ID: B-3869

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SHEET

OJECI: 55514.1.1

DRAWN BY: <u>C</u> A DUNNAGAN

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>33314.1.1(B-3869)</u> COUNTY <u>MADISON</u>	F.A. PROJ. <u>BRSTP-1151(3)</u>
PROJECT DESCRIPTION <u>BRIDGE NO.146 ON</u>	SR-1151 OVER BIG PINE CREEK
SITE DESCRIPTION	

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33314.1.1_(B-3869)	1	17

CAUTION NOTICE

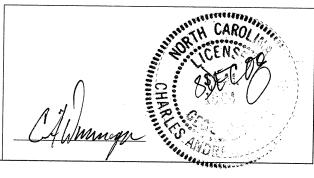
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENDINGERING UNIT AT (19) 250-0408. NEITHER, THE SUSUPFACE 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 SUBSUPFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUPFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREWOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS INDICATED IN THE SUBSUPFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND 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 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 CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS TO BE.

<u> </u>	
C J COFFEY	
_ R D CHILDERS	
M M HAGER	
D O CHEEK	_
	_
	_
INVESTIGATED BY <u>C</u> A DUNNAGAN	_
CHECKED BY <u>W</u> D FRYE, Jr	
SUBMITTED BY <u>W</u> D FRYE, Jr	_
DATEDECEMBER 2008	
	-

PERSONNÉL ____ T B DANIEL



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

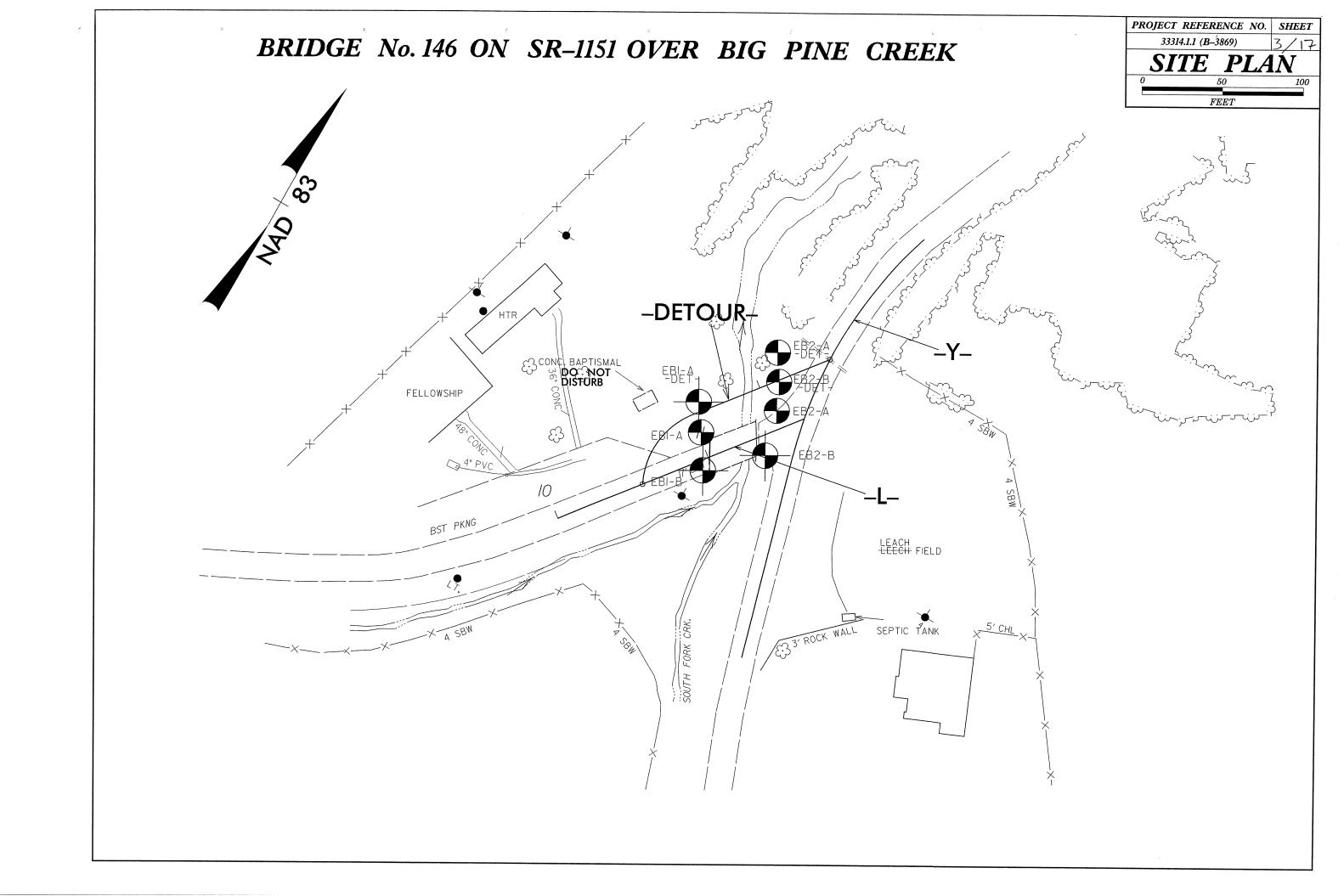
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

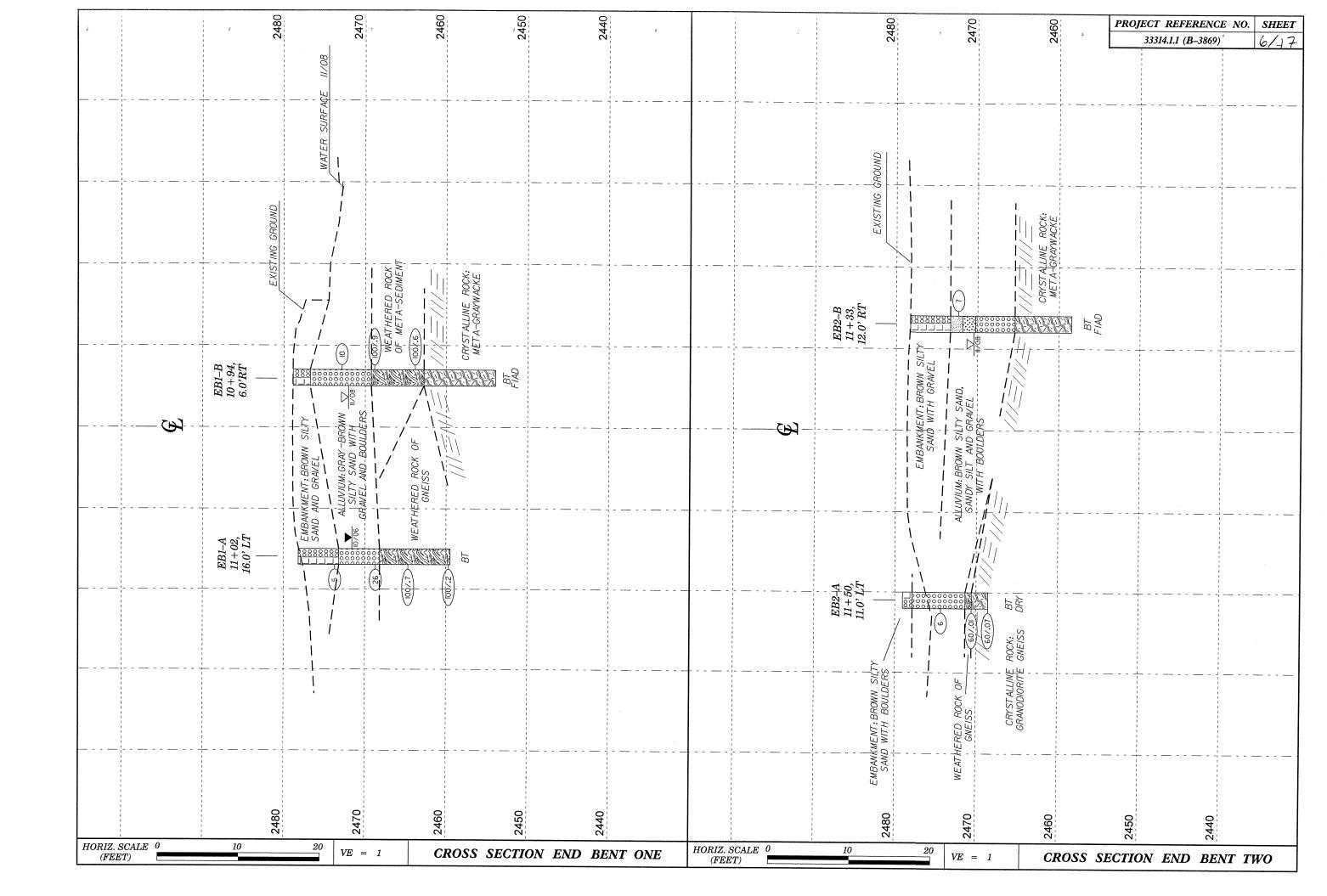
SOIL DESCRIPTION ROCK DESCRIPTION TERMS AND DEFINITIONS <u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COAR UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, (ALSO IARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER 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 ALFOOT PER 6A RIOWS. THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. AQUIFER - A WATER BEARING FORMATION OR STRATA. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: ANGULARITY OF GRAINS OF WEATHERED ROCK. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE WEATHERED OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. VERY STIFF, GRAY, SILTY CLAY, WOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 SUBANGULAR, SUBROUNDED, OR ROUNDED, NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. ROCK (WR <u> ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL MINERALOGICAL COMPOSITION SOIL LEGEND AND AASHTO CLASSIFICATION FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THA IT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE CRYSTALLINE ROCK (CR) MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS GENERAL GRANIII AR MATERIALS STI T-CLAY MATERIALS WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, ORGANIC MATERIALS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE (≤ 35% PASSING #200 35% PASSING #200 GNEISS, GABBRO, SCHIST, ETC. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. UNCLES, GABRAN, COLINIS, ELC.
FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN
SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED, ROCK TYPE
INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD CROUP A-1 A-3 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 NON-CRYSTALLINE ROCK (NCR) COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM CLASS. A-3 LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50 SLIGHTLY COMPRESSIBLE COASTAL PLAIN SEDIMENTARY ROCK SYMBOL <u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED PASSING SHELL BEDS. ETC SILT-DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT WEATHERING # 10 MUCK. CLAY ORGANIC MATERIAL PEAT ROCKS OR CUTS MASSIVE ROCK. SOILS OTHER MATERIAL SOILS SOILS SOILS ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE * 200 RACE OF ORGANIC MATTER RACE 1 - 10% HAMMER IF CRYSTALLINE. 5 ~ 12% LITTLE 10 - 207 46 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 11 MN 41 MN 41 MN 40 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MX 10 MX 11 MN 11 MX 11 MN 11 MX 11 LIQUID LIMIT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, SOILS WITH MODERATELY ORGANIC 5 - 10% 12 - 20% ASTIC INDEX 6 MX DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF LITTLE OR HIGHLY ORGANIC 21017 >20% (V SI L) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF 35% AND ABOVE HIGHLY OF A CRYSTALLINE NATURE. MODERATE GROUP INDEX 0 0 0 4 MX | 8 MX | 12 MX | 16 MX | No MX ORGANI GROUND WATER FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY AMOUNTS OF ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO SOILS ∇ SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING CLAYEY (SLL) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR SOILS MATTER CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. SOILS **Y**__ MATERIALS SAND STATIC WATER LEVEL AFTER 24 HOURS SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GEN. RATING FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM ∇_{PW} POOR PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA (LGOM) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS PARENT MATERIAL. EXCELLENT TO GOOD FAIR TO POOR AS A UNSUITABLE POOR DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED SUBGRADE FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. OW-SPRING OR SEEP PI OF A-7-5 SUBGROUP IS
LL - 30; PI OF A-7-6 SUBGROUP IS > LL ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL CONSISTENCY OR DENSENESS MISCELLANEOUS SYMBOLS SEVERE 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, FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN RANGE OF UNCONFINED COMPACTNESS OR OPT DAT TEST BORING SAMPLE ROADWAY EMBANKMENT (RE) PRIMARY SOIL TYPE PENETRATION RESISTENCE COMPRESSIVE STRENGTH IF TESTED, WOULD YIELD SPT REFUSAL (TONS/FT2) WITH SOIL DESCRIPTION DESIGNATIONS JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED 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 KAQLINIZED TO SOME S - BULK SAMPLE SEVERE ${\color{red} {\sf LEDGE}}$ - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. \oplus GENERALLY SOIL SYMBOL AUGER BORING (SEV.) LOOSE SS - SPLIT SPOON GRANIII AR EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. MEDIUM DENSE N/A ARTIFICIAL FILL (AF) OTHER SAMPLE. IF TESTED, YIELDS SPT N VALUES > 100 BPF LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. DENSE 3Ø TO 5Ø THAN ROADWAY EMBANKMENT CORE BORING (NON-COHESIVE) VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN VERY DENSE >50 ST - SHELBY TUBE 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 SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. SAMPLE V SEV.) INFERRED SOIL BOUNDARY VERY SOF Oww MONITORING WELL PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN SOFT 2 TO 4 RS - ROCK SAMPLE VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF INFERRED ROCK LINE NTERVENING IMPERVIOUS STRATUM. 0.25 TO 0.50 MEDIUM STIFF 4 TO 8 PIEZOMETER 0.5 TO 1.0 1 TO 2 SILT-CLAY Δ RT - RECOMPACTED TRIAXIAL ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND MATERIAL STIFF 8 TO 15 INSTALLATION RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ALLUVIAL SOIL BOUNDARY SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS VERY STIFF SAMPLE (COHESIVE: 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 2 TO 4 ALSO AN EXAMPLE \bigcirc 5/025 CBR - CALIFORNIA BEARING INSTALLATION ROCK HARDNESS RATIO SAMPLE EXPRESSED AS A PERCENTAGE. → SPT N-VALUE CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE SOUNDING ROD U.S. STD. SIEVE SIZE (REF)- SPT REFUSAL SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. PARENT ROCK. 4,76 0.25 OPENING (MM) 2.00 0.42 0.075 0.053 SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY LINIFORM THICKNESS AND CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED **ABBREVIAT** RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. FINE TO DETACH HAND SPECIMEN. COBBLE GRAVEL BOULDER SILT AR - AUGER REFUSAL HT. - HTGHLY w - MOISTURE CONTENT SAND (COB.) CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE (BLDR) (GR.) BT - BORING TERMINATED MED. - MEDIUN V - VERY SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR VST - VANE SHEAR TEST CL. - CLAY MICA. - MICACEOUS HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED 2.0 0.05 0.005 BY MODERATE BLOWS. CONE PENETRATION TEST MOD. - MODERATELY WEA. - WEATHERED SIZE IN. 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 SQUI WITH CSE. - COARSE NP - NON PLASTIC 7 - UNIT WEIGHT MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT - DILATOMETER TEST 7 - DRY UNIT WEIGHT CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. - CORRELATION OF TERMS - ORGANIC 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION - VOID RATIO SAP. - SAPROLITIC SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS (ATTERRERG | IMITS) DESCRIPTION FIAD - FILLED IMMEDIATELY AFTER DRILLING <u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. SD. - SAND, SAND FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN FOSS. - FOSSILIFFROUS SL. - SILT. SILTY PIECES CAN BE BROKEN BY FINGER PRESSURE. - SATURATED USUALLY LIQUID: VERY WET. USUALLY FRAC. - FRACTURED, FRACTURES SLI. - SLIGHTLY STRATA ROCK QUALITY <u>DESIGNATION (SROD) -</u> A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS MITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE, FROM BELOW THE GROUND WATER TABLE CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH (SAT.) LIQUID LIMIT FRAGS. - FRAGMENTS TCR - TRICONE REFUSAL BT-BORING TERMINATED OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY PLASTIC FINGERNAL SFMISOLID: REQUIRES DRYING TO EQUIPMENT USED ON SUBJECT PROJECT TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER ATTAIN OPTIMUM MOISTURE FRACTURE SPACING PLASTIC LIMIT THICKNESS HAMMER TYPE TERM SPACING ADVANCING TOOLS: DRILL UNITS: BENCH MARK: BM-101: -BL- STA 10+71, 79' LT, 8' SPIKE VERY THICKLY BEDDED > 4 FEET - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE VERY WIDE MORE THAN 10 FEET X AUTOMATIC MANUAL OPTIMUM MOISTURE IN 38" WHITE OAK THICKLY BEDDED 1.5 - 4 FEET _ CLAY BITS MOBILE B-SHRINKAGE LIMIT MODERATELY CLOSE THINLY BEDDED Ø.16 - 1.5 FFFT ELEVATION: 2474.58 FT. 1 TO 3 FEET VERY THINLY BEDDED __ 6' CONTINUOUS FLIGHT AUGER REQUIRES ADDITIONAL WATER TO CORE SIZE: CLOSE Ø 16 TO 1 FEET - DRY - (D) ___ BK-51 THICKLY LAMINATED NOTES: ATTAIN OPTIMUM MOISTURE 0.008 - 0.03 FEET LESS THAN 0.16 FEET X 8" HOLLOW AUGERS ___-в____ THINLY LAMINATED < 0.008 FEET PLASTICI INDIRATION HARD FACED FINGER BITS CME-45C X -N XWL FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. PLASTICITY INDEX (PI) DRY STRENGTH TUNG,-CARBIDE INSERTS ___-H____ NONPLASTIC VERY LOW X CME-550 0-5 RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIARI F LOW PLASTICITY 6-15 SLIGHT CASING X W/ ADVANCER HAND TOOLS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. PORTABLE HOIST TRICONE ____ *STEEL TEETH POST HOLE DIGGER GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; HIGH PLASTICITY 26 OR MORE MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER. TRICONE ___ HAND AUGER GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; SOUNDING ROD INDURATED CORE BIT DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN. RED. YELLOW-BROWN, BLUE-GRAY). DIFFICULT TO BREAK WITH HAMMER. VANE SHEAR TEST MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE. SAMPLE BREAKS ACROSS GRAINS.

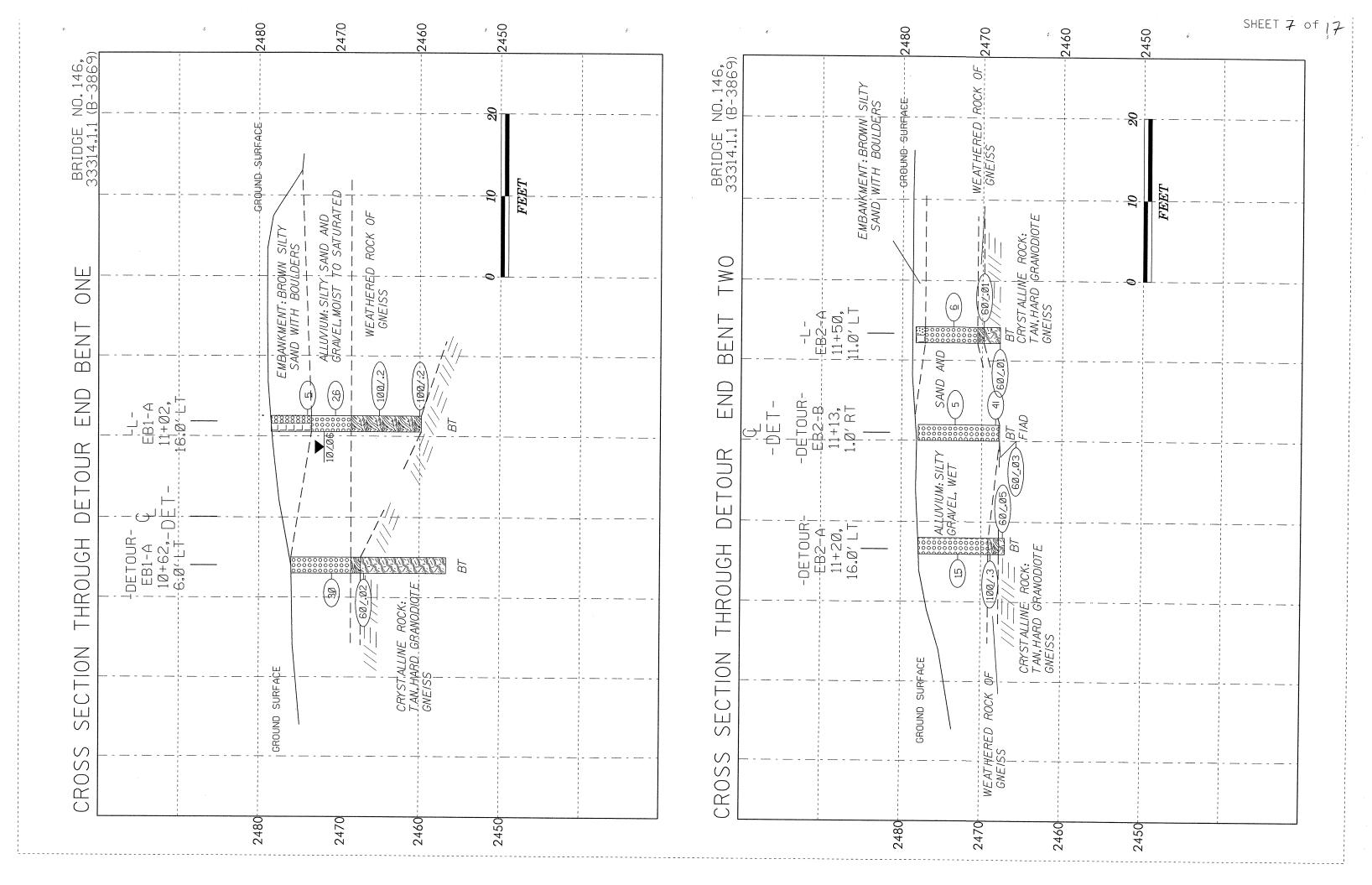
PROJECT REFERENCE NO. SHEET NO. 33314.1.1_(B-3869) 2.



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2480		EMBANKMENT: BROWN SILTY SAND	EB2-A 10+94, 6.0' RT			EB2–B 11+33, 12.0' RT	EXISTING GROUND	248
2470 2460		AND-GRAVEL ALLUVIUM: GRAY-BROWN SILTY SAND WITH GRAVEL AND BOULDERS WEATHERED ROCK OF META-SEDIMENT	9	CREEK SURFAC		-II/O8 OF ORGANA OF ORGANA SAND	'N SANDY SILT WITH TRACE C-MATTER,SHTY-SAND D BASAL GRAVEL LAYER WITH AND BOULDERS	247
2450		CRYSTALLINE ROCK: META-SEDIMENT	BT FIAD			BT FIAD		246 245
2440								244
			11+00				11+50	

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2480			1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	-A -DET- 10+62, 6.0'LT					11 -	†-DET- +20, 0'LT			2480
2470		EXISTING GROUN	30)	ALLUVIUM: BROWN SIL AND GRA	TY SAND - VEL, MOIST	WATER SI	RFACE 10/06	ALLUVIUM BROWN SILTY AND GRAVE			- EXISTING GRO	UND —	
2470		//	601.02)		TE GNEISS LUNE ROCK: RD,GRANODIORITE		702 10700	<u>WEAT HERED</u> ///// crys	ROCK: 60/205	DOV.3 GRAND ON / / / / / / / / / / / / / / / / / / /	D <u>IOR</u> ITE GNEISS DIORITE GNIESS		2470
2460				DRY 10/206								-	2460
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NCDOT GEOTECHNICAL ENGINEERING UNIT

GEOLOGIST Daniel, T. B. ID. B-3869 **COUNTY MADISON** PROJECT NO. 33314.1.1 SITE DESCRIPTION BRIDGE NO. 146 ON SR-1151 OVER BIG PINE CREEK GROUND WTR (ft) ALIGNMENT -L-STATION 11+02 OFFSET 16ft LT 0 HR. N/A **BORING NO. EB1-A EASTING** 869,687 COLLAR ELEV. 2,476.0 ft TOTAL DEPTH 18.7 ft **NORTHING** 762,739 24 HR. 6.6 HAMMER TYPE Automatic **DRILL MACHINE CME-550X** DRILL METHOD H.S. Augers SURFACE WATER DEPTH N/A DEPTH TO ROCK N/A **START DATE** 10/16/06 **COMP. DATE** 10/16/06 | DRIVE | DEPTH | BLOW COUNT | | Count BLOWS PER FOOT SAMP. SOIL AND ROCK DESCRIPTION MOI G (ft) 0.5ft 0.5ft 0.5ft 0 50 75 NO. 100 2480 GROUND SURFACE 2,476.0 ROADWAY EMBANKMENT EMBANKMENT: BROWN SILTY SAND WITH BOULDERS 2475 2,472.5 3.5 ALLUVIAL ALLUVIUM: BROWN SILTY SAND AND GRAVEL 2470 2,467.5 8.5 12 WEATHERED ROCK WEATHERED ROCK OF GNEISS 2465 2,462.5 13.5 22 68 32 1001.7 2460 2,457.5 18.5 Boring Terminated by Auger Refusal at Elevation 2,457.3 ft CRYSTALLINE ROCK: TAN, HARD, GRANODIORITE GNEISS 100/.2 100/.2 2450 2445 2440 2435 2430 2425 2420 2415 2410 2405

3/17

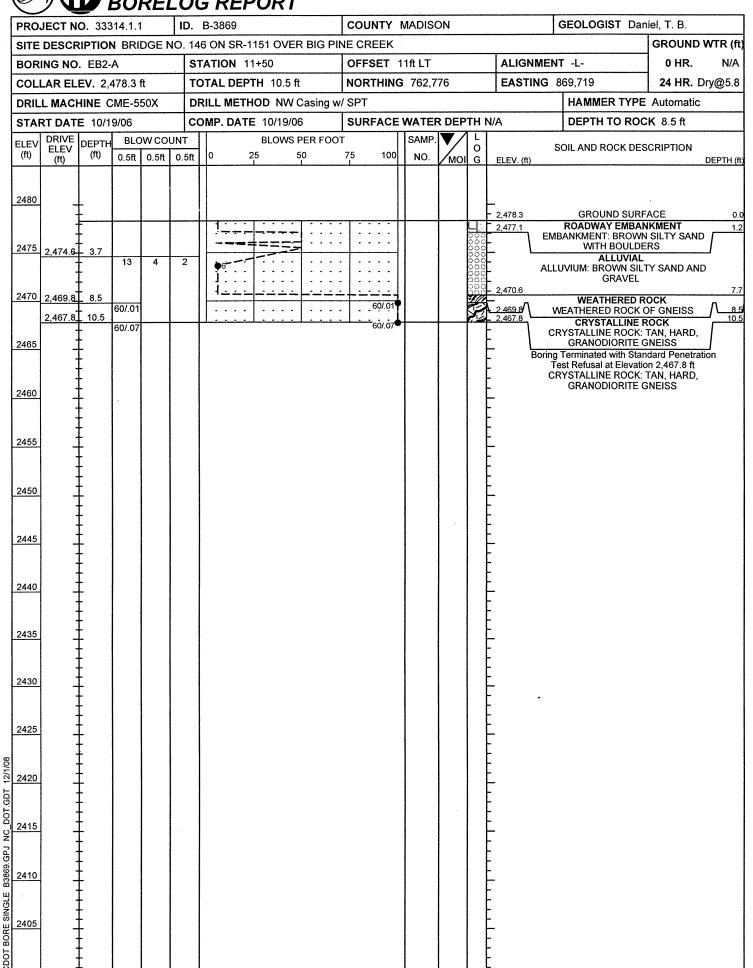


PRO	JECT N	O. 33	314.4.4	4	IE).	B-386	59			cou	NTY	Madiso	n			GEOLOGIST Hager, M. M.		
SITE	DESCR	IPTIO	N Bric	ige N	D. 14	16	ON SI	R-115	1 OVER E	BIG PINE	CRE	EK.						GROUND	WTR (f
BOR	ING NO	. EB1	-B			Sī	TATIO	N 10)+94		OFF	SET 6	oft RT			ALIGNME	NT -L-	0 HR.	6.8
COL	LAR EL	EV. 2,	478.8	ft		TC	OTAL	DEPT	TH 24.9 ft		NOR	THING	762,7	721		EASTING	869,701	24 HR.	FIAD
DRIL	L MACH	HINE (CME-5	50		DF	RILL N	NETH	OD NW	Casing w	SPT	Core				HAMMER TYPE Automatic			
STA	RT DAT	E 11/2	20/08			CC	OMP.	DATE	11/20/08	3	SUR	FACE	WATE	R DEF	TH I	√A	DEPTH TO RO	OCK 16.1 ft	
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT					PER FOOT			SAMP.	-	L		SOIL AND ROCK DI	ESCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5	ft	0	1	5 5	i0 	75	100	NO.	MO		ELEV. (ft)			DEPTH
2480	_	_														2,478.8		25.05	,
	-	-		†	I^-	7	-				T			1	H3	-	GROUND SUF	ANKMENT	(
2475	1	-						::			::					2,476.7	Brown silty sand a		2
2413	2,473.8	5.0		<u> </u>	<u>_</u>	╛					 			1	000	– Gra	y-brown silty sand wit	h gravel. Boulde	rs
	-	-	1	4	6		∶ ♦	10 -			: :	::		₹W7	0000	<u>.</u>			
2470		-					• •	-:-:			<u> </u>				000	- 2,469.2			
	2,468.8	<u>10.0</u>	34	39	61/0).4	::	::			1::			I	10	2,409.2	WEATHERED		g
	1	-				-	: :	: -				00/0.9		l		•	Weathered rock of me	eta-sediment.	
2465	2,463.8	15.0					 				+								
		-	80	20/0.1	1			::			- 1	00/0.6				2,462.7	CRYSTALLINE	BUCK	16
2460	_	-														· ·	OKTOTALLINE	. ROOK	
	1	-		İ					• • •, •		٠.					2,458.2			20
	I	-					::				::						CRYSTALLINE	ROCK	
2455	1	-				1					┼	\dashv				- - 2,453.9			24
	1	•												1			ing Terminated at Elev meta-graywa		in
2450	1	•														•	meta-graywa	icke.	
	1	-														- ·			
	1	•														•			
445		-																	
	1	• •														•			
2440	‡																		
2440	†	-			İ											-			
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435						1									<u> </u>	_			
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2430	1	•				١									E	_			
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425	Ŧ																		
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420		•														<u> </u>			
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415	1														E	-			
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410	<u> </u>														F	_			
	Ŧ														F	_			
	‡														F				
2405	+														 	-			
l	‡																		
400	‡																		



SHEET 9/17

PRO	JECT N				D. B-					CC	UNTY Madison		GEOLOGIST Hag	er M M	
-				ge NO. 1			151 OVE	R BIC	PINE	<u> </u>			- CLOCOGO Tray	GROUND	WTR (ff)
	RING NO						10+94				······································	ALIGNMEN	IT -L-	0 HR.	6.8
COL	LAR EL	EV. 2,	478.8	ft	TOT	AL DE	PTH 24	.9 ft		 		EASTING		24 HR.	FIAD
DRIL	L MACI	INE C	ME-5	50	DRIL	L ME	THOD N	W Ca	sing w	ــــــــــــــــــــــــــــــــــــــ			HAMMER TYPE	Automatic	
STA	RT DAT	E 11/2	20/08		COM	P. DA	TE 11/2	0/08		su	RFACE WATER DEPTH N/A	DEPTH TO ROC	K 16.1 ft		
COR	RE SIZE	NXWL	•		TOT	AL RU	N 8.8 ft			DR	ILLER Coffey, Jr., C.				
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	UN RQD	SAMP.	STF REC.	RQD	Г	DES	SCRIPTION	AND REMARKS		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	ELEV. (ft)			·	DEPTH (ft)
2462.7	3 2,462.7_	_ 16.1	3.8	0:59	(1.2)	(0.3)				1	- 2,462.7		g @ 16.1 ft LINE ROCK		16.1
2460	450.0	- 400		1:08 1:08	32%	8%					Light tan and gray met	ta-siltstone. I		eathered. Soft	
	2,458.9	19.9	5.0	0:55/0.8 0:58 1:24	(3.8)	(1.8)			ļ		a) Abu		along bedding @ 45°. is @ 10°.		20.6
2455	-	-		1:53	76%	36%					Gray meta-gray	CRYSTAL	LINE ROCK tly weathered. Modera	tely hard	<i>-</i>
2400	2,453.9	24.9		1:52 1:40							2,453.9 a)) Parts along	bedding @ 45°. is @ 60°.	toly nata.	24.9
		- -									Boring Terminate		on 2,453.9 ft in meta-g	aywacke.	J
2450	-	_													
		-			l						•				
2445]										· •				
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2440		-									• •				
2440	-	- -													
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2435	-	-									<u>-</u>				
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2400]	_									-				
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2385]	-									-				
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PRO.	JECT N	O. 333	314.4.4	1	IE),	B-386	69			cou	NTY	Madiso	1			-	SEOLOGIST Ha	ger, M. M.	
SITE	DESCR	IPTIO	N Brid	ge NC). 14	46 C	ON SI	R-1151	OVER E	IG PINE	CREE	EK.							GROUND	WTR (f
BOR	ING NO	. EB2-	В			ST	ATIO	N 11+	+33		OFF	SET '	12ft RT			ALIGN	MENT	Г -L-	0 HR.	7.8
COLI	LAR EL	EV. 2,	478.31	ft		то	TAL	DEPTI	H 19.8 ft		NOR	THING	762,7	76		EASTIN	IG 8	69,721	24 HR.	FIAD
DRIL	L MACI	INE C	ME-5	50		DR	RILL	METHO	D NW C	Casing w	SPT	Core						HAMMER TYPE	E Automatic	
STAF	RT DAT	E 11/2	0/08			CO	MP.	DATE	11/20/08	3	SUR	FACE	WATE	R DEP	1 HT	N/A		DEPTH TO RO	CK 12.8 ft	
ELEV	DRIVE	DEPTH	BLC	ow co	UNT	- T	T		BLOWS F	PER FOOT			SAMP.	\bigvee	L		Si	OIL AND ROCK DE	SCRIPTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5	5ft	0	25 1	5	0.	75 	100	NO.	MO	G	ELEV. (ft)		——————————————————————————————————————		DEPTH
												l								
2480						-														
	-												<u> </u>	<u> </u>		2,478.3		GROUND SUR		
	-	-					1:1:				: :					_		ROADWAY EMBA Brown silty sand ar		
2475	_	F					H				+									
	2,473.4	4.9	12	5	2	1	7	,		: : : :	: :					2,473.4 2,471.9		ALLUVIAL		
2470	-						1 1		<u> </u>		Ŀ	<u>: : </u>		∇		2,470.3	Bro	wn sandy silt with tra material.		
	-	Ė				١					٠.				000	- \		ALLUVIAL Brown silty sand wi		7
		‡					: :								000	- L		ALLUVIAL	•	
2465	-	ţ			l		::				1::					- 2,465.5 -	В	rown sand, gravel a		12
		<u> </u>					: :				: :	::				-				
	-	Ļ					: :				: :					-				
2460	-	ŀ					-				+					 - 2,458.5				1
			<u> </u>													- E	Boring	Terminated at Elevi meta-graywad		in
2455	-	Ł														-		meta-graywa	ж	
		F																		
		F														-				
2450	_	‡														_				
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0445		‡														-				
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2435	_	‡														_				
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SHEET

PROJECT NO. 333/14.4 D. B-3889	2	YŲ	D (CO	RE E	BOR	NN	G RE	PO	RT	•	•		,	÷ .	1/17
EOPING NO. E82-8 STATION 11-93 OFFSET 12R RT ALKINMENT -L Q HR. 7.8	PRO											UNTY Madison		GEOLOGIST Ha	ger, M. M.	
COLLAR ELEV. 2,478.3 \$ TOTAL DEPTH 19.8 \$ NORTHING 762,776 EASTING 869,721 24 R. FAD	SITE	DESCR	IPTIOI	N Brid	ge NO. 1	46 ON	SR-1	151 OVE	R BIG	PINE	E CR	EEK.				WTR (ft)
DRILL MACHINE CME-550 DRILL METHOD NW Casing w/ SPT Core SIZEN TO THE TIZO 05 COMP. DATE 1/2008 SUBFACE WATER DEPTH N/A DEPTH TO ROCK 12.8 ft TOTAL RUN 7.0 ft TOTAL	BOR	ING NO.	EB2-	В		STA	TION	11+33			OF	FSET 12ft RT	ALIGNMEN	IT -L-	0 HR.	7.8
START DATE 11/20/08	COL	LAR ELE	ΞV. 2,	478.3	ft	TOT	AL DE	PTH 19	.8 ft		NO	RTHING 762,776	EASTING	869,721	24 HR.	FIAD
CONFIDENCE CON	DRIL	L MACH	IINE C	ME-5	50	DRIL	L ME	THOD N	W Cas	sing w	/ SP	T Core		HAMMER TYPI	E Automatic	
ELEV CHIP	STAI	RT DATE	∃ 11/2	0/08		COM	P. DA	TE 11/2	0/08		SU	RFACE WATER DEPTH N/	A	DEPTH TO RO	CK 12.8 ft	
10 (0 0 0 0 0 0 0 0 0	COR	E SIZE	NXWL					N 7.0 ft			DF	ILLER Cheek, D. O.				
2463.6 1.8 2.0 1.2 (1.8) (0.7)		ELEV			RATE	REC.	JN RQD (ft) %		REC. (ft) %	RQD (ft) %	0		ESCRIPTION	AND REMARKS		DEPTH (ft)
2460 - 14.8 1.12 305 305 4.8 1.3 4.8	2465.4	5	- 10 0													
2450		2,463.5	- 12.8 - 14.8		1:12	90%	(0.7) 35%								Fissile.	12.8
2485 19.8 13.8 13.4 19.8 2455 19.8 13.4 19.8 2455 80 19.8 80 1		1	•	5.0	1:24	(4.6) 92%	(3.5) 70%						a) Parts along	bedding @ 45°.		
2455 Boring Terminated at Elevation 2,458.5 ft in meta-graywacke.	2460	2 450 5	- - - 10 0		1:35								c) Joint	s @ 20°.		
2445.		2,438.5	19.0		1:34							- 2,458.5 - Boring Termina	ated at Elevation	on 2,458.5 ft in meta-	graywacke.	19.8
2449 2449 2449 2449 2438 2439 2425 2420 2416 2417 2418 2418 2418 2418 2418 2418 2418 2418	2455	1	•									_				
2449 2449 2449 2449 2438 2439 2425 2420 2416 2417 2418 2418 2418 2418 2418 2418 2418 2418		<u> </u>										<u>.</u>				
2449 2449 2449 2449 2438 2439 2425 2420 2416 2417 2418 2418 2418 2418 2418 2418 2418 2418	2450	‡										<u>.</u>				
2440 2435 2430 2425 2425 2410 2410 2410 2410 2410 2410 2410 2410	2450	‡	-									-				
2440 2435 2430 2425 2425 2410 2410 2410 2410 2410 2410 2410 2410		‡										<u>-</u>				
2435 2430 2425 2420 2410 2400	2445	‡	• •									-				
2435 2430 2425 2420 2410 2400		‡										- -				
2435 2430 2425 2420 2410 2400	2440	+ ‡										- -				
2425		‡										- -				
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2425	2435	\pm	-									- -				
2425		I										- -				
2420 2415 2410 2410 2406 2408 2408 2408 2408 2408 2408 2408 2408	2430	<u> </u>										- - -				ļ
2420 2415 2410 2410 2406 2408 2408 2408 2408 2408 2408 2408 2408		1										- - -				
2420 2415 2410 2410 2406 2408 2408 2408 2408 2408 2408 2408 2408	2425	‡										- -				l
2415 2410 2406 2400 2396	2425	+	•													
2415 2410 2406 2400 2396		‡										<u>.</u> -				
2410	2420	+	•					-				-				
2410		Ŧ										<u>.</u>				
2405 2400 2395	2415	\pm										•				
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<u> </u>	/ U		BOI	KEL		G	REPORT		
	JECT NO						B-3869		DGIST Daniel, T. B.
SITE	DESCR	IPTIO	N BRII	DGE N			ON SR-1151 OVER BIG PI		GROUND WTR (ft)
BOR	ING NO.	EB1-	Α		s	STA	ATION 10+62	FSET 6ft LT ALIGNMENT -DET	· .
COL	LAR ELI	EV. 2,	478.5 f	ft		гот	TAL DEPTH 19.3 ft	RTHING 762,755 EASTING 869,676	
DRIL	L MACH	IINE (ME-5	50X	ם	DRI	ILL METHOD H.S. Augers	HAMI	MER TYPE Automatic
STAI	RT DATE	≣ 10/1	6/06		c	100	MP. DATE 10/17/06		TH TO ROCK 8.7 ft
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	JNT 0.5ft	t	BLOWS PER FOO 0 25 50	100 NO. MOI G ELEV. (ft)	D ROCK DESCRIPTION DEPTH (ft)
2480	_	_						2,478.5 GR	OUND SURFACE 0.0
2475	2,474.4	- - - - 4.1	13	17	13			OCC ALLUVIUM:	ALLUVIAL BROWN SILTY SAND AND RAVEL, MOIST
2470	2,469. 4 -	- - - 9.1	60/.02		10		• • • • • • • • • • • • • • • • • • •	- 60/.02 WEATHE	7.5 ATHERED ROCK 8.7 RED ROCK OF GNEISS
2465	-	-	607.02					CRY WHITE TO TA PREDOMI	/STALLINE ROCK IN GRANODIORITE GNEISS. INATELY QUARZT WITH AND BIOTITE. HARD; VERY HTLY WEATHERED. 14.3
2460	-	-						WHITE TO TA PREDOMI	/STALLINE ROCK IN GRANODIORITE GNEISS. INATELY QUARZT WITH AND BIOTITE. HARD; VERY 19.3 HTLY WEATHERED.
2455	-							– Test Refus – CRYSTALI	ated with Standard Penetration sal at Elevation 2,459.2 ft LINE ROCK: TAN, HARD, NODIORITE GNEISS
2450	-	-							
2445		- - -							
2440		- - -							
2435	-								
2430	-								
2425	-								
2420									
2415	-								
2410	-	 - - -							
2405		† † †							

SHEET 1 OF1

							DATE <u>18-Oct-06</u>						
					CO	RE	BORING REPORT						
PROJE	CT: _	33314	<u>.1.1</u>	I. D. NO:	B-38	369	BORING NO: <u>EB1-A (-DET-)</u> GEOLOGIST: <u>C A Dunnagan</u>						
DESCB	ESCRIPTION: Bridge No. 146 on SR-1151 over Big Pine Creek												
DESCR	IF HON.		bridge	110. 140 (<u> </u>	31 Over	big Pirie Creek						
COUNT	Y:	Madison		•	COLLA	R ELEV	ATION: <u>2476.0</u> FT. TOTAL DEPTH: <u>19.3</u> FT.						
		DRILL		REC.	RQD.								
ELEV.	DEPTH	RATE	RUN	FEET	FEET	SAMP.	FIELD CLASSIFICATION AND REMARKS						
(FEET)	(FEET)	MIN./FT.	(FEET)	%	%	#							
2466.8	9.2		1 1	4.0	0.0								
			5.1	4.6	2.9		M/hite to linkt ton many dispits maning Double in the maning to						
] 3.1	90	57		White to light tan granodiorite gneiss. Predominately quartz with trace amounts of feldspar and biotite. Hard, very slightly weathered. Generally						
2461.7	14.3		1 "		0,		massive with weakly foliated zones. Slightly fractured with joints						
2461.7	14.3				***************************************		at 10° and 45°.						
•				4.0	2.8								
		20	5.0				•						
	40.0			80	56								
2456.7	19.3												
			1										
			1	ĺ									
			1 1										
			new-money-washing.		······································		CORING TERMINATED AT						
·····							ELEVATION 2456.7 FT.						
		D D 21 :	9.1.				OITE MAN						
DH	KILLEK:	R D Chi	iders	-		CORE	SIZE: NXWL EQUIPMENT: CME-550						



PRO	JECT N	O. 33	314.1.	1	ID.	. E	B-3869	COUNT	ΥN	MADISC	ON			GEOLOGIST Da	niel, T. B.	
SITE	DESCF	RIPTIO	N BRI	DGE I	NO. 1	46	ON SR-1151 OVER BIG F	INE CREE	K						GROUND	WTR (f
BOR	ING NO	. EB2	-A(-DE	:T-)	1	STA	ATION 11+20	OFFSE	Γ 1	6ft LT			ALIGNM	ENT -DET-	0 HR.	N/A
COL	LAR EL	EV. 2,	477.8	ft	Ti	ro	TAL DEPTH 10.8 ft	NORTH	ING	762,8	06		EASTING	G 869,707	24 HR. D	ry@3.3
DRIL	L MACI	HINE (CME-5	50X	C	DRI	ILL METHOD NW Casing	w/ SPT						HAMMER TYPE	E Automatic	
STAI	RT DAT	E 10/1	8/06		0	COI	MP. DATE 10/18/06	SURFA	CE	WATER	DEP	TH N	N/A	DEPTH TO RO	CK 10.0 ft	· · · · · · · · · · · · · · · · · · ·
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT	\prod	BLOWS PER FO	T		SAMP.	lacktriangledown/	г о		SOIL AND ROCK DE	SCRIPTION	•
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5f	Щ	0 25 50	75 1	00	NO.	MOI	1	ELEV. (ft)	COLE / WE NOOK BE		DEPTH
2480	-											000		GROUND SURI ALLUVIAL		
2475	2,473.8	4.0	woн	WOH	15	-				SS-1			- - -	ALLUVIUM: GRAY TO E SAND WITH GR	ROWN SILTY	
2470	2,468.8_ 2,467.1		100/.3	0				100	/.3				2,469.1 2,467.8	WEATHERED F		10
2465	- - - -	- - -	60/.05	<u> </u>				60/.0	05				2.467.0	WEATHERED ROCK CRYSTALLINE I CRYSTALLINE ROCK: GRANODIORITE	ROCK TAN, HARD, GNEISS	
2460	- - -												- Bor	ring Terminated with Star Test Refusal at Elevati CRYSTALLINE ROCK: GRANODIORITE	on 2,467.0 ft TAN, HARD,	ion
2455	-											-	-			
2450	-												- - -			
2445	-	-										-	· · -			
2440	1	-											· · -			
2435	-												- -			
2430	- - - -	- - - -										-	- -			
2425	- - - - -	- - - -										- -	· · · · · · · · · · · · · · · · · · ·			
2420	- - - - -	- - -										- - -	-			
2415	+ - - -	• • •										- - - -				
2410	<u> </u>	• • •										- - -	-			
2405		• •										-	_			
2400	1	•										F				



SHEET 13/17

PRO	JECT N						3869				T	CO11	NTV	MADIC	ON.			Torsussian s		
	DESCR							1151	0)/[D DI				MADIS	ON			GEOLOGIST Da		
	~			DGE						K BI	G PIN						T		GROUND	
	ING NO			<u></u>			TION					OFFSET 1ft RT ALIGNMENT -DET- NORTHING 762,791 EASTING 869,713				0 HR.	N/A			
	LAR ELI						AL DEF					NOR	THING	762,7	791		EASTING		24 HR.	FIAD
	L MACH			50X			L MET											HAMMER TYP		
	RT DATI		T			OM	P. DAT				L		FACE	WATE	T	A .	N/A	DEPTH TO RO	CK 10.1 ft	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	,	0		25 L	LOWS	PER 50		75	100	NO.	МО	0 I G	ELEV. (ft)	SOIL AND ROCK DE		DEPTH (ft)
2480	_	-																GROUND SUF	RFACE	0.0
2475	2,474.3	- - - 3.6	2	3	2			:		:		::	: :			0000000	-	ALLUVIA Brown silty sand w	L	
2470	2,469.3	•	9	11	30		5	:	· · · · · · · · · · · · · · · · · · ·	: - :		: :			W	000000000	-			
	2,467.7	<u> 10.2</u> -	60/.03	<u>i</u>	- 00	⊬	· · · ·	<u> </u>	. •41	<u>ا</u>	خبخ	ــــــــــــــــــــــــــــــــــــ	60/.03	 	Sat.	000	2,467.8 2,467.7/	CRYSTALLINE	ROCK	10.1
2465	 	- - -			`												- 1	Granodiorite ging Terminated with Sta Test Refusal at Elevat CRYSTALLINE ROCK	neiss. andard Penetrati ion 2,467.7 ft : TAN, HARD,	
2460	+	• • •															<u> </u>	GRANODIORITE	GNEISS	J
2455	† - -	• • •															- - - -			
2450		• • •															- - - -			
2445		· · ·															• • • -			
2440	1	• • •															• • •			
2435	1	•		*													- - -			
2430	‡	•																		
2425	‡																- - - -			
2420	‡ ‡																• • • • .			
2415	‡ <u>‡</u>				·												• • •			
2410	† †																•			
2405	1																- 			
2400	+																-		ı	

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: B-	-3869									
DEPORT ON CAMPI	EC OF. C. II.	60 .114								
REPORT ON SAMPL	LES OF: Solis	for Quality			·····					
PROJECT:	33314.1.1	CC	OUNTY:	Madi	con		Owner:	NCDO)T	· · · · · · · · · · · · · · · · · · ·
DATE SAMPLED:	10.18.06		RECEIVE		10.19.06		DATE REI		····	06
SAMPLED FROM:	Bridge	DATE			D BY:			UKIE	D: 10.25	.00
SUBMITTED BY:			SA	WIPLE	DBY:		unnagan	TDADD	CDECITIO	TEXANI
LABORATORY:	W. D. Frye	· · · · · · · · · · · · · · · · · · ·				2002	SIAN	DAKD	SPECIFICA	TION
LABURATURY:	Asheville									
			TEST	RESU	ULTS					
Project Sample No.	SS-1									
Lab Sample No. A	153940									
HiCAMS Sample #										
Retained #4 Sieve %	0.0									
Passing #10 Sieve %	92									
Passing #40 Sieve %	72							٠,		
Passing #200 Sieve %	41	·								
		M	INUS #1	0 FR	ACTIO	N				
Soil Mortar - 100%										
Coarse Sand -Ret. #60	45									
Fine Sand - Ret. #270	16									
Silt 0.05-0.005 mm %	25									
Clay < 0.005 mm %	14									
Passing # 40 Sieve %										
Passing # 200 Sieve %	<u> </u>							l		<u> </u>
			···							
Liquid Limit	33									
Plastic Index	NP									
AASHTO Classification	A-4 (1)									
Quantity										
Texture	12.02									
Station Hole No.	13+02					-				
	1.5								······································	
Depth (ft) From: To:	4.5 5.1				····					
10;	3.1					 				
Remarks:					····					<u> </u>

A-153940								····		
CC:										
C. A. Dunnagan										
File							***************************************			
					·		·····			
SOILS ENGINEER:		······································		***************************************			***************************************			



FIELD SCOUR REPORT

WBS:_	33314.1.1	_ TIP:	B-3869	COUNTY: Madison							
DESCRIPTION(1): B	ridge No. 146	on SR-11		Creek							
			EXISTING								
Information from:	Field Ir Other	spection (explain)	! Mici	rofilm (reel pos:)							
Bridge No.: 14 Foundation Type: P	6 Length: ile	29.0ft	Total Bents:2	Bents in Channel: 0 Bents in Floodplain: 2	-						
EVIDENCE OF SO Abutments or En		Very min	or amount along	concrete pile cap at EB2.	-						
Interior Bents: N											
Channel Bed: N	one noted.										
Channel Bank: U											
EXISTING SCOUR PROTECTION Type(3): Pile & panel end bent walls.											
Extent(4): W	Extent(4): Walls extend +/- 5.0ft beyond either side of bridge.										
Effectiveness(5): Fi	ne.										
Obstructions(6): No	one noted.										

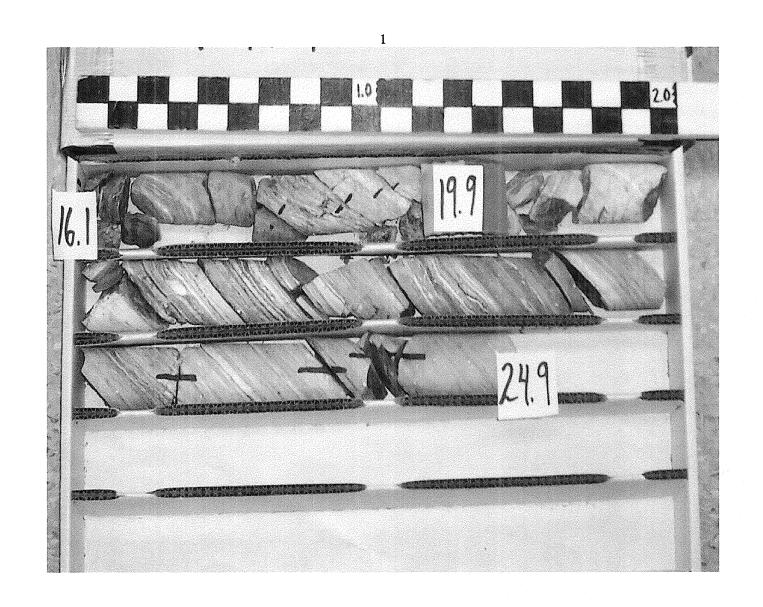
INSTRUCTIONS

- 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.
- Note obstructions such as dams, fallen trees, debris at bents, etc.
- Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 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.

SHEET	15/	17
		1 1

	DESIGN INFORMATION
Channel Bed Material(7)): Sand, gravel, cobbles and boulders.
Channel Bank Material(8)): Silty sand.
Channel Bank Cover(9)): Trees, shrubs and grass.
Floodplain Width(10)): <u>> 100ft</u> .
Floodplain Cover(11)	
Stream is(12)): Aggrading Degrading X Static
Channel Migration Tendency(13)): Southeast.
Observations and Other Comr	ments:
DESIGN SCOUR ELEVATION	NS(14) Feet Meters
DENTO	
BENTS B1	<u> </u>
SB Lanes, Lt	
SB Lanes, Rt	
NB Lanes, Lt	
NB Lanes, Rt	
-	
Comparison of DSE to Hydrau	ulics Unit theoretical scour:
No scour indicated in Bridge R	Report & Hydraulic Design Report (9/05).
SOIL ANALYSIS RESULTS F	ROM 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	
	Template Revised 02/07/

Reported by: C A Dunnagan	Date:	10/2/2006
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33314.1.1 (B-3869)
Madison County
Bridge No. 146 on SR-1151
Over Big Pine Creek.
EB1-B
Box 1 of 1

33314.1.1 (B-3869)
Madison County
Bridge No. 146 on SR-1151
Over Big Pine Creek.
EB2-B
Box 1 of 1



33314.1.1 (B-3869)
Madison County
Bridge No. 146 on SR-1151
Over Big Pine Creek.
EB1-A (-DET-)
Box 1 of 1