# ID: B-428

# **ROJECT: 33621.1.1**

# STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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# STRUCTURE SUBSURFACE INVESTIGATION

			-		
PROJ. REFERENCE NO. <u>B</u>	<del>-4</del> 281		_ F.A. PROJ.	BRST	<b>P-</b> 008(4)
COUNTY <u><b>Stokes</b></u> Project description <u>E</u> (-L— <b>Station 19+60</b> )	BRIDGE #60	ON NC	8/89 OVER	DAN	RIVER
SITE DESCRIPTION					

#### **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 YARROUS FIELD BORNG 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 1999 250-4098, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNG LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

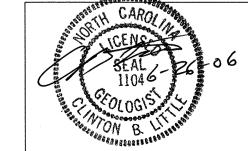
CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STILL ON-PLACE TEST DATA CAN BE RELIED ON ONLY TO THE DECREE 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 FIRM. DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THAS PROJECT. THE DEPARTMENT DOES NOT MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTICATION 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 INVESTICATIONS AS HE DEEMS NECESSARY TO SATISFY HANGLE 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 PRESON RESULTING FROM THE ACTUAL CONDITIONS.

	C.L. SMITH
	K. WISE
-	
INVESTIGATED BY	J.E. BEVERLY
CHECKED BY	C.B. LITTLE
SUBMITTED BY	U.D. LILLE
DATE	JUNE 2006

PERSONNEL

J.K. STICKNEY



#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEG	GEND, TERMS, SYMBOI	LS, AND ABBREVIATI	ONS	
SOIL DESCRIPTION	GRADATION CONTROL AND ADDRESS	0.000005	ROCK DESC		TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLICHT POWER AUGER, AND YIELD LESS THAN 100 BLOVS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AGSHTO TZG6, 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, ANDULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE.  VERY STEFF, GRAY, SULY CLAY, WOST WITH WITEREDOED FINE SAND LIVERS, MASTIC M-7-6	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (#PORTY 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: ANGUL. SUBANGULAR, SUBROUNDED, OR ROUNDED.	SPT REFUSAL IN NON-COAST OF WEATHERED ROCK MATERIA	DICATES THE LEVEL AT WHICH NON-COASTAL IS PENETRATION BY A SPLIT SPOON SAMPLE AL PLAIN MATERIAL. THE TRANSITION BETW ROCK. LS ARE TYPICALLY DIVIDED AS FOLLOWS:	STED, WOULD YIELD SPT REFUSAL, AN INCERRED PLAIM MATERIAL WOULD YIELD SPT REFUSAL.  ER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS,  EEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE  ATERIAL THAT WOULD YIELD SPT N VALUES > 100  STED.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ACUIFER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  AREILLACEOUS - 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
SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCR WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR)  NON-CRYSTALLINE	FINE TO COARSE GRAIN WOULD YIELD SPT REFU GNEISS, GABBRO, SCHIST,	IGNEOUS AND METAMORPHIC ROCK THAT ISAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	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.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7 CLASS. A-1-b A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7 SYMBOL	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 3I  MODERATELY COMPRESSIBLE LIDUID LIMIT EQUAL TO 31- HIGHLY COMPRESSIBLE LIDUID LIMIT GREATER THAN	ROCK (NCR) 1-50 COASTAL PLAIN	SEDIMENTARY ROCK THA INCLUDES PHYLLITE, SLA COASTAL PLAIN SEDIMEN	IT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUYIUM - 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
X PASSING SILT-	PERCENTAGE OF MATERIAL	(CP)	SHELL BEDS, ETC. WEATHER		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 50 MX		- 10% FRESH RO		MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. <u>ODP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIDUID LINIT   48 MX 41 MN 50ILS WITH   PLASTIC INDEX 6 MX NP 18 MX 13 MN 13 MN 13 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR   HIGHLY	MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME         20 - 10H           HIGHLY ORGANIC         >10%         >20%         HIGHLY         35%	Z AND ABOVE (V SLI.) CR		E JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, E BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX  USUAL TYPES STONE FRACS. OF MAJOR GRAVEL AND SAND	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT RO	CK GENERALLY FRESH, JOINTS STAINED AND	DISCOLORATION EXTENDS INTO ROCK UP TO GRANITOID ROCKS SOME OCCASIONAL FELDSPAR ALLINE ROCKS RING UNDER HAMMER BLOWS,	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO DNE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SHAPE CHARLES AND SHAPE SHA	STATIC WATER LEVEL AFTER 24 HOURS  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SII (MOD.) GR	ONIFICANT PORTIONS OF ROCK SHOW DISCOL ANITOID ROCKS, MOST FELDSPARS ARE DULL LL SOUND UNDER HAMMER BLOWS AND SHOW		FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
SUBGRADE   PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP		TH FRESH ROCK. L ROCK EXCEPT QUARTZ DISCOLORED OR ST	AINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS  PRIMARY SOIL TYPE  COMPACTINESS DR RANGE OF STRANGARD RANGE OF UNCONFINED PRIMARY SOIL TYPE  COMPACTINESS DR PRIMARY SOIL TYPE  CO	MISCELLANEOUS SYMBOLS  ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  MISCELLANEOUS SYMBOLS  SPT CPT DET OFT TEST BORING VST PMT	SEVERE AN (MDD. SEV.) AN	D DISCOLORED AND A MAJORITY SHOW KAOL	INIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FJELD.  JOINT - FRACTURE IN ROCK ALONG WHICH ND APPRECIABLE MOVEMENT HAS OCCURRED.
CONSISTENCY	S - BU  SOIL SYMBOL  AUGER BORING  SS - 9  AUGER BORING  SS - 9	SPLIT SPOON EX		AINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME USUALLY REMAIN.	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.
DENSE   30 TO 50	INFERRED SOIL BOUNDARY	SAMPLE (V SEV.) TH	E MASS IS EFFECTIVELY REDUCED TO SOIL MAINING. SAPROLITE IS AN EXAMPLE OF ROI	AINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK CK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR MAIN. IF TESTED, YIELDS SPT N VALUES 100 BPF	MOTILED (MOT.)- IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTILING 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.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0	ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  SLOPE INDICATOR	RECOMPACTED TRIAXIAL COMPLETE ROISAMPLE SCI	CK REDUCED TO SOIL. ROCK FABRIC NOT DI ATTERED CONCENTRATIONS. QUARTZ MAY BE SO AN EXAMPLE.	SCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - 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
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES  SPT N-VALUE	RATIO SAMPLE	ROCK HAR  ANNOT BE SCRATCHED BY KNIFE OR SHARP	DNESS PICK. BREAKING OF HAND SPECIMENS REQUIRES	EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SDIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
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	SOUNDING ROD     REF     SPT REFUSAL     ABBREVIATIONS	HARD C	EVERAL HARD BLOWS OF THE GEOLOGIST'S ! AN BE SCRATCHED BY KNIFE OR PICK ONLY		PARENT ROCK. <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND  RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER         COBBLE         GRAVEL         CDARSE         FINE         SLLT         CLAY           (BLDR.)         (COB.)         (GR.)         (CSE. SD.)         (F SD.)         (SL.)         (CL.)	BT - BORING TERMINATED MED MEDIUM V - VE	MODERATELY C VANE SHEAR TEST HARD E	XCAVATED BY HARD BLOW OF A GEOLOGIST	SES OR GROOVES TO 0.25 INCHES DEEP CAN BE S PICK, HAND SPECIMENS CAN BE DETACHED	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305	CSE COARSE NP - NON PLASTIC $\gamma$ - UI DMT - DILATOMETER TEST ORG ORGANIC $\gamma_d$ - DI	UNIT WEIGHT MEDIUM CO DRY UNIT WEIGHT HARD CO	AN BE EXCAVATED IN SMALL CHIPS TO PEIG	EEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION	F - FINE SD SAND, SANDY	SOFT C	ROM CHIPS TO SEVERAL INCHES IN SIZE BY	FE OR PICK. CAN BE EXCAVATED IN FRAGMENTS Y MODERATE BLOWS OF A PICK POINT. SMALL, THIN	THAN 0.1 FOOT PER 60 BLDWS.  STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIDUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICONE REFUSAL	VERY C SOFT 0		E. NTED READILY WITH POINT OF PICK. PIECES 1 INCH FINGER PRESSURE. CAN BE SCRATCHED READILY BY	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 THI TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC   SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT		CTURE SPACING	BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING DRGANIC MATTER.
PLL PLASTIC LIMIT  OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE  SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	TYPE: IERM  VERY WIDE  WIDE  MODERATELY	3 TO 10 FEET CLOSE 1 TO 3 FEET	TERM	BENCH MARK: GEODETIC SURVEY MONUMENT (A-94) IN CONCRETE WINGWALL OF EXISTING BRIDGE AT EBI-A (NOTE: ELEVATION CORRECTED FOR NAVD 88) ELEVATION: 73I.42 FT.
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER CORE SIZE  X 8° HOLLOW AUGERS	ALDA ULUGE	0.16 TO 1 FEET LESS THAN 0.16 FEET	VERY: THINLY BEDDED         0.03 - 0.16 FEET           THICKLY LAMINATED         0.008 - 0.03 FEET           THINLY LAMINATED         < 0.008 FEET	NOTES:
PLASTICITY  PLASTICITY INDEX (PI) DRY STRENGTH	CME-45C HARD FACED FINGER BITS X-N XV	FOR SEDIMENTARY	INDURAT  ROCKS, INDURATION IS THE HARDENING OF	THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1
NONPLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS -H		F RUBBING WITH F	FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY 6-15 SLIGHT MED, PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		OLS: ST HOLE DIGGER MODER	GENTLE BLOW E ATELY INDURATED GRAINS CAN BE	3Y HAMMER DISINTEGRATES SAMPLE. SEPARATED FROM SAMPLE WITH STEEL PROBE; WHEN HIT WITH HAMMER.	
COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOU	ND AUGER UNDING ROD INDURA NE SHEAR TEST	DIFFICULT TO I	FFICULT TO SEPARATE WITH STEEL PROBE; BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTRE		BLOWS REQUIRED TO BREAK SAMPLE; S ACROSS GRAINS.	

PROJECT REFERENCE NO.

B-4281

SHEET NO.



# STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY P.O. BOX 25201, RALEIGH, N.C. 27611-5201 LYNDO TIPPETT

GOVERNOR SECRETARY

June 21, 2006

STATE PROJECT: 33621.1.1 (B-4281)

COUNTY:

Stokes

**DESCRIPTION:** 

Bridge #60 on NC 8/89 over the Dan River

(-L- Station 19+60)

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement for bridge number 60 on NC 8/89 over the Dan River. The new structure is located upstream from the existing structure. The proposed bridge will consist of 3 span lengths at 120', 160', and 120' for a total length of 400 feet. The bridge will be set at a 90 degree skew angle and total bridge width is set at 35' 3". Proposed end bent slopes are 1.5:1 (H:V) with class II rip rap slope protection.

Seven foundation test borings were performed utilizing a CME-550X drill machine, hollow stem augers, NXWL coring apparatus, and an automatic drop hammer. A boring could not be performed for the EB1-B location due to overhead power lines and a steep rip rapped slope. The field investigation for this project was conducted in May of 2006.

#### Physiography/Geology

The project area is located in rural north central Stokes County. The site is flat to gently sloping with the Dan River floodplain extending out approximately 600 feet. Geologically the area is underlain by biotite schist of the Sauratown Mountains Anticlinorium.

Site specific soils noted during our investigation were roadway fill, alluvial, and residual in nature. Roadway fill is associated with NC 8/89. No borings were performed in the fill therefore soil type and conditions are unknown. Alluvium is comprised of soft to medium stiff clayey sandy silt (A-4) and very loose to medium dense sand (A-2-4). Residual soils were only noted in borings at EB2 and consist of a small layer of very dense silty sand (A-2-4).

Sheet 3

#### **Foundation Materials**

#### End Bent 1:

A single boring (EB1-A) was performed west of the Dan River and encountered 9.6 feet of alluvium consisting of soft to medium stiff brown micaceous clayey sandy silt (A-4). Weathered rock lies at the base of alluvial soil. Auger refusal was achieved on hard crystalline rock (biotite schist) at our boring location. Elevation of weathered rock for this bent location is 707.95 feet. Hard rock elevation is 701.38 feet.

2

#### Bent 1:

Two borings were performed along the top of the western riverbank for this bent location. The stratigraphy begins with 12.5 feet of alluvium consisting of very loose brown micaceous sand (A-2-4) overlying weathered rock. Weathered rock is quickly followed by hard crystalline rock in the strata sequence. Each of these borings was cored to evaluate the rock. Rock type is hard to very hard biotite schist. The below elevation data delineates the boundaries for weathered rock and hard rock at each boring location:

<b>Boring Location</b>	Weathered Rock Elev. (feet)	Hard Rock Elev. (feet)
B1-A	702.85	701.47
B1-B	702.46	699.16

#### Bent 2:

Two borings were performed along the eastern riverbank for this bent location. Approximately 15.5 feet of alluvial loose brown micaceous sand (A-2-4) was found overlying a very thin layer of weathered rock and then followed by hard crystalline rock. The rock in each of these borings was cored for evaluation. Rock type is hard to very hard biotite schist. The below elevation data delineates the boundaries for weathered rock and hard rock at each boring location:

<b>Boring Location</b>	Weathered Rock Elev. (feet)	Hard Rock Elev. (feet)
B2-A	701.55	701.35
B2-B	701.95	701.76

#### End Bent 2:

A pair of borings performed for this location encountered 17.1 - 17.4 feet of alluvial soft brown-gray clayey sandy silt (A-4). Beneath alluvium at approximate elevation 703.5 feet lies a 1.5 - 2.0 foot layer of residual very dense brown-gray silty sand (A-2-4). Residual soil is followed by weathered rock and each boring terminated on hard crystalline rock (biotite schist). The below elevation data delineates the boundaries for weathered rock and hard rock at each boring location:

<b>Boring Location</b>	Weathered Rock Elev. (feet)	Hard Rock Elev. (feet)
EB2-A	701.74	699.24
EB2-B	702.20	699.11

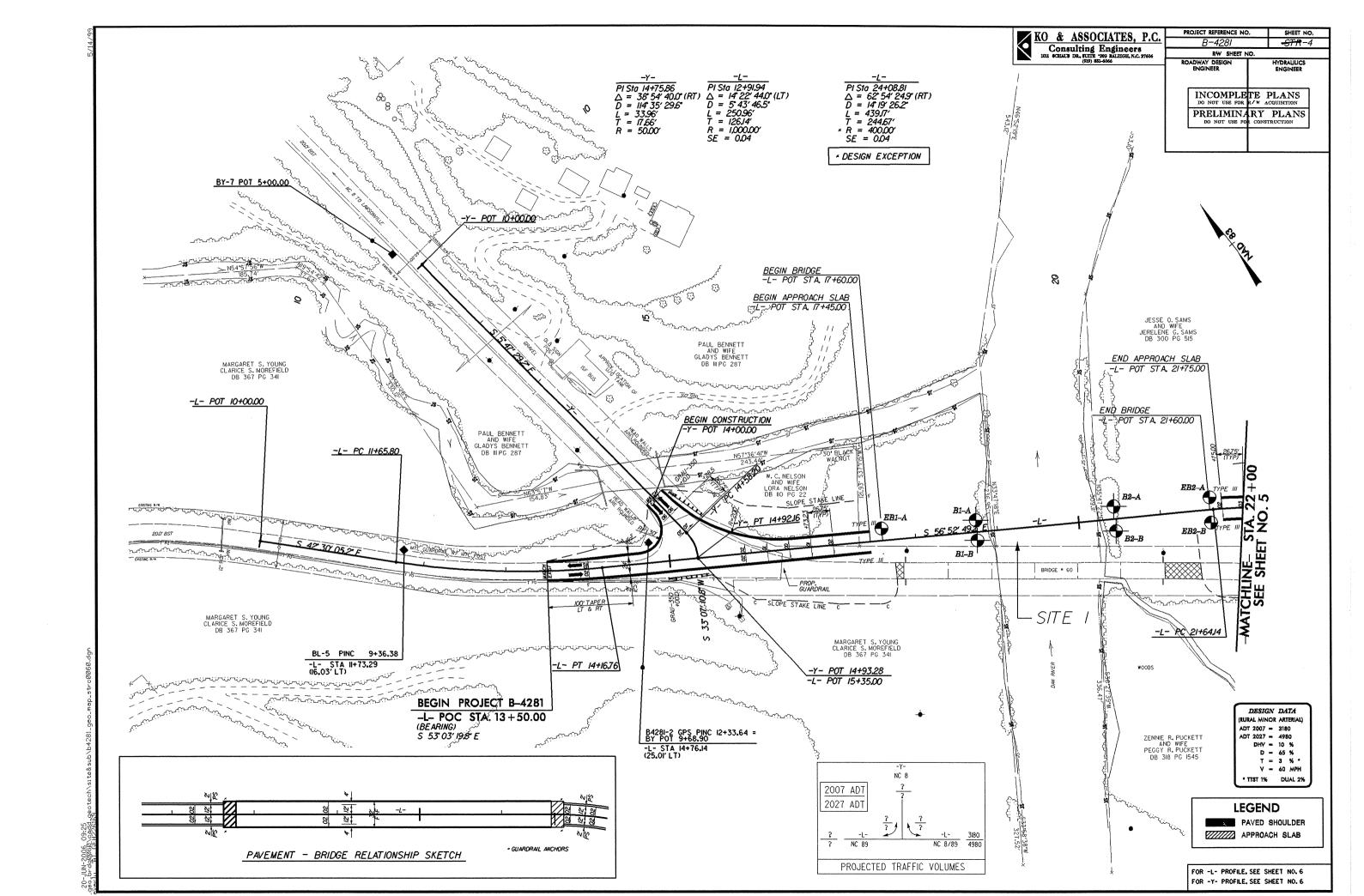
# Groundwater

Based on 24 hour groundwater measurements taken at boring locations, and the water surface elevation of the creek, we determined that natural groundwater should be in the vicinity of elevation 705 - 708 feet.

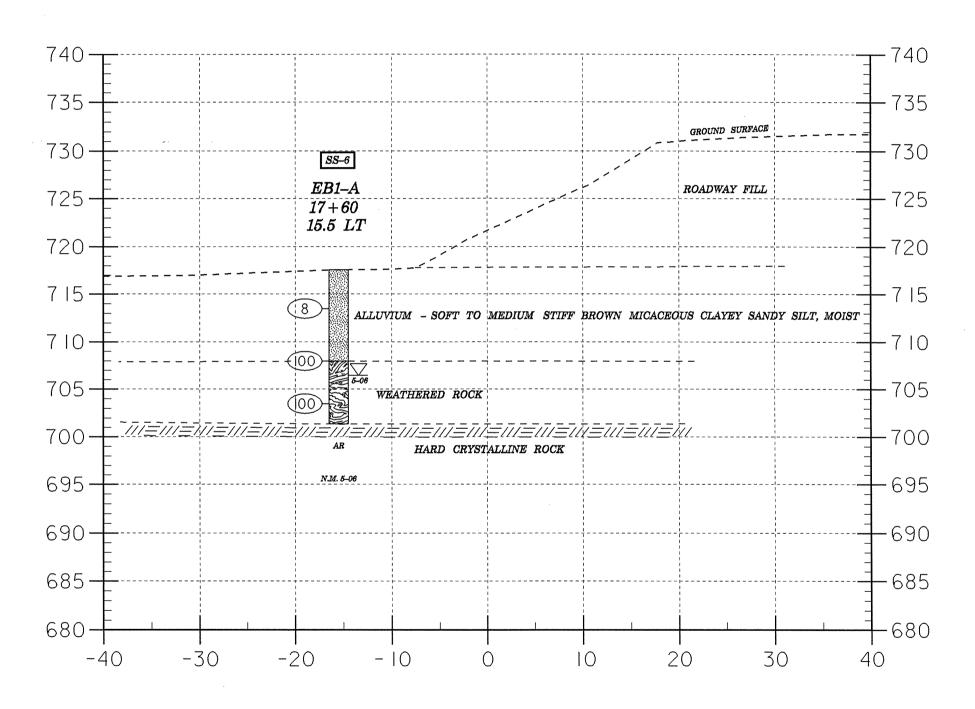
Respectfully submitted,

J.E. Beverly, Project Geologist

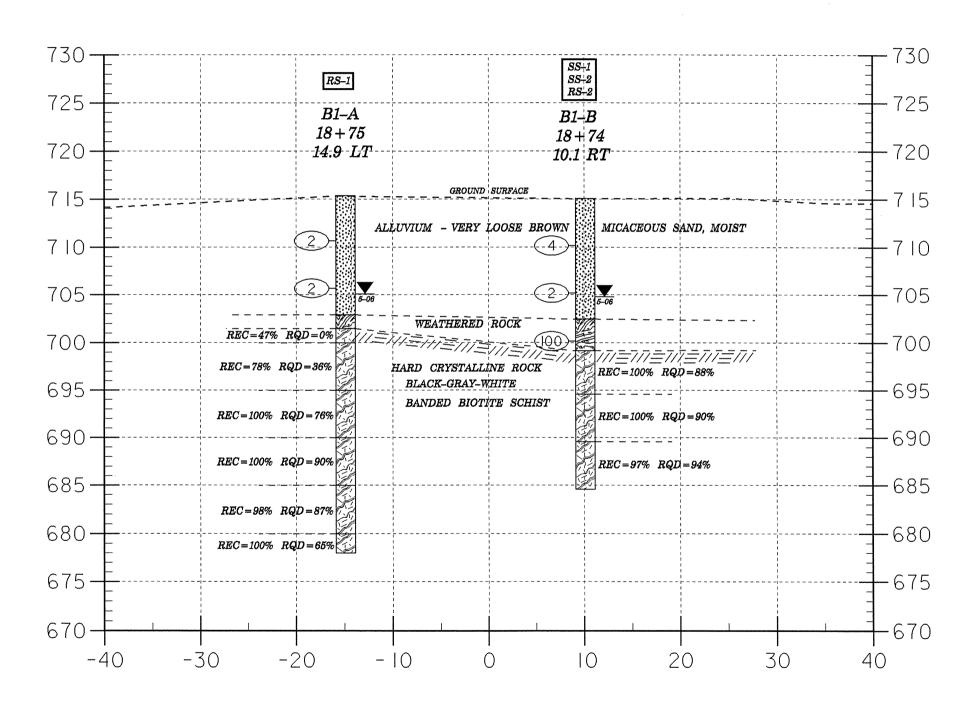
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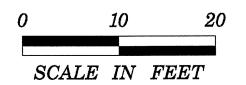


# SECTION THROUGH END BENT 1

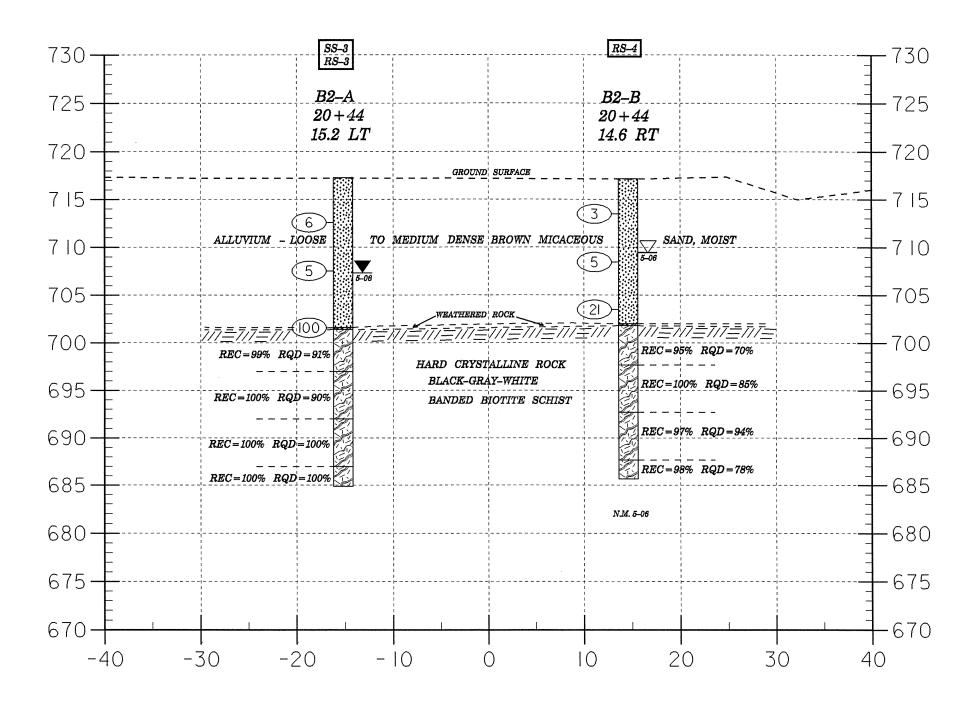


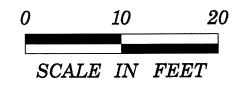
# SECTION THROUGH B1-A AND B1-B



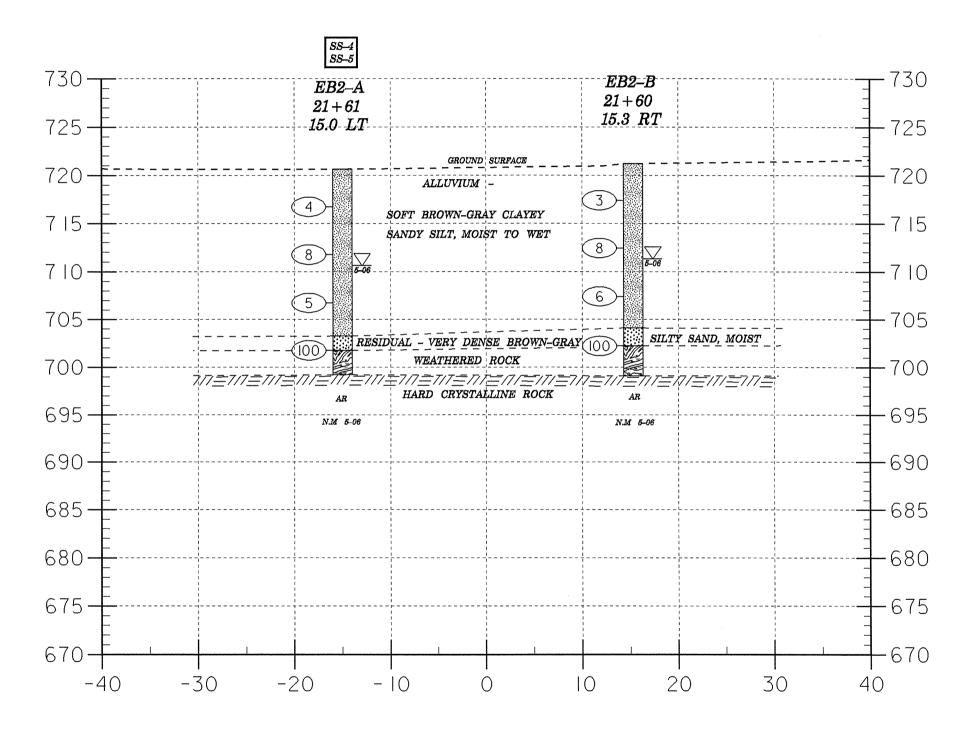


# SECTION THROUGH B2-A AND B2-B



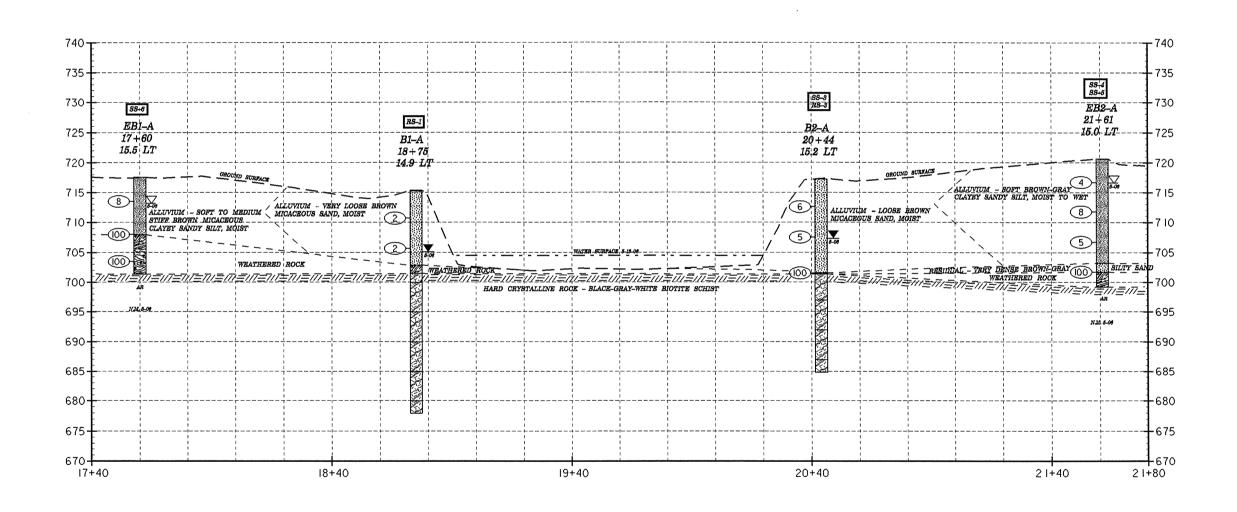


# SECTION THROUGH EB2-A AND EB2-B



IPROJECT REE NO	SHEET NO	ΤΠΤΔΙ	SHEETS
11100 LC 1 11L1 8 1108	<u> </u>	1017	$\bigcirc$
B-4287	9	i	
D-4201	) <i>9</i>		

# PROFILE 15 FEET LEFT OF -L-



# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

						GEOT	<u>ECHN</u>	CAL	UNIT B	ORING	LOG			
	T NO 3362				ID B-4			NTY ST			GEO	LOG	IST J.K. STICKNE	Υ
SITE DES	CRIPTIO	N BRI	DGE	#60 C	ON NC	8/89 OVE	R THE D	AN RIV	ER					GND WATER
	NO EB1-A	4			NORT	HING 0.00	)			EASTING	0.00			0 HR 11.10ft
ALIGNM					BORIN	G LOCAT	ION 17+	60.000		OFFSET 15.50ft LT				24 HR N/A
	ELEV 71				TOTAL	L DEPTH	16.20ft		START DA	ATE 5/16/0	)6		COMPLETION D	ATE 05/16/06
DRILL MACHINE CME-550X							DRILL	метно	D H.S. AL	JGERS			HAMMER TYPE	AUTOMATIC
SURFACI	E WATER								CK 16.20f				Log EB1-A, Page 1 of 1	
ELEV	DEPTH	1	-ow		PEN		BLOWS P			SAMPLE	MOI	[년		ND ROCK
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#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION CECTECHNICAL LINIT RODING LOG

BIOTITE SCHIST REC=98%							GEOT	ECHN	ICAL L	JNIT B	ORING	<u>LO</u> G			
BORING NO B1-A	PROJECT	Γ <b>NO</b> 3362	21.1.1			ID B-4	281	COU	NTY STO	OKES		GEO	LOG	IST J.K. STICKNE	Υ
ALIGNMENT L  COLLAR LLEV 715.37 ↑ TOTAL DEPTH 37.40 ↑ START DATE \$75.00 ↑ TOTAL DEPTH 37.40 ↑ START DATE \$75.00 ↑ HAMMER TYPE AUTOMATIC  BURLL MACHINE CME-550X  DEPTH DEPTH DEPTH DEPTH DEPTH DEPTH DEPTH TO ROCK 13.90 ↑ Lag BL-A, Page 1 of 1	SITE DES	CRIPTIO	N BRI	DGE	#60 C	ON NC	8/89 OVE	R THE C	AN RIVE	R					GND WATER
COLLAR ELEV 715.37f    TOTAL DEPTH 37.40f    START DATE 5/15/06   COMPLETION DATE 05/15/06	BORING	NO B1-A				NORT	HING 0.00	0			EASTING	0.00			0 HR 8.00ft
COLLAR ELEV 715.37f    TOTAL DEPTH 37.40f    START DATE 5/15/06   COMPLETION DATE 05/15/06	ALIGNMI	ENT L			]						14.90ft LT 24 HR 10.30ft				
SURFACE WATER DEPTH	COLLAR	ELEV 71	5.37ft							START DA	TE 5/15/0	)6	M	COMPLETION D.	ATE 05/15/06
DEPTH	DRILL M.	ACHINE (	CME-	550X		***************************************		DRILL	METHOI	NW CA	SING			HAMMER TYPE	AUTOMATIC
BLOW   PEN   BLOW   PEN   BLOWS PER FOOT   SAMPLE   MAD   C   SOIL AND ROCK   DESCRIPTION	SURFACE	E WATER	DEPT	Ή				DEPTH	TO ROC	K 13.90ff	<del></del>			Log B1-A, Page 1 of 1	
715.37 - Ground Surface - ALLUVIUM - VERY LOOSE BROWN MICACEOUS SAND  710.00 4.70 0 1 1 1 1.0 -2	ELEV/	DEDTU	BI	LOW	CT	PEN	E					1	Ĺ		ID ROCK
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BLACK-GRAY-WHITE BANDED ELEVATION 677 97 FEET N. VERY BLACK-GRAY-WHITE BANDED BIOTITE SCHIST, REC=100%	677.97												<b>W</b>		
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# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33621.1.1

COLLAR ELEV: 715.37

TOTAL DEPTH: 37.4

BORING NO: B1-A

TOTAL RUN: 23.5

SITE DESCRPTION: BRIDGE #60 ON NC 8/89 OVER THE DAN RIVER

PROJECT ID: B-4281

**COUNTY: STOKES** 

**BORING LOCATION (STA): 18+75** 

PERSONNEL: HKW, TM

**DRILL MACHINE:** CME-550

DRILL EQUIP: NX-CASING, TRICONE

**GEOLOGIST: J.K. STICKNEY** 

DRILLER: C.L. SMITH OFFSET: 14.9 LT

CORE SIZE: NXWL **DATE STARTED:** 05/15/06 DATE COMPLETED: 05/15/06

		·					
ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
701.47	13.9		1	47	0		BLACK-GRAY-WHITE BANDED, SLIGHTLY WEATHERED TO VERY SLIGHTLY WEATHERED, HARD, BIOTITE SCHIST WITH VERY CLOSE FRACTURE SPACING
699.97	15,4		2	78	36		BLACK-GRAY-WHITE BANDED, SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, BIOTITE SCHIST WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING
694.97	20.4		3	100	76	RS-1	BLACK-GRAY-WHITE BANDED, FRESH, VERY HARD, BIOTITE SCHIST WITH CLOSE TO WIDE FRACTURE SPACING
689.97	25.4		4	100	90	·	AS ABOVE
684.97	30.4	·	5	98	87		AS ABOVE BUT FRACTURE SPACING IS VERY CLOSE TO CLOSE
679.97	35.4		6	100	65		AS ABOVE
677.97	37.4						
NOTES							· .

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DDO IECO	NO 3362	111			ID P 4				UNIT B	UNING	_		Iron III OTION	· · · · · · · · · · · · · · · · · · ·	
			חפר		ID B-4			NTY ST		-	I GEO	LOG	IST J.K. STICKNE	Y GND WATER	
SITE DES BORING		Y DKI	DGE :		ON NC 8/89 OVER THE DAN RIVER						0.00				
			*************			HING 0.00		.71.500		EASTING				0 HR 7.40ft	
ALIGNMI		- 00"							OFFSET		RT	T	24 HR 10.30ft		
	ELEV 71				TOTAL	L DEPTH	<del></del>		START DA		)6		COMPLETION D		
	ACHINE (						<del> </del>		D NW CA				HAMMER TYPE	AUTOMATIC	
SURFACE	E WATER				IDEN	,			CK 15.90ft		T === -	<del>7</del>	Log B1-B, Page 1 of 1		
ELEV	DEPTH	l	OW (		PEN		BLOWS F	PER FO		SAMPLE		L OG		ND ROCK	
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	-												BIOTITE SCHIS		
-										RS-2				=88%	
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690.00_															
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# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33621.1.1

PROJECT ID: B-4281

**COUNTY: STOKES** 

SITE DESCRPTION: BRIDGE #60 ON NC 8/89 OVER THE DAN RIVER **BORING NO:** B1-B

**BORING LOCATION (STA): 18+74.5** 

COLLAR ELEV: 715.06 PERSONNEL: HKW, TM TOTAL DEPTH: 30.5 DRILL MACHINE: CME-550

TOTAL RUN: 14.6

DRILL EQUIP: NX-CASING, TRICONE

**GEOLOGIST: J.K. STICKNEY** DRILLER: C.L. SMITH OFFSET: 10.1 RT **CORE SIZE:** NXWL DATE STARTED: 05/15/06

DATE COMPLETED: 05/15/06

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
699.16	15.9		1	100	88		BLACK-WHITE-GRAY BANDED, FRESH, VERY HARD, BIOTITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING
694.56	20.5		2	100	90	RS-2	AS ABOVE
689.56	25.5		3	97	94		AS ABOVE
684.56	30.5						
NOTES							

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

•						GEOT	ECHN	ICAL (	JNIT B	ORING	LOG			
PROJECT	NO 3362	21.1.1			ID B-4	281	COU	NTY ST	OKES		GEO	LOG	IST J.K. STICKNE	Υ
SITE DES	CRIPTIO	N BRI	DGE	#60 (	ON NC	8/89 OVE	R THE C	OAN RIVE	ER					GND WATER
BORING I	NO B2-A				NORT	HING 0.00	0			EASTING	0.00			0 HR 9.00ft
ALIGNMI	ENT L				BORIN	IG LOCAT	TION 20	+44.000		OFFSET	15.20ft	LT		24 HR 9.90ft
COLLAR	ELEV 71	7.25ft			TOTAI	L DEPTH	32.40ft START DA			ATE 5/15/06 COMPLI			COMPLETION D	ATE 05/15/06
DRILL MA	ACHINE (	CME-	550X				DRILL METHOD NW CASI						HAMMER TYPE	AUTOMATIC
SURFACE	WATER								K 15.90f				Log B2-A, Page 1 of 1	
ELEV	DEPTH	ı	LOW		PEN			PER FOO		SAMPLE	<b>Y</b> /		SOIL AN	ND ROCK
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700.00										1			<u> </u>	RED ROCK
7										RS-3			HARD	
7													BLACK-GRAY-V BIOTITE SCHI	
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690.00_													AS ABOVE -	
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SHEET /3 OF 2/

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33621.1.1

PROJECT ID: B-4281

**COUNTY: STOKES** 

SITE DESCRPTION: BRIDGE #60 ON NC 8/89 OVER THE DAN RIVER

BORING NO: B2-A COLLAR ELEV: 717.25 BORING LOCATION (STA): 20+44 PERSONNEL: HKW, TM

TOTAL DEPTH: 32.4
TOTAL RUN: 16.5

DRILL MACHINE: CME-550
DRILL EQUIP: NX-CASING, TRICONE

GEOLOGIST: J.K. STICKNEY DRILLER: C.L. SMITH OFFSET: 15.2 LT

CORE SIZE: NXWL
DATE STARTED: 05/15/06
DATE COMPLETED: 05/15/06

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
701.35	15.9		I	99	91	RS-3	BLACK-GRAY-WHITE BANDED, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, BIOTITE SCHIST WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING
696.95	20.3		2	100	90	·	BLACK-GRAY-WHITE BANDED, FRESH, VERY HARD, BIOTITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING
691.95	25.3		3	100	100	·	AS ABOVE BUT CORE IS 1 SOLID PIECE
686.95	30.3		4	100	100		AS ABOVE - CORE IS 1 SOLID PIECE
684.85	32.4						
NOTES				1			

### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

	GEOTECHNICAL UNIT BORING LOG														
PROJECT	NO 3362	1.1.1			ID B-4	281	COU	NTY STO	OKES		GEO	LOG	IST J.K. STICKNEY		
SITE DES			DGE i	#60 C	ON NC	8/89 OVE	R THE C	AN RIVE	ER					GND WATER	
BORING I	NO B2-B			I	NORT	HING 0.00	0			EASTING	0.00			0 HR 7.70ft	
ALIGNMI	ENT L				BORIN	ig LOCAT	TION 20-	+44.000		OFFSET	14.60ft	RT		24 HR N/A	
COLLAR	ELEV 717	7.16ft		7	TOTAL	L DEPTH	31.50ft	9	START DA	TE 5/16/0	)6		COMPLETION D.	ATE 05/16/06	
DRILL MA	ACHINE (	CME-5	550X				DRILL METHOD NW CA			ASING			HAMMER TYPE AUTOMATIC		
SURFACE	WATER								K 15.40f				Log B2-B, Page 1 of 1		
ELEV	DEPTH	BL	OW (		PEN		BLOWS F			SAMPLE	MOI	151		ID ROCK	
		6in	6in	6in	(ft)	0 2	25 5 <b>L</b>	50 <b>L</b>	75 10	NO NO	MOI	Ğ	DEŞCF	RIPTION	
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717.16				<u> </u>			-Ground	Surface		<u> </u>	<u> </u>	54580			
														ERY LOOSE TO	
	- 3.70	1	1	2	1.0	3	L	<u> </u>			10107			NSE BROWN DUS SAND	
						<b>K</b>	<u></u>				MOIST		1111071022	, , , , , , , , , , , , , , , , , , , ,	
710.00	0.70	_													
_	8.70	2	2	3	1.0	5					моіѕт				
=	_														
_	- 13.70	9	11	10	1.0		21								
-	_					::::X									
700.00	_													RED ROCK	
-	-													ROCK -	
_	_												BLACK-GRAY-V BIOTITE SCHI	ST, REC=95%	
-	_							<b></b>		RS-4				=70%	
_	_												AS ABOVE - REC	=100% RQD=85%	
690.00_													AS ABOVE - REC	C=97% RQD=94%	
_	_				1 1										
685.66	-											3	AS ABOVE - REC	C=98% RQD=78%	
-						COR	NG TER	MINATE	5 AT						
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SHEET /4 OF 2/

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33621.1.1

PROJECT ID: B-4281

**COUNTY: STOKES** 

**GEOLOGIST:** J.K. STICKNEY

OFFSET: 14.6 RT

**CORE SIZE:** NXWL

**DATE STARTED:** 05/16/06

DATE COMPLETED: 05/16/06

SITE DESCRPTION: BRIDGE #60 ON NC 8/89 OVER THE DAN RIVER DRILLER: C.L. SMITH **BORING LOCATION (STA): 20+44 BORING NO:** B2-B COLLAR ELEV: 717.16 PERSONNEL: HKW, TM **TOTAL DEPTH: 31.5** DRILL MACHINE: CME-550 TOTAL RUN: 16.1 DRILL EQUIP: NX-CASING, TRICONE

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
701.76	15.4		. 1	95	70		BLACK-GRAY-WHITE BANDED, MODERATELY WEATHERED TO FRESH, HARD TO VERY HARD BIOTITE SCHIST WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING (1ST 0.3' FEET OF RUN WAS WEATHERED THEN ROCK WAS FRESH AND VERY HARD)
697.66	19.5		2	100	85	RS-4	BLACK-GRAY-WHITE BANDED, FRESH, VERY HARD, BIOTITE GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING
692.66	24.5		3	97	94		AS ABOVE WITH MODERATELY CLOSE TO WIDE FRACTURE SPACING (CORE IN 2 SOILD PIECES)
687.66	29.5		4	. 98	78		AS ABOVE BUT WITH MODERATELY CLOSE FRACTURE SPACING
685.66	31.5						
							`
NOTES		·					

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

						GEUI	ECHI	NICAL	<u> </u>	ORING	LOG			
PROJECT					ID B-4281 COUNTY STOKES						GEOLOGIST J.K. STICKNEY			
SITE DES	CRIPTIO	N BR	IDGE	#60 (	ON NC	8/89 OVE	ER THE	DAN RIV	ER					GND WATER
BORING	NO EB2-A	4			NORT	HING 0.0	0			EASTING	0.00			0 HR 10.00ft
ALIGNMI	ENT L				BORIN	NG LOCAT	TION 21	+61.000		OFFSET	15.00f	t LT		24 HR N/A
COLLAR	ELEV 72	0.64ft			TOTA	L DEPTH	21.40ft START DATE 5/16/0			06	ATE 05/16/06			
DRILL M.	ACHINE	CME-	550X				DRILL	метно	D H.S. AL	JGERS			HAMMER TYPE	AUTOMATIC
SURFACE	E WATER						DEPTI	I TO RO	CK 21.40f	t			Log EB2-A, Page 1 of 1	
ELEV	DEPTH	1	LOW		PEN	L		PER FO		SAMPLE	<b>Y</b> /	15	SOIL AN	ID ROCK
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710.00_	_					[米]					MOIST	П		
_	_					1-1		<u>                                     </u>						
_	_ 13.90	2	2	3	1.0	-1-5				SS-5	M/W			
_						本				33-5	101/00			
_	_ - 18.90	100			0.4				100-				DECIDITAL 1	/FD\
789:29 <del>-</del>		'00			0.4				(	4		<b>S</b>	RESIDUAL - \ BROWN-GRA	Y SILTY SAND
099.24				<b></b>	+-+					<del> </del>	-	<b>F</b>		RED ROCK
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# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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PROJECT	FNO 3362	21.1.1			ID B-4			NTY ST		Ortino	<del></del>		GIST J.K. STICKNE	·
SITE DES							R THE I	DAN RIV	ER	······································	1 GEO	LUC	JIST J.K. STICKNE	
BORING	NO EB2-E	3	***************************************			HING 0.00		271141111	L1\	EASTING	2 0 00			GND WATER
ALIGNM	ENT L					IG LOCAT		+60 000		OFFSET		+ DT		0 HR 9.90ft 24 HR N/A
COLLAR	ELEV 72	1.21ft				L DEPTH			START D	ATE 5/16/0		CIXI	COMPLETION DA	
DRILL M.						3221111			D H.S. AU					
SURFACE				A					CK 22.10f			••••••	HAMMER TYPE	AUTOWATIC
ELEV	DEPTH		LOW		PEN	Е		PER FO		SAMPLE	▼ /	1	Log EB2-B, Page 1 of 1	ID ROCK
Lus Lus Lus V	DEFIN	6in	6in	6in	(ft)	0 2	5	50	75 10		MO	POG		RIPTION
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710.00						[-7]				1				
_	13.80	2	3	3	1.0	-1-6								
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Z88:99 <u></u>		!								4			BROWN-GRAY	SILTY SAND
099.11					-	AUGE						<b>S</b>	WEATHER	ED ROCK
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M & T Form 503

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAY
MATERIALS & TESTS UNI
SOILS LABORATORY

T. I. P. No.	B-4281								
	REPORT ON	SAMPLES OF	SOILS FO	R QUALITY	7				
Project	33621.1.1	County	STOKES		Owner	3			
Date: Sampled		Received	5/25/06		<b>Reported</b> 5/30/06				
Sampled from	BRIDGE			Ву	- JEBEVER				
Submitted by	N WAINAINA					Standard Spe	ecifications		
is and analogue by	11 112 AAI (1 AAI (1 A			-	1773	- Standard Spi	.cmeations		
<b>200000 700 70000</b>									
730032 TO 73003	37								
6/23/06		T	EST RESUI	.TS					
Proj. Sample No		SS-1	SS-2	SS-3	SS-4	SS-5	SS-6		
Lab. Sample No.		730032	730033	730034	730035	730036	730037		
Retained #4 Sie		% -	-	_	-	-			
Passing #10 Sie	eve	% 100	100	100	100	100	100		
Passing #40 Sie	eve	% 96	97	98	100	99	99		
Passing #200 Si	eve	% 17	18	26	71	58	44		
		MINUS	S NO. 10 FRA	ACTION					
SOIL MORTAR	- 100%				Ī .				
Coarse Sand F	Ret - #60	% 23.2	47.5	15.5	2.0	3.8	8.5		
Fine Sand Ret		% 65.3	37.7	66.3	40.5	50.4	56.0		
Silt 0.05 - 0.00	05 mm	% 5.5	8.8	10.2	29.3	23.7	15.3		
Clay < 0.005 1		% 6.0	6.0	8.1	28.2	22.2	20.2		
Passing #40 Sie		% -	-	-	-	-	-		
LOCATION	1	% B1-B	B1-B	B2-A	EB2-A	EB2-A	EB1-A		
L. L.		25	26	24	35	30	24		
P. I.	~ · ·	NP	NP	NP	9	5	1		
AASHTO Classi	tication	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-4(6)	A-4(1)	A-4(0)		
Station		18+74.5	18+74.5	20+44	21+61	21+61	17+60		

10.1 RT

5.40

6.40

to

10.1 RT

 $\mathbf{L}$ 

10.40

11.40

15.2 LT

L

5.20

6.20

15 LT

 $\mathbf{L}$ 

4.40

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15 LT

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14.40

15.40

15.5 LT

L

4.60

5.60

cc: JEBEVERLY Soils File

LOCATION

Depth (Ft)

ALIGNMENT

Soils Engineer Page 1

Sheet 16



ROCK CORE TRANSMITTAL

WBS: 33621.1.1 TIP:	B-4281	SUBMITTED BY: J	.E. Beverly
COUNTY: Stokes		DATE:	06/15/06
DESCRIPTION: Bridge #060 on NC 8/89 o	ver Dan River		
PLEASE TEST THESE ROCK SAMPLES FO	R:		
☑ Unit Weight ☑ Compressive Stre	ength (Q <sub>u</sub> , ASTM D2938)	✓ Young's Modulus (E, ASTM D3148)	

	nit Weigh her	it 🗹 Co	empressive Strength (Q <sub>u</sub> , AS		✓ Young's Modulus (E, ASTM D3148)  Other				
Lab No.	Samp. No.	Strength	Loc: Line, Sta, Offset, Northing & Easting	Depth (feet)	Formation, NCGS State Map Abbrv., and Simple Description	RQD (%)	Unit Wt.	Q (MPsi)	E (MPsi)
	RS-1	1	B1-A	23.5-23.9	Sauratown, CZmg, Biotite Schist	76%			
	RS-2	2	B1-B	21.5-22.0	As above	90%	***		
	RS-3	1	B2-A	17.8-18.3	As above	91%			
	RS-4	2	B2-B	21.7-22.1	As above	85%			
	,	And the second							-
			·						
						ALL MARKET AND ADDRESS AND ADD			····

REMIT RESULTS TO: J.E. Beverly
N. W. Wainaina, Geotechnical Engineering Unit (Attn.

Steve Wirth



# FIELD SCOUR REPORT

WBS:	33621.1.1	TIP:	B-4281	COUNTY: STOKES					
DESCRIPTION(1):	BRIDGE 60 ON	NC 8/89	OVER THE DA	N RIVER					
			EXISTING	BRIDGE					
Information from:	Field Othe	nspection r (explain)	X Mi	crofilm (reel pos:)					
Bridge No.: Foundation Type:	60 Length	n: 315 N ROCK	Total Bents: _	7 Bents in Channel: 2 Bents in Floodplain: 5					
EVIDENCE OF Abutments or	SCOUR(2) End Bent Slopes	s: <u>NONE</u> (	OBSERVED						
Interior Bents:	Interior Bents: NOT VISIBLE. BRIDGE INSPECTION REPORT SHOWED NONE.  THERE WAS EROSION ON THE STREAMBANKS NEAR BENTS 3 & 6								
Channel Bed:	NONE VISIBLE								
Channel Bank:				IKS ARE STEEP AND UNSTABLE DOWNSTREAM, CHANNEL, UNDERCUT BANKS.					
EXISTING SCO Type(3):	UR PROTECTION	ON							
Extent(4):	FILL SLOPES	AT EACH	END BENT FR	OM 25' BACK & UNDER BRIDGE.					
Effectiveness(5):	GOOD								
Obstructions(6):	TREE & LIMB	DEBRIS A	AT BENTS 4 & 5	j					

#### **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).
- 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.

Channel E	Bed Material(	<u>l</u> 7): <u>ROCK,BOU</u>	DESIGN IN LDERS,COE			RAVEL			
Channel Ba	ank Material(	8): <u>SAND (A-2</u> -		NCE SS-2					
Channel	Bank Cover(	9): GRASS & T							
		0): 600'							
		1): TREES, SH							
		2): Aggra							
Channel Migration									
Observations a	nd Other Co	mments:							
DESIGN SCOL		Feet Meters							
	BEN								
	B1			T			T	T	<del>1 1</del>
	10	2 701							
				<u> </u>					
Comparison of THEORETICAL					M THE CH	IANNEL ELE	EVATION	I (DUE T	 o
PROXIMITY TO									
SOIL ANALYS	IS RESULTS	FROM CHAN	NEL BED A	ND BANK N	IATERIAL				·
Bed or Bank								<u> </u>	
Sample No.	SEE	PAGE	16						
Retained #4 Passed #10									
Passed #10 Passed #40									
Passed #40								1	
Coarse Sand							· · · · · · · · · · · · · · · · · · ·	<u> </u>	
Fine Sand				<b>-</b>				<b>-</b>	
Silt									
Clay									
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AASHTO								<u> </u>	
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Template Revised 02/07/06

Reported by:

\_\_ **D**a

Date: 10/26/2006

