STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

September 29, 2011

MEMORANDUM TO: C. E. (Neil) Lassiter, Jr., P.E.
Division 2 Engineer

ATTENTION: Lang Jones
Division 2 DDC Engineer

FROM: CAK for Kyung (K. J.) Kim, Ph.D., P.E.
Eastern Regional Geotechnical Manager

STATE PROJECT: 13202.1007011 (DF13202.2007010)
FEDERAL PROJECT:
COUNTY: Beaufort

DESCRIPTION: Bridge No. 19 on SR 1004 (Hickory Point Road) over Huddy's Gut (Pamlico River Inlet)

SUBJECT: Bridge Foundation Recommendations

The Geotechnical Engineering Unit has completed the subsurface investigation and has prepared the foundation design recommendations for the above structure and presents the following project data:

__X__ Bridge Inventory (7) pages

__X__ Foundation Design Recommendations (3) pages

_____ Design Calculations ( ) pages

_____ Special Provisions ( ) pages

Please call Majid Khazaei, P.E. or Chris Kreider, P.E. at (919) 662-4710 if there are any questions concerning this memorandum.

KJK/CAK/MK
Attachment

MAILING ADDRESS:
EASTERN REGIONAL OFFICE
GEOTECHNICAL ENGINEERING UNIT
1570 MAIL SERVICE CENTER
RALEIGH NC 27699-1570

TELEPHONE: 919-662-4710
FAX: 919-662-3095

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

LOCATION:
3301 JONES SAUSAGE RD., SUITE 100
GARNER, NC 27529-9489

FOUNDATION RECOMMENDATIONS

WBS: 13202.1007011

T.I.P. NO.: DF13202.2007010

COUNTY: Beaufort

STATION: 15+53.00 -L-

DESCRIPTION : Bridge No. 19 on SR 1004 (Hickory Point Road) over Huddy's Gut (Pamlico River Inlet)

	INITIALS	DATE
DESIGN	MK	9/28/11
CHECK	MOV	10/3/11
APPROVAL	CAK	10/3/11

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

SIGNATURE

10-3-11

BENT	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	15+18.00 -L-	Cap on HP 12x53 Steel Piles	85 tons/pile	Bottom of Cap El. = -0.7 ft ± Estimated Length of Pile = 70 ft ± Number of Piles = 7
END BENT 2	15+88.00 -L-	Cap on HP 12x53 Steel Piles	85 tons/pile	Bottom of Cap El. = -0.5 ft ± Estimated Length of Pile = 70 ft ± Number of Piles = 7

NOTES ON PLANS & COMMENTS

See Following Pages

PREPARED BY: MK
DATE: 9/28/2011
CHECKED BY: MOV
DATE: 10/3/11

FOUNDATION RECOMMENDATION NOTES ON PLANS

1) FOR PILES, SEE SPECIAL PROVISIONS.

2) PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

3) DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

4) PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

5) DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

6) IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40 to 60 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

FOUNDATION RECOMMENDATION COMMENTS

1) 2:1 (H:V) SLOPE AT THE END BENTS ARE OK WITH SLOPE PROTECTION.

2) REINFORCED BRIDGE APPROACH FILLS ARE REQUIRED AT EACH END BENT.

3) NO WAITING PERIOD IS REQUIRED BEFORE BEGINNING ANY WORK FOR END BENT CONSTRUCTION AFTER COMPLETION OF THE EMBANKMENT AT EACH END BENT.

PILE PAY ITEM QUANTITIES

(Revised 3/4/10)

WBS ELEMENT 13202.1007011 DATE 9/28/2011

TIP NO. DF13202.2007010 DESIGNED BY MK

COUNTY Beaufort CHECKED BY MOV / 10/3/11

STATION 15+53.00 -L-

DESCRIPTION Bridge No. 19 on SR 1004 (Hickory Point Road) over Huddy's Gut (Pamlico River Inlet)

NUMBER OF BENTS WITH PILES _____
NUMBER OF PILES PER BENT _____
NUMBER OF END BENTS WITH PILES _____
NUMBER OF PILES PER END BENT _____

Only required for "Predrilling for Piles" & "Pile Excavation" Pay Items

	PILE PAY ITEM QUANTITIES							
Bent # or End Bent #	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling for Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft) In Soil	Pile Excavation (per linear ft) Not In Soil	PDA Testing (per each)	PDA Assistance (per each)
End Bent #1	no			4				
End Bent #2	no			4				
TOTALS			0	8	0	0	0	0

Notes:
Blanks or "no" represent quantity of zero.

If steel pile points are required, Structure Design should calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates may be or are required, Structure Design should calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

If PDA testing may be required, show quantities of "PDA Assistance", if applicable, and "PDA Testing" as totals only. If PDA testing is required, show quantities of "PDA Assistance", if applicable, and "PDA Testing" for each specific bent or end bent from the Notes on Plans.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF13202.2007010	1	7

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. DF13202.2007010 F.A. PROJ. _____

COUNTY BEAUFORT

PROJECT DESCRIPTION BRIDGE NO. 19 ON SR 1004 (HICKORY POINT ROAD) OVER PAMLICO RIVER INLET AT -L- STA. 15+53.01.

PROJECT: DF13202.2007010 ID:

CONTENTS

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

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C.DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NOTHING THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

PERSONNEL

J.P. DELOATCH

J.R. SWARTLEY

R.E. SMITH

J.M. EDMONDSON

INVESTIGATED BY D.N. ARGENBRIGHT

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE SEPTEMBER 2011

NORTH CAROLINA LICENSED SEAL 1050 GEOLOGIST D.N. ARGENBRIGHT

9-28-11

DRAWN BY: C.P. TURNER

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

NOTE - BY MAKING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE

PROJECT REFERENCE NO.	SHEET NO.
DF13202.2007010	2 OF 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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

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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2, A-3	A-4, A-5, A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING # 10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT / PLASTIC INDEX	6 MX		NP	40 MX / 10 MX	41 MN / 10 MX	40 MX / 11 MN	41 MN / 11 MN	40 MX / 10 MX	41 MN / 10 MX	40 MX / 11 MN	41 MN / 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	20 MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS., GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:
☐ MOBILE B- ___	☐ CLAY BITS	☒ AUTOMATIC ☐ MANUAL
☐ BK-51	☐ 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:
☒ CME-45B	☐ 8" HOLLOW AUGERS	☐ -B ___
☐ CME-550	☐ HARD FACED FINGER BITS	☐ -N ___
☐ PORTABLE HOIST	☐ TUNG.-CARBIDE INSERTS	☐ -H ___
☐ ___	☒ CASING ☐ W/ ADVANCER	HAND TOOLS:
☐ ___	☒ TRICONE 2 15/16 "STEEL TEETH	☐ POST HOLE DIGGER
	☐ TRICONE ___ "TUNG.-CARB.	☐ HAND AUGER
	☐ CORE BIT	☐ SOUNDING ROD
	☐ ___	☐ VANE SHEAR TEST
		☐ ___

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

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

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

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

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

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

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

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

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

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

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

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

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

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

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

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

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

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

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

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

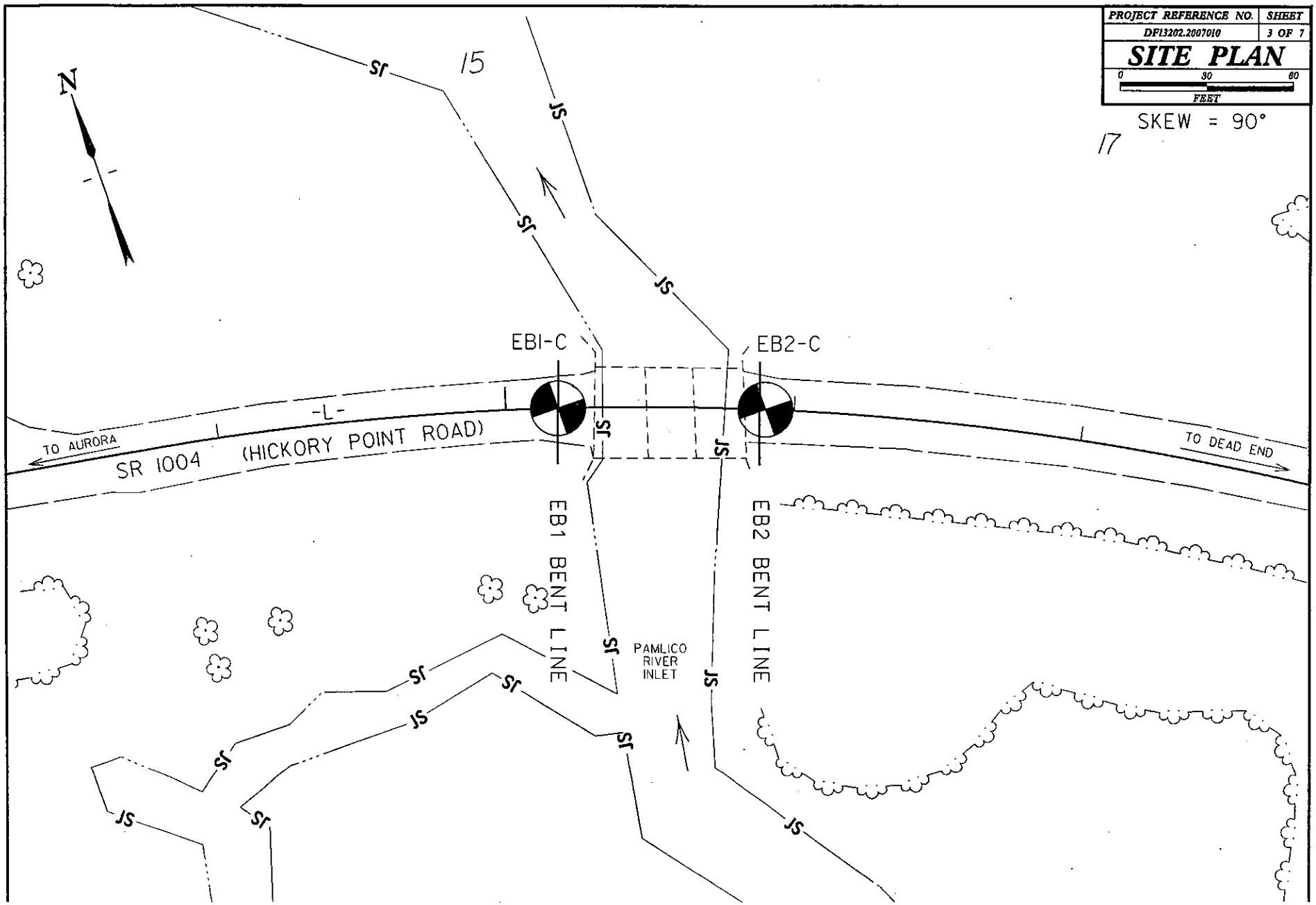
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: CONTROL POINT NO. 2

ELEVATION: 4.44 FT.

NOTES:

REVISED 09/23/09

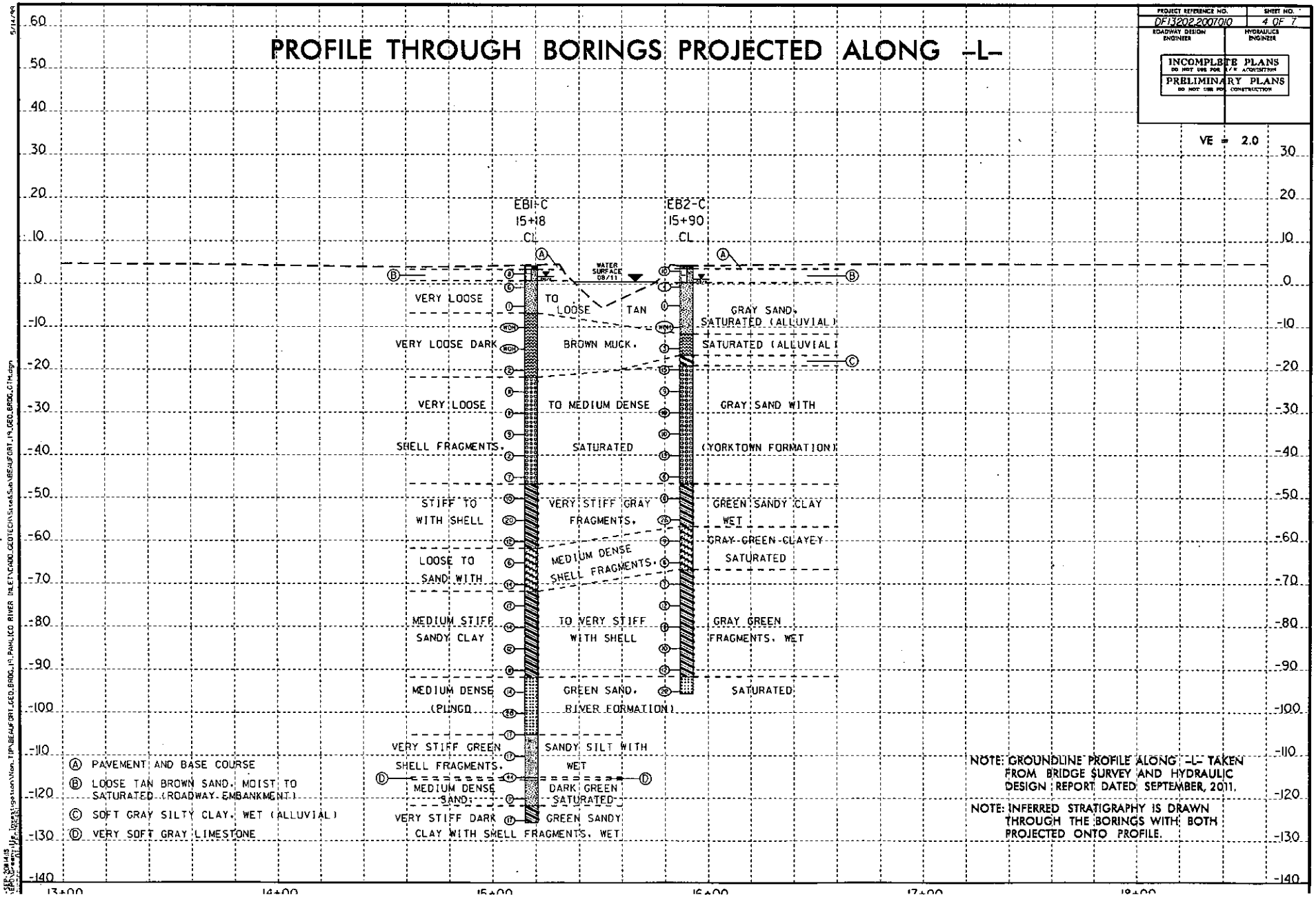

PROJECT REFERENCE NO.
DF13202.2007010
SHEET
3 OF 7
SITE PLAN
0
30
60
FEET
SKEW = 90°
N
15
17
EB1-C
EB2-C
-L-
TO AURORA
SR 1004 (HICKORY POINT ROAD)
TO DEAD END
EB1 BENT LINE
EB2 BENT LINE
PAMLICO
RIVER
INLET
JS

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO.	SHEET NO.
DF13202.2007010	4 OF 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

VE = 2.0



Ⓐ PAVEMENT AND BASE COURSE

Ⓑ LOOSE TAN BROWN SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)

Ⓒ SOFT GRAY SILTY CLAY, WET (ALLUVIAL)

Ⓓ VERY SOFT GRAY LIMESTONE

NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED SEPTEMBER, 2011.

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

5/14/99

SEP 04 2013

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS DF13202.2007010	TIP N/A	COUNTY BEAUFORT	GEOLOGIST DeLoatch, J. P.
SITE DESCRIPTION BRIDGE NO. 19 ON SR 1004 OVER PAMLICO RIVER INLET			GROUND WTR (ft)
BORING NO. EB1-C	STATION 15+18	OFFSET CL	ALIGNMENT -L-
COLLAR ELEV. 4.2 ft	TOTAL DEPTH 129.9 ft	NORTHING 599,511	EASTING 2,671,258
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 92% 6/27/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 09/20/11	COMP. DATE 09/21/11	SURFACE WATER DEPTH N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	2.5

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
5											
	3.3	0.9	3	3	5	8				4.2 GROUND SURFACE	0.0
										3.3 ASPHALT PAVEMENT	0.9
0	0.2	4.0	3	3	3	6				ROADWAY EMBANKMENT TAN BROWN SAND, MOIST TO SAT. 0.7	3.5
										ALLUVIAL TAN SAND, SAT.	
-5	-4.2	8.4	WOH	WOH	1	1					
										-6.8	11.0
-10	-9.2	13.4	WOH	WOH	WOH	0				ALLUVIAL DARK BROWN MUCK, SAT.	
-15	-14.2	18.4	WOH	WOH	WOH	0					
-20	-19.2	23.4	WOH	WOH	2	2					
										-21.8	26.0
-25	-24.2	28.4	3	5	6	11				COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)	
-30	-29.2	33.4	5	5	6	11					
-35	-34.2	38.4	3	3	6	9					
-40	-39.2	43.4	WOH	WOH	2	2					
-45	-44.2	48.4	7	3	4	7					
										-46.8	51.0
-50	-49.2	53.4	3	4	6	10				COASTAL PLAIN GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)	
-55	-54.2	58.4	5	7	13	20					
-60	-59.2	63.4	3	3	9	12					
										-61.8	66.0
-65	-64.2	68.4	3	2	4	6				COASTAL PLAIN GRAY GREEN CLAYEY SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)	
-70	-69.2	73.4	4	4	10	14					
										-71.8	76.0
	-74.2	78.4									

WBS DF13202.2007010	TIP N/A	COUNTY BEAUFORT	GEOLOGIST DeLoatch, J. P.
SITE DESCRIPTION BRIDGE NO. 19 ON SR 1004 OVER PAMLICO RIVER INLET			GROUND WTR (ft)
BORING NO. EB1-C	STATION 15+18	OFFSET CL	ALIGNMENT -L-
COLLAR ELEV. 4.2 ft	TOTAL DEPTH 129.9 ft	NORTHING 599,511	EASTING 2,671,258
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 92% 6/27/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 09/20/11	COMP. DATE 09/21/11	SURFACE WATER DEPTH N/A

GROUND WTR (ft)	
0 HR.	N/A
24 HR.	2.5

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-75						Match Line				
-80	-79.2	83.4	4	6	8	14				COASTAL PLAIN GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)*(continued)*
-85	-84.2	88.4	4	5	7	12				
-90	-89.2	93.4	4	5	6	11				
										-91.8 96.0
-95	-94.2	98.4	3	5	9	14				COASTAL PLAIN GREEN SAND, SAT (PUNGO RIVER FORMATION)
-100	-99.2	103.4	6	9	11	20				
-105	-104.2	108.4	5	8	9	17				-106.2 109.4
-110	-109.2	113.4	5	7	10	17				COASTAL PLAIN GREEN SANDY SILT WITH SHELL FRAGMENTS, WET (PUNGO RIVER FORMATION)
-115	-114.2	118.4	5	13	31	44				-115.2 119.4
										-116.8 120.0 COASTAL PLAIN GRAY LIMESTONE
-120	-119.2	123.4	4	5	8	11				COASTAL PLAIN DARK GREEN SAND WITH SHELL FRAGMENTS, SAT. (PUNGO RIVER FORMATION) -121.8 126.0
-125	-124.2	128.4	5	7	10	17				COASTAL PLAIN DARK GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (PUNGO RIVER FORMATION) -125.7 129.9
										Boring Terminated at Elevation -125.7 ft in very stiff clay

CDOT BORE DOUBLE BEAUFORT_BRDG_19.GPJ NC_DOT.GDT 9/28/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS DF13202.2007010	TIP N/A	COUNTY BEAUFORT	GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 19 ON SR 1004 OVER PAMLICO RIVER INLET				GROUND WTR (ft)
BORING NO. EB2-C	STATION 15+90	OFFSET CL	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 4.3 ft	TOTAL DEPTH 99.9 ft	NORTHING 599,487	EASTING 2,671,325	24 HR. 3.2
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 92% 6/27/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, R. E.	START DATE 09/22/11	COMP. DATE 09/23/11	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
5											
	4.0	0.3	7	6	4	10				4.3 GROUND SURFACE	0.0
										3.5 ASPHALT PAVEMENT	0.8
0	0.3	4.0	3	2	2	4				ROADWAY EMBANKMENT GRAVEL BASE COURSE	
										0.3 ROADWAY EMBANKMENT TAN BROWN SAND, MOIST TO SAT.	4.0
-5	-4.1	8.4	WOH	WOH	1	1				ALLUVIAL TAN GRAY SAND, SAT.	
-10	-9.1	13.4	WOH	WOH	WOH	0					
										-11.7 ALLUVIAL DARK BROWN MUCK WITH WOOD, SAT	15.0
-15	-14.1	18.4	WOR	1	2	3					
										-16.7 ALLUVIAL GRAY SILTY CLAY WITH WOOD, WET	21.0
-20	-19.1	23.4	WOR	6	7	15				-19.1 COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)	23.4
-25	-24.1	28.4	2	4	5	9					
-30	-29.1	33.4	5	5	5	10					
-35	-34.1	38.4	5	5	5	10					
-40	-39.1	43.4	5	6	7	13					
-45	-44.1	48.4	4	2	4	6					
										-46.7 COASTAL PLAIN GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)	51.0
-50	-49.1	53.4	3	5	6	11					
-55	-54.1	58.4	8	10	18	28					
										-56.7 COASTAL PLAIN GRAY GREEN CLAYEY SAND WITH SHELL FRAGMENTS, SAT. (YORKTOWN FORMATION)	61.0
-60	-59.1	63.4	4	5	4	9					
-65	-64.1	68.4	2	3	3	6					
										-66.7 COASTAL PLAIN GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)	71.0
-70	-69.1	73.4	3	3	4	7					
	-74.1	78.4									

WBS DF13202.2007010	TIP N/A	COUNTY BEAUFORT	GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 19 ON SR 1004 OVER PAMLICO RIVER INLET				GROUND WTR (ft)
BORING NO. EB2-C	STATION 15+90	OFFSET CL	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 4.3 ft	TOTAL DEPTH 99.9 ft	NORTHING 599,487	EASTING 2,671,325	24 HR. 3.2
DRILL RIG/HAMMER EFF./DATE GFO0063 CME-45B 92% 6/27/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, R. E.	START DATE 09/22/11	COMP. DATE 09/23/11	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-75						Match Line				
-80	-79.1	83.4	4	5	6	11				COASTAL PLAIN GRAY GREEN SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)*(continued)*
-85	-84.1	88.4	5	6	4	10				
-90	-89.1	93.4	4	4	8	12				
										-91.7 COASTAL PLAIN GREEN SAND, SAT. (PUNGO RIVER FORMATION) 96.0
-95	-94.1	98.4	5	8	14	22				-95.6 Boring Terminated at Elevation -95.6 ft in medium dense sand 99.9

NCDOT BORE DOUBLE BEAUFORT_BRDG_19.GPJ NC_DOT.GDT 9/28/11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 0F13202.2007010 TIP: N/A COUNTY: BEAUFORT

DESCRIPTION(1): BRIDGE NO. 19 ON SR 1004 OVER PAMLICO RIVER INLET

EXISTING BRIDGE

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

Bridge No.: 19 Length: 52' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
Foundation Type: Timber piles

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: SCOUR 2 TO 5 FEET BEHIND BOTH END BENTS ACROSS ROADWAY

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

EXISTING SCOUR PROTECTION

Type(3): WOODEN END WALL

Extent(4): 15' OUTSIDE EDGE OF BRIDGE

Effectiveness(5): NOT EFFECTIVE

Obstructions(6): STORM DEBRIS FROM HURRICANE IRENE

INSTRUCTIONS

1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): MUCK AND SAND

Channel Bank Material(8): MUCK

Channel Bank Cover(9): SALT MARSH GRASS

Floodplain Width(10): 400 FEET

Floodplain Cover(11): SALT MARSH GRASS

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

Channel Migration Tendency(13): VERY SLIGHT TENDENCY TO MIGRATE SOUTHEAST

Observations and Other Comments: BRIDGE DECK LIFTED OFF PILES BY HURRICANE IRENE STORM SURGE

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

	BENTS B1										
CHANNEL BED	-13										

Comparison of DSE to Hydraulics Unit theoretical scour:
GEOTECHNICAL DSE AGREES WITH THE HYDRAULIC UNIT'S 100 YR. THEORETICAL CONTRACTION SCOUR.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

Form GEU-017e Revised 7/26/2007

Reported by: Dean Argenbright DEAN ARGENBRIGHT Date: 9/21/2011