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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 32649.1.1 (B-2532) F.A. PROJ. BRSTP-0708(4)

COUNTY CRAVEN

PROJECT DESCRIPTION BRIDGE NO. 60 ON US 70 BUSINESS OVER

THE TRENT RIVER

SITE DESCRIPTION <u>RETAINING WALL 1 LEFT OF -L- AT STA. 36+00</u>

AND WALL 2 RIGHT OF -L- AT STA. 36+00

N.C. 32649.1.1 1 5

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 BORNING LOGS, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING LINIT AT (919) 250-408B. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOGS, ROCK CORES, OR SOLI TEST DATA ARE PART OF THE CONTRACT.

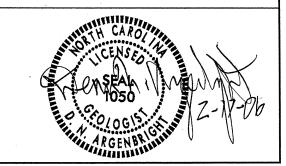
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA AND THE RESERVENT SAMPLED STRATA AND THE IN STIU (IN-PLACE) TEST DATA CAN BE RELIED ON ORLY TO THE DEGREE OF RELIABLITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTURE CONDITIONS INDICATED IN THE SUBSURFACE 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 PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS 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 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.

_	WNC
_	LWD
	RES
· _	FMW
INVESTIGATED B	Y F. M. WESCOTT
CHECKED BY	D. N. ARGENBRIGHT
SUBMITTED BY_	D. N. ARGENBRIGHT

PERSONNEL

FEBRUARY 2006



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

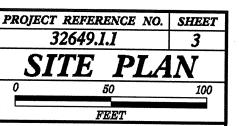
COV. DECODINETION		CA LEGEND, IERM	is, stribols, A			
SOIL DESCRIPTION	GRADATION WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES	FROM FINE TO COARSE.	HARD ROCK IS NON-CO	ASTAL PLAIN MATERIAL TH	DESCRIPTION HAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	<u>UNIFORM</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY TH POORLY GRADED)		I ROCK LINE INDICATES	THE LEVEL AT WHICH NON	NOT THE STATE WOLLD YIELD STATE OF THE STATE	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR		IN NON-COASTAL PLAT OF WEATHERED ROCK.	N MATERIAL. THE TRANSIT	TION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADDINGER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE		ROCK MATERIALS ARE	TYPICALLY DIVIDED AS FO	DLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS.
VERY STAFF, GRAY, SETT CLAY, MOST WITH INTERBEDDED FINE SAID LAVERS, HIGHLY PLASTIC, 4-7-6	SUBANGULAR, SUBROUNDED, DR ROUNDED.	TENTOS MINODERIS		NON-COASTAL	PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITI	ON	ROCK (WR)	BLOWS PER F	OOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	USED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)	WOULD YIELD	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 OR ABOVE THE GROUND SURFACE.
CLASS. (\$ 35% PASSING *200) (> 35% PASSING *200)		· · · · · · · · · · · · · · · · · · ·	MON-COVETAL LINE	UNEISS, GABBH	RD, SCHIST, ETC. RSE GRAIN METAMORPHIC AND NON-CDASTAL PLAIN	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 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3-7-8 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT	T LESS THAN 31	NON-CRYSTALLINE ROCK (NCR)	SEDIMENTARY	ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOC	MODERATELY COMPRESSIBLE LIQUID LIMIT	T EQUAL TO 31-50	COASTAL PLAIN	COASTAL PLAI	'LLITE, SLATE, SANDSTONE, ETC. N SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	4
Z PASSING	PERCENTAGE OF MATERIA	T GREATER THAN 50	SEDIMENTARY ROCK (CP)	SPT REFUSAL. SHELL BEDS, E	RUCK 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.
* 10 50 MX GRANULAR SILT- MUCK,	ORGANIC MATERIAL GRANULAR SILT - CLAY	·		W _E	EATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40 38 MX 58 MX 51 MN S01LS PEAT 200 15 MX 25 MX 16 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	SULS SULS	OTHER MATERIAL RACE 1 - 10%	FRESH ROCK FRES	SH, CRYSTALS BRIGHT, FEW	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
TIME LITHER THAT	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LI	TTLE 10 - 20%	1	CRYSTALLINE.		HORIZONTAL.
PLASTIC INDEX 6 MX NP 18 MX 10 MX 11 MN 10 MX 11 MN 10 MX 11 MN 11 MN LITTLE OR HIGHLY		DME 20 - 35% IGHLY 35% AND ABOVE	(V SLI.) CRYSTALS	ON A BROKEN SPECIMEN F	AINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANI			OF A CRYS	STALLINE NATURE.		THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER	DRILLING	SLIGHT ROCK GENE (SLI.) 1 INCH. OP	ERALLY FRESH, JOINTS STA EN JOINTS MAY CONTAIN C	AINED AND DISCOLORATION EXTENDS INTO ROCK UP TO CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS		CRYSTALS	ARE DULL AND DISCOLORE	D. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING	PW PERCHED MATER CATHRATER 70HE OR MATER REAL	DINC CIDATA	MODERATE SIGNIFICAN (MOD.) GRANITOID	NT PORTIONS OF ROCK SHO	OW DISCOLORATION AND WEATHERING EFFECTS. IN ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAB	LE MANUEL MANUEL DE MANUEL	KING SIRATA	DULL SOUN	ND UNDER HAMMER BLOWS I	AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP		WITH FRES MODERATELY ALL ROCK		ED DD CTANED IN COMMITTED DOORS IN THE DOORS	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOL	S	SEVERE AND DISCO	LORED AND A MAJORITY SI	ED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL HOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPACTNESS OR CONSISTENCY	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SET CPT OPT ONT TEST BORD VST PMT	ING SAMPLE	(MOD. SEV.) AND CAN B	BE EXCAVATED WITH A GEO L WOULD YIELD SPT REFUS	DLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.
(M-ANEDE) (10M2/FI-)	WITH SOIL DESCRIPTION VST PMT	DESIGNATIONS S - BULK SAMPLE	SEVERE ALL ROCK	EXCEPT QUARTZ DISCOLOR	RED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUICED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE (4 TO 10 NAC)	SOIL SYMBOL AUGER BORING		(SEV.) IN STRENG	TH TO STRONG SOIL. IN G OME FRAGMENTS OF STRON	RANITOID 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	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY FMRANKMENT - CORE BORING	SAMPLE	IF TESTED	, YIELDS SPT N VALUES >	100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) VERY DENSE >50	Y	ST - SHELBY TUBE	VERY SEVERE ALL ROCK	EXCEPT QUARTZ DISCOLOR	ED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY SOFT <2 <0.25	INFERRED SOIL BOUNDARY MONITORING WE	SAMPLE SAMPLE	REMAINING.	. SAPROLITE IS AN EXAMPL	TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK LE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	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
GENERALLY SOFT 2 TO 4 0.25 TO 0.50 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE A PIEZOMETER	RM - RESILIENT MODULUS SAMPLE	VESTIGES (OF THE ORIGINAL ROCK FA	ABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIFF 8 TO 15 1 TO 2	ALLUVIAL SOIL BOUNDARY INSTALLATION	RS - ROCK SAMPLE	COMPLETE ROCK REDUI	CED TO SOIL. ROCK FABRIC	C NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICAT	OR	ALSO AN E	XAMPLE.	THAT BE THESENT AS DIKES ON STRINGERS, SAPROLITE IS	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 AN
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES	SAMPLE		ROC	K HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD REF— SPT REFUSAL	CBR - CALIFORNIA BEARING	VERY HARD CANNOT B	E SCRATCHED BY KNIFE OF	R SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		RATIO SAMPLE		HARD BLOWS OF THE GEOL	LOGIST'S PICK. ICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	ABBREVIATIONS AR - AUGER REFUSAL HI HIGHLY	w - MOISTURE CONTENT	TO DETAC	H HAND SPECIMEN.	TEK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS,
(BLDR.) (COB.) (GR.) (SAND SAND (SL.) (CL.)	BT - BORING TERMINATED MED MEDIUM	V - VERY	MODERATELY CAN BE S	CRATCHED BY KNIFE OR P	ICK. GOUGES OR GROOVES TO \$25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MICA MICACEOUS CPT - CONE PENETRATION TEST MOD MODERATELY	VST - VANE SHEAR TEST WEA WEATHERED	HARD EXCAVATE BY MODER	D BY HARD BLOW OF A GE RATE BLOWS.	EDLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLIP PLANE.
SIZE IN. 12 3	CSE COARSE NP - NON PLASTIC	7 - UNIT WEIGHT	MEDIUM CAN BE G	GROOVED OR GOUGED 0.05	INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 148 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE	DMT - DILATOMETER TEST ORG ORGANIC DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST	$\gamma_{\rm d}$ - DRY UNIT WEIGHT	HARD CAN BE E	A GEOLOGIST'S PICK.	S TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	• - VOID RATIO SAP SAPROLITIC F - FINE SD SAND, SANDY		SOFT CAN BE G	ROVED OR GOUGED READIL	Y BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIDUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY			AN BE BROKEN BY FINGER	N SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICONE REFUSAL				E EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED
PLASTIC SEMISON ID. PEONIDES, DEVING TO	Total Majorie Ner done		SOFT OR MORE : FINGERNAI	IN THICKNESS CAN BE BRO IL.	DKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
(PI) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT (PROJECT	FRACTURE	SPACING	BEDDING	IOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
"" PLL + PLASTIC LIMIT -	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:	IERM	SPACING	IERM THICKNESS	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		X AUTOMATIC MANUAL	VERY WIDE WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET	
SL _ SHRINKAGE LIMIT	MOBILE B CLAY BITS 6° CONTINUOUS FLIGHT AUGER		MODERATELY CLOSE	3 TO 10 FEET 1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: FT.
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	1 1 1	CORE SIZE:	CLOSE VERY CLOSE	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	NOTES:
	8º HULLOW AUGERS		VENT GLOSE		THINLY LAMINATED < 0.008 FEET	
PLASTICITY	CME-45C HARD FACED FINGER BITS		FOR OFFICE TOTAL		DURATION	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS		FUR SEDIMENTARY ROCKS,		ENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
LOW PLASTICITY 6-15 SLIGHT	CME-550 X CASING W/ ADVANCER	1	FRIABLE		NG WITH FINGER FREES NUMEROUS GRAINS: E BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH	HAND TOOLS: POST HOLE DIGGER	MODERATELY IN		G CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
COLOR	-l	HAND AUGER	HUDERATELY IN		S EASILY WHEN HIT WITH HAMMER.	
	X OTHER CME 45B INICONE TONGCARB.	SOUNDING ROD	INDURATED		S ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE,	OTHEROTHER	VANE SHEAR TEST			CULT TO BREAK WITH HAMMER.	·
TO DESCRIPE THE PROPERTY OF TH	UIHEK	OTHER	EXTREMELY IND		HAMMER BLOWS REQUIRED TO BREAK SAMPLE; E BREAKS ACROSS GRAINS.	
		-1	-A			1

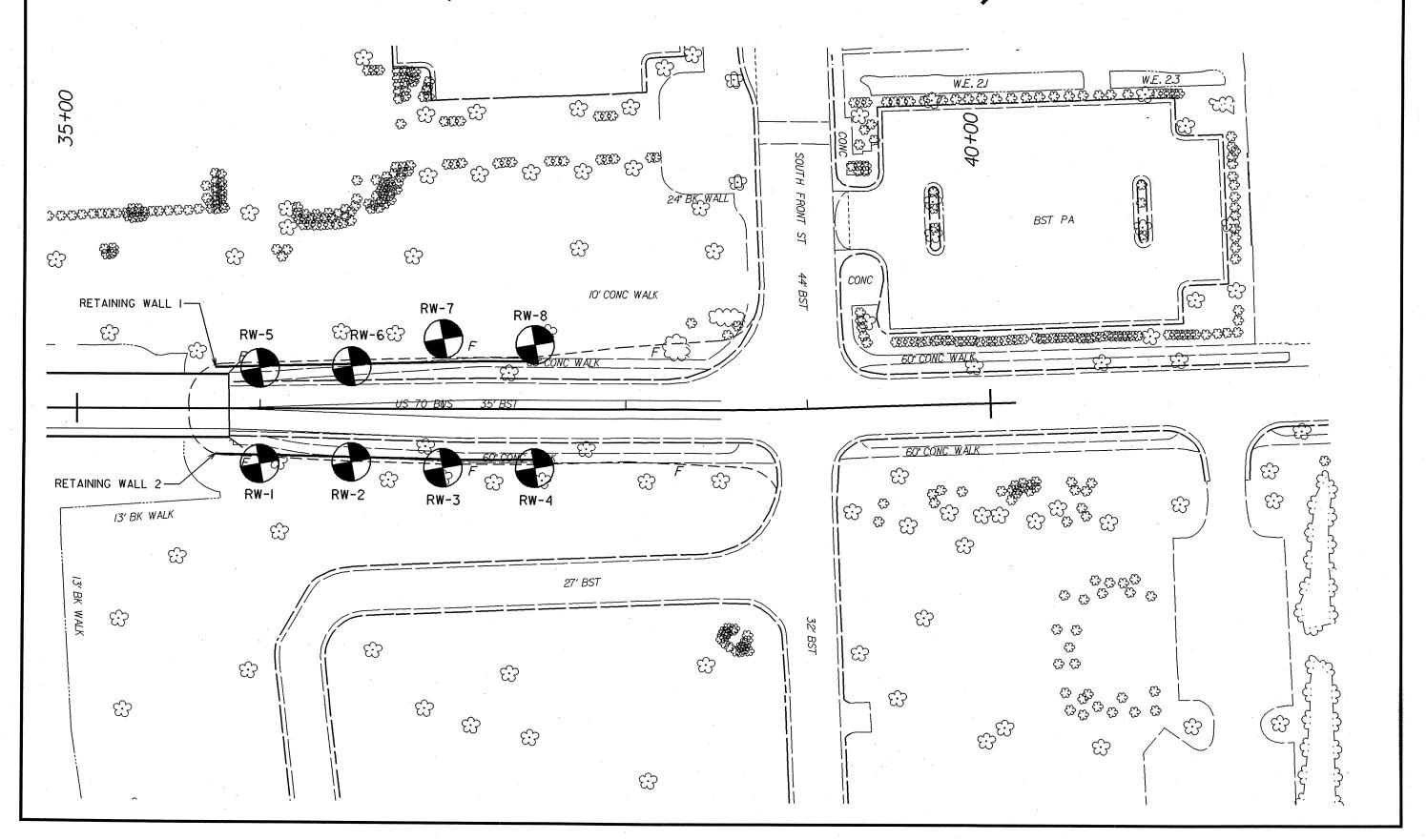
PROJECT REFERENCE NO.

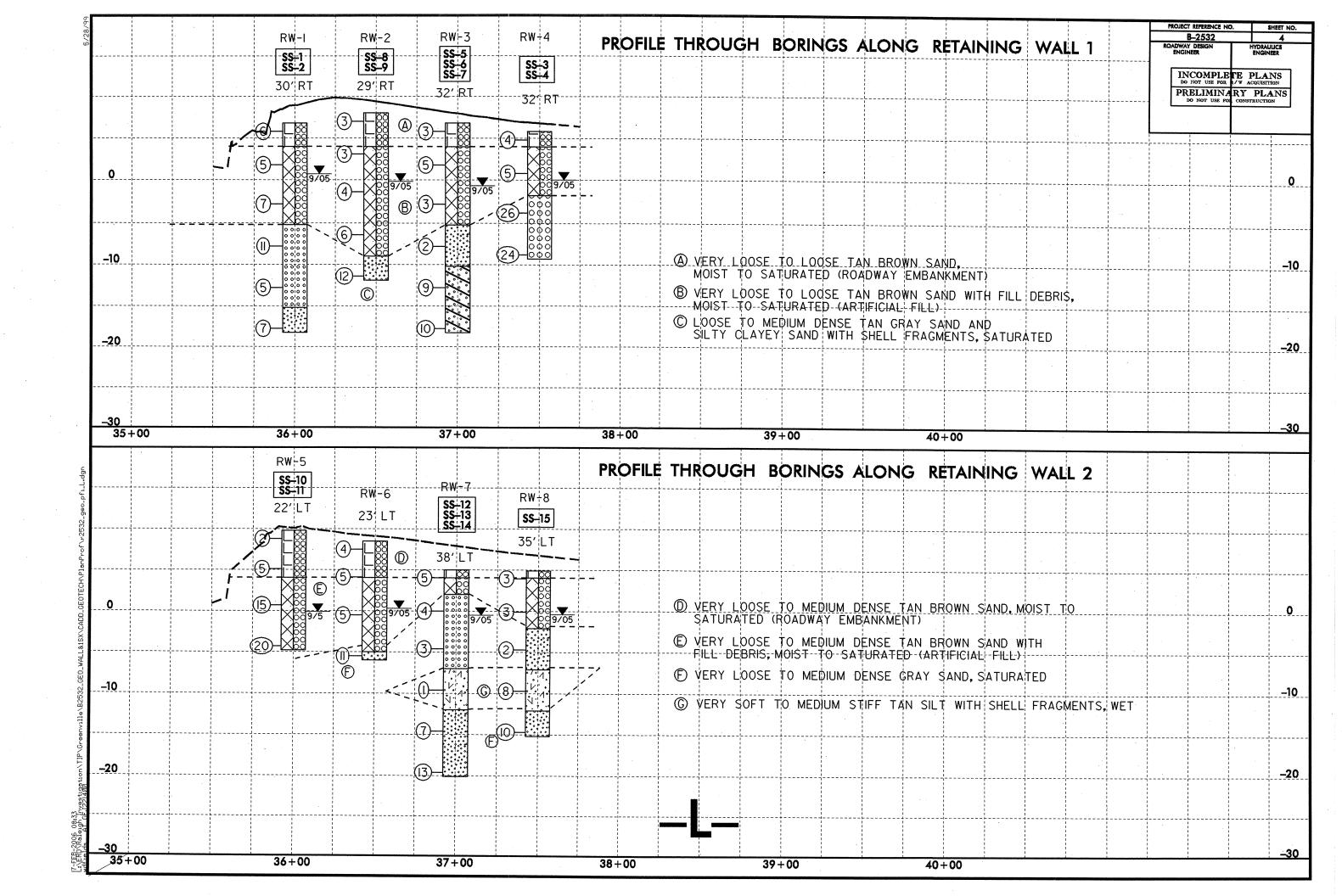
32649.I.I (B-2532)

SHEET NO.

TEST SITE PLAN (WALL 1 & WALL 2)







Proj. No. 32649.1.1 ID No. B-2532 County: Craven

HOLE#	SAMPLE#	PASS 10	PASS 40	PASS 200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
RW-1	SS-1	100	98	2	21.4	77.8	0.8	0.0	15	NP	A-3(0)	13.6-15.1		
	SS-2	97	93	38	12.8	54.8	17.2	15.2	18	4	A-2-4(0)	23.6-25.1	,	
RW-4	SS-3	60	49	15	34.0	44.6	13.8	7.6	32	NP	A-1-b(0)	4.0-5.5	•	
	SS-4	53	43	23	25.0	45.2	20.2					13.6-15.1		
RW-3	SS-5	46	39	19	26.4	40.8	17.6	15.2	29	NP	A-1-b(0)	8.6-10.1		
	SS-6	99	96	17	10.6	77.6					• •	13.6-15.1		
	SS-7	53	41	31	30.2	19.8						18.6-20.1		
													4	
RW-2	SS-8	100	31	2	87.0	11.2	0.2	1.6	21	NP	A-1-b(0)	3.9-5.4		
	SS-9	99	94	13	17.8	72.6	6.0	3.6	14	NP	A-2-4(0)	18.4-19.9		
RW-5	SS-10	99	34	2	84.0	14.8	1.2	0.0	17	NP	A-1-b(0)	3.7-5.2		
	SS-11	47	39	. 11.	28.0	52.4	12.4				A-1-b(0)			•
RW-7	SS-12	79	60	10	56.0	32.6	5.8	5.6	19	NP	A-3(0)	4.0-5.5		
	SS-13	45	45	38	6.2	13.2	63.0				` '	13.6-15.1		
	SS-14	96	94	35	4.0	67.0	17.4					18.6-20.1		
RW-8	SS-15	100	96	17	13.6	74.0	4.8	7.6	18	NP	A-2-4(0)	8.6-10.1		

CONTENTS:

NCDOT Geotechnical Engineering Unit

SupplementalLegend - CPT Equivalent

N60 Determination

Geotechnical Report

Boring Location Plan

Generalized Subsurface Profile

SPT Test Boring Logs

CPT Test Boring Logs

Summary of Laboratory Test Data

(Performed November 12, 2005)

Site Vicinity Map

Test Boring Logs

Field Scour Report

Grain Size Curves

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT_	h 1 / A	·). NO	B-2532
COUNTYCRA				
PROJECT DESCRI	PTION	BRIDGE	No. 60	OVER
THE TRENT RIVE				

STATE STATE PROJECT REFERENCE NO. N.C. B-2532 1 61 STATE PROJ. NO. P.E.

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Structure Design

INVESTIGATED BYS&ME, INC.	PERSONNEL	S. JOHNSON
CHECKED BYA.F. RIGGS, JR.		A. NASH
SUBMITTED BYS&ME, INC.		N. BRADLEY
DATEDECEMBER 2,2005		A. MARTIN
		M. MOSELEY
		Jo. WHITE
•		J. WALKER
		Ja. WHITE
		P. PHELPS
		T. PERE7



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T. PEREZ DRAWN BY:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

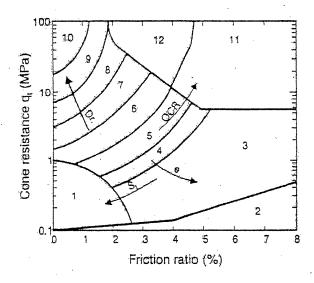
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

	· · · · · · · · · · · · · · · · · · ·			
	SOIL AND ROCK LE	GEND, TERMS, SYMBOLS	, AND ABBREVIATIONS	
ONL DECONOTION			ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL DESCRIPTION SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLONS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 7266, ASTM D-1566). SOIL	GRADATION WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (POORLY GRADED) GRAP-GRADED INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	ALSO ROCK LINE INDICA	N-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL AN INFERRED TES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. PERFERRING NOW SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER G0 BLOWS. PLAIN MATERIAL, THE TRANSITION BY ETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO ELASSIFICATION, AND OTHER PERTIRENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGU	OF WEATHERED RO ROCK MATERIALS	CK. ARE TYPICALLY DIVIDED AS FOLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY SILTY CLAY, MOST WITH WITERBEDGED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRYSTALLINE	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (55% PASSING *200) (785% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESC WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR)	WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS WHICH 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	NON-CRYSTALLINE ROCK (NCR)	FIRE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7 SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 3 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT 31-67 LIQUID LIMIT GREATER THA	COASTAL PLAIN	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	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.
IZ PASSING SING SILT- GRANULAR SILT- GRANULAR CLAY MUCK. CLAY SOILS COLLS PEAT SOILS COLLS PEAT	PERCENTAGE OF MATERIAL GRANULAR SILT- CLAY ORGANIC MATERIAL SOILS OTHER MATE	ERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
= 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10	- 10% HAMME - 20% VERY SLIGHT BROWN	FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER IR IF CRYSTALLINE. GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL.
PLASTIC INDEX 6 MX N.P. 18 MX 18 MX 111 MN 11 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35%	Z AND ABOVE (V. SLI.) CRYST OF A	ALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY ROCK RINGS UNDER HAMMER BLOWS IF CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS	GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.	(SLI.) 1 INCH	GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO . OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR ALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOLES SULES SOLES	STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	MODERATE SIGNIF	CONTROL OF THE PROPERTY OF THE	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SUBGRADE	HC HOLE CAVE SPRING OR SEEPAGE	DULL WITH	SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED FRESH ROCK. OCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30 CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND D (MOD. SEV.) AND C	ISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AN 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 THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT2)		AMPLE IF TES	<u>STED, WOULD YIELD SPT REFUSAL.</u> OCKS EXCEPT QUARTZ DISCOLORED OŔ STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY VERY LOOSE (4 TO 10 RANULAR NAME OF THE PROPERTY OF	SOIL SYMBOL CPT TEST BORING S- BL	ULK SAMPLE (SEV.) IN STI	RENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME IT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LEDUE - H SHEP-LINE HIDSE OF PROSECTION OF ROCK WHOSE THICKNESS IS STALLE COMMINED TO LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50 VERY DENSE >50	ROADWAY EMBANKMENTS SI	SAMPLE VERY SEVERE ALL R	STED, YIELDS SPT N. VALUES > 100 BPF OCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT ASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
VERY SOFT (2 (0.25 GENERALLY SOFT 2 TO 4 0.25 70 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1	SIFETTE INFERRED ROCK LINE MONITORING WELL RS- RI	ROCK SAMPLE VESTION	NING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR SES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 188 BPF REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	25/825 DIP/DIP DIRECTION OF INSTALLATION T	RECOMPACTED SCATTI	ERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS AN EXAMPLE.	ACCK QUALITY DESIGNATION (R.Q.D.) - 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 SLUPE INDICATION CBR - STRALLATION SPT N-VALUE	- CBR SAMPLE	ROCK HARDNESS	SAPPOLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 50 200 270 OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	➤ WATER LOSS O- SPT TEST SAMPLE	SEVE	OT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES RAL HARD BLOWS OF THE GEOLOGISTS PICK. BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	ABBREVIATIONS AR - AUGER REFUSAL PMT - PRESSUREMETER TE	TO D	BE SCRATCHED BY KNIFE OR PICK GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.) GRAIN MM 305 75 2.0 0.25 0.05 0.005	BT - BORING TERMINATED SD SAND, SANDY CL CLAY SL SILT, SILTY CPT - CONE PENETRATION TEST SLI SLIGHTLY	HARD EXCA	VATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED ODERATE BLOWS.	SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) _ NUMBER OF BLOWS (N OR B.P.F.) OF
SIZE IN. 12" 3" SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE TCR - TRICONE REFUSAL DMT - DILATOMETER TEST	HARD CAN	BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE T OF A GEOLOGISTS PICK.	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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO F FINE W - MOISTURE CONTENT	FROM	BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS I CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN SE CAN BE BROKEN BY FINGER PRESSURE.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE LL LIQUID LIMIT	FOSS FOSSILIFEROUS V VERY FRAC FRACTURED YST - VANE SHEAR TEST FRAGS FRAGMENTS MED MEDIUM	VERY CAN I	DE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH ORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FRNAIL.	STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT		URE SPACING BEDDING	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER T		SPACING IERM THICKNESS VERY THICKLY BEDDED > 4 FEET	BENCH MARK: NCDOT Troverse Station Reber & Cop Stamped 'B2532-1' Located at Station 11+80.66 -BL-
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE	MOBILE 8- 57 DRAG BITS AUTO	DMATIC MANUAL VERY WIDE WIDE MODERATELY CLC	MORE THAN 10 FEET THICKLY BEDDED 1.5 - 4 FEET 3 TO 10 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 10.43'
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS FLIGHT AUGER CORE SIZE BK-51 8 HOLLOW AUGERS -B	CLOSE VERY CLOSE	0.16 TO 1 FEET VERY 1 HINLY BEDDEL 0.000 - 0.03 FEET LESS THAN 0.16 FEET THICKLY LAMINATED 0.000 - 0.03 FEET THINLY LAMINATED < 0.000 FEET	BENCH MARK: RR Spike in SW Corner of Paved Perking Area in NW Quadrant of Front St. and Tryon Palace Dr. Intersection Located at Station 38+16 -BL ELEVATION: 5.82'
PLASTICITY			INDURATION CKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	NOTES: ADDITIONAL SOIL/ROCK DESCRIPTIONS
PLASTICITY INDEX (PI) DRY STRENGTH	TUNGCARBIDE INSERTS -H	Ton Separation in	CKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, FRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
NONPLASTIC Ø-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	CASING W/ ADVANCER HAND TOO		GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	WITH FRIABLE WITH FRIABLE TO INDURATED VERY THINLY TO THICKLY BEDDED
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE 2-15/16 STEEL TEETH POS		Y INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	SANDY LIMESTONE LAYERS SANDY LIMESTONE LAYERS
COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	OTHER CORE BIT SOL	UNDING ROD INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.	FRIABLE TO MODERATELY INDURATED THINLY BEDOED SANDY LIMESTONE
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER OTHER OTHER	NE SHEAR TEST HEREXTREMELY	/ INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: SAMPLE BREAKS ACROSS GRAINS.	WITH THIN FINE TO COARSE SAND LAYERS
				REVISED 09/15/00

CPT Soil Profiling and Classification ¹

Soil samples are not recovered during CPT testing; however, it is possible to obtain an approximate soil classification using from cone resistance q_c and friction ratio R_f . Literature has shown that q_c is relatively high in sands and low in clays. Further, R_f is relatively low sands and high in clays. Soil types based on CPT results are usually referred to as soil behavior type (SBT). Soil classification charts have been adapted and improved based on expanded databases. One of the most commonly used behavior type charts, Figure 1, is suggested by Robertson (1986). Using q_c and R_f , this chart gives reasonable predictions of soil behavior up to 60 feet in depth.



Zone	Soil behaviour type
1	Sensitive fine grained
. 2	Organic material
.3:	Clav
4	Silty Clay to clay
.5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravelly sand to sand
11.	Lery stiff fine grained*
1.2	Sand to clavey sand*

* Overconsolidated or cemented

Figure 1: Soil behavior type classification chart (after Robertson, 1986)

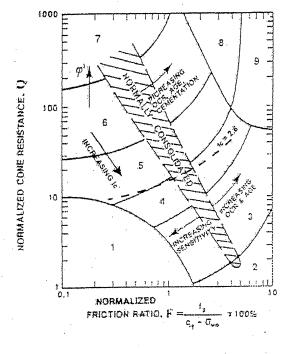
Since both penetration resistance and sleeve friction increase with depth due to the increase of effective overburden stress (σ_{vo}), CPT data requires correction (normalization). Robertson (1990) developed a normalized CPT soil behavior chart, Figure 2, using normalized friction ratio, R_f , and normalized cone resistance, Q_t .

$$F_r = \left[f_{sc} / (q_c - \sigma_{\nu_0}) \right] \times 100 \qquad Q_t = \left(q_c - \sigma_{\nu_o} \right) / \sigma_{\nu_0}$$

The Equivalent Soil Description for the CPT boring logs were based on correlations with the above soil behavior type classification chart using CPT data, visual field classification, and laboratory test results. The soils obtained from adjacent SPT soil test, auger probe, and geoprobe borings were visually classified and verified in the laboratory using the AASHTO soil classification system. These were correlated with the CPT data and presented on the CPT boring logs and profiles.

Robertson, P. K. (1989) "Soil Classification using Cone Penetration Test", Canadian Geotechnical Journal, Edmonton, Alberta.

Robertson, P. K. (1998) "Cone Penetration Testing for Geotechnical and Environmental Site Investigation", ConeTec Inc.



Zone	Soil Behaviour Type	. I _c
1	Sensitive, fine grained	N/A
2 .	Organic soils - peats	> 3.6
3	Clays - silty clay to clay	2.95 - 3.6
4	Silt mixtures - clayey silt to silty clay	2.60 - 2.95
5	Sand mixtures - silty sand to sandy silt	2.05 – 2.6
6	Sands - clean sand to silty sand	1.31 - 2.05
7	Gravelly sand to dense sand	< 1.31
8	Very stiff sand to clavey sand*	N/A
:5)	Very stiff, fine grained*	N/A

* Heavily overconsolidated or cemeuted

Figure 2: Normalized soil behavior type classification chart (after Robertson, 1990)

Note the charts are based on a broad sampling and are not regionally specific. Overlap in some zones should be expected and adjusted based on local experience.

Proposed by Jeffries and Davies (1993), the following equation combines the normalized cone parameters into a soil behavior type index, I_c.

$$I_c = ((3.47 - \log Q_T)^2 + (\log F_r + 1.22)^2)^{0.5}$$

Collecting additional parameters such as the pore water pressure during testing improves soil classification.

Correlation between CPT Data and SPT N₆₀

Standard penetration test (SPT) N-values can be correlated to CPT cone penetration resistance, q_c. The following equation was developed by Jeffries and Davies (1993):

$$\frac{(q_c/P_a)}{N_{60}} = 8.5 \left(1 - \frac{I_c}{4.6}\right)$$

Where I_c is the aforementioned soil behavior type index and q_c is normalized by P_a (atmospheric pressure). Corrections for the grain size influence are included in the equation.

 $^{^{1}}$ Jefferies, M. G. and Davies M. P. (1993), "Use of CPT to Estimate Equivalent SPT N_{60} ", Geotechnical Testing Journal, Philadelphia, Pennsylvania.

STATE PROJECT NO.:

32649.1.1

I.D. NO.:

COUNTY:

B-2532

FEDERAL PROJECT NO.:

N/A Craven

DESCRIPTION:

Bridge No. 60 on Over Trent River on US 70 Business

SUBJECT:

Structure Subsurface Investigation – Inventory Report

Project Description

The project site is located on US 70 Business just south of New Bern and north of the elevated US 70 Bypass/ US 70 Business interchange in Craven County, North Carolina at the crossing of the Trent River (See Site Vicinity Map, Sheet 6). The proposed project consists of a replacement bridge structure. Based on the Preliminary General Drawings, the center of the proposed bascule will be at Station 32+21.39 along the -L-survey line. The new bridge structure will have a clear roadway width of 45 feet. The new bridge structure will be approximately 1762 feet and 5 inches long with the bents constructed on a skew angle of 90° to the -L-survey line. The new bridge structure will consist of nineteen spans with lengths of 1 at 94 feet 7 inches, 6 at 93 feet 8.5 inches, 5 at 90 feet 6 inches, 2 at 93 feet 3.5 inches, 1 at 166 feet (bascule span), 1 at 71 feet, 2 at 71 feet 2.5 inches and 1 at 72 feet 1 inch. The structure will have twenty bents (two end bents and eighteen interior bents).

Based upon the Preliminary General Drawings provided by NCDOT, the finished grade elevations for the new bridge structure will be approximately elevation 13 feet at the south approach and approximately elevation 14 feet at the north approach. The center line of the replacement bridge structure will be located approximately 1.75 feet east the center of the existing structure. Earthwork is anticipated at the approaches and the new shoulders will be benched into the existing embankment. Fill depths on the order of 9 to 10 feet are anticipated, above the flood plain, along the shoulders at the north and south approaches. In addition, the existing fill slopes will be cut back and reworked at the end bents to a slope of 1.5:1 (horizontal to vertical) and Class II Rip-Rap erosion protection will be placed.

A geotechnical investigation was conducted between October 26 and November 29, 2005. Boring B13-B was offset approximately 40 feet right of the existing bridge due to fiber optic lines, electric cables associated with the swing span of the bridge located along the river bottom. Boring B14-A was offset approximately 35 feet left of the existing bridge due to the electric cables located on the river bottom and a buried water line located outside of the fender system. Borings were not performed on the opposite sides of Interior Bents 13 and 14 due to the rotation of the swing span of the bridge. Boring BTP-1 was drilled in the vicinity of the test pile driven by NCDOT. Borings EB1-B and EB2-A were drilled within the existing roadway on roadway embankment fill. Borings B1-A, B2-B, B3-A, B4-B, B5-A, B6-B, B9-A, B15-A, B16-B and B18-B were drilled from the existing bridge deck, in the river channel, and borings B7-A, B8-B, B10-B, B11-A, B12-A, B13-B, B14-A, B17-B and BTP-1 were drilled from a shallow draft barge in the river channel (See Site Plan, Sheets 7 and 8). In addition to soil test borings, six Cone Penetration Test (CPT) soundings were pushed November 16 and 17, 2005 at locations shown on the Boring Location Plan (See Site Plan, Sheets 7 and 8) with a truck mounted CPT rig. CPT-1 through CPT-5 were pushed through previously cored holes in the bridge deck, in the river channel

and CPT-6 was pushed along the roadway shoulder on roadway embankment fill. All land borings and borings drilled from the existing bridge deck were performed with a Mobile B-57 drill rig or BK-51 drill rig mounted on an all-terrain carrier. All water borings were drilled with a CME-45c mounted on the S&ME's shallow draft barge. Representative soil samples were collected for visual classification in the field and for laboratory classification analysis by the NCDOT accredited S&ME soil testing laboratory. No Shelby tube sample was obtained from the river channel to perform Erosion Function Apparatus testing due to non-cohesive materials and organic materials located at the surface. Traffic Control Safety Services provided traffic control during drilling operations.

Physiography and Geology

The project site is located south of New Bern at the crossing of US 70 Business over the Trent River where the Trent River flows into the Neuse River in Craven County, North Carolina. The existing bridge structure is approximately 1762 feet 5 inches long and approximately 33 feet wide. The existing bridge is situated within the flood plain of the Trent River along a two lane paved road (US 70 Business) and consists of a reinforced concrete deck overlain with asphalt on steel I-beams supported on reinforced concrete pile caps and pre-stressed 22 inch octagonal concrete piles. US 70 Business runs approximately north and south and has roadway embankment shoulders. The flood plain extends approximately 500 feet on the north side of the river and approximately 1500 feet on the south side of the river and consists mainly of commercial development. A marina is located southwest of the existing bridge and Union Point Park is located northeast of existing bridge. The Convention Center is located immediately northwest of the existing bridge. A water line was bored beneath the river bed and varies from approximately 30 to 50 feet west of the existing bridge. A fiber optic cable is attached beneath the right side of the exiting bridge, then goes along the river bottom around the right side of the finder system at the channel crossing. Electric cables associated with the swing span, signals and gates are attached beneath the existing bridge and also run beneath and adjacent to the bridge from the bridge tender house to the opposite side of the channel. Underground utilities including fiber optic cables, water and power are located along the roadway shoulders at the north and south approaches.

The site is located within the eastern portion of the Coastal Plain Physiographic and Geologic Province of North Carolina in Craven County. The Coastal Plain Province is typically characterized by marine and eolian sediments that were deposited during the transgressive and regressive depositional sequences of the ocean moving into and out of North Carolina. As such, the Coastal Plain Province is characterized by subdued topographic features and flat, low-lying terrain. The geology of the southeastern portion of Craven County, near the project site, primarily consists of recent alluvial sediments underlain by Coastal Plain Deposits of the James City, Yorktown, Belgrade and River Bend Formations. Typically, the alluvium consists of gray silty coarse to fine sands and fine sandy silts. The alluvium is underlain by the James City Formation and Yorktown Formations to the south above the Belgrade Formation. The James City Formation and Yorktown Formation are characterized by dissolved shell material and appears to have been eroded away to the north and main river channel of the Trent River. The surface of the Belgrade Formation is irregular and appears to have been eroded with several paleo channels. The Belgrade Formation consists of tan to gray sands and thinly bedded indurated sandy limestone. The Belgrade Formation is underlain by the River Bend Formation. The surface of the River Bend Formation appears to be relatively uniform. The River Bend Formation typically consist of gray moldic limestone with sand layers.

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Foundation Materials

The borings were advanced to depths ranging from 66.5 to 109.6 feet (elevations -64.4 to -125.5 feet) at collar elevations ranging from 11.0 to -16.4 feet.

Roadway embankment fill materials were encountered in borings EB1-B and EB2-A to depths of about 8.0 to 12.0 feet (elevations 2.6 to -1.5 feet) below the collar elevation. The fill material encountered in these borings consists of medium dense to loose gray slightly silty clayey fine to coarse sand (A-2-4) and medium dense tan-brown fine to coarse sand (A-1-b) with trace of silt. Standard penetration test (SPT) N-values in the fill materials ranged from 9 to 19 blows per foot (bpf).

Alluvial deposits were encountered beneath the embankment fill materials in borings EB1-B and EB2-A and in the river channel in the remaining borings to depths ranging from about 11.0 to 42.0 feet (elevations -11.0 to -42.6 feet) beneath collar elevations. Typically, alluvial deposits encountered consist of very loose to dense gray, dark gray and brown silty fine to coarse sand (A-3, A-2-4, A-1-b) with trace of shell material, limestone fragments and little to trace amounts of organic matter, very soft to medium stiff brown and gray clayey fine sandy silt (A-4), very loose brown highly organic fine sand (Muck) and very soft black-brown highly organic fine sandy silt (Muck). The standard penetration test (SPT) N-values for the alluvial soils ranged from Weight of Hammer (WOH) to 45 bpf.

Soils of the James City Formation were encountered beneath the alluvial deposits in boring EB1-B to a depth of about 26.0 feet (elevation -15.0 feet) beneath the collar elevation. The James City Formation consists of stiff brown fine sandy silt (A-4) with trace of shell material. The standard penetration test (SPT) N-value for the James City Formation is 11 bpf.

Soils of the Yorktown Formation were encountered beneath the James City Formation in boring EB1-B and beneath the alluvium in borings B1-A and B2-B to depths ranging from about 17.0 to 32.6 feet (elevations -20.4 to -25.4 feet) beneath the collar elevation. The Yorktown Formation consists of stiff gray fine sandy silt (A-4) with trace of shell material. The standard penetration test (SPT) N-values for the Yorktown Formation soils ranged from 12 to 14 bpf.

Beneath the Yorktown Formation in borings EB1-B, B1-A and B2-B and beneath the alluvium in the remaining borings, the Belgrade Formation was encountered at depths ranging from about 17.0 to 42.0 feet (elevations -20.4 to -42.6 feet) beneath collar elevations and extended to depths ranging from about 43.8 to 72.0 feet (elevations -57.2 to -65.3 feet) beneath collar elevations. The Belgrade Formation consist of medium dense to very dense gray-tan silty fine to coarse sands (A-3, A-2-4, A-1-b) with trace of friable to indurated thinly bedded gray and tan sandy limestone layers, medium dense to dense gray and tan silty fine to coarse sand (A-1-b) with friable to indurated thinly to thickly bedded gray and tan sandy limestone layers and friable to indurated thinly to thickly bedded gray-tan sandy limestone with trace of thin sand layers. The standard penetration test (SPT) N-values for the Belgrade Formation ranged from 12 bpf to 100 blows per 0.8 feet of penetration.

The River Bend Formation was encountered beneath the Belgrade Formation in all of the borings at depths ranging from about 43.8 to 72.0 feet (elevations -57.2 to -65.3 feet) beneath collar elevations and extended

to boring termination. Soils and rock encountered within the River Bend Formation consist of friable to extremely indurated very thinly to thickly bedded gray moldic limestone with trace of thin sand layers, dense gray silty fine to coarse sand (A-1-b) with indurated thinly bedded moldic limestone layers, very dense gray silty fine to coarse sand (A-1-b) with friable to indurated thinly bedded gray sandy limestone layers and medium dense to very dense gray silty fine to coarse sand (A-2-4). The N-values within the River Bend Formation ranged from 28 to 60 blows with no penetration.

A NWD4 split core barrel was advanced in borings B3-A, B7-A, B11-A, B13-B, B14-A and B17-B to evaluate limestone in the Belgrade and River Bend Formations. Coring activities recovered 0 to 100 percent of the total core run. Recoveries of 13% to 94% were common with higher percent recoveries typical of the limestone encountered within the River Bend Formation.

Notes to Designer

The Mobile B-57 and CME-45c drill rigs are equipped with a manual hammer. Standard Penetration tests were performed with a traditional rope, cathead and Safety Hammer. The BK-51 drill rig is equipped with a hydraulic automatic hammer. Standard Penetration tests were performed with the attached Autohammer and not with a traditional rope, cathead and Safety Hammer.

Cone Penetration Testing¹

The cone penetration test (CPT) consists of hydraulically pushing a metal cone of specific dimensions into the ground. The CPT borings were performed using an integrated electronic cone system. The cone method used was designed in accordance with ASTM D 3341-94 having a tip area of 15 cm² and a sleeve friction area of 230 cm². The peizometer element consists of a 5 mm plastic porous element located immediately behind the cone tip. The cone utilized during this exploration is capable of measuring tip resistance, sleeve friction and dynamic pore pressures. Soil resistance at the cone tip and sleeve are measured by electronic sensors. The cone resistance, q_c , is the total force acting on the cone divided by the projected area of the cone; and the side friction, f_{sc} , is the total frictional force acting on the sleeve divided by its surface area. Data is typically expressed in terms of the friction ratio, R_f ($f_{sc}/q_c \times 100$). Tip and sleeve values can be used to estimate soil properties and soil classification. Additional sensors can measure changes in pore pressure within the soil caused by the penetration of the cone. Pore pressures dissipation measurements were conducted at internals, which were noted to have an increase in the in-situ pore pressure during the real time soil property measurements of the cone.

¹ Jefferies, M. G. and Davies M. P. (1993), "Use of CPT to Estimate Equivalent SPT N₆₀", Geotechnical Testing Journal, Philadelphia, Pennsylvania.

Robertson, P. K. (1989) "Soil Classification using Cone Penetration Test", Canadian Geotechnical Journal, Edmonton, Alberta.

Robertson, P. K. (1998) "Cone Penetration Testing for Geotechnical and Environmental Site Investigation", ConeTec Inc.

Groundwater

Groundwater depths were not measured at the time of drilling operations since mud rotary drilling procedures were used. Borings EB1-B and EB2-A, performed within the existing roadway, were filled at completion of drilling due to safety concerns. The remaining borings were performed with the river channel. The river level at the time of our field investigation was elevation -0.1 feet on November 11, 2005. Loss of drilling fluid was observed in most of the borings at depths of 43.8 to 72.0 feet (elevations -65.3 feet to -57.2 feet) beneath the collar elevations.

QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty, expressed or implied, is made.

The conclusions submitted in this report are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of subsurface variations between the borings may not become evident until construction. If variations appear evident, then the conclusions contained in this report may need to be reevaluated. In the event that any changes in the nature, design, or location of the structure are planned, the conclusions contained in this report will not be considered valid unless the changes are reviewed by S&ME, and the conclusions of the report are modified or verified in writing.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours, S&ME, Inc.

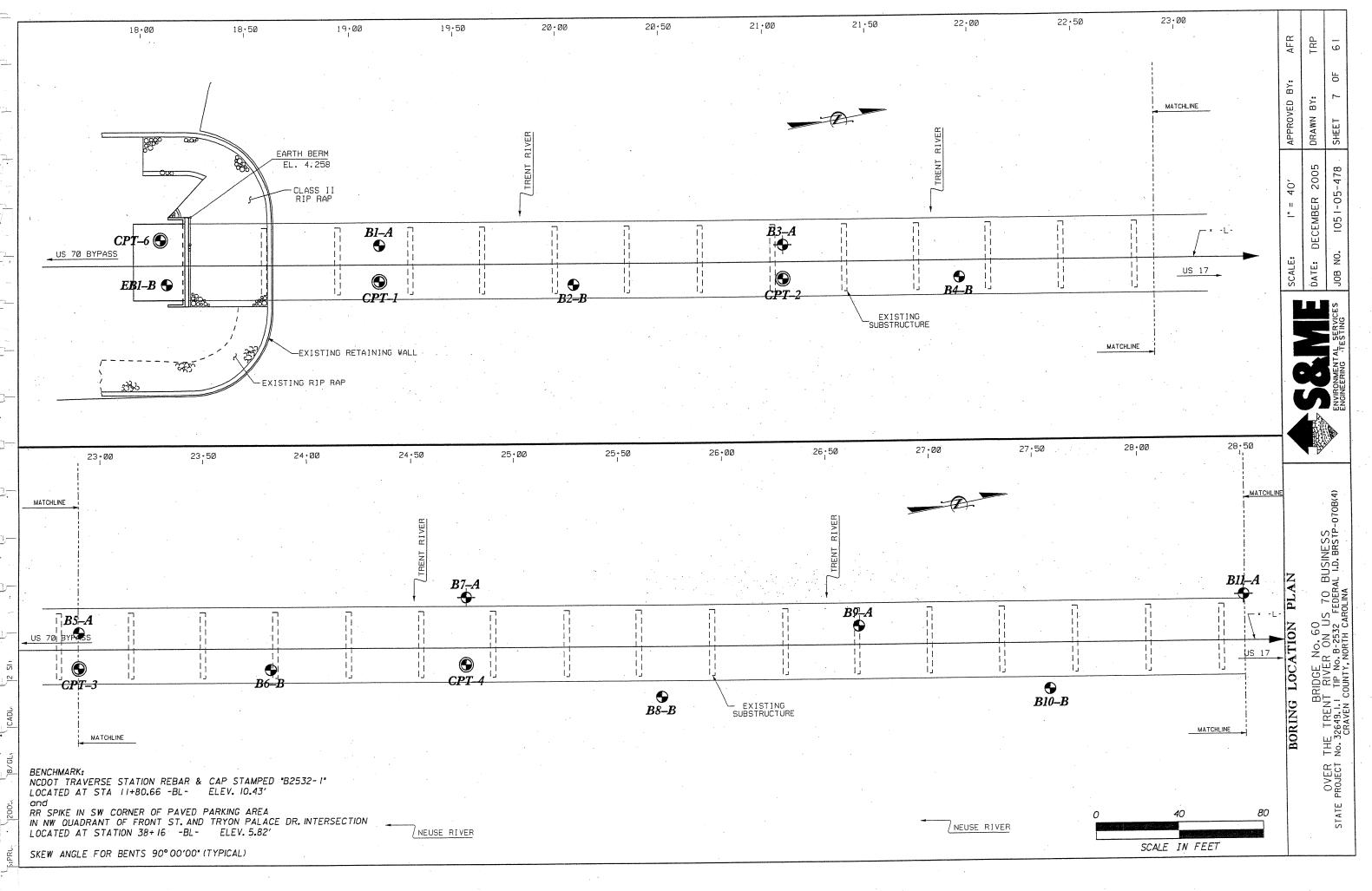
J. Shane Johnson, P.G. Project Geologist

N.C. Registration No. 1753

Men 1 Resyl Abner F. Riggs, Jr. P.E. Chief Geotechnical Engineer N.C. Registration No. 14125

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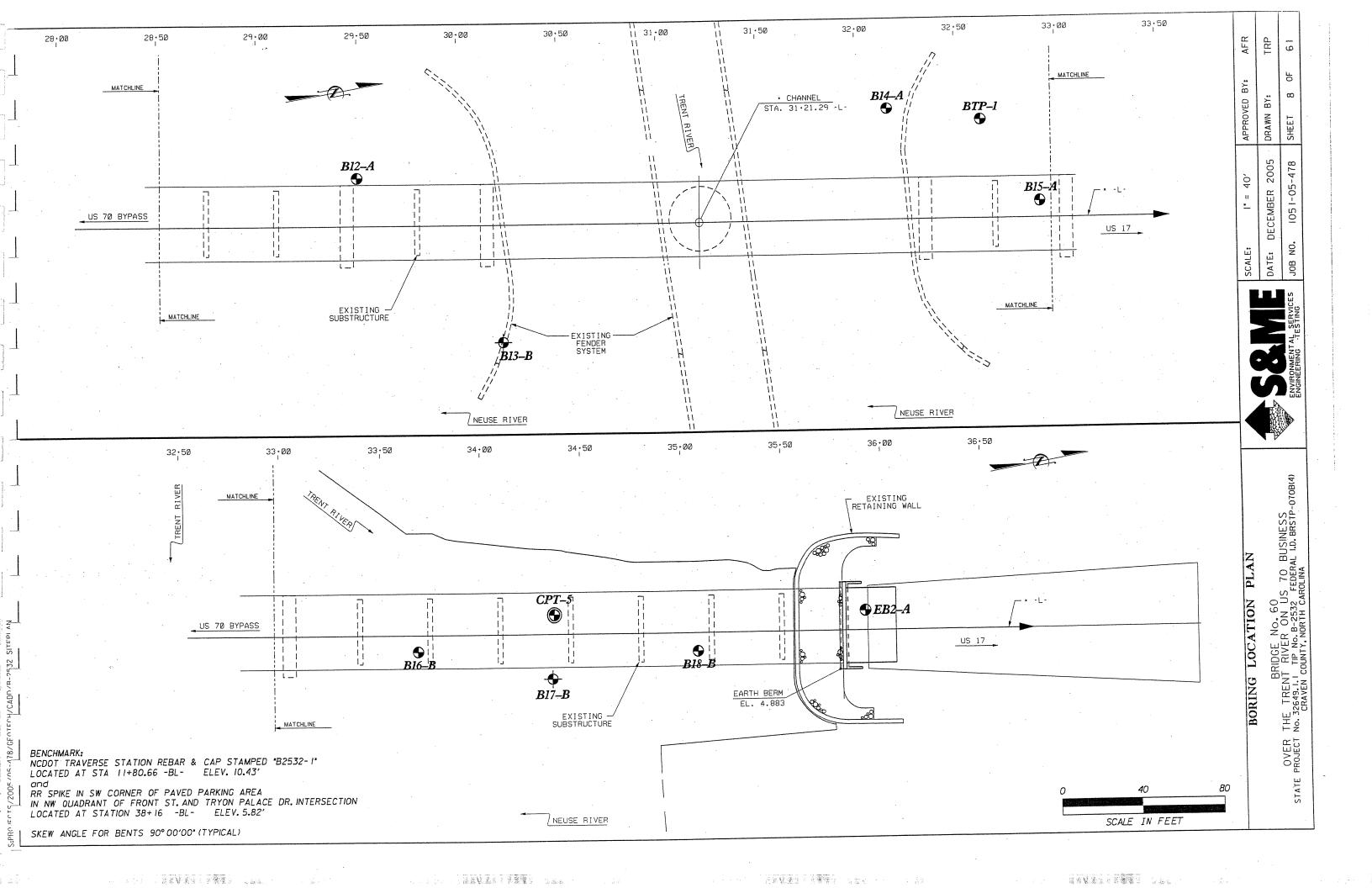
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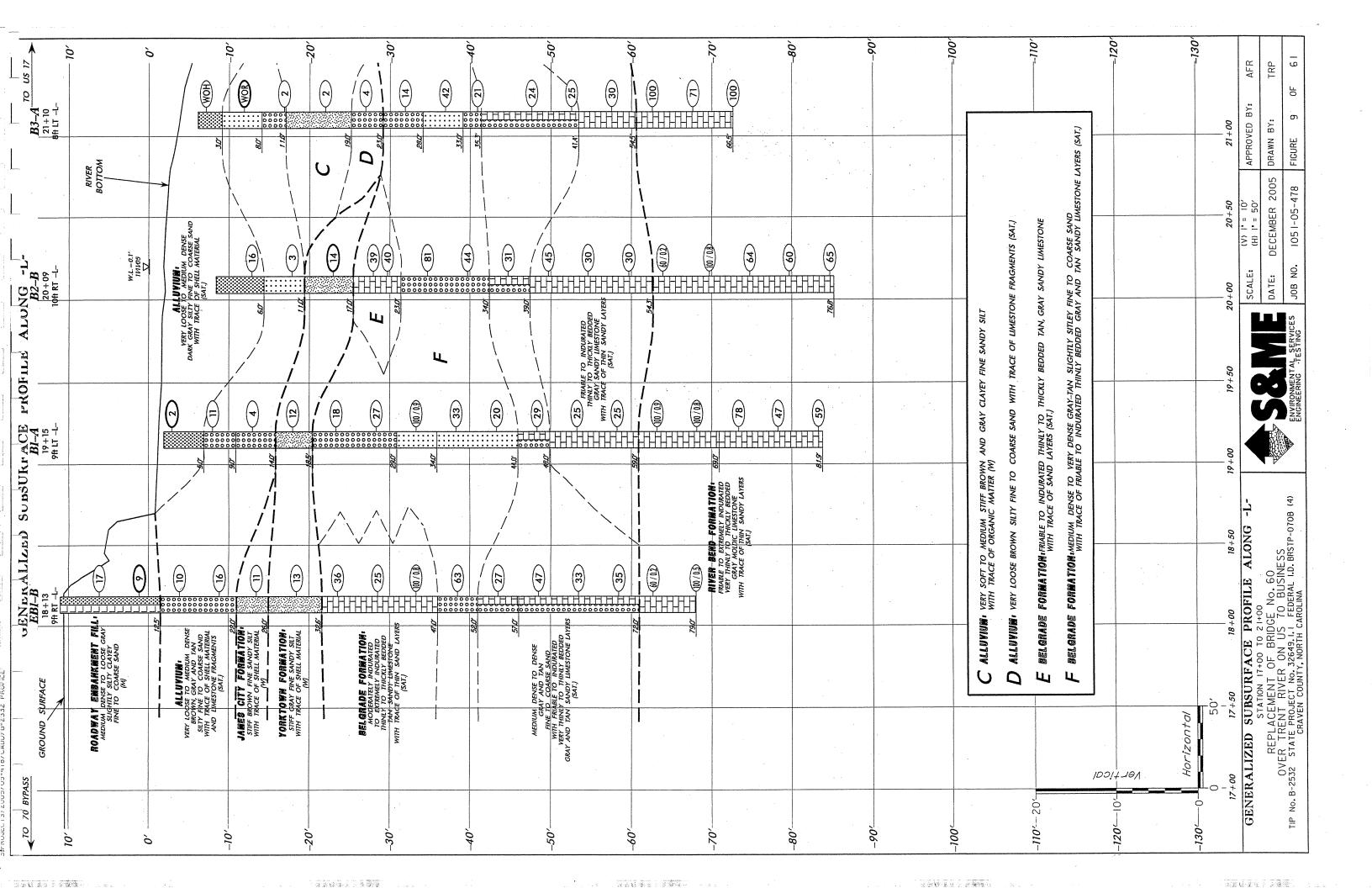


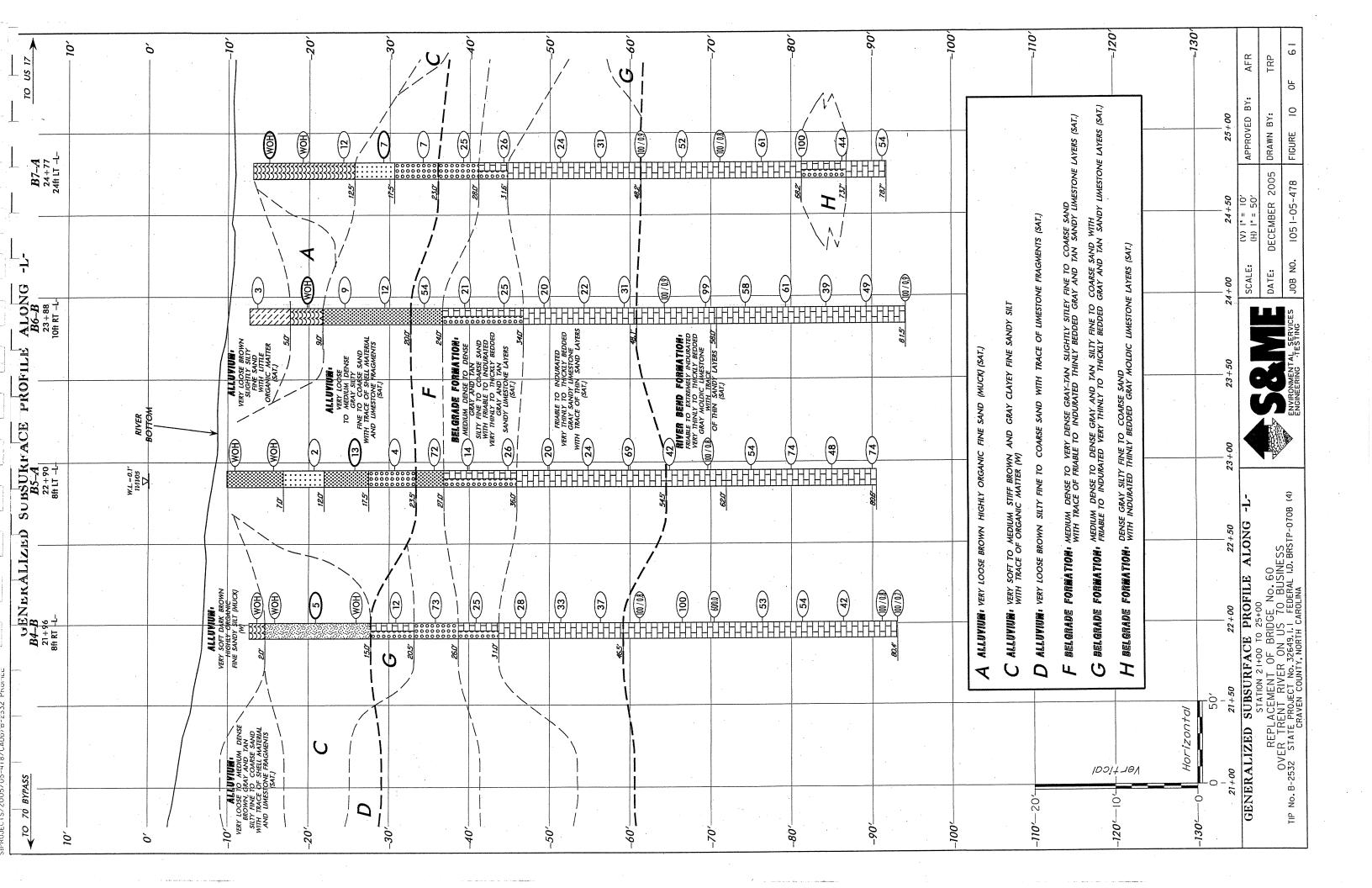
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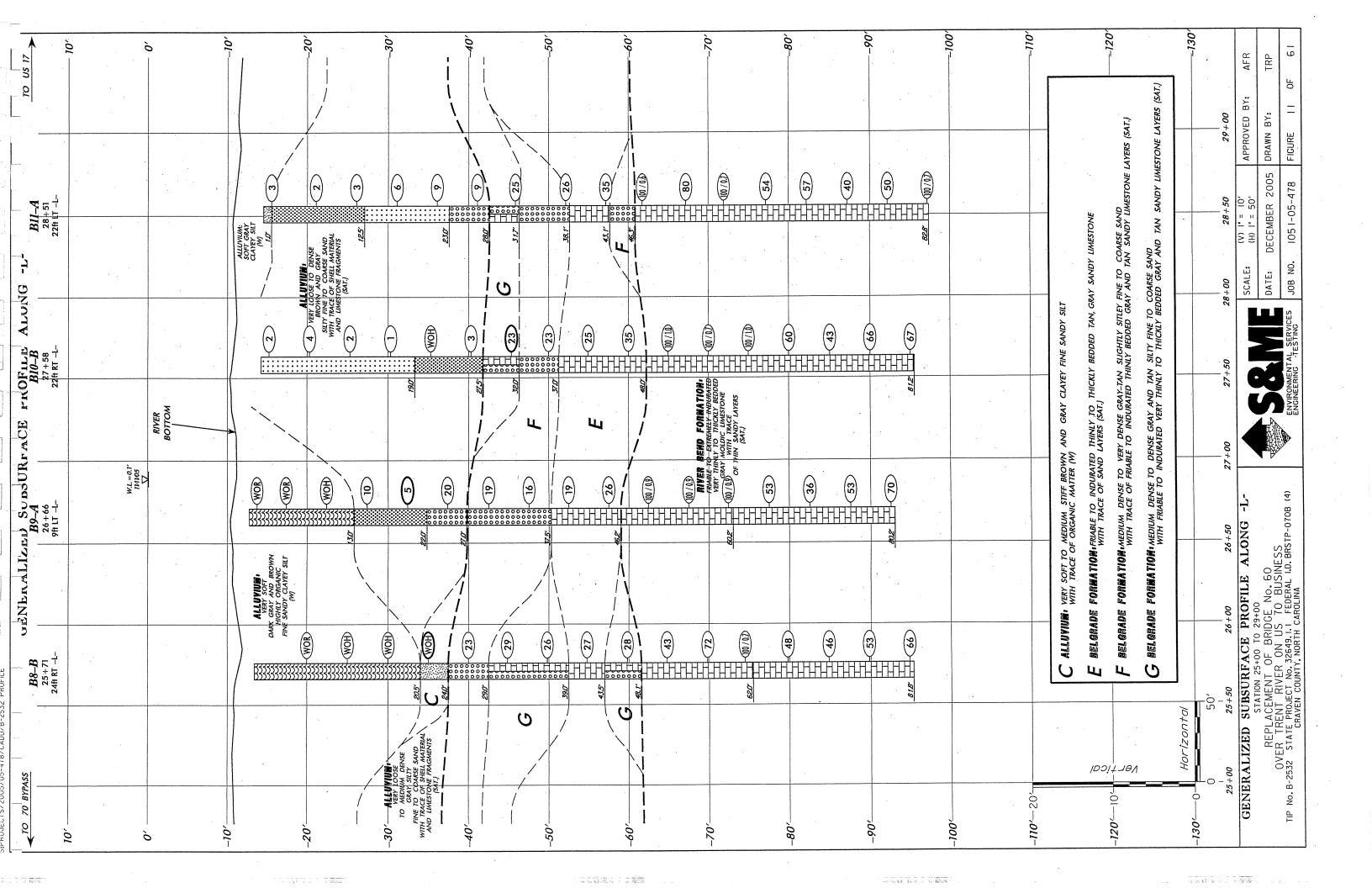
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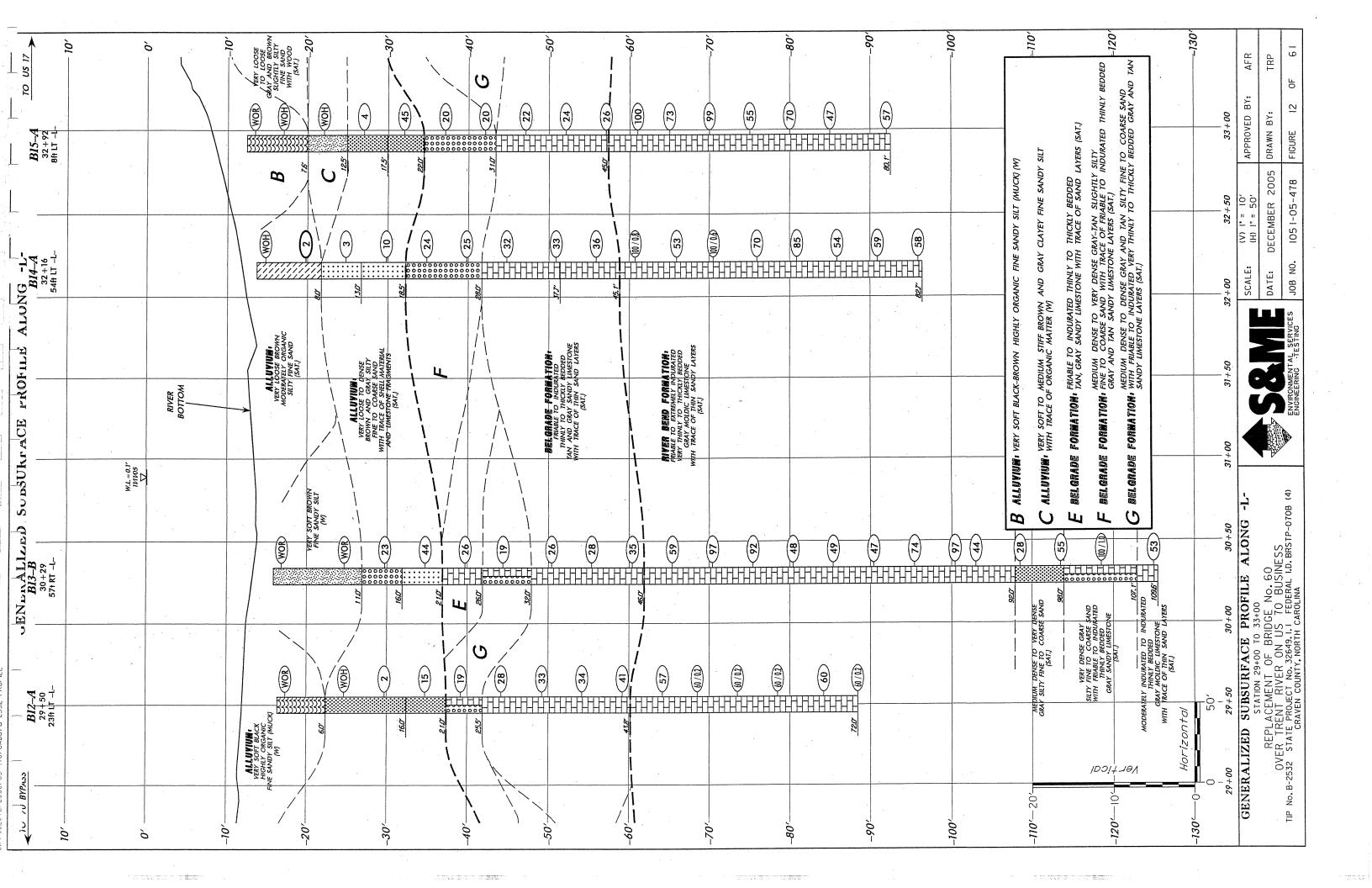
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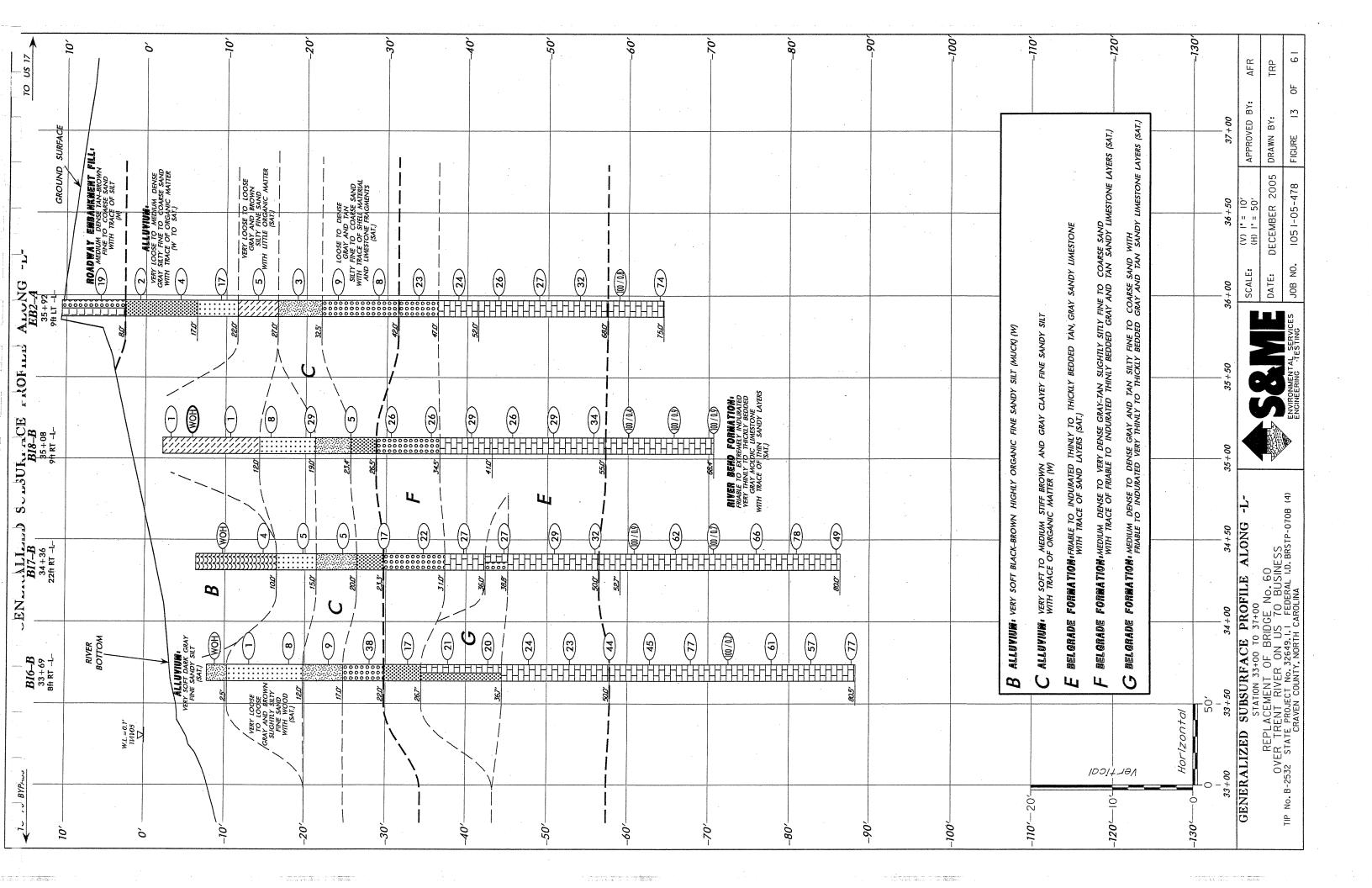
















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_	<u> </u>								000	_ ' '	LTY FINE SAND
-17.0	15.1				: 					WITH TRACE	OF LIMESTONE
	-	4	5	7	··· ф12· · · · · · · · · · · · · · ·			W	F	YORKTOWN	MENTS FORMATION:
_	-								1	204 STIFF DARK GRAY	CLAYEY FINE SANDY 1
-22.3	20.4								000	(A	LT (-4)
-	-	13	8	10	0.18			Sat.	000	WITH TRACE OF	SHELL MATERIAL FORMATION:
-	-								000	_ MEDIUM DENSE	TAN SILTY FINE TO
-27.3	25.4								000-		E SAND 1-b)
-		13	14	13	27			Sat.	000	WITH TRACE	OF FRIABLE TO DURATED THINLY
	-									-30.9 BEDDED TAN SA	NDY LIMESTONE 25
-32.3	30.4									VERY DENSE TAN	ERS -GRAY FINE SAND
1	-	22	. 38	62/0.4		100/0.9		Sat.		(A	3) CE OF SILT
-	- 1					100/0.9				-35.9	34
-37.3	_ 35.4	- 11			;			C-4	:::}-	DENSE TO MEDIUM SLIGHTLY SILTY CO.	I DENSE GRAY-TAN ARSE TO FINE SAND
1	-	11	15	18				Sat.	:::F	(A	3) OF FRIABLE TO
1	-								∷∷	MODERATELY IN	DURATED THINLY
-42.3	- 40.4	10	10	10				Sat.	∷:t		SANDY LIMESTONE ERS
+	-	,10	10		φ^{20}			000	∷⊹		
47.3 I	45.4				· · · · · · · · · · · · · · · · · · ·					-45.9 MEDIUM DENSE G	RAY SILTY FINE TO
77.5		10	14	15	Φ 29			Sat.	其	COARS	E SAND 1-b)
#	-				П			ľ	件	<u>–49.9</u> WITH FRIABLÈ T	O MODERATELY48
52.3	50.4	. 1						Ė	丑	INDURATED THIN SANDY LIMES	LY BEDDED GRAY TONE LAYERS
-	:	15	12	13	25	: : :		Sat.	뀨	FRIABLE TO MODEF THINLY BEDDE	
Ŧ	-	į							平	LIMES	TONE
57.3	55.4							_	井	WITH TRACE OF T	HIN SAND LAYERS
±		16	12	13	25			Sat.	丑		
+						· · · ·		F	파	-60.9	59
62.3	60.4]		. F	拝	RIVER BEND FRIABLE TO IND	FORMATION: URATED THINLY
‡		47	53/0.4			100/0.9		Sat.	土	BEDDED GRAY MO	DLDIC LIMESTONE
+	.							F	4	WITH TRACE OF T	HIN SAND LAYERS
67.3	65.4	61	26/0.2]]		Sat.	廿		
Ŧ		64	36/0.3			100/0.8		Sal.	井		
‡						· · ·		F	丰	-70.9	69
72.3	70.4	38	40	38				, , F	규	•	
						0	1	Sat			

SHEET 15 OF 61





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

ROJE	CT NO.	INEERIN RONMEN 3264				ID. E	3-2532		CC	YTNUC	Crav	en			GEOLOG	IST S	SHEET . JOHNSON	
	ESCRIF		Bridge				ess over T		ver					1			GROUN	ID WATER
ORIN	G NO.	B 1-A		ВС	ORIN	G LOCA	TION 19	9+15		OFFS	ET 9.0			L	MENT -L-		0 HR.	N/A
OLLA	R ELĘ\	/. -1.9	ft	NORT	THIN	G 496,	796.0			EAST		2,586					24 HR.	N/A
TAL	DEPTH	4 81.9	ft	DRILL	L MA	CHINE	Mobile B	-57	DRILL	METH		otary Wa	ash w/N	IW Casing/	2-7/8" Tricone	HAM	MER TYPE	MANUAL
TE S	STARTE	ED 11	/1/05			COMP	LETED	11/1/05		SURF	ACE W	ATER	DEP	TH 1.7	ft			
EV.	DEPTH	BLO	ow co	UNT			BLOWS P				SAMP.		L		SOIL AN	ID ROC	K DESCRIPT	ION
ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40	60	80	100	NO.	MOI						
5.0			ļ	 	-	Conti	nued from	previo	us page	<u> </u>		-			MODE	RATELY	/ INDURATE	D TO
7.3	75.4	ļ]:			/.				0-1	井	•	EXTREM	ELY IND	URATED THI ED GRAY M	NLY TO
1	-	22	25	22	:	· · · · .	: : : : · · · · · · · · · · · · · · · ·	47				Sat.	田	•		LIME	STONE	
	_				:			.\					田		WIIH IK.		THIN SAND	LAYERS
2.3	_ 80.4 _	45	37	22	1:	 		0 59				Sat.	出	-83.8				
				 					***************************************						1) ADVANCE	D NW C	ASING TO 1 TO 15.1 FEE	5.1 FEET.
}							TERMINAT INDURAT							•	CASING 1	3.4 FEE	T).	•
	_						LIMES						E		3) ADVANCE TO 80.4 F		'TRICONE R	OLLER
-	-												F	_		TER W	ITH QUICKG	EL ADDED
1															5) NO LOSS	OF DRI	LLING FLUID	
ţ	-													•	OBSERVE 6) APPROXI		RILLING FLU	IID
-	<u></u>			1											DENSITY	66 PCF.		
-	-]:	<u> </u>					
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	EZ	GINEERI VIRONME	NG • TES	STING RVICES	The co. Transport	-	SHEET 1 OF 2
PROJ	ECT NO) . 326	649.1.1		ID. B-2532 COUNTY Craven G	EOLOGIST N.	Bradley
SITE	DESCR	IPTION	Bridge	e 60 on	JS 70 Business over Trent River		GROUND WATER (f
BORIN	NG NO.	B 2-E	3	ВС	RING LOCATION 20+09 OFFSET 10.0 ft RT ALIGNMENT	Γ -L-	0 HR. N/A
COLL	AR ELE	V. -8.4	4 ft	NORT	HING 496,885.1 EASTING 2,586,943.0		24 HR. N/A
TOTA	L DEPT	H 76.8	8 ft	DRILL	MACHINE Mobile B-57 DRILL METHOD Rotary wash, w/NW Casing/2-7/8" Tr	icone HAMM	ER TYPE MANUAL
DATE	START	ED 1	0/26/05	·	COMPLETED 10/26/05 SURFACE WATER DEPTH 8 ft	····	
ELEV.	DEPTI	H BL	OW CO	UNT	BLOWS PER FOOT SAMP. ▼ L O	SOIL AND ROCK	DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80 100 NO. MOI G		
		ł.		,			
-0.4	1	ŀ			RIVER LEVEL		
-0.4	 		1		TOUR TENED		
	Ŧ						
_	Ŧ						
	‡ ·				DIVED POTTOM		•
	‡ -	+	 		RIVER BOTTOM84	ALLU	
-11.9	3.5				MEC	DIUM DENSE DAF TO COAR	RK GRAY SILTY FINE SE SAND
-	-	2	10	6	• 16 Sat.	(A-2	2-4)
	‡						COARSE TO FINE
-16.9	8.5	2	.1	2	Sat	SAN (A-	
-	- .	. ~		2			
- -21.9	13.5				STII	YORKTOWN F FF GRAY CLAYE	ORMATION: Y FINE SANDY SILT
2.1.0	10.0	4	- 6	8	ss. w	(A-	
-	_					,	
-26.9	18.5	<u> </u>	-		MO	BELGRADE F	ORMATION: RATED THINLY TO
-28.7	20.3	42	23	16			I SANDY LIMESTONE
-	_ '	20	15	25	φ40 · · · · · · · · · · · · · · · · · · ·	WITH TRACE OF	SAND LATERS
-33.7	_ - 25.3					RY DENSE TO DE COARSE	NSE TAN FINE TO
33.7		19	41	40	Sat. Sat. Sat. Sat.	(A-1 WITH TRAC	-b)
1	_			.	000	WITH TRAC	E OF SIL1
-38.7	30.3				000		
· 1		18	20	24	Sat. Sa		•
40.7	- 050				000 -42.4	ICE CDAY OILTV	EINE TO COADSE
43.7	- 35.3 -	16	14	17	Sat. Sat.	SAN	
$\overline{1}$	- -						NDURATED THINLY
48.7	40.3				FRIA		NDY LIMESTONE ATELY INDURATED
\pm	<u> </u>	16	23	22	TH	INLY TO THICKL' SANDY LIM	Y BEDDED GRAY ESTONE
<u>.</u> , J	. 45.0				wr	TH TRACE OF TH	HIN SAND LAYERS
53.7	45.3	16	15	15	Sat.		
Ŧ							
58.7	50.3						
Ŧ	<u>-</u>	15	15	15	Sat.		
., J					-62.7		
63.7 +	55.3	60/0.2					ED TO INDURATED
Ŧ					TH	INLY TO THICKLY MOLDIC LIM	/ BEDDED GRAY ESTONE
38.7	60.3				· · · · · · · · · · · · · · · · · · ·	WITH TRACE OF	
+		44	56/0.3		Sat.		
<u> ‡ </u>							
73.7 +	65.3	- 1			Sat.		





SHEET 16 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	ENV	RONME	TAL SER	RVICES								Mar of	TRANS	%	SHEET	2 OF 2
PROJE	CT NO.	3264	49.1.1			ID.	B-2532		С	OUNTY	Crav	/en		GEOLOGIS1	N. Bradley	
SITE D	ESCRIF	MOIT	Bridge					r Trent R	iver						GROU	ND WATER (ft)
BORIN	G NO.	B 2-B		BO	DRING	LOCA	TION	20+09		OFFS	ET 10	0.0 ft R	Γ	ALIGNMENT -L-	0 HR.	N/A
COLLA	R ELE	<i>I</i> 8.4	ft	NORT	HING	496	,885.1			EAST		2,586			24 HR.	N/A ·
TOTAL	DEPTH	76.8	ft	DRILL	- MAC	HINE	Mobile	B-57	DRILL	. METH	OD	Rotary wa Roller	sh w/N	W Casing/2-7/8" Tricone	HAMMER TYPE	MANUAL
DATE	STARTE)/26/05		·	COM	PLETED	10/26/0)5	SURF	ACE V	VATER	DEP	TH 8 ft	÷ 4.	
ELEV.	DEPTH		OW CO			00		PER FOO		400	SAMP		L	SOIL AND I	ROCK DESCRIPT	ΓΙΟΝ
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P		40 !	60	80 	100	NO.	MOI	G			
						.	1.6									
-75.2	-	 	<u> </u>		 	Conti	nuea tro	m previo	us page			+			BEND FORMATION	
-78.7	- - 70.3							:: <i>I</i> :				C-+	用		NDURATED TO IN THICKLY BEDDE	
	-	40	30	30	1 : :			∵ ф 60				Sat	耳		DIC LIMESTONE F SAND LAYERS	
-	-				: :			::::					鬥			·
-83.7	75.3	35	36	29	::			:::/	 65 · · ·			Sat	耳	- - 85.2		76.
-	-											1		1) ADVANCED N	IW CASING 18.5 ING TO 18.5 FEE	FEET.
	- -							ED AT ELI Y MOLDIO						CASING 20.5 I	FEET).	•
	- -													75.3 FEET. 4) RIVER WATER		
	-									-	έ,			USED AS DRI	ILLING FLUID.	
	- 													DENSITY 66 F	PCF.	
	- -													OBSERVED.	DIVILLING 1 LOID	
	<u>.</u>											;		•		
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ANVIA : KATA - LAL



N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	W	ENG ENVI	INEERIN RONMEN	G • TES	TING VICES			,					May or	TRAKE	3			SHEET 1	OF 2	
ſ	PROJE	CT NO.	3264	19.1.1			ID.	B-2532		CC	DUNTY	Crave	en			GEOLOGI	S T S.	JOHNSON		
1	SITE D	ESCRIP	TION	Bridge	60 on	US 70	Busin	ess over Tre	ent Riv	/er								GROUNI	WATER ((ft)
1	BORIN	G NO.	B 3-A		ВО	RING	LOCA	TION 21+	10		OFFSI	ET 8.0	ft LT		ALIGNN	MENT -L-		0 HR.	N/A	
ı	COLLA	R ELEV	·6.1	ft	NORT	HING	496	,987.8			EASTI	NG	2,586,	,943.	2			24 HR.	N/A	
İ	TOTAL	DEPTH	66.5	ft	DRILL	MAC	HINE	Mobile B-5	57	DRILL	METH	OD R	otary was	h w/N D4 Co	W Casing/2-7 re Barrel	7/8" Tricone	HAMN	IER TYPE	MANUAL	
	DATE S	STARTE	D 11	/2/05	L		COM	PLETED 11	1/2/05		SURF				TH 5.7					
t	ELEV.	DEPTH	BLO	ow cou	JNT	Γ		BLOWS PE	R F00	 Т		SAMP.	lacksquare	L		COII AN	D BOCK	DESCRIPTION	NI.	
	(ft)	(ft)	0.5ft	0.5ft	0.5ft	Q	20	40	60	80	100	NO.	моі	O G		SOIL AN	D ROCK	DESCRIPTION		
																		•		
-1																				1
_}	-0.4							RIVER LI	EVEL				∇		-					
1	_	_													-					
1	_									_					-					
_	-6.1	0.0	4	WOH	WOH	d wo		RIVER BO	NOTTO	1			Sat.	***	<u>-6.1</u>		ALLU	VIUM:		0.00
١	-	F	,			I BWC									- 9.1	VERY LOC		K GRAY SILT	Y FINE	3.0
- }	-10.9	4.8													- \	WITH TR	ACE OF	·2-4) SHELL MATE	RIAL /	
_[_	WOR	WOR	WOR	o wc	 R					SS-4	Sat		-	VERY L	OOSE G	RAY FINE SA	ND	
	1	-				╽╏	 							000	-14.1	VERYLO	•	1-3) HT GRAY FIN	IE TO	· 8.0
-	-15.9	9.8	1	WOH	2								Sat.	000	 - -17.1		COARS	E SAND 1-b)		11.0
_	-	-	'	WOIT	2											SOFT BROW	/N CLAY	EY FINE SAN	IDY SILT	
	-20.9	- 14.8				: :	 								-		(F	\-4)		
f	-20.9	14.0	1	1	1	0.2							w		-					
\dashv		-				: :	 						·		- 054	,				19.0
	-25.9	19.8				<u> </u>	. <i></i>			 				000	25.1 -	VERY LOC		WN SILTY F	NE TO	19.0
	-	_	WOH	2	2	. 64								000	- -			E SAND -1-b)		
-	.]					: L_								000	29.1	WITH		OF LIMESTO MENTS	NE /	23.0
-	-30.9	24.8	7	5	9	::								000	-	BEL MEDIUM DEN	GRADE	FORMATION		.
	-	-	·			::	·Ψ 14 ·	· · · · · · ·						000		MEDIONI DEI	COARS	E SAND ,	I I IIVL 10	28.0
-	-35.9	29.8				::											CE OÈ II	-1-b) NDURATED ⁻		
Ì	- 00.0		14	23	19	::		0 42		<i>.</i> .			Sat.		- \			I SANDY LIM	1	1
	-30 0	- - 33 8								· · · ·		-		000	-39.1	DENSE GRA		SLIGHTLY SIL	.TY FINE Γ	33.0
_	-39.9	33.8	7	10	11		: : . : . : . : . : . : . : . : . : . : . :	21	 	· · · ·			Sat.	000	-41.4	MEDILIM D	. (/	N-3) RAY SILTY F	INE TO F	35.3
	1						:::]						.		- \	MEDIÓM D	COARS	E SAND	10	
	_	_					: : : 		 	 					- L 	MEDIUM D	ENSE G	-1-b) RAY SILTY F	INE TO	
	-46.6	- 40.5		10	40		: : :						Sat.		<u>.</u>			SE SAND -1-b)		
			8	12	12		🛊	24					Jai.		-			LY INDURAT		
105	F4.0	45.5												E E				ANDY LIMES		
શ	-51.6	- 45.5 -	5	11	14			25					Sat.		- 53.5	•				47.4
	1	-					!	7							-00.0			RATED THIN		
01.6	-56.6	- - 50.5				: :								H	-	•	LIMES	ED GRAY SA STONE		
الم	1	-	6	13	17		 	¢ 30					Sat.	開	_	WITH TRA	ACE OF	THIN SAND L	AYERS	
IJΙ	-										· · ·			罝	-60.6					54.5
EW2.G	-61.6	- 55.5 -	50	50/0.5							· · · ·		Sat.	団	- -	INDURATED	TO EXT	REMELY INC	URATED	
1	. ‡	-	-5							 	100				-		LIMES	D GRAY MOL STONE		
~ ₁	-66.6	- - 60.5								: :/.	 			開	-	WITH TRA		THIN SAND L	AYERS	
EGE.		-	29	29	.42					3 71			Sat.	岡	- -					
- 1	1	-					 			::\:		*		開	-					
۵۲	-71.6	- 65.5 -	28	72/0.5						· · · · ·	·		Sat.	罝	- 72.6					66.5
	1	-									100				-					

S&ME
ENGINEERING - TESTING



N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

A STATE OF THE STA

OJE	CT NO	. 3264	19.1.1	.,		ID. E	3-2532	***************************************	С	OUNTY	Crav	en		GEOLOGIST S. JOHNS	T 2 OF 2 ON
E D	ESCRIF	PTION	Bridge	e 60 on	US 70) Busine	ess over	Trent Ri	ver					GRO	UND WATER (ft)
RIN	G NO.	В 3-А		ВС	ORING	LOCA	TION 2	21+10		OFFS	ET 8.0	ft LT		ALIGNMENT -L- 0 HR.	N/A
LLA	R ELE	/. -6.1	ft	NORT	HING	496,	987.8			EAST	ING	2,586	,943.	3.2 24 HR.	N/A
TAL	DEPTH	1 66.5	ft	DRILL	_ MAC	HINE	Mobile	B-57	DRILL	METH	OD R	otary wa	sh w/N	NW Casing/2-7/8" Tricone HAMMER TYP	E MANUAL
TE S	STARTE	ED 11	/2/05	.1		COMP	LETED	11/2/05	 j	SURF				PTH 5.7 ft	
٧.	DEPTH	BLO	OW CO	UNT	T	1		PER FOO		L	SAMP.	7			
)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	80	100	NO.	MOI	O G	SOIL AND ROCK DESCRI	PTION
						· · · · · · · · · · · · · · · · · · ·									
2					 	Contir	nued fro	m previo	us page	•				-72.6 L	
	-					ET IN EX	TREME	ATED AT LY INDUF LIMESTO	RATED (1) ADVANCED NW CASING TO 2) SET NW CASING TO 33.8 FE CASING 18.9 FEET). 3) ADVANCED NWD4 CORE BA FROM 35.3 TO 60.5 FEET. 4) ADVANCED 2-7/8" TRICONE TO 65.5 FEET. 5) RIVER WATER WITH QUICK(USED AS DRILLING FLUID. 6) APPROXIMATE DRILLING FL DENSITY 66 PCF.	ET (TEMP RREL FROM 60.5 GEL ADDED
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N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

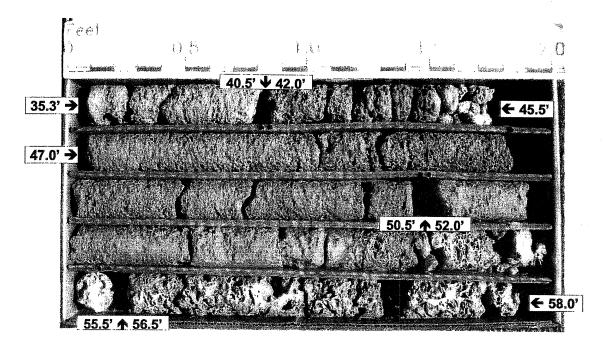
W	ENG ENVI	INEERI RONMI	NG + TEST	TING /ICES							SHEET 1 OF 1
PROJ	ECT NO.	326	649.1.1			ID. B-2	532			Ci	DUNTY Craven GEOLOGIST S. JOHNSON
SITE	ESCRIP	TION	Bridge	60 on	US 70	Business	over	rent F	River		GROUND WATER (ft)
BORIN	IG NO.	B 3-A	١	ВС	RING	LOCATIO	DN 2	1+10			OFFSET 8.0 ft LT ALIGNMENT -L- 0 HR. N/A
ļ	AR ELEV			NORT							EASTING 2,586,943.2 24 HR. N/A
 	DEPTH			DRILL	. MAC	HINE M				RILL	METHOD Rotary wash w/NW Casing/2-7/8" Tricone Roller/NWD4 Core Barrel HAMMER TYPE MANUAL
	STARTE		1/2/05			COMPLE					SURFACE WATER DEPTH 5.7 ft
	SIZE N		DRILL	R	:UN	TOTAL F		25.2 ft	Jι	—Ы	DRILLER M. MOSELEY
ELEV.	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	O G		DESCRIPTION AND REMARKS
-41.4	35.3	5.2	0:15 0:15	(0.7)	(N/A		(1.6) 13%		9 H	-41 -41	
-46.6	40.5		0:20 0:20 0:25/1.2							<u>-</u>	MEDIUM DENSE GRAY SILTY FINE TO COARSE SAND (A-1-b) WITH MODERATELY INDURATED TO INDURATED VERY THINKY
-48.1	42.0	3.5	N=24 0:15 0:20	(0.9)	(N/A)					-	TO THINLY BEDDED GRAY SANDY LIMESTONE
-51.6 -53.1	45.5	0.5	0:20 0:15/0.5 <i>N=25</i>	1	2110					- 53.	.5 47.4
-56.6	47.0 50.5	3.5	0:20 0:20 0:25	(3.1) 89%	(N/A)		(4.6) 65%		H	- -	FRIABLE TO INDURATED THINLY TO THICKLY BEDDED GRAY SANDY LIMESTONE
-58.1	52.0	3.5	\0:15/0.5 N=30 0:45 0:45	(2.5) 71%	(N/A)					- - 60.	WITH TRACE OF THIN SAND LAYERS
-61.6 -62.6	55.5 56.5	4.0	1:00 \0:30/0.5 \N=100	(2.4)	(N/A)		(3.4) 57%			-	RIVER BEND FORMATION: INDURATED TO EXTREMELY INDURATED THINLY BEDDED GRAY
-66.6	60.5		0:50 2:00 2:00	60%				·		- -	MOLDIC LIMESTONE WITH TRACE OF THIN SAND LAYERS
			\2:00 \N=71/							- - -	
-72.6	66.5	ŀ	N=100						팤	72.	00.0
											BORING TERMINATED AT ELEV72.6 FEET IN EXTREMELY INDURATED GRAY MOLDIC LIMESTONE.
		·							F	-	



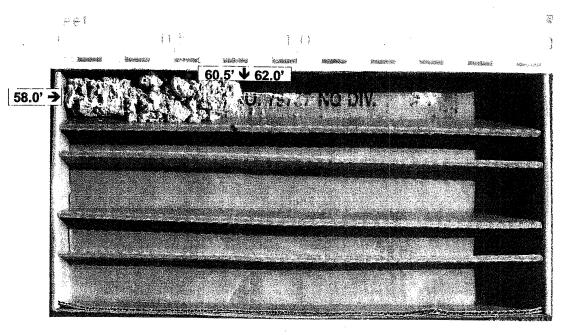
SHEET 18 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B3-A
Site Description: Bridge No	o. 60 over Trent River on US 70	Business	Driller: M. Moseley
Collar Elev.: -6.1 ft.	Core Size: NWD4	Equipment: Mobile B-57	Geologist: S. Johnson
Elev. at T.D.: -72.6 ft.	Total Depth: 66.5 ft.	Total Run: 25.2 ft.	Date: 11/02/2005



Box 1 of 2
Top of Box @ 35.3 feet; Bottom of Box @ 58.0 feet



Box 2 of 2
Top of Box @ 58.0 feet; Bottom of Box @ 62.0 feet





- W	ENV	INEERII IRONME	NG • TES	TING VICES	OF TRANSPAR	SHEET 1 OF 2
PROJ	ECT NO	. 326	49.1.1		ID. B-2532 COUNTY Craven GEOLOGIST	
SITE	DESCRI	PTION	Bridge	e 60 on	JS 70 Business over Trent River	GROUND WATER (ft)
BORII	NG NO.	B 4-B		В	RING LOCATION 21+96 OFFSET 8.0 ft RT ALIGNMENT -L-	0 HR. N/A
COLL	AR ELE	V. -12	.7 ft	NORT		24 HR. N/A
TOTA	L DEPTI	d 80.4	l ft	DRILL	MACHINE Mobile B-57 DRILL METHOD Rotary wash w/NW Casing/2-7/8" Tricone Roller HAM	MER TYPE MANUAL
DATE	START	ED 1	0/27/05		COMPLETED 10/27/05 SURFACE WATER DEPTH 13.2 ft	
ELEV.	DEPTH	BL	ow co	JNT	BLOWS PER FOOT SAMP. V L O SOIL AND ROO	K DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80 100 NO. MOI G	
0.5					RIVER LEVEL	•
	ŧ					
: 	<u> </u>					•
Ĺ.	±					
	±					
r	Ŧ					
_	 					•
-12.7	- 0.0				RIVER BOTTOM12.7	0
-14.9	2.2	WOH	WOH	WOH	ΨWOOD -14.7 VERY SOFT DAI	UVIUM: RK BROWN HIGHLY2
	-	WOH	WOH	WOH	(N	NE SANDY SILT IUCK)
	‡				\ VERY SOFT TO N	MEDIUM STIFF GRAY NE SANDY SILT
-19.9	7.2	3	2	3		A-4)
	‡	٦	2	S	\$\frac{\phi}{2}^5 \cdots \cdot	
-24.9	12.2					
-24.5	12.2	WOH	WOH	WOH	d woh······ w d −	
	‡				-27.7 PFI GRADE	15 FORMATION:
-29.9	17.2			-	MEDIUM DENSE	TAN SILTY FINE TO SE SAND
	‡	. 3	4	. 8	(A) 12 (A) 12 (A) 13 (A) 14 (A) 15 (A) 16 (A	√-1-b)
· · · ·					SANDY LIME	THINLY BEDDED TAN 20 STONE LAYERS
-34.9	22.2	25	37	36	VERY DENSE SIL	TY FINE TO COARSE AND
	<u> </u>				(A 	A-1-b) F CEMENTED SAND 26
-39.9	27.2	40	-10	12	I I I I LA	YERS N-GRAY SILTY FINE TO
. :	_	13	13	12	\$\frac{\pi_{25}}{25} \cdot \frac{\pi_{25}}{25} \cdot \pi_{2	SE SAND A-1-b)
	-					Y INDURATED THINLY 31 Y SANDY LIMESTONE
<u>-45.4</u> _	<u>- 32.7</u>	12	14	14		RATELY INDURATED
	-				THINLY TO THICK	KLY BEDDED GRAY IMESTONE
~ <u>-50.4</u> –	- - 37.7					THIN SAND LAYERS
	-	15	14	19	Sat.	
1	-		İ			
_ -55.4	<u> 42.7</u>	16	16	21	Sat.	•
	-			I		
-60.4	- - 47.7	·				FORMATION:
	-	51	49/0.3		MODERATELY Sat.	' INDURATED TO JRATED THINLY TO
_ 1	-				THICKLY BEDD	ED GRAY MOLDIC STONE
-65.4	- 52.7	61	39/0.5			OF SAND LAYERS
-]	-	ا ا	55/0.5		100	
-70.4	- - 57.7					
1	- 1	60/0.0		$\overline{}$	Sat	
- Ŧ	-			.		



SHEET 19 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

•	ENGI	INEERIN RONMEN	IG • TES VIAL SER	TING VICES							Mar of	TRANS	9		SHEET :	2 OF 2
PROJE	CT NO.	3264	19.1.1			ID.	B-2532	CC	YTNUC	Crav	en		GEOLOGI	ST N.	Bradley	
SITE D	ESCRIP	TION	Bridge	e 60 on	US 7	0 Busin	ess over Trent F	River							GROUN	D WATER (ft)
BORIN	G NO.	B 4-B		ВС	ORING	LOCA	TION 21+96		OFFS	ET 8.0	ft RT		ALIGNMENT -L-		0 HR.	N/A
COLLA	R ELEV	 12.	7 ft	NORT	HING	497	,069.5		EAST		2,586				24 HR.	N/A
TOTAL	. DEPTH	80.4	ft	DRILL	. MAC	HINE	Mobile B-57	DRILL	METH	OD R	totary wa toller	sh w/N	W Casing/2-7/8" Tricone	HAMN	ER TYPE	MANUAL
DATE	STARTE	D 10)/27/05			COM	PLETED 10/27	/05	SURF	ACE W	ATER	DEP.	TH 13.2 ft		•	
ELEV.	DEPTH	BL	ow co	UNT			BLOWS PER FC			SAMP.	$\cdot \mathbf{\nabla} /$	L	SOII ANI	ROCK	DESCRIPTI	ON
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20 	40 60	80 1	100	· NO.	MOI					
-74.3						Conti	nued from previ	ous page								
-75.4 -	- 62.7	07	04	20			· · · · · · / ·	 .	: : :		Cat	田			FORMATION INDURATED	
	-	27	21	32	::	 					Sat	田	- EXTREMEL	Y INDU	RATED THIN	NLY TO
] ,,,]	67.7				: :							出	-	LIMES	D GRAY MC	
-80.4 -	- 67.7	35	31	23	1 : :			<i>.</i> .			Sat	H	- WITH TRACE	OF SAN	ID LAYERS	(continued)
] -	-											耳	- -			
-85.4 -	- - 72.7] : :						Sat	串	• - ,			
	-	32	20	22	: :						Sai	田	• •			
						: : : :						旪	• •	,		
-90.4 -	<u> </u>	54	46/0.3	ļ ··	::				· · · ·		Sat	田	- . ·			-
-92.4 -	- 79.7		-43/0.2-		::			1.0	0/0.8	٠.	Sat	田	- -93.1			80.4
-	-	5/	-43/0.2-		200		DI (IN) AT C		0/0.7				1) ADVANCED 2) SET NW CA			.2 FEET.
-	-						RMINATED AT EL ELY INDURATED	GRAY MO				F	CASING 26. 3) ADVANCED	0 FEET		•
	-						LIMESTONE.				;	F	- 79.7 FEET.			
	_ ,											F	- 4) RIVER WAT - USED AS D	RILLING	FLUID.	
	-										ŀ		5) APPROXIMA DENSITY 66		LLING FLUIC)
	-												6) NO LOSS O OBSERVED	F DRILL	ING FLUID	•
-	-						•							•		
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SHEET 1 OF 2

	ENVI	MEEKIN	G • TEST	ING ICES							W. O.	784492				1 OF 2	
PROJE	CT NO.	3264	9.1.1			ID. E	3-2532	С	OUNTY	Crave	en		GEOLOGIST	N.	.Bradley/S.	Johnson	
SITE D	ESCRIP	TION	Bridge	60 on	US 70) Busine	ess over Trent Ri	ver							GROU	ND WATER	(ft)
BORIN		B 5-A				LOCA			OFFSE	ET 8.0	ft LT		ALIGNMENT -L-		0 HR.	N/A	
	RELEV		ft	NORT	HING	497.	164.9		EASTI		2,586,				24 HR.	N/A	
	DEPTH					HINE		DRILL	METH	OD Ro	otary Wa	sh w/N	IW Casing/2-7/8" Tricone H.	AMN	MER TYPE	AUTOMA	ATIC
	STARTE		/4/05		,		PLETED 11/7/05					DEP	TH 9.7 ft				
ELEV.	DEPTH		OW COL	INT	l		BLOWS PER FOO		1	SAMP.	V /	L				- :	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40 60	8,0	100		мог	0	SOIL AND R	OC	K DESCRIP	TION	
(11)	(11)	0.010	0.011	0.01							7,0101						
																•	
-0.2							RIVER LEVEL	·			∇						
						* ,							•				
-	_											F	•				
-	_						• .						- -				
	_												• •				
-9.9	0.0						RIVER BOTTO	М					-9.9	A 1 1 1	11/11/84		0
		WOH	WOH	WOH	φw	он					Sat.		VERY LOOSE	DAF		ILTY FINE	
-			:		.								- <i>'</i>		AND (-2-4)		
-14.7	- 4.8	WOH	WOH	WOH							Sat.		-			*	
	- ·	11011	,,,,,,,		φw.								-16.9 VERY LOO	SE	GRAY FINE	SAND	
-19.7	- - 9.8				: :								- -	(A-3)		
-19.7	3.0	1	1	1	0.2	 !					Sat.						
•	F					- 1:::							MEDIUM DE			E SAND	
-24.7	14.8										١.		WITH TRAC	CE C	k-2-4) OF SILT ANI	CLAY	,
-		8	7	6		.ф.13				SS-6	Sat.		- 27.4				1
	_					- :::						000	LOOSE DARK			COARSE	
-29.7	19.8	2	2	2	: :				• • • •		Sat.	000	<u>-</u>	(A	AND \-1-b)		
	L	-	2	-	. 9	4						000	FRAGMENTS A	ACE AND	OF LIMES SHELL FR	TONE AGMENTS	
	24.0				: L	· · · ·		-	 			000	33.4 - BELGR	ADE	FORMATI	ON:	2
-34.7	24.8	20	32	40	1			. J . Ф.72.	 		Sat.		VERY DENSE	()	\-2-4)		2
	F				1::	: [-36.9 WITH TRACE BEDDED GR	OF	INDÚRATE SANDY I IM	D THINLY ESTONE	
-38.8	28.9	4	7	7					<i>.</i>		Sat.			LA	YERS		
-	-				: :									SAR	SE SAND	I I IIVL IO	
-43.8 ·	33.9												WITH MODERA	NTEL			•
		14	12	14]::	/	p 26 · · · · · ·				Sat.		BEDDED GR	LA	YERS		<u></u>
	‡				: :		•					H	FRIABLE TO M THINLY TO T	ODE	RATELY IN	NDURATED ED GRAY	
-48.8	38.9	7	11	9	: :						Sat.	田	SAN WITH TRACE	DY I	_IMESTON!	Ξ .	
-	‡	'	''	9		· · • • 2						田	- WITH TRACE	. 01	THIN SAIN	- LI (1 LI (V	
E0 0 :	120				::	:::\						田	-				
-53.8	43.9	10	12	12	1 : :	· · · · f					Sat.	出					
-	-											田	- -			*	
-58.8	48.9											田	_		•		
_	F	10	42	27				> 69 ⋅			Sat.	田	<u>,</u>				
	ļ .				: :							田	<u>-</u>				
-63.8	53.9	18	21	21	: :			•			Sat.	田	- - 65.3		٠	* .	
-	_	10	41	41			<u>φ42····</u>	· · ·	: : : 				_ RIVER I	BEN	DFORMAT	ION:	
									: : :			田	- INDURATED TO - THINLY TO T	THIC	KLY BEDD	ED GRAY	,
-68.8	58.9	52	48/0.3	<u> </u>	1				: : : 6		Sat.	田		DIC	LIMESTON	E	
-	F							1	00/0.8			田	-71.9				
74.0	641											岸	_				
-74.0	64.1	27_	25	29	<u> L</u>		54-		· · · ·		Sat.	山					

S&ME FINGINEERING - TESTING

SHEET 20 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

⋄	ENGI ENVIR	NEERING ONMEN	G • TES	TING VICES					1 OF	THAMSE	y	SHEET 2 OF 2
PROJE	CT NO.	3264	9.1.1	······	ID. B-2532	C	YTNUC	Crave	n		GEOLOGIST	N.Bradley/S.Johnson
SITE DE	SCRIP	TION	Bridge	60 on l	US 70 Business over Tr	ent River						GROUND WATER (ft)
BORING	S NO.	B 5-A		во	RING LOCATION 22-	-90	OFFSE	T 8.0	ft LT		ALIGNMENT -L-	0 HR. N/A
COLLA	R ELEV	9.9	ft	NORT	HING 497,164.9		EASTI		2,586,			24 HR. N/A
TOTAL	DEPTH	80.6	ft	DRILL	MACHINE BK-51	DRILL	METHO	DD Ro	otary Wa	sh w/N	IW Casing/2-7/8" Tricone	MMER TYPE AUTOMATIC
DATE S	TARTE	D 11	/4/05		COMPLETED 1	1/7/05	SURFA	CE W	ATER	DEP	TH 9.7 ft	
ELEV.	DEPTH	BLC	ow col	TNL	BLOWS PE		1	SAMP.	lacktriangledown		SOIL AND RO	OCK DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40	60 .80	100	NO.	MOI	G		
							,					
-75.0					Continued from	previous page	•					
70.5	<u>.</u>		·			:\::::::				土	INDURATED THI	D TO MODERATELY NLY TO THICKLY BEDDED
-79.0	69.1					\						OLDIC LIMESTONE OF THIN SAND LAYERS
+	_	26	34	40		74 :			Sat.		(continued)
1 7	•					· / · · · · ·				井		
-84.0	74.1	25	26	22		/ .8			Sat.	丑	• -	
	-					Ž: : : : : :				丑	• •	
-89.0	79.1	,								量	•	
	-	27	36	38		74 .			Sat.	丰	90.5 - 1) ADVANCED N	W CASING TO 24.8 FEET.
1 7	-				BORING TERMINAT						2) SET 24.8 FEET CASING 23.8 F	OF NW CASING (TEMP
	-				FEET IN INDURATED		DED					7/8" TRICONE ROLLER
	-										4) RIVER WATER	USED AS DRILLING
	-										5) APPROXIMATI	UICKGEL ADDED. E DRILLING FLUID
	-										DENSITY 66 P	CF.
	- -										-	
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	ENGI ENVIR	NEERIN ONMEN	G · TES	TING VICES	**					1	The state of the s	TRANSE) - 	SHEET 1 OF 2	2
PROJE	CT NO.	3264	9.1.1	****	ID.	B-2532		cc	UNTY	Crave	n		GEOLOGIST	A. RIGGS	
SITE DI	ESCRIP	TION	Bridge	60 on	JS 70 Bus	ness over	Trent Riv	/er						GROUND WATE	R (ft)
BORIN	G NO.	B 6-B	.,	ВО	RING LOC	ATION :	23+88		OFFS	ET 10.0	oft RT	-	ALIGNMENT -L-	0 HR. N/A	4
COLLA	R ELEV	12.	7 ft	NORT	HING 49	7,258.1			EAST		2,587,			24 HR. N/A	4
TOTAL	DEPTH	81.5	ft	DRILL	MACHINE	BK-51		DRILL	METH	OD Ro	tary Wa	sh w/N	W Casing/2-7/8" Tricone HA	MMER TYPE AUTON	MATIC
DATE S	TARTE	D 11	/8/05	L.,	cor	MPLETED	11/8/05		SURF	ACE W	ATER	DEP.	TH 12.7 ft		
	DEPTH		OW COL	JNT			PER FOO			SAMP.	lacktriangledown	L	COU AND DO	OCK DESCRIPTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20	40	60	80	100	NO.	MOI	O G	SOIL AND RC		
0.0															
1	-				-										
1	-												_		
7	-														
1	-											l F	•		
1	-											F	· 		
-12.7	- 0.0					RIVER	воттог	Л					-12.7		C
1	-	1	2	1	· • 3 · · ·						Sat.			LLUVIUM : ROWN SLIGHTLY SILTY	
1	-												FI	INE SAND (A-3)	
-18.8	- - 6.1				·									E ÒRGANIC MATTER ROWN HIGHLY ORGANIC	
-10.0		1	WOH	WOH	φwoH··					SS-7	Sat.		FI	INE SAND (MUCK)	-
1	-				<u> </u>								ORGANIC	CONTENT 39.6%	
-23.4	- 10.7	3	4	5							Sat.		LOOSE TO MED	IUM DENSE GRAY SILTY	7
-	-	3	-		© 9 √			· · · ·						INE SAND · (A-2-4)	
20.4	-				: : : :										
-28.4	- 15.7 -	6	7	5					·		Sat.				
	- -					·							•		
-33.4	- - 20.7				L_								-32.7 BELGRA	DE FORMATION:	
_	-	12	21	33			. 6 54 .				Sat.			GRAY SLIGHTLY SILTY INE SAND	
	- ·											<u>• (1</u>	-36.7 WITH TRA	(A-2-4) CE OF LIMESTONE	<u> </u>
-38.4	<u> 25.7</u>	12	10	11							Sat.		FRAGMENTS	AND SHELL MATERIAL GRAY SLIGHTLY SILTY	لــا
	-	'-	'									#		COARSE SAND	
-43.3	30.6					\: : : : :						li I	WITH FRIAB	(A-1-b) LE TO MODERATELY	
_	-	8	14	11		φ 25					Sat.	日調	- INDURATED T SAND	HINLY BEDDED GRAY Y LIMESTONE	
	-					J : : : :						岸	-46.7 FRIARI E TO MC	DERATELY INDURATED)
-48.3	35.6	10	10	10					· · ·		Sat.	団	VERY THINLY T	O THINLY BEDDED TAN Y LIMESTONE	
-	-	10	10	. 10		20						田		OF THIN SAND LAYERS	
-53.3	- - - 40.6											田	• •		
-55.5	- 40.0	12	11	11		22					Sat.	岸	· _		
7	- -					\ ::::						H	-		
-58.3	45.6		ļ			:\::::					Sat.	田	- -		
. 1	-	13	11	20		0 31.					Cat.	臣	-60.8		
									::]			田	INDURATED TO	END FORMATION: EXTREMELY INDURATE	.D
-63.3	_ 50.6 -	54	46/0.4								Sat.	田	THINLY TO TH MOLD	IICKLY BEDDED GRAY IC LIMESTONE	
-	- -							10	0/0.9			開	WITH TRACE	OF THIN SAND LAYERS	
<i>-</i> 68.3	- - 55.6		<u> </u>						::		0	開	-		
1	-	27	42	57						9	Sat.	田	- 		
=	-												- · -		
-73.3	- 60.6 -	36	27	31			0 58				Sat.	田	-		
i					,		9 30				i .	1 1			





SHEET 21 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

CONTRACTOR AND A SECOND CONTRACTOR OF SECOND CONTRA

ENGI	INEERIN RONMEN	G • TES	TING VICES			,			,	THE OF	TRANSE				SHEET 2	2 OF 2
PROJECT NO.	3264	19.1.1			ID. B-2	2532	C	OUNTY	Crave	en			GEOLO	SIST A	RIGGS	
SITE DESCRIP	TION	Bridge	60 on	US 70) Business	s over Trer	nt River					-			GROUNI	D WATER (ft)
BORING NO.	B 6-B		ВС	RING	LOCATION	ON 23+8	8	OFFS	ET 10.	0 ft R7	Γ	ALIGNMI	ENT -L-	•	0 HR.	N/A
COLLAR ELEV	12.	7 ft	NORT	HING	497,25	8.1		EAST	ING	2,587	,010.3	3			24 HR.	N/A
TOTAL DEPTH	81.5	ft	DRILL	MAC	HINE B	K-51	DRIL	L METH	OD R	tary Wa	ash w/N	W Casing/2-7	7/8" Tricone	HAMI	MER TYPE	AUTOMATIC
DATE STARTE	D 11	/8/05			COMPLI	ETED 11/	8/05	SURF	ACE W	ATER	DEP.	TH 12.7	ft			
ELEV. DEPTH	BLO	ow col	TNL		BL	OWS PER	FOOT		SAMP.	lacktriangledown/	LO		SOILA	ND ROCK	(DESCRIPTI	ON
(ft) (ft)	0.5ft	0.5ft	0.5ft	O I	20	40	60 80	100	NO.	MOI			JOIL A		· DEGOTTI TI	O14
					*.											
-74.8					Continu	ed from pr	evious pag	e								
14.0						· · · · ·	1				耳				REMELY IND	
-78.3 + 65.6							1				串	. v	1	MOLDIC I	IMESTONE THIN SAND L	
	27	35	26				b 61			Sat.	出		VVIIIII		tinued)	AIENO
+						:::/.					世					*
-83.3 70.6	20	17	22			39				Sat.	出					
!											井	- '				
-88.3 _ 75.6						::/::					旪					
<u> </u>	18	18	31			49	<u> </u>			Sat.	田	-		•		•
‡				: :							用		•	•		
-93.3 _ 80.6	62	38/0.4			<u> </u>	<u> </u>			<u> </u>	Sat	日	-94.2	151/4110	ED 104/0	ACINO TO 20	81.5
‡				В	ORING TE	RMINATED	1 O AT ELEV.	00/0.9 -94.2					SET NW	CASING '	ASING TO 26 TO 26.0 FEET	
‡					ET IN EXT		IDURATED					3)		ED 2-7/8"	'TRICONE R	OLLER
‡						25.0 22	0,0112.					- 4)	RIVER W	ATER WI) 80.6 FEET. ITH QUICKGE	L ADDED
‡					٠							•	USED AS	DRILLIN	IG FLUID. RILLING FLU	
												. ,	OBSERV	ED BELO	OW 48.1 FEET RILLING FLU	Γ.
<u> </u>] [_	DENSITY			
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Section 20 Section 20





			TAL SER	VICES	T				21 12 17 7		21	TRAB		SHEET		
	CT NO.		49.1.1			B-2532			OUNTY	Crav	en		GEOLOGIST S.	JOHNSON		100
SITE D	ESCRIP	TION	Bridge			iness over		er	Г				T	ł	D WATER	(π)
BORIN	G NO.	B 7-A		BC	RING LOC	ATION 2	24+77		OFFSE	ET 24	.0 ft LT		ALIGNMENT -L-	0 HR.	N/A	
OLLA	R ELEV	/ 13.	1 ft	NORT	HING 49	7,351.8			EASTI		2,586			24 HR.	N/A	
OTAL	DEPTH	78.7	ft	DRILL	MACHINE	CME-48	5c	DRILL	METHO	OD R	otary Wa WD4	ish w/N	IW Casing/2-7/8" Tricone to HAMN	MER TYPE	MANUAL	-
ATE S	STARTE	D 1	1/9/05		CO	MPLETED	11/9/05		SURFA	ACE W	ATER	DEP	TH 11.6 ft	·		
ELEV.	DEPTH	BL	ow co	UNT		BLOWS	PER FOOT			SAMP.	V /	L	SOIL AND ROCK	DESCRIPTI	ON	
(ft)	·(ft)	0.5ft	0.5ft	0.5ft	0 2	0 40	60	80	100	NO.	мог	1 - 1	SOIL AND NOCK	DESORT II	O14	
-1.5						RIVER	LEVEL									
1	_												• •			
+	-												<u>-</u>			
1	_											F	•	•		
‡	-												•			
. 🖠	-												-			
7	-				,	RIVER I	воттом				<u> </u>		-13.1			
4.1	1.0	MO	MOL	MOLL						SS-8	w		ALLU VERY SOFT TO STI	IVIUM: FF DARK BR	OWN TO	
. ‡	-	WOH	WOH	WOH	₩ 0H···			· · ·			"		BROWN HIGHLY OF	RGANIC FINE		
8.2	5.1								:::			緻		ILT JCK)		
7	-	WOH	WOH	WOH	& WOH.						W	\		ES OF WOOL		
†					:\:`::::			: : :			1		- ORGANIC CC	JINI ENI 24.7		
3.2	10.1	<u> </u>			: :\: : :			· · ·	:::			***	· · .	•		
-	-	6	6	6	12				: : -		W	\				
. 7	-							: : :	:::			***	LOOSE GRAY SLIGH		COARSE	
8.2	15.1				:: ::::					000		:::F		E SAND N-3)		
	-	4	3	4	. . ∳7 · ·				:::	SS-9	Sat.	::: <u> </u>	=-:30.6	,		
Ŧ	-											000-	LOOSE GRAY SLIG		FINE TO	
33.2	20.1						: : : : :	: : :	:::		1	000		SE SAND -1-b)		
1	- -	5	4	3	· • 7 · ·			: : :	:::			000				•
1	-					7 : : : :			:::			000		FORMATION		
38.2	25.1	10	11	. 14		1					Sat.	000	MEDIUM DENSE G COARS	RAY SILTY F E SAND	INE TO	
‡	-	10	''	14		Φ 25 · · ·						000	(A·	-1-b)	NE	
‡	•					1::::		: : :	: : :			:H	FRAG	MENTS		
3.2	_ 30.1	11	11	15				 	: : :		Sat.		MEDIUM DENSE GRA	(Y-TAN SILT) SE SAND	FINE TO	
Ŧ	-		''	'`		an √0						井	- (A-	-1-b)		
‡	-							: : :	:::			臣	WITH FRIABLE INDURATED THINLY	BEDDED GI	RAY-TAN	
‡						: : : :		: : :	:::			中	SANDY LIMES	TONE LAYE	RS	
0.3	37.2	. 10	11	13		1			:::	•	Sat.	田	MODERATELY			
1	-	. 10	.,	13		Ψ 24						井	INDURATED THINLY TAN-GRAY SAN			
‡						:/::::		: : :	: : :			玕	WITH TRACE OF T			
5.3	42.2	10	14	17					: : :		Sat.	井	- ·			
+						. ¥3'						丑				
, , ‡	. 470					11:::						击				
0.3	47.2	11	54	46/0.4		: <u>L: : :</u>		 	اصن		Sat.	丰	-61.3	EODMATIC:	1.	
<u></u>								· · 10	0/0.9			井	RIVER BEND INDURATED TO EXT	REMELY IND	URATED	
_{5.3} 🗐	52.2						· · · · · ·	<u>/</u>			.	丑	THINLY BEDDE			
+	- 52.2	41	30	22			≪ 52 · ·				Sat.		WITH TRACE OF		AYERS	
‡	.								:::			耳				
0.3 ±	57.2								:::I			丑	_			
, 		54	46/0.3						0/0.8		Sat.	井				
, T												詽				
5.3 🛨	62.2						:::: <i>:</i> /	/ : :	:::			井	-			
		34	30	31			· · · € 61÷			***	Sat.					



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SHEET 22 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

Ø.	ENG ENV	INEERIN IRONMEI	IG • TES	TING								-	The same	TRAM	SHEET 2 OF 2
PROJ	ECT NO.	326	19.1.1			ID.	B-25	32		С	OUNTY	Crav	en		GEOLOGIST S. JOHNSON
SITE	DESCRIP	PTION	Bridge	e 60 on	US 70) Busir	ness o	over T	rent Ri	ver					GROUND WATER (
BORIN	IG NO.	B 7-A		ВС	DRING	LOCA	TION	1 24	+77		OFFS	ET 24	.0 ft L	Γ	ALIGNMENT -L- 0 HR. N/A
COLL	AR ELE\	/13.	1 ft	NORT	HING	497	.351.	.8			EAST	ING	2,586	.992	2.6 24 HR. N/A
	_ DEPTH			DRILL				IE-45c		DRIII	L METH	OD R	otary Wa		/NW Casing/2-7/8" Tricone to HAMMER TYPE MANUAL
				DIVILL	_ IVIAC								WD4		
	STARTE		1/9/05		т	COM			1/9/05		SUKF	ACE W	1	DEF	PTH 11.6 ft
	DEPTH		OW COL		-	20		WS PE 40	ER FOC 60		100	SAMP.	17	o	SOIL AND ROCK DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20 		40	<u> </u>	80 	100	NO.	MOI	G	
70.0						Conti	inued	l from	nrevio	us pag	Δ.				
-76.3	 	-			 							 	 	口	
	±				: :									臣	<u> </u>
-80.3	67.2	- 50	10/0 5	ļ									Sat.	片	-L_ 81.3
	‡	52	48/0.5		: :						100		Sat.		DENSE GRAY SILTY FINE TO COARSE
	‡				1::		<i>.</i> 							E	- SAND - (A-1-b)
35.3 -	72.2	10	10	- 00	• •			. .					Sat.	뮕	WITH INDURATED THINLY BEDDED GRAY
	‡	12	18	26	: :			<u>Ф 44</u>	· · ·		• • •		Sat.		-86.8 MOLDIC LIMESTONE LAYERS INDURATED TO EXTREMELY INDURATED
	‡				: :		 		1::					耳	THICKLY BEDDED GRAY MOLDIC
90.3	77.2	21	26	20					.				Sat.	臣	LIMESTONE
	<u> </u>	31	20	28	 · ·			• • • •	⊙ 54 ·			 	Jal.	开	7 -91.8 1) ADVANCED NW CASING TO 30.1 FEET.
	‡				BOR	RING TE	RMIN	IATED	AT ELE	V91.8	FEET	٠.			2) SET NW CASING TO 30.1 FEET (TEMP
-	+				ININ	NDURAT	TED G	SRAY N	MOLDIC	LIMES	TONE.				CASING 12.7 FEET). 3) ADVANCED 2-7/8" TRICONE TO 31.6
	‡												Ì		FEET.
	‡												,		4) ADVANCED NWD4 CORE BARREL FROM 31.6 TO 77.2 FEET.
-	+						,						,		5) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID.
	Ŧ														- 6) APPROXIMATE DRILLING FLUID
	‡								٠		•				DENSITY 66 PCF. 7) LOSS OF DRILLING FLUID OBSERVED
-	+														BELOW 47 FEET.
	Į.														F ·
	<u> </u>														‡
-	+														<u> </u>
	F												ł		F
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V	ENGINEERING . TESTING



SHEET 23 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

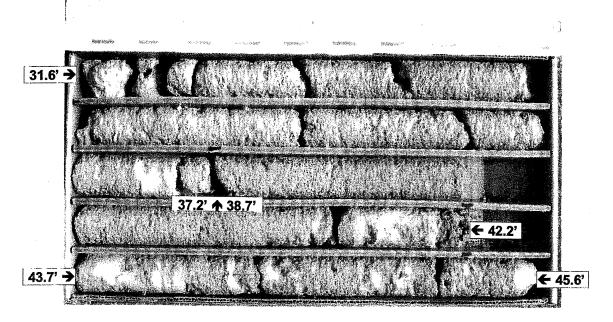
Secretary and the second

	ENVIR	ONWE	IG • TEST VIAL SERV	CES						SHEET 1 OF 1
PROJE	CT NO.	326	49.1.1			ID. B-25	532			COUNTY Craven GEOLOGIST S. JOHNSON
SITE D	ESCRIP	TION	Bridge	60 on l	JS 70	Business	over T	rent R	iver	GROUND WATER (ft)
BORIN	G NO.	B 7-A		BOI	RING	LOCATIO	N 24	+77		OFFSET 24.0 ft LT ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV.	-13	.1 ft	NORTH	HING	497,351	.8			EASTING 2,586,992.6 24 HR. N/A
TOTAL	DEPTH	78.7	ft ft	DRILL	MACH	IINE C	ME-45	>	DRI	RILL METHOD Rotary Wash w/NW Casing/2-7/8" Tricone to HAMMER TYPE MANUAL
DATES	STARTE) 1	1/9/05		T	COMPLE	TED	11/9/0	5	SURFACE WATER DEPTH 11.6 ft
CORE	SIZE N	WD4				TOTAL R	UN 4	7.1 ft		DRILLER A. MARTIN
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE	REC. (ft)	RQD (ft)	SAMP.	STR REC. (ft) %	ATA RQD (ft) %	L 0 C	DESCRIPTION AND REMARKS
(10)	(1.5)	(**)	(Min/ft)	%	%		%	%	G	44.7 Begin Coring @ 31.6 ft 31
-44.7	31.6	5.6	0:20	(4.2)	(N/A)		(9.9)		-	44.7
			0:20 0:15	75%			60%		臣	BELGRADE FORMATION: MODERATELY INDURATED TO INDURATED THINLY TO THICKLY
	07.0		0:15 0:20						蓝	BEDDED TAN-GRAY SANDY LIMESTONE WITH TRACE OF THIN SAND LAYERS
-50.3	37.2		0:10/0.6	 					曲	<u>-</u> -
-51.8	38.7	3.5	N=24 0:20	(2.7) 77%	(N/A)				岸丰	- -
-55.3	42.2		0:20 0:20	1176					罝	<u> </u>
	40.7		0:10/0.5 N=31		(2.1/2.)				崖	<u></u>
-56.8	43.7	3.5	0:25	(3.0) 86%	(N/A)				井	<u>-</u> -
-60.3	47.2		0:25 0:30	<u> </u>		ļ			旪	
-61.7	48.6	3.6	\ <u>0:15/0.5</u> W=1 <i>00/0</i> .9		(N/A)		(10.8) 54%		田	RIVER BEND FORMATION:
-65.3	52.2		1:30 1:20	69%			5476		田	INDURATED TO EXTREMELY INDURATED THINLY BEDDED GRAY MOLDIC LIMESTONE
-00.0	32.2		1:15 0:45/0.6	/				<	毌	- WITH TRACE OF THIN SAND LAYERS
-66.8	53.7	3.5	N=52 1:00	(3.3)	(N/A)				#	-
-70.3	57.2		1:45			ļ			甲	- -
-71.1	58.0	4.2	2:00 0:45/0.5		(N/A)	1			臣	- - -
			<u>V=100/0.</u> 4:05	64%					串	<u>‡</u>
-75.3	62.2		4:00 3:45			1			曲	
-76.8	63.7	3.5	4:00 0:30/0.2	(2.3)	(N/A)				曲	<u>‡</u>
-80.3	67.2		N=61 2:40	1 00%					岀	-
-81.3	68.2	4.0	2:45 3:00	(1.3)	(N/A)		(1.3)			81.3
			1:35/0.5	33%		1	24%			(A-1-b)
-85.3	72.2		1:30	'	-					WITH INDURATED THINLY BEDDED GRAY MOLDIC LIMESTONE LAYERS 73
-86.8	73.7	3.5	1:35 1:25	(3.5) 100%	(N/A)		(3.5) 70%		耳	INDURATED TO EXTREMELY INDURATED THICKLY BEDDED GRAY
-90.3	77.2		1:30 N=44	100%			10%		茁	MOLDIC LIMESTONE
-91.8	78.7		1:30 1:40						岸	-91.8 78
01.0	70.7		1:45 0:35/0.5							BORING TERMINATED AT ELEV. 91.8 FEET IN INDURATED GRAY MOLDIC LIMESTONE.
			N=54	1						INOCESIO EINIESTONE.
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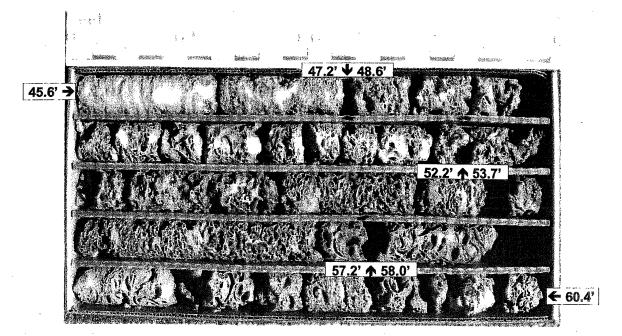


CORE PHOTOS

	The state of the s	T	I
Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B7-A
Site Description: Bridge No.	60 over Trent River on US 70 E	Business	Driller: A. Martin
Collar Elev.: -13.1 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson
Elev. at T.D.: -91.8 ft.	Total Depth: 78.7 ft.	Total Run: 47.1 ft.	Date: 11/09/2005



Box 1 of 3
Top of Box @ 31.6 feet; Bottom of Box @ 45.6 feet



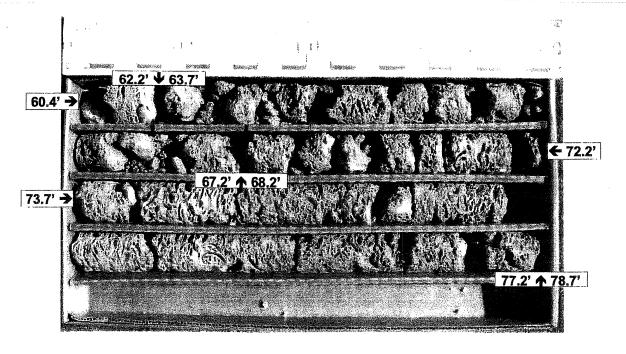
Box 2 of 3
Top of Box @ 45.6 feet; Bottom of Box @ 60.4 feet



SHEET 24 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B7-A
Site Description: Bridge No.	60 over Trent River on US 70 E	Business	Driller: A. Martin
Collar Elev.: -13.1 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson
Elev. at T.D.: -91.8 ft.	Total Depth: 78.7 ft.	Total Run: 47.1 ft.	Date: 11/09/2005



Box 3 of 3
Top of Box @ 60.4 feet; Bottom of Box @ 78.7 feet





	ENVI	SONWER	G . TES TAL SER	VICES							W. O.	TRANS			,	SHEET	1 OF 2	
PROJE	CT NO.	3264	9.1.1			ID.	B-2532	C	OUNTY	Crave	∋n			GEOLOG	IST S.	AOSNHOL		
SITE D	ESCRIP	TION	Bridge	60 on	US 70	Busin	ess over Trent R	iver		,						GROUN	ID WATER	(ft)
BORIN		B 8-B				LOCA			OFFSI	ET 24.	0 ft RT	-	ALIGNM	ENT -L-		0.HR.	N/A	
	RELEV		5 ft	NORT	HING	497	,435.7		EASTI	ING	2,587	056.	5			24 HR.	N/A	
ļ	DEPTH			DRILL			CME-45c	DRILL	METH		otary Wa	sh w/N	IW Casing/2-	7/8" Tricone	HAMM	IER TYPE	MANUAL	
	STARTE		/8/05	Ditte			PLETED 11/8/0	_l				DEP.	TH 12.1	ft				
ļ	DEPTH		ow col	INIT	ĺ	00111	BLOWS PER FO		1	SAMP.	V	L						
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40 60	80	100		мог	O G		SOIL AN	ID ROCK	DESCRIPT	ION	
(11)	(11)	0.011	0.010	0.0.0							V WO		····					
								•								•	·	
-1.4							RIVER LEVEL	-	~~~									
_														. *				
	- -												<u> </u>	•				
-	- -																	
	-																	
-	_												-					
	_						RIVER BOTTO	М					-13.5					0.00
					T -						-		_	VERY SOF	ALLU T BROW	IVIUM : 'N HIGHLY (ORGANIC	
	_														FINE SA	NDY SILT JCK)		
-19.0	5.5				:										(1010	3011)		
		WOR	WOR	WOR	φwo	OR					W							
-																		
-24.0	10.5										w					•		, ,
	_	WOH	WOH	WOH	φŵα	ĎΗ.					. **		-					
							· · · · · · · · · · · ·											
-29.0	15.5	WOH	WOH	WOH	owc		<i></i>				w							
-	_	WOIT	WOIT	WOIT	OVIC				• • •				•					
240	- 20 = -	-											-34.0			•		20.5
-34.0	20.5	WOH	WOH	WOH	d w	OH				SS-10	26.4		-	VERY SOF		CLAYEY FIN	IE SANDY	
-	_												-37.5		(A	∖-4)	AATTED /	24.0
-39.0	25.5											000		BEL	GRADE	ORGANIC !	N:	
-		. 9	9	14			23				Sat.	000	-	MEDIUM [BRAY SILTY SE SAND	FINE TO	
	_											000	-42.5	WITH TRA	ACE OF I	-1-b) NDURATEI	THINLY /	29.0
-43.8	30.3	15	16	13				• • • •			Sat.		[BEDDED	GRAY S	ANDY LIME	STONE	
	-		,,,				. J. 29 . J							MEDIUM L	COARS	RAY SILTY SE SAND	FINE IO	
-48.8	- - 35.3						:/::::::::::						•		RIABLÈ 1	-1-b) TO MODER		
10.0		12	12	14		(26' : : : : :				Sat.		-			ILY BEDDE STONE LAY		
3	_												-52.5					39.0
-53.8	40.3		45	40							Sat.		•	FRIABLE TO THINL	Y BEDDE	ED GRAY SA	ANDY	
	 	14	15	12			Φ 27					井	 -57.0	WITH TRA		STONE THIN SAND	LAYERS	43.5
	0						. \					記	-57.0		ENSE G	RAY SILTY		
-58.8	45.3	15	14	14			0.28				Sat.		- .		(A-	SE SAND -1-b)		
	-												-61.6	WITH MODE	ERATEL\ GRAY S	Y INDURAT ANDY LIME	ED THINLY STONE /	48.1
-63.8	50.3											田		RIVE	ER BEND	FORMATIC INDURATE	ON:	
	_	40	26	17			0.43				Sat.	出	-	EXTREM	MELY IND	DURATED T	HINLY	
	-											井	•			OLDIC LIMI THIN SAND		
-68.8	55.3										Sat.	田						
	-	54	32	40				0.72			Jai.	出	<u> </u>					
	-											計						
-73.8	60.3	80	20/0.2						6		Sat.	田	75.5					62.0
51 -	-		_ 3. 3				 	1(00/0.7		1	H	-10.0			·····		





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

PROJECT 10 10 10 10 10 10 10 1		ENG!	NEERIN	G TES	TING VICES								01	TRANS	<i>"</i>			SHEET	2 OF 2	
BORING NO. B & B BORING LOCATION 25+71 OFFSET 24.0 ft RT ALIGNMENT -L- 0 HR. N/A	PROJE	CT NO.	3264	9.1.1			ID.	B-2532		· C	YTNUC	Crave	en			GEOLOG	IST S.	JOHNSON		
COLLAR ELEV. -13.5 ft NORTHING 497,435.7 EASTING 2.587,056.5 24 HR. N/A	SITE D	ESCRIP	TION.	Bridge	60 on	US 70	Busin	ess ove	r Trent Ri	ver								GROUN	D WATER	(ft)
TOTAL DEPTH 81.8 TOTAL DEPTH 81.8 TOTAL DEPTH 81.8 TOTAL DEPTH 81.8 TOTAL DEPTH 81.8 TOTAL DEPTH 81.8 TOTAL DEPTH	BORIN	G NO.	B 8-B		во	RING	LOCA	TION	25+71		OFFS	ET 24.	0 ft R7		ALIGN	MENT -L-	ŧ	0 HR.	N/A	
DATE STARTED 11/8/105 COMPLETED 11/8/105 SURFACE WATER DEPTH 12.1 ft	COLLA	R ELEV	13.	5 ft	NORT	HING	497	435.7			EAST	ING	2,587	,056.	5			24 HR.	N/A	
DATE STARTED 11/8/05 COMPLETED 11/8/05 SURFACE WATER DEPTH 12.1 ft	TOTAL	DEPTH	81.8	ft	DRILL	MAC	HINE	CME-	45c	DRILL	METH			sh w/N	VW Casing/2	2-7/8" Tricone	HAMN	ER TYPE	MANUAL	-
Continued from previous page	DATE	STARTE	D 11	/8/05			COM	PLETEC	11/8/05)	SURF	ACE W	ATER	DEP	TH 12.1	1 ft				
(ft) (ft) 0.5ft 0.5ft 0.5ft 0 20 40 60 80 100 NO. MOI G -76.2	ELEV.	DEPTH	BLO	ow cor	JNT			BLOWS	S PER FOO)T	<u> </u>	SAMP.	V /			SOU AN	ID BOCK	DESCRIPT	ION	
-76.2 Continued from previous page -78.8 65.3 GRAY MOLDIC LIMESTONE GRAY MOLDIC LIMESTONE WITH TRACE OF THIN SAND LAYERS (continued) -83.8 70.3 Sat. -88.8 75.3 29 26 27 -93.8 80.3 29 28 38 BORING TERMINATED AT ELEV95.3 FEET IN INDURATED TRILING TO 25.5 FEET. 2) SET NW CASING TO 25.5 FEET. 3) ADVANCED 2-78" TRICONE ROLLER TO 80.3 FEET. 4) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID OBSERVED. 6) APPROXIMATE DRILLING FLUID 6) APPROXIMATE DRILLING FLUID 6) APPROXIMATE DRILLING FLUID 6) APPROXIMATE DRILLING FLUID 6) APPROXIMATE DRILLING FLUID	(ft)	(ft)	0.5ft	0.5ft	0.5ft	O I	20	40	60	.80	100	NO.	MOI	1 1		JOIL AI	ID ROOK	· DEGOIGH 1		
-78.8																				
-78.8							Conti	inued fro	om previo	us nade										
-83.8 70.3 26 29 17	-76.2	_				: :			1		<u> </u>					FRIABLE TO	INDURA	TED THINL	Y BEDDED	
-83.8 70.3 26 29 17 0.46 Sat. -88.8 75.3 29 26 27 0.53 Sat. -93.8 80.3 29 28 38 0.66 Sat. -95.3 S	-78.8	65.3	30	28	20								Sat.		-		ACE OF T	THIN SAND		
-88.8 75.3 29 26 27 6.53 Sat Sat	-	-	50	20	2.5				Ψ48					出	-		(cont	inuea)		
-88.8 75.3 29 26 27 6.53 Sat Sat	-83.8 ⁻	70.3							::::::						-		*			
29 26 27 -93.8 80.3 29 28 38 BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. 1) ADVANCED NW CASING TO 25.5 FEET. 2) SET NW CASING TO 25.5 FEET. 2) SET NW CASING TO 25.5 FEET. 3) ADVANCED 2-7/8" TRICONE ROLLER TO 80.3 FEET. 4) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID. 5) SOME LOSS OF DRILLING FLUID OBSERVED. 6) APPROXIMATE DRILLING FLUID			26	29	17				46				Sat.	H	-					
29 26 27 -93.8 80.3 29 28 38 BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. 1) ADVANCED NW CASING TO 25.5 FEET. 2) SET NW CASING TO 25.5 FEET. 2) SET NW CASING TO 25.5 FEET. 3) ADVANCED 2-7/8" TRICONE ROLLER TO 80.3 FEET. 4) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID. 5) SOME LOSS OF DRILLING FLUID OBSERVED. 6) APPROXIMATE DRILLING FLUID		-							:\::::					田	-					
-93.8 80.3 29 28 38 BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. - 1) ADVANCED NW CASING TO 25.5 FEET 2) SET NW CASING TO 25.5 FEET 2) SET NW CASING TO 25.5 FEET 3) ADVANCED 2-7/8" TRICONE ROLLER - TO 80.3 FEET 4) RIVER WATER WITH QUICKGEL ADDED - USED AS DRILLING FLUID OBSERVED OBSERVED 6) APPROXIMATE DRILLING FLUID	-88.8	75.3	20	26	27								Sat.	耳	-				٠	
29 28 38 Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.	-	-	25	. 20										田	- ′					
29 28 38 Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.	-038	80.3							:::\:				•	田	- -			•		
BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. BORING TERMINATED AT ELEV95.3 FEET IN INDURATED GRAY MOLDIC LIMESTONE. - 2) SET NW CASING TO 25.5 FEET(TEMP CASING 13.2 FEET). 3) ADVANCED 2-7/8" TRICONE ROLLER TO 80.3 FEET. 4) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID. 5) SOME LOSS OF DRILLING FLUID OBSERVED. 6) APPROXIMATE DRILLING FLUID	-90.0		29	28	38				/	66			Sat.	里			-5.444.6	AONO TO O		81.8
						Bf	ORING EET IN	I INDUR	ATED GRA	ELEV	95.3 DIC				- - - - -	CASING 1 3) ADVANCE TO 80.3 F 4) RIVER W USED AS 5) SOME LC OBSERVE 6) APPROXI	3.2 FEET ED 2-7/8" EET. ATER WI' DRILLIN SS OF D ED. MATE DF	F). TRICONE F TH QUICKG G FLUID. RILLING FL	ROLLER EL ADDED UID	





	ENGI	NEERIN ONMFN	G . TEST	TING VICES								Mar or	<u> 784897</u>	%			SHEET	1 OF 2	
PROJE		3264				ID.	B-2532		·C	OUNTY	Crave	en			GEOLOG	IST A.	T		
ITE DE	ESCRIP	TION	Bridge	60 on l	JS 70) Busin	ess over	Trent R	iver								GROUN	ID WATER ((ft)
ORING	G NO.	B 9-A				LOCA		26+66		OFFSI	ET 9.0	ft LT		ALIGNM	ENT -L-		0 HR.	N/A	
OLLA	R ELEV	-12.8	3 ft	NORTI	HING	497	,535.1	***************************************		EAST		2,587,					24 HR.	N/A	
<u> </u>	DEPTH			DRILL	MAC	HINE	BK-51		DRIL	METH	OD Ro	otary Wa	sh w/N	W Casing/2-7	7/8" Tricone	HAM	MER TYPE	AUTOMA	TIC
	TARTE		/9/05	L		COM	PLETED	11/9/0	<u> </u>	SURF	ACE W	ATER	DEP	TH 12.5	ft		,	,	
	DEPTH		W COL	JNT		1		PER FO			SAMP.	$\mathbf{V}/$	L		COII AA	ID BOCK	(DESCRIPT	ION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ō	20	40	60	80	100	NO.	моі	O G		SUIL AI	UD ROOF	CDESORII		
. (1.5)																			
			,																
-0.3							RIVE	R LEVEL				∇							
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. 4	-																		
12.8 †	- 0.0						RIVER	вотто	M				<u> </u>	-12.8			D (1) (8.4.		
+	-	WOR	WOR	WOR	φw	OR· ·						W		_		SOFT DA	JVIUM: .RK GRAY H		
16.4	- - 3.6				:							w		<u>-</u>	OF		CLAYEY SIL' UCK)	1	
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21.4	- 8.6 -	WOH	WOH	WOH	d i	 						W	綴						
1	-				"									-					
-26.4 -26.4	- - 13.6				Ľ	 	 			 					OOSE DAR	K GRAY	TO GRAY C	OARSE TO	
1	-	3	5	5		o 10 .	 		: : :			Sat.		-		FINE	SAND (-2-4)		
1	-					<u> </u> ::::	 	· · · ·		 				-		TRACE C	F SILT, CLA	Y AND	
-31.4	- 18.6			3	: /		 				SS-11	Sat.		_		UKGAN	C MATTER	*	
1		5	2	3	. ф	5					-	1		24.9			•	· ·	
·					. L								000	-34.8	MEDIUM I		IGHT GRAY	FINE TO	
-36.4	- 23.6 -	13	9	11			20					Sat.	000	Ē			SE SAND \-1-b)		
1	<u> </u>										ř.		000	-39.8					
-41.5	- - 28.7												000	-	MEDILIM	DENSE 1	FORMATIO FAN-GRAY S	SLIGHTLY	
	-	12	10	9		∳ 1	9					Sat.	000		CLAYEY SLI	GHTLY S S	SILTY FINE T AND	O COARSE	
1	-					:: :							000	F	WITH	TRACE	4-1-b) OF MODERA	ATELY	
-46.5	- 33.7 -	10	8 .	8		: 1:						Sat.	000	L	INDURA	TED THI	NLY BEDDE IMESTONE	D GRAY	
1	_				::								000	-		0/11/01/			
-51.5	- - 38.7				: :	: 5								50.3	FRIABLE 1	O MODE	RATELY IN	DURATED	
1		11	9	10	::	6	9					Sat.		F	TAN-C	SRAY SA	NDY LIMES	TONE	
1	_				::	\					1		田	F	WITHTF	ACE OF	THIN SAND	LAIERO	
-56.5	43.7	12	12	14	::	:::\	<u> </u>					Sat.	田	ļ.					
	<u> </u>	12	12	'*		: : :	Ψ 26			· · · · ·			岸	-59.0	Dir	FR REN	D FORMATIO	ON:	
-61 <i>.</i> 5	48.7				::	: : :							耳	-	INDURATE	D TO EX	TREMELY II KLY BEDDE	NDURATED	
01.0		64	36/0.4		::			 		100/0 0		Sat.	岸	‡		MOLDIC	LIMESTONE		
Ŧ	_				: :	: : :		<i></i> .					田	<u> </u>	WITH T		F VERY THI YERS	IN DAIND	
-66.5	- 53.7			05/0 /						: : :		Sat.	出	<u> </u>					
1	F	36	35	65/0.4	: :					100/0.9		Jan	計	‡					
1		1	ı	1	1					- 1	1	1	-	3					
-71.5	58.7				: :								一	<u> </u>					





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

197	ENGI	VEERIN ONMEN	G • TES	TING VICES								War of	TRANS	5	SHEET	2 OF 2
PROJE	CT NO.		9.1.1			ID. E	3-2532		C	YTNUC	Crav	en		GEOLOGIST A	RIGGS	
SITE D	ESCRIPT	TION	Bridge	60 on	US 70	Busin	ess ove	r Trent Ri	ver					·	GROUN	ID WATER (ft)
BORIN	G NO.	B 9-A		ВО	RING	LOCA	TION	26+66		OFFS	ET 9.0	ft LT		ALIGNMENT -L-	0 HR.	N/A
COLLA	R ELEV.	-12.	8 ft	NORT	HING	497,	535.1	,		EAST		2,587		111 C : 10 TIOL T :	24 HR.	N/A
TOTAL	. DEPTH	80.2	ft	DRILL	MAC	HINE	BK-51		DRILL	METH	OD R	oller			MER TYPE	AUTOMATIC
DATE	STARTE) 11	/9/05			COMF	LETED	11/9/05	j.	SURF	ACE W	ATER	DEP	TH 12.5 ft	<u>~</u>	
ELEV.	DEPTH		OW COL			00		PER FOO		100	SAMP.		0	SOIL AND ROC	(DESCRIPT	ION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	9	20	40 1	60	80	100	NO.	MOI	G			
																,
-75.1						Conti	nued fro	m previo	us page)				INDURATED TO EX	DEMEI V IN	DUBATED
-76.5	63.7	27	27	26								Sat.	開	VERY THINLY TO T	HINLY BEDD IMESTONE	ED GRAY
	‡												囯	 WITH TRACE OF 	THIN SAND	LAYERS
-81.5 ·	68.7						/						田	- (<i>coi</i>	tinued)	
	‡	22	19	17			. 036					Sat.	H		•	
00.5	73.7					 		<u> </u>					出			
-60.5	73.7	26	23	30				53 .				Sat.	出	_		
						 		:::\::	· · · ·				出	-		,
<u>-91.5</u>	78.7	36	35	35		 		: : : : \	 6 70			Sat.	出	- 93.0		80.2
<u> </u>											<u> </u>	1	T^{H}	1) ADVANCED NW C 2) SET NW CASING		2.1 FEET.
-	‡]				BOR IN E	ING TE XTREM	ELY IND	ED AT ELI URATED (EV93.0 GRAY M	OLDIC				CASING 29.0 FEE 3) ADVANCED 2-7/8'	Γ).	
	‡						LIME	ESTONE.				1 ;		FROM 32.1 TO 78 RIVER WATER W	7 FEET.	
-	‡													USED AS DRILLIN 5) APPROXIMATE D	G FLUID.	
	‡													 DENSITY 66 PCF. 		
	‡	•												- 6) SOME LOSS OF DOBSERVED BELO		
-	‡			,			•									. •
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~	ENG! ENVIR	NEERIN ONMEN	G • TEST	TING VICES								OT OF	TRANSP				SHEET		
PROJE	ECT NO.					ID.	B-2532		C	OUNTY	Crave	n .		(3EOLO	SIST S.	JOHNSON	1 .	
SITE D	ESCRIP	TION	Bridge	60 on l	JS 70	Busin	ess ove	r Trent Ri	ver								GROUN	ND WATER	R (ft)
BORIN	IG NO.	B10-B		во	RING	LOCA	TION	27+58		OFFSE	ET 22.	oft RT		ALIGNME	NT -L-		0 HR.	N/A	
	AR ELEV		3 ft	NORT	HING	497	,620.2			EASTI		2,587,			-		24 HR.	N/A	
	DEPTH			DRILL	MAC	HINE	CME-	45c	DRILL	METH	OD Ro	tary Wa	sh w/N	NW Casing/2-7/8	" Tricone	HAMN	IER TYPE	MANUA	L
	STARTE		/9/05					11/9/05		SURF			DEP.	TH 12.7 f					
	DEPTH		W COL	INIT				S PER FOO			SAMP.	V /	L				, DECODING	rion.	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40		80	100	NO.	мог	G		SOIL A	ND ROCK	DESCRIPT	ION	
(11)	(11)	0.010		0.01								10101							
-1.6							RIVE	R LEVEL				∇							
	‡													_					
_	‡													_				*	
	_													- - ·					
	<u> </u>													-					
-	+			·										_					
	Ŧ													-				*	
-14.3							RIVE	R BOTTO	M			Sat.		14.3		ΔΙΙΙ	JVIUM:		0.0
-	‡	1	1	1	02							oat.	 :::	-	VERY	LOOSE	GRAY FINE	SAND	
	<u> </u>				. .									_	1	WITH TRA	A-3) ACE OF SIL	T .	
-19.3	5.0	1	1	3						'		Sat.		- 			•		
-	Ŧ	•	1.		94	4							::: <u>}</u>	_					
	‡				: :												-		
-24.3	10.0	1	1	1	1:1:							Sat.		-					
	<u> </u>	,			Y.2								:::t						
io a	I 150				: :										•		•		
-29.5	15.0	WOH	1	WOH	61					 		Sat.		- .					
-	†													F			•		19.
-34.3	20.0							·						33.3	VERY LC		AY SILTY FI	NE SAND	10.
	 	WOH	WOH	WOH	bw	 ОН- ·						Sat.		_	WITH TE	A) RACE OF	N-2-4) SILT AND (ORGANIC	
	Ī.				1:									<u> E</u>			YERS		
-39.3	25.0				11:	 			• • •			0-4		-					
•	<u> </u>	3	1	. 2	-63	3				, .		Sat.		-41.8					27.
	+				: :										BI	ELGRADE	FORMATION GRAY SILT	ON:	
-44.3	30.0				1::	: : :					SS-12	Sat.		<u>L</u>	MUIUHIN	COAR	SE SAND	I FINE IO	
	‡	9	11	12	: :	· · ·	23				00-12	Jai.		-46.3 M	ITH MOI	DERATÈL	λ−1-b) .Y INDURAT	ED THINL	32
	±		-										000	Į \	BEDDE	D GRAY	SANDY LIM	ESTONE	1
-49.0	34.7	11	11	12	: :							Sat.	000		MEDIUM	DENSE	YERS GRAY SILT	Y FINE TO	.
	Ŧ.	<u> </u>	."	-	: :	: : : 1	7.23						000	-51.3		(/	SE SAND A-1-b)		. 37
E40	‡ 20.7								• • • •	 			団	F \	WITH	TRACE	OF MODER	ATELY	1
-54.0 -	39.7	11	12	13	1		0 25					Sat.	田	⊢ \	GF	RAY SANI	ABLE THIN	ONE	
	+						\						開	F	RIABLE	TO MODE	RATELY IN GRAY LIM	IDURATED	
-59.0	44.7		Ľ	' '		::::	. \						田	E	WITH T	RACE OF	THIN SANE	LAYERS	
-55.0	 	15	15	20	1::		\ 35	 		 		Sat.	出	-					
	<u></u>												田	-62.3		/EB 55.	n FORMATI	ON	48
-64.0	49.7]								岸	‡	MOD	ERATEL	D FORMATI Y INDURAT	ED TO	
- :- :	+	32	68/0.5] · · ·					00/1.0		Sat.	田	-	FXTR	EMELY IN	IDURATED	THINLY	
	‡								1				田	-	WITH TI	RACE OF	THIN SANE	LAYERS	
-69.0	54.7			1								0.4	H	-					
-	+	25	42	58/0.2						00/0.7		Sat.		<u> </u>					
	Ŧ								!				H	_					
-74.0	59.7		10'0 5							:::[Sat.	压	}					
-	‡	56	46/0.5							00/1.0	<u> </u>		Щ	Ε					
1200	· 184	- A.A.A	e - '. '	14.44	8			7 to 1 A	() ()	HWV #	4:18		10 16 1	Balas ar 1	47			4444	1.00





SHEET 27 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

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⋄	ENGI	NEERIN	G - TES	TING VICES								Sept of	TRANSP	*/			SHEET	2 OF 2
PROJE	CT NO.					ID. E	3-2532		С	OUNTY	Crave	en			GEOLO	SIST S	. JOHNSON	1
ITE DI	ESCRIP	TION	Bridge	60 on l	JS 70	Busine	ess over T	rent Riv	er								GROUN	ID WATER (f
ORIN	G NO.	B10-B		во	RING	LOCA	TION 27	'+58		OFFSI	ET 22.	0 ft RT	•	ALIGN	MENT -L	•	0 HR.	N/A
OLLA	R ELEV	'14.3	3 ft	NORT	HING	497,	620.2			EAST		2,587,					24 HR.	N/A
DTAL	DEPTH	81.2	ft	DRILL	MAC	HINE	CME-45		DRILL	METH	OD R	otary Wa	sh w/N	IW Casing/2	-7/8" Tricone	HAM	MER TYPE	MANUAL
ATE S	STARTE	D 11	/9/05	4		COMP	LETED	11/9/05		SURF	ACE W	ATER	DEP	TH 12.7	7 ft		u.	
EV.	DEPTH	BLC	ow cor	TNL			BLOWS P	ER FOO	Т		SAMP.	lacksquare	L		SOIL A	ND ROC	K DESCRIPT	TION
(ft)	(ft)	0.5ft	0.5ft	- 0.5ft -	0	20	40	60	80	100	NO.	MOI						
7C 4						Conti	nued from	previou	ıs paq	9								
6.4	~									7			田				D FORMATION Y INDURATE	
9.0	64.7	27	33	27					/			Sat.	毌		EXTRE	MELY IN	IDURATED T	THINLY
-	-						• • • • •	. /				-	岀			RACE OF	THIN SAND	
4.0	- - 69.7						· · · /	/: : :	• • • • •				进	-		· (CO	ntinued)	
-	_	20	21	22				3				Sat.	計					•
. 1	-							<u> </u>					鬥	•		٠		
9.0	74.7	23	25	41								Sat.	田					
	-	25	20	7,	• •				66				田	-				
4.0	- 79.7												田	•				
+.0	- 13.1	22	27	40		 <u></u>			.67	 		Sat.	囯	95.5	4) 45) (41)	TO AUAC	CASING TO	24.7 EEET
-	-				В	ORING	TERMINAT	TED AT I	ELEV	95.5					2) SET NW	CASING	TO 34.7 FEI	
.]	-						INDURAT LIMES	ED GRA						-	CASING 3) ADVANO	ED 2-7/8	E1). B" TRICONE I	ROLLER
_	-						LIIVILO	1011						-	TO 79.7 4) RIVER V	FEET. VATER V	VITH QUICK	GEL ADDED
-	<u> </u>													.	USED F	OR DRIL	LING FLUID. NG FLUID O	
-					٠				٠.					-	BELOW	50 FEET		•
	<u>_</u> .													- -,	DENSIT	Y 66 PCF	E.	
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SHEET 1 OF 2

	ENGI ENVIR	NEERING ONMEN	G , TEST ITAL SERV	ring vices							W. 01	TRANSIS				SHEET	1 OF 2	
PROJE	CT NO.	3264	9.1.1			ID.	B-2532		COUNTY	Crave	en		GEOL	.OGIST	S.	JOHNSON		
SITE D	ESCRIP	TION	Bridge	60 on l	US 70) Busir	ness over Trer	nt River								GROUN	ID WATER	(ft)
BORIN	G NO.	B11-A		ВО	RING	LOCA	ATION 28+5	1	OFFS	ET 22.	0 ft LT		ALIGNMENT	-L-		0 HR.	N/A	
	R ELEV		3 ft	NORT	HING	497	7,719.5		EAST		2,587,					24 HR.	N/A	
	DEPTH			DRILL	MAC	HINE	CME-45c	DR	ILL METH		otary Wa	sh w/NV	V Casing/NWD4 Core	∍ H	IAMN	IER TYPE	MANUAL	
	STARTE		/10/05			,	IPLETED 11/	10/05	SURF	ACE W	ATER	DEPT	H 12.2 ft					
	DEPTH		ow col	JNT	Γ		BLOWS PER	FOOT		SAMP.	V /	L	9011	AND	onck	DESCRIPT	ION	-
(ft)	(ft)	0.5ft	0.5ft	0.5ft	o	20	40	60	30 100	NO.	моі	O G	3011	LANDI		DEGOTAL		
				-			· ·	,				ŀ						
			1.1															
-2.4							RIVER LE	VEL		 	∇							
	-											上						
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	-											-						
-	-											F	•					
	_				·							F						
-14.6	- 0.0						RIVER BOT	гтом				-	-14.6			,		0.00
-14.0	- 0.0	1	2	1	. 0.3	· · ·					W	<u>-</u>	-15.6			J VIUM : 'CLAYEY SI	LT /	1.0
					: :						Sat.		1		1 (4	4-4) (Y SILTY FIN	- 1	
-20.1	5.5														(A	-2-4) ORGANIC N		
20.	- 0.0	WOH	1	1	1 2 2						Sat.		· VVIII	TRAC	EOF	ORGANIC I	MATTER	
	_				: :	1						**						
-25.1	10.5										Sat.	-	-					
	<u>.</u>	2	1	2	(4)	3							-27.1 LO	OSE GI	RAY S	SILTY FINE	SAND	12.5
					:							:::F			()	A-3) ORGANIC I		
-30.1	15.5	4	3	. 3		6					Sat.							
					:			,				li::F	•				•	
-35.1	20.5									ŀ.	C-4	 ::: -	-					
		4	5	4		φ 9 ·					Sat.		-37.6					23.0
	<u> </u>				: :	:::		,				000	LOOS			E TO COAR (-1-b)		,
-40.1	25.5	5	4	5	: :	ļ : :					Sat.	000	- 1.	WITH	H TŘ	ACE OF SIL	Г	
	F					¥							-42.6	BELG	RADE	FORMATIO	N:	. 28.0
-44.8	30.2]::	: : :					0-4	Hit.	- TL	LE TO N	MODE	ERATELY IN ED GRAY S	DURATED	
	<u> </u>	11	12	13			ф 25 · · · · · ·				Sat.		-46.3		LIME	STONE TO COARS		31.7
	‡						1::::::::::::::::::::::::::::::::::::::					000	1		LA'	YERS	.1	
	± 20.0	•					1				1	000	_ MEDI	OW DEV	COAR	GRAY SILTY SE SAND	FINE IO	
-51.2	36.6	16	14	12	1		<u>)</u> 26				Sat.	000	-52.7 W	TH TR	ACE (∖-1-b) OF MODER/	ATELY	38.1
:	<u> </u>										-	井	INDL	JRATED	IHT C	NLY BEDDE STONE LAY	D GRAY	,
-56.2 -61.2 -66.2	41.6] : ;						0-1	甲	FRIABL	ETON	MODE	RATELY IN	DURATED	
	-	18	18	17	: :		φ 35				Sat.	000	S	SANDY	LIMES	KLY BEDDE STONE LAY	ERS /	43.1
	-											000	DENS -60.9	E GRA		TY FINE TO AND	COARSE	46.3
-61.2	46.6	89	11/0.1		1 : :		· · <u>L · · · · · · · · · · · · · · · · ·</u>	· · · ·	 ,		Sat.			/ITH TR	(A	\-1-b) OF GRAY S	ANDY	
	F	09	1 1/0.1		: :				100/0.6			井		LIME	<u>ESTO</u>	NE LAYERS	<u> </u>	
66.0	51.0		1						. /			用	EXTRE	MELY II	NDUF	RATED TO II	NDURATED	
-66.2	51.6	24	27	53	1				œ(80 · · ·		Sat.	田		MOL	LDIC I	KLY BEDDE LIMESTONE		•
	<u> </u>								: \ : :			毌	WITH	TRAC	E OF	THIN SAND	LAYERS	
-71.2	56.6	-							:::\		Sat.	田						
		87	13/0.2		: :				100/0.7	'	oal.	屏						
_	<u> </u>				: :				Z			串	-					
-76.2	61.6	.36	29	25	1::			<i>//</i>			Sat.	世				····	,	





SHEET 28 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	ENG	NEERIN	G TES	TING VICES								01	TRANSEY	<i>,</i>			SHEET :	2 OF 2
PROJE	CT NO.	3264	9.1.1			ID.	3-2532		C	YTNUC	Crav	en			GEOLOG	IST S.	JOHNSON	
SITE D	ESCRIP	TION	Bridge	60 on	US 70) Busin	ess over	Trent Riv	/er								GROUN	D WATER (ft)
BORIN	G NO.	B11-A		ВС	RING	LOCA	TION	28+51		OFFS	ET 22	0 ft LT		ALIGNN	MENT -L-		0 HR.	N/A
COLLA	R ELEV	. -14.	6 ft	NORT	HING	497	719.5			EAST		2,587				.,,	24 HR.	Ņ/A
TOTAL	DEPTH	82.8	ft	DRILL	MAC	HINE	CME-4	5c	DRILL	METH		otary Wa arrel	sh w/N'	W Casing/N	IWD4 Core	HAMN	MER TYPE	MANUAL
DATES	STARTE	D 11	/10/05			COM	PLETED	11/10/0	5	SURF	ACE W	ATER	DEPT	TH 12.2	t ft			
ELEV.	DEPTH	BLO	ow col	TAL				PER FOO			SAMP.		0		SOIL AN	ID ROCK	(DESCRIPTI	ON
(ft)	(ft)	0.5ft	0.5ft	-0.5ft	0 .	, 20	40	60	80	100	NO.	MOI						
-77.2						Conti	nued fro	m previo	us page	,								
-11.2	_				: :			: \ : :					臣				FORMATIO ATED TO IN	
04.0	- 66.6				: :			: 1::						•	THINLY T	O THICK	KLY BEDDED	
-81.2 ₋	66.6	29	26	31	1)				Sat.	岸				.IMESTONE THIN SAND I	_AYERS
-	-												耳			(con	tinued)	
-86.2 ₋	71.6						· · · · /	/: : : :	· · · ·				串	•				
	_	. 27	16	24			6/4	0,				Sat.	曲					
-	-				: :		:::/						井					
-91.2 -	_ 76.6 -	21	25	25				50				Sat.	井					
	-								 				旪					
-96.2	_ _ 81.6		-										开	-				
-		25	43	57/0.2	<u> · · · </u>				10	0/0.7		Sat.	串	-97.4 1	I) ADVANCE	D NW C	ASING TO 2	5.5 FEET.
	_							ATED AT	ELEV9	7.4		-				ASING T	TO 25.5 FEE	
	-					EETIN		TED GRA STONE.	Y MOLL	OIC -			<u> </u>	. 3		D NWD4	4 CORE BAR	REL
	_												<u> </u>	. 4	4) RIVER WA	ATER WI	TH QUICKG	EL ADDED
_																MATE DI	G FLUID. RILLING FLU	ID
	- .							· ·					<u> </u>	. 6		DRILLIN	G FLUID OB	SERVED
	_									,			ΙĿ	_	BELOW 5	D FEET.		
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SHEET	29 OF 61	
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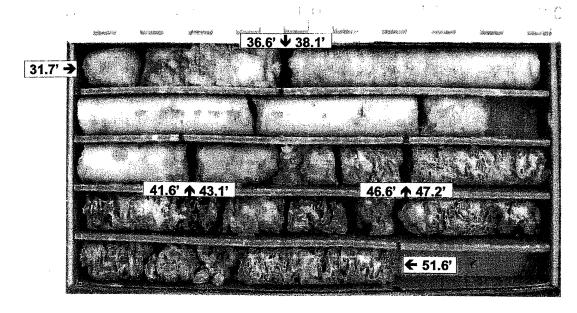
N.C.D.O.T. GEOTECHNICAL CORE BORING REPORT

•	ENG! ENVI	INEERI1	NG - TEST NTAL SERVI	NG CES						SHEET 1 OF 1
PROJE	CT NO.		49.1.1			ID. B-25	532	,		COUNTY Craven GEOLOGIST S. JOHNSON
SITE D	ESCRIP	TION	Bridge	60 on L	JS 70	Business	over T	rent Ri	iver	GROUND WATER (ft)
BORIN	G NO.	B11-/	4	ВО	RING	LOCATIO	N 28	3+51		OFFSET 22.0 ft LT ALIGNMENT -L- 0 HR. N/A
COLLA	AR ELEV	·14	.6 ft	NORTH	HING	497,719	9.5			EASTING 2,587,061.0 24 HR. N/A
TOTAL	DEPTH	82.8	3 ft	DRILL	MAC	HINE C	ME-450	3	DRI	RILL METHOD - Rotary Wash w/NW Casing/NWD4 Core HAMMER TYPE MANUAL
DATE:	STARTE	D 1	1/10/05			COMPLE	TED	11/10/0	05	SURFACE WATER DEPTH 12.2 ft
CORE	SIZE N	WD4				TOTAL R				DRILLER A. MARTIN
ELEV. (ft)	DEPTH (ft)	ŘUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft)	RATA RQD (ft) %	L O G	DESCRIPTION AND REMARKS
						-				-46.3 Begin Coring @ 31.7 ft 31.
-46.3	31.7	4.9	1:00 1:00	(0.9)	(N/A)	(0.9) 14%		000	46.3 31.
			0:45 0:30	10%			1-170		0000	- MEDIUM DENSE GRAT SILTT FINE TO COARSE SAND
-51.2	36.6	ļ	0:20/0.9	}		-	1		000	- (A-1-b)
-52.7	38.1	3.5	N=26 1:00	(3.2)	(N/A)	(3.2)	<u> </u>		GRAY SANDY LIMESTONE LAYERS FRIABLE TO MODERATELY INDURATED THINLY TO THICKLY
-56.2	41.6		1:15 1:00	91%			64%		壯	BEDDED GRAY SANDY LIMESTONE LAYERS
			0:30/0.5 N=35	<u> </u>			<u> </u>		耳	-57.7 43.
-57.7	43.1	3.5	1:00 2:00	(0.8)	(N/A)	(0.5)		000	DENOE GIVE OF THE TO GO MADE OF THE
-61.2	46.6		3:00 1 2:00/0.5		· .		(23.4)	 		WITH TRACE OF SANDY LIMESTONE LAYERS
-61.8	47.2	4.4	N=100/0.		(N/A)	64%		田	RIVER BEND FORMATION: EXTREMELY INDURATED TO INDURATED THINLY TO THICKLY
000	54.0		2:10 2:15						井	BEDDED GRAY MOLDIC LIMESTONE WITH TRACE OF THIN SAND LAYERS
-66.2	51.6		2:10	 	-	1			耳	- WITH HAGE OF THIN GAINS EXPERTS
-67.7	53.1	3.5	1:00/0.4 N=80	(3.1)	(N/A	.)	1		串	• •
-71.2	56.6		2:00 2:30	3 70					岸	
-71.9	57.3	4.3	2:40	(4.2)	(N/A)	1		出	
		4.	1:20/0.5 N=100/0.						出	
-76.2	61.6	 	1:40	-	-		-		田	
-77.7	63.1	3.5	1:40 1:30	(2.3)	(N/A	.)	1	-	田	
-81.2	66.6		0:20/0.3 N=54	66%					田	
-82.7	68.1	3.5	3:00 3:10	(3.2)	(N/A	\	4		串	
		3.5	3:05 1:30/0.5	91%	(14)	"	ŀ		田	
-86.2	71.6	-	N=57 2:05	1	╁──		1		耳	
-87.7	73.1	3.5	2:10 2:15	(3.3)	(N/A)	1		田	
-91.2	76.6		1:00/0.5						岸	├- -
-92.7	78.1	3.5	1:30	(3.3)	(N/A) .	-		出	- -
		3.5	1:15 1:30	94%	(1417)	"			出	-
-96.2	81.6	 	0:35/0.5 N=50				1		出	 97.4
-97.4	82.8		2:00 2:00							BORING TERMINATED AT ELEV97.4 FEET IN INDURATED GRAY
5			2:30 1:00/0.5							MOLDIC LIMESTONE.
3			N=100/0.			1 .				
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CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B11-A							
Site Description: Bridge No.	Site Description: Bridge No. 60 over Trent River on US 70 Business									
Collar Elev.: -14.6 ft.	Collar Elev.: -14.6 ft. Core Size: NWD4 Equipment: CME-45c									
Elev. at T.D.: -97.4 ft.	Total Depth: 82.8 ft.	Total Run: 51.1 ft.	Date: 11/10/2005							



Box 1 of 4
Top of Box @ 31.7 feet; Bottom of Box @ 51.6 feet



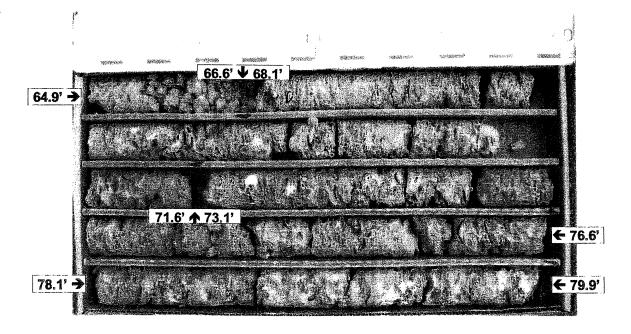
Box 2 of 4
Top of Box @ 53.1 feet; Bottom of Box @ 64.9 feet



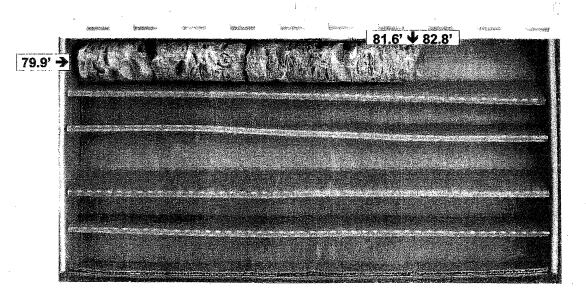
SHEET 30 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B11-A	
Site Description: Bridge No.	Driller: A. Martin			
Collar Elev.: -14.6 ft.	Geologist: S. Johnson			
Elev. at T.D.: -97.4 ft.	Total Depth: 82.8 ft.	Total Run: 51.1 ft.	Date: 11/10/2005	



Box 3 of 4
Top of Box @ 64.9 feet; Bottom of Box @ 79.9 feet



Box 4 of 4
Top of Box @ 79.9 feet; Bottom of Box @ 82.8 feet





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

			IG • TES VTAL SER	TING VICES								Mar Si	TRANS					T 1 OF 2	
	ECT NO.		49.1.1			ID. B				YTAUC	Crav	en			GEO	LOGIST	N.Bradley		
SITE	DESCRIF	TION	Bridge	e 60 on	US 70) Busine	SS OVE	er Trent Riv	er									OUND WATER	
30RIN	IG NO.	B12-A		BC	DRING	LOCAT	ION	29+50			ET 23.			ALIGN	IENT	-L-	0 HF		
COLLA	AR ELEV	/. -16.	4 ft	NORT	HING	497,8	317.1			EAST		2,587					24 HF		
TOTAL	_ DEPTH	72.0	ft-	DRILL	_ MACI	HINE	CME-	45c	DRILL	METH	OD R	otary Wa	ash w/N	W Casing /2	-7/8" Tricc	ne HA	MMER TY	PE MANUA	L
DATE	STARTE	D 1	/17/05	<u></u>		COMP	LETED	11/18/05	5	SURF	ACE W	ATER	DEP	TH 15.1	ft				
ELEV.	DEPTH	BL	ow col	JNT	Ι '		BLOWS	S PER FOO	r		SAMP.	V /	LO			II AND DO	OCK DESCF	DIDTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	80	100	NO.	МОІ				IL AND INC			
							DIVE	R LEVEL				∇		•					
-1.3	 		-				NIVL	-IX LL VLL			· ·	 							
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	‡						DIV/EE	R BOTTOM						 16.4			÷		0.0
<u>-16.4 </u>	<u> </u>	WOR	WOR	WOR	d wo		KIVER					W		10.4	VEDV		LUVIUM:	V OBCANIC	<u> </u>
	‡					 								. "	VERY	FINE	SANDY SIL	LY ORGANIC .T	
-	‡								·					.			(MUCK)		
-23.7 ·	7.3													22.4	VERY			GRAY SILTY	6
-23.1	± 7.5	WOH	WOH	WOH	d wo	DH						Sat.		<u>. </u>			NE SAND (A-2-4)		
	<u> </u>														·		,		
-28.7	12.3]]: :									•					
_	Ŧ	2	1	1	\$ 2							Sat.							
	‡				: <u> :</u>	 	• • •							32.4	MEDIL	MADENICE	DDOWN S	ILTY FINE TO	16
-33.7	† 17.3 †	6	5	10	1 : : :	. 0 15						Sat.		-	MEDIO		RSE SAND		
-	‡				: : :	· Ψ :								-			(A-2-4)		21
-38.2	21.8] : : :	. L		<i></i> .		· · ·				37.4 -		BELGRA	DE FORMA	TION:	
٠	‡	9	10	9		🗘 19						Sat.		- -	MEDIUN	DENSE T COA	「AN-GRAY \RSE SAND	SILTY FINE TO)	
	<u> </u>				: : :									-41.9	WITH N	ODERAT	(A-1-b) FLY INDUR	ATED THINLY	25
-43.2 _	26.8	18	15	13	: : :	: : : :]					•	Sat.	耳	: \		D TAN-GF		LIMESTONE	-
-	t				: : :								田	_ L		E TO MO	DERATELY	INDURATED BRAY SANDY	٠.
-48.2	31.8						\						田	•		LIN	MESTONE		
-		13	16	17] : : :							Sat.	井	-	WITH	TRACE C	F THIN SA	ND LAYERS	•
-	Ŧ	-			: : :	 	: : : :						計		•				
-53.2	36.8	10	15	40	: : :		:					Sat.	田						
_	‡	18	15	19	: : :		. 4 34		· · ·			Jac	田	-					
E0.0	‡,,,				: : :		: :\: :	<i></i> 					田	•					
-58.2 -	41.8	20	24	17			:: 6:	 41				Sat.	鬥	- - 60.2					43
-	<u> </u>						L			: : :			臣				ND FORMA		
-63.2	46.8							: : : : : :	 							INLY BED	DED GRAY	O INDURATED MOLDIC	
_	<u> </u>	43	37	20								Sat.	耳	• 	WITH		MESTONE OF THIN SA	ND LAYERS:	
-	_				: : :								聞					•	
-68.2	51.8	60/0.2										Sat.	団	•					
	F	5010.2							60	0/0.2				-					
-73.2]	56.8						 	: : <i>: : :</i> :					H						
, 5.4	- 50.0	60/0.2					 			· · ф 0/0.2		Sat.	田	•					
-	-												H						



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N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

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•	ENG!	INEERIN RONMEN	G • TES ITAL SER	TING VICES								Star Of	TRANS				SHEET	2 OF 2	
PROJE	CT NO.	3264	9.1.1			ID.	B-2532		C	OUNTY	Crav	en			GEOLOG	SIST N	.Bradley/A.i	NASH	
SITE D	ESCRIP	TION	Bridge	e 60 on	US 70) Busin	ess ove	er Trent R	iver								GROUN	ID WATER	र (ft)
BORIN	IG NO.	B12-A		ВС	RING	LOCA	TION	29+50		OFFS	ET 23	.0 ft LT	-	ALIGN	MENT -L-		0 HR.	N/A	,
COLLA	AR ELEV	. -16.	4 ft	NORT	HING	497	,817.1			EAST		2,587					24 HR.	N/A	
TOTAL	DEPTH	72.0	ft	DRILL	MAC	HINE	CME-	45c	DRIL	L METH	OD R	otary Wa	sh w/N	W Casing /	2-7/8" Tricone	HAMI	MER TYPE	MANUAI	L
DATE	STARTE	D 11	/17/05			COM	PLETEL	11/18/	05	SURF	ACE W	ATER	DEP.	TH 15.	1 ft	, 	7.		
	DEPTH		OW COL	JNT		l		S PER FO		,	SAMP.	V /	L			ND DOO!	V DECODIDE	10h!	***************************************
(ft)	(ft)	0.5ft	0.5ft	0.5ft	o	20	40	60	80	100	NO.	моі	0 G		SOIL A	ND ROC	K DESCRIPT	ION	
								· ·											
-76.1				-	 	Conti	nued fr	om previo	ous pag	e · · · · · ·		-			RIV	ER BENI	FORMATIO	N:	***************************************
-78.2	61.8	60/0.0			: :		· · · ·			الر∷		Sat.	出	•			RATED TO IN		
-	‡	60/0.2								60/0.2 ·		J	出	-		LIME	STONE THIN SAND		
-83.2	66.8				::		 		· //.				井	-	**********		tinued)	BULLO	
-03.2	00.8	31	28	32)	 		Sat.	臣	-					
-	-				::						1		田	- .					
-88.2	71.8								`	<u>``</u>	ļ		耳	88.4	4) 45) (41) (61	-D NW 0	ACINIC TO 4	70	72
-	‡	60/0.2			BOR	ING TE	RMINAT	TED AT EL	EV88.	60/0.2 4 FEET		Sat.		-	2) SET NW (CASING T	ASING TO 1 TO 17.3 FEE	T (TEMP	
	‡	-	2		INE	XTREM	IELY INC	OURATED ESTONE.	GRAY N	OLDIC				- -		16.2 FEE ED 2-7/8"	F). TRICONE TO	0 71.8	
	<u> </u>							2010112.						-	FEET. 4) RIVER W.	ATER WI	TH QUICKGI	EL ADDED	
-	‡														USED AS	DRILLIN			
	<u> </u>													-	DENSITY	65 PCF.	RILLING FLU		
	<u> </u>						•				٠				OBSERVI	ED BELO	W 45 FEET.	מוט	
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N.C.D.O.T. GEOTECHNICAL UNIT

	ENG	INEERIN RONMEN	G • TEST	ING ICES						le	West of	TRANSPOR				SHEET	1 OF 2	
PRO.	JECT NO.	3264	9.1.1			ID. E	3-2532	С	OUNTY	Crave	en			GEOLOG	IST S.	JOHNSON	/N.Bradley	
SITE	DESCRIP	TION	Bridge	60 on	US 70	Busin	ess over Tren	nt River								GROUN	D WATER (ft)
BOR	ING NO.	B13-B		ВО	RING I	LOCA	TION 30+2	9	OFFS	ET 57.	0 ft RT	-	ALIGNM	ENT -L-		0 HR.	N/A	
COLI	AR ELEV	15.9	9 ft	NORT	HING	497,	,880.5		EAST	NG	2,587,	170.3				24 HR.	N/A	
TOTA	AL DEPTH	109.	6 ft	DRILL	MACH	IINE	CME-45c	DRILI	METH	OD Ro	tary Wa	sh/NW C	asing/2-7/8 e Barrel	7	HAM	MER TYPE	MANUAL	
	STARTE		/11/05	•		COMF	PLETED 11/2	29/05	SURF	ACE W								
ELEV	. DEPTH	BLO	OW COU	INT	<u>_</u>		BLOWS PER	FOOT	·	SAMP.	lacksquare	L O		SOU AN	ID BOCK	(DESCRIPTI	ON	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	O I	20	40 6	80	100	NO.	моі	- 1		JOIL AI	10 11001			
1							RIVER LE	/E1			-							l
	-						RIVER LE	VEL			∇	-						
	<u>†</u>																	1
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-15.9	1.0.0	WOR	WOR	WOR	D WOF		RIVER BOT	TOM			w		-15.9			JVIUM:		0.00
	‡ .		,,,,,,,		ΨWOF							L.		VERY SOI		VN FINE SAN A-4)	IDY SILT	
	‡											E						
	‡											F						
23.7	7.8	WOR	WOR	WOR	OWOF					·	w ·	F						
1	‡				WWO.							F	-26.9					11.0
	12.8					· . :						000-			COARS	BRAY SILTY F SE SAND		
_	#	12	10	13		.	23		• • • •		Sat.	000	•	WITH	A) LIMESTO	-1-b) ONE FRAGME	ENTS	
1	1 .					: :L							-31.9			AY FINE SAN		16.0
	17.8	44	10	25							Sat.				- (,	A-3) ACE OF SILT		Į.
_	±	14	19	25							Juli		-36.9	· . •	VIIII IIV	AOL OI OILI		21.0
1 20.7	. 🖠 🚕 .						<u> </u>						-50.9	BE	LGRADE	FORMATION BEDDED TAN	N:	
	<u>+ 22.8</u> <u>+ </u>	10	12	14			26				Sat.	曲			LIME	STONE		
	+						l::::::						-41.9			THIN SAND I		26.0
-43.4	27.5	40	9	10							Sat.	計		WEDIUM	COARS	TAN SILTY F SE SAND	INE TO	
	Ŧ	10	9	10		Φ 19						計		WITH FR	JABLE TI	ı-1-b) HINLY BEDD	ED TAN	l
	Ŧ					: : :							-47.9			RATELY IND		32.0
-49.4	33.5	10	- 10	40		: /.					Sat.	土			BEDDED	TAN-GRAY		
- [-1	Ŧ	12	13	13		9	26				l oat.	盐		WITH TR		STONE THIN SAND I	LAYERS	
1	‡											計						
-54.4 19:	38.5	13	12	16			φ ₂₈ · · · ·				Sat.	肝						
	‡											臣						
-59.4	43.5						:\:\:::::			-	C-1	耳						
V2.GP	‡	14	14	21	<i>:</i> : :		35				Sat.	出	-61.9					46.0
- [:	‡ .											耳		MODE	RATELY	FORMATIO INDURATEI	O T O	
<u>-64.4</u>	48.5	34	40	19	: : :		· · · · · · · · / · /	3 .59	• • • •		Sat.	耳	E	XTREMELY	/ INDURA	ATED THINLY	Y BEDDED	
	‡				: : :							井				THIN SAND		
-69.4	53.5								· · · ·			甘						
BOF	‡	41	26	71					97		Sat.	出						
EL	‡											山						.
- <u>}</u> <u>-74.4</u>	<u>+ 58.5</u>	ļ							:/:		<u></u>	丑						





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	ENGI	NEERIN	G • TEST	TING VICES				`	Ser. OF	TRAMAR				SHEET	2 OF 2	
PROJEC		3264		**********	ID. B-2532	cc	YTNUC	Crave	n			GEOLOG		JOHNSON		
SITE DE	SCRIP	TION	Bridge	60 on l	3 70 Business over Tr	rent River								GROUN	ID WATER (ft)
BORING	NO.	B13-B		ВО	ING LOCATION 30-	+29	OFFSE	E T 57.	oft RT	-	ALIGNMI	ENT -L-		0 HR.	N/A	
COLLA	R ELEV	15.9	9 ft	NORTI	NG 497,880.5		EASTI		2,587,					24 HR.	N/A	
TOTAL	DEPTH	109.	6 ft	DRILL	IACHINE CME-45c	DRILL	METHO	OD Ro	tary Wa cone/NV	sh/NW VD4 Co	Casing/2-7/8" ore Barrel		HAMN	IER TYPE	MANUAL	
DATE S	TARTE	D 11	/11/05		COMPLETED 1	1/29/05	SURFA	ACE W	ATER	DEPT	ΓH 14.9	ft				
ELEV.	DEPTH	BLC	ow cor	JNT	BLOWS PE		1	SAMP.	lacktriangledown/			SOIL AN	ID ROCK	DESCRIPT	ION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	20 40	60 80	100	NO.	/MOI	G						
-75.1					Continued from	previous page										
		39	40	52		· · · · · · /			Sat.	出	•			FORMATIO INDURATEI		
-79.4	63.5					/				井	. E			TED THINLY C LIMESTOR		
-73.4	- 00.0	23	24	24	· · · · · · · · · · · · · · · · · · ·	48			Sat.			WITH TR		THIN SAND I tinued)	LAYERS	
1										旪						
-84.4	68.5	32	25	24					Sat.	甲						
1		JZ.	20.		: : : : : : : : : : : : : : : : : : : :	49				開						
-89.4	73.5				: : : : : : : : : : : : : : : : : : : :		: : :			鬥	• • .					
	-	17	18	29		7			Sat.	耳						
+	.					X:::::	: : :			耳				•		
-94.4	78.5 -	31	37	37					Sat.	耳	-					
#							: : :			用	•					
-99.4	83.5						$\langle \dots $			耳						l
1	•	27	27	70				.* •	Sat.	岸	-					.
-102.5	86.6	48	20	24		······			Sat.	串	•	*				l
#	-									臣	-					
-107.5	91.6									田	-107.9			-		92.0
‡	•	17	15	13	28				Sat.		-			VERY DEN		
†	•										-			-2-4)		İ
-112.5	- 96.6 -	20	25	30		6 55			Sat.		-113.9		•			98.0
ļ. ‡	•										-	VERY D		RAY SILTY F SE SAND	INE TO	
-117.5	101.6								Cat		•	WITH FRI		-1-b) INDURATE	D THINLY	.
‡	•	50	50/0.5			1 10	00/1.0		Sat.	III.	-	BEDDED	GRAY S	SANDY LIME	STONE	
	•						::				<u>.</u>					
-124.0	108.1					I				胃	-123.0			INDURATE		107.1
	-	31	19	34		Ø 53 · · · · ·			Sat.	用			ESTONE	NLY BEDDEI WITH TRAC		109.6
• ‡	•				BORING TERMINATE						_ \) ADVANCED I	SAND W CASING	LAYERS G TO 22.8 FEET	ON 11-11-05.	
\perp					FEET IN MODERATELY MOLDIC LIM		GRAY				_ 2) ·	SET NW CAS FEET) ON 1		.8 FEET (TEMP	. CASING 16.0	1
1											- 3) -) ADVANCED 2 ON 11-11-05		ONE ROLLER T	O 83.5 FEET	
1														G TO 29.0 FEET EET (TEMP CA		.
+	-						• .				 6	FEET) ON 1		ONE ROLLER 1	O 86.6 FEET	.
						•					-	ON 11-28-05		RE BARREL FRO		
	-										- '	108.1 FEET	ON 11-29-0			
	:										_	DRILLING FI	LUID.	IG FLUID DENS		
‡	-	,												ER OBSERVED		
	-											1) BORING LO		MPOSITE OF TO ON 11/11/05 AN		
'‡	-										- -	109.6 FEET			33.3 .9	
ı t	•							<u> </u>	1							





N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

•	ENG! ENVIR	NEERII	NG · TESTI NTAL SERVI	ING ICES						SHEET 1 OF 1
PROJE	CT NO.		49.1.1	***************************************	T	ID. B-25	532		- (COUNTY Craven GEOLOGIST S. JOHNSON/N.Bradley
SITE D	ESCRIP	TION	Bridge (60 on L	JS 70	Business	over T	rent Ri	ver	GROUND WATER (ft)
BORIN	G NO.	B13-E	3	ВО	RING	LOCATIO	N 30	+29		OFFSET 57.0 ft RT ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	15	.9 ft	NORTH	IING	497,880).5			EASTING 2,587,170.3 24 HR. N/A
TOTAL	. DEPTH	109	.6 ft	DRILL	MACI	HINE CI	ME-450		DRIL	L METHOD Rotary Wash/NW Casing/2-7/8" HAMMER TYPE MANUAL
DATE	STARTE	D 1	1/28/05			COMPLE	TED '	11/29/0	5	SURFACE WATER DEPTH 14.9 ft
CORE	SIZE N	WD4				TOTAL R	~			DRILLER A. MARTIN
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)		SAMP. NO.	STR REC. (ft)	ATA RQD (ft) %	C G	DESCRIPTION AND REMARKS
										-104.0 Begin Coring @ 88.1 ft 88.
-104.0 -107.5	88.1 91.6	3.5	0:30/0.5 0:30 0:30 0:30	(1.6) 46%	(N/A))	(1.6) 41%			RIVER BEND FORMATION: MODERATELY INDURATED TO EXTREMELY INDURATED THINLY 107.9 BEDDED GRAY MOLDIC LIMESTONE 92.1
-109.0	93.1	3.5	N=28 0:30/0.5 0:30	(0.0) 0%	(N/A)		(0.0) 0%			WITH TRACE OF THIN SAND LAYERS MEDIUM DENSE TO VERY DENSE GRAY SILTY FINE TO COARSE SAND
<u>-112.5</u>	96.6		0:45 0:35	 						-113.9 (A-2-4) -98.1
-114.0	98.1	3.5	N=55 0:30/0.5 0:45	(1.3) 37%	(N/A))	(2.1) 23%		上	VERY DENSE GRAY SILTY FINE TO COARSE SAND
-117.5	101.6		0:45 0:45 0:35						井	(A-1-b) WITH FRIABLE TO INDURATED THINLY BEDDED GRAY SANDY
-119.0	103.1	5.0	N=100/1.0 0:30/0.5 0:30	(1.1) 22%	(N/A))			計	LIMESTONE
-124.0	108.1		0:30 0:30				(1.0)		4	-123.0 107. MODERATELY INDURATED TO INDURATED THINLY BEDDED (20)
-125.5	109.6	,	0:30 0:35 <i>N=5</i> 3	}		-	40%		౼	-125.5 GRAY MOLDIC LIMESTONE WITH TRACE OF THIN SAND LAYERS BORING TERMINATED AT ELEV125.5 FEET IN MODERATELY



SHEET 33 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B13-B									
Site Description: Bridge No.	Site Description: Bridge No. 60 over Trent River on US 70 Business											
Collar Elev.: -15.9 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: N. Bradley									
Elev. at T.D.: -125.5 ft.	Total Depth: 109.6 ft.	Total Run: 21.5 ft.	Date: 11/28-29/2005									



Box 1 of 1 Top of Box @ 88.1 feet; Bottom of Box @ 109.6 feet





19	ENG ENVI	INEERIN RONMEN	IG • TES	TING VICES		**						Way of	TRAKS)		SHEET	1 OF 2	
PRO.	JECT NO.		19.1.1			ID.	3-2532		C	YTNUC	Crave	en		GEOLOG	ST S.	. JOHNSON		
SITE	DESCRIP	TION	Bridge	60 on	US 7	0 Busin	ess over	Trent Riv	ver							GROUN	D WATER (ft)
BORI	NG NO.	B14-A		ВС	RING	S LOCA	TION 3	2+16		OFFSI	ET 54.	0 ft LT		ALIGNMENT -L-		0 HR.	N/A	
COLL	AR ELEV	/. -13.	7 ft	NORT	HING	498	,084.4			EASTI		2,587				24 HR.	N/A	
TOTA	L DEPTH	82.7	ft	DRILL	. MAC	CHINE	CME-45	5c	DRILL	METHO	OD Ro	otary Wa	sh w/N	NW Casing/NWD4 Core	HAM	MER TYPE	MANUAL	
ļ	STARTE		/15/05	L		COMP	PLETED	11/15/0	5	SURF	ACE W	ATER	DEP	TH 12.6 ft				
ļ	DEPTH	,	ow col	JNT			BLOWS F	PER FOO	Т		SAMP.	V/	L	SOII AN	D BOCK	C DESCRIPTI	ON	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	. 20	40	60	80 L	100	NO.	МОІ	1 1	JOILAN				
		,					DIV/ED	R LEVEL				∇						
-1.1	1	-			-		KIVEK	LEVEL				V						
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-13.8	+ 0.1						RIVER I	BOTTON	Λ					- 13.7				0.0
-13.6	<u> </u>	WOH	WOH	WOH	φw	OH···						Sat.		- VERY LOC	ALLU OSE BR	J VIUM : OWN MODEF	RATELY	
	+								 					ORG	ANIC SIL	TY FINE SAN	1D	
-18.8	F 5.1]] :				 			_		ORC	SANIC C	A-2-4) ONTENT 9.7'	%	
	‡	1	1	1	1 1	· · · ·					SS-13	Sat.		····				
	‡.				:\								1	21.7 - VERY L		GRAY FINE S	AND	8.0
-23.8	10.1				: :							Sat.		 - w	.) ITH TRA	A-3) ACE OF SILT		
	+	2	1	2	•	3						Juli		-26.7				13.0
	Ŧ				: - : :	7:::			<i>.</i>					LOOSE GF		ARSE TO FIN A-3)	E SAND	
-28.8	<u>† 15.1</u>	4	5	- 5		10.						Sat.		WITH TRA	CE OF S	SILT AND LIM	ESTONE	
	Ŧ				l : :	Ĭ :: :								_ -32.2	FRAG	BMENTS		18.5
-33.8	‡ 20.1					!							000	_ BEL		FORMATION TAN SILTY F		
00.0	 	9	11	13	: :	· · · •	24 · · ·					Sat.	000	- WEDIOW	COARS	SE SAND		
	‡ .				: :								000		TRACE	-1-b) OF LIMESTO		
-38.8	25.1		10	40	: :	: : :						Sat.	000		TS AND	CEMENTED	SANDS	
	±	11	12	13	::	: : : \$	25					J Out.	000	 - _{-41.7}				28.0
40.0	1				: :		7:::		 				田	FRIABLE TO	MODE	RATELY IND TAN-GRAY S	URATED SANDY	
-43.8	† 30.1 _	15	17	15	::		032					Sat.	王	-	LIME	STONE THIN SAND L		
	+				: :								出		ICL OI	THIN OAND L	J(1210	
	Ŧ .								 				井	- -				
-49.9	36.2	13	18	15	: :							Sat.	開	 51.4				37.
	‡	,5		.0			. الم		 				田	 MODERA 		DURATED THE		
-54.9	† + 41.2				· ·		$\cdot \mid \cdot \cdot$						버	- WITH TRA	ACE OF	THIN SAND L	AYERS	
-54.5	+ 41.2	21	18	1.8			. 936.					Sat.	耳					
	±			-			: 1::						臣	- -58.8				45.1
-59.9	46.2					• • • •							出	RIVE		FORMATION TREMELY IN		
	Ŧ	43	57/0.3						10	0/0.84		Sat.	川	THINLY T	O THICK	KLY BEDDED		
	Ŧ								/.				岡			_IMESTONE THIN SAND L	AYERS	
-64.9	51.2	41	20	33				/				Sat.	田	<u>.</u> 				
	‡	41	20	JJ	: :			G-53					出					
-69.9	+ 56.2				: :					$\cdot \cdot \cdot $		-	田	-				
-09.9	56.2	84	16/0.1		::				10	0/0.6		Sat.	田					
-54.9 -59.9 -64.9 -74.9	1		-		::				 	Z			田	-				
-74.9	F 61.2				::				:				出					
:1	T	28	30	40	l				-/ · · ·			L Sat.						





SHEET 34 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

E	NGINEER NVIRONM	ING • TE ENTAL SE	STING RVICES				,	West of the second	TRANSPORT		SHEET 2 OF 2
PROJECT	IO . 32	649.1.1			ID. B-2532	OUNTY	Crave	en		GEOLOGIST S.	JOHNSON
SITE DESC	RIPTION	Bridg	e 60 on	US 70	Business over Trent River						GROUND WATER (ft)
ORING NO). B14	-A	BC	ORING	LOCATION 32+16	OFFSE	T 54.	0 ft LT		ALIGNMENT -L-	0 HR. N/A
OLLAR EI	.EV 1	3.7 ft	NORT	HING	498,084.4	EASTI			094.3	O :	24 HR. N/A
OTAL DEF	PTH 82	.7 ft	DRILL	MAC	CHINE CME-45c DRIL	L METHO	טע Ba	rrel			IER TYPE MANUAL
ATE STAF	RTED	11/15/05	j		COMPLETED 11/15/05	SURFA	ACE W	ATER	DEPTH	12.6 ft	
LEV. DEF		LOW CC		1	BLOWS PER FOOT	100	SAMP.		0	SOIL AND ROCK	DESCRIPTION
(ft) (ff) 0.51	t 0.5ft	0.5ft	9	20 40 60 80	100	NO.	MOI			
75.9					Continued from previous pag	e ·			 	DIVER REND	FORMATION:
+	.			: :					井	INDURATED TO EXT	REMELY INDURATED
9.9 + 66			<u> </u>	∷				Sat.	异	MOLDIC L	IMESTONE
1	23	37	48	::	/	9 85 · ·		Jat.	耳		THIN SAND LAYERS inued)
. Ľ.				: :					串		
1.9 <u>† 71</u>	.2 24	27	27	1::				Sat.	曲		
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).9 76	.2								旪		•
7	18	31	28]::	· · · · · · · · · · · · • 59 · · · ·			Sat.	丑		
‡									毌		
<u> 1.9 † 81</u>	.2	33	25	1		: .		Sat.		96.4	
+	- 35	+	+		9.58				HE	1) ADVANCED NW CA 2) SET NW CASING T	
‡					BORING TERMINATED AT ELEV96.4 FEET			ļ ;	I E	CASING 13.7 FEET	7).
‡				IN II	NDURATED GRAY MOLDIC LIME	STONE			l F	31.6 TO 81.2 FEET	
‡									l F	USED AS DRILLING	
‡									l F	5) APPROXIMATE DR DENSITY 65 PCF.	RILLING FLUID
‡									F	6) SOME LOSS OF DI OBSERVED BELO	
‡	.								l F		
‡								l .	l F		
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N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

SHEET 1 OF 1

	ENVI	RONME	NTAL SERV	ICES				***************************************		SHEET 1 OF 1
PROJE	CT NO.	326	49.1.1			ID. B-2	532			COUNTY Craven GEOLOGIST S. JOHNSON
SITE D	ESCRIP	TION	Bridge	60 on l	JS 70	Business	over 7	rent F	liver	GROUND WATER (ft)
BORIN	G NO.	B14-	A	ВО	RING	LOCATIO	N 32	2+16		OFFSET 54.0 ft LT ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	13	.7 ft	NORTI	IING	498,084	1.4			EASTING 2,587,094.3 24 HR . N/A
TOTAL	DEPTH	82.	7 ft	DRILL	MACI	HINE CI	ME-45	C	DR	ILL METHOD Rotary Wash w/NW Casing/NWD4 Core HAMMER TYPE MANUAL
DATES	STARTE	D 1	1/15/05			COMPLE	TED	11/15/	05	SURFACE WATER DEPTH 12.6 ft
CORE	SIZE N	IWD4				TOTAL R	UN 5	51.1 ft		DRILLER A. MARTIN
ELEV.	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	RQD (ft)	SAMP. NO.	STR REC. (ft)	RQD (ft)	L O G	DESCRIPTION AND REMARKS
			(10111111111111111111111111111111111111	76	76		76	70		-45.3 Begin Coring @ 31.6 ft 31.0
-45.3	31.6	4.6	1:00 1:05	(4.6) 100%	(N/A))	(4.6) 75%		川	BELGRADE FORMATION:
			1:00 1:00	1.00%			7070		旪	FRIABLE TO MODERATELY INDURATED THINLY BEDDED TAN-GRAY SANDY LIMESTONE
-49.9	36.2		0:30/0.6 N=33	 		1			駐	- WITH TRACE OF THIN SAND LAYERS -51.4 37:
-51.4	37.7	3.5	1:00	(3.5)	(N/A))	(5.7) 77%		塂	MODERATELY INDURATED THICKLY BEDDED GRAY SANDY
-54.9	41.2		1:00 1:00				1170		詽	LIMESTONE - WITH TRACE OF THIN SAND LAYERS
-56.4	42.7	3.5	0:30/0.5 N=36	(3.3)	(N/A)				出	THE STATE OF THE OWN DIVERS
		3.5	1:10 1:05	94%	(IVA)	1			上	-58.8 45.
-59,9	46.2		1:00 0:30/0.5				(25.4) 68%		臣	RIVER BEND FORMATION:
-60.7	47.0	4.2	V=100/0.		(N/A))			片	INDURATED TO EXTREMELY INDURATED THINLY TO THICKLY BEDDED GRAY MOLDIC LIMESTONE
-64.9	51.2		2:00						臣	WITH TRACE OF THIN SAND LAYERS
			2:00 2:00	(2.5)					串	•
-66.4	52.7	3.5	0:20/0.2 N=53	(3.5) 100%	(N/A))			曲	
-69.9	56.2		1:30 1:30						井	-
-70.5	56.8	4.4	1:40 0:40/0.5	(4.3) 98%	(N/A))			用	
740	61.2		N=100/0.	4					用	
-74.9	01.2		2:00 2:30						出	-
-76.4	62.7	3.5	2:30 2:20	(3.5) 100%	(N/A))			出	
-79.9	66.2		1:00/0.4 N=70	1.00%					曲	
-81.4	67.7	3,5	1:00 1:00	(3.5)	(N/A	, 			井	
		0.0	1:10 0:30/0.5	100%	(, ., .,	'			田	
-84.9	71.2		N=85	1					罝	-
-86.4	72.7	3.5	1:00 1:10	(2.9)	(N/A)				岸	
-89.9	76.2		1:05 0:30/0.5	03%					田	-
-91.4	77.7	3.5	N=54 2:00	(3.0)	(N/A				田	
,		3.5	2:05 2:15	86%	(IV/A	'			臣	
-94.9 -96.4	81.2 82.7		0:45/0.5 N=59	 	 	-			田	- -96.4 82.
-50.4	02.1		1:45 1:40	1		1			Ħ	BORING TERMINATED
			1:40	1					l F	AT ELEV96.4 FEET - IN INDURATED GRAY MOLDIC LIMESTONE
			0:45/0.5 N=58	1		1			F	WALLES OWN MOUND FINED LONG
					•				l F	
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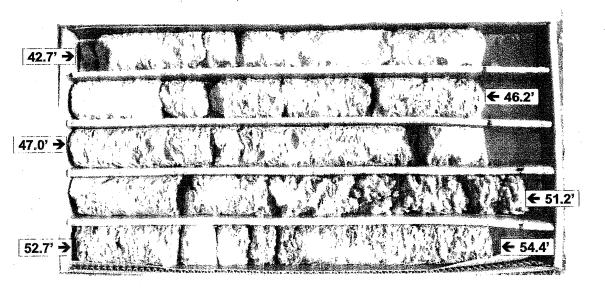
SHEET 35 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B14-A								
Site Description: Bridge No. 60 over Trent River on US 70 Business Driller: A. Martin											
Collar Elev.: -13.7 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson								
Elev. at T.D.: -96.4 ft.	Total Depth: 82.7 ft.	Total Run: 51.1 ft.	Date: 11/15/2005								



Box 1 of 5
Top of Box @ 31.6 feet; Bottom of Box @ 41.2 feet

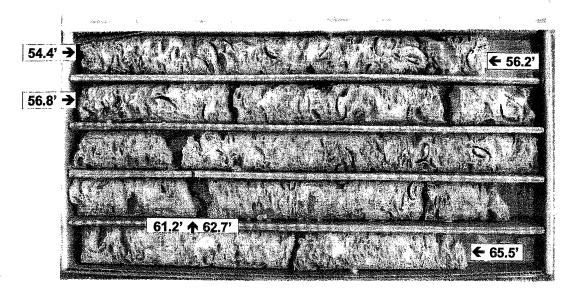


Box 2 of 5
Top of Box @ 42.7 feet; Bottom of Box @ 54.4 feet

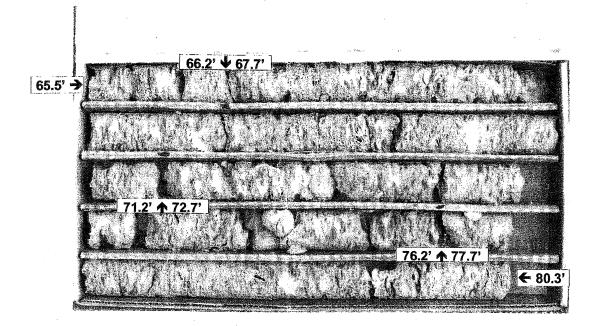


CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B14-A								
Site Description: Bridge No. 60 over Trent River on US 70 Business Driller: A. Martin											
Collar Elev.: -13.7 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson								
Elev. at T.D.: -96.4 ft.	Total Depth: 82.7 ft.	Total Run: 51.1 ft.	Date: 11/15/2005								



Box 3 of 5
Top of Box @ 54.4 feet; Bottom of Box @ 65.5 feet



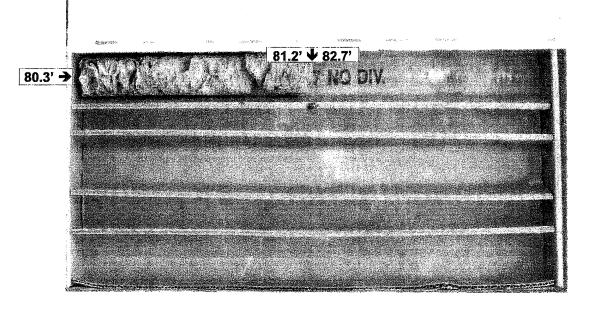
Box 4 of 5
Top of Box @ 65.5 feet; Bottom of Box @ 80.3 feet



SHEET 36 OF 61

CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B14-A									
Site Description: Bridge No. 60 over Trent River on US 70 Business Driller: A. Martin												
Collar Elev.: -13.7 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson									
Elev. at T.D.: -96.4 ft.	Total Depth: 82.7 ft.	Total Run: 51.1 ft.	Date: 11/15/2005									



Box 5 of 5
Top of Box @ 80.3 feet; Bottom of Box @ 82.7 feet





Late Control of the water of the Control of the Con

1	ENGI	NEERING ONMEN	TEST	ING							Star Or	24442	*		SHEET	1 OF 2	
PROJE				1010	ID.	B-2532		C	OUNTY	Crave	en		GEOLOG	IST N	. Bradley		
SITE DE				60 on l	S 70 Busi		r Trent Riv	ver			· · · · · · · · · · · · · · · · · · ·				GROUN	ID WATER (ft)
BORING		B15-A	Dilago		RING LOCA		32+92		OFFSE	T 8.0	ft LT		ALIGNMENT -L-		0 HR.	N/A	
	R ELEV		ft	NORTI		3,151.0			EASTI		2,587,				24 HR.	N/A	
					MACHINE	BK-51		DRILL	METHO	n Ro	otary Was	h w/N	W Casing/2-7/8" Tricone	HAM	MER TYPE	AUTOMA	TIC
	DEPTH			DRILL			11/15/0	L	SURFA			DEP"	TH 11.8 ft				
	TARTE		14/05		CON		PER FOO		L	SAMP.		L			V DECODIDE	10hl	
ELEV.	- I		W COU	0.5ft	0 20		60		100		моі	0 G	SOIL A	ND ROC	K DESCRIPT	ION	
(ft) "	(ft)	0.5ft	0.5ft	0.511	Ĭ						V WOI						
1													•	•			
-0.6	ì					RIVE	R LEVEL				∇		_				
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1	_		•			D1\/E	R BOTTO	\A					- 12.4				0.
-12.4	- 0.0 -	WOR	WOR	WOR	wor.	· · · ·					W	333	- VERYS	OFT BLA	UVIUM: CK BROWN	HIGHLY	
					1:::::	 						***************************************	- ORG	SANIC FI	NE SANDY S	SILT	
-16.0	3.6	WOH	WOH	WOH	WOH!						W		WITH	TRACE	OF WOOD D	EBRIS	
	-												-20.0				
-21.0	8.6										0-4		VERY SOI	T GRAY	CLAYEY FIN	NE SANDY	٠.
-	-	WOH	WOH	WOH	ф woH ∴						Sat.		- -		(A-4)		
-													-24.9	PAV SII	TY FINE TO	COARSE	1:
-26.0	13.6	2	· 2	2	7:::						Sat.		1	5	SAND		
-		2	2	-	. Q 4		: : : : :						WITHTR	ACE OF	A-2-4) SHELL MATE	ERIAL AND	1
	100				: ! : : : :		j	::::	 				7 -29.9 LIN	MESTON BRAY SIL	E FRAGMEN TY FINE TO	COARSE	
-31.0	18.6	7	12	33			4 5	· · ·			Sat.			5	SAND (A-2-4)		
•	+											000	-34.4 WITH 7	TRACE C	F CEMENTE	D SAND	2
-36.1	23.7				: : : :					-	Sat	0000	L P	FLGRAD	F FORMATIC	ON:	
	-	10	10	10	d	20					Sat.	000	,	COA	AN-GRAY SIL RSE SAND	IT FINE IO	
•	‡				: : : :							000	E WIT	· 'H TRAC	(A-1-b) E OF LIMES	TONE	
-41.1	28.7	<u> </u>	. 10	10							Sat.	000	F	FRA	GMENTS		
	‡	9	10	10	9) 20 • · · · ·			 			000	ERIARI E	TO MOD	ERATELY IN	IDURATED	3
	_											H	THINLY	BEDDE	D TAN-GRAY	SANDY	
-46.1	33.7	12	11	11		0 22					Sat.	臣	₹ with t	RACE O	F THIN SAND	LAYERS	
	+								 			三	<u> </u>				
-51.1	T 38.7											片	‡				
971	-	12	12	12		Q 24					Sat.	臣	1				
	‡											三					
-56.1	43.7	<u> </u>	10								Sat.	片	-57.4				
	‡	12	12	14		00. 26						臣	L INDURAT	FD TO E	ND FORMAT	INDURATED	
-60.0	47.6					 				5.0	Sat.	豆	THIN	LY BEDI	DED GRAY MESTONE	OLDIC	
	<u></u>	29	53	47	• • • •				100			H	+ WITH T	RACE O	F THIN SAN	D LAYERS	
-64.0	51.6							:: <i>::</i> /	/ 		`Sat.	臣	-				
-	+	41	40	33				.0073			Jai	三	 				
	Ŧ					 			<u> </u>			出	<u> </u>				
-69.0	56.6	45	36	63	1::::	. <i></i> 				99	Sat.	H	<u>+</u>				
•	Ţ.				: : : :			· · · ·	//			耳	‡		•		
740	61.6					 		.//.				片	‡				
-64.0 -69.0	01.0	27	26	29	1						Sat.						

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SHEET 37 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	ENGI	NEERING	G TES	TING				٠				Will OF	TRANSE	SHEET 2 OF 2
ROJE	CT NO.	3264		11053		ID. B	-2532		C	YTNUC	Crav	en		GEOLOGIST N. Bradley
	SCRIP			e 60 on	US 70	Busine	ess over	Trent Riv	/er					GROUND WATER (ft)
		B15-A				LOCAT		32+92		OFFSE	ET 8.0	ft LT		ALIGNMENT -L- 0 HR. N/A
LAI	R ELEV	12.4	4 ft	NORT	HING	498,	151.0			EASTI	NG	2,587,	153.	.0 24 HR . N/A
	DEPTH			DRILL	MACH	IINE	BK-51		DRILL	. METH	ם סכ	Rotary Wa Roller	sh w/N	NW Casing/2-7/8" Tricone HAMMER TYPE AUTOMATI
	TARTE		/14/05			COMP	LETED	11/15/0	5	SURF	ACE W	ATER	DEP	PTH 11.8 ft
v.	DEPTH	BLO	ow co	UNT	l .	-	BLOWS	PER FOO			SAMP	. ▼/	L	SOIL AND ROCK DESCRIPTION
	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	80	100	NO.	моі	1 1	
						Contir	nued fro	m previou	ıs paqe	9				
4	-			+				\ .					H	RIVER BEND FORMATION: INDURATED TO EXTREMELY INDURATED
o †	- 66.6				: : :	 		:::/:					田	THINLY BEDDED GRAY MOLDIC LIMESTONE
<u> </u>	- 00.0	25	40	30	1 : : :			::::)	b 70			Sat.	出	WITH TRACE OF THIN SAND LAYERS
1	-					 		::/:					H	(continued)
) †	71.6							/.::				Sat.	岡	T
-	-	25	23	24	• •		!	47				Jai.	開	<u> </u>
1	-							1					田	‡
+	- .				1			./					出	-
\exists	78.6	38	27	30	1 : : :			57				Sat.	田	
7														1) ADVANCED NW CASING TO 18.6 FEET. 2) SET NW CASING TO 18.6 FEET (TEMP
-	-						AT ELEV	TERMINAT 792.5 FEI	ET					CASING 29.5 FEET). 3) ADVANCED 2-7/8" TRICONE ROLLER
1	-				ININ	IDURAT	ED GRA	Y MOLDIC	LIMES	TONE.			ľ	FROM 23.7 TO 78.6 FEET. 4) RIVER WATER WITH QUICKGEL ADDED
1	- -													USED AS DRILLING FLUID. 5) APPROXIMATE DRILLING FLUID
7	-													DENSITY 66 PCF.
1	-													6) SOME LOSS OF DRILLING FLUID OBSERVED.
-	<u> </u>		,											
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	ENVIR	NEERIN	TAL SERV	/ICES						Will ST			SHEET	
ROJE	CT NO.	3264	9.1.1		ID. B-	2532		COUNTY	Crave	en		GEOLOGIST A		ID MATTER (54)
ITE D	ESCRIP	TION	Bridge	60 on l	JS 70 Busines	s over Tre	ent River							ID WATER (ft)
ORIN	G NO.	B16-B		ВО	RING LOCATI	ON 33+	69	OFFSE	ET 8.0	ft RT		ALIGNMENT -L-	0 HR.	N/A
OLLA	R ELEV	7.8	ft	NORT	HING 498,22	23.9		EASTI		2,587,			24 HR.	N/A
	DEPTH			DRILL	MACHINE E	3K-51	DRI	LL METHO	OD R	otary Was	sh w/N	W Casing/2-7/8" Tricone HAM	MER TYPE	AUTOMATIO
	STARTE		/10/05			ETED 11	1/11/05	SURF	ACE W	ATER	DEP	TH 17.4 ft		
EV.	DEPTH	,	ow col	INT		LOWS PER			SAMP.	\mathbf{V}	L	SOIL AND ROC	V DESCRIPT	ION
_E v. (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20	40	60 80	100	NO.	моі	O G	SOIL AND ROC	A DESORT	
(11)	(11)	0.010	0.010	0.0.0										
1.1					,	RIVER LI	EVEL	. :		∇	\vdash			
-	-											• •	•	
-	‡											. 		100
-	<u> </u>								•			-		
7.8	0.0					RIVER BO	MOTTO			Sat.	33334	7.8 - AL	_UVIUM:	
-	F .	WOH	WOH	WOH	Φ WOH···		<i></i> .			Jun		VERY SOFT DARK	GRAY FINE S (A-4)	SANDY SILT
-	4.2											WITH TRACE (È SHELL MA	TERIAL
2.0	4.2	1	WOH	1	01					Sat.		VERY LOOSE TO	LOOSE BRO SAND	WN FINE
	+				:\:::::								(A-3)	NTC AND
7.0	9.2				: \ : : : :							_ WITH SOME WO	LAYERS	NIS AND
		3	3	. 5			· · · · · ·			No Rec.		•		
-	<u> </u>											19.8 STIFF GRAY	FINE SANDY	SILT
2.0	14.2							· · · · ·		102		- WITH TRACE ((A-4) OF SHELL MA	TERIAL
	-	2	4	. 5	· · • 9· · ·	 		 . <i>.</i>		W		24.8	J. J	
-	‡				L	 :		<i>.</i>			000	DENSE LIGHT		FINE TO
27.0	19.2									Sat.	000	-	RSE SAND (A-1-b)	
•	+	9	12	26		· : \$7.38				Jai.	000	WITH TRACE	OF GRAY S	ANDY ITS
-	<u> </u>				: : : 			,				BEL GRAD	E FORMATIC	ON:
31.8	<u>† 24.0</u>	15	9	8						Sat.		MEDIUM DENSE	SAND	SILITFINE
	‡ ·	'3		, "								34.5 WITH TRACE OF	(A-2-4) FRIABLE GR	AY SANDY
- 36.8	29.0										WII	LIMEST MEDIUM DEN	ONE LAYERS	3 1
30.6	23.0	10	9	12	21					Sat.		- COARSE	TO FINE SAI	ND
	Ŧ				1::::1:							WITH FRIABLE	(A-2-4) [HINLY BEDE	ED LIGHT
- 41.8	T 34.0											TAN SANDY L	IMESTONE L	AYERS
	1	10	10	10	· · · · 6 20		• • • • •			Sat.	脚	44.5		
	Ι.				: : : : -						岸	 FRIABLE TO MOI 	DERATELY IN	IDURATED
46.8	39.0				↓ ∶∶∶∶∤				1	Sat.	臣	1	DED GRAY S IESTONE	
	Ŧ	12	11	13		24 · · · ·				"	田	WITH TRACE C	F THIN SAND	LAYERS
	‡										耳	 		
51.8	44.0	<u> </u>	12	1	: : : :					Sat.	片	}		*
	<u>+</u>	13	12	11	2	3					片	<u> </u>	•	
	Ŧ			1.	1:::::						上	<u> </u>		
56.8	49.0	13	12	32	│ -					Sat.	耳	-57.8	ND EODMAT	ION:
	‡	13	12	1							片	MODERATE	ND FORMATI LY INDURAT	ED TO
	±					::::	• • • • • • • • • • • • • • • • • • • •				日	EXTREMELY INDU	IRATED THIN LDIC LIMEST	ILY BEDDED ONE
61.8	54.0	24	21	24	1:::::	45	<i>.</i>			Sat.	占	WITH TRACE OF WIT	FINE TO CO.	ARSE SAND
	‡		-				<u> </u>				F	<u>t</u>	_AYERS	
ee o	+ =0.0	1	1			: : : : :					上			
66.8	† 59.0 	35	27	50	1:::::			77		Sat.	耳	-		
	-				: : : : : :			\mathcal{N}			压	1		
71.8	+ 64.0]			::.		-	井	<u>.</u>		
	‡	58	42/0.2	2]			- 100/0.7	1	Sat.	屈	<u>}</u>		
	L.	1	1	1	1			/	1	1	1	-T		





SHEET 38 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

RO.IF		2004	~		In Doc	20	COLINITA	Canada	~~		GEOLOGIST A. NASH
	CT NO.	3264			ID. B-25		COUNTY	Crave			GROUND WATER (fi
	ESCRIP		Briage		US 70 Business of			ET 8.0	4 DT		ALIGNMENT -L- 0 HR. N/A
	IG NO.		· · ·	NORT	RING LOCATION		EAST		2,587	100	
	AR ELEV.						RILL METH	OD R	otary Wa		/NW Casing/2-7/8" Tricone HAMMER TYPE AUTOMATI
	DEPTH			DRILL	MACHINE BK	ED 11/11/05			ATED	DED	PTH 17.4 ft
	DEPTH		/10/05 DW COL	INIT		WS PER FOOT	JUNI	SAMP.		L	11.7 IL
(ft)	(ft)	0.5ft	0.5ft	0.5ft		40 60	80 100	1	моі	0	SOIL AND ROCK DESCRIPTION
(11)	(10)	0.012		U.GIL		<u> </u>		1	IVICI		
				,	-						
75.9 76.8	69.0				Continued	from previous p	oage				RIVER BEND FORMATION:
10.0	<u> </u>	30	35	26		61.			Sat.	出	MODERATELY INDURATED TO EXTREMELY INDURATED THINLY BEDDED
	‡					:::: ::::				井	GRAY MOLDIC LIMESTONE WITH TRACE OF FINE TO COARSE SAND
81.8	74.0	33	27	30		::::/ <u>:</u> :::	,		Sat.	田	LAYERS (continued)
	‡	აა	21	30						田	+ -
-	+ 70.0									田	<u>‡</u>
86.8	79.0	40	45	32		::::: <u>`</u>	9.77 <u>· · · ·</u>	<u></u>	Sat.	出	88.3
	_				BOBI	NG TERMINATED					1) ADVANCED NW CASING TO 53.6 FEET. 2) SET NW CASING TO 53.6 FEET(TEMP
	<u> </u>				ATE	LEV88.3 FEET			1		CASING 24.1 FEET). 3) ADVANCED 2-7/8" TRICONE ROLLER TO
	<u> </u>				IN INDURATED	GRAY MOLDIC LII	VIES I ONE.				79.0 FEET. 4) RIVER WATER USED WITH QUICKGEL
-											ADDED AS DRILLING FLUID. 5) APPROXIMATE DRILLING FLUID
	- 1										DENSITY 66 PCF.
	Ŧ I							1			6) DRILLING FLUID LOSS OBSERVED BETWEEN 64 TO 79 FEET.
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PROJECT NO				ID.	B-2532		COUNTY	Crave	n		GEOLOGIST S.	,	
SITE DESCR		Bridge	60 on l	JS 70 Busir	ness over Tr	rent River						GROUN	D WATER (ft)
BORING NO.			ВО	RING LOCA	ATION 34	+36	OFFSE	T 22.	Oft RT	· A	LIGNMENT -L-	0 HR.	N/A
COLLAR ELE	V6.4	ft	NORTI	HING 498	3,287.4		EASTI		2,587,			24 HR.	N/A
TOTAL DEPT			DRILL	MACHINE	CME-45c	DR	ILL METHO	DD Ro	otary Wa Irrel	sh w/NW (Casing/NWD4 Core HAMI	MER TYPE	MANUAL
DATE START		/14/05		COM	PLETED 1	1/14/05	SURF	ACE W	ATER	DEPTH	5.3 ft		
ELEV. DEPT		ow cor	JNT		BLOWS PE	ER FOOT		SAMP.	lacksquare	L 0	SOIL AND ROCK	(DESCRIPTI	ON
(ft) (ft)	0.5ft	0.5ft	0.5ft	0 20	40	60 8	0 100	NO.	моі				
					RIVER L	FVEL			∇				
-1.1	_				11112111					-			
+										F			
+					RIVER B	ОТТОМ					5.4	UVIUM:	0.
0.7 + 2.2											VERY SOFT TO S	OFT BROWN	HIGHLY
-8.7 + 2.3	WOH	.WOH	WOH	ф woн					W		ORGANIC FII	NE SANDY S IUCK)	: L. I
Ŧ				1::::									
-13.7 7.3				: : : : :					w				
Ŧ.	WOH	2	2	φ4: : :					"	<u> </u>	16.4		10
Ŧ				: 						:::t	LOOSE GRAY SLIGH	11LY SILTY F A-3)	INE SAND
<u>-18.7 † 12.3</u>	3	3	2	. 65					Sat.				
‡				: *:::							21.4 MEDIUM STIFF GF	AY FINE SAI	NDY SILT
-23.7 + 17.3		-		: : : :						L.		(A-4)	
	3	2	3	. φ ₅ : :			:::::		W	L-	26.4		2
‡ .				: :							LOOSE GRAY	SILTY FINE S N-2-4)	SAND
-28.7 + 22.3		7	10						Sat.		29.7	-	2
<u>+</u>	3	'	10		⁷					000	MEDIUM DENSE TA	FORMATIO N-GRAY SIL	N: TY FINE TO
20.7 1 27.7	,	ľ		: : :						000		SE SAND A-1-b)	
-33.7 + 27.3 +	10	10	12	: : : <i>}</i>	0.22				Sat.	000	WITH TRACE	E OF LIMEST GMENTS	ONE
1				: : : : :						000_	37.4 FRIABLE THINLY	BEDDED TA	N CDAV
-38.7 - 32.3] : : : : :					Sat.	进	SANDY	LIMESTONE	
Ŧ	10	13	14		Ф 27 · · ·					出	WITH TRACE OF	THIN SAND	LAYERS
F				: : : : :					1		42.4 MEDIUM DENSE	GRAY SILTY	
-43.7 + 37.3 +	11	14	13	: : : : :	0.27				Sat.		45.2	RSE SAND A-1-b)	
Ŧ				: : : : :						串	WITH FRIABLE INDURATED TH	INLY BEDDE	D GRAY
Ŧ			1							臣	SANDY LIME FRIABLE TO MOD	ERATELY IN	DURATED
-49.9 7 43.5	14	15	14	<u> </u>	0 29	<i></i>			Sat.	曲	THINLY BED	DED GRAY SA ESTONE	ANDY
· ‡										出	WITH TRACE OF	THIN SAND	LAYERS
-54.9 + 48.5	5]:::::	: 1::::			-		用	·		
+	18	15	17	:::::	(a) (32)				Sat.	田	-56.4 MODERATELY	INDURATED	THINLY
‡									1	出	BEDDED GRAY WITH TRACE OF	THIN SAND	LAYERS
-59.9 + 53.6	63	37/0.4	-	:::::		. 	100/0.9		Sat.	曲	RIVER BEN	ID FORMATION XTREMELY II	ON: NDURATED
‡	33	3,70,4				 	/			井	THINLY TO THIS	KLY BEDDE	D GRAY
-64.9 + 58.						 /	<u> </u>			田	MOLDIC WITH TRACE O	THIN SAND	LAYERS
-64.9 T 58.5	26	33	29	1					Sat.	田			
+										井			
-69.9 63.		1							Sat.	肝		-	
Ŧ	75	25/0.2	!				100/0.7		Jal	耳			•
Ŧ				: : : :			<i>]</i> //.::			井			
<i>-</i> 74.9 † 68.	5			1		· · · · /		1	Sat	1			





SHEET 39 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

DO :-	CT NO.	3264	TAL SER			ID, B	-2532			OUNTY	Crave	en		GEOLOG	ST S.	JOHNSON	
				60 on l				r Trent f		-							D WATER (ft
	ESCRIPT		bilage		RING			34+36		OFFSI	ET 22.	0 ft RT	- 1	ALIGNMENT -L-		0 HR.	N/A
		B17-B	4	NORTI			287.4	34100		EAST		2,587,				24 HR.	N/A
	R ELEV.						CME-4	150	DDII	L METH	OD R	otary Wa		V Casing/NWD4 Core	HAM	MER TYPE	MANUAL
	DEPTH			DRILL				11/14				ATED	DEDT	H 5.3 ft	1.2	2-	
	STARTE		/14/05	15.17				PER FC		SURF	SAMP.	TV/	L				
- 1	DEPTH		OW COL	0.5ft	, o	20	40	60	80	100	1	1	0 G	SOIL AN	ID ROC	K DESCRIPTI	ON
(ft)	(ft)	0.5ft	0.5ft	0.511	<u> </u>						110.	/MOI	G			. 1	
						•											
75.9						Contir	nued fro	m prev	ous pag	е		<u> </u>	-	RIVI	D RENI	D FORMATIO	N·
-	-				: : :								耳	INDURATEI	TO EX	TREMELY IN KLY BEDDED	DURATED
79.9	73.5]:::							0.4	耳	. N	OLDIC	LIMESTONE	
-		29	34	44	: : :				∷ <i>)</i> ∂:7	ġ		Sat.	世	WITH TR		THIN SAND I ntinued)	LAYERS
-	F				: : :			 	Z				曲				
84.9	78.5	32	23	26	∤ ∷ ∷	· · · ·		49				Sat.	井士	-86.4			
	<u> </u>												ΠĒ	1) ADVANCE 2) SET NW C	D NW C	ASING TO 37	7.3 FEET. I (TEMP
•	‡						AT ELEY	TERMIN /86.4 F	EET				E	CASING 6 - 3) ADVANCE	4 FFFT	1	
-					ININ	IDURA1	red GR	AY MOLI	DIC LIME	STONE			lE	38.8 TO 78 4) RIVER W	3.5 FEE	Γ.	
	‡												<u> </u>	USED AS	DRILLIN	IG FLUID.	
-													1 F	5) APPROXII DENSITY	MATE DI 65 PCF.	RILLING FLUI	D
	<u> </u>												F	6) SOME LO	SS OF E		
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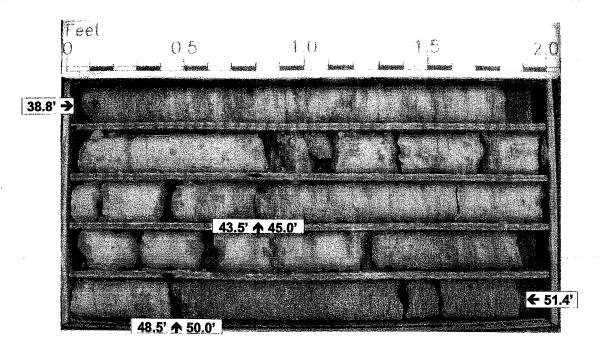
N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

The state of the s	ENGI	NEERIN	IG • TEST	ING CES						SHEET 1 OF 1
PROJE	CT NO.		49.1.1			ID. B-25	532			COUNTY Craven GEOLOGIST S. JOHNSON
	ESCRIP			60 on L	JS 70	Business	over T	rent R	iver	GROUND WATER (ft)
		B17-E				LOCATIO		+36		OFFSET 22.0 ft RT ALIGNMENT -L- 0 HR. N/A
	R ELEV			NORTH		498.287				EASTING 2,587,208.1 24 HR. N/A
	DEPTH			DRILL		HINE C	ME-450		DF	ORILL METHOD Rotary Wash w/NW Casing/NWD4 Core HAMMER TYPE MANUAL
	STARTE		1/14/05			COMPLE				SURFACE WATER DEPTH 5.3 ft
	SIZE N		17 17 17 00			TOTAL R				DRILLER A. MARTIN
			DRILL	RI	JN	J 01145	STR	ATA	L	TOORDING AND DEMARKS
(ft)	DEPTH (ft)	(ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	NO.	REC. (ft) %	RQD (ft) %	O G	
45.0	20.0	4.7	1:15	(4.6)	(N/A)	(8.0)		1	45.2 Begin Coring @ 38.8 ft 38
-45.2	38.8	4.7	1:05 1:20	98%		<u> </u>	71%		岸	BELGRADE FORMATION: FRIABLE TO MODERATELY INDURATED THINLY BEDDED GRAY
-49.9	43.5		1:15						耳	SANDY LIMESTONE WITH TRACE OF THIN SAND LAYERS
-51.4	45.0	3.5	N=29 1:05	(3.4)	(N/A)	1		臣	
-54.9	48.5		1:15 1:20	97%	ľ				屏	
-54.9	40.5		0:40/0.5 N=32	_					臣	
-56.4	50.0	3.5	1:20 1:20	(3.3)	(N/A	.)	93%		臣	MODERATELY INDURATED THINLY BEDDED GRAY SANDY LIMESTONE
-59.9	53.5		1:10				(19.2)		臣	WITH TRACE OF THIN SAND LAYERS
-60.8	54.4	4.1	0:45/0.5 N=100/0.		(N/A	.)	70%		上	RIVER BEND FORMATION: INDURATED TO EXTREMELY INDURATED THINLY TO THICKLY
-64.9	58.5		2:00 2:30	30%					出	BEDDED GRAY MOLDIC LIMESTONE WITH TRACE OF THIN SAND LAYERS
-04.9	36.3		2:45 3:00]		上	-
-66.4	60.0	3.5	0:05/0.1 N=62	(3.3)	(N/A)			H	
-69.9	63.5		2:45 3:00				4		臣	-
-70.6	64.2	4.3	3:00 1:50/0.5	(4.1) 95%	(N/A	()	1		H	
 4.0	00.5		N=100/0.						臣	+
-74.9	68.5	<u> </u>	1:45 1:50				1		上	
-76.4	70.0	3.5	1:50 1:30	(3.5) 100%	(N/A	1)			片	'
-79.9	73.5	ļ	1:00/0.3 N=66		ļ	·	-		一	<u>+</u> -
-81.4	75.0	3.5	2:30 2:40	(3.5)	(N/A	0	-		井	
		0.0	3:00 1:40/0.5	100%	1	1			H	-
-84.9 -86.4	78.5 80.0	 	N=78 2:00	1	 				耳	T
00.1	00.0		2:10				l.			BORING TERMINATED AT ELEV86.4 FEET IN INDURATED GRAY
			2:05 1:40/0.5	<u>.</u>						MOLDIC LIMESTONE.
			N=49	4						
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CORE PHOTOS

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Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B17-B
Site Description: Bridge No	o. 60 over Trent River on US 70) Business	Driller: A. Martin
Collar Elev.: -6.4 ft.	Core Size: NWD4	Equipment: CME-45c	Geologist: S. Johnson
Elev. at T.D.: -86.4 ft.	Total Depth: 80.0 ft.	Total Run: 41.2 ft.	Date: 11/14/2005



Box 1 of 4
Top of Box @ 38.8 feet; Bottom of Box @ 51.4 feet



Box 2 of 4
Top of Box @ 51.4 feet; Bottom of Box @ 63.5 feet

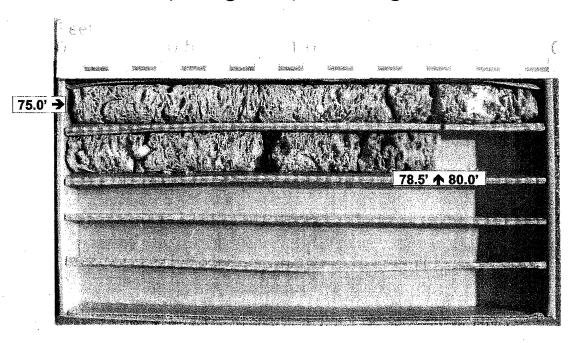


CORE PHOTOS

Project No.: 32649.1.1	ID No.: B-2532	County: Craven	Boring No.: B17-B
Site Description: Bridge No	o. 60 over Trent River on US 70	Business	Driller: A. Martin
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Elev. at T.D.: -86.4 ft.	Total Depth: 80.0 ft.	Total Run: 41.2 ft.	Date: 11/14/2005



Box 3 of 4
Top of Box @ 64.2 feet; Bottom of Box @ 73.5 feet



Box 4 of 4
Top of Box @ 75.0 feet; Bottom of Box @ 80.0 feet

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N.C.D.O.T. GEOTECHNICAL UNIT

	ENG ENVI	RONMEN	IG • TES VTAL SER	VICES					W. 01	TRAME			SHEET 1	OF 1	
PROJE	CT NO.	3264	19.1.1		ID. B-2532	cou	NTY	Crave	en		GEOLOG	IST A.	RIGGS		
SITE D	ESCRIF	TION	Bridge	e 60 on	US 70 Business over Trent River					.,			GROUND	WATER (f	ft)
BORIN	G NO.	B18-B		BC	ORING LOCATION 35+08	0	FFSE	T 9.0	ft RT		ALIGNMENT -L-		0 HR.	N/A	
COLLA	R ELEV	/. -2.2	ft	NORT	THING 498,360.5	, E	ASTII		2,587	,			24 HR.	N/A	
TOTAL	DEPTH	68.4	ft	DRILL	L MACHINE Mobile B-57 DI	RILL MI	ETHC		otary Wa	ish w/N	W Casing/2-7/8" Tricone	HAMN	MER TYPE N	MANUAL	
DATE S	STARTE	D 11	/3/05		COMPLETED 11/3/05	SI	URFA	CE W	ATER	DEPT	ΓH 1.9 ft		1.		
ELEV.	DEPTH	BL	ow col	JNT	BLOWS PER FOOT			SAMP.	$\mathbf{V}/$	L		ים הספו			***************************************
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60	80	100	NO.	моі	O G	, SOIL AN	iD ROCK	DESCRIPTION		
										- 1			•		
							.								
-0.3			ļ		RIVER LEVEL				∇						
-2.2	0.0	- 1	1	WOH	RIVER BOTTOM				Sat.	124	2.2	ALLU	JVIUM:		0.0
-4.9	2.7		,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									K GRAY TO BE	ROWN	
-	-	1	WOH	WOH	ф woн			SS-14	Sat.			(A	-2-4)	ED.	
1	-						: :						RGÁNIC MATT ONTENT 4.4%	EK	
-9.6	- 7.4 -	1	WOH	1	- 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		::		Sat.	13.4	-				
‡	_	`			¶::::::::::::::::::::::::::::::::::::		: :				•				
-14.6	- - 12.4						: :				-14.2				- 12.
-14.0	- 12.4	2	3	5		• • •			Sat.	::: <u> </u>			DENSE GRAY-I		
Ŧ	-				::::::::::::::::::::::::::::::::::::::					Ŀ		(/	4-3) WOOD		
-19.6	- - 17.4]:::::\:\::::::::::::::::::::::::::::::					-		*****	WOOD		
7	_	9	15	14	29		::		Sat. W		-21.2 VERV SOE	TDARK	GRAY CLAYEY	FINE	19.
‡	-						::		٧٧	F	· VERT SOI	SAND	Y SILT	1 11412	
-24.6	22.4	1	WOH	5	-		::		Sat.				4-4)		23.4
1	- [']	ļ '	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		- 0 5		: :			- -	LOOSE		SILTY FINE SAN -2-4)	1D	
-29.6	- - 27.4				.		: :			000		CE OF S	HELL MATERIA	LAND	26.
-29.0		12	14	12	0 26				Sat.	000	BEI	GRADE	FORMATION:		
Ŧ	-		_	-						000	MEDIUM DI SLIGHTLY S	ENSE 17 SILTY FIN	IN SLIGHTLY C IE TO COARSE	SAND	
-34.6	- 32.4				<u> </u>		\vdots		١.	000	. WITH		-1-b) OF FRIABLE T	0	
7	-	11	13	13	26		::		Sat.	000	MODERA	ATELY IN	IDURATED THI ANDY LIMESTO	NLY	34.
‡	-						: :			毌		•	RATELY INDUI		
-39.6	- 37.4 -	8	14	15	0.29		: :		Sat.	曲	 VERY THIN 	ILY TO T	HINLY BEDDE		
‡	-			ŀ	27		: :			盽			IMESTONE THIN SAND LA	YERS	41.
-44.7	- - 42.5						: :			戸	FRIABLE T		RATELY INDUI		
1		14	12	14	26		: :		Sat.	開			HINLY BEDDED IMESTONE	GRAY	
1	- ,				1:::::		: :			田	· WITH TRA	ACE OF	THIN SAND LA	YERS	
-49.7	47.5			1.			$\cdot \cdot $		C-1	出					
7	<u>.</u>	13	13	16	Q 29				Sat.	迚			•		
1	- -						::			田					
-54.7	52.5	16	17	17	- · · · · · · · · · · · · · · · · · · ·	::::	::		Sat.	田	.				
‡	- -						<u>.</u>			岸	-57.2	ED DENI	FORMATION:		55.
-59.7	- - 57.5						:			耳	INDURATE	TO EX	TREMELY INDU		
	-	100/0.4			1	. 100/0.	· φ		Sat.	出	· : N	10LDIC I	(LY BEDDED G IMESTONE		
1	- .	,					:			世	WITH TR	ACE OF	THIN SAND LA	YERS	
-64.7	62.5	000		10/0.1			:		80+	田	· 				
Ŧ	-	38	60	40/0.4	,	100/0.	9		Sat.	朏			IG TO 36.8 FEET.	ASING	
‡	-		1				:			卧	15.4 FEET).		6.8 FEET (TEMP C CONE ROLLER FR	1	
-69.7	67.5	57	_43/0.4_		<u> </u>				Sat	單	70 6 TO 67.5 FEE	T.	UICKGEL ADDED	1	68.
Ī	•				BORING TERMINATED AT ELEV70.6 FEET	100/0.	97			F	DRILLING FI	LUID.	ING FLUID OBSEF		
‡	- -			l	IN EXTREMELY INDURATI GRAY MOLDIC LIMESTON	VE ED	1			F		FEET.	NG FLUID DENSIT		
		l		1	J. J. J. J. J. J. J. J. J. J. J. J. J. J	- —			L		UIAFFRUAIIVA		· · · · · · · · · · · · · · · · · · ·		





•	ENGI	NEERIN	G • TES	TING VICES								Mar or	TRANSP	y		SHEET		
PROJE	CT NO.	3264				ID.	3-2532		С	YTNUC	Crav	en		GEOLOG	IST S	OZNHOL.	1	
	ESCRIP	TION	Bridae	60 on l	US 7	0 Busin	ess ove	r Trent F	River							GROUN	ID WATER	(f
	G NO.					LOCA		35+92		OFFSI	ET 9.0	ft LT		ALIGNMENT -L-		0 HR.	N/A	
	R ELEV			NORTI	HING	498	446.4			EASTI	NG	2,587	,205,	3		24 HR.	N/M	
				DRILL			Mobile	R-57	DRILL	METH		-1/4" HSA		y Wash w/2-7/8" Tricone	HAM	MER TYPE	MANUAL	
	DEPTH			DRILL	IVIAC			10/31/				oller ATER	DED	TH N/A	1			
	STARTE		/31/05			COIVIE				JORG	SAMP		L	111 1071				
ELEV.	DEPTH		OW COL	,	0	. 20	BLOWS 40	S PER FO 60	· 80	100	l		0	SOIL AN	ID ROC	K DESCRIPT	ION	
(ft)	. (ft)	.0.5ft	0.5ft	0.5ft	Ĭ.				<u> </u>	<u></u>	140.	MOI	G					
40.0						ASPHA	LT PAV	/EMENT	SURFA	CE	,			10.6				
10.6	<u> </u>					[L 0 5	ROADV	VAY EM	BANKMENT TAN-BROWN	FILL: FINE TO	
	‡ .					:::::::::::::::::::::::::::::::::::::::								- WILDIOW L	COAR	SE SAND		
6.7	3.9	6	8	11								М		- W		\-1-b) ACE OF SILT	•	
_	F	U		''		· · ψ 1								- -				
	‡					<u>::</u> :::			 					- 2.6	ΔΙΙ	UVIUM:		
1.7	8.9	1	1	1	. .							W		VERY LOO	SE TO L	OOSE GRAY	TO DARK	
-	+	·	İ		1/2									_	(/	E TO COARS A-2-4)		
.0.0	Į,,,				: :									with tr	ACE OF	ORGANIC N	MATTER	
-3.3	13.9	4	2	2	1:	 4			 			Sat.	₩	<u>.</u>				٠.
-	<u> </u>				•									6.4		- 0041/ -11/-	CAND	
-8.3	18.9													- MEDIUM -		GRAY FINE (A-3)	SAND	
-0.3	10.9	5	8	9	::	. 0.17						Sat.		- v		ACÉ OF SILT	Ī	
	‡					<u> </u>			<i></i> 					11.4	144 744	D BROWN SI	TV EINE	
-12.9	23.5] : [•. • •		C-4		- LOOSE GF -	S	AND	LITFINE	
	Į.	2	3	2	∶∳	5						Sat.		- WITH LIT	() TI F OR	4-2-4) GANIC MAT	TER AND	
-	‡				│ :								777	16.4	PIECES	OF WOOD		_
-17.9	28.5				. .							l w		SOFT GRA		EY FINE SA (A-4)	NDY SILI	
	+	2	1	2	.\phi:	3						"		<u>.</u> .		, ,		
-	Ŧ				: :								000	-21.9 LOOSE TAN	011 777 / 1	-NIE TO 004	DOE CAND	
-22.9	33.5	2	4	5	: -]::::			· · · · ·			Sat.	000	-	(,	A-1-b)		
_	‡	2	4		: :	9				 			0000	_ WITH		E OF LIMEST GMENTS	ONE	
	<u> </u>												000					
-27.9	38.5	7	2	6	1 : :							Sat.	0000	_	•			
_	‡				: :	J							0000					
00.0	± 42.5					<u></u>							000	- BE	LGRADI	E FORAMTIC GRAY SILTY F	N:	
-32.9	T 43.5	9	11	12			23					Sat.	000	<u> </u>	(,	A-1-b)		
-	Ŧ				: :						·		000	- WITH 36.4 MODER	I TRACI ATFI Y I	E OF FRIABL NDURATED	E TO THINLY	,
-37.9	48.5				: :	:::1	 						田	- \ BEDDED	GRAY	SANDY LIME	STONE]
-01.0	-70.0	12	13	11	1 : :	: : :	24					Sat.	井	THINL	Y BEDE	ERATELY IN DED GRAY S	ANDY	
-	±													- - <u>-41.4</u> WITH TR		ESTONE THIN SAND	LAYERS	_
-42.9	T 53.5] : :		: : :						川	FRIABLE T	O MOD	ERATELY IN	DURATED	_
	ļ	12	12	14] : :		26					Sat.			SANDY	THINLY BEDI		
. -	<u> </u>						1:		[.]			.	田	WITH TR	ACE OF	THIN SAND	LAYERS	
-47.9	58.5			`]								田	-				
	F	13	13	14		: : :	2 7.					Sat.	田	_				
-	‡						: 1: : : : : : : : : : : : : : : : : :		 	 			田	-				
-52.9	63.5						.		. 			824	田	F				
	<u> </u>	17	17	15	: :	: : :	ф 32					Sat.	田	<u>-</u>				
-	‡				: :		: : :::						川	,		,		
-57.9	68.5		<u></u>		.							Sat.	囯	58.4 58.4		D EODMATI	ON!	
	±	13	45	55/0.3	:				1	00/0.8		Jai	H	- MODI	FRATEL	ID FORMATI Y INDURATI	ED TO	
-	Ŧ				: :				· · · · ·	/		ŀ	田	INDURA	TED TH	INLY BEDDE LIMESTONE	D GRAY	
-62.9	73.5		47	27	1 : :				: : :/			Sat.	片	├ wiтн [']	TRACE	OF SAND LA	YERS	





SHEET 43 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

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***	ENGI	NEERING	G • TES	TING								West of	78489	SHEET 2 OF 2
PROJEC		3264				ID. E	3-2532		CC	DUNTY	Crave	en		GEOLOGIST S. JOHNSON
SITE DE		ION	Bridge	60 on 1	US 70) Busine	ess over	Trent Riv	ver					GROUND WATER (ft)
BORING		EB2-A		ВО	RING	LOCA	TION 3	35+92		OFFSE	ET 9.0	ft LT		ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV.	10.6	ft	NORT	HING	498,	446.4			EASTI		2,587,		
TOTAL	DEPTH	75.0	ft	DRILL	MAC	HINE	Mobile	B-57	DRILL	METHO	OD 3-	1/4" HSA oller	√Rotar	Rotary Wash w/2-7/8" Tricone HAMMER TYPE MANUAL
DATE S			/31/05	L		COMP	LETED	10/31/0	5	SURF	ACE W	ATER	DEP	EPTH N/A
ELEV.	DEPTH	BLC	w col	JNT		·	BLOWS	PER FOO			SAMP.	lacksquare	L O	SOIL AND ROCK DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 I	20	40	60 L	80	100	NO.	моі		
														· ·
						Contin	nued froi	m previo	us page	,				-64.4
-64.2						. B	ORING T AT ELEV ODERATI	m previou ERMINAT -64.4 FEI ELY INDU IIC LIMES	ED ET RATED					-64.4 - 1) ADVANCED 3-1/4" HSA TO 18.5 FEET 2) ADVANCED 2-7/8" TRICONE ROLLER TO 73.5 FEET 3) RIVER WATER WITH QUICKGEL ADDED USED AS DRILLING FLUID 4) APPROXIMATE DRILLING FLUID DENSITY 65 PCF 5) LOSS OF DRILLING FLUID OBSERVED BELOW 33.5 FEET.





PROJE			G • TES	VICES		T	5 55		— т	00:::::::::::::::::::::::::::::::::::::		Mary St.				SHEET 1	. 0	
	ECT NO.	3264				<u> </u>	B-2532			COUNTY	Crave	en		GEOLOG	N I CI		D MATER /#	
	ESCRIP							ver Tren		1		A 6		41104		4	D WATER (ft	ij
	IG NO.	BTP- 1				LOCA		32+63	}		ET 48.			ALIGNMENT -L-		0 HR.	N/A	
OLLA	AR ELEV	12.	5 ft	NORT	HING	498	3,129.5			EAST		2,587				24 HR.	N/A	
OTAL	. DEPTH	78.0	ft	DRILL	MAC	HINE	CME	-45c	DRI	LL METH	OD R	oller		W Casing/2-7/8" Tricone	HAMI	MER TYPE	MANUAL	
ATE S	STARTE	D 11	/16/05			COM	PLETE	D 11/1	7/05	SURF	ACE W	ATER	DEP	TH 10.8 ft				
ELEV.	DEPTH	BLO	ow cor	TNL			BLOW	VS PER I			SAMP.	lacksquare	L	SOIL A	ND ROC	K DESCRIPTI	ON	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20 	41	0 6	0 80	100	NO.	MOI	1 " 1					
							RIV	ÆR LEV	/FI			∇						
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	‡													•				
-	‡													-				
-	‡						RIVE	R BOT	ГОМ					12.5			····	(
-14.4 -	1.9				T -								羉	· VERY S.C	FT TO S	UVIUM: OFT BLACK I	HIGHLY	
		2	WOH	WOH	d wo	OH · ·						W	緻	- ORG		NE SANDY SI UCK)	LT	
7	<u> </u>				1:	: : :	 							• •	(
-19.4 -	6.9				:[:				· • • • •			w	錣		•			
	F	. 2	2	2	· ф 4	4		· · · · ·	 			"	綴					
	‡				<u>;</u> }		 <i>.</i> .		 				***	23.3 VERVI 00	SE TO L	OOSE GRAY	COARSE	1
<u>-24.4 -</u>	11.9	2	1	2	. .							Sat.		- VERTEOU	TO FIN	NE SAND	00/1102	
	ţ l				:4,									· WITH TRA	CE OF S	A-3) SILT AND LIME	ESTONE	
-29.4 -	16.9				: \									• •	FRAG	SMENTS		
	79,0	6	5	4	: :}	9						Sat.		-				
]	-													•				
-34.4 -	21.9			10		<u>:::</u>	 					Sat.	041	34.4 	GRADE	FORMATION	<u>.</u>	2
	F ·	13	11	13		9	9 24		 			Jai.	E		DENSE	TAN SILTY FI SE SAND		
-39.0	26.5					:::[H	-	(A	\-1-b)	D. THUNK V	,
-03.0	20.0	11	11	10		:::	21		 			Sat.		BEDDED TA	N SAND	Y INDURATEI Y LIMESTONI	E LAYERS	
. +	‡					:::			 									,
<u>-44.0</u>	31.5			00		L		 : :				Sat.	門	- 43.5 - FRIABLE T	O MODE	RATELY IND	URATED	3
-	_	21	23	22	• •			45				Jac	田	•	LIME	AN TO GRAY		
40.0	20.5						/						田	- WITH TR	ACE OF	THIN SAND L	AYERS	
-49.0 -	36.5	17	18	15			(33	3 : : :			· .	Sat.	田	- 		•		
-	_					• • •	(田	• •				
-54.0	41.5						:::/:						田	•				
_	<u> </u>	19	19	21	· ·		: : i	40				Sat.	田					
]	<u> </u>				: :	: : :							田	- -				
-59.0	46.5	17	83/0.3		• •	: : :	: : :			· · · · ·		Sat.	田	59.5 RIV	ER BENI	FORMATIO	N:	- 4
7	 					: : :			 	100/0.8			田	 EXTREMEL 	Y INDUF	RATED TO INI ED GRAY MO	DURATED	
-64.0	51.5					:			 				開	-	LIME	STONE		
	L	30	45	55								Sat.	田	WITH TR	ACE OF	THIN SAND L	AYEKS	
										100			坩	• •		•	•	
]				1									二	-				
- -69.0	56.5									1	}	0-4	1	-				
-69.0	56.5	43	57/0.3		: :					100/0.8		Sat.	囯	•				
-69.0 - 	56.5 - 61.5	43	57/0.3		· · · · · · · · · · · · · · · · · · ·					100/0.8/-	,	Sat.	量	- - - - ·				





SHEET 44 OF 61 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

**	ENGI	NEERIN	G • TES	TING VICES								Star or	TRANSE				SHEET	2 OF 2
PROJE	CT NO.	3264			1	ID. E	3-2532		С	OUNTY	Crav	en			GEOLOG	SIST N	. Bradley	
ITE D	ESCRIP	TION	Bridge	e 60 on	US 70	Busine	ess over	Trent R	iver								GROUI	ND WATER (ft
	G NO.	BTP- 1		ВС	RING	LOCA	TION :	32+63		OFFSI	ET 48.	.0 ft LT		ALIGNN	MENT -L-		0 HR.	N/A
OLLA	R ELEV	12.	5 ft	NORT	HING	498,	129.5			EAST		2,587,				,	24 HR.	N/A
OTAL	DEPTH	78.0	ft	DRILL	MAC	HINE	CME-4	-5c	DRIL	METH	OD R	totary was toller	h w/NV	V Casing/2-	7/8" Tricone	HAM	MER TYPE	MANUAL
	STARTE		/16/05			COMP	LETED	11/17/0	05	SURF	ACE W	ATER	DEP1	FH 10.8	3 ft		2.4	
LEV.	DEPTH	BLO	ow co	UNT	Ī		BLOWS	PER FO	ОТ		SAMP.	. 🗸	L		SOIL A	ND ROC	K DESCRIPT	TION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	.80	100	NO.	MOI						
						Conti	nued fro	m previo	nue nad	A								
-76.5 -	-			 					\	<u> </u>			田		RIV	ER BEN	D FORMATION RATED TO IN	ON:
-79.0	66.5	50	47	43	1::					·\		Sat.	进		THINL	Y BEDDI	ED GRAY M	OLDIC
-	_	50	+1	43		 				90			卅		WITH TF	RACE OF	STONE THIN SAND	LAYERS
040	71.5				: :	 		 		<i>!</i> : : :			鬥			(coi	ntinued)	
-84.0	71.5	32	39	42	1 : :				: : :	81		Sat.	田	_				
	<u> </u>								l:: A				臣	•				
-89.0	76.5] : :				• • • • • • • • • • • • • • • • • • • •			Sat.	田	•				
	<u> </u>	30	31	53	 					84		Jan			1) ADVANC	ED NW C	CASING TO 2	21.9 FEET.
	-							TERMINA						-	CASING	11 9 FFF	TO 21.9 FEE T).	
	Ł.				INE	KTREM	ELY INDU	/90.5 FI JRATED	TO INDL	IRATED				_	76.5 FEE	Τ.	TRICONE F	
	ł					GR	AY MOLI	DIC LIME	STONE					- -	4) RIVER W	ATER W	ITH QUICKE NG FLUID.	SEL ADDED
	F				'									-	5) NO LOSS	S OF DRI	LLING FLUID).
	‡													_	OBSERV 6) APPROX	(ED. (IMATE D	RILLING FLU	DID
	‡													-	DENSITY	/ 66 PCF		
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N.C.D.O.T. GEOTECHNICAL UNIT **BORING LOG**

SHEET 1 OF 1 TYPE OF CONE 1.75 sq. In. PEIZO CONE ROD TYPE 1.75 in Dia. MAXIMUM DOWN PRESSURE Approximately 20 tsf GEOLOGIST S. JOHNSON COUNTY Craven ID. B-2532 **PROJECT NO.** 32649.1.1 HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck TOTAL DEPTH 29.3 ft **GROUND WATER (ft)** SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River SURFACE WATER DEPTH 1.5 ft **COMPLETED** 11/16/05 DATE STARTED 11/16/05 N/A ALIGNMENT -L-0 HR. OFFSET 8.0 ft RT BORING LOCATION 19+15 BORING NO. CPT- 1 J. WHITE TECHNICIAN A. MARTIN N/A DRILLER: 24 HR. **EASTING** 2,586,924.4 **NORTHING** 496,793.3 COLLAR ELEV. -2.1 ft EQUIVALENT SPT N₆₀ EQUIVALENT SOIL DESCRIPTION PORE PRESSURE (tsf) SOIL BEHAVIOR TYPE FRICTION RATIO (%) CONE RESISTANCE (tsf) ELEV. DEPTH FRICTION (tsf) (Robertson 1990) RIVER BOTTOM ALLUVIUM: VERY LOOSE TO LOOSE DARK GRAY -2.1 0.00 COARSE TO FINE SAND (A-2-4)WITH TRACE OF SILTY, CLAY AND SHELL MATERIAL
LOOSE TO MEDIUM DENSE GRAY AND -8.1 T 6.0 TAN
SILTY FINE TO COARSE SAND (A-1-b)
WITH TRACE OF LIMESTONE FRAGMENTS YORKTOWN FORMATION: STIFF DARK GRAY CLAYEY FINE SANDY -15.1 I SILT (A-4) WITH TRACE OF SHELL MATERIAL BELGRADE FORMATION: -20.6 + 18.5 MEDIUM DENSE TO VERY DENSE TAN MEDIUM DENSE TO VERT DENSE TAIN
SILTY FINE TO COARSE SAND
(A-1-b)
WITH TRACE OF FRIABLE TO
MODERATELY INDURATED THINLY
BEDDED TAN SANDY LIMESTONE LAYERS 1) SET 15.4 FEET OF NW CASING (TEMPORARY CASING 13.7 FEET) 2) DIRECT PUSH TO 29.3 FEET. CONE PENETRATION TEST REFUSAL AT ELEVATION -31.4 FEET IN VERY DENSE TAN SILTY FINE SAND WITH SANDY LIMESTONE LAYERS.

CONTRACTOR OF THE LOCAL



SHEET 1 OF 1 MAXIMUM DOWN PRESSURE Approximately 20 tsf TYPE OF CONE 1.75 sq. in. PEIZO CONE ROD TYPE 1.75 in Dia. GEOLOGIST S. JOHNSON **COUNTY** Craven PROJECT NO. 32649.1.1 ID. B-2532 HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck TOTAL DEPTH 25.6 ft **GROUND WATER (ft)** SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River SURFACE WATER DEPTH 6.3 ft **COMPLETED** 11/17/05 11/17/05 0 HR. DATE STARTED N/A ALIGNMENT -L-BORING LOCATION 21+10 OFFSET 8.0 ft RT BORING NO. CPT- 2 TECHNICIAN J. WHITE A. MARTIN N/A DRILLER: 24 HR. **EASTING** 2,586,959.0 **NORTHING** 496,985.2 COLLAR ELEV. -6.5 ft EQUIVALENT SPT N₆₀ SOIL BEHAVIOR TYPE PORE PRESSURE (tsf) **EQUIVALENT SOIL DESCRIPTION** FRICTION RATIO (%) CONE RESISTANCE (tsf) FRICTION (tsf) ELEV. DEPTH 20 60 80 100 G (Robertson 1990) (ft) (ft) ALLUVIUM: VERY LOOSE DARK GRAY SILTY FINE SAND 0.00 (A-2-4)
WITH TRACE OF SHELL MATERIAL
VERY SOFT GRAY CLAYEY FINE SANDY -12.0 | 5.5 SILT LOOSE LIGHT GRAY FINE TO COARSE SAND (A-1-b) -17.0 10.5 SOFT BROWN CLAYEY FINE SANDY SILT (A-4)LOOSE TO VERY DENSE BROWN SILTY FINE TO COARSE SAND (A-1-b)
WITH TRACE OF LIMESTONE FRAGMENTS BELGRADE FORMATION:

MEDIUM DENSE TO VERY DENSE

GRAY-TAN

SILTY FINE TO COARSE SAND

(A-1-b)

WITH TRACE OF INDURATED THINLY

BEDDED GRAY-TAN SANDY LIMESTONE

1) SET 22.0 FEET OF NW

CASING (TEMPORARY CASING 19.3 FEET)

2) DIRECT PUSH TO 25.6 FEET. -29.5 + 23.0 CONE PENETRATION TEST REFUSAL AT ELEVATION -32.1 FEET IN VERY DENSE GRAY-TAN SILTY FINE TO COARSE SAND WITH SANDY LIMESTONE LAYERS.

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SHEET 1 OF 1 TYPE OF CONE 1.75 sq. In. PEIZO CONE ROD TYPE 1.75 in Dia. MAXIMUM DOWN PRESSURE Approximately 20 tsf GEOLOGIST S. JOHNSON **COUNTY** Craven ID. B-2532 PROJECT NO. 32649.1.1 HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck TOTAL DEPTH 21.9 ft **GROUND WATER (ft)** SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River SURFACE WATER DEPTH 10.8 ft **COMPLETED** 11/17/05 DATE STARTED 11/17/05 ALIGNMENT -L-0 HR. N/A OFFSET 9.0 ft RT BORING LOCATION 22+90 BORING NO. CPT-3 J. WHITE **TECHNICIAN** A. MARTIN DRILLER: 24 HR. N/A **EASTING** 2,586,992.0 COLLAR ELEV. -11.0 ft NORTHING 497,162.2 EQUIVALENT SPT N₆₀ PORE PRESSURE (tsf) SOIL BEHAVIOR TYPE EQUIVALENT SOIL DESCRIPTION 100 G FRICTION RATIO (%) CONE RESISTANCE (tsf) ELEV. DEPTH FRICTION (tsf) 20 60 80 (Robertson 1990) - (ft) ALLUVIUM: -11.0 0.00 VERY SOFT DARK GRAY FINE SANDY SILT (A-4)VERY LOOSE TO LOOSE GRAY FINE SAND -16.5 + 5.5 LOOSE TO MEDIUM DENSE GRAY -23.0 12.0 FINE SAND (A-2-4) WITH TRACE OF SILT AND CLAY LOOSE TO DENSE GRAY
FINE TO COARSE SAND
(A-1-b)
WITH TRACE OF LIMESTONE FRAGMENTS
AND SHELL MATERIAL

1) SET 27.0 FEET OF NW
OASING (TEMPORARY CASING CAS SEET) -32.9 + 21.9 CASING.(TEMPORARY CASING 24.9 FEET). 2) DIRECT PUSH TO 21.9 FEET. CONE PENETRATION TEST REFUSAL AT ELEVATION -32.9 FEET IN VERY DENSE

SEVERENCE PROPERTY.

THE MODE S. S. WINE W. S. STREET



SHEET 1 OF 1 Approximately 20 tsf MAXIMUM DOWN PRESSURE TYPE OF CONE 1.75 sq. In. PEIZO CONEROD TYPE 1.75 in Dia. GEOLOGIST S. JOHNSON PROJECT NO. 32649.1.1 **ID.** B-2532 **COUNTY** Craven HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck **GROUND WATER (ft)** TOTAL DEPTH 19.7 ft SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River SURFACE WATER DEPTH 12.4 ft DATE STARTED 11/17/05 COMPLETED 11/17/05 ALIGNMENT -L-0 HR. N/A BORING NO. CPT- 4 BORING LOCATION 24+77 OFFSET 8.0 ft RT TECHNICIAN J. WHITE DRILLER: A. MARTIN 24 HR. N/A COLLAR ELEV. -12.6 ft **NORTHING** 497,346.4 **EASTING** 2,587,024.2 EQUIVALENT SPT N₆₀ PORE PRESSURE (tsf) SOIL BEHAVIOR TYPE CONE RESISTANCE (tsf) FRICTION RATIO (%) ELEV. DEPTH FRICTION (tsf) **EQUIVALENT SOIL DESCRIPTION** 100 G 80 60 (Robertson 1990) 200 (ft) (ft) RIVER BOTTOM -12.6 0.00 ALLUVIUM: VERY SOFT DARK BROWN HIGHLY ORGANIC FINE SANDY SILT (MUCK) WITH PIECES OF WOOD LOOSE GRAY SLIGHTLY SILTY FINE SAND -23.6 + 11.0 LOOSE TO DENSE GRAY SLIGHTLY SILTY
FINE TO COARSE SAND
(A-1-b)

1) SET 32.0 FEET OF NW
CASING (TEMPORARY CASING 27.7 FEET)
2) DIRECT PUSH TO 19.7 FEET. -32.3 CONE PENETRATION TEST REFUSAL AT ELEVATION -32.3 FEET IN DENSE GRAY SILTY FINE TO COARSE SAND.



N.C.D.O.T. GEOTE BORING LOG

SHEET 1 OF 1 Approximately 20 tsf TYPE OF CONE 1.75 sq. In. PEIZO CONE ROD TYPE 1.75 in Dia. MAXIMUM DOWN PRESSURE GEOLOGIST S. JOHNSON COUNTY Craven **ID.** B-2532 PROJECT NO. 32649.1.1 HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck TOTAL DEPTH 50.9 ft GROUND WATER (ft) SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River SURFACE WATER DEPTH 4.1 ft 11/17/05 **COMPLETED** 11/17/05 DATE STARTED ALIGNMENT -L-0 HR. N/A OFFSET 9.0 ft LT BORING LOCATION 34+37 BORING NO. CPT-5 J. WHITE TECHNICIAN DRILLER: A. MARTIN 24 HR. N/A 2,587,177.9 **NORTHING** 498,294.2 **EASTING** COLLAR ELEV. -4.3 ft EQUIVALENT SPT N₆₀ SOIL BEHAVIOR TYPE PORE PRESSURE (tsf) FRICTION RATIO (%) CONE RESISTANCE (tsf) **EQUIVALENT SOIL DESCRIPTION** FRICTION (tsf) 100 G ELEV. DEPTH 40 60 80 20 (Robertson 1990) 200 (ft) (ft) RIVER BOTTOM -4.3 0.00 ALLUVIUM: VERY LOOSE TO LOOSE BROWN SILTY FINE SAND (A-2-4)
VERY SOFT TO SOFT BROWN HIGHLY ORGANIC FINE SANDY SILT (MUCK) LOOSE TO MEDIUM DENSE GRAY SLIGHTLY SILTY FINE SAND (A-3) SOFT TO MEDIUM STIFF GRAY -21.8 + 17.5 FINE SANDY SILT -24.3 LOOSE GRAY SILTY FINE SAND (A-2-4)BELGRADE FORMATION: -28.3 1 24.0 MEDIUM DENSE TO DENSE TAN-GRAY SILTY FINE TO COARSE SAND (A-1-b)WITH TRACE OF LIMESTONE FRAGMENTS FRIABLE THINLY BEDDED TAN-GRAY SANDY LIMESTONE WITH TRACE OF THIN SAND LAYERS MEDIUM DENSE GRAY SILTY FINE TO COARSE SAND -40.3 INDURATED THINLY BEDDED GRAY
SANDY LIMESTONE LAYERS
FRIABLE TO MODERATELY INDURATED
THINLY TO THICKLY BEDDED GRAY
CANDY LIMESTONE

THINLY TO THICKLY BEDDED GRAY

CANDY LIMESTONE -43.3 SANDY LIMESTONE WITH TRACE OF THIN SAND LAYERS 1) SET 22.0 FEET OF NW CASING.(TEMPORARY CASING 19.3 FEET) 2) DIRECT PUSH TO 50.9 FEET. CONE PENETRATION TEST REFUSAL AT **ELEVATION -55.2 FEET IN MODERATELY** INDURATED SANDY LIMESTONE.



SHEET 1 OF 1

TYPE OF CONE 1.75 sq. In. PEIZO CONE ROD TYPE 1.75 in Dia. MAXIMUM DOWN PRESSURE Approximately 20 tsf GEOLOGIST S. JOHNSON **COUNTY** Craven PROJECT NO. 32649.1.1 ID. B-2532 HAMMER TYPE N/A DRILL METHOD Direct Push DRILL MACHINE CPT Truck GROUND WATER (ft) TOTAL DEPTH 31.1 ft SITE DESCRIPTION Bridge 60 on US 70 Business over Trent River **COMPLETED** 11/17/05 SURFACE WATER DEPTH N/A DATE STARTED 11/17/05 0 HR. N/A OFFSET 12.0 ft LT ALIGNMENT -L-BORING NO. CPT- 6 BORING LOCATION 18+10 **TECHNICIAN** J. WHITE DRILLER: A. MARTIN 24 HR. Ń/A **EASTING** 2,586,886.4 COLLAR ELEV. 10.9 ft **NORTHING** 496,693.5 EQUIVALENT SPT'N₆₀ FRICTION RATIO (%) PORE PRESSURE (tsf) SOIL BEHAVIOR TYPE **EQUIVALENT SOIL DESCRIPTION** FRICTION (tsf) CONE RESISTANCE (tsf) 0 ELEV. DEPTH 60 80 100 (Robertson 1990) GROUND SURFACE 10.9 0.00 ROADWAY EMBANKMENT FILL: MEDIUM DENSE TO LOOSE GRAY SLIGHTLY SILTY FINE TO COARSE SAND ALLUVIUM: LOOSE TO MEDIUM DENSE BROWN SILTY FINE TO COARSE SAND SILTY FINE TO COARSE SAND
(A-1-b)
WITH LITTLE SHELL MATERIAL
SOFT TO MEDIUM STIFF BROWN
FINE SANDY SILTY CLAY
(A-7-5)
LOOSE TO MEDIUM DENSE BROWN
SILTY FINE TO COARSE SAND
(A-1-b) -11.6 + 22.5 (A-1-b)

JAMES CITY FORMATION:
SOFT TO STIFF BROWN FINE SANDY SILT (A-4)
WITH TRACE OF SHELL MATERIAL
YORKTOWN FORMATION:
STIFF GRAY FINE SANDY SILT (A-4) WITH TRACE OF SHELL MATERIAL -20.2 CONE PENETRATION TEST REFUSAL AT 1) DIRECT PUSH TO 31.1 FEET **ELEVATION -20.2 FEET ON INDURATED** TAN SANDY LIMESTONE.

CALLAND SABAGE

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

			AASH	ТО		% Pa	assing		Coarse	Fine						Organic	Moisture
Boring	Sample	Sample Depth	Classific	ation		Sie	ve#		Sand	Sand	Silt	Clay	LL	PL	PI	Content	Content
No.	No.	Feet			10	40	60	200								%	%
EB1-B	SS-1	8.8-10.3	A-2-4	(0)	91	72	56	26	39	38	7	16	23	17	6	N.A.	N.A.
B1-A	SS-2	0.0-1.5	A-2-4	(0)	100	96	- 86	12	14	78	· 3	5	24	. N.P.	N.P.	N.A.	N.A.
B2-B	SS-3	13.5-15.0	A-4	(1)	99	93	91	52	8	56	17	19	23	15	8	N.A.	N.A.
В3-А	SS-4	4.8-6.3	A-3	(0)	99	51	18	4	82	15	0	3	21	N.P.	N.P.	N.A.	N.A.
B4-B	SS-5	7.2-8.7	A-4	(0)	100	97	91	37	9	66	10	15	20	N.P.	N.P.	N.A.	N.A.
B5-A	SS-6	14.8-16.3	A-2-4	(0)	100	100	92	11	8	85	2	5	24	N.P.	N.P.	N.A.	N.A.
В6-В	SS-7	6.1-7.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	39.6	N.A.
B7-A	SS-8	1.1-2.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	24.7	N.A.
B7-A	SS-9	15.1-16.6	A-3	(0)	98	98	84	8	15	81	. 1	. 3	24	N.P.	N.P.	N.A.	N.A.
B8-B	SS-10	20.5-22.0	A-4	(1)	100	100	99	50	1	63	16	20	24	- 1:7	7	N.A.	26.4
B9-A	SS-11	18.6-20.1	A-2-4	(0)	100	100	- 89	16	12	80	3	5	22	N.P.	N.P.	N.A.	N.A.
B10-B	SS-12	30.0-31.5	A-1-b	(0)	100	47	31	18	69	15	8	8	20	N.P.	N.P.	N.A.	N.A.
B14-A	SS-13	5.1-6.6	N.A.	N.A.	65	52	41	16	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	9.7	N.A.
B18-B	SS-14	2.7-4.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4.4	N.A.

N.A.: Not Analyzed N.P.: Non Plastic

Project Name: Bridge 60 Over the Trent River on US 70 Business

S&ME Project No.:

<u>1051-05-478</u>

State Project No.: 32649.1.1

County:

Craven

Federal ID No.: N/A

TIP No.:

B-2532

Checked By:

CONTRACTOR CONTRACTOR

JSJ & AFR

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 32649.1.1 ID: B-2532 COUNTY: <u>Craven</u>
DESCRIPTION(1): Bridge 60 Over The Trent River on US 70 Business
INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection microfilm(Reel:Pos:) x other Preliminary General Drawings
COUNTY BRIDGE NO. 60 BRIDGE LENGTH 1762.4' NO. BENTS IN: CHANNEL 43 FLOOD PLAIN 3
FOUNDATION TYPE: Pre-stressed 22 Inch Octagonal Concrete Piles
EVIDENCE OF SCOUR(2):
ABUTMENTS OR END BENT SLOPES: No significant signs of eroison at the end bents.
INTERIOR BENTS: None observed at Interior Bent No. 1. Minor erosion observed at Interior Bent No.45. None
observed at the remainder of the Interior Bents due to bents being located in the channel. Concrete has been cast in-place
to repair a concrete pile located at Interior Bent No. 45 on the left side of the bent.
CHANNEL BED: None observed
CHANNEL BANKS: None observed
EXISTING SCOUR PROTECTION:
TYPE(3): Concrete abutments with concrete wingwalls. A timber retaining wall with concrete cap is located between Interior Bent No. 1
and Interior Bent No. 2. A timber retaining wall with concrete cap is located between End Bent No. 2 and Interior Bent No. 45. Rip Rap has
been placed between the abutment and the top of the retaining walls.
EXTENT(4): Concrete wingwalls extend a few feet beyond the concrete abutments. The retaing walls extends approximately
40 to 45 feet left and wraps around to approximatley 40 to 45 feet beyond each end of the bridge. Rip Rap has been placed
between the abutments and the top of the retaining walls
EFFECTIVENESS(5): Relatively effective with some minor erosion at both abutments.
OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Pedestrian bridge crosses beneath the existing bridge between Interior
Bent No.43 and Interior Bent 44. Retaining walls at both ends of the bridge. Bridge fender system upstream and downstream
of main channel.
DESIGN INFORMATION:
of shell material, brown slightly silty fine sand (A-3) with little organic matter, dark gray and brown highly organic fine sandy and
and clayey silt (Muck), gray fine sand (A-3) with trace of silt, gray clayey silt (A-4), gray silty fine to coarse sand (A-2-4), brown fine
sandy silt (A-4), brown moderately organic silty fine sand (A-2-4)
CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Brown, gray and tan silty fine to coarse sand (A-1-b)
with trace of shell materials and limestone fragments, dark gray silty coarse to fine sand (A-2-4) with trace of shell material
and organic material
CHANNEL BANK COVER(9): Commercial development is located on each side of the river.
FLOOD PLAIN WIDTH(10): 500 +/- feet on the north side of the river and 1500 +/- feet on the south side of the river
FLOOD PLAIN COVER(11): Commerical development is located on each side of the river.

DESIGN INFORMATION CONT.	PAGE 2
STREAM IS X DEGRADING AGGRADING (12)	
OTHER OBSERVATIONS AND COMMENTS: A water line is buried beneath the river bottom 40 to 50) feet left of the
existing bridge. A fiber optic cable is attached beneath the right side of the bridge, then goes along the rive	er bottom
around the right side of the finder system at the channel crosssing. Marina located southwest of bridge an	d Ünion
Point Park is located northeast of the bridge. Convention Center is located northwest of bridge.	
CHANNEL MIGRATION TENDENCY (13): Migration tendency to the north	
REPORTED BY: J. Shane Johnson DATE: 11/12/20	05
GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):	
The Geotechnical Unit agrees with the theoretical scour shown on the Bridge Survey	
and Hydraulic Design report dated 11/14/05	
and right admit 2 doi: growth added rin in the	
REPORTED BY: Class Market DATE: 12/19 INSTRUCTIONS GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED. NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.	<u>/05</u> -
5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING. 6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.	
DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS. B) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE	
DISTRIBUTION, ATTACH LAB RESULTS.	
DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC. 10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).	
10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)	
12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING	
13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE	
BRIDGE (APPROXIMATELY 100 YEARS). 14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE	
(APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON	
A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS	
THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY	
ADJUSTED SCOUR ELEVEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE;	

PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

SHEET 53 OF 61

PROJECT #:	32649.1.1
COUNTY:	Craven
DESCRIPTION:	Replacement of Bridge No.60 Over Trent River on US 70 Business

	CH	IANNEL B	ED		CHANN	IEL BED	
	. 1	MATERIA			MATE	ERIAL	
SAMPLE #	SS-2	SS-4	SS-5	SS-6	SS-9	SS-10	SS-11
RETAINED #4	0	. 0	0	0	3	0	0
PASSING #10	100	. 99	100	100	98	100	100
PASSING #40	96	51	97	100	98	100	100
PASSING #200	12	4	37	11	8	50	16
COARSE SAND	14	82	9	8	15	11	12
FINE SAND	78	15	66	85	81	63	80
SILT	3	0	10	2	1	16	3
CLAY	5	3 ·	15	5	3	20	5
LL .	24	21	20	24	24	24	22
PL ·	N.P.	N.P.	N.P.	N.P.	N.P.	17	N.P.
AASHTO	A-2-4(0)	A-3(0)	A-4(0)	A-2-4(0)	A-3(0)	A-4(1)	A-2-4(0)
CLASSIFICATION			·				
						<u> </u>	
STATION	19+15	21+10	21+96	22+90	24+77	25+71	26+66
OFFSET	9 LT	8 LT	8 RT	8 LT	24 LT	24 RT	9 LT
DEPTH	0.0	4.8	7.2	14.8	15.1	20.5	18.6

Laboratory Report Version 4.2

Particle Size Analysis of Soils

TIP NO: B-2532

Sample Date: 11/1/2005

AASHTO T 88 as Modified by NCDOT

11/29/2005 Report Date: 1051-05-478 S&ME Project #: 11/18 - 11/29/05 Test Date(s): Bridge 60 on US 70 Business Project Name:

NCDOT Client Name:

Sample Description:

Client Address:

Location:

32649.1.1 State Project #: B1-A Boring #:

19+15

F.A. Project No: N/A

Sample #: SS-2

Offset: 9 LT

Depth: 0.0 ft.

Dark Gray Coarse to Fine Sand with Trace of Silt, Clay and Shell Material A-2-4(0)

	1.5" 1"3/4" 1/2'3/8" #4	#10 #20 #40 #60 #100 #200#270	
100%			
90%			
80%			
70%			
60 JuAn 1955 884			
50%			
50%			
4002			
(40%)			
30%		\ <u> </u>	
		N	
20%			
1000			
10%			
0%			
100	10	1 0:1 Particle Size (mm)	0.01 0.

As Defin	ed by NCDOT	Nation (Carlos Carlos 966 35 8490	Fine Sand			< 0.25 mm and > 0.05 mm					
Gravel	< 75 m	nm and > 2.00	mm		Silt		< 0.05 and > 0.005 mm				
Coarse Sand		nm and > 0.2:		. (Clay		< 0.005 mm				
Maximum Pa		3/8"		oarse Sand	14.2%		Silt	2.0%			
, 	Gravel	0.3%		Fine Sand	78.1%		Clay	5.0%			
Apparent Relativ	e Density		Moistu	ire Content			% Passing #200	12.4%			
* * .	quid Limit	24	P	lastic Limit	0	•	Plastic Index	N.P.			

Signature

Soil	Mortar	(-#10	Sieve)	

5.0% 2.4% Clay 78.4% Silt Fine Sand Coarse Sand 14.2% Weathered & Friable Hard & Durable □ Soft □ Angular \square Description of Sand & Gravel Particles: Rounded Sodium Hexametaphosphate: Dispersing Agent: Mechanical Stirring Apparatus (A) Length of Dispersion Period:

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T265: Laboratory Determination of Moisture Content of Soils AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

Technical Responsibility:

Mal Karajan

Laboratory Supervisor

< 0.25 mm and > 0.05 mm

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

Report Date: 11/29/2005 1051-05-478 S&ME Project #: Test Date(s): 11/18 - 11/29/05 Bridge 60 on US 70 Business over Trent River Project Name:

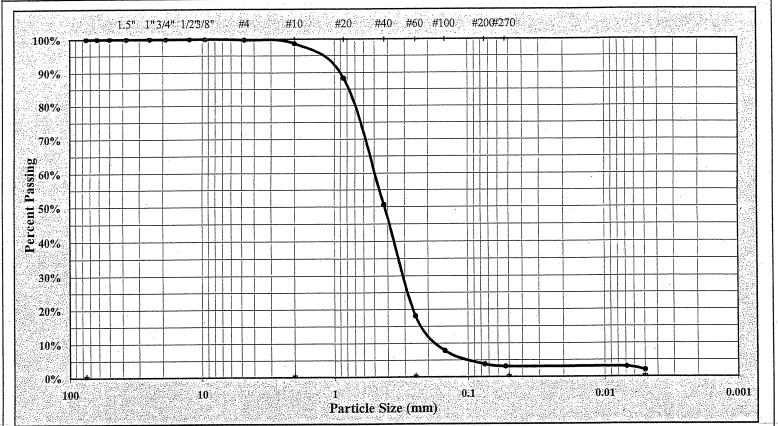
Client Name: NCDOT

Client Address:

TIP NO: B-2532 32649.1.1 F.A. Project No: N/A State Project #:

Sample Date: 11/2/2005 Sample #: SS-4 Boring #: В3-А Depth: 4.8 ft. Offset: 8 LT 21+10 Location:

Gray Fine Sand A-3(0)Sample Description:



As Defin	ed by NCDO	Daniela, barber	ing extraction and	Fir	ne Sand		< 0.25 mm and > 0.05	mm
Gravel		nm and > 2.00			Silt		< 0.05 and > 0.005 r	nm
Coarse Sand		mm and > 0.2			Clay		< 0.005 mm	
Maximum Pa	rticle Size	3/8"	C	oarse Sand	80.6%		Silt	0.0%
	Gravel	1.3%		Fine Sand	15.0%		Clay	3.0%
Apparent Relativ	e Density		Moist	ire Content	36.6%	•	% Passing #200	3.8%
Lic	luid Limit	21	. P	lastic Limit	0		Plastic Index	N.P.
•								

,	,		Soil Mo	rtar (-	#10	Sieve)						
Coarse Sand	81.7%	Fine Sand	15.2%			Silt	0.19	6	•	Clay	3.0%	
Description of Sand	d & Gravel Particles:	Rounded l]. A:	ngular		Hard & Durable		Soft		Weathered	& Friable	; <u> </u>
Mechanical Stirring App	paratus (A) Ler	gth of Dispersion	Period: 1	min.		Dispersing Agent:	Sod	ium He	xameta	phosphate:	40 g./ Liter	
	ITO T88: Particle Size Anal paration of Disturbed Soil a			Test		AASHTO T265: Lab						3
AASHTO T89: Determi	ining the Liquid Limit of So	ils ·		A.A	ASHTO	O T90: Determining the	Plastic					
AASHTO M 145: The C	Classification of Soils and S	oil Aggregate Mix	tures for High	way Cons	structio	on Purposes		AS'	TM D	854: Specific Gra	vity of Soils	

Technical	Responsibility:
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Particle Size Analysis of Soils

SHEET 55 OF 61

Particle Size Analysis of Soils

AASHTO T 88 as Modified by NCDOT 11/29/2005 Report Date: 1051-05-478 S&ME Project #: 11/18 - 11/29/05 Test Date(s): Bridge 60 on US 70 Business over Trent River Project Name:

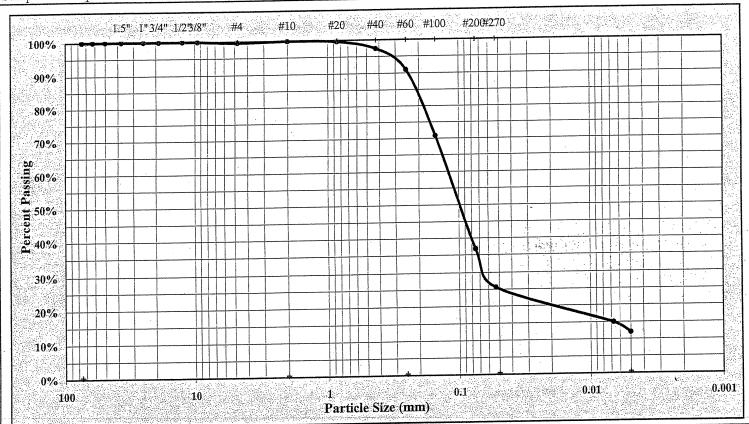
NCDOT Client Name:

Client Address:

TIP NO: B-2532 F.A. Project No: N/A 32649.1.1 State Project #: Sample Date: 10/27/2005

Sample #: SS-5 B4-B Boring #: Depth: 7.2 ft. Offset: 8 RT 21+96 Location:

A-4(0)Grav Clayey Fine Sandy Silt Sample Description:



ΔCHATIN	ea by NCDUI	gga statistical and every translated.	paggeria, seggi styrik mystorik 🜓					
Harrist Control of the Control of th		nm and > 2.00		(Silt		< 0.05 and > 0.005 a	mm
Gravel					Clay		< 0.005 mm	
Coarse Sand	< 2.00	mm and > 0.2					C*14	11.00/
Maximum Pa	rticle Size	3/8"	C	oarse Sand	8.9%		Silt	11.0%
Withham I a	Gravel	0.1%		Fine Sand	65.4%		Clay	15.0%
Apparent Relativ		012,0	Moistu	ire Content		0,	% Passing #200	36.8%
* *	luid Limit	20	Pl	lastic Limit	0		Plastic Index	N.P.

	Soil N	Mortar (-#10	Sieve)			
Coarse Sand 8.9%	Fine Sand 65.5	5%	Silt	10.6%	Clay	15.0%
Description of Sand & Gravel Parti	cles: Rounded \square	Angular 🗆	Hard & Durable	□ Soft □	Weathered	& Friable 🛚
Mechanical Stirring Apparatus (A)	Length of Dispersion Period:		Dispersing Agent:	Sodium Hexameta	hosphate:	40 g./ Liter
	ze Analysis of Soils as Modified by				af Maintaga Co	

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

Technical Responsibility:

AASHTO T265: Laboratory Determination of Moisture Content of Soils

< 0.25 mm and > 0.05 mm

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

ASTM D 854: Specific Gravity of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

> Laboratory Supervisor Mal Karajan Signature

AASHTO T 88 as Modified by NCDOT

Report Date: 11/29/2005 1051-05-478 11/18 - 11/29/05 Test Date(s): Bridge 60 on US 70 Business over Trent River

Client Name: NCDOT

Client Address:

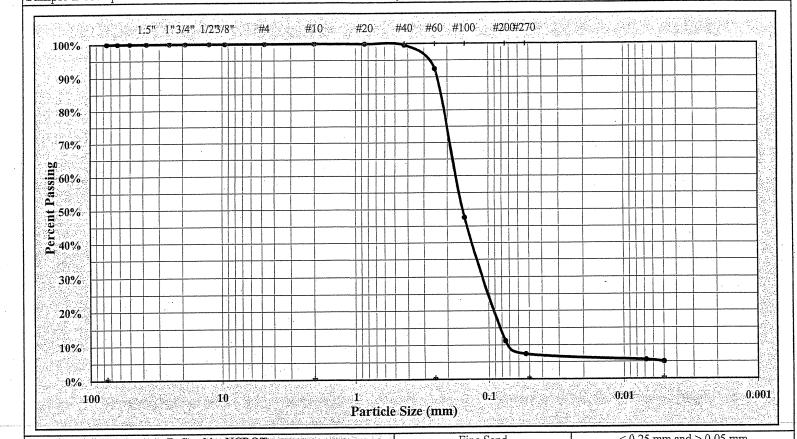
S&ME Project #:

Project Name:

TIP NO: B-2532 F.A. Project No: N/A 32649.1.1 State Project #:

Sample Date: 11/7/2005 Sample #: SS-6 B5-A Boring #: Offset: 8 LT Depth: 14.8 ft.

22+90 Location: Gray Fine to Coarse Sand with Trace of Silt and Clay A-2-4(0)Sample Description:



As Defii	ied by NCDOT	EEAFER BUT 100	阿克斯斯斯 克克斯 (1)	Fine	e Sand	< 0.25 mm and > 0	iun cu.	
Gravel		nm and > 2.00 r			Silt	< 0.05 and > 0.00)5 mm	
Coarse Sand	< 2.00	mm and > 0.25	mm	C	Clay	< 0.005 mm	1	_
Maximum Pa	article Size	#10	C	oarse Sand	7.6%	Silt	2.0%	
	Gravel	0.0%	٠	Fine Sand	85.1%	Clay	6.0%	
Apparent Relati	ve Density	•	Moist	ire Content		% Passing #200	11.2%	
* * ,	quid Limit	24	P	lastic Limit	0	Plastic Index	N.P.	٠

			Soil Mortar	(-#10	Sieve)				•		
Coarse Sand	7.6%	Fine Sand	85.1%		Silt	1.89	%		Clay	5.5%	
Description of Sand	d & Gravel Particles:	Rounded [] Angula	ır 🗆	Hard & Durable		Soft		Weathered	& Friable	
Mechanical Stirring App	paratus (A) Ler	gth of Dispersion P	eriod: 1 min.		Dispersing Agent:	Soc	lium Hex	kametaph	nosphate:	40 g./ Liter	
References: AASH	TO T88: Particle Size Ana	ysis of Soils as Mo	dified by the NCDO	OT							
AASHTO T87: Dry Prep	paration of Disturbed Soil a	nd Soil Aggregate S	Samples for Test	•	AASHTO T265: Lab						
AASHTO T89: Determi	ning the Liquid Limit of So	ils		AASHTO	T90: Determining the	Plastic	Limit &	Plasticit	ry Index of Soil	.S	

AASHTO M 145: The Classification of Soils		way Construction Purposes	ASTM D 854: Specific Gravity of Soils
Technical Responsibility:	Mal Karajan	,	<u>Laboratory Supervisor</u>

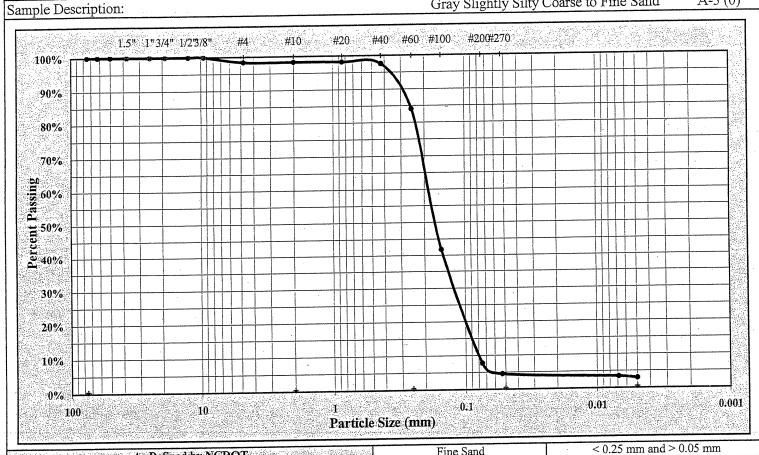
Technical Responsibility:

Particle Size Analysis of Soils

Laboratory Supervisor

AASHTO T 88 as Modified by NCDOT

11/29/2005 Report Date: 1051-05-478 S&ME Project #: 11/18 - 11/29/05 Test Date(s): Bridge 60 on US 70 Business Over Trent River Project Name: NCDOT Client Name: Client Address: TIP NO: B-2532 F.A. Project No: N/A State Project #: 32649.1.1 Sample Date: 11/9/2005 Sample #: SS-9 B7-A Boring #: Depth: 15.1 ft. Offset: 24 LT 24+77 Location: Gray Slightly Silty Coarse to Fine Sand A-3(0)



ad by NI III I	34 N. 154 SEV	0.0132210200325994550.00	1 111	Coana	1			
< 75 n	am and > 2.00 n	nm		Silt		< 0.05 a	nd > 0.005 r	nm
				Clav		< (0.005 mm	
\ 2.00	iiiii aiid > 0.25						C:14	1.0%
rticle Size	3/8"	C	oarse Sand	14.3%		4	SIII	1.070
Gravel	1.7%		Fine Sand	79.5%			Clay	3.0%
e Density		Moistu	re Content			% Passin	g #200	7.7%
quid Limit	24	Pl	astic Limit	0		Plasti	ic Index	N.P.
	< 75 n < 2.00 rticle Size Gravel ve Density	< 75 mm and > 2.00 r < 2.00 mm and > 0.25 rticle Size 3/8" Gravel 1.7% ve Density	< 75 mm and > 2.00 mm < 2.00 mm and > 0.25 mm rticle Size 3/8" Co Gravel 1.7% ve Density Moistu	< 75 mm and > 2.00 mm < 2.00 mm and > 0.25 mm rticle Size 3/8" Coarse Sand Gravel 1.7% Fine Sand ve Density Moisture Content	< 75 mm and > 2.00 mm Silt < 2.00 mm and > 0.25 mm Clay rticle Size 3/8" Coarse Sand 14.3% Gravel 1.7% Fine Sand 79.5% Ve Density Moisture Content	< 75 mm and > 2.00 mm Silt < 2.00 mm and > 0.25 mm Clay rticle Size 3/8" Coarse Sand 14.3% Gravel 1.7% Fine Sand 79.5% Ve Density Moisture Content	< 75 mm and > 2.00 mm Silt < 0.03 a	< 75 mm and > 2.00 mm Silt < 0.03 and > 0.00 mm < 2.00 mm and > 0.25 mm Clay < 0.005 mm

	Coarse Sand 14.5%	Fine Sand 80.	9%	Silt	1.1%	Clay	3.5%
	Description of Sand & Gravel Particle	es: Rounded \square	Angular 🗆	Hard & Durable			& Friable 🗆
	Mechanical Stirring Apparatus (A)	Length of Dispersion Period:		Dispersing Agent:	Sodium Hexameta	aphosphate:	40 g./ Liter
-	References: AASHTO T88: Particle Size AASHTO T87: Dry Preparation of Disturbed Son AASHTO T89: Determining the Liquid Limit of AASHTO M 145: The Classification of Soils are	oil and Soil Aggregate Sample f Soils	s for Test AASHT	AASHTO T265: La O T90: Determining the on Purposes	Plastic Limit & Plasti		S .

Signature

Mal Karajan

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Soil Mortar (-#10 Sieve)

Particle Size Analysis of Soils



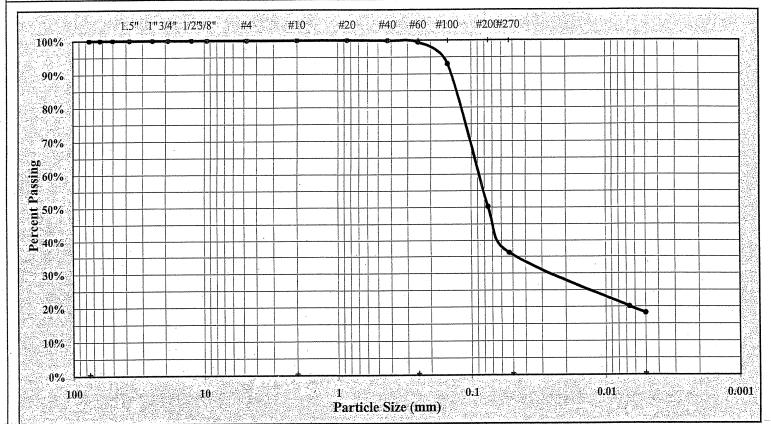
AASHTO T 88 as Modified by NCDOT

Report Date: 11/29/2005 1051-05-478 S&ME Project #: Test Date(s): 11/18 - 11/29/05 Bridge 60 on US 70 Business Over Trent River Project Name:

NCDOT Client Name:

Client Address:

TIP NO: B-2532 32649.1.1 F.A. Project No: N/A State Project #: Sample Date: 11/8/2005 Sample #: SS-10 B8-B Boring #: Offset: 24 RT Depth: 20.5 ft. 25+71 Location: Gray Clayey Fine Sandy Silt A-4(1)Sample Description:



As Defii	ned by NCDO	P		Fir	ne Sand	1	< 0.25 mm and > 0.05	mm	
Gravel		mm and > 2.0			Silt		< 0.05 and > 0.005 a	mm	
Coarse Sand	< 2.00	mm and > 0 .	.25 mm		Clay		< 0.005 mm		
Maximum Pa	article Size	#10	С	oarse Sand	0.6%		Silt	16.0%	
	Gravel	0.0%		Fine Sand	63.2%		Clay	20.0%	
Apparent Relati	ve Density		Moistu	ire Content	26.4%		% Passing #200	50.2%	
Li	quid Limit	24	P	lastic Limit	17		Plastic Index	7	
·									

Soil N	Aortar (-#10 Sieve)		
Coarse Sand 0.6% Fine Sand 63.2	%	Silt 16.1%	Clay 20.1%
Description of Sand & Gravel Particles: Rounded □	Angular □ Hard &	Durable 🗆 Soft 🗀	Weathered & Friable □
Mechanical Stirring Apparatus (A) Length of Dispersion Period:	1 min. Dispersing	Agent: Sodium Hexame	etaphosphate: 40 g./ Liter
References: AASHTO T88: Particle Size Analysis of Soils as Modified by AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples AASHTO T89: Determining the Liquid Limit of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for I	for Test AASHTO AASHTO T90: Deter	rmining the Plastic Limit & Plas	ion of Moisture Content of Soils sticity Index of Soils O 854: Specific Gravity of Soils

Technical Responsibility:	
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Laboratory Report Version 4.2

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

11/29/2005 Report Date: 1051-05-478 S&ME Project #: 11/18 - 11/29/05 Test Date(s): Bridge 60 on US 70 Business Over Trent River Project Name: NCDOT Client Name: Client Address: TIP NO: B-2532 F.A. Project No: N/A 32649.1.1 State Project #: Sample Date: 11/9/2005 Sample #: SS-11 Boring #: B9-A Depth: 18.6 ft. Offset: 9 LT 26+66 Location: Gray Coarse to Fine Sand with Trace of Silt and Clay A-2-4(0)Sample Description: #40 #60 #100 #200#270 #20 1.5" 1"3/4" 1/23/8" 100% 90% Percent Passing 40% 0.01 0.001 0.1 10 Particle Size (mm) < 0.25 mm and > 0.05 mmFine Sand As Defined by NCDOT < 0.05 and > 0.005 mmSilt < 75 mm and > 2.00 mm < 0.005 mm Clay < 2.00 mm and > 0.25 mmCoarse Sand 11.5% 4.0% Silt Coarse Sand #20 Maximum Particle Size Clay 5.0% 79.6% 0.0% Fine Sand Gravel % Passing #200 15.5% 19.4% Apparent Relative Density Moisture Content N.P. 0 Plastic Index 22 Plastic Limit Liquid Limit Soil Mortar (-#10 Sieve) 5.0% Silt 3.9% Clay Fine Sand 79.6% Coarse Sand 11.5% Hard & Durable □ Soft □ Weathered & Friable □ Angular 🗆 Description of Sand & Gravel Particles: Rounded Sodium Hexametaphosphate: Dispersing Agent: Length of Dispersion Period: Mechanical Stirring Apparatus (A) References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT AASHTO T265: Laboratory Determination of Moisture Content of Soils AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO T89: Determining the Liquid Limit of Soils ASTM D 854: Specific Gravity of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes Laboratory Supervisor Mal Karajan Technical Responsibility:

A C. L. S. L. C. CHANGE MASS. STATE SERVICE SERVICE.

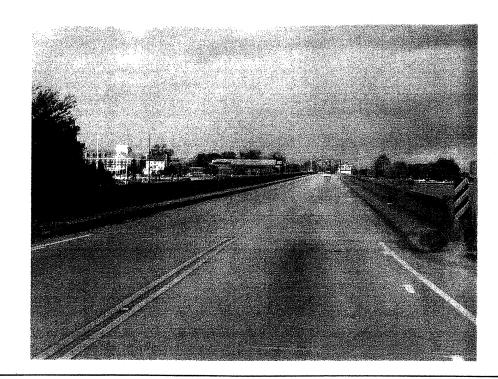
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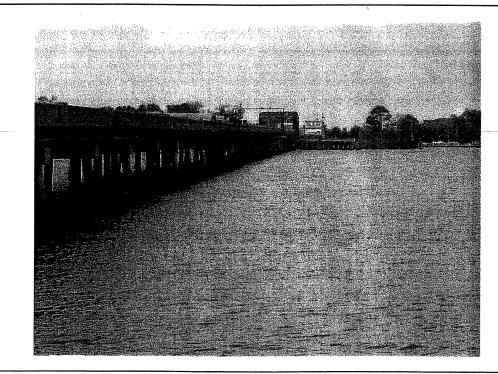
S&ME, INC.

3109 Spring Forest Road, Raleigh, N.C. 27616

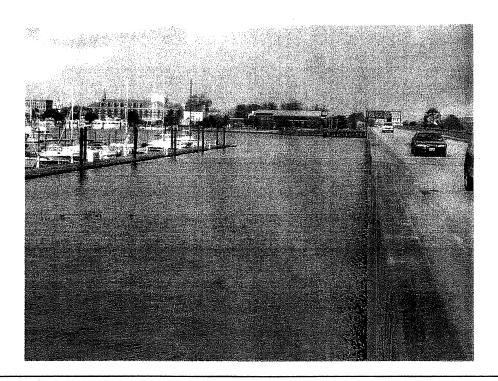
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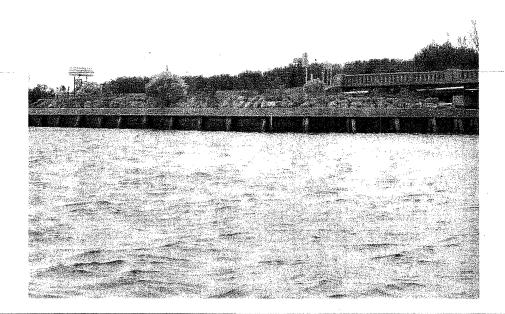
Photograph No. 1:
This photograph was taken from the south approach, along the -L- alignment, looking north.



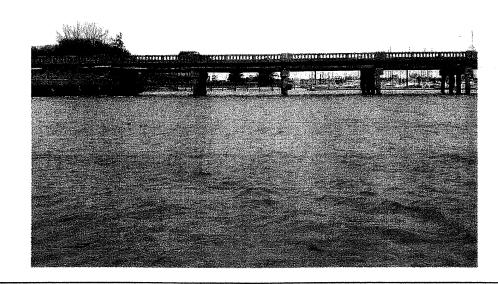
Photograph No. 2: This photograph was taken from right of the -L- alignment, looking north, along the existing bridge.



Photograph No. 3: This photograph was taken from left of the -L- alignment, looking north, along the existing bridge.



Photograph No. 4: This photograph was taken from right of the -L- alignment, looking southwest, at a retaining wall east of proposed End Bent No. 1.



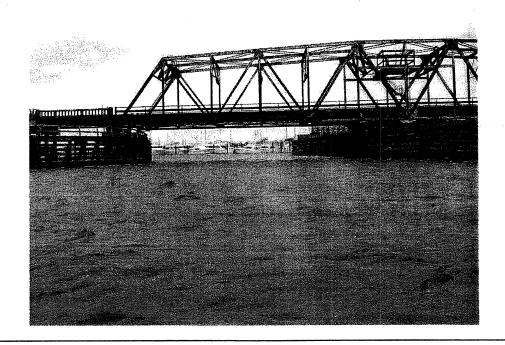
Photograph No. 5:

This photograph was taken from right of the -L- alignment, looking west, at proposed End. -Bent No. 1 and Interior Bent No. 1.



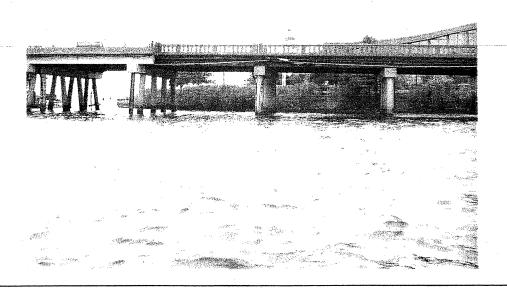
Photograph No. 6:

This photograph was taken from right of the -L- alignment, looking west (upstream), at proposed Interior Bents No. 7 and No. 8.



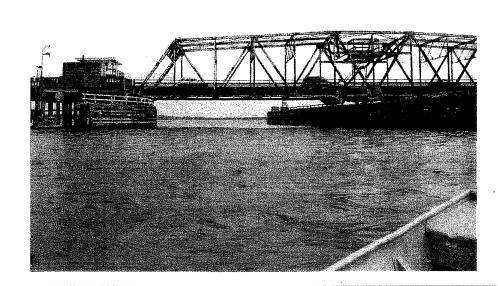
Photograph No. 7:

This photograph was taken from right of the -L- alignment, looking west, at proposed Interior Bent No. 13.



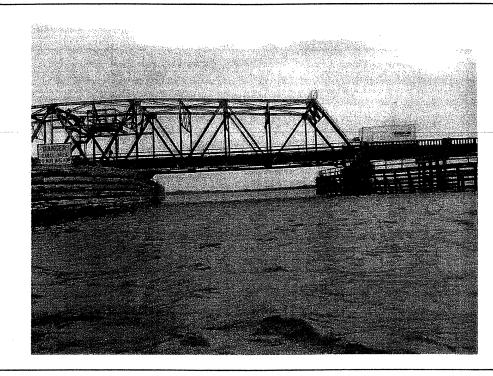
Photograph No. 8:

This photograph was taken from right of the -L- alignment, looking west, at proposed Interior Bents No. 16 and No. 17.



Photograph No. 9:

This photograph was taken from left of the -L- alignment, looking east, at proposed Interior—Sent No. 14. BTP-1 is also being drilled just north of the existing fender system.



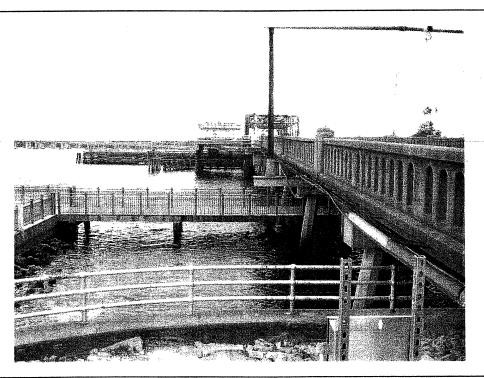
Photograph No. 10:

This photograph was taken from left of the -L- alignment, looking east, at proposed Interior 3ent No. 13.



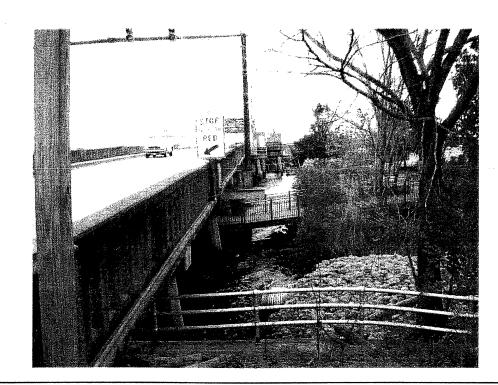
Photograph No. 11:

This photograph was taken from left of the -L- alignment, looking east, at proposed Interior Bents No. 9, No. 10 and No. 11.



Photograph No. 12:

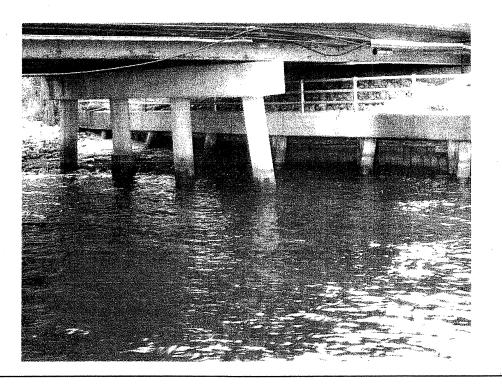
This photograph was taken from right of the -L- alignment, looking south, along the existing bridge.



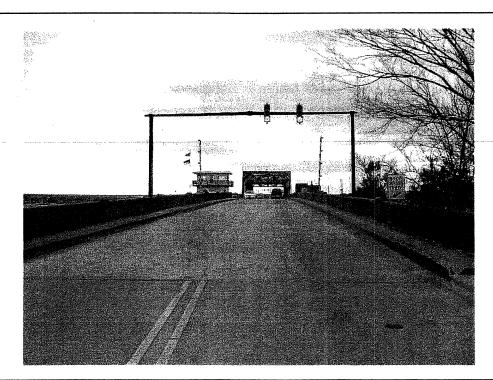
Photograph No. 13:
This photograph was taken from left of the -L- alignment, looking south, along the existing bridge.



Photograph No. 14:This photograph was taken from the existing bridge, looking east (downstream).



Photograph No. 15: This photograph was taken from right of the -L- alignment, looking northwest, at existing End Bent No. 2.



Photograph No. 16: This photograph was taken from the north approach, along the -L- alignment, looking south.