481

3858

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GEOTECHNICAL ENGINEERING UNIT

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## STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38587.1.1 (B-4817) \_ F.A. PROJ. <u>BRNHS-74(71)</u> COUNTY SCOTLAND PROJECT DESCRIPTION BRIDGE NO. 23 ON -L- (US 74WB) OVER GUM SWAMP CREEK

STATE STATE PROJECT REPERENCE NO. SHEET TO 38587.1.1 (B-4817)

#### CAUTION NOTICE

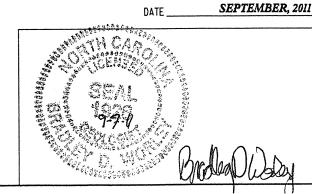
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOCS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING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

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A DEDTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUBFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSUBFACE CONDITIONS BETWEEN BORNES OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACE) TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELABLITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS AND WARY 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 INSPERIORIT 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.

	J.K. SIICKNEY
<u>.</u>	M.L. SMITH
	C.L. SMITH
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INVESTIGATED B	Y B.D. WORLEY
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PERSONNEL



DRAWN BY: K.B. MILLER and B.D. WORLEY

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

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

#### PROJECT REFERENCE NO. 38587.I.I (B-4817) SHEET NO.

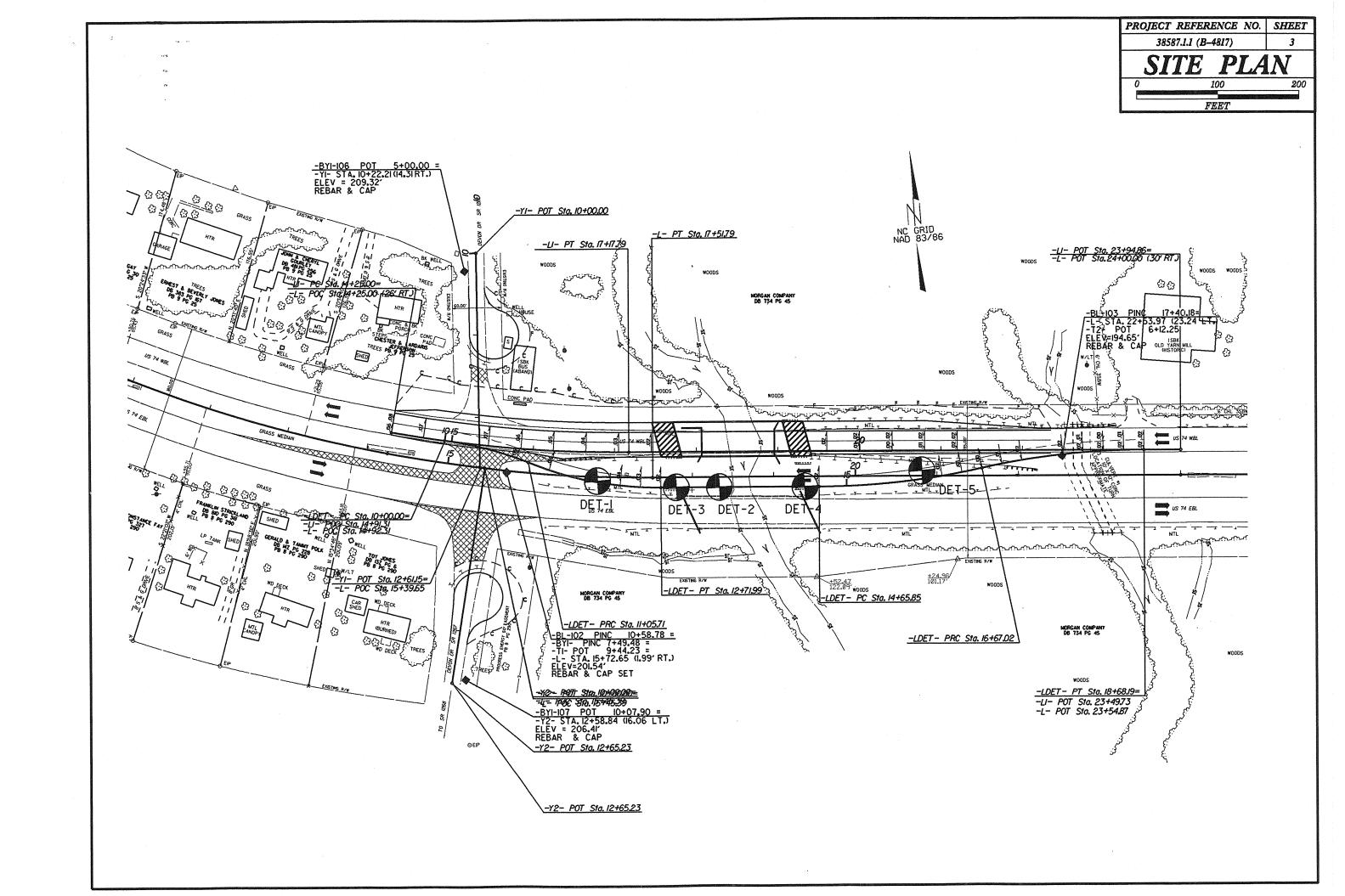
#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

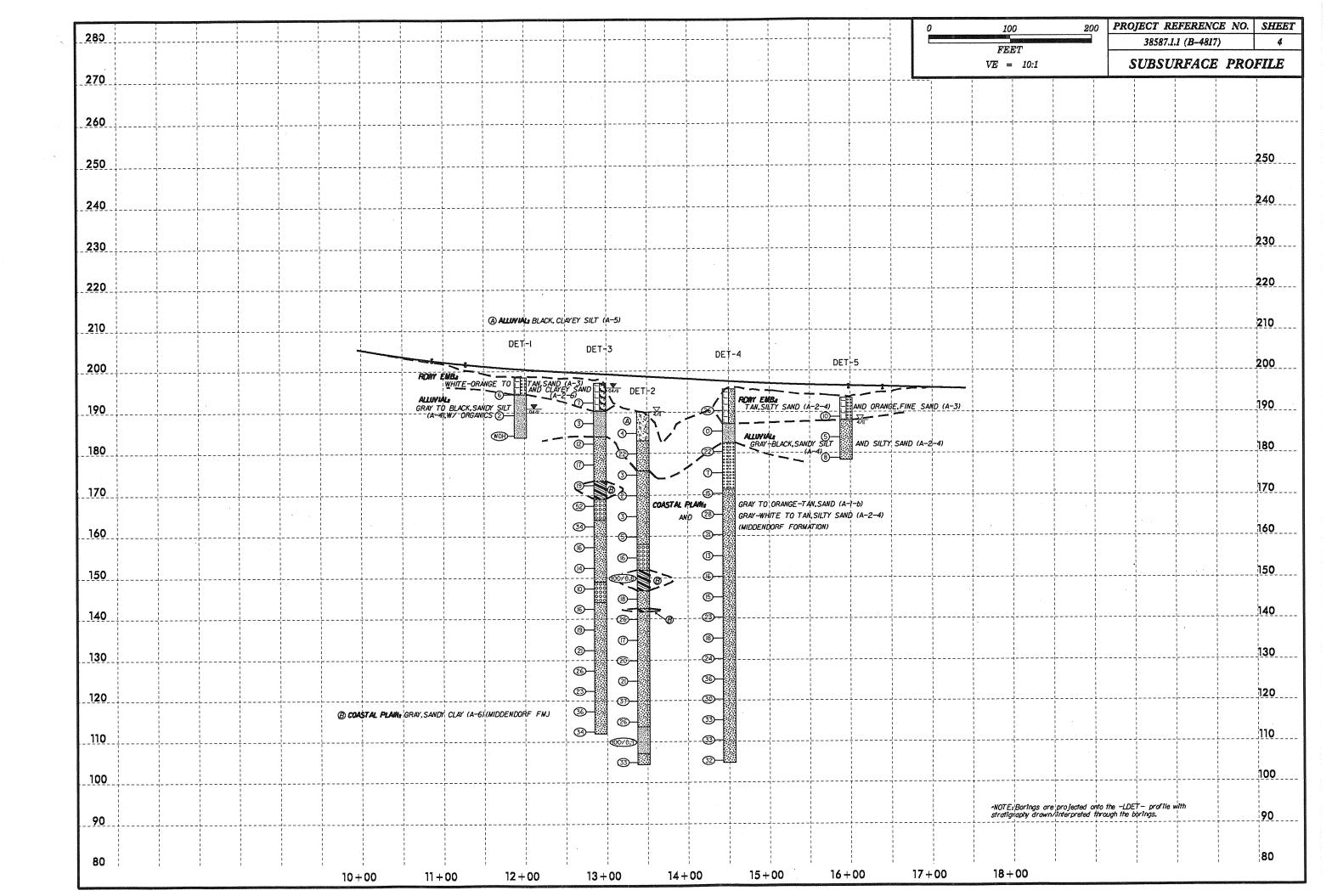
#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

	SOIL AND ROCK	LEGEND, TERMS,	SYMBOLS, AND ABBREV	TATIONS	
SOIL DESCRIPTION	GRADATION		ROCK	DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FIN LINIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME S	NE TO COARSE. SIZE. (ALSO	ROCK LINE INDICATES THE LEVEL AT WHICH NON	HAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED H-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	PODRLY GRADED)  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZ	1	IN NON-COASTAL PLAIN MATERIAL. THE TRANSIT	ON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. FION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADUJEER - A WATER BEARING FORMATION OR STRATA.  ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR. TEXTURE, MDISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SDIL GRAINS IS DESIGNATED BY THE TERMS:	ANICLE AD	DF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FO	DLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STAFF, PRACSETY CLAY, MOST WITH INTERSEDDED FIRE SAND LATERS, MERRY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	Į W		PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 OOT IF TESTED.	DR 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	MINERALOGICAL COMPOSITION		CONCTALLINE TO COAR	RSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO DR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)  COMPARIZED TO THE COMPANY OF	MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	DESCRIPTIONS	ROCK (CR) GNEISS, GABBR	RO, SCHIST, ETC.	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	COMPRESSIBILITY	RI	NON-CRYSTALLINE SEDIMENTARY	ISE GRAIN METAMORPHIC AND NON-COASTAL PLAIN ROCK THAT WOULD YEJLD SPT REFUSAL IF TESTED. ROCK TYPE LLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-5 A-2-7 A-7-5 A-3 A-6, A-7 SYMBOL 80808080808	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS TO MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER	TO 31-50 CC R THAN 50 SE	COASTAL PLAIN CDASTAL PLAI SEDIMENTARY ROCK SPT REFUSAL.	N SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	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.
Z PASSING SILT-	PERCENTAGE OF MATERIAL	<u> </u>	CP) SHELL BEDS, E	EATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
= 10 59 MX	ORGANIC MATERIAL SOILS SOILS OTHER TRACE OF DRGANIC MATTER 2 - 3% 3 - 5% TRACE	MATERIAL 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW HAMMER IF CRYSTALLINE.	JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIGUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 50ILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE MODERATELY ORGANIC 5 - 10% 12 - 20% SOME	10 - 20% 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STA	NINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, ACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PLASTIC INDEX   6 MX   NP   18 MX   19 MX   11 MN   11 MN   10 MX   10 MX   11 MN   11 MN   LITTLE OR   HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY  GROUND WATER	354 AND ABOVE	OF A CRYSTALLINE NATURE.	AINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		SLIJ 1 INCH. OPEN JOINTS MAY CONTAIN (	CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR ED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND GRAVEL AND SAND SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS		MODERATE SIGNIFICANT PORTIONS OF ROCK SHO	DW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM
GEN.RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STR	ATA (*	DULL SOUND UNDER HAMMER BLOWS	ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.  FLOOD PLAIN (FP) - LAND BORDERING A STREAM BUILT OF SEDIMENTS DEPOSITED BY
SUBGRADE PI OF A-7-5 SUBGROUP IS \leq LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30	O-M⊶ SPRING OR SEEP	MI	WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLOR	RED DR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SE	SEVERE AND DISCOLORED AND A MAJORITY S MOD. SEV.) AND CAN BE EXCAVATED WITH A GEO	SHOW KADLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH DLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY CONSISTENCY CONSISTENCY PRIMARY SOIL TYPE CONSISTENCY PRIMARY SOIL TYPE CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  ROADWAY EMBANKMENT (RE)  PPT DHT TEST BORING  WITH SOIL DESCRIPTION	TEST BURING W/ CORE	IF TESTED, WOULD YIELD SPT REFUS		JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE <4	SDIL SYMBOL AUGER BORING		SEVERE ALL ROCK EXCEPT QUARTZ DISCOLOF SEV.) IN STRENGTH TO STRONG SDIL. IN G EXTENT, SOME FRAGMENTS OF STRON	GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER - CORE BORING	REF SPT REFUSAL	IF TESTED, YIELDS SPT N VALUES >	100 BPF	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
(NDN-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	THAN ROADWAY EMBANKMENT  INFERRED SOTI BOUNDARY  MONITORING WELL		V SEV.) THE MASS IS EFFECTIVELY REDUCED	RED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT TO SOIL STATUS, WITH DNLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF A
VERY SOFT         <2         <0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.50	DIEZOMETED		REMAINING, SAPROLITE IS AN EXAMP VESTIGES OF THE ORIGINAL ROCK FA	LE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR ABRIC REMAIN. IF TESTED, YIELDS SPT N. VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INSTALLATION	C	COMPLETE ROCK REDUCED TO SDIL. ROCK FABRI	IC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND . Z MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 ID 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 24	25/025 DIP & DIP DIRECTION OF	L	ALSO AN EXAMPLE.		ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN A
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES  CONE PENETROMETER TO	TEST		K HARDNESS	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	SOUNDING ROD		VERY HARD CANNOT BE SCRATCHED BY KNIFE C SEVERAL HARD BLOWS OF THE GEDI	OR SHARP PICK. BREAKING OF HAND SPECIMENS REDUIRES LOGIST'S PICK.	PARENT ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS		HARD CAN BE SCRATCHED BY KNIFE DR F TO DETACH HAND SPECIMEN.	PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILE - AN INTROSPE BODY TO TRIBEDOY ROCK OF AFFORMMENT OF THE MORNING THE TRIBEDOY THE COMPARED MITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODED ROCKS.
BOULDER CUBBLE GRAVEL SAND SAND SILI CLAY (BLDR.) (CDB.) (GR.) (GSE.SD.) (FSD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEOUS		HARD EXCAVATED BY HARD BLOW OF A G	PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3		7d- DRY UNIT WEIGHT		INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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 WIT
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS S - BULK	POINT OF A GEOLOGIST'S PICK.	PS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO DR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO SD SAND, SANDY SF - FINE SL SILT, SILTY	SS - SPLIT SPOON ST - SHELBY TUBE	FROM CHIPS TO SEVERAL INCHES I	LY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGT OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL F			RE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH ROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	STRATA ROCK QUALITY DESIGNATION (SRDD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM FOUND.
LL LIOUID LIMIT SEMISOLID; REQUIRES DRYING TO	HI HIGHLY V - VERY	RATIO .	FINGERNAIL.		TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING DRGANIC MATTER.
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJE		FRACTURE SPACING  TERM SPACING	BEDDING  TERM THICKNESS	BENCH MARK: BM #2 "X" MARK IN NE WINGWALL ON EAST BOUND
	DRILL DN15: HDVANCARG (DDES)	MER TYPE:  AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET	BRIDGE ON US 74
OM OPTIMUM MOISTURE - MDIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	notoriatio Linitoria	WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	N 382405 E 1840336 ELEVATION: 197.2 F
REDUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE	G' CONTINUOUS FLIGHT AUGER COR	E SIZE:	CLOSE Ø.16 TO 1 FEET VERY CLOSE LESS THAN Ø.16 FEET	THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET  THINLY LAMINATED	NOTES: BORINGS USED IN THS INVENTORY WERE DRILLED ON -LDET- ALIGNMENT
PLASTICITY	A B HULLOW HUDERS	-В		NDURATION	
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH	TUNG-CARRIDE INSERTS	1		DENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW	X CME-550	-н		ING WITH FINGER FREES NUMEROUS GRAINS; LE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST X TRICONE 2 15/6 STEEL TEETH	ND TODLS: POST HOLE DIGGER		S CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGH PLASTICITY 26 OR MORE HIGH  COLOR	TRICONE TUNGCARB.	HAND AUGER	BREAK	(S EASILY WHEN HIT WITH HAMMER,	
CULUR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT	SDUNDING ROD		IS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: CULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		VANE SHEAR TEST		P HAMMER BLOWS REQUIRED TO BREAK SAMPLE; LE BREAKS ACROSS GRAINS.	
			TIPRE	and a second second	REVISED 09/23/09





GROUND WTR (ft)

24 HR. Artesian HAMMER TYPE Automatic

0 HR.

GEOLOGIST Stickney, J. K.

SURFACE WATER DEPTH N/A

SOIL AND ROCK DESCRIPTION

**GROUND SURFACE** ALLUVIAL
Black, CLAYEY SILT (A-5), w/ organics

White, SILTY SAND (A-2-4)

COASTAL PLAIN
Tan-orange, SILTY SAND (A-2-4)
(Middendorf Fm.)

White, SAND (A-1-b)

Gray, SANDY CLAY (A-6)

White-gray, SILTY SAND (A-2-4)

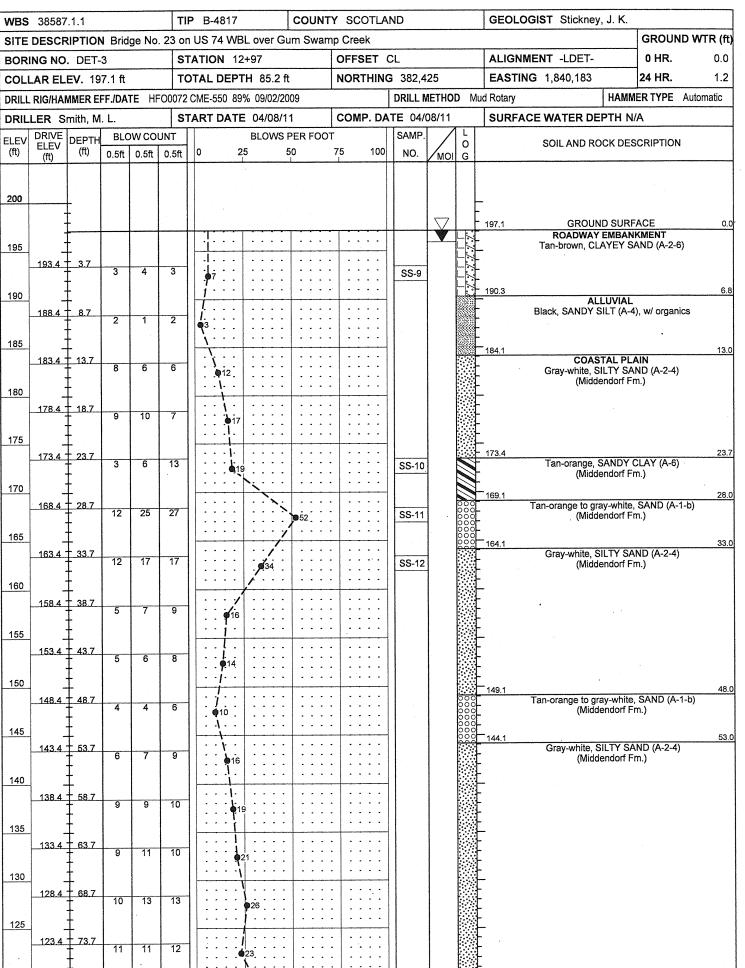
Gray, SANDY CLAY (A-6) White-gray, SILTY SAND (A-2-4)

ALIGNMENT -LDET-

**EASTING** 1,840,236

	3858							3-4817					SCOTL	AND				GEO	LOGIST Stickney, J. K.	<del>.,,</del>		<b>S</b> 3858					B-4817		COUNT			טו		GEOL	
SITE	DESC	RIPTI	ION	Bridg	e No.	23 o	n US	74 W	BL ov	er Gu	ım Swa	<del></del>						<del></del>		GROUND WTR (	1				ge No	<del></del>	US 74 WE	····	um Swam					T	
BOR	ING N	O. DE	ET-1			s	TATI	ON 1	2+00			0	FFSET	1 ft L	Γ			<del> </del>	SNMENT -LDET-	0 HR. Dr	<del> </del>	RING NO					ATION 1				SET CL			ALIG	
COL	LAR E	LEV.	198.6	6 ft		T	OTA	L DEP	TH 1	14.6 ft		N	ORTHI	NG 38	2,44	0		EAS	TING 1,840,088	<b>24 HR.</b> 7.		LLAR EI					TAL DEP			NOR	THING			EAST	
DRILL	RIG/H	AMMER	R EFF.	/DATE	E HF	00072	2 CME	-550 8	9% 09	9/02/20	09			DRIL	L ME	ETHOD	) H.S	S. Auger	s HAN	MER TYPE Automatic	DRII	LL RIG/HA	MMER E	FF./DA	TE HE	-00072	CME-550 89	3% 09/02/2	009	·	[	DRILL M	ETHOD	Mud Rotary	
DRIL	LER :	Smith,	, M. L	<u></u>		S	TAR	T DAT	E 04	1/06/1	1	С	OMP. D	ATE (	04/0	6/11		SUR	FACE WATER DEPTH	N/A		LLER S				SI	ART DAT	E 04/07/	11	COM	IP. DAT	E 04/0	7/11	SURF	AC
ELEV	DRIVE	DEP	тн	BLOV	v col	JNT	П		BL	OWS F	PER FC	тоот		SAN	ИР. ₹		L O		SOIL AND ROCK D	SCRIPTION	ELE'	V DRIVE	DEPTH	BLC	w co				PER FOOT		1.1	SAMP.		0	
(ft)	ELEV (ft)	(ft)		.5ft	0.5ft	0.5ft	0		25	5	50	75	10	O NO	р. <u>Г</u>	моі		ELEV. (f		DEPTH DEPTH		(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 	50	75	100	NO.	MOI		
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200																l	L	_			195		1			-							l	_	
		Ŧ	_	_			Н.,		<del></del>		Τ				-			198.6	GROUND SUF		.0		‡											ļ.	
		Ŧ		İ					1						.	l			White-orange, fine				<u></u>										$\nabla$	190.1	
195	195.5	+ 3.1	1	4	4	2	1	6			<del>                                     </del>			SS	i-1			-194.5	ALLUVIA		1 190	<u>'</u>	<del> </del>				<u> </u>	T	Τ	Τ			<del></del>	130.1	
		Ŧ	-				L										F		Black-gray to white gray,				İ						: : : :	1	: :		1		1
190	190.5	+ 8.	1				i				: :	1					F				185	185.9	4.2	WOH	3	1		<u> </u>	<u> </u>	<u> </u>		SS-3	ŀ		
100		‡	Ì	2	1	1	2		1.			1		i 1 .	-2			-					Ŧ				1						Ŀ	183.1	
		‡					i:		- :		: :			.			*					180.0	9.2												
185	185.5	<u> </u>	1 W	ион у	woh	WOH	بَلَا	• • •	4	· · ·	ļ.:			41		Ī	-	184.0		1.	.6 180	100.3	+	9	11	11		22				SS-4			
		$\pm$	-	$\dashv$			190							1	寸			104.0	Boring Terminated at Ele Alluvial SANDY S	vation 184.0 ft in			‡				/.	: : : :							
		‡																	Alluviai SAINDT S	ILI (A-4)	175	175.9	14.2	1 -	2		1			1		-00.5	:	175.9	
		+																-			11/3		‡	'	_	'.	3	1	<b> </b>			SS-5			
		İ														.	L						‡					: : : :		- 1				<b>#</b>	
		Ŧ			Į.												l				170	170.9	19.2	1	1	1	2		• • • •	<u> </u>				<u> </u>	
		Ŧ													.		l						<u> </u>				1: : : :			: :	:				
		Ŧ															-					165.9	24.2				1:::::		: : : :	1	: : :			<b>#</b>	
		+	l												ı		F	-			165	j	+	1	2	1	3			+		SS-6			
		‡	Ì														F						Ŧ				i			1	: : :				
		‡																			160	160.9	29.2	2	2	3	1	: : : :		1 .					
		# 1	1		1													<del>-</del>					Ŧ	-	_		.,							158.1	
		‡																•				455.0	‡				: \ : : :	: : : :		1				000	:
		1																			155		34.2	5	7	9	16	ļ	<b>  · · · ·</b>	<u> </u>		SS-7	1		
		+																					‡					<b>\</b>	: : : :		. : :		Ö	000- 000- 151.9	
	·	1																			1	150.9	39.2			10/0.0		: : : `	\:		:			151.9	
		+																-			150	4	± .	33	60	40/0.3		<b> </b>	<b> </b>	+-:	100/0.8	SS-8			
		Ŧ																					1										•	146.9	
		Ŧ		1												_					145	145.9	44.2	6	7	11		بسبس سنر	1		• •		ļ		
		Ŧ																•			-		<u>+</u>				· · · · · · · · · · · · · · · · · · ·	Ĭ : : : :			· · ·		Ŀ	142.5	
		‡												.				•				140.9	I 49.2								: : :			141.7	$\overline{}$
		‡																			140	) 140.3	+	16	12	14		26						-	
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	1	‡		1														-			125	2	+	7	11	10	1	21	+	<del>.  </del>		,			
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	-	‡																-			120	120.9	69.2	8	12	25		.\.	.	.				<b>:::</b>	
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		‡																- -					‡				: : : :	17:::			: : :				
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BS	38587	1.1	*		Т	IP I	B-4817			COUNT	Y SC	OTLA	ND			GEOLO	GIST Stick	ney, J. K.		
ΤE	DESCR	IPTIOI	N Brid	ge No	. 23 o	n US	5 74 W	BL ove	r Gu	m Swan	np Cre	ek							GROU	ND WTR (fi
ORI	NG NO.	DET-	2		S	TAT	ION 1	3+50			OFF	SET (	CL			ALIGN	IENT -LDE	T-	0 HR.	0.0
)LL	AR ELE	E <b>V</b> . 19	0.1 ft		Т	ОТА	L DEP	TH 85	5.7 ft		NOF	THING	382,4	19		EASTIN	G 1,840,2	36	24 HR.	Artesian
LL	RIG/HAN	MER E	FF./DA	TE HE	0007	2 CMI	E-550 8	9% 09/0	02/200	)9			DRILL N	NETHO	D M	lud Rotary		HAM	MER TYPE	Automatic
ILI	LER Sr	nith, M	l. L.		s	TAR	T DAT	E 04/	07/11		CON	IP. DA	TE 04/	07/11		SURFA	CE WATER	DEPTH 1	N/A	
V	DRIVE ELEV	DEPTH	BLC	ow co	UNT					ER FOO			SAMP.	V			SOIL ANI	D ROCK DE	SCRIPTIO	N
1	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25 	5 	0	75	100	NO.	МО		ELEV. (ft)				DEPTH (
													ľ							
1						₽		<b>2</b> 26	/latch	Line			<u> </u>				hite-gray, SIL	TV 60 ND 7	A 2 AVconti	nued)
	1	•						\`-	∺⊹	-+-:-	:- <del> -</del> -					– 113.6 W		ray, SANDY		
	110.9	79.2				:		: :			:   :					-				
1	-	-	45	55/0.2				<del> </del>			:   :	100/0.7	SS-18			<b>-</b>				
-	1	-							 , <del></del> -	· · ·	:   -					107.1	\A #=14 = ===	ay, SILTY S	AND /A 2 4	<u>83</u>
	105.9	84.2	11	14	19	$\left\{ \left[ \cdot \right] \right\}$		933	<b>,</b>							- 104.4	vvnite-gra	ay, SILIT S	AND (A-2-4	) 85
l				<u> </u>		╁		<b>4</b> 00				. <u>.                                   </u>	1			-	Boring Termi	nated at Ele	vation 104.4	4 ft in
-		•														-	Coastai P	Middendorf I	Fm.)	7)
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BS	38587	.1.1			TI	P B-4817	7	COUN	ITY SCOT	LAND	)			GEOLOGIST Stickn	ey, J. K.	
TE	DESCR	IPTIOI	N Brid	ge No	. 23 or	US 74 W	/BL ove	r Gum Swa	mp Creek	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>						GROUND WTR
	NG NO.					TATION			OFFSET	CL				ALIGNMENT -LDET	-	0 HR. 0
OLL	AR ELI	EV. 19	7.1 ft		TC	OTAL DEF	PTH 85	.2 ft	NORTH	NG :	382,42	25		EASTING 1,840,18	3	24 HR. 1
RILL	RIG/HAN	MER E	FF./DA	TE H	-00072	CME-550 8	39% 09/0	2/2009	<del></del>	DI	RILL M	ETHO	) Mu	ıd Rotary	HAMN	IER TYPE Automatic
RILI	ER Sr	nith, N	l. L.		ST	TART DA	re 04/0	08/11	COMP.	DATE	04/0	8/11		SURFACE WATER	DEPTH N	/A
ΕV	DRIVE ELEV	DEPTH	BLC	w co	UNT		BLO	WS PER FO	ОТ	S	AMP.	$\overline{\mathbf{V}}$	L	SOIL AND	ROCK DES	SCRIPTION
ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 1	00	NO.	MOI		ELEV. (ft)		DEPTH
														•		
20						_	N	latch Line	<del></del>					Grav white	42 VT 112	ND (A-2-4)
ŀ	118.4	78.7	15	17	19		1	36		:			+	(Middend	orf Fm.) (co	ntinued)
5	‡	-								:	•		#			
_	113.4	- 83.7					1.1			-			-	<u>-</u>		
		-	19	16	18		34			4				111.9 Roring Termina	ted at Flev	ation 111.9 ft in
-	1	<del>-</del>											F	Coastal Pla	in SILTY S	AND (A-2-4)
	1	-											F	(IVII	auchaon i	,
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WBS	38587	.1.1			TI	P B-4817	,	COUNT	Y SCOTLA	AND			GEOLOGIST Stickney, J.		
SITE	DESCR	RIPTIOI	<b>N</b> Brid	ge No	. 23 or	1 US 74 W	BL over C	Sum Swan	np Creek					GROUN	D WTR (ft)
BOR	NG NO	. DET	-4		S	TATION '	4+55		OFFSET	CL			ALIGNMENT -LDET-	0 HR.	FIAD
COLI	AR ELI	<b>EV</b> . 19	5.6 ft		TO	OTAL DEF	PTH 90.8	ft	NORTHIN	<b>G</b> 382,4	113		EASTING 1,840,341	24 HR.	FIAD
DRILL	RIG/HAN	MMER E	FF./DA	TE H	-00072	CME-550 8	9% 09/02/	2009		DRILL I	NETHO	D M	ud Rotary H.	AMMER TYPE	Automatic
DRIL	LER S	mith, M	l. L.		S	TART DAT	E 04/12/	'11	COMP. DA	ATE 04/	12/11		SURFACE WATER DEPT	H N/A	
ELEV	DRIVE ELEV	DEPTH	<b> </b>	w co				PER FOO		SAMP.		L	SOIL AND ROCK	DESCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	MOI	G			
200													no.		
	1	-											•		
	-	_											. 195.6 GROUND S	URFACE	0.0
195							1						<ul> <li>ROADWAY EM</li> <li>Gray-tan, SILTY</li> </ul>		
	-												•	,	
190	191.3	4.3	15	15	11		26			SS-13	]		•		
-		_						.							
	186.3	9.3	WOU	MOR	WOH	1	: : :	.			-		187.1 ALLU\		8.5
185	-	Ŀ	VVOH	VVOIT	VVOI	0	<del> </del>			SS-14	-		Black, SANDY SILT	(A-4), w/ organic	CS
												• • • •	- 182.5 - COASTAL	ΡΙ ΔΙΝ	13.1
180	181.3	14.3	7	12	10	`	22			SS-15		0000	Gray-white, fine SAN	D (A-3) (Middend	iorf
						/	1:::					0000	- -	,	
	176.3	19.3				. /:						0000	· •		
175			4	4	3	7							_		
	-					$  \cdot\rangle\cdot$						0000			04.0
170	171.3 _	24.3	6	8	7	<b>b</b> 15			.	SS-16			Tan-orange to gray-v	vhite, SILTY SAI	24.3 ND
	_	F				\					1		(A-2-4) w/ thin clay sea	ms, (Middendorf	rm.)
	166.3	29.3											- -		
165	_	F	10	12	16		<b>9</b> 28			$\{ \}$			- 		
	-	F					<b>∦</b> ∷::				1		<u>.</u>		
160	_161.3_	34.3	7	11	10		/ : : :			SS-17	1		•		
	-	F				/					1		<del>-</del> -		
	156.3	39.3				:::/:							- -		
155	_	-	5	6	7	13.	1		·   · · · · ·	-			• •- ·		
	-	Ŧ.											•		
150	151.3	44.3	5	7	9								- -	·	
	<u> </u>	‡													
	146.3	49.3				:::::::::::::::::::::::::::::::::::::	: : :						<u>.</u>		
145	_	-	6	6	9	415	5			$\  \cdot \ $			<u>-</u> -		
	-	‡											<del>-</del> -		
140	_141.3_	54.3	12	10	13		7	: ::					-		
140	-	‡					1						 		
	136.3	503				:::;							- -		
135	-	1	5	7	11	1	18		-	41			<u>.</u>		
	-	‡			1								<u>.</u>		
	131.3	64.3	7	12	12	:							<u>-</u>		
400	-	+		'-	'-		24			1			<del></del>		
130	-	T	1	1	1	1 1									
130	100.0	I					\\	:   : : :					-		
130	126.3	69.3	8	12	24		36_						- - - -		
	126.3	69.3	8	12	24		36						- - - - -		

WBS	3858	7.1.1			TIF	P B-4817		coul	NTY S	COTLA	ND .			GEOLOGIST Stickn	эу, J. K.		L	<b>3</b> 8587.1.1				P B-4817	COUNTY S		ND		GEOLOGIST Stickney	
SITE	DESC	RIPTIO	N Brid	dge No	. 23 on	US 74 W	BL over	Gum Sw	amp Cr	reek					GROUN	D WTR (ft)	SITE	DESCRIPT	ION Brid	dge No	o. 23 on	US 74 WBL over G	<del></del>					GROUND WTF
BOR	ING NO	D. DET	-4		ST	ATION 1	4+55		OF	FSET C	)L			ALIGNMENT -LDET	- 0 HR.	FIAD	BOF	RING NO. DE	ET-5		ST	ATION 16+00	OFF	FSET C	L		ALIGNMENT -LDET-	0 HR.
COL	LAR E	LEV. 19	95.6 ft		ТС	TAL DEP	TH 90.8	B ft	NO	RTHING	382,4	13		EASTING 1,840,341	24 HR.	FIAD	COL	LAR ELEV.	193.4 ft	t	TO	TAL DEPTH 15.1	ft NO	RTHING	382,4	21	<b>EASTING</b> 1,840,485	24 HR. FI
DRILI	L RIG/HA	MMER E	FF./DA	TE H	00072	CME-550 8	9% 09/02	/2009	t	1	DRILL I	METHOL	) Mud	Rotary	HAMMER TYPE	Automatic	DRIL	L RIG/HAMME	R EFF./D/	ATE H	FO0072	CME-550 89% 09/02/2	:009		DRILL M	IETHOD	H.S. Augers	HAMMER TYPE Automa
		Smith, N				ART DAT			СО	MP. DA	TE 04/	12/11		SURFACE WATER I	DEPTH N/A		DRII	LER Smith	, M. L.		ST	ART DATE 04/12/	11 CO	MP. DA	TE 04/1	12/11	SURFACE WATER DE	PTH N/A
		DEPTH		ow co		T		S PER FC	OT	T	SAMP.	$\nabla$	L	COUL AND	ROCK DESCRIPTION		ELEV	DRIVE DEP	TH BL	.ow.co		BLOWS	PER FOOT		SAMP.	L	SOIL AND RO	CK DESCRIPTION
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft		О	25	50	75	100	NO.	MOI	O E	ELEV. (ft)	ROCK DESCRIPTION	DEPTH (ft)	(ft)	(ft) (ft	) 0.5ft	0.5ft	0.5ft	0 25	50 75	100	NO.	MOI G		
-			1	1																		i.						
120							Ma	atch Line								-	195											
120	<del> </del>	<del> </del>	1	t	†				.		T			Tan-orange to	gray-white, SILTY SAN y seams, (Middendorf	ND Em \												D SURFACE
		1 700					1		- 1					(A-2-4) W/ LIIII CI	continued)	1111.)		‡					1 1				Orange-red and bla	EMBANKMENT ck-gray, fine SAND (A-3)
115	116.3	79.3	18	19	14		33_		-   -				_				190	189.8 3.0	6	5	-	•   • • • •					0 0	
		+					1:1::		: :   :				_					‡	2	5	5	10 : : : :						LUVIAL
	111.3	84.3											-					1 1		-		:/: : :   : : : :	1				Gray-black, S	ILTY SAND (A-2-4)
110		‡	14	17	16		<b>9</b> 33_						L.			,	185	184.8 8.1	6 2	2	3	,	<del>    .</del>					
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405	106.3	# 89.3	11	16	16				1							90.8	180	179.8 13				1	1 1					
105	-	<del> </del>	╁╌	+			<b>Q</b> 32				<del>                                     </del>		-	104.8 Boring Termina	ted at Elevation 104.8 n SILTY SAND (A-2-4)	ft in	1	1/9.8 + 13	2	3	5	•8 · · · · ·					178.3	
		İ												Coastal Pla (Mi	n SILTY SAND (A-2-4) Idendorf Fm.)	)		T .									Boring Terminated Allluvial SIL	l at Elevation 178.3 ft in TY SAND (A-2-4)
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SHEET 9 of 11 38587.1.1 (B-4817)

DET-1 SOIL TEST RESULTS AASHTO % BY WEIGHT % PASSING (SIEVES) SAMPLE DEPTH OFFSET STATION CLASS. P.I. MOISTURE C.SAND F.SAND SILT CLAY 10 40 200 ORGANIC INTERVAL NO. 3.6-4.6 8.6-9.6 
 22.6
 3.9
 4.0
 93
 55
 10

 7.9
 21.6
 14.1
 97
 75
 40
 12+00 A-3(0) 19 69.4 NP SS-1 L3 LT 12+00 A-4(0) SS-2 L3 LT

DET-3															
				SO.	IL T	ES7	RES	SULT	S						
SAMPLE			DEPTH	AASHTO				% BY WE	IGHT		% PA	SSING (SI	EVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-9	CL	12+97	3.7-4.7	A-2-6(1)	28	14	53.3	18.8	5.7	22.2	98	67	29		•
SS-10	CL	12+97	23.7-24.7	A-6(3)	29	12	24.8	30.3	16.6	28.3	99	90	48	-	-
SS-11	CL	12+97	28.7-29.7	A-1-b(0)	19	NP	80.7	9.0	1.2	9.1	99	42	11	-	, <b>-</b>
SS-12	CL	12+97	33.7-34.7	A-2-4(0)	23	NP	58.6	30.8	1.5	9.1	100	82	11	•	•

DET-2					Control of Pool and Associated Control of Control								NAMES AND ASSESSMENT OF THE PARTY OF THE PAR		
				SO.	IL T	ES7	RES	SULT	S						
SAMPLE			DEPTH	AASHTO				% BY WE	IGHT		% PA	SSING (SI	EVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-3	CL	13+50	4.7-5.7	A-5(6)	54	9	12.9	36.2	30.7	20.2	99	91	58	-	-
SS-4	CL	13+50	9.7-10.7	A-2-4(0)	23	NP	8.7	80.9	6.4	4.0	100	100	16	-	
SS-5	CL	13+50	14.7-15.7	A-2-4(0)	23	4	33.2	47.1	5.6	14.1	96	75	21	-	•
SS-6	CL	13+50	24.7-25.7	A-2-4(0)	24	9	67.9	14.1	5.9	12.1	93	42	18	w '	-
SS-7	CL	13+50	34.7-35.7	A-1-b(0)	20	5	68.5	13.5	3.8	14.1	89	46	17	-	•
SS-8	CL	13+50	39.2-40.7	A-6(3)	29	14	37.0	23.0	11.7	28.3	100	79	45	-	-
SS-18	CL	13+50	79.2-80.4	A-4(1)	23	10	31.3	31.7	14.7	22.2	99	81	43	·	

<u> DET-4</u>			-	SO.	IL T	ES7	RES	SULT	S			•			
SAMPLE			DEPTH	AASHTO				% BY WE	IGHT		% PA	SSING (SI	ÉVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-13	CL	14+55	4.8-5.8	A-2-4(0)	15	NP	45.7	35.4	8.9	10.1	97	71	23		
SS-14	CL	14+55	9.8-10.8	A-4(0)	37	4	11.9	50.5	23.4	14.1	100	93	48		-
SS-15	CL	14+55	14.8-15.9	A-3(0)	23	NP	55.3	39.3	2.4	3.0	100	78	7	-	-
SS-16	CL	14+55	24.8-25.8	A-2-4(0)	19	NP	71.7	15.2	3.0	10.1	98	55	14	. •	-
SS-17	CL	14+55	34.8-35.8	A-2-4(0)	19	NP	72.2	12.7	1.9	13.1	99	59	16	-	

## FIELD SCOUR REPORT

WBS:	38587.1.1	TIP:	B-4817	COUNTY: Scotland	
DESCRIPTION(1):	Bridge No. 23 o	over Gum S	Swamp Creek o	on US 74 Westbound	
			EXISTING	BRIDGE	
Information from:	Field I Other	nspection [	x Mic Routine Inspect	crofilm (reel pos:) tion Report (2011)	
Bridge No.: Foundation Type	23 Length Abutments: rei	n: 90' nforced co	Total Bents: ncrete on pile fo	3 Bents in Channel: 1 Bents in Floodplain: 2 potings. Int. Bents: reinforced concrete on pile footings.	-
EVIDENCE OF	SCOUR(2)				
Abutments or	End Bent Slopes creek overtopp			present at end bent abutments due to prior	-
Interior Bents	Scour pockets			erior bent.	
Channel Bed	Very minor sco	our in the cl	nannel bed awa	ay from the existing interior bent.	
Channel Bank	Creek bank ero	osion (unde	ercutting scour)	is visible on both east and west banks.	_
EXISTING SCO Type(3)	UR PROTECTION				_
					-
Obstructions(6)	Drift debris ups	stream (50'	) of existing stru	ucture	_

#### **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.

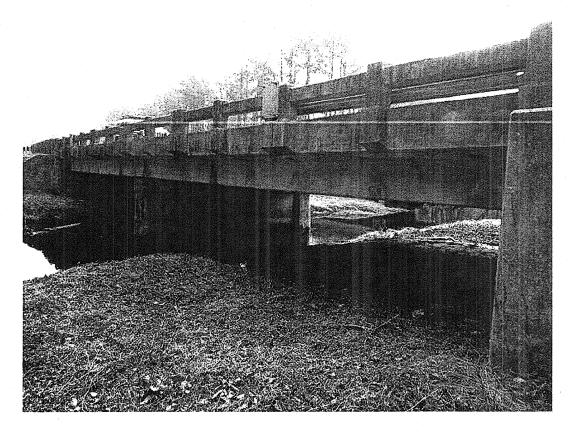
	<u></u>	<u>DESIGN IN</u>	FORMA	<u>ATION</u>					
Channel Bed Material(7)	Dark brown to black, clayey silt (A-5) and gray-black silty sand (A-2-4)								
Channel Bank Material(8)	Gray-black sandy silt (A-4)								
Channel Bank Cover(9)	Grass, brush, trees								
Floodplain Width(10)	Over 3000 ft. (approx. width Gum Swamp)								
Floodplain Cover(11)	Grass, brush, trees								
Stream is(12)	Aggrading x Degrading Static								
annel Migration Tendency(13	): Slightly to the west.								
Observations and Other Comments:									
DESIGN SCOUR ELEVATIO	TIONS(14) Feet X Meters								
BENT	<u>s</u>								
B1	B2								
DSE 185 ft	. 171 ft.								·
·									
								<u> </u>	
Comparison of DSE to Hydraulics Unit theoretical scour:  The Geotechnical Engineering Unit agrees with the Hydraulic Unit's theoretical scour elevations as described in the Bridge Survey and Hydraulic Design Report dated May 1, 2011.									
SOIL ANALYSIS RESULTS	FROM CHANN	NEL BED AN	D BANK	MATE	RIAL				
Bed or Bank	<u> </u>							İ	
Sample No.			<del></del> 1						
Retained #4 See	e Sheet 9 for So	Sheet 9 for Soil Test Results.							
Passed #10									
Passed #40									
Passed #200	i i								
Coarse Sand									
Fine Sand								ļ	
Silt									
Clay									
LL L	•								
PI					·			ļ	-
AASHTO									
Station								<u> </u>	
Offset								<del> </del>	
Depth		1						<u></u>	

Form GEU-017e Revised 7/26/20

Reported by:

Date:

## Site Photographs



North side of existing, looking east -southeast



South side of existing, looking east - northeast



View looking west (down station)