This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document -

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page. This file or an individual page shall not be considered a certified document.

703 S R REFERENCE

SEE SHEET 3 FOR PLAN SHEET LAYOUT

AT TIME OF INVESTIGATION

DESCRIPTION TITLE SHEET

LEGEND

PLAN SHEET

BORING LOGS

LABORATORY TEST RESULTS

PROFILES

CONTENTS

SHEET

3

4 - 5

6 - 11

12 - 33

S て 463 PROJEC

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _LENOIR

PROJECT DESCRIPTION C.F. HARVEY PARKWAY AND NC 58 TO INTERSECTION OF NC 11 AND GRANGER STATION ROAD GRADING, PAVING, DRAINAGE, STRUCTURES AND SIGNALS SITE DESCRIPTION BRIDGE NO. 216 AND NO. 217 ON -L-(FELIX HARVEY PARKWAY) OVER -Y6- (FERRELL ROAD)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5703	1	33

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 ENCINEERING UNIT AT 1999 707-6800. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL 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 LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STRDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE LINE OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE CONSIDERABLY WITH TWE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PERCIPITATION AND WIND AS WELL AS OTHER NON-LIMATIC CATORS PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

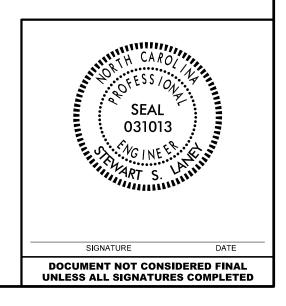
- TES: THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. 2.

PERSONNEL

S. LANEY K. HILL S. MITCHELL S. TIERNAN C. CHANDLER F. WRIGHT E. BLONSHINE J. PEELE M. RAWLS INVESTIGATED BY ______. DRAWN BY C. CHANDLER

CHECKED BY S. MITCHELL

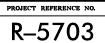
- SUBMITTED BY ______S&ME, INC.
- DATE _____FEBRUARY, 2017



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

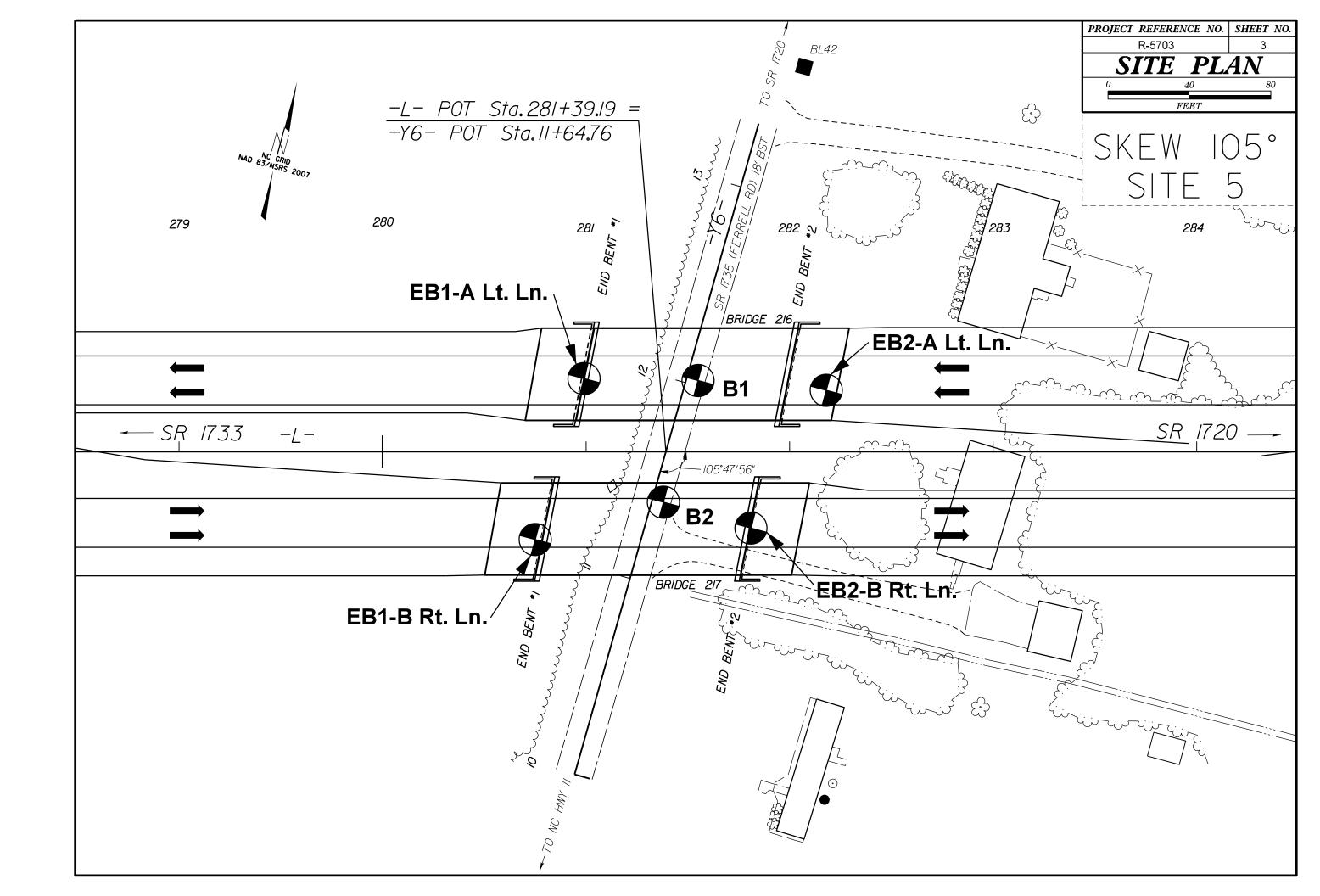
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

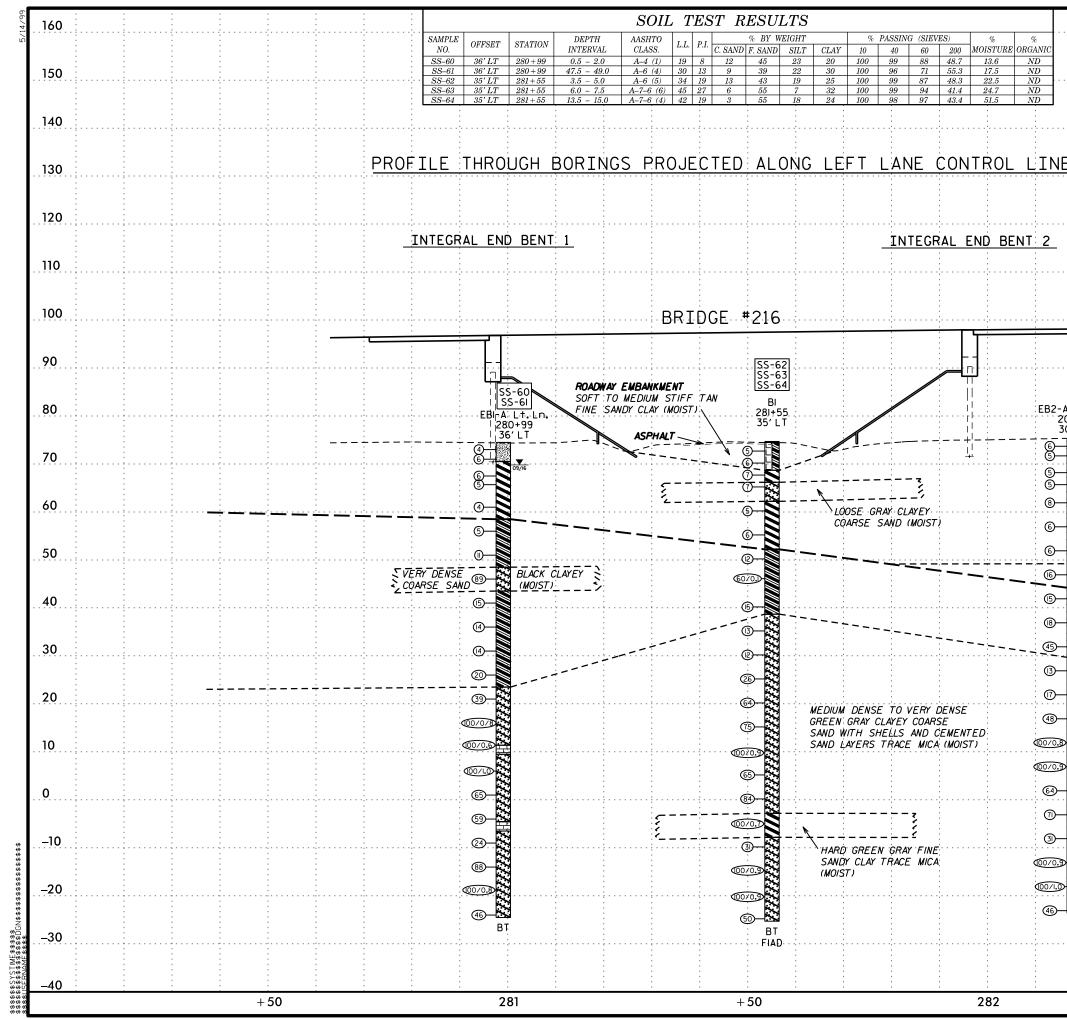
		SOIL	DESCRIPTION		T	GRADATION		T		ROCK DES	CRIPTION
	BE PENETRATED ACCORDING TO	IDERED UNCONSOLIDATED.SEMI-C D WITH A CONTINUOUS FLIGHT D THE STANDARD PENETRATION	ONSOLIDATED, OR WEATHERED E POWER AUGER AND YIELD LESS TEST (AASHTO T 206, ASTM DI	THAN 100 BLOWS PER FOOT 586). SOIL CLASSIFICATION	UNIFORMLY GRADED - IN	TES A GOOD REPRESENTATION OF PARTIC NDICATES THAT SOIL PARTICLES ARE ALL	APPROXIMATELY THE SAME SIZE.	ROCK LINE I SPT REFUSA	INDICATES THE LEVEL AL IS PENETRATION BY	IN MATERIAL THAT W AT WHICH NON-COAS Y A SPLIT SPOON SAI	OULD YIELD SPT REFUSAL IF TESTE STAL PLAIN MATERIAL WOULD YIELD MPLER EQUAL TO OR LESS THAN 0.1
	CONSISTENCY, C	COLOR, TEXTURE, MOISTURE, AASH	ITO CLASSIFICATION, AND OTHE	R PERTINENT FACTORS SUCH		ANGULARITY OF GRAIN	IS	REPRESENTED	D BY A ZONE OF WEAT	ATHERED ROCK.	
							SIGNATED BY THE TERMS:		SILES AND THE RELET		
No. C.2. Service Description				CATION			TION			100 BLOWS PER FO	OT IF TESTED.
				ORGANIC MATERIALS	MINERAL NAM				E	FINE TO COARSE G	RAIN IGNEOUS AND METAMORPHIC RO REFUSAL IF TESTED. ROCK TYPE IN
			A-4 A-5 A-6 A-7	A-1, A-2 A-4, A-5	- ARE USED IN		ERED OF SIGNIFICANCE.		<u>ZZ_ZZ_</u> _	GNEISS, GABBRO, SCI	HIST, ETC.
	CLASS. A-1-a (A-1-b A-2-4 A-2-5 A-2-6 A	A-2-7 A-7-5. A-7-6	A-3 A-6, A-7	C 10		11 (2)			SEDIMENTARY ROCK	THAT WOULD YEILD SPT REFUSAL
	SYMBOL 000000				8 MODE	RATELY COMPRESSIBLE	LL = 31 - 50			COASTAL PLAIN SEI	DIMENTS CEMENTED INTO ROCK, BUT
• • • • • • • • • • • • • • • • • • •				CRANILLAR SILT- MUCK	HIGHL					SHELL BEDS, ETC.	
NUME O	*40 30 MX 5			SOUS CLAY PEAT				1		WEATH	IERING
		25 MX 10 MX 35 MX 35 MX 35 MX 3	15 MX 36 MN 36 MN 36 MN 36 MN					FRESH			S MAY SHOW SLIGHT STAINING. ROCK
	PASSING #40			SOLIS WITH	LITTLE ORGANIC MATT	TER 3 - 5% 5 - 12%	LITTLE 10 - 20%	VERY SLIGHT			SOME JOINTS MAY SHOW THIN CLAY C
State Left I				LITTLE OR HIGHLY				(V SLI.)			HINE BRIGHTLY. ROCK RINGS UNDER H
	GROUP INDEX Ø	9 0 0 4 M	K 8 MX 12 MX 16 MX NO MX	AMOUNTS OF SOLLS		GROUND WATER		SLIGHT			AND DISCOLORATION EXTENDS INTO RO
		LAND FINE SILLY OR CLAYEY		URGANIC				(SLI.)			
	MATERIALS SAN	ND SANU GRAVEL AND SAND	SUILS SUILS								
In the constraints of the c		EXCELLENT TO GOOD	FAIR TO POOR				WATER BEARING STRATA	(100.7	DULL SOUND UNDER H		
CONSISTENT OR DEVELOPMENTS MOSE OF MALLONS SYMBOLS HUBBER SCI. 1YFE MISSEL MARKED TO BUSCIES MISSEL MARKED TO BUSCIES MISSEL MARKED TO BUSCIES HUBBER SCI. 1YFE MISSEL MARKED TO BUSCIES MISSEL MARKED TO BUSCIES MISSEL MARKED TO BUSCIES DENNEL Y STATUS OF DATA STRUCTURES SUPEL TO BUSCIES SUPEL TO BUSCIES MISSEL MARKED TO BUSCIES DENNEL Y STATUS OF DATA STRUCTURES SUPEL TO BUSCIES SUPEL TO BUSCIES SUPEL TO BUSCIES DEVELOPMENT OF DATA STRUCTURES SUPEL TO BUSCIES SUPEL TO BUSCIES SUPEL TO BUSCIES SUPEL TO BUSCIES DEVELOPMENT OF DATA STRUCTURES SUPEL TO BUSCIES SUPEL TO BUSCIES SUPEL TO BUSCIES SUPEL TO BUSCIES DEVELOPMENT OF DATA STRUCTURES SUPEL TO BUSCIES		PI OF A-7-5 SUBGROUP IS ≤	LL - 30 ; PI OF A-7-6 SUBGROUP IS :	> LL - 30		SPRING OR SEEP					STAINED. IN GRANITOID ROCKS ALL F
Humany Set. Live Conversion Conversion Conversion Provide Set Set Set Set Set Set Set Set Set Se		CONSISTEN	ICY OR DENSENESS	1		MISCELLANEOUS SYMBO	LS	SEVERE	AND DISCOLORED AND) A MAJORITY SHOW K	AOLINIZATION. ROCK SHOWS SEVERE L
Unserting Normality Inverting (ID0x4717)	PRIMARY SOIL T					ANKMENT (RE) 25/025 DIP & DIP DIR	ECTION	(MUD. SEV.)			T'S PILK, RULK GIVES "LLUNK" SUUND "
Bit Number of State Products of State Rest of State Products of State Products of State Rest of State Products of Products		CUNSISTENCT	(N-VALUE)				CTURES				
					SOIL SYMBOL			(324.)	TO SOME EXTENT. SO	OME FRAGMENTS OF ST	RONG ROCK USUALLY REMAIN.
IDENTIFY Set	MATERIAL	DENSE		N/A				VERY			
State State <th< td=""><td>(NON-COHESIVE</td><td></td><td></td><td></td><td></td><td></td><td></td><td>SEVERE</td><td>BUT MASS IS EFFECT</td><td>TIVELY REDUCED TO S</td><td>OIL STATUS, WITH ONLY FRAGMENTS OF</td></th<>	(NON-COHESIVE							SEVERE	BUT MASS IS EFFECT	TIVELY REDUCED TO S	OIL STATUS, WITH ONLY FRAGMENTS OF
Sile Low Hollow SITF 4 10 a 40 10 a 40 10 a 10 2 770 200 REFERE ROLL IN LIFE Monthank Matchink Matchi	GENERALLY				- INFERRED SOI	L BOUNDARY - CORE BORING	1	(V SEV.)			
COMESTINE VERY STIFF 15 TO 38 2 TO 4 ++++++ ALLUNA, SDI, BONNARY MEXCAN LET MUSE ALLUNA, SDI, BONNARY MEXCAN LET MUSE COMESTINE TEXTURE OR GRAIN SIZE TEXTURE OR GRAIN SIZE MEXCAN LET MUSE ALLUNA, SDI, BONNARY MEXCAN LET MUSE	SILT-CLAY	MEDIUM STIFF	4 TO 8	Ø.5 TO 1.Ø	INFERRED ROC	K LINE MW MONITORING WE		COMPLETE			
Image //* RECOMMENDATION SYMBOLS VERT HADDRESS US, STU, SITUE SIZE 4 18 48 68 288 278 CRUID GROW 4.25 2.85 2.85 2.85 0.85					ALLUVIAL SOI		SPT N-VALUE			RATIONS. QUARTZ MAY	BE PRESENT AS DIKES OR STRINGERS
LS. STD. SERVE SIZE 4 9 45 68 200 273 US. STD. SERVE SIZE 4,76 280 662 672 280 662 0 </td <td></td> <td></td> <td></td> <td>> 4</td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td>ROCK H</td> <td>ARDNESS</td>				> 4	<u> </u>					ROCK H	ARDNESS
OPERATION (HMP) - 4.76 2.20 0.42 0.23 0.04 0.05 0.04 0.00 0.05 0.05 0.04 0.00 0.05 0.04 0.00 0.05 0.04 0.00 0.05 0.04 0.00 0.05 0.04 0.00 0.04 0.00 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 <th0.06< th=""> 0.06 0.06<td></td><td></td><td></td><td>070</td><td></td><td></td><td></td><td>VERY HARD</td><td></td><td></td><td></td></th0.06<>				070				VERY HARD			
Display Coasts (CSBJ) Coasts (CSBJ) Coasts (CSBJ) File (CSBJ) Lit (CSBJ) Coasts (CSBJ)						🖾 UNSUITABLE WASTE 🛛 🖾	ACCEPTABLE, BUT NOT TO BE	HARD			
BUDD LUB LUD ABBREVIATIONS BABREVIATIONS APPOINT APP	BOULDER	COBBLE GRAVEL		SILT CLAY		ACCEPTABLE DEGRADABLE ROCK					
STZE IN DUC D	(BLDR.)	(COB.) (GR.)) (SL.) (CL.)		ABBREVIATIONS					
SOLL MOISTURE CORRELATION OF TERMS C.L. CLAV MODE - MODERATELY C.P UNIT WEIGHT SOLL MOISTURE SCALE FIELD MOISTURE Guite For FIELD MOISTURE			0 0.25	0.05 0.005							
SOL MOISTURE SCALE FILD MOISTURE GUIDE FOR FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION DESCRIPTION ORG OBCANIC Junction ATTERBERG LIMITS DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION Sec COARSE DMR OBCANIC Junction Junction Sec COARSE DMR OBCANIC Junction <	SIZE IN. IA			15040			γ - UNIT WEIGHT				
CATTERBERG LIMITS) DESCRIPTION UNDER VALUE VEX.PLOY Off - OLLATORETER TEST PMT - PRESSUREVETER TEST SAMPLe ABBREVIATIONS Control of the con			MOISTURE				$\gamma_{ m d}$ - dry unit weight	0057			
- SATURATED - SATURATED - USUALLY LIQUIDY VET, VSUALLY - SATURATED - GAUNO VATER TABLE - SATURATED - USUALLY LIQUIDY VET, VSUALLY - SATURATED - USUALLY LIQUIDY VET, VSUALLY - SATURATED - SA				IELD MOISTURE DESCRIPTION	DMT - DILATOMETER TES	ST PMT - PRESSUREMETER TE		50F1	FROM CHIPS TO SEVE	ERAL INCHES IN SIZE	BY MODERATE BLOWS OF A PICK POIN
LL LIDUID LIMIT (SHL) PROM BELOW THE INDUM WITH THRE F - FINE SL - SIL, SILTY ST - SHELBY TUBE SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCR. PLASTIC - WET - (W) SEMISOLID, REDUIRES DRYIND TO ATTAIN OPTIMUM MOISTURE - MET - (W) SEMISOLID, AEDUIRES DRYIND TO ATTAIN OPTIMUM MOISTURE SEL SIL, SILTY ST - SHELBY TUBE RAC FRACEWERS SL SILTY SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCR FINGERNALL. (P) PLASTIC LIMIT - WET - (W) SOLID, AT OR NEAR OPTIMUM MOISTURE FRAC FRACEWERS SL SILTY ST - SHELBY TUBE RT - FRACEWER SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCR FINGERNALL. (P) PLASTIC LIMIT - WET - (W) SOLID, AT OR NEAR OPTIMUM MOISTURE FRAC FRACEWERS SL SILTY RT - RECOMPACTED TRIAXIL CRE - 45C IEBM SPECTME IEBM IEBM SPECTME IEBM SPECTME IEBM IEBM IEBM IEBM IEBM IEBM IEBM IEBM IEBM SPECTME IEBM IEBM								VERY			
PLASTIC - WET - (W) SEMISOLID, REQUIRES DRVING TO ATTAIN OPTIMUM MOISTURE FRACE, - FRACTURES, FRACTURES TCR - TRICOME REFUSAL WO MORE THAN 18 FEET FT - RECOMPACTED TRIAXIAL FT - RECOMPACTED TRIAXIAL (P1) PLASTIC LIMIT - WET - (W) SOLIDIA FOURES DRVING TO ATTAIN OPTIMUM MOISTURE FRACE, - FRACTURES, FRACTURES CR - TRICOME REFUSAL WO MORE THAN 18 FEET FT - RECOMPACTED TRIAXIAL FT - RECOMPACTED TRIAXIAL 0M OPTIMUM MOISTURE - MOIST - (M) SOLIDIA TO R NEAR OPTIMUM MOISTURE FRACE, - FRACTURES, FRACTURES CR - TRICOME REFUSAL WO MORE THAN 18 FEET VERY THICKLY BEDDED 0M OPTIMUM MOISTURE - MOIST - (M) SOLIDIA TO R NEAR OPTIMUM MOISTURE FRACE, - FRACTURES, CR CONSTRUCT VERY THICKLY BEDDED 0M OPTIMUM MOISTURE - MOIST - (M) SOLIDIA TO R NEAR OPTIMUM MOISTURE FRACE, - FRACTURES WO MORE THAN 18 FEET VERY THICKLY BEDDED 0M OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE FRACE, FRACTURES WO MORE THAN 18 FEET VERY THICKLY BEDDED 0MOERATELY PLASTIC - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE CME-55 B* HAULON AUGER CRESSE - M INDURATED FRACENTRIX VERY VERY VERY VERY VERY VERY VERY VERY			T.) FROM BELOW	THE GROUND WATER TABLE					OR MORE IN THICKNES		
Image: Price of the second	RANGE <	- WFT			FRAC FRACTURED, FRAC	TURES TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL			CINC	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE EQUIPMENT USED ON SUBJECT PROJECT VERY WIDE MORE THAN 10 FEET TURCLY BEDDED SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CLOSE 0.16 TO 1 FOOT VERY HICKLY BEDDED - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE CME-45C CLAY BITS MANUAL CME-45C CLAY BITS CME-45C THINLY LAMINATED - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE CME-45C CLAY BITS CME-45C CLAY BITS CME-45C THINLY LAMINATED - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE CME-45C CLAY BITS CME-45C CLAY BITS - DRY - (D) RESTIGATING OF MATERIAL BY CEMENTING VALUERS GRAINS ARE DIFLOY CME-55Ø GRAINS ARE DIFLOY DIFLOW AUGERS -N			ATTAIN OPTI	MUM MOISTURE							
UM UM UNITS: ADVANCING TOULS: HAMMER TYPE: MODERATELY CLOSE 1 TO 3 FET THINLY BEDDED SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE C CME-45C C LAY BITS Automatic MODERATELY CLOSE 1 to 3 FET THINLY BEDDED PLASTICITY OR - 55 C CME-55 0 + 0 LOW AUGERS THINLY LAMINATED NON PLASTIC 0 + 5 VERY LOW OF HAMP ACCD FINGER BITS -N FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTIN NON PLASTIC 0 + 5 VERY LOW OF ATTAIN OPTIMUM MOISTURE C CME-550 HAMP ACCD FINGER BITS -N FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTIN NON PLASTIC 0 + 5 VERY LOW OF ATTAIN OPTIMUM AUGER TUNG, CARBIDE INSERTS -N FRIABLE GBAINS CAN BE SEPARATED FROM SAMPLE WITH HINGER FREES NUMEROUS GRAIN SLIGHTLY PLASTIC 16 + 25 MEDIUM PORTABLE HOIST X TRICONE 2 15/16' STEEL TEETH HAND AUGER MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH HIMMER. DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROW, BLUE-GRAY).		- MOIS		NEAR OPTIMUM MOISTURE	EO	UIPMENT USED ON SUBJECT	PROJECT	VERY WID	DE MORE		
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE CME-45C CLAY BITS X AUTOMATIC MANUAL CLOSE 0.6 TO 1 FOOT VERY THINLY BEDDED THICKY LAMINATED PLASTICITY CME-55 6' CONTINUOUS FLIGHT AUGER 6' CONTINUOUS FLIGHT AUGER 0''''''''''''''''''''''''''''''''''''		PTIMUM MUISTURE	50210, HT 6N	MEAN OF THOSE HOISTONE				MODERATE	ELY CLOSE 1	TO 3 FEET	THINLY BEDDED 0.1
PLASTICITY OPT SUP ATTAIN OPTIMUM MOISTURE CME-55 Generation of the component of th			(D) REQUIRES AD	DITIONAL WATER TO	CME-45C						
PLASTICITY Dry Strength CME-550 HARD FACED FINGER BITS Image: Composition for the strength For Sedimentary Rocks, INDURAtion is the HARDENING OF MATERIAL BY CEMENTING NON PLASTIC 0-5 VERY LOW Image: Composition for the strength Image: Composition for the strength Image: Composition for the strength For Sedimentary Rocks, INDURAtion is the HARDENING OF MATERIAL BY CEMENTING NON PLASTIC 0-5 SLIGHT VERY LOW Image: Composition for the strength Image: Composition for the strength For Sedimentary Rocks, INDURAtion is the HARDENING OF MATERIAL BY CEMENTING MODERATELY PLASTIC 6-15 SLIGHT Very Login Image: Composition for the strength For Sedimentary Rocks, Induration is the HARDENING OF MATERIAL BY CEMENTING MODERATELY PLASTIC 16-25 MEDIUM Image: Composition for the strength Image: Composition for the strength For Sedimentary Rocks, Induration is the HARDENING OF MATERIAL BY CEMENTING MODERATELY PLASTIC 16-25 MEDIUM Image: Composition for the strength Image: Composition for the strength For Sedimentary Rocks, Induration for the strength Grains Can BE SEPARATED FROM SAMPLE with for the strength MODERATELY PLASTIC 26 OR MORE HIGH Image: Portable hoist Tricone 2 ison for the strength MODERATELY INDURATED Grains Can BE		- DRT	ATTAIN OPTI	MUM MOISTURE	CME-55						
PLASTIC 10-5 URY STRENDITY NON PLASTIC 0-5 VANE SHEAR TEST SLIGHTLY PLASTIC 6-15 SLIGHT NODERATELY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 260 MORE HIGH PORTABLE HOIST X raising W/ ADVANCER POST HOLE DIGGER MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH HIGHLY PLASTIC 260 MORE HIGH PORTABLE HOIST X raising W/ ADVANCER DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). X CME-750 TRICONE Y NNCCARB. SOUNDING ROD INDURATED ORAINS ARE SEGUIRED TO BREAK SAM		P	LASTICITY								
SLIGHTLY PLASTIC 6-15 SLIGHT Index casing HOUS CANDLE INSERTS HAND TOOLS: MODERATELY PLASTIC 16-25 MEDIUM Image: State of the state	NON DI AC				L 145-220		L]-N				
HIGHLY PLASTIC 26 OR MORE HIGH PORTABLE HOIST X TRICONE 2_15/16'STEEL TEETH POST HOLE DIGGER MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER. COLOR COLOR X TRICONE 2_15/16'STEEL TEETH HAND AUGER BREAKS EASILY WHEN HIT WITH HAMMER. BREAKS EASILY WHEN HIT WITH HAMMER. DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). X CME-750 TRICONE TUNGCARB. SOUNDING ROD INDURATED BREAKS MITH HAMMER. DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). X CME-750 CORE BIT VANE SHEAR TEST DISTURE VIEW UNDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SA	SLIGHTLY	PLASTIC	6-15	SLIGHT	VANE SHEAR TEST		HAND TOOLS:	FRIAB	3LE		
COLOR Indications CME-750 Indications TRICONE TUNGCARB. Sounding Rod Inducated Grains are difficult to separate with still Descriptions May Include Color or Color Combinations (Tan, RED, Yellow-Brown, Blue-Gray). X CME-750 Include Sounding Rod Inducated Difficult to break with hammer. Descriptions May Include Color or Combinations (Tan, RED, Yellow-Brown, Blue-Gray). X CME-750 CORE BIT VANE SHEAR TEST Exterior Number of Sharp Hammer Blows Required to Break Sa								MODE	RATELY INDURATED		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).			COLOR								
SHARP HAMMER BLOWS REDUIRED TO BREAK SA					X			INDUR	ATED		
					X <u>D-50</u>			EXTRE	EMELY INDURATED	SHARP HAMMER SAMPLE BREAKS	BLOWS REQUIRED TO BREAK SAMPLE ACROSS GRAINS.



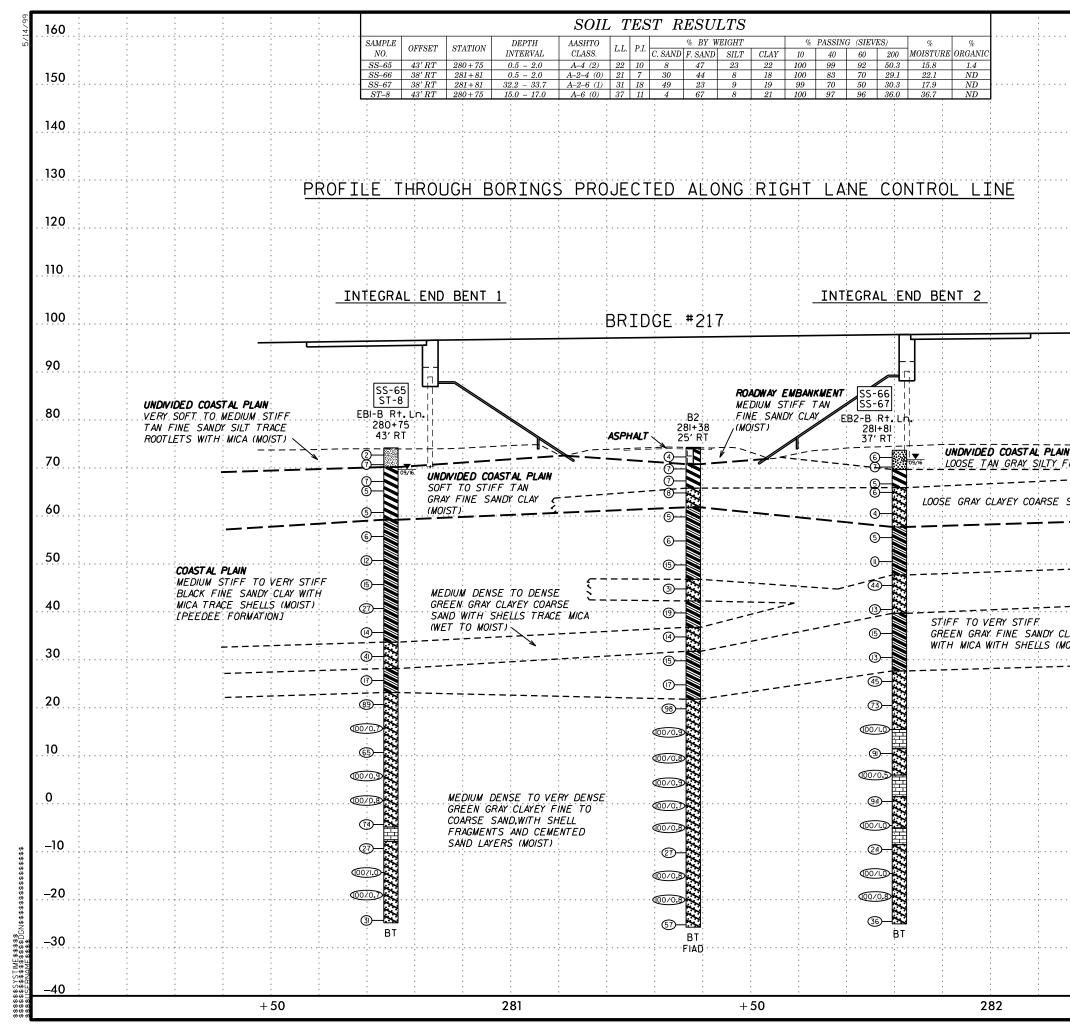


	TERMS AND DEFINITIONS
ED. AN INFERRED D SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
T N VALUES >	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DDES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
NCLUDES GRANITE,	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. IC.	<u>COLLUVIUM</u> - SULS THAT CUNTRIN HERECHALE HADDATS OF CHCCOM CHROMATE. <u>COLLUVIUM</u> - CHCCK 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.
	$\overline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK 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.
IS. 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. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
LOSS OF STRENGTH	
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 DF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
T ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND S. 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 AND EXPRESSED AS A PERCENTAGE.
NS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS 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.
DEEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. D BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF)OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
N FRAGMENTS NT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - 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.
HED READILY BY	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BL-42
THICKNESS	
4 FEET 1.5 - 4 FEET	N 578,979.2720 E 2,441,651.4540 ELEVATION: 74.53 FEET
.16 - 1.5 FEET	NOTES:
03 - 0.16 FEET 108 - 0.03 FEET	FIAD - FILLED IMMEDIATLEY AFTER DRILLING
< 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE;	
PROBE;	
E;	DATE: 8-15-14





		PROJECT REFERENCE NO.	SHEET NO.
		R-5703 ROADWAY DESIGN	4 HYDRAULICS
		ENGINEER	ENGINEER
÷		INCOMPLET	E PLANS
		DO NOT USE FOR R	W ACQUISITION
-		DOCUMENT NOT CON UNLESS ALL SIGNATU	RES COMPLETED
- 			130
		VE 1:	1
-			120
			120
÷			110
			100
			00
			90
4 Lt.	Ln.		80
02+18 0' L.T			
N			
09/			70
	SOFT TO MEDIUM STIFF GRAY TAN FINE SANDY CLAY		
	AND SANDY SILT TRACE		
	GRAVEL (MOIST)		60
			50
	MEDIUM DENSE GRAY BLACK CLA	 AYFY	
	<u>COARSE_SAND (MOIST)</u>		
	COAST AL PLAIN		40
	MEDIUM STIFF TO HARD GREEN BLACK FINE TO COARSE	SANDY CLAY	
	TRACE SHELLS TRACE MICA (M [PEEDEE FORMATION]		
			30
\sim			
22			20
\sim			20
\sim			10
	······		
N			÷
\sim	· · · · · · · · · · · · · · · · · · ·		0
22			÷
$\sum_{i=1}^{n}$			
N			_10
	NOTE : GROUNDI	LINE ALONG LEFT LANE	
2	CONTROL LINE	23 FEET LEFT OF -L-	-20
Σ		ARY GENERAL DRAWING C.F.HARVEY PARKWAY	-20
BT	OVER SR 1735	BETWEEN SR 1733 AND	
	SR 1720 LEFT	: : :	_30
		D STRATIGRAPHY IS DRA BORINGS WITH BOTH	AWN
		TO THE PROFILE	
			-40
	+ 50		



—

	· · · · · · · · · · · · · · · · · · ·	project reference no. R-5703	SHEET NO.
		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
		INCOMPLE	TE PLANS
		DO NOT USE FOR R	/W ACQUISITION
	· · · · · · · · · · · · · · · · · · ·		
		DOCUMENT NOT CO UNLESS ALL SIGNAT	
			130
		VE 1	<u>.</u>]
	; ;		120
			110
	1 1 1 1 1 1 1 1 1		100
			
			90
	· · · · · · · · · · · · · · · · · · ·		
	1 1 1 1 1 1 1 1		
	· · · · · · · · · · · · · · · · · · ·	:	80
,			
INE SAND (MQIST)			70
SAND (MOIST TO WET)	· · · · · · · · · · · · · · · · · · ·		60
	1 1 1 1 1 1 1 1 1		
	· · · · · · · · · · · · · · · · · · ·		50
			40
AY	· · · · · · · · · · · · · · · · · · ·		
AY DISTI	1 1 1 1 1 1 1 1 1		30
	· · · · · · · · · · · · · · · · · · ·		20
	· · · · · · · · · · · · · · · · · · ·		10
	· · · · · · · · · · · · · · · · · · ·		0
	<u>.</u>		–10
	NOTE : GROUNDLIN	: E ALONG RIGHT LAN	ιE
	CONTROL LINE 23	FEET LEFT OF -L- GENERAL DRAWING	
	FOR BRIDGE ON C.	F. HARVEY PARKWAY	Y ;
	SR 1720 LEFT LAI		-30
	NOTE : INFERRED STATES	TRATIGRAPHY IS DE	RAWN
	PROJECTED ONTO		4.0
: :	+ 50	: : :	

intercention Sign 49, 2014 - 2 (4) - 4 (4) (4000 / 2 (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)		Y LENOIR	GEOLOGIST Blonshine, E.G.	WBS 46375.1.1 TIP R-5703	COUNTY LENOIR	GEOLOGIST Blonshine, E.G.
COLLAR LUY, Y, R TOTAL DEPTH: 60.01 NOTHING 275:00 NOTHING 275:00 LATING 2.441:00 LATING 2	SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) ov	er -Y6- (Ferrell Rd)	GROUND WTR (ft)	SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey P	Pkwy) over -Y6- (Ferrell Rd)	GROUND WTR (ft)
DBL.R.LAMUART FF. DATE DBL.R.LAMUART CL. MURL NUMBER 2004 10 MARK 100 M	BORING NO. EB1-A Lt. Ln. STATION 280+99	OFFSET 36 ft LT	ALIGNMENT -L- 0 HR. N/A	BORING NO. EB1-A Lt. Ln. STATION 280+99	OFFSET 36 ft LT	ALIGNMENT -L- 0 HR. N/A
Diff. Let Mist 1 Start Date UP of U Could Date UP of U Support With E DETMINA Diff. Let Mist 1 Start Date UP of U Could Date UP of U Support With E DETMINA UP of U	COLLAR ELEV. 74.5 ft TOTAL DEPTH 99.0 ft	NORTHING 578,803	EASTING 2,441,586 24 HR. 4.7	COLLAR ELEV. 74.5 ft TOTAL DEPTH 99.0 ft	t NORTHING 578,803	EASTING 2,441,586 24 HR. 4.7
Link Disc Disc <thdis< th=""> Disc Disc D</thdis<>	DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016	DRILL METHOD Mu	d Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016	DRILL METHOD	Mud Rotary HAMMER TYPE Automatic
Image: No. Dist			SURFACE WATER DEPTH N/A			SURFACE WATER DEPTH N/A
1 1.1 1.1 1.000000000000000000000000000000000000			SOIL AND ROCK DESCRIFTION	ELEV (ft) DRIVE ELEV (ft) DEPTH BLOW COUNT BLOWS P (ft) 0.5ft 0.5ft 0.5ft 0 25 5		SOIL AND ROCK DESCRIPTION
$\frac{1}{7} 10 + 79 21/0.1 + + + 100/0.6 + 9.5 + 65.0 + 9.5 + 65.0 + 9.5 + 65.0 + 100/0.6 $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	75 100 NO. MOI G SS-60 14% M M M M M M M M M M M M M M M M M M M M M M <td>SOLL AND ROCK DESCRIPTION DEPTH (t) -74.5 GROUND SURFACE 0.0 UNDIVIDED COASTAL PLAIN Tan Gray Fine Sandy SILT - 70.5 - - 70.5 - - 58.5 - - 58.5 - - 64.5 - - 70.6 - - 58.5 - - 64.5 - - 70.6 - - 64.5 - - 70.6 - - 64.5 - - 70.6 Black Clayey Coarse SAND - 44.5 - - - 6 - - - 6 - - - 6 - - - 6 - - - 70.0 - - - 61.0 - - - 62.0 - - - 7 - - -</td> <td>(n) (n) (n) 0.5n 0.5n 0 23 5 -5 -8.0 82.5 -10 7 10 14 -13.0 87.5 -15 25 38 50 -18.0 92.5 -20 44 56/0.3 -23.0 97.5 24 26 20</td> <td>50 75 100 NO. MOI G</td> <td></td>	SOLL AND ROCK DESCRIPTION DEPTH (t) -74.5 GROUND SURFACE 0.0 UNDIVIDED COASTAL PLAIN Tan Gray Fine Sandy SILT - 70.5 - - 70.5 - - 58.5 - - 58.5 - - 64.5 - - 70.6 - - 58.5 - - 64.5 - - 70.6 - - 64.5 - - 70.6 - - 64.5 - - 70.6 Black Clayey Coarse SAND - 44.5 - - - 6 - - - 6 - - - 6 - - - 6 - - - 70.0 - - - 61.0 - - - 62.0 - - - 7 - - -	(n) (n) (n) 0.5n 0.5n 0 23 5 -5 -8.0 82.5 -10 7 10 14 -13.0 87.5 -15 25 38 50 -18.0 92.5 -20 44 56/0.3 -23.0 97.5 24 26 20	50 75 100 NO. MOI G	
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	M M	-4.5 79.0			

SHEET 6 OF 33

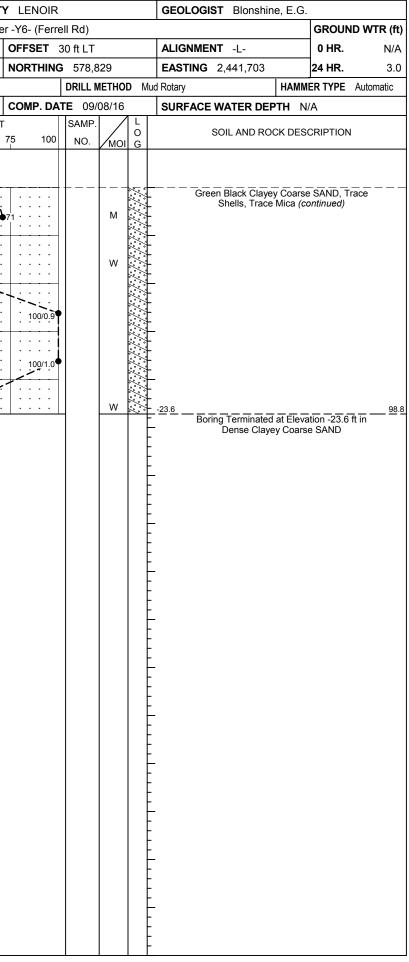
COLLAR ELEV. / A / A TOTAL DEPTH NO.000000000000000000000000000000000000														.06							י ר										
LOCKING NO. E1 STATION 751-56 OPFERT 25-11 ALGOMENT 4 D1R. D1R. TATION 751-56 COLLAGE LEX / 7.1 TOTAL DEPTH 100.0 TOTAL DEPTH 100.0<																		GEOLOGIST Blonshine, E.G			-										
OLLAS BLEV. 7.7.1 TOTAL DEPTH 100.01 OWNER 57.02 EASTING 2.441 (2) Jahr. 1 TOTAL DEPTH 100.01 TOTAL PECT DESIGNER 55 302035 DBL.BOMMMER TOTAL TH2CD DESIGNER 55 30205 DBLLETING NARGAN IMMENTER TAIL DBL.BOMMMER TAIL TOTAL PECT DESIGNER 55 302035 DBL.BOMMMER TOTAL TH COVER DESIGNER 55 30205 DBLLETING NARGAN IMMENTER TAIL DTATE DEPTH 100.01 DBL.BOMMMER TAIL DTATE DEPTH 100.01 DBL.BOMMER TAIL DEPTH 100.01 DBL.BOMMER TAIL DBL.BOMMER TAIL				Bric	lge No	. 216	on -L·	· (Feli	x Har	rvey P	kwy) ov			,					_					N Brid	dge No			-		[,] Pkwy) c	ver -
	BOR	NG NO	. B1			S	TATIC	DN 2	81+5	5		OFFS	BET	35 ft LT				ALIGNMENT -L-	01	HR. N/A	BOF	ring no). B1			S	ΤΑΤΙΟ	N 28	1+55		OF
Diffuse Conv. Date: OP (7/16) Conv. Date: OP (7/16) Softwart PART DATE: OP (7/16) OP (7/16) <th>COLL</th> <th>AR EL</th> <th>EV. 74</th> <th>4.7 ft</th> <th></th> <th>т</th> <th>OTAL</th> <th>DEP</th> <th>TH</th> <th>100.0</th> <th>ft</th> <th>NOR</th> <th>THING</th> <th>G 578,8</th> <th>317</th> <th></th> <th></th> <th>EASTING 2,441,641</th> <th>24 H</th> <th>HR. FIAD</th> <th>COL</th> <th>LAR EL</th> <th>.EV. 7</th> <th>4.7 ft</th> <th></th> <th>т</th> <th>OTAL I</th> <th>DEPT</th> <th>H 100.</th> <th>.0 ft</th> <th>NC</th>	COLL	AR EL	EV . 74	4.7 ft		т	OTAL	DEP	TH	100.0	ft	NOR	THING	G 578,8	317			EASTING 2,441,641	24 H	HR. FIAD	COL	LAR EL	.EV. 7	4.7 ft		т	OTAL I	DEPT	H 100.	.0 ft	NC
Lacy Wey purp B.Cov CONT Here Support Here	DRILL	RIG/HA	MMER E	FF./DA	TE HF	PC0279	Diedri	ch D50) 88% ⁻	12/09/20	015			DRILL I	METH	OD	Mud I	Rotary HAMI	MER T	YPE Automatic	DRIL	L RIG/HA	AMMER E	EFF./DA	TE H	PC0279	Diedric	h D50 8	38% 12/09	9/2015	
m m	DRIL	LER C	ain, J.			S	TART	DATE	E 08	3/17/16	6	СОМ	P. DA	TE 08/	/17/1	6	:		N/A		DRI	LLER	Cain, J.			S	TART	DATE	08/17/	/16	c
0 0	ELEV	DRIVE	יייישען	·					BLC	OWS P	ER FOO	т		SAMP.					SCRIP		ELE\			·	-	_			BLOWS	S PER FO	ОТ
13.2 10.2 20 30.4 10	(ft)		(ft)	0.5ft	0.5ft	0.5ft	0		25	5	0	75	100	NO.	Им				50141) (ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	5	50	75
10 12 13 2 2 10 12 13 2 4 10 12 13 2 4 10 12 13 2 4 10 12 13 4 1 10 12 13 4 1 10 12 13 4 1 10 12 13 4 1 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 2 3 10 12 13 10 10 11 12 13 10 10 12 13 10 10 10 13 12 13 10 10 14 14 14 10 10 15 12 13 10 10																															
10 11 2 2 3 10 11 2 3 10 11 11 11 11 10 11 11 11 11 10 11 11 11 11 10 11 11 11 11 11 11 11 11 11 12 115 11 11 11 11 13 11 11 11 11 11 14 11 11 11 11 11 15 11 11 11 11 11 15 11 11 11 11 11 15 11 11 11 11 11 16 11 11 11 11 11 17 11 11 11 11 11 18 11 11 11 11 11 19 11 11 11 11 11 10 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 </td <td>75</td> <td></td> <td>Ļ</td> <td></td> <td>L74</td> <td>.7 GROUND SURI</td> <td>FACE</td> <td></td> <td></td> <td><u> </u></td> <td><u> </u></td> <td></td> <td>L</td> <td></td> <td></td> <td></td> <td>Mat</td> <td>tch Line</td> <td></td>	75		Ļ														L74	.7 GROUND SURI	FACE			<u> </u>	<u> </u>		L				Mat	tch Line	
1 12 33 4 4 10 12 33 4<		73.7	- 1.0	2	2	3		 		· · ·	· · · ·				м								±								ن نساست
10 60 3 3 4 0 60 3 3 4 0 60 3 3 4 0 60 3 3 4 0 612 113.5 2 2 3 10 11.2 11.3.5 2 2 3 10 11.3 2 2 3 3 10 11.3 2 2 3 3 10 11.3 2 2 3 3 10 11.3 2 3 3 5 60.3 11.2 11.3.4 86.5 3 50.02 11.3 2.4 5 5 7 11.2 11.3.4 86.5 11.2 20.3 11.3.4 86.5 11.2 20.3 11.3.4 86.5 11.2 20.3 11.3.4 86.5 11.2 20.3 11.3.4 86.5 11.2 20.3 11.2 20.3 11.2 20.3 11.2 20.3 11.2 20.3 11.2 20.3 <		71.2	3.5					 		· · ·	· · ·		I									-8.8	83.5			47					
Image: Problem of the second state of the s	70	68 7		3	2	4	_••		+					SS-62	23%	6		3.7		6.0		_	Ŧ	10	14	1/			-031		
60 80 10 2 3 4 4 5 5 5 7 10 50 50 5 5 7 10 50 50 5 5 7 10 50 5 5 7 10 50 5 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 5 7 10 50 50 7 10 50 50 7 10 50 50 7 10 50 50 7 10 50 50 7 10 50 50 7 10 50 50 7 10 50 50 7 10 10 10 10 10 10			ŧ	3	3	4		7 • •						SS-63	25%	6 K	ł	UNDIVIDED COAST		AIN	1		Ŧ								
00 512 13.5 2 2 3 3 5 460 3 5 5 7 3 3 5 460 3 5 5 7 3 3 5 460 3 5 5 <td>65</td> <td>66.2</td> <td>8.5</td> <td>2</td> <td>3</td> <td>4</td> <td></td> <td>· · · · · ·</td> <td></td> <td>· · ·</td> <td></td> <td></td> <td></td> <td></td> <td>Ιм</td> <td></td> <td><u>}</u>60</td> <td></td> <td></td> <td></td> <td></td> <td>-13.8</td> <td><u> </u></td> <td>33</td> <td>67/0.4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td> [.</td>	65	66.2	8.5	2	3	4		· · · · · ·		· · ·					Ιм		<u>}</u> 60					-13.8	<u> </u>	33	67/0.4						[.
90 402 435 - <td></td> <td>-</td> <td>Ŧ</td> <td></td> <td> </td> <td>/~/~</td> <td>÷</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Ŧ</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		-	Ŧ													/~/~	÷						Ŧ								
00 1 2 2 3 3 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 38 9 460.4 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 1 20 1 1 20 1 1 1 1 1 1 1 1 1 1 1 <td></td> <td>61.2</td> <td>† 13.5</td> <td></td> <td></td> <td></td> <td> [</td> <td>· · ·</td> <td></td> <td>· · ·</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Tan to Black Silty CLA</td> <td>Y with</td> <td><u>12.5</u></td> <td></td> <td>-18.8</td> <td>+ 93.5</td> <td></td> <td></td> <td></td> <td> </td> <td></td> <td>••••</td> <td>• • • •</td> <td>•••</td>		61.2	† 13.5				[· · ·		· · ·								Tan to Black Silty CLA	Y with	<u>12.5</u>		-18.8	+ 93.5						••••	• • • •	•••
55 562 105 2 3 3 50 512 23.5 5 7 40 412 33.5 0 0 55 302 48.5 6 6 312 43.5 0 6 312 43.5 0 5 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 40 12 45.5 15 312 45.5 15 27 312 45.5 15 27 312 45.5 15 27 45 16 12 14 46 16 13 12 45.5 15 1312 45.5 16 14 14 15 16 16 16 17 16 18 16	60		+	2	2	3	-•5		···					SS-64	52%	6	1				-20		+	38	54	46/0.4					•••
55 56 105 2 3 3			ŧ					· · · · · ·		· · · · · ·													‡							• • • •	
30 512 23.8 5 5 7 12 12 40 412 43.8 6 6 7 13 40 412 43.8 6 6 7 30 342 48.8 6 6 7 312 43.5 6 6 7 13 312 43.5 6 7 13 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 312 43.5 16 12 14 45 12 14 16 16 111 12 43.5 18 17 14 12 43.5 18	55	56.2	18.5	2	3	3		· · ·		· · · · · ·	· · · · · ·	.	· · ·								-25	-23.8	98.5	11	20	30			· · · ·		
50 51.2 22.3 5 7 1<	- 55	-	ŧ	-			- @6 1	i 													-25		+	+						50	
50 5 5 7 40 40 22 28.5 600.1 M <t< td=""><td></td><td>- </td><td></td><td></td><td></td><td></td><td> <u>ˈ</u></td><td> </td><td></td><td>· · ·</td><td>· · ·</td><td>· · · · · ·</td><td>· · ·</td><td></td><td></td><td></td><td>5</td><td></td><td></td><td>22.5</td><td></td><td></td><td>‡</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		- 					<u>ˈ</u>	 		· · ·	· · ·	· · · · · ·	· · ·				5			22.5			‡								
48 482 228 600.1 412 33.5 0	50	51.2	23.5	5	5	7		•12	· ·				• •		м			Black Coarse Sandy CL	AIN AY with	h Shells			1								
45 600.1 000.1 000.1 000.1 40 412 33.5 6 6 9 35 36.2 38.5 6 7 30 31.2 43.5 0 5 30 31.2 43.5 0 5 30 22.5 53.5 15 12 10 11.2 63.5 28 28 10 11.2 63.5 19 37 10 11.2 63.5 19 37 10 12 73.5 15 17 10 12 73.5 15 17			t					 	<u> </u>	· • • •		.	· · ·					[Peedee Forma	ation]				<u>+</u>								
40 412 33.5 6 6 9		46.2	28.5									:+	· · ·		М		ł						ł								
40 6 6 9 10	45	-	ł	60/0.1									60/0.1										\pm								
40 6 6 9 10			Ŧ								مترجبهم												Ŧ								
35 38.2 38.5 6 6 7 30 31.2 43.5 6 5 7 30 22 24.5 16 12 14 12 20 21.2 53.5 15 27 37 10 11.2 63.5 19 37 63.0.4 10 11.2 63.5 19 31 34	40	41.2	33.5	6	6	9		• • • •							М								Ŧ								
36 38.5 6 6 7 30 31.2 43.5 6 5 7 30 22 24.5 16 12 14 12 53.5 15 27 37 15 16 2.6 2.8 2.7 15 16 2.8 2.7 10 11.2 63.5 19 37 10 11.2 63.5 19 31 12 73.5 19 37 12 73.5 19 31		-	ŧ					- T ¹⁵⁻									3			36.0			Ŧ								
35 - 6 6 7 -		36 2 ·	1 38 5					· [· ·		· · · · · ·	· · · ·	.				1° /° .	* *	Shells, Trace Mica, with o	cement	ted sand			Ŧ								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	35		+	6	6	7		 	· ·	· · ·					м	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\$ -	layers					‡								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			ŧ					i: :		· · ·	· · · ·						\$ \$						‡								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	30	31.2	43.5	6	5	7		· [· · ·		· · ·		: : :	· ·			<u>}</u>	* *						‡								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	- 30	-	ŧ	Ĭ	Ĭ	'	-	• 12 • • • •				.			M	<u>/</u> ~/~							‡								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			± 40 -				:	: '`\		· · ·	 	· · ·	· · · ·		1	<u>/</u> ~/~	÷						‡								
0 21.2 53.5 15 27 37 15 16.2 58.5 26 28 47 15 16.2 58.5 26 28 47 10 11.2 63.5 19 37 63/0.4 10 19 37 63/0.4 10 12 73.5 19 31		20.2	+ 48.5	16	12	14	<u> </u>	· · · ·	26			· · ·			м	~~~	, , ,						‡								
20 21.2 53.5 15 27 37 16.2 58.5 26 28 47 15 16.2 58.5 26 28 47 10 11.2 63.5 19 37 63/0.4 10 11.2 63.5 19 31 34 10 12 73.5 19 31 34			ŧ				:	 				.	· · ·			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	; -						<u>†</u>								
16.2 58.5 26 28 47 10 11.2 63.5 19 37 63/0.4 6.2 68.5 19 31 34 10 1.2 73.5 10 31	ר'כ	21.2	53.5	45	07	07		· · ·				: : :	· ·		1	<i>%</i> .,	, , ,						±								
15 16.2 58.5 26 28 47 11.2 63.5 19 37 63/0.4 10 11.2 63.5 19 31 34 10 100/0.9 100/0.9 100/0.9 10 10 100/0.9 11.2 73.5 10		-	ŧ	15	27	37	 .		+			۱ <u> </u>			M	~~~~ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	÷						\pm								
15 26 28 47 .			ŧ					· · ·					• •			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Ŧ								
10 11.2 63.5 19 37 63/0.4 6.2 68.5 19 31 34 1.2 73.5 19 31 34	N 15	16.2	58.5	26	28	47	:								М	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	₹ F						Ŧ								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-	-	Ŧ				.					· .				~~~~ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	÷						Ŧ								
10 19 37 63/0.4 100/0.9 6.2 68.5 19 31 34 10 10 100/0.9 100/0.9 10 10 100/0.9 10 10 10 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 100/0.9 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10		11 2 [.]	63.5				:	· · ·		· · ·		· · `	· · · \		1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	*						Ŧ								
	10		+	19	37	63/0.4	- <u>·</u>		• •		· · ·				М	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	* *						‡								
			‡				:	 		· · ·	· · · · · ·	1 . . ¹ ر · ·			1	<u>/~/~</u>	* *						‡								
		6.2	68.5	10	21	3/		· · ·		· · ·	 	· / · · ·	· ·			<u>/</u> ~/~	÷						‡								
		-	ŧ	19		34	 .				€	5			M	·~~~~	÷						‡								
			+				:	· · ·		· · ·		· 	· ·		1	<i>%</i>	, , ,						ŧ								
		1.2	1 73.5	26	39	45			· ·				34		М	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	۰ ا						Ŧ								
		-	£										\ <u>`</u>			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Ŧ								
-3.8 78.5 -2.8 -77.5 Generative -3.8 78.5		-3.8	T 78.5				:	· · ·		· · ·		.	· \`		1		<u>}</u> -2	.8 Green Grey Fine Sandv Cl	LAY, T				Ŧ								
$\frac{1}{2}$ -5 30 36 64/0.2 ···· ··· ··· ··· ··· ··· ··· ··· ···	-5		T	30	36	64/0.2	.		• •	•••		.	• •\		Μ	N	1	,,	,				Ť								

SHEET 7 OF 33

NT	Y LENOIR				GEOLOGIS	T Blonshin	e, E.G.		
ove	r -Y6- (Ferre	ll Rd)						GROUN	ID WTR (ft)
	OFFSET 3	85 ft LT			ALIGNMEN	F -L-		0 HR.	N/A
	NORTHING	578,8	17		EASTING 2	2,441,641		24 HR.	FIAD
		DRILL N	IETHO	D Mu	d Rotary		НАММ	ER TYPE	Automatic
	COMP. DAT	FE 08/	17/16		SURFACE V	VATER DEP	TH N/	A	
тос		SAMP.		L					
	75 100	NO.	мо	O G	5	OIL AND ROO	K DESU	RIPTION	1
•									
	100/0.7			N	Green	Grey Fine Sa	ndy CLA	Y, Trace	Mica — — — —
م بر					<u>-7.8</u> Gree			e SAND w	/ith
			м		SI	en Grey Claye nells, with cen	nented s	and layers	S
· · · <:				·					
			м	<u>}.</u>					
	100/0.9								
· ·				~~. ////					
			м	<u>,</u>					
· ·	100/0.9			~ , .,,					
/	1::::			~					
	· · · · ·		M		-25.3 Borin	n Terminated	at Eleva	tion -25.3	100.0 ft in
				ΙĿ	Donn	g Terminated Dense Clay	ey Fine	SAND	
				E					
				I F					
				E					
				ΙĿ					
				l E					
				F					
				F					
				F					
				F					
					•				
				Ē					
				[
				F					

14/7 0	400-	75 4 4						1					0.50					14/7		- 4 4				D D			
	4637					IP R-5703			Y LENOIF				GEOLO	DGIST Blonshine	·				46375					P R-57			DUNTY
				-				Pkwy) ove	er -Y6- (Fer				1				. ,					-		on -L- (F			
). EB2		Ln.		TATION 2			OFFSET				-	MENT -L-		0 HR.	N/A		ING NO			Ln.		TATION			
		LEV. 7				OTAL DEP			NORTHIN					NG 2,441,703		24 HR.	3.0		LAR EL					OTAL DE			1
				ATE S		8 CME-750 86							ud Rotary			R TYPE Aut	tomatic					TE SI		CME-750			
DRIL		Miller, T				TART DAT			COMP. D			3	SURFA	CE WATER DEP	TH N//	A		DRIL		/liller, T	-						0
ELEV (ft)		DEPTH		OW CC	_			PER FOOT		SAMP				SOIL AND ROC	K DESC	RIPTION		ELEV (ft)	ELEV	DEPTH (ft)	· — — —					WS PER I	
(11)	(ft)		0.51	t 0.5ft	0.5ft	0	25	50	75 100) NO.	/мо)I G	ELEV. (ft)				DEPTH (ft)	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50	75
80		+											_					0		+					N	Aatch Lir	ne V
		Ŧ											-						-2.1	77.3	35	34	37			.	$\left \left \left$
75	747	Ŧ											- 75.2	GROUND			0.0	-5	-	Ŧ							
	74.7	+ 0.5	2	4	2	•6 · · ·				1	M		-	UNDIVIDED C Gray Tan Fine Sand			1		-7.1	82.3							
	72.7	+ 2.5	1	2	3	- ↓ · · · · ·					—м-	$-\mathbf{N}$	-	,	, ,				-7.1.	+ 02.3 +	9	12	19		• • 31		
70	69.2	+ 6.0											-					-10		ŧ					· · ·		· · · ·
		Ŧ	3	2	3	$\left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \bullet 5 \cdot \cdot \cdot \end{array} \right $					м		-						-12.1	87.3	13	57/0.4	_		· · · ·		
65	66.7	+ 8.5	2	2	3	- i · · · ·					м		-					-15	-	‡	-3	5770.4			· · · · · · ·		· · · ·
00		†				$\left \begin{array}{c}1\\1\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot\\\cdot$				-			-					10		†							
	62.9	<u> </u>	5	5	3	$ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot$					м		-						<u>-17.1</u> .	92.3	34	66/0.5	5		· · · · · · ·		· · · ·
60		‡											- 				16.0	-20		ŧ					· · ·		
	57.9	17.3				- 								Black Fine Sandy	CLAY,	Trace Mica			-22.1	97.3	18	20	26		· · · · · · ·	· · ·	
55		‡	3	3	3	● ⁶ · · ·					M		-							<u> </u>	18	20	26			• •46 •	• • •
- 55		‡											-						-	ŧ							
	52.9	22.3	2	3	3	$\left \begin{array}{c} \bullet \\ \bullet $					м		-						-	ŧ							
50		1				<u>·```</u>							- 49.2				26.0		-	ŧ							
	47.9	27.3												Gray Black Clay	yey Coar	se SAND	<u> 26.0</u>			ŧ							
		ŧ	6	7	9		6 · · · ·				м		-							ŧ							
45		÷					<u> </u>	<u> </u>	<u> </u>			/./.	44.2				<u> 31.0</u>		-	÷							
	42.9	32.3	5	6	9						м		-	Green Black Fine	AL PLAI	LAY, Trace			-	ŧ							
40		Ŧ					·							Shells, T [Peedee						ł							
	37.9	± 37.3] ::::							-							ł							
		Ŧ	11	8	10		18				м		-						-	ł							
35		Ŧ						+	+				_						-	Ŧ							
ì	32.9	42.3	8	7	38			45 • • • •			М		-							ŧ							
		<u>+</u>											- 29.7				45.5			Ł							
30	27.9	47.3					/							Green Black Clayey	Coarse	SAND, Trace	, <u> </u>		-	ŧ							
o'		+	5	5	8	· ·•13·					м		-	Offelia, 1		Ja				Ŧ							
25		Ŧ					+						_						-	Ŧ							
20 15	22.9	<u> </u>	5	6	11	$\left \left \begin{array}{c} \cdot \cdot \cdot I \\ \cdot \cdot I \end{array} \right $	_				М		-							Ŧ							
20		Ŧ											-						-	Ŧ							
	17.9	57.3											-						-	Ŧ							
		+ 57.5	29	21	27			●48 <u></u> ・・・・			w		-							Ŧ							
15		Ŧ					+ • • • •						-							Ŧ							
	12.9	62.3	50	50/0.3	3								-							Ŧ							
10		Ŧ		0.0					100/0.8	•			-						-	Ŧ							
	7.0	Ŧ								1			-						-	ŧ							
	7.9	<u> </u>	50	50/0.4	4				100/0 9	•			-							ŧ							
5		‡				· · · ·	+ • • • •	· · · ·					-						-	‡							
2	2.9	72.3		47	47	$\left \left \begin{array}{ccc} \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \end{array} \right \right $		 /					-						-	‡							
0		‡	8	17	47			• • •64			M	///	-						-	‡							
	<u> </u>		1		1		1	i	1			~~°						L	I	L	I	I	I	1			

SHEET 8 OF 33



WBS 46375.1.1		UNTY LENOIR	GEOLOGIST Blonshine, E.G.		WBS	S 46375	5.1.1		Т	TIP R-5703 COUM	NTY LENOIR		GEOLOGIST Blonshine,	E.G.
SITE DESCRIPTION Bridge No. 2								Bridae		on -L- (Felix Harvey Pkwy) o		d)		GROUND WTR (ft)
BORING NO. EB1-B Rt. Ln.	STATION 280+75	OFFSET 43 ft RT	ALIGNMENT -L- 0 HR.	• •				B Rt. Ln.		TATION 280+75	OFFSET 43 ft		ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 74.2 ft	TOTAL DEPTH 99.0 ft	NORTHING 578,721	EASTING 2,441,584 24 HR.			LAR EL				OTAL DEPTH 99.0 ft	NORTHING 5		EASTING 2,441,584	24 HR. 4.5
DRILL RIG/HAMMER EFF./DATE SME		DRILL METHOD			_			-		3 CME-750 86% 02/11/2016		ILL METHOD N		HAMMER TYPE Automatic
DRILLER Miller, T.	START DATE 09/13/16	COMP. DATE 09/01/16	SURFACE WATER DEPTH N/A							TART DATE 09/13/16	COMP. DATE			
ELEV DRIVE DEPTH BLOW COUN			-					BLOW		BLOWS PER FO		MP. L		
(ft) ELEV (ft) 0.5ft 0.5ft 0	0.5ft 0 25 50	75 100 NO. MOI		DEPTH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft 0.	.5ft 0.5ft			IO. MOI G	SOIL AND ROCK	DESCRIPTION
75					-5					Match Line				
73.7 - 0.5	<u></u>	· · · · · · ·	T4.2 GROUND SURFACE	0.0			+	+-		· · · · · · · · · · · · · · · · · · ·				
71.7 - 2.5	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	· · · SS-65 16%	Tan Fine Sandy SILT, Trace Rootlets a	and		-8.3 -	82.5	8 1	11 16				-7.8	82.0
	4 • • 7 · · · · · · · · · · · · · · · · ·		Tan Fine Sandy CLAY, Trace Rootlets	4.0 ts.	-10		‡		11 16	•27		M	-	
68.2 6.0 2 3	$4 \begin{vmatrix} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{vmatrix} \cdot \cdot \cdot \cdot$		with mica	,		-	ŧ						-	
65 66.2 8.0 2 2	3		5		-15	-13.3 -	+ 87.5 +	32 68	/0.5		100/1.0		-	
		" 🛚	5			1 -	ŦI						-	
61.7 - 12.5			5			-18.3 -	92.5	25 4-	10.0		!		-	
60 2 2	3	· · · · · · · M	59.2	<u> 15.0</u>	-20		‡	35 45/	/0.2		100/0.7		- -	
		37%	COASTAL FLAIN				‡						-	
55 <u>56.7 + 17.5</u> <u>55</u> <u>55</u> <u>56.7 + 17.5</u> <u>55</u> <u>55</u> <u>55</u> <u>55</u> <u>55</u> <u>55</u> <u>55</u> <u></u>	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Black Fine Sandy CLAY with Mica, Trac Shells	ace		-23.3 -	+ 97.5 +	14 1	13 18	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			- 24.8	99.0
			[Peedee Formation]			-	‡						Boring Terminated a Dense Clayey	t Elevation -24.8 ft in
51.7 - 22.5			3			-	‡							ODDISE OAND
50 - 3 5	7	· · · · · · · · · · · · · · · · · · ·	<u>\$</u>			-	‡						<u>Other Samples:</u> ST-8 (15.0 - 17.0)	
			\$			-	‡						-	
46.7 - 27.5	$\frac{1}{10} \begin{vmatrix} \cdot \cdot \cdot \mathbf{i} \\ \cdot \cdot \cdot \mathbf{j} \end{vmatrix} = \begin{vmatrix} \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \end{vmatrix} = \begin{vmatrix} \cdot \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{vmatrix}$	· · · · · · · M				-	±							
		····				-	±							
41.7 + 32.5						-	±							
40 5 8	19 P 27	м				-	Ŧ						-	
						-	ŦI						-	
36.7 - 37.5 6 6	<i>[</i> .					-	Ŧ						-	
			33.7	40.5		-	Ŧ						-	
	\		Green Gray Clayey Coarse SAND	<u>40.5</u>		-	Ŧ						-	
31.7 - 42.5 32 20	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	· · · · · · ·				-	ŦI							
		··· / ··· /		46.0		-	ŦI						-	
26.7 - 47.5			Green Gray Coarse Sandy CLAY, Trac Mica	ice		-	ŦI						-	
	10	· · · · · · · M				-	‡						-	
			23.2 Green Gray Clayey Fine to Coarse SAN	ND. <u>51.0</u>		-	‡						-	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	63	· · · · M N	with shell fragments and cemented sar	and			‡						-	
						-	‡						-	
		$\cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot$				-	‡						-	
	3/0.2	M				-	‡						-	
						-	‡						-	
11.7 + 62.5 10 + 15 32	<u> </u>	· · · · · · ·				-	‡						-	
							‡						-	
						-	‡						-	
² 5 - 39 61/0.4		100/0.9				-	‡						-	
		· · · · · · ·				-	‡						-	
		· · · · · · ·				-	±						-	
						-	t l						-	
						-	ŧ I						-	
	44		× 4.8	79.0			+						-	
· · · · · ·	• • • •		·				·	· · ·		·	1			

SHEET 9 OF 33

							URE LU						_									
	3 4637						Y LENOIR			GEOL	.OGIST Blonshine, E.G.			/BS 4637					P R-5703			NTY LE
			Brio	dge No		on -L- (Felix Harvey Pkwy) ove		-				GROUND WTR (ft)		ITE DESCR		N Bric	dge No				Pkwy) o	
BOF	RING NO). B2			S	TATION 281+38	OFFSET 2	5 ft RT		ALIGI	NMENT -L-	0 HR. N/A	В	ORING NO	. B2			ST	ATION 2	81+38		OFFS
COL	LAR EL	_EV . 74	4.3 ft		Т	OTAL DEPTH 100.0 ft	NORTHING	578,755		EAST	ING 2,441,640	24 HR. FIAD		OLLAR EL					TAL DEP			NOR
DRIL	L RIG/HA	AMMER E	FF./DA	TE H	PC0279	Diedrich D50 88% 12/09/2015		DRILL METH	OD N	Mud Rotary	HAMME	R TYPE Automatic	DI	RILL RIG/HA	MMER E	FF./DA	TE HF	PC0279	Diedrich D50	88% 12/09	2015	
DRI	LER				S	TART DATE 08/17/16	COMP. DAT	E 08/17/10	6	SURF	ACE WATER DEPTH N/	A	D	RILLER (ST	ART DATI	E 08/17/	16	СОМ
ELEV	DRIVE ELEV		BLC			BLOWS PER FOO		SAMP.			SOIL AND ROCK DESC	RIPTION	EL		DEPTH	BLC				BLOWS		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 50	75 100	NO. MO	DI G	ELEV. (ft)	DEPTH (ft)	(1	ft) (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75
75		+									GROUND SURFA	.CE <u>وب</u>		-5	┣───		93/0.3		_	Mat	ch Line	
	73.3	1.0	3	2	2			м		74.0	ASPHALT STONE	0.3			ŧ	'	00/0.0					
70	70.8	3.5								70.8	ROADWAY EMBANK			10 -9.2	83.5							· · · · · · · ·
10	68.3	+ 6.0	4	3	4			м		F	Tan Fine Sandy Cl UNDIVIDED COASTAL	_ PLAIN			ŧ	9	11	16		•27		
		Ţ	2	3	4	1 · · · · · · · · · · · · · · · · · · · · · · ·		м		<u> </u>	Orange Grey Fine Sand				‡							
65	65.8	<u> </u>	2	4	4			w		<u>65.8</u>	Grey Clayey Coarse	<u>SAND 8.5</u>		15 -14.2	- 88.5 -	40	60/0.3				· · · ·	· · [>]
		‡				.T			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~) 					ŧ							
	60.8	+ 13.5] ₽				<u>61.8</u>		<u>n 12.5</u>		-19.2	93.5						· · · · · ·	· · · · · · · ·
60		+	2	2	3			w		-	Black Fine Sandy Silty CLA with Mica	Y with Shells,	-2	20 - 19.2	ŧ	50	50/0.3					!
		1								1	[Peedee Formation	on]			ŧ							
55	55.8	- 18.5	2	3	3					Ł			-2	25 -24.2	98.5	22	28	29				
		ł								Ł					<u> </u>						9 57	
	50.8	- 23.5								ł					Ŧ							
50			5	6	9	Q 15		м		-				-	Ŧ							
		Ŧ								46.8		27.5			Ŧ							
45	45.8	28.5	15	11	20				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Green Grey Clayey Fine S Mica	AND, Trace			Ŧ							
		Ŧ			20	9 31		м			Wica			-	Ŧ							
	40.0	T 33.5								<u>}_ 42.3</u>	Green Grey Fine Sandy CLA	Y, Trace Mica 32.0			Ŧ							
40	40.8	<u>+ 33.5</u> +	11	9	10	· · · · · · · · · · · · · · · · · · ·		м		-				_	ŧ							
		Ŧ								36.8		27.5			ŧ							
35	35.8	38.5	6	6	8					, <u>}</u> = <u>,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Green Grey Clayey Coarse				ŧ							
		Ŧ		0	0	• • • • • • • • • • • • • • • • • • •		м	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\$— \$-	Shells, Trace Mic	Ja		-	ŧ							
	00.0	‡								<u>31.8</u>		42.5			ŧ							
30	30.8	+ 43.5	5	7	8	↓ · · ├ · · · · · · · · · · ·		м		<u>}</u>	Green Grey Fine Sandy CL/ with Shells	AY WITH MICA,		-	‡							
1117		‡								ļ.					ŧ							
	25.8	48.5			10	· · · · · · · · · · · · · · ·				1					ŧ							
25		‡	6	7	10			м		 -				-	ŧ							
		‡								21.8		<u>52.5</u>			‡							
2 20	20.8	- 53.5	21	23	75			В М		,÷ ,∲	Clayey Fine SAND with Clay Shells, Trace Mica and cen			-	‡							
C10.7		‡							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\$ - \$-	layers				‡							
107.0	15.8	- 58.5							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	∲- }-					‡							
N 15	-	‡	49	51/0.4	·		100/0.9	м	/~/~	∲ }-				-	ŧ							
-> c		‡							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\$ _					‡							
15 10-10-01-02-02 10-01-01-02-02 5	10.8	- 63.5	33	52	48/0.3			м		,- -				-	‡							
-010-		‡					- 100/0.8¶			- 					‡							
	5.8	- 68.5					· · · · ·		/~/~	, ,					‡							
		+	50	50/0.4	·		100/0.9	м	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>}</u>				-	ŧ							
		±					· · · · · !			, , ,					ŧ							
	0.8	73.5	18	73	27/0.2			м	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, L				_	t							
		ŧ							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, , ,					ŧ							
	-4 2	1 78 5					· · · · · !		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, }					Ŧ							
z -5	-4.2	T 70.0			1			L_м_	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1					T							

T	LENOIR				<u> </u>	GEOLOGIST	Blonshine	e, E.G.		
ove	r -Y6- (Ferr	el	l Rd)						GROUN	D WTR (ft)
	OFFSET	2	5 ft RT			ALIGNMENT	-L-		0 HR.	N/A
	NORTHING	G	578,7	55		EASTING 2,	441,640		24 HR.	FIAD
		Τ	DRILL M	IETHOI	D Mu	d Rotary		HAMM	ER TYPE	Automatic
	COMP. DA	T	E 08/	17/16		SURFACE W	ATER DEP	TH N/	A	
от			SAMP.	/	L O	¢۵	IL AND ROO			
	75 100		NO.	/моі	G	00				
	100/0.8									
 	· · · · · · · · · · · ·					Clayey Shells	Fine SAND , Trace Mica	and cei	mented sa	with Ind
							layers (continue	d)	
				М		-				
				м		-				
 	100/0.8									
	100/0.8			W		-				
· ·	.									
/.				М		- 05 - 7				100.0
				IVI	Ē	<u>-25.7</u>	Terminated	at Eleva	tion -25.7	1 <u>00.0</u> ft in
						Ver	y Dense Cla	iyey Coa	Irse SANL)
						-				
					E					
					F	_				
					-	-				
					F					
					F	-				
					F					
					F					
					F	-				
						-				
					-					
						-				
					-					
						-				
						-				
						-				
						-				
					Ē	_				
					-					
					F					

WBS 46375.1.1		NTY LENOIR	GEOLOGIST Blonshine, E.G.		WBS 46375.1.1	TIP R-5703 COU	NTY LENOIR	GEOLOGIST Blonshine, E.G.
SITE DESCRIPTION Bridge No. 2				ND WTR (ft)		p. 217 on -L- (Felix Harvey Pkwy) (GROUND WTR (ft)
BORING NO. EB2-B Rt. Ln.	STATION 281+81	OFFSET 38 ft RT	ALIGNMENT -L- 0 HR.		BORING NO. EB2-B Rt. Ln.	STATION 281+81	OFFSET 38 ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 73.7 ft	TOTAL DEPTH 98.7 ft	NORTHING 578,754	EASTING 2,441,685 24 HR .	1.9	COLLAR ELEV. 73.7 ft	TOTAL DEPTH 98.7 ft	NORTHING 578,754	EASTING 2,441,685 24 HR. 1.9
DRILL RIG/HAMMER EFF./DATE SME	2938 CME-750 86% 02/11/2016	DRILL METHOD	Mud Rotary HAMMER TYPE	Automatic	DRILL RIG/HAMMER EFF./DATE SM	ME2938 CME-750 86% 02/11/2016	DRILL METHOD	Mud Rotary HAMMER TYPE Automatic
DRILLER Miller, T.	START DATE 09/12/16	COMP. DATE 09/12/16	SURFACE WATER DEPTH N/A		DRILLER Miller, T.	START DATE 09/12/16	COMP. DATE 09/12/16	SURFACE WATER DEPTH N/A
ELEV (ft) DRIVE ELEV (ft) DEPTH (ft) BLOW COUN 0.5ft 0.5ft 0	NT BLOWS PER FO 0.5ft 0 25 50	00T SAMP. ▼ L 75 100 NO. MOI G		N DEPTH (ft)	ELEV DRIVE DEPTH BLOW CO (ft) (ft) 0.5ft 0.5ft		00T SAMP. 75 100 NO. MOI	L O SOIL AND ROCK DESCRIPTION G
75 73.2 0.5 2 3 71.2 2.5 2 3	3 1	SS-66 22%	73.7 GROUND SURFACE	0.0	-5	Match Line		
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		69.7 Tan Gray Fine Sandy CLAY	<u>4.0</u>	-10 -13.5 + 87.2		м К	
65.9 1 7.8	3 	· · · · · · · · · · · · · · · · · · ·	65.9 Gray Clayey Coarse SAND	<u>7.8</u>	-13.5 + 87.2 24 44 -15 - 24 44 -18.5 + 92.2	56/0.5	100/1.0 9	
	2	· · · · · · · · · · · · · · · · · · ·	57.7COASTAL PLAIN	<u> </u>	<u>-20</u> <u>+</u> 52 48/0.3	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
55 22.2 2	3	· · · · · · · · · · · · · · · · · · ·	Black Fine Sandy CLAY with Mica, T Shells [Peedee Formation]	race		21 · · · · · •36 · · ·	··· ··· M	-25.0 98.7 Boring Terminated at Elevation -25.0 ft in Dense Clayey Coarse SAND
50 3 4	7	· · · · · · · · · · · · · · · · · · ·	47.7Balck Clayey Coarse SAND with M	<u>26.0</u> lica				
45 5 10	34	M M						
	7	· · · · · · SS-67 18% · · · · · · · · · · · · · · · · · · ·	39.7Black Fine Sandy CLAY with Shells, ⁺ Mica	<u>34.0</u> Trace				-
31.5 42.2	8 							
26.5 47.2 7 15		M M M	27.7 Green Gray Clayey Fine SAND, Tra Shells, Trace Mica and cemented s	<u>46.0</u> ace and				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	42		layers					
16.5 57.2 16.5 57.2 15 38		100/1.0	• • • • • • • • • • • • • • • • • • •	58.2				
$\begin{array}{c c} & & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ \end{array}$	38	·····/	+ 11.5	62.2				
6.5 - 67.2 6.5 - 67.2 00/0.5		100/0.5	7 7 7 6.0	67.7				
11800 1.5 - 72.2 0 - 42 53 200 - 42 53	41	· · · · · · · · · · · · · · · · · · ·		72.2				
^m -3.5 - 77.2 -5 - 14 14 86	6/0.5		• • • • • • • • • • •	78.7				

SHEET 11 OF 33

Revision No. 0

Particle Size Analysis of Soils



Form No. TR-T88

Revision No. 0 Provision Data: 12/20/00

Revision No. 0 Revision Date: 12/20/	/09	AASHTO T88 as Modifi	ied by NCDOT		CANE	Revis	sion No. 0 sion Date: 12/20/09	9	AASHTO T88 as
S	P.ME Inc. Dalaigh	3201 Spring Forest R	and Dalaigh North	~ .	y Assurance		S.P.	ME, Inc. Raleigh,	2201 Spring Eq
S&ME Project #:	6235-16-010	5201 Spring Forest K		ort Date:	11/8/16	S&N	ME Project #:	6235-16-010	S201 Spring F0
Project Name:		way Extension R-5703	1	Date(s):	11/1-8/16		ect Name:	C.F. Harvey Park	way Extension R
State Project #:	N/A	F.A. Project No: N/A		IP NO: N/A	11/1-0/10		e Project #:	N/A	F.A. Project N
Client Name:	Michael Baker En			II NO. IVA			nt Name:	Michael Baker Er	6
Address:	Raleigh, NC	igineering					ress:	Raleigh, NC	igineering
Boring #:	EB1-A Lt. Ln.	Sample #: SS-	60	Sample Date:	N/A		ing #:	EB1-A Lt. Ln.	Sample #
Location:	Site-Borehole	Offset: N/A		Depth (ft):	0.5-2.0'		ation:	Site-Borehole	Offset
	n: Tan gray fine sand		*	1 1	A-4 (1)				
	" 1"3/4" 1/2'3/8" #4		#60 #100 #200 #270				1.5"	1"3/4" 1/2'3/8" #4	#10 #20
100%						1	00%		
90%		· · · · · · · · · · · · · · · · · · ·					90%		
90 76			\						
80%							80%		
70.0/									+ + + + + + + + + + + + + + + + + + + +
70%							70%		
bercent Bassing %09 and %09 an						Passing	60%		
t bas									
50%						Percent	50%		
a 40%						. Per	40%		
30%							30%		
20%							20%		
10%							10%		
0%			<u>. </u>				0%		
100	10	1	0.1	0.01	0.001		100	10	1
		Particle Size (m	m)						Particle
Carrent	As Defined by NCDOT	12.00	Fine Sand		nd > 0.05 mm			s Defined by NCDOT	1 2 00
Gravel Coarse Sand		and > 2.00 mm n and >0.25 mm	Silt Clay		> 0.005 mm 05 mm		Gravel Coarse Sand		and > 2.00 mm m and >0.25 mm
Maximum Particle		Coarse Sand	12%	Silt	23%	Max	timum Particle Siz		Coarse
Gravel	0%	Fine Sand	45%	Clay	20%	Grav		0%	Fine S
Apparent Relative I		Moisture Co		% Passing #20			arent Relative De		Moist
Liquid Limit	19	Plastic Limit		Plastic Index	8		uid Limit	30	Plastic
Elquid Ellille	17	Soil Mortar (-#1		T lustre maex	0			50	Soil Mort
Coarse Sand	i 12%	Fine Sand 45%		23% C	lay 20%		Coarse Sand	9%	Fine Sand
Description of San	d & Gravel Particles:	Rounded		Angular	X	D	escription of Sand &	& Gravel Particles:	Rounded
Hard & Dura	ible 🗵	Soft	□ We	athered & Friable			Hard & Durable		Soft
References / Comments	s / Deviations: ND=	Not Determined.				Refer	rences / Comments /	Deviations: ND=	Not Determined.
	_								
Karen W		118-06-0305	Laboratory To		11/8/2016		Karen Wa		118-06-0305
Technician	n Name	Certification No.	Position	n	Date		Technician No	ame	Certification No.
Stewart La	nev PF		Senior Eng	vineer			Stewart Lane	PV PE	
Technical Res		Signature	Position		Date		Technical Respon		Signature
i conneur resp	-	be reproduced, except in full, w					_ connear respon		be reproduced, except
								(p = 1 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0	
		3201 Spring For	est Poad						3201 Spr

S&ME, Inc.

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

Quality Assurance

				Quali	ty Assurance
Inc. Raleigh,	3201 Spring Fore	st Road, R	aleigh, North Ca	arolina 27616	
5-16-010			Repor	t Date:	11/8/16
Harvey Parky	vay Extension R-5	703	Test D	Date(s):	11/1-8/16
	F.A. Project No:	N/A	TIP	NO: N/A	
hael Baker En	0				
eigh, NC	0 0				
-A Lt. Ln.	Sample #:	SS-61		Sample Date:	N/A
-Borehole	Offset:	N/A		Depth (ft):	47.5-48.0
k sandy CLAY		1.1/1.1		0	A-6 (4)
1/2'3/8" #4	#10 #20 #	40 #60 #10	0 #200 #270		
		$+ $ \wedge			++
			λ		
			- \		+
			- N		++
				₹	
10	1		0.1	0.01	0.001
	Particle Siz	ze (mm)			
ed by NCDOT		F	ine Sand	< 0.25 mm a	and > 0.05 mm
	and > 2.00 mm	1	Silt		l > 0.005 mm
< 2.00 mm	n and >0.25 mm		Clay	< 0.0)05 mm
#10	Coarse S	and	9%	Silt	22%
0%	Fine San	d	39%	Clay	30%
2.650	Moisture	Content	17.5%	% Passing #20	00 55.3%
30	Plastic L	imit	17	Plastic Index	13
	Soil Mortar				
9%	Fine Sand	39%	Silt	22%	Clay 30%
vel Particles:	Rounded		5.110	Angular	X Solve
×er i articles.	Soft		Weath	hered & Friable	
	Not Determined.	<u>ц</u>	weat		U
IND-	tot Determined.				
	118-06-0305		Laboratory Tech	hnician	11/8/2016
	Certification No.		Position	miviun	Date
	congreation no.		1 000000		Latt
Ξ			Senior Engin	neer	
	Signature	_	Position		Date
is report shall not h	e reproduced. except in f	ull. without the		&ME_Inc.	

report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

3201 Spring Forest Road Raleigh, NC 27616

Revision No. 0

Particle Size Analysis of Soils



Form No. TR-T88

Revision No. 0 Revision Date: 12/20/09

evision Date: 12/20/09			AASHTO T88 as M	lodified by N	NCDOT	P.C.		
S	2.ME I	na Dalaigh	, 3201 Spring Fore	st Dood D	alaigh North	Carolina	Quality As.	surance
S&ME Project #:		5-16-010	, 5201 Spring Fore	si Kuau, K	<u> </u>	port Date:		/8/16
Project Name:			kway Extension R-5	703		st Date(s):		l-8/16
State Project #:	N/A	That vey Fall	F.A. Project No:			ST Date(S). ΓΙΡ ΝΟ:	N/A	1-0/10
Client Name:		nael Baker E	6	N/A		TIP NO:	IN/A	
Address:			ligineering		_			
	B-1	igh, NC	Sample #	SS-62	_	Samula	Data	N/A
Boring #: Location:		Borehole	Sample #: Offset:	N/A		Sample		3.5-5.0'
Sample Description				IN/A		Depu	$\frac{h(ft):}{0} = \frac{1}{A-6}$	
							0 1-0) ()
1.5' 100%	" 1"3/4" 1	/2'3/8" #4	#10 #20 #	40 #60 #10	00 #200 #270			
90%				$+ \mathbf{N} +$				_
	+ +			++1				
80%								
70%								
				+++				
.ig 60%	+				\mathbf{N}			
60%								
a 40%								_
30%								
20%								
								_
10%								I.
0%				+				
100		10	1		0.1	0.0)1	0.001
			Particle Si	ze (mm)				
·	As Define	ed by NCDOT		F	ine Sand	< 0	.25 mm and >	0.05 mm
Gravel			m and > 2.00 mm		Silt	<	0.05 and > 0.0	005 mm
Coarse Sand			nm and >0.25 mm		Clay		< 0.005 m	
Maximum Particle	Size	#20	Coarse S		13%	Silt		19%
Gravel		0%	Fine Sar	d	43%	Clay		25%
Apparent Relative I	Density	2.650	Moisture	e Content	22.5%	% Passi	ing #200	48.3%
Liquid Limit		34	Plastic L	imit	15	Plastic	Index	19
			Soil Mortar	(-#10 Siev	e)			
Coarse Sand	1	13%	Fine Sand	43%	Silt	19%	Clay	25%
Description of San	d & Grav	el Particles:	Rounded			A	ngular	X
Hard & Dura	ble	X	Soft		W	eathered & F	Friable	
References / Comments	s / Deviatio	ons: ND	Not Determined.					
<u>Karen</u> W	Varner		118-06-0305		Laboratory 7	<u>Fechnician</u>	<u>1</u>	1/8/2016
Technician	n Name		Certification No.		Positi	ion		Date
10011110101								
<u>Stewart La</u> Technical Res	•		Signature		Senior En Positi	-		Date

Revision Date: 12/20/09		AASHTO 188 as Me	5 2		Quality Ass	urance
S&I S&ME Project #:	ME, Inc. Raleigh 6235-16-010	, 3201 Spring Fores	t Road, Raleigh	, North Carolina Report Date:		0/16
Project Name:		kway Extension R-57	/03	Test Date(s):		9/20/16
State Project #:	N/A	F.A. Project No:		TIP NO:	N/A	<i>J</i> /20/10
Client Name:	Michael Baker E	0		In No.	11/2 1	
Address:	Raleigh, NC			-		
Boring #:	B1	Sample #:	SS-63	Sample	Date:	N/A
Location:	Site-Borehole	1	N/A			5 - 7.5
Sample Description: I	Light Gray Coarse			1	A-7-	
1.5" 1 100%	"3/4" 1/2'3/8" #4	#10 #20 #4	0 #60 #100 #20	00 #270		
90%						
80%						
70%						
50 60%						
Pas			\rightarrow			
50%			N			
م 40%						
30%						
20%						
10%						
0%			↓			
100	10	1 Particle Siz	0.1 e (mm)	0.	01	0.00
As	Defined by NCDOT		Fine San		0.25 mm and > 0	
Gravel		m and $> 2.00 \text{ mm}$	Silt	<	< 0.05 and > 0.00	
Coarse Sand Maximum Particle Siz		nm and >0.25 mm Coarse Sa	Clay	6% Silt	< 0.005 mm	n 7%
Gravel	0%	Fine Sand		55% Clay		32%
		Moisture			sing #200	41.4%
Apparent Relative Dei Liquid Limit	45	Plastic Li		18 Plastic	•	27
Elquid Ellint		Soil Mortar (Index	21
Coarse Sand	6%		55%	Silt 7%	Clay	32%
Description of Sand &		Rounded			ngular	X
Hard & Durable References / Comments / L		Soft	\boxtimes	Weathered &	Friable	X
Mal Krajan.		104-01-0703	Lab	oratory Manager	0/	12/2016
Iviai Istajali,		Certification No.		Position	<u> </u>	Date
Technician Na	me	Certification No.				
Technician Na		M Contraction No.	- >	ouotom. Monoor	0.1	06/2016
	ET	Signature	<u> </u>	oratory Manager Position	<u>9/</u>	26/2016 Date

3201 Spring Forest Road Raleigh, NC 27616

B1 SS-62 (3.5-5.0')

S&ME, Inc.

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

Revision No. 0

Particle Size Analysis of Soils



Form No. TR-T88

Revision No. 0 Revision Date: 12/20/09

Revision Date: 12/20/09		AASHTO T88 as M	odified by NCL	DOT			
S&ME	. Inc. Raleigh. 3	201 Spring Fore	st Road. Rale	eigh. North C		Quality As 616	surance
	35-16-010			<u> </u>	t Date:		1/8/16
-		ay Extension R-5	703	1	Date(s):		/1-8/16
State Project #: N/	· ·	F.A. Project No:				N/A	
0	ichael Baker Eng	6	A 172 B				
	lleigh, NC	0					
Boring #: B-		Sample #:	SS-64		Sample Da	ate:	N/A
	te-Borehole	Offset:	N/A		Depth (13.5-15.0
Sample Description: Tai	n Black Silty CL	AY				0 A-7	7-6 (4)
1.5" 1"3/4	" 1/2'3/8" #4	#10 #20 #	40 #60 #100	#200 #270			
90%							
			+++		++++	++++	_ _
80%							
70%							
0.0							
60%				\mathbb{N}			
₩ ₩ ₩ ₩							
				\			
م 40%					++++	+++++++++++++++++++++++++++++++++++++++	
20.0/							
30%							
20%							
							_
10%							
0%			· ·				
100	10	1 Particle Siz).1	0.01		0.00
As Def	ined by NCDOT		Fine	Sand	< 0.25	5 mm and >	- 0.05 mm
Gravel		nd > 2.00 mm		Silt		05 and > 0.	
Coarse Sand		and >0.25 mm		lay		< 0.005 n	
Maximum Particle Size	#20	Coarse S	and	3%	Silt		18%
Gravel	0%	Fine San	d	55%	Clay		24%
Apparent Relative Densit	y 2.650	Moisture	Content	51.5%	% Passing	g #200	43.4%
Liquid Limit	42	Plastic L	imit	23	Plastic Inc	lex	19
Carrie Sand	20/	Soil Mortar		0:14	1.00/	Class	240/
Coarse Sand Description of Sand & Gr	3%	Fine Sand Rounded	55%	Silt	18% Ang	Clay	24%
Hard & Durable		Soft		Weat	hered & Fria		
References / Comments / Devid		ot Determined.		weat		iore	
		110.06.0005		1			1/0/001/0
Karen Warner		<u>118-06-0305</u>	L	aboratory Tech	nnician	<u> </u>	1/8/2016
Technician Name		Certification No.		Position			Date
				а · п ·			
Stewart Laney, P	<u>.</u> E		_	Senior Engin	neer		
Stewart Laney, P Technical Responsibility		Signature	_	Senior Engli Position	neer		Date

	Sa	&ME,	, Inc. I	Rale	eigh,	3201 Sj	pring Fo	orest	Road, F	Raleig	h, Nort	h Caro	lina 2	2761	6		
S&ME Proje	ct #:	623	35-16-0	010							Re	eport Da	ate:		11	/14/	/16
Project Name	e:	C.F	7. Harv	vey	Parky	way Ext	tension I	R-570	13		Te	est Date	e(s):		10/7 -	- 11/	/14/16
State Project		N/A	4			F.A. P	roject N	0: N/	/A			TIP NC):	N/2	A		
Client Name:					er En	gineerin	g				_						
Address:			leigh, 1														
Boring #:			1-B R			S	Sample #		S-65				mple				I/A
Location:			e-Bore				Offset		A				Dept	h (ft)			5 - 2
Sample Desc	ription:	Tan	Coars	se to	Fine	e Sandy	Clayey	SILT							A	-4	(2)
100%	1.5"	1"3/4"	1/2'3/8"	•	#4 ©	#10	#20 ©	#40	#60 #10	00 #2	200 #270				1		
				++	++				\mathbf{N}								
90%																	
80%				+++					$+$ \cdot								
70%									1								
				+++						\mathbf{N}							
.us 60%				++						\mathbf{N}							
Percent Passing										N							
erce				+++	++-												
[≏] 40%																	
30%				+++													
2007				+++										N			
20%																	
10%				+++													
0%									+								
100			10				1			0.1			0.0	1			0.0
							Particl	e Size ((mm)								
	A	As Defi	ned by						I	Fine Sa	nd				m and >		
	avel		<u> </u>			and > 2.0		_		Silt			<		and > 0		mm
Maximum Pa	e Sand	ize		< 2.0 #10		n and >0.2	25 mm Coars	e Sar	d	Clay	8%	Sil	t	<	0.005 r	nm	23%
Gravel				0%			Fine S				47%						22%
Apparent Rel	lative D	ensity		ND					ontent		15.8		Pass	ing ‡	<i>‡</i> 200		50.3%
Liquid Limi		ensity		22			Plasti				12		stic	-			10
						S			#10 Siev	ve)					-		
Coars	se Sand		8%	_		Fin	e Sand	47	7%	/	Silt	23	%		Clay		22%
Description	of Sand	& Gra	avel Pa	rticl	es:	Ro	ounded						Aı	ngula	r	I	
Hard	& Durab	ole]			Soft				W	/eathere	d & F	riabl	e	I	
References / Co	omments	/ Devia	ations:		ND=	Not Deter	rmined.										
M	1 Vraio	. БТ				104	01 0702	,		Lal	anatam	Mono			1	1/1/	1/2016
	al Kraja echnician l						01-0703 ication No.	-		Lat	ooratory Posit		ger		1		<u>4/2016</u> ate
						~	R				. 000						
Ma	al Kraja	<u>n, ET</u>				0			>	Lat	ooratory	y Manag	ger		1	1/14	4/2016
	nigal Dam	onsibility	v			Sig	gnature				Posi	tion				D	ate
Tech	nicai Kespo																

3201 Spring Forest Road Raleigh, NC 27616

B1 SS-64 (13.5-15.0')

S&ME, Inc.

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

3201 Spring Forest Road Raleigh, NC 27616

EB1-B Rt. Ln. SS-65 (0.5 - 2 ft) Classification

Form No: TR-T267

Revision No. 0

Revision Date: 07/10/08

Moisture, Ash, and Organic Matter



		AAS	HTO T-267			Quality Ass	surance
	S&ME, Inc. Raleig	gh, 3201 Spring Fo	orest Raod,	Raleigh,	North Caroli	na 27616	
Project #:	6235-16-010				Report Date:	10/21	/16
Project Name:	C.F. Harvey Parkw	ay Extension R-570)3		Test Date(s):	10/18 - 10)/21/16
Client Name:	Michael Baker Eng	ineering					
Client Address	s: Raleigh, NC						
Boring #:	EB1-B Rt. Ln.	Sample #:	SS	-65	Sam	ple Date:	N/A
Location:	Site-Borehole	Offset:	N	/A	D	epth (ft):	0.5 - 2
Sample Descri	ption: Tan Coarse to	Fine Sandy Clayey	SILT (A-4)	(2)			
Equipment:	Balance: 0.01 g.Read	lability, 500g. Minim	um Capaccity	,			
Balance:	<i>S&ME ID #:</i> 1024	Cal. Date:	11/06/16	Due:	11/06/17		
Method A:	Moisture Content D	etermination	Re	equired O	ven Temperat	$ure:105 \pm 5^{\circ}C$	2
	Oven Tempe	rature: 105 °	С		<i>Tare</i> #	р	
						1 - 10	—

	oven Tempera	105	C		14/6 #	Р
t	Tare Weight (Di	sh plus Aluminu	m Foil Cover	 シ	grams	45.69
а	Mass of As-Rece	grams	92.40			
b	Mass of Oven D	ry Specimen + 7	Tare Wt.		grams	86.03
w	Water Weight				(a-b)	6.37
A	Mass of As-Rece	eived Specimen			(a-t)	46.71
В	Mass of Oven D	ry Specimen			(b-t)	40.34
% Mo	isture Content as a	% of As Receiv	ed or Total N	I ass	(w/A)*100	13.6%
%	6 Moisture Content		(w/B)*100	15.8%		
S&ME	E ID #: 1454	Cal. Date:	10/7/16	Due:	10/7/17	

Oven

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination

	104
grams	50.17
grams	86.05
grams	85.56
c-t	35.39
(b-t)	35.88
(C/B)*100	98.6%
100-D	1.4%
	grams grams c-t (b-t) (C/B)*100

Muffle Furnace: S&ME ID #:

<u>Mal Krajan, ET</u>

Technical Responsibility

Notes / Deviations / References:

		/	2		
N	1		X_	-	-
		\subset			-

Signature

Laboratory Manager Position

11/14/2016 Date

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Form No: TR-T289-1 Revision No. 0

Revision Date: 07/10/08

		A		Quality Assurance					
	S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carol								
Project #: 6235-16-010		010				1	1/7/16		
Project Name	e: C.F. Harv	ey Parkway Extension I	R-5703		Test Date(s):	11/5	- 11/7/16		
Client Name:	Michael E	Baker Engineering							
Client Addre	ss: Raleigh, N	ЛС							
Boring #:	EB1-B Rt. Ln.	Sample	e #: SS-65		Sample D	ate:	N/A		
Location:	Site-Borehole	Offs	set: N/A		Depth	(ft):	0.5 - 2		
Sample Desc	ription:	Fan Coarse to Fine Sand	ly Clayey S	SILT (A-4) (2)					
Equipment:									
Balance		S&ME ID#	1024	Cal. Date:	11/6/16	Due:	11/6/17		
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16	Due:	6/11/17		
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16	Due:	NA		

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature ⁰ C	22.4

Measuring pH of Soil

	Meas
Weigtht of Air	Dry Soil (g)
Distilled Water	· (g)
Temperature ⁰ C	2
pH Readings	
Notes / Deviations / References:	AASHTO T-289: Detern

Mal	Kraja	n, ET
Technic	al Respo	onsibility



This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.



pH of Soil

surements	
	30.02
	30.01
	22.4
	5.61

mining pH of Soil for Use in Corrosion Testing

Laboratory Manager Position

11/14/2016

Date

Revision No. 0

Particle Size Analysis of Soils



Form No. TR-T88

Revision No. 0 . 12/20/09 D

Revision Date: 12/20/09		AASHTO T88 as M	Iodified by NCD	OT			Re	vision Date: 12/20/09)	AASHTO T88 as
			5 5		Qual	ity Assurance				
S&I	ME, Inc. Raleigh, 3	201 Spring Fore	est Road, Ralei	igh, North Ca	-	v		S&	ME, Inc. Raleigh,	3201 Spring For
S&ME Project #:	6235-16-010			Report		11/8/16	S&	ME Project #:	6235-16-010	g
Project Name:	C.F. Harvey Parkw	vav Extension R-5	5703	Test D		11/1-8/16		oject Name:	C.F. Harvey Park	way Extension R-
State Project #:		F.A. Project No:		TIP	<u> </u>			ate Project #:	N/A	F.A. Project No
Client Name:	Michael Baker Eng	v	19/23					ient Name:	Michael Baker Er	<i>v</i>
Address:	Raleigh, NC	sincering						ldress:	Raleigh, NC	ignicering
Boring #:	EB2-B Rt. Ln.	Sample #:	88.66		Sample Date:	N/A		pring #:	EB2-B Rt. Ln.	Sample #:
Location:	Site-Borehole	Offset:				0.5-2.0'		cation:	Site-Borehole	Offset:
			N/A		Depth (ft):					
Sample Description:	Tan gray fine silty	SAND			0	A-2-4 (0)		mple Description:	Black clayey coars	se sand
1.5" 1 100% 90% 80% 70% 50% 40% 30% 20% 10%	"3/4" 1/2"3/8" #4		#40 #60 #100	#200 #270			Percent Passing	100% 90% 80% 70%	1"3/4" 1/2'3/8" #4	
0% 100	10	1	0.1	1	0.01	0.00	01	0%	10	1
<u> </u>		Particle Si	ize (mm)							Particle
	Defined by NCDOT		Fine S			and > 0.05 mm			s Defined by NCDOT	
Gravel		and > 2.00 mm	Si			d > 0.005 mm		Gravel		n and > 2.00 mm
Coarse Sand		and >0.25 mm	Cla	2		005 mm		Coarse Sand		m and >0.25 mm
Maximum Particle Siz		Coarse S			Silt	8%		aximum Particle Siz		Coarse
Gravel	0%	Fine Sar	nd	44%	Clay	18%	Gr	avel	1%	Fine Sa
Apparent Relative Der	nsity 2.650	Moisture	e Content	22.1%	% Passing #2	00 29.1%	Ap	parent Relative De	nsity 2.650	Moistu
Liquid Limit	21	Plastic L	Limit	14	Plastic Index	7	Lie	quid Limit	31	Plastic
		Soil Mortar	(-#10 Sieve)							Soil Morta
Coarse Sand	30%	Fine Sand	44%	Silt	8% (Clay 18%		Coarse Sand	49%	Fine Sand
Description of Sand &	c Gravel Particles:	Rounded			Angular	×		Description of Sand &	& Gravel Particles:	Rounded
Hard & Durable		Soft	\mathbf{X}	Weath	ered & Friable	\mathbf{X}		Hard & Durable		Soft
References / Comments / D		Not Determined.					Ret	ferences / Comments / 1		=Not Determined.
Karen War	ner	118-06-0305	La	boratory Tech	inician	11/8/2016		Karen War	rner	118-06-0305
Technician Na	me	Certification No.		Position		Date		Technician No	ame	Certification No.
Stewart Laney	y, P.E			Senior Engin	leer			Stewart Lane	ey, P.E	
Technical Respons		Signature		Position		Date		Technical Respon	•	Signature
-	This report shall not be	e reproduced, except in	full, without the writ	tten approval of S&	ME, Inc.			~	This report shall not	be reproduced, except in
	•		P Forest Road	** *					•	3201 Sprii

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

Quality Assurance

										Qı	uali	ity A	lssui	ance	
ore	st Roa	d, Ra	leigł	1, N	lor	th	Ca	rolina	a 2	76	16				
								Date:				1	1/8/	16	
R-5	703				Test Date(s):						11/1-8/16				
No:					-			NO:		N	/Δ		110		
110.	N/A				_	1.		NO .	_	11/	Π				
				-1											
#:	SS-67						S	Sampl						J/A	
et:	N/A							Dep	oth	(ft	:):		32.3	-33.7	7'
											0	A-	2-6	(1)	
ц	40 #60	#100	42	00 ;	#27	0									
#	40 #60	#100	#2		#27	0									_
				\square							$\left \right $	_			-
									++		\square	-			-
\mathbb{N}^+				++	+				+	++	++	+			-
N				Ħ					₩		Ħ	-			
									П	I	Π				
				\parallel					\parallel	\parallel		_			
	$+ \cdot$			\square	+	_			++	+	\vdash	+			-
	- \			++		_			+	++-	++	-			-
				\square					╈		H	+			
											Ħ	+			
			\searrow												
						-	_		Щ						-
		_		\square	$\left \right $				╈	+	4	_			- 11
				\square					++		H	-			-
				++		-			+	++-	++	+			
	<u> </u>								++		Ħ	+			
			0.1					0).01					(0.001
cle Siz	ze (mm)														
-	. ,				_		_		_	_					
	-	Fir	e Sar	ıd	< 0.25 mm					_					
			Silt				_		< 0			id > 0.005 mm .005 mm			
	o m d		Clay	4	00	/		2:14		<	< U.	005	mm	00/	
rse S					.9%			Silt						9%	
San					2%			Clay						19%	
sture	e Conte	ent		17	7.9	%	9	% Pas	sir	ıg	#2	00		30.39	%
tic L	imit				13]	Plastic	e Ir	nde	x			18	
	(-#10 \$	Sieve)													
1	23%)		9	Silt	t	(9%			(Clay	7	19%	6
	2370				5110		-		An	<u>m</u> 1		Juj		\mathbf{X}	5
						w.	oth			-					
						we	aine	ered &	rr	180	le				
-						_									~
<u>)5</u>]	Labo	orat				niciar	<u>1</u>					8/201	<u>6</u>
0.					Pos	sitio	п						Ľ	Date	
						_									
			<u>S</u>	eni	or	En	gine	eer							
					Pos	sitio	n						Ľ	Date	
	ull with	ut thay	witten	ann	ROL	alot	(S.R.)	ME Ino							

3201 Spring Forest Road Raleigh, NC 27616

Revision No. 0

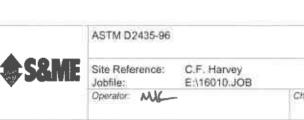
Particle Size Analysis of Soils



Revision No. 0 Revision Date: 12/20	/09	A	ASHTO T88	as Mod	ified by NC	CDOT			
	&ME. Inc. R	aleigh, 32	01 Spring l	Forest	Road. Ra	leigh. North	Qi Carolina 2761	<i>iality Assi</i> 16	irance
S&ME Project #:	6235-16-01	<u> </u>	or opting i	. or ese .		<u> </u>	port Date:	12/2	7/16
Project Name:	C.F. Harve	y Parkwa	y Extension	R-570	3		st Date(s):	12/24 - 1	2/27/16
State Project #:	N/A	F	.A. Project	No: N/	A	1	TIP NO: N/	Ά	
Client Name:	Michael Ba		neering						
Address:	Raleigh, N	С							
Boring #:	EB1-B Rt.		Sample		Г-8		Sample Date		N/A
Location:	Site-Boreh		Offse		/A		Depth (ft	/	- 17.0 ft.
Sample Description	1: Dark Gray (Coarse to I	Fine Sandy	Silty C	LAY			A-6	(0)
	" 1"3/4" 1/2'3/8"	#4	#10 #20	#40	#60 #100	#200 #270			
90%									
80%									
00 /0									
70%									-
50 %									
ercent Passing									
ti 50%						- \			
erce									
≏ 40%									
30%									
20%									
10%									
0%	10		1		*	0.1	0.01		0.00
100	10		Part	icle Size (0.1	0.01		0.00
	As Defined by N	Срот			Fin	e Sand	< 0.25 n	nm and > 0	.05 mm
Gravel			d > 2.00 mm			Silt		and > 0.00	
Coarse Sand Maximum Particle			nd >0.25 mm	rse San		Clay 40/	< Silt	< 0.005 mm	8%
					a	4%			
Gravel		%		Sand		67%	Clay		21%
Apparent Relative	5	D		sture C		ND	% Passing		36.0%
Liquid Limit	3′	/		tic Lim	1t #10 Sieve)	26	Plastic Inde	x	11
Coarse San	d 4%		Fine Sand	,	7%	Silt	8%	Clay	21%
Description of Sar		icles:	Rounded	. 57		~	Angul	,	X
Hard & Dura			Soft			W	eathered & Friab		
	o / Daviations.	ND=No	t Determined.						
References / Comment	s / Deviaions.								
			104 01 07			T 1	M	10	7/2016
Mal Kra	jan, ET		<u>104-01-07(</u>			Laboratory	-		27/2016
	jan, ET		104-01-070 Certification N		9	Laboratory Positi	-		27/2016 Date
Mal Kra Technicia	j <mark>an, ET</mark> n Name	N			>	Positi	on		Date
Mal Kra	j <u>an, ET</u> ^{n Name} jan, ET	Ø			>		on Manager	<u>9/2</u>	

Oedometer Settlement Tests

Sample details Sketch showing specimen location in original Sample		5.0 ark
	$\begin{array}{l} \mbox{Type} \\ \mbox{Height } H_{\Omega} \mbox{(in)} \\ \mbox{Diameter } D_{\Omega} \mbox{(in)} \\ \mbox{Weight } W_{\Omega} \mbox{(gr)} \\ \mbox{Bulk Density } \rho \mbox{(PCF)} \\ \mbox{Particle Density } \rho_{s} \end{array}$	1 1 2 2 1 1 2 2 (
Initial Conditions		
Settlement Channel Moisture Content w_0 % Dry Density p_d (PCF) Voids Ratio e_0	1001 34.1 84.95 0.9546	
Deg of Saturation S ₀ % Swelling Pressure Ss (TSF)	94.9 0.000	
Final Conditions		
Moisture Content w _f %	33.4	
Dry Density _{Ρd} (PCF) Voids Ratio e _f	86.77 0.9137	
Deg of Saturation S _f %	97.16	
Settlement: (in)	0.021	
Compression Index C _c	0.085	
	Test specimer	



3201 Spring Forest Road Raleigh, NC 27616

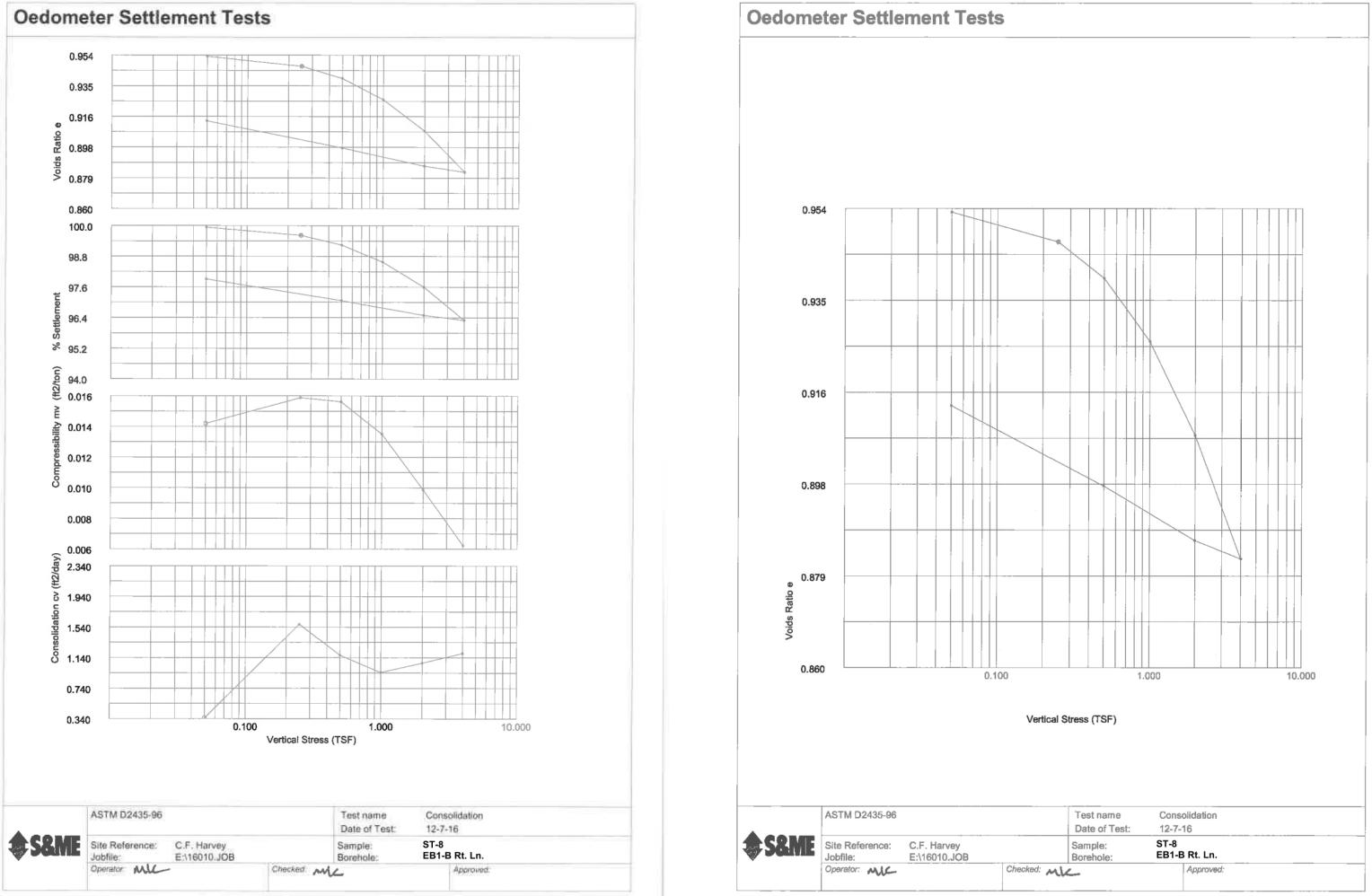
EB1-B Rt. Ln. ST-8 (15.0 - 17.0 ft) Classification

.0 - 17.0 ft. rk Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)

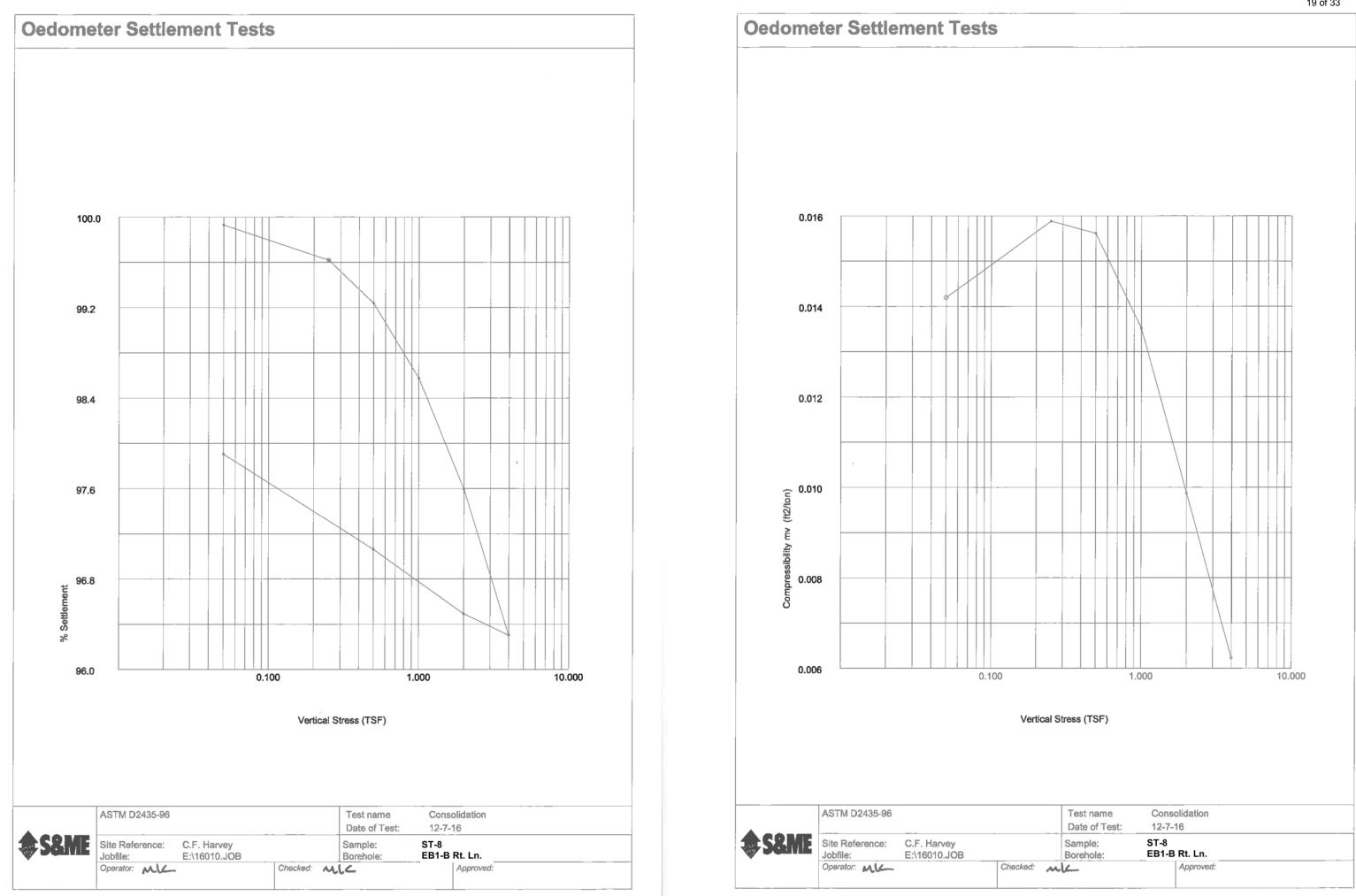
Undisturbed 0.998 2.501 146.57 113.89 2.661 (measured)

taken from the middle portion of UD tube.

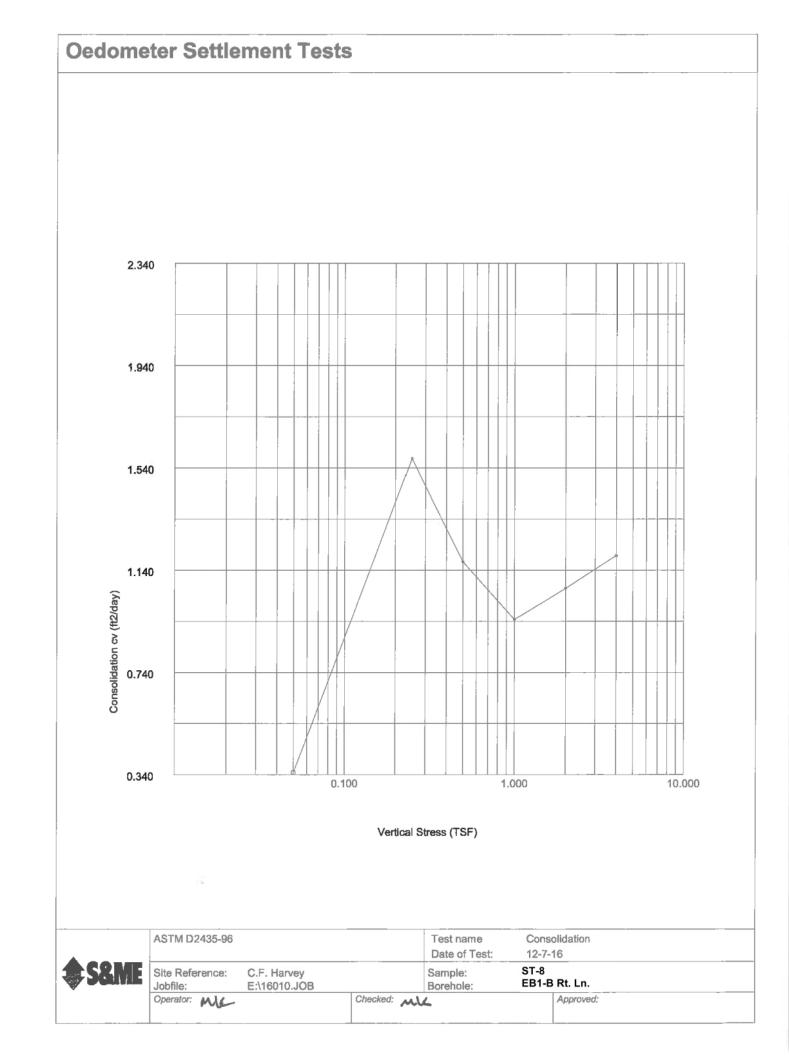
	Test name Date of Test	Consolidation 12-7-16	
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
ecked;	MK_	Approved:	



	Test name	Consolidation	
	Date of Test:	12-7-16	
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
hecked.	MK	Approved:	



	Test name	Consolidation	
	Date of Test:	12-7-16	
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
checked:	mle	Approved:	



Stress (TSF)	lnitial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e _f	t ₅₀ (mins)	Secondary Compr C _{sec}	c _v (ft2/day)	m _v (ft2/ton)
0.050	21.6	0.0007	0.0	21.6	0.9532	1.430	0.00	0.348	0.014
0.250	21.6	0.0038	0.0	21.6	0.9472	0.314	0.0001	1.577	0.016
0.500	21.6	0.0076	0.0	21.6	0.9397	0.420	0.00	1.173	0.015
1.000	21.6	0.0142	0.0	21.6	0.9268	0.514	0.00	0.948	0.013
2.000	21.6	0.0240	0.0	21.6	0.9076	0.448	0.0003	1.069	0.010
4.000	21.6	0.0369	0.0	21.6	0.8823	0.391	0.0004	1.197	0.007
2.000	21.6	0.0350	0.0	21.6	0.8861				0.001
0.500	21.6	0.0293	0.0	21.6	0.8972				0.004
0.050	21.6	0.0209	0.0	21.6	0.9137				0.019

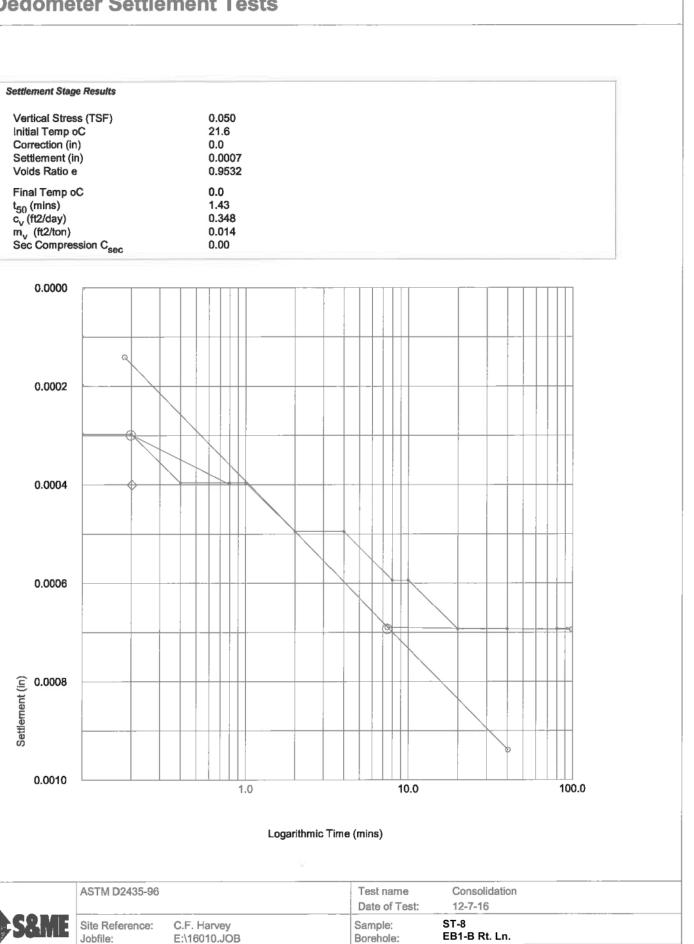
ASTM	D243	5-96
------	------	------

	Test name Date of Test:	Consolidation 12-7-16
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.
icked:	mle.	Approved

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.033	1	0.0001	0.0001
4	0.050	2	0.0002	0.0002
5	0.067	2	0.0002	0.0002
6	0.083	2	0.0002	0.0002
7	0.100	3	0.0003	0.0003
8	0.200	3	0.0003	0.0003
9	0.400	4	0.0004	0.0004
10	0.800	4	0.0004	0.0004
11	1.000	4	0.0004	0.0004
12	2.000	5	0.0005	0.0005
13	4.000	5	0.0005	0.0005
14	8.000	6	0.0006	0.0006
15	10.000	6	0.0006	0.0006
16	20.000	7	0.0007	0.0007
17	40.000	7	0.0007	0.0007
18	80.000	7	0.0007	0.0007
19	93.330	7	0.0007	0.0007

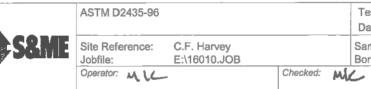
Oedometer \$	Settlement	Tests
--------------	------------	-------

Settlement Stage Results	
Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0007
Voids Ratio e	0.9532
Final Temp oC	0.0
t ₅₀ (mins)	1.43
c _v (ft2/day)	0.348
m _v (ft2/ton)	0.014
Sec Compression C _{sec}	0.00



Approved:

ASTM D2435-96			Test name Date of Test:	Consolidation 12-7-16	Load: 0.050 (TSF)
Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
Operator: MUC		Checked: M	L-	Appnive	đ

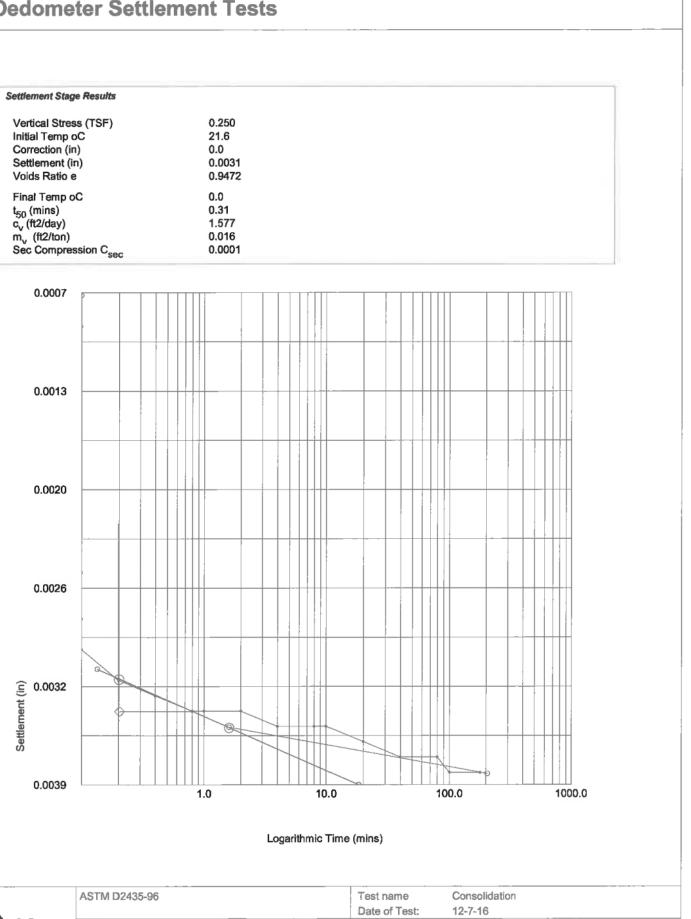


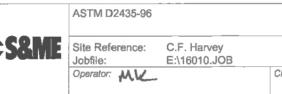
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	7	0.0007	0.0007
2	0.017	9	0.0009	0.0009
3	0.033	9	0.0009	0.0009
4	0.050	25	0.0025	0.0025
5	0.067	28	0.0028	0.0028
6	0.083	30	0.0030	0.0030
7	0.100	30	0.0030	0.0030
8	0.200	32	0.0032	0.0032
9	0.400	33	0.0033	0.0033
10	0.800	34	0.0034	0.0034
11	1.000	34	0.0034	0.0034
12	2.000	34	0.0034	0.0034
13	4.000	35	0.0035	0.0035
14	8.000	35	0.0035	0.0035
15	10.000	35	0.0035	0.0035
16	20.000	36	0.0036	0.0036
17	40.000	37	0.0037	0.0037
18	80.000	37	0.0037	0.0037
19	100.000	38	0.0038	0.0038
20	178.550	38	0.0038	0.0038

ASTM D2435	96		Test name Date of Test:	Cons 12-7-	olidation Load: 0.250 (TSF 16
Site Reference	E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.
Operator: M	L	Checked: M	ic.		Approved:

Oedometer Settlement Tests

0.250
21.6
0.0
0.0031
0.9472
0.0
0.31
1.577
0.016
0.0001



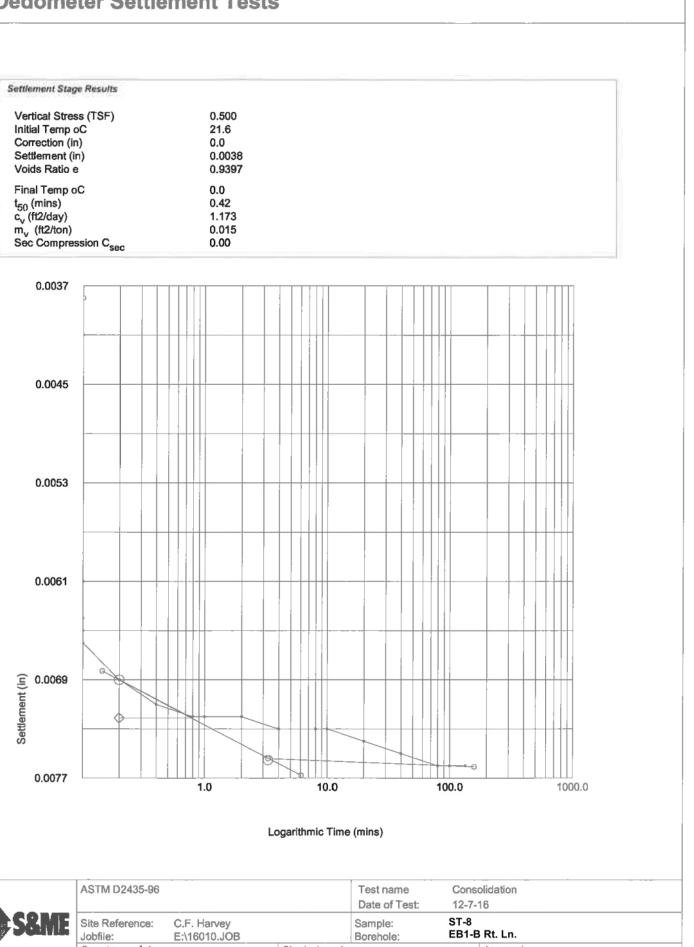


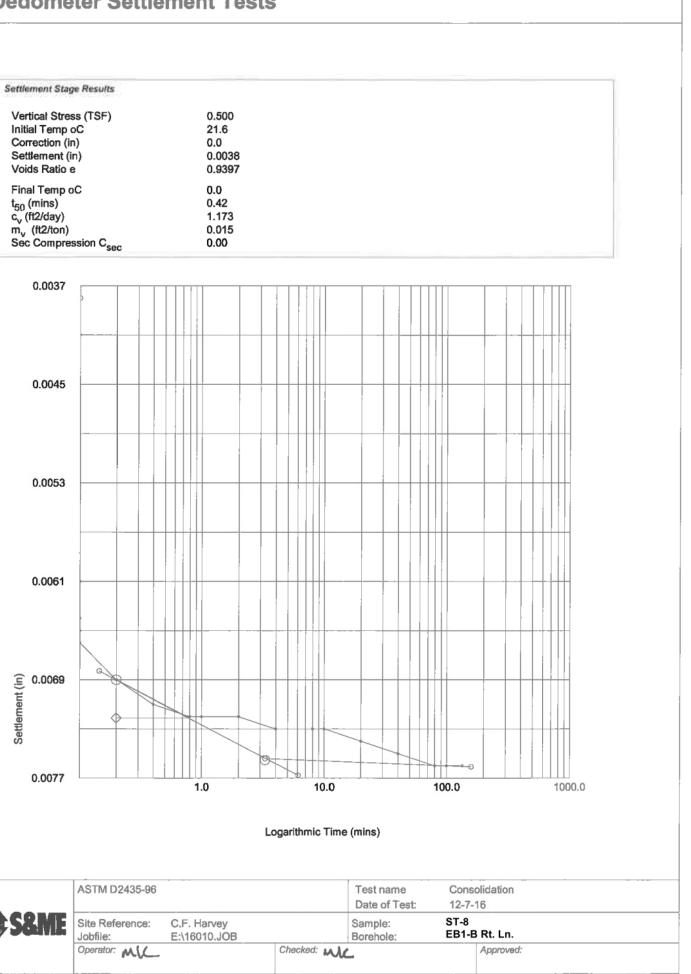
ST-8 EB1-B Rt. Ln. Sample: Borehole: Checked: MK Approved:

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	38	0.0038	0.0038
2	0.017	41	0.0041	0.0041
3	0.033	41	0.0041	0.0041
4	0.050	61	0.0061	0.0061
5	0.067	64	0.0064	0.0064
6	0.083	65	0.0065	0.0065
7	0.100	66	0.0066	0.0066
8	0.200	69	0.0069	0.0069
9	0.400	71	0.0071	0.0071
10	0.800	72	0.0072	0.0072
11	1.000	72	0.0072	0.0072
12	2.000	72	0.0072	0.0072
13	4.000	73	0.0073	0.0073
14	8.000	73	0.0073	0.0073
15	10.000	73	0.0073	0.0073
16	20.000	74	0.0074	0.0074
17	40.000	75	0.0075	0.0075
18	80.000	76	0.0076	0.0076
19	100.000	76	0.0076	0.0076
20	135.067	76	0.0076	0.0076

	ASTM D2435-96			Test name Date of Test:	Consolida 12-7-16	tion Load: 0.500 (TSF)
S&ME	Site Reference: Jobfile:	C.F. Harvey E.\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt.	Ln.
	Operator MK		Checked: M	K	Αρι	anaved:

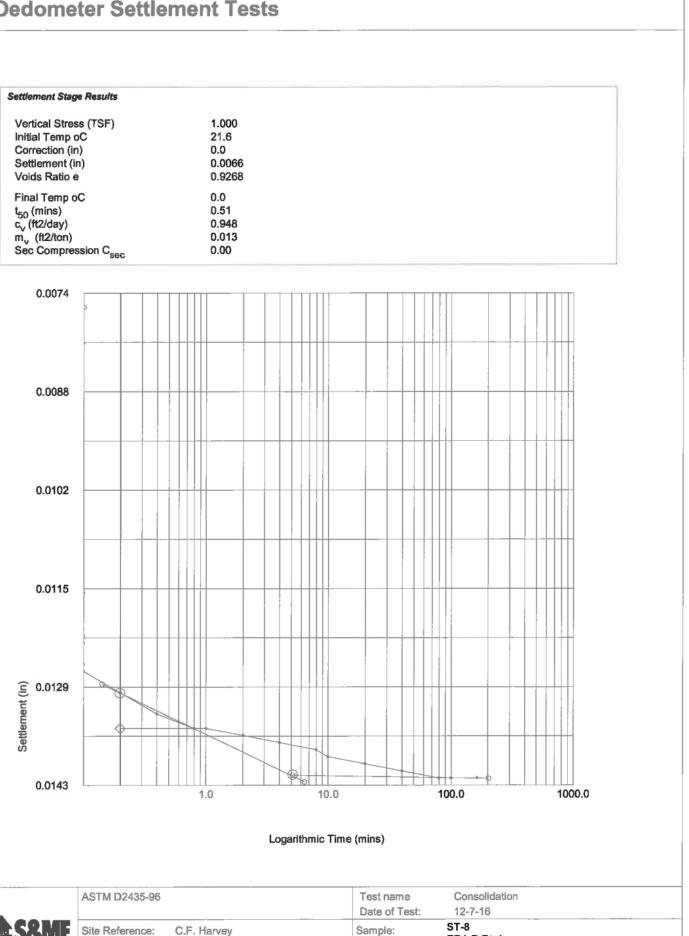
Settlement Stage Results	
Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0038
Voids Ratio e	0.9397
Final Temp oC	0.0
t ₅₀ (mins)	0.42
c _v (ft2/day)	1.173
m _v (ft2/ton)	0.015
Sec Compression C _{sec}	0.00



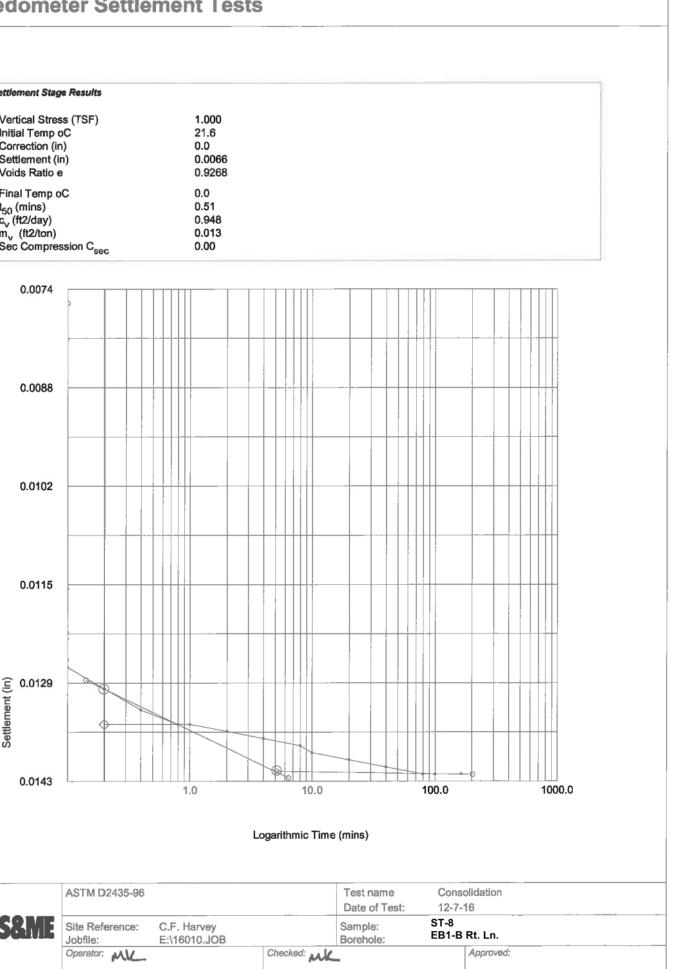


No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	76	0.0076	0.0076
2	0.017	81	0.0081	0.0081
3	0.033	116	0.0116	0.0116
4	0.050	122	0.0122	0.0122
5	0.067	123	0.0123	0.0123
6	0.083	126	0.0126	0.0126
7	0.100	127	0.0127	0.0127
8	0.200	130	0.0130	0.0130
9	0.400	133	0.0133	0.0133
10	0.800	135	0.0135	0.0135
11	1.000	135	0.0135	0.0135
12	2.000	136	0.0136	0.0136
13	4.000	137	0.0137	0.0137
14	8.000	138	0.0138	0.0138
15	10.000	139	0.0139	0.0139
16	20.000	140	0.0140	0.0140
17	40.000	141	0.0141	0.0141
18	80.000	142	0.0142	0.0142
19	100.000	142	0.0142	0.0142
20	163.330	142	0.0142	0.0142

Settlement Stage Results	
Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0066
Voids Ratio e	0.9268
Final Temp oC	0.0
t ₅₀ (mins)	0.51
c _v (ft2/day)	0.948
m _v (ft2/ton)	0.013
Sec Compression C _{sec}	0.00



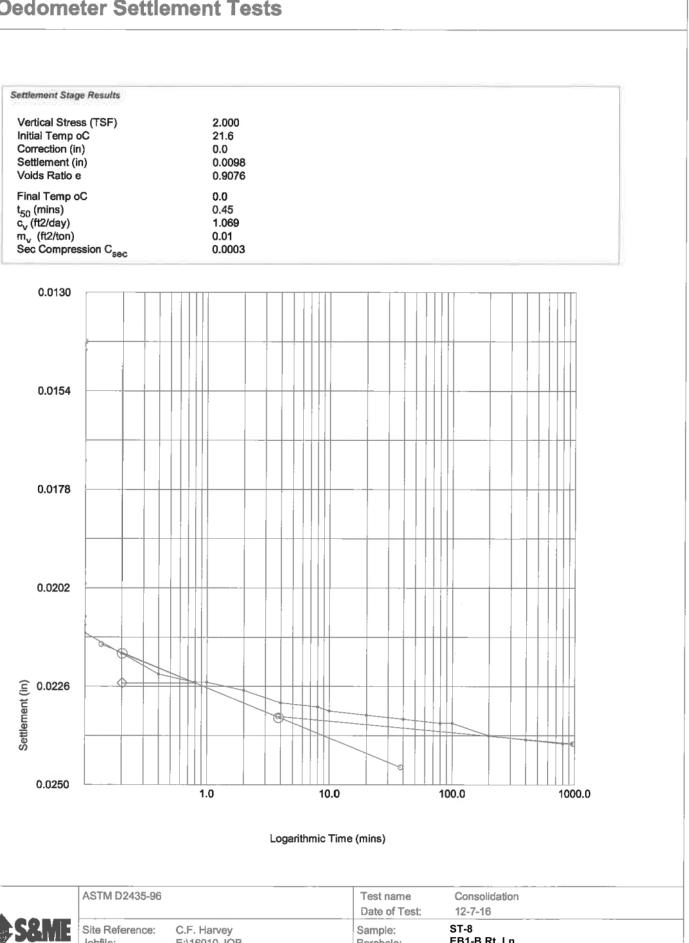
S&ME	ASTM D2435-96			Test name Date of Test:	Conso 12-7-1	lidation Load: 1.000 (TSF) 6
	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B F	Rt. Ln.
	Operator: ML		Checked: M	1c		Approved.

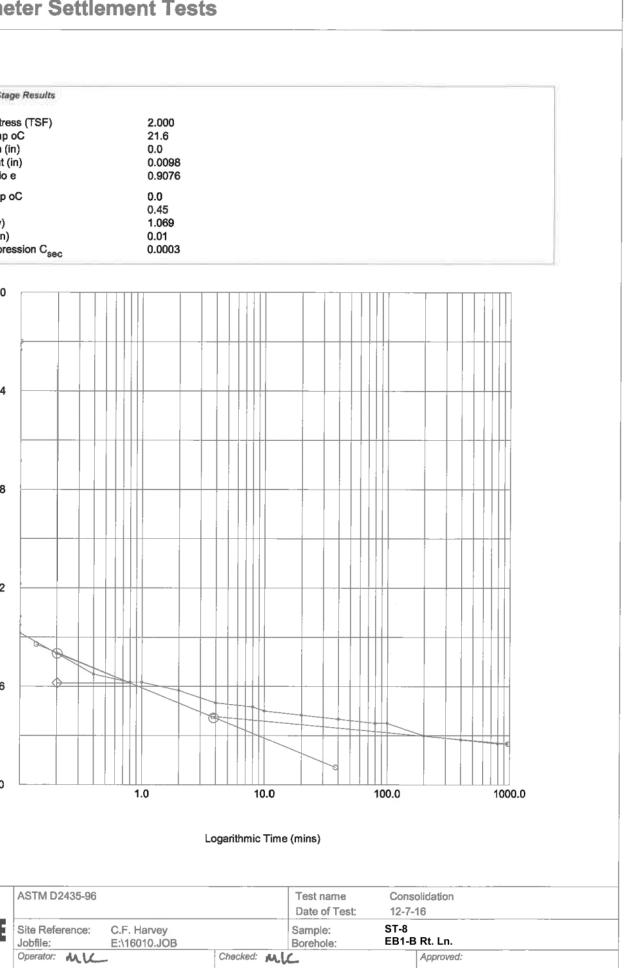


No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	142	0.0142	0.0142
2	0.017	144	0.0144	0.0144
3	0.033	171	0.0171	0.0171
4	0.050	201	0.0201	0.0201
5	0.067	209	0.0209	0.0209
6	0.083	211	0.0211	0.0211
7	0.100	213	0.0213	0.0213
8	0.200	218	0.0218	0.0218
9	0.400	223	0.0223	0.0223
10	0.800	225	0.0225	0.0225
11	1.000	225	0.0225	0.0225
12	2.000	227	0.0227	0.0227
13	4.000	230	0.0230	0.0230
14	8.000	231	0.0231	0.0231
15	10.000	232	0.0232	0.0232
16	20.000	233	0.0233	0.0233
17	40.000	234	0.0234	0.0234
18	80.000	235	0.0235	0.0235
19	100.000	235	0.0235	0.0235
20	200.000	238	0.0238	0.0238
21	400.000	239	0.0239	0.0239
22	800.000	240	0.0240	0.0240
23	948.650	240	0.0240	0.0240

	ASTM D2435-96			Test name Date of Test:	Cons 12-7-	olidation Load: 2.000 (TSF) 16
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.
•	Operator: MK	-	Checker M	6		Approved:

Settlement Stage Results	
Vertical Stress (TSF) Initial Temp oC Correction (in) Settlement (in) Voids Ratio e	2.000 21.6 0.0 0.0098 0.9076
Final Temp oC t ₅₀ (mins) c _v (ft2/day) m _v (ft2/ton) Sec Compression C _{sec}	0.0 0.45 1.069 0.01 0.0003
0.0130	



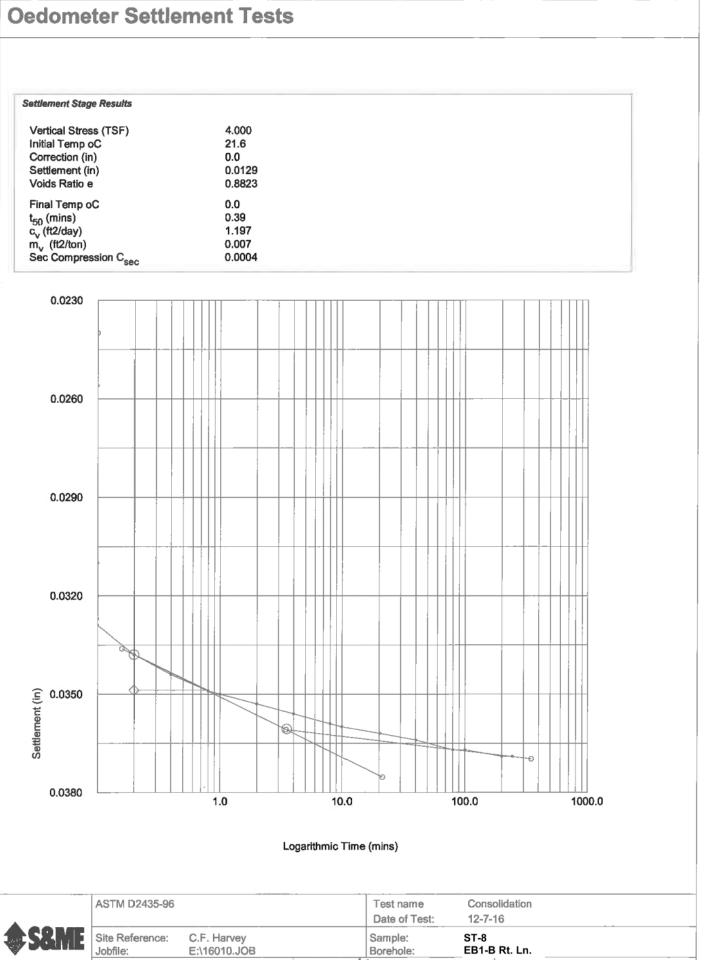


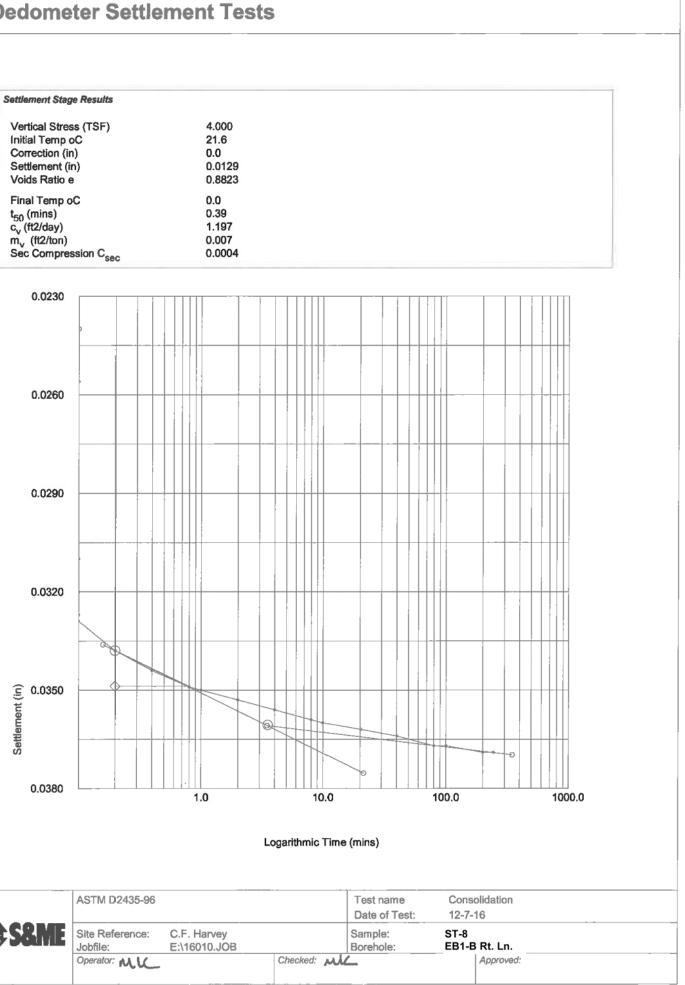
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
hecked:	MLC	Approved:	

No.	Time (mins)	Displacement (divs)	Displacement (In)	Settlement (in)
1	0.000	240	0.0240	0.0240
2	0.017	256	0.0256	0.0256
3	0.033	256	0.0256	0.0256
4	0.050	310	0.0310	0.0310
5	0.067	320	0.0320	0.0320
6	0.083	327	0.0327	0.0327
7	0.100	329	0.0329	0.0329
8	0.200	338	0.0338	0.0338
9	0.400	344	0.0344	0.0344
10	0.800	349	0.0349	0.0349
11	1.000	350	0.0350	0.0350
12	2.000	353	0.0353	0.0353
13	4.000	356	0.0356	0.0356
14	8.000	359	0.0359	0.0359
15	10.000	360	0.0360	0.0360
16	20.333	362	0.0362	0.0362
17	40.333	364	0.0364	0.0364
18	80.333	367	0.0367	0.0367
19	100.333	367	0.0367	0.0367
20	200.333	369	0.0369	0.0369
21	244.517	369	0.0369	0.0369

Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB	Samp Boreh	le: ST-	
ASTM D2435-96		110.571	and such a second	-7-16

Settlement Stage Results	
Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0129
Voids Ratio e	0.8823
Final Temp oC	0.0
t ₅₀ (mins)	0.39
c, (ft2/day)	1.197
m, (ft2/ton)	0.007
Sec Compression C _{sec}	0.0004

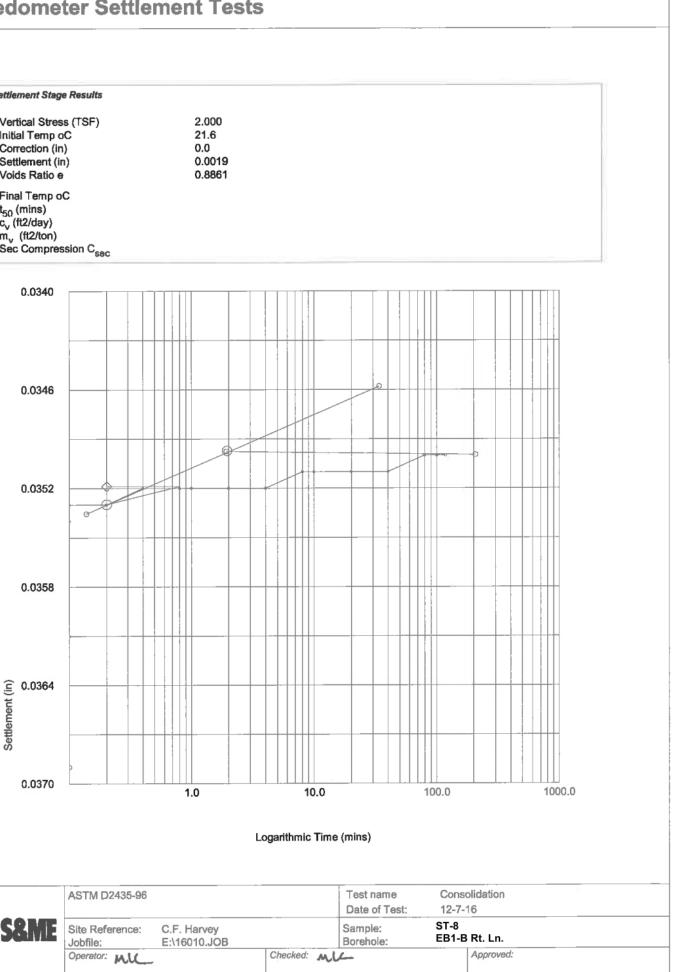




No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	369	0.0369	0.0369
2	0.017	361	0.0361	0.0361
3	0.033	354	0.0354	0.0354
4	0.050	353	0.0353	0.0353
5	0.067	353	0.0353	0.0353
6	0.083	353	0.0353	0.0353
7	0.100	353	0.0353	0.0353
8	0.200	353	0.0353	0.0353
9	0.400	352	0.0352	0.0352
10	0.800	352	0.0352	0.0352
11	1.000	352	0.0352	0.0352
12	2.000	352	0.0352	0.0352
13	4.000	352	0.0352	0.0352
14	8.000	351	0.0351	0.0351
15	10.000	351	0.0351	0.0351
16	20.000	351	0.0351	0.0351
17	40.000	351	0.0351	0.0351
18	80.000	350	0.0350	0.0350
19	100.000	350	0.0350	0.0350
20	117.767	350	0.0350	0.0350

	ASTM D2435-96			Test name Date of Test:	Consol 12-7-10	idation Load: 2.000 (TSF) 6
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B I	Rt. Ln.
	Operator: MUL		Checked: 📣	Le.	1	Approved

Oedometer Settlement Tests Settlement Stage Results Vertical Stress (TSF) 2.000 21.6 Initial Temp oC 0.0 Correction (in) Settlement (in) 0.0019 Voids Ratio e 0.8861 Final Temp oC t_{50} (mins) c_v (ft2/day) m_v (ft2/ton) Sec Compression C_{sec} 0.0340 0.0346 0.0352 Ø 0.0358 드 0.0364 Settlement 0.0370 1.0



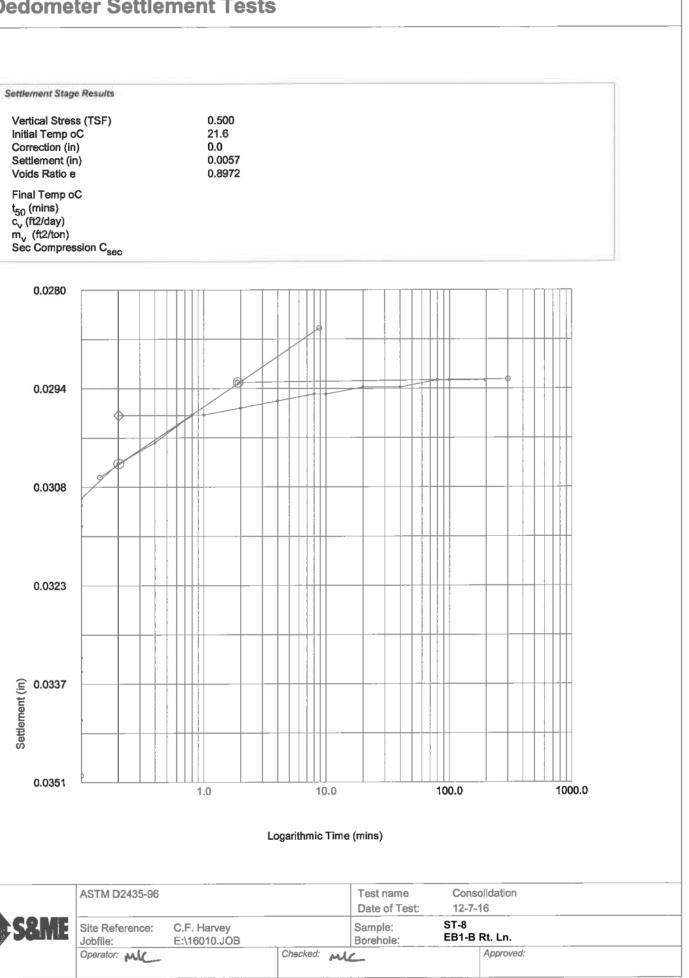
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	350	0.0350	0.0350
2	0.017	342	0.0342	0.0342
3	0.033	335	0.0335	0.0335
4	0.050	333	0.0333	0.0333
5	0.067	314	0.0314	0.0314
6	0.083	311	0.0311	0.0311
7	0.100	310	0.0310	0.0310
8	0.200	305	0.0305	0.0305
9	0.400	302	0.0302	0.0302
10	0.800	298	0.0298	0.0298
11	1.000	298	0.0298	0.0298
12	2.000	297	0.0297	0.0297
13	4.000	296	0.0296	0.0296
14	8.000	295	0.0295	0.0295
15	10.000	295	0.0295	0.0295
16	20.000	294	0.0294	0.0294
17	40.000	294	0.0294	0.0294
18	80.000	293	0.0293	0.0293
19	100.000	293	0.0293	0.0293
20	196.130	293	0.0293	0.0293

•	ASTM D2435-96			Test name Date of Test	Conso 12-7-1	elidation Load: 0.500 (TSF)	
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B I	Rt. Ln.	
	Operator: M.LC		Checked M	K		Approved.	

Oedometer Settlement Tests

Settlement Stag Vertical Stress Initial Temp of Correction (in Settlement (in Voids Ratio e Final Temp of t ₅₀ (mins) c _v (ft2/day) m _v (ft2/ton) Sec Compress	s (TSF) C)) C	C			0.500 21.6 0.0 0.0057 0.8972		
0.0280	-						
0.0294	<						
0.0308	2					 	
0.0323							
Settlement (in)							
ഗ് 0.0351	2			1	.0		

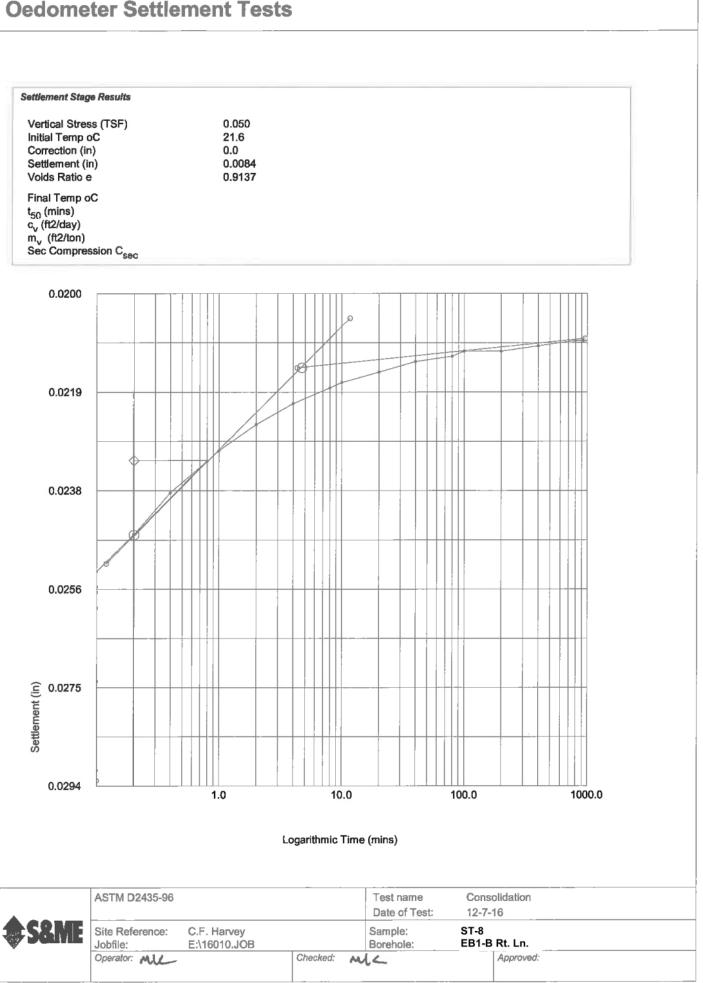
1



No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	293	0.0293	0.0293
2	0.017	291	0.0291	0.0291
3	0.033	274	0.0274	0.0274
4	0.050	260	0.0260	0.0260
5	0.067	257	0.0257	0.0257
6	0.083	256	0.0256	0.0256
7	0.100	253	0.0253	0.0253
8	0.200	246	0.0246	0.0246
9	0.400	238	0.0238	0.0238
10	0.800	232	0.0232	0.0232
11	1.000	230	0.0230	0.0230
12	2.000	225	0.0225	0.0225
13	4.000	221	0.0221	0.0221
14	8.000	218	0.0218	0.0218
15	10.000	217	0.0217	0.0217
16	20.000	215	0.0215	0.0215
17	40.000	213	0.0213	0.0213
18	80.000	212	0.0212	0.0212
19	100.000	211	0.0211	0.0211
20	200.000	211	0.0211	0.0211
21	400.000	210	0.0210	0.0210
22	800.000	209	0.0209	0.0209
23	930.983	209	0.0209	0.0209

	ASTM D2435-96			Test name Date of Test:	Consolida 12-7-16	ation Load: 0.050 (TSF)
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt.	Ln.
	Operator: ML		Checked: 🔺	NIC	App	proved:

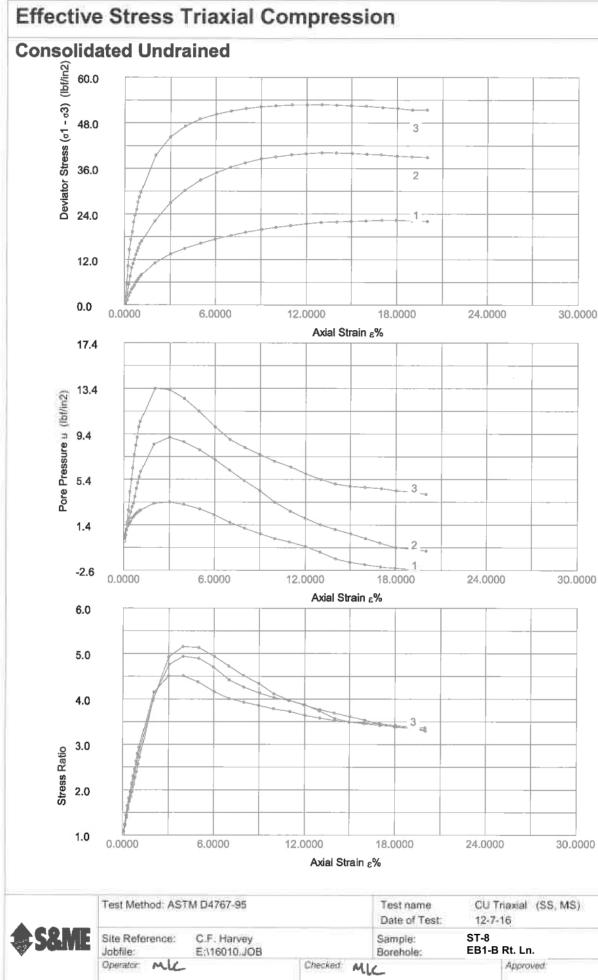
Settlement Sta	ge Results		
Vertical Stre Initial Temp Correction (i Settlement (Voids Ratio	oC in) in)	0.050 21.6 0.0 0.0084 0.9137	
Final Temp t_{50} (mins) c_v (ft2/day) m_v (ft2/ton) Sec Compresent			
0.0200			
0.0219			
0.0238			
0.0256			
Settlement (in) Settlement (in)			
ഗ് 0.0294			



Effective Stress Triaxial Compression

Consolidated Undrained

Sample details Sketch showing specimen location in original Sample	Depth Description:		.0 - 17.0 ark Gray (to Fine Sandy S	Silty CLAY	(A-6) (0)
	Type Height H_{Ω} (in) Diameter D_{Ω} (i Weight W_{Ω} (gr Bulk Density ρ Particle Densit) (PCF)	Specim Undistu 5.974 2.864 1167.6 115.58 2.661 (measu	rbed	Specimen 2 Undisturbed 5.951 2.864 1176 116.86 2.661 (measured)	Specime Undisturi 5.863 2.865 1170.8 118.00 2.661 (measure	bed
Initial Conditions							
	Specimen 1	Specin		Specir	men 3		
Cell Pressure o ₃ (lbf/in2) Pore Pressure u (lbf/in2)	7.0 0.0	16.0 0.0		26.0 0.0			
Machine Speed d.(in/min)	0.0079	0.0091		0.0068	3		
No. of Membranes	1	1		1	-		
Total Thickness (in)	0.012	0.012		0.012			
Strain Channel	1798	1798		1798			
Load Channel	1798	1798		1798			
Pore P. Channel	1779	1779		1779			
Volume Channel	Volume Chang				e Chang		
Mointure Content w %			_		0		
Moisture Content w ₀ %	36.9 84.45	35.7 86.12		37.6 85.76			
Dry Density _{Ρd0} (PCF) Voids Ratio e ₀	0.97	0.93		0.94			
Deg of Saturation S ₀ %	100.00	100.00		100.00)		
Final B Value	0.98	0.97		0.98	,		
51							
Final Conditions	Specimen 1	Specin	nen 2	Specin	nen 3		Eallura Skatah
Moisture Content w _f %	33.8	31.8		31.5	nen 3		Fallure Sketch
Moisture Content w _f % Dry Density _{Pd} (PCF)	33.8 86.50	31.8 88.85	;	31.5 89.27	nen 3		Fallure Sketch Sp 1 Sp 2
Moisture Content w _f % Dry Density _{Pd} (PCF) Voids Ratio e _f	33.8 86.50 0.92	31.8 88.85 0.87		31.5 89.27 0.86	nen 3		
Moisture Content w _f % Dry Density ρ _d (PCF) Voids Ratio e _f Deg of Saturation S _f %	33.8 86.50 0.92 97.93	31.8 88.85 0.87 97.53		31.5 89.27 0.86 97.61			
Moisture Content w _f % Dry Density ρ _d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria	33.8 86.50 0.92 97.93 Mx Stress Rate	31.8 88.85 0.87 97.53 Mx Street	ess Ratio	31.5 89.27 0.86 97.61 Mx Str			
Moisture Content w _f % Dry Density ρ _d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain ε _f %	33.8 86.50 0.92 97.93 Mx Stress Ratio 4.0	31.8 88.85 0.87 97.53 Mx Stre 4.0	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0			Sp 1 Sp 2
Moisture Content w _f % Dry Density p _d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain _{8f} % Corr Dev Stress (σ ₁ - σ ₂)f (lbf/in2)	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1			
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain ϵ_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2)	33.8 86.50 0.92 97.93 Mx Stress Ratio 4.0	31.8 88.85 0.87 97.53 Mx Stre 4.0	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0			Sp 1 Sp 2
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain ϵ_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2)	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3	ess Ratio	31.5 89.27 0.86 97.61 Mx Stro 4.0 47.1 13.5			Sp 1 Sp 2
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2
Final Conditions Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3) _f Notes:	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain s_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain s_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain s_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain s_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0) 14.9 3.8 18.7	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6			Sp 1 Sp 2 Sp 3
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain s _f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Minor Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3) _f Notes:	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0 14.9 3.8 18.7 4.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6	ess Ratio	CLIT	Sp 1 Sp 2 Sp 3 Surface Inclination
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ε_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (Ibf/in2) Minor Stress σ_{3f} (Ibf/in2) Major Stress σ_{1f} (Ibf/in2) Stress Ratio (σ_1/σ_3)f	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0 14.9 3.8 18.7 4.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6	ess Ratio		Sp 1 Sp 2 Sp 3 Surface Inclination
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ϵ_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Major Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3) _f Notes:	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0 14.9 3.8 18.7 4.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6 4.5	ess Ratio Test name Date of Test:	12-7-	Sp 1 Sp 2 Sp 3 Surface Inclination
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Failure Criteria Axial Strain ϵ_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Major Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3) _f Notes: Test Method: AST	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0 14.9 3.8 18.7 4.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6 4.5	Test name Date of Test: Sample:	12-7-1 ST-8	Sp 1 Sp 2 Sp 3 Surface Inclination
Moisture Content w_f % Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation S_f % Failure Criteria Axial Strain ϵ_f % Corr Dev Stress ($\sigma_1 - \sigma_3$)f (lbf/in2) Major Stress σ_{3f} (lbf/in2) Major Stress σ_{1f} (lbf/in2) Stress Ratio (σ_1/σ_3) _f Notes:	33.8 86.50 0.92 97.93 Mx Stress Ration 4.0 14.9 3.8 18.7 4.9	31.8 88.85 0.87 97.53 Mx Stre 4.0 30.2 7.3 37.5	ess Ratio	31.5 89.27 0.86 97.61 Mx Str 4.0 47.1 13.5 60.6 4.5	Test name Date of Test: Sample: Borehole:	12-7-1 ST-8	Sp 1 Sp 2 Sp 3 Surface Inclination



	Test name Date of Test:	CU Triexial (SS, MS) 12-7-16	
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
hecked	MIC	Approved.	

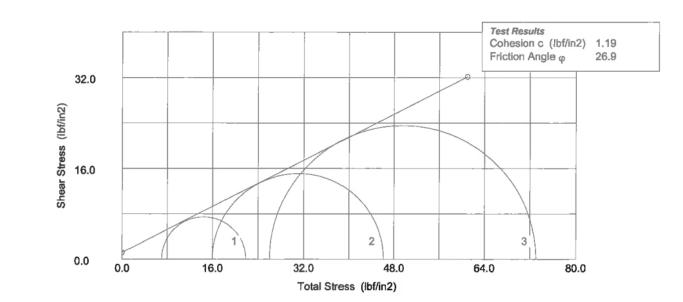
		· · ·	
	-		
0			
0-0-0-0-			
-	2-		
00	18.0000	24.0000	30.0000

	3		
	2		
	1		
0	·		
100	40.0000	010000	
000	18.0000	24.0000	30.0000



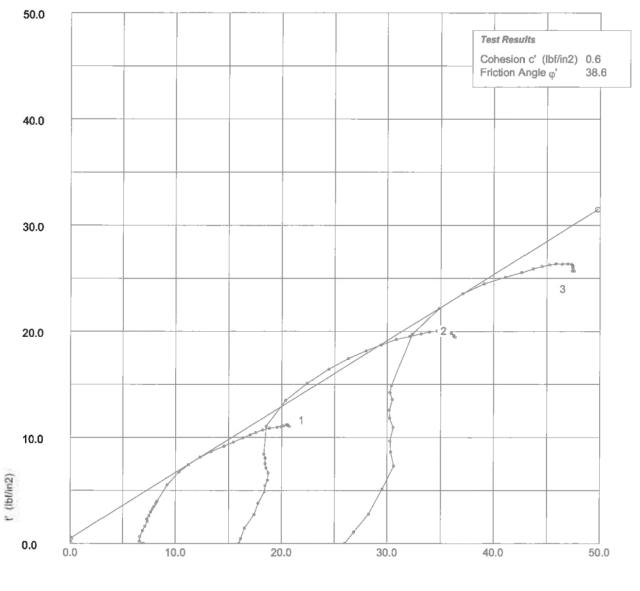
Consolidated Undrained

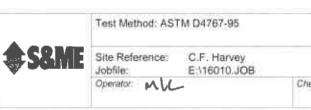




	Test Method: AST	M D4767-95		Test name Date of Test:	CU T 12-7-	naxial (SS, MS) 16
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	3 Rt. Ln.
	Operator: MK		Checked: M	ik.		Approved:

Effective Stress Triaxial Compression Consolidated Undrained







	Test name Date of Test:	CU Triaxial (SS, MS) 12-7-16				
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.				
ecked	MIC-	Approved.				

Effective Stress Triaxial Compression

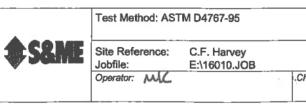
Page 1/3

Consolidated Undrained Shear (Specimen 1)

No.	Strain (divs)	Strain 8%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (Ibf/in2)	D. Stress (σ ₁ - σ ₃) _m (lbf/in2)	D. Stress (σ ₁ - σ ₃) _c (lbf/in2)	Minor Str σ ₃ ΄ (lbf/in2)	Major Str σ ₁ ' (lbf/in2)	Ratio σ ₁ '/σ ₃ '
1	95	0.00	503	0.0	0	0.0	0.0	0.0	7.00	7.00	1.00
2	148	0.09	530	2.7	6	0.6	0.4	0.4	6.40	6.83	1.07
3	207	0.19	586	8.3	10	1.0	1.3	1.3	6.00	7.31	1.22
4	260	0.28	658	15.5	13	1.3	2.4	2.4	5.70	8.14	1.43
5	314	0.37	711	20.8	15	1.5	3.3	3.3	5.50	8.77	1.59
6	372	0.47	767	26.4	17	1.7	4.1	4.1	5.30	9.45	1.78
7	426	0.56	808	30.5	20	2.0	4.8	4.6	5.00	9.63	1.93
8	480	0.65	847	34.4	21	2.1	5.4	5.2	4.90	10.13	2.07
9	538	0.75	894	39.1	23	2.3	6.1	6.0	4.70	10.66	2.27
10	593	0.84	928	42.5	24	2.4	6.6	6.5	4.60	11.09	.2.41
11	648	0.93	961	45.8	25	2.5	7.2	7.0	4.50	11.50	2.56
12	706	1.03	997	49.4	26	2.6	7.7	7.6	4.40	11.96	2.72
13 14	760 1263	1.12	1025 1236	52.2	27 33	2.7 3.3	8.1 11.3	8.0	4.30 3.70	12.29 14.76	2.86 3.99
14	1883	1.97 3.02	1406	73.3 90.3	33	3.4	13.8	11.1 13.5	3.60	17.06	3.99 4.74
16	2444	3.96	1517	101.4	32	3.4	15.4	13.5	3.80	18.69	4.92
17	3067	5.02	1625	112.2	28	2.8	16.8	16.3	4.20	20.46	4.87
18	3633	5.97	1714	121.1	23	2.3	18.0	17.3	4.70	22.03	4.69
19	4258	7.03	1803	130.0	16	1.6	19.1	18.4	5.40	23.76	4.40
20	4825	7.98	1876	137.3	11	1.1	19.9	19.1	5.90	25.04	4.24
21	5449	9.04	1951	144.8	6	0.6	20.8	19.9	6.40	26.31	4.11
22	6017	9.99	2012	150.9	2	0.2	21.4	20.5	6.80	27.28	4.01
23	6584	10.95	2067	156.4	-1	-0.1	22.0	20.9	7.10	28.04	3.95
24	7212	12.01	2126	162.3	-5	-0.5	22.5	21.4	7.50	28.92	3.86
25	7778	12.97	2173	167.0	-10	-1.0	22.9	21.8	8.00	29.76	3.72
26	8409	14.03	2212	170.9	-16	-1.6	23.2	21.9	8.60	30.53	3.55
27	8976	14.99	2245	174.2	-19	-1.9	23.4	22.1	8.90	30.95	3.48
28	9545	15.95	2279	177.6	-21	-2.1	23.6	22.2	9.10	31.28	3.44
29	10174	17.01	2320	181.7	-23	-2.3	23.8	22.3	9.30	31.65	3.40
30	10745	17.97	2348	184.5	-24	-2.4	23.9	22.4	9.40	31.77	3.38
31	11351	19.00	2365	186.2	-25	-2.5	23.8	22.2	9.50	31.75	3.34
32	11958	20.02	2379	187.6	-27	-2.7	23.7	22.1	9.70	31.78	3.28

S&ME	Test Method: AST	TM D4767-95		Test name Date of Test:	CU Triaxia 12-7-16	(SS, MS) Shear (Specimen 1)	
	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. L	n.	
	Operator: MIC		Ghecked MK		Approved		

Effective Stress Triaxial Compression Consolidated Undrained Shear (Specimen 2) Strain (divs) Strain 8% Load (divs) Load (lbs) No. - (0 82 0.00 683 0.0 0 1 2 136 0.09 739 5.6 3 190 864 3 0.18 18.1 9 245 4 0.28 1028 34.5 1 297 0.37 1164 48.1 5 2 351 409 6 0.46 1303 62.0 2 0.56 1384 7 70.1 3 461 1453 0.64 77.0 8 3 515 0.74 1539 9 85.6 - 3 575 626 682 739 10 11 12 13 14 15 16 0.84 1600 91.7 4 0.92 1653 97.0 5 1.02 1720 103.7 5 1.12 1767 108.4 6 1239 1.96 2123 144.0 1849 3.00 2459 177.6 2409 3.95 2695 201.2 17 3022 4.99 2904 222.1 18 19 3641 6.04 3065 238.2 4201 6.99 3196 251.3 6 20 21 **476**6 7.95 3304 262.1 5 5380 9.00 3413 273.0 4 22 23 24 5946 9.96 3485 280.2 3 6562 11.00 3560 287.7 26 11.97 7129 3621 293.8 20 25 7746 13.01 3677 299.4 -14 26 27 28 8314 13.98 3710 302.7 10 8934 15.03 3746 306.3 6 15.99 3771 9501 308.8 2 29 10066 16.95 3799 311.6 -2 30 10689 18.01 3818 313.5 -6 31 11264 18.99 3846 316.3 -7 32 11866 20.01 3877 319.4 -9



Page 2 / 3

hoon						
Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ ₁ - σ ₃) _m (lbf/in2)	D. Stress (σ ₁ - σ ₃) _c (lbf/in2)	Minor Str o ₃ (lbf/ln2)	Major Str σ ₁ ΄ (lbf/in2)	Ratio σ ₁ '/σ ₃ '
0	0.0	0.0	0.0	16.00	16.00	1.00
3	0.3	0.9	0.9	15.70	16.59	1.06
Ð	0.9	2.9	2.9	15.10	17.96	1.19
13	1.3	5.5	5.5	14.70	20.15	1.37
20	2.0	7.6	7.6	14.00	21.60	1.54
25	2.5	9.8	9.8	13.50	23.28	1.72
30	3.0	11.1	10.9	13.00	23.89	1.84
33	3.3	12.1	12.0	12.70	24.67	1.94
39	3.9	13.5	13.3	12.10	25.41	2.10
16	4.6	14.4	14.3	11.40	25.66	2.25
51	5.1	15.2	15.1	10.90	25.98	2.38
56	5.6	16.3	16.1	10.40	26.51	2.55
61	6.1	17.0	16.8	9.90	26.73	2.70
35	8.5	22.4	22.1	7.50	29.60	3.95
91	9.1	27.3	27.0	6.90	33.85	4.91
37	8.7	30.6	30.2	7.30	37.46	5.13
30	8.0	33.5	32.9	8.00	40.90	5.11
71	7.1	35.5	34.8	8.90	43.74	4.92
52	6.2	37.1	36.3	9.80	46.14	4.71
i3	5.3	38.2	37.5	10.70	48.15	4.50
14	4.4	39.4	38.5	11.60	50.11	4.32
4	3.4	40.0	39.0	12.60	51.64	4.10
26	2.6	40.6	39.6	13.40	52.96	3.95
20	2.0	41.0	39.9	14.00	53.89	3.85
4	1.4	41.3	40.1	14.60	54.71	3.75
0	1.0	41.3	40.0	15.00	55.02	3.67
i	0.6	41.3	39.9	15.40	55.35	3.59
2	0.2	41.1	39.7	15.80	55.55	3.52
2	-0.2	41.0	39.6	16.20	55.78	3.44
6	-0.6	40.7	39.2	16.60	55.84	3.36
7	-0.7	40.6	39.1	16.70	55.77	3.34
9	-0.9	40.5	38.9	16.90	55.81	3.30

	Test name Date of Test:	CU Triaxial (SS, MS) Shear (Specimen 2) 12-7-16
	Sample: Borehole:	ST-8 EB1-B Rt. Ln.
hecked: 🔒	NC	Approved:

Effective Stress Triaxial Compression

Page 3 / 3

Consolidated Undrained Shear (Specimen 3)

ł	Consolidated Undrained Snear (Specimen 3)											
	No.	Strain (divs)	Strain ε%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ ₁ - σ ₃) _m	D. Stre (σ ₁ - σ ₂		Str Major Str	Ratio σ ₁ '/σ ₃ '
				• •	• •	. ,	. ,	(lbf/in2)	(ibf/in	2) (lbf/in2		-13
	1	0	0.00	708	0.0	0	0.0	0.0	0.0	26.00	26.00	1.00
		41	0.07	842	13.4	2	0.2	2.1	2.1	25.80	27.93	1.08
		86	0.15	1056	34.8	5	0.5	5.5	5.5	25.50	31.04	1.22
	4	136	0.24	1353	64.5	16	1.6	10.3	10.3	24.40	34.66	1.42
	5	185	0.32	1628	92.0	27	2.7	14.6	14.6	23.30	37.92	1.63
		236	0.41	1795	108.7	43	4.3	17.3	17.3	21.70	38.95	1.80
		293	0.51	1937	122.9	54	5.4	19.5	19.3	20.60	39.93	1.94
	8	345	0.60	2101	139.3	64	6.4	22,1	21.9	19.60	41.51	2.12
l		399	0.69	2212	150.4	76	7.6	23.8	23.6	18.40	42.04	2.29
l		456	0.79	2312	160.4	84	8.4	25.4	25.2	17.60	42.80	2.43
l		509	0.88	2437	172.9	91	9.1	27.3	27.2	16.90	44.05	2.61
l		561	0.97	2523	181.5	100	10.0	28.6	28.5	16.00	44.49	2.78
l		619	1.07 2.03	2607 3254	189.9	105	10.5	29.9 20.8	29.8	15.50	45.28	2.92
l		1175 1735	3.00	3596	254.6 288.8	134 133	13.4 13.3	39.8 44.6	39.5 44.3	12.60 12.70	52.07 56.99	4.13 4.49
ľ		2302	3.98	3816	310.8	125	12.5	44.0	47.1	13.50	60.58	4.49
		2866	4.95	3979	327.1	114	11.4	49.5	49.0	14.60	63.59	4.49
		3488	6.03	4105	339.7	100	10.0	50.9	50.2	16.00	66.24	4.14
		4053	7.01	4205	349.7	89	8.9	51.8	51.1	17.10	68.21	3.99
		4624	7.99	4294	358.6	82	8.2	52.6	51.8	17.80	69.59	3.91
		5191	8.97	4369	366.1	76	7.6	53.1	52.2	18.40	70.63	3.84
		5756	9.95	4433	372.5	70	7.0	53.5	52.5	19.00	71.50	3.76
		6384	11.04	4499	379.1	65	6.5	53.8	52.7	19.50	72.22	3.70
		6950	12.01	4546	383.8	59	5.9	53.8	52.7	20.10	72.80	3.62
		7524	13.01	4599	389.1	54	5.4	53.9	52.8	20.60	73.37	3.56
		8092	13.99	4641	393.3	50	5.0	53.9	52.7	21.00	73.66	3.51
		8661	14.97	4677	396.9	48	4.8	53.8	52.5	21.20	73.67	3.48
		9232	15.96	4719	401.1	47	4.7	53.7	52.3	21.30	73.65	3.46
ł		9858	17.04	4756	404.8	46	4.6	53.5	52.1	21.40	73.47	3.43
		10433	18.04	4789	408.1	44	4.4	53.3	51.8	21.60	73.40	3.40
		10996	19.01	4811	410.3	43	4.3	53.0	51.4	21.70	73.11	3.37
	32	11561	19.99	4862	415.4	41	4.1	53.0	51.4	21.90	73.28	3.35
ļ												
		Test	lethod: AST	M D4767-9	5		Test n	ame	CU Tria	axial (SS. M	IS) Shear (Spe	cimen 3)
					-		Date o		12-7-16		erour (opo	
	Acon		- (0.5.11						-		
			eference:	C.F. Harv			Sample		ST-8 EB1-B R	2t In		
	₩	Jobfile		E:\16010.	JOR	Chaolind	Boreho	ie:				
		Operat	or: MLC-	~		Checked:	mic.		1	Approved:		

33 of 33