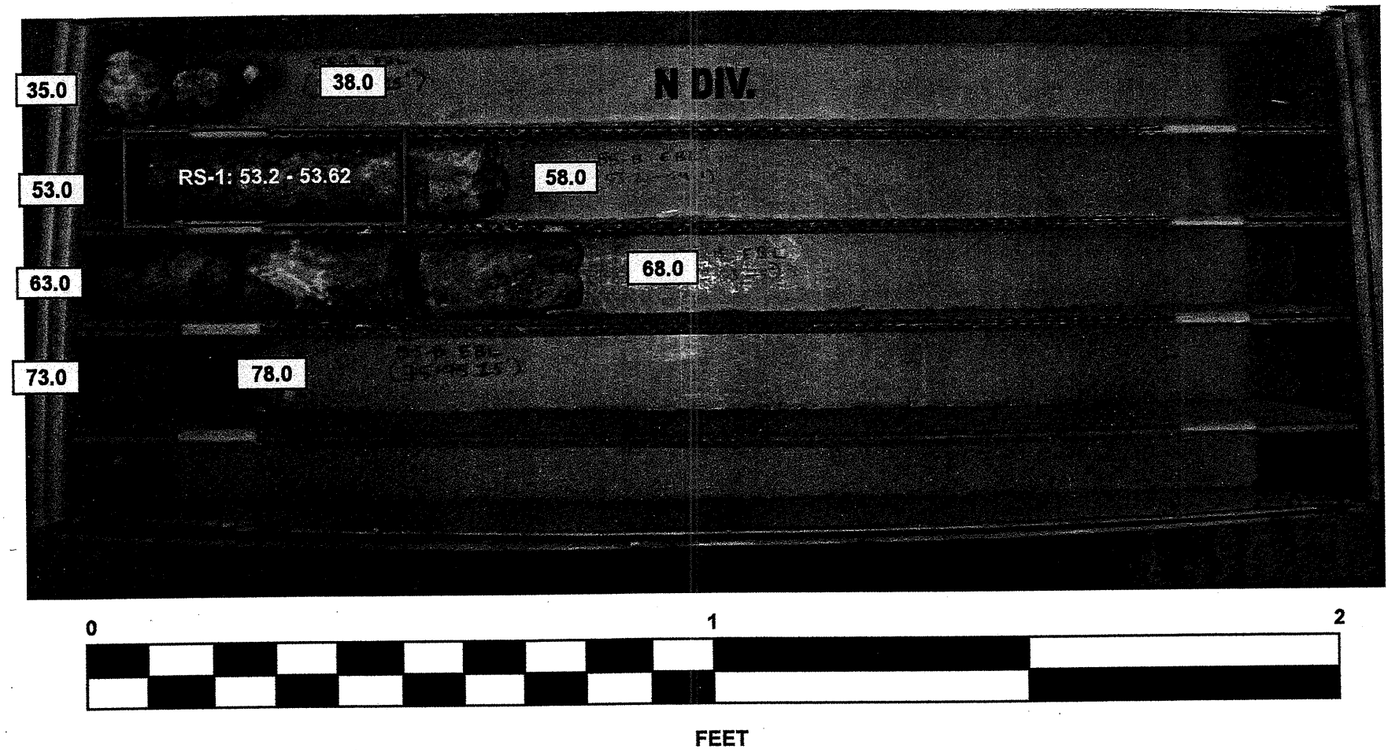
NCDOT BORE DOUBLE R-2633BB_GEO_BRDG_ADD.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

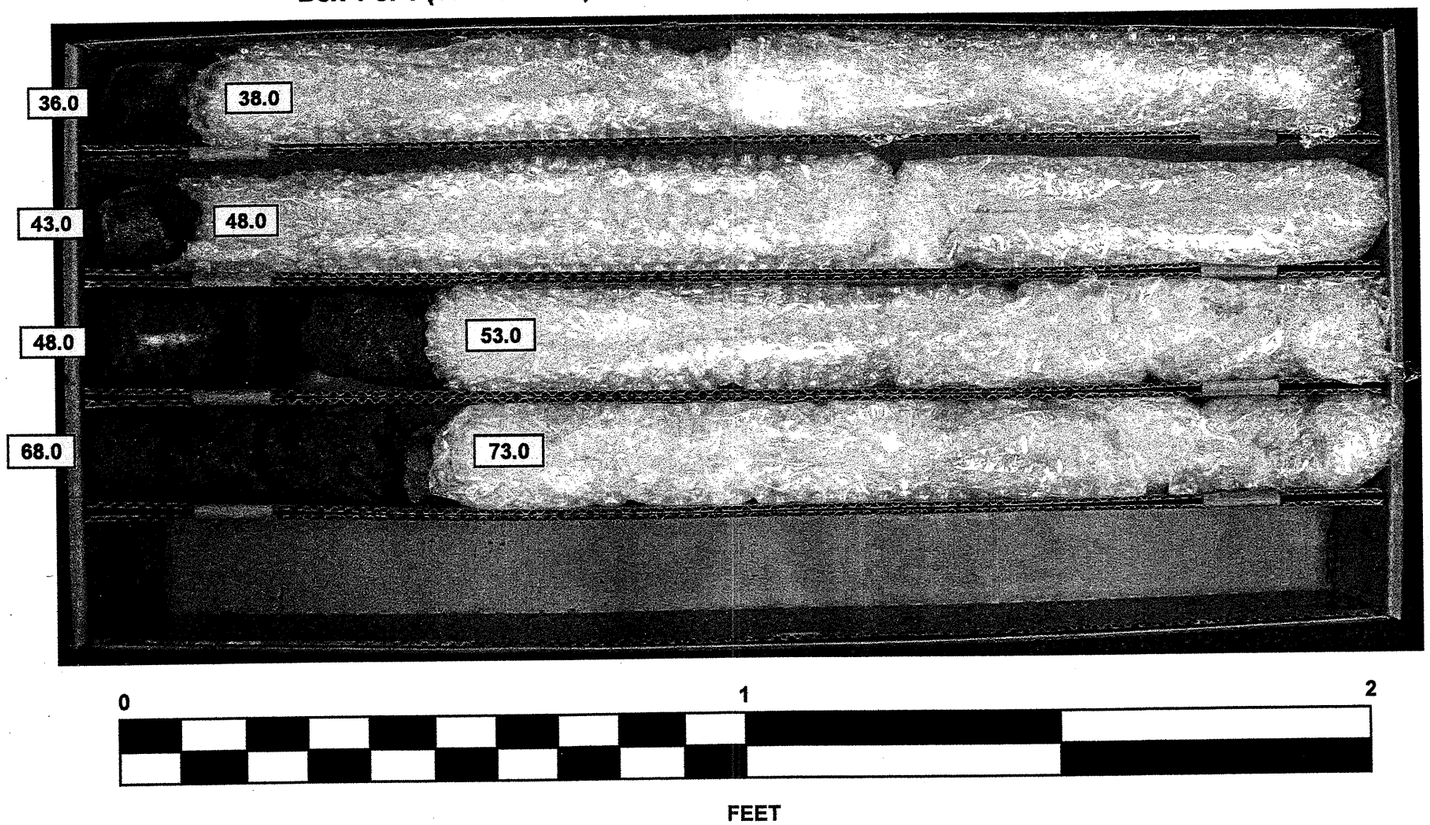
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS./ N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-C WBL	**STATION** 325+27	**OFFSET** 59 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 83.0 ft	**NORTHING** 191,969	**EASTING** 2,301,286	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID5003 D-25 93% 05/25/2012		**DRILL METHOD** Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/29/12	**COMP. DATE** 11/29/12	**SURFACE WATER DEPTH** 0.2ft
CORE SIZE NQ	**TOTAL RUN** 47.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
-35.4											Begin Coring @ 36.0 ft
	-35.4	36.0	2.0	04:36/1.0 00:35/1.0	(0.1) 5%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-35.5 / 36.1 GRAY SANDSTONE (PEEDEE FORMATION) -37.4 / 38.0 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-40	-37.4	38.0	5.0	00:36/1.0 00:26/1.0 03:26/1.0 00:23/1.0 02:31/1.0	(0.0) 0%	(0.0) 0%					
	-42.4	43.0	5.0	00:26/1.0 00:28/1.0 04:40/1.0 07:45/1.0 00:11/1.0	(0.1) 2%	(0.0) 0%					-42.4 / 43.0
-45	-47.4	48.0	5.0	00:08/1.0 01:29/1.0 03:35/1.0 08:07/1.0 00:08/1.0	(0.5) 10%	(0.0) 0%		(0.1) 100%	(0.0) 0%		-44.9 / 45.5 -45.0 / 45.6 GRAY SANDSTONE (PEEDEE FORMATION) GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) -50.4 / 51.0 -50.9 / 51.5 GRAY SANDSTONE (PEEDEE FORMATION)
-50	-52.4	53.0	5.0	00:09/1.0 00:09/1.0 03:56/1.0 02:31/1.0 00:08/1.0	(0.0) 0%	(0.0) 0%		(0.5) 100%	(0.0) 0%		-52.4 / 53.0 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-55	-57.4	58.0	5.0	00:08/1.0 00:09/1.0 00:14/1.0 00:11/1.0 00:07/1.0	(0.0) 0%	(0.0) 0%					-57.4 / 58.0
-60	-62.4	63.0	5.0	00:07/1.0 00:15/1.0 02:34/1.0 05:31/1.0 00:14/1.0	(0.0) 0%	(0.0) 0%					-62.4 / 63.0
-65	-67.4	68.0	5.0	00:45/1.0 00:13/1.0 00:22/1.0 02:52/1.0 00:24/1.0	(0.5) 10%	(0.0) 0%					-67.4 / 68.0
-70	-72.4	73.0	5.0	00:15/1.0 00:23/1.0 00:17/1.0 00:15/1.0 00:13/1.0	(0.0) 0%	(0.0) 0%		(0.5) 100%	(0.0) 0%		-70.6 / 71.2 -71.1 / 71.7 GRAY SANDSTONE (PEEDEE FORMATION) -72.4 / 73.0 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-75	-77.4	78.0	5.0	00:13/1.0 00:27/1.0 00:27/1.0 00:30/1.0 00:18/1.0	(0.0) 0%	(0.0) 0%					-77.4 / 78.0
-80	-82.4	83.0									-82.4 / 83.0
											Boring Terminated at Elevation -82.4 ft in Very Dense Sand

CORE PHOTOGRAPH
B5-C EBL
Box 1 of 1 (35.0' to 38.0', 53.0' to 58.0', 63.0' to 68.0', 73.0' to 78.0')



CORE PHOTOGRAPH
B6-C WBL
Box 1 of 1 (36.0' to 38.0', 43.0' to 48.0', 48.0' to 53.0', 68.0' to 73.0')



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	86

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION BRIDGE ON -L- (US 17) OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN

MAD

J.P. DELOATCH

R.E. SMITH

J.M. EDMONDSON

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2011

NORTH CAROLINA LICENSED SEAL 2240 GEOLOGIST TYLER C. BOTTOMS

7/15/11

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 86

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 VITREOUS 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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
DM — 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
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-___
- [X] DIEDRICH D-50
- [X] CME-45B
- [X] CME-55
- [ ] 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: SEE NOTES BELOW

ELEVATION: FT.

NOTES:

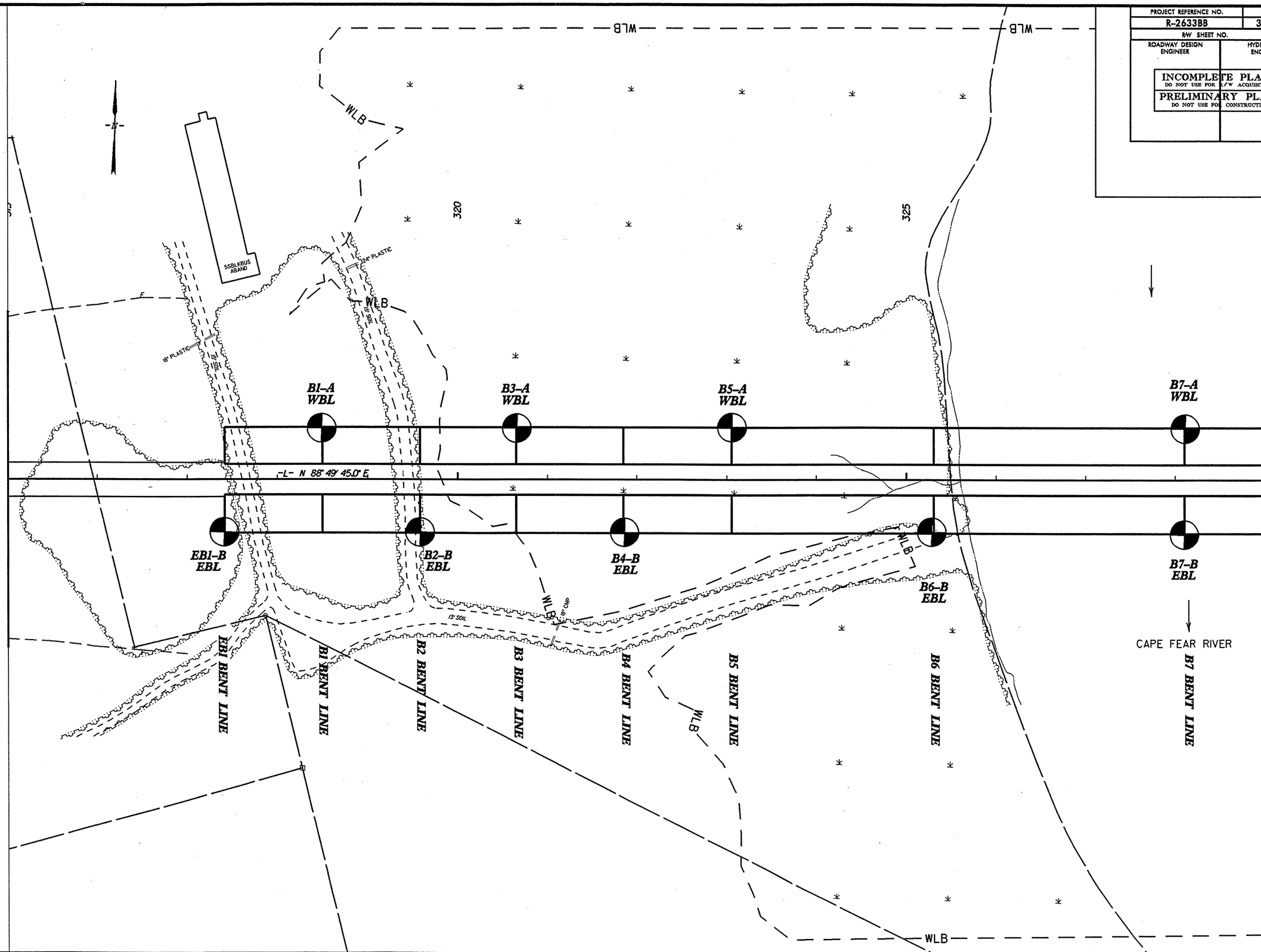
COLLAR ELEVATIONS COLLECTED USING A TIMBLE 5800 GPS WITH A TRIMBLE TSC2 DATA COLLECTOR

Coordinate System :	US State Plane 1983
Zone :	North Carolina 3200
Datum :	NAD 1983 (Conus)
Ellipsoid Name :	Geodetic Ref System 1980
Geoid Model :	GEOID03 (Conus)

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	3 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



STA. 329+00 SEE SHEET 4

REVISIONS

8/17/99

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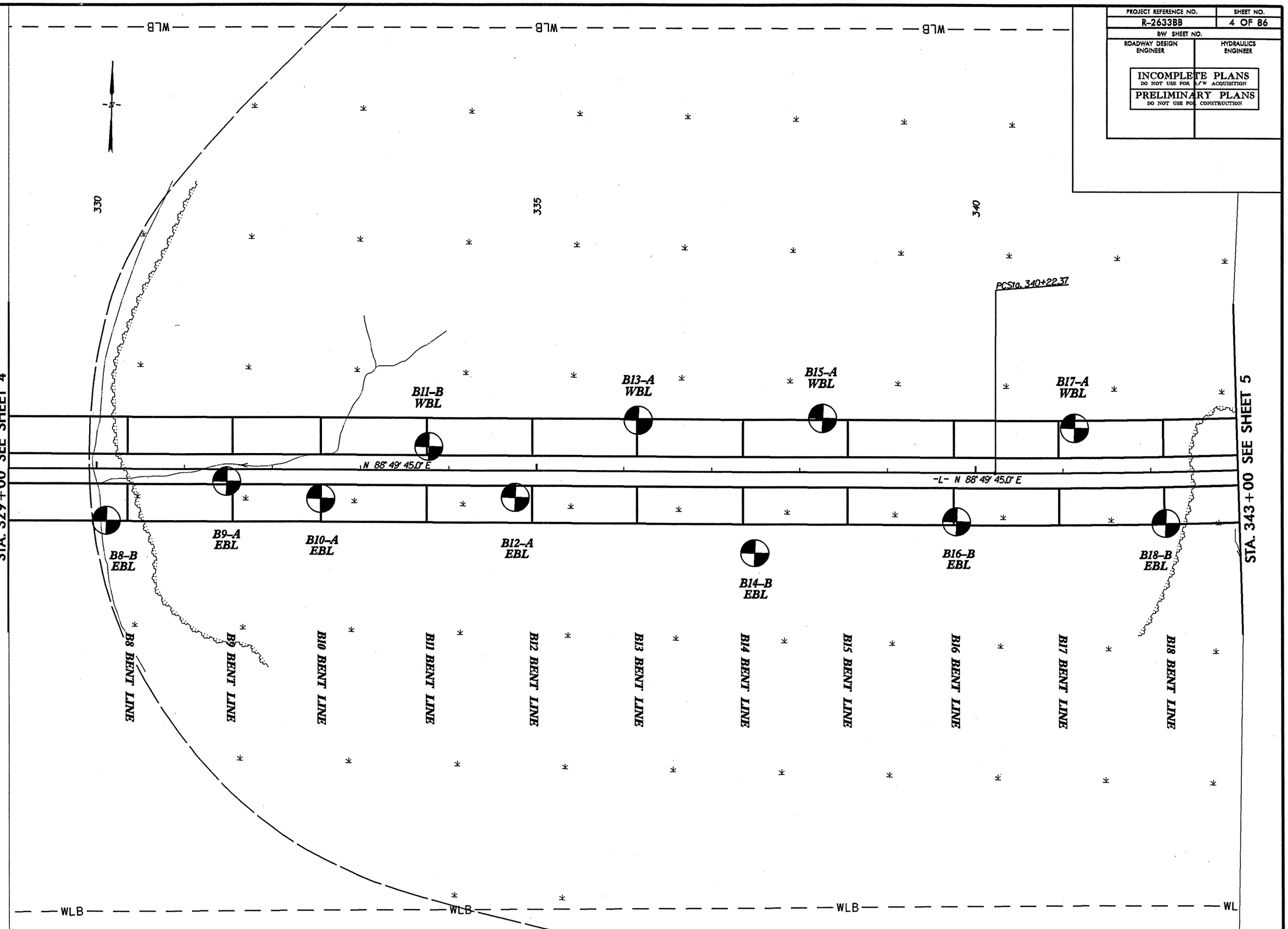
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	4 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

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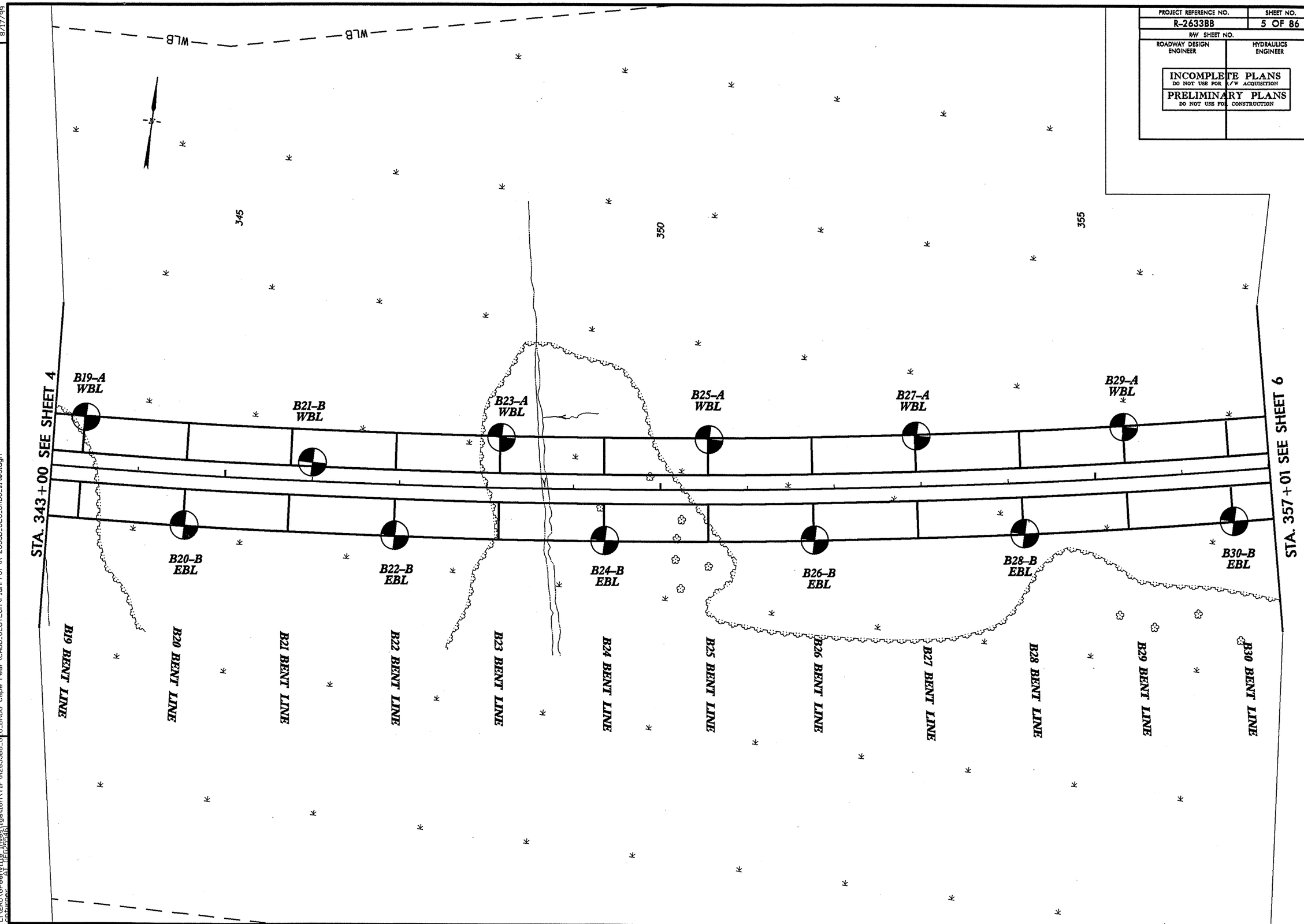
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	5 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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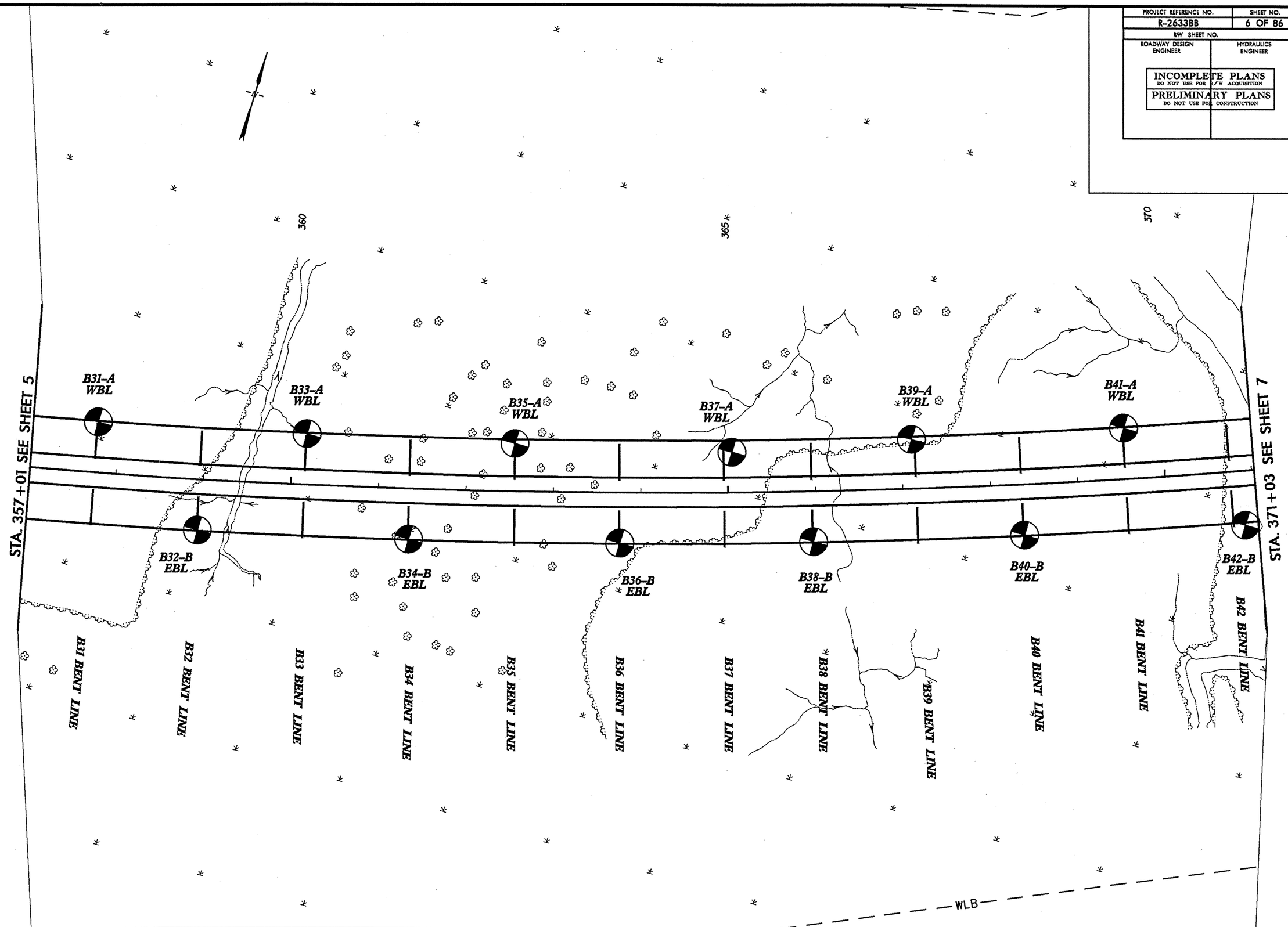
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	6 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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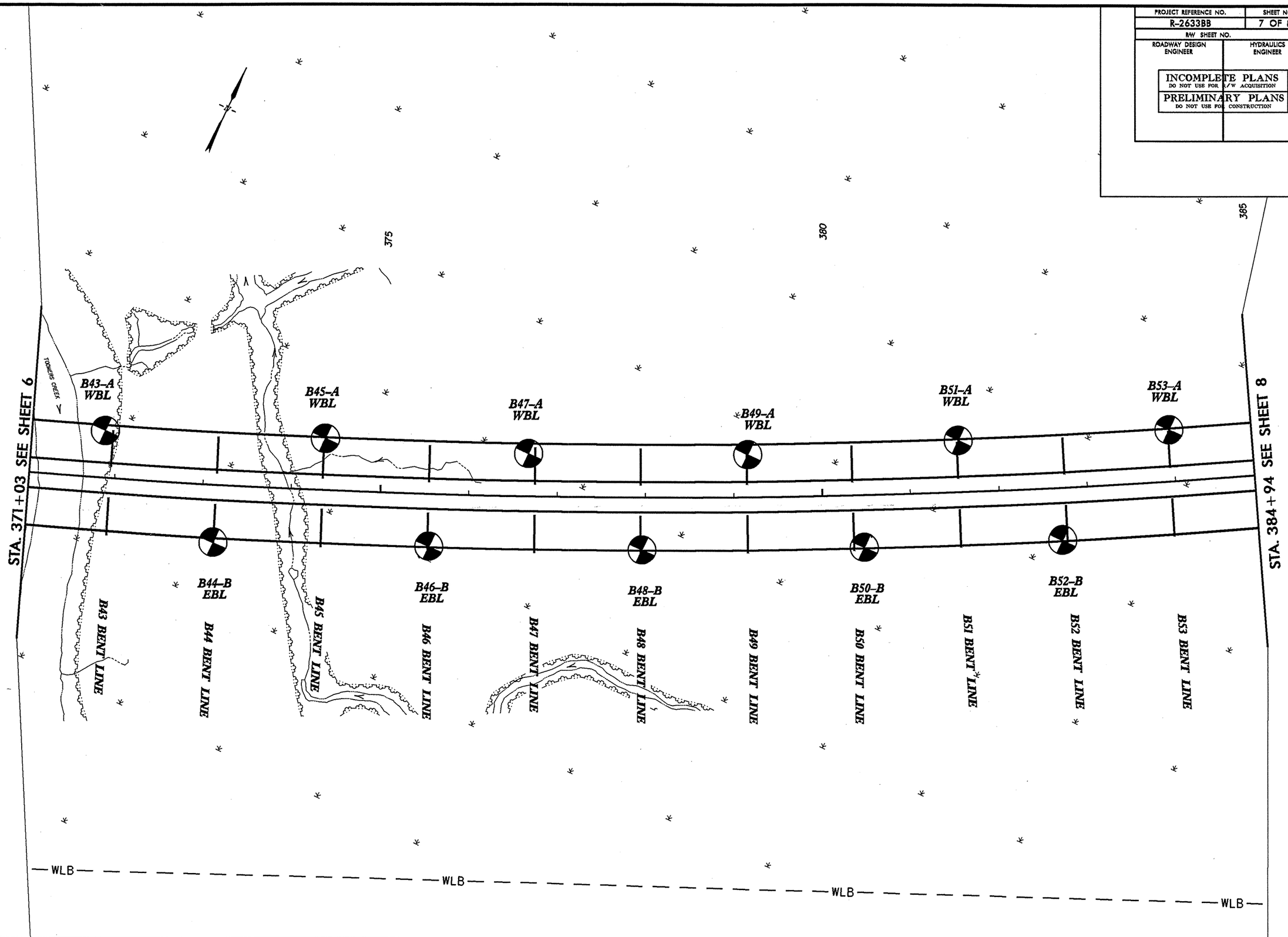
engineer at Rev 2.9.6

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	7 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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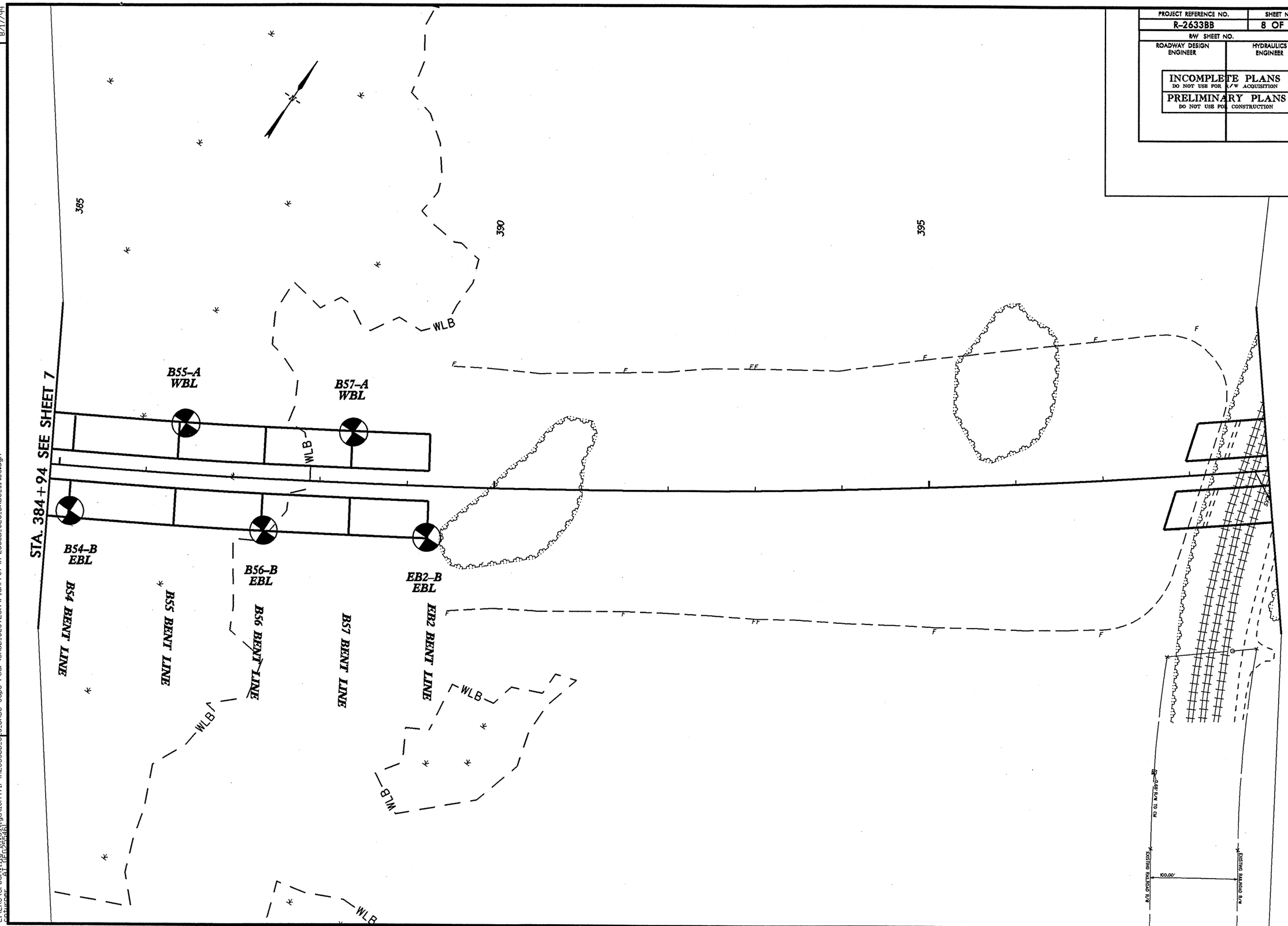
converter - All in Project

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	8 OF 86
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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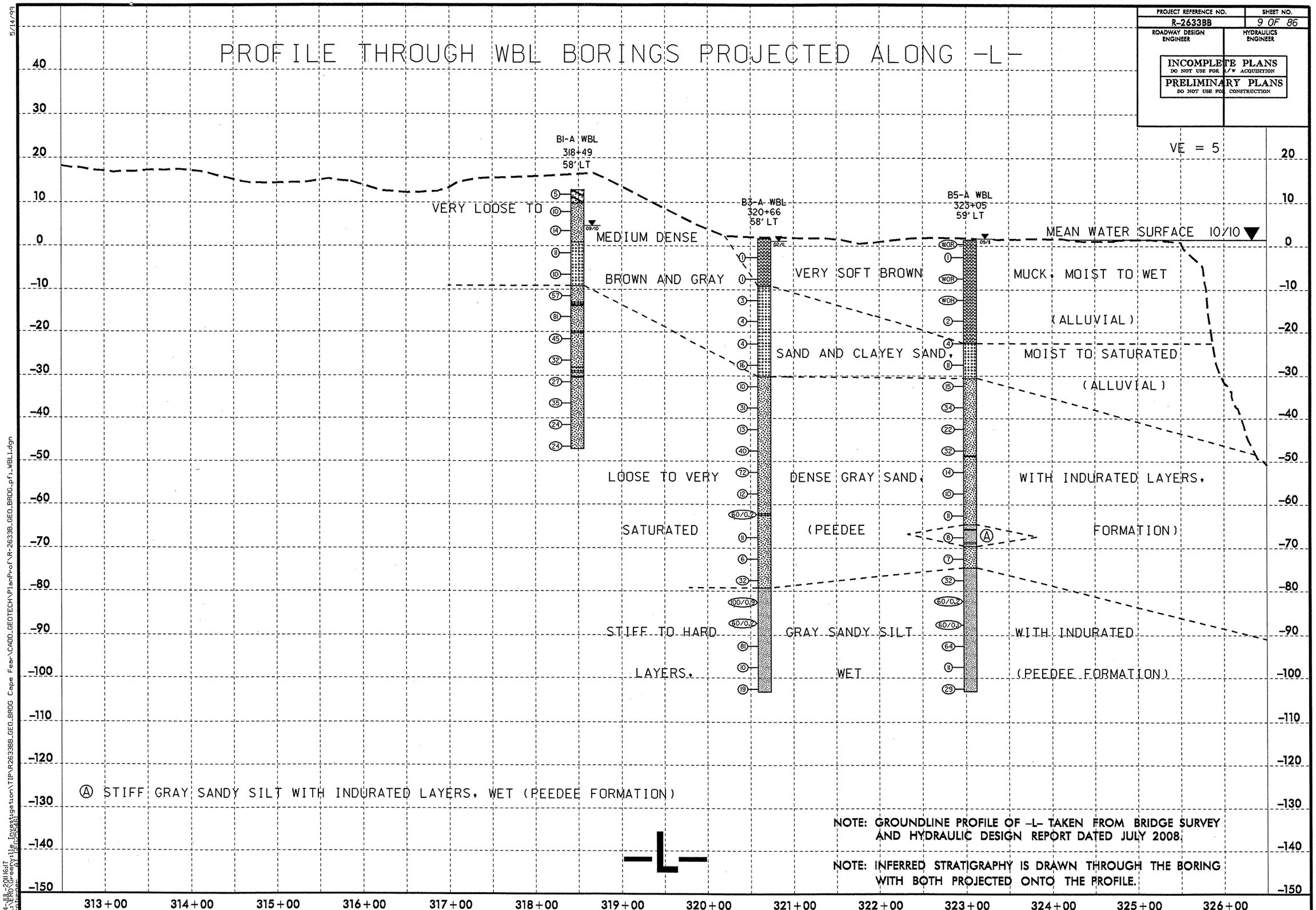
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	9 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	10 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

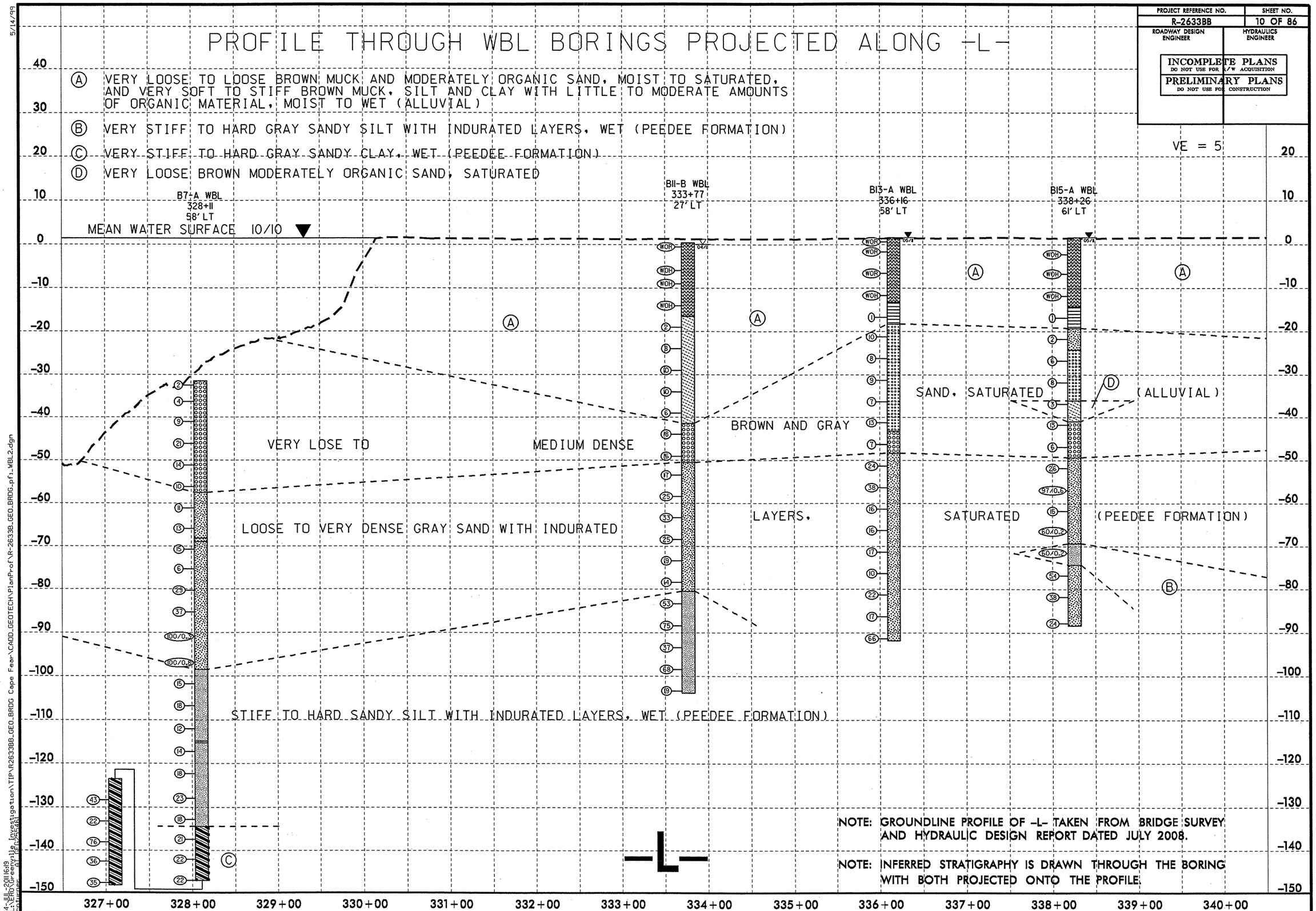
PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-

Ⓐ VERY LOOSE TO LOOSE BROWN MUCK AND MODERATELY ORGANIC SAND, MOIST TO SATURATED, AND VERY SOFT TO STIFF BROWN MUCK, SILT AND CLAY WITH LITTLE TO MODERATE AMOUNTS OF ORGANIC MATERIAL, MOIST TO WET (ALLUVIAL)

Ⓑ VERY STIFF TO HARD GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)

Ⓒ VERY STIFF TO HARD GRAY SANDY CLAY, WET (PEEDEE FORMATION)

Ⓓ VERY LOOSE BROWN MODERATELY ORGANIC SAND, SATURATED



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	11 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-

VE = 5

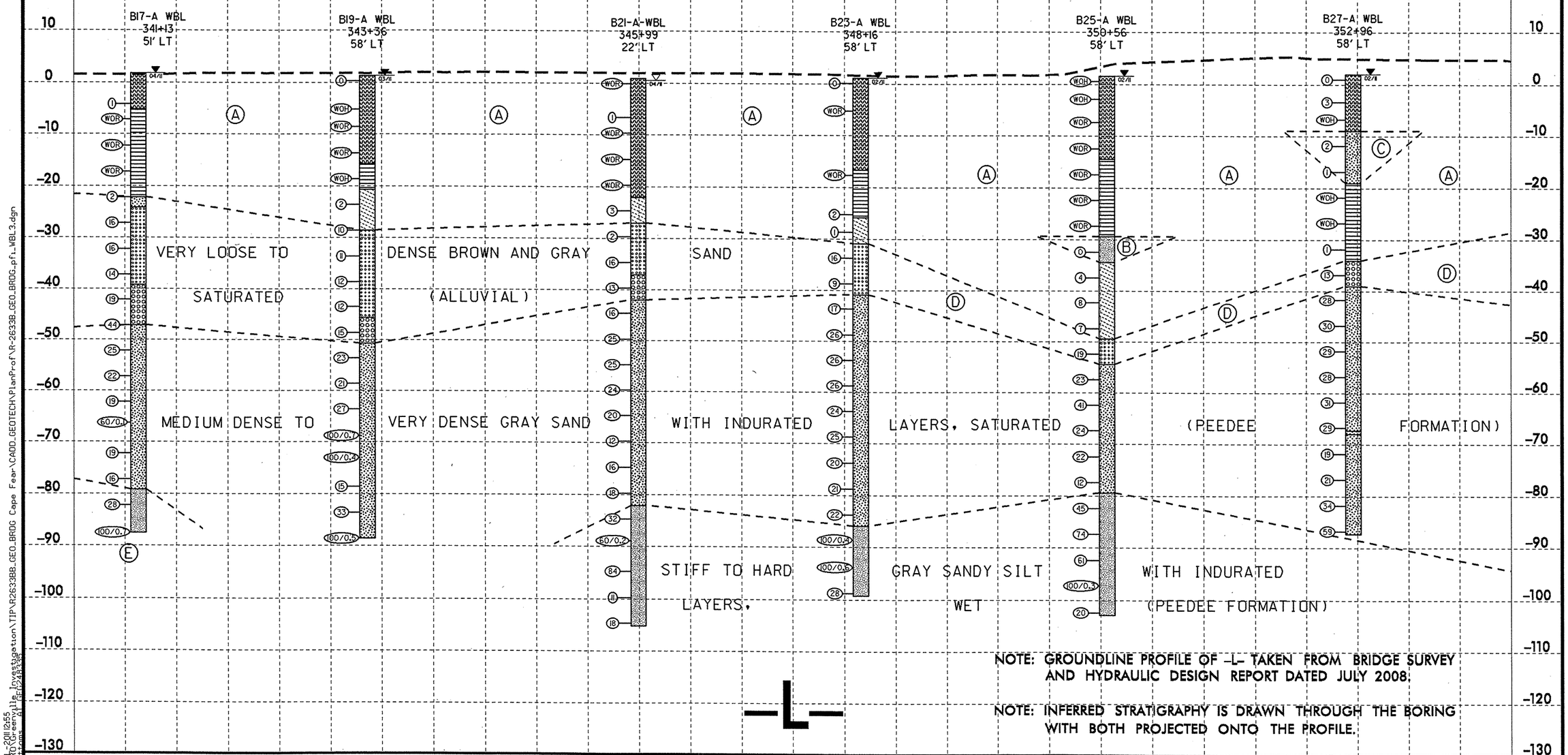
Ⓐ VERY LOOSE TO LOOSE BROWN MUCK AND MODERATELY ORGANIC SAND, MOIST TO SATURATED, AND VERY SOFT TO STIFF BROWN MUCK, SILT AND CLAY WITH LITTLE TO MODERATE AMOUNTS OF ORGANIC MATERIAL, MOIST TO WET (ALLUVIAL)

Ⓑ VERY SOFT BROWN SANDY SILT, WET (ALLUVIAL)

Ⓒ VERY LOOSE BROWN SAND, SATURATED (ALLUVIAL)

Ⓓ LOOSE TO MEDIUM DENSE GRAY AND TAN SAND, SATURATED (ALLUVIAL)

Ⓔ VERY STIFF TO HARD GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	12 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

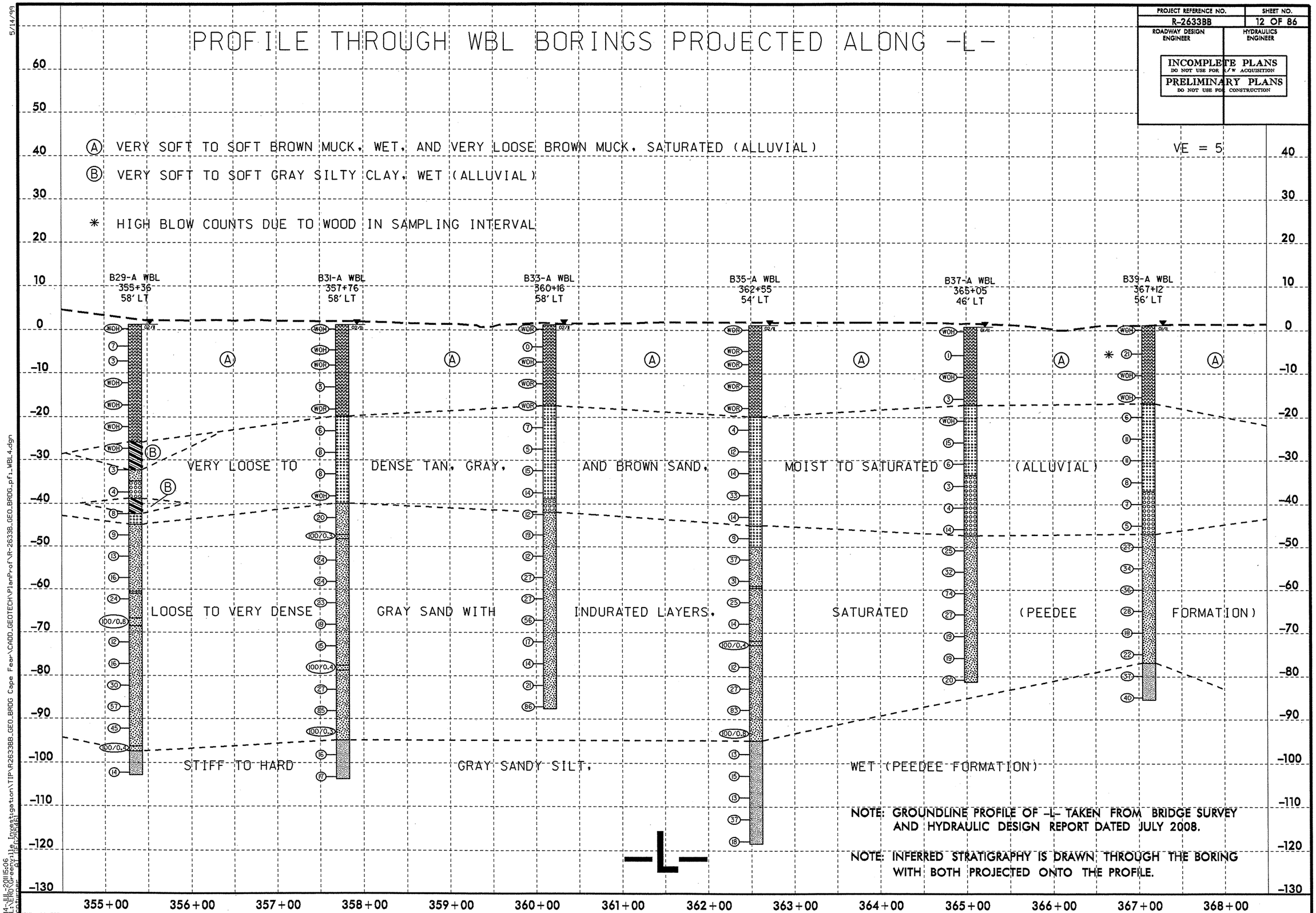
PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-

Ⓐ VERY SOFT TO SOFT BROWN MUCK, WET, AND VERY LOOSE BROWN MUCK, SATURATED (ALLUVIAL)

Ⓑ VERY SOFT TO SOFT GRAY SILTY CLAY, WET (ALLUVIAL)

* HIGH BLOW COUNTS DUE TO WOOD IN SAMPLING INTERVAL

VE = 5



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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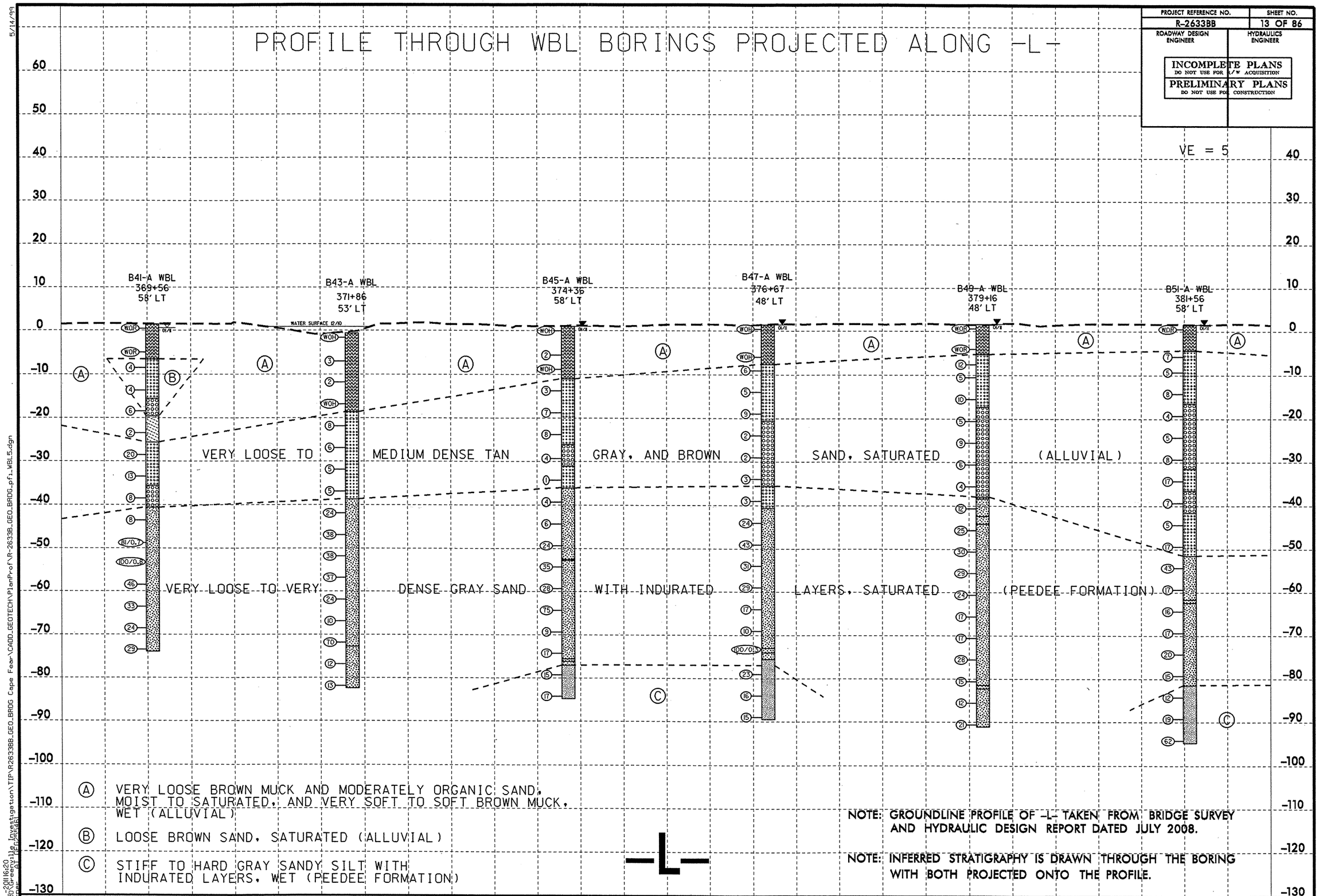
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	13 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-



Ⓐ VERY LOOSE BROWN MUCK AND MODERATELY ORGANIC SAND, MOIST TO SATURATED, AND VERY SOFT TO SOFT BROWN MUCK, WET (ALLUVIAL)

Ⓑ LOOSE BROWN SAND, SATURATED (ALLUVIAL)

Ⓒ STIFF TO HARD GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)

NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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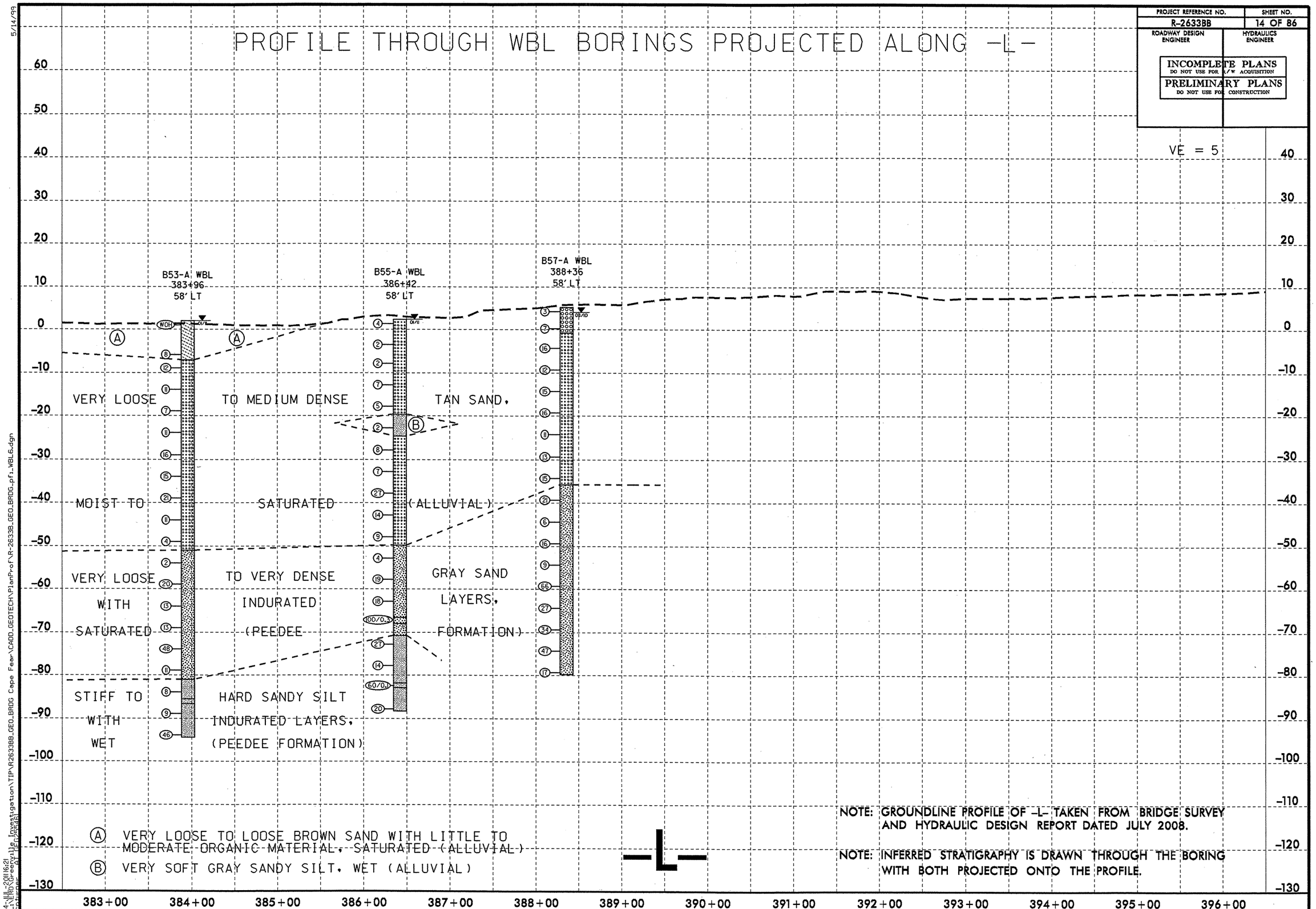
PROFILE THROUGH WBL BORINGS PROJECTED ALONG -L-
PROJECT REFERENCE NO.
R-2633BB
SHEET NO.
14 OF 86
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
VE = 5
B53-A WBL
383+96
58' LT
B55-A WBL
386+42
58' LT
B57-A WBL
388+36
58' LT
VERY LOOSE
TO MEDIUM DENSE
TAN SAND,
MOIST TO
SATURATED
(ALLUVIAL)
VERY LOOSE
WITH
SATURATED
TO VERY DENSE
INDURATED
(PEEDEE
GRAY SAND
LAYERS,
FORMATION)
STIFF TO
WITH
WET
HARD SANDY SILT
INDURATED LAYERS,
(PEEDEE FORMATION)
Ⓐ VERY LOOSE TO LOOSE BROWN SAND WITH LITTLE TO MODERATE ORGANIC MATERIAL, SATURATED (ALLUVIAL)
Ⓑ VERY SOFT GRAY SANDY SILT, WET (ALLUVIAL)
-L-
NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.
383+00
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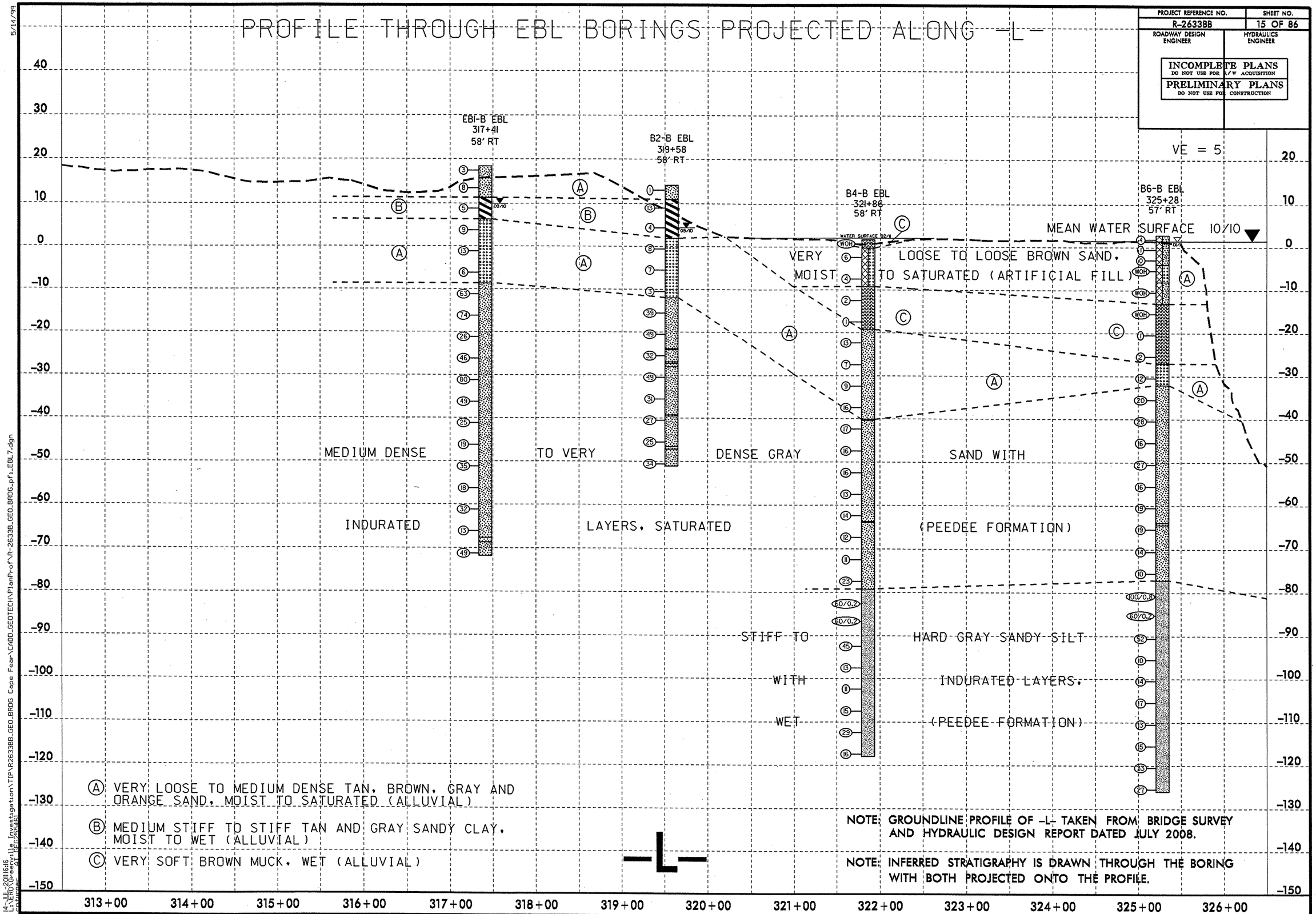
PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-
PROJECT REFERENCE NO.
R-2633BB
SHEET NO.
15 OF 86
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
VE = 5
EB1-B EBL
317+41
58' RT
B2-B EBL
319+58
58' RT
B4-B EBL
321+86
58' RT
B6-B EBL
325+28
57' RT
MEAN WATER SURFACE 10/10
VERY LOOSE TO LOOSE BROWN SAND,
MOIST TO SATURATED (ARTIFICIAL FILL)
MEDIUM DENSE TO VERY DENSE GRAY SAND WITH
INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
STIFF TO HARD GRAY SANDY SILT
WITH INDURATED LAYERS,
WET (PEEDEE FORMATION)
Ⓐ VERY LOOSE TO MEDIUM DENSE TAN, BROWN, GRAY AND ORANGE SAND, MOIST TO SATURATED (ALLUVIAL)
Ⓑ MEDIUM STIFF TO STIFF TAN AND GRAY SANDY CLAY, MOIST TO WET (ALLUVIAL)
Ⓒ VERY SOFT BROWN MUCK, WET (ALLUVIAL)
-L-
NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.
313+00
314+00
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326+00
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PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	16 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

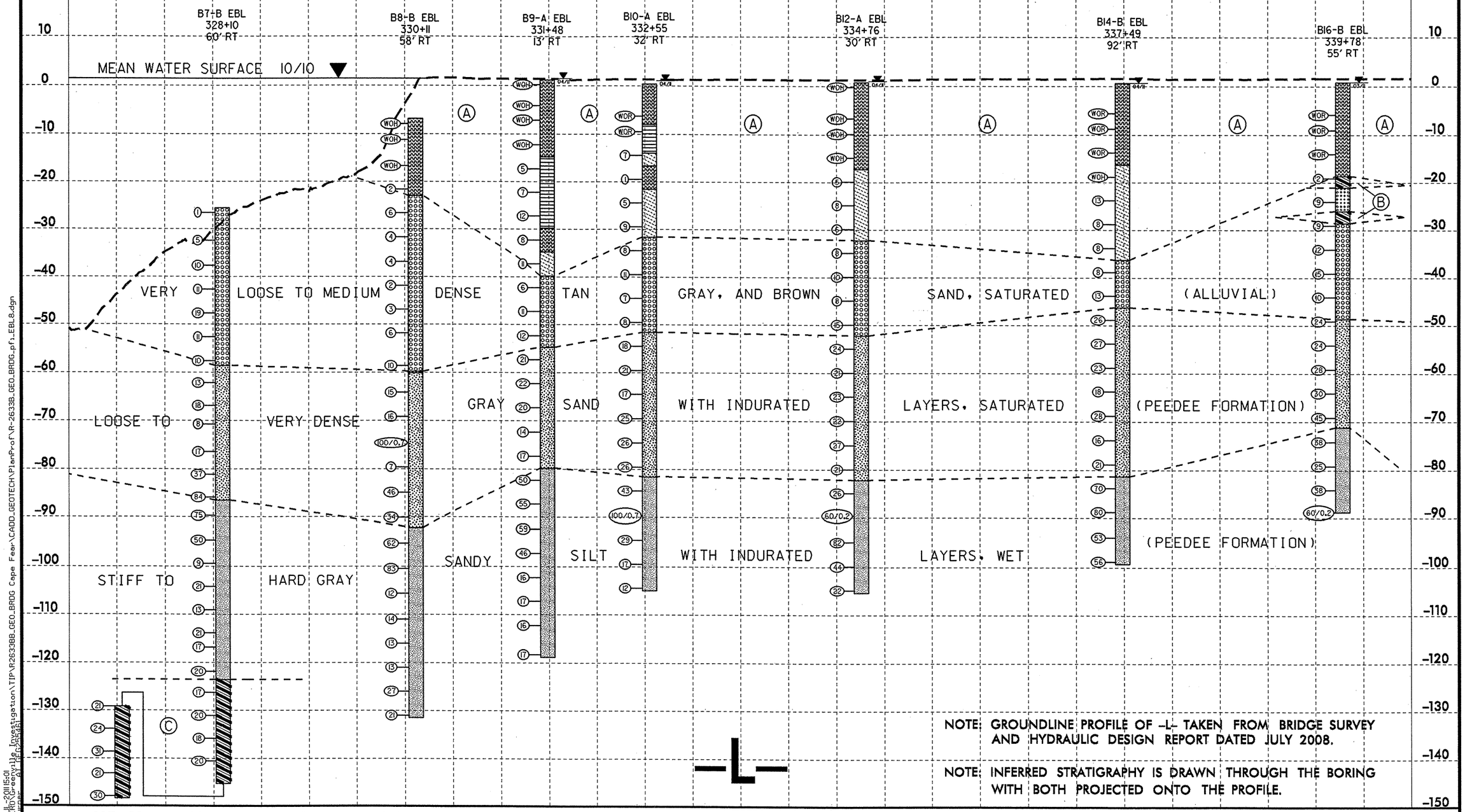
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-

Ⓐ VERY SOFT BROWN MUCK AND MODERATELY ORGANIC CLAY, MOIST TO WET, AND VERY LOOSE TO MEDIUM DENSE BROWN MUCK AND MODERATELY ORGANIC SAND, SATURATED (ALLUVIAL)

Ⓑ SOFT GRAY SANDY CLAY, WET (ALLUVIAL)

Ⓒ VERY STIFF TO HARD GRAY SANDY CLAY, WET (PEEDEE FORMATION)



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

5/14/99

14-JUL-2011 15:01
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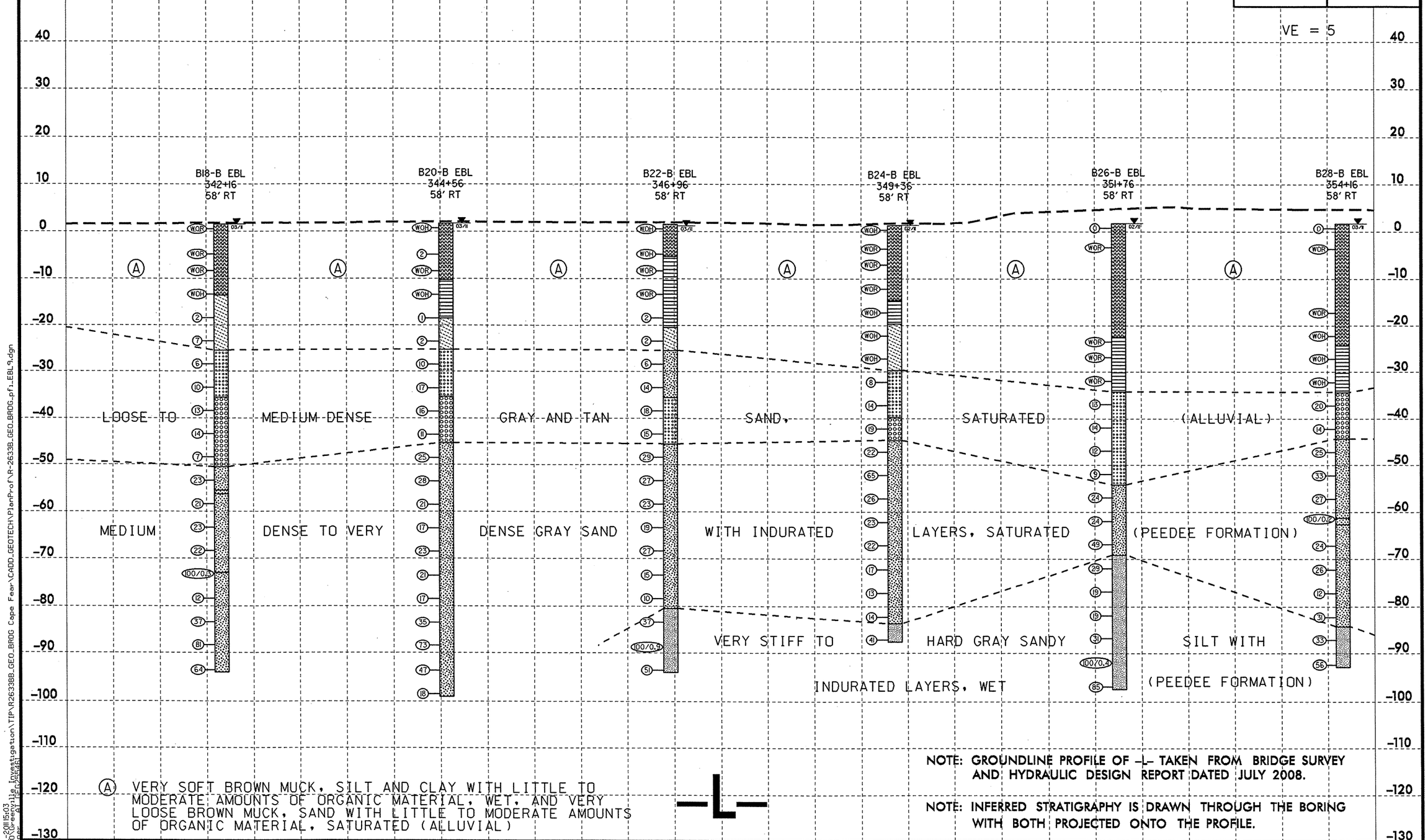
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	17 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-



(A) VERY SOFT BROWN MUCK, SILT AND CLAY WITH LITTLE TO MODERATE AMOUNTS OF ORGANIC MATERIAL, WET, AND VERY LOOSE BROWN MUCK, SAND WITH LITTLE TO MODERATE AMOUNTS OF ORGANIC MATERIAL, SATURATED (ALLUVIAL)

-L-

NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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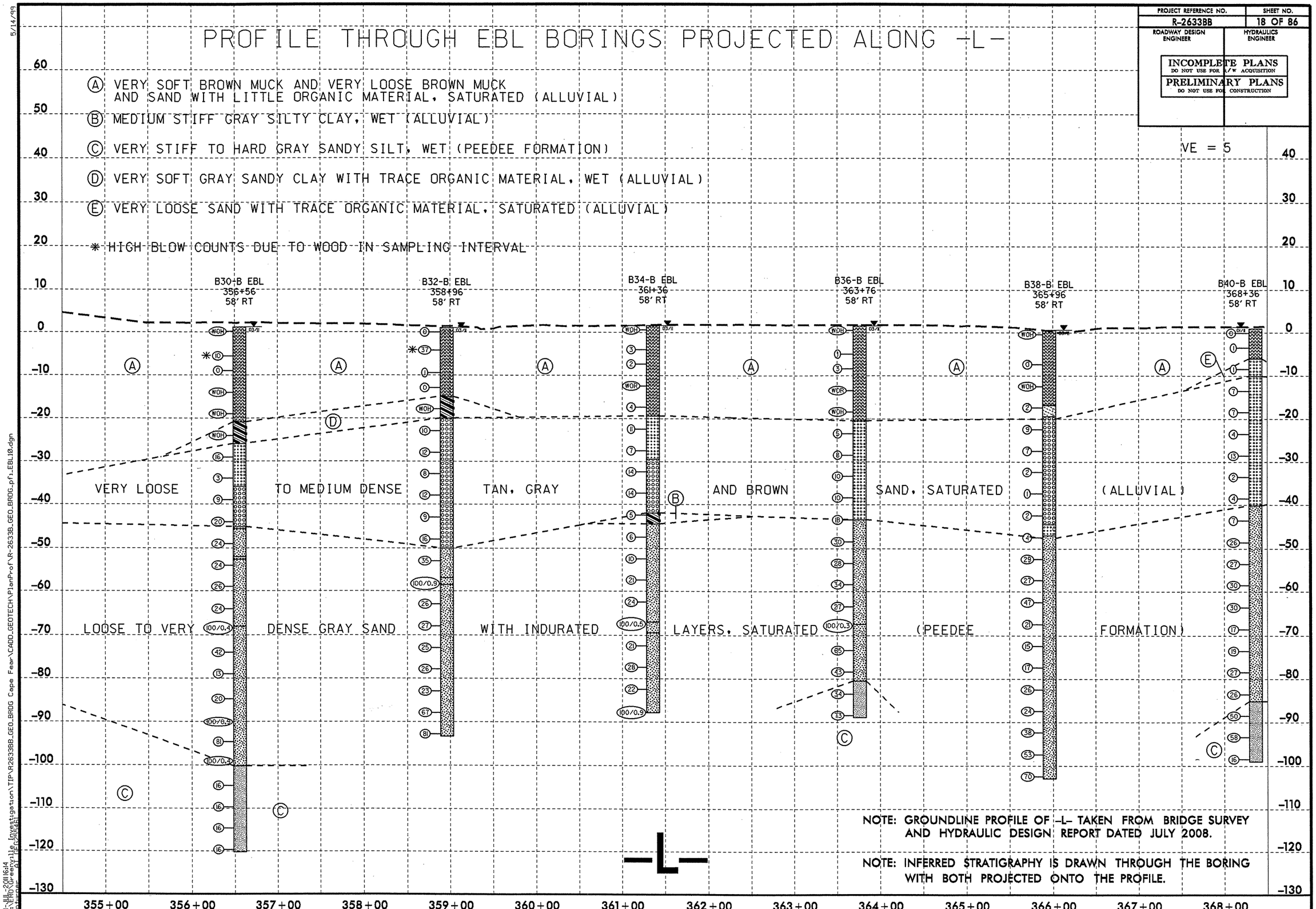
PROJECT REFERENCE NO.
R-2633BB
SHEET NO.
18 OF 86
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-
Ⓐ VERY SOFT BROWN MUCK AND VERY LOOSE BROWN MUCK AND SAND WITH LITTLE ORGANIC MATERIAL, SATURATED (ALLUVIAL)
Ⓑ MEDIUM STIFF GRAY SILTY CLAY, WET (ALLUVIAL)
Ⓒ VERY STIFF TO HARD GRAY SANDY SILT, WET (PEEDEE FORMATION)
Ⓓ VERY SOFT GRAY SANDY CLAY WITH TRACE ORGANIC MATERIAL, WET (ALLUVIAL)
Ⓔ VERY LOOSE SAND WITH TRACE ORGANIC MATERIAL, SATURATED (ALLUVIAL)
* HIGH BLOW COUNTS DUE TO WOOD IN SAMPLING INTERVAL
VE = 5
B30-B EBL 356+56 58' RT
B32-B EBL 358+96 58' RT
B34-B EBL 361+36 58' RT
B36-B EBL 363+76 58' RT
B38-B EBL 365+96 58' RT
B40-B EBL 368+36 58' RT
VERY LOOSE TO MEDIUM DENSE TAN, GRAY AND BROWN SAND, SATURATED (ALLUVIAL)
LOOSE TO VERY DENSE GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-L-
NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.
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PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	19 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-

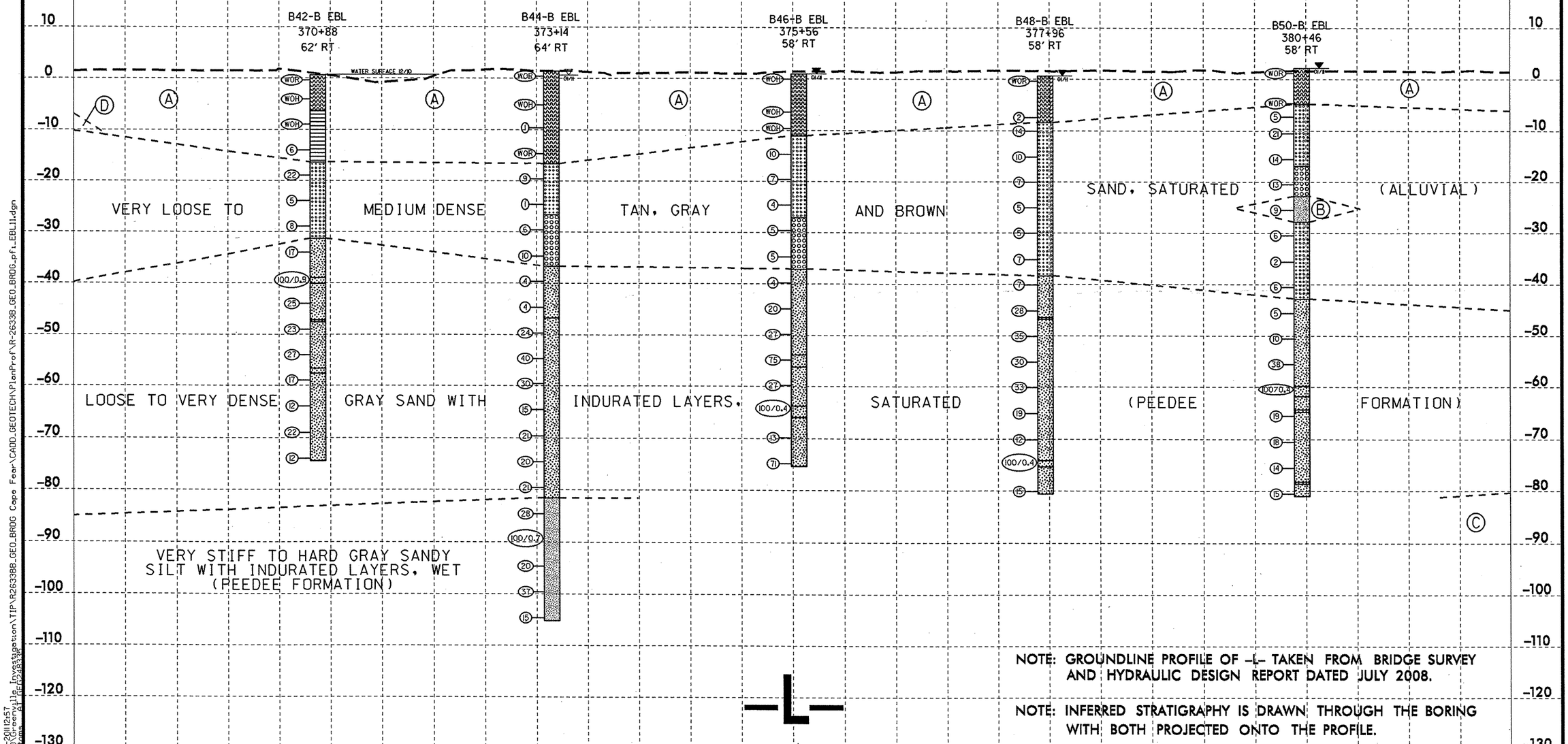
Ⓐ VERY SOFT TO MEDIUM STIFF BROWN MUCK AND SILTY CLAY WITH LITTLE ORGANIC MATERIAL, MOIST TO WET (ALLUVIAL)

Ⓑ STIFF TAN SANDY SILT, WET (ALLUVIAL)

Ⓒ STIFF TO HARD GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)

Ⓓ VERY LOOSE SAND WITH TRACE ORGANIC MATERIAL, SATURATED (ALLUVIAL)

VE = 5



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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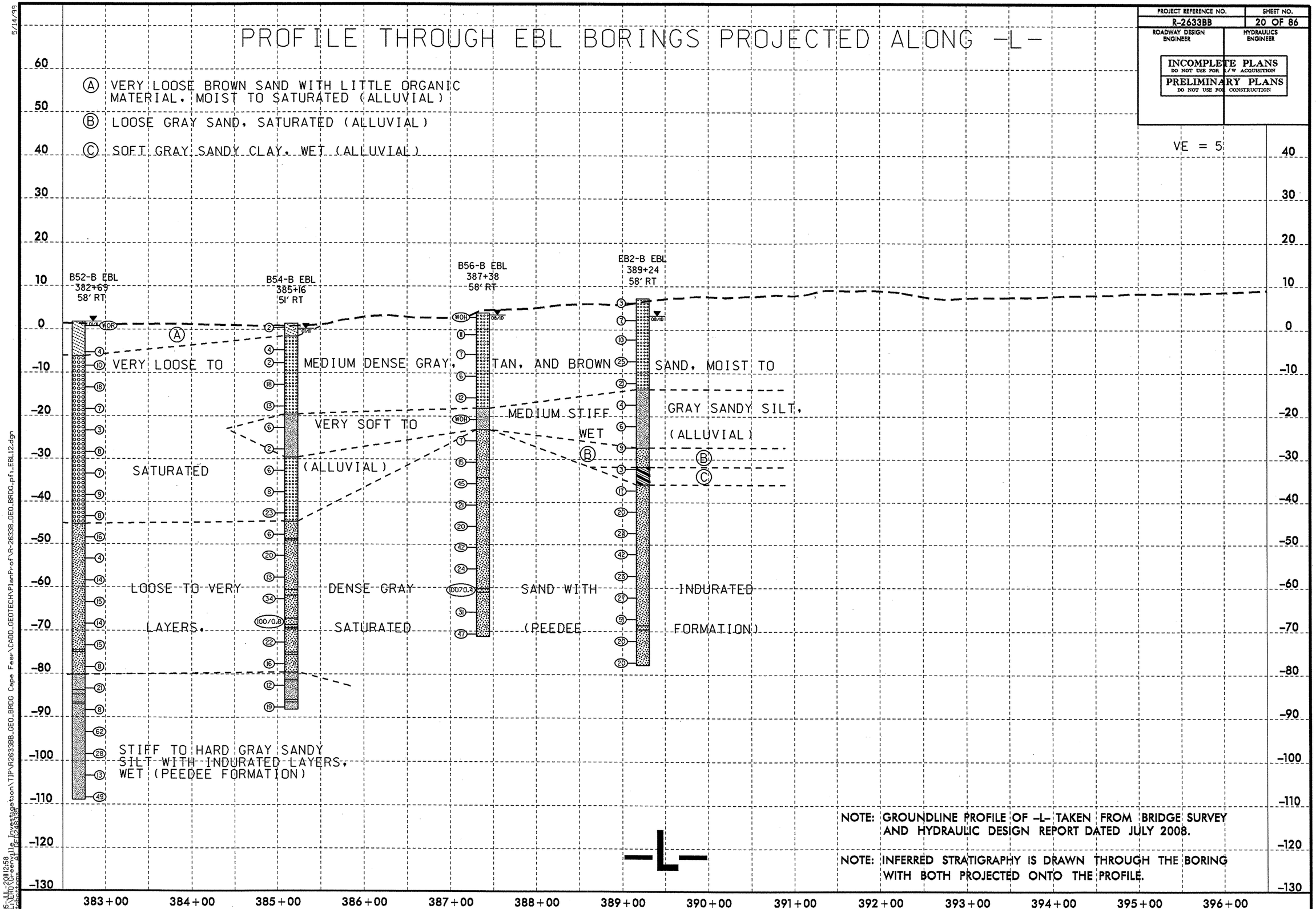
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	20 OF 86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH EBL BORINGS PROJECTED ALONG -L-

VE = 5



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED JULY 2008.

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

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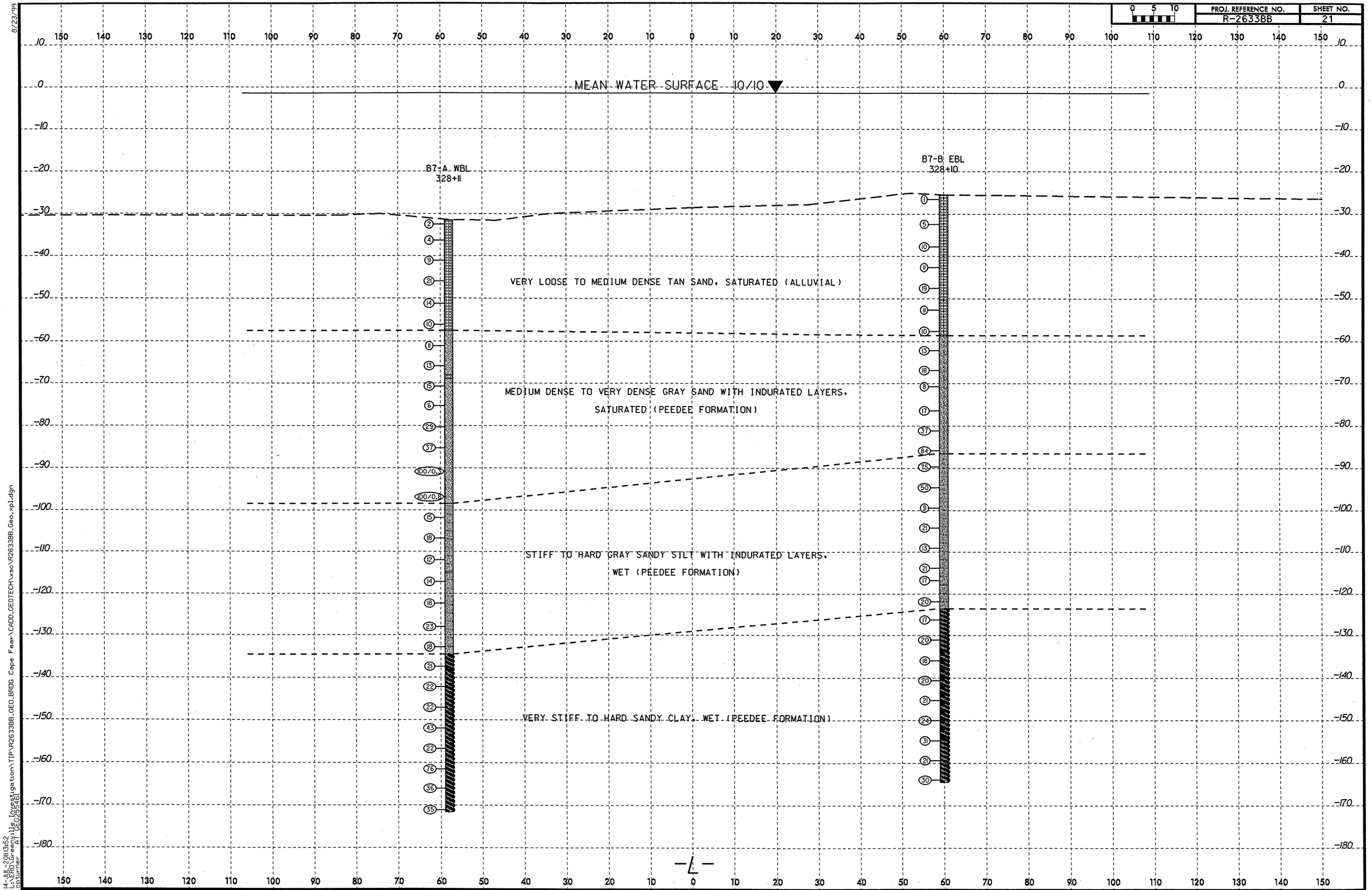

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** DeLoatch, J. P.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. EB1-B EBL	**STATION** 317+41	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 18.3 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 191,836	**EASTING** 2,300,502 — **24 HR.** 8.3
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 03/02/11	**COMP. DATE** 03/03/11	**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)
20											
	18.3	0.0								18.3 GROUND SURFACE	0.0
			1	1	2	3	SS-607			**ALLUVIAL** TAN SAND, MOIST	
15	14.3	4.0									
			3	4	4	8					
10	9.8	8.5						▼		11.3	7.0
			4	3	2	5	SS-608			**ALLUVIAL** TAN SANDY CLAY, MOIST TO WET	
5	4.8	13.5								6.3	12.0
			3	3	6	9	SS-609			**ALLUVIAL** TAN SAND, SATURATED	
0	-0.2	18.5									
			6	6	7	13					
-5	-5.2	23.5									
			4	3	3	6	SS-610				
-10	-10.2	28.5								-8.7	27.0
			38	55	8	63				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-15	-15.2	33.5									
			25	29	45	74	SS-611				
-20	-20.2	38.5									
			13	15	11	26					
-25	-25.2	43.5									
			11	20	26	46	SS-612				
-30	-30.2	48.5									
			21	30	50	80					
-35	-35.2	53.5									
			14	22	27	49	SS-613				
-40	-40.2	58.5									
			10	13	12	25					
-45	-45.2	63.5									
			8	8	11	19	SS-614				
-50	-50.2	68.5									
			14	17	18	35					
-55	-55.2	73.5									
			11	8	10	18	SS-615				
-60											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** DeLoatch, J. P.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. EB1-B EBL	**STATION** 317+41	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 18.3 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 191,836	**EASTING** 2,300,502 — **24 HR.** 8.3
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 03/02/11	**COMP. DATE** 03/03/11	**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
-60						Match Line				
	-60.2	78.5	51	19	13	32				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-65	-65.2	83.5								
			7	6	7	13	SS-616			-67.7 86.0
										-68.7 87.0
-70	-70.2	88.5								
			6	34	15	49				-71.7 90.0
										Boring Terminated at Elevation -71.7 ft in Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B1-A WBL	**STATION** 318+49	**OFFSET** 58 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 12.8 ft	**TOTAL DEPTH** 59.9 ft	**NORTHING** 191,954	**EASTING** 2,300,608
DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 09/10/10	**COMP. DATE** 09/13/10	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 1.1

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)
15											
	12.8	0.0	WOH	2	3	5	SS-31			12.8 GROUND SURFACE	0.0
10	8.8	4.0	3	5	5	10	SS-32			9.8 **ALLUVIAL** BROWN AND GRAY SAND AND CLAYEY SAND, MOIST TO SATURATED	3.0
5	4.4	8.4	3	5	9	14					
0	-0.6	13.4	4	5	6	11	SS-33			0.8	12.0
-5	-5.6	18.4	3	4	6	10					
-10	-10.6	23.4	2	12	45	57	SS-34			-9.2 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	22.0
-15	-15.6	28.4	32	41	40	81				-13.1 / -13.5 / -13.8 / -14.0	25.9 / 26.3 / 26.6 / 26.8
-20	-20.6	33.4	13	21	24	45				-20.0 / -20.3	32.8 / 33.1
-25	-25.6	38.4	6	15	17	32	SS-35				
-30	-30.6	43.4	15	11	16	27				-29.0 / -29.4 / -30.3 / -30.5	41.8 / 42.2 / 43.1 / 43.3
-35	-35.6	48.4	10	15	20	35					
-40	-40.6	53.4	9	11	13	24	SS-36				
-45	-45.6	58.4	10	10	14	24				-47.1 Boring Terminated at Elevation -47.1 ft in Medium Dense Sand	59.9

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B2-B EBL	**STATION** 319+58	**OFFSET** 58 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 13.9 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 191,841	**EASTING** 2,300,719
DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 09/09/10	**COMP. DATE** 09/10/10	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 9.5

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)
15											
	13.9	0.0	WOH	WOH	1	1	SS-25			13.9 GROUND SURFACE	0.0
10	9.9	4.0	5	6	7	13	SS-26			10.9 **ALLUVIAL** TAN SAND, MOIST	3.0
5	5.4	8.5	2	2	2	4				**ALLUVIAL** GRAY SANDY CLAY, MOIST TO WET	
0	0.4	13.5	3	4	4	8	SS-27			1.9 **ALLUVIAL** ORANGE SAND, SATURATED	12.0
-5	-4.6	18.5	3	3	4	7					
-10	-9.6	23.5	2	1	2	3				-12.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	25.9
-15	-14.6	28.5	11	11	28	39	SS-28				
-20	-19.6	33.5	28	29	20	49					
-25	-24.6	38.5	15	19	13	32				-24.0 / -24.2 / -27.0 / -27.3	37.9 / 38.1 / 40.9 / 41.2
-30	-29.6	43.5	20	18	31	49	SS-29				
-35	-34.6	48.5	13	16	15	31					
-40	-39.6	53.5	13	13	14	27				-39.3 / -39.6	53.2 / 53.5
-45	-44.6	58.5	28	13	12	25					
-50	-49.6	63.5	10	16	18	34				-46.6 / -47.2 / -51.1 Boring Terminated at Elevation -51.1 ft in Dense Sand	60.5 / 61.1 / 65.0

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B3-A WBL	**STATION** 320+66	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 104.9 ft	**NORTHING** 191,959	**EASTING** 2,300,824 — **24 HR.** 0.7
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/08/11	**COMP. DATE** 02/08/11	**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)
										1.8 GROUND SURFACE	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (26.3% ORGANIC), MOIST TO WET	
	-1.5	3.3	WOH	WOH	1	1	SS-552				
	-6.5	8.3	WOH	WOH	1	1					
										-9.2 **ALLUVIAL** BROWN SAND, SATURATED	11.0
	-11.5	13.3	1	2	1	3	SS-553				
	-16.5	18.3	1	2	2	4	SS-554				
	-21.5	23.3	2	1	3	4					
	-26.5	28.3	4	5	11	16					
	-31.5	33.3	3	6	4	10	SS-555				
	-36.5	38.3	13	16	15	31	SS-556				
	-41.5	43.3	5	6	7	13					
	-46.5	48.3	7	18	22	40	SS-557				
	-51.5	53.3	7	47	25	72					
	-56.5	58.3	1	5	7	12	SS-558				
	-61.5	63.3	4	60/0.2		60/0.2	SS-559			-30.2 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	32.0
	-66.5	68.3	4	5	6	11					
	-71.5	73.3	3	3	3	6	SS-560			-62.0 / -62.4 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	63.8 / 64.2

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B3-A WBL	**STATION** 320+66	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 104.9 ft	**NORTHING** 191,959	**EASTING** 2,300,824 — **24 HR.** 0.7
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/08/11	**COMP. DATE** 02/08/11	**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
	-76.5	78.3	6	11	21	32				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-81.5	83.3	43	57/0.4		100/0.9				-79.2 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) 81.0
	-86.5	88.3	26	60/0.2		60/0.2	SS-561			
	-91.5	93.3	23	41	40	81				
	-96.5	98.3	4	5	5	10	SS-562			
	-101.5	103.3	5	7	12	19				-103.1 104.9 Boring Terminated at Elevation -103.1 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B4-B EBL	**STATION** 321+86	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 119.7 ft	**NORTHING** 191,844	**EASTING** 2,300,946 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/10/11	**COMP. DATE** 02/11/11	**SURFACE WATER DEPTH** 0.3ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
										WATER SURFACE (02/10/11)	
1.8		0.0	WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (57.6% ORGANIC), WET	0.0
-1.4		3.2	2	3	3	6	SS-563			**ARTIFICIAL FILL** BROWN SAND, SATURATED	2.0
-6.4		8.2	2	2	2	4	SS-564				
-11.4		13.2	WOH	1	1	2	SS-565			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (52.5% ORGANIC), WET	11.0
-16.4		18.2	WOH	WOH	1	1					
-21.4		23.2	6	7	6	13	SS-566			**ALLUVIAL** ORANGE AND BROWN SAND, SATURATED	21.0
-26.4		28.2	6	4	3	7					
-31.4		33.2	3	5	4	9	SS-567				
-36.4		38.2	4	5	11	16					
-41.4		43.2	8	8	9	17	SS-568			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	42.0
-46.4		48.2	7	6	10	16					
-51.4		53.2	8	7	9	16					
-56.4		58.2	5	6	7	13	SS-569				
-61.4		63.2	6	6	8	14					
-66.4		68.2	5	5	7	12				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	65.5
-71.4		73.2	4	5	6	11	SS-570				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B4-B EBL	**STATION** 321+86	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 119.7 ft	**NORTHING** 191,844	**EASTING** 2,300,946 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/10/11	**COMP. DATE** 02/11/11	**SURFACE WATER DEPTH** 0.3ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
						Match Line				
-76.4		78.2	8	9	14	23				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-81.4		83.2	14	26	60/0.2	60/0.2	SS-571			-79.2 — **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) — 81.0
-86.4		88.2	60/0.2			60/0.2				
-91.4		93.2	11	18	27	45	SS-572			
-96.4		98.2	6	5	8	13	SS-573			
-101.4		103.2	6	5	6	11				
-106.4		108.2	6	7	8	15				
-111.4		113.2	9	15	14	29	SS-574			
-116.4		118.2	5	7	9	16				-117.9 — 119.7
										Boring Terminated at Elevation -117.9 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/15/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-A WBL	**STATION** 323+05	**OFFSET** 59 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 104.4 ft	**NORTHING** 191,965	**EASTING** 2,301,064 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/09/11	**COMP. DATE** 02/09/11	**SURFACE WATER DEPTH** 0.1ft

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)
5											
	1.4	0.0	WOR	WOR	WOR	0				1.4 WATER SURFACE (02/09/11)	0.0
0										**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (37.1% ORGANIC), WET	
	-1.5	2.9	1	0	1	1					
-5											
	-6.5	7.9	WOR	WOR	WOR	0					
-10											
	-11.5	12.9	WOH	WOH	WOH	0	SS-585				
-15											
	-16.5	17.9	1	1	1	2					
-20											
	-21.5	22.9	WOH	WOH	4	4	SS-575			-22.5	23.9
-25										**ALLUVIAL** BROWN SAND, SATURATED	
	-26.5	27.9	5	5	6	11	SS-576				
-30										-30.6	32.0
	-31.5	32.9	7	6	9	15	SS-577			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-35											
	-36.5	37.9	10	17	17	34					
-40											
	-41.5	42.9	6	10	12	22	SS-578				
-45											
	-46.5	47.9	12	15	17	32				-48.6	50.0
-50										-48.8	50.2
	-51.5	52.9	8	7	7	14	SS-579				
-55											
	-56.5	57.9	6	4	6	10					
-60											
	-61.5	62.9	5	6	5	11					
-65										-64.6	66.0
	-66.5	67.9	4	3	5	8	SS-580			-65.6 / -65.8 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)	67.0 / 67.2
-70										-68.6 / -68.9 / -69.6	70.0 / 70.3 / 71.0
	-71.5	72.9	3	3	4	7	SS-581			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-75										-74.6	76.0

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B5-A WBL	**STATION** 323+05	**OFFSET** 59 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 104.4 ft	**NORTHING** 191,965	**EASTING** 2,301,064 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/09/11	**COMP. DATE** 02/09/11	**SURFACE WATER DEPTH** 0.1ft

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
-75						Match Line				
	-76.5	77.9	2	10	22	32	SS-582			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) *(continued)*
-80										
	-81.5	82.9	26	60/0.2		60/0.2				
-85										
	-86.5	87.9	20	32	60/0.1	60/0.1	SS-583			
-90										
	-91.5	92.9	26	30	34	64				
-95										
	-96.5	97.9	4	5	6	11				
-100										
	-101.5	102.9	5	10	19	29	SS-584			-103.0 / 104.4
										Boring Terminated at Elevation -103.0 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-B EBL	**STATION** 325+28	**OFFSET** 57 ft RT	**ALIGNMENT** -L- — **0 HR.** 1.5
COLLAR ELEV. 2.9 ft	**TOTAL DEPTH** 128.9 ft	**NORTHING** 191,853	**EASTING** 2,301,289 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/27/11	**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)
10											
5											
	2.9	0.0								2.9 GROUND SURFACE	0.0
			2	2	2	4	SS-586			**ARTIFICIAL FILL** BROWN SAND WITH WOOD FRAGMENTS, MOIST TO SATURATED	
0	0.5	2.4	1	1	0	1	SS-587				
	-2.0	4.9	1	0	0	0					
-5	-4.5	7.4	WOH	WOH	WOH	0	SS-588			-4.1	7.0
-10	-9.5	12.4	WOH	WOH	WOH	0	SS-589			-8.1	11.0
										-13.1	16.0
-15	-14.5	17.4	WOH	WOH	WOH	0	SS-590			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (36.7% ORGANIC), WET	
-20	-19.5	22.4	WOH	WOH	1	1					
-25	-24.5	27.4	1	1	1	2					
										-27.1	30.0
-30	-29.5	32.4	1	5	7	12	SS-591			**ALLUVIAL** BROWN SAND WITH WOOD FRAGMENTS, SATURATED	
										-32.1	35.0
-35	-34.5	37.4	10	9	11	20	SS-592			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-40	-39.5	42.4	6	17	11	28					
-45	-44.5	47.4	5	7	9	16	SS-593				
-50	-49.5	52.4	20	13	14	27					
-55	-54.5	57.4	7	8	8	16					
-60	-59.5	62.4	8	8	11	19	SS-594				
-65	-64.5	67.4	8	8	11	19				-64.0 / -64.5	66.9 / 67.4
-70	-69.5	72.4								**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B6-B EBL	**STATION** 325+28	**OFFSET** 57 ft RT	**ALIGNMENT** -L- — **0 HR.** 1.5
COLLAR ELEV. 2.9 ft	**TOTAL DEPTH** 128.9 ft	**NORTHING** 191,853	**EASTING** 2,301,289 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/27/11	**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
-70						Match Line				
			9	6	8	14	SS-595			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-75	-74.5	77.4	3	5	5	10				
-80	-79.5	82.4	17	48	52/0.3	100/0.3	SS-596			
-85	-84.5	87.4	27	60/0.2		60/0.2				
-90	-89.5	92.4	16	23	29	52	SS-597			
-95	-94.5	97.4	4	5	5	10	SS-598			
-100	-99.5	102.4	6	6	8	14				
-105	-104.5	107.4	9	8	9	17	SS-599			
-110	-109.5	112.4	5	6	7	13				
-115	-114.5	117.4	7	7	8	15				
-120	-119.5	122.4	8	13	20	33	SS-600			
-125	-124.5	127.4	13	15	12	27				-77.1 / 80.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
										-126.0 / 128.9 Boring Terminated at Elevation -126.0 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-A WBL	**STATION** 328+11	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -31.5 ft	**TOTAL DEPTH** 140.1 ft	**NORTHING** 191,976	**EASTING** 2,301,568 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/08/10	**COMP. DATE** 10/12/10	**SURFACE WATER DEPTH** 33.0ft

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)
-30											
	-31.5	0.0								-31.5 GROUND SURFACE	0.0
			1	1	1	2	SS-47			**ALLUVIAL** TAN SAND, SATURATED	
-35	-35.3	3.8									
			1	2	2	4					
-40	-40.1	8.6									
			2	3	6	9					
-45	-45.1	13.6									
			5	11	10	21	SS-48				
-50	-50.1	18.6									
			4	7	7	14					
-55	-55.1	23.6									
			4	5	5	10					
-60	-60.1	28.6									
			5	5	6	11	SS-49				
-65	-64.9	33.4									
			4	6	7	13					
-70	-69.7	38.2									
			4	6	9	15					
-75	-74.3	42.8									
			2	3	3	6	SS-50				
-80	-79.3	47.8									
			5	10	19	29					
-85	-84.3	52.8									
			9	10	27	37					
-90	-90.1	58.6									
			53	100/0.3		100/0.3					
-95	-95.6	64.1									
			14	25	75/0.3	100/0.8					
-100	-100.8	69.3									
			6	8	7	15	SS-51				
-105	-105.8	74.3									
			6	8	10	18	SS-52				
-110											
										-57.5 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	26.0
										-68.1 / -68.9	36.6 / 37.4
										-98.5 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)	67.0

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-A WBL	**STATION** 328+11	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -31.5 ft	**TOTAL DEPTH** 140.1 ft	**NORTHING** 191,976	**EASTING** 2,301,568 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/08/10	**COMP. DATE** 10/12/10	**SURFACE WATER DEPTH** 33.0ft

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
-110						Match Line				
	-111.0	79.5	4	4	8	12				**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) *(continued)*
-115										-114.8 / -115.2
	-116.2	84.7	5	6	8	14				
-120										
	-121.4	89.9	6	8	10	18	SS-53			
-125										
	-127.1	95.6	16	11	12	23				
-130										
	-131.8	100.3	10	8	10	18				
-135										-134.5 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-136.4	104.9	5	9	12	21	SS-54			
-140										
	-141.2	109.7	7	10	12	22				
-145										
	-146.1	114.6	6	9	13	22				
-150										
	-150.9	119.4	17	18	25	43	SS-55			
-155										
	-155.7	124.2	6	8	14	22				
-160										
	-160.5	129.0	21	32	44	76				
-165										
	-165.1	133.6	9	18	18	36	SS-56			
-170										
	-170.1	138.6	9	17	18	35				-171.6 Boring Terminated at Elevation -171.6 ft in Hard Sandy Clay

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-B EBL	**STATION** 328+10	**OFFSET** 60 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -25.6 ft	**TOTAL DEPTH** 138.9 ft	**NORTHING** 191,856	**EASTING** 2,301,571 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/13/10	**COMP. DATE** 10/14/10	**SURFACE WATER DEPTH** 27.1ft

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)
-25										-25.6 GROUND SURFACE	0.0
	-25.6	0.0	WOH	WOH	1	1	SS-57			**ALLUVIAL** TAN SAND, SATURATED	
-30											
	-31.4	5.8	2	2	3	5					
-35											
	-36.7	11.1	2	4	6	10					
-40											
	-41.7	16.1	3	4	7	11	SS-58				
-45											
	-46.7	21.1	7	9	10	19					
-50											
	-51.6	26.0	4	4	7	11					
-55											
	-56.6	31.0	1	4	6	10	SS-59				
-60										-58.6 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	33.0
	-61.2	35.6	3	5	8	13	SS-60				
-65											
	-65.9	40.3	20	8	10	18					
-70											
	-69.7	44.1	4	4	4	8					
-75											
	-75.4	49.8	4	6	11	17	SS-61				
-80											
	-80.1	54.5	17	18	19	37					
-85											
	-84.9	59.3	11	23	61	84					
-90										-86.6 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)	61.0
	-88.7	63.1	40	42	33	75	SS-62				
-95											
	-93.6	68.0	13	20	30	50					
-100											
	-98.4	72.8	4	4	5	9	SS-63				
-105											
	-103.2	77.6	4	8	13	21					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B7-B EBL	**STATION** 328+10	**OFFSET** 60 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -25.6 ft	**TOTAL DEPTH** 138.9 ft	**NORTHING** 191,856	**EASTING** 2,301,571 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/13/10	**COMP. DATE** 10/14/10	**SURFACE WATER DEPTH** 27.1ft

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
-105						Match Line				
	-108.1	82.5	5	6	7	13				**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION) *(continued)*
-110										
	-112.9	87.3	4	8	13	21	SS-64			
-115										
	-115.8	90.2	7	7	10	17				
-120										
	-120.9	95.3	10	9	11	20				
-125										-123.6 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION) 98.0
	-125.3	99.7	6	7	10	17	SS-65			
-130										
	-130.1	104.5	7	8	12	20				
-135										
	-134.9	109.3	7	9	9	18				
-140										
	-139.6	114.0	7	8	12	20	SS-66			
-145										
	-144.3	118.7	8	9	12	21				
-150										
	-149.0	123.4	7	10	14	24				
-155										
	-153.7	128.1	8	15	16	31				
-160										
	-158.3	132.7	7	8	13	21				
	-163.0	137.4	9	15	15	30				-164.5 Boring Terminated at Elevation -164.5 ft in Very Stiff Sandy Clay 138.9

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B8-B EBL	**STATION** 330+11	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -7.1 ft	**TOTAL DEPTH** 124.4 ft	**NORTHING** 191,862	**EASTING** 2,301,796 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/06/10	**COMP. DATE** 10/07/10	**SURFACE WATER DEPTH** 4.4ft

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)
										WATER SURFACE (10/06/10)	
-5											
	-7.1	0.0								-7.1 GROUND SURFACE	0.0
-10			WOH	WOH	WOH	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
	-10.2	3.1	WOH	WOH	WOH	0	SS-39				
-15											
	-15.7	8.6	WOH	WOH	WOH	0					
-20											
	-20.7	13.6	WOH	1	1	2				-23.1	16.0
-25										**ALLUVIAL** GRAY SAND, SATURATED	
	-25.7	18.6	3	4	2	6					
-30											
	-30.7	23.6	WOH	2	2	4	SS-40				
-35											
	-35.9	28.8	1	1	3	4					
-40											
	-40.9	33.8	1	1	1	2					
-45											
	-45.9	38.8	1	1	2	3	SS-41				
-50											
	-50.8	43.7	12	3	3	6					
-55											
	-57.6	50.5	2	3	7	10				-59.8 / -60.1	52.7 / 53.0
-60										**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
	-63.2	56.1	5	7	8	15	SS-42				
-65											
	-68.2	61.1	6	8	8	16					
-70											
	-73.4	66.3	5	6	94/0.2	100/0.7					
-75											
	-78.6	71.5	3	3	4	7	SS-43				
-80											
	-83.9	76.8	10	15	31	46					
-85											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B8-B EBL	**STATION** 330+11	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. -7.1 ft	**TOTAL DEPTH** 124.4 ft	**NORTHING** 191,862	**EASTING** 2,301,796 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/06/10	**COMP. DATE** 10/07/10	**SURFACE WATER DEPTH** 4.4ft

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
-85						Match Line				
-90	-89.1	82.0	4	11	23	34				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-95	-94.3	87.2	13	24	38	62	SS-44			
-100	-99.5	92.4	29	28	55	83				-92.1 / 85.0 — **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-105	-104.7	97.6	4	6	6	12				
-110	-110.0	102.9	5	6	8	14	SS-45			
-115	-115.0	107.9	4	6	7	13				
-120	-120.0	112.9	5	5	8	13				
-125	-125.0	117.9	16	15	12	27	SS-46			
-130	-130.0	122.9	11	11	10	21				-131.5 / 124.4 — Boring Terminated at Elevation -131.5 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B9-A EBL	**STATION** 331+48	**OFFSET** 13 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 120.0 ft	**NORTHING** 191,910	**EASTING** 2,301,908 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/21/11	**COMP. DATE** 04/21/11	**SURFACE WATER DEPTH** 0.3ft

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)
5											
	1.2	0.0								WATER SURFACE (04/21/11)	0.0
0			WOH	WOH	WOH	0	SS-650			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, SATURATED	
	-3.3	4.5									
-5			WOH	WOH	WOH	0					
	-6.3	7.5									
			WOH	WOH	WOH	0	SS-651				
-10											
	-11.3	12.5									
			WOH	WOH	WOH	0					
-15											
	-16.3	17.5								-14.8 / 16.0	
			2	3	2	5				**ALLUVIAL** BROWN MODERATELY ORGANIC SANDY CLAY WITH WOOD FRAGMENTS, WET	
-20											
	-21.3	22.5									
			3	4	3	7	SS-652				
-25											
	-26.3	27.5									
			5	6	6	12					
-30											
	-31.3	32.5								-29.8 / 31.0	
			3	2	6	8	SS-653			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (31.4% ORGANIC), WET	
-35											
	-36.3	37.5								-34.8 / 36.0	
			5	5	6	11				**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
-40											
	-41.3	42.5								-39.8 / 41.0	
			2	3	3	6				**ALLUVIAL** BROWN SAND, SATURATED	
-45											
	-46.3	47.5									
			4	5	6	11	SS-654				
-50											
	-51.3	52.5									
			5	5	7	12					
-55											
	-56.3	57.5								-54.8 / 56.0	
			9	9	12	21	SS-655			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-60											
	-61.3	62.5									
			8	9	13	22					
-65											
	-66.3	67.5									
			7	8	12	20					
-70											
	-71.3	72.5									
			6	6	8	14	SS-656				
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B9-A EBL	**STATION** 331+48	**OFFSET** 13 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 120.0 ft	**NORTHING** 191,910	**EASTING** 2,301,908 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/21/11	**COMP. DATE** 04/21/11	**SURFACE WATER DEPTH** 0.3ft

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
-75						Match Line				
	-76.3	77.5								
			6	7	10	17				
-80										
	-81.3	82.5								
			12	19	31	50	SS-657			
-85										
	-86.3	87.5								
			9	15	40	55				
-90										
	-91.3	92.5								
			25	25	34	59				
-95										
	-96.3	97.5								
			26	25	21	46	SS-658			
-100										
	-101.3	102.5								
			6	7	9	16	SS-659			
-105										
	-106.3	107.5								
			7	7	10	17				
-110										
	-111.3	112.5								
			7	7	9	16	SS-660			
-115										
	-117.3	118.5								
			7	7	10	17				

COASTAL PLAIN GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*

-79.8 / 81.0

COASTAL PLAIN GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)

-118.8 / 120.0

Boring Terminated at Elevation -118.8 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B10-A EBL	**STATION** 332+55	**OFFSET** 32 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 0.4 ft	**TOTAL DEPTH** 105.4 ft	**NORTHING** 191,893	**EASTING** 2,302,015 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/19/11	**COMP. DATE** 04/19/11	**SURFACE WATER DEPTH** 0.7ft

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)
5											
0										WATER SURFACE (04/19/11)	
										0.4 GROUND SURFACE	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS, MOIST TO WET	
-5	-5.5	5.9	WOR	WOR	WOR	0					
	-8.5	8.9	WOR	WOR	WOR	0	SS-661			-8.1	8.5
-10										**ALLUVIAL** BROWN MODERATELY ORGANIC CLAY (9.8% ORGANIC), WET	
	-13.5	13.9	1	3	4	7				-14.0	14.4
-15										**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
										-16.6	17.0
	-18.5	18.9	1	0	1	1	SS-662			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (20.7% ORGANIC), WET	
-20										-21.6	22.0
	-23.5	23.9	2	1	4	5	SS-663			**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
-25											
	-28.5	28.9	3	3	6	9					
-30										-31.6	32.0
	-33.5	33.9	3	4	4	8	SS-664			**ALLUVIAL** BROWN SAND, SATURATED	
-35											
	-38.5	38.9	5	5	6	11					
-40											
	-43.5	43.9	3	3	4	7	SS-665				
-45											
	-48.5	48.9	4	4	4	8					
-50										-51.6	52.0
	-53.5	53.9	8	8	10	18	SS-666			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-55											
	-58.5	58.9	10	10	11	21					
-60											
	-63.5	63.9	6	7	10	17					
-65											
	-68.5	68.9	10	11	14	25	SS-667				
-70											
	-73.5	73.9	8	10	16	26					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B10-A EBL	**STATION** 332+55	**OFFSET** 32 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 0.4 ft	**TOTAL DEPTH** 105.4 ft	**NORTHING** 191,893	**EASTING** 2,302,015 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/19/11	**COMP. DATE** 04/19/11	**SURFACE WATER DEPTH** 0.7ft

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
-75						Match Line				
	-78.5	78.9	8	10	16	26				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										-81.6 82.0
	-83.5	83.9	12	18	25	43	SS-668			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85										
	-88.5	88.9	29	52	48/0.2	100/0.7				
-90										
	-93.5	93.9	11	12	17	29	SS-669			
-95										
	-98.5	98.9	7	6	11	17				
-100										
	-103.5	103.9	6	8	4	12				-105.0 105.4
-105										Boring Terminated at Elevation -105.0 ft in Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B11-B WBL	**STATION** 333+77	**OFFSET** 27 ft LT	**ALIGNMENT** -L- — **0 HR.** 0.4
COLLAR ELEV. 0.5 ft	**TOTAL DEPTH** 104.4 ft	**NORTHING** 191,955	**EASTING** 2,302,136 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/13/11	**COMP. DATE** 04/14/11	**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)
5											
0	0.5	0.0	WOR	WOR	WOR	0	SS-617			GROUND SURFACE 0.5	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS, MOIST TO WET	
-5	-5.0	5.5	WOH	WOH	WOH	0					
	-8.0	8.5	WOH	WOH	WOH	0					
-10											
	-13.0	13.5	WOH	WOH	WOH	0	SS-618				
-15										-16.5	17.0
	-18.0	18.5	3	1	1	2	SS-619			**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
-20											
	-23.0	23.5	4	4	4	8	SS-620				
-25											
	-28.0	28.5	4	3	7	10					
-30											
	-33.0	33.5	5	5	5	10					
-35											
	-38.0	38.5	3	3	3	6	SS-621				
-40										-41.5	42.0
	-43.0	43.5	9	10	8	18				**ALLUVIAL** BROWN SAND WITH WOOD FRAGMENTS, SATURATED	
-45											
	-48.0	48.5	10	8	8	16	SS-622				
-50										-50.5	51.0
	-52.4	52.9	9	8	9	17	SS-633			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-55											
	-57.4	57.9	9	9	16	25	SS-624				
-60											
	-62.4	62.9	8	11	22	33					
-65											
	-67.4	67.9	11	12	13	25					
-70											
	-72.4	72.9	8	8	11	19	SS-625				
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B11-B WBL	**STATION** 333+77	**OFFSET** 27 ft LT	**ALIGNMENT** -L- — **0 HR.** 0.4
COLLAR ELEV. 0.5 ft	**TOTAL DEPTH** 104.4 ft	**NORTHING** 191,955	**EASTING** 2,302,136 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD92544 CME 45 77% 3/31/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/13/11	**COMP. DATE** 04/14/11	**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
-75						Match Line				
	-77.4	77.9	6	5	9	14				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										-80.5 / 81.0
	-82.4	82.9	14	22	31	53	SS-626			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85										
	-87.4	87.9	8	26	49	75				
-90										
	-92.4	92.9	8	14	23	37	SS-627			
-95										
	-97.4	97.9	34	25	43	68				
-100										
	-102.4	102.9	8	9	10	19	SS-628			-103.9 / 104.4
										Boring Terminated at Elevation -103.9 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B12-A EBL	**STATION** 334+76	**OFFSET** 30 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.8 ft	**TOTAL DEPTH** 106.2 ft	**NORTHING** 191,900	**EASTING** 2,302,236 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/12/11	**COMP. DATE** 04/13/11	**SURFACE WATER DEPTH** 0.2ft

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)
5											
0	0.8	0.0	WOH	WOH	WOH	0				0.8 WATER SURFACE (04/12/11)	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (19.8% ORGANIC), SATURATED	
-5	-5.9	6.7	WOH	WOH	WOH	0	SS-629				
-10	-8.9	9.7	WOH	WOH	WOH	0					
-15	-13.9	14.7	WOH	WOH	WOH	0				-17.2	18.0
-20	-18.9	19.7	2	3	2	5	SS-630			**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
-25	-23.9	24.7	2	4	4	8					
-30	-28.9	29.7	3	1	5	6	SS-631				
-35	-33.9	34.7	4	4	4	8				-32.2	33.0
										ALLUVIAL BROWN SAND, SATURATED	
-40	-38.9	39.7	4	5	5	10					
-45	-43.9	44.7	6	4	4	8					
-50	-48.9	49.7	4	6	9	15	SS-632				
-55	-53.9	54.7	10	11	13	24	SS-633			-52.2	53.0
										COASTAL PLAIN GRAY SAND, SATURATED (PEEDEE FORMATION)	
-60	-58.9	59.7	7	9	12	21					
-65	-63.9	64.7	9	10	13	23					
-70	-68.9	69.7	8	10	12	22	SS-634				
-75	-73.9	74.7	8	9	18	27					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B12-A EBL	**STATION** 334+76	**OFFSET** 30 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.8 ft	**TOTAL DEPTH** 106.2 ft	**NORTHING** 191,900	**EASTING** 2,302,236 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/12/11	**COMP. DATE** 04/13/11	**SURFACE WATER DEPTH** 0.2ft

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
-75						Match Line				
-80	-78.9	79.7	7	9	12	21				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-83.9	84.7	12	11	15	26	SS-635			-82.2 / 83.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-90	-88.9	89.7	27	60/0.2		60/0.2				
-95	-93.9	94.7	18	28	54	82	SS-636			
-100	-98.9	99.7	24	23	21	44	SS-637			
-105	-103.9	104.7	9	10	12	22	SS-638			-105.4 / 106.2 Boring Terminated at Elevation -105.4 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B13-A WBL	**STATION** 336+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 93.5 ft	**NORTHING** 191,980	**EASTING** 2,302,367 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/12/11	**COMP. DATE** 05/12/11	**SURFACE WATER DEPTH** 0.0ft

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))
5										
	1.7	0.0								1.7 / 0.0 WATER SURFACE (05/12/11)
0	-0.7	2.4	WOR	WOR	WOR	0	SS-298			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (28.5% TO 68.0% ORGANIC), WET
			WOR	WOR	WOR	0				
-5	-5.7	7.4	WOR	WOR	WOR	0	SS-299			
-10	-10.7	12.4	WOH	WOH	WOH	0				
-15	-15.7	17.4	WOH	WOH	1	1	SS-300			-13.3 / 15.0 **ALLUVIAL** BROWN SANDY SILT WITH LITTLE ORGANIC MATERIAL (7.6% ORGANIC), WET
-20	-20.3	22.0	1	3	7	10	SS-301			-18.3 / 20.0 **ALLUVIAL** GRAY SAND, SATURATED
-25	-25.3	27.0	3	4	4	8				
-30	-30.3	32.0	3	4	5	9	SS-302			
-35	-35.3	37.0	2	3	4	7				
-40	-40.3	42.0	5	6	7	13				
-45	-45.3	47.0	3	3	4	7	SS-303			-43.3 / 45.0
-50	-50.3	52.0	8	10	14	24	SS-304			-48.3 / 50.0 **COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)
-55	-55.3	57.0	5	8	30	38				
-60	-60.3	62.0	3	8	8	16				
-65	-65.3	67.0	5	6	10	16	SS-305			
-70	-70.3	72.0	6	7	10	17				
-75										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B13-A WBL	**STATION** 336+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 93.5 ft	**NORTHING** 191,980	**EASTING** 2,302,367 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/12/11	**COMP. DATE** 05/12/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-75.3	77.0	4	4	6	10				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-80.3	82.0	1	7	15	22	SS-306			
-85	-85.3	87.0	6	7	10	17				
-90	-90.3	92.0	54	29	37	66				-91.8 / 93.5 Boring Terminated at Elevation -91.8 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B14-B EBL	**STATION** 337+49	**OFFSET** 92 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 0.7 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 191,843	**EASTING** 2,302,510
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/11	**COMP. DATE** 04/06/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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)
5											
0										0.7 WATER SURFACE (04/06/11)	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (15.5% TO 20.1% ORGANIC), WET	
-5	-4.8	5.5	WOR	WOR	WOR						
	-7.8	8.5	WOR	WOR	WOR		SS-639				
-10							SS-640				
	-12.8	13.5	WOR	WOR	WOR						
-15										-16.3	17.0
	-17.8	18.5	WOH	WOH	WOH					**ALLUVIAL** BROWN MODERATELY ORGANIC SAND WITH WOOD FRAGMENTS, SATURATED	
-20							SS-641				
	-22.8	23.5	6	6	7	13					
-25							SS-642				
	-27.8	28.5	6	5	3	8					
-30											
	-32.8	33.5	4	3	5	8					
-35							SS-643				
	-37.8	38.5	5	4	4	8					
-40											
	-42.8	43.5	3	5	8	13					
-45							SS-644				
	-47.8	48.5	8	10	16	26					
-50							SS-645				
	-52.8	53.5	10	13	14	27					
-55											
	-57.8	58.5	9	12	11	23					
-60											
	-62.8	63.5	8	8	10	18					
-65							SS-646				
	-67.8	68.5	9	10	18	28					
-70											
	-72.8	73.5	6	8	8	16					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B14-B EBL	**STATION** 337+49	**OFFSET** 92 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 0.7 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 191,843	**EASTING** 2,302,510
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/11	**COMP. DATE** 04/06/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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
-75						Match Line				
	-77.8	78.5	6	9	12	21	SS-647			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										-81.3 82.0
	-82.8	83.5	12	31	39	70	SS-648			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85										
	-87.8	88.5	10	17	63	80				
-90										
	-92.8	93.5	17	25	28	53	SS-649			
-95										
	-97.8	98.5	16	22	34	56				-99.3 100.0
										Boring Terminated at Elevation -99.3 ft in Hard Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B15-A WBL	**STATION** 338+26	**OFFSET** 61 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 191,998	**EASTING** 2,302,584 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/24/11	**SURFACE WATER DEPTH** 0.0ft

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))
5										
										1.7 WATER SURFACE (05/24/11) 0.0
0	-1.3	3.0	WOH	WOH	WOH	0	SS-307			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (34.1% ORGANIC), WET
-5	-5.8	7.5	WOH	WOH	WOH	0				
-10	-10.8	12.5	WOH	WOH	WOH	0				
-15	-15.8	17.5	WOH	1	0	1	SS-308			-14.3 16.0 **ALLUVIAL** BROWN MODERATELY ORGANIC SILT (13.6% ORGANIC), WET
-20	-20.8	22.5	WOH	1	1	2				-19.3 21.0 **ALLUVIAL** BROWN SAND WITH WOOD FRAGMENTS, SATURATED
-25	-25.8	27.5	4	3	3	6	SS-309			-24.3 26.0
-30	-30.8	32.5	3	4	4	8				
-35	-35.8	37.5	WOH	1	2	3	SS-310			-34.3 36.0 BROWN MODERATELY ORGANIC SAND (6.4% ORGANIC), SATURATED
-40	-40.8	42.5	4	7	6	13	SS-311			-39.3 41.0 **ALLUVIAL** BROWN SAND WITH WOOD FRAGMENTS, SATURATED
-45	-45.8	47.5	2	3	3	6				
-50	-50.8	52.5	7	11	15	26	SS-312			-49.3 51.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-55	-55.8	57.5	5	47	50/0.1	97/0.6	SS-313			
-60	-60.8	62.5	5	7	8	15	SS-314			
-65	-65.8	67.5	5	60/0.2		60/0.2				
-70	-70.8	72.5	13	60/0.2		60/0.2	SS-315			-69.3 71.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-75										-74.3 76.0

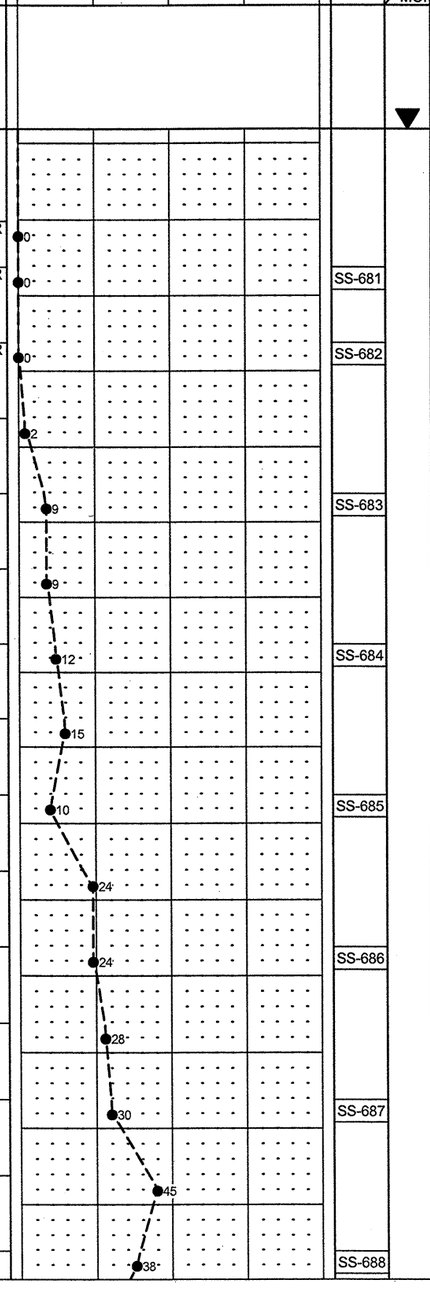
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B15-A WBL	**STATION** 338+26	**OFFSET** 61 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 90.0 ft	**NORTHING** 191,998	**EASTING** 2,302,584 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/24/11	**COMP. DATE** 05/24/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
-80	-75.8	77.5	10	29	25	54				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-80.8	82.5	9	16	22	38	SS-316			
	-86.8	88.5	6	5	19	24				-88.3 90.0 Boring Terminated at Elevation -88.3 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

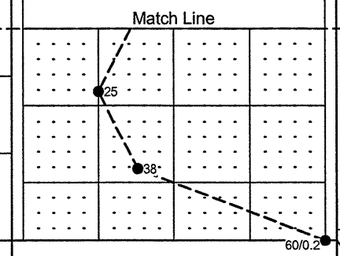
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B16-B EBL	**STATION** 339+78	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 89.7 ft	**NORTHING** 191,885	**EASTING** 2,302,739 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/30/11	**COMP. DATE** 04/04/11	**SURFACE WATER DEPTH** 0.0ft

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))
0.9									WATER SURFACE (03/30/11) — 0.0
									ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (36.8% TO 38.7% ORGANIC), SATURATED
-5.1		6.0	WOR	WOR	WOR				
-8.1		9.0	WOR	WOR	WOR	SS-681			
-13.1		14.0	WOR	WOR	WOR	SS-682			
-18.1		19.0	1	1	1				
-18.6									19.5
									ALLUVIAL GRAY SANDY CLAY, WET
-21.1									22.0
									ALLUVIAL BROWN SAND, SATURATED
-23.1		24.0	1	3	6	SS-683			
-26.1									27.0
									ALLUVIAL GRAY SANDY CLAY, WET
-28.1		29.0	3	4	5				
-28.6									29.5
									ALLUVIAL BROWN SAND, SATURATED
-33.1		34.0	3	5	7	SS-684			
-38.1		39.0	5	7	8				
-43.1		44.0	4	4	6	SS-685			
-48.1		49.0	7	10	14				
-48.6									49.5
									COASTAL PLAIN GRAY SAND, SATURATED (PEEDEE FORMATION)
-53.1		54.0	11	10	14	SS-686			
-58.1		59.0	35	13	15				
-63.1		64.0	25	15	15	SS-687			
-68.1		69.0	21	24	21				
-71.1									72.0
									COASTAL PLAIN GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-73.1		74.0	26	23	15	SS-688			



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B16-B EBL	**STATION** 339+78	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 89.7 ft	**NORTHING** 191,885	**EASTING** 2,302,739 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/30/11	**COMP. DATE** 04/04/11	**SURFACE WATER DEPTH** 0.0ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-78.1		79.0	7	9	16				
-83.1		84.0	15	17	21				
-88.1		89.0	28	60/0.2		SS-689			
									COASTAL PLAIN GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) *(continued)*
-88.8									89.7
									Boring Terminated at Elevation -88.8 ft in Very Hard Sandy Silt

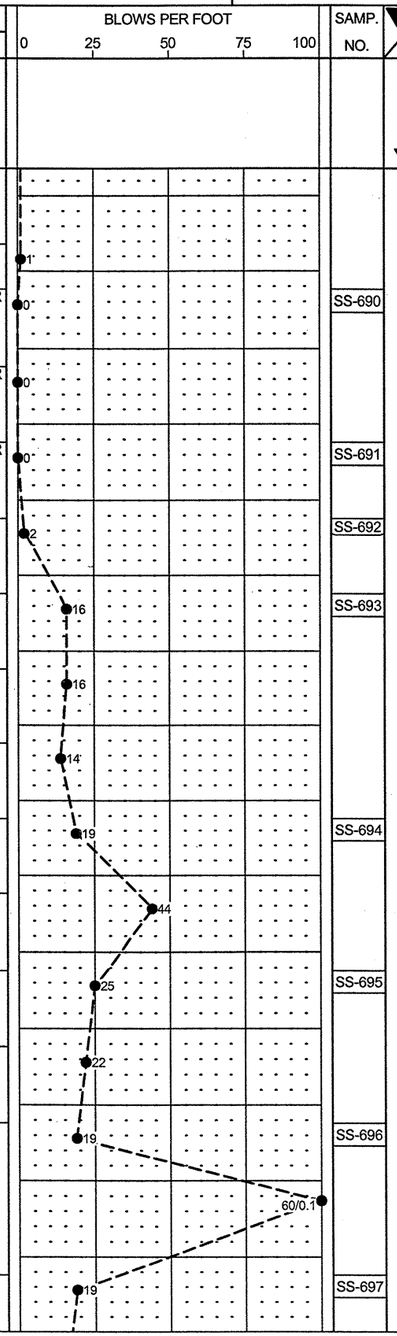


NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

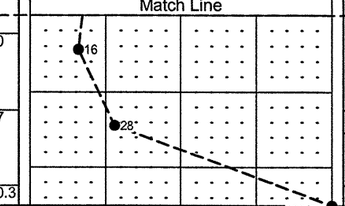
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B17-A WBL	**STATION** 341+13	**OFFSET** 51 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 89.3 ft	**NORTHING** 191,994	**EASTING** 2,302,871 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/07/11	**COMP. DATE** 04/08/11	**SURFACE WATER DEPTH** 0.0ft

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)
									1.8 WATER SURFACE (04/07/11)	0.0
	-3.2	5.0	1	1	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
	-6.2	8.0	WOR	WOR	WOR	SS-690			-5.2 **ALLUVIAL** BROWN SILTY CLAY WITH LITTLE TO MODERATE ORGANIC CONTENT AND WOOD FRAGMENTS (9.5% TO 18.6% ORGANIC), WET	7.0
	-11.2	13.0	WOR	WOR	WOR					
	-16.2	18.0	WOR	WOR	WOR	SS-691				
	-21.2	23.0	1	0	2	SS-692			-22.2	24.0
	-26.2	28.0	5	8	8	SS-693			-24.2 **ALLUVIAL** BROWN SAND, SATURATED	26.0
	-31.2	33.0	5	7	9					
	-36.2	38.0	5	8	6				-39.2	41.0
	-41.2	43.0	9	9	10	SS-694				
	-46.2	48.0	19	28	16				-47.2 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	49.0
	-51.2	53.0	9	12	13	SS-695				
	-56.2	58.0	8	10	12					
	-61.2	63.0	5	8	11	SS-696				
	-66.2	68.0	60/0.1							
	-71.2	73.0	6	8	11	SS-697				



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B17-A WBL	**STATION** 341+13	**OFFSET** 51 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 89.3 ft	**NORTHING** 191,994	**EASTING** 2,302,871 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/07/11	**COMP. DATE** 04/08/11	**SURFACE WATER DEPTH** 0.0ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
	-76.2	78.0	4	6	10				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-81.2	83.0	10	11	17	SS-698			-79.2 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) — 81.0
	-86.2	88.0	25	75	25/0.3	SS-699			-87.5 — 89.3



Boring Terminated at Elevation -87.5 ft in Hard Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B18-B EBL	**STATION** 342+16	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 95.4 ft	**NORTHING** 191,890	**EASTING** 2,302,977 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/11	**COMP. DATE** 03/24/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.5	0.0								1.5 WATER SURFACE (03/24/11)	0.0
0			WOR	WOR	WOR	0	SS-290	474%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (34.8% TO 55.0% ORGANIC), SATURATED TO WET	
	-4.0	5.5									
-5			WOR	WOR	WOR	0					
	-7.4	8.9									
			WOR	WOR	WOR	0	SS-291				
-10											
	-12.4	13.9									
			WOH	WOH	WOH	0				-13.6	15.1
-15										**ALLUVIAL** GRAY AND BROWN SAND WITH LITTLE ORGANIC MATERIAL (4.1% ORGANIC), SATURATED	
	-17.4	18.9									
			WOH	1	1	2	SS-292				
-20											
	-22.4	23.9									
			2	4	3	7					
-25										-25.5	27.0
	-27.4	28.9								**ALLUVIAL** GRAY SAND, SATURATED	
			2	3	3	6	SS-293				
-30											
	-32.4	33.9									
			3	3	7	10					
-35										-35.5	37.0
	-37.4	38.9									
			5	6	7	13	SS-294				
-40											
	-42.4	43.9									
			4	6	8	14					
-45											
	-47.4	48.9									
			3	3	4	7	SS-295				
-50										-50.5	52.0
	-52.4	53.9								**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
			8	10	13	23	SS-296				
-55										-55.5	57.0
	-57.4	58.9								-56.3	57.8
			8	10	11	21					
-60											
	-62.4	63.9									
			9	11	12	23					
-65											
	-67.4	68.9									
			8	10	12	22					
-70											
	-72.4	73.9								-72.9	74.4
			31	100/0.3		100/0.3				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B18-B EBL	**STATION** 342+16	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 95.4 ft	**NORTHING** 191,890	**EASTING** 2,302,977 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/11	**COMP. DATE** 03/24/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-77.4	78.9								GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
			5	6	6	12	SS-297			
-80										
	-82.4	83.9								
			15	17	20	37				
-85										
	-87.4	88.9								
			8	20	61	81				
-90										
	-92.4	93.9								-93.9 / 95.4
			15	29	35	64				Boring Terminated at Elevation -93.9 ft in Very Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B19-A WBL	**STATION** 343+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.3 ft	**TOTAL DEPTH** 89.9 ft	**NORTHING** 192,013	**EASTING** 2,303,091 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/11	**COMP. DATE** 03/23/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.3	0.0								1.3 WATER SURFACE (03/23/11)	0.0
0			1	0	0	0	SS-282	637%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (37.3% TO 55.5% ORGANIC), WET	
-5	-4.2	5.5	WOH	WOH	WOH	0					
	-7.6	8.9	WOR	WOR	WOR	0	SS-283				
-10											
	-12.6	13.9	WOR	WOR	WOR	0					
-15										-15.7	17.0
	-17.6	18.9	WOH	WOH	WOH	0	SS-284			**ALLUVIAL** BROWN SANDY CLAY WITH LITTLE ORGANIC MATERIAL (10.1% ORGANIC), WET	
-20										-20.7	22.0
	-22.6	23.9	1	1	1	2	SS-285			**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL, SATURATED	
-25											
	-27.6	28.9	2	4	6	10					
-30										-28.6	29.9
	-32.6	33.9	4	5	6	11	SS-286			**ALLUVIAL** TAN SAND, SATURATED	
-35											
	-37.6	38.9	4	6	6	12					
-40											
	-42.6	43.9	5	5	7	12					
-45										-45.7	47.0
	-47.6	48.9	2	5	10	15	SS-287				
-50										-50.7	52.0
	-52.6	53.9	8	11	12	23	SS-288			**COASTAL PLAIN** GRAY SAND WITH VERY DENSE LAYERS, SATURATED (PEEDEE FORMATION)	
-55											
	-57.6	58.9	6	10	11	21					
-60											
	-62.6	63.9	17	16	11	27					
-65											
	-67.6	68.9	19	44	56/0.2	100/0.7					
-70											
	-72.6	73.9	100/0.4			100/0.4					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B19-A WBL	**STATION** 343+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.3 ft	**TOTAL DEPTH** 89.9 ft	**NORTHING** 192,013	**EASTING** 2,303,091 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/11	**COMP. DATE** 03/23/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-77.6	78.9	5	5	10	15	SS-289			**COASTAL PLAIN** GRAY SAND WITH VERY DENSE LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-82.6	83.9	10	15	18	33				
-85										
	-87.6	88.9	17	100/0.5		100/0.5				-88.6 89.9
										Boring Terminated at Elevation -88.6 ft in Very Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/15/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B20-B EBL	**STATION** 344+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 100.7 ft	**NORTHING** 191,901	**EASTING** 2,303,218 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/22/11	**COMP. DATE** 03/23/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.7	0.0								1.7 WATER SURFACE (03/22/11)	0.0
0			WOH	WOH	WOH	0	SS-275	691%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (58.0% ORGANIC), SATURATED	
-5	-4.1	5.8	WOH	1	1	2					
	-7.5	9.2	WOR	WOR	WOR	0					
-10										-10.3	12.0
	-12.5	14.2	WOH	WOH	WOH	0	SS-276			**ALLUVIAL** BROWN SANDY CLAY WITH LITTLE ORGANIC MATERIAL (11.3% ORGANIC), WET	
-15											
	-17.5	19.2	WOH	WOH	1	1					
-20										-18.5	20.2
	-22.5	24.2	WOH	1	1	2	SS-277			**ALLUVIAL** GRAY AND BROWN MODERATELY ORGANIC SAND (8.0% ORGANIC), SATURATED	
-25										-25.3	27.0
	-27.5	29.2	4	4	6	10	SS-278			**ALLUVIAL** TAN SAND, SATURATED	
-30											
	-32.5	34.2	7	8	9	17					
-35										-35.3	37.0
	-37.5	39.2	6	8	8	16	SS-279				
-40											
	-42.5	44.2	4	6	5	11					
-45										-45.3	47.0
	-47.5	49.2	10	12	13	25	SS-280			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-50											
	-52.5	54.2	7	13	15	28					
-55											
	-57.5	59.2	5	10	11	21					
-60											
	-62.5	64.2	7	8	9	17					
-65											
	-67.5	69.2	8	11	12	23					
-70											
	-72.5	74.2	7	10	11	21					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B20-B EBL	**STATION** 344+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 100.7 ft	**NORTHING** 191,901	**EASTING** 2,303,218 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/22/11	**COMP. DATE** 03/23/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-77.5	79.2	5	7	10	17				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-82.5	84.2	12	17	18	35	SS-281			
-85										
	-87.5	89.2	7	15	58	73				
-90										
	-92.5	94.2	18	22	25	47				
-95										
	-97.5	99.2	6	9	9	18				-99.0 100.7

Boring Terminated at Elevation -99.0 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B21-B WBL	**STATION** 345+99	**OFFSET** 22 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.4
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 106.1 ft	**NORTHING** 191,993	**EASTING** 2,303,356	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/26/11	**COMP. DATE** 04/26/11	**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)
5											
0	0.9	0.0	WOR	WOR	WOR					0.9 GROUND SURFACE	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS, MOIST TO WET	
-5	-5.7	6.6	1	0	1						
-10	-8.7	9.6	WOR	WOR	WOR						
-15	-13.7	14.6	WOR	WOR	WOR		SS-670				
-20	-18.7	19.6	WOR	WOR	WOR		SS-671				
										-22.1	23.0
-25	-23.7	24.6	1	2	1		SS-672			**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL (4.7% ORGANIC), SATURATED	
										-27.1	28.0
-30	-28.7	29.6	3	1	1		SS-673			**ALLUVIAL** BROWN SAND, SATURATED	
-35	-33.7	34.6	5	7	9						
										-37.1	38.0
-40	-38.7	39.6	5	6	7		SS-674				
										-42.1	43.0
-45	-43.7	44.6	7	7	9		SS-675			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-50	-48.7	49.6	9	12	13						
-55	-53.7	54.6	9	10	15						
-60	-58.7	59.6	9	10	14		SS-676				
-65	-63.7	64.6	11	9	11						
-70	-68.7	69.6	6	5	7						
-75	-73.7	74.6	16	7	9		SS-677				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B21-B WBL	**STATION** 345+99	**OFFSET** 22 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.4
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 106.1 ft	**NORTHING** 191,993	**EASTING** 2,303,356	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/26/11	**COMP. DATE** 04/26/11	**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
-75						Match Line				
-80	-78.7	79.6	4	5	13					**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-83.7	84.6	8	10	22		SS-678			
-90	-88.7	89.6	60/0.2							-82.1 83.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-95	-93.7	94.6	30	41	43		SS-679			
-100	-98.7	99.6	5	5	6		SS-680			
-105	-103.7	104.6	7	7	11					-105.2 106.1 Boring Terminated at Elevation -105.2 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B22-B EBL	**STATION** 346+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 95.4 ft	**NORTHING** 191,921	**EASTING** 2,303,460 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/21/11	**COMP. DATE** 03/22/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.5	0.0								1.5 WATER SURFACE (03/21/11)	0.0
0			WOH	WOH	WOH	0	SS-269	793%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (55.8% ORGANIC), WET	
	-4.0	5.5								-5.5	7.0
-5			WOH	WOH	WOH	0				**ALLUVIAL** BROWN MODERATELY ORGANIC SANDY CLAY (13.9% ORGANIC), WET	
	-7.4	8.9									
-10			WOR	WOR	WOR	0	SS-270	92%			
	-12.4	13.9									
-15			WOR	WOR	WOR	0					
	-17.4	18.9									
-20			1	1	1	2				-20.5	22.0
	-22.4	23.9								**ALLUVIAL** BROWN MODERATELY ORGANIC SAND, SATURATED	
-25			2	1	1	2	SS-271			-25.5	27.0
	-27.4	28.9								**ALLUVIAL** GRAY AND TAN SAND, SATURATED	
-30			2	2	4	6					
	-32.4	33.9									
-35			5	6	8	14				-35.5	37.0
	-37.4	38.9									
-40			7	8	10	18	SS-272				
	-42.4	43.9									
-45			5	6	9	15				-45.5	47.0
	-47.4	48.9								**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-50			12	13	16	29	SS-273				
	-52.4	53.9									
-55			9	12	15	27					
	-57.4	58.9									
-60			6	10	13	23					
	-62.4	63.9									
-65			7	8	11	19	SS-274				
	-67.4	68.9									
-70			7	14	13	27					
	-72.4	73.9									
-75			5	7	8	15					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B22-B EBL	**STATION** 346+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 95.4 ft	**NORTHING** 191,921	**EASTING** 2,303,460 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/21/11	**COMP. DATE** 03/22/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-77.4	78.9								**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80			4	4	6	10				-80.5 82.0
	-82.4	83.9								**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85			12	15	22	37				
	-87.4	88.9								
-90			22	44	60/0.4	100/0.9				
	-92.4	93.9								-93.9 95.4
			10	24	27	51				Boring Terminated at Elevation -93.9 ft in Hard Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B23-A WBL	**STATION** 348+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 100.3 ft	**NORTHING** 192,051	**EASTING** 2,303,568 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/22/11	**COMP. DATE** 02/22/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.1	0.0								1.1 WATER SURFACE (02/22/11)	0.0
0			1	0	0	0	SS-211	334%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (34.8% TO 50.0% ORGANIC), WET AND SATURATED	
	-4.3	5.4	WOR	WOR	WOR	0	SS-212				
-5											
-10											
-15											
	-16.6	17.7	WOR	WOR	WOR	0	SS-213			-16.6 **ALLUVIAL** BROWN SILTY CLAY WITH LITTLE ORGANIC MATERIAL (9.1% ORGANIC), WET	17.7
-20											
-25	-24.3	25.4	1	1	1	2					
	-27.7	28.8	1	1	0	1	SS-214			-25.9 **ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL, SATURATED	27.0
-30										-30.9 **ALLUVIAL** TAN SAND, SATURATED	32.0
	-32.7	33.8	5	8	8	16	SS-215				
-35											
	-37.7	38.8	3	5	4	9					
-40										-40.9 **COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	42.0
	-42.7	43.8	5	8	9	17	SS-216				
-45											
	-47.7	48.8	8	12	14	26					
-50											
	-52.7	53.8	20	11	15	26					
-55											
	-57.7	58.8	8	11	15	26	SS-217				
-60											
	-62.7	63.8	7	10	14	24					
-65											
	-67.7	68.8	8	12	13	25					
-70											
	-72.7	73.8	6	9	11	20	SS-218				
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B23-A WBL	**STATION** 348+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 100.3 ft	**NORTHING** 192,051	**EASTING** 2,303,568 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/22/11	**COMP. DATE** 02/22/11	**SURFACE WATER DEPTH** 0.0ft

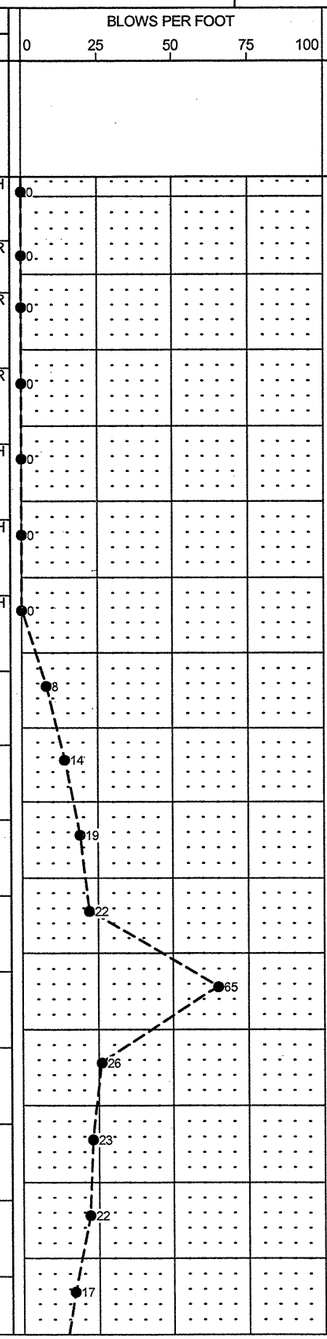
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-75						Match Line				
	-77.7	78.8	5	8	13	21				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-82.7	83.8	5	9	13	22				
-85										-85.9 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) 87.0
	-87.7	88.8	45	100/0.4		100/0.4				
-90										
	-92.7	93.8	12	70	30/0.1	100/0.6				
-95										
	-97.7	98.8	13	14	14	28				-99.2 Boring Terminated at Elevation -99.2 ft in Very Stiff Sandy Silt 100.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B24-B EBL	**STATION** 349+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.3 ft	**TOTAL DEPTH** 89.0 ft	**NORTHING** 191,945	**EASTING** 2,303,698
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/23/11	**COMP. DATE** 02/24/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	N/A

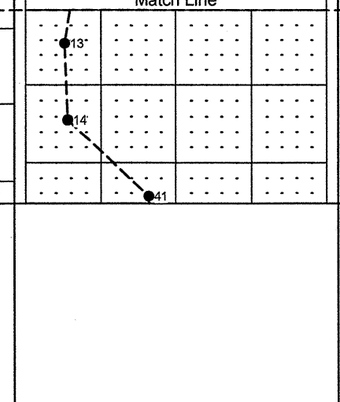
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
	1.3	0.0	WOH	WOH	WOH				WATER SURFACE (02/23/11)	
	-2.8	4.1	WOR	WOR	WOR	SS-219	261%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (39.0% ORGANIC), WET	
	-6.2	7.5	WOR	WOR	WOR	SS-220	872%			
	-11.2	12.5	WOR	WOR	WOR					
	-14.7	16.0							**ALLUVIAL** BROWN SANDY CLAY WITH LITTLE ORGANIC MATERIAL (6.6% ORGANIC), WET	
	-16.2	17.5	WOH	WOH	WOH	SS-221	100%			
	-19.7	21.0							**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL, SATURATED	
	-21.2	22.5	WOH	WOH	WOH	SS-222				
	-26.2	27.5	WOH	WOH	WOH					
	-29.7	31.0							**ALLUVIAL** GRAY SAND, SATURATED	
	-31.2	32.5	3	4	4	SS-223				
	-36.2	37.5	5	6	8					
	-39.7	41.0								
	-41.2	42.5	3	8	11	SS-224				
	-44.7	46.0							**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
	-46.2	47.5	7	10	12	SS-225				
	-51.2	52.5	10	43	22					
	-56.2	57.5	8	11	15					
	-61.2	62.5	8	11	12					
	-66.2	67.5	6	9	13	SS-226				
	-71.2	72.5	6	8	9					



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B24-B EBL	**STATION** 349+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 1.3 ft	**TOTAL DEPTH** 89.0 ft	**NORTHING** 191,945	**EASTING** 2,303,698
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/23/11	**COMP. DATE** 02/24/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	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
	-76.2	77.5	5	5	8				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-81.2	82.5	1	5	9				
	-83.7	85.0							**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
	-86.2	87.5	10	16	25				
	-87.7	89.0							Boring Terminated at Elevation -87.7 ft in Hard Sandy Silt



NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B25-A WBL	**STATION** 350+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 104.5 ft	**NORTHING** 192,079	**EASTING** 2,303,805 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/18/11	**COMP. DATE** 02/21/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.6	0.0	WOH	WOH	WOH	0				1.6 WATER SURFACE (02/18/11)	0.0
0										**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
	-1.9	3.5	WOH	WOH	WOH	0					
-5											
	-6.4	8.0	WOR	WOR	WOR	0					
-10											
	-11.4	13.0	WOR	WOR	WOR	0					
-15										-14.4	16.0
	-16.4	18.0	WOR	WOR	WOR	0	SS-203			SANDY AND SILTY CLAY WITH LITTLE ORGANIC MATERIAL (7.1% ORGANIC), WET	
-20											
	-21.4	23.0	WOR	WOR	WOR	0					
-25											
	-26.4	28.0	WOR	WOR	WOR	0	SS-204				
-30										-29.4	31.0
	-31.4	33.0	1	0	0	0	SS-205			**ALLUVIAL** BROWN SANDY SILT, WET	
-35										-34.4	36.0
	-36.4	38.0	1	1	3	4	SS-206			**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL (4.0% ORGANIC), SATURATED	
-40											
	-41.4	43.0	3	4	4	8					
-45											
	-46.4	48.0	3	3	4	7	SS-207				
-50										-49.4	51.0
	-51.4	53.0	5	8	11	19	SS-208			TAN SAND, SATURATED	
-55										-54.4	56.0
	-56.4	58.0	5	11	12	23	SS-209			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-60											
	-61.4	63.0	12	17	24	41					
-65											
	-66.4	68.0	10	11	13	24					
-70											
	-71.4	73.0	5	8	14	22					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B25-A WBL	**STATION** 350+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 104.5 ft	**NORTHING** 192,079	**EASTING** 2,303,805 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/18/11	**COMP. DATE** 02/21/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.4	78.0	4	4	8	12				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										-79.4 81.0
	-81.4	83.0	10	20	25	45	SS-210			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-85										
	-86.4	88.0	5	14	60	74				
-90										
	-91.4	93.0	16	24	37	61				
-95										
	-96.4	98.0	43	100/0.3		100/0.3				
-100										
	-101.4	103.0	5	8	12	20				-102.9 104.5
										Boring Terminated at Elevation -102.9 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B26-B EBL	**STATION** 351+76	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 99.2 ft	**NORTHING** 191,979	**EASTING** 2,303,939 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/24/11	**COMP. DATE** 03/01/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.8	0.0								1.8 WATER SURFACE (02/24/11)	0.0
0			1	0	0	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (36.2% ORGANIC), WET	
	-2.5	4.3	WOR	WOR	WOR	0	SS-227	682%			
-5											
-10											
-15											
-20											
	-22.5	24.3	WOR	WOR	WOR	0	SS-228	69%		-22.5 **ALLUVIAL** BROWN SANDY CLAY WITH LITTLE ORGANIC MATERIAL (6.4% TO 7.0% ORGANIC), WET	24.3
-25											
	-25.9	27.7	WOR	WOR	WOR	0					
-30											
	-30.9	32.7	WOR	WOR	WOR	0	SS-229	77%			
-35										-34.2 **ALLUVIAL** TAN AND GRAY SAND, SATURATED	36.0
	-35.9	37.7	5	5	8	13	SS-230				
-40											
	-40.9	42.7	5	6	8	14					
-45											
	-45.9	47.7	3	5	7	12	SS-231				
-50											
	-50.9	52.7	3	4	5	9					
-55										-54.2 **COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	56.0
	-55.9	57.7	7	11	13	24	SS-232				
-60											
	-60.9	62.7	10	12	12	24					
-65											
	-65.9	67.7	10	10	39	49					
-70										-69.2 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)	71.0
	-70.9	72.7	9	11	18	29	SS-233				
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B26-B EBL	**STATION** 351+76	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 99.2 ft	**NORTHING** 191,979	**EASTING** 2,303,939 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/24/11	**COMP. DATE** 03/01/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-75.9	77.7	5	7	12	19				**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) *(continued)*
-80										
	-80.9	82.7	8	8	11	19				
-85										
	-85.9	87.7	10	13	18	31				
-90										
	-90.9	92.7	45	100/0.4		100/0.4				
-95										
	-95.9	97.7	22	30	55	85				-97.4 99.2
										Boring Terminated at Elevation -97.4 ft in Hard Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B27-A WBL	**STATION** 352+96	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.0 ft	**TOTAL DEPTH** 89.3 ft	**NORTHING** 192,115	**EASTING** 2,304,039 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/16/11	**COMP. DATE** 02/17/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	2.0	0.0								2.0 WATER SURFACE (02/16/11)	0.0
0			1	0	0	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
	-2.4	4.4	4	2	1	3					
-5	-5.8	7.8	WOH	WOH	WOH	0					
-10										-9.0	11.0
	-10.8	12.8	2	1	1	2	SS-197			**ALLUVIAL** GRAY SAND WITH WOOD FRAGMENTS (1.2% ORGANIC), SATURATED	
-15	-15.8	17.8	1	1	0	1					
-20										-19.0	21.0
	-20.8	22.8	WOH	WOH	WOH	0	SS-198			**ALLUVIAL** BROWN SILTY CLAY WITH LITTLE TO MODERATE ORGANIC MATERIAL (5.4-18.7% ORGANIC), WET	
-25	-25.8	27.8	WOH	WOH	WOH	0					
-30	-30.8	32.8	WOH	WOH	1	1	SS-199				
-35										-34.0	36.0
	-35.8	37.8	5	6	7	13	SS-200			**ALLUVIAL** TAN SAND, SATURATED	
-40										-39.0	41.0
	-40.8	42.8	6	12	16	28	SS-201			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-45	-45.8	47.8	6	12	18	30					
-50	-50.8	52.8	12	13	16	29					
-55	-55.8	57.8	8	13	15	28					
-60	-60.8	62.8	10	15	16	31	SS-202				
-65	-65.8	67.8	6	11	18	29				-67.3 / -68.0	69.3 / 70.0
-70	-70.8	72.8	7	9	10	19				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B27-A WBL	**STATION** 352+96	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.0 ft	**TOTAL DEPTH** 89.3 ft	**NORTHING** 192,115	**EASTING** 2,304,039 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/16/11	**COMP. DATE** 02/17/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-75.8	77.8	7	12	9	21				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-80.8	82.8	10	15	19	34				
-85	-85.8	87.8	12	24	35	59				-87.3 / 89.3
										Boring Terminated at Elevation -87.3 ft in Very Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B28-B EBL	**STATION** 354+16	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 94.4 ft	**NORTHING** 192,018	**EASTING** 2,304,176 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/01/11	**COMP. DATE** 03/02/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.7	0.0								1.7 WATER SURFACE (03/01/11)	0.0
0			1	0	0	0				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (26.3% ORGANIC), WET	
	-2.8	4.5	WOR	WOR	WOR	0					
-5											
-10											
-15											
	-16.2	17.9	WOR	WOR	WOR	0	SS-234	663%			
-20											
	-21.2	22.9	WOH	WOH	WOH	0					
-25										-24.3	26.0
	-26.2	27.9	WOH	WOH	WOH	0	SS-235	67%		**ALLUVIAL** BROWN MODERATELY ORGANIC SILT WITH WOOD FRAGMENTS, WET	
-30											
	-31.2	32.9	WOH	WOH	WOH	0					
-35										-34.3	36.0
	-36.2	37.9	6	9	11	20	SS-236			**ALLUVIAL** GRAY SAND, SATURATED	
-40											
	-41.2	42.9	3	5	9	14					
-45										-44.3	46.0
	-46.2	47.9	7	12	13	25	SS-237			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-50											
	-51.2	52.9	9	14	19	33					
-55											
	-56.2	57.9	11	12	15	27					
-60											
	-61.2	62.9	100/0.2			100/0.2				-61.2	62.9
-65										-62.6	64.3
	-66.2	67.9	7	11	13	24	SS-238			GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-70											
	-71.2	72.9	59	11	15	26					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B28-B EBL	**STATION** 354+16	**OFFSET** 58 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.7 ft	**TOTAL DEPTH** 94.4 ft	**NORTHING** 192,018	**EASTING** 2,304,176 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/01/11	**COMP. DATE** 03/02/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.2	77.9	3	5	7	12				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-81.2	82.9	10	12	19	31				
-85										-84.3 / 86.0
	-86.2	87.9	8	12	21	33	SS-239			**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-90										
	-91.2	92.9	21	23	33	56				-92.7 / 94.4
										Boring Terminated at Elevation -92.7 ft in Hard Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B29-A WBL	**STATION** 355+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 104.0 ft	**NORTHING** 192,156	**EASTING** 2,304,275 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/09/11	**COMP. DATE** 02/16/11	**SURFACE WATER DEPTH** 0.0ft

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))
5										
	1.2	0.0								1.2 / 0.0 WATER SURFACE (02/09/11)
0			WOH	WOH	WOH	0	SS-189	763%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (21.8% TO 64.8% ORGANIC), WET
	-2.8	4.0	1	3	4	7				
-5	-6.3	7.5	1	2	1	3	SS-190			
-10	-11.3	12.5	WOH	WOH	WOH	0				
-15	-16.3	17.5	WOH	WOH	WOH	0				
-20	-21.3	22.5	WOH	WOH	WOH	0				
-25	-26.3	27.5	WOH	WOH	WOH	0	SS-191	52%		-25.8 / 27.0 **ALLUVIAL** GRAY SILTY CLAY WITH WOOD FRAGMENTS, WET
-30	-31.3	32.5	1	2	1	3				-32.3 / 33.5 **ALLUVIAL** TAN SAND WITH WOOD FRAGMENTS, SATURATED
-35	-36.3	37.5	2	3	1	4	SS-192			-34.8 / 36.0
-40	-41.3	42.5	3	3	5	8	SS-193			-38.8 / 40.0 **ALLUVIAL** GRAY SILTY CLAY, WET; -42.3 / 43.5 **ALLUVIAL** TAN SAND, SATURATED
-45	-46.3	47.5	6	5	4	9	SS-194			-44.8 / 46.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-50	-51.3	52.5	5	7	6	13				
-55	-56.3	57.5	6	7	9	16				
-60	-61.3	62.5	10	11	13	24	SS-195			-60.5 / 61.7; -61.0 / 62.2
-65	-66.3	67.5	12	21	79/0.3	100/0.8				-66.8 / 68.0; -68.5 / 69.7 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-70	-71.3	72.5	6	5	7	12				
-75										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B29-A WBL	**STATION** 355+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 104.0 ft	**NORTHING** 192,156	**EASTING** 2,304,275 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/09/11	**COMP. DATE** 02/16/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.3	77.5	6	7	9	16				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-81.3	82.5	11	12	18	30	SS-196			
-85	-86.3	87.5	12	23	34	57				
-90	-91.3	92.5	12	22	23	45				
-95	-96.3	97.5	100/0.4			100/0.4				-96.3 / 97.5; -97.4 / 98.6 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-100	-101.3	102.5	6	7	7	14				-102.8 / 104.0 Boring Terminated at Elevation -102.8 ft in Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B30-B EBL	**STATION** 356+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 121.3 ft	**NORTHING** 192,062	**EASTING** 2,304,414 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/02/11	**COMP. DATE** 03/07/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.1	0.0								1.1 WATER SURFACE (03/02/11)	0.0
0			WOH	WOH	WOH	0	SS-240	902%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (67.1% ORGANIC), SATURATED	
-5	-4.6	5.7	3	5	5	WOOD 10					
-10	-8.0	9.1	3	0	0	0					
-15	-13.0	14.1	WOH	WOH	WOH	0					
-20	-18.0	19.1	WOH	WOH	WOH	0					
-25	-23.0	24.1	WOH	WOH	WOH	0	SS-241	33%		-20.9 **ALLUVIAL** GRAY SANDY CLAY WITH TRACE ORGANIC MATERIAL (3.1% ORGANIC), WET	22.0
-30	-28.0	29.1	7	8	8	16	SS-242			-25.9 **ALLUVIAL** GRAY AND TAN SAND, SATURATED	27.0
-35	-33.0	34.1	2	2	1	3				-35.9	37.0
-40	-38.0	39.1	3	4	5	9	SS-243				
-45	-43.0	44.1	5	7	13	20				-45.1 / -45.6 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	46.2 / 46.7
-50	-48.0	49.1	9	11	13	24	SS-244				
-55	-53.0	54.1	7	10	14	24				-52.0 / -52.6	53.1 / 53.7
-60	-58.0	59.1	9	11	15	26					
-65	-63.0	64.1	7	11	13	24	SS-245				
-70	-68.0	69.1	100/0.4			100/0.4				-68.0 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	69.1
-75	-73.0	74.1	9	12	30	42					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B30-B EBL	**STATION** 356+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 121.3 ft	**NORTHING** 192,062	**EASTING** 2,304,414 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/02/11	**COMP. DATE** 03/07/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-78.0	79.1	5	5	8	13				
-85	-83.7	84.8	8	9	11	20	SS-246			
-90	-88.7	89.8	20	45	55/0.4	100/0.9				
-95	-93.7	94.8	14	20	61	81				
-100	-98.7	99.8	100/0.4			100/0.4				-100.2 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION) 101.3
-105	-103.7	104.8	6	7	9	16	SS-247			
-110	-108.7	109.8	6	8	8	16				
-115	-113.7	114.8	6	7	9	16				
-120	-118.7	119.8	6	8	8	16				-120.2 Boring Terminated at Elevation -120.2 ft in Very Stiff Sandy Silt 121.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B31-A WBL	**STATION** 357+76	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 104.8 ft	**NORTHING** 192,202	**EASTING** 2,304,506 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/08/11	**COMP. DATE** 02/09/11	**SURFACE WATER DEPTH** 0.0ft

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)
1.1		0.0								WATER SURFACE (02/08/11)	0.0
			WOH	WOH	WOH	0	SS-181	704%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (31.5% TO 63.1% ORGANIC), WET	
-3.7		4.8	WOH	WOH	WOH	0					
-7.2		8.3	WOR	WOR	WOR	0	SS-182	903%			
-12.2		13.3	2	2	1	3					
-17.2		18.3	WOR	WOR	WOR	0					
-22.2		23.3	2	3	3	6	SS-183				
-27.2		28.3	2	4	4	8					
-32.2		33.3	2	3	5	8					
-37.2		38.3	WOH	WOH	WOH	0	SS-184				
-42.2		43.3	5	8	12	20					
-47.2		48.3	100/0.3			100/0.3					
-52.2		53.3	5	11	13	24	SS-185				
-57.2		58.3	8	11	13	24					
-62.2		63.3	9	11	12	23					
-67.2		68.3	6	8	11	19	SS-186				
-19.9		21.0								**ALLUVIAL** TAN AND GRAY SAND, SATURATED	
-39.9		41.0									
-47.2 / -48.2		48.3 / 49.3								**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B31-A WBL	**STATION** 357+76	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 104.8 ft	**NORTHING** 192,202	**EASTING** 2,304,506 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/08/11	**COMP. DATE** 02/09/11	**SURFACE WATER DEPTH** 0.0ft

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
						Match Line				
-72.2		73.3	6	7	8	15				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-77.2		78.3	11	100/0.4		100/0.4				-77.7 / -78.8 — 78.8 / 79.9
-82.2		83.3	10	11	16	27	SS-187			
-87.2		88.3	24	37	48	85				
-92.2		93.3	27	100/0.3		100/0.3				
-97.2		98.3	6	7	9	16	SS-188			-94.9 — 96.0 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-102.2		103.3	5	7	10	17				-103.7 — 104.8 Boring Terminated at Elevation -103.7 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B32-B EBL	**STATION** 358+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.0 ft	**TOTAL DEPTH** 94.4 ft	**NORTHING** 192,115	**EASTING** 2,304,652 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/08/11	**COMP. DATE** 03/08/11	**SURFACE WATER DEPTH** 0.0ft

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))
5										
0	1.0	0.0	1	0	0	0	SS-248	359%		1.0 / 0.0 WATER SURFACE (03/08/11)
	-3.2	4.2	6	14	23	WOOD 37				**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (34.2% TO 36.2% ORGANIC), WET
-5										
	-8.5	9.5	1	0	1	1	SS-249			
-10										
	-11.9	12.9	1	0	0	0				
-15										-15.0 / 16.0 **ALLUVIAL** BROWN SANDY CLAY WITH TRACE ORGANIC MATERIAL (3.5% ORGANIC), WET
	-16.9	17.9	WOH	WOH	WOH	0	SS-250			-20.0 / 21.0 **ALLUVIAL** TAN SAND, SATURATED
-20										
	-21.9	22.9	3	4	6	10	SS-251			
-25										
	-26.9	27.9	3	4	8	12				
-30										
	-31.9	32.9	3	4	4	8				
-35										
	-36.9	37.9	4	5	7	12	SS-252			
-40										
	-41.9	42.9	2	3	6	9				
-45										
	-46.9	47.9	7	8	8	16				
-50										-50.0 / 51.0
	-51.9	52.9	7	12	23	35	SS-253			
-55										
	-56.9	57.9	8	33	67/0.4	100/0.9				-56.9 / 57.9 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-60										-58.5 / 59.5
	-61.9	62.9	8	11	15	26				
-65										
	-66.9	67.9	6	13	14	27				
-70										
	-71.9	72.9	9	12	13	25	SS-254			
-75										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B32-B EBL	**STATION** 358+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.0 ft	**TOTAL DEPTH** 94.4 ft	**NORTHING** 192,115	**EASTING** 2,304,652 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/08/11	**COMP. DATE** 03/08/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.9	77.9	7	10	16	26				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-81.9	82.9	6	11	12	23				
-85										
	-86.9	87.9	23	28	39	67				
-90										
	-91.9	92.9	21	33	48	81				-93.4 / 94.4 Boring Terminated at Elevation -93.4 ft in Very Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B33-A WBL	**STATION** 360+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 88.9 ft	**NORTHING** 192,258	**EASTING** 2,304,739 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/07/11	**COMP. DATE** 02/08/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.2	0.0								1.2 WATER SURFACE (02/07/11)	0.0
0			WOR	WOR	WOR	0	SS-173	529%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (19.1% TO 34.7% ORGANIC) , WET	
	-2.9	4.1									
-5			1	0	0	0					
	-6.4	7.6	WOH	WOH	WOH	0	SS-174				
-10											
	-11.4	12.6	WOR	WOR	WOR	0					
-15											
	-16.4	17.6	WOR	WOR	WOR	0				-17.4	18.6
-20										**ALLUVIAL** TAN AND GRAY SAND, SATURATED	
	-21.4	22.6	2	3	4	7	SS-175				
-25											
	-26.4	27.6	2	2	3	5	SS-176				
-30											
	-31.4	32.6	5	7	8	15					
-35											
	-36.4	37.6	2	7	7	14				-38.8	40.0
-40											
	-41.4	42.6	2	5	7	12	SS-177			-41.9	43.1
-45										**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
	-46.2	47.4	4	9	10	19					
-50											
	-51.2	52.4	4	5	7	12	SS-178				
-55											
	-56.2	57.4	10	13	14	27					
-60											
	-61.2	62.4	6	12	15	27					
-65											
	-66.2	67.4	16	34	22	56	SS-179				
-70											
	-71.2	72.4	4	5	12	17					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B33-A WBL	**STATION** 360+16	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.2 ft	**TOTAL DEPTH** 88.9 ft	**NORTHING** 192,258	**EASTING** 2,304,739 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/07/11	**COMP. DATE** 02/08/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.2	77.4	7	7	7	14				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-81.2	82.4	8	8	13	21	SS-180			
-85										
	-86.2	87.4	37	17	69	86				-87.7 88.9
										Boring Terminated at Elevation -87.7 ft in Very Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B34-B EBL	**STATION** 361+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 89.4 ft	**NORTHING** 192,174	**EASTING** 2,304,888 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/09/11	**COMP. DATE** 03/09/11	**SURFACE WATER DEPTH** 0.0ft

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)
	1.6	0.0								WATER SURFACE (03/09/11)	1.6 / 0.0
			WOH	WOH	WOH	0	SS-255	865%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (12.1% TO 54.8% ORGANIC), WET TO SATURATED	
	-3.0	4.6	1	1	2	3					
	-6.4	8.0	1	1	1	2	SS-256	213%			
	-11.4	13.0	WOR	WOR	WOR	0					
	-16.4	18.0	1	1	3	4					
										ALLUVIAL TAN SAND, SATURATED	-19.4 / 21.0
	-21.4	23.0	3	5	6	11	SS-257				
	-26.4	28.0	2	3	4	7					-29.4 / 31.0
	-31.4	33.0	6	7	7	14	SS-258				
	-36.4	38.0	7	7	7	14					
	-41.4	43.0	2	2	3	5	SS-259			ALLUVIAL GRAY SILTY CLAY, WET	-41.9 / 43.5
										COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	-44.4 / 46.0
	-46.4	48.0	2	3	3	6	SS-260				
	-51.4	53.0	4	4	6	10					
	-56.4	58.0	5	9	12	21					
	-61.4	63.0	8	10	14	24					
	-66.4	68.0	8	100/0.5		100/0.5					-66.9 / 68.5
										GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	-69.4 / 71.0
	-71.4	73.0	9	10	11	21	SS-261				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B34-B EBL	**STATION** 361+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 89.4 ft	**NORTHING** 192,174	**EASTING** 2,304,888 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/09/11	**COMP. DATE** 03/09/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.4	78.0	9	12	16	28				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80	-81.4	83.0	7	9	13	22				
-85	-86.4	88.0	21	45	55/0.4	100/0.9				-87.8 / 89.4
										Boring Terminated at Elevation -87.8 ft in Very Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B35-A WBL	**STATION** 362+55	**OFFSET** 54 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 119.5 ft	**NORTHING** 192,314	**EASTING** 2,304,971 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/01/11	**COMP. DATE** 02/03/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
0	1.1	0.0	WOR	WOR	WOR	0	SS-164	409%		1.1 WATER SURFACE (02/01/11)	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (13.7% TO 35.6% ORGANIC), WET TO SATURATED	
-5	-3.8	4.9	WOR	WOR	WOR	0					
	-6.9	8.0	WOR	WOR	WOR	0					
-10											
	-11.9	13.0	WOR	WOR	WOR	0	SS-165				
-15											
	-16.9	18.0	WOR	WOR	WOR	0					
-20										-19.9	21.0
	-21.9	23.0	2	2	2	4	SS-166			**ALLUVIAL** TAN SAND, SATURATED	
-25											
	-26.9	28.0	4	5	7	12					
-30											
	-31.9	33.0	7	7	7	14					
-35											
	-36.9	38.0	9	14	19	33	SS-167				
-40											
	-41.9	43.0	7	7	7	14					
-45										-44.9	46.0
	-46.9	48.0	3	4	5	9	SS-168			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-50										-49.9	51.0
	-51.9	53.0	14	17	20	37					
-55											
	-56.9	58.0	11	14	17	31					
-60										-59.1 / -59.6	60.2 / 60.7
	-61.9	63.0	9	10	15	25	SS-169				
-65											
	-66.9	68.0	5	6	8	14					
-70											
	-71.9	73.0	17	100/0.4		100/0.4				-71.9 / -72.9	73.0 / 74.0
-75										GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B35-A WBL	**STATION** 362+55	**OFFSET** 54 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 119.5 ft	**NORTHING** 192,314	**EASTING** 2,304,971 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 02/01/11	**COMP. DATE** 02/03/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.9	78.0	2	4	8	12	SS-170			GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-81.9	83.0	7	9	18	27				
-85										
	-86.9	88.0	47	49	34	83				
-90										
	-91.9	93.0	26	37	63/0.3	100/0.8				
-95										-94.9 / 96.0
	-96.9	98.0	4	6	7	13	SS-171			**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-100										
	-101.9	103.0	5	7	8	15				
-105										
	-106.9	108.0	5	6	7	13				
-110										
	-111.9	113.0	11	17	20	37	SS-172			
-115										
	-116.9	118.0	4	7	11	18				-118.4 / 119.5
										Boring Terminated at Elevation -118.4 ft in Very Stiff Sandy Silt

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BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B36-B EBL	**STATION** 363+76	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 90.4 ft	**NORTHING** 192,239	**EASTING** 2,305,119 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/11/11	**COMP. DATE** 03/14/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.5	0.0								1.5 WATER SURFACE (03/11/11)	0.0
0			WOH	WOH	WOH	0	SS-262			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (35.3% TO 53.2% ORGANIC), SATURATED TO WET	
	-4.0	5.5	1	1	0	1					
-5											
	-7.4	8.9	1	1	2	3	SS-263				
-10											
	-12.4	13.9	WOR	WOR	WOR	0					
-15											
	-17.4	18.9	WOH	WOH	WOH	0					
-20										-20.5	22.0
	-22.4	23.9	WOH	1	4	5	SS-264			**ALLUVIAL** TAN AND BROWN SAND, SATURATED	
-25											
	-27.4	28.9	3	4	4	8					
-30											
	-32.4	33.9	3	4	6	10	SS-265				
-35											
	-37.4	38.9	2	4	6	10					
-40											
	-42.4	43.9	6	12	6	18				-43.4	44.9
-45											
	-47.4	48.9	21	14	16	30	SS-266				
-50											
	-52.4	53.9	9	12	16	28					
-55											
	-57.4	58.9	14	15	19	34					
-60											
	-62.4	63.9	10	12	15	27	SS-267				
-65											
	-67.4	68.9	100/0.3			100/0.3				-67.4	68.9
-70										**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
	-72.4	73.9	9	12	53	65					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B36-B EBL	**STATION** 363+76	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 90.4 ft	**NORTHING** 192,239	**EASTING** 2,305,119 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/11/11	**COMP. DATE** 03/14/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-77.4	78.9	12	15	28	43				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-80										-80.5 / 82.0
	-82.4	83.9	10	14	20	34	SS-168			**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-85										
	-87.4	88.9	14	28	45	73				-88.9 / 90.4
										Boring Terminated at Elevation -88.9 ft in Hard Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B37-A WBL	**STATION** 365+05	**OFFSET** 46 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.7 ft	**TOTAL DEPTH** 82.0 ft	**NORTHING** 192,375	**EASTING** 2,305,212
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/27/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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)
5											
	0.7	0.0	WOH	WOH	WOH	0				0.7 WATER SURFACE (01/27/11)	0.0
0										**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET	
-5	-4.8	5.5	WOH	WOH	1	1	SS-539				
-10	-9.8	10.5	WOH	WOH	WOH	0					
-15	-14.8	15.5	WOH	1	2	3	SS-601			-17.3	18.0
-20	-19.8	20.5	WOH	WOH	WOH	0				**ALLUVIAL** BROWN SAND WITH WOOD FRAGMENTS, SATURATED	
-25	-24.8	25.5	6	8	7	15	SS-602				
-30	-29.8	30.5	2	3	3	6					
-35	-34.8	35.5	1	1	2	3	SS-540			-33.3	34.0
-40	-39.8	40.5	1	2	2	4					
-45	-44.8	45.5	3	7	7	14				-47.3	48.0
-50	-49.8	50.5	9	12	13	25	SS-541			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-55	-54.8	55.5	10	14	18	32					
-60	-59.8	60.5	11	15	59	74	SS-542				
-65	-64.8	65.5	11	11	16	27	SS-543				
-70	-69.8	70.5	5	8	11	19					
-75	-74.8	75.5									

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B37-A WBL	**STATION** 365+05	**OFFSET** 46 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 0.7 ft	**TOTAL DEPTH** 82.0 ft	**NORTHING** 192,375	**EASTING** 2,305,212
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/27/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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
-75						Match Line				
-80	-79.8	80.5	5	7	12	19	SS-544			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
			8	10	10	20	SS-545			-81.3 82.0 Boring Terminated at Elevation -81.3 ft in Medium Dense Sand

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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B38-B EBL	**STATION** 365+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 103.5 ft	**NORTHING** 192,300	**EASTING** 2,305,321 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/28/11	**COMP. DATE** 02/01/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
0	0.6	0.0	WOH	WOH	WOH	0				0.6 WATER SURFACE (01/28/11)	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS, WET	
-5	-6.4	7.0	1	0	0	0					
-10	-11.4	12.0	WOH	WOH	WOH	0					
-15	-16.4	17.0	1	1	1	2	SS-546			-16.9	17.5
-20	-21.4	22.0	3	3	6	9	SS-547			-19.4 **ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL (3.3% ORGANIC), SATURATED	20.0
										ALLUVIAL BROWN SAND WITH WOOD FRAGMENTS, SATURATED	
-25	-26.4	27.0	2	3	4	7					
-30	-31.4	32.0	2	1	1	2					
-35	-36.4	37.0	WOH	1	0	1					
-40	-41.4	42.0	1	1	1	2					
-45	-46.4	47.0	1	2	2	4	SS-548			-44.4 / -46.9	45.0 / 47.5
-50	-51.4	52.0	15	15	14	29	SS-549			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-55	-56.4	57.0	11	12	15	27					
-60	-61.4	62.0	10	15	32	47					
-65	-66.4	67.0	8	9	12	21					
-70	-71.4	72.0	4	5	10	15					
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B38-B EBL	**STATION** 365+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 103.5 ft	**NORTHING** 192,300	**EASTING** 2,305,321 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/28/11	**COMP. DATE** 02/01/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
-80	-76.4	77.0	6	6	11	17	SS-550			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-81.4	82.0	8	10	16	26				
-90	-86.4	87.0	9	10	14	24				
-95	-91.4	92.0	10	15	23	38	SS-551			
-100	-96.4	97.0	16	22	31	53				
	-101.4	102.0	30	41	29	70				-102.9 / 103.5
										Boring Terminated at Elevation -102.9 ft in Very Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

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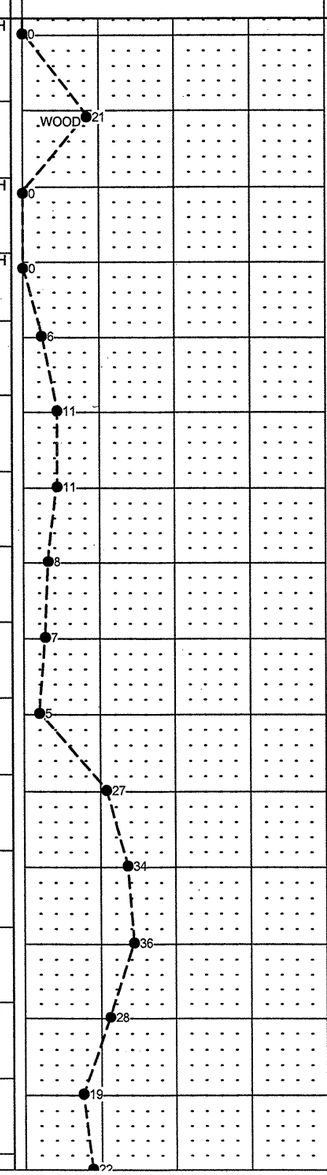
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B39-A WBL	**STATION** 367+12	**OFFSET** 56 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 86.5 ft	**NORTHING** 192,447	**EASTING** 2,305,405 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/25/11	**COMP. DATE** 01/25/11	**SURFACE WATER DEPTH** 0.0ft

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))
5									
0	1.1	0.0	WOH	WOH	WOH				1.1 / 0.0 WATER SURFACE (01/25/11) **ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS, WET
-5	-4.4	5.5	3	9	12				
-10	-9.4	10.5	WOH	WOH	WOH				
-15	-14.4	15.5	WOH	WOH	WOH				-16.9 / 18.0 **ALLUVIAL** BROWN SAND, SATURATED
-20	-18.9	20.0	2	2	4	SS-532			
-25	-23.9	25.0	4	5	6				
-30	-28.9	30.0	4	5	6	SS-533			
-35	-33.9	35.0	2	4	4				-36.9 / 38.0
-40	-38.9	40.0	3	3	4	SS-534			
-45	-43.9	45.0	3	3	2				-46.9 / 48.0 **COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)
-50	-48.9	50.0	10	12	15	SS-535			
-55	-53.9	55.0	10	14	20				
-60	-58.9	60.0	11	20	16	SS-536			
-65	-63.9	65.0	9	12	16				
-70	-68.9	70.0	9	9	10	SS-537			
-75	-73.9	75.0	8	9	13				

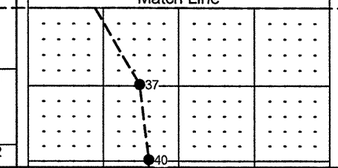
BLOWS PER FOOT (0 25 50 75 100)



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B39-A WBL	**STATION** 367+12	**OFFSET** 56 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.1 ft	**TOTAL DEPTH** 86.5 ft	**NORTHING** 192,447	**EASTING** 2,305,405 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/25/11	**COMP. DATE** 01/25/11	**SURFACE WATER DEPTH** 0.0ft

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))
-75									Match Line
-80	-78.9	80.0	10	16	21	SS-538			-76.9 / 78.0 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-85	-83.9	85.0	13	18	22				-85.4 / 86.5 Boring Terminated at Elevation -85.4 ft in Hard Sandy Silt

BLOWS PER FOOT (0 25 50 75 100)



NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B40-B EBL	**STATION** 368+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 192,379	**EASTING** 2,305,559 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/21/11	**COMP. DATE** 01/24/11	**SURFACE WATER DEPTH** 0.4ft

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))
5										
0	0.9	0.0	1	0	0	0				WATER SURFACE (01/21/11) — 0.9 / 0.0
							SS-500			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (33.1% TO 38.3% ORGANIC), SATURATED
-5	-2.5	3.4	1	1	0	1	SS-501			
										-6.1 / 7.0
-10	-7.5	8.4	1	0	1	1	SS-502			**ALLUVIAL** BROWN SAND WITH TRACE ORGANIC MATERIAL (2.3% ORGANIC), SATURATED
										-10.1 / 11.0
-15	-12.5	13.4	3	3	4	7				**ALLUVIAL** BROWN AND TAN SAND, SATURATED
-20	-17.5	18.4	2	3	4	7				
-25	-22.5	23.4	1	2	2	4	SS-503			
-30	-27.5	28.4	7	7	6	13				
-35	-32.5	33.4	1	1	1	2	SS-504			
-40	-37.5	38.4	2	2	2	4				-40.1 / 41.0
-45	-42.5	43.4	5	4	3	7				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)
-50	-47.5	48.4	8	12	14	26	SS-505			
-55	-52.5	53.4	11	12	15	27				
-60	-57.5	58.4	11	13	17	30	SS-506			
-65	-62.5	63.4	11	14	16	30				
-70	-67.5	68.4	5	7	10	17				
-75	-72.5	73.4	6	7	12	19	SS-603			

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B40-B EBL	**STATION** 368+36	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 192,379	**EASTING** 2,305,559 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/21/11	**COMP. DATE** 01/24/11	**SURFACE WATER DEPTH** 0.4ft

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
-75						Match Line				
-80	-77.5	78.4	10	12	15	27				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-82.5	83.4	8	11	15	26	SS-604			
										-85.1 / 86.0
-90	-87.5	88.4	11	14	36	50				**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-95	-92.5	93.4	14	26	32	58	SS-605			
	-97.5	98.4	7	7	9	16	SS-606			-99.0 / 99.9
										Boring Terminated at Elevation -99.0 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B41-A WBL	**STATION** 369+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** 0.9
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 75.4 ft	**NORTHING** 192,528	**EASTING** 2,305,633 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/20/11	**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)
10											
5											
	1.4	0.0								1.4 GROUND SURFACE	0.0
0			WOR	WOR	WOR	0	SS-507			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (19.1% TO 25.4% ORGANIC) , MOIST TO SATURATED	
	-4.1	5.5									
-5			WOR	WOR	WOR	0	SS-508				
	-7.5	8.9								-6.6	8.0
			2	2	2	4	SS-509			**ALLUVIAL** BROWN SAND, SATURATED	
-10											
	-12.5	13.9									
			1	2	2	4					
-15										-15.6	17.0
	-17.5	18.9									
			2	2	4	6	SS-510			-19.6	21.0
-20										**ALLUVIAL** BROWN SAND WITH MODERATE ORGANIC MATERIAL (7.4% ORGANIC), SATURATED	
	-22.5	23.9									
			1	1	1	2	SS-511				
-25										-25.6	27.0
	-27.5	28.9								**ALLUVIAL** TAN SAND, SATURATED	
			8	9	11	20	SS-512				
-30											
	-32.5	33.9									
			4	6	7	13					
-35										-35.6	37.0
	-37.5	38.9									
			4	3	5	8	SS-513				
-40										-40.6	42.0
	-42.5	43.9								**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
			2	3	5	8	SS-514				
-45											
	-47.5	48.9									
			8	21	60/0.2	81/0.7	SS-515				
-50											
	-52.5	53.9									
			29	71/0.3		100/0.8	SS-516				
-55											
	-57.5	58.9									
			13	16	30	46	SS-517				
-60											
	-62.5	63.9									
			18	15	18	33					
-65											
	-67.5	68.9									
			9	10	14	24	SS-518				
-70											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B41-A WBL	**STATION** 369+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** 0.9
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 75.4 ft	**NORTHING** 192,528	**EASTING** 2,305,633 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/20/11	**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
-70						Match Line				
	-72.5	73.9								**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)* -74.0 / 75.4
			7	9	20	29				Boring Terminated at Elevation -74.0 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B42-B EBL	**STATION** 370+88	**OFFSET** 62 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 192,461	**EASTING** 2,305,799 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD53638 CME-45B		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 12/08/10	**COMP. DATE** 12/08/10	**SURFACE WATER DEPTH** 0.0ft

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)
10											
5											
0	0.6	0.0								0.6 WATER SURFACE (12/08/10)	0.0
			WOR	WOR	WOR	0	SS-75	87%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (35.1% ORGANIC), WET	
-5	-3.1	3.7	WOH	WOH	WOH	0					
	-8.0	8.6	WOH	WOH	WOH	0	SS-76	199%		-6.4 **ALLUVIAL** BROWN SILTY CLAY WITH LITTLE ORGANIC MATERIAL (11.2% ORGANIC), WET	7.0
-10											
	-13.0	13.6	6	4	2	6					
-15										-16.4 **ALLUVIAL** TAN SAND, SATURATED	17.0
	-18.0	18.6	7	10	12	22	SS-77				
-20											
	-23.0	23.6	2	2	3	5					
-25											
	-28.0	28.6	2	4	4	8					
-30											
	-33.0	33.6	6	8	9	17	SS-78			-31.4	32.0
-35											
	-38.0	38.6	7	11	89/0.4	100/0.9	SS-79			-39.0 / -40.1	39.6 / 40.7
-40											
	-43.0	43.6	8	11	14	25					
-45										-47.1 / -47.5	47.7 / 48.1
	-48.0	48.6	6	10	13	23	SS-80				
-50											
	-53.0	53.6	8	12	15	27					
-55										-56.7 / -57.7	57.3 / 58.3
	-58.0	58.6	6	7	10	17				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-60											
	-63.0	63.6	5	4	8	12	SS-81				
-65											
	-68.0	68.6	12	9	13	22					
-70											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B42-B EBL	**STATION** 370+88	**OFFSET** 62 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 192,461	**EASTING** 2,305,799 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD53638 CME-45B		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 12/08/10	**COMP. DATE** 12/08/10	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
	-73.0	73.6	5	6	6	12				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)* — -74.5 / 75.1
										Boring Terminated at Elevation -74.5 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B43-A WBL	**STATION** 371+86	**OFFSET** 53 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. -0.7 ft	**TOTAL DEPTH** 81.7 ft	**NORTHING** 192,604	**EASTING** 2,305,849 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD53638 CME-45B		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 12/06/10	**COMP. DATE** 12/07/10	**SURFACE WATER DEPTH** 0.8ft

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 ELEV. (ft)	DEPTH (ft)
10											
5											
0										WATER SURFACE (12/06/10)	
	-0.7	0.0								GROUND SURFACE -0.7	0.0
			WOH	WOH	WOH	0	SS-67	431%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (23.6% TO 34.9% ORGANIC), WET	
-5	-6.1	5.4	2	2	1	3					
-10	-10.9	10.2	WOH	1	1	2					
-15	-15.9	15.2	WOH	WOH	WOH	0	SS-68	217%			
										-18.7 **ALLUVIAL** BROWN SAND, SATURATED 18.0	
-20	-20.9	20.2	3	4	4	8	SS-69				
-25	-25.9	25.2	2	3	3	6	SS-70				
-30	-30.9	30.2	2	2	3	5					
-35	-35.9	35.2	2	2	3	5					
										-38.7 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) 38.0	
-40	-40.9	40.2	6	10	14	24	SS-71				
-45	-45.9	45.2	11	17	21	38					
-50	-50.9	50.2	10	15	23	38					
-55	-55.9	55.2	10	16	21	37	SS-72				
-60	-60.9	60.2	6	10	14	24					
-65	-65.9	65.2	5	5	5	10	SS-73				
-70											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B43-A WBL	**STATION** 371+86	**OFFSET** 53 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. -0.7 ft	**TOTAL DEPTH** 81.7 ft	**NORTHING** 192,604	**EASTING** 2,305,849 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAD53638 CME-45B		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 12/06/10	**COMP. DATE** 12/07/10	**SURFACE WATER DEPTH** 0.8ft

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
-70						Match Line				
	-70.9	70.2	17	39	31	70	SS-74			-72.8 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) 72.1
-75	-75.9	75.2	5	5	7	12				
-80	-80.9	80.2	6	6	7	13				-82.4 Boring Terminated at Elevation -82.4 ft in Medium Dense Sand 81.7

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B44-B EBL	**STATION** 373+14	**OFFSET** 64 ft RT	**ALIGNMENT** -L- / **0 HR.** 0.8
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 106.5 ft	**NORTHING** 192,543	**EASTING** 2,306,012 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/13/11	**COMP. DATE** 01/18/11	**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)
5											
	1.4	0.0								1.4 GROUND SURFACE	0.0
0			WOR	WOR	WOR	0	SS-519			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (23.4% TO 34.0% ORGANIC), MOIST TO WET	
-5	-4.1	5.5	WOH	WOH	WOH	0	SS-520				
-10	-8.6	10.0	1	0	1	1	SS-521				
-15	-13.6	15.0	WOR	WOR	WOR	0				-16.6	18.0
-20	-18.6	20.0	5	5	4	9	SS-522			**ALLUVIAL** BROWN SAND, SATURATED	
-25	-23.6	25.0	1	0	1	1				-26.6	28.0
-30	-28.6	30.0	2	2	4	6	SS-523				
-35	-33.6	35.0	4	5	5	10				-36.6	38.0
-40	-38.6	40.0	3	2	2	4	SS-524				
-45	-43.6	45.0	3	2	2	4				-46.6	48.0
-50	-48.6	50.0	6	10	14	24	SS-525			**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)	
-55	-53.6	55.0	42	19	21	40	SS-526				
-60	-58.6	60.0	36	14	16	30					
-65	-63.6	65.0	8	7	8	15	SS-527				
-70	-68.6	70.0	9	9	12	21					
-75	-73.6	75.0	8	8	12	20	SS-528				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Stetler, T.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B44-B EBL	**STATION** 373+14	**OFFSET** 64 ft RT	**ALIGNMENT** -L- / **0 HR.** 0.8
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 106.5 ft	**NORTHING** 192,543	**EASTING** 2,306,012 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CAT1519 DIEDRICH D-50 98% 04/07/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/13/11	**COMP. DATE** 01/18/11	**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
-75						Match Line				
-80	-78.6	80.0	10	9	12	21				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
										-81.6 / 83.0
-85	-83.6	85.0	10	10	18	28	SS-529			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
-90	-88.6	90.0	63	37/0.2		100/0.7				
-95	-93.6	95.0	9	9	11	20	SS-530			
-100	-98.6	100.0	8	15	22	37	SS-531			
-105	-103.6	105.0	7	7	8	15				-105.1 / 106.5

Boring Terminated at Elevation -105.1 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B45-A WBL	**STATION** 374+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 85.7 ft	**NORTHING** 192,702	**EASTING** 2,306,078 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/26/11	**COMP. DATE** 01/27/11	**SURFACE WATER DEPTH** 0.0ft

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)
10											
5											
0	0.9	0.0								0.9 WATER SURFACE (01/26/11)	0.0
			WOH	WOH	WOH	0	SS-150	361%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (52.4% ORGANIC), WET	
-5	-4.7	5.6	WOH	1	1	2					
	-7.8	8.7	WOH	WOH	WOH	0					
-10										-11.1	12.0
	-12.8	13.7	2	2	1	3	SS-151			**ALLUVIAL** BROWN AND TAN SAND, SATURATED	
-15											
	-17.8	18.7	2	4	3	7					
-20											
	-22.8	23.7	3	4	4	8					
-25										-26.1	27.0
	-28.3	29.2	1	2	2	4	SS-152				
-30										-31.1	32.0
	-33.3	34.2	WOR	WOR	1	1	SS-153				
-35										-36.1	37.0
	-38.3	39.2	2	2	2	4	SS-154				
-40											
	-43.3	44.2	1	2	4	6					
-45											
	-48.3	49.2	8	10	14	24					
-50										-52.5 / -52.8	53.4 / 53.7
	-53.3	54.2	13	15	20	35	SS-155			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-55											
	-58.3	59.2	10	12	16	28					
-60											
	-63.3	64.2	8	58	17	75					
-65											
	-68.3	69.2	3	4	5	9	SS-156				
-70											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B45-A WBL	**STATION** 374+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 85.7 ft	**NORTHING** 192,702	**EASTING** 2,306,078 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/26/11	**COMP. DATE** 01/27/11	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
-75	-73.3	74.2	6	6	11	17				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
										-75.6 / -76.2 / -77.1 — 76.5 / 77.1 / 78.0
-80	-78.3	79.2	4	6	9	15				**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
	-83.3	84.2	8	8	9	17				-84.8 — 85.7
										Boring Terminated at Elevation -84.8 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B46-B EBL	**STATION** 375+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 76.2 ft	**NORTHING** 192,643	**EASTING** 2,306,234 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/28/11	**SURFACE WATER DEPTH** 0.0ft

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)
10											
5											
0	0.9	0.0	WOH	WOH	WOH	0	SS-157	619%		0.9 WATER SURFACE (01/27/11)	0.0
										ALLUVIAL BROWN MUCK WITH WOOD FRAGMENTS (49.6% ORGANIC), WET	
-5	-5.4	6.3	WOH	WOH	WOH	0					
-10	-8.6	9.5	WOH	WOH	WOH	0				-11.1	12.0
										ALLUVIAL BROWN AND TAN SAND, SATURATED	
-15	-13.6	14.5	2	4	6	10	SS-158				
-20	-18.6	19.5	2	3	4	7					
-25	-23.6	24.5	1	2	2	4				-27.1	28.0
-30	-28.6	29.5	1	2	3	5	SS-159				
-35	-33.6	34.5	2	2	3	5	SS-160			-37.1	38.0
										COASTAL PLAIN GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-40	-38.8	39.7	1	2	2	4	SS-161				
-45	-43.8	44.7	7	9	11	20					
-50	-48.8	49.7	11	13	14	27					
-55	-53.8	54.7	10	33	42	75	SS-162			-53.8	54.7
										-56.2	57.1
-60	-58.8	59.7	9	11	16	27					
-65	-63.8	64.7	100/0.4			100/0.4				-63.8	64.7
										-65.9	66.8
										GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-70	-68.8	69.7	5	5	8	13	SS-163				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B46-B EBL	**STATION** 375+56	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.9 ft	**TOTAL DEPTH** 76.2 ft	**NORTHING** 192,643	**EASTING** 2,306,234 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/27/11	**COMP. DATE** 01/28/11	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
-75	-73.8	74.7	10	23	48	71				GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)* -75.3 76.2
										Boring Terminated at Elevation -75.3 ft in Very Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B47-A WBL	**STATION** 376+67	**OFFSET** 48 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 90.9 ft	**NORTHING** 192,785	**EASTING** 2,306,292 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/25/11	**COMP. DATE** 01/26/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.4	0.0								1.4 WATER SURFACE (01/25/11)	0.0
0			WOH	WOH	WOH	0	SS-143	601%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (53.3% ORGANIC), WET	
-5	-5.0	6.4	WOH	WOH	WOH	0					
	-8.0	9.4	2	3	3	6	SS-144			-7.6 **ALLUVIAL** BROWN SAND, SATURATED	9.0
-10											
	-13.0	14.4	5	3	2	5					
-15											
	-18.0	19.4	3	4	5	9					
-20										-20.6	22.0
	-23.0	24.4	WOH	1	1	2	SS-145				
-25											
	-28.0	29.4	1	1	1	2					
-30											
	-33.0	34.4	1	1	2	3					
-35										-35.6 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	37.0
	-38.0	39.4	1	2	1	3	SS-146				
-40										-40.6	42.0
	-43.0	44.4	8	9	15	24	SS-147				
-45											
	-48.0	49.4	11	19	24	43					
-50											
	-53.0	54.4	11	13	18	31					
-55											
	-58.0	59.4	10	14	15	29	SS-148				
-60											
	-63.0	64.4	5	6	11	17					
-65											
	-68.0	69.4	3	5	5	10					
-70											
	-73.0	74.4	100/0.3			100/0.3				-73.0 / -74.1	74.4 / 75.5
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B47-A WBL	**STATION** 376+67	**OFFSET** 48 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 90.9 ft	**NORTHING** 192,785	**EASTING** 2,306,292 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/25/11	**COMP. DATE** 01/26/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-78.0	79.4	7	5	18	23	SS-149			-75.6 **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION) 77.0
-80										
	-83.0	84.4	5	6	10	16				
-85										
	-88.0	89.4	5	5	10	15				-89.5 90.9
										Boring Terminated at Elevation -89.5 ft in Very Stiff Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B48-B EBL	**STATION** 377+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 81.2 ft	**NORTHING** 192,743	**EASTING** 2,306,454 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/21/11	**COMP. DATE** 01/21/11	**SURFACE WATER DEPTH** 0.0ft

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))
10										
5										
0	0.6	0.0	WOR	WOR	WOR	0	SS-136			0.6 WATER SURFACE (01/21/11) 0.0 **ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (51.0% ORGANIC), WET
-5	-6.4	7.0	WOR	1	1	2 14				
-10	-9.1	9.7	3	5	9		SS-137			-8.4 9.0 **ALLUVIAL** TAN SAND, SATURATED
-15	-14.1	14.7	4	5	5	10				
-20	-19.1	19.7	2	3	4	7	SS-138			
-25	-24.1	24.7	2	2	3	5				
-30	-29.1	29.7	2	2	3	5				
-35	-34.1	34.7	3	3	4	7	SS-139			
-40	-39.1	39.7	2	3	4	7	SS-140			-38.4 39.0 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-45	-44.1	44.7	12	13	15	28				
-50	-49.1	49.7	17	16	19	35				-46.4 47.0 -46.7 47.3
-55	-54.1	54.7	10	13	17	30	SS-141			
-60	-59.1	59.7	12	15	18	33				
-65	-64.1	64.7	2	7	12	19				
-70	-69.1	69.7	2	5	7					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B48-B EBL	**STATION** 377+96	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 0.6 ft	**TOTAL DEPTH** 81.2 ft	**NORTHING** 192,743	**EASTING** 2,306,454 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/21/11	**COMP. DATE** 01/21/11	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
-75	-74.1	74.7	100/0.4			12 100/0.4	SS-142			-74.1 74.7 -75.3 75.9 GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-80	-79.1	79.7	4	5	10	15				-80.6 81.2 Boring Terminated at Elevation -80.6 ft in Medium Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B49-A WBL	**STATION** 379+16	**OFFSET** 48 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 92.7 ft	**NORTHING** 192,890	**EASTING** 2,306,516 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/21/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.6	0.0								1.6 WATER SURFACE (01/20/11)	0.0
0			WOR	WOR	WOR	0	SS-129			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (53.6% ORGANIC), WET	
	-3.2	4.8									
-5			WOR	WOR	WOR	0				-5.4	7.0
	-6.6	8.2	1	3	9	12	SS-130			**ALLUVIAL** GRAY AND BROWN SAND, SATURATED	
-10	-9.6	11.2	2	2	3	5					
-15	-14.6	16.2	2	4	6	10				-17.4	19.0
-20	-19.6	21.2	1	2	3	5	SS-131				
-25	-24.6	26.2	3	4	5	9					
-30	-29.6	31.2	2	3	3	6					
-35	-34.6	36.2	2	2	2	4					
										-38.0 / -38.4	39.6 / 40.0
-40	-39.6	41.2	2	4	8	12	SS-132				
										-42.3 / -44.1	43.9 / 45.7
-45	-44.6	46.2	9	11	14	25				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-50	-49.6	51.2	9	12	18	30					
-55	-54.6	56.2	22	13	16	29	SS-133				
-60	-59.6	61.2	9	11	13	24					
-65	-64.6	66.2	7	8	9	17					
-70	-69.6	71.2	5	7	10	17	SS-134				
-75	-74.6	76.2									

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B49-A WBL	**STATION** 379+16	**OFFSET** 48 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.6 ft	**TOTAL DEPTH** 92.7 ft	**NORTHING** 192,890	**EASTING** 2,306,516 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/21/11	**SURFACE WATER DEPTH** 0.0ft

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	
-75						Match Line					
			19	13	15	28				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*	
-80	-79.6	81.2	5	5	10	15				-81.5 / -82.3	83.1 / 83.9
-85	-84.6	86.2	4	4	8	12	SS-135				
-90	-89.6	91.2	18	9	12	21				-91.1	92.7

Boring Terminated at Elevation -91.1 ft in Medium Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B50-B EBL	**STATION** 380+46	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.2 ft	**TOTAL DEPTH** 83.2 ft	**NORTHING** 192,853	**EASTING** 2,306,680 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/20/11	**SURFACE WATER DEPTH** 0.0ft

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)
10											
5											
	2.2	0.0								2.2 WATER SURFACE (01/20/11)	0.0
0			WOR	WOR	WOR	0	SS-121	461%		**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (52.7% ORGANIC), WET	
	-3.6	5.8									
-5			WOR	WOR	WOR	0				-4.8 **ALLUVIAL** BROWN AND GRAY SAND, SATURATED	7.0
	-6.2	8.4	2	2	3	5	SS-122				
-10	-9.5	11.7	8	10	11	21	SS-123				
-15	-14.5	16.7	2	6	8	14				-16.8	19.0
-20	-19.5	21.7	3	6	7	13	SS-124				
-25	-24.5	26.7	1	3	6	9	SS-125			-22.8 **ALLUVIAL** TAN SANDY SILT, WET	25.0
-30	-29.5	31.7	5	4	2	6	SS-126			-27.8 **ALLUVIAL** TAN SAND, SATURATED	30.0
-35	-34.5	36.7	1	1	1	2					
-40	-39.5	41.7	2	3	3	6					
-45	-44.5	46.7	1	2	3	5	SS-127			-42.8	45.0
-50	-49.5	51.7	1	2	8	10					
-55	-54.5	56.7	10	17	21	38					
-60	-59.5	61.7	6	100/0.4		100/0.4				-59.8	62.0
										-61.8	64.0
-65	-64.5	66.7	11	9	10	19	SS-128			-64.3 / -64.8 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	66.5 / 67.0
-70	-69.5	71.7									

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B50-B EBL	**STATION** 380+46	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.2 ft	**TOTAL DEPTH** 83.2 ft	**NORTHING** 192,853	**EASTING** 2,306,680 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/20/11	**COMP. DATE** 01/20/11	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
			4	7	11	18				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-75	-74.5	76.7	6	6	8	14				
-80	-79.5	81.7	5	6	9	15				-78.2 / -78.6 / -81.0 — 80.4 / 80.8 / 83.2
										Boring Terminated at Elevation -81.0 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B51-A WBL	**STATION** 381+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 96.3 ft	**NORTHING** 193,006	**EASTING** 2,306,725 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/19/11	**COMP. DATE** 01/19/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	1.5	0.0								1.5 WATER SURFACE (01/19/11)	0.0
0			WOR	WOR	WOR	0	SS-113			**ALLUVIAL** BROWN MUCK WITH WOOD FRAGMENTS (61.0% ORGANIC), WET	
-5	-4.8	6.3	4	4	3	7	SS-114			-4.5 **ALLUVIAL** BROWN AND TAN SAND, SATURATED	6.0
-10	-8.3	9.8	3	3	2	5					
-15	-13.3	14.8	1	2	6	8				-16.5	18.0
-20	-18.3	19.8	2	2	2	4	SS-115				
-25	-23.3	24.8	2	2	3	5					
-30	-28.3	29.8	4	4	4	8				-31.5	33.0
-35	-33.3	34.8	5	8	9	17	SS-116			-36.5	38.0
-40	-38.3	39.8	3	4	3	7	SS-117			-41.5	43.0
-45	-43.3	44.8	2	2	3	5	SS-118				
-50	-48.3	49.8	3	7	10	17				-51.5	53.0
-55	-53.3	54.8	13	20	23	43	SS-119				
-60	-58.3	59.8	5	7	10	17				-61.6 / -62.3	63.1 / 63.8
-65	-63.3	64.8	6	7	9	16				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-70	-68.3	69.8	6	8	9	17	SS-120				
-75	-73.3	74.8	7	8	12	20					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B51-A WBL	**STATION** 381+56	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 1.5 ft	**TOTAL DEPTH** 96.3 ft	**NORTHING** 193,006	**EASTING** 2,306,725 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/19/11	**COMP. DATE** 01/19/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
-80	-78.3	79.8	6	6	9	15				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-85	-83.3	84.8	3	3	9	12				-81.5 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) 83.0
-90	-88.3	89.8	6	8	11	19				
	-93.3	94.8	9	21	41	62				-94.8 96.3
										Boring Terminated at Elevation -94.8 ft in Hard Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B52-B EBL	**STATION** 382+69	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 110.7 ft	**NORTHING** 192,957	**EASTING** 2,306,879 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/14/11	**COMP. DATE** 01/18/11	**SURFACE WATER DEPTH** 0.0ft

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))
10										
5										
1.8		0.0								1.8 WATER SURFACE (01/14/11) 0.0
0			WOR	WOR	WOR	0	SS-105			**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL (3.3% ORGANIC), SATURATED
-5	-4.3	6.1	3	2	2	4	SS-106			-6.2 8.0
	-7.4	9.2	5	5	5	10	SS-107			**ALLUVIAL** TAN SAND, SATURATED
-10										
	-12.4	14.2	6	8	10	18				
-15										
	-17.4	19.2	3	3	4	7				
-20										
	-22.4	24.2	2	1	2	3	SS-108			
-25										
	-27.4	29.2	4	4	4	8				
-30										
	-32.4	34.2	4	3	4	7	SS-109			
-35										
	-37.4	39.2	4	5	4	9				
-40										
	-42.4	44.2	7	4	4	8				
-45										-45.2 47.0
	-47.4	49.2	4	7	9	16	SS-110			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)
-50										
	-52.4	54.2	2	2	2	4				
-55										
	-57.4	59.2	6	6	8	14				
-60										
	-62.4	64.2	7	7	8	15	SS-111			
-65										
	-67.4	69.2	4	6	8	14				
-70										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B52-B EBL	**STATION** 382+69	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.8 ft	**TOTAL DEPTH** 110.7 ft	**NORTHING** 192,957	**EASTING** 2,306,879 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/14/11	**COMP. DATE** 01/18/11	**SURFACE WATER DEPTH** 0.0ft

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
-70						Match Line				
-75	-72.4	74.2	5	6	9	15				**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-77.4	79.2	4	5	3	8	SS-112			-74.5 76.3 -75.0 76.8
-80										-80.2 82.0
-85	-82.4	84.2	5	6	15	21				**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) -83.8 85.6 -84.8 86.6
	-87.4	89.2	5	4	4	8				-86.7 88.5 -87.1 88.9
-90										
-95	-92.4	94.2	15	22	40	62				
	-97.4	99.2	14	12	16	28				
-100										
-105	-102.4	104.2	5	5	8	13				
	-107.4	109.2	6	13	36	49				-108.9 110.7
										Boring Terminated at Elevation -108.9 ft in Hard Sandy Silt

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B53-A WBL	**STATION** 383+96	**OFFSET** 58 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 2.0 ft	**TOTAL DEPTH** 96.4 ft	**NORTHING** 193,119	**EASTING** 2,306,935
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/14/11	**COMP. DATE** 01/14/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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))
5										
	2.0	0.0								2.0 WATER SURFACE (01/14/11) 0.0
			WOH	WOH	WOH	0	SS-97			**ALLUVIAL** BROWN SAND WITH LITTLE TO MODERATE ORGANIC MATERIAL (4.2% TO 5.3% ORGANIC), SATURATED
0										
-5	-4.8	6.8	3	4	4	8	SS-98			
	-7.9	9.9								-7.0 9.0 **ALLUVIAL** TAN SAND, SATURATED
			4	6	6	12	SS-99			
-10										
	-12.9	14.9	4	4	7	11				
-15										
	-17.9	19.9	4	3	4	7				
-20										
	-22.9	24.9	2	4	7	11	SS-100			
-25										
	-27.9	29.9	6	8	8	16				
-30										
	-32.9	34.9	4	5	10	15				
-35										
	-37.9	39.9	6	10	11	21	SS-101			
-40										
	-42.9	44.9	3	4	7	11				
-45										
	-47.9	49.9	3	1	3	4				
-50										-51.0 53.0 **COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION)
	-52.9	54.9	1	1	1	2	SS-102			
-55										
	-57.9	59.9	5	9	11	20				
-60										
	-62.9	64.9	6	5	8	13				
-65										
	-67.9	69.9	6	6	7	13	SS-103			
-70										
	-72.9	74.9	6	12	36	48				
-75										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B53-A WBL	**STATION** 383+96	**OFFSET** 58 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 2.0 ft	**TOTAL DEPTH** 96.4 ft	**NORTHING** 193,119	**EASTING** 2,306,935
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/14/11	**COMP. DATE** 01/14/11	**SURFACE WATER DEPTH** 0.0ft

GROUND WTR (ft): 0 HR. N/A; 24 HR. 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
-75						Match Line				
	-77.9	79.9	3	4	7	11				**COASTAL PLAIN** GRAY SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-80										
	-82.9	84.9	3	4	4	8	SS-104			
-85										-81.0 83.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)
	-87.9	89.9	4	4	5	9				-85.5 87.5 -86.6 88.6
-90										
	-92.9	94.9	12	20	26	46				-94.4 96.4 Boring Terminated at Elevation -94.4 ft in Hard Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

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BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B54-B EBL	**STATION** 385+16	**OFFSET** 51 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 1.4 ft	**TOTAL DEPTH** 89.6 ft	**NORTHING** 193,083	**EASTING** 2,307,093 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/13/11	**COMP. DATE** 01/13/11	**SURFACE WATER DEPTH** 1.2ft

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))
										WATER SURFACE (01/13/11)
	1.4	0.0								GROUND SURFACE (1.4 / 0.0)
			1	1	1	2	SS-89			**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL (3.0% ORGANIC), SATURATED (-1.6 / 3.0)
	-3.8	5.2	3	2	2	4	SS-90			**ALLUVIAL** BROWN AND TAN SAND, SATURATED
	-6.7	8.1	2	1	1	2	SS-91			
	-11.7	13.1	6	9	9	18				
	-16.7	18.1	6	6	7	13				
	-21.7	23.1	3	3	3	6	SS-92			
	-26.7	28.1	1	1	1	2				
	-31.7	33.1	3	3	3	6	SS-93			
	-36.7	38.1	4	4	4	8				
	-41.7	43.1	3	7	16	23				
	-46.7	48.1	2	2	4	6	SS-94			
	-51.7	53.1	4	8	12	20				
	-56.7	58.1	6	6	7	13				
	-61.7	63.1	42	16	18	34				
	-66.7	68.1	10	15	85/0.3	100/0.8	SS-95			

SOIL AND ROCK DESCRIPTION (continued)

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))
						Match Line				
	-71.7	73.1	7	9	13	22				-69.7 / 71.1 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-76.7	78.1	7	6	10	16				-75.0 / 76.4; -75.6 / 77.0
	-81.7	83.1	5	5	7	12	SS-96			-79.6 / 81.0 **COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) (-81.3 / 82.7; -81.7 / 83.1)
	-86.7	88.1	8	8	11	19				-86.0 / 87.4; -86.6 / 88.0; -88.2 / 89.6

Boring Terminated at Elevation -88.2 ft in Very Stiff Sandy Silt

-19.6	21.0	**ALLUVIAL** GRAY SANDY SILT, WET	
-29.6	31.0	**ALLUVIAL** GRAY SAND, SATURATED	
-44.6	46.0	**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-48.7	50.1		
-49.1	50.5		
-60.6	62.0		
-61.9	63.3		
-67.2	68.6		
-68.7	70.1		
-69.3	70.7		

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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B55-A WBL	**STATION** 386+42	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.3 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 193,241	**EASTING** 2,307,147 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/12/11	**COMP. DATE** 01/12/11	**SURFACE WATER DEPTH** 0.0ft

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)
5											
	2.3	0.0								2.3 WATER SURFACE (01/12/11)	0.0
			WOH	2	2	4	SS-82			**ALLUVIAL** TAN SAND, SATURATED	
0											
	-2.5	4.8	1	1	1	2					
-5											
	-6.8	9.1	WOH	1	1	2	SS-83				
-10											
	-11.8	14.1	4	3	4	7					
-15											
	-16.8	19.1	2	3	2	5				-19.7	22.0
-20										**ALLUVIAL** GRAY SANDY SILT, WET	
	-21.8	24.1	1	1	1	2	SS-84				
-25										-24.7	27.0
	-26.8	29.1	3	4	4	8	SS-85			**ALLUVIAL** TAN SAND, SATURATED	
-30											
	-31.8	34.1	3	4	3	7					
-35											
	-36.8	39.1	12	13	14	27	SS-86				
-40											
	-41.8	44.1	8	7	7	14					
-45											
	-46.8	49.1	4	4	5	9					
-50										-49.7	52.0
	-51.8	54.1	1	2	2	4	SS-87			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-55											
	-56.8	59.1	1	9	10	19					
-60											
	-61.8	64.1	7	7	11	18					
-65										-66.5	68.8
	-66.8	69.1	100/0.3			100/0.3				-67.9	70.2
-70										-70.7	73.0
	-71.8	74.1	6	11	16	27	SS-88			**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION)	
-75											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B55-A WBL	**STATION** 386+42	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 2.3 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 193,241	**EASTING** 2,307,147 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC6893 CME-55 88% 02/10/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 01/12/11	**COMP. DATE** 01/12/11	**SURFACE WATER DEPTH** 0.0ft

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
-75						Match Line				
	-76.8	79.1	5	6	8	14				**COASTAL PLAIN** GRAY SANDY SILT WITH INDURATED LAYERS, WET (PEEDEE FORMATION) *(continued)*
-80										
	-81.8	84.1	29	60/0.1		60/0.1				-81.8 84.1 / -82.9 85.2
-85										
	-86.8	89.1	6	6	14	20				-88.3 90.6
										Boring Terminated at Elevation -88.3 ft in Very Stiff Sandy Silt

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B56-B EBL	**STATION** 387+38	**OFFSET** 58 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 3.9 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 193,190	**EASTING** 2,307,289	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 08/17/10	**COMP. DATE** 08/17/10	**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)
5											
	3.9	0.0								3.9 GROUND SURFACE	0.0
			WOH	WOH	WOH	0	SS-17			**ALLUVIAL** TAN SAND, MOIST TO SATURATED	
0	-0.1	4.0									
			3	5	6	11					
-5	-4.7	8.6									
			1	3	4	7	SS-18				
-10	-9.7	13.6									
			1	1	5	6					
-15	-14.7	18.6									
			8	9	3	12					
-20	-19.7	23.6								-18.1 **ALLUVIAL** GRAY SANDY SILT, WET	22.0
			WOH	WOH	WOH	0	SS-19				
-25	-24.7	28.6								-23.1 **COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	27.0
			1	2	5	7	SS-20				
-30	-29.7	33.6									
			4	6	9	15	SS-21				
-35	-34.7	38.6								-34.3	38.2
			20	25	20	45					
-40	-39.7	43.6									
			15	10	11	21	SS-22				
-45	-44.7	48.6									
			8	9	11	20					
-50	-49.7	53.6									
			12	19	23	42	SS-23				
-55	-54.7	58.6									
			6	9	15	24					
-60	-59.7	63.6								-60.3	64.2
			7	100/0.4		100/0.4				-61.1	65.0
-65	-64.7	68.6									
			8	13	18	31					
-70	-69.7	73.6									
			9	17	30	47				-71.2 Boring Terminated at Elevation -71.2 ft in Dense Sand	75.1

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B57-A WBL	**STATION** 388+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 5.2 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,341	**EASTING** 2,307,312 — **24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 08/11/10	**COMP. DATE** 08/12/10	**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)
10											
5	5.2	0.0	1	1	2	3	SS-9			5.2 GROUND SURFACE	0.0
0	1.2	4.0	2	3	4	7				**ALLUVIAL** TAN SAND, MOIST TO SATURATED	
-5	-3.3	8.5	4	6	10	16				-0.8	6.0
-10	-8.3	13.5	4	5	7	12	SS-10				
-15	-13.3	18.5	5	7	8	15					
-20	-18.3	23.5	7	8	8	16					
-25	-23.3	28.5	4	5	6	11	SS-11				
-30	-28.3	33.5	5	8	5	13					
-35	-33.3	38.5	2	6	9	15				-35.8	41.0
-40	-38.3	43.5	4	12	9	21	SS-12			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
-45	-43.3	48.5	2	3	3	6					
-50	-48.3	53.5	5	7	9	16	SS-13				
-55	-53.3	58.5	3	4	5	9	SS-14				
-60	-58.3	63.5	8	36	30	66	SS-15				
-65	-63.3	68.5	8	12	15	27					
-70	-68.3	73.5	23	16	18	34					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. B57-A WBL	**STATION** 388+36	**OFFSET** 58 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 5.2 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,341	**EASTING** 2,307,312 — **24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 08/11/10	**COMP. DATE** 08/12/10	**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
-70						Match Line				
-75	-73.3	78.5	17	13	34	47	SS-16			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
	-78.3	83.5	5	7	10	17				-79.8 / 85.0

Boring Terminated at Elevation -79.8 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. EB2-B EBL	**STATION** 389+24	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 7.2 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,289	**EASTING** 2,307,448 — **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 08/10/10	**COMP. DATE** 08/11/10	**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)
10											
	7.2	0.0								7.2 GROUND SURFACE	0.0
			WOH	1	2	3	SS-1			**ALLUVIAL** GRAY AND TAN SAND, MOIST TO SATURATED	
5											
	3.2	4.0	1	3	4	7					
0											
	-1.3	8.5	3	4	6	10					
-5											
	-6.3	13.5	10	11	14	25	SS-2				
-10											
	-11.3	18.5	7	11	10	21					
-15										-13.8	21.0
	-16.3	23.5	2	2	2	4	SS-3	26%		**ALLUVIAL** GRAY SANDY SILT, WET	
-20											
	-21.3	28.5	2	2	4	6					
-25											
	-26.3	33.5	WOH	3	6	9					
-30										-27.3	34.5
										ALLUVIAL GRAY SAND, SATURATED	
	-31.3	38.5	3	1	2	3	SS-4			-31.8	39.0
-35										**ALLUVIAL** GRAY SANDY CLAY, WET	
	-36.3	43.5	16	9	8	17	SS-5			-35.9	43.1
-40										**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION)	
	-41.3	48.5	13	11	9	20					
-45											
	-46.3	53.5	10	12	12	24	SS-6				
-50											
	-51.3	58.5	7	16	26	42					
-55											
	-56.3	63.5	9	10	13	23	SS-7				
-60											
	-61.3	68.5	9	12	15	27					
-65											
	-66.3	73.5	9	15	36	51					
-70										-68.7 / -69.6	75.9 / 76.8

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNS. / N. HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER			**GROUND WTR (ft)**
BORING NO. EB2-B EBL	**STATION** 389+24	**OFFSET** 58 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 7.2 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,289	**EASTING** 2,307,448 — **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 81% 03/26/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 08/10/10	**COMP. DATE** 08/11/10	**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
-70						Match Line				
	-71.3	78.5	9	10	10	20	SS-8			**COASTAL PLAIN** GRAY SAND WITH INDURATED LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-75										
	-76.3	83.5	6	9	11	20				-77.8 / 85.0
										Boring Terminated at Elevation -77.8 ft in Medium Dense Sand

NCDOT BORE DOUBLE R2633B_GEO_BRDG.GPJ NC_DOT.GDT 7/15/11

34491.1.2
R-2633BB
BRIDGE ON US17 OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

EB1-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-607	58 RT	317+41	0.0-1.5	A-2-4(0)	18	NP	69.1	20.6	8.3	2.0	100	86	12	-	-
SS-608	58 RT	317+41	8.5-10.0	A-7-6(11)	47	31	42.0	8.6	17.3	32.0	98	72	51	-	-
SS-609	58 RT	317+41	13.5-15.0	A-3(0)	20	NP	12.0	78.9	5.1	4.0	100	98	10	-	-
SS-610	58 RT	317+41	23.5-25.0	A-3(0)	23	NP	16.2	76.9	4.9	2.0	100	99	8	-	-
SS-611	58 RT	317+41	33.5-35.0	A-2-4(0)	18	NP	18.2	68.3	7.5	6.0	98	95	15	-	-
SS-612	58 RT	317+41	43.5-45.0	A-2-4(0)	20	NP	7.0	79.5	9.5	4.0	100	100	16	-	-
SS-613	58 RT	317+41	53.5-55.0	A-2-4(0)	18	NP	3.8	86.3	5.9	4.0	100	100	12	-	-
SS-614	58 RT	317+41	63.5-65.0	A-2-4(0)	21	NP	1.6	85.3	7.1	6.0	100	100	17	-	-
SS-615	58 RT	317+41	73.5-75.0	A-2-4(0)	24	NP	1.0	85.9	9.1	4.0	100	100	18	-	-
SS-616	58 RT	317+41	83.5-85.0	A-2-4(0)	21	NP	0.6	77.7	13.7	8.0	100	100	28	-	-

B1-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-31	58 LT	318+49	0.0-1.5	A-2-6(0)	31	15	29.7	39.6	6.5	24.1	61	51	21	-	-
SS-32	58 LT	318+49	4.0-5.5	A-2-4(0)	15	NP	60.1	23.4	7.4	9.1	100	84	19	-	-
SS-33	58 LT	318+49	13.4-14.9	A-3(0)	22	NP	13.5	82.4	1.1	3.0	100	98	5	-	-
SS-34	58 LT	318+49	23.4-24.9	A-2-4(0)	22	NP	11.6	77.2	5.1	6.0	93	92	12	-	-
SS-35	58 LT	318+49	38.4-39.9	A-2-4(0)	20	NP	8.0	80.3	3.6	8.0	100	100	14	-	-
SS-36	58 LT	318+49	53.4-54.9	A-2-4(0)	21	NP	3.8	82.4	6.7	7.0	100	100	16	-	-

B2-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-25	58 RT	319+58	0.0-1.5	A-2-4(0)	17	NP	62.3	23.3	7.3	7.0	100	82	16	-	-
SS-26	58 RT	319+58	4.0-5.5	A-7-6(12)	41	22	29.8	10.7	19.3	40.2	99	81	63	-	-
SS-27	58 RT	319+58	13.5-15.0	A-3(0)	25	NP	9.2	86.4	1.4	3.0	100	99	5	-	-
SS-28	58 RT	319+58	28.5-30.0	A-2-4(0)	18	NP	16.0	65.2	7.7	11.1	98	95	20	-	-
SS-29	58 RT	319+58	43.5-45.0	A-2-4(0)	19	NP	12.4	74.8	5.7	7.0	100	96	15	-	-

B3-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-552	58 LT	320+66	3.3-4.8	-	-	-	-	-	-	-	-	-	-	-	26.3
SS-553	58 LT	320+66	13.3-14.8	A-3(0)	21	NP	48.8	48.4	1.7	1.0	100	86	4	-	-
SS-554	58 LT	320+66	18.3-19.8	A-3(0)	25	NP	14.3	79.5	5.1	1.0	100	98	7	-	-
SS-555	58 LT	320+66	33.3-34.8	A-2-4(0)	20	NP	5.3	80.5	7.1	7.0	98	97	16	-	-
SS-556	58 LT	320+66	38.3-39.8	A-2-4(0)	22	NP	3.5	85.0	7.5	4.0	100	100	15	-	-
SS-557	58 LT	320+66	48.3-49.8	A-2-4(0)	23	NP	3.1	81.7	10.1	5.0	88	87	17	-	-
SS-558	58 LT	320+66	58.3-59.8	A-2-4(0)	22	NP	1.8	78.4	11.7	8.0	97	96	26	-	-
SS-559	58 LT	320+66	63.3-64.0	A-2-4(0)	22	NP	0.7	76.0	14.2	9.0	100	100	32	-	-
SS-560	58 LT	320+66	73.3-74.8	A-2-4(0)	23	NP	0.2	76.6	15.1	8.0	100	100	30	-	-
SS-561	58 LT	320+66	88.3-89.0	A-4(0)	21	NP	1.0	64.6	24.4	10.0	99	98	48	-	-
SS-562	58 LT	320+66	98.3-99.8	A-4(0)	25	1	0.4	64.8	18.8	16.0	100	100	46	-	-

B4-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-563	58 RT	321+86	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	57.6
SS-564	58 RT	321+86	3.2-4.7	A-3(0)	19	NP	54.0	38.3	3.7	4.0	100	86	9	-	-
SS-565	58 RT	321+86	13.2-14.7	-	-	-	-	-	-	-	-	-	-	-	52.5
SS-566	58 RT	321+86	23.2-24.7	A-2-4(0)	20	NP	27.4	55.0	9.6	8.0	100	92	29	-	-
SS-567	58 RT	321+86	33.2-34.7	A-2-4(0)	22	NP	2.9	82.5	6.5	8.0	100	100	17	-	-
SS-568	58 RT	321+86	43.2-44.7	A-2-4(0)	24	NP	2.3	86.6	6.1	5.0	100	100	14	-	-
SS-569	58 RT	321+86	58.2-59.7	A-2-4(0)	23	NP	0.6	80.2	11.1	8.0	100	100	26	-	-
SS-570	58 RT	321+86	73.2-74.7	A-2-4(0)	23	NP	0.4	76.2	15.3	8.0	100	100	30	-	-
SS-571	58 RT	321+86	83.2-84.4	A-4(0)	21	NP	0.3	65.5	23.2	11.0	100	100	45	-	-
SS-572	58 RT	321+86	93.2-94.7	A-4(0)	22	NP	0.2	65.5	24.3	10.0	100	100	49	-	-
SS-573	58 RT	321+86	98.2-99.7	A-4(0)	25	4	0.8	62.8	18.4	18.1	100	100	47	-	-
SS-574	58 RT	321+86	113.2-114.7	A-4(2)	28	8	2.2	57.0	20.8	20.1	100	99	54	-	-

B5-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-585	59 LT	323+05	12.9-14.4	-	-	-	-	-	-	-	-	-	-	-	37.1
SS-575	59 LT	323+05	23.9-24.4	A-3(0)	21	NP	57.8	36.1	3.1	3.0	100	91	7	-	-
SS-576	59 LT	323+05	27.9-29.4	A-3(0)	22	NP	79.0	17.5	2.5	1.0	97	52	4	-	-
SS-577	59 LT	323+05	32.9-34.4	A-2-4(0)	20	NP	5.6	81.8	6.5	6.0	100	99	15	-	-
SS-578	59 LT	323+05	42.9-44.4	A-2-4(0)	22	NP	1.7	81.8	9.4	7.0	100	100	21	-	-
SS-579	59 LT	323+05	52.9-54.4	A-2-4(0)	23	NP	0.6	84.2	9.2	6.0	100	100	20	-	-
SS-580	59 LT	323+05	67.9-69.4	A-4(0)	20	NP	1.4	67.6	19.0	12.0	100	99	38	-	-
SS-581	59 LT	323+05	72.9-74.4	A-2-4(0)	23	NP	0.2	77.1	13.6	9.0	100	100	35	-	-
SS-582	59 LT	323+05	77.9-79.4	A-4(0)	22	NP	0.2	71.2	21.6	7.0	100	100	36	-	-
SS-583	59 LT	323+05	87.9-89.0	A-4(0)	22	NP	0.2	70.3	21.5	8.0	100	100	43	-	-
SS-584	59 LT	323+05	102.9-104.4	A-4(0)	26	5	2.2	60.0	19.4	18.3	100	99	49	-	-

B6-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-586	57 RT	325+28	0.0-1.5	A-2-4(0)	19	NP	54.5	25.3	9.0	11.2	91	76	20	-	-
SS-587	57 RT	325+28	2.4-3.9	A-2-4(0)	16	NP	60.4	19.1	6.2	14.2	100	89	22	-	-
SS-588	57 RT	325+28	7.4-8.9	A-3(0)	17	NP	66.5	23.6	2.7	7.1	99	86	10	-	-
SS-589	57 RT	325+28	12.4-13.9	A-2-4(0)	18	NP	48.4	36.8	5.6	9.2	100	90	15	-	-
SS-590	57 RT	325+28	17.4-18.9	-	-	-	-	-	-	-	-	-	-	-	36.7
SS-591	57 RT	325+28	32.4-33.9	A-3(0)	20	NP	68.3	29.7	1.0	1.0	99	61	3	-	-
SS-592	57 RT	325+28	37.4-38.9	A-2-4(0)	21	NP	3.4	83.9	5.6	7.1	100	99	16	-	-
SS-593	57 RT	325+28	47.4-48.9	A-2-4(0)	23	NP	0.9	84.8	6.1	8.1	100	100	18	-	-
SS-594	57 RT	325+28	62.4-63.9	A-2-4(0)	22	NP	0.6	82.6	9.7	7.1	100	100	23	-	-
SS-595	57 RT	325+28	72.4-73.9	A-2-4(0)	21	NP	0.4	76.1	3.2	20.3	100	100	31	-	-
SS-596	57 RT	325+28	82.4-83.7	A-4(0)	21	NP	0.2	70.0	21.7	8.1	100	100	40	-	-
SS-597	57 RT	325+28	92.4-93.9	A-4(0)	24	NP	1.0	68.0	20.9	10.2	100	100	45	-	-
SS-598	57 RT	325+28	97.4-98.9	A-4(0)	24	NP	0.2	65.1	22.5	12.2	100	100	45	-	-
SS-599	57 RT	325+28	107.4-108.9	A-4(0)	27	6	0.4	63.5	17.8	18.3	100	100	48	-	-
SS-600	57 RT	325+28	122.4-123.9	A-4(2)	29	8	2.2	52.7	22.7	22.4	100	99	58	-	-

B7-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-47	58 LT	328+11	0.0-1.5	A-1-b(0)	23	NP	92.8	6.1	1.0	0.0	100	36	1	-	-
SS-48	58 LT	328+11	13.6-15.1	A-1-b(0)	22	NP	89.3	8.5	1.2	1.0	96	39	3	-	-
SS-49	58 LT	328+11	28.6-30.1	A-2-4(0)	21	NP	1.4	77.9	10.6	10.1	100	99	27	-	-
SS-50	58 LT	328+11	42.8-44.3	A-2-4(0)	21	NP	0.7	77.5	11.7	10.1	100	100	29	-	-
SS-51	58 LT	328+11	69.3-70.8	A-4(0)	24	NP	0.4	65.9	23.6	10.1	100	100	51	-	-
SS-52	58 LT	328+11	74.3-75.8	A-4(0)	25	4	0.8	64.1	14.9	20.2	100	100	47	-	-
SS-53	58 LT	328+11	89.9-91.4	A-4(2)	30	8	1.4	58.7	17.7	22.2	100	99	54	-	-
SS-54	58 LT	328+11	104.9-106.4	A-6(6)	33	13	0.8	51.9	20.9	26.4	100	100	64	-	-
SS-55	58 LT	328+11	119.4-120.9	A-6(9)	33	15	1.8	44.4	25.4	28.4	100	99	71	-	-
SS-56	58 LT	328+11	133.6-135.1	A-6(6)	29	12	0.6	47.3	27.8	24.3	100	100	71	-	-

B7-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-57	60 RT	328+10	0.0-1.5	A-1-b(0)	20	NP	88.4	10.4	1.1	0.0	100	41	2	-	-
SS-58	60 RT	328+10	16.1-17.6	A-1-b(0)	19	NP	92.9	6.4	0.7	0.0	98	32	1	-	-
SS-59	60 RT	328+10	31.0-32.5	A-1-b(0)	23	NP	80.4	17.1	0.4	2.0	88	29	3	-	-
SS-60	60 RT	328+10	35.6-37.1	A-2-4(0)	23	NP	1.0	81.9	8.0	9.2	99	98	24	-	-
SS-61	60 RT	328+10	49.8-51.3	A-2-4(0)	21	NP	0.3	74.5	16.0	9.2	100	100	32	-	-
SS-62	60 RT	328+10	63.1-64.6	A-4(0)	23	NP	0.6	69.8	19.4	10.2	100	100	45	-	-
SS-63	60 RT	328+10	72.8-74.3	A-4(1)	27	8	0.6	63.2	15.8	20.4	100	100	48	-	-
SS-64	60 RT	328+10	87.3-88.8	A-4(0)	28	5	1.2	65.4	15.0	18.3	100	99	49	-	-
SS-65	60 RT	328+10	99.7-101.2	A-6(7)	34	14	0.8	51.4	19.3	28.5	100	99	65	-	-
SS-66	60 RT	328+10	114.0-115.5	A-6(9)	39	17	2.2	51.6	19.7	26.5	100	98	63	-	-

B8-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-39	58 RT	330+11	3.1-4.6	A-7-5(14)	51	21	7.1	28.0	34.7	30.2	100	99	67	-	-
SS-40	58 RT	330+11	23.6-25.1	A-1-b(0)	19	NP	96.0	3.4	0.6	0.0	99	19	1	-	-
SS-41	58 RT	330+11	38.8-40.3	A-1-b(0)	23	NP	96.2	2.6	0.2	1.0	100	26	2	-	-
SS-42	58 RT	330+11	56.1-57.6	A-2-4(0)	23	NP	1.6	83.2	8.2	7.1	100	99	21	-	-
SS-43	58 RT	330+11	71.5-73.0	A-2-4(0)	23	NP	1.0	73.8	16.1	9.1	100	99	33	-	-
SS-44	58 RT	330+11	87.2-88.7	A-4(0)	23	NP	0.4	67.2	22.3	10.1	100	100	47	-	-
SS-45	58 RT	330+11	102.9-104.4	A-4(0)	26	5	0.6	64.3	14.9	20.2	100	100	48	-	-
SS-46	58 RT	330+11	117.9-119.4	A-4(3)	31	9	2.0	58.9	19.0	20.2	100	99	54	-	-

B9-A EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-650	13 RT	331+48	0.0-1.5	A-1-b(0)	21	NP	85.9	11.1	2.0	1.0	97	44	4	-	-
SS-651	13 RT	331+48	7.5-9.0	-	-	-	-	-	-	-	-	-	-	-	-
SS-652	13 RT	331+48	22.5-24.0	A-7-6(12)	46	21	3.4	39.7	32.8	24.1	100	99	63	-	-
SS-653	13 RT	331+48	32.5-34.0	-	-	-	15.6	6.0	54.3	24.1	100	87	80	-	31.4
SS-654	13 RT	331+48	47.5-49.0	A-1-b(0)	16	NP	94.9	3.8	1.3	0.0	100	20	2	-	-
SS-655	13 RT	331+48	57.5-59.0	A-2-4(0)	23	NP	1.2	85.3	7.5	6.0	100	100	18	-	-
SS-656	13 RT	331+48	72.5-74.0	A-2-4(0)	22	NP	0.8	76.8	14.3	8.0	100	100	28	-	-
SS-657	13 RT	331+48	82.5-84.0	A-4(0)	22	NP	0.2	70.4	23.4	6.0	100	100	37	-	-
SS-658	13 RT	331+48	97.5-99.0	A-4(0)	23	NP	0.2	65.4	26.4	8.0	100	100	47	-	-
SS-659	13 RT	331+48	102.5-104.0	A-4(0)	26	3	0.6	66.2	15.1	18.1	100	100	42	-	-
SS-660	13 RT	331+48	112.5-114.0	A-4(0)	28	5	0.8	62.8	16.3	20.1	100	99	48	-	-

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R-2633BB

BRIDGE ON US17 OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

B10-A EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-661	32 RT	332+55	8.9-10.4	-	-	-	-	-	-	-	-	-	-	-	9.8
SS-662	32 RT	332+55	18.9-20.4	-	-	-	-	-	-	-	-	-	-	-	20.7
SS-663	32 RT	332+55	23.9-25.4	A-3(0)	18	NP	78.5	18.4	2.0	1.0	100	78	3	-	-
SS-664	32 RT	332+55	33.9-35.4	A-1-b(0)	15	NP	91.1	7.6	1.2	0.0	100	30	1	-	-
SS-665	32 RT	332+55	43.9-45.4	A-1-b(0)	17	NP	96.6	2.6	0.7	0.0	100	12	1	-	-
SS-666	32 RT	332+55	53.9-55.4	A-2-4(0)	23	NP	1.0	83.4	10.5	5.1	100	100	19	-	-
SS-667	32 RT	332+55	68.9-70.4	A-2-4(0)	22	NP	1.6	75.5	14.8	8.1	100	99	29	-	-
SS-668	32 RT	332+55	83.9-85.4	A-4(0)	22	NP	0.4	71.6	19.8	8.1	100	100	38	-	-
SS-669	32 RT	332+55	93.9-95.4	A-4(0)	22	NP	0.2	63.9	25.7	10.2	100	100	50	-	-

B11-B WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-617	27 LT	333+77	0.0-1.5	-	-	-	35.2	11.7	32.9	20.2	100	74	55	-	-
SS-618	27 LT	333+77	13.5-15.0	-	-	-	6.5	42.0	29.3	22.2	100	99	56	-	-
SS-619	27 LT	333+77	18.5-20.0	A-2-4(0)	25	NP	33.3	44.0	14.5	8.1	100	92	25	-	-
SS-620	27 LT	333+77	23.5-25.0	A-3(0)	17	NP	81.8	16.2	2.0	0.0	100	66	3	-	-
SS-621	27 LT	333+77	38.5-40.0	A-1-b(0)	20	NP	89.9	8.1	2.0	0.0	100	44	2	-	-
SS-622	27 LT	333+77	48.5-50.0	-	-	-	88.5	9.3	2.2	0.0	52	13	2	-	1.7
SS-623	27 LT	333+77	52.9-54.4	A-2-4(0)	25	NP	3.8	83.8	8.3	4.0	81	79	14	-	-
SS-624	27 LT	333+77	57.9-59.4	A-2-4(0)	24	NP	1.0	85.3	7.7	6.1	100	100	19	-	-
SS-625	27 LT	333+77	72.9-74.4	A-2-4(0)	22	NP	0.4	76.2	17.4	6.1	100	100	30	-	-
SS-626	27 LT	333+77	82.9-84.4	A-4(0)	22	NP	0.2	72.1	19.6	8.1	100	100	37	-	-
SS-627	27 LT	333+77	92.9-94.4	A-4(0)	23	NP	0.4	67.5	24.0	8.1	100	100	45	-	-
SS-628	27 LT	333+77	102.9-104.4	A-4(0)	26	4	0.4	61.6	19.8	18.2	100	100	49	-	-

B12-A EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-629	30 RT	334+76	6.7-8.2	-	-	-	15.8	31.5	32.5	20.2	100	90	56	-	19.8
SS-630	30 RT	334+76	19.7-21.2	-	-	-	51.9	45.3	2.8	0.0	100	89	3	-	-
SS-631	30 RT	334+76	29.7-31.2	A-3(0)	30	NP	79.0	16.9	2.1	2.0	100	52	5	-	-
SS-632	30 RT	334+76	49.7-51.2	A-1-a(0)	16	NP	80.6	15.2	2.1	2.0	48	15	2	-	-
SS-633	30 RT	334+76	54.7-56.2	A-2-4(0)	21	NP	1.6	84.3	8.1	6.0	100	100	18	-	-
SS-634	30 RT	334+76	69.7-71.2	A-2-4(0)	21	NP	0.8	75.6	15.5	8.0	100	100	29	-	-
SS-635	30 RT	334+76	84.7-86.2	A-4(0)	23	NP	0.6	70.2	21.2	8.0	100	100	38	-	-
SS-636	30 RT	334+76	94.7-96.2	A-4(0)	23	NP	0.4	62.8	28.8	8.0	100	100	52	-	-
SS-637	30 RT	334+76	99.7-101.2	A-4(0)	24	NP	0.4	59.8	29.8	10.0	100	100	51	-	-
SS-638	30 RT	334+76	104.7-106.2	A-4(0)	27	6	0.8	64.6	16.5	18.1	100	100	45	-	-

B13-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-298	58 LT	336+16	0.0-1.5	A-5(3)	220	NP	45.6	14.5	27.7	12.1	95	65	40	-	68.0
SS-299	58 LT	336+16	7.4-8.9	A-5(1)	69	NP	37.5	17.8	22.5	22.2	100	69	48	-	28.5
SS-300	58 LT	336+16	17.4-18.9	A-4(1)	34	9	6.1	55.5	18.3	20.2	100	99	45	-	7.6
SS-301	58 LT	336+16	22.0-23.5	A-3(0)	24	NP	15.3	77.5	3.1	4.0	100	98	9	-	-
SS-302	58 LT	336+16	32.0-33.5	A-3(0)	14	NP	85.4	12.9	1.7	0.0	100	69	3	-	-
SS-303	58 LT	336+16	47.0-48.5	A-1-a(0)	17	NP	85.6	12.7	1.7	0.0	43	15	1	-	-
SS-304	58 LT	336+16	52.0-53.5	A-2-4(0)	22	NP	1.2	88.8	3.9	6.1	100	100	15	-	-
SS-305	58 LT	336+16	67.0-68.5	A-2-4(0)	22	NP	1.0	84.0	7.0	8.1	100	100	21	-	-
SS-306	58 LT	336+16	82.0-83.5	A-2-4(0)	22	NP	0.4	77.3	14.2	8.1	100	100	32	-	-

B14-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-639	92 RT	337+49	5.5-7.0	-	-	-	40.5	16.9	22.6	20.1	100	74	44	-	20.1
SS-640	92 RT	337+49	8.5-10.0	-	-	-	-	-	-	-	-	-	-	-	15.5
SS-641	92 RT	337+49	18.5-20.0	A-2-4(0)	30	NP	6.8	68.2	12.9	12.0	100	99	28	-	-
SS-642	92 RT	337+49	23.5-25.0	A-3(0)	24	NP	76.0	20.8	1.2	2.0	100	81	4	-	-
SS-643	92 RT	337+49	33.5-35.0	A-1-b(0)	29	NP	88.3	8.8	0.9	2.0	100	42	3	-	-
SS-644	92 RT	337+49	43.5-45.0	A-1-b(0)	19	NP	83.2	11.4	1.3	4.0	66	16	4	-	-
SS-645	92 RT	337+49	48.5-50.0	A-2-4(0)	24	NP	1.9	84.5	6.6	7.0	100	100	17	-	-
SS-646	92 RT	337+49	63.5-65.0	A-2-4(0)	23	NP	1.4	81.8	8.7	8.0	100	100	22	-	-
SS-647	92 RT	337+49	78.5-80.0	A-2-4(0)	21	NP	0.8	71.4	17.8	10.0	100	100	35	-	-
SS-648	92 RT	337+49	83.5-85.0	A-4(0)	23	NP	0.4	70.8	20.8	8.0	100	100	38	-	-
SS-649	92 RT	337+49	93.5-95.0	A-4(0)	23	NP	0.2	68.2	21.6	10.0	100	100	45	-	-

B15-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-307	61 LT	338+26	3.0-5.0	-	-	-	-	-	-	-	-	-	-	-	34.1
SS-308	61 LT	338+26	17.5-19.0	-	-	-	-	-	-	-	-	-	-	-	13.6
SS-309	61 LT	338+26	27.5-29.0	A-3(0)	25	NP	54.9	42.8	0.3	2.0	100	97	3	-	-
SS-310	61 LT	338+26	37.5-39.0	A-1-b(0)	57	NP	84.0	11.7	2.3	2.0	95	36	5	-	6.4
SS-311	61 LT	338+26	42.5-44.0	A-1-b(0)	19	NP	90.0	8.3	1.7	0.0	100	22	3	-	-
SS-312	61 LT	338+26	52.5-54.0	A-2-4(0)	23	NP	4.0	87.8	2.1	6.1	95	93	12	-	-
SS-313	61 LT	338+26	57.5-58.6	A-2-4(0)	23	NP	2.4	87.6	3.9	6.1	100	99	15	-	-
SS-314	61 LT	338+26	62.5-64.0	A-2-4(0)	21	NP	1.2	85.8	4.9	8.1	100	100	19	-	-
SS-315	61 LT	338+26	72.5-73.2	A-4(0)	19	NP	0.8	68.8	20.3	10.1	100	100	39	-	-
SS-316	61 LT	338+26	82.5-84.0	A-2-4(0)	19	NP	0.6	72.5	16.9	10.1	100	100	35	-	-

B16-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-681	55 RT	339+78	9.0-10.5	A-1-b(0)	72	NP	48.8	24.4	18.6	8.1	77	47	23	-	36.8
SS-682	55 RT	339+78	14.0-15.5	-	-	-	-	-	-	-	-	-	-	-	38.7
SS-683	55 RT	339+78	24.0-25.5	A-3(0)	27	NP	45.4	48.8	4.8	1.0	100	92	7	-	-
SS-684	55 RT	339+78	34.0-35.5	A-1-b(0)	19	NP	88.0	9.1	1.9	1.0	100	44	3	-	-
SS-685	55 RT	339+78	44.0-45.5	A-1-b(0)	22	NP	89.3	8.0	1.7	1.0	60	11	2	-	-
SS-686	55 RT	339+78	54.0-55.5	A-2-4(0)	25	NP	1.3	85.6	7.1	6.0	99	99	17	-	-
SS-687	55 RT	339+78	64.0-65.5	A-2-4(0)	22	NP	2.2	77.5	12.3	8.0	96	95	26	-	-
SS-688	55 RT	339+78	74.0-75.5	A-4(0)	20	NP	1.2	65.5	21.2	12.0	100	99	40	-	-
SS-689	55 RT	339+78	89.0-89.7	A-4(0)	23	NP	1.4	70.5	20.0	8.0	100	99	40	-	-

B17-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-690	51 LT	341+13	8.0-9.5	A-7-5(20)	72	24	19.6	14.0	36.3	30.1	100	86	69	-	18.6
SS-691	51 LT	341+13	18.0-19.5	A-7-5(25)	58	26	1.6	19.0	39.3	40.1	100	99	84	-	9.5
SS-692	51 LT	341+13	23.0-24.0	A-2-4(0)	29	NP	3.2	65.3	21.4	10.0	100	100	34	-	-
SS-693	51 LT	341+13	28.0-29.5	A-3(0)	15	NP	73.3	22.8	2.8	1.0	100	81	4	-	-
SS-694	51 LT	341+13	43.0-44.5	A-1-b(0)	17	NP	92.5	4.9	2.6	0.0	100	20	3	-	-
SS-695	51 LT	341+13	53.0-54.5	A-2-4(0)	22	NP	2.7	85.1	6.2	6.0	100	99	16	-	-
SS-696	51 LT	341+13	63.0-64.5	A-2-4(0)	22	NP	1.4	80.3	9.3	9.0	100	99	24	-	-
SS-697	51 LT	341+13	73.0-74.5	A-2-4(0)	21	NP	1.2	74.3	14.4	10.0	100	100	29	-	-
SS-698	51 LT	341+13	83.0-84.5	A-4(0)	22	NP	0.4	70.9	20.6	8.0	100	100	37	-	-
SS-699	51 LT	341+13	88.0-89.3	A-4(0)	22	NP	0.4	70.5	21.0	8.0	100	100	44	-	-

B18-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-290	58 RT	342+16	0.0-1.5	A-2-5(0)	143	NP	64.3	8.4	11.2	16.1	91	41	26	473.7	55.0
SS-291	58 RT	342+16	8.9-10.4	A-5(0)	86	NP	39.8	21.7	22.4	16.1	100	71	41	-	34.8
SS-292	58 RT	342+16	18.9-20.4	A-2-4(0)	26	NP	21.1	53.9	13.0	12.1	100	99	29	-	4.1
SS-293	58 RT	342+16	28.9-30.4	A-3(0)	20	NP	67.1	29.3	1.5	2.0	100	92	4	-	-
SS-294	58 RT	342+16	38.9-40.4	A-1-b(0)	23	NP	87.4	10.5	0.1	2.0	100	40	3	-	-
SS-295	58 RT	342+16	48.9-50.4	A-1-b(0)	25	NP	92.9	5.4	1.7	0.0	94	12	3	-	-
SS-296	58 RT	342+16	53.9-55.4	A-2-4(0)	24	NP	1.2	88.8	3.9	6.0	100	100	14	-	-
SS-297	58 RT	342+16	78.9-80.4	A-2-4(0)	23	NP	0.8	76.4	14.8	8.0	100	100	30	-	-

B19-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-282	58 LT	343+36	0.0-1.5	A-5(5)	161	NP	48.2	8.4	27.2	16.1	100	60	45	636.7	55.5
SS-283	58 LT	343+36	8.9-10.4	A-5(5)	93	NP	36.6	13.7	25.6	24.1	100	71	53	-	37.3
SS-284	58 LT	343+36	18.9-20.4	A-7-6(11)	46	19	2.0	39.0	26.8	32.2	100	99	65	-	10.1
SS-285	58 LT	343+36	23.9-25.4	A-3(0)	24	NP	13.7	81.4	0.9	4.0	100	100	6	-	-
SS-286	58 LT	343+36	33.9-35.4	A-3(0)	24	NP	71.0	26.3	2.7	0.0	100	84	3	-	-
SS-287	58 LT	343+36	48.9-50.4	A-1-b(0)	23	NP	91.3	6.4	0.3	2.0	79	16	2	-	-
SS-288	58 LT	343+36	53.9-55.4	A-2-4(0)	23	NP	1.0	88.6	4.3	6.0	100	100	14	-	-
SS-289	58 LT	343+36	78.9-80.4	A-2-4(0)	21	NP	0.4	76.2	15.4	8.0	100	100	31	-	-

B20-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-275	58 RT	344+56	0.0-1.5	A-2-5(0)	163	NP	61.1	10.9	12.0	16.1	93	47	27	690.5	58.0
SS-276	58 RT	344+56	14.2-15.7	A-7-6(15)	46	21	3.4	30.6	29.8	36.2	100	98	74	-	11.3
SS-277	58 RT	344+56	24.2-25.7	A-2-4(0)	31	NP	20.5	59.1	8.3	12.1	99	96	24	-	8.0
SS-278	58 RT	344+56	29.2-30.7	A-3(0)	25	NP	75.0	24.1	0.9	0.0	100	91	1	-	-
SS-279	58 RT	344+56	39.2-40.7	A-1-b(0)	21	NP	84.0	13.7	2.3	0.0	100	49	3	-	-
SS-280	58 RT	344+56	49.2-50.7	A-2-4(0)	24	NP	0.2	90.9	0.9	8.0	100	100	13	-	-
SS-281	58 RT	344+56	84.2-85.7	A-2-4(0)	22	NP	0.4	76.8	14.8	8.0	100	100	33	-	-

B21-B WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-670	22 LT	345+99	14.6-16.1	A-7-6(16)	46	21	3.7	26.2	37.5	32.6	100	98	76	-	-
SS-671	22 LT	345+99	19.6-21.1	A-7-6(12)	43	19	1.0	40.3	30.2	28.5	100	100	67	-	-
SS-672	22 LT	345+99	24.6-26.1	-	-	-	-	-	-	-	-	-	-	-	4.7
SS-673	22 LT	345+99	29.6-31.1	A-3(0)	19	NP	33.0	60.3	3.7	3.1	100	98	7	-	-
SS-674	22 LT	345+99	39.6-41.1	A-1-b(0)	14	NP	90.1	8.6	0.2	1.0	100	40	2	-	-
SS-675	22 LT	345+99	44.6-46.1	A-2-4(0)	22	NP	2.8	84.9	7.1	5.1	100	99	15	-	-
SS-676	22 LT	345+99	59.6-61.1	A-2-4(0)	21	NP	0.7	84.5	8.6	6.1	100	100	20	-	-
SS-677	22 LT	345+99	74.6-76.1	A-2-4(0)	21	NP	0.6	73.2	18.0	8.1	100	100	33	-	-
SS-678	22 LT	345+99	84.6-86.1	A-4(0)	22	NP	0.6	72.6	18.6	8.1	100	100	36	-	-
SS-679	22 LT	345+99	94.6-96.1	A-4(0)	21	NP	0.4	68.6	20.9	10.2	100	100	47	-	-
SS-680	22 LT	345+99	99.6-101.1	A-4(0)	24	2	0.2	70.4	17.2	12.2	100	100	41	-	-

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B22-B EBL 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-269	58 RT	346+96	0.0-1.5	A-5(0)	149	NP	52.7	11.3	16.0	20.1	100	57	38	793.0	55.8
SS-270	58 RT	346+96	8.9-10.4	A-7-5(14)	51	18	8.0	25.1	32.7	34.2	100	95	71	92.0	13.9
SS-271	58 RT	346+96	23.9-25.4	A-2-4(0)	26	NP	1.8	87.4	4.7	6.0	100	100	13	-	-
SS-272	58 RT	346+96	38.9-40.4	A-3(0)	20	NP	85.4	12.9	1.7	0.0	100	63	3	-	-
SS-273	58 RT	346+96	48.9-50.4	A-2-4(0)	23	NP	1.4	86.4	6.1	6.0	100	100	16	-	-
SS-274	58 RT	346+96	63.9-65.4	A-2-4(0)	21	NP	0.8	81.5	9.7	8.0	100	100	24	-	-

B23-A WBL 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-211	58 LT	348+16	0.0-1.5	A-7-5(45)	105	34	8.5	4.8	48.3	38.4	100	94	87	333.5	50.0
SS-212	58 LT	348+16	5.4-6.9	A-2-5(0)	97	NP	46.9	22.6	24.4	6.1	100	66	33	-	34.8
SS-213	58 LT	348+16	17.7-19.2	A-7-6(14)	46	19	2.6	32.5	36.6	28.3	100	99	72	-	9.1
SS-214	58 LT	348+16	28.8-30.3	A-2-4(0)	25	NP	3.7	81.8	8.4	6.1	100	99	17	-	-
SS-215	58 LT	348+16	33.8-35.3	A-3(0)	21	NP	80.8	17.3	0.9	1.0	100	86	2	-	-
SS-216	58 LT	348+16	43.8-45.3	A-2-4(0)	23	NP	4.9	87.3	3.7	4.0	100	98	11	-	-
SS-217	58 LT	348+16	58.8-60.3	A-2-4(0)	22	NP	0.6	84.7	9.6	5.1	100	100	20	-	-
SS-218	58 LT	348+16	73.8-75.3	A-2-4(0)	22	NP	0.5	76.8	15.7	7.1	100	100	29	-	-

B24-B EBL 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-219	58 RT	349+36	0.0-1.5	A-7-5(20)	91	16	25.7	4.4	43.6	26.3	100	79	71	261.2	-
SS-220	58 RT	349+36	7.5-9.0	A-5(0)	108	NP	51.5	13.7	26.7	8.1	100	59	37	872.0	39.0
SS-221	58 RT	349+36	17.5-19.0	A-6(5)	35	13	1.0	47.3	31.5	20.2	100	100	58	99.5	6.6
SS-222	58 RT	349+36	22.5-24.0	A-2-4(0)	25	2	0.6	71.5	15.8	12.1	100	100	33	-	-
SS-223	58 RT	349+36	32.5-34.0	A-3(0)	21	NP	26.5	69.6	2.9	1.0	100	100	5	-	-
SS-224	58 RT	349+36	42.5-44.0	A-1-b(0)	19	NP	89.7	7.0	1.3	2.0	100	42	4	-	-
SS-225	58 RT	349+36	47.5-49.0	A-2-4(0)	21	NP	1.8	86.7	6.5	5.1	100	100	15	-	-
SS-226	58 RT	349+36	67.5-69.0	A-2-4(0)	22	NP	0.6	80.2	13.1	6.1	100	100	24	-	-

B25-A WBL 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-203	58 LT	350+56	18.0-19.5	A-6(7)	38	14	1.0	47.0	31.9	20.2	100	100	60	-	7.1
SS-204	58 LT	350+56	28.0-29.5	A-7-6(13)	42	17	0.8	31.3	39.7	28.2	100	100	77	-	-
SS-205	58 LT	350+56	33.0-34.5	A-4(0)	28	NP	3.2	65.1	17.5	14.1	100	99	36	-	-
SS-206	58 LT	350+56	38.0-39.5	A-2-4(0)	26	NP	6.6	73.5	12.9	7.1	100	99	22	-	4.0
SS-207	58 LT	350+56	48.0-49.5	A-3(0)	23	NP	26.9	65.7	3.3	4.0	100	95	8	-	-
SS-208	58 LT	350+56	53.0-54.5	A-3(0)	20	NP	51.8	41.1	4.0	3.0	100	69	9	-	-
SS-209	58 LT	350+56	58.0-59.5	A-2-4(0)	23	NP	1.4	82.9	10.7	5.0	100	100	20	-	-
SS-210	58 LT	350+56	83.0-84.5	A-4(0)	23	NP	0.2	73.4	20.4	6.0	100	100	39	-	-

B26-B EBL 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-227	58 RT	351+76	4.3-5.8	-	-	-	-	-	-	-	-	-	-	682.4	36.2
SS-228	58 RT	351+76	24.3-25.8	A-6(11)	40	17	1.0	33.9	34.7	30.3	100	100	71	68.5	7.0
SS-229	58 RT	351+76	32.7-34.2	A-6(10)	36	16	0.4	37.3	32.2	30.1	100	100	71	76.5	6.4
SS-230	58 RT	351+76	37.7-39.2	A-3(0)	21	NP	19.5	73.1	3.4	4.0	100	98	8	-	-
SS-231	58 RT	351+76	47.7-49.2	A-3(0)	22	NP	80.9	15.7	1.3	2.0	100	76	4	-	-
SS-232	58 RT	351+76	57.7-59.2	A-2-4(0)	23	NP	0.8	83.8	10.4	5.0	100	100	21	-	-
SS-233	58 RT	351+76	72.7-74.2	A-4(0)	22	NP	0.2	71.2	18.5	10.1	100	100	37	-	-

B27-A WBL 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-197	58 LT	352+96	12.8-14.3	A-2-4(0)	22	NP	4.3	78.6	8.0	9.1	100	100	21	-	1.2
SS-198	58 LT	352+96	22.8-24.3	A-7-5(25)	66	25	5.8	16.7	45.2	32.3	97	94	81	-	18.7
SS-199	58 LT	352+96	32.8-34.3	A-7-6(20)	42	19	0.4	10.7	50.6	38.3	100	100	95	-	5.4
SS-200	58 LT	352+96	37.8-39.3	A-1-b(0)	19	NP	92.0	5.3	1.6	1.0	96	20	3	-	-
SS-201	58 LT	352+96	42.8-44.3	A-2-4(0)	21	NP	13.0	72.3	10.7	4.0	99	90	17	-	-
SS-202	58 LT	352+96	62.8-64.3	A-2-4(0)	24	NP	0.8	85.2	10.0	4.0	100	100	19	-	-

B28-B EBL 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-234	58 RT	354+16	17.9-19.4	A-5(5)	57	6	18.0	24.8	26.9	30.3	94	82	58	662.9	26.3
SS-235	58 RT	354+16	27.9-29.4	A-4(0)	23	5	10.1	51.9	15.8	22.2	100	98	43	67.4	-
SS-236	58 RT	354+16	37.9-39.4	A-1-b(0)	20	NP	88.6	8.6	1.8	1.0	100	41	3	-	-
SS-237	58 RT	354+16	47.9-49.4	A-2-4(0)	20	NP	2.1	85.8	7.1	5.1	100	100	16	-	-
SS-238	58 RT	354+16	67.9-69.4	A-2-4(0)	22	NP	1.1	81.4	10.4	7.1	100	100	23	-	-
SS-239	58 RT	354+16	87.9-89.4	A-4(0)	22	NP	0.3	69.3	21.3	9.1	100	100	40	-	-

B29-A WBL 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-189	58 LT	355+36	0.0-1.5	A-5(2)	160	NP	52.8	5.2	33.9	8.1	96	54	40	762.1	64.8
SS-190	58 LT	355+36	7.5-9.0	-	-	-	19.8	30.6	25.4	24.2	82	75	42	-	21.8
SS-191	58 LT	355+36	27.5-29.0	A-6(14)	39	21	5.4	24.8	33.5	36.3	100	99	73	51.6	-
SS-192	58 LT	355+36	37.5-39.0	A-1-b(0)	21	5	86.5	5.9	3.5	4.0	84	20	7	-	-
SS-193	58 LT	355+36	42.5-43.5	A-6(17)	40	19	1.4	16.3	44.0	38.3	100	99	88	-	-
SS-194	58 LT	355+36	47.5-49.0	A-2-4(0)	26	NP	1.6	89.1	7.3	2.0	100	100	12	-	-
SS-195	58 LT	355+36	62.5-64.0	A-2-4(0)	23	NP	0.7	83.0	10.3	6.0	100	100	22	-	-
SS-196	58 LT	355+36	82.5-84.0	A-2-4(0)	23	NP	0.2	74.0	18.8	7.1	100	100	32	-	-

B30-B EBL 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-240	58 RT	356+56	0.0-1.5	A-2-5(0)	205	NP	57.7	7.6	26.7	8.0	92	47	33	902.0	67.1
SS-241	58 RT	356+56	24.1-25.6	A-6(2)	26	12	19.8	36.5	15.6	28.1	100	93	47	32.6	3.1
SS-242	58 RT	356+56	29.1-30.6	A-3(0)	21	NP	77.8	18.0	2.2	2.0	100	82	5	-	-
SS-243	58 RT	356+56	39.1-40.6	A-1-b(0)	20	NP	83.4	13.4	3.2	0.0	76	47	3	-	-
SS-244	58 RT	356+56	49.1-50.6	A-2-4(0)	24	NP	1.4	89.2	7.4	2.0	100	100	12	-	-
SS-245	58 RT	356+56	64.1-65.6	A-2-4(0)	21	NP	0.6	76.8	16.6	6.0	100	100	29	-	-
SS-246	58 RT	356+56	84.8-86.3	A-2-4(0)	22	NP	0.6	74.1	19.2	6.0	100	100	33	-	-
SS-247	58 RT	356+56	104.8-106.3	A-4(0)	24	1	0.6	67.7	17.6	14.0	100	100	41	-	-

B31-A WBL 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-181	58 LT	357+76	0.0-1.5	A-5(4)	177	NP	47.0	6.5	38.4	8.1	91	56	43	704.2	63.1
SS-182	58 LT	357+76	8.3-9.8	-	-	-	30.4	18.6	26.6	24.3	100	82	53	902.9	31.5
SS-183	58 LT	357+76	23.3-24.8	A-3(0)	19	NP	66.4	27.7	1.9	4.1	100	64	7	-	-
SS-184	58 LT	357+76	38.3-39.8	A-3(0)	21	NP	45.8	47.0	3.1	4.1	89	64	9	-	-
SS-185	58 LT	357+76	53.3-54.8	A-2-4(0)	22	NP	1.0	80.4	10.4	8.1	100	100	24	-	-
SS-186	58 LT	357+76	68.3-69.8	A-2-4(0)	21	NP	0.4	75.6	15.9	8.1	100	100	31	-	-
SS-187	58 LT	357+76	83.3-84.8	A-2-4(0)	23	NP	0.6	73.8	19.6	6.1	100	100	33	-	-
SS-188	58 LT	357+76	98.3-99.8	A-4(0)	23	2	0.2	67.1	18.5	14.2	100	100	45	-	-

B32-B EBL 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-248	58 RT	358+96	0.0-1.5	A-7-5(24)	110	14	18.8	8.0	45.1	28.1	99	85	74	359.3	34.2
SS-249	58 RT	358+96	9.5-11.0	-	-	-	-	-	-	-	-	-	-	-	36.2
SS-250	58 RT	358+96	17.9-19.4	-	-	-	-	-	-	-	-	-	-	-	3.5
SS-251	58 RT	358+96	22.9-24.4	A-1-b(0)	25	NP	87.2	10.8	2.0	0.0	94	48	2	-	-
SS-252	58 RT	358+96	37.9-39.4	A-1-b(0)	24	NP	87.4	10.8	1.8	0.0	100	40	2	-	-
SS-253	58 RT	358+96	52.9-54.4	A-2-4(0)	24	NP	0.4	73.5	18.0	8.0	100	100	32	-	-
SS-254	58 RT	358+96	72.9-74.4	A-2-4(0)	31	NP	1.6	87.0	7.4	4.0	100	100	15	-	-

B33-A WBL 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-173	58 LT	360+16	0.0-1.5	A-7-5(19)	111	11	22.7	8.5	52.6	16.2	98	82	69	528.6	34.7
SS-174	58 LT	360+16	7.6-9.1	-	-	-	33.2	16.6	25.8	24.3	97	84	50	-	19.1
SS-175	58 LT	360+16	22.6-24.1	A-3(0)	23	NP	63.9	32.5	1.5	2.0	100	78	4	-	-
SS-176	58 LT	360+16	27.6-29.1	A-3(0)	20	NP	93.1	6.2	0.7	0.0	100	51	1	-	-
SS-177	58 LT	360+16	43.1-44.1	A-2-4(0)	19	NP	12.2	67.8	10.9	9.1	98	95	22	-	-
SS-178	58 LT	360+16	52.4-55.9	A-2-4(0)	25	NP	1.1	84.7	9.1	5.1	100	100	20	-	-
SS-179	58 LT	360+16	67.4-68.9	A-2-4(0)	21	NP	2.4	69.5	21.0	7.1	97	96	33	-	-
SS-180	58 LT	360+16	82.4-83.9	A-2-4(0)	22	NP	0.6	73.2	18.1	8.1	100	100	33	-	-

B34-B EBL 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-255	58 RT	361+36	0.0-1.5	A-5(2)	184	NP	49.3	7.6	27.1	16.0	91	53	40	864.6	54.8
SS-256	58 RT	361+36	8.0-9.5	A-2-7(1)	46	14	56.9	10.4	16.6	16.0	96	69	32	212.7	12.1
SS-257	58 RT	361+36	23.0-24.5	A-3(0)	22	NP	88.6	9.4	2.0	0.0	100	51	2	-	-
SS-258	58 RT	361+36	33.0-34.5	A-1-b(0)	22	NP	87.8	9.2	3.0	0.0	97	43	3	-	-
SS-259	58 RT	361+36	43.5-44.5	A-6(16)	37	20	1.0	21.4	39.5	38.1	100	100	84	-	-
SS-260	58 RT	361+36	48.0-49.5	A-2-4(0)	24	NP	1.8	89.8	6.4	2.0	100	100	12	-	-
SS-261	58 RT	361+36	73.0-74.5	A-2-4(0)	21	NP	0.6	72.9	18.4	8.0	100	100	33	-	-

B35-A WBL 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-164	54 LT	362+55	0.0-1.5	A-7-5(15)	115	12	33.2	8.5	44.1	14.2	100	78	59	408.5	35.6
SS-165	54 LT	362+55	13.0-14.5	A-2-5(0)	55	NP	64.6	12.6	12.7	10.1	97	69	23	-	13.7
SS-166	54 LT	362+55	23.0-24.5	A-3(0)	21	NP	72.3	25.6	0.0	2.0	100	72	3	-	-
SS-167	54 LT	362+55	38.0-39.5	A-3(0)	23	NP	64.1	33.5	1.3	1.0	100	76	3	-	-
SS-168	54 LT	362+55	48.0-49.5	A-3(0)	25	NP	1.8	91.6	3.5	3.0	100	100	9	-	-
SS-169	54 LT	362+55	63.0-64.5	A-2-4(0)	23	NP	0.9	84.9	9.1	5.1	100	100	19	-	-
SS-170	54 LT	362+55	78.0-79.5	A-2-4(0)	20	NP	0.3	72.6	20.0	7.1	100	100	34	-	-
SS-171	54 LT	362+55	98.0-99.5	A-4(0)	22	1	0.4	68.3	15.1	16.2	100	100	42	-	-
SS-172	54 LT	362+55	113.0-114.5	A-4(0)	25	4	2.6	60.2	21.0	16.2	100	99	50	-	-

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	84 OF 86

34491.1.2
R-2633BB
BRIDGE ON US17 OVER CAPE FEAR RIVER AT -L- STA. 353+32.50

B36-B EBL 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-262	58 RT	363+76	0.0-1.5	A-2-5(0)	190	NP	65.7	6.4	19.8	8.0	95	38	27	-	53.2
SS-263	58 RT	363+76	8.9-10.4	A-5(12)	96	8	30.5	8.4	37.1	24.0	97	77	61	-	35.3
SS-264	58 RT	363+76	23.9-25.4	A-3(0)	22	NP	85.2	11.8	3.0	0.0	100	67	4	-	-
SS-265	58 RT	363+76	33.9-35.4	A-3(0)	22	NP	82.0	16.4	1.6	0.0	100	59	2	-	-
SS-266	58 RT	363+76	48.9-50.4	A-2-4(0)	23	NP	4.4	82.2	9.4	4.0	100	98	18	-	-
SS-267	58 RT	363+76	63.9-65.4	A-2-4(0)	23	NP	1.2	84.8	10.0	4.0	100	100	19	-	-
SS-268	58 RT	363+76	83.9-85.4	A-4(0)	22	NP	0.2	71.3	22.4	6.0	100	100	36	-	-

B37-A WBL 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-539	46 LT	365+05	5.5-7.0	-	-	-	-	-	-	-	-	-	-	-	-
SS-601	46 LT	365+05	15.5-17.0	A-3(0)	24	NP	87.5	9.4	1.1	2.0	100	60	4	-	-
SS-602	46 LT	365+05	25.5-27.0	A-3(0)	21	NP	53.5	43.6	0.8	2.0	100	74	4	-	-
SS-540	46 LT	365+05	35.5-37.0	A-1-b(0)	23	NP	91.8	7.8	0.4	0.0	94	28	0	-	-
SS-541	46 LT	365+05	50.5-52.0	A-2-4(0)	23	NP	1.1	84.4	10.5	4.0	100	100	20	-	-
SS-542	46 LT	365+05	60.5-62.0	A-2-4(0)	22	NP	3.4	79.0	11.6	6.0	99	97	23	-	-
SS-543	46 LT	365+05	65.5-67.0	A-2-4(0)	21	NP	0.5	79.9	12.6	7.0	100	100	26	-	-
SS-544	46 LT	365+05	75.5-77.0	A-2-4(0)	22	NP	0.1	75.4	16.5	8.0	100	100	31	-	-
SS-545	46 LT	365+05	80.5-82.0	A-2-4(0)	22	NP	14.5	60.4	17.1	8.0	100	100	27	-	-

B38-B EBL 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-546	58 RT	365+96	17.5-18.5	A-3(0)	28	NP	81.3	12.9	3.7	2.0	100	67	6	-	3.3
SS-547	58 RT	365+96	22.0-23.5	A-1-b(0)	21	NP	86.3	11.7	0.9	1.0	98	47	2	-	-
SS-548	58 RT	365+96	47.0-47.5	A-3(0)	23	NP	24.7	65.6	5.7	4.0	82	67	10	-	-
SS-549	58 RT	365+96	52.0-53.5	A-2-4(0)	23	NP	1.5	89.6	6.9	2.0	100	99	13	-	-
SS-550	58 RT	365+96	77.0-78.5	A-2-4(0)	20	NP	0.7	75.5	14.7	9.1	100	100	30	-	-
SS-551	58 RT	365+96	92.0-93.5	A-2-4(0)	22	NP	0.3	75.7	17.9	6.1	100	100	33	-	-

B39-A WBL 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-532	56 LT	367+12	20.0-21.5	A-3(0)	20	NP	82.3	15.7	1.0	1.0	100	71	2	-	-
SS-533	56 LT	367+12	30.0-31.5	A-3(0)	21	NP	63.4	33.7	0.9	2.0	100	99	3	-	-
SS-534	56 LT	367+12	40.0-41.5	A-1-b(0)	22	NP	97.4	1.8	0.8	0.0	89	11	1	-	-
SS-535	56 LT	367+12	50.0-51.5	A-2-4(0)	22	NP	2.1	84.3	8.6	5.0	91	90	16	-	-
SS-536	56 LT	367+12	60.0-61.5	A-2-4(0)	22	NP	1.5	83.4	9.1	6.0	100	100	20	-	-
SS-537	56 LT	367+12	70.0-71.5	A-2-4(0)	21	NP	0.4	79.3	14.3	6.0	100	100	26	-	-
SS-538	56 LT	367+12	80.0-81.5	A-4(0)	22	NP	0.2	70.8	20.9	8.0	100	100	37	-	-

B40-B EBL 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-500	58 RT	368+36	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	38.3
SS-501	58 RT	368+36	3.4-4.9	-	-	-	-	-	-	-	-	-	-	-	33.1
SS-502	58 RT	368+36	8.4-9.9	A-3(0)	24	NP	81.2	12.9	2.9	3.0	99	68	6	-	2.3
SS-503	58 RT	368+36	23.4-24.9	A-3(0)	24	NP	88.7	9.9	1.4	0.0	100	62	2	-	-
SS-504	58 RT	368+36	33.4-34.9	A-3(0)	24	NP	83.1	15.0	0.9	1.0	100	70	2	-	-
SS-505	58 RT	368+36	48.4-49.9	A-2-4(0)	22	NP	1.6	82.8	9.6	6.0	100	100	20	-	-
SS-506	58 RT	368+36	58.4-59.9	A-2-4(0)	23	NP	1.1	79.5	14.4	5.0	100	100	24	-	-
SS-603	58 RT	368+36	73.4-74.9	A-2-4(0)	22	NP	0.4	73.6	15.9	10.2	100	100	32	-	-
SS-604	58 RT	368+36	83.4-84.9	A-2-4(0)	21	NP	0.2	76.8	15.9	7.1	100	100	31	-	-
SS-605	58 RT	368+36	93.4-94.9	A-4(0)	23	NP	0.3	71.2	20.3	8.1	100	100	42	-	-
SS-606	58 RT	368+36	98.4-99.9	A-4(0)	25	4	0.6	64.9	16.2	18.3	100	100	46	-	-

B41-A WBL 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-507	58 LT	369+56	1.0-1.5	-	-	-	-	-	-	-	-	-	-	-	25.4
SS-508	58 LT	369+56	5.5-7.0		Orga	Only	0.0	0.0	0.0	0.0		0	0	-	19.1
SS-509	58 LT	369+56	8.9-10.4	A-3(0)	19	NP	86.1	11.9	2.0	0.0	100	60	2	-	-
SS-510	58 LT	369+56	18.9-20.4	A-1-b(0)	20	NP	94.0	5.6	0.4	0.0	100	48	1	-	-
SS-511	58 LT	369+56	23.9-25.4	A-2-4(0)	35	NP	55.1	23.5	13.3	8.0	100	83	22	-	7.4
SS-512	58 LT	369+56	28.9-30.4	A-3(0)	17	NP	68.8	27.2	3.0	1.0	100	91	5	-	-
SS-513	58 LT	369+56	38.9-40.4	A-1-b(0)	21	NP	94.4	4.2	1.4	0.0	97	26	2	-	-
SS-514	58 LT	369+56	43.9-45.4	A-2-4(0)	24	9	15.5	40.0	20.3	24.1	73	64	35	-	-
SS-515	58 LT	369+56	48.9-50.1	A-2-4(0)	20	NP	4.0	76.2	11.7	8.0	100	99	23	-	-
SS-516	58 LT	369+56	53.9-54.7	A-2-4(0)	19	NP	8.2	64.0	17.8	10.0	90	85	30	-	-
SS-517	58 LT	369+56	58.9-60.4	A-2-4(0)	23	NP	1.8	81.4	10.7	6.0	100	99	21	-	-
SS-518	58 LT	369+56	68.9-70.4	A-2-4(0)	20	NP	0.6	75.6	15.7	8.0	100	100	29	-	-

B42-B EBL 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	62 RT	370+88	0.0-1.5	A-7-5(32)	63	27	3.5	3.9	41.6	51.0	100	97	94	86.9	35.1
SS-76	62 RT	370+88	8.6-10.1	A-7-5(34)	63	29	2.7	3.9	40.4	53.1	100	98	95	198.4	11.2
SS-77	62 RT	370+88	18.6-20.1	A-3(0)	24	NP	86.4	13.4	0.2	0.0	100	55	1	-	-
SS-78	62 RT	370+88	33.6-35.1	A-2-4(0)	23	NP	1.4	87.7	5.8	5.1	100	100	14	-	-
SS-79	62 RT	370+88	38.6-40.1	A-2-4(0)	24	NP	1.7	88.9	5.3	4.1	100	100	12	-	-
SS-80	62 RT	370+88	48.6-50.1	A-2-4(0)	23	NP	1.0	86.6	8.3	4.0	100	100	17	-	-
SS-81	62 RT	370+88	63.6-65.1	A-2-4(0)	22	NP	0.4	73.6	16.8	9.2	100	100	33	-	-

B43-A WBL 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-67	53 LT	371+86	0.0-1.5	-	-	-	-	-	-	-	-	-	-	430.6	34.9
SS-68	53 LT	371+86	15.2-16.7	A-7-5(32)	86	29	6.3	4.3	52.7	36.7	88	84	80	217.2	23.6
SS-69	53 LT	371+86	20.2-21.7	A-3(0)	21	NP	79.0	20.0	1.0	0.0	100	63	2	-	-
SS-70	53 LT	371+86	25.2-26.7	A-3(0)	19	NP	71.1	27.3	0.5	1.0	95	54	3	-	-
SS-71	53 LT	371+86	40.2-41.7	A-2-4(0)	24	NP	1.6	83.7	8.6	6.1	100	100	19	-	-
SS-72	53 LT	371+86	55.2-56.7	A-2-4(0)	26	NP	1.2	89.8	5.9	3.1	100	100	13	-	-
SS-73	53 LT	371+86	65.2-66.7	A-2-4(0)	22	NP	0.3	78.7	12.9	8.2	100	100	28	-	-
SS-74	53 LT	371+86	70.2-71.7	A-2-4(0)	18	NP	0.8	71.2	15.7	12.2	100	100	31	-	-

B44-B EBL 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-519	64 RT	373+14	0.0-1.5	-	-	-	10.0	6.4	39.4	44.1	100	93	85	-	-
SS-520	64 RT	373+14	5.5-7.0	-	-	-	18.5	4.0	41.4	36.1	100	84	79	-	23.4
SS-521	64 RT	373+14	10.0-11.5	A-7-5(16)	91	16	26.9	9.2	43.8	20.1	96	78	63	-	34.0
SS-522	64 RT	373+14	20.0-21.5	A-3(0)	22	NP	83.0	14.4	2.5	0.0	100	76	3	-	-
SS-523	64 RT	373+14	30.0-31.5	A-1-b(0)	22	NP	84.9	14.0	1.1	0.0	93	34	1	-	-
SS-524	64 RT	373+14	40.0-41.5	A-2-4(0)	27	NP	1.3	89.8	4.9	4.0	99	99	12	-	-
SS-525	64 RT	373+14	50.0-51.5	A-2-4(0)	23	NP	1.2	85.7	9.1	4.0	100	100	17	-	-
SS-526	64 RT	373+14	55.0-56.5	A-2-4(0)	23	NP	1.9	81.9	10.1	6.0	100	99	20	-	-
SS-527	64 RT	373+14	65.0-66.5	A-2-4(0)	23	NP	0.4	79.8	11.7	8.0	100	100	25	-	-
SS-528	64 RT	373+14	75.0-76.5	A-2-4(0)	22	NP	0.2	71.6	20.2	8.0	100	100	35	-	-
SS-529	64 RT	373+14	85.0-86.5	A-4(0)	22	NP	0.2	69.6	22.2	8.0	100	100	40	-	-
SS-530	64 RT	373+14	95.0-96.5	A-4(0)	25	2	0.4	66.2	15.3	18.1	100	100	44	-	-
SS-531	64 RT	373+14	100.0-101.5	A-4(0)	26	4	2.0	58.2	21.8	18.1	100	99	50	-	-

B45-A WBL 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-150	58 LT	374+36	0.0-1.5	A-5(15)	139	NP	19.3	7.6	61.0	12.1	85	74	63	360.5	52.4
SS-151	58 LT	374+36	13.7-15.2	A-3(0)	22	NP	72.6	23.7	1.6	2.0	100	78	4	-	-
SS-152	58 LT	374+36	29.2-30.7	A-1-b(0)	22	NP	92.9	5.2	0.9	1.0	87	17	2	-	-
SS-153	58 LT	374+36	34.2-35.7	A-3(0)	21	NP	80.1	17.3	1.6	1.0	100	64	3	-	-
SS-154	58 LT	374+36	39.2-40.7	A-2-4(0)	25	NP	4.3	88.0	3.6	4.0	99	97	11	-	-
SS-155	58 LT	374+36	54.2-55.7	A-2-4(0)	22	NP	1.8	86.6	7.5	4.0	100	99	15	-	-
SS-156	58 LT	374+36	69.2-70.7	A-2-4(0)	22	NP	0.3	78.2	14.5	7.0	100	100	28	-	-

B46-B EBL 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-157	58 RT	375+56	0.0-1.5	A-5(16)	138	NP	13.9	7.2	54.7	24.1	81	74	65	619.2	49.6
SS-158	58 RT	375+56	14.5-16.0	A-3(0)	24	NP	86.8	11.7	0.5	1.0	100	63	2	-	0.7
SS-159	58 RT	375+56	29.5-31.0	A-1-b(0)	19	NP	92.5	6.3	0.2	1.0	92	26	2	-	-
SS-160	58 RT	375+56	34.5-36.0	A-1-b(0)	21	NP	90.2	8.9	0.9	0.0	100	41	1	-	-
SS-161	58 RT	375+56	39.7-41.2	A-2-4(0)	23	NP	61.4	27.6	7.0	4.0	100	92	12	-	-
SS-162	58 RT	375+56	54.7-56.2	A-2-4(0)	24	NP	30.6	58.8	6.6	4.0	100	100	14	-	-
SS-163	58 RT	375+56	69.7-71.2	A-2-4(0)	21	NP	0.6	75.5	14.9	9.1	100	100	30	-	-

B47-A WBL 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-143	48 LT	376+67	0.0-1.5	A-5(20)	137	NP	21.9	8.2	51.7	18.1	100	87	72	601.0	53.3
SS-144	48 LT	376+67	9.4-10.9	A-3(0)	23	NP	80.5	16.2	1.3	2.0	100	55	4	-	-
SS-145	48 LT	376+67	24.4-25.9	A-1-b(0)	19	NP	88.8	9.8	0.4	1.0	94	43	2	-	-
SS-146	48 LT	376+67	39.4-40.9	A-3(0)	22	NP	5.6	87.9	2.4	4.0	96	94	9	-	-
SS-147	48 LT	376+67	44.4-45.9	A-2-4(0)	23	NP	2.4	85.7	5.8	6.0	100	99	16	-	-
SS-148	48 LT	376+67	59.4-60.9	A-2-4(0)	21	NP	1.0	86.0	6.9	6.0	100	100	17	-	-
SS-149	48 LT	376+67	79.4-80.9	A-4(0)	22	NP	0.3	71.3	18.3	10.1	100	100	38	-	-

B48-B EBL 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-136	58 RT	377+96	0.0-1.5	A-5(1)	170	NP	47.7	14.3	16.9	21.1	100	67	39	-	51.0
SS-137	58 RT	377+96	9.7-11.2	A-3(0)	26	NP	74.2	23.4	1.4	1.0	100	76	3	-	-
SS-138	58 RT	377+96	19.7-21.2	A-3(0)	26	NP	72.5	26.7	0.8	0.0	97	55	1	-	-
SS-139	58 RT	377+96	34.7-36.2	A-3(0)	25	NP	84.6	13.5	0.9	1.0	96	57	2	-	-
SS-140	58 RT	377+96	39.7-41.2	A-2-4(0)	27	NP	2.8	89.4	6.8	1.0	100	99	11	-	-
SS-141	58 RT	377+96	54.7-56.2	A-2-4(0)	23	NP	1.4	88.0	4.6	6.0	100	100	14	-	-
SS-142	58 RT	377+96	69.7-71.2	A-2-4(0)	20	NP	0.6	79.8	9.6	10.0	100	100	26	-	-

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B49-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-129	48 LT	379+16	0.0-1.5	A-5(2)	162	NP	46.0	15.6	17.3	21.1	100	68	40	-	53.6
SS-130	48 LT	379+46	8.2-9.7	A-3(0)	26	NP	79.8	16.6	3.5	0.0	100	63	4	-	-
SS-131	48 LT	379+16	21.2-22.7	A-1-b(0)	26	NP	76.7	22.1	0.2	1.0	95	50	1	-	-
SS-132	48 LT	379+16	41.2-42.7	A-2-4(0)	23	NP	3.0	85.0	6.0	6.0	100	99	16	-	-
SS-133	48 LT	379+16	56.2-57.7	A-2-4(0)	25	NP	1.8	86.8	7.4	4.0	100	99	15	-	-
SS-134	48 LT	379+16	71.2-72.7	A-2-4(0)	22	NP	0.8	75.6	17.6	6.0	100	100	29	-	-
SS-135	48 LT	379+16	86.2-87.7	A-2-4(0)	22	NP	0.8	77.7	14.4	7.0	100	99	28	-	-

B50-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-121	58 RT	380+46	0.0-1.5	A-5(0)	175	NP	51.1	11.8	20.3	16.9	96	58	37	461.1	52.7
SS-122	58 RT	380+46	8.4-9.9	A-3(0)	25	NP	74.7	22.6	0.7	2.0	100	72	3	-	0.7
SS-123	58 RT	380+46	11.7-13.2	A-3(0)	24	NP	87.3	9.5	1.2	2.0	100	54	4	-	1.3
SS-124	58 RT	380+46	21.7-23.2	A-1-b(0)	23	NP	87.5	10.9	0.6	1.0	99	46	2	-	-
SS-125	58 RT	380+46	26.7-28.2	A-4(0)	22	5	16.0	39.1	24.8	20.1	99	96	49	-	-
SS-126	58 RT	380+46	31.7-33.2	A-3(0)	26	NP	43.7	52.4	0.9	3.0	100	94	5	-	-
SS-127	58 RT	380+46	46.7-48.2	A-2-4(0)	27	NP	2.3	89.9	4.8	3.0	100	100	11	-	-
SS-128	58 RT	380+46	66.7-68.2	A-2-4(0)	23	NP	0.4	80.9	11.6	7.0	100	100	24	-	-

B51-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-113	58 LT	381+56	0.0-1.5	A-2-5(0)	158	NP	54.9	11.0	17.3	16.9	95	53	34	-	61.0
SS-114	58 LT	381+56	6.3-7.8	A-3(0)	23	NP	78.9	17.8	1.3	2.0	100	68	4	-	-
SS-115	58 LT	381+56	19.8-21.3	A-1-b(0)	25	NP	82.7	16.1	0.1	1.0	98	42	2	-	-
SS-116	58 LT	381+56	34.8-36.3	A-3(0)	26	NP	61.4	35.8	0.8	2.0	100	84	4	-	-
SS-117	58 LT	381+56	39.8-41.3	A-1-b(0)	21	NP	83.8	13.1	0.1	3.0	98	34	4	-	-
SS-118	58 LT	381+56	44.8-46.3	A-3(0)	24	NP	4.4	89.0	2.6	4.0	100	98	10	-	-
SS-119	58 LT	381+56	54.8-56.3	A-2-4(0)	21	NP	2.8	84.6	8.6	4.0	99	98	16	-	-
SS-120	58 LT	381+56	69.8-71.3	A-2-4(0)	22	NP	53.2	28.0	10.8	8.0	100	97	19	-	-

B52-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-105	58 RT	382+69	0.0-1.5	A-3(0)	32	NP	81.9	12.9	3.2	2.0	99	66	5	-	3.3
SS-106	58 RT	382+69	6.1-7.6	A-3(0)	23	NP	78.9	16.4	3.7	1.0	100	62	5	-	-
SS-107	58 RT	382+69	9.2-10.7	A-1-b(0)	22	NP	87.4	10.3	1.3	1.0	100	38	3	-	-
SS-108	58 RT	382+69	24.2-25.7	A-1-b(0)	23	NP	72.2	23.3	2.4	2.0	91	49	5	-	-
SS-109	58 RT	382+69	34.2-35.7	A-1-b(0)	23	NP	77.4	19.8	0.8	2.0	98	50	3	-	-
SS-110	58 RT	382+69	49.2-50.7	A-2-4(0)	22	NP	50.6	39.4	5.0	5.0	99	81	12	-	-
SS-111	58 RT	382+69	64.2-65.7	A-2-4(0)	22	NP	0.6	82.1	10.2	7.0	100	100	22	-	-
SS-112	58 RT	382+69	79.2-80.7	A-2-4(0)	22	NP	0.4	75.1	14.4	10.0	100	100	33	-	-

B53-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-97	58 LT	383+96	0.0-1.5	A-3(0)	35	NP	82.1	8.5	7.4	2.0	100	61	9	-	5.3
SS-98	58 LT	383+96	6.8-8.3	A-3(0)	22	NP	87.9	5.9	4.1	2.0	100	52	7	-	4.2
SS-99	58 LT	383+96	9.9-11.4	A-3(0)	22	NP	80.1	18.2	1.7	0.0	99	57	2	-	-
SS-100	58 LT	383+96	24.9-26.4	A-3(0)	22	NP	62.3	33.0	2.7	2.0	97	68	6	-	-
SS-101	58 LT	383+96	39.9-41.4	A-3(0)	22	NP	37.6	54.4	4.9	3.0	100	86	9	-	-
SS-102	58 LT	383+96	54.9-56.4	A-2-4(0)	24	NP	1.0	87.8	7.1	4.0	100	100	16	-	-
SS-103	58 LT	383+96	69.9-71.4	A-2-4(0)	23	NP	0.4	76.6	15.0	8.0	100	100	29	-	-
SS-104	58 LT	383+96	84.9-86.4	A-4(0)	23	NP	0.2	35.0	59.8	5.0	100	100	70	-	-

B54-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-89	51 RT	385+16	0.0-1.5	A-3(0)	31	NP	80.9	14.1	3.0	2.0	97	58	5	-	3.0
SS-90	51 RT	385+16	5.2-6.7	A-3(0)	27	NP	80.1	17.1	1.8	1.0	100	61	3	-	1.0
SS-91	51 RT	385+16	8.1-9.6	A-3(0)	23	NP	77.1	19.5	2.4	1.0	100	64	4	-	-
SS-92	51 RT	385+16	23.1-24.6	A-4(0)	20	NP	9.9	53.9	24.1	12.1	100	99	43	-	-
SS-93	51 RT	385+16	33.1-34.6	A-3(0)	22	NP	64.7	29.1	2.2	4.0	100	68	7	-	-
SS-94	51 RT	385+16	48.1-49.6	A-2-4(0)	27	NP	1.6	90.2	5.1	3.0	100	100	12	-	-
SS-95	51 RT	385+16	68.1-69.4	A-2-4(0)	22	NP	0.9	79.9	13.2	6.0	100	100	24	-	-
SS-96	51 RT	385+16	83.1-84.6	A-4(0)	22	NP	0.5	69.6	18.8	11.1	100	100	40	-	-

B55-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-82	58 LT	386+42	0.0-1.5	A-3(0)	26	NP	85.6	13.8	0.6	0.0	100	63	1	-	-
SS-83	58 LT	386+42	9.1-10.6	A-3(0)	25	NP	74.0	22.6	1.3	2.0	100	76	4	-	-
SS-84	58 LT	386+42	24.1-25.6	A-4(5)	28	9	5.6	33.0	39.2	22.1	100	99	76	-	-
SS-85	58 LT	386+42	29.1-30.6	A-3(0)	24	NP	27.0	67.5	3.5	2.0	100	95	7	-	-
SS-86	58 LT	386+42	39.1-40.6	A-3(0)	25	NP	26.9	67.2	3.9	2.0	100	94	8	-	-
SS-87	58 LT	386+42	54.1-55.6	A-2-4(0)	24	NP	1.3	86.8	6.8	5.0	100	100	16	-	-
SS-88	58 LT	386+42	74.1-75.6	A-4(0)	22	NP	0.4	40.8	56.7	2.0	100	100	62	-	-

B56-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-17	58 RT	387+38	0.0-1.5	A-3(0)	23	NP	84.6	13.8	1.6	0.0	100	58	2	-	-
SS-18	58 RT	387+38	8.6-10.1	A-3(0)	22	NP	80.2	18.7	1.1	0.0	100	75	1	-	-
SS-19	58 RT	387+38	23.6-25.1	A-4(6)	29	9	3.2	24.6	47.9	24.2	100	99	81	-	-
SS-20	58 RT	387+38	28.6-30.1	A-2-4(0)	20	NP	17.7	60.2	10.0	12.1	100	93	27	-	-
SS-21	58 RT	387+38	33.6-35.0	A-2-4(0)	22	NP	5.2	80.0	6.7	8.1	100	99	18	-	-
SS-22	58 RT	387+38	43.6-45.1	A-2-4(0)	24	NP	2.2	88.7	4.0	5.0	100	100	13	-	-
SS-23	58 RT	387+38	53.6-55.1	A-2-4(0)	25	NP	2.6	88.3	7.1	2.0	100	99	12	-	-

B57-A WBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-9	58 LT	388+36	0.0-1.5	A-1-b(0)	27	NP	88.3	10.9	0.8	0.0	100	50	1	-	-
SS-10	58 LT	388+36	13.5-15.0	A-3(0)	24	NP	72.7	26.5	0.8	0.0	100	70	1	-	-
SS-11	58 LT	388+36	28.5-30.0	A-3(0)	24	NP	45.0	51.6	3.4	0.0	100	90	4	-	-
SS-12	58 LT	388+36	43.5-45.0	A-2-4(0)	23	NP	6.2	77.1	10.7	6.1	100	99	20	-	-
SS-13	58 LT	388+36	53.5-55.0	A-2-4(0)	28	NP	2.9	89.7	5.3	2.0	100	99	11	-	-
SS-14	58 LT	388+36	58.5-60.0	A-2-4(0)	25	NP	0.5	87.8	4.6	7.1	100	100	16	-	-
SS-15	58 LT	388+36	63.5-65.0	A-2-4(0)	23	NP	2.2	80.6	12.1	5.0	100	99	22	-	-
SS-16	58 LT	388+36	78.5-80.0	A-2-4(0)	22	NP	0.7	77.7	15.5	6.1	100	100	28	-	-

EB2-B EBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-1	58 RT	389+24	0.0-1.5	A-3(0)	24	NP	85.6	12.4	2.0	0.0	100	62	2	-	-
SS-2	58 RT	389+24	13.5-15.0	A-3(0)	23	NP	79.6	17.6	2.8	0.0	100	77	4	-	-
SS-3	58 RT	389+24	23.5-25.0	A-4(0)	22	6	8.1	50.1	27.7	14.1	100	98	49	26.3	-
SS-4	58 RT	389+24	39.0-40.0	A-6(6)	29	14	3.6	40.2	30.0	26.2	100	99	65	-	-
SS-5	58 RT	389+24	43.5-45.0	A-2-4(0)	22	NP	5.9	77.0	12.1	5.0	99	96	21	-	-
SS-6	58 RT	389+24	53.5-55.0	A-2-4(0)	23	NP	2.6	87.6	7.8	2.0	100	99	13	-	-
SS-7	58 RT	389+24	63.5-65.0	A-2-4(0)	23	NP	0.8	85.8	10.4	3.0	100	100	18	-	-
SS-8	58 RT	389+24	78.5-80.0	A-2-4(0)	22	NP	0.5	83.0	9.5	7.1	100	100	22	-	-

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 34491.1.2 TIP: R-2633BB COUNTY: BRUNSWICK / NEW HANOVER

DESCRIPTION(1): BRIDGE ON -L- (US 17 BYPASS) OVER THE CAPE FEAR RIVER

EXISTING BRIDGE

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

Bridge No.: N/A Length: ____ Total Bents: ____ Bents in Channel: ____ Bents in Floodplain: ____
Foundation Type: ____

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: N/A

Interior Bents: N/A

Channel Bed: N/A

Channel Bank: N/A

EXISTING SCOUR PROTECTION

Type(3): N/A

Extent(4): N/A

Effectiveness(5): N/A

Obstructions(6): N/A

DESIGN INFORMATION

Channel Bed Material(7): SAND

Channel Bank Material(8): SAND AND MUCK

Channel Bank Cover(9): TREES, GRASS

Floodplain Width(10): 3000' (±)

Floodplain Cover(11): TREES, GRASS

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

Channel Migration Tendency(13): WEST TOWARD END BENT 1

Observations and Other Comments: ____

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK Feet X Meters ____

See Sheet 81
"Soil Test Results",
for samples:
(Channel Bed) SS-47, SS-57
(Channel Bank) SS-585, SS-586, SS-39

Comparison of DSE to Hydraulics Unit theoretical scour:
Geotechnical analysis of the DSE agrees with the Hydraulic Unit's theoretical 100yr scour.

DESIGN SCOUR ELEVATIONS (14)

B3	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
-2.0	-3.0	-2.8	-3.5	-44.5	-2.0	-2.0
B10	**B11**	**B12**	**B13**	**B14**	**B15**	**B16**
-2.0	-2.0	-2.0	-2.0	-1.8	-2.0	-1.8
B17	**B18**	**B19**	**B20**	**B21**	**B22**	**B23**
-2.0	-1.8	-1.8	-1.5	-1.5	-1.5	-2.0
B24	**B25**	**B26**	**B27**	**B28**	**B29**	**B30**
-1.8	0.2	1.5	1.8	1.0	-1.5	-1.5
B31	**B32**	**B33**	**B34**	**B35**	**B36**	**B37**
-2.0	-2.5	-2.2	-2.2	-2.0	-2.0	-2.2
B38	**B39**	**B40**	**B41**	**B42**	**B43**	**B44**
-3.5	-2.5	-2.2	-2.2	-2.5	-4.0	-2.2
B45	**B46**	**B47**	**B48**	**B49**	**B50**	**B51**
-2.8	-2.5	-2.2	-2.2	-2.2	-2.2	-2.2
B52	**B53**	**B54**	**B55**	**B56**	**B57**	
-2.5	-2.8	-3.0	-1.0	0.8	1.8	

Template Revised 02/07/06

Reported by: Tyler C. Bottoms **Date:** 7/15/2011

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.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	16

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. STPNHF-17(1)

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION US 17 (WILMINGTON BYPASS) FROM WEST OF THE CAPE FEAR RIVER IN BRUNSWICK COUNTY TO NORTH OF WILMINGTON IN NEW HANOVER COUNTY.

SITE DESCRIPTION BRIDGE ON US 17 OVER PROGRESS ENERGY SPUR LINE AND SR 1394 BETWEEN SR 1430 AND US 421 AT -L- STA. 425+60.75

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-9	CROSS SECTIONS
10-16	BORE LOGS

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN, INC

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE NOVEMBER 2011

NORTH CAROLINA LICENSED SEAL 2240 GEOLOGIST TYLER C. BOTTOMS

5/29/12

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 16

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
DM — 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
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
- [ ] 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: J182: -EYIO- STA. 17+83, CL (TAKEN FROM ROADWAY DTM FILE)

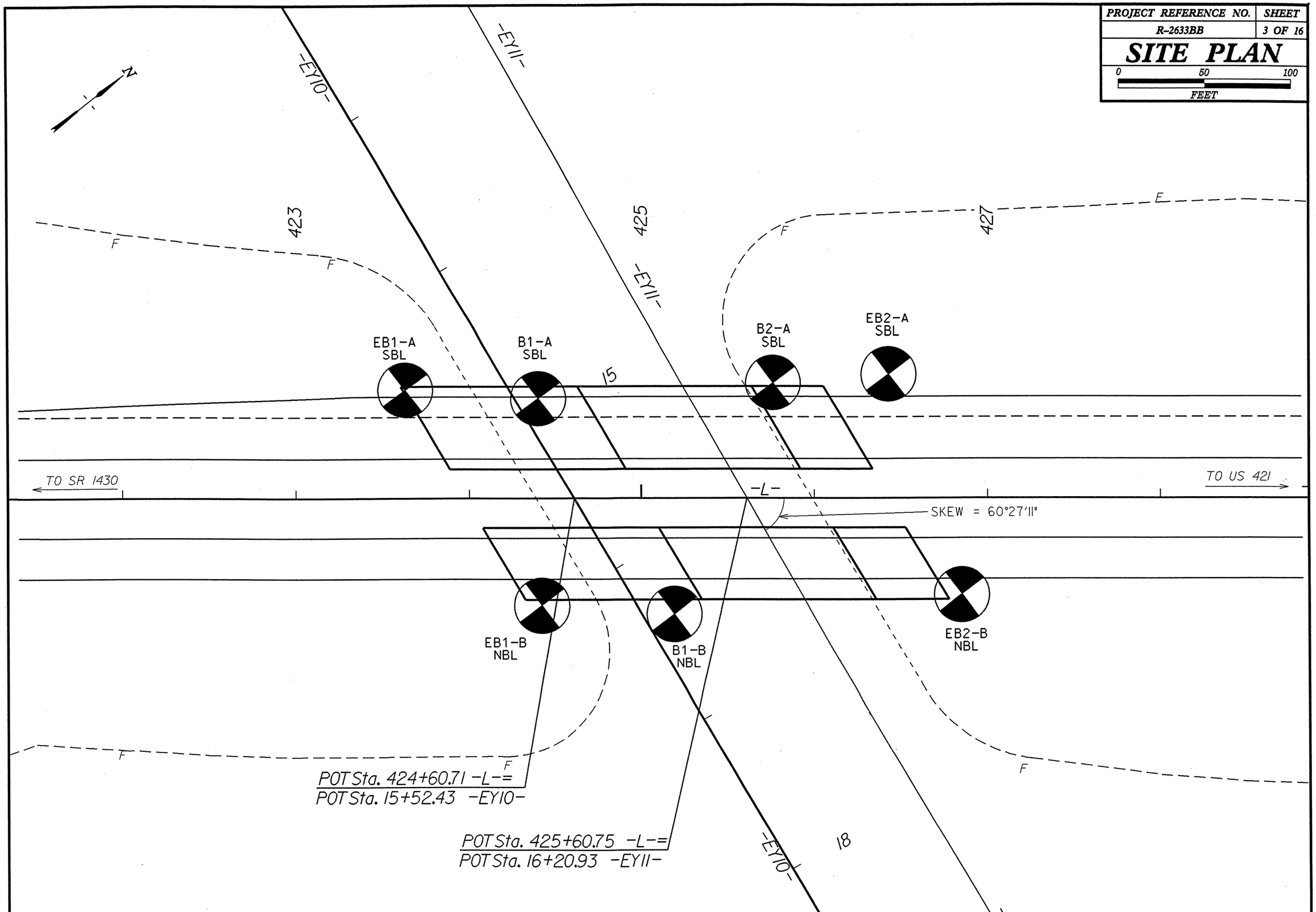
ELEVATION: 18.47 FT.

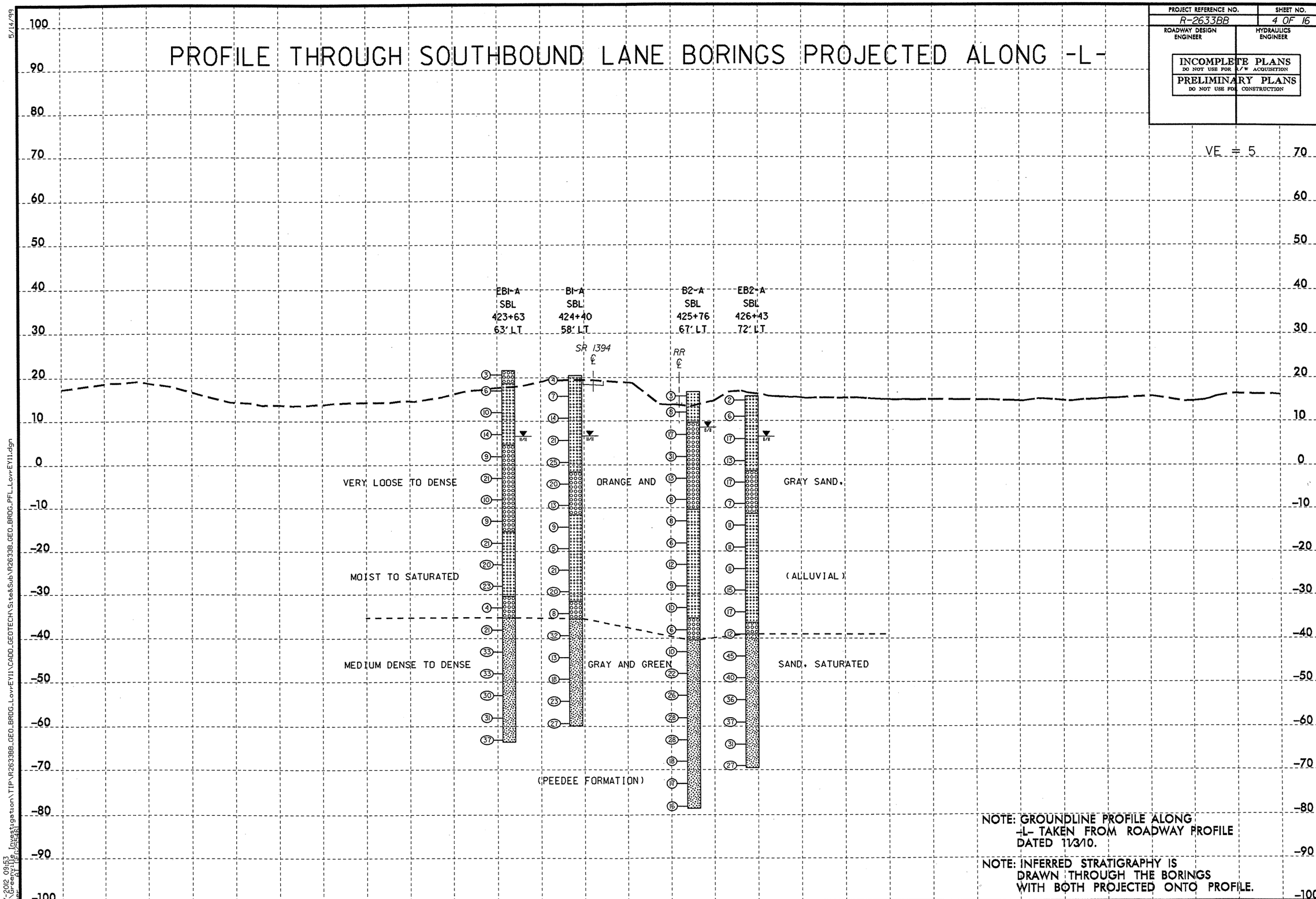
NOTES:

PROJECT REFERENCE NO.	SHEET
R-2633BB	3 OF 16

SITE PLAN

0 50 100
FEET

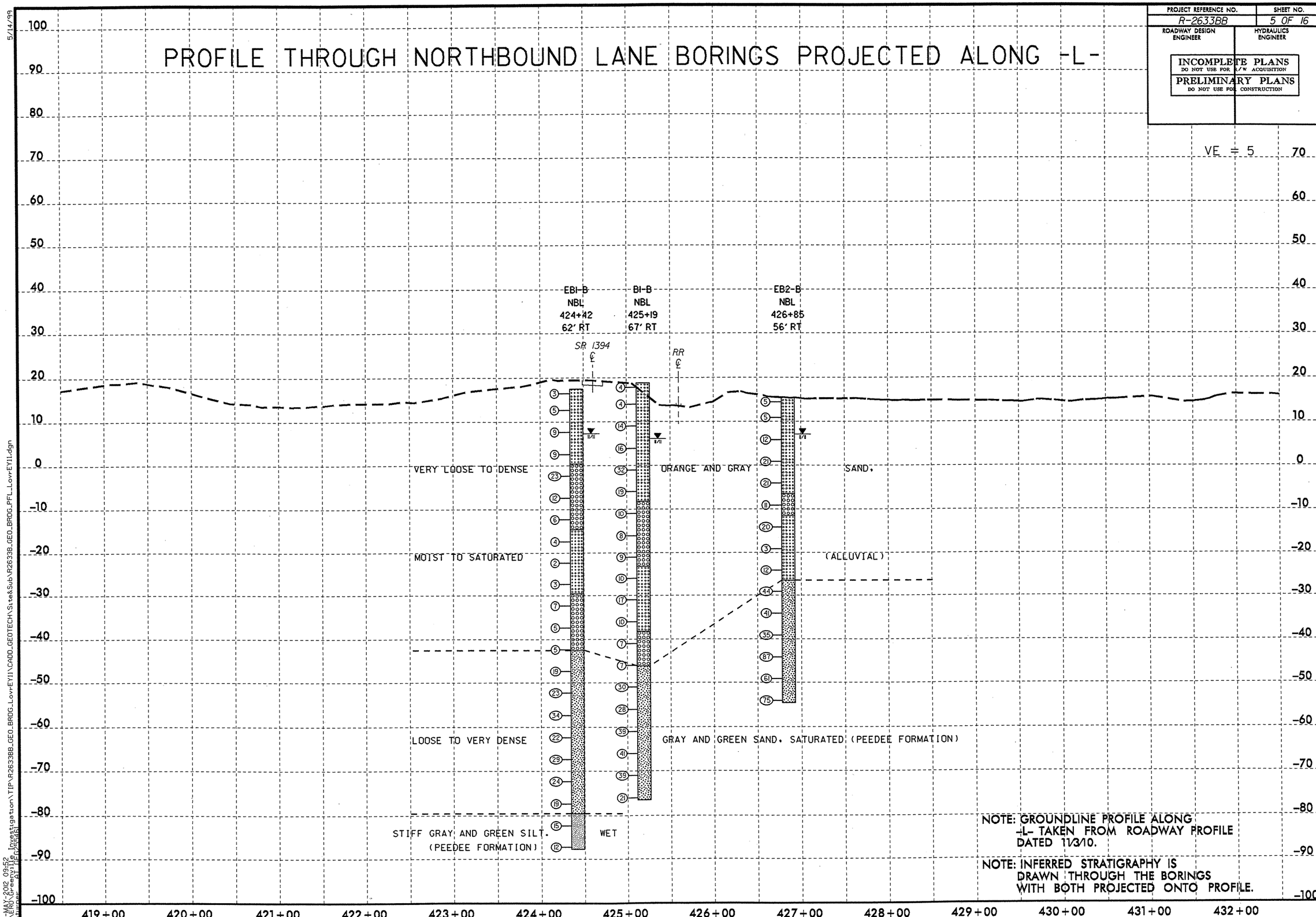



PROJECT REFERENCE NO.
R-2633BB
SHEET NO.
4 OF 16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-
VE = 5
EB1-A
SBL
423+63
63' LT
B1-A
SBL
424+40
58' LT
B2-A
SBL
425+76
67' LT
EB2-A
SBL
426+43
72' LT
SR 1394
RR
VERY LOOSE TO DENSE
ORANGE AND
GRAY SAND,
MOIST TO SATURATED
(ALLUVIAL)
MEDIUM DENSE TO DENSE
GRAY AND GREEN
SAND, SATURATED
(PEEDEE FORMATION)
NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
419+00
420+00
421+00
422+00
423+00
424+00
425+00
426+00
427+00
428+00
429+00
430+00
431+00
432+00

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	5 OF 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

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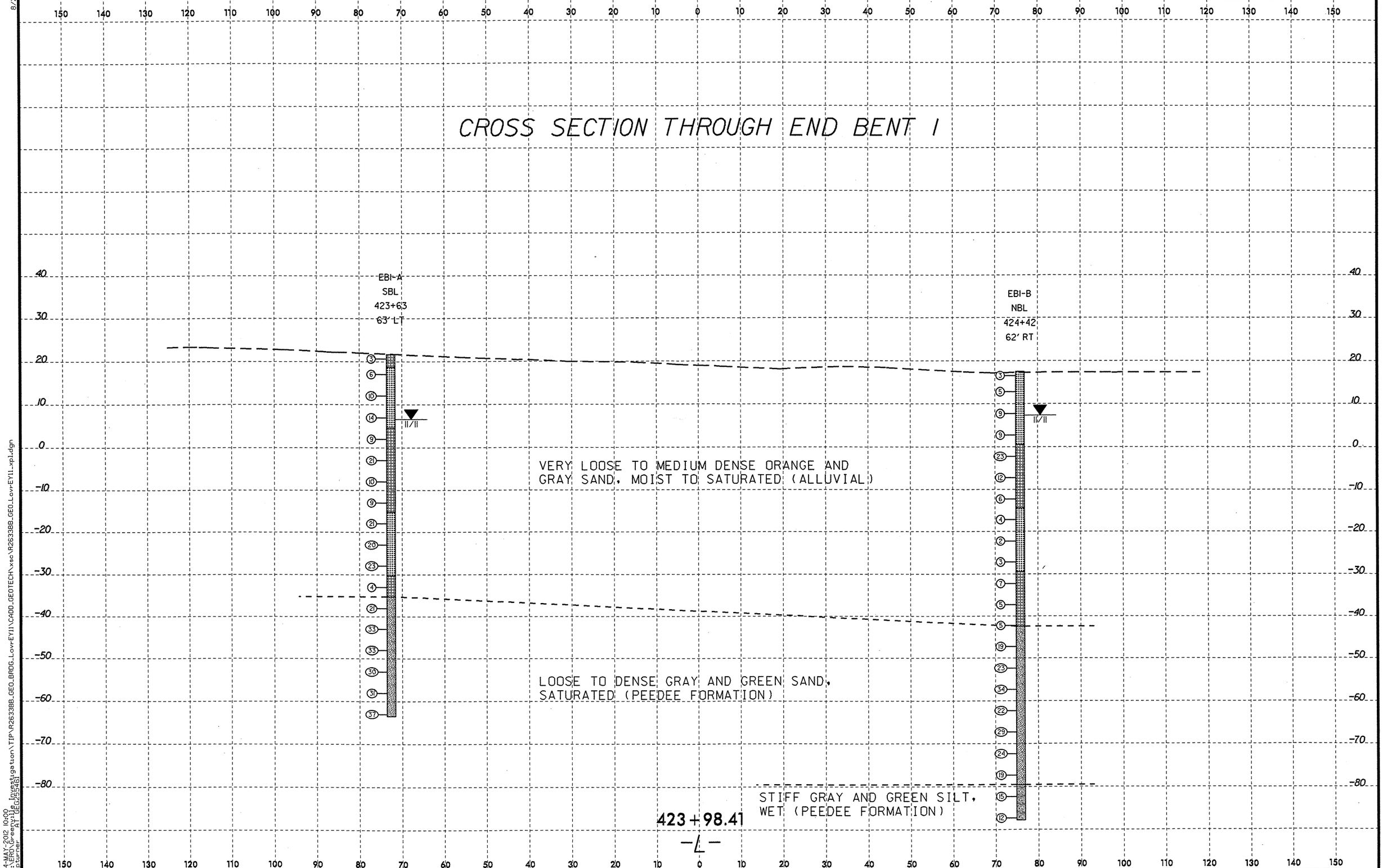
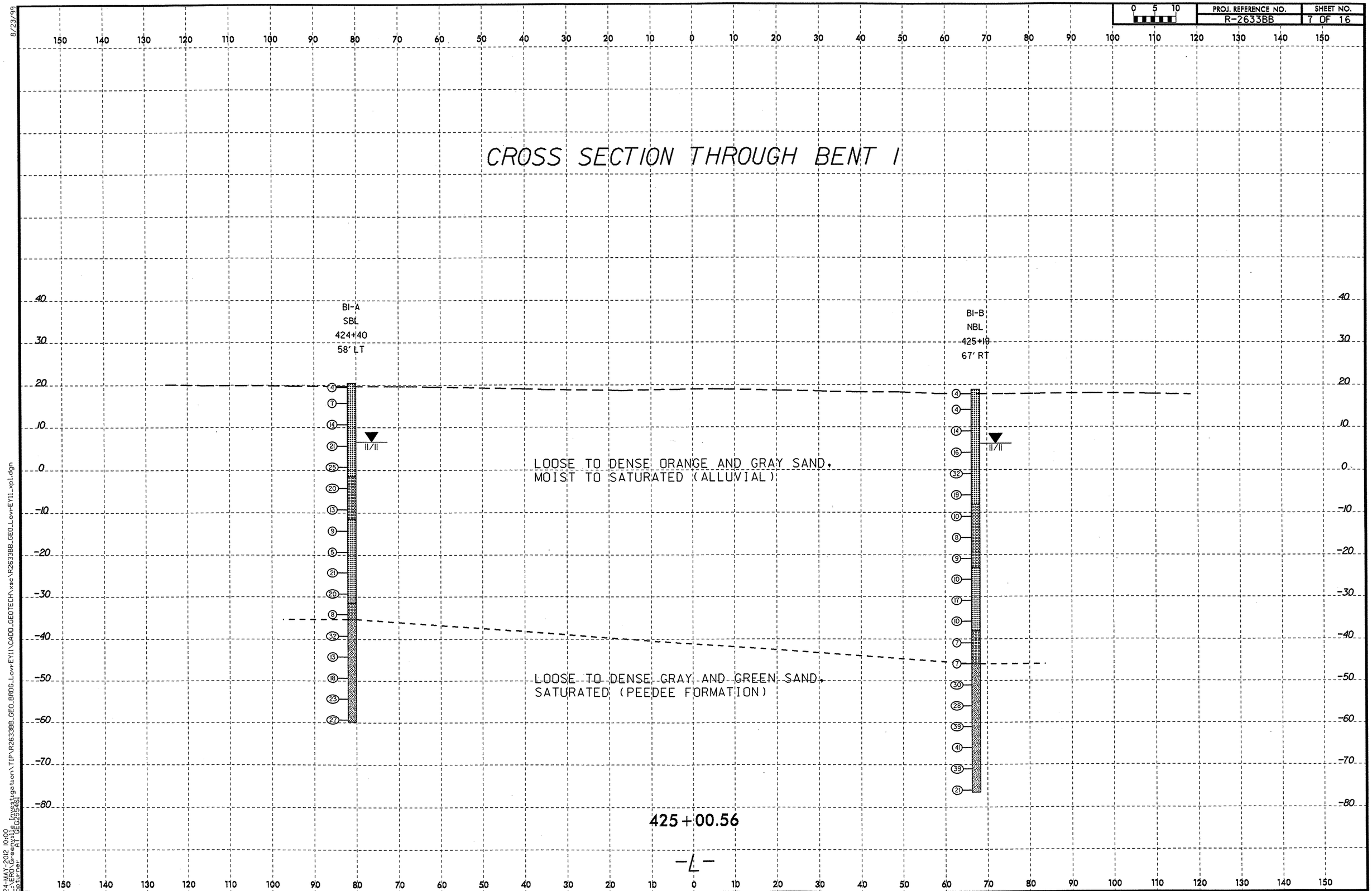


PROJ. REFERENCE NO.
R-2633BB
SHEET NO.
6 OF 16
CROSS SECTION THROUGH END BENT 1
EBI-A
SBL
423+63
63' LT
EBI-B
NBL
424+42
62' RT
VERY LOOSE TO MEDIUM DENSE ORANGE AND GRAY SAND, MOIST TO SATURATED (ALLUVIAL)
LOOSE TO DENSE GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)
STIFF GRAY AND GREEN SILT, WET (PEEDEE FORMATION)
423+98.41
-L-

PROJ. REFERENCE NO. R-2633BB
SHEET NO. 7 OF 16



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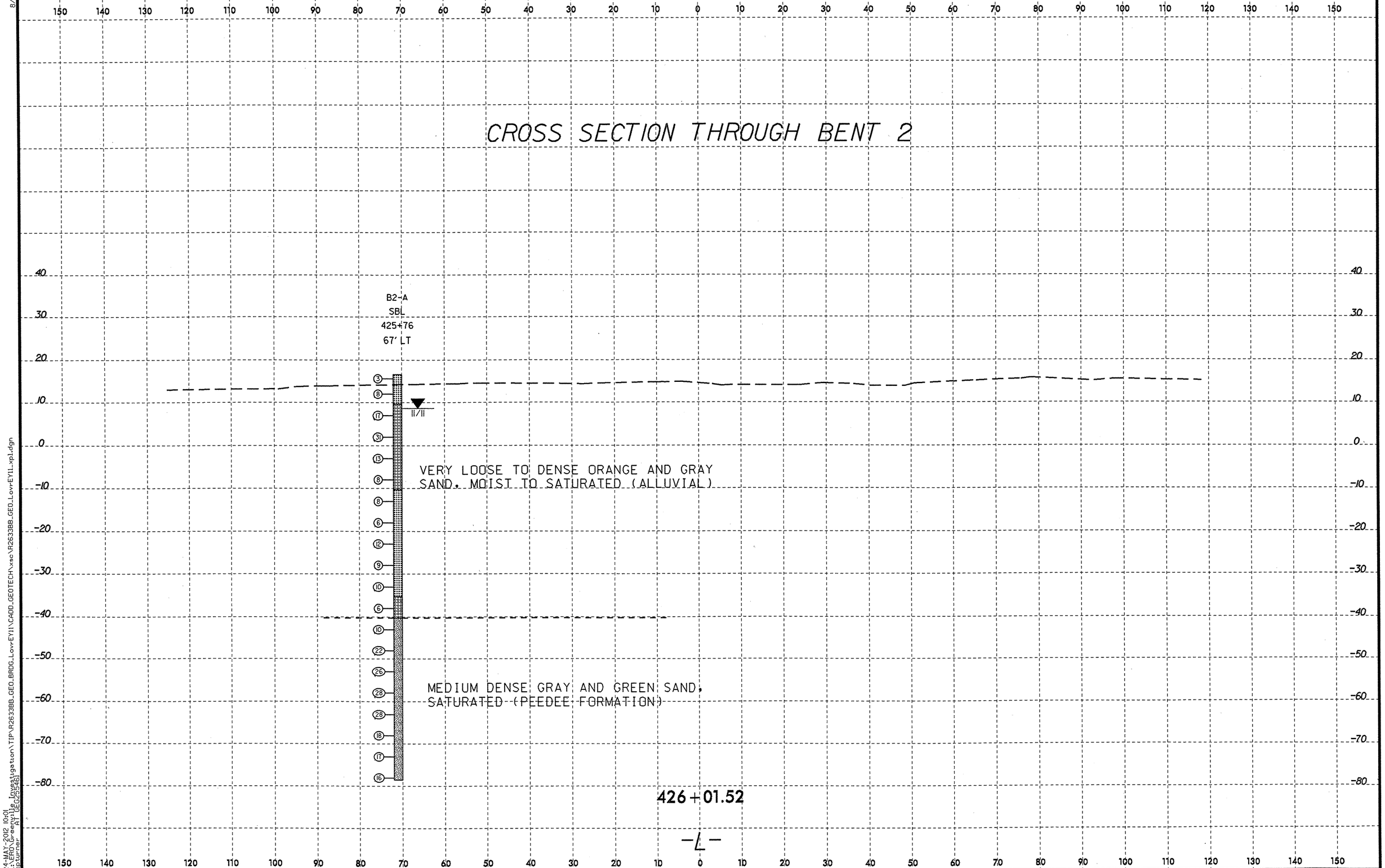
PROJ. REFERENCE NO. R-2633BB
SHEET NO. 8 OF 16



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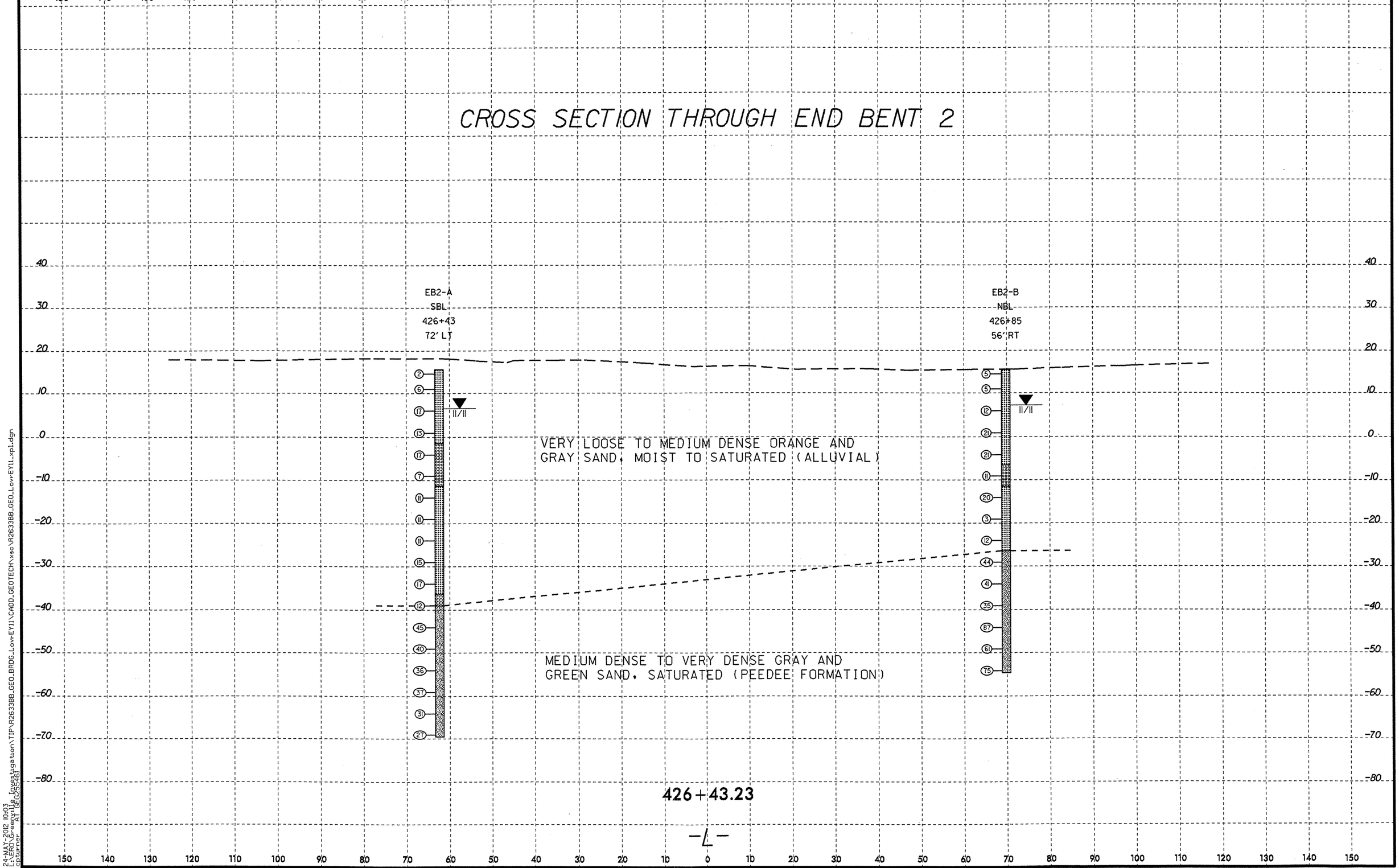
PROJ. REFERENCE NO. R-2633BB
SHEET NO. 9 OF 16

CROSS SECTION THROUGH END BENT 2



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cpturner AT GEG255461

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB1-A SBL	**STATION** 423+63	**OFFSET** 63 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.7 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 195,720	**EASTING** 2,309,855 / **24 HR.** 15.1
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/01/11	**COMP. DATE** 11/01/11	**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)
	21.7	0.0								GROUND SURFACE	0.0
	18.0	3.7	1	1	2	3				**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED	3.0
	13.0	8.7	1	3	3	6					
	8.0	13.7	3	4	6	10					
	3.0	18.7	5	6	8	14		▼			
	-2.0	23.7	3	3	6	9				4.7	17.0
	-7.0	28.7	6	9	12	21					
	-12.0	33.7	3	4	6	10					
	-17.0	38.7	3	4	5	9					
	-22.0	43.7	5	12	9	21				-15.3	37.0
	-27.0	48.7	8	10	10	20					
	-32.0	53.7	8	11	12	23					
	-37.0	58.7	1	1	3	4				-30.3	52.0
	-42.0	63.7	10	12	9	21				-35.3	57.0
	-47.0	68.7	17	16	17	33				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)	
	-52.0	73.7	16	17	16	33					
			11	12	18	30					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB1-A SBL	**STATION** 423+63	**OFFSET** 63 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.7 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 195,720	**EASTING** 2,309,855 / **24 HR.** 15.1
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/01/11	**COMP. DATE** 11/01/11	**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
-55						Match Line				
	-57.0	78.7	10	15	16	31				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-60	-62.0	83.7	8	16	21	37				-63.5 / 85.2
										Boring Terminated at Elevation -63.5 ft in Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB1-B NBL	**STATION** 424+42	**OFFSET** 62 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.5 ft	**TOTAL DEPTH** 105.3 ft	**NORTHING** 195,708	**EASTING** 2,310,003 / **24 HR.** 10.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/31/11	**COMP. DATE** 11/01/11	**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))
20										
	17.5	0.0	1	1	2	3				17.5 / 0.0 GROUND SURFACE
15										**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED
	13.7	3.8	2	2	3	5				
10										
	8.7	8.8	4	4	5	9		▼		
5										
	3.7	13.8	4	5	4	9				
0										0.5 / 17.0
	-1.3	18.8	9	11	12	23				
-5										
	-6.3	23.8	5	6	6	12				
-10										
	-11.3	28.8	3	3	3	6				
-15										-14.5 / 32.0
	-16.3	33.8	1	2	2	4				
-20										
	-21.3	38.8	WOH	1	1	2				
-25										
	-26.3	43.8	2	1	2	3				
-30										-29.5 / 47.0
	-31.3	48.8	3	3	4	7				
-35										
	-36.3	53.8	3	2	3	5				
-40										
	-41.3	58.8	2	2	3	5				-42.5 / 60.0
-45										**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)
	-46.3	63.8	5	8	11	19				
-50										
	-51.3	68.8	9	11	12	23				
-55										
	-56.3	73.8	8	18	16	34				
-60										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB1-B NBL	**STATION** 424+42	**OFFSET** 62 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.5 ft	**TOTAL DEPTH** 105.3 ft	**NORTHING** 195,708	**EASTING** 2,310,003 / **24 HR.** 10.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/31/11	**COMP. DATE** 11/01/11	**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
-60						Match Line				
	-61.3	78.8	8	10	12	22				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-65										
	-66.3	83.8	9	12	17	29				
-70										
	-71.3	88.8	10	10	14	24				
-75										
	-76.3	93.8	8	9	10	19				
-80										-79.5 / 97.0
	-81.3	98.8	6	7	8	15				**COASTAL PLAIN** GRAY AND GREEN SILT, WET (PEEDEE FORMATION)
-85										
	-86.3	103.8	4	5	7	12				-87.8 / 105.3
										Boring Terminated at Elevation -87.8 ft in Stiff Silt

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY11.GPJ NC_DOT.GDT 4/15/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B1-A SBL	**STATION** 424+40	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 20.5 ft	**TOTAL DEPTH** 80.3 ft	**NORTHING** 195,778	**EASTING** 2,309,906 / **24 HR.** 13.9
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/07/11	**COMP. DATE** 11/07/11	**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))
25										
20	20.5	0.0	3	2	2	4				20.5 / 0.0 GROUND SURFACE
	16.7	3.8	2	3	4	7				**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED
15	11.7	8.8	4	7	7	14				
10	6.7	13.8	6	10	11	21				
5	1.7	18.8	6	9	16	25				
0	-3.3	23.8	6	9	11	20				-1.5 / 22.0
-5	-8.3	28.8	4	6	7	13*				
-10	-13.3	33.8	3	4	5	9				-11.5 / 32.0
-15	-18.3	38.8	3	2	3	5*				
-20	-23.3	43.8	5	9	12	21				
-25	-28.3	48.8	9	10	10	20				
-30	-33.3	53.8	3	4	4	8				-31.5 / 52.0
-35	-38.3	58.8	7	16	16	32*				-35.5 / 56.0 **COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)
-40	-43.3	63.8	6	7	6	13*				
-45	-48.3	68.8	5	9	9	18				
-50	-53.3	73.8	8	10	13	23*				
-55										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B1-A SBL	**STATION** 424+40	**OFFSET** 58 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 20.5 ft	**TOTAL DEPTH** 80.3 ft	**NORTHING** 195,778	**EASTING** 2,309,906 / **24 HR.** 13.9
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/07/11	**COMP. DATE** 11/07/11	**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
-55						Match Line				
	-58.3	78.8	9	11	16	27				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
										-59.8 / 80.3 Boring Terminated at Elevation -59.8 ft in Medium Dense Sand

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY11.GPJ NC_DOT.GDT 4/15/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B1-B NBL	**STATION** 425+19	**OFFSET** 67 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.9 ft	**TOTAL DEPTH** 95.3 ft	**NORTHING** 195,766	**EASTING** 2,310,053 / **24 HR.** 12.7
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/08/11	**COMP. DATE** 11/08/11	**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)
20											
	18.9	0.0								18.9 GROUND SURFACE	0.0
			1	2	2	4				**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED (ALLUVIAL)	
15	15.1	3.8									
			2	2	2	4					
10	10.1	8.8									
			4	6	8	14					
5	5.1	13.8						▼			
			6	7	9	16					
0	0.1	18.8									
			10	15	17	32					
-5	-5.0	23.8									
			6	9	10	19					
-10	-10.0	28.8								-8.2	27.0
			2	5	5	10					
-15	-15.0	33.8									
			2	4	4	8					
-20	-20.0	38.8									
			4	4	5	9					
-25	-25.0	43.8								-23.2	42.0
			4	5	5	10					
-30	-30.0	48.8									
			9	9	8	17					
-35	-35.0	53.8									
			4	4	6	10					
-40	-40.0	58.8								-38.2	57.0
			2	3	4	7					
-45	-45.0	63.8									
			2	2	5	7				-46.1	64.9
-50	-50.0	68.8								**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)	
			4	16	14	30					
-55	-55.0	73.8									
			12	13	15	28					
-60	-60.0	78.8									

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B1-B NBL	**STATION** 425+19	**OFFSET** 67 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.9 ft	**TOTAL DEPTH** 95.3 ft	**NORTHING** 195,766	**EASTING** 2,310,053 / **24 HR.** 12.7
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/08/11	**COMP. DATE** 11/08/11	**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
-60						Match Line				
			12	18	21	39				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-65	-65.0	83.8								
			7	23	18	41				
-70	-70.0	88.8								
			12	18	21	39				
-75	-75.0	93.8								
			7	10	11	21				-76.5 95.3
										Boring Terminated at Elevation -76.5 ft in Medium Dense Sand

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY11.GPJ NC_DOT.GDT 4/15/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B2-A SBL	**STATION** 425+76	**OFFSET** 67 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 16.7 ft	**TOTAL DEPTH** 95.2 ft	**NORTHING** 195,892	**EASTING** 2,309,980 / **24 HR.** 8.1
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/02/11	**COMP. DATE** 11/03/11	**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))
20										
	16.7	0.0	3	1	2	3				16.7 GROUND SURFACE 0.0
15										**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED
	13.0	3.7	3	4	4	8				
10								▼		9.7 7.0
	8.0	8.7	5	8	9	17				
5										
	3.0	13.7	7	13	18	31				
0										
	-2.0	18.7	4	6	7	13				
-5										
	-7.0	23.7	3	4	4	8				
-10										-10.3 27.0
	-12.0	28.7	2	4	4	8				
-15										
	-17.0	33.7	2	3	3	6				
-20										
	-22.0	38.7	4	5	7	12				
-25										
	-27.0	43.7	3	3	6	9				
-30										
	-32.0	48.7	2	4	6	10				
-35										-35.3 52.0
	-37.0	53.7	2	3	3	6				
-40										-40.3 57.0
	-42.0	58.7	3	3	7	10				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)
-45										
	-47.0	63.7	10	10	12	22				
-50										
	-52.0	68.7	8	11	15	26				
-55										
	-57.0	73.7	11	13	15	28				
-60										

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. B2-A SBL	**STATION** 425+76	**OFFSET** 67 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 16.7 ft	**TOTAL DEPTH** 95.2 ft	**NORTHING** 195,892	**EASTING** 2,309,980 / **24 HR.** 8.1
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/02/11	**COMP. DATE** 11/03/11	**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
-60						Match Line				
	-62.0	78.7	10	13	15	28				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
-65										
	-67.0	83.7	8	8	10	18				
-70										
	-72.0	88.7	7	8	9	17				
-75										
	-77.0	93.7	7	8	8	16				-78.5 95.2
										Boring Terminated at Elevation -78.5 ft in Medium Dense Sand

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 426+43	**OFFSET** 72 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 15.7 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 195,949	**EASTING** 2,310,017 / **24 HR.** 9.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/03/11	**COMP. DATE** 11/03/11	**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)
20											
15	15.7	0.0	1	1	1	2				15.7 GROUND SURFACE	0.0
										ALLUVIAL ORANGE AND GRAY SAND, MOIST TO SATURATED	
10	12.0	3.7	2	2	4	6					
5	7.0	8.7	4	7	10	17					
0	2.0	13.7	1	5	8	13				-1.3	17.0
-5	-3.0	18.7	5	7	10	17					
-10	-8.0	23.7	2	3	4	7				-11.3	27.0
-15	-13.0	28.7	4	5	6	11					
-20	-18.0	33.7	4	5	6	11					
-25	-23.0	38.7	4	5	6	11					
-30	-28.0	43.7	5	8	7	15					
-35	-33.0	48.7	5	9	8	17				-36.3	52.0
-40	-38.0	53.7	4	5	7	12				-39.0	54.7
										COASTAL PLAIN GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)	
-45	-43.0	58.7	10	23	22	45					
-50	-48.0	63.7	12	16	24	40					
-55	-53.0	68.7	12	19	17	36					
-60	-58.0	73.7	9	16	21	37					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 426+43	**OFFSET** 72 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 15.7 ft	**TOTAL DEPTH** 85.2 ft	**NORTHING** 195,949	**EASTING** 2,310,017 / **24 HR.** 9.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/03/11	**COMP. DATE** 11/03/11	**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
-60						Match Line				
-65	-63.0	78.7	8	13	18	31				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION) *(continued)*
	-68.0	83.7	8	12	15	27				-69.5 / 85.2
										Boring Terminated at Elevation -69.5 ft in Medium Dense Sand

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY11.GPJ NC_DOT.GDT 4/15/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY11- (PROGRESS ENERGY SPUR LINE) AND -EY10- (SR 1394)			**GROUND WTR (ft)**
BORING NO. EB2-B NBL	**STATION** 426+85	**OFFSET** 56 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 15.5 ft	**TOTAL DEPTH** 70.1 ft	**NORTHING** 195,905	**EASTING** 2,310,144
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/02/11	**COMP. DATE** 11/02/11	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	8.4

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)
15.5		0.0								GROUND SURFACE	0.0
	11.9	3.6	1	2	3	5				**ALLUVIAL** ORANGE AND GRAY SAND, MOIST TO SATURATED	
	6.9	8.6	2	2	3	5					
	1.9	13.6	5	6	6	12					
	-3.1	18.6	5	9	12	21					
	-8.1	23.6	5	10	11	21					
	-13.1	28.6	4	5	6	11				-6.5	22.0
	-18.1	33.6	4	8	12	20				-11.5	27.0
	-23.1	38.6	2	2	1	3					
	-28.1	43.6	5	6	6	12				-26.5	42.0
	-33.1	48.6	8	19	25	44				**COASTAL PLAIN** GRAY AND GREEN SAND, SATURATED (PEEDEE FORMATION)	
	-38.1	53.6	43	19	22	41					
	-43.1	58.6	11	13	22	35					
	-48.1	63.6	16	53	34	87					
	-53.1	68.6	13	23	38	61					
			16	23	52	75				-54.6	70.1
										Boring Terminated at Elevation -54.6 ft in Very Dense Sand	

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY11.GPJ NC_DOT.GDT 4/15/13

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	17

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. STPNHF-17(1)

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION US 17 (WILMINGTON BYPASS) FROM WEST OF THE CAPE FEAR RIVER IN BRUNSWICK COUNTY TO NORTH OF WILMINGTON IN NEW HANOVER COUNTY.

SITE DESCRIPTION BRIDGE ON US 17 OVER PROGRESS ENERGY SPUR LINE AT -L- STA. 398+75.47

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-9	CROSS SECTIONS
10-17	BORE LOGS

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN, INC.

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JUNE 2012

NORTH CAROLINA LICENSED SEAL 2240 GEOLOGIST TYLER C. BOTTOMS

6/14/12

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 17

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0	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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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
- [ ] 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:

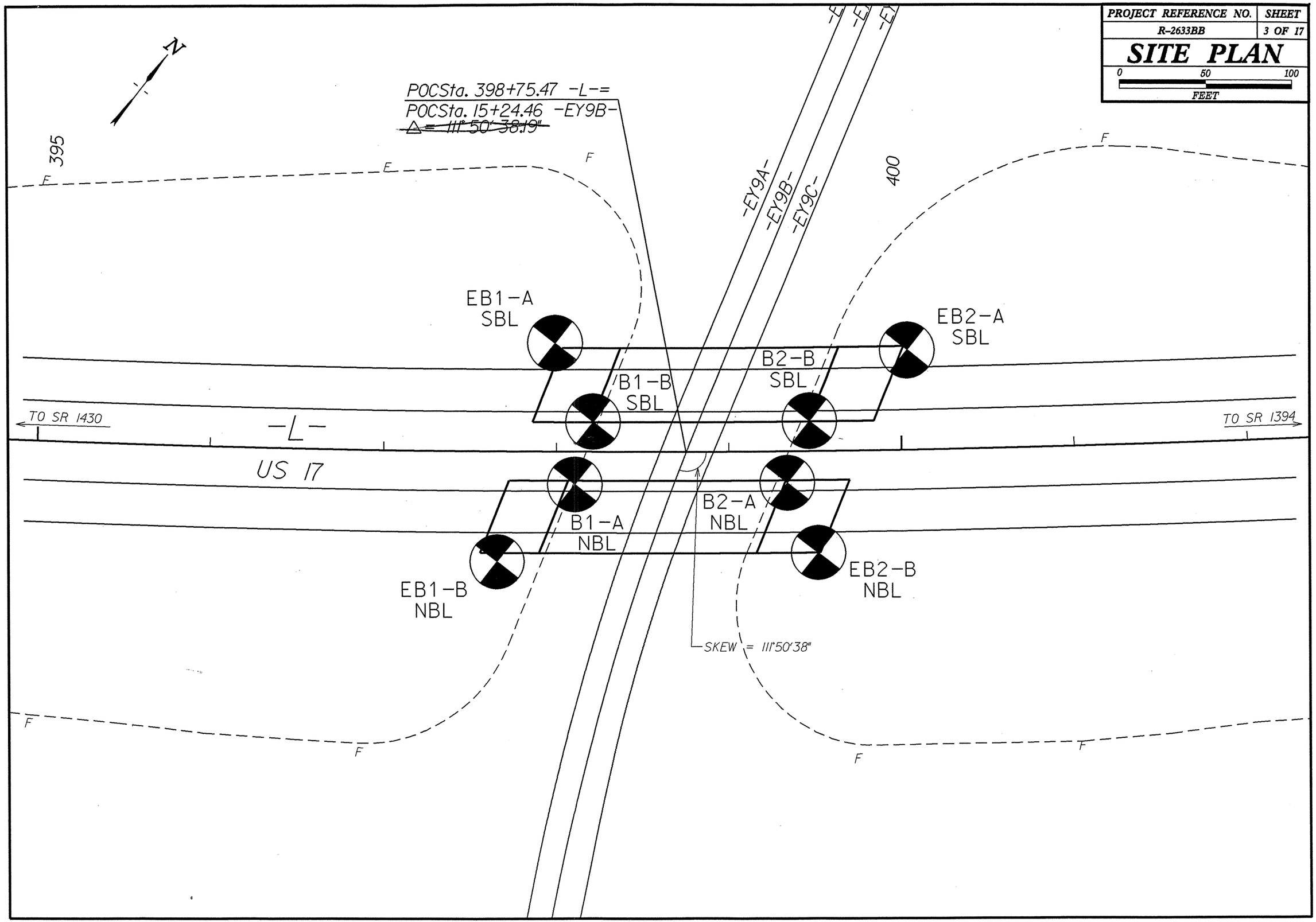
ELEVATION: FT.

NOTES:

PROJECT REFERENCE NO.	SHEET
R-2633BB	3 OF 17

SITE PLAN

0 50 100
FEET



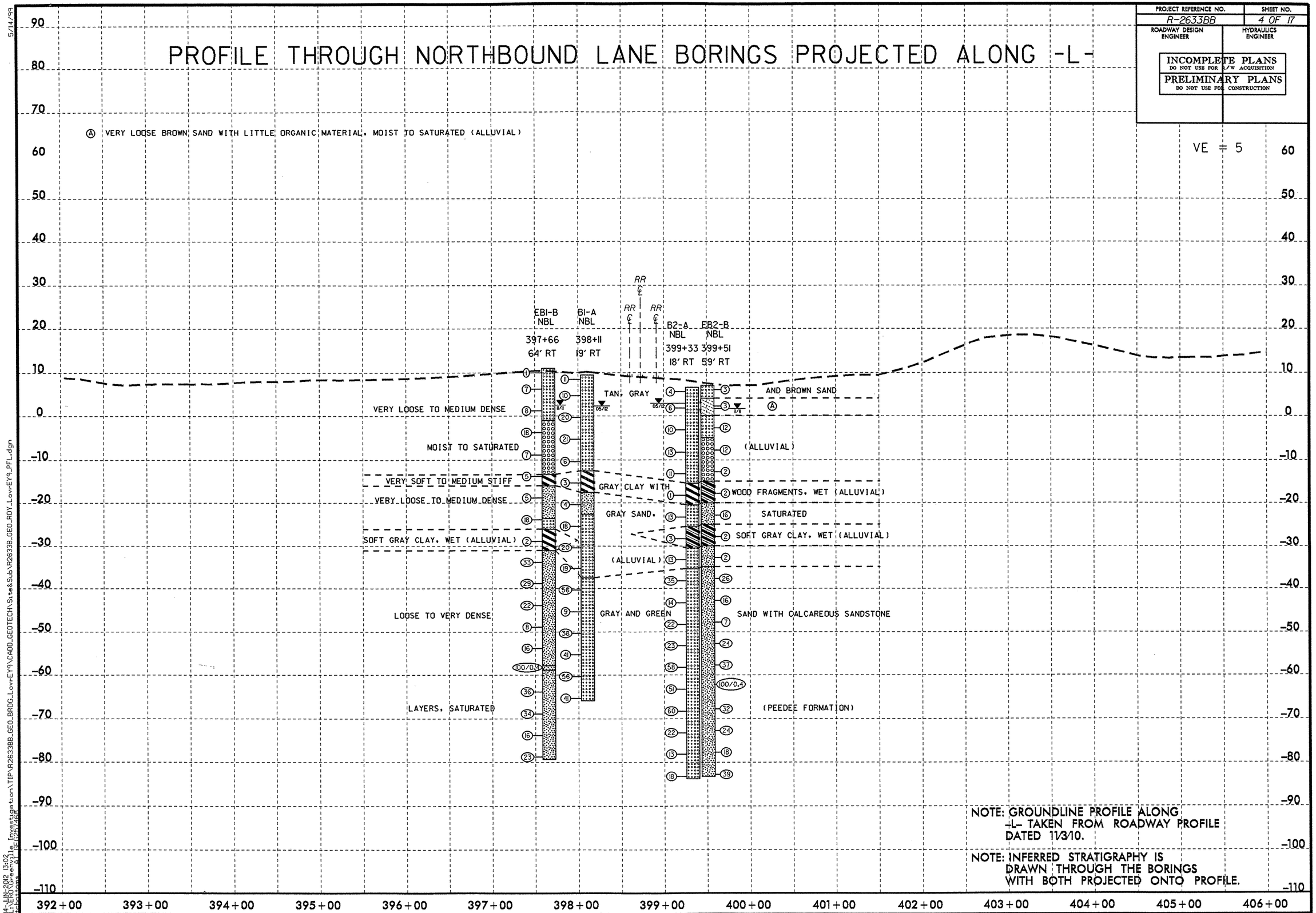
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	4 OF 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-

VE = 5



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

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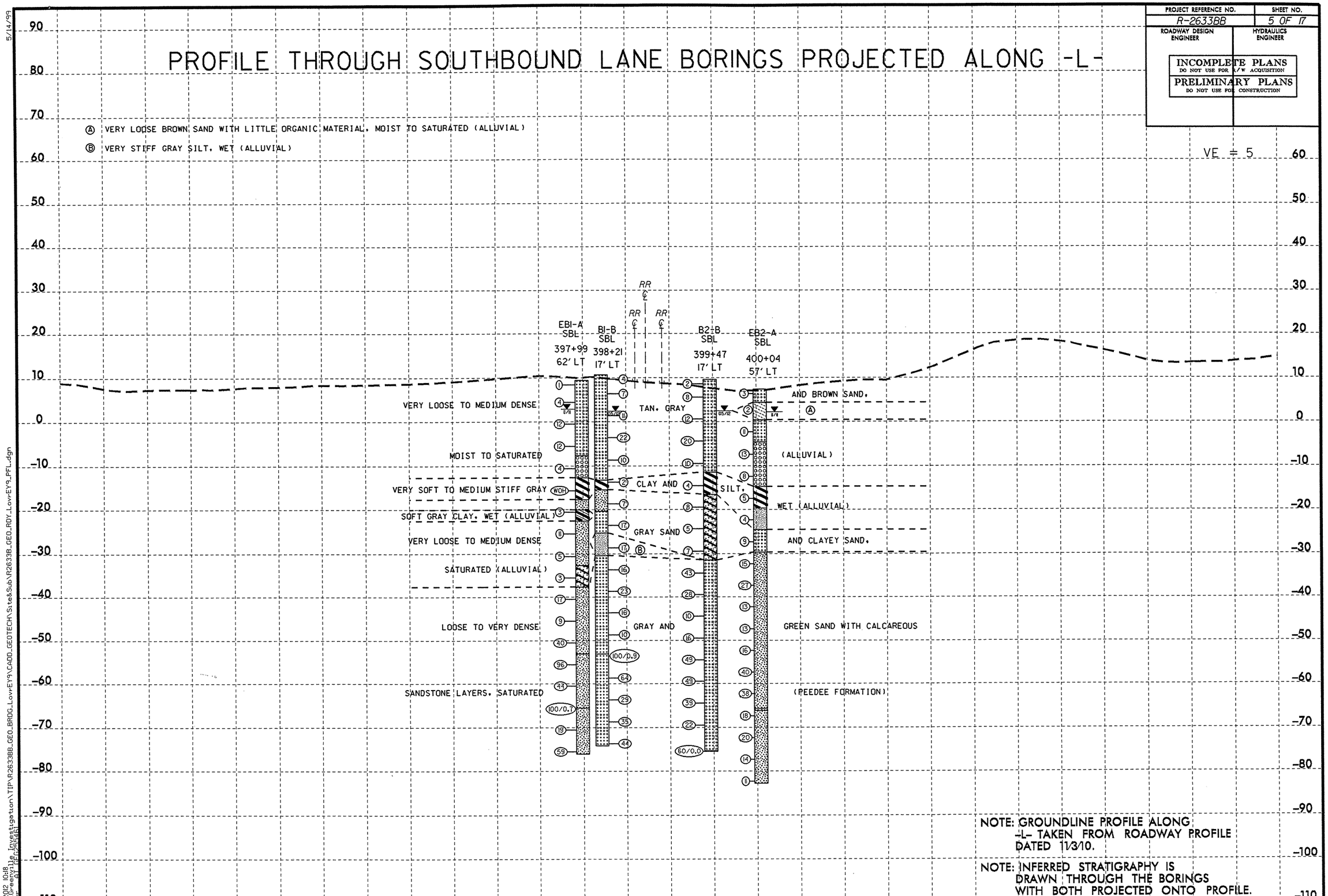
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	5 OF 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

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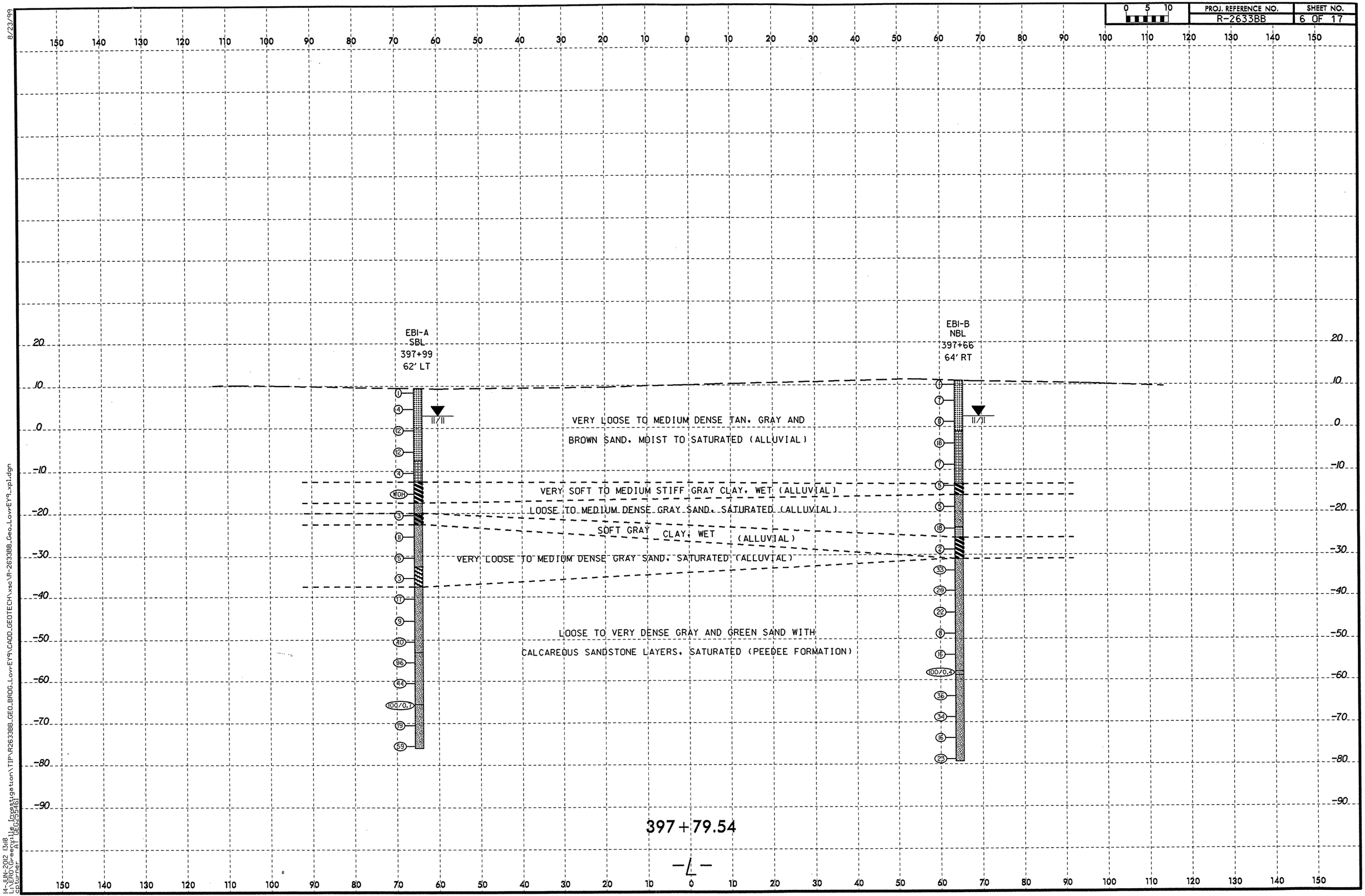

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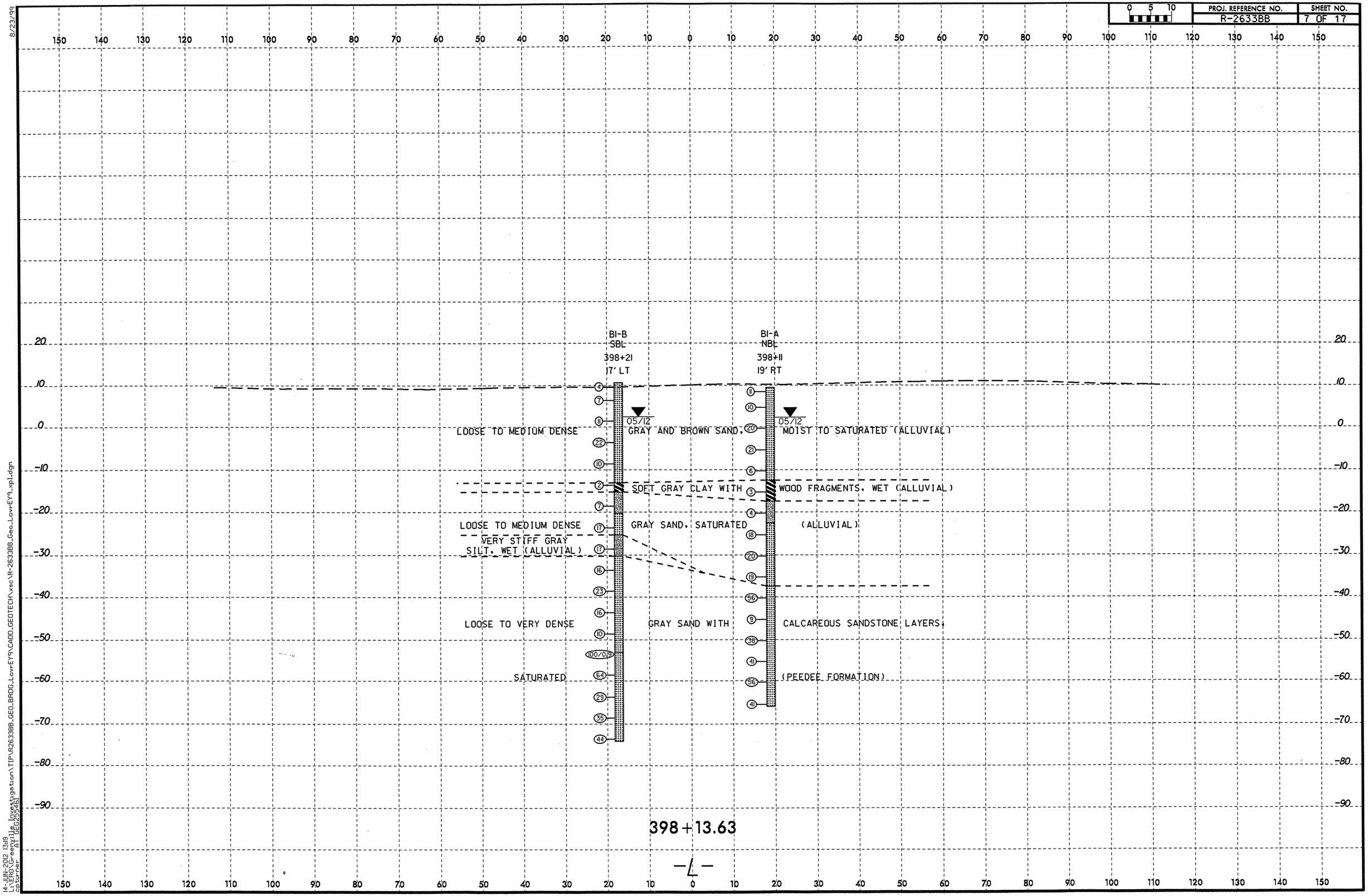
SHEET NO. 7 OF 17



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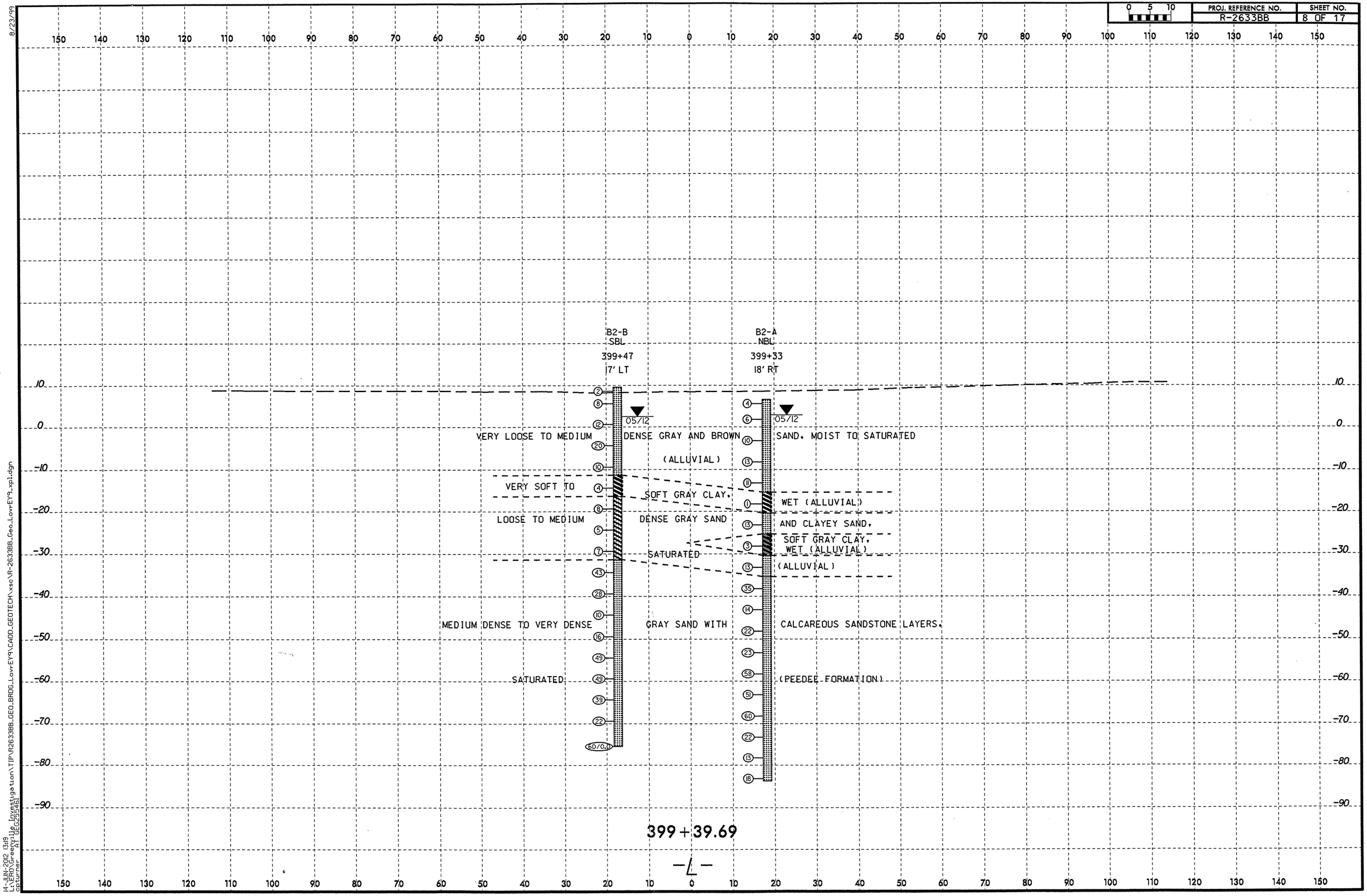

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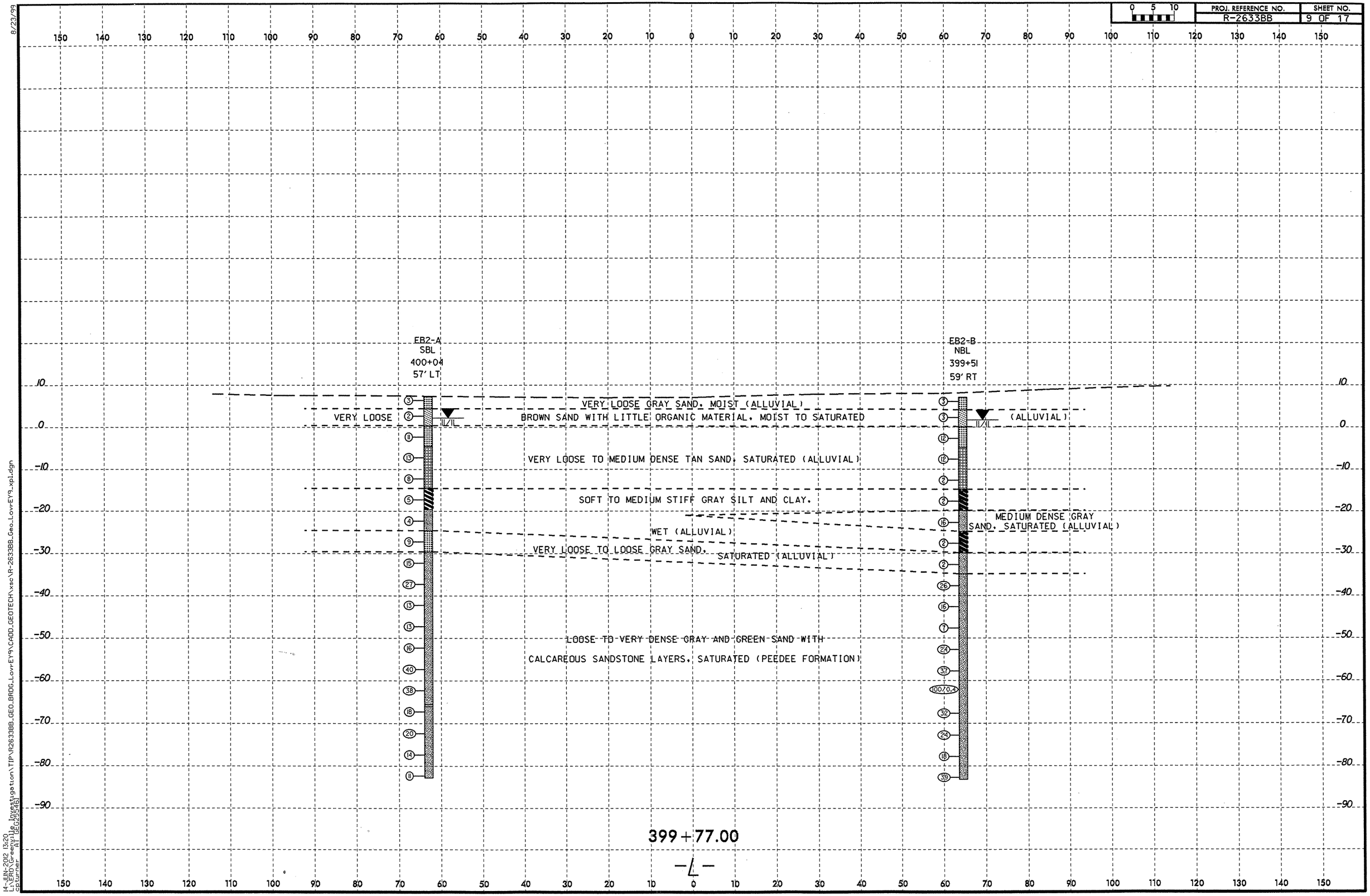
SHEET NO. 9 OF 17



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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB1-A SBL	**STATION** 397+99	**OFFSET** 62 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.4 ft	**TOTAL DEPTH** 85.4 ft	**NORTHING** 193,890	**EASTING** 2,308,094	**24 HR.** 6.5
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/15/11	**COMP. DATE** 11/15/11	**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)
10	9.4	0.0	WOH	WOH	1	1				GROUND SURFACE	0.0
5	5.5	3.9	1	2	2	4				**ALLUVIAL** TAN AND BROWN SAND, MOIST TO SATURATED	
0	0.5	8.9	4	6	6	12					
-5	-4.5	13.9	4	5	7	12					
-10	-9.5	18.9	2	2	2	4				-7.6	17.0
-15	-14.5	23.9	WOH	WOH	WOH	0				-12.6 **ALLUVIAL** GRAY CLAY, WET	22.0
-20	-19.5	28.9	3	1	2	3				-17.6 **ALLUVIAL** GRAY SAND, SATURATED	27.0
-25	-24.5	33.9	5	6	5	11				-20.0 **ALLUVIAL** GRAY CLAY, WET	29.4
-30	-29.5	38.9	3	3	2	5				-22.6 **ALLUVIAL** GRAY SAND, SATURATED	32.0
-35	-34.5	43.9	2	1	2	3				-32.6	42.0
-40	-39.5	48.9	6	7	10	17				-37.6 **COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)	47.0
-45	-44.5	53.9	3	4	5	9					
-50	-49.5	58.9	7	15	25	40					
-55	-54.5	63.9	23	42	54	96				-53.0	62.4
-60	-59.5	68.9	12	19	25	44					
-65	-64.5	73.9	15	20	80/0.2	100/0.7				-65.5 **COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)	74.9
-70	-69.5	78.9									

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB1-A SBL	**STATION** 397+99	**OFFSET** 62 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.4 ft	**TOTAL DEPTH** 85.4 ft	**NORTHING** 193,890	**EASTING** 2,308,094	**24 HR.** 6.5
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/15/11	**COMP. DATE** 11/15/11	**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
-70			6	8	11	Match Line 19				**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-75	-74.5	83.9	8	11	48	59				-76.0 85.4

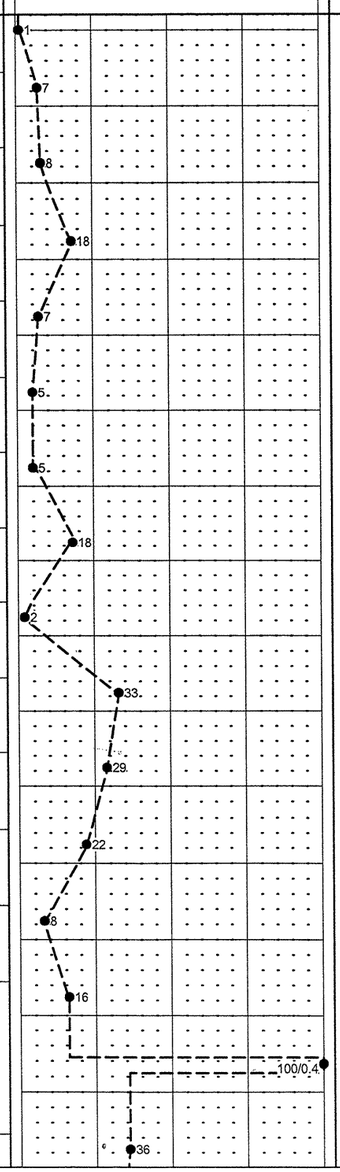
Boring Terminated at Elevation -76.0 ft in Very Dense Sand

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

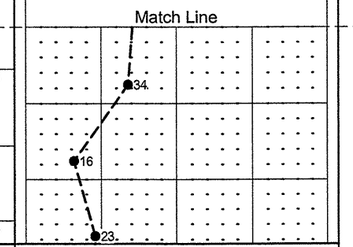
WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB1-B NBL	**STATION** 397+66	**OFFSET** 64 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 11.0 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,771	**EASTING** 2,308,145 — **24 HR.** 8.5
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/08/11	**COMP. DATE** 11/09/11	**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))
11.0		0.0							GROUND SURFACE (11.0 / 0.0)
			WOH	1	0				**ALLUVIAL** TAN AND GRAY SAND, MOIST TO SATURATED
7.2		3.8	2	3	4				
2.2		8.8	2	4	4				
-2.8		13.8	5	8	10				
-7.8		18.8	3	3	4				
-12.8		23.8	2	2	3				
-17.8		28.8	5	2	3				
-22.8		33.8	2	9	9				
-27.8		38.8	2	1	1				
-32.8		43.8	6	17	16				
-37.8		48.8	7	15	14				
-42.8		53.8	10	11	11				
-47.8		58.8	3	4	4				
-52.8		63.8	6	8	8				
-57.8		68.8	100/0.4						
-62.8		73.8	13	17	19				
-1.0		12.0							**ALLUVIAL** GRAY CLAY, WET (-13.4 / 24.4)
-16.0		27.0							**ALLUVIAL** GRAY SAND, SATURATED
-23.5		34.5							
-26.0		37.0							**COASTAL PLAIN** GRAY AND GREEN CLAY, WET (PEEDEE FORMATION)
-31.0		42.0							**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)
-57.8		68.8							
-58.8		69.8							**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)



WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB1-B NBL	**STATION** 397+66	**OFFSET** 64 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 11.0 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,771	**EASTING** 2,308,145 — **24 HR.** 8.5
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/08/11	**COMP. DATE** 11/09/11	**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
-67.8		78.8	10	16	18				**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-72.8		83.8	5	8	8				
-77.8		88.8	5	7	16				
-79.3		90.3							Boring Terminated at Elevation -79.3 ft in Medium Dense Sand



NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B1-B SBL	**STATION** 398+21	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.7 ft	**TOTAL DEPTH** 84.8 ft	**NORTHING** 193,869	**EASTING** 2,308,139	**24 HR.** 8.3
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/14/12	**COMP. DATE** 05/14/12	**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)
15											
10	10.7	0.0	1	2	2	4				10.7 GROUND SURFACE	0.0
	7.4	3.3	2	3	4	7				**ALLUVIAL** GRAY AND BROWN SAND, MOIST TO SATURATED	
5	2.4	8.3	4	5	6	11		▼			
0	-2.6	13.3	5	9	13	22					
-5	-7.6	18.3	3	5	5	10					
-10	-12.6	23.3	WOH	WOH	2	2				-13.1	23.8
-15	-17.6	28.3	2	4	3	7				**ALLUVIAL** GRAY CLAY WITH WOOD FRAGMENTS, WET -15.3	26.0
-20	-22.6	33.3	8	9	8	17				**ALLUVIAL** GRAY SAND, SATURATED -20.3	31.0
-25	-27.6	38.3	2	3	14	17				-25.3 **ALLUVIAL** GRAY SILT, WET	36.0
-30	-32.6	43.3	4	7	9	16				-30.3 **COASTAL PLAIN** GRAY SAND WITH CALCAREOUS SANDSTONE LAYERS AND SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)	41.0
-35	-37.6	48.3	6	10	13	23					
-40	-42.6	53.3	6	7	9	16					
-45	-47.6	58.3	4	4	6	10					
-50	-52.6	63.3	4	96/0.4		100/0.9				-53.0	63.7
-55	-57.6	68.3	33	35	29	64					
-60	-62.6	73.3	8	12	17	29					
-65											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B1-B SBL	**STATION** 398+21	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.7 ft	**TOTAL DEPTH** 84.8 ft	**NORTHING** 193,869	**EASTING** 2,308,139	**24 HR.** 8.3
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/14/12	**COMP. DATE** 05/14/12	**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	
-65						Match Line					
-70	-67.6	78.3	11	14	21	35					
	-72.6	83.3	10	24	20	44				-74.1 Boring Terminated at Elevation -74.1 ft in Dense Sand	84.8

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B1-A NBL	**STATION** 398+11	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.5 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 193,834	**EASTING** 2,308,153	**24 HR.** 7.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/15/12	**COMP. DATE** 05/15/12	**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)
10										9.5 GROUND SURFACE	0.0
	9.5	0.0	8	5	6	11				ALLUVIAL GRAY SAND, MOIST TO SATURATED	
5	5.7	3.8	3	4	6	10					
0	0.7	8.8	6	9	11	20					
-5	-4.3	13.8	8	10	11	21					
-10	-9.3	18.8	2	2	4	6				-12.5 ALLUVIAL GRAY CLAY WITH WOOD FRAGMENTS, WET	22.0
-15	-14.3	23.8	2	1	2	3				-17.5 ALLUVIAL GRAY SAND, SATURATED	27.0
-20	-19.3	28.8	3	1	3	4				-22.5	32.0
-25	-24.3	33.8	3	9	9	18					
-30	-29.3	38.8	7	11	9	20					
-35	-34.3	43.8	6	9	10	19				-37.5 COASTAL PLAIN GRAY SAND WITH CALCAREOUS SANDSTONE LAYERS AND SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)	47.0
-40	-39.3	48.8	17	39	17	56					
-45	-44.3	53.8	4	4	5	9					
-50	-49.3	58.8	11	17	21	38					
-55	-54.3	63.8	11	18	23	41					
-60	-59.3	68.8	14	24	32	56					
-65	-64.3	73.8	11	17	24	41				-65.8 Boring Terminated at Elevation -65.8 ft in Dense Sand	75.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B2-B SBL	**STATION** 399+47	**OFFSET** 17 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 9.6 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,947	**EASTING** 2,308,237
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/15/12	**COMP. DATE** 05/15/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 7.1

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))
10										9.6 / 0.0 GROUND SURFACE
	9.6	0.0	WOH	WOH	2	2				**ALLUVIAL** GRAY AND BROWN SAND, MOIST TO SATURATED
	6.6	3.0	2	4	4	8				
5										
0	1.6	8.0	4	5	7	12				
	-3.4	13.0	5	10	10	20				
-5										
-10	-8.4	18.0	4	4	6	10				
	-13.4	23.0	1	2	2	4				-11.4 / 21.0 **ALLUVIAL** GRAY CLAY, WET
-15										
-20	-18.4	28.0	2	3	5	8				-16.4 / 26.0 **ALLUVIAL** GRAY CLAYEY SAND, SATURATED
	-23.4	33.0	1	2	3	5				
-25										
-30	-28.4	38.0	2	4	3	7				
	-33.4	43.0	11	26	17	43				-31.4 / 41.0 **COASTAL PLAIN** GRAY SAND WITH CALCAREOUS SANDSTONE LAYERS AND SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)
-35										
-40	-38.4	48.0	6	13	15	28				
	-43.4	53.0	5	5	5	10				
-45										
-50	-48.4	58.0	6	6	10	16				
	-53.4	63.0	17	22	27	49				
-55										
-60	-58.4	68.0	16	20	29	49				
	-63.4	73.0	15	16	23	39				
-65										
-70	-68.4	78.0	9	10	12	22				

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B2-B SBL	**STATION** 399+47	**OFFSET** 17 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 9.6 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 193,947	**EASTING** 2,308,237
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/15/12	**COMP. DATE** 05/15/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 7.1

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
-70						Match Line				
-75	-74.4	84.0	9	15	60/0.0	60/0.0				-75.3 / 84.9; -75.4 / 85.0 Boring Terminated at Elevation -75.4 ft on Calcareous Sandstone

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B2-A NBL	**STATION** 399+33	**OFFSET** 18 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 6.6 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,911	**EASTING** 2,308,249
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/16/12	**COMP. DATE** 05/17/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	3.7

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)
10											
	6.6	0.0								6.6 GROUND SURFACE	0.0
5			2	2	2	4				**ALLUVIAL** GRAY AND BROWN SAND, MOIST TO SATURATED	
	2.8	3.8	3	3	3	6					
0											
	-2.2	8.8	2	5	5	10					
-5											
	-7.2	13.8	4	6	7	13					
-10											
	-12.2	18.8	3	6	5	11					
-15										-15.4	22.0
	-17.2	23.8	WOH	WOH	1	1				**ALLUVIAL** GRAY CLAY, WET	
-20										-20.4	27.0
	-22.2	28.8	6	6	7	13				**ALLUVIAL** GRAY SAND, SATURATED	
-25										-25.4	32.0
	-27.2	33.8	2	1	2	3				**ALLUVIAL** GRAY CLAY, WET	
-30										-30.4	37.0
	-32.2	38.8	7	7	6	13				**ALLUVIAL** GRAY SAND, SATURATED	
-35										-35.4	42.0
	-37.2	43.8	6	13	22	35				**COASTAL PLAIN** GRAY SAND WITH CALCAREOUS SANDSTONE LAYERS AND SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)	
-40											
	-42.2	48.8	7	7	7	14					
-45											
	-47.2	53.8	8	10	12	22					
-50											
	-52.2	58.8	7	10	13	23					
-55											
	-57.2	63.8	15	26	32	58					
-60											
	-62.2	68.8	15	24	27	51					
-65											
	-67.2	73.8	10	17	43	60					
-70											

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Heter, J.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. B2-A NBL	**STATION** 399+33	**OFFSET** 18 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 6.6 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,911	**EASTING** 2,308,249
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/16/12	**COMP. DATE** 05/17/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	3.7

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
-70						Match Line				
	-72.2	78.8	8	10	12	22				**COASTAL PLAIN** GRAY SAND WITH CALCAREOUS SANDSTONE LAYERS AND SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION) *(continued)*
-75										
	-77.2	83.8	5	5	8	13				
-80										
	-82.2	88.8	6	7	11	18				-83.7 90.3
										Boring Terminated at Elevation -83.7 ft in Medium Dense Sand

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 400+04	**OFFSET** 57 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 7.4 ft	**TOTAL DEPTH** 90.2 ft	**NORTHING** 194,014	**EASTING** 2,308,256 — **24 HR.** 5.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/09/11	**COMP. DATE** 11/10/11	**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)
7.4		0.0							GROUND SURFACE	0.0
	7.4		1	1	2				**ALLUVIAL** GRAY SAND, MOIST	
	3.7	3.7	1	1	1		▼		**ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL, MOIST TO SATURATED	
	-1.3	8.7	3	5	6				**ALLUVIAL** TAN SAND, SATURATED	
	-6.3	13.7	4	6	7					
	-11.3	18.7	2	4	4					
	-16.3	23.7	1	2	3					
	-21.3	28.7	1	2	2					
	-26.3	33.7	6	4	5					
	-31.3	38.7	8	9	6					
	-36.3	43.7	6	14	13					
	-41.3	48.7	12	6	7					
	-46.3	53.7	5	5	8					
	-51.3	58.7	6	7	9					
	-56.3	63.7	11	18	22					
	-61.3	68.7	10	17	21					
	-66.3	73.7	8	8	10					

BLOWS PER FOOT: 0 25 50 75 100

ELEV. (ft)	DEPTH (ft)
4.4	3.0
0.4	7.0
-4.6	12.0
-14.6	22.0
-19.6	27.0
-24.6	32.0
-29.6	37.0
-65.6	73.0
-66.1	73.5

ALLUVIAL GRAY CLAY, WET

ALLUVIAL GRAY SILT, WET

ALLUVIAL GRAY SAND, SATURATED

COASTAL PLAIN GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 400+04	**OFFSET** 57 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 7.4 ft	**TOTAL DEPTH** 90.2 ft	**NORTHING** 194,014	**EASTING** 2,308,256 — **24 HR.** 5.2
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/09/11	**COMP. DATE** 11/10/11	**SURFACE WATER DEPTH** N/A

Match Line

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-71.3		78.7	7	8	12				**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*	
-76.3		83.7	6	7	7					
-81.3		88.7	4	5	6					
-82.8									Boring Terminated at Elevation -82.8 ft in Medium Dense Sand	90.2

NCDOT BORE DOUBLE R-2633B_GEO_BRDG_LOVREY9.GPJ NC_DOT.GDT 6/14/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB2-B NBL	**STATION** 399+51	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 7.2 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,890	**EASTING** 2,308,288 / **24 HR.** 5.4
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/11	**COMP. DATE** 11/14/11	**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)
	7.2	0.0	WOH	1	2	3				7.2 GROUND SURFACE	0.0
										ALLUVIAL GRAY SAND, MOIST	
	3.4	3.8	1	1	2	3		▼		4.2 **ALLUVIAL** BROWN SAND WITH LITTLE ORGANIC MATERIAL, MOIST TO SATURATED	3.0
	-1.6	8.8	2	5	7	12				0.2 **ALLUVIAL** TAN SAND, SATURATED	7.0
	-6.6	13.8	3	5	7	12				-4.8	12.0
	-11.6	18.8	1	1	1	2				-14.8 **ALLUVIAL** GRAY CLAY, WET	22.0
	-16.6	23.8	1	1	1	2				-19.8 **ALLUVIAL** GRAY SAND, SATURATED	27.0
	-21.6	28.8	4	8	8	16				-24.8 **ALLUVIAL** GRAY CLAY, WET	32.0
	-26.6	33.8	WOH	1	1	2				-29.8 **ALLUVIAL** GRAY SAND, SATURATED	37.0
	-31.6	38.8	1	1	1	2				-34.8 **COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION)	42.0
	-36.6	43.8	6	17	9	26					
	-41.6	48.8	5	7	9	16					
	-46.6	53.8	2	3	4	7					
	-51.6	58.8	6	9	15	24					
	-56.6	63.8	13	16	21	37					
	-61.6	68.8	100/0.4			100/0.4					
	-66.6	73.8	10	13	19	32					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY9- (PROGRESS ENERGY SPUR LINE)			**GROUND WTR (ft)**
BORING NO. EB2-B NBL	**STATION** 399+51	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 7.2 ft	**TOTAL DEPTH** 90.3 ft	**NORTHING** 193,890	**EASTING** 2,308,288 / **24 HR.** 5.4
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/14/11	**COMP. DATE** 11/14/11	**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
-70						Match Line				
	-71.6	78.8	8	9	15	24				**COASTAL PLAIN** GRAY AND GREEN SAND WITH CALCAREOUS SANDSTONE LAYERS, SATURATED (PEEDEE FORMATION) *(continued)*
-75	-76.6	83.8	6	8	10	18				
-80	-81.6	88.8	51	22	17	39				-83.1 90.3 Boring Terminated at Elevation -83.1 ft in Dense Sand

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	6

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY BRUNSWICK /NEW HANOVER

PROJECT DESCRIPTION US 17 FROM SR 1430 (CEDAR HILL ROAD) TO US 421 NORTH OF WILMINGTON

SITE DESCRIPTION BRIDGE ON -RPC4 OVER -EY13- AT -RPC4- STA. 16+73.17

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN, INC.

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE NOVEMBER 2011

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE

PROJECT: 34491.1.2

ID: R-2633BB

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 6

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, 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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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	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
- [X] CME-45B
- [ ] 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: -BY12-

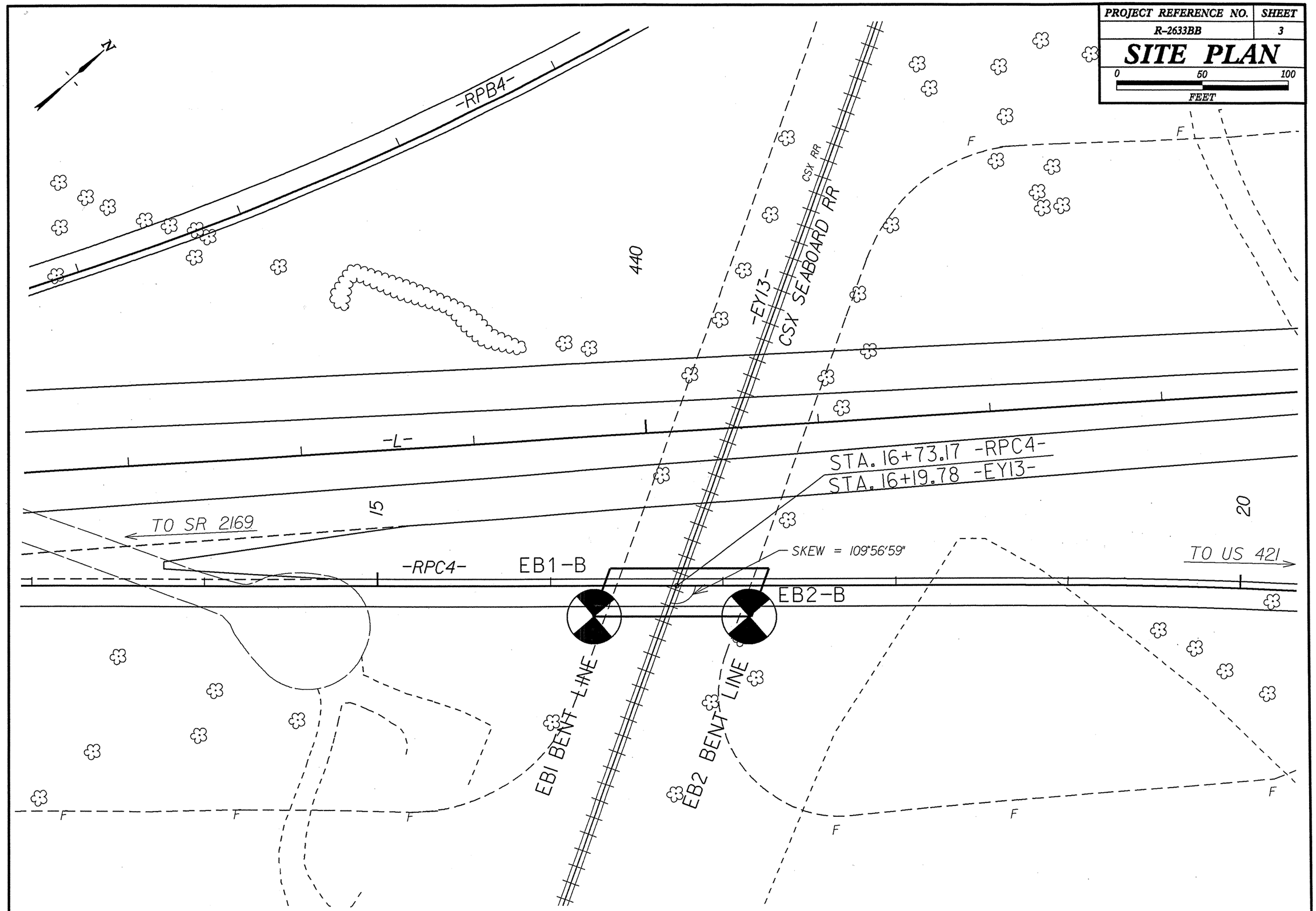
ELEVATION: 14.85 FT.

NOTES:

PROJECT REFERENCE NO.	SHEET
R-2633BB	3

SITE PLAN

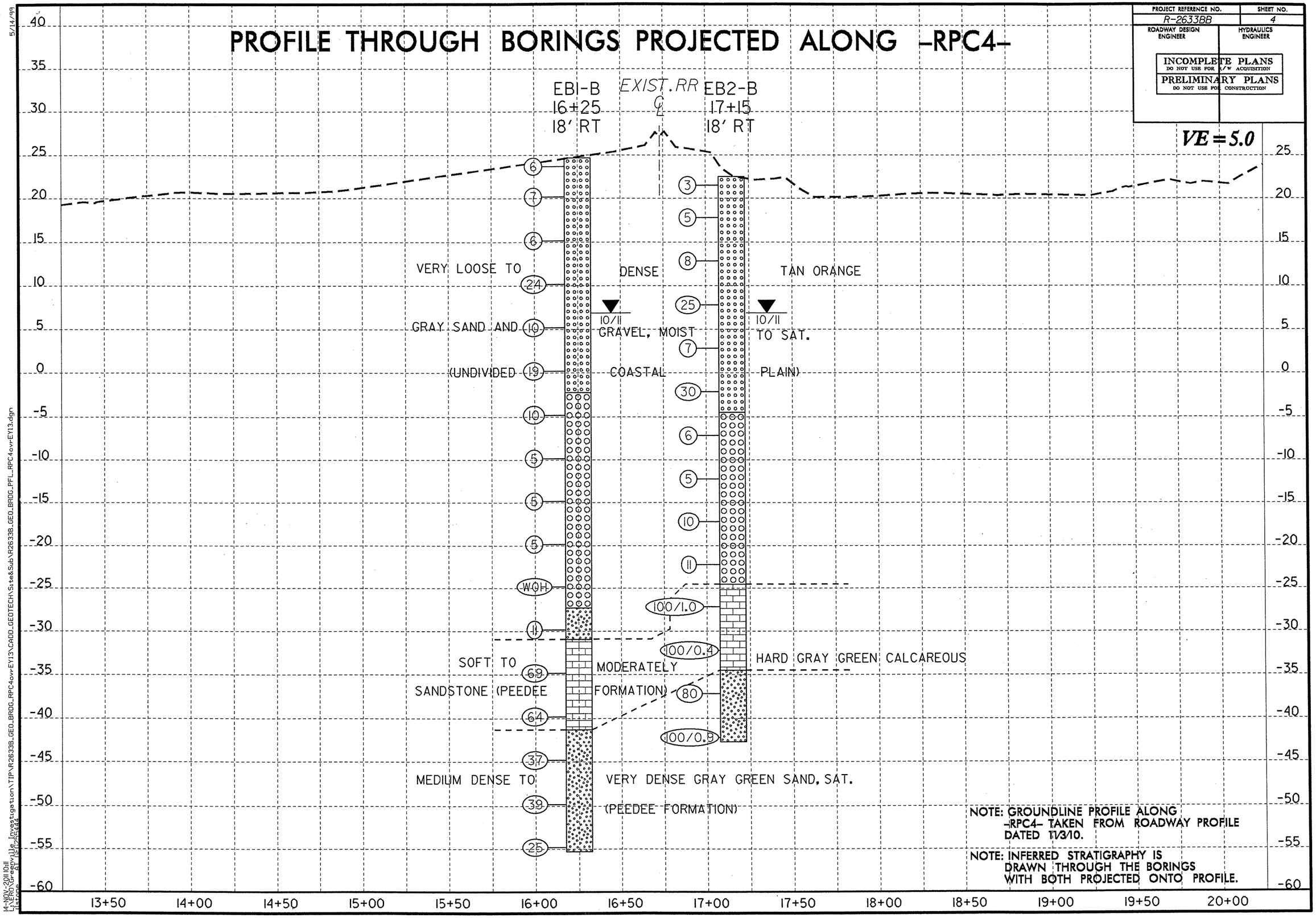
0 50 100
FEET



PROFILE THROUGH BORINGS PROJECTED ALONG -RPC4-

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



NOTE: GROUNDLINE PROFILE ALONG -RPC4- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

5/14/99

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L:\ERO\Greenville Investigation\TIP\R2633B_GEO_BRDG_RPC4ovr-EY13\CADD_GEOTECH\Site&Sub\R2633B_GEO_BRDG_PFL_RPC4ovr-EY13.dgn

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPC4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 16+25	**OFFSET** 18 ft RT	**ALIGNMENT** -RPC4-
COLLAR ELEV. 24.7 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 196,896	**EASTING** 2,310,950
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/26/11	**COMP. DATE** 10/26/11	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	17.8

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)
30											
25	24.7	0.0								24.7 GROUND SURFACE	0.0
			1	2	4	6				**UNDIVIDED COASTAL PLAIN** TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
20	21.2	3.5	2	3	4	7					
15	16.2	8.5	2	2	4	6					
10	11.2	13.5	6	10	14	24					
5	6.2	18.5	4	4	6	10					
0	1.2	23.5	8	8	11	19				-2.3	27.0
-5	-3.8	28.5	5	5	5	10					
-10	-8.8	33.5	2	2	3	5					
-15	-13.8	38.5	2	2	3	5					
-20	-18.8	43.5	1	2	3	5					
-25	-23.8	48.5	WOH	WOH	WOH	0				-27.3	52.0
-30	-28.8	53.5	3	3	8	11				-30.9	55.6
										COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE (PEEDEE FORMATION)	
-35	-33.8	58.5	22	24	45	69					
-40	-38.8	63.5	15	26	38	64				-41.3	66.0
										COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
-45	-43.8	68.5	11	18	19	37					
-50	-48.8	73.5	10	13	26	39					

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPC4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 16+25	**OFFSET** 18 ft RT	**ALIGNMENT** -RPC4-
COLLAR ELEV. 24.7 ft	**TOTAL DEPTH** 80.0 ft	**NORTHING** 196,896	**EASTING** 2,310,950
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/26/11	**COMP. DATE** 10/26/11	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	17.8

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
-50						Match Line				
-55	-53.8	78.5	11	12	13	25				**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION) *(continued)*
										-55.3 80.0
										Boring Terminated at Elevation -55.3 ft IN DENSE SAND

NCDOT BORE DOUBLE BORELOGS.GPJ NC_DOT.GDT 11/14/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** NEW HANOVER	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -RPC4- OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 17+15	**OFFSET** 18 ft RT	**ALIGNMENT** -RPC4-	**0 HR.** N/A
COLLAR ELEV. 22.5 ft	**TOTAL DEPTH** 65.2 ft	**NORTHING** 196,965	**EASTING** 2,311,009	**24 HR.** 15.6
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/26/11	**COMP. DATE** 10/26/11	**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)
25											
	22.5	0.0								22.5 GROUND SURFACE	0.0
			1	1	2	3				**UNDIVIDED COASTAL PLAIN** TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
20	18.8	3.7	2	2	3	5					
15	13.8	8.7	2	4	4	8					
10	8.8	13.7	8	12	13	25		▼			
5	3.8	18.7	1	3	4	7					
0	-1.2	23.7	8	15	15	30				-4.5	27.0
-5	-6.2	28.7	2	3	3	6					
-10	-11.2	33.7	2	2	3	5					
-15	-16.2	38.7	3	4	6	10					
-20	-21.2	43.7	3	5	6	11					
-25	-26.2	48.7	31	44	56	100/1.0				-24.5	47.0
										COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE (PEEDEE FORMATION)	
-30	-31.2	53.7	57	100/0.4		100/0.4					
-35	-36.2	58.7	32	33	47	80				-34.5	57.0
										COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
-40	-41.2	63.7	20	44	56/0.4	100/0.9				-42.7	65.2
										Boring Terminated at Elevation -42.7 ft IN VERY DENSE SAND	

NCDOT BORE DOUBLE BORELOGS.GPJ NC_DOT.GDT 11/14/11

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BB	1	10

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34491.1.2 (R-2633BB) F.A. PROJ. _____

COUNTY NEW HANOVER

PROJECT DESCRIPTION US 17 FROM SR 1430 (CEDAR HILL ROAD) TO US 421 NORTH OF WILMINGTON

SITE DESCRIPTION BRIDGE ON US 17 BYPASS OVER -EY13- AT -L- STA. 440+50.13

PROJECT: 34491.1.2 ID: R-2633BB

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-7	CROSS SECTIONS
8-10	BORE LOGS

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

CATLIN, INC

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE NOVEMBER 2011

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE

DRAWN BY: C.P. TURNER, J.L. STONE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	2 OF 10

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
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
- [X] CME-45B
- [ ] 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 (REC.) - 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: -BY12-

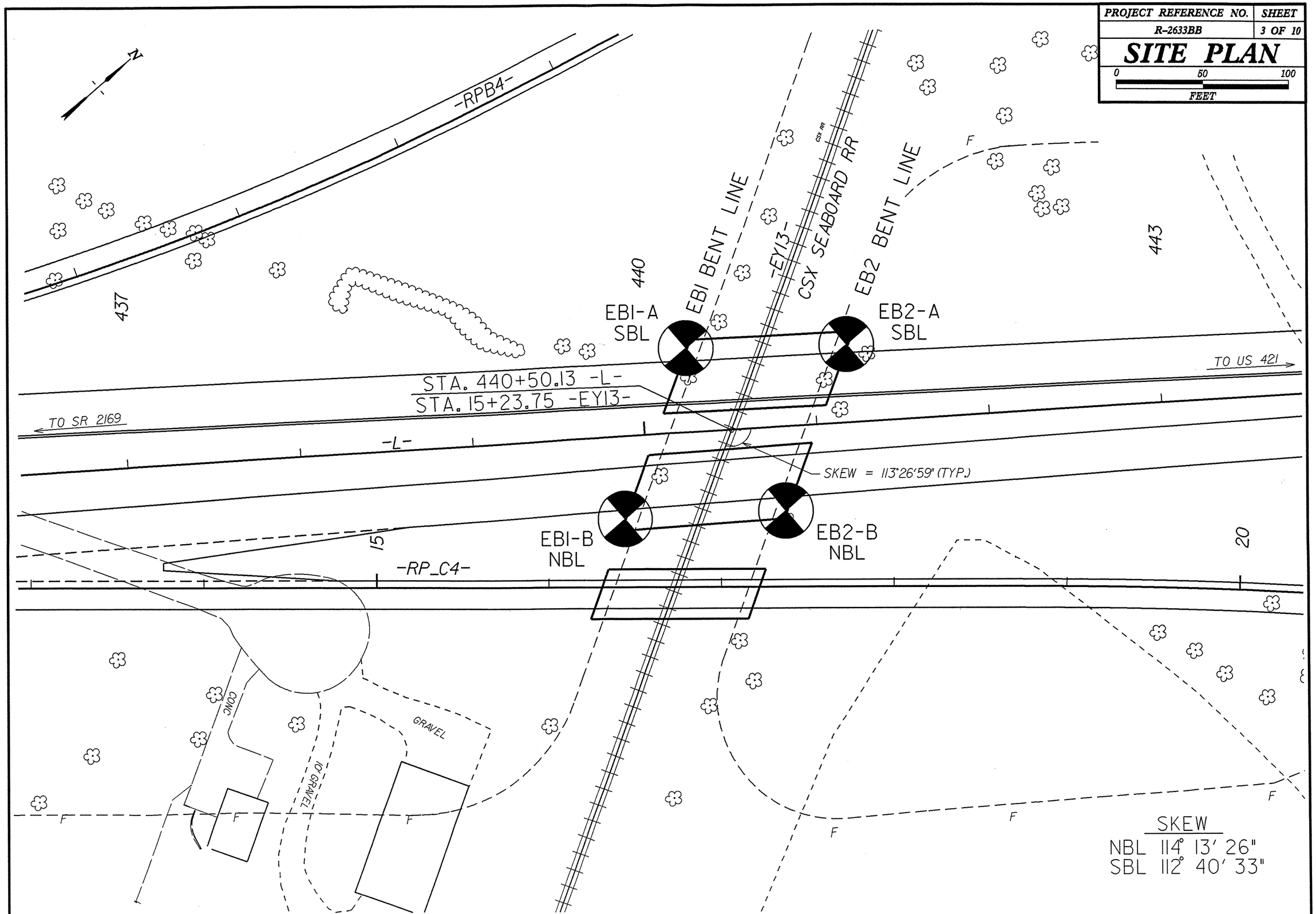
ELEVATION: 14.85 FT.

NOTES:

PROJECT REFERENCE NO.	SHEET
R-2633BB	3 OF 10

SITE PLAN

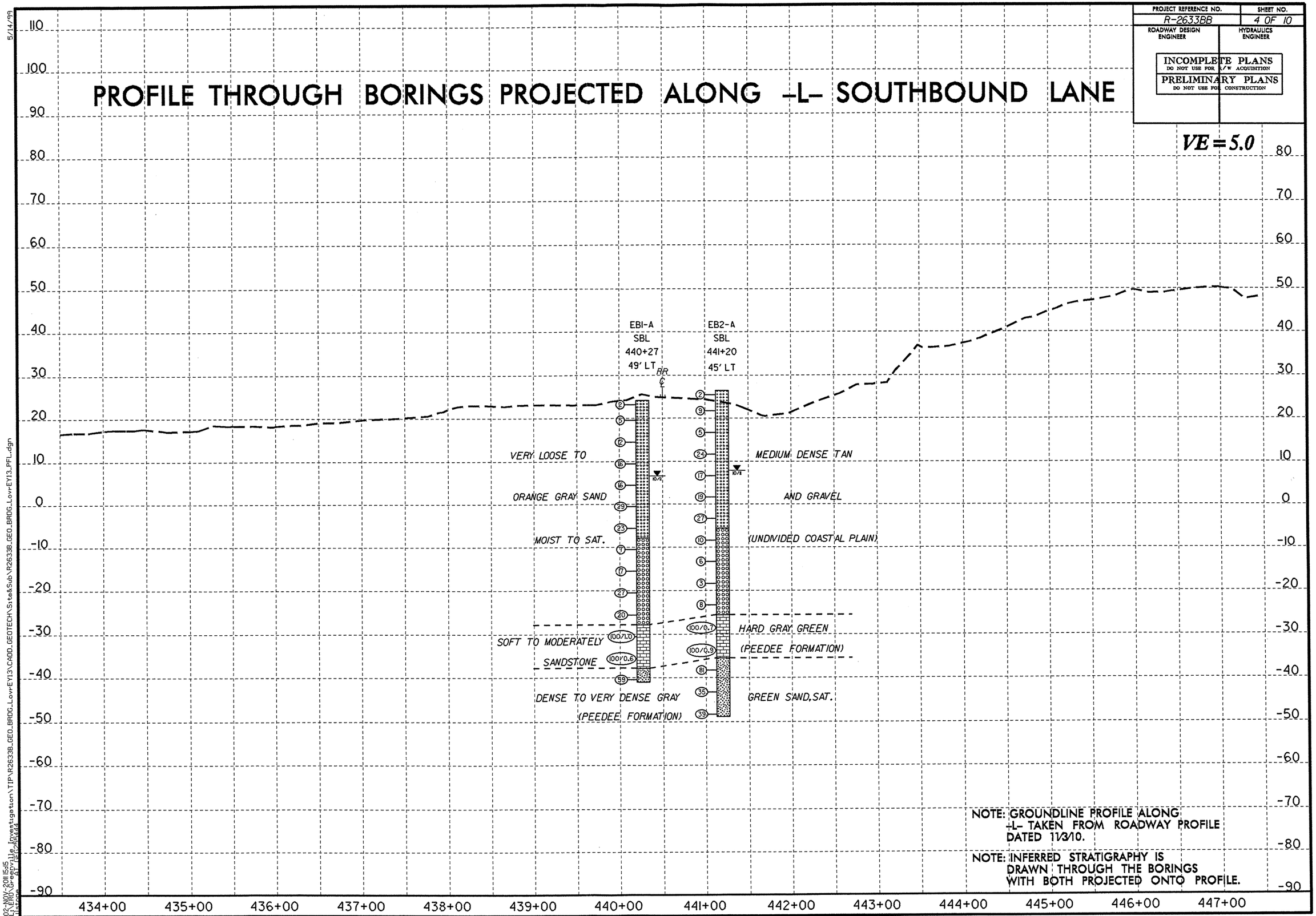
0 50 100
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	4 OF 10
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- SOUTHBOUND LANE



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

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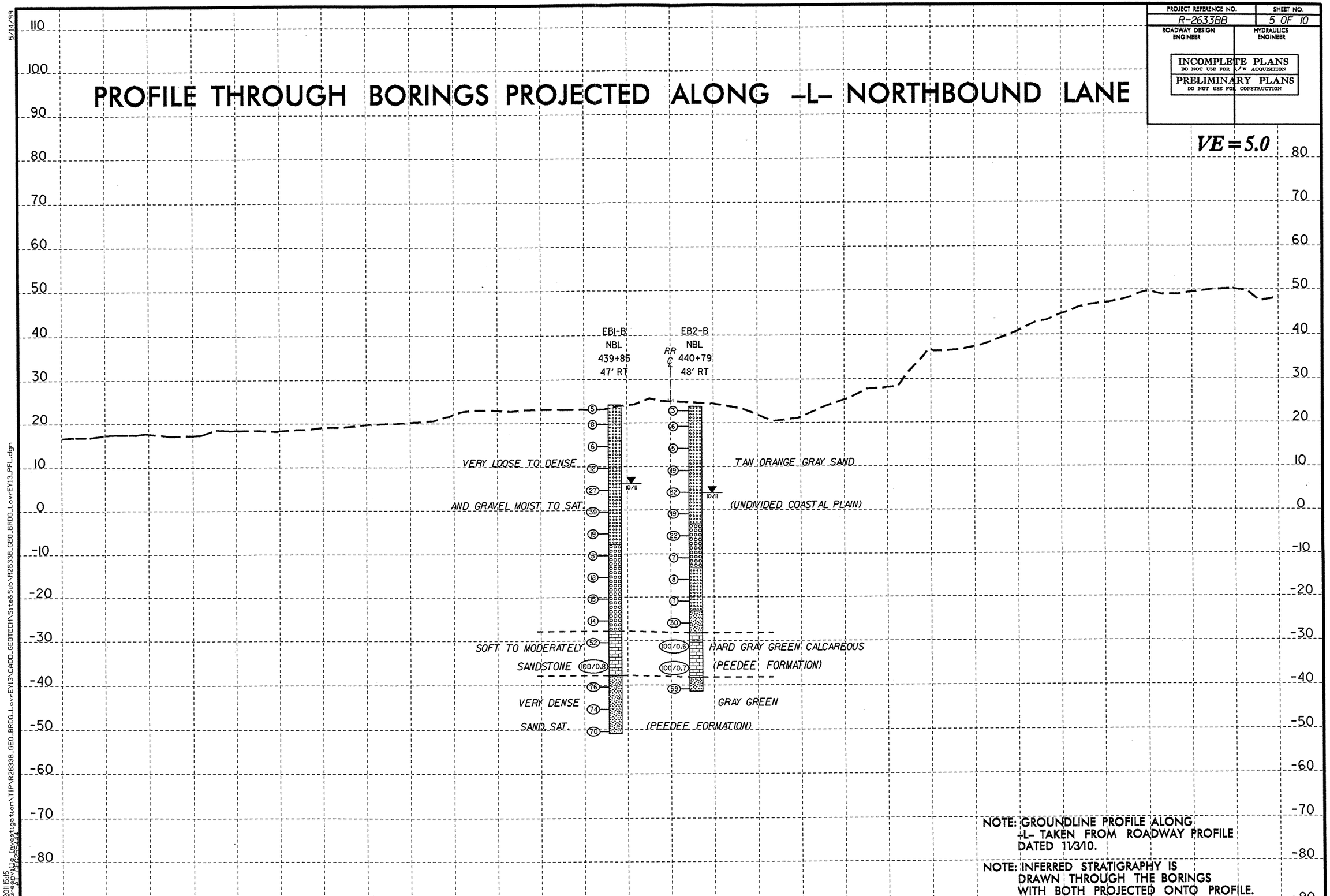
PROJECT REFERENCE NO.	SHEET NO.
R-2633BB	5 OF 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L- NORTHBOUND LANE



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 11/3/10.

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

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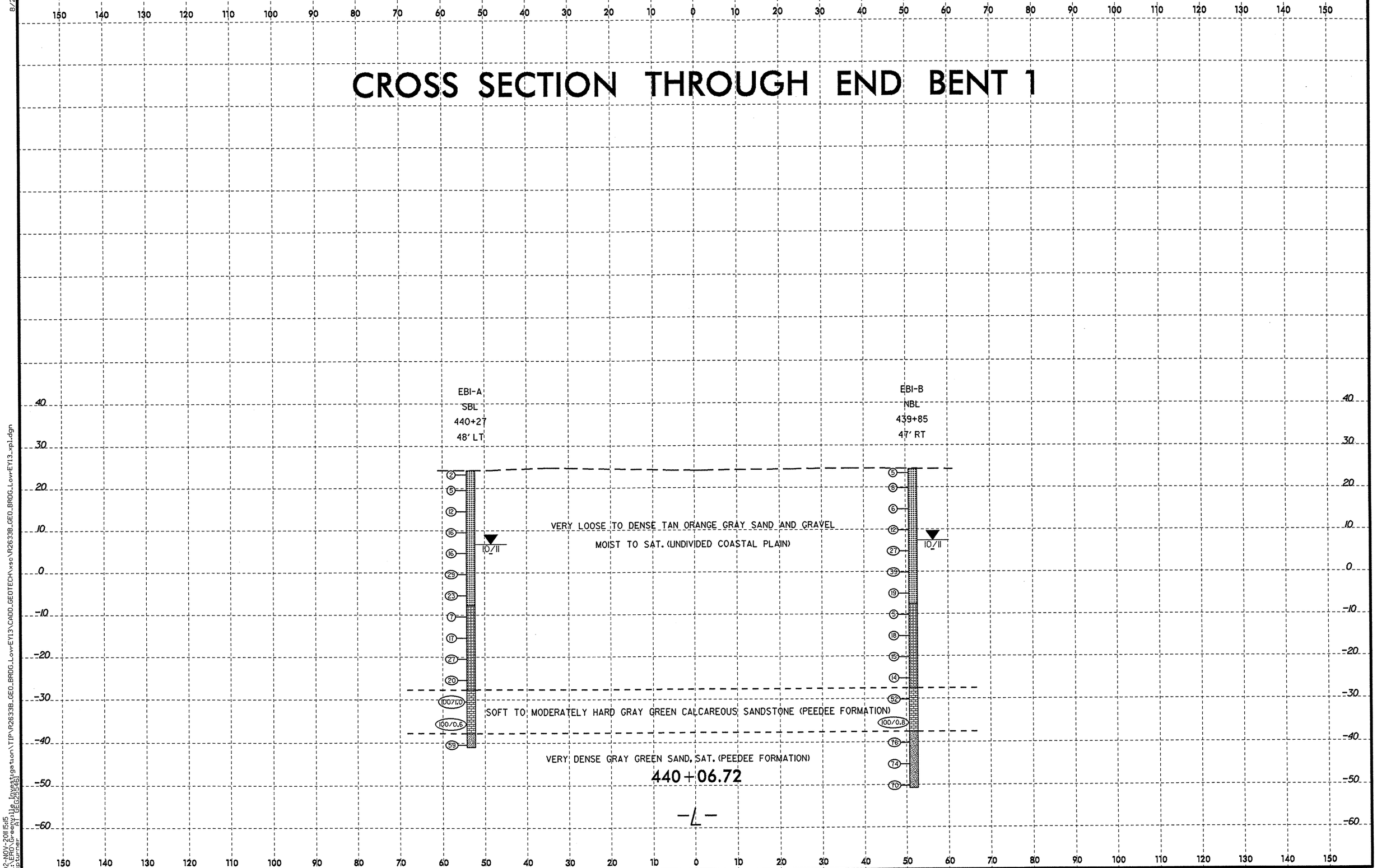
PROJ. REFERENCE NO. R-2633BB
SHEET NO. 6 OF 10

CROSS SECTION THROUGH END BENT 1



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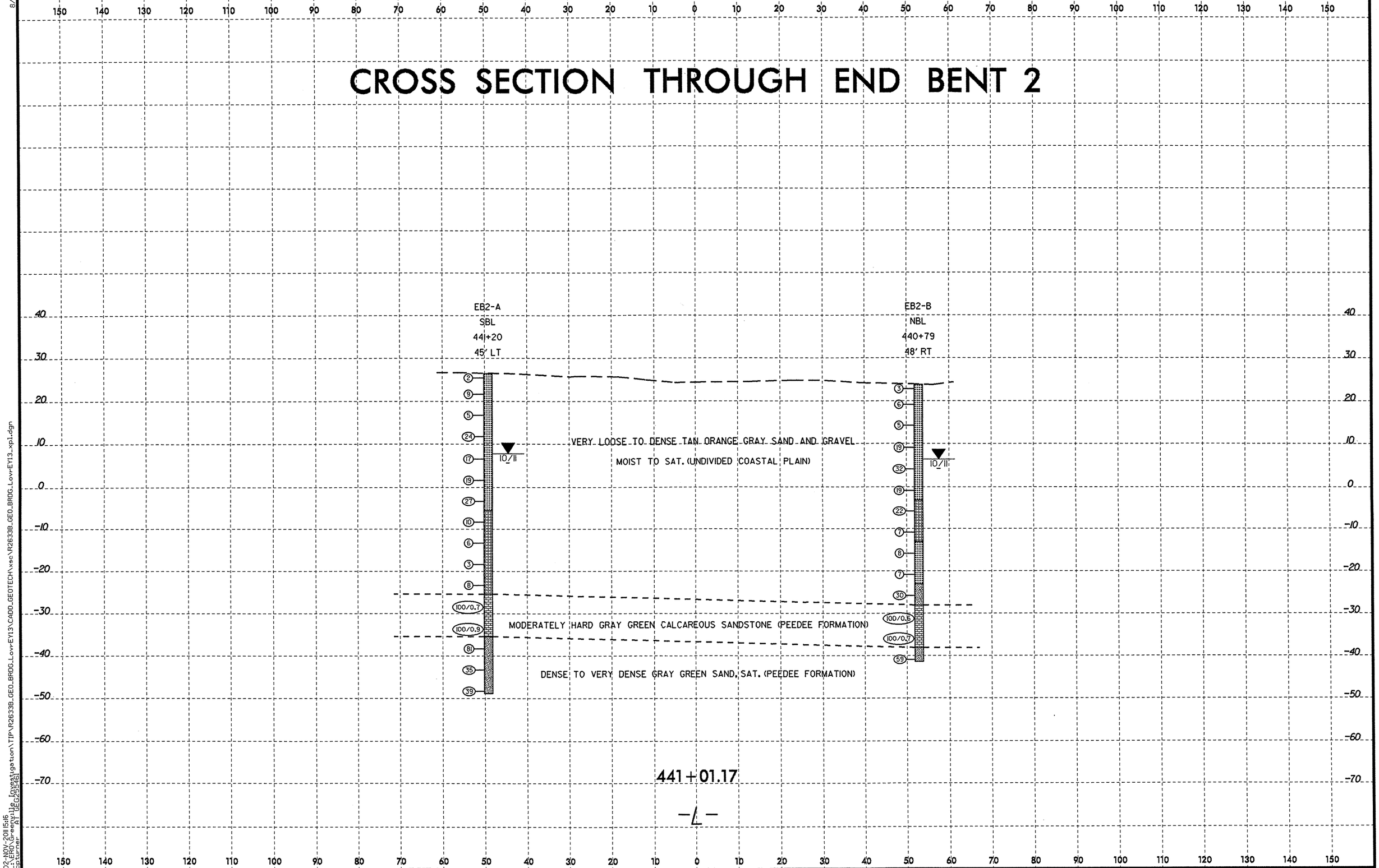
PROJ. REFERENCE NO.	SHEET NO.
R-2633BB	7 OF 10

CROSS SECTION THROUGH END BENT 2



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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNSWICK	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB1-A SBL	**STATION** 440+27	**OFFSET** 49 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 24.3 ft	**TOTAL DEPTH** 65.2 ft	**NORTHING** 197,040	**EASTING** 2,310,868	**24 HR.** 17.6
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/20/11	**COMP. DATE** 10/20/11	**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)
25											
	24.3	0.0								24.3 GROUND SURFACE	0.0
			1	1	1	2				UNDIVIDED COASTAL PLAIN TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
20	20.6	3.7	1	2	3	5					
15	15.6	8.7	3	5	7	12					
10	10.6	13.7	3	5	11	16					
5	5.6	18.7	6	8	8	16					
0	0.6	23.7	8	14	15	29					
-5	-4.4	28.7	6	11	12	23					
-10	-9.4	33.7	3	3	4	7				-7.7	32.0
-15	-14.4	38.7	6	8	9	17					
-20	-19.4	43.7	9	13	14	27					
-25	-24.4	48.7	5	9	11	20					
-30	-29.4	53.7	49	46	54	100/1.0				-27.7 COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE, (PEEDEE FORMATION)	52.0
-35	-34.4	58.7	42	79	21/0.1	100/0.6					
-40	-39.4	63.7	13	32	27	59				-37.7 COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	62.0
										-40.9 Boring Terminated at Elevation -40.9 ft IN VERY DENSE SAND	65.2

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNSWICK	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB1-B NBL	**STATION** 439+85	**OFFSET** 47 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 24.4 ft	**TOTAL DEPTH** 75.1 ft	**NORTHING** 196,949	**EASTING** 2,310,920	**24 HR.** 17.1
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/19/11	**COMP. DATE** 10/19/11	**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	
25											
	24.4	0.0	WOH	2	3	5				24.4 GROUND SURFACE	0.0
										UNDIVIDED COASTAL PLAIN TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
20	20.8	3.6	3	4	4	8					
15	15.8	8.6	2	3	3	6					
10	10.8	13.6	3	4	8	12					
5	5.8	18.6	5	13	14	27					
0	0.8	23.6	14	19	20	39					
-5	-4.2	28.6	8	8	11	19				-7.6	32.0
-10	-9.2	33.6	2	2	3	5					
-15	-14.2	38.6	6	7	11	18					
-20	-19.2	43.6	5	7	8	15					
-25	-24.2	48.6	5	7	7	14				-27.6 COASTAL PLAIN GRAY GREEN CALCAREOUS SANDSTONE, (PEEDEE FORMATION)	52.0
-30	-29.2	53.6	24	29	23	52					
-35	-34.2	58.6	25	49	51/0.3	100/0.8				-37.6 COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	62.0
-40	-39.2	63.6	24	38	38	76					
-45	-44.2	68.6	14	42	32	74					
-50	-49.2	73.6	13	32	38	70				-50.7 Boring Terminated at Elevation -50.7 ft IN VERY DENSE SAND	75.1

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 11/2/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNSWICK	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 441+20	**OFFSET** 45 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 26.5 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 197,112	**EASTING** 2,310,927 — **24 HR.** 18.6
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/25/11	**COMP. DATE** 10/25/11	**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)
30											
	26.5	0.0								26.5 GROUND SURFACE	0.0
25			1	1	1	2				**UNDIVIDED COASTAL PLAIN** TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
	22.7	3.8	2	4	5	9					
20											
	17.7	8.8	2	3	2	5					
15											
	12.7	13.8	5	10	14	24					
10											
	7.7	18.8	8	10	7	17					
5											
	2.7	23.8	6	9	10	19					
0											
	-2.3	28.8	10	13	14	27				-5.5	32.0
-5											
	-7.3	33.8	6	5	5	10					
-10											
	-12.3	38.8	3	3	3	6					
-15											
	-17.3	43.8	1	2	1	3					
-20											
	-22.3	48.8	4	4	4	8					
-25										-25.5	52.0
	-27.3	53.8	25	40	60/0.2	100/0.7				**COASTAL PLAIN** GRAY GREEN CALCAREOUS SANDSTONE, (PEEDEE FORMATION)	
-30											
	-32.3	58.8	18	44	56/0.4	100/0.9					
-35										-35.5	62.0
	-37.3	63.8	10	41	40	81				**COASTAL PLAIN** GRAY GREEN SAND, SAT.(PEEDEE FORMATION)	
-40											
	-42.3	68.8	15	16	19	35					
-45											
	-47.3	73.8	16	18	21	39				-48.8	75.3

Boring Terminated at Elevation -48.8 ft IN

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNSWICK	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB2-A SBL	**STATION** 441+20	**OFFSET** 45 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 26.5 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 197,112	**EASTING** 2,310,927 — **24 HR.** 18.6
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/25/11	**COMP. DATE** 10/25/11	**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
-50						Match Line				DENSE SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34491.1.2	**TIP** R-2633BB	**COUNTY** BRUNSWICK	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE ON -L- (US 17 BYPASS) OVER -EY13- (CSX SEABOARD RAILROAD)			**GROUND WTR (ft)**
BORING NO. EB2-B NBL	**STATION** 440+79	**OFFSET** 48 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 23.8 ft	**TOTAL DEPTH** 65.2 ft	**NORTHING** 197,023	**EASTING** 2,310,977 — **24 HR.** 17.4
DRILL RIG/HAMMER EFF./DATE CAT6394 CME-45B 91% 02/19/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/25/11	**COMP. DATE** 10/25/11	**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)
25											
	23.8	0.0								23.8 GROUND SURFACE	0.0
			1	1	2	3				**UNDIVIDED COASTAL PLAIN** TAN ORANGE GRAY SAND AND GRAVEL, MOIST TO SAT.	
20	20.1	3.7	2	3	3	6					
15	15.1	8.7	2	2	3	5					
10	10.1	13.7	5	9	10	19		▼			
5	5.1	18.7	11	16	16	32					
0	0.1	23.7	6	9	10	19				-3.2	27.0
-5	-4.9	28.7	10	10	12	22					
-10	-9.9	33.7	4	4	3	7				-13.2	37.0
-15	-14.9	38.7	3	4	4	8					
-20	-19.9	43.7	3	3	4	7				-23.2	47.0
-25	-24.9	48.7	8	15	15	30				-28.2	52.0
-30	-29.9	53.7	48	87	13/0.1	100/0.6				**COASTAL PLAIN** GRAY GREEN CALCAREOUS SANDSTONE (PEEDEE FORMATION)	
-35	-34.9	58.7	28	85	15/0.2	100/0.7				-38.2	62.0
-40	-39.9	63.7	15	28	31	59				**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION) -41.4	65.2

Boring Terminated at Elevation -41.4 ft IN VERY DENSE SAND

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 11/2/11