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REFERENCE

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT**

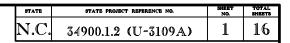
STRUCTURE SUBSURFACE INVESTIGATION

COUNTY ALAMANCE

PROJECT DESCRIPTION MEBANE - NC 119 RELOCATION FROM I-40/85 TO NORTH OF US 70

SITE DESCRIPTION BRIDGE NO. 434 ON -NBL- OVER I-40/85 WB AND I-40/85 EB (DDI)

\sim 34900.1 PROJEC



CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING 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 UNIT AT 1999 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

Soli AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. THE LABORATION SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY INHERENT IN THE STRUDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE MOVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

NOTES:

ES: THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE. NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT. BY HAVING REDUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

R. TOOTHMAN

W. TRAPP

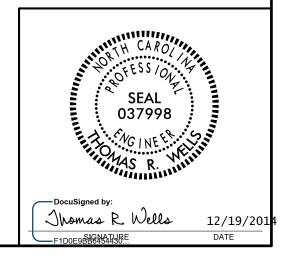
INVESTIGATED BY <u>T.</u> WELLS

DRAWN BY <u>T. Wells</u>

CHECKED BY <u>X. BARRETT</u>

SUBMITTED BY _____KLEINFELDER, INC.

DATE DECEMBER 2014



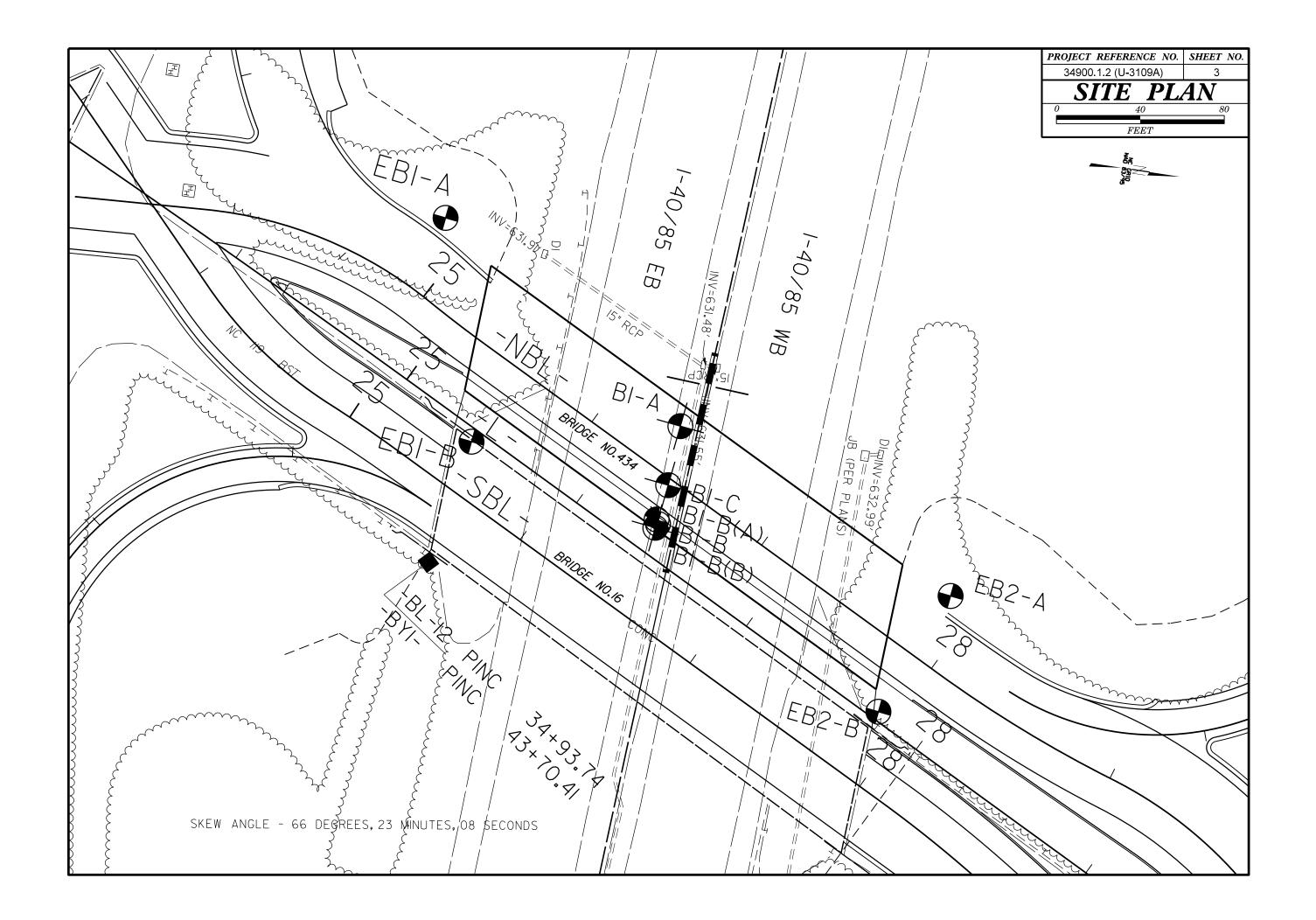
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

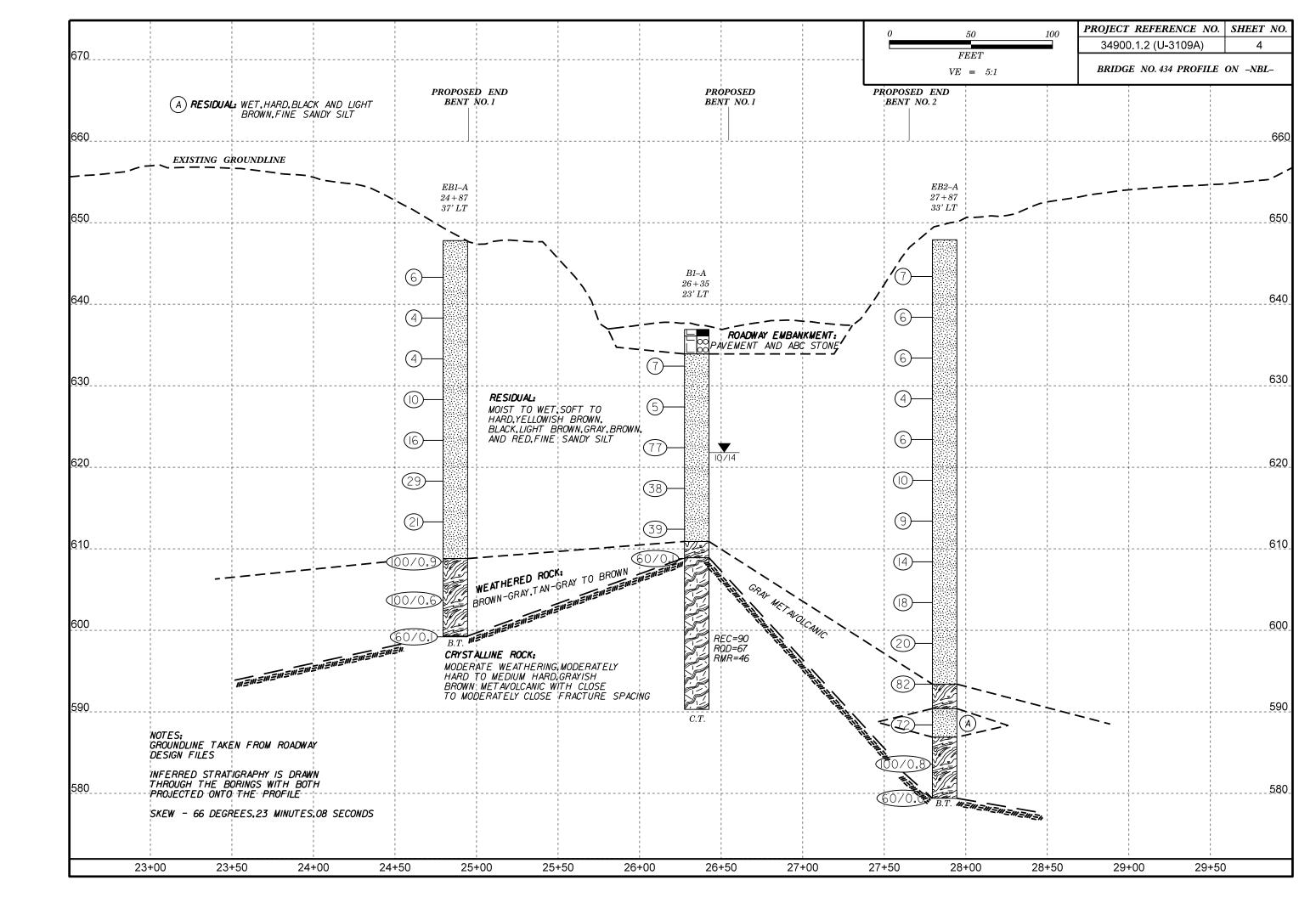
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL (DESCR	IPTION					r		GF	RADATION							ROCK	DESCRIP	TION	
BE PENETF ACCORDIN IS B4	RATED WITH NG TO THE ASED ON TH	i a continu(Standard P IE AASHTO S	ATED, SEMI-COM NUS FLIGHT PO ENETRATION TE YSTEM. BASIC)WER AUG EST (AASH DESCRIPT	ER AND YI HTO T 206 TIONS GENE	ELD LESS , ASTM D15 ERALLY INC	THAN 100 BL 86), SOIL CL LUDE THE F	.OWS PER .ASSIFICA OLLOWING	R FOOT ATION G:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATES	DICATES	S THAT SOIL XTURE OF UNI	PARTICLES ARE AL IFORM PARTICLE SI	LL APPROXIM IZES OF TWO	ATELY THE SAME SIZE.	ROCK LINE II SPT REFUSAL BLOWS IN NO	NDICATI . IS PE DN-COA	ES THE L ENETRATIONSTAL PLA	LEVEL 4 ION BY 1 AIN MA	I MATERIAL THA AT WHICH NON- A SPLIT SPOOM ATERIAL, THE	AT WOULD Y -COASTAL P N SAMPLER	'IELD SPT RE LAIN MATERIA EQUAL TO OR	FUSAL IF TESTE L WOULD YIELD LESS THAN Ø.1 OIL AND ROCK
AS	MINERALO	GICAL COMPO	ISTURE, AASHTO SITION, ANGULA	ARITY, STR	RUCTURE, P	LASTICITY,	ETC. FOR EX	AMPLE,	SUCH		<u>v 00 0</u>		ITY OF GRAI			REPRESENTED ROCK MATERI				HERED RUCK. DIVIDED AS FOL	LOWS:		
V			MOIST WITH INT					A-7-6		ANGULAR, SUBAN			SOIL GRAINS IS D OR ROUNDED.	ESIGNATED E	IT THE TERMS:	WEATHERED							OULD YIELD SPT
GENERAL		JIL LEG GRANULAR MATI	END AND		TUULF						MI	NERALOGI	ICAL COMPOS	ITION		ROCK (WR)				100 BLOWS PER			IETAMORPHIC RO
CLASS.	(≤ 35% PASSING		(>:	35% PASSING	■200)	ORGANI	C MATERIAL	LS				Z, FELDSPAR, MICA, 1 N THEY ARE CONSI			CRYSTALLINE ROCK (CR)			I'M I		SPT REFUSA	L IF TESTED	ROCK TYPE IN
GROUP CLASS. A	A-1 -1-a A-1-b	A-3	A-2 A-2-5 A-2-6 A-2	_	A-5 A-6	6 A-7 A-7-5,		-4. A-5 -6. A-7		HRE USED IN	DESCR		RESSIBILITY		DNIFICHNCE.	NON-CRYSTAL	LINE				SE GRAIN M	ETAMORPHIC #	AND NON-COASTA
		H-2-4				A-7-6						MPRESSIBLE		LL < 31		ROCK (NCR)		<u> </u>		ROCK TYPE INC	CLUDES PHY	LLITE, SLATE,	SANDSTONE, ETC
% PASSING				S				Ę				COMPRESSIBL PRESSIBLE	LE	LL = 31 · LL > 50	- 50	COASTAL PLA SEDIMENTARY					ROCK TYPE		INTO ROCK, BUT MESTONE, SANDS
*10	а мх					ſ	RANULAR	SILT- CLAY	MUCK,		P	PERCENTA	GE OF MATER	7IAL		(CP)				SHELL BEDS, E	TC. ATHERIN	IG	
*40 30 *200 15	0 MX 50 MX 5 MX 25 MX	51 MN 10 MX 35 MX	85 MX 35 MX 35	MX 36 MN	36 MN 36 M	4N 36 MN	SOILS	SOILS	PEAT	ORGANIC MATERIAL		GRANULAR SOILS	SILT - CLAY SOILS	OTHE	R MATERIAL	FRESH	ROCK	FRESH, CF	RYSTALS				STAINING. ROCK
MATERIAL PASSING #40 LL PI	_ 6 MX		41 MN 40 MX 41 I 0 MX 11 MN 11 P				SOILS WIT LITTLE O MODERATI	R	HIGHLY	TRACE OF ORGANIC MA LITTLE ORGANIC MATT MODERATELY ORGANIC HIGHLY ORGANIC	TER	2 - 3% 3 - 5% 5 - 10% > 10%	3 - 5% 5 - 12% 12 - 20% > 20%	TRACE LITTLE SOME HIGHLY	1 - 10% 10 - 20% 20 - 35% 35% AND ABOVE	VERY SLIGHT (V SLI.)	ROCK CRYST		LY FRES A BROKE	SH. JOINTS STAII EN SPECIMEN FA			OW THIN CLAY C
GROUP INDEX	0	0 0	4 MX	8 MX	12 MX 16 M	IX NO MX	AMOUNTS (DF	ORGANIC SOILS			GROL	UND WATER			SLIGHT	ROCK	GENERALL	LY FRES	SH. JOINTS STAI			XTENDS INTO RO
OF MAJOR C	TONE FRAGS.		TY OR CLAYEY WEL AND SAND			CLAYEY SOILS	ORGANIC MATTER		50125				BORE HOLE IMMEDI VEL AFTER <u>24</u>		R DRILLING	(SLI.)	CRYST	TALS ARE	DULL A	AND DISCOLORED	. CRYSTALL	INE ROCKS RIN	SOME OCCASIONA G UNDER HAMMEF
MATERIALS GEN. RATING	Sand						FAIR TO			 ₽₩			ATURATED ZONE, OF		RING STRATA	MODERATE (MOD.)	GRANI	ITOID ROCK	KS, MOST	T FELDSPARS A	RE DULL AN	D DISCOLORED,	THERING EFFECTS SOME SHOW CLA
AS SUBGRADE		EXCELLENT TO	GOOD		FAIR TO PO	JR	POOR	POOR	UNSUITABLE			NG OR SEEP						SOUND UN FRESH RO		MMER BLOWS A	ND SHOWS S	IGNIFICANT LO	SS OF STRENGTH
	I		BGROUP IS ≤ LL				LL - 30									MODERATELY	ALL R	ROCK EXCE	EPT QUA				DID ROCKS.ALL F
			NSISTENC		DENSE		PANGE (OF UNCO		<u> </u>		MISCELLA	NEOUS SYMB	ULS		SEVERE (MOD, SEV.)							SHOWS SEVERE L
PRIMARY SC	DIL TYPE	CONS	TNESS OR STENCY		RATION RES (N-VALUE	SISTENCE	COMPRES		RENGTH	L ROADWAY EMB			OF ROCK STRU SPT		SLOPE INDICATOR	SEVERE (SEV.)	ALL R	ROCK EXCE	EPT QUA		D OR STAIN		RIC CLEAR AND E
GENERALI		U	OSE	1	4 TO 10					SOIL SYMBOL			OPT DMT TEST BO	RING	INSTALLATION		TO SO	OME EXTEN	NT. SOM	HE FRAGMENTS C	OF STRONG F	ROCK USUALLY	
MATERIAL (NON-COH		DI	M DENSE NSE DENSE	ļ	10 TO 3 30 TO 5 > 50			N/A			Y EMBAN	NKMENT 🗸		. 🛆	CONE PENETROMETER	VERY SEVERE (V SEV.)	ALL R BUT M	ROCK EXCE MASS IS E	EPT QUA EFFECTI\	ARTZ DISCOLORE	D OR STAIN TO SOIL STA	ED. ROCK FABF TUS, WITH ONL	RIC ELEMENTS AR Y FRAGMENTS OF A DEGREE THAT
GENERALI	LY		'SOFT OFT	1	< 2 2 TO 4			< 0.25 25 TO 0.	.5	- INFERRED SOIL	L BUUNL)- CORE BORING	• •	SOUNDING ROD TEST BORING	(* SEV./							YIELD SPT N V
SILT-CLA MATERIAL (COHESIV	-	S VER1	M STIFF TIFF STIFF		4 TO 8 8 TO 15 15 TO 3			5 TO 1.0 1 TO 2 2 TO 4	0	ALLUVIAL SOIL) MONITORING W PIEZOMETER INSTALLATION	$\overset{\Psi}{\frown}$	WITH CORE	COMPLETE	SCATT		NCENTRA	IL. ROCK FABRIC ATIONS. QUARTZ			CERNIBLE ONLY
			ARD		> 30 RATN S	175		> 4		<u> </u>			DATION SYME							ROCK	HARDN	ESS	
U.S. STD. SIE	VE 617E		4 10	40		200	270								SSIFIED EXCAVATION -	VERY HARD				D BY KNIFE OR OF THE GEOLOO		BREAKING OF	HAND SPECIMEN
OPENING (MM			4.76 2.00	0.42	2 0.25	0.075	0.053			SHALLOW	ZZ UN	NSUITABLE WA		ACCEP لا محمَّد ACCEP USED	TABLE, BUT NOT TO BE IN THE TOP 3 FEET OF	HARD	CAN B	BE SCRATC	CHED BY	Y KNIFE OR PIC		H DIFFICULTY.	HARD HAMMER BI
BOULDER (BLDR.)		BLE	GRAVEL	COAR SAN	ID	FINE SAND	SIL (SL.		CLAY (CL.)		<u></u> AC	CCEPTABLE DE	EGRADABLE ROCK	EMBAN	KMENT OR BACKFILL		CAN B		CHED BY	Y KNIFE OR PICH			0.25 INCHES DE
GRAIN MM	305	75	2.0	(CSE. S	0.25	(F SD.)	0.05	0.005		AR - AUGER REFUSAL			REVIATIONS MEDIUM	VST	- VANE SHEAR TEST	HARD		VATED BY ODERATE B		LOW OF A GEOL	.OGIST'S PIC	CK. HAND SPEC	IMENS CAN BE D
SIZE IN.	12	3	STURE -							BT - BORING TERMINATED CL CLAY CPT - CONE PENETRATION		MICA MOD	- MICACEOUS MODERATELY NON PLASTIC	wea. γ-	- WEATHERED UNIT WEIGHT DRY UNIT WEIGHT	MEDIUM HARD	CAN B		ATED IN	SMALL CHIPS			SURE OF KNIFE O 4 SIZE BY HARD
	MOISTURE :	SCALE	FIELD M DESCR	OISTURE			ELD MOISTU	RE DESC	RIPTION	CSE COARSE DMT - DILATOMETER TES	т	ORG PMT -	ORGANIC PRESSUREMETER T		MPLE ABBREVIATIONS	SOFT	CAN B	BE GROVED	D OR GO	DUGED READILY			E EXCAVATED IN OF A PICK POIN
			- SATUR (SAT.				ID: VERY WE			DPT - DYNAMIC PENETRAT e - VOID RATIO F - FINE	FION TE	SD 5	SAPROLITIC SAND, SANDY SILT, SILTY		BULK SPLIT SPOON SHELBY TUBE	VERY	CAN B	BE CARVED	D WITH I		EXCAVATED		POINT OF PICK.
PLASTIC RANGE <		LIMIT					QUIRES DRY			FOSS FOSSILIFEROUS FRAC FRACTURED, FRAC	TURES	SLI TCR -	SLIGHTLY TRICONE REFUSAL	RS -		SOFT	FINGE	RNAIL.			EN BY FINGE	ER PRESSURE.	CAN BE SCRATCH
			- WET -	(w)	ATT	AIN OPTIM	UM MOISTUP	RE		FRAGS FRAGMENTS HI HIGHLY		w - M V - VE	OISTURE CONTENT	CBR	 CALIFORNIA BEARING RATIO 	TERM	RAC	TURE		SPACING	_	TERM	BEDDING
			- MOIST	- (M)	501		NEAR OPTIM		STUDE	EOI	UIPME	ENT USED	ON SUBJEC	T PROJE	СТ	VERY WID	2	1	MORE T	THAN 10 FEET O 10 FEET		ERY THICKLY	
		M MOISTURE AGE LIMIT			502				510NL	DRILL UNITS:		NCING TOOLS:		HAMMER	_	MODERATE	LY CLI	OSE	1 TC	O 3 FEET	т	HINLY BEDDED	0.1
			- DRY -	ŝ			ITIONAL WA			CME-45C		CLAY BITS			TOMATIC MANUAL	CLOSE VERY CLO	SE	L		TO 1 FOOT HAN 0.16 FEET		ERY THINLY E HICKLY LAMIN	
						AIN OPTIM	UM MOISTUP	κE.		X CME-55		6 CONTINUOUS 8 HOLLOW AL	S FLIGHT AUGER	CORE SIZ	_	L				Thir	T JURATIO	HINLY LAMINA	TED <
				ASTIC						СМЕ-550		HARD FACED		∐-в _	Ц-н	FOR SEDIMEN	TARY	ROCKS. IN					CEMENTING, HE
	PLASTIC HTLY PLAS	TIC	PLAST	0-5 6-15	NDEX (PI)		VEF	<u>STRENGT</u> RY LOW LIGHT	<u>H</u>	VANE SHEAR TEST		TUNGCARBID	E INSERTS	X -N Q		- FRIABI			20.011	RUBBING WI	ITH FINGER	FREES NUMER	ROUS GRAINS; RATES SAMPLE.
MODE	RATELY PL LY PLASTI	ASTIC	2	16-25 26 OR M	i		м	EDIUM HIGH		PORTABLE HOIST			W/ ADVANCER 		ST HOLE DIGGER	MODER	ATELY	INDURATE	ED			ATED FROM S	SAMPLE WITH ST
				COLOF	3						X	TRICONE 2	15/16" TUNGCARB.		JNDING ROD	INDUR	٩ΤΕD						TE WITH STEEL
			OR OR COLOR I, DARK, STREA							X MOBILE B-57		CORE BIT			NE SHEAR TEST			INDURATE	:D	SHARP HAM) BREAK SAMPLE
-																							

ргојест перегенсе на <u>sheet на</u> 34900.1.2 (U-3109A) 2

ED. AN INFERRED	TERMS AND DEFINITIONS ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
) SPT REFUSAL. 1 FOOT PER 60	ALLOVIUM (ALLOV) - SUILS THAT HAVE BEEN TRANSPORTED BY WATER.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
T N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
DCK THAT ICLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
AL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED. C.	$\underline{\text{COLLUVIUM}}$ - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, 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.
RINGS UNDER	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
COATINGS IF OPEN.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
AMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
DCK UP TO AL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL .OSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
RE DISCERNIBLE	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
F ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
<u>VALUES < 100 BPF</u> IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
S. SAPROLITE IS	<u>ROCK QUALITY DESIGNATION (ROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
IS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPI) - NUMBER OF BLOWS (N OR BPF)OF A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH HED READILY BY	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 BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: SEE NOTES
THICKNESS 4 FEET	
.5 - 4 FEET	ELEVATION: IN NOTES FEET
16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET 0.008 FEET	FIAD - FILLED IN AFTER DRILLING BENCHMARKS:
AT, PRESSURE, ETC.	TOP OF DRAIN AT STA. 26+27, 53' LT -NBL- (844,024 FT N, 1,911,611 FT E) ELEV. 636.96 FT
	BL-12 AT STA.25+59.46,64.36'RT -L- (843,908.51FT N,1,91,723.39 FT E) ELEV.658.75
TEEL PROBE;	LLLV. 000.10
PROBE:	
E;	DATE: 8-15-14





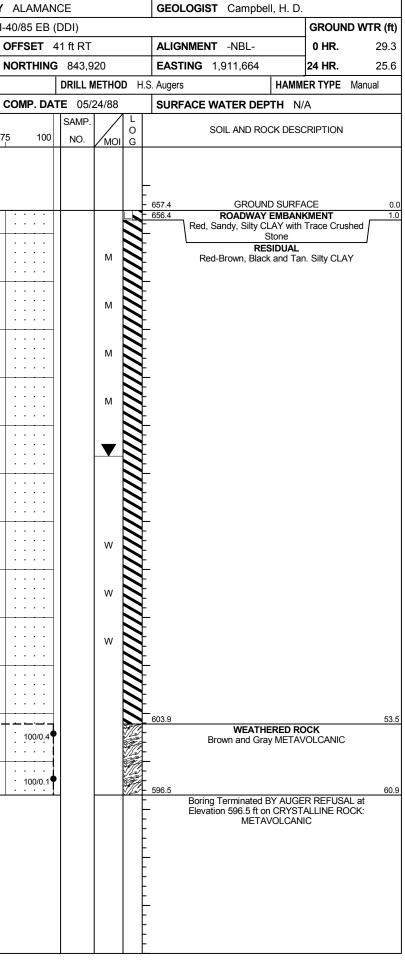
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360¦_	EB1–A								66	650		B1-	-A		B1	- <i>C B</i>
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650				 	STING GROU		 	 0	6	50_640		23';			<u>3´1</u>	RT <u>2</u> EXIST
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640		-, <u></u> -;	• • • • • • • • • • • • • • • • • • •		 		 	·····	64	10_630						
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630		YELLOWISH E	BROWN TO	BLACK	AND LIGH	T BROWN	i i +		63	30_620	+		09/14		3-	
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620										20_610		39-				L
1								© © © ©				©70.)	THE MEMERS		- 36-	$\left \right\rangle$
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	34900).1.2			Т	P U-310	09A		COUNT	Y ALA	AMAN	CE			GEO	LOGIST Well	s, T. R.			WBS	34900).1.2			٦	TP U-	3109A	١	COU	JNTY
SITE	DESCR	IPTION	Brid	ge No	. 434 c	on -NBL-	over l	1-40/85	WB and	1 1-40/85	5 EB ([DDI)						GROUN	D WTR (ft)	SITE	DESCR	IPTION	Brid	ge No	. 434	on -NE	BL- ov	er I-40/	85 WB a	and I-4
BORI	NG NO.	EB1-	A		SI	TATION	24+8	7		OFFS	ET 3	7 ft LT			ALIG	NMENT -NBI	-	0 HR.	N/A	BOR	ING NO	EB1-	·B		5	OITATIO	N 25	+59		0
COLL	AR ELE	EV. 64	7.8 ft		т	DTAL DE	PTH	48.6 ft		NORT	HING	843,8	392		EAS	ING 1,911,5	60	24 HR.	FIAD	COL	LAR ELI	EV. 65	57.4 ft		٦	OTAL	DEPT	H 60.9	9 ft	N
DRILL	RIG/HAI	MMER EF	FF./DA	TE TF	RI9435	CME-55 8	1% 02	/07/2014				DRILL	METHO	DD N	lud Rotary		HAMN	IER TYPE	Automatic	DRIL	L RIG/HA	MMER E	FF./DA	re ci	ME-45					
		oothma	n, R. I	Ξ.	ST	FART DA	TE 1	10/03/14	4	COM	P. DAT	E 10/	/03/14		SUR	ACE WATER	DEPTH N	I/A		DRIL	LER N	/A			S	TART	DATE	05/23	3/88	C
	DRIVE ELEV	DEPTH		W COL					PER FOO			SAMP.				SOIL AND	ROCK DES	CRIPTION		ELEV	DRIVE ELEV	DEPTH	<u> </u>	W CO	-				'S PER FO	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	i0	75	100	NO.	И		ELEV. (1				DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	5	50	75
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	609.3	38.5	20	60/0.4			·			<u> </u>				477	608.8	WE	ATHERED R	OCK	39.0		618.3	39.1		-						
	-	F						· · · ·		.	I				-	Tan-Gr	ay to Brown a ETAVOLCAN	and Gray				Ŧ	2	4	6		10 .	· · · · · · ·	· · · ·	
605	604.3	43.5		0.4/0.4											-	IV				615	_	F								
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-	599.3		60/0.1								60/0.1 ⁺			9 <u>12</u>	599.3 599.2 -	CRY	STALLINE R	ROCK	48.5		608.3	49.1	2	2	9		 	· · · ·	· · · ·	
	-														-	Boring Term	inated WITH	STANDARD		005		ŧ		2			11 . • •	· · ·	· · ·	· ·
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	LUG REPURI				CONL	BURING RE		I
WBS 34900.1.2	TIP U-3109A COU	NTY ALAMANCE	GEOLOGIST Wells, T. R.	WBS 34900.1.2		TIP U-3109A	COUN	TY ALAMANCE GEOLOGIST Wells, T. R.
SITE DESCRIPTION Bridge No	. 434 on -NBL- over I-40/85 WB a	and I-40/85 EB (DDI)	GROUND WTR (f	SITE DESCRIPTI	ON Bridge No.	434 on -NBL- over I-40)/85 WB an	nd I-40/85 EB (DDI) GROUND WTR (1
BORING NO. B1-A	STATION 26+35	OFFSET 23 ft LT	ALIGNMENT -NBL- 0 HR. N/A	BORING NO. B1	-A	STATION 26+35		OFFSET 23 ft LT ALIGNMENT -NBL- 0 HR. N/
COLLAR ELEV. 636.9 ft	TOTAL DEPTH 46.6 ft	NORTHING 844,018	EASTING 1,911,641 24 HR. 15.1	COLLAR ELEV.	636.9 ft	TOTAL DEPTH 46	.6 ft	NORTHING 844,018 EASTING 1,911,641 24 HR. 15.
DRILL RIG/HAMMER EFF./DATE TR		DRILL METHOD						DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic
DRILLER Toothman, R. E.	START DATE 09/29/14	COMP. DATE 09/30/14	SURFACE WATER DEPTH N/A	DRILLER Tooth		START DATE 09/2		COMP. DATE 09/30/14 SURFACE WATER DEPTH N/A
				CORE SIZE NQ		TOTAL RUN 18.5 f		
ELEV DRIVE (ft) DEPTH BLOW COU (ft) 0.5ft 0.5ft			SOIL AND ROCK DESCRIPTION					
				ELEV RUN (ft) ELEV DEP (ft) (ft) (ft)		REC. RQD (ft) (ft) NO.	STRATA REC. RQD (ft) (ft) % %	D O DESCRIPTION AND REMARKS G ELEV. (ft) DEPTH
) % %	% %	
640			-	<u>608.9</u> <u>608.8 4 28.</u>	1_/ <u>3.5 N=60/0</u>	1/ (3.2) (2.3)	(16.7) (12.4	Begin Coring @ 28.0 ft 4) L 608.9 CRYSTALLINE ROCK 28 608.9 Moderate Weathering, Moderately Hard to Medium Hard, Grayish Brown 28
			L 636.9 GROUND SURFACE 0.		1:25/0. 5:00/1. 4:35/1	5 91% 66%	90% 67%	Moderate Weathering, Moderately Hard to Medium Hard, Grayish Brown METAVOLCANIC with Close to Moderately Close Fracture Spacing
635		· · · · · ·	636.1 Asphalt 0. ROADWAY EMBANKMENT	605 <u>605.3 -</u> 31.	3.5 N=60/0 1:25/0. 5:00/1. 5 4:35/1. 5.0 4:55/1. 4:30/1. 3:55/1. 1:25/0. 4:30/1. 3:55/1. 4:45/1.	0 (3.6) (2.5)		
6334 - 35			ABC Stone 3.	41 7	3:55/1.			11 fractures at 0 degrees to degrees, 1 fracture at 10 degrees to 20 degrees, 2 fractures at 20 degrees to 30 degrees, 8 fractures at 30 to 40
	4 · · · · · · · · · · · · · · · · · · ·	М	Black and Brown to Gray and Brown, Fine Sandy SILT	600 600.3 36.	9 4:40/1.			degrees, 6 fractures at 40 degrees to 50 degrees, 2 fractures at 70 degrees to 80 degrees.
630 +		· · · · · · · · · · · · · · · · · · ·	-		5.0 4:15/1.	0 (5.0) (4.0) RS-1 0 100% 80%	1	R1 = 4, R2 = 8, R3 = 10, R4 = 20, R5 = 4, RMR = 46
628.4 + 8.5 + 1 2	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	· · · · · · · · M	- -	‡	4:10/1.			ROCK CLASS III, ROCK TYPE E
		· · · · · ·		595 595.3 41.	5.0 5:30/1.	0 0 (4.9) (3.6)		
			<u> </u>	‡	5:15/1.	0 98% 72%		
<u>623.4</u> 13.5 13 28	49			590.3 + 46.	4.45/1	ol I I		11 fractures at 0 degrees to degrees, 1 fracture at 10 degrees to 20 degrees, 2 fractures at 20 degrees to 30 degrees, 8 fractures at 30 to 40 degrees, 6 fractures at 40 degrees to 50 degrees, 2 fractures at 70 degrees to 80 degrees. R1 = 4, R2 = 8, R3 = 10, R4 = 20, R5 = 4, RMR = 46 ROCK CLASS III, ROCK TYPE E
620			-		4.10/1.			Boring Terminated at Elevation 590.3 ft in CRYSTALLINE ROCK:
618.4 18.5	20		-					METAVOLCANIC
615 1								
613.4 + 23.5 + 3 9		· · · · · · · M	- -					
610	♥ <u>39</u>		610.9 <u>26</u> .					
608.9 7 28.0			WEATHERED ROCK 608.9 Brown-Gray METAVOLCANIC 28.					
60/0.1			CRYSTALLINE ROCK Grayish Brown METAVOLCANIC	‡				
605 +		· · · · · · ·						
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			4_ 4_	‡				
		· · · · · ·	590.3 46.	$ $ $ $ \pm				
			Boring Terminated at Elevation 590.3 ft in CRYSTALLINE ROCK: METAVOLCANIC	‡				
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CORE PHOTOGRAPHS

B1-A BOXES 1 and 2: 28.1 to 46.6 FEET



FEET

SHEET 9 BRIDGE NO. 434 ON -NBL- OVER I-40/85 WB AND I-40/85 EB (DDI)

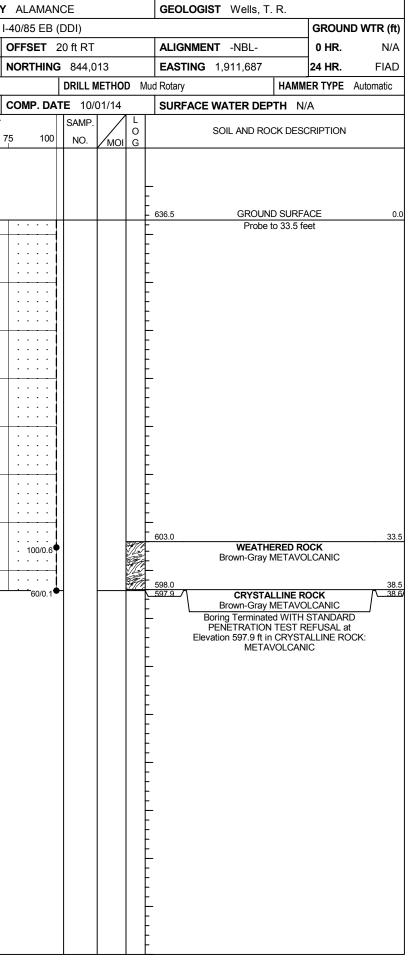
	3 4900).1.2			TI	IP	U	-31	09/	4			со	UN	ITY	
SITE	DESCR	RIPTIO	N Brid	ge No	. 434	0	n -N	BL	- ov	ver l	-40	/85	WB	ar	nd I	
BOF	ING NO	. B1-C	;		S	T/	ATIO	лс	26	6+4	7					
COL	LAR EL	EV. 63	36.5 ft		Т	0	TAL	. DI	EP	ГΗ	33.	6 ft				
DRIL	l Rig/Hai	MMER E	FF./DA	TE TE	RI8016	N	10BI	LE E	3-57	92	% 0	2/07	7/201	4		
DRII	LER T	oothma	an, R. I	Ξ.	S	T/	ART	D	ATI	E 0	9/2	9/1	4			
	DRIVE ELEV	DEPTH		W CO	-				_		_OW		PER F	=00		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		0		2	25		5	50		-	ĺ
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ENGINEERING UNIT

Y ALAMANC	CE			GEOLOGIST Wells, T. R.		
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OFFSET 3	ft RT			ALIGNMENT -NBL-	0 HR.	. 14.1
NORTHING	844,0	16		EASTING 1,911,670	24 HR	. FIAD
	DRILL M	ETHO	ОН.	S. Augers HAM	 MER TYPE	Automatic
COMP. DAT	E 09/2	29/14		SURFACE WATER DEPTH	I/A	
	SAMP.	▼∕	L O	SOIL AND ROCK DE		N
75 100	NO.	моі	G	ELEV. (ft)		DEPTH (ft)
				636.5 GROUND SUR 635.7 Asphalt 633.5 ABC Ston 631.0 Gray-Brown, Silty, Coars 631.0 RESIDUA Brown to Black and Brow SilLT 608.5 Brown and Gray MET. 608.5 Brown and Gray MET. 603.0 CRYSTALLINE Grayish Brown META Boring Terminated WIT PENETRATION TEST Elevation 602.9 ft in Cl ROCK: METAVO	NKMENT b to Fine S m, Fine S m, Fine S N, Fine S N, Fine S N, Fine S M, Fine S M	0.0 0.8 3.0 SAND 5.5 andy 26.5 IIC 28.0 with 33.5 C 33.6 ARD - at

NCDOT GEOTECHNICAL ENGINEERING UNIT

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COLLAR ELEV. 636.5 ft TOTAL DEPTH 32.5 ft NORTHING 844,014 EASTING 1,911,889 24 HR. FIAD DRULL ROMAMMER EFF.DATE TRADE DATE 09/28144 DRUL RETHOD HR. S. Augers HAMMER TYPE Automotion ROMERTING ROMERTING DRUL ROMAMMER EFF.DATE TOTAL DEPTH 38.0 DRULL ROMAMMER EFF.DATE TART DATE 0208/14 COMP. DATE 0209/14 SURFACE WATER DEPTH NA DEVEL PERCONDUCT BLOWS PER FDOT BLOWS PER FDOT BLOWS PER FDOT SOIL AND ROCCIDESGRIPTION DEPTH MIA 000 0.05 0.05 0.05 GROUND SURFACE 0.05 0.					ige No						WB a			, ,	эт						. ,					age No					35 WB a	ind I-4
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SITE DESCRIPTION Bridge No. 434 on -NBL- over I-40/85 WB and I-40/85 EB (DDI) GROUND WTR (ft) SITE DESCRIPTION Bridge No. 434 on -NBL- over I-40/85 WB and I-40/85 EB (DDI) GROUND WTR (ft) BORING NO. B1-B(B) STATION 26+54 OFFSET 23 ft RT ALIGNMENT -NBL- 0 HR. N/A COLLAR ELEV. 636.5 ft TOTAL DEPTH 51.6 ft NORTHING 844,013 EASTING 1,911,691 24 HR. FIAD DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic DRILLER Toothman, R. E. STAT DATE 10/01/14 COMP. DATE 10/02/14 SURFACE WATER DEPTH N/A DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic ELEV DRILL RIG / LAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 DRILL METHOD Mud Rotary/NQ Core HAMMER TYPE Automatic Util trig/HAMMER EFF./DATE BLOWS PER FOOT SAMP. <							
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DBLLE Province (Friday Million) DBLLE Province (Friday Million) <thdblle (friday="" million)<="" province="" th=""> DBLLE Province</thdblle>	COLLAR ELEV. 636.5 ft	TOTAL DEPTH 51.6 ft NORTHING 844,013	EASTING 1,911,691 24 HR. FIAD	COLLAR ELEV. 636.5 ft	TOTAL DEPTH 51.6 ft	NORTHING 844,013	EASTING 1,911,691 24 HR. FIAD
Description STATU DATE 100/1/4 COUP DATE 100/1/4 <t< td=""><td>DRILL RIG/HAMMER EFF./DATE TRI9</td><td></td><td></td><td>DRILL RIG/HAMMER EFF./DATE TRI9</td><td>435 CME-55 81% 02/07/2014</td><td>DRILL METHOD N</td><td>Aud Rotary/NQ Core HAMMER TYPE Automatic</td></t<>	DRILL RIG/HAMMER EFF./DATE TRI9			DRILL RIG/HAMMER EFF./DATE TRI9	435 CME-55 81% 02/07/2014	DRILL METHOD N	Aud Rotary/NQ Core HAMMER TYPE Automatic
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990 901 <td>$\begin{array}{c c} ELEV & ELEV & DEPTH & DEOW & OOOR \\ (ft) & (ft) & (ft) & 0.5ft & 0.5ft & 0 \end{array}$</td> <td></td> <td></td> <td></td> <td>RUN STRATA</td> <td><u> </u></td> <td></td>	$\begin{array}{c c} ELEV & ELEV & DEPTH & DEOW & OOOR \\ (ft) & (ft) & (ft) & 0.5ft & 0.5ft & 0 \end{array}$				RUN STRATA	<u> </u>	
BD BD<				ELEV ELEV DEPTH RUN RATE	REC. RQD (ft) (ft) NO. (ft) (ft)		
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65. 1	↓ ∓			<u>599.9 36.6</u> 0:40/0.2 5.15/1.0		, Moderate Moderate	Weathering, Moderately Hard, Grayish Brown
1 1	635			+ 3:40/1.0 + 3:55/1.0	0 100% 50%		, , ,
20 00 <						13 fractures at 0 degrees, 8 fracture) degrees to degrees, 5 fracture at 10 degrees to 20 es at 30 degrees to 40 degrees, 2 fractures at 40 to 50
co				$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\frac{1}{100\%}$ (3.5)	degrees, 10 frac	ctures at 60 degrees to 70 degrees, 1 fracture at 70
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CORE PHOTOGRAPHS

B1-B(B) BOXES 1 and 2: 35.4 to 51.6 FEET

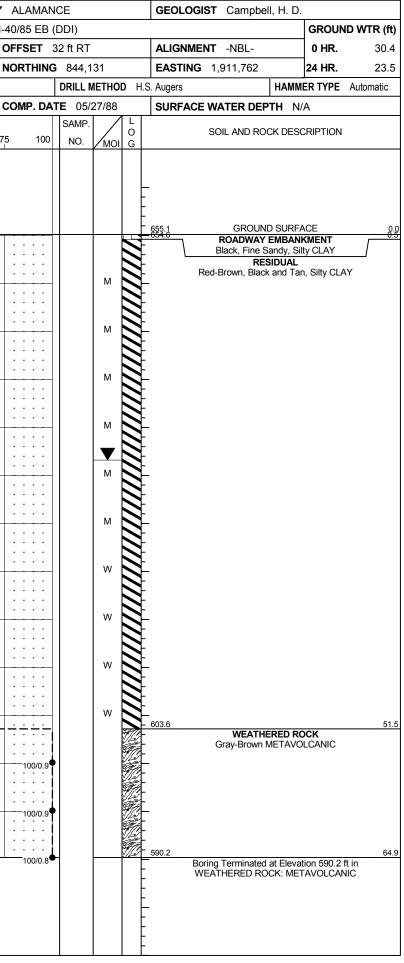




SHEET 13 BRIDGE NO. 434 ON -NBL- OVER I-40/85 WB AND I-40/85 EB (DDI)

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	34900		L D						1 40/0								1020	LOGIST We					34900						3109A			
	DESCR			ge No						5 VVE	B and			. ,						GROUND	. ,					ge No					85 WB an	
	NG NO.						ON							33 ft LT			_	INMENT -NB		0 HR.	N/A		NG NO.									OF
	AR ELE								68.5			NOR	THING	3 844,				TING 1,911,7		24 HR.	FIAD		AR ELI					JTAL I	DEPT	H 64.9	<u>#</u>	NO
	RIG/HAI																Mud Rotar			ER TYPE A	utomatic		RIG/HA		FF./DA1	TE CI						
	ER TO	oothma					T DA		10/03/				1P. DA	TE 10	_			FACE WATER	R DEPTH N	/A		DRIL	LER N	I/A					DATE	05/26/		co
ELEV (ft)	ELEV	DEPTH (ft)							LOWS		FOOT		100	SAMP	1.7			SOIL AN	ID ROCK DES	CRIPTION		ELEV (ft)	ELEV	DEPTH (ft)		W CO			2		S PER FOC	
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0		25		50		75	100	NO.	<u> </u>	101 G	ELEV. (ft)			DEPTH (ft)	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	2)	50	75
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_	584.4	<u>- 63.5</u>	60	40/0.3									100/0.8				Ŧ						-	Ŧ								
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580	- 579.4	68.5						·	· · ·		· · ·						- 579.4				68.5		- 1.0	+ 04.1	63	37/0.3		• •	• •	• • • •	• • • •	• •
		- - -	60/0.0										60/0.0 [¶]				- - - -	PENETRA Elevation 579.	minated WITH ATION TEST R 4 ft on CRYST METAVOLCAN	EFUSAL at ALLINE ROCI	K:		- - - -									
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LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 34900.1.2 (U-3109A) F.A. NO.: STP-0119 (10) COUNTY: ALAMANCE BRIDGE NO. 434 ON -NBL- OVER I-40/85 WB AND 1-40/85 EB (DDI)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1-A	36.0-36.3	METAVOLCANIC	Cziv	50	3.98	1.97	171.4	6,060	N/M	N/M	RMR=46

Sheet 15

SITE PHOTOGRAPHS



View Looking North along -NBL- from End Bent 1



Profile of Bridge From Existing Bridge Looking West

SHEET 16 BRIDGE NO. 434 ON -NBL- OVER I-40/85 WB AND I-40/85 EB (DDI)