STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	44

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CRAVEN

PROJECT DESCRIPTION US 70 (HAVELOCK BYPASS) FROM NORTH OF CARTERET/CRAVEN COUNTY LINE TO NORTH OF PINE GROVE ROAD

SITE DESCRIPTION SITE 3 – DUAL BRIDGES NO. 276 AND NO. 277 ON –L– (US 70 – HAVELOCK BYPASS) OVER EAST PRONG OF SLOCUM CREEK –L– STATION 177+67.00

REFERENCE: R-1015

PROJECT: 34360

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CAUTION NOTICE

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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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NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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INVESTIGATED BY J. K. CRENSHAW

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SUBMITTED BY B. D. KEANEY

DATE JULY, 2018

HDR

NORTH CAROLINA LICENSED SEAL 2504 GEOLOGIST JARED K. CRENSHAW

DocuSigned by:
Jared Crenshaw 7/31/2018
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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-1015	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 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR 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			
MATERIAL PASSING #40 LL	—		—	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
PI	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 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 0.5 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 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
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	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.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 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 WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-25
- [X] CME-45B

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 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 ____
- [ ] -H ____
- [ ] -N ____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD 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 FOOT
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 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, SUCH 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: N/A

ELEVATION: N/A FEET

NOTES:

BORING LOCATIONS AND ELEVATIONS OBTAINED FROM MCKIM & CREED, INC. - 6/28/18

UCP - UNDIVIDED COASTAL PLAIN

FIAD - FILLED IMMEDIATELY AFTER DRILLING

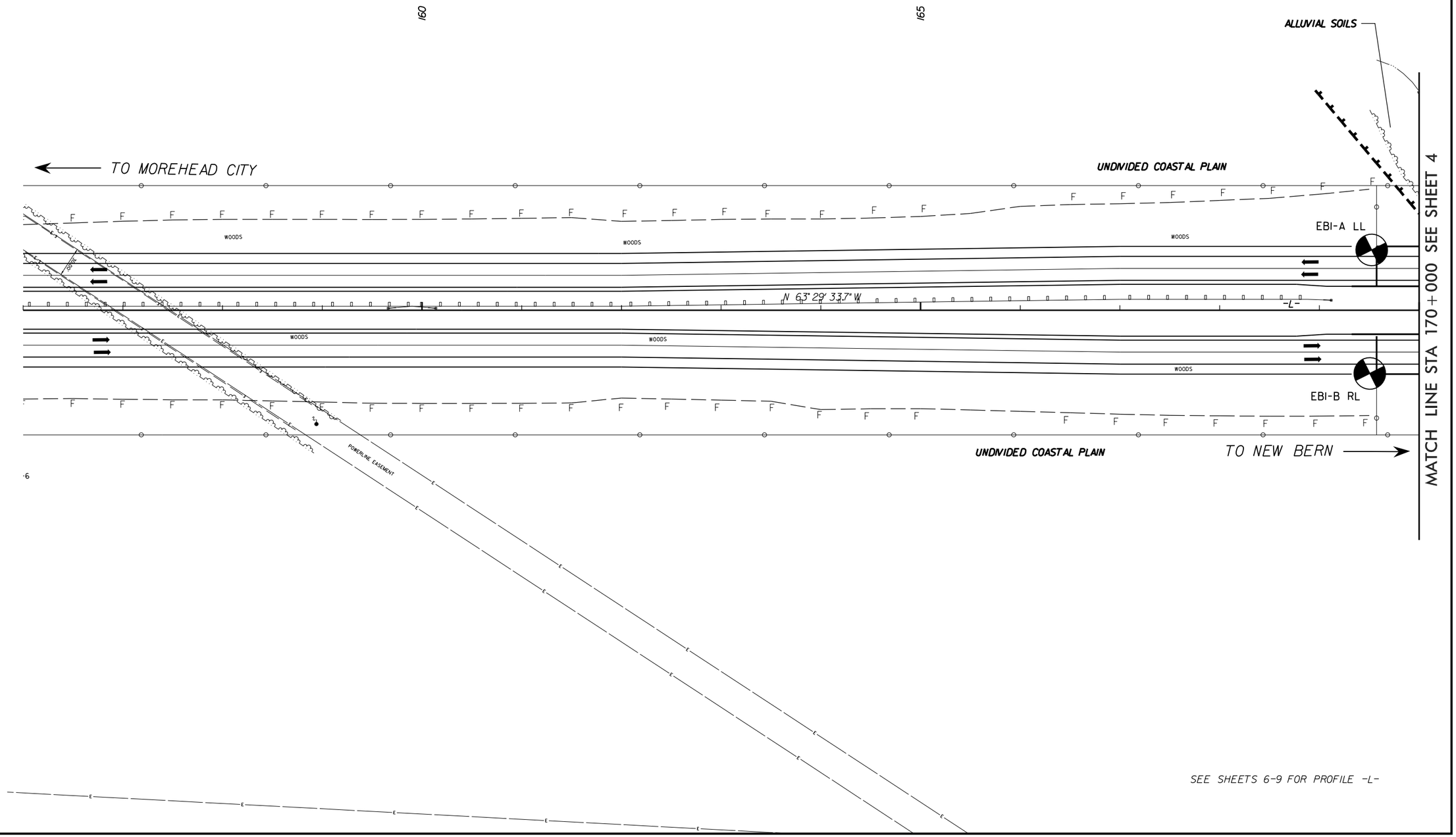
DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
R-1015	3

SITE PLAN

0 100 200
FEET

SKEW = 90°

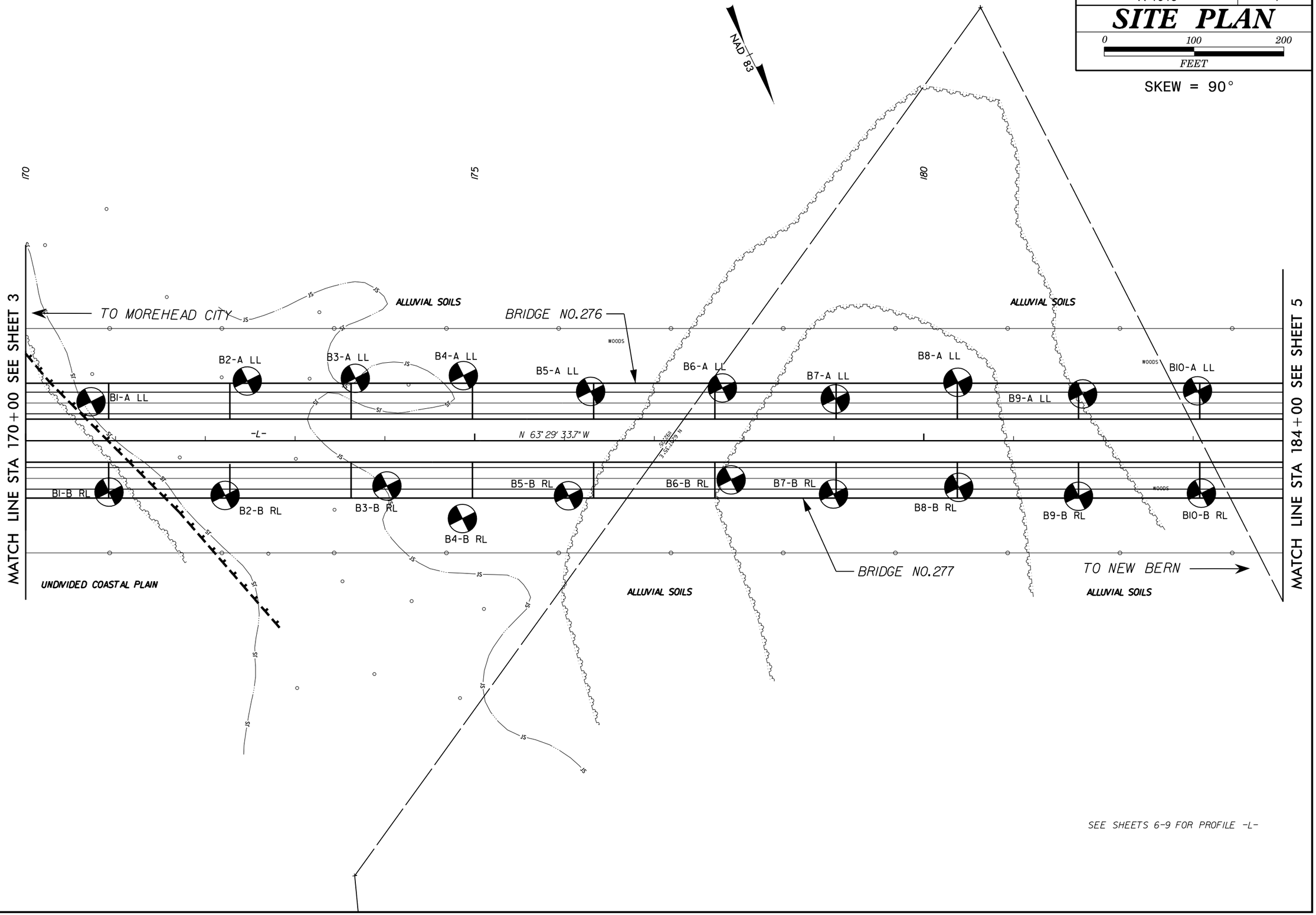


PROJECT REFERENCE NO.	SHEET NO.
R-1015	4

SITE PLAN

0 100 200
FEET

SKEW = 90°



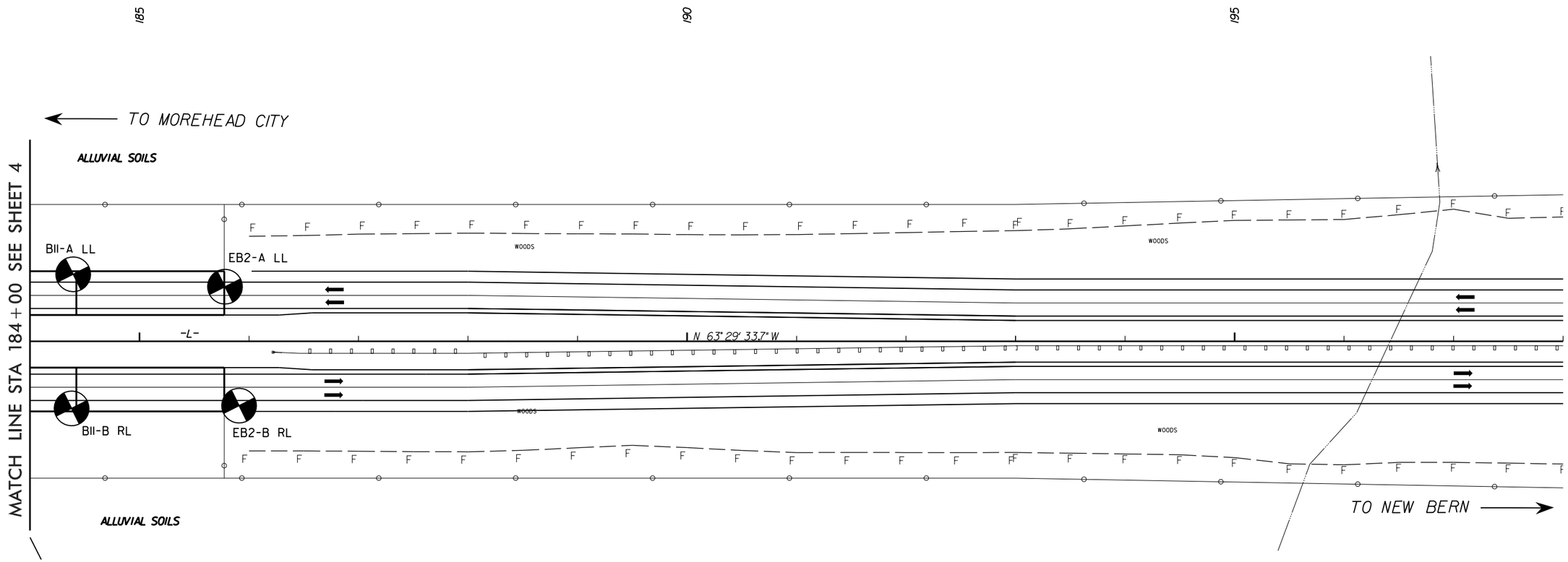
SEE SHEETS 6-9 FOR PROFILE -L-

PROJECT REFERENCE NO.	SHEET NO.
R-1015	5

SITE PLAN

0 100 200
FEET

SKEW = 90°



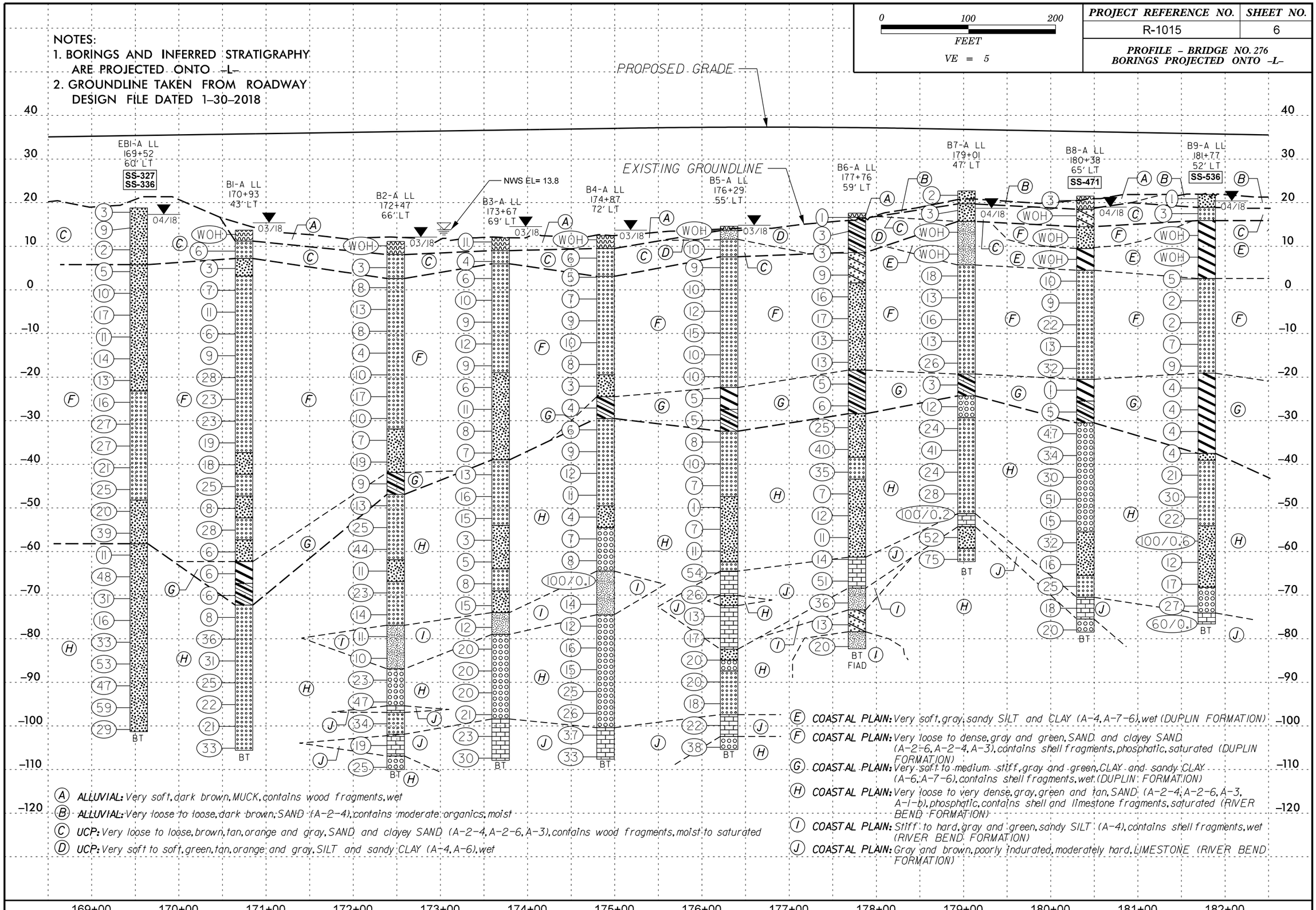
SEE SHEETS 6-9 FOR PROFILE -L-

PROJECT REFERENCE NO.	SHEET NO.
R-1015	6

PROFILE – BRIDGE NO. 276
BORINGS PROJECTED ONTO –L–

0 100 200
FEET
VE = 5

NOTES:
1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO –L–
2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1–30–2018



(A) **ALLUVIAL:** *Very soft, dark brown, MUCK, contains wood fragments, wet*

(B) **ALLUVIAL:** *Very loose to loose, dark brown, SAND (A-2-4), contains moderate organics, moist*

(C) **UCP:** *Very loose to loose, brown, tan, orange and gray, SAND and clayey SAND (A-2-4, A-2-6, A-3), contains wood fragments, moist to saturated*

(D) **UCP:** *Very soft to soft, green, tan, orange and gray, SILT and sandy CLAY (A-4, A-6), wet*

(E) **COASTAL PLAIN:** *Very soft, gray, sandy SILT and CLAY (A-4, A-7-6), wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Very loose to dense, gray and green, SAND and clayey SAND (A-2-6, A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Very soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Very loose to very dense, gray, green and tan, SAND (A-2-4, A-2-6, A-3, A-1-b), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*

(I) **COASTAL PLAIN:** *Stiff to hard, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)*

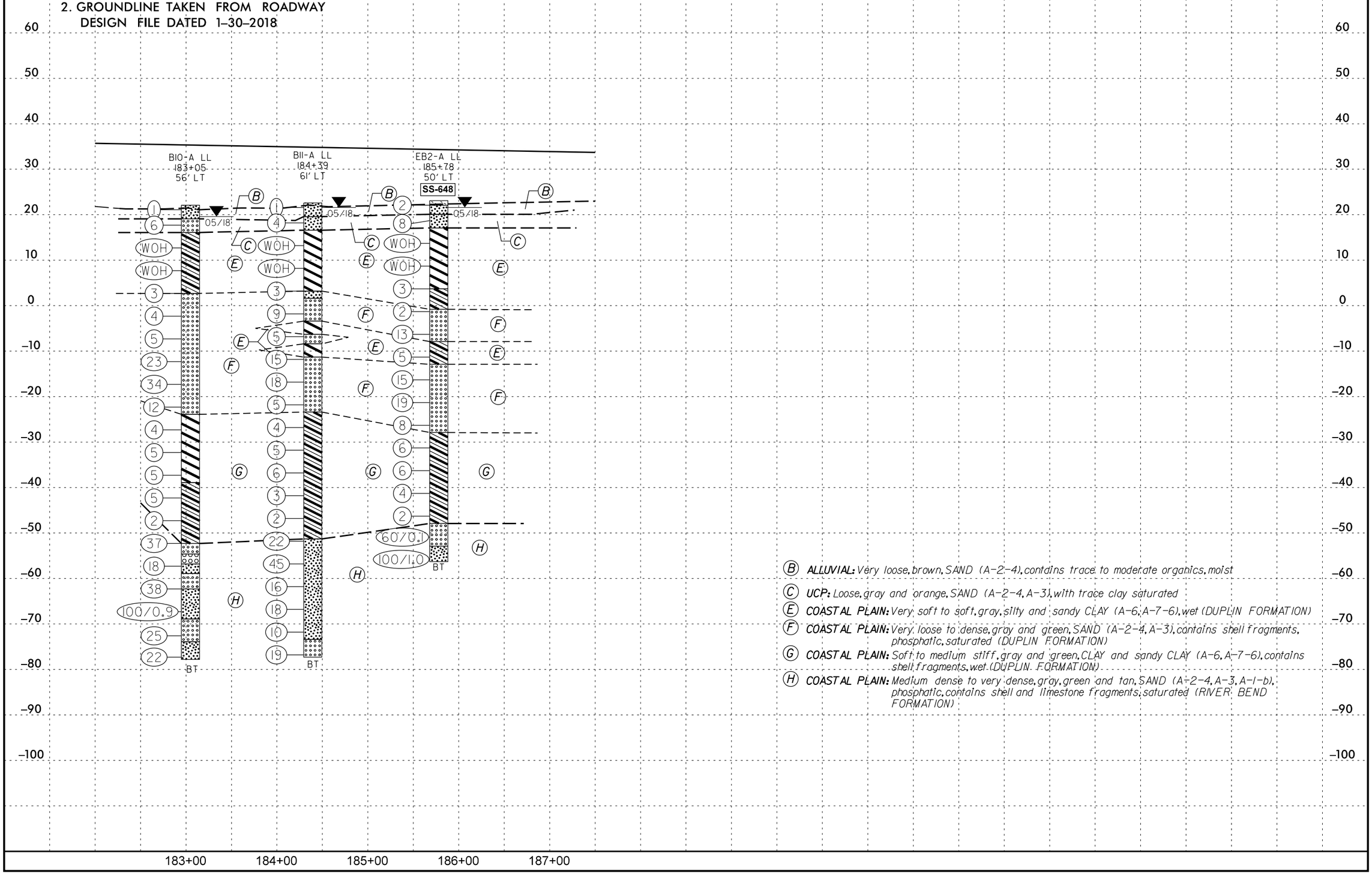
(J) **COASTAL PLAIN:** *Gray and brown, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION)*

PROJECT REFERENCE NO.	SHEET NO.
R-1015	7

PROFILE – BRIDGE NO. 276
BORINGS PROJECTED ONTO –L–

0 100 200
FEET
VE = 5

NOTES:
1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO –L–
2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1–30–2018

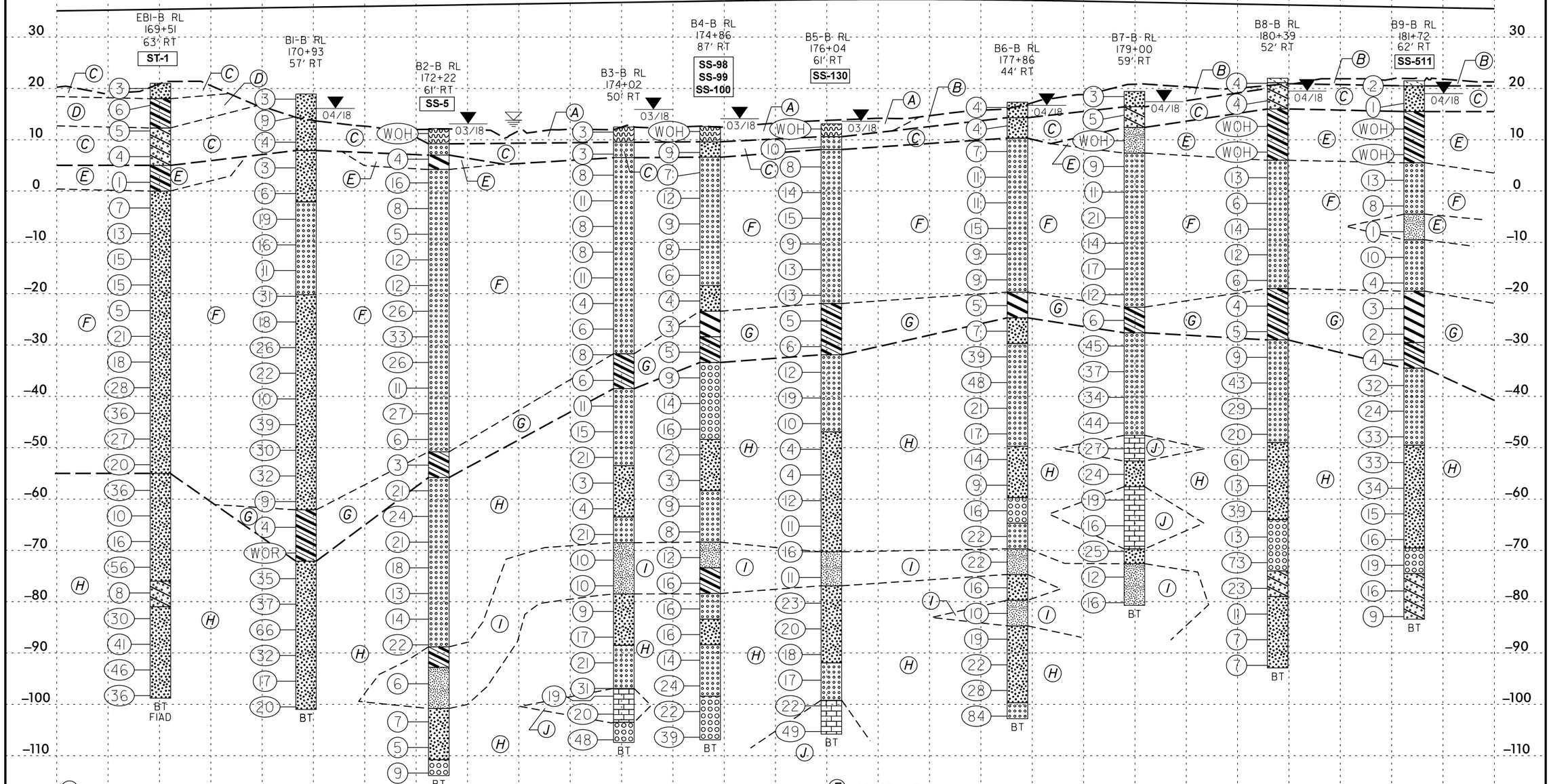


NOTES:
1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO –L–
2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1–30–2018

0 100 200
FEET
VE = 5

PROJECT REFERENCE NO.	SHEET NO.
R-1015	8

PROFILE – BRIDGE NO. 277
BORINGS PROJECTED ONTO –L–



(A) **ALLUVIAL:** *Very soft to soft, dark brown, MUCK, contains wood fragments, moist to wet*

(B) **ALLUVIAL:** *Very loose to loose, dark brown, SAND (A-2-4), contains moderate organics, saturated*

(C) **UCP:** *Very loose to loose, brown, tan, orange and gray, SAND and clayey SAND (A-2-4, A-2-6, A-3), contains wood fragments, moist to saturated*

(D) **UCP:** *Medium stiff, tan, orange and gray, sandy CLAY (A-6), wet*

(E) **COASTAL PLAIN:** *Very soft to medium stiff, gray, sandy SILT and CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Very loose to dense, gray and green, SAND and clayey SAND (A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Very loose to very dense, gray, green and tan, SAND (A-2-4, A-2-6, A-3, A-1-b), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*

(I) **COASTAL PLAIN:** *Medium stiff to very stiff, gray and green, sandy SILT and CLAY (A-4, A-6), wet (RIVER BEND FORMATION)*

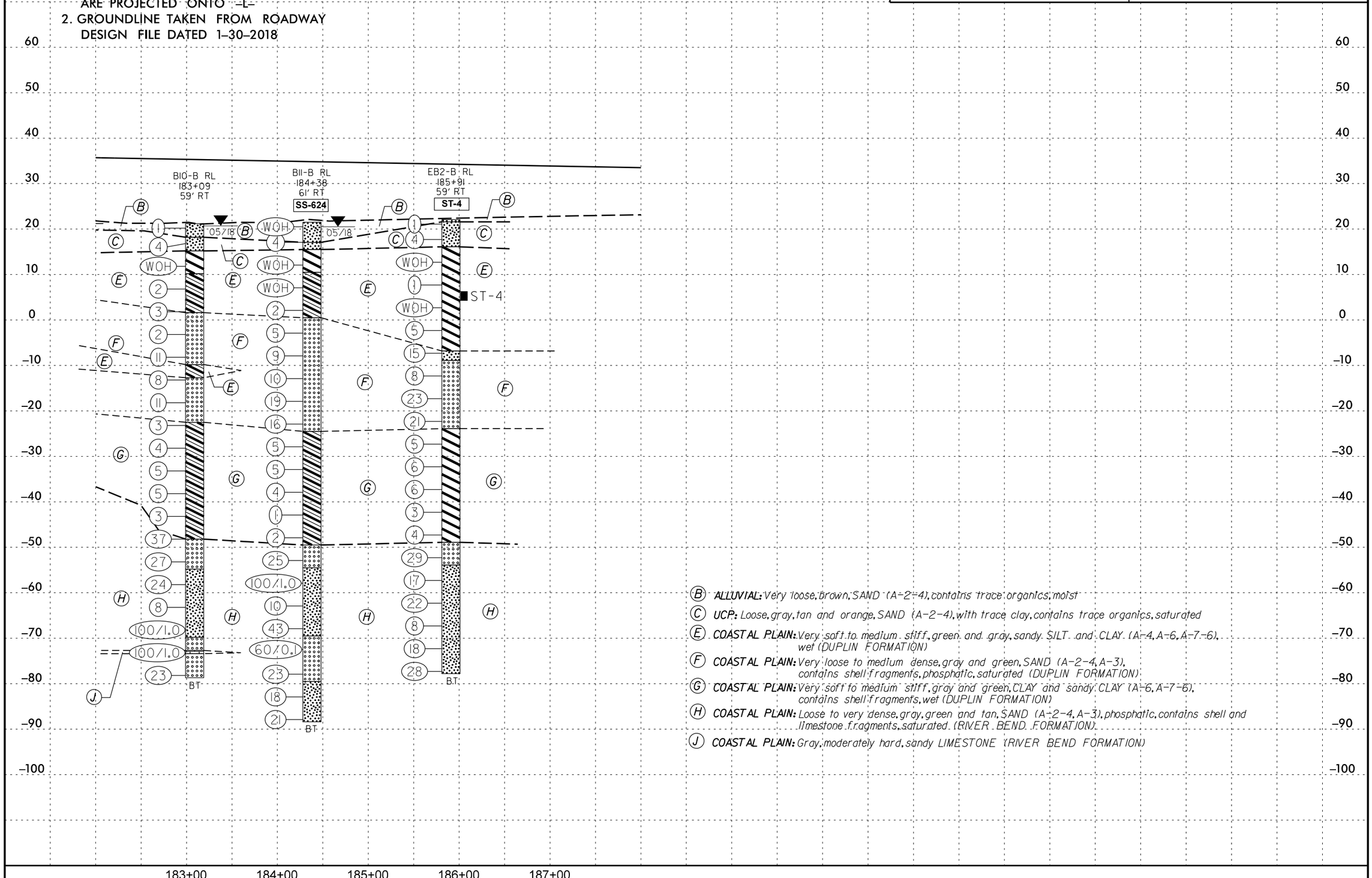
(J) **COASTAL PLAIN:** *Gray and brown, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION)*

PROJECT REFERENCE NO.	SHEET NO.
R-1015	9

PROFILE – BRIDGE NO. 277
BORINGS PROJECTED ONTO –L–

0 100 200
FEET
VE = 5

NOTES:
1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO –L–
2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1–30–2018



(B) **ALLUVIAL:** Very loose, brown, SAND (A-2-4), contains trace organics, moist

(C) **UCP:** Loose, gray, tan and orange, SAND (A-2-4), with trace clay, contains trace organics, saturated

(E) **COASTAL PLAIN:** Very soft to medium stiff, green and gray, sandy SILT and CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION)

(F) **COASTAL PLAIN:** Very loose to medium dense, gray and green, SAND (A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)

(G) **COASTAL PLAIN:** Very soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)

(H) **COASTAL PLAIN:** Loose to very dense, gray, green and tan, SAND (A-2-4, A-3), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)

(J) **COASTAL PLAIN:** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)

PROJECT REFERENCE NO.	SHEET NO.
R-1015	10

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

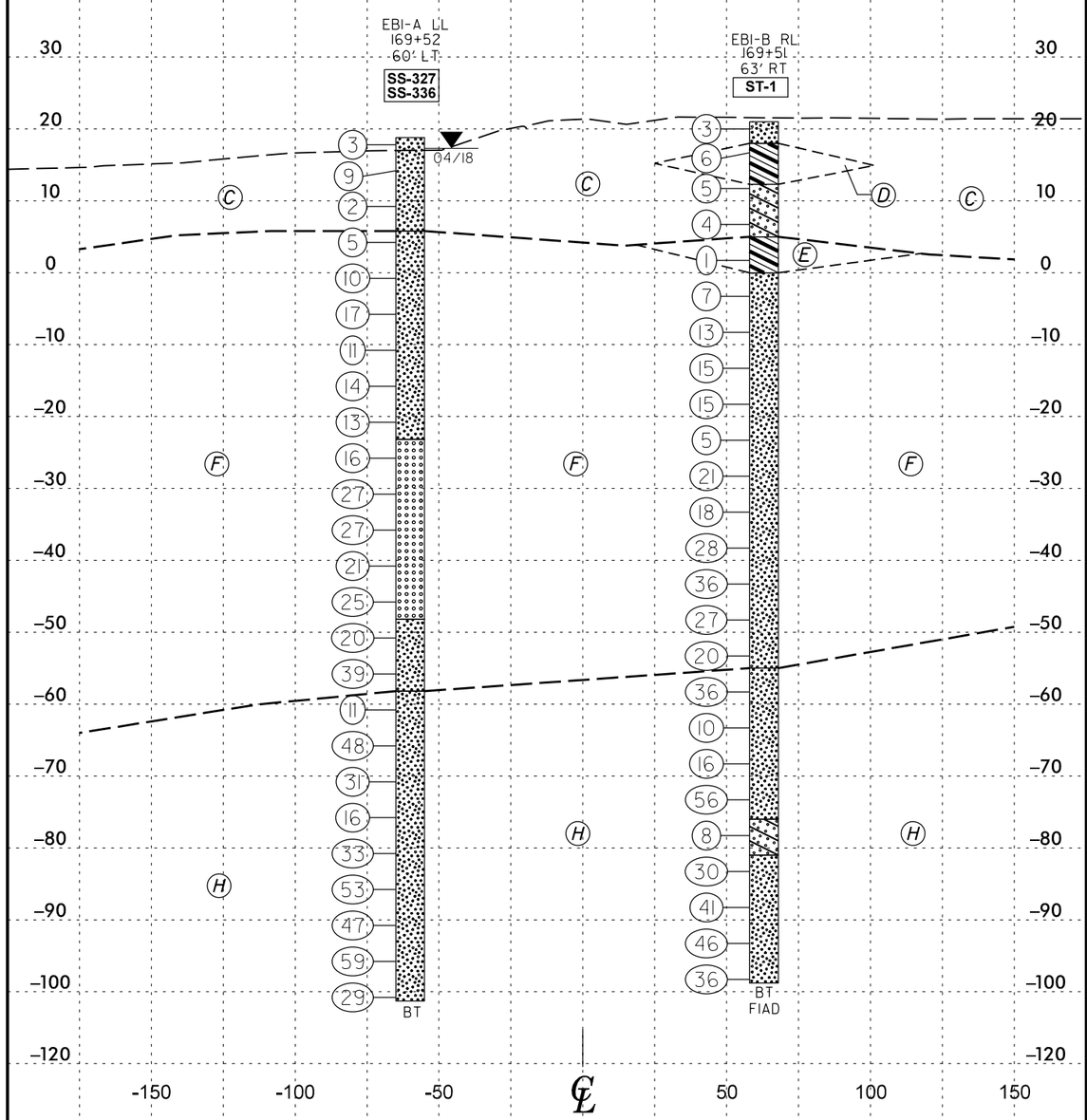
(C) **UCP:** *Very loose to loose, tan, orange and light gray, SAND and clayey SAND (A-2-4, A-2-6), moist to saturated*

(D) **UCP:** *Medium stiff, gray and orange, fine sandy and silty CLAY (A-6), moist to wet*

(E) **COASTAL PLAIN:** *Very soft, gray, sandy CLAY (A-6), wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Loose to dense, gray, brown and tan, fine to coarse SAND (A-2-4, A-3), with silt and clay interbeds, contains shell fragments, saturated (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Loose to very dense, tan and gray, SAND (A-2-4, A-2-6), contains cemented shell fragments, saturated (RIVER BEND FORMATION)*



HORIZ. SCALE (FEET) 0 50 100

VE = 2.5

CROSS SECTION – END BENT 1
–L– STA 169+55.33

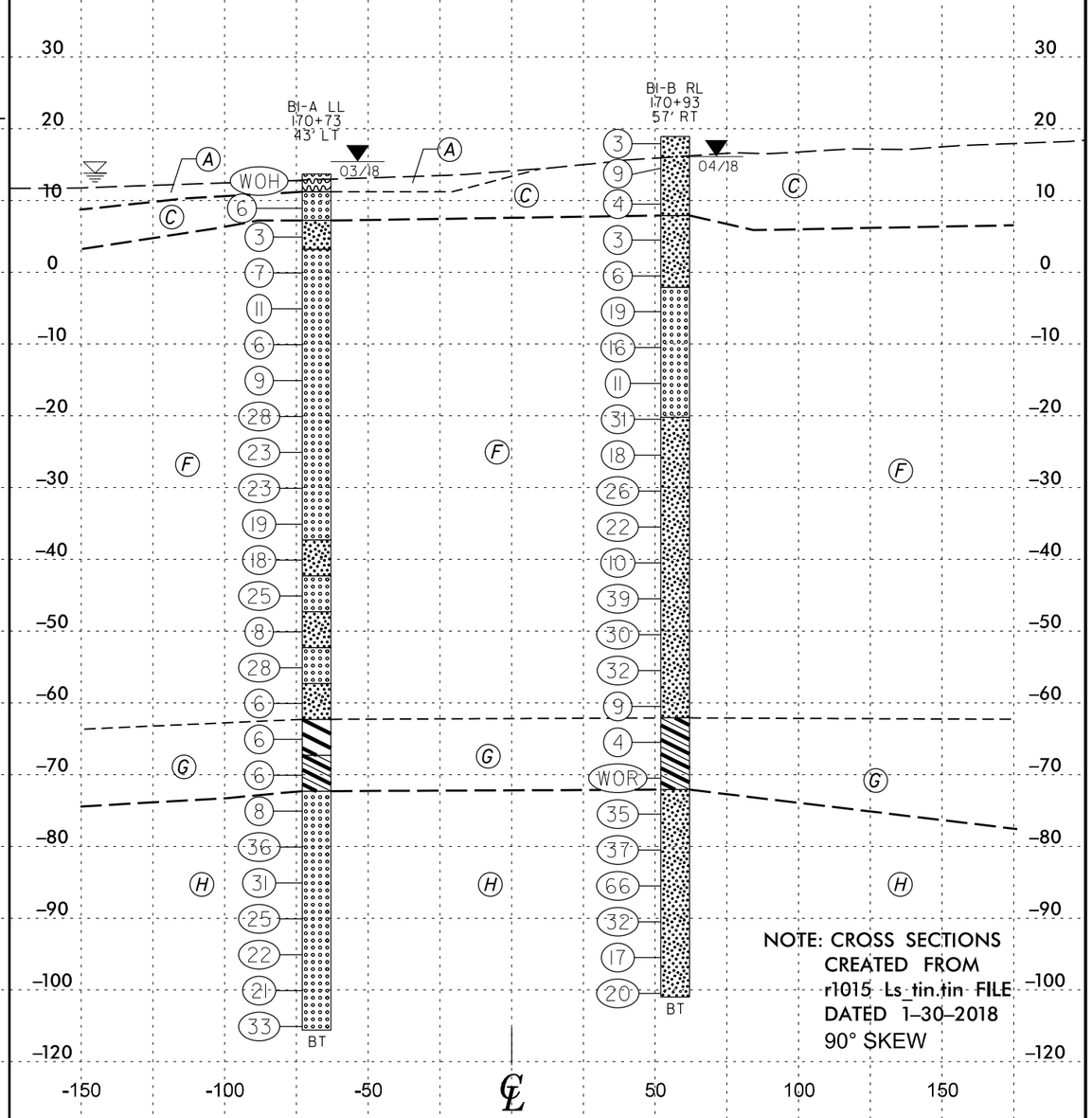
(A) **ALLUVIAL:** *Very soft, dark brown, MUCK, moist*

(C) **UCP:** *Very loose to loose, gray and tan, clayey and silty SAND (A-3, A-2-4), contains wood fragments, moist to saturated*

(F) **COASTAL PLAIN:** *Very loose to dense, gray, tan and brown, SAND and clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Very soft to medium stiff, green and gray, CLAY and sandy CLAY (A-6, A-7-6), micaceous, wet (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Loose to very dense, tan and gray, fine to coarse SAND (A-2-4, A-3), with trace silt and clay, contains shell fragments, saturated (RIVER BEND FORMATION)*



NOTE: CROSS SECTIONS CREATED FROM r1015_Ls_tin.tin FILE DATED 1-30-2018 90° SKEW

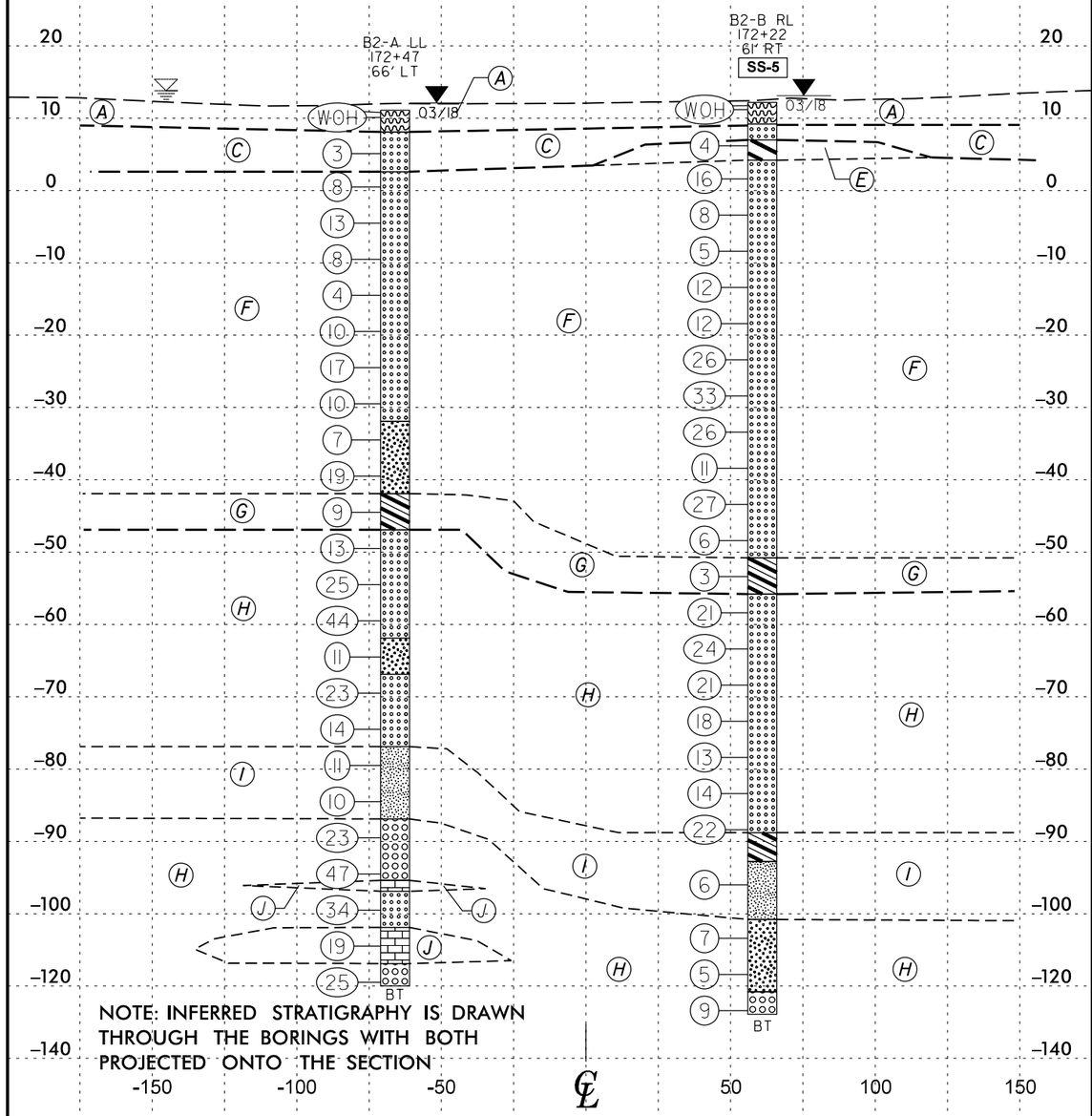
HORIZ. SCALE (FEET) 0 50 100

VE = 2.5

CROSS SECTION – BENT 1
–L– STA 170+91.50

PROJECT REFERENCE NO.	SHEET NO.
R-1015	11

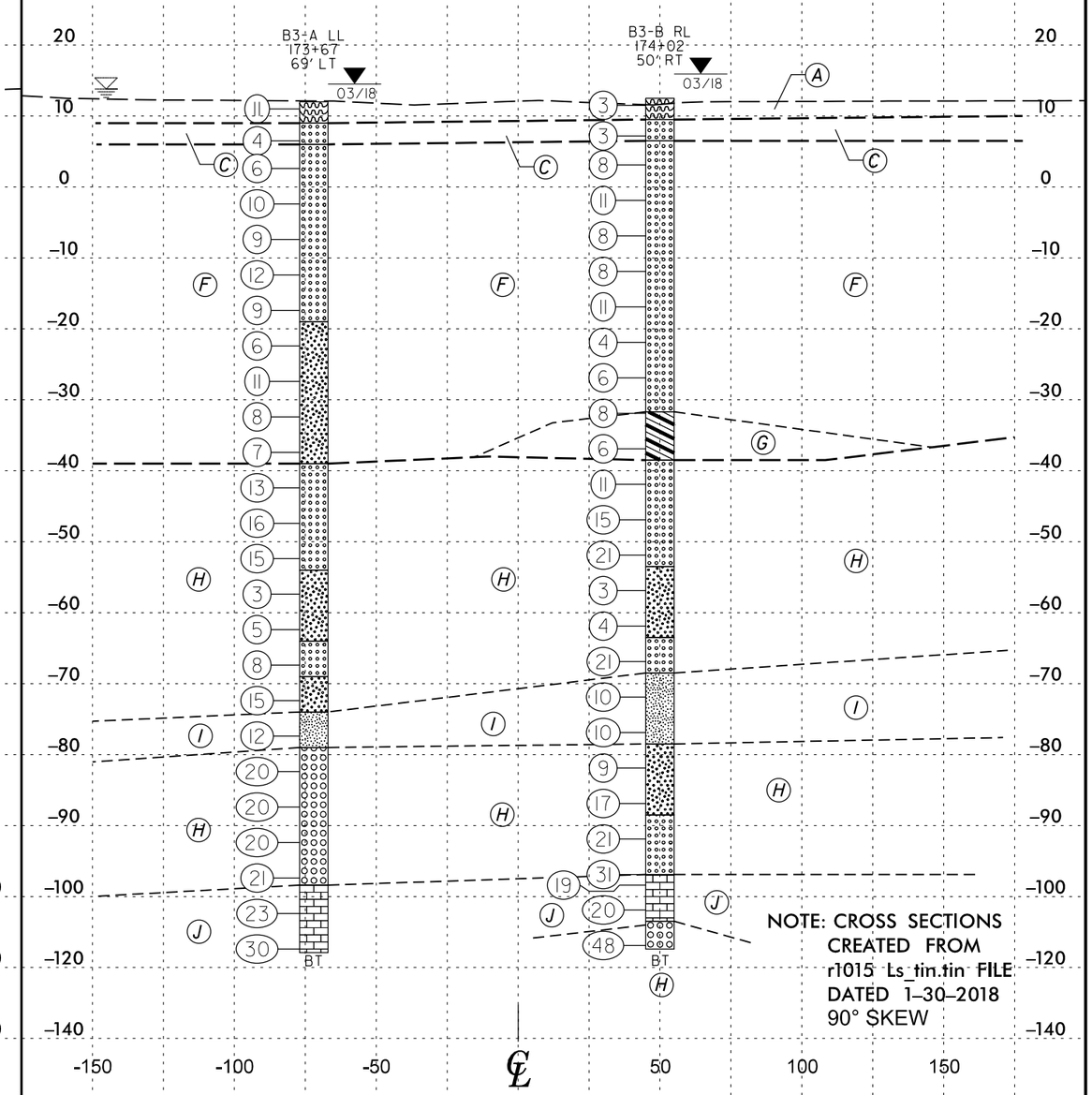
(A) **ALLUVIAL:** *Very soft, dark brown, MUCK, wet*
(C) **UCP:** *Very loose, brown, gray and tan, SAND (A-3), contains wood fragments, saturated*
(E) **COASTAL PLAIN:** *Medium stiff, gray and green, silty CLAY (A-7-6), wet (DUPLIN FORMATION)*
(F) **COASTAL PLAIN:** *Loose to dense, gray and brown, SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)*
(G) **COASTAL PLAIN:** *Soft to stiff, gray, sandy CLAY (A-6), wet (DUPLIN FORMATION)*
(H) **COASTAL PLAIN:** *Loose to medium dense, green and gray, SAND (A-1-b, A-2-4, A-3), saturated (RIVER BEND FORMATION)*
(I) **COASTAL PLAIN:** *Medium stiff to very stiff, gray and green, SILT and sandy CLAY (A-4, A-6), wet (RIVER BEND FORMATION)*
(J) **COASTAL PLAIN:** *Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)*



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 2
–L– STA 172+26+75

(A) **ALLUVIAL:** *Soft to stiff, dark brown, MUCK, contains wood fragments, moist to wet*
(C) **UCP:** *Very loose, tan, SAND (A-3), contains wood fragments, saturated*
(F) **COASTAL PLAIN:** *Loose to medium dense, gray and green, SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)*
(G) **COASTAL PLAIN:** *Medium stiff, gray and green, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)*
(H) **COASTAL PLAIN:** *Very loose to dense, gray and green, SAND (A-1-b, A-2-4, A-3), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*
(I) **COASTAL PLAIN:** *Stiff, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)*
(J) **COASTAL PLAIN:** *Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)*



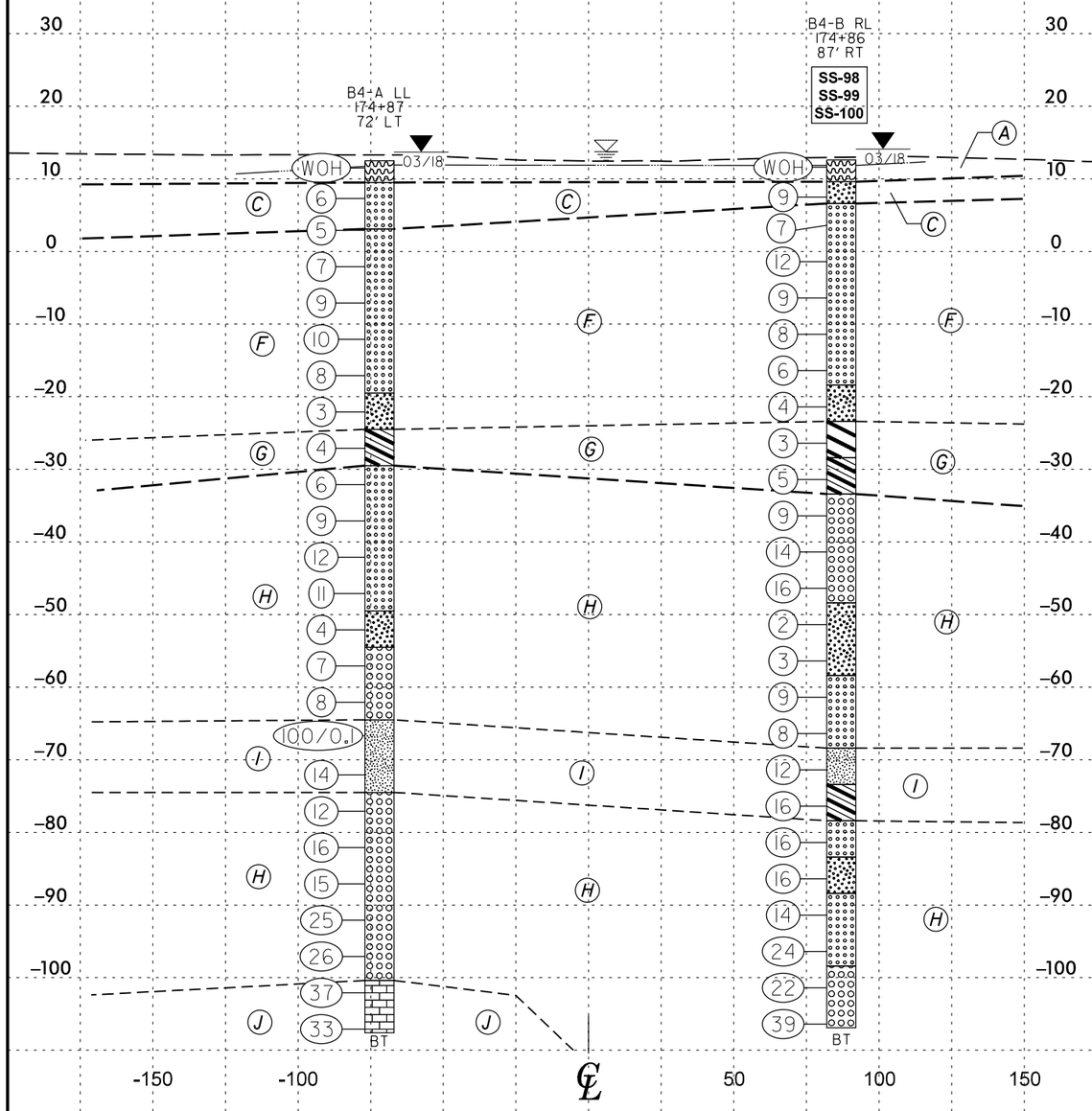
HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 3
–L– STA 173+61+75

PROJECT REFERENCE NO.	SHEET NO.
R-1015	12

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

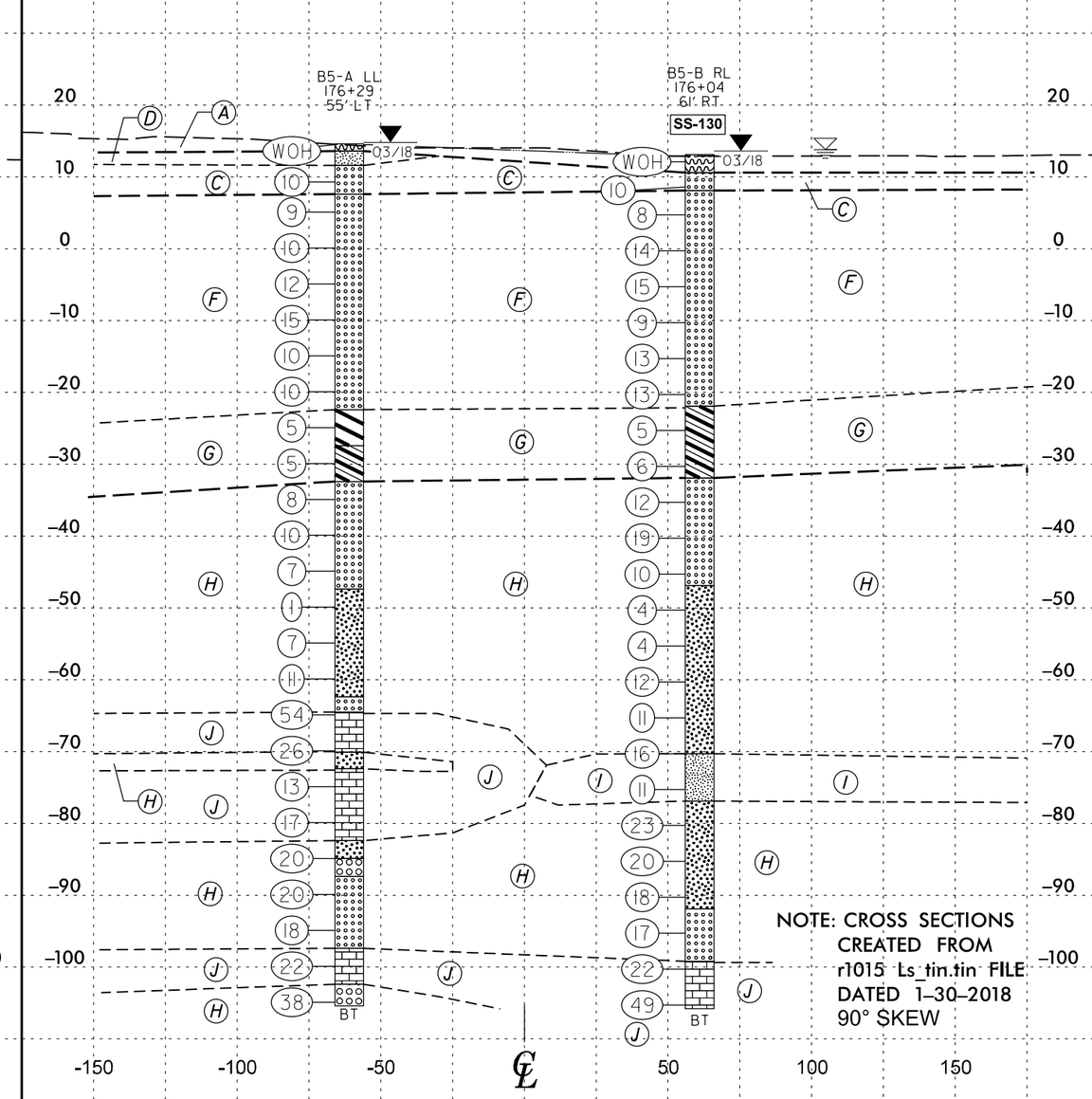
- (A) **ALLUVIAL:** *Very soft, dark brown, MUCK, wet*
- (C) **UCP:** *Loose, tan and brown, SAND (A-2-4, A-3), contains wood fragments, saturated*
- (F) **COASTAL PLAIN:** *Very loose to medium dense, gray and green, SAND (A-2-4, A-3), contains shell fragments, saturated (DUPLIN FORMATION)*
- (G) **COASTAL PLAIN:** *Soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)*
- (H) **COASTAL PLAIN:** *Loose to dense, gray and green, SAND (A-2-4, A-3, A-1-b), with trace clay, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*
- (I) **COASTAL PLAIN:** *Stiff to hard, green, sandy SILT and sandy CLAY (A-4, A-6), contains shell fragments, wet (RIVER BEND FORMATION)*
- (J) **COASTAL PLAIN:** *Brown and gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)*



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 4
–L– STA 174+96.75

- (A) **ALLUVIAL:** *Very soft, dark brown, MUCK, wet*
- (C) **UCP:** *Loose to medium dense, tan, SAND (A-3), contains wood fragments, saturated*
- (D) **UCP:** *Very soft, green, SILT (A-4), wet*
- (F) **COASTAL PLAIN:** *Loose to medium dense, gray and green, SAND (A-3), contains shell fragments, saturated (DUPLIN FORMATION)*
- (G) **COASTAL PLAIN:** *Medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, saturated (DUPLIN FORMATION)*
- (H) **COASTAL PLAIN:** *Very loose to dense, gray and green, SAND (A-2-4, A-3, A-1-b), with trace clay, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*
- (I) **COASTAL PLAIN:** *Stiff, gray and green, sandy SILT (A-4), wet (RIVER BEND FORMATION)*
- (J) **COASTAL PLAIN:** *Gray and brown, moderately hard, LIMESTONE (RIVER BEND FORMATION)*



NOTE: CROSS SECTIONS CREATED FROM r1015 Ls_tin.tin FILE DATED 1-30-2018 90° SKEW

HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 5
–L– STA 176+32.00

PROJECT REFERENCE NO.	SHEET NO.
R-1015	13

(A) **ALLUVIAL:** Very soft, brown, MUCK, wet

(B) **ALLUVIAL:** Loose, dark brown, SAND (A-2-4), moist to saturated

(C) **UCP:** Loose, gray and tan, SAND (A-2-4), saturated

(D) **UCP:** Soft, tan, orange and gray, fine sandy, silty CLAY (A-6), wet

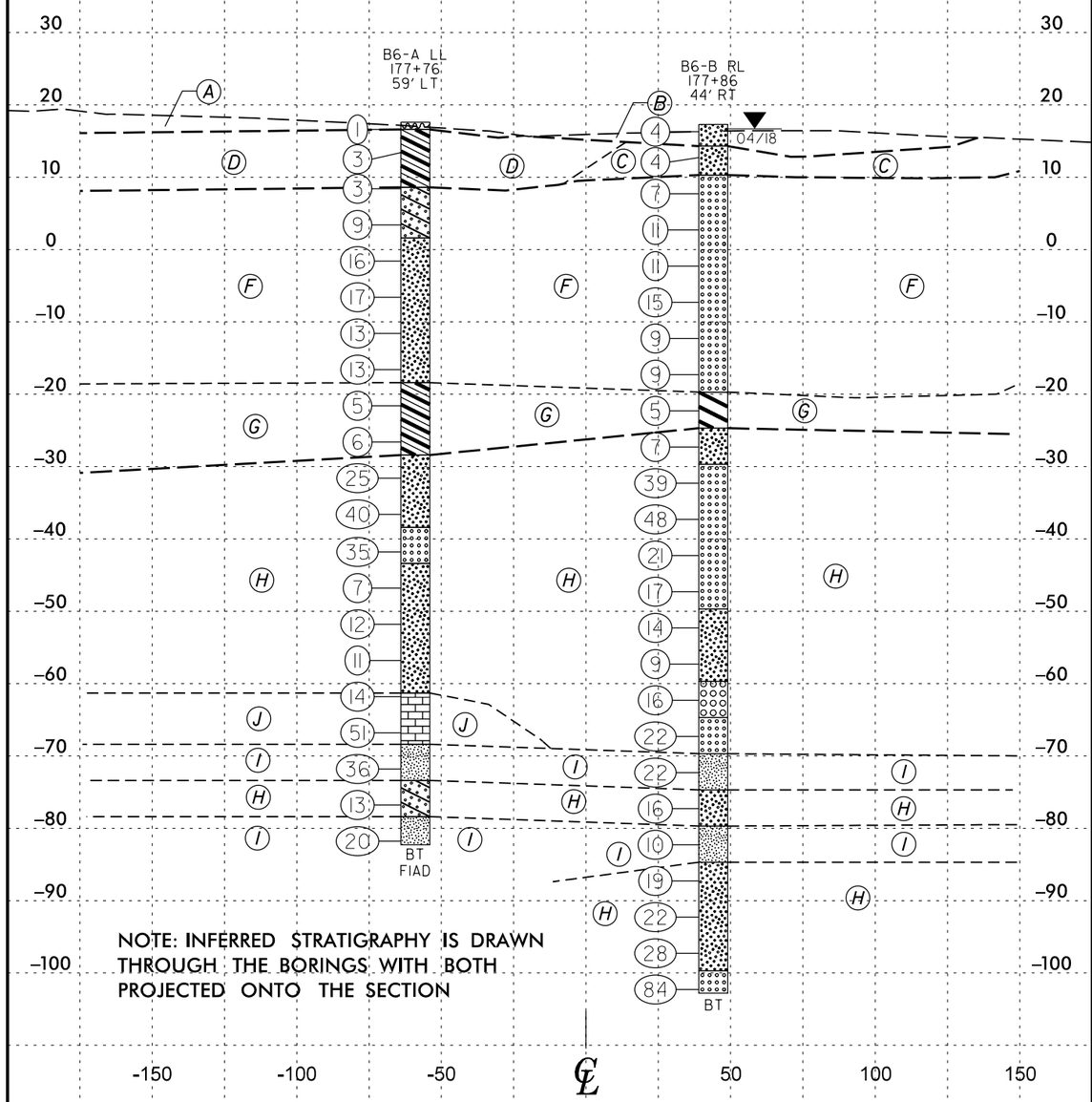
(F) **COASTAL PLAIN:** Very loose to medium dense, gray, SAND and clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)

(G) **COASTAL PLAIN:** Medium stiff, green and gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)

(H) **COASTAL PLAIN:** Loose to very dense, gray, green and tan, SAND (A-2-6, A-2-4, A-3, A-1-b), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)

(I) **COASTAL PLAIN:** Stiff to hard, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)

(J) **COASTAL PLAIN:** Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 6
–L– STA 177+67.00

(B) **ALLUVIAL:** Very loose, brown and gray, SAND (A-2-4), moist

(C) **UCP:** Very loose to loose, tan and orange, SAND and clayey SAND (A-2-4, A-2-6), saturated

(E) **COASTAL PLAIN:** Very soft, gray, sandy SILT (A-4), wet (DUPLIN FORMATION)

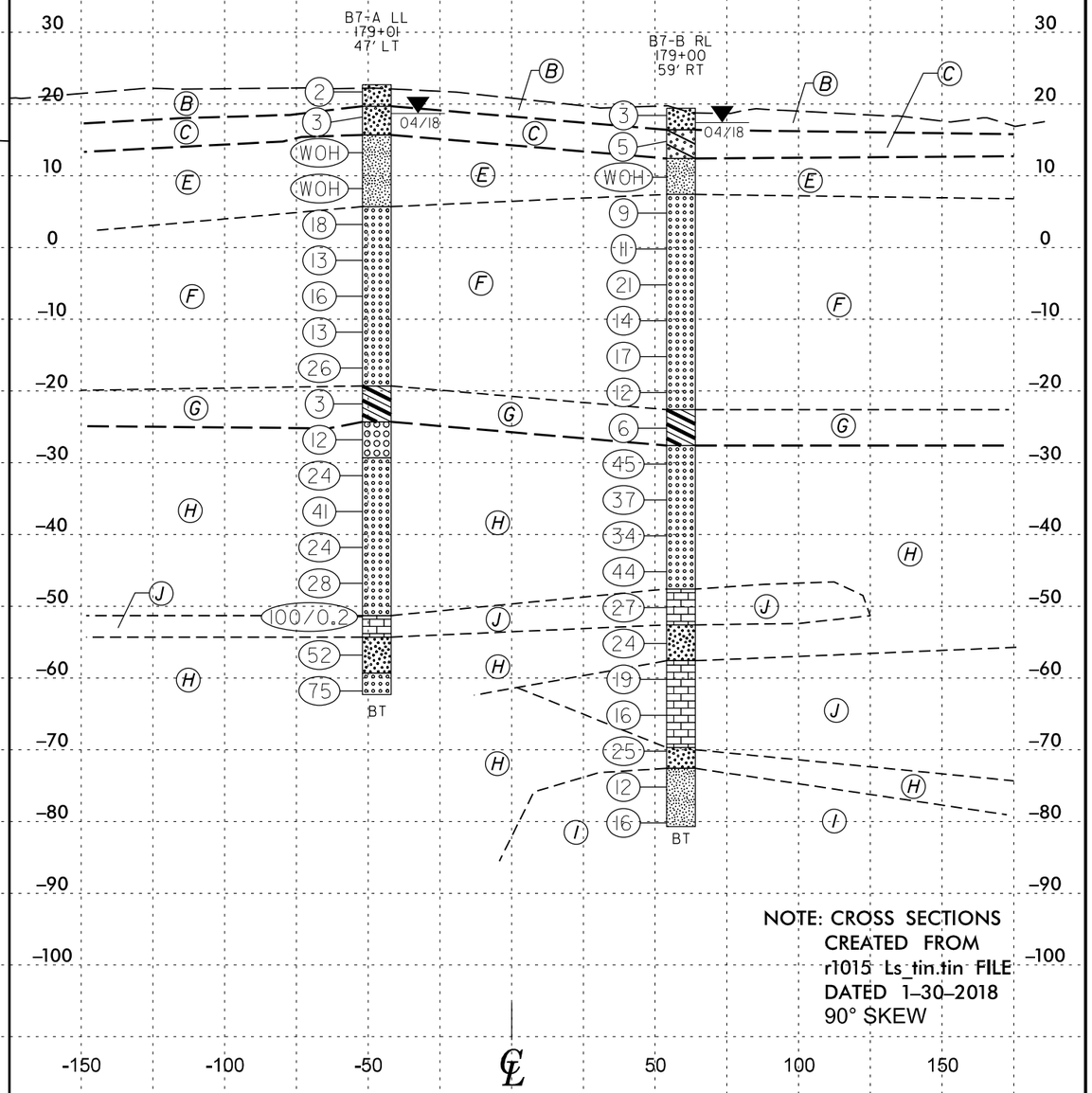
(F) **COASTAL PLAIN:** Loose to medium dense, gray and green, SAND (A-3), contains shell fragments, saturated (DUPLIN FORMATION)

(G) **COASTAL PLAIN:** Soft to medium stiff, gray, sandy CLAY (A-6), contains shell fragments, wet (DUPLIN FORMATION)

(H) **COASTAL PLAIN:** Medium dense to very dense, gray, SAND (A-3, A-1-b, A-2-4), phosphatic, contains shell fragments, saturated (RIVER BEND FORMATION)

(I) **COASTAL PLAIN:** Stiff to very stiff green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)

(J) **COASTAL PLAIN:** Gray, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION)

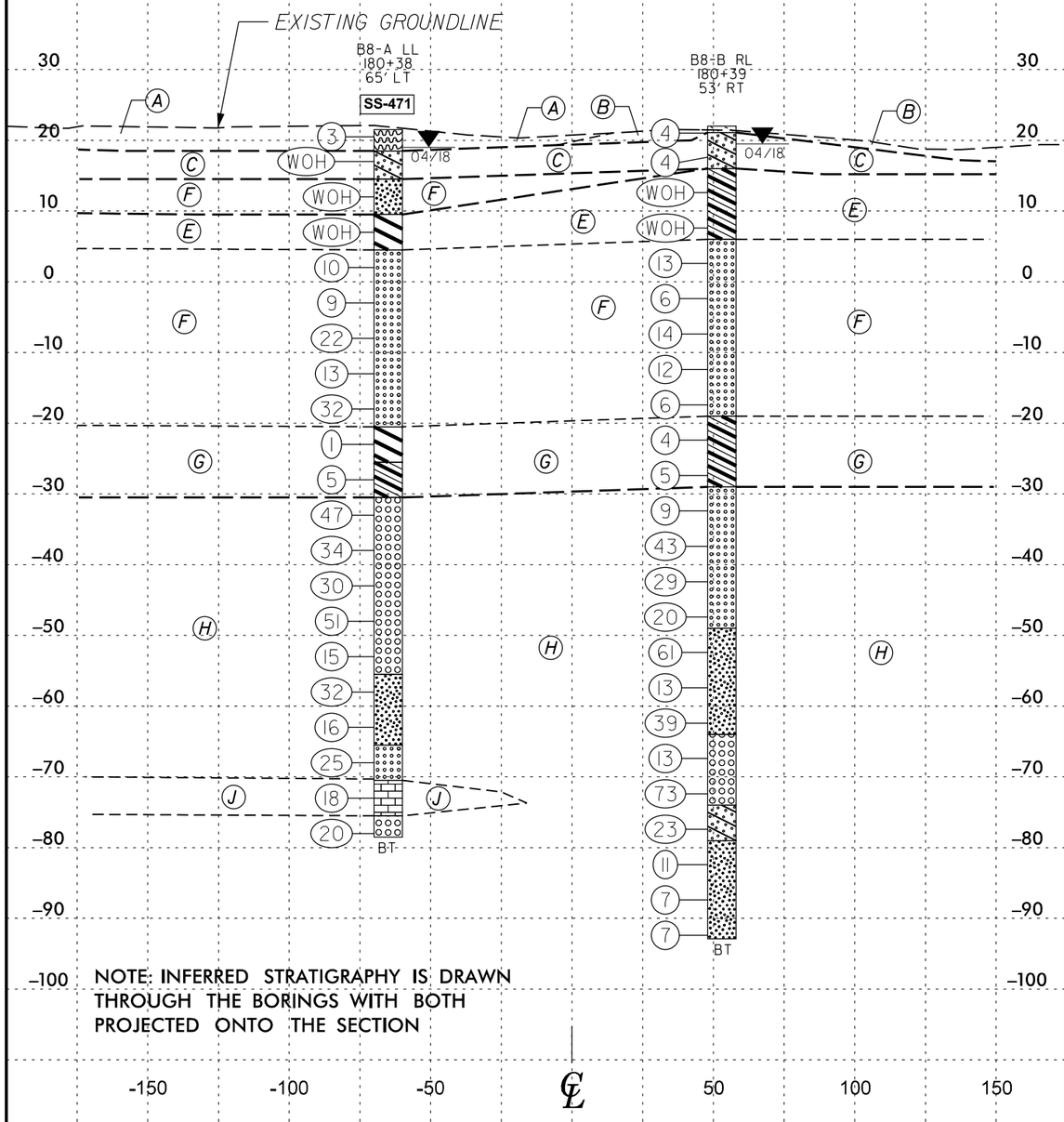


HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 7
–L– STA 179+02.00

PROJECT REFERENCE NO.	SHEET NO.
R-1015	14

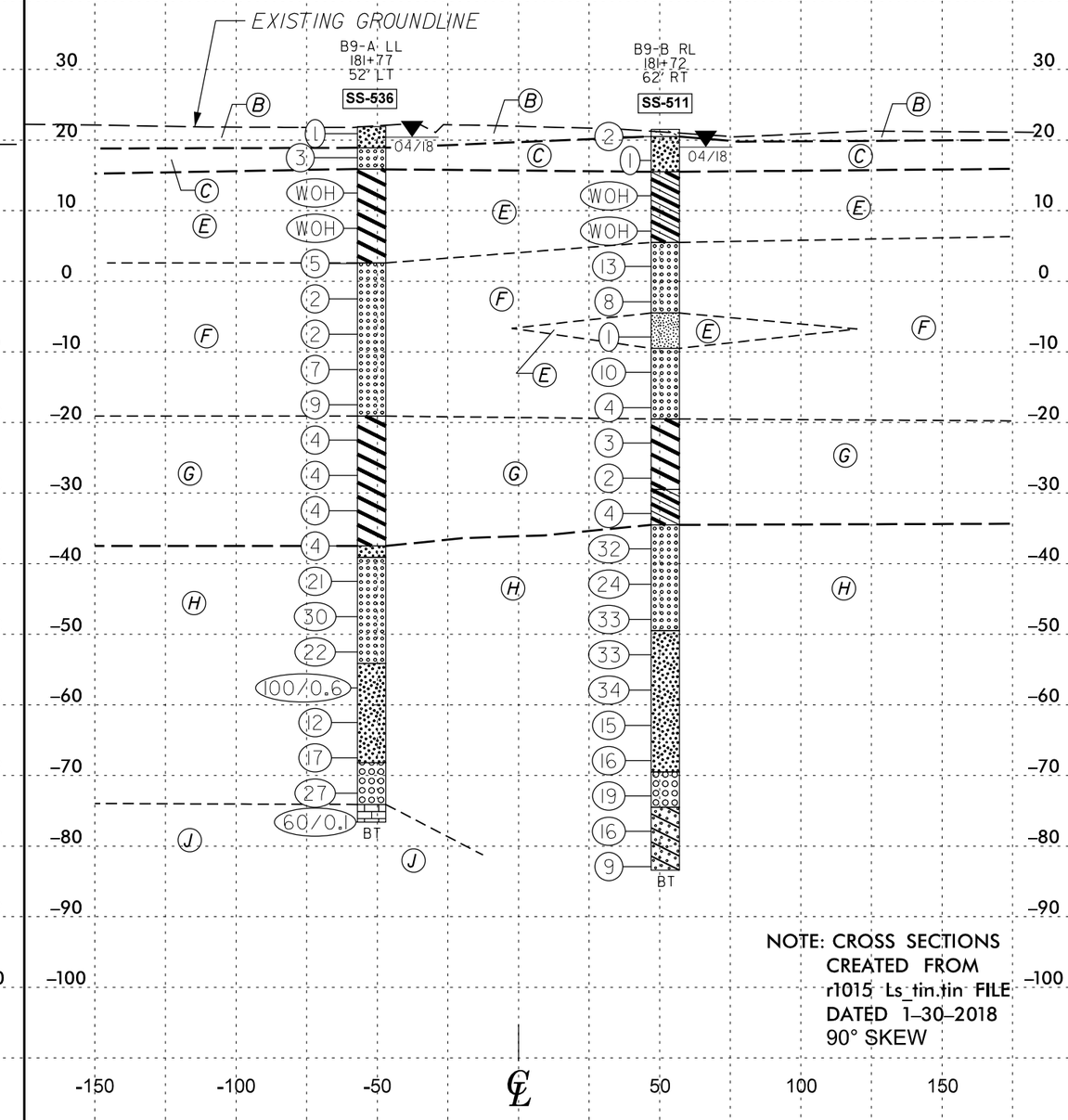
(A) **ALLUVIAL:** Very soft, dark brown, MUCK, moist
(B) **ALLUVIAL:** Very loose, dark brown, SAND 9A-2-4), contains moderate organics, moist
(C) **UCP:** Very loose, brown, tan and orange, clayey SAND (A-2-6), saturated
(E) **COASTAL PLAIN:** Very soft, gray, sandy and silty CLAY (A-6, A-7-6), wet (DUPLIN FORMATION)
(F) **COASTAL PLAIN:** Very loose to dense, gray, SAND (A-2-4, A-3) with clay interbeds, phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
(G) **COASTAL PLAIN:** Very soft to medium stiff, gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
(H) **COASTAL PLAIN:** Loose to very dense, gray and green, SAND and clayey SAND (A-1-b, A-2-6, A-2-4, A-3), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
(J) **COASTAL PLAIN:** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 8
–L– STA 180+37.25

(B) **ALLUVIAL:** Very loose, dark brown, SAND (A-2-4), contains moderate organics, moist
(C) **UCP:** Very loose, gray, tan and orange, SAND (A-3, A-2-4), saturated
(E) **COASTAL PLAIN:** Very soft, gray, SILT, CLAY and sandy CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION)
(F) **COASTAL PLAIN:** Very loose to medium dense, gray, SAND (A-3) contains shell fragments, saturated (DUPLIN FORMATION)
(G) **COASTAL PLAIN:** Soft to medium stiff, gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
(H) **COASTAL PLAIN:** Loose to very dense, gray and green, SAND and silty to clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments (RIVER BEND FORMATION)
(J) **COASTAL PLAIN:** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 9
–L– 181+72.25

PROJECT REFERENCE NO.	SHEET NO.
R-1015	15

(B) **ALLUVIAL:** *Very loose, brown, silty SAND (A-2-4), contains trace organics, moist*

(C) **UCP:** *Loose, gray, SAND and silty SAND (A-3, A-2-4), saturated*

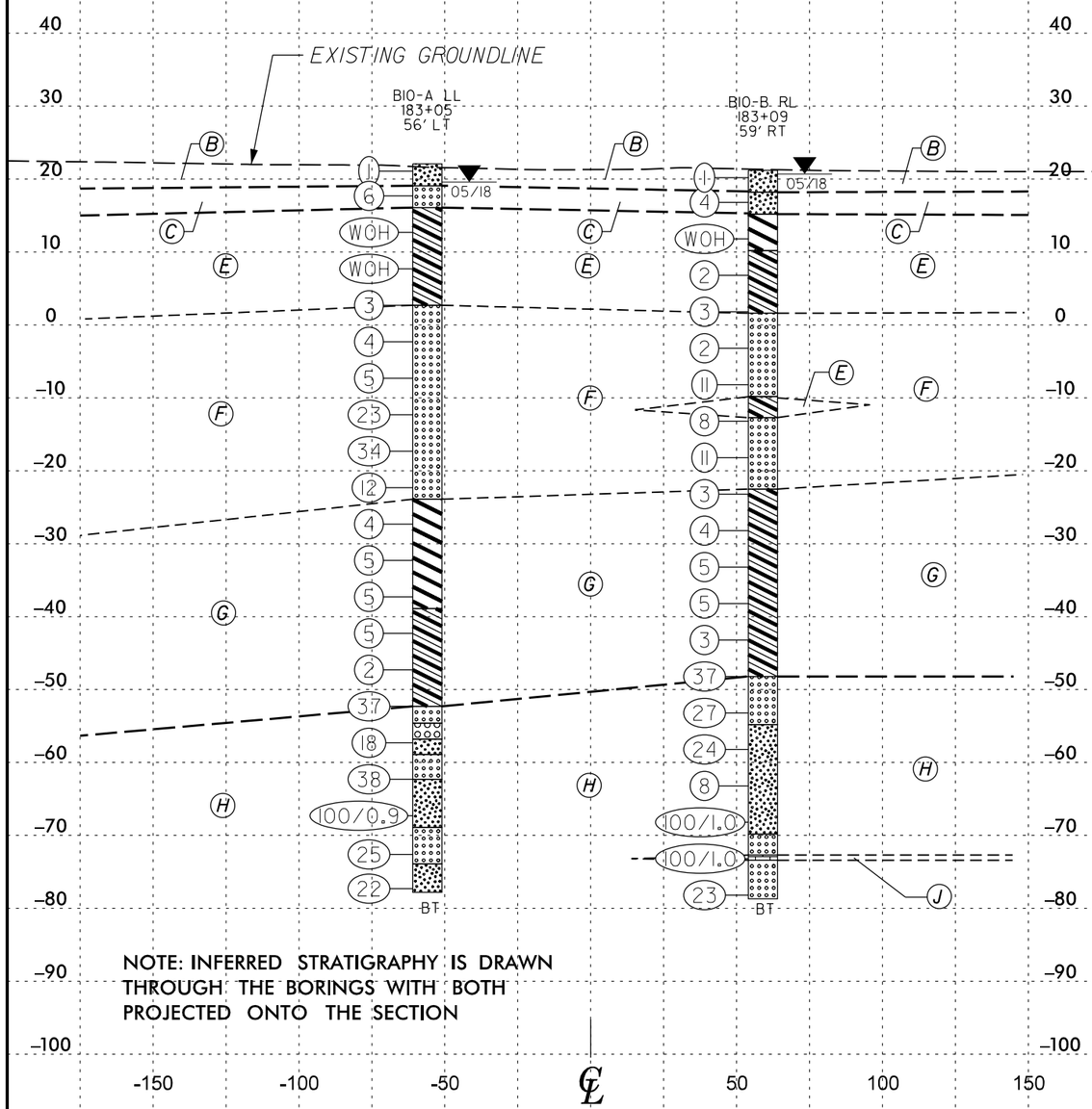
(E) **COASTAL PLAIN:** *Very soft to medium stiff, gray, sandy and silty CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Very loose to dense, gray, SAND (A-3), with trace clay, contains shell fragments, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Soft to stiff, gray, silty and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Loose to very dense, gray and green, SAND (A-2-4, A-3, A-1-b), contains shell fragments, saturated (RIVER BEND FORMATION)*

(J) **COASTAL PLAIN:** *Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)*



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 10
–L– STA 183+07.25

(B) **ALLUVIAL:** *Very loose, dark brown, silty and clayey SAND (A-2-4), moist*

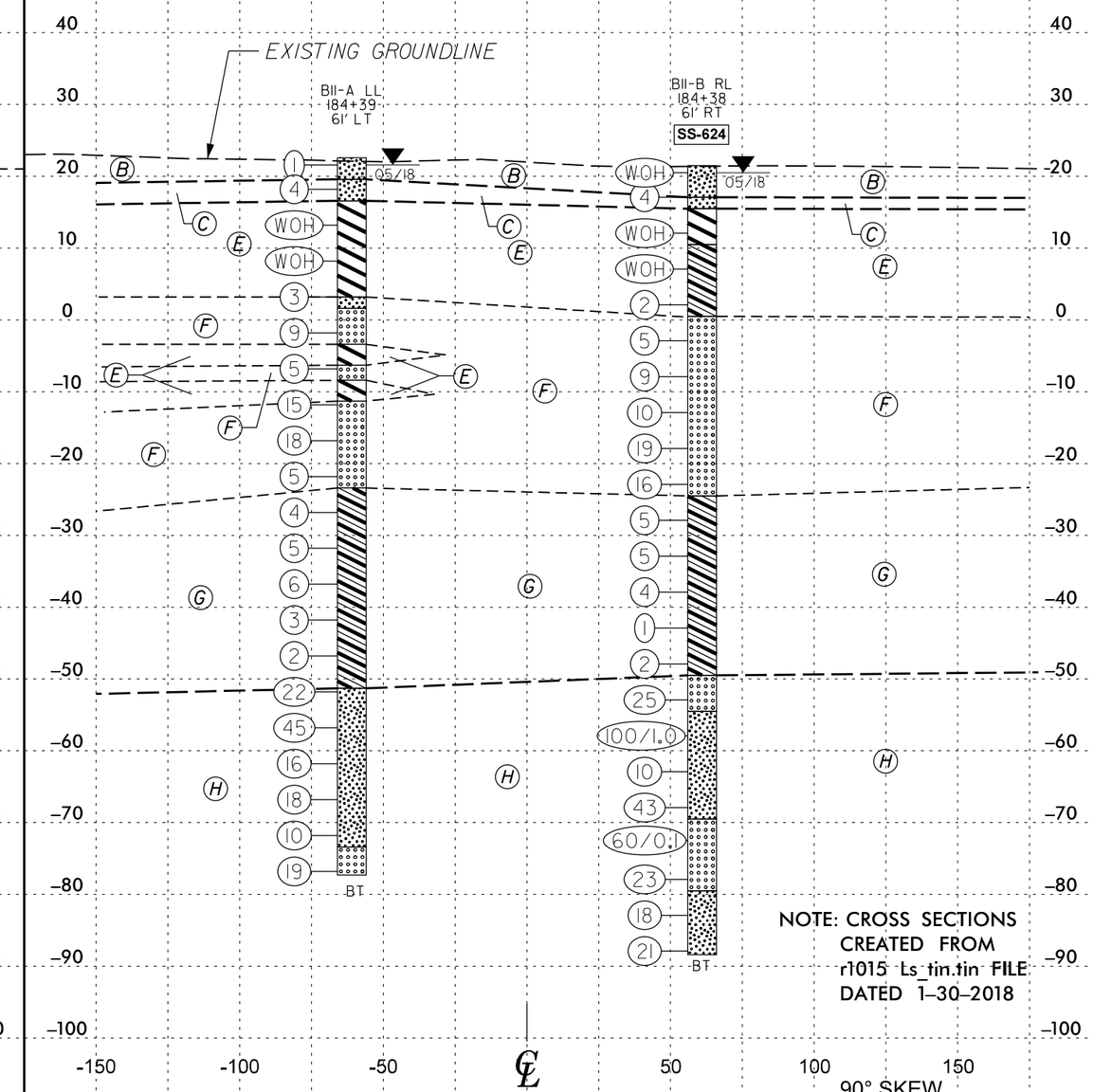
(C) **UCP:** *Loose, gray and orange, SAND (A-2-4), with trace clay, saturated*

(E) **COASTAL PLAIN:** *Very soft to soft, gray, clay and sandy CLAY (A-6, A-7-6), wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Loose to medium dense, gray, SAND (A-2-4, A-3), with trace clay, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Very soft to medium stiff, sandy CLAY (A-6), contains shell fragments, wet (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Medium dense to very dense, gray, tan and green, SAND (A-2-4, A-3), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)*



HORIZ. SCALE (FEET) 0 50 100 | VE = 2.5

CROSS SECTION – BENT 11
–L– STA 184+42.50

PROJECT REFERENCE NO.	SHEET NO.
R-1015	16

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

(B) **ALLUVIAL:** *Very loose, brown, silty SAND (A-2-4), some moderately organic, moist*

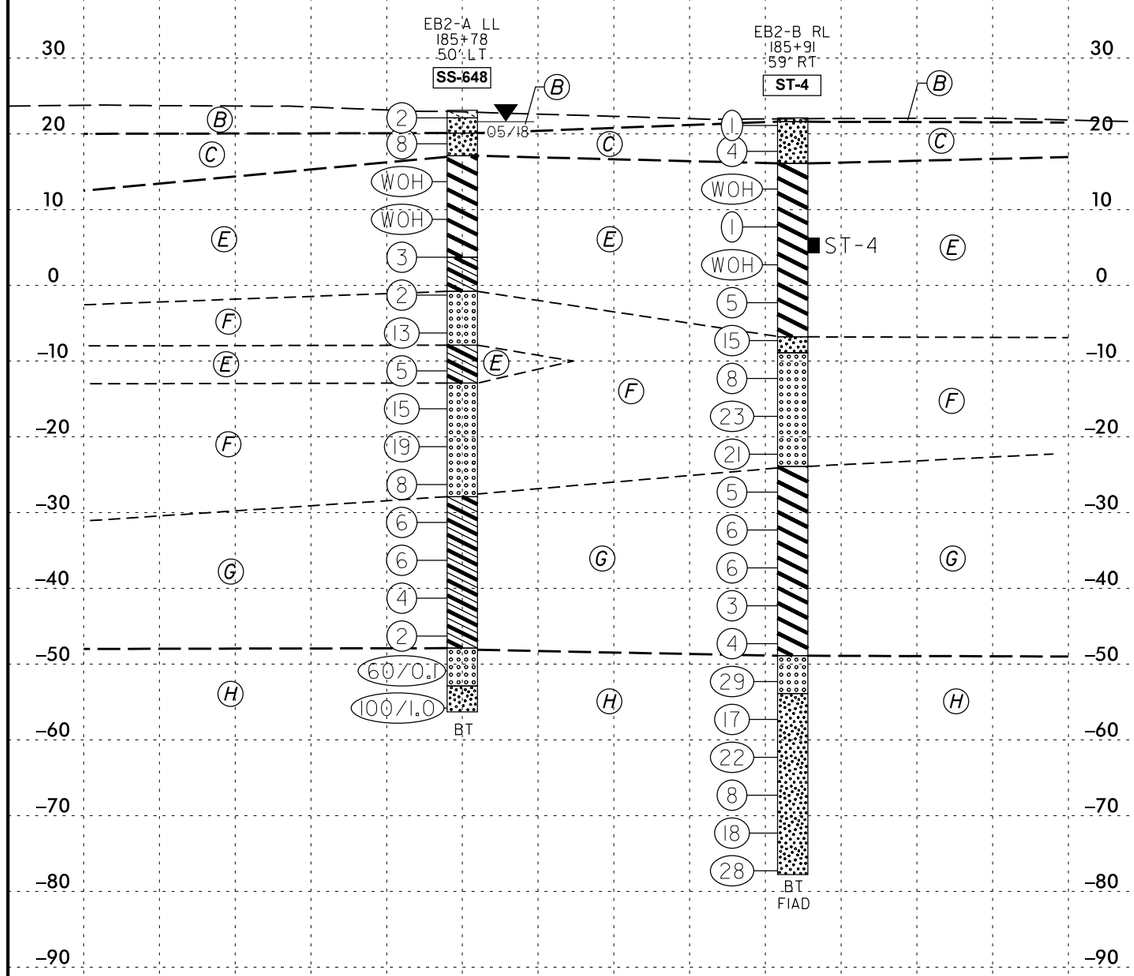
(C) **UCP:** *Loose, gray, tan and orange, SAND (A-2-4), with silt and clay, some with trace organics, saturated*

(E) **COASTAL PLAIN:** *Very soft to medium stiff, gray, CLAY (A-6, A-7-6), with fine sand and silt, wet (DUPLIN FORMATION)*

(F) **COASTAL PLAIN:** *Very loose to medium dense, gray, SAND (A-2-4, A-3), with trace clay, saturated (DUPLIN FORMATION)*

(G) **COASTAL PLAIN:** *Soft to medium stiff, gray, silty and sandy CLAY (A-6, A-7-6), contains shell fragments (DUPLIN FORMATION)*

(H) **COASTAL PLAIN:** *Loose to very dense, green and gray, silty SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (RIVER BEND FORMATION)*



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

NOTE: CROSS SECTIONS CREATED FROM r1015 Ls_tin.tin FILE DATED 1-30-2018 90° SKEW

-150 -100 -50 ℄ 50 100 150

HORIZ. SCALE (FEET) 0 50 100

VE = 2.5

CROSS SECTION – END BENT 2 –L– STA 185+78.67

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB1-A LL	**STATION** 169+52	**OFFSET** 60 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.8 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 409,756	**EASTING** 2,625,695 / **24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/10/18	**COMP. DATE** 04/10/18	**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											
25											
20											
	18.8	0.0								18.8 GROUND SURFACE	0.0
			1	1	2	3		M		**UNDIVIDED COASTAL PLAIN** Tan, orange and light gray, silty, fine to coarse SAND (A-2-4(0)), contains wood fragments	
15	15.2	3.6	5	5	4	9		Sat.			
10	10.2	8.6	2	1	1	2	SS-327	26%			
5	5.2	13.6								5.8 **COASTAL PLAIN** Gray, dark brown and tan, phosphatic, fine to coarse SAND (A-2-4, A-3(0)), with trace silt and clay, contains shell fragments (DUPLIN FORMATION)	13.0
			1	2	3	5		Sat.			
0	0.2	18.6	3	3	7	10		Sat.			
-5	-4.8	23.6	9	8	9	17		Sat.			
-10	-9.8	28.6	4	6	5	11		Sat.			
-15	-14.8	33.6	7	7	7	14		Sat.			
-20	-19.8	38.6	8	6	7	13		Sat.		-23.2	42.0
-25	-24.8	43.6	6	7	9	16		Sat.			
-30	-29.8	48.6	9	11	16	27		Sat.			
-35	-34.8	53.6	8	12	15	27	SS-336	24% Sat.			
-40	-39.8	58.6	6	10	11	21		Sat.			
-45	-44.8	63.6	9	11	14	25		Sat.		-48.2	67.0
-50	-49.8	68.6									

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB1-A LL	**STATION** 169+52	**OFFSET** 60 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.8 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 409,756	**EASTING** 2,625,695 / **24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/10/18	**COMP. DATE** 04/10/18	**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				
			5	7	13	20		Sat.		Gray, dark brown and tan, phosphatic, fine to coarse SAND (A-2-4, A-3(0)), with trace silt and clay, contains shell fragments (DUPLIN FORMATION) *(continued)*
-55	-54.8	73.6	13	17	22	39		Sat.		
-60	-59.8	78.6	7	5	6	11		Sat.		-58.2 77.0 **COASTAL PLAIN** Gray and tan, fine to coarse SAND (A-2-4), with trace silt and clay, contains shell fragments (RIVER BEND FORMATION)
-65	-64.8	83.6	13	21	27	48		Sat.		
-70	-69.8	88.6	8	12	19	31		Sat.		
-75	-74.8	93.6	9	9	7	16		Sat.		
-80	-79.8	98.6	8	13	20	33		Sat.		
-85	-84.8	103.6	15	21	32	53		Sat.		
-90	-89.8	108.6	17	20	27	47		Sat.		
-95	-94.8	113.6	14	23	36	59		Sat.		
-100	-99.8	118.6	8	12	17	29		Sat.		-101.3 120.1 Boring Terminated at Elevation -101.3 ft in SAND (River Bend Formation)

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB1-B RL	**STATION** 169+51	**OFFSET** 63 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.0 ft	**TOTAL DEPTH** 119.8 ft	**NORTHING** 409,866	**EASTING** 2,625,752 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/11/18	**COMP. DATE** 04/11/18	**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											
25											
20	21.0	0.0	2	2	1	3		M		21.0 GROUND SURFACE	0.0
										UNDIVIDED COASTAL PLAIN Tan, silty, fine SAND (A-2-4)	
15	17.7	3.3	2	3	3	6		W 29%		18.0 Gray and orange, fine sandy CLAY (A-6(3)), with trace silt	3.0
10	12.7	8.3	WOH	2	3	5		Sat.		12.3 Tan and orange, silty, clayey, fine to coarse SAND (A-2-6)	8.7
5	7.7	13.3	1	2	2	4		Sat.		5.0 **COASTAL PLAIN** Gray, fine sandy, silty CLAY (A-6) (DUPLIN FORMATION)	16.0
0	2.7	18.3	1	0	1	1		W		0.0 Gray, brown and tan, phosphatic, fine to coarse SAND (A-2-4), with silt and clay interbeds, contains cemented shell fragments (DUPLIN FORMATION)	21.0
-5	-2.3	23.3	4	3	4	7		Sat.			
-10	-7.3	28.3	4	6	7	13		Sat.			
-15	-12.3	33.3	4	7	8	15		Sat.			
-20	-17.3	38.3	8	7	8	15		Sat.			
-25	-22.3	43.3	1	2	3	5		Sat.			
-30	-27.3	48.3	7	7	14	21		Sat.			
-35	-32.3	53.3	7	7	11	18		Sat.			
-40	-37.3	58.3	8	11	17	28		Sat.			
-45	-42.3	63.3	8	14	22	36		Sat.			
-50	-47.3	68.3	9	13	14	27		Sat.			

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB1-B RL	**STATION** 169+51	**OFFSET** 63 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.0 ft	**TOTAL DEPTH** 119.8 ft	**NORTHING** 409,866	**EASTING** 2,625,752 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/11/18	**COMP. DATE** 04/11/18	**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				
-55	-52.3	73.3	3	7	13	20		Sat.		Gray, brown and tan, phosphatic, fine to coarse SAND (A-2-4), with silt and clay interbeds, contains cemented shell fragments (DUPLIN FORMATION) *(continued)* -55.0 / 76.0
-60	-57.3	78.3	10	16	20	36		Sat.		**COASTAL PLAIN** Gray and tan, cemented, fine to coarse SAND (A-2-4, A-2-6), with silt and clay, contains shell fragments (RIVER BEND FORMATION)
-65	-62.3	83.3	6	5	5	10		Sat.		
-70	-67.3	88.3	6	6	10	16		Sat.		
-75	-72.3	93.3	13	20	36	56		Sat.		-76.0 / 97.0
-80	-77.3	98.3	4	4	4	8		Sat.		-81.0 / 102.0
-85	-82.3	103.3	12	14	16	30		Sat.		
-90	-87.3	108.3	11	17	24	41		Sat.		
-95	-92.3	113.3	12	20	26	46		Sat.		
	-97.3	118.3	10	13	23	36		Sat.		-98.8 / 119.8

Boring Terminated at Elevation -98.8 ft in SAND (River Bend Formation)

Drill chatter from 111.0' to 113.0'
Strata break in split spoon at a depth of 8.7'
ST 1 taken in offset boring at STA 169+54 58' RT

Other Samples:
ST-1 (4.5 - 6.5)

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B1-A LL	**STATION** 170+73	**OFFSET** 43 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 13.7 ft	**TOTAL DEPTH** 119.3 ft	**NORTHING** 409,825	**EASTING** 2,625,595 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/28/18	**COMP. DATE** 03/29/18	**SURFACE WATER DEPTH** 1.7ft

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)
20											
15										WATER SURFACE (03/28/18)	
	13.7	0.0	WOH	WOH	WOH	0		W		13.7 SWAMP	0.0
10	9.9	3.8	2	1	5	6		Sat.		**ALLUVIAL** Dark brown, sandy MUCK 11.2	2.5
5	5.9	7.8	2	1	2	3		Sat.		**UNDIVIDED COASTAL PLAIN** Tan, SAND (A-3), contains wood fragments 7.2	6.5
0	0.9	12.8	4	3	4	7		Sat.		**COASTAL PLAIN** Gray, tan and brown, phosphatic, fine SAND (A-2-4, A-3), contains shell fragments, with trace clay (DUPLIN FORMATION) 3.2	10.5
-5	-4.1	17.8	3	5	6	11		Sat.			
-10	-9.1	22.8	3	3	3	6		Sat.			
-15	-14.1	27.8	5	4	5	9		Sat.			
-20	-19.1	32.8	7	12	16	28		Sat.			
-25	-24.1	37.8	7	9	14	23		Sat.			
-30	-29.1	42.8	7	10	13	23		Sat.			
-35	-34.1	47.8	7	8	11	19		Sat.		-37.3	51.0
-40	-39.1	52.8	4	5	13	18		Sat.		-42.3	56.0
-45	-44.1	57.8	7	11	14	25		Sat.		-47.3	61.0
-50	-49.1	62.8	4	4	4	8		Sat.		-52.3	66.0
-55	-54.1	67.8	8	12	16	28		Sat.		-57.3	71.0
-60	-59.1	72.8	4	3	3						

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B1-A LL	**STATION** 170+73	**OFFSET** 43 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 13.7 ft	**TOTAL DEPTH** 119.3 ft	**NORTHING** 409,825	**EASTING** 2,625,595 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/28/18	**COMP. DATE** 03/29/18	**SURFACE WATER DEPTH** 1.7ft

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
-60						Match Line				
-65	-64.1	77.8	4	3	3	6		Sat.		Gray, tan and brown, phosphatic, fine SAND (A-2-4, A-3), contains shell fragments, with trace clay (DUPLIN FORMATION) *(continued)* -62.3 76.0
-70	-69.1	82.8	2	2	4	6		W		Green and gray, micaceous, silty, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION) -67.3 81.0
-75	-74.1	87.8	5	4	4	6		W		-72.3 86.0
-80	-79.1	92.8	12	14	22	8		Sat.		**COASTAL PLAIN** Dark gray, SAND (A-3) (RIVER BEND FORMATION)
-85	-84.1	97.8	11	14	17	36		Sat.		
-90	-89.1	102.8	9	12	13	31		Sat.		
-95	-94.1	107.8	8	10	12	25		Sat.		
-100	-99.1	112.8	7	9	12	22		Sat.		
-105	-104.1	117.8	8	13	20	21		Sat.		
						33				-105.6 119.3

Boring Terminated at Elevation -105.6 ft in SAND (River Bend Formation)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B1-B RL	**STATION** 170+93	**OFFSET** 57 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.9 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 409,924	**EASTING** 2,625,622 / **24 HR.** 2.8
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/09/18	**COMP. DATE** 04/10/18	**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											
	18.9	0.0								18.9 GROUND SURFACE	0.0
			2	1	2	3		M		**UNDIVIDED COASTAL PLAIN** Gray and tan, phosphatic, clayey, silty, fine SAND (A-2-4)	
15	15.5	3.4	3	5	4	9		Sat.			
10	10.5	8.4	3	2	2	4		Sat.		7.9 **COASTAL PLAIN** Gray, tan, dark gray and green, phosphatic, fine to coarse SAND (A-2-4, A-3), with some silt and trace clay, contains shell and wood fragments (DUPLIN FORMATION)	11.0
5	5.5	13.4	2	2	1	3		Sat.			
0	0.5	18.4	3	3	3	6		Sat.		-2.1	21.0
-5	-4.5	23.4	5	10	9	19		Sat.			
-10	-9.5	28.4	7	6	10	16		Sat.			
-15	-14.5	33.4	4	5	6	11		Sat.			
-20	-19.5	38.4	8	12	19	31		Sat.		-20.2	39.1
-25	-24.5	43.4	7	9	9	18		Sat.			
-30	-29.5	48.4	10	11	15	26		Sat.			
-35	-34.5	53.4	7	8	14	22		Sat.			
-40	-39.5	58.4	6	5	5	10		Sat.			
-45	-44.5	63.4	12	17	22	39		Sat.			
-50	-49.5	68.4	9	13	17	30		Sat.			
-55	-54.5	73.4									

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B1-B RL	**STATION** 170+93	**OFFSET** 57 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 18.9 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 409,924	**EASTING** 2,625,622 / **24 HR.** 2.8
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 04/09/18	**COMP. DATE** 04/10/18	**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				
			8	13	19	32		Sat.		Gray, tan, dark gray and green, phosphatic, fine to coarse SAND (A-2-4, A-3), with some silt and trace clay, contains shell and wood fragments (DUPLIN FORMATION) *(continued)*
-60	-59.5	78.4	4	4	5	9		Sat.		-62.1 81.0
-65	-64.5	83.4	WOH	WOH	4	4		W		Gray and green, fine sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
-70	-69.5	88.4	WOR	WOR	WOR	0		W		-72.1 91.0
-75	-74.5	93.4	11	14	21	35		Sat.		**COASTAL PLAIN** Tan and gray, fine to coarse SAND (A-2-4), with silt and trace clay, contains shell fragments (RIVER BEND FORMATION)
-80	-79.5	98.4	13	18	19	37		Sat.		
-85	-84.5	103.4	21	29	37	66		Sat.		
-90	-89.5	108.4	11	13	19	32		Sat.		
-95	-94.5	113.4	5	8	9	17		Sat.		
-100	-99.5	118.4	6	8	12	20		Sat.		-101.0 119.9

Boring Terminated at Elevation -101.0 ft in SAND (River Bend Formation)

Potential dissolution cavity from 82.0' to 91.0'

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B2-A LL	**STATION** 172+47	**OFFSET** 66 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 11.1 ft	**TOTAL DEPTH** 121.1 ft	**NORTHING** 409,882	**EASTING** 2,625,429 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/28/18	**COMP. DATE** 03/28/18	**SURFACE WATER DEPTH** 0.6ft

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 (ELEV. (ft) / DEPTH (ft))
15										
	11.1	0.0	WOH	WOH	WOH	0		W		WATER SURFACE (03/28/18) — SWAMP (11.1 / 0.0); **ALLUVIAL** Dark brown, MUCK
10										
	6.1	5.0	2	1	2	3		Sat.		8.1 / 3.0 **UNDIVIDED COASTAL PLAIN** Brown and tan, SAND (A-3), contains wood fragments
5										
	1.5	9.6	2	2	6	8		Sat.		2.6 / 8.5 **COASTAL PLAIN** Gray, phosphatic, SAND (A-3, A-2-4), contains shell fragments (DUPLIN FORMATION)
0										
	-3.5	14.6	4	6	7	13		Sat.		
-5										
	-8.5	19.6	3	4	4	8		Sat.		
-10										
	-13.5	24.6	2	1	3	4		Sat.		
-15										
	-18.5	29.6	3	5	5	10		Sat.		
-20										
	-23.5	34.6	5	8	9	17		Sat.		
-25										
	-28.5	39.6	4	5	5	10		Sat.		-31.9 / 43.0
-30										
	-33.5	44.6	4	4	3	7		Sat.		
-35										
	-38.5	49.6	5	7	12	19		Sat.		-41.9 / 53.0 Gray, sandy CLAY (A-6) (DUPLIN FORMATION)
-40										
	-43.5	54.6	4	4	5	9		W		-46.9 / 58.0 **COASTAL PLAIN** Dark gray, green and gray, fine SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION)
-45										
	-48.5	59.6	4	5	8	13		Sat.		
-50										
	-53.5	64.6	5	11	14	25		Sat.		
-55										
	-58.5	69.6	12	19	25	44		Sat.		-61.9 / 73.0
-60										
	-63.5	74.6	4	5	6	11		Sat.		
-65										

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B2-A LL	**STATION** 172+47	**OFFSET** 66 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 11.1 ft	**TOTAL DEPTH** 121.1 ft	**NORTHING** 409,882	**EASTING** 2,625,429 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/28/18	**COMP. DATE** 03/28/18	**SURFACE WATER DEPTH** 0.6ft

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
-65						Match Line				
	-68.5	79.6	7	10	13	23		Sat.		-66.0 / 77.1 Dark gray, green and gray, fine SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION) *(continued)*
-70										
	-73.5	84.6	4	6	8	14		Sat.		-76.9 / 88.0 Green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
-75										
	-78.5	89.6	5	4	7	11		W		
-80										
	-83.5	94.6	4	4	6	10		W		-86.9 / 98.0 Brown and light gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION)
-85										
	-88.5	99.6	9	10	13	23		Sat.		
-90										
	-93.5	104.6	18	28	19	47		Sat.		-95.4 / 106.5 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION) -96.9 / 108.0
-95										
	-98.5	109.6	13	20	14	34		Sat.		**COASTAL PLAIN** Dense, gray, SAND (A-3), contains shell fragments (RIVER BEND FORMATION) -101.9 / 113.0
-100										
	-103.5	114.6	9	9	10	19				**COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
-105										
	-108.5	119.6	12	11	14	25		Sat.		-106.9 / 118.0 **COASTAL PLAIN** Gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION) -110.0 / 121.1
-110										Boring Terminated at Elevation -110.0 ft in SAND (River Bend Formation)

Drill chatter at 106.5'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B2-B RL	**STATION** 172+22	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.2 ft	**TOTAL DEPTH** 126.1 ft	**NORTHING** 409,985	**EASTING** 2,625,508 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/13/18	**COMP. DATE** 03/15/18	**SURFACE WATER DEPTH** 0.9ft

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										
	12.2	0.0	WOH	WOH	WOH	0				WATER SURFACE (03/13/18) — SWAMP (12.2 / 0.0)
10								W		**ALLUVIAL** Dark Brown, MUCK (9.2 / 3.0)
	7.2	5.0	1	2	2	4				**UNDIVIDED COASTAL PLAIN** Gray, SAND (A-3) (7.0 / 5.2)
5								W		**COASTAL PLAIN** Gray and green, silty CLAY (A-7-6) (DUPLIN FORMATION) (4.2 / 8.0)
	2.6	9.6	3	7	9	16				Gray and brown, phosphatic, fine to coarse SAND (A-3(0)), contains shell fragments (DUPLIN FORMATION)
0								Sat.		
	-2.4	14.6	4	4	4	8				
-5								Sat.		
	-7.4	19.6	4	2	3	5	SS-5	20%		
-10										
	-12.4	24.6	3	6	6	12				
-15								Sat.		
	-17.4	29.6	6	6	6	12				
-20								Sat.		
	-22.4	34.6	7	12	14	26				
-25								Sat.		
	-27.4	39.6	6	13	20	33				
-30								Sat.		
	-32.4	44.6	8	11	15	26				
-35								Sat.		
	-37.4	49.6	6	5	6	11				
-40								Sat.		
	-42.4	54.6	7	13	14	27				
-45								Sat.		
	-47.4	59.6	4	3	3	6				
-50								Sat.		
										-50.8 / 63.0 — Gray, sandy CLAY (A-6) (DUPLIN FORMATION)
	-52.4	64.6	1	2	1	3				
-55								W		-55.8 / 68.0 — **COASTAL PLAIN** Gray, SAND (A-3) (RIVER BEND FORMATION)
	-57.4	69.6	6	9	12	21				
-60								Sat.		
	-62.4	74.6	8	8	16	24				
-65								Sat.		

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B2-B RL	**STATION** 172+22	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.2 ft	**TOTAL DEPTH** 126.1 ft	**NORTHING** 409,985	**EASTING** 2,625,508 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/13/18	**COMP. DATE** 03/15/18	**SURFACE WATER DEPTH** 0.9ft

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				
	-67.4	79.6	7	10	11	21		Sat.		**COASTAL PLAIN** Gray, SAND (A-3) (RIVER BEND FORMATION) *(continued)*
-70										
	-72.4	84.6	8	9	9	18		Sat.		
-75										
	-77.4	89.6	5	5	8	13		Sat.		
-80										
	-82.4	94.6	4	5	9	14		Sat.		
-85										
	-87.4	99.6	7	13	9	22		W		-88.8 / 101.0 — Gray and green, sandy CLAY (A-6) (RIVER BEND FORMATION)
-90										
-95	-95.0	107.2	2	2	4	6		W		-92.8 / 105.0 — Green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
-100										-100.8 / 113.0 — Gray and green, silty SAND (A-2-4), contains shell fragments (RIVER BEND FORMATION)
	-102.4	114.6	WOH	3	4	7		Sat.		
-105										
	-107.4	119.6	2	2	3	5		Sat.		
-110										-110.8 / 123.0 — Gray, SAND (A-1-b), contains shell and limestone fragments (RIVER BEND FORMATION)
	-112.4	124.6	2	5	4	9		Sat.		-113.9 / 126.1 — Boring Terminated at Elevation -113.9 ft in SAND (River Bend Formation)

Potential dissolution cavity from 104.6' to 107.2'
Drill chatter at 123.1'
Strata break in split spoon at a depth of 5.2'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B3-A LL	**STATION** 173+67	**OFFSET** 69 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.0 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 409,933	**EASTING** 2,625,320 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/27/18	**COMP. DATE** 03/27/18	**SURFACE WATER DEPTH** 2.5ft

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										WATER SURFACE (03/27/18)
	12.0	0.0								12.0 SWAMP 0.0
10			2	7	4	11		W		**ALLUVIAL** Dark brown, MUCK, contains wood fragments 9.0 3.0
	7.5	4.5	4	2	2	4				**UNDIVIDED COASTAL PLAIN** No recovery - inferred as loose, tan SAND (A-3) 6.0 6.0
5	3.6	8.4	WOH	2	4	6		Sat.		**COASTAL PLAIN** Gray, phosphatic, SAND (A-3, A-2-4), contains shell fragments (DUPLIN FORMATION)
0	-1.4	13.4	5	5	5	10		Sat.		
-5	-6.4	18.4	4	5	4	9		Sat.		
-10	-11.4	23.4	6	5	7	12		Sat.		
-15	-16.4	28.4	4	5	4	9		Sat.		-19.0 31.0
-20	-21.4	33.4	3	3	3	6		Sat.		
-25	-26.4	38.4	5	5	6	11		Sat.		
-30	-31.4	43.4	5	4	4	8		Sat.		
-35	-36.4	48.4	WOH	3	4	7		Sat.		-39.0 51.0 **COASTAL PLAIN** Dark gray and green, silty SAND (A-3, A-2-4) (RIVER BEND FORMATION)
-40	-41.4	53.4	3	5	8	13		Sat.		
-45	-46.4	58.4	5	8	8	16		Sat.		
-50	-51.4	63.4	5	7	8	15		Sat.		-54.0 66.0
-55	-56.4	68.4	2	1	2	3		Sat.		
-60	-61.4	73.4	2	2	3	5		Sat.		-64.0 76.0
-65										

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B3-A LL	**STATION** 173+67	**OFFSET** 69 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.0 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 409,933	**EASTING** 2,625,320 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/27/18	**COMP. DATE** 03/27/18	**SURFACE WATER DEPTH** 2.5ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
	-66.4	78.4	2	3	5	8		Sat.		Dark gray and green, silty SAND (A-3, A-2-4) (RIVER BEND FORMATION) *(continued)*
-70	-71.4	83.4	4	5	10	15		Sat.		-69.0 81.0
-75	-76.4	88.4	5	4	8	12		W		-74.0 86.0 Green, sandy SILT (A-4) (RIVER BEND FORMATION)
-80	-81.4	93.4	6	8	12	20		Sat.		-79.0 91.0 Brown and gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION)
-85	-86.4	98.4	7	7	13	20		Sat.		
-90	-91.4	103.4	7	9	11	20		Sat.		
-95	-96.4	108.4	5	9	12	21		Sat.		-98.4 110.4
-100	-101.4	113.4	10	11	12	23				**COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
-105	-106.4	118.4	23	11	19	30				-107.9 119.9
										Boring Terminated at Elevation -107.9 ft in LIMESTONE (River Bend Formation)
										Split spoon from 4.5' to 6.0' resulted in no recovery
										Drill chatter at 110.4'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B3-B RL	**STATION** 174+02	**OFFSET** 50 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.5 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 410,056	**EASTING** 2,625,342 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/15/18	**COMP. DATE** 03/16/18	**SURFACE WATER DEPTH** 3.4ft

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))
15										WATER SURFACE (03/15/18)
	12.5	0.0								12.5 SWAMP 0.0
10			WOH	2	1	3		Sat.		**ALLUVIAL** Dark brown, MUCK, contains wood fragments
	8.2	4.3								9.5 3.0
5			2	2	1	3		Sat.		**UNDIVIDED COASTAL PLAIN** Tan, SAND (A-3), contains wood fragments
	4.1	8.4								6.5 6.0
0			1	3	5	8		Sat.		**COASTAL PLAIN** Gray and green, SAND (A-3), contains shell fragments (DUPLIN FORMATION)
	-0.9	13.4								
-5			3	5	6	11		Sat.		
	-5.9	18.4								
-10			5	4	4	8		Sat.		
	-10.9	23.4								
-15			4	3	5	8		Sat.		
	-15.9	28.4								
-20			4	5	6	11		Sat.		
	-20.9	33.4								
-25			3	2	2	4		Sat.		
	-25.9	38.4								
-30			3	3	3	6		Sat.		Clay interbed 38.9'-39.1'
	-30.9	43.4								
-35			5	4	4	8		Sat.		-31.7 44.2 Gray and green, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
	-35.9	48.4								
-40			2	2	4	6		W		-38.5 51.0 **COASTAL PLAIN** Dark gray, green and light gray, SAND (A-3, A-2-4), contains shell and cemented limestone fragments (RIVER BEND FORMATION)
	-40.9	53.4								
-45			4	4	7	11		Sat.		
	-45.9	58.4								
-50			5	6	9	15		Sat.		
	-50.9	63.4								
-55			7	9	12	21		Sat.		-53.5 66.0
	-55.9	68.4								
-60			2	1	2	3		Sat.		
	-60.9	73.4								
-65			2	1	3	4		Sat.		-63.5 76.0

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B3-B RL	**STATION** 174+02	**OFFSET** 50 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.5 ft	**TOTAL DEPTH** 119.9 ft	**NORTHING** 410,056	**EASTING** 2,625,342 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/15/18	**COMP. DATE** 03/16/18	**SURFACE WATER DEPTH** 3.4ft

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
-65						Match Line				
	-65.9	78.4	11	10	11	21		Sat.		Dark gray, green and light gray, SAND (A-3, A-2-4), contains shell and cemented limestone fragments (RIVER BEND FORMATION) *(continued)*
-70										-68.5 81.0 Gray and green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
	-70.9	83.4	4	4	6	10		W		
-75										
	-75.9	88.4	4	4	6	10		W		-78.5 91.0 Gray, green and light gray, silty SAND (A-2-4, A-3), contains shell and limestone fragments (RIVER BEND FORMATION)
-80										
	-80.9	93.4	6	3	6	9		Sat.		
-85										
	-85.9	98.4	10	9	8	17		Sat.		-88.5 101.0
-90										
	-90.9	103.4	10	12	9	21		Sat.		
-95										
	-95.9	108.4	4	8	23	31		Sat.		-96.9 109.4 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard LIMESTONE (RIVER BEND FORMATION)
	-97.4	109.9	10	11	8	19		Sat.		
-100										
	-100.9	113.4	7	11	9	20		Sat.		-103.5 116.0 **COASTAL PLAIN** Gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION)
-105										
	-105.9	118.4	6	17	31	48		Sat.		-107.4 119.9 Boring Terminated at Elevation -107.4 ft in SAND (River Bend Formation)

Strata break in split spoon at a depth of 44.2'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B4-A LL	**STATION** 174+87	**OFFSET** 72 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.5 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 409,984	**EASTING** 2,625,211 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 03/23/18	**COMP. DATE** 03/26/18	**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)
20											
15										WATER SURFACE (03/23/18)	
	12.5	0.0	WOH	WOH	WOH	0		W		SWAMP 12.5	0.0
10										**ALLUVIAL** Dark brown, MUCK 9.5	3.0
	8.3	4.2	6	4	2	6		Sat.		**UNDIVIDED COASTAL PLAIN** Tan, SAND (A-3)	
5											
	3.9	8.6	1	2	3	5		Sat.		3.1	9.4
0										**COASTAL PLAIN** Gray and green, phosphatic, SAND (A-3, A-2-4), contains shell fragments (DUPLIN FORMATION)	
	-1.1	13.6	3	3	4	7		Sat.			
-5											
	-6.1	18.6	3	4	5	9		Sat.			
-10											
	-11.1	23.6	4	5	5	10		Sat.			
-15											
	-16.1	28.6	5	4	4	8		Sat.		-19.5	32.0
-20											
	-21.1	33.6	2	1	2	3		Sat.		-24.5	37.0
-25										Gray and green, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)	
	-26.1	38.6	4	2	2	4		W		-29.5	42.0
-30										**COASTAL PLAIN** Dark gray, green and gray, SAND (A-3, A-2-4, A-1-b), contains limestone fragments (RIVER BEND FORMATION)	
	-31.1	43.6	4	3	3	6		Sat.			
-35											
	-36.1	48.6	3	4	5	9		Sat.			
-40											
	-41.1	53.6	4	5	7	12		Sat.			
-45											
	-46.1	58.6	8	7	4	11		Sat.		-49.5	62.0
-50											
	-51.1	63.6	1	2	2	4		Sat.		-54.5	67.0
-55											
	-56.1	68.6	4	4	3	7		Sat.			
-60											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B4-A LL	**STATION** 174+87	**OFFSET** 72 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.5 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 409,984	**EASTING** 2,625,211 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 03/23/18	**COMP. DATE** 03/26/18	**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
-60						Match Line				
	-61.1	73.6	5	3	5	8		Sat.		Dark gray, green and gray, SAND (A-3, A-2-4, A-1-b), contains limestone fragments (RIVER BEND FORMATION) *(continued)*
-65										-64.5 / 77.0
	-66.1	78.6	85	100/0.1		100/0.1		W		Green, SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
-70										
	-71.1	83.6	5	5	9	14		W		-74.5 / 87.0
-75										
	-76.1	88.6	7	5	7	12		Sat.		Brown and gray, phosphatic, SAND (A-1-b), contains limestone and shell fragments (RIVER BEND FORMATION)
-80										
	-81.1	93.6	6	7	9	16		Sat.		
-85										
	-86.1	98.6	7	7	8	15		Sat.		
-90										
	-91.1	103.6	8	8	17	25		Sat.		
-95										
	-96.1	108.6	12	11	15	26		Sat.		
-100										-100.4 / 112.9
	-101.1	113.6	13	15	22	37		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK** Brown and gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)
-105										
	-106.1	118.6	13	14	19	33				-107.6 / 120.1
										Boring Terminated at Elevation -107.6 ft in LIMESTONE (River Bend Formation)
										Drill chatter from 75.9' to 76.9' and at 106.3' Hard drilling at 112.9' Strata break in split spoon at a depth of 9.4'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B4-B RL	**STATION** 174+86	**OFFSET** 87 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.6 ft	**TOTAL DEPTH** 119.5 ft	**NORTHING** 410,126	**EASTING** 2,625,283 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/19/18	**COMP. DATE** 03/20/18	**SURFACE WATER DEPTH** 1.5ft

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										WATER SURFACE (03/19/18)
	12.6	0.0								12.6 SWAMP 0.0
			WOH	WOH	WOH	0		W		**ALLUVIAL** Dark brown, MUCK
10										9.6 3.0
	8.5	4.1	1	4	5	9		Sat.		**UNDIVIDED COASTAL PLAIN** Tan and brown, SAND (A-2-4), contains wood fragments
5										6.6 6.0
	4.6	8.0	1	3	4	7		Sat.		**COASTAL PLAIN** Gray and green, phosphatic, SAND (A-3, A-2-4), contains shell fragments (DUPLIN FORMATION)
0										
	-0.4	13.0	3	6	6	12		Sat.		
-5										
	-5.4	18.0	3	4	5	9		Sat.		
-10										
	-10.4	23.0	4	4	4	8		Sat.		
-15										
	-15.4	28.0	2	2	4	6		Sat.		-18.4 31.0
-20										
	-20.4	33.0	2	1	3	4		Sat.		-23.4 36.0
-25										Gray and green, phosphatic, fine to coarse, highly sandy CLAY (A-7-5(15), A-6(1)), with little silt, contains shell fragments (DUPLIN FORMATION)
	-25.4	38.0	WOH	1	2	3	SS-98	38%		
-30										-28.4 41.0
	-30.4	43.0	1	2	3	5	SS-99	32%		
-35										-33.4 46.0
	-35.4	48.0	2	4	5	9	SS-100	15%		**COASTAL PLAIN** Dark gray, green and brown, fine to coarse SAND (A-1-b(0), A-2-4, A-3), with trace clay, contains cemented shell fragments (RIVER BEND FORMATION)
-40										
	-40.4	53.0	5	6	8	14		Sat.		
-45										
	-45.4	58.0	5	6	10	16		Sat.		
-50										-48.4 61.0
	-50.4	63.0	1	1	1	2		Sat.		
-55										
	-55.4	68.0	2	1	2	3		Sat.		-58.4 71.0
-60										
	-60.4	73.0	4	4	5	9		Sat.		
-65										

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B4-B RL	**STATION** 174+86	**OFFSET** 87 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 12.6 ft	**TOTAL DEPTH** 119.5 ft	**NORTHING** 410,126	**EASTING** 2,625,283 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/19/18	**COMP. DATE** 03/20/18	**SURFACE WATER DEPTH** 1.5ft

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				
	-65.4	78.0	6	3	5	8		Sat.		Dark gray, green and brown, fine to coarse SAND (A-1-b(0), A-2-4, A-3), with trace clay, contains cemented shell fragments (RIVER BEND FORMATION) *(continued)*
-70										-68.4 81.0
	-70.4	83.0	4	4	8	12		W		Green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
-75										-73.4 86.0
	-75.4	88.0	6	7	9	16		W		Dark gray, phosphatic, sandy CLAY (A-6), contains shell fragments (RIVER BEND FORMATION)
-80										-78.4 91.0
	-80.4	93.0	5	7	9	16		Sat.		Brown, gray and tan, phosphatic, SAND (A-3, A-2-4, A-1-b), contains cemented shell fragments (RIVER BEND FORMATION)
-85										-83.4 96.0
	-85.4	98.0	9	7	9	16		Sat.		
-90										-88.4 101.0
	-90.4	103.0	7	6	8	14		Sat.		
-95										
	-95.4	108.0	10	8	16	24		Sat.		-98.4 111.0
-100										
	-100.4	113.0	11	9	13	22		Sat.		
-105										
	-105.4	118.0	21	18	21	39		Sat.		-106.9 119.5

Boring Terminated at Elevation -106.9 ft in SAND (River Bend Formation)

Drill chatter from 75.7' to 75.9', 84.9' to 86.1', 110.6' and at 117.0'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B5-A LL	**STATION** 176+29	**OFFSET** 55 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.6 ft	**TOTAL DEPTH** 120.0 ft	**NORTHING** 410,063	**EASTING** 2,625,092	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Fowler, B.	**START DATE** 03/21/18	**COMP. DATE** 03/22/18	**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)
20											
15	14.6	0.0	WOH	WOH	WOH	0		W		14.6 WATER SURFACE (03/21/18)	0.0
										13.6 **ALLUVIAL** Dark brown, MUCK	1.0
10	10.3	4.3	6	6	4	10		W		11.6 **UNDIVIDED COASTAL PLAIN** Green, SILT (A-4) Tan, SAND (A-3), contains wood fragments	3.0
5	6.1	8.5	4	4	5	9		Sat.		7.6 **COASTAL PLAIN** Gray, phosphatic, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	7.0
0	1.1	13.5	2	4	6	10		Sat.			
-5	-3.9	18.5	4	6	6	12		Sat.			
-10	-8.9	23.5	4	7	8	15		Sat.			
-15	-13.9	28.5	5	4	6	10		Sat.			
-20	-18.9	33.5	4	6	4	10		Sat.		-22.4 Gray and green, silty, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION)	37.0
-25	-23.9	38.5	1	3	2	5		W		-27.4	42.0
-30	-28.9	43.5	3	2	3	5		Sat.		-32.4 **COASTAL PLAIN** Dark gray, green and gray, SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION)	47.0
-35	-33.9	48.5	3	4	4	8		Sat.			
-40	-38.9	53.5	5	5	5	10		Sat.			
-45	-43.9	58.5	2	3	4	7		Sat.		-47.4	62.0
-50	-48.9	63.5	2	1	0	1		Sat.			
-55	-53.9	68.5	3	2	5	7		Sat.			
-60	-58.9	73.5	3	4	7	11		Sat.			

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B5-A LL	**STATION** 176+29	**OFFSET** 55 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.6 ft	**TOTAL DEPTH** 120.0 ft	**NORTHING** 410,063	**EASTING** 2,625,092	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Fowler, B.	**START DATE** 03/21/18	**COMP. DATE** 03/22/18	**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
-60						Match Line				
-65	-63.9	78.5	4	14	40	54				-62.4 Dark gray, green and gray, SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION) *(continued)* 77.0
-70	-68.9	83.5	6	5	21	26		Sat.		-64.5 Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION) 79.1
-75	-73.9	88.5	10	5	8	13				-70.1 Green, fine SAND (A-2-4) (RIVER BEND FORMATION) 84.7
-80	-78.9	93.5	6	8	9	17				-72.4 **COASTAL PLAIN SEDIMENTARY ROCK** Gray and brown, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION) 87.0
-85	-83.9	98.5	6	9	11	20		Sat.		-82.4 **COASTAL PLAIN** Brown and gray, SAND (A-2-4, A-1-b, A-3), contains shell fragments (RIVER BEND FORMATION) 97.0
-90	-88.9	103.5	6	5	15	20		Sat.		-84.9 99.5
-95	-93.9	108.5	8	8	10	18		Sat.		-87.4 102.0
-100	-98.9	113.5	10	8	14	22				-97.4 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION) 112.0
-105	-103.9	118.5	24	17	21	38		Sat.		-102.4 **COASTAL PLAIN** Gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION) 117.0
										-105.4 120.0

Boring Terminated at Elevation -105.4 ft in SAND (River Bend Formation)

Strata break in split spoon at depths 79.1' and 84.7'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B5-B RL	**STATION** 176+04	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 13.1 ft	**TOTAL DEPTH** 118.9 ft	**NORTHING** 410,156	**EASTING** 2,625,166 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/20/18	**COMP. DATE** 03/21/18	**SURFACE WATER DEPTH** 0.5ft

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										
	13.1	0.0	WOH	WOH	WOH	0		W		WATER SURFACE (03/20/18) — 13.1 / 0.0; **ALLUVIAL** Dark brown, MUCK
10	9.6	3.5	6	6	4	10		Sat.		10.6 / 2.5; **UNDIVIDED COASTAL PLAIN** Tan, SAND (A-3)
5	5.7	7.4	3	3	5	8		Sat.		8.1 / 5.0; **COASTAL PLAIN** Gray and green, phosphatic, SAND (A-3), contains shell fragments (DUPLIN FORMATION)
0	0.7	12.4	4	6	8	14		Sat.		
-5	-4.3	17.4	6	7	8	15		Sat.		
-10	-9.3	22.4	3	5	4	9		Sat.		
-15	-14.3	27.4	7	6	7	13		Sat.		
-20	-19.3	32.4	5	7	6	13		Sat.		-21.9 / 35.0; Gray and green, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
-25	-24.3	37.4	WOH	2	3	5		W		
-30	-29.3	42.4	2	2	4	6		Sat.		-31.9 / 45.0; **COASTAL PLAIN** Dark gray, gray and green, fine to coarse SAND (A-3, A-2-4(0)), with trace silt and clay, contains limestone fragments (RIVER BEND FORMATION)
-35	-34.3	47.4	3	5	7	12		Sat.		
-40	-39.3	52.4	5	8	11	19		Sat.		
-45	-44.3	57.4	4	5	5	10		Sat.		-46.9 / 60.0
-50	-49.3	62.4	3	2	2	4		Sat.		
-55	-54.3	67.4	1	2	2	4		Sat.		
-60	-59.3	72.4	1	4	8	12	SS-130	16%		
-65	-64.3	77.4								

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J. K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B5-B RL	**STATION** 176+04	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 13.1 ft	**TOTAL DEPTH** 118.9 ft	**NORTHING** 410,156	**EASTING** 2,625,166 / **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MID0314 D-25 84% 09/05/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 03/20/18	**COMP. DATE** 03/21/18	**SURFACE WATER DEPTH** 0.5ft

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				
			8	6	5	11		Sat.		Dark gray, gray and green, fine to coarse SAND (A-3, A-2-4(0)), with trace silt and clay, contains limestone fragments (RIVER BEND FORMATION) *(continued)*
-70	-69.3	82.4	5	7	9	16		Sat.		-70.3 / 83.4; Gray and green, sandy SILT (A-4) (RIVER BEND FORMATION)
-75	-74.3	87.4	4	5	6	11		W		-76.9 / 90.0; Gray, phosphatic, SAND (A-2-4, A-3), contains shell fragments (RIVER BEND FORMATION)
-80	-79.3	92.4	8	10	13	23		Sat.		
-85	-84.3	97.4	8	10	10	20		Sat.		
-90	-89.3	102.4	4	6	12	18		Sat.		-91.9 / 105.0
-95	-94.3	107.4	8	8	9	17		Sat.		
-100	-99.3	112.4	7	11	11	22				-99.2 / 112.3; **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)
-105	-104.3	117.4	22	23	26	49				-105.8 / 118.9; Boring Terminated at Elevation -105.8 ft in LIMESTONE (River Bend Formation)

Drill chatter from 84.3' to 85.5' and from 112.3' to 113.9'
Strata break in split spoon at a depth of 83.4'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B6-A LL	**STATION** 177+76	**OFFSET** 59 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.6 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,125	**EASTING** 2,624,959 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Coogan, M.	**START DATE** 04/13/18	**COMP. DATE** 04/16/18	**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										
	17.6	0.0								17.6 / 0.0 GROUND SURFACE
			WOH	0	1	1		W		16.6 / 1.0 **ALLUVIAL** Dark brown, MUCK
15										**UNDIVIDED COASTAL PLAIN** Tan, orange and gray, fine sandy, silty CLAY (A-6)
	14.4	3.2	1	1	2	3		W		
10										
	9.4	8.2	WOH	1	2	3		Sat.		8.6 / 9.0 **COASTAL PLAIN** Gray, phosphatic, clayey, fine to coarse SAND (A-2-6, A-2-4), contains shell fragments, with silt and clay (DUPLIN FORMATION)
5										
	4.4	13.2	3	3	6	9		Sat.		
0										1.6 / 16.0
	-0.6	18.2	5	5	11	16		Sat.		
-5										
	-5.6	23.2	6	6	11	17		Sat.		
-10										
	-10.6	28.2	5	5	8	13		Sat.		
-15										
	-15.6	33.2	5	4	9	13		Sat.		
-20										-18.4 / 36.0 Green and gray, fine to medium, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
	-20.6	38.2	1	2	3	5		W		
-25										
	-25.6	43.2	3	2	4	6		Sat.		-28.4 / 46.0 **COASTAL PLAIN** Green and gray, phosphatic, fine to coarse, SAND (A-2-4, A-3), with silt and clay, contains shell fragments (RIVER BEND FORMATION)
-30										
	-30.6	48.2	11	11	14	25		Sat.		
-35										
	-35.6	53.2	11	16	24	40		Sat.		-38.4 / 56.0
-40										
	-40.8	58.4	12	17	18	35		Sat.		-43.4 / 61.0
-45										
	-45.8	63.4	4	5	2	7		Sat.		
-50										
	-50.8	68.4	5	6	6	12		Sat.		
-55										
	-55.8	73.4	6	6	5	11		Sat.		
-60										

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Johnson, M.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B6-A LL	**STATION** 177+76	**OFFSET** 59 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.6 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,125	**EASTING** 2,624,959 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Coogan, M.	**START DATE** 04/13/18	**COMP. DATE** 04/16/18	**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				
	-60.8	78.4	13	7	7	14		Sat.		-61.3 / 78.9 Green and gray, phosphatic, fine to coarse, SAND (A-2-4, A-3), with silt and clay, contains shell fragments (RIVER BEND FORMATION) *(continued)*
-65										**COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
	-65.8	83.4	77	21	30	51		Sat.		-68.4 / 86.0
-70										**COASTAL PLAIN** Green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
	-70.8	88.4	7	19	17	36		W		-73.4 / 91.0
-75										Brown, clayey SAND (A-2-6), contains shell fragments (RIVER BEND FORMATION)
	-75.8	93.4	6	5	8	13		Sat.		-78.4 / 96.0
-80										Gray, sandy SILT (A-4) (RIVER BEND FORMATION)
	-80.8	98.4	3	5	15	20		W		-82.3 / 99.9
										Boring Terminated at Elevation -82.3 ft in SILT (River Bend Formation)
										Strata break in split spoon at depths 9.0' and 78.9'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B6-B RL	**STATION** 177+86	**OFFSET** 44 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.3 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 410,221	**EASTING** 2,624,996 / **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/17/18	**COMP. DATE** 04/17/18	**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											
	17.3	0.0								17.3 GROUND SURFACE	0.0
			WOH	2	2	4		M		**ALLUVIAL** Dark brown, SAND (A-2-4)	
15	13.7	3.6								14.3	3.0
			4	1	3	4		Sat.		**UNDIVIDED COASTAL PLAIN** Gray and tan, SAND (A-2-4)	
10	8.7	8.6								10.3	7.0
			2	2	5	7		Sat.		**COASTAL PLAIN** Gray, phosphatic, SAND (A-3), with trace clay in part, contains shell fragments (DUPLIN FORMATION)	
5	3.7	13.6									
			5	4	7	11		Sat.			
0	-1.3	18.6									
			4	5	6	11		Sat.			
-5	-6.3	23.6									
			6	7	8	15		Sat.			
-10	-11.3	28.6									
			3	2	7	9		Sat.			
-15	-16.3	33.6									
			5	5	4	9		Sat.			
-20	-21.3	38.6								-19.7	37.0
			2	2	3	5		W		Gray, silty CLAY (A-7-6), contains shell fragments (DUPLIN FORMATION)	
-25	-26.3	43.6								-24.7	42.0
			3	3	4	7		Sat.		**COASTAL PLAIN** Gray, dark gray, green and tan, silty, poorly indurated SAND (A-2-4, A-3, A-1-b), contains shell and limestone fragments (RIVER BEND FORMATION)	
-30	-31.3	48.6								-29.7	47.0
			11	19	20	39		Sat.			
-35	-36.3	53.6									
			15	20	28	48		Sat.			
-40	-41.3	58.6									
			11	10	11	21		Sat.			
-45	-46.3	63.6									
			5	8	9	17		Sat.			
-50	-51.3	68.6								-49.7	67.0
			16	8	6	14		Sat.			
-55	-56.3	73.6									
			5	4	5	9		Sat.			
-60										-59.7	77.0

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B6-B RL	**STATION** 177+86	**OFFSET** 44 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 17.3 ft	**TOTAL DEPTH** 120.1 ft	**NORTHING** 410,221	**EASTING** 2,624,996 / **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/17/18	**COMP. DATE** 04/17/18	**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	78.6								Gray, dark gray, green and tan, silty, poorly indurated SAND (A-2-4, A-3, A-1-b), contains shell and limestone fragments (RIVER BEND FORMATION) *(continued)*
			10	8	8	16		Sat.		
-65	-66.3	83.6								-64.7 82.0
			13	13	9	22		Sat.		
-70	-71.3	88.6								-69.7 87.0
			8	10	12	22		W		Gray and green, SILT (A-4) (RIVER BEND FORMATION)
-75	-76.3	93.6								-74.7 92.0
			7	7	9	16		Sat.		Brown, SAND (A-2-4), contains shell fragments (RIVER BEND FORMATION)
-80	-81.3	98.6								-79.7 97.0
			4	4	6	10		W		Gray and green, sandy SILT (A-4) (RIVER BEND FORMATION)
-85	-86.3	103.6								-84.7 102.0
			10	10	9	19		Sat.		Gray and green, SAND (A-2-4, A-3), contains shell fragments (RIVER BEND FORMATION)
-90	-91.3	108.6								
			13	11	11	22		Sat.		
-95	-96.3	113.6								
			9	14	14	28		Sat.		
-100	-101.3	118.6								-99.7 117.0
			30	53	31	84		Sat.		-102.8 120.1

Boring Terminated at Elevation -102.8 ft in SAND (River Bend Formation)

Drill chatter from 115.1' to 118.6'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B7-A LL	**STATION** 179+01	**OFFSET** 47 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.7 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 410,192	**EASTING** 2,624,852 / **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/18/18	**COMP. DATE** 04/18/18	**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										
25										
	22.7	0.0								22.7 / 0.0 GROUND SURFACE
20			WOH	1	1	2		M		**ALLUVIAL** Brown, SAND (A-2-4)
	19.2	3.5								19.7 / 3.0 **UNDIVIDED COASTAL PLAIN** Tan and orange, SAND (A-2-4)
15			2	2	1	3		Sat.		
	14.2	8.5								15.7 / 7.0 **COASTAL PLAIN** Gray, sandy SILT (A-4) (DUPLIN FORMATION)
10			WOH	WOH	WOH	0		W		
	9.2	13.5								
5			WOH	WOH	WOH	0		W		
	4.2	18.5								5.7 / 17.0 Gray, phosphatic in part, SAND (A-3), with thin clay interbeds, contains shell fragments (DUPLIN FORMATION)
0			5	7	11	18		Sat.		
	-0.8	23.5								
-5			5	6	7	13		Sat.		
	-5.8	28.5								
-10			7	7	9	16		Sat.		
	-10.8	33.5								
-15			5	8	5	13		Sat.		
	-15.8	38.5								
-20			9	11	15	26		Sat.		
	-20.8	43.5								-19.3 / 42.0 Gray, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
-25			2	1	2	3		W		-24.3 / 47.0 **COASTAL PLAIN** Gray, phosphatic, SAND (A-1-b, A-3), contains cemented shell fragments (RIVER BEND FORMATION)
	-25.8	48.5								
-30			2	3	9	12		Sat.		-29.3 / 52.0
	-30.8	53.5								
-35			11	12	12	24		Sat.		
	-35.8	58.5								
-40			13	16	25	41		Sat.		
	-40.8	63.5								
-45			9	10	14	24		Sat.		
	-45.8	68.5								
-50			10	12	16	28		Sat.		

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B7-A LL	**STATION** 179+01	**OFFSET** 47 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.7 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 410,192	**EASTING** 2,624,852 / **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/18/18	**COMP. DATE** 04/18/18	**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				
	-50.8	73.5	35	100/0.2		100/0.2				-51.3 / 74.0 Gray, phosphatic, SAND (A-1-b, A-3), contains cemented shell fragments (RIVER BEND FORMATION) *(continued)*
-55										-54.3 / 77.0 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)
	-55.8	78.5	20	30	22	52		Sat.		
-60										-59.3 / 82.0 **COASTAL PLAIN** Green, SAND (A-2-4, A-3) (RIVER BEND FORMATION)
	-60.8	83.5	17	38	37	75		Sat.		-62.3 / 85.0

Boring Terminated at Elevation -62.3 ft in SAND (River Bend Formation)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B7-B RL	**STATION** 179+00	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 19.4 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 410,286	**EASTING** 2,624,901 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/18/18	**COMP. DATE** 04/18/18	**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))
35										
30										
25										
20	19.4	0.0								19.4 GROUND SURFACE 0.0
			1	2	1	3				**ALLUVIAL** Brown and gray, SAND (A-2-4)
15	15.8	3.6	2	3	2	5		M Sat.		16.4 3.0 **UNDIVIDED COASTAL PLAIN** Tan and orange, clayey SAND (A-2-6)
10	10.8	8.6	WOH	WOH	WOH	0		W		12.4 7.0 **COASTAL PLAIN** Gray, SILT (A-4) (DUPLIN FORMATION)
5	5.8	13.6	4	4	5	9		Sat.		7.4 12.0 Gray and green, phosphatic, clayey SAND (A-3), contains shell fragments (DUPLIN FORMATION)
0	0.8	18.6	3	5	6	11		Sat.		
-5	-4.2	23.6	5	9	12	21		Sat.		
-10	-9.2	28.6	4	7	7	14		Sat.		
-15	-14.2	33.6	5	8	9	17		Sat.		
-20	-19.2	38.6	5	6	6	12		Sat.		
										-22.6 42.0 Gray, sandy CLAY (A-6) (DUPLIN FORMATION)
-25	-24.2	43.6	1	3	3	6		Sat.		
										-27.6 47.0 **COASTAL PLAIN** Gray, SAND (A-3), contains shell fragments (RIVER BEND FORMATION)
-30	-29.2	48.6	12	23	22	45		Sat.		
-35	-34.2	53.6	12	13	24	37		Sat.		
-40	-39.2	58.6	7	13	21	34		Sat.		
-45	-44.2	63.6	15	21	23					

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B7-B RL	**STATION** 179+00	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 19.4 ft	**TOTAL DEPTH** 100.1 ft	**NORTHING** 410,286	**EASTING** 2,624,901 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/18/18	**COMP. DATE** 04/18/18	**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
-45						Match Line				
-50	-49.2	68.6	5	6	21	44 27		Sat.		-47.6 67.0 Gray, SAND (A-3), contains shell fragments (RIVER BEND FORMATION) *(continued)* **COASTAL PLAIN SEDIMENTARY ROCK** Gray, poorly cemented, moderately hard, LIMESTONE (RIVER BEND FORMATION)
-55	-54.2	73.6	7	10	14	24		Sat.		-52.6 72.0 Gray and green, SAND (A-2-4) (RIVER BEND FORMATION)
-60	-59.2	78.6	18	12	7	19				-57.6 77.0 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)
-65	-64.2	83.6	5	7	9	16				
-70	-69.2	88.6	9	9	16	25		Sat.		-69.7 89.1 **COASTAL PLAIN** Gray and green, SAND (A-2-4) (RIVER BEND FORMATION)
-75	-74.2	93.6	5	5	7	12		W		-72.6 92.0 Green, sandy SILT (A-4), contains shell fragments (RIVER BEND FORMATION)
-80	-79.2	98.6	3	6	10	16		W		-80.7 100.1 Boring Terminated at Elevation -80.7 ft in SILT (River Bend Formation) Drill chatter from 75.1' to 78.6' and 90.9' to 91.9'

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B8-A LL	**STATION** 180+38	**OFFSET** 65 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 410,353	**EASTING** 2,624,780 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/19/18	**COMP. DATE** 04/19/18	**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											
	21.5	0.0								21.5 GROUND SURFACE	0.0
20			1	1	2	3		M		**ALLUVIAL** Dark brown, MUCK, with wood fragments	
	18.0	3.5	WOH	WOH	WOH	0		Sat.		18.5 **UNDIVIDED COASTAL PLAIN** Tan and orange, clayey SAND (A-2-6)	3.0
15										14.5	7.0
	13.0	8.5	WOH	WOH	WOH	0		Sat.		**COASTAL PLAIN** Gray, silty SAND (A-2-4) (DUPLIN FORMATION)	
10										9.5	12.0
	8.0	13.5	WOH	WOH	WOH	0		W		Gray, silty CLAY (A-7-6) (DUPLIN FORMATION)	
5										4.5	17.0
	3.0	18.5	4	4	6	10		Sat.		Gray, phosphatic, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	
0											
	-2.0	23.5	4	4	5	9		Sat.			
-5											
	-7.0	28.5	6	9	13	22		Sat.			
-10											
	-12.0	33.5	5	6	7	13		Sat.			
-15											
	-17.0	38.5	8	17	15	32		Sat.			
-20										-20.5	42.0
	-22.0	43.5	WOH	WOH	1	1		W		Gray, CLAY and sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION)	
-25										-25.5	47.0
	-27.0	48.5	1	2	3	5		Sat.			
-30										-30.5	52.0
	-32.0	53.5	17	23	24	47	SS-471	19%		**COASTAL PLAIN** Gray and green, phosphatic, fine to coarse SAND (A-1-b(0), A-2-4, A-3), with trace clay, contains shell and limestone fragments (RIVER BEND FORMATION)	
-35											
	-37.0	58.5	14	15	19	34		Sat.			
-40											
	-42.0	63.5	12	17	13	30		Sat.			
-45											
	-47.0	68.5	18	19	32	51		Sat.			
-50											
	-52.0	73.5	7	5	10	15		Sat.			
-55											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Crenshaw, J.K.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B8-A LL	**STATION** 180+38	**OFFSET** 65 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 410,353	**EASTING** 2,624,780 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/19/18	**COMP. DATE** 04/19/18	**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	78.5	9	14	18	32		Sat.		-55.5 Gray and green, phosphatic, fine to coarse SAND (A-1-b(0), A-2-4, A-3), with trace clay, contains shell and limestone fragments (RIVER BEND FORMATION) *(continued)* 77.0
-60										
	-62.0	83.5	6	6	10	16		Sat.		
-65										-65.5 87.0
	-67.0	88.5	12	11	14	25		Sat.		
-70										-70.5 92.0
	-72.0	93.5	14	9	9	18				**COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
-75										-75.5 97.0
	-77.0	98.5	10	8	12	20		Sat.		-78.5 **COASTAL PLAIN** Gray, SAND (A-1-b), contains cemented shell fragments (RIVER BEND FORMATION) 100.0

Boring Terminated at Elevation -78.5 ft in SAND (River Bend Formation)

Circulation loss and drill chatter from 85.0' to 88.5'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B8-B RL	**STATION** 180+39	**OFFSET** 52 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 22.0 ft	**TOTAL DEPTH** 114.9 ft	**NORTHING** 410,248	**EASTING** 2,624,726	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Wiggins, M.	**START DATE** 04/23/18	**COMP. DATE** 04/25/18	**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)
35											
30											
25											
	22.0	0.0								GROUND SURFACE	0.0
20			1	2	2	4		M		21.1 **ALLUVIAL** Dark brown, moderately organic SAND (A-2-4)	0.9
	18.6	3.4	2	2	2	4		Sat.		**UNDIVIDED COASTAL PLAIN** Brown and orange, clayey, fine SAND (A-2-6)	
15										16.0	6.0
	13.6	8.4	WOH	WOH	WOH	0		W		**COASTAL PLAIN** Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	
10											
	8.6	13.4	WOH	WOH	WOH	0		W			
5										6.0	16.0
	3.6	18.4	4	4	9	13		Sat.		Gray, phosphatic, SAND (A-3), with clay interbeds, conatains shell fragments (DUPLIN FORMATION)	
0											
	-1.4	23.4	3	3	3	6		Sat.			
-5											
	-6.4	28.4	5	6	8	14		Sat.			
-10											
	-11.4	33.4	5	6	6	12		Sat.			
-15											
	-16.4	38.4	3	3	3	6		Sat.			
-20										-19.0	41.0
	-21.4	43.4	WOH	2	2	4		W		Gray, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)	
-25											
	-26.4	48.4	2	2	3	5		Sat.			
-30										-29.0	51.0
	-31.4	53.4	2	3	6	9		Sat.		**COASTAL PLAIN** Gray, dark gray and green, phosphatic, clayey, silty SAND (A-3, A-2-4, A-1-b, A-2-6), contains cemented shell fragments and limestone fragments (RIVER BEND FORMATION)	
-35											
	-36.4	58.4	10	18	25	43		Sat.			
-40											
	-41.4	63.4	12	14	15	29		Sat.			
-45											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B8-B RL	**STATION** 180+39	**OFFSET** 52 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 22.0 ft	**TOTAL DEPTH** 114.9 ft	**NORTHING** 410,248	**EASTING** 2,624,726	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Wiggins, M.	**START DATE** 04/23/18	**COMP. DATE** 04/25/18	**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
-45						Match Line				
	-46.4	68.4	10	8	12	20		Sat.		Gray, dark gray and green, phosphatic, clayey, silty SAND (A-3, A-2-4, A-1-b, A-2-6), contains cemented shell fragments and limestone fragments (RIVER BEND FORMATION) *(continued)*
-50										-49.0 71.0
	-51.4	73.4	41	23	38	61		Sat.		
-55										
	-56.4	78.4	5	5	8	13		Sat.		
-60										
	-61.4	83.4	5	8	31	39		Sat.		-64.0 86.0
-65										
	-66.4	88.4	7	7	6	13		Sat.		-69.0 91.0
-70										
	-71.4	93.4	5	60	13	73		Sat.		-74.0 96.0
-75										
	-76.4	98.4	7	7	16	23		Sat.		-79.0 101.0
-80										
	-81.4	103.4	3	4	7	11		Sat.		
-85										
	-86.4	108.4	3	3	4	7		Sat.		
-90										
	-91.4	113.4	3	3	4	7		Sat.		-92.9 114.9

Boring Terminated at Elevation -92.9 ft in SAND (River Bend Formation)

Drill chatter and fluid loss at 72.7'
Drill chatter from 84.9' to 88.4' and 97.4'
Hard drilling encountered from 91.0' to 92.0'
Strata break in split spoon at a depth of 0.9'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B9-A LL	**STATION** 181+77	**OFFSET** 52 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 21.9 ft	**TOTAL DEPTH** 98.5 ft	**NORTHING** 410,310	**EASTING** 2,624,603	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Wiggins, M.	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**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											
	21.9	0.0								21.9 GROUND SURFACE	0.0
20			1	1	0	1		M		**ALLUVIAL** Brown, silty SAND (A-2-4), contains trace organics	
	18.5	3.4								18.9 **UNDIVIDED COASTAL PLAIN** Gray, SAND (A-3)	3.0
15			2	2	1	3		Sat.			
	13.5	8.4								15.9 **COASTAL PLAIN** Gray, CLAY (A-7-6) (DUPLIN FORMATION)	6.0
10			WOH	WOH	WOH	0		W			
	8.5	13.4									
5			WOH	WOH	WOH	0		W			
	3.5	18.4								2.6 Gray, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	19.3
0			1	2	3	5		Sat.			
	-1.5	23.4									
-5			1	1	1	2		Sat.			
	-6.5	28.4									
-10			2	0	2	2		Sat.			
	-11.5	33.4									
-15			2	3	4	7		Sat.			
	-16.5	38.4									
-20			4	4	5	9		Sat.		-19.1 Gray, fine to coarse, sandy CLAY (A-7-6)(26), with some silt, contains shell fragments (DUPLIN FORMATION)	41.0
	-21.5	43.4									
-25			2	2	2	4	SS-536	56%			
	-26.5	48.4									
-30			1	2	2	4		W			
	-31.5	53.4									
-35			WOH	1	3	4		W			
	-36.5	58.4									
-40			1	1	3	4		Sat.		-37.5	59.4
	-41.5	63.4								-39.1 **COASTAL PLAIN** Gray and green, clayey SAND (A-2-4, A-3), contains shell fragments and trace limestone fragments (RIVER BEND FORMATION)	61.0
-45			8	8	13	21		Sat.			
	-46.5	68.4									
-50			14	15	15	30		Sat.			
	-51.5	73.4									
-55			7	10	12	22		Sat.		-54.1	76.0

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. B9-A LL	**STATION** 181+77	**OFFSET** 52 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 21.9 ft	**TOTAL DEPTH** 98.5 ft	**NORTHING** 410,310	**EASTING** 2,624,603	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Wiggins, M.	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**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				
	-56.5	78.4	20	63	37/0.1	100/0.6				Gray and green, clayey SAND (A-2-4, A-3), contains shell fragments and trace limestone fragments (RIVER BEND FORMATION) *(continued)*
-60										
	-61.5	83.4	4	4	8	12		Sat.		
-65										
	-66.5	88.4	6	8	9	17		Sat.		-68.2 Gray, SAND (A-1-b), with limestone fragments 90.1
-70										
	-71.5	93.4	4	15	12	27		Sat.		
-75										-74.1 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION) 96.0
	-76.5	98.4	60/0.1			60/0.1				-76.6 98.5

Boring Terminated at Elevation -76.6 ft in Moderately Hard Limestone (River Bend Formation)

Drill chatter at 90.1'
Split spoon from 98.4' to 98.5' resulted in no recovery
Strata break in split spoon at depths 19.3' and 59.4'

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/25/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B9-B RL	**STATION** 181+72	**OFFSET** 62 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 104.9 ft	**NORTHING** 410,410	**EASTING** 2,624,658 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/25/18	**COMP. DATE** 04/26/18	**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											
	21.5	0.0								GROUND SURFACE	0.0
20			1	1	1	2		M		20.5 **ALLUVIAL** Dark brown, moderately organic SAND (A-2-4)	1.0
	18.1	3.4								**UNDIVIDED COASTAL PLAIN** Tan and orange, SAND (A-2-4)	
15			1	1	0	1		Sat.		15.5	6.0
	13.1	8.4								**COASTAL PLAIN** Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	
10			WOH	WOH	WOH	0		W			
	8.1	13.4									
5			WOH	WOH	WOH	0		W		5.5	16.0
	3.1	18.4								Gray, SAND (A-3) (DUPLIN FORMATION)	
0			5	5	8	13		Sat.			
	-1.9	23.4									
-5			3	4	4	8		Sat.		-4.5	26.0
	-6.9	28.4								Gray, fine to coarse, sandy SILT (A-4)(0), with little clay (DUPLIN FORMATION)	
-10			1	0	1	1	SS-511	42%		-9.5	31.0
	-11.9	33.4								Gray, SAND (A-3) (DUPLIN FORMATION)	
-15			5	5	5	10		Sat.			
	-16.9	38.4									
-20			4	2	2	4		Sat.		-19.5	41.0
	-21.9	43.4								Gray, CLAY and sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION)	
-25			2	2	1	3		W			
	-26.9	48.4									
-30			1	1	1	2		W		-29.5	51.0
	-31.9	53.4									
-35			3	2	2	4		Sat.		-34.5	56.0
	-36.9	58.4								**COASTAL PLAIN** Gray and green, phosphatic, silty SAND (A-1-b, A-3, A-2-4, A-2-6), contains shell and limestone fragments (RIVER BEND FORMATION)	
-40			11	14	18	32		Sat.			
	-41.9	63.4									
-45			9	12	12	24		Sat.			
	-46.9	68.4									
-50			8	15	18	33		Sat.		-49.5	71.0
	-51.9	73.4									
-55			14	13	20	33		Sat.			

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B9-B RL	**STATION** 181+72	**OFFSET** 62 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 104.9 ft	**NORTHING** 410,410	**EASTING** 2,624,658 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Wiggins, M.	**START DATE** 04/25/18	**COMP. DATE** 04/26/18	**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				
	-56.9	78.4	17	17	17	34		Sat.		Gray and green, phosphatic, silty SAND (A-1-b, A-3, A-2-4, A-2-6), contains shell and limestone fragments (RIVER BEND FORMATION) *(continued)*
-60										
	-61.9	83.4	5	4	11	15		Sat.		
-65										
	-66.9	88.4	8	5	11	16		Sat.		-69.5 91.0
-70										
	-71.9	93.4	23	7	12	19		Sat.		-74.5 96.0
-75										
	-76.9	98.4	10	8	8	16		Sat.		
-80										
	-81.9	103.4	5	5	4	9		Sat.		-83.4 104.9
										Boring Terminated at Elevation -83.4 ft in SAND (River Bend Formation)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B10-A LL	**STATION** 183+05	**OFFSET** 56 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.1 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,364	**EASTING** 2,624,487 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 04/27/18	**COMP. DATE** 04/30/18	**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											
25											
	22.1	0.0								22.1 GROUND SURFACE	0.0
20			WOH	1	0	1		M		**ALLUVIAL** Brown, silty SAND (A-2-4), contains trace organics	
	18.7	3.4								19.1	3.0
			2	2	4	6		Sat.		**UNDIVIDED COASTAL PLAIN** Gray, SAND (A-3)	
15										16.1	6.0
	13.7	8.4								**COASTAL PLAIN** Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	
			WOH	WOH	WOH	0		W			
10											
	8.7	13.4									
			WOH	WOH	WOH	0		W			
5											
	3.7	18.4								2.7	19.4
			WOH	1	2	3		Sat.		Gray, SAND (A-3), with trace clay in part, contains shell fragments (DUPLIN FORMATION)	
0											
	-1.3	23.4									
			2	2	2	4		Sat.			
-5											
	-6.3	28.4									
			2	2	3	5		Sat.			
-10											
	-11.3	33.4									
			8	10	13	23		Sat.			
-15											
	-16.3	38.4									
			10	16	18	34		Sat.			
-20											
	-21.3	43.4									
			10	8	4	12		Sat.			
-25										-23.9	46.0
	-26.3	48.4								Gray, silty, sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION)	
			2	2	2	4		W			
-30											
	-31.3	53.4									
			2	2	3	5		W			
-35											
	-36.3	58.4									
			1	2	3	5		W		-38.9	61.0
-40											
	-41.3	63.4									
			2	3	2	5		W			
-45											
	-46.3	68.4									
			WOH	WOH	2	2		W			
-50											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B10-A LL	**STATION** 183+05	**OFFSET** 56 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.1 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,364	**EASTING** 2,624,487 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 04/27/18	**COMP. DATE** 04/30/18	**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				
	-51.3	73.4								Gray, silty, sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION) *(continued)*
			3	10	27	37		Sat.		-52.3 / 74.4
-55										**COASTAL PLAIN** Gray and green, silty, medium to coarse SAND (A-3, A-1-b, A-2-4), contains cemented shell fragments (RIVER BEND FORMATION)
	-56.3	78.4								-54.6 / 76.7
			4	8	10	18		Sat.		-56.8 / 78.9
-60										-58.9 / 81.0
	-61.3	83.4								
			5	9	29	38		Sat.		-62.3 / 84.4
-65										
	-66.3	88.4								
			9	23	77/0.4	100/0.9		Sat.		-68.9 / 91.0
-70										
	-71.3	93.4								
			6	7	18	25		Sat.		-73.9 / 96.0
-75										
	-76.3	98.4								
			5	9	13	22		Sat.		-77.8 / 99.9
										Boring Terminated at Elevation -77.8 ft in SAND (River Bend Formation)

Loss of circulation at 83.0' and from 84.9' to 88.4'
Caving at 30.0'
Drill chatter at 74.3' and from 89.9' to 90.9'
Strata break in split spoon at depths 19.4', 74.4', 78.9' and 84.4'

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B10-B RL	**STATION** 183+09	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.2 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,468	**EASTING** 2,624,534 / **24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/01/18	**COMP. DATE** 05/01/18	**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											
	21.2	0.0	WOH	WOH	1	1		M		21.2 GROUND SURFACE	0.0
20										**ALLUVIAL** Brown, silty SAND (A-2-4), contains trace organics	
	17.8	3.4	2	2	2	4		Sat.		18.2 **UNDIVIDED COASTAL PLAIN** Gray, silty SAND (A-2-4)	3.0
15										15.2 **COASTAL PLAIN** Gray, silty CLAY (A-7-6, A-6) (DUPLIN FORMATION)	6.0
	12.8	8.4	WOH	WOH	WOH	0		W			
10										10.2	11.0
	7.8	13.4	WOH	1	1	2		W			
5											
	2.8	18.4	WOH	1	2	3		W		1.6 Gray, SAND (A-3), with trace clay in part (DUPLIN FORMATION)	19.6
0											
	-2.2	23.4	1	1	1	2		Sat.			
-5											
	-7.2	28.4	3	5	6	11		Sat.			
-10										-9.8 Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	31.0
	-12.2	33.4	WOH	3	5	8		Sat.		-12.7 Gray, SAND (A-3) (DUPLIN FORMATION)	33.9
-15											
	-17.2	38.4	4	5	6	11		Sat.			
-20											
	-22.2	43.4	1	1	2	3		W		-22.5 Gray, silty CLAY (A-6), contains trace shell fragments (DUPLIN FORMATION)	43.7
-25											
	-27.2	48.4	2	2	2	4		W			
-30											
	-32.2	53.4	2	2	3	5		W			
-35											
	-37.2	58.4	1	2	3	5		W			
-40											
	-42.2	63.4	2	1	2	3		W			
-45											
	-47.2	68.4	2	8	29	37		W		-48.2 **COASTAL PLAIN** Gray and green, SAND (A-3, A-2-4), contains cemented shell and limestone fragments (RIVER BEND FORMATION)	69.4
-50											
	-52.2	73.4	11	12	15	27		Sat.		-54.8	76.0
-55											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B10-B RL	**STATION** 183+09	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.2 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,468	**EASTING** 2,624,534 / **24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/01/18	**COMP. DATE** 05/01/18	**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				
	-57.2	78.4	8	9	15	24		Sat.		Gray and green, SAND (A-3, A-2-4), contains cemented shell and limestone fragments (RIVER BEND FORMATION) *(continued)*
-60										
	-62.2	83.4	4	3	5	8		Sat.		
-65										
	-67.2	88.4	20	54	46/0.5	100/1.0				
-70										-69.8 91.0
	-72.2	93.4	65	35/0.5		100/1.0				-72.7 93.9
-75										-73.4 94.6 **COASTAL PLAIN SEDIMENTARY ROCK** Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
	-77.2	98.4	15	14	9	23		Sat.		-78.7 **COASTAL PLAIN** Gray, SAND (A-3), with limestone fragments (RIVER BEND FORMATION) 99.9

Boring Terminated at Elevation -78.7 ft in SAND (River Bend Formation)

Drill chatter from 72.6' to 75.1', 87.7' to 88.4' and 93.9' to 94.6'
Strata breaks in split spoon at depths 19.6', 33.9', 43.7' and 69.4'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B11-A LL	**STATION** 184+39	**OFFSET** 61 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.6 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,419	**EASTING** 2,624,364 / **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/01/18	**COMP. DATE** 05/01/18	**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)
										22.6 GROUND SURFACE	0.0
	22.6	0.0	WOH	WOH	1	1		M		**ALLUVIAL** Dark brown silty SAND (A-2-4)	
	19.2	3.4	2	3	1	4		Sat.		19.6 **UNDIVIDED COASTAL PLAIN** Gray and orange, silty SAND (A-2-4), with trace clay	3.0
	14.2	8.4	WOH	WOH	WOH	0		W		16.6 **COASTAL PLAIN** Gray, CLAY (A-7-6) (DUPLIN FORMATION)	6.0
	9.2	13.4	WOH	WOH	WOH	0		W			
	4.2	18.4	WOH	1	2	3		W		3.2 Gray, clayey SAND (A-2-4, A-3) (DUPLIN FORMATION)	19.4
	-0.8	23.4	5	4	5	9		Sat.		1.6	21.0
	-5.8	28.4	3	3	2	5		Sat.		-3.4 Gray, CLAY (A-7-6) (DUPLIN FORMATION)	26.0
	-10.8	33.4	1	5	10	15		Sat.		-6.3 Gray, SAND (A-3) (DUPLIN FORMATION)	28.9
	-15.8	38.4	6	9	9	18		Sat.		-8.4 Gray, CLAY (A-7-6) (DUPLIN FORMATION)	31.0
	-20.8	43.4	3	2	3	5		Sat.		-11.3 Gray, SAND (A-3) (DUPLIN FORMATION)	33.9
	-25.8	48.4	1	2	2	4		W		-23.4 Gray, silty CLAY (A-6), contains trace shell fragments (DUPLIN FORMATION)	46.0
	-30.8	53.4	2	2	3	5		W			
	-35.8	58.4	2	3	3	6		W			
	-40.8	63.4	WOH	1	2	3		W			
	-45.8	68.4	WOH	1	1	2		W			

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B11-A LL	**STATION** 184+39	**OFFSET** 61 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.6 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,419	**EASTING** 2,624,364 / **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/01/18	**COMP. DATE** 05/01/18	**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
	-50.8	73.4	3	5	17	22		Sat.		-51.3 Gray, silty CLAY (A-6), contains trace shell fragments (DUPLIN FORMATION) *(continued)* 73.9
	-55.8	78.4	4	5	40	45		Sat.		**COASTAL PLAIN** Gray and tan, cemented, clayey, fine to coarse SAND (A-2-4, A-3), contains shell and limestone fragments (RIVER BEND FORMATION)
	-60.8	83.4	12	9	7	16		Sat.		
	-65.8	88.4	8	8	10	18		Sat.		
	-70.8	93.4	6	3	7	10		Sat.		-73.4 96.0
	-75.8	98.4	14	10	9	19		Sat.		-77.3 99.9

Match Line

Boring Terminated at Elevation -77.3 ft in SAND (River Bend Formation)

Strata breaks in split spoon at depths 19.4', 28.9', 33.9' and 73.9'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B11-B RL	**STATION** 184+38	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 109.9 ft	**NORTHING** 410,528	**EASTING** 2,624,420 / **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/02/18	**COMP. DATE** 05/02/18	**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)
35											
30											
25											
	21.5	0.0	WOH	WOH	WOH	0				21.5 GROUND SURFACE	0.0
20								M		**ALLUVIAL** Brown, silty, clayey SAND (A-2-4)	
	18.1	3.4	WOH	2	2	4		Sat.		17.1	4.4
15										15.5 **UNDIVIDED COASTAL PLAIN** Gray and orange, SAND (A-2-4), with trace clay	6.0
	13.1	8.4	WOH	WOH	WOH	0		W		**COASTAL PLAIN** Gray, silty, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION)	
10										10.5	11.0
	8.1	13.4	WOH	WOH	WOH	0		W			
5											
	3.1	18.4	1	1	1	2		W			
0										0.5 Gray, SAND (A-3), with trace clay (DUPLIN FORMATION)	21.0
	-1.9	23.4	4	3	2	5		Sat.			
-5											
	-6.9	28.4	2	2	7	9		Sat.			
-10											
	-11.9	33.4	3	5	5	10		Sat.			
-15											
	-16.9	38.4	7	9	10	19		Sat.			
-20											
	-21.9	43.4	5	7	9	16		Sat.			
-25										-24.5 Gray, fine sandy CLAY (A-6)(8), with little silt and trace sand, contains shell fragments (DUPLIN FORMATION)	46.0
	-26.9	48.4	2	2	3	5		W			
-30											
	-31.9	53.4	2	2	3	5		W			
-35											
	-36.9	58.4	2	1	3	4		W			
-40											
	-41.9	63.4	WOH	WOH	1	1	SS-624	42% W			
-45											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. B11-B RL	**STATION** 184+38	**OFFSET** 61 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 21.5 ft	**TOTAL DEPTH** 109.9 ft	**NORTHING** 410,528	**EASTING** 2,624,420 / **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/02/18	**COMP. DATE** 05/02/18	**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
-45						Match Line				
	-46.9	68.4	WOH	WOH	2	2		W		Gray, fine sandy CLAY (A-6)(8), with little silt and trace sand, contains shell fragments (DUPLIN FORMATION) *(continued)*
-50										-49.5 71.0
	-51.9	73.4	10	11	14	25		Sat.		**COASTAL PLAIN** Gray and green, cemented, silty, fine to medium SAND (A-3, A-2-4), contains shell and limestone fragments (RIVER BEND FORMATION)
-55										-54.5 76.0
	-56.9	78.4	62	38/0.5		100/1.0				
-60										
	-61.9	83.4	9	5	5	10		Sat.		
-65										
	-66.9	88.4	5	7	36	43		Sat.		
-70										-69.5 91.0
	-71.9	93.4	19	60/0.1		60/0.1				
-75										
	-76.9	98.4	11	10	13	23		Sat.		
-80										-79.5 101.0
	-81.9	103.4	6	7	11	18		Sat.		
-85										
	-86.9	108.4	6	8	13	21		Sat.		-88.4 109.9

Boring Terminated at Elevation -88.4 ft in SAND (River Bend Formation)

Drill chatter from 75.3' tp 76.3', 90.3' to 90.8' and 94.0' to 94.5'
Strata break in split spoon and a depth of 4.4'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. EB2-A LL	**STATION** 185+78	**OFFSET** 50 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 23.1 ft	**TOTAL DEPTH** 79.4 ft	**NORTHING** 410,491	**EASTING** 2,624,245	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Powell, B.	**START DATE** 05/02/18	**COMP. DATE** 05/03/18	**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											
	23.1	0.0								23.1 GROUND SURFACE	0.0
			WOH	1	1	2				22.1 **ALLUVIAL**	1.0
20	19.7	3.4						M		Dark brown, moderately organic SAND (A-2-4)	
			2	3	5	8		Sat.		20.1 Brown, silty SAND (A-2-4)	3.0
15	14.7	8.4								17.1 **UNDIVIDED COASTAL PLAIN** Gray, silty SAND (A-2-4)	6.0
			WOH	WOH	WOH	0		W		**COASTAL PLAIN** Gray, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION)	
10	9.7	13.4									
			WOH	WOH	WOH	0		W			
5	4.7	18.4									
			WOH	1	2	3		W		3.7	19.4
0	-0.3	23.4									
			WOH	1	1	2		Sat.		-0.8 Gray, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	23.9
-5	-5.3	28.4									
			2	4	9	13		Sat.		-7.9 Gray, sandy CLAY (A-6), with sand interbeds (DUPLIN FORMATION)	31.0
-10	-10.3	33.4									
			2	2	3	5		W		-12.9 Gray, SAND (A-3), with trace clay (DUPLIN FORMATION)	36.0
-15	-15.3	38.4									
			5	7	8	15		Sat.			
-20	-20.3	43.4									
			8	9	10	19		Sat.			
-25	-25.3	48.4									
			6	5	3	8		Sat.		-27.9 Gray, fine sandy CLAY (A-6(9)), with little silt and trace coarse sand, contains shell fragments (DUPLIN FROMATION)	51.0
-30	-30.3	53.4									
			2	3	3	6		Sat.			
-35	-35.3	58.4									
			2	3	3	6		Sat.			
-40	-40.3	63.4									
			2	1	3	4		Sat.			
-45	-45.3	68.4									
			WOH	1	1	2	SS-648	39%		-47.9 **COASTAL PLAIN** Gray and green, phosphatic, silty, fine to coarse SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION)	71.0
-50	-50.3	73.4									
			10	60/0.1		60/0.1				-52.9	76.0
-55											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				**GROUND WTR (ft)**
BORING NO. EB2-A LL	**STATION** 185+78	**OFFSET** 50 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 23.1 ft	**TOTAL DEPTH** 79.4 ft	**NORTHING** 410,491	**EASTING** 2,624,245	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Powell, B.	**START DATE** 05/02/18	**COMP. DATE** 05/03/18	**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				
	-55.3	78.4	80	20/0.5		100/1.0				-56.3 Gray and green, phosphatic, silty, fine to coarse SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION) *(continued)* 79.4

Boring Terminated at Elevation -56.3 ft in SAND (River Bend Formation)

Drill chatter from 74.3' to 75.6'
Loss of circulation at 78.4'
Strata breaks in split spoon at depths 19.4' and 23.9'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB2-B RL	**STATION** 185+91	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.1 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,594	**EASTING** 2,624,282 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/03/18	**COMP. DATE** 05/04/18	**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)
35											
30											
25											
	22.1	0.0								GROUND SURFACE	0.0
20			WOH	WOH	1	1		M		21.6 **ALLUVIAL** Brown, silty SAND (A-2-4)	0.5
	18.7	3.4	WOH	1	3	4		Sat.		**UNDIVIDED COASTAL PLAIN** Tan and orange, SAND (A-2-4), with clay, contains trace organics	
15										16.1 **COASTAL PLAIN** Gray, CLAY (A-7-6), with some fine sand and silt (DUPLIN FORMATION)	6.0
	13.7	8.4	WOH	WOH	WOH	0		W			
10											
	8.7	13.4	WOH	WOH	1	1		W			
5								61%			
	3.7	18.4	WOH	WOH	WOH	0		W			
0											
	-1.3	23.4	1	2	3	5		W			
-5											
	-6.3	28.4	5	7	8	15		Sat.		-6.8 Gray, clayey SAND (A-2-4, A-3), contains shell fragments, with trace clay (DUPLIN FORMATION) -8.9	28.9 31.0
-10											
	-11.3	33.4	3	3	5	8		Sat.			
-15											
	-16.3	38.4	8	11	12	23		Sat.			
-20											
	-21.3	43.4	10	10	11	21		Sat.		-23.9 Gray, silty CLAY (A-7-6), contains shell fragments (DUPLIN FORMATION)	46.0
-25											
	-26.3	48.4	1	2	3	5		W			
-30											
	-31.3	53.4	2	3	3	6		W			
-35											
	-36.3	58.4	2	3	3	6		W			
-40											
	-41.3	63.4	1	1	2	3		W			
-45											

WBS 34360.1.1	**TIP** R-1015	**COUNTY** CRAVEN	**GEOLOGIST** Grainger, P.
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)			**GROUND WTR (ft)**
BORING NO. EB2-B RL	**STATION** 185+91	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 22.1 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 410,594	**EASTING** 2,624,282 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 78% 08/20/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Powell, B.	**START DATE** 05/03/18	**COMP. DATE** 05/04/18	**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
-45						Match Line				
	-46.3	68.4	1	1	3	4		W		Gray, silty CLAY (A-7-6), contains shell fragments (DUPLIN FORMATION) *(continued)* -48.9 71.0
-50										**COASTAL PLAIN**
	-51.3	73.4	12	15	14	29		W		Gray and green, silty, fine to medium SAND (A-3, A-2-4), phosphatic, contains shell and limestone fragments (RIVER BEND FORMATION) -53.9 76.0
-55										
	-56.3	78.4	7	6	11	17		Sat.		
-60										
	-61.3	83.4	3	8	14	22		Sat.		
-65										
	-66.3	88.4	4	2	6	8		Sat.		
-70										
	-71.3	93.4	7	9	9	18		Sat.		
-75										
	-76.3	98.4	14	15	13	28		Sat.		-77.8 99.9

Boring Terminated at Elevation -77.8 ft in SAND (River Bend Formation)

Drill chatter from 75.1' to 76.1'
Strata break in split spoon at a depth of 0.5'
ST-4 taken in offset boring at STA 185+90
63' RT

Other Samples:
ST-4 (16.1 - 18.1)

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-327	60 LT	169+52	8.6-10.1	A-2-4(0)	NP	NP	9.8	74.1	2.2	13.9	100	99	17.7	26.2	-
SS-336	60 LT	169+52	53.6-55.1	A-3(0)	NP	NP	1.8	90.7	0	7.7	100	99.6	9	23.7	-
SS-5	61 RT	172+22	19.6-21.1	A-3(0)	NP	NP	28.1	69.9	0.3	1.7	99.8	97.1	2.5	20.2	-
SS-98	87 RT	174+86	38.0-39.5	A-7-5(15)	50	29	14.9	31.8	19.5	33.8	92.5	81.5	59.4	37.5	-
SS-99	87 RT	174+86	43.0-44.5	A-6 (1)	35	15	44.1	23.5	11.2	21.2	96.2	68.5	35.9	31.6	-
SS-100	87 RT	174+86	48.0-49.5	A-1-b(0)	NP	NP	71.8	22.4	0.2	5.6	99	49	6.4	14.7	-
SS-130	61 RT	176+04	72.4-73.9	A-2-4(0)	NP	NP	40.6	38.2	9.6	11.3	88.8	64.9	20.9	16.2	-
SS-471	65 LT	180+38	53.5-55.0	A-1-b(0)	NP	NP	82.3	12.6	0	5.7	98.5	43.6	6	19.4	-
SS-536	52 LT	181+77	43.4-44.9	A-7-6(26)	53	35	10.7	25	26.2	38.1	99.1	91.6	75.2	56.4	-
SS-511	62 RT	181+72	28.4-29.9	A-4(0)	NP	NP	43	24.3	16.6	16.1	100	71.9	37.6	41.9	-
SS-624	61 RT	184+38	63.4-64.9	A-6(8)	38	17	8.2	42.8	18	31	97.3	91.2	60.3	41.6	-
SS-648	50 LT	185+78	68.4-69.9	A-6(9)	38	19	5.5	47.1	16.5	30.9	99.4	95.7	58.7	39.4	-
ST-1	58 RT	169+54	4.5-6.5	A-6(3)	34	12	0.2	59.1	6	34.7	100	99.9	45.2	29.2	-
ST-4	63 RT	185+90	16.1-18.1	A-7-6(31)	61	37	0.2	22.9	22.7	54.2	100	99.9	80.5	60.7	-

Photo 1: Looking towards End Bent 2 and up station of -L-

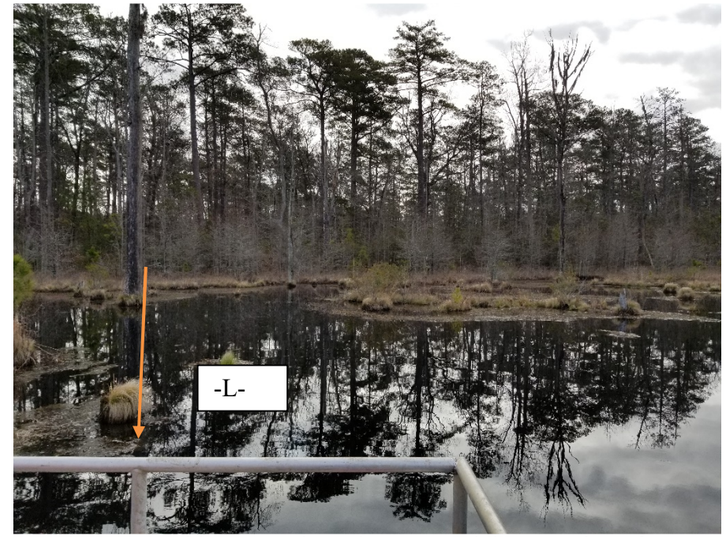


Photo 2: Looking towards End Bent 1 and down station of -L-

Photo 3: Looking upstream at the East Prong of Slocum Creek

Photo 4: Looking downstream at the East Prong of Slocum Creek