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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34182.1.4 (I-3318BB)	1	27

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34182.1.4 (I-3318BB)* F.A. PROJ. *IMS-095-2(119)105*

COUNTY *JOHNSTON*

PROJECT DESCRIPTION

SITE DESCRIPTION *REPLACE BRIDGES 114 & 116 ON -L- (I-95) OVER LITTLE RIVER AT STA. 24+68*

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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) 707-6850. 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.

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PERSONNEL

CONSULTANT:

SUMMIT

INVESTIGATED BY *J. L. PEDRO*

CHECKED BY *N. T. ROBERSON*

SUBMITTED BY *N. T. ROBERSON*

DATE *JANUARY 2013*

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

DocuSigned by: Jaime Love Pedro 2EFF7169ED9243B... 9/5/2014

DRAWN BY: *T.T. WALKER, J. L. PEDRO*

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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: 34182.1.4

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34182.1.4 (I-3318BB)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

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

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- ☐ MOBILE B-___
- ☐ BK-51
- ☐ CME-45C
- ☐ CME-550
- ☐ PORTABLE HOIST
- ■ D-50 TRACK
- ☐ _____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☐ 6" CONTINUOUS FLIGHT AUGER
- ☐ 8" HOLLOW AUGERS
- ☐ HARD FACED FINGER BITS
- ■ TUNG.-CARBIDE INSERTS
- ■ CASING ■ W/ ADVANCER
- ☐ TRICONE _____" STEEL TEETH
- ☐ TRICONE _____" TUNG.-CARB.
- ■ CORE BIT
- ■ 2¼ HOLLOW AUGERS

HAMMER TYPE:
- ■ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ■ -N Q2
- ☐ -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:
GPK FILE DATED 10/8/2013 AND TIN FILE DATED 6/21/2011 WERE USED TO GET BORING ELEVATIONS AND CROSS SECTION GROUNDLINES.

REVISED 09/23/09

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SITE PLAN

0 50 100
FEET

NC GRID
NAD 83

LIFT STATION

60" WW W/3SBW

-LRPA- POT Sta. 10+00.00 =
-L- POT Sta. 21+00.00 OFF 39° LT.

22+00 23+00 24+00 25+00 26+00 27+00

WOODS

UNKNOWN SIZE AND TYPE

BILLBOARD

FSS

W

16" DI

EOI

POLE

8" DIP

8" DUCT IRON
(ABOVE GROUND HERE)

48"

SB_EBI-A SB_BI-A SB_B2-A SB_EB2-A

LITTLE RIVER

SS

MTL GUARDRAIL

-LRPA-

TO SMITHFIELD

SB_EBI-B SB_BI-B SB_B2-B SB_EB2-B

18" RCP

5 SPAN STEEL & CONC GE

-L-

TO KENLY

NB_EBI-A NB_BI-A NB_B2-A NB_EB2-A

BM# 2

NB_BI-B

BM# 1

NB_EBI-B

-BL- 100

NB_B2-B

NB_EB2-B

48" WW & 2SBW

BILLBOARD

WOODS

SKEW ANGLE = 110°

SOUTHBOUND

0	20	40
FEET		
VE = 2:1		

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	4
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L- PROFILE	

SB_EB1-B
23+41
21' LT

SB_B1-B
24+35
12' LT

SB_B2-B
25+21
18' LT

SB_EB2-B
26+10
18' LT

CONCRETE

ROADWAY

EMBANKMENT, TAN, ORANGE, AND GRAY, V. LOOSE TO MED. DENSE, SILTY SAND WITH GRAVEL

ALLUVIAL, BROWN AND GRAY, SOFT, WET, SANDY CLAY AND VERY LOOSE, SILTY SAND WITH SOME GRAVEL

LITTLE RIVER

WATER SURFACE 12/18/13

WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)

FIAD 12/13

CRYSTALLINE ROCK, GRAY-GREEN, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST

REC=97% RQD=63% RMR=57

ALLUVIAL, GRAY AND BROWN, MED. STIFF, MOIST, SANDY SILT AND MED. DENSE, SILTY SAND WITH SOME GRAVEL

CONCRETE

ROADWAY EMBANKMENT, TAN, ORANGE, AND BROWN, MED. STIFF TO STIFF, MOIST, SILTY CLAY AND CLAYEY SILT

12/13

Ⓐ RESIDUAL, TAN-GRAY, HARD, MOIST, SAPROLITIC, SANDY SILT

Ⓑ RESIDUAL, GRAY, DENSE, DRY TO MOIST, SAPROLITIC, SILTY SAND

+20 +40 +60 +80 24+00 +20 +40 +60 +80 25+00 +20 +40 +60 +80 26+00 +20

0	20	40
FEET		
VE = 2:1		

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	5
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L- PROFILE	

NORTHBOUND

NB_EB1-A
23+27
19' RT

NB_B1-A
24+13
12' RT

NB_B2-A
25+08
16' RT

NB_EB2-A
25+96
20' RT

LITTLE RIVER

WATER SURFACE 1/9/14

CONCRETE

ROADWAY EMBANKMENT, ORANGE, BROWN, TAN, AND GRAY, LOOSE TO MED. DENSE, MOIST TO WET, SILTY SAND

ALLUVIAL, GRAY AND TAN, MED. STIFF, MOIST TO WET, SILTY CLAY AND V. LOOSE, SILTY SAND

ALLUVIAL, GRAY, TAN, AND BROWN, V. LOOSE TO MED. DENSE, MOIST TO WET, SILTY SAND AND MED. TO VERY STIFF, SANDY SILT

ROADWAY EMBANKMENT, TAN, BROWN, MED. STIFF, MOIST, ORANGE, AND STIFF TO SILTY CLAY AND CLAYEY SILT

WEATHERED ROCK

(METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK, GREEN-GRAY, VERY SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST

REC=99% RQD=63% RMR=56

150 140 130 120 110 100 90 80 70

+20 +40 +60 +80 24+00 +20 +40 +60 +80 25+00 +20 +40 +60 +80 26+00 +20

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	6

CROSS SECTION THROUGH END BENT 1 -SBL-

SB_EB1-A
23+65
86' LT

SB_EB1-B
23+41
21' LT

℄

MATCH LINE A

ASPHALT AND CONCRETE

ROADWAY EMBANKMENT, GRAY, TAN, BROWN, AND ORANGE, VERY LOOSE TO MED. DENSE, SILTY SAND AND MED. STIFF, CLAYEY SILT AND SOME CONCRETE

ALLUVIAL, ORANGE-BROWN, MED. DENSE, SAT., COARSE SAND

12/13

WEATHERED ROCK

(METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK
(METAVOLCANIC CHLORITE SCHIST)

FIAD
12/13

160	160	
150	150	
140	140	
130	130	
120	120	
110	110	
100	100	
90	90	
80	80	
70	70	

SB_EB1-A: (A) 13; 100/0.5; 100/0.9; 100/0.3; 100/0.4; 60/0.0

SB_EB1-B: 2; 15; 11; 8; 4; 24; 100/0.7; (B) 83; 100/0.4; (B); 100/0.9; 100/0.4

Ⓐ RESIDUAL, ORANGE-BROWN AND GRAY, STIFF, MOIST, CLAYEY SILT

Ⓑ RESIDUAL, TAN-GRAY, HARD, MOIST, SAPROLITIC, SANDY SILT

SKEW ANGLE = 110°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	7

CROSS SECTION THROUGH BENT 1 -SBL-

140 130 120 110 100 90 80 70 60 50

SB_B1-A
24+49
71' LT

SB_B1-B
24+35
12' LT

℄

ALLUVIAL, BROWN, GRAY, AND GREEN-GRAY, SOFT TO STIFF, MOIST TO WET, SILTY AND SANDY CLAY

01/14

12

4

RESIDUAL, GRAY TO TAN, SAPROLITIC, CLAYEY

57

AND GREEN-GRAY, HARD, MOIST, SILT

100/0.4

100/0.7

100/0.6

WEATHERED ROCK

RESIDUAL, TAN-BROWN AND VERY STIFF, MOIST,

20

GREEN-GRAY, CLAYEY SILT

100/0.4

100/0.6

100/0.5

(METAVOLCANIC CHLORITE SCHIST)

100/0.4

100/0.6

100/0.3

100/0.3

60/0.1

100/0.2

60/0.0

FIAD
12/13

CRYSTALLINE ROCK, TO FRESH, MODERATELY FRACTURE SPACING,

GREEN-GRAY, SLIGHTLY WEATHERED HARD TO HARD, VERY CLOSE TO CLOSE METAVOLCANIC CHLORITE SCHIST

REC=98% RQD=61% RMR=46

MATCH LINE A

SKEW ANGLE = 110°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34182.1.4 (3318BB)	8

CROSS SECTION THROUGH BENT 2 –SBL–

140
130
120
110
100
90
80
70
60
50

SB_B2–A
25+61
83' LT

SB_B2–B
25+21
18' LT

℄

WATER SURFACE 12/18/13

01/14

9
12
100/0.2
100/0.4
60/0.1

ALLUVIAL, GRAY AND BROWN, VERY LOOSE TO MED. DENSE, MOIST TO SATURATED, SILTY SAND WITH SOME GRAVEL

WEATHERED ROCK

(METAVOLCANIC CHLORITE SCHIST)

2
100/0.2
100/0.7
100/0.5
60/0.1

MATCH LINE A

CRYSTALLINE ROCK, GRAY-GREEN, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST

REC=97% RQD=63% RMR=57

© ROADWAY EMBANKMENT, GRAY AND TAN, LOOSE, MOIST, SILTY SAND

SKEW ANGLE = 110°

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	9

CROSS SECTION THROUGH END BENT 2 -SBL-

160 150 140 130 120 110 100 90 80 70

SB_EB2-A
26+33
82' LT

SB_EB2-B
26+10
18' LT

℄

MATCH LINE A

ASPHALT AND CONCRETE

ROADWAY EMBANKMENT, ORANGE-BROWN AND TAN, MED. STIFF TO HARD, MOIST, SILTY CLAY AND CLAYEY SILT

ALLUVIAL, ORANGE-BROWN AND GRAY, STIFF, MOIST TO WET. AND MED. DENSE, SILTY SAND

SANDY SILT

WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

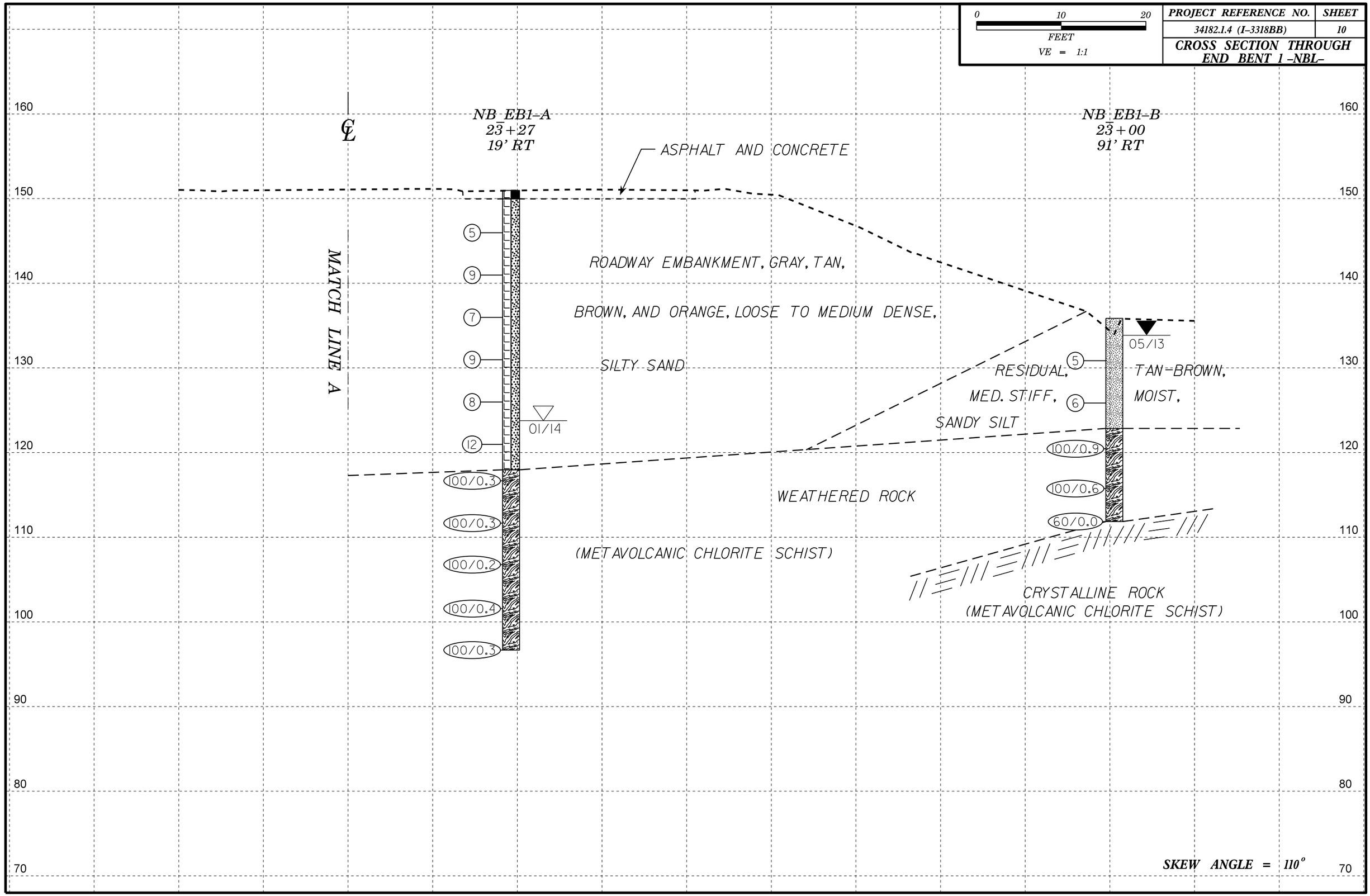
Ⓓ RESIDUAL, GRAY, DENSE, DRY, SAPROLITIC, SILTY SAND

SB_EB2-A: 32, 01/14, 11, 100/0.7, 100/0.2, 60/0.1, 60/0.0, 60/0.0

SB_EB2-B: 6, 6, 8, 12, 8, 12/13, 49, Ⓓ, 100/0.6, 100/0.6, 100/0.4, 100/0.4, 100/0.4, 100/0.2

SKEW ANGLE = 110°

0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34182.1.4 (I-3318BB)	10
	CROSS SECTION THROUGH END BENT 1 -NBL-	



0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	11

CROSS SECTION THROUGH BENT 1 –NBL–

140
130
120
110
100
90
80
70
60
50

℄

NB_B1–A
24+13
12' RT

NB_B1–B
23+86
75' RT

MATCH LINE A

01/14

12/13

(5) ALLUVIAL, GRAY, MEDIUM STIFF, MOIST TO WET, SILTY CLAY

(6) RESIDUAL, GRAY, STIFF, DRY, SANDY SILT

100/0.8
100/0.3
100/0.2
60/0.1

WEATHERED ROCK

(METAVOLCANIC CHLORITE SCHIST)

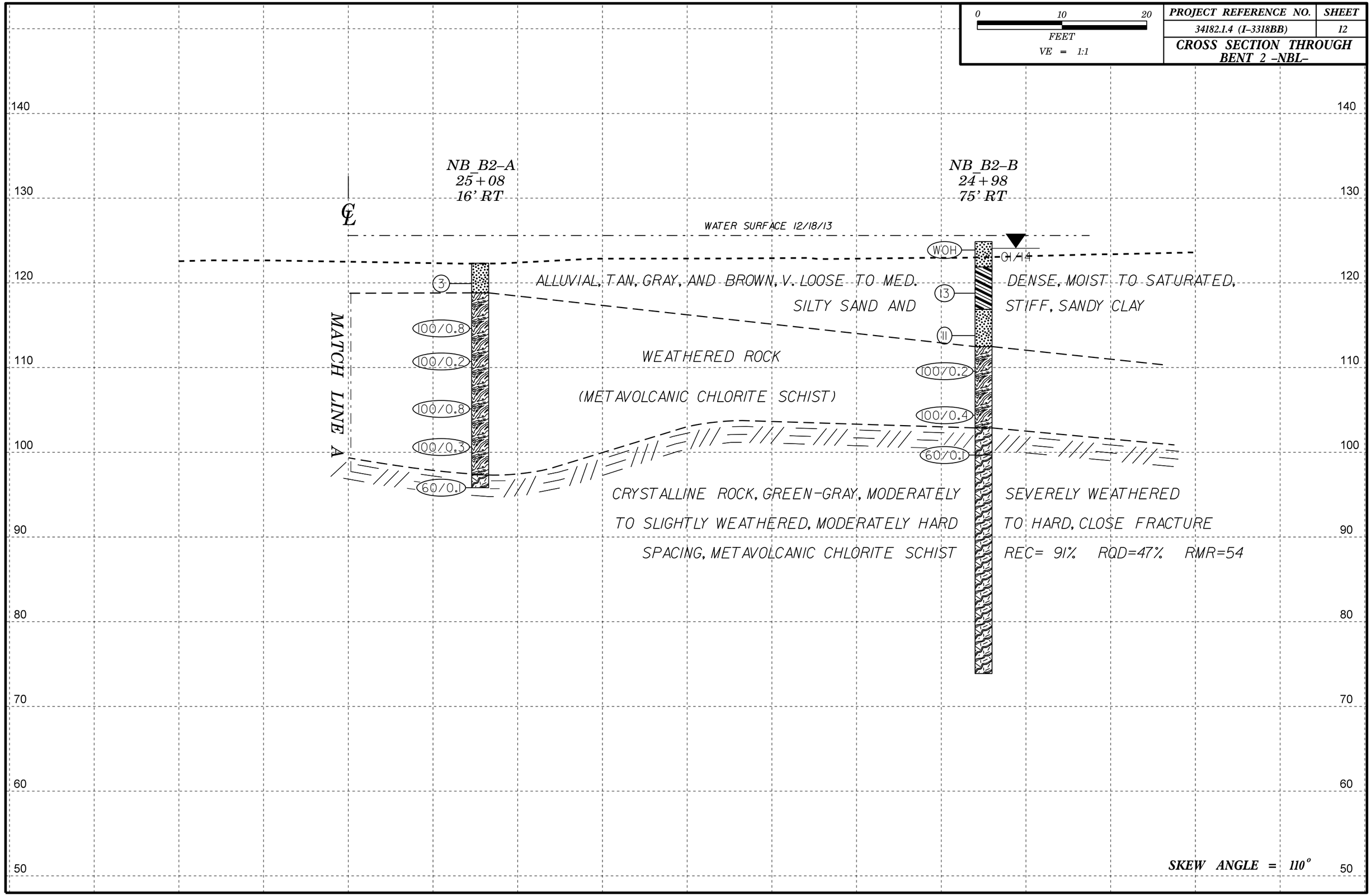
100/0.9
100/0.6
100/0.8
100/0.6
100/0.4
60/0.1

CRYSTALLINE ROCK, GREEN-GRAY,
VERY SLIGHTLY WEATHERED TO FRESH, MODERATELY
HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC
CHLORITE SCHIST

REC=99% RQD=63% RMR=56

SKEW ANGLE = 110°

0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34182.1.4 (I-3318BB)	12
	CROSS SECTION THROUGH BENT 2 -NBL-	



PROJECT REFERENCE NO.	SHEET
34182.1.4 (I-3318BB)	13
CROSS SECTION THROUGH END BENT 2 -NBL-	

0 10 20
FEET
VE = 1:1

NB_EB2-A
25+96
20' RT

NB_EB2-B
25+76
75' RT

℄

MATCH LINE A

ASPHALT AND CONCRETE

ROADWAY EMBANKMENT, ORANGE-BROWN AND GRAY, MED. STIFF TO STIFF, MOIST TO WET, SILTY CLAY AND CLAYEY SILT

ALLUVIAL, AND SANDY GRAY, MED. TO VERY STIFF, MOIST TO SAT., CLAY AND MED. DENSE, SILTY SAND

SANDY SILT

WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)

CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

11, 6, 9, 11, 5, 20, 100/0.2, 60/0.1, 60/0.1

12/13

3, 6, 100/0.5, 100/0.2, 100/0.3, 100/0.2, 100/0.2, 60/0.1

12/13

Ⓓ RESIDUAL, GRAY, DENSE, DRY, SAPROLITIC, SILTY SAND

SKEW ANGLE = 110°

160 150 140 130 120 110 100 90 80 70

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_EB1-A	**STATION** 23+65	**OFFSET** 86 ft LT	**ALIGNMENT** -L-	**0 HR.** 8.0
COLLAR ELEV. 135.3 ft	**TOTAL DEPTH** 34.2 ft	**NORTHING** 663,430	**EASTING** 2,248,890	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/23/13	**COMP. DATE** 12/23/13	**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)
135.3										GROUND SURFACE	0.0
131.3										**ROADWAY EMBANKMENT** BROWN, CLAYEY SILT	4.0
130.9										CONCRETE	4.4
										ALLUVIAL ORANGE-BROWN, COARSE SAND	
126.1		9.2	2	5	8	13		Sat.			
124.8											10.5
122.8										**RESIDUAL** ORANGE-BROWN AND GRAY, CLAYEY SILT WITH SOME SAND	12.5
121.1		14.2	100/0.5			100/0.5				**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)	
116.1		19.2	47	53/0.4		100/0.9					
111.1		24.2	100/0.3			100/0.3					
106.1		29.2	100/0.4			100/0.4					
102.3											33.0
101.1		34.2	60/0.0			60/0.0				**CRYSTALLINE ROCK** (METAVOLCANIC CHLORITE SCHIST)	34.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 101.1 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_EB1-B	**STATION** 23+41	**OFFSET** 21 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 151.1 ft	**TOTAL DEPTH** 54.4 ft	**NORTHING** 663,361	**EASTING** 2,248,895	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/17/13	**COMP. DATE** 12/17/13	**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
151.1										GROUND SURFACE 0.0
149.7										**ROADWAY EMBANKMENT** 1.4
										ASPHALT AND CONCRETE
										TAN, GRAY, AND ORANGE, SILTY SAND WITH SOME GRAVEL
147.1		4.0	1	1	1	2		M		
142.1		9.0	2	7	8	15		M		
137.1		14.0	2	5	6	11		M		
132.1		19.0	1	4	4	8		M		
127.1		24.0	1	1	3	4		M		
122.1		29.0	1	8	16	24		M		
117.1		34.0	6	50	50/0.2	100/0.7		M		
116.6										34.5
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)
113.1		38.0	10	41	42	83		M		**RESIDUAL** TAN-GRAY, SAPROLITIC, SANDY SILT
112.1		39.0								
108.1		43.0	100/0.4			100/0.4				**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
107.1		44.0								
103.1		48.0								
102.1		49.0	21	17	83/0.4	100/0.9				**RESIDUAL** TAN-GRAY, SAPROLITIC, SANDY SILT
101.6		49.5								**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
97.1		54.0	100/0.4			100/0.4				54.4
96.7										Boring Terminated at Elevation 96.7 ft IN WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B1-A	**STATION** 24+49	**OFFSET** 71 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 126.2 ft	**TOTAL DEPTH** 56.0 ft	**NORTHING** 663,452	**EASTING** 2,248,973	**24 HR.** 4.1
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/03/14	**COMP. DATE** 01/03/14	**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)
130											
125										126.2 GROUND SURFACE	0.0
										ALLUVIAL GRAY, SILTY CLAY	
120	121.0	5.2	3	5	7	12		M		118.2	8.0
115	116.0	10.2	29	27	30	57		M		**RESIDUAL** GRAY TO TAN-GREEN, SAPROLITIC, CLAYEY SILT	
110	111.0	15.2	100/0.4			100/0.4				112.7	13.5
										WEATHERED ROCK (SCHIST)	
105	106.0	20.2	6	8	12	20		M		107.2	19.0
										RESIDUAL TAN TO GREEN-GRAY AND BROWN, SAPROLITIC, CLAYEY SILT	
100	101.0	25.2	100/0.4			100/0.4				102.7	23.5
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)	
95	96.0	30.2	37	63/0.4		100/0.4					
90	91.0	35.2	100/0.3			100/0.3					
										87.2	39.0
85	86.0	40.2	60/0.1			60/0.1	RS-3			85.9 **CRYSTALLINE ROCK** (METAVOLCANIC CHLORITE SCHIST)	40.3
80										GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	
75										REC=98% RQD=61%	
										RMR=46	
										70.2	56.0
										Boring Terminated at Elevation 70.2 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

NCDOT BORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 1/31/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B1-A	**STATION** 24+49	**OFFSET** 71 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 126.2 ft	**TOTAL DEPTH** 56.0 ft	**NORTHING** 663,452	**EASTING** 2,248,973	**24 HR.** 4.1
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/03/14	**COMP. DATE** 01/03/14	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 15.7 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)
85.9											Begin Coring @ 40.3 ft	
85	85.9	40.3	0.7	2:50/0.7	(0.7)	(0.0)		(15.4)	(9.6)		85.9 GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, MODERATELY	40.3
	85.2	41.0	5.0	3:10/1.0 2:35/1.0 2:10/1.0 205/1.0 2:25/1.0	100%	0%	RS-3	98%	61%		HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	
					(5.0) 100%	(3.0) 60%					RMR=46	
80	80.2	46.0	5.0	1:52/1.0 2:10/1.0 2:05/1.0 1:50/1.0 1:56/1.0	(5.0) 100%	(3.3) 66%						
75	75.2	51.0	5.0	1:50/1.0 1:52/1.0 1:54/1.0 1:58/1.0 1:55/1.0	(4.7) 94%	(3.3) 66%						
	70.2	56.0									70.2 Boring Terminated at Elevation 70.2 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	56.0

NCDOT CORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 2/3/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B1-B	**STATION** 24+35	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 123.5 ft	**TOTAL DEPTH** 43.9 ft	**NORTHING** 663,392	**EASTING** 2,248,984	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/20/13	**COMP. DATE** 12/20/13	**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)
125										GROUND SURFACE	123.5	0.0
										ALLUVIAL BROWN, GRAY, AND GREEN-GRAY, SANDY CLAY WITH TRACE GRAVEL AND ORGANICS		
120	119.6	3.9	1	1	3	4		W			117.3	6.2
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)		
115	114.6	8.9	62	38/0.2		100/0.7						
110	109.6	13.9	40	60/0.1		100/0.6						
105	104.6	18.9	45	55/0.1		100/0.6						
100	99.6	23.9	100/0.5			100/0.5						
95	94.6	28.9	41	59/0.1		100/0.6						
90	89.6	33.9	100/0.3			100/0.3						
85	84.6	38.9	100/0.2			100/0.2						
80	79.6	43.9	60/0.0			60/0.0					79.6	43.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 79.6 ft ON CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)		

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B2-A	**STATION** 25+61	**OFFSET** 83 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.0
COLLAR ELEV. 124.4 ft	**TOTAL DEPTH** 24.1 ft	**NORTHING** 663,509	**EASTING** 2,249,070	**24 HR.** 0.3
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/10/14	**COMP. DATE** 01/10/14	**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)
125										GROUND SURFACE	124.4	0.0
										ROADWAY EMBANKMENT GRAY AND TAN, SILTY SAND		
120	120.4	4.0	1	4	5	9		M			116.9	7.5
										ALLUVIAL GRAY, SILTY SAND		
115	115.4	9.0	1	5	7	12		M			112.4	12.0
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)		
110	110.4	14.0	100/0.2			100/0.2						
105	105.4	19.0	100/0.4			100/0.4						
100	100.4	24.0	60/0.1			60/0.1					101.2	23.2
										CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	100.3	24.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 100.3 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)		

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B2-B	**STATION** 25+21	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 122.6 ft	**TOTAL DEPTH** 40.8 ft	**NORTHING** 663,433	**EASTING** 2,249,060	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/18/13	**COMP. DATE** 12/18/13	**SURFACE WATER DEPTH** 3.0ft	

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)
125										WATER SURFACE (12/18/13)
	122.6	0.0	WOH	1	1	2		Sat.		122.6 GROUND SURFACE 0.0 **ALLUVIAL** BROWN, SILTY SAND
120										
	117.6	5.0	100/0.2			100/0.2				118.7 3.9 **WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
115										
	112.6	10.0	66	34/0.2		100/0.7				
110										
	107.6	15.0	100/0.5			100/0.5				
105										
	102.6	20.0	60/0.1			60/0.1				103.1 19.5 102.5 20.1 **CRYSTALLINE ROCK** (METAVOLCANIC CHLORITE SCHIST)
100							RS-4			GRAY-GREEN, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST REC=97% RQD=63% RMR=57
95										
90										
85										81.8 40.8 Boring Terminated at Elevation 81.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

NCDOT BORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 1/31/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_B2-B	**STATION** 25+21	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 122.6 ft	**TOTAL DEPTH** 40.8 ft	**NORTHING** 663,433	**EASTING** 2,249,060	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/18/13	**COMP. DATE** 12/18/13	**SURFACE WATER DEPTH** 3.0ft	
CORE SIZE NQ2	**TOTAL RUN** 20.7 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)
102.5											Begin Coring @ 20.1 ft
	102.5	20.1	0.7	3:10/0.7	(0.7)	(0.0)		(20.0)	(13.1)		102.5 GRAY-GREEN, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST 20.1
100	101.8	20.8	5.0	4:30/1.0 3:45/1.0 3:10/1.0 2:30/1.0 2:38/1.0	100%	0%		97%	63%		RMR=57
					(4.4)	(3.1)	RS-4				
	96.8	25.8			88%	62%					
95			5.0	3:35/1.0 2:50/1.0 2:42/1.0 2:25/1.0 3:10/1.0	(5.0) 100%	(3.7) 74%					
	91.8	30.8									
90			5.0	2:10/1.0 2:05/1.0 3:30/1.0 3:52/1.0 2:41/1.0	(4.9) 98%	(2.3) 46%					
	86.8	35.8									
85			5.0	2:48/1.0 3:00/1.0 2:32/1.0 2:46/1.0 2:41/1.0	(5.0) 100%	(4.0) 80%					
	81.8	40.8									81.8 40.8 Boring Terminated at Elevation 81.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

NCDOT CORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 2/3/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_EB2-A	**STATION** 26+33	**OFFSET** 82 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.4
COLLAR ELEV. 135.1 ft	**TOTAL DEPTH** 33.6 ft	**NORTHING** 663,538	**EASTING** 2,249,136	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/31/13	**COMP. DATE** 12/31/13	**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)
										135.1	0.0
										GROUND SURFACE	
										ROADWAY EMBANKMENT BROWN TO ORANGE-BROWN, CLAYEY SILT WITH SOME SAND, GRAVEL, AND CONCRETE FRAGMENTS	
										129.0	6.1
										ALLUVIAL ORANGE-BROWN AND GRAY, SANDY SILT WITH TRACE GRAVEL	
										123.5	11.6
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)	
										114.0	21.1
										CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	
										101.5	33.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 101.5 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

140											
135											
130	131.5	3.6	2	9	23	32		M			
125	126.5	8.6	3	5	6	11		W			
120	121.5	13.6	10	20	80/0.2	100/0.7					
115	116.5	18.6	100/0.2			100/0.2					
110	111.5	23.6	60/0.1			60/0.1					
105	106.5	28.6	60/0.0			60/0.0					
	101.5	33.6	60/0.0			60/0.0					

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 116 ON -L- (I-95 SOUTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. SB_EB2-B	**STATION** 26+10	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 25.6
COLLAR ELEV. 150.9 ft	**TOTAL DEPTH** 59.2 ft	**NORTHING** 663,470	**EASTING** 2,249,141	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/17/13	**COMP. DATE** 12/17/13	**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	
										150.9	0.0
										GROUND SURFACE	
										149.5	1.4
										ROADWAY EMBANKMENT ASPHALT AND CONCRETE	
										ORANGE-BROWN, SILTY CLAY WITH SOME GRAVEL	
										138.9	12.0
										TAN-BROWN TO ORANGE-BROWN, CLAYEY SILT	
										130.9	20.0
										ALLUVIAL	
										128.9 GRAY, SILTY SAND	22.0
										GRAY, SANDY SILT	
										120.9	30.0
										RESIDUAL GRAY, SAPROLITIC, SILTY SAND	
										117.4	33.5
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)	
										91.7	59.2
										Boring Terminated at Elevation 91.7 ft IN WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)	

155											
150											
145	146.9	4.0	1	2	4	6		M			
140	141.9	9.0	1	2	4	6		M			
135	136.9	14.0	3	3	5	8		M			
130	131.9	19.0	1	2	10	12		M			
125	126.9	24.0	1	3	5	8		M			
120	121.9	29.0	2	11	38	49		D			
115	116.9	34.0	85	15/0.1		100/0.6					
110	111.9	39.0	68	32/0.1		100/0.6					
105	106.9	44.0	100/0.4			100/0.4					
100	101.9	49.0	100/0.4			100/0.4					
95	96.9	54.0	100/0.4			100/0.4					
	91.9	59.0	100/0.2			100/0.2					

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_EB1-A	**STATION** 23+27	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** 27.2
COLLAR ELEV. 151.0 ft	**TOTAL DEPTH** 54.3 ft	**NORTHING** 663,319	**EASTING** 2,248,899	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/08/14	**COMP. DATE** 01/08/14	**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)
										151.0 GROUND SURFACE 0.0
										150.0 **ROADWAY EMBANKMENT** 1.0 ASPHALT AND CONCRETE GRAY, TAN, AND ORANGE-BROWN, SILTY SAND
	147.0	4.0	1	2	3	5		M		
	142.0	9.0	2	5	4	9		M		
	137.0	14.0	2	3	4	7		M		
	132.0	19.0	2	4	5	9		M		
	127.0	24.0	2	4	4	8		M		
	122.0	29.0	4	6	6	12		M		
	117.0	34.0	100/0.3			100/0.3				118.0 33.0 **WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
	112.0	39.0	100/0.3			100/0.3				
	107.0	44.0	100/0.2			100/0.2				
	102.0	49.0	100/0.4			100/0.4				
	97.0	54.0	100/0.3			100/0.3				96.7 54.3 Boring Terminated at Elevation 96.7 ft IN WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_EB1-B	**STATION** 23+00	**OFFSET** 91 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 135.9 ft	**TOTAL DEPTH** 24.0 ft	**NORTHING** 663,243	**EASTING** 2,248,904	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 05/23/13	**COMP. DATE** 05/23/13	**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
										135.9 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN, SANDY SILT
	131.9	4.0	2	2	3	5	SS-8	M		
	126.9	9.0	2	2	4	6	SS-9	M		
	121.9	14.0	29	55	45/0.4	100/0.9				122.9 13.0 **WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
	116.9	19.0	19	50	50/0.1	100/0.6				
	111.9	24.0	60/0.0			60/0.0				111.9 24.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 111.9 ft ON CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B1-A	**STATION** 24+13	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 126.2 ft	**TOTAL DEPTH** 41.2 ft	**NORTHING** 663,361	**EASTING** 2,248,974	**24 HR.** 4.1
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/06/14	**COMP. DATE** 01/06/14	**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)
130											
125										126.2 GROUND SURFACE	0.0
	120.9	5.3	1	2	3	5		M		**ALLUVIAL** GRAY, SILTY CLAY	
120										117.7	8.5
	115.9	10.3	11	89/0.3		100/0.8				**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)	
115											
	110.9	15.3	100/0.3			100/0.3					
110											
	105.9	20.3	100/0.2			100/0.2					
105										102.2	24.0
	100.9	25.3	60/0.1			60/0.1				100.8 **CRYSTALLINE ROCK** (METAVOLCANIC CHLORITE SCHIST)	25.4
100										GREEN-GRAY, VERY SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	
95							RS-1			REC=99% RQD=63%	
90										RMR=56	
85										85.0	41.2
										Boring Terminated at Elevation 85.0 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

NCDOT BORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 1/31/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B1-A	**STATION** 24+13	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 126.2 ft	**TOTAL DEPTH** 41.2 ft	**NORTHING** 663,361	**EASTING** 2,248,974	**24 HR.** 4.1
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/06/14	**COMP. DATE** 01/06/14	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 15.8 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)
100.8											Begin Coring @ 25.4 ft	
100	100.8	25.4	0.8	1:58/0.8	(0.7) 88%	(0.5) 63%		(15.6) 99%	(9.9) 63%		100.8 GREEN-GRAY, VERY SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	25.4
	100.0	26.2	5.0	1:45/1.0 1:50/1.0 2:05/1.0 2:15/1.0 2:18/1.0	(5.0) 100%	(2.4) 48%					RMR=56	
95	95.0	31.2	5.0	1:59/1.0 1:47/1.0 2:10/1.0 3:18/1.0 2:46/1.0	(5.0) 100%	(3.9) 78%	RS-1					
90	90.0	36.2	5.0	2:06/1.0 2:10/1.0 2:04/1.0 1:59/1.0 2:13/1.0	(4.9) 98%	(3.1) 62%					85.0	41.2
85	85.0	41.2									Boring Terminated at Elevation 85.0 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

NCDOT CORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 2/3/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B1-B	**STATION** 23+86	**OFFSET** 75 ft RT	**ALIGNMENT** -L-	**0 HR.** 2.4
COLLAR ELEV. 126.6 ft	**TOTAL DEPTH** 34.1 ft	**NORTHING** 663,293	**EASTING** 2,248,976	**24 HR.** 2.6
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/16/13	**COMP. DATE** 12/16/13	**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)
130										
										126.6 GROUND SURFACE 0.0
125										**ALLUVIAL** GRAY, SILTY CLAY
	122.6	4.0	2	2	4	6		M		120.1 6.5
120										**RESIDUAL** GRAY, SANDY SILT
	117.6	9.0	20	80/0.4		100/0.9				117.6 9.0
115										**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
	112.6	14.0	51	49/0.1		100/0.6				
110										
	107.6	19.0	34	66/0.3		100/0.8				
105										
	102.6	24.0	75	25/0.1		100/0.6				
100										
	97.6	29.0	100/0.4			100/0.4				
95										
	92.6	34.0	60/0.1			60/0.1				93.6 33.0
										92.5 **CRYSTALLINE ROCK** 34.1
										(METAVOLCANIC CHLORITE SCHIST)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 92.5 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B2-A	**STATION** 25+08	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 122.3 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 663,397	**EASTING** 2,249,062	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/09/14	**COMP. DATE** 01/09/14	**SURFACE WATER DEPTH** 1.6ft	

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
125										WATER SURFACE (01/09/14)
										122.3 GROUND SURFACE 0.0
120	120.9	1.4	WOR	WOH	3	3		W		**ALLUVIAL** TAN-GRAY, SILTY SAND WITH SOME COARSE SAND
										118.8 3.5
115	115.9	6.4	40	18	82/0.3	100/0.8				**WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)
110	110.9	11.4	100/0.2			100/0.2				
105	105.9	16.4	54	46/0.3		100/0.8				
100	100.9	21.4	100/0.3			100/0.3				
	95.9	26.4	60/0.1			60/0.1				97.3 25.0
										95.8 **CRYSTALLINE ROCK** 26.5
										(METAVOLCANIC CHLORITE SCHIST)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 95.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B2-B	**STATION** 24+98	**OFFSET** 75 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 124.9 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 663,339	**EASTING** 2,249,078	**24 HR.** 0.8
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/13/14	**COMP. DATE** 01/13/14	**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)
125											
	124.9	0.0	WOH	WOH	WOH	0		Sat.		124.9 GROUND SURFACE	0.0
										ALLUVIAL BROWN, SILTY SAND WITH SOME COARSE SAND	
120	119.8	5.1	4	5	8	13		M		121.9	3.0
										TAN AND BROWN, SANDY CLAY	
115	114.8	10.1	3	5	6	11		M		116.9 GRAY, SILTY SAND	8.0
										112.5 **WEATHERED ROCK** (METAVOLCANIC CHLORITE SCHIST)	12.4
110	109.8	15.1	100/0.2			100/0.2					
105	104.8	20.1	100/0.4			100/0.4				102.9 **CRYSTALLINE ROCK** (METAVOLCANIC CHLORITE SCHIST)	22.0
100	99.8	25.1	60/0.1			60/0.1	RS-2			99.7 GREEN-GRAY, MODERATELY SEVERELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	25.2
95										REC=91% RQD=47%	
90										RMR=54	
85											
80											
75										73.9	51.0
										Boring Terminated at Elevation 73.9 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	

NCDOT BORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 1/31/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_B2-B	**STATION** 24+98	**OFFSET** 75 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 124.9 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 663,339	**EASTING** 2,249,078	**24 HR.** 0.8
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/13/14	**COMP. DATE** 01/13/14	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 25.8 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)
99.7											Begin Coring @ 25.2 ft	
	99.7	25.2	0.8	1:20/0.8	(0.6)	(0.6)		(23.5)	(12.2)		99.7 GREEN-GRAY, MODERATELY SEVERELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, METAVOLCANIC CHLORITE SCHIST	25.2
	98.9	26.0	5.0	1:22/1.0 1:16/1.0	75%	75%	RS-2	91%	47%			
95				1:46/1.0 1:38/1.0 1:45/1.0	(4.2) 84%	(1.5) 30%					RMR=54	
	93.9	31.0	5.0	1:08/1.0 1:25/1.0 1:30/1.0 1:26/1.0 1:33/1.0	(4.7) 94%	(1.5) 30%						
90	88.9	36.0	5.0	1:14/1.0 1:25/1.0 1:27/1.0 1:35/1.0 1:30/1.0	(5.0) 100%	(2.5) 50%						
85	83.9	41.0	5.0	1:28/1.0 1:36/1.0 1:40/1.0 1:29/1.0 1:43/1.0	(4.3) 86%	(1.7) 34%						
80	78.9	46.0	5.0	1:51/1.0 1:27/1.0 1:23/1.0 1:38/1.0 1:30/1.0	(4.7) 94%	(3.2) 64%						
75	73.9	51.0									73.9 Boring Terminated at Elevation 73.9 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	51.0

NCDOT CORE DOUBLE I3318BB_GEO_BH.GPJ NC_DOT.GDT 2/3/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_EB2-A	**STATION** 25+96	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** 24.8
COLLAR ELEV. 151.0 ft	**TOTAL DEPTH** 43.6 ft	**NORTHING** 663,430	**EASTING** 2,249,144	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/19/13	**COMP. DATE** 12/19/13	**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)
										GROUND SURFACE	151.0	0.0
										ROADWAY EMBANKMENT ASPHALT AND CONCRETE	149.1	1.9
										ORANGE-BROWN, SILTY CLAY WITH SOME FINE SAND		
											144.3	6.7
										ORANGE-BROWN AND GRAY, CLAYEY SILT		
											133.0	18.0
										ALLUVIAL GRAY, SILTY SAND		
											129.3	21.7
										GRAY AND BROWN, SANDY SILT WITH SOME GRAVEL		
											119.5	31.5
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)		
											113.5	37.5
										CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)		
											107.4	43.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 107.4 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)		

WBS 34182.1.4	**TIP** I-3318BB	**COUNTY** JOHNSTON	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION BRIDGE NO. 114 ON -L- (I-95 NORTHBOUND) OVER LITTLE RIVER				**GROUND WTR (ft)**
BORING NO. NB_EB2-B	**STATION** 25+76	**OFFSET** 75 ft RT	**ALIGNMENT** -L-	**0 HR.** 1.3
COLLAR ELEV. 137.1 ft	**TOTAL DEPTH** 39.0 ft	**NORTHING** 663,371	**EASTING** 2,249,149	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SUM0093 DIEDRICH D-50 86% 08/15/2013		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 12/30/13	**COMP. DATE** 12/30/13	**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)
										GROUND SURFACE	137.1	0.0
										ROADWAY EMBANKMENT BROWN, ORANGE, AND GRAY, SILTY CLAY		
											130.7	6.4
										ALLUVIAL GRAY, SANDY CLAY WITH TRACE GRAVEL		
											125.5	11.6
										WEATHERED ROCK (METAVOLCANIC CHLORITE SCHIST)		
											98.2	38.9
										CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)	98.1	39.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 98.1 ft IN CRYSTALLINE ROCK (METAVOLCANIC CHLORITE SCHIST)		

PROJ. NO. - 34182.1.4
ID NO. - I-3318BB
COUNTY - JOHNSTON

SB_B1-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	**71' LT**	**24+49**	**41.0-41.4**	**SCHIST**	**145.0**	**0.89**	**0.82**

SB_B2-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-4	**18' LT**	**25+21**	**23.5-23.9**	**SCHIST**	**163.4**	**2.19**	**0.42**

NB_EB1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-8	**91' RT**	**23+00**	**4.0-5.5**	**A-4(3)**	**30**	**8**	**8.1**	**37.5**	**28.2**	**26.2**	**97**	**92**	**59**	**-**	**-**
S-9	**91' RT**	**23+00**	**9.0-10.5**	**A-4(5)**	**33**	**10**	**16.3**	**24.8**	**30.6**	**28.2**	**100**	**90**	**65**	**-**	**-**

NB_B1-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	**12' RT**	**24+13**	**31.2-31.7**	**SCHIST**	**163.7**	**2.46**	**0.42**

NB_B2-B

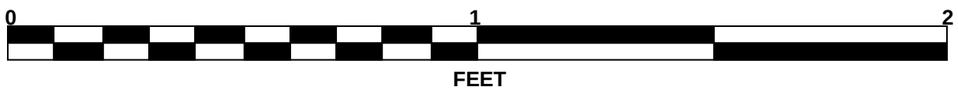
ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-2	**75' RT**	**24+98**	**26.0-26.6**	**SCHIST**	**173.2**	**2.05**	**0.58**

CORE PHOTOGRAPHS

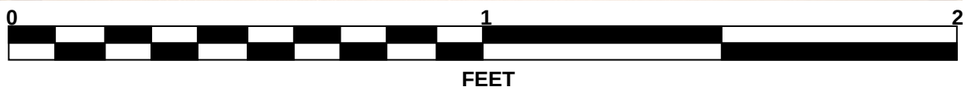
SB_B1-A

BOXES 1 & 2: 40.3 - 56.0 FEET



SB_B2-B

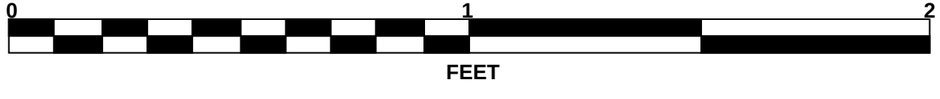
BOXES 1 - 3: 20.1 - 40.8 FEET



CORE PHOTOGRAPHS

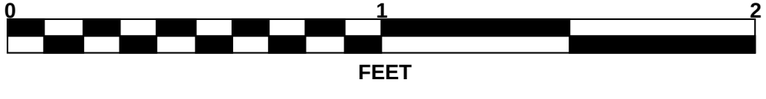
NB_B1-A

BOXES 1 & 2: 25.4 - 41.2 FEET



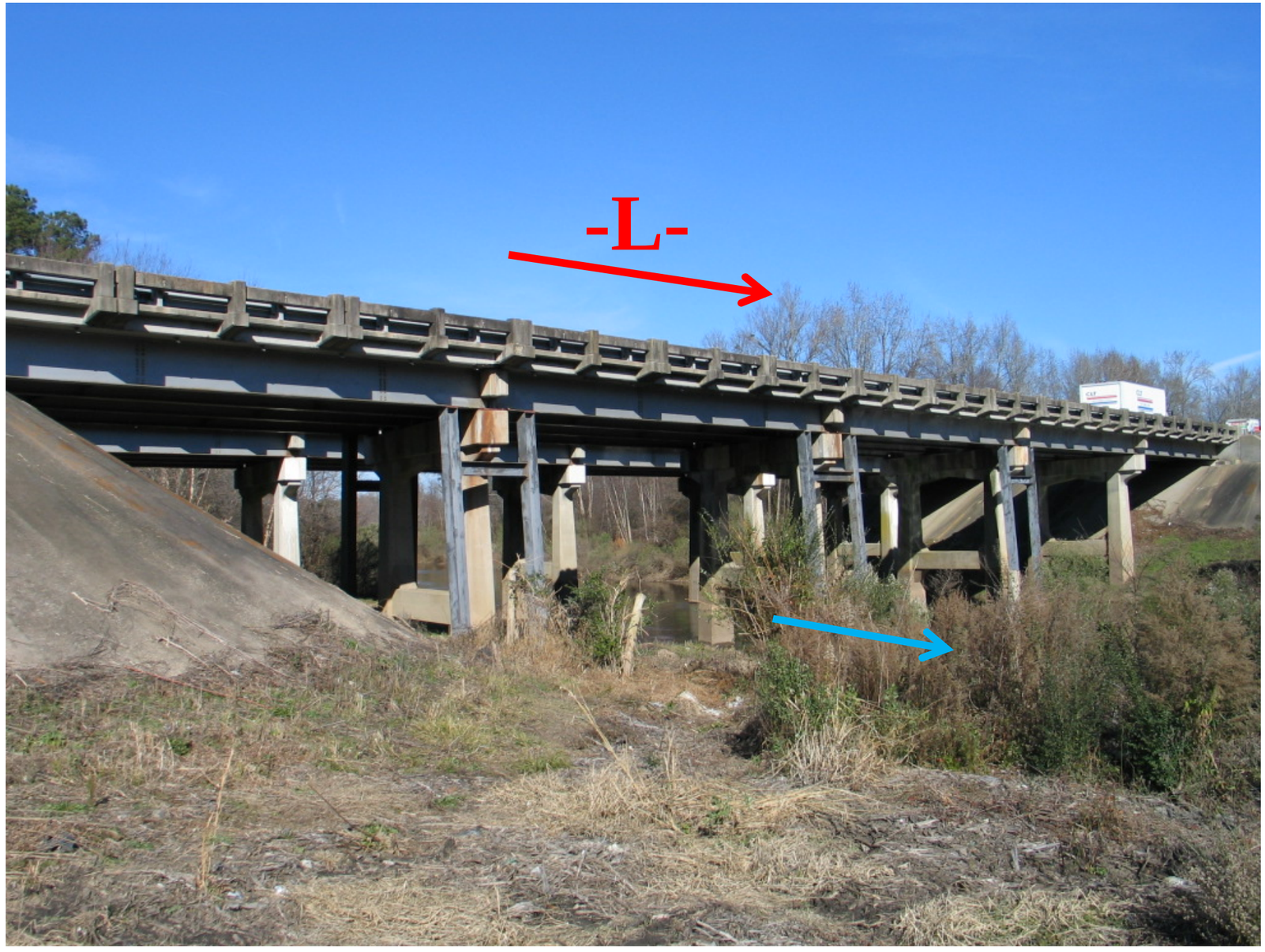
NB_B2-B

BOXES 1 - 3: 25.2 - 51.0 FEET



SITE PHOTOGRAPH

Bridge Nos. 114 and 116 on –L– (I-95) over Little River



Looking North and upstream at Bridge No. 114