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**CONTENTS** 

SHEET NO.

3-7

**DESCRIPTION** 

TITLE SHEET LEGEND RETAINING WALL ENVELOPES SOIL TEST RESULTS

#### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY **DURHAM** 

PROJECT DESCRIPTION NC 55 (ALSTON AVE.) FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF US 70 BUSANC 98 (HOLLOWAY ST.)

SITE DESCRIPTION <u>RETAINING WALL 1: LEFT OF -LALT- STATION</u> 38 + 00

RETAINING WALL 2: RIGHT OF -LALT- STATION 47+00 RETAINING WALL 3: LEFT OF -Y14- STATION 10+50 RETAINING WALL 4: RIGHT OF -LALT- STATION 50+00 RETAINING WALL 5: RIGHT OF -LALT- STATION 58+00

STATE PROJECT REFERENCE NO. 8 U = 3308

#### **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 SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

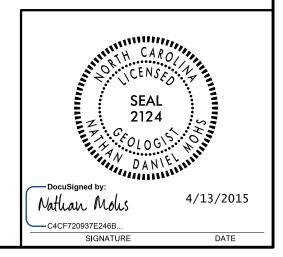
SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE, INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORHOUS. 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 STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS HOLD WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND AS WELL AS OTHER NON-LIMATIC FACTORS. 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 HIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS, AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEM NECESSARY TO SATISFY HINSELF AS TO CONDITIONS TO BE ENCOUNTERED OF PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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.

N.D. MOHS **TERRACON** INVESTIGATED BY N.D. MOHS CHECKED BY N.T. ROBERSON SUBMITTED BY \_N.T. ROBERSON DATE APRIL 2015

**PERSONNEL** 



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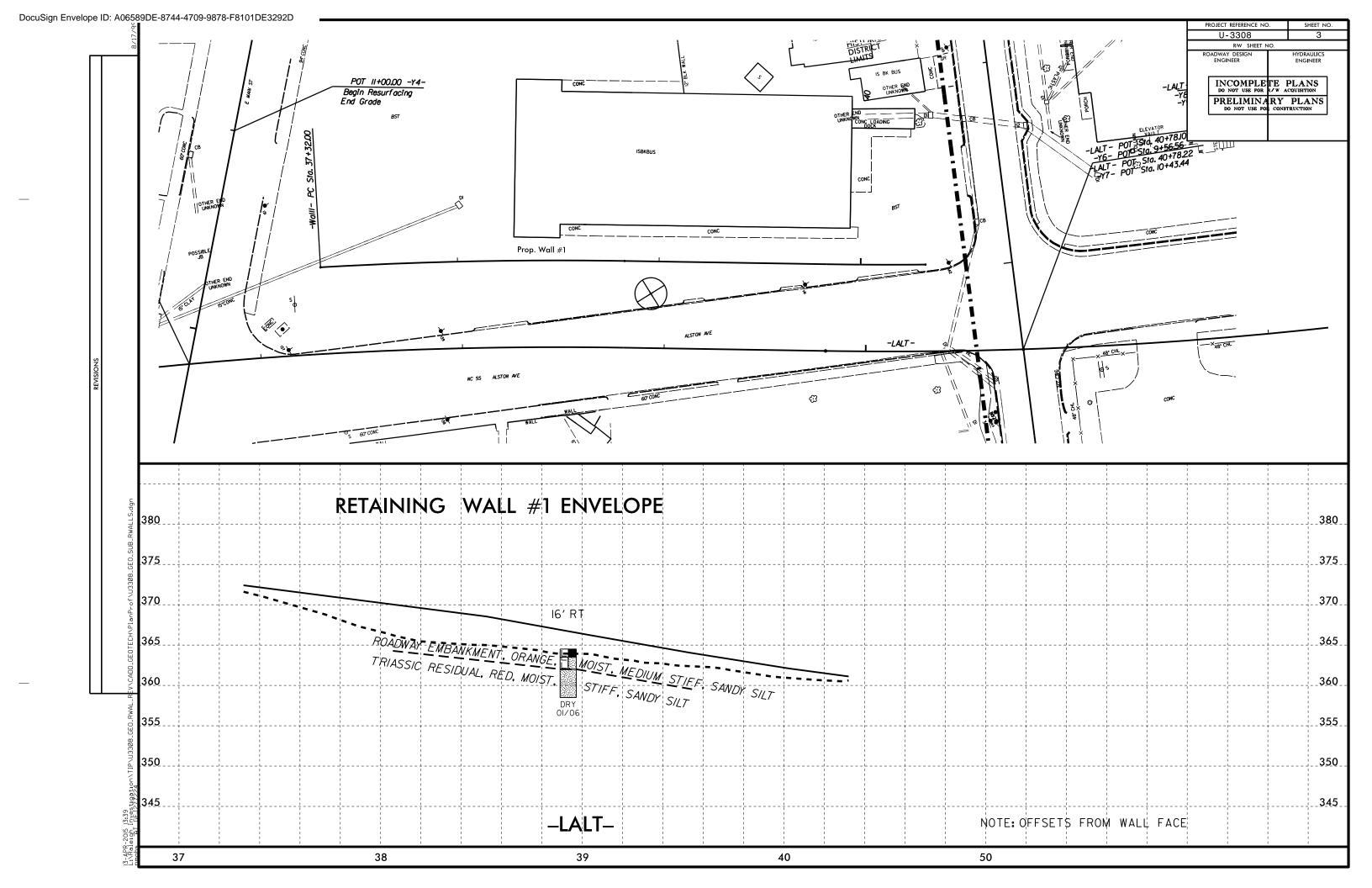
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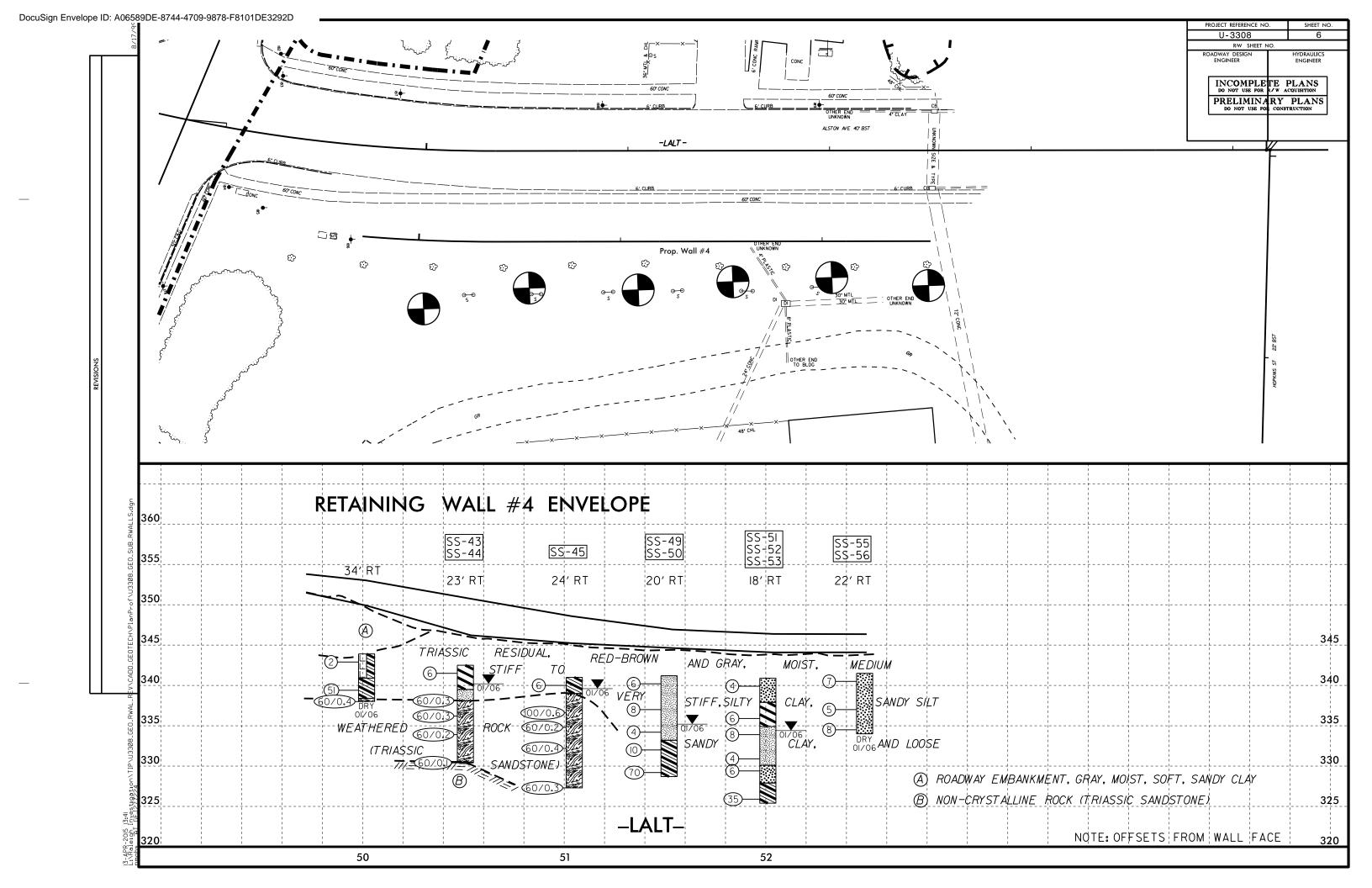
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

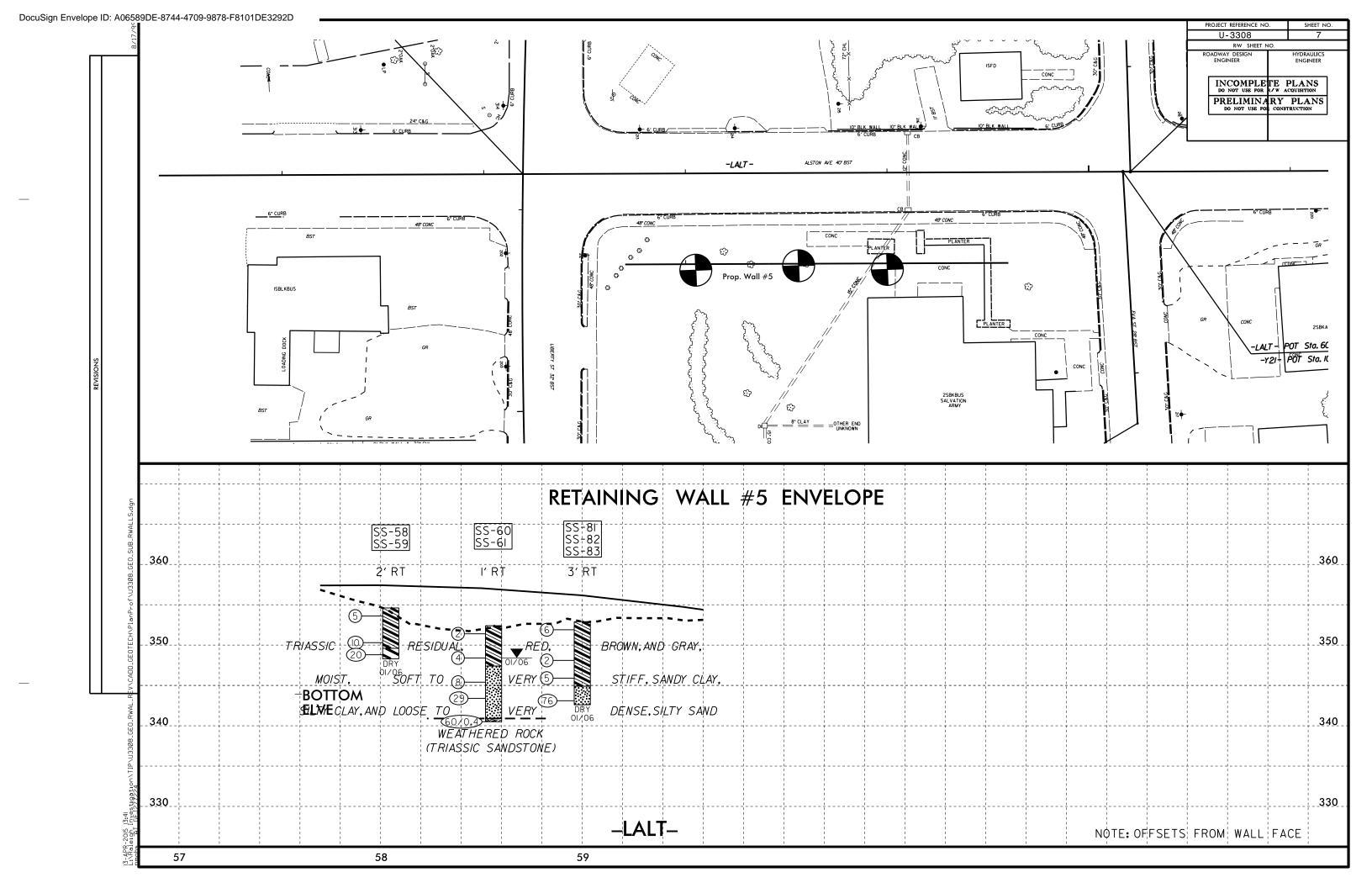
## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND VIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK, ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF.GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD STR EFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	CNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE  LL < 31	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLO SET REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 48 MX 41 MN 48 MX 41 MN 50ILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE UT HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 8 8 4 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF ORGANIC SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MATOR CRAYEL AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SANU GRAVEL AND SAND SUILS SUILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN  (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK,	FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES  OF ROCK STRUCTURES  SLOPE INDICATOR  SLOPE INDICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL  SOIL SYMBOL  SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL MEDIUM DENSE 10 TO 30 N/A  MATERIAL DENSE 30 TO 50  (NON-COHESIVE) DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY DENSE > 50		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT         < 2         < 0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.5	INFERRED SOIL BOUNDARY ————————————————————————————————————	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0     MATERIAL   STIFF   8 TO 15   1 TO 2	WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	HOSE IN THE TOP 2 SEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER	SHALLOW UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.  MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE. SD.) (F SD.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CPT - CONE PENETRATION TEST  NP - NON PLASTIC  7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION SOIDE FOR THEE MOTOR DESCRIPTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <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
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO   SD SAND, SANDY   SS - SPLIT SPOON   F - FINE   SL SILT, SILTY   ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK:
(PI) PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO  EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 6 CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8* HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI)  DRY STRENGTH	CME-550 HARD FACED FINGER BITS -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST UNGCARBIDE INSERTS	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	CASING W/ ADVANCER POST HOLE DIGGER POST HOLE DIGGER TRICONE STEEL TEETH	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	HAND AUGER	CRAINS ARE DISCISSED TO SERAPATE WITH STEEL PROBE.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD VANE SHEAR TEST	INDURATED DIFFICULT TO BREAK WITH HAMMER,	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	ANNE SUEMIL [E2]	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-
		SHILLE DUEHVS HOUDSS DUHINS.	DATE: 8-13-14







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PROJECT REFERENCE NO.	SHEET NO.
(U-3308)	8

$SOIL\ TEST\ RESULTS$															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	C.SAND	% BY F.SAND	WEIGHT SILT	CLAY	% PA	SSING (S	SIEVES)	% MOISTURE	$^{\%}_{ORGANIC}$
SS-33	48 RT	47 +0.3	0.0-1.5	A-2-4(0)	22	4	41.6	25. /	15.2	18.2	78	58	29	-	-
SS-34	44 RT	47 +46	0.0-1.5	A-6(3)	25	12	27.8	26.2	17.5	28.5	99	82	51	_	_
SS-35	44 RT	47 +46	3. 5-5. 0	A-2-4(0)	23	4	52. 7	21.7	17.4	8.1	100	63	29	_	_
SS-36	42 RT	47 +83	0.0-1.5	A-4(1)	24	10	33. /	23. 5	19.1	24. 3	97	77	46	_	_
SS-37	42 RT	47 +83	3.7-5.2	A-2-4(0)	21	1	49.3	22. 9	19.7	8.1	100	86	32	_	_
SS-74	18 RT	11+29	0.0-1.5	A-2-4(0)	15	NP	51.0	27.1	13.9	8.1	98	70	25	_	_
SS-75	I 8 RT	11+29	<i>3.</i> 7 -5. <i>2</i>	A-4(0)	22	NP	7.3	59.5	13.0	20. 2	100	100	39	-	_
SS-76	24 RT	10+83	0.0-1.5	A-4(0)	20	5	43. 3	21.8	2. 5	32. 4	94	69	36	-	_
SS-77	24 RT	10+83	<i>3.</i> 9 <i>-</i> 5. <i>4</i>	A-2-4(0)	23	5	55.0	18.8	10.0	16.2	100	68	29	_	_
SS-72	22 RT	11+10	0.0-1.5	A-6(4)	30	11	8.1	42.7	18.9	30. 3	100	96	56	_	_
SS-43	54 RT	50+51	0.0-1.5	A-7-6(8)	44	17	23. 3	21.7	34.7	20. 3	96	83	57	_	-
SS-44	54 RT	50+51	3. 4-4. 9	A-4(0)	22	4	13.8	<i>52.1</i>	21.9	12.2	100	95	42	_	-
SS-45	54 RT	51 +05	0.0-1.5	A-6(2)	29	11	20.5	38. 3	22. 9	18.3	100	89	48	_	-
SS-49	52 RT	51 +52	3. 2-4. 7	A-4(0)	16	NP	12.6	47.5	27.8	12.2	100	96	48	_	-
SS-50	52 RT	51 +52	<i>8.</i> 2-9. 7	A-6(18)	38	21	0.4	17.0	50.1	<i>32.</i> 5	100	100	89	_	1
SS-51	52 RT	52+01	4.0-5.5	A-7-6(18)	46	26	8.9	<i>25. 4</i>	29. 2	<i>3</i> 6. 5	100	96	73	_	_
SS-52	52 RT	52+01	9.0-10.5	A-4(0)	24	7	8.3	54.8	14.6	22. 3	100	99	45	_	-
SS-53	52 RT	52+01	14.0-15.5	A-6(11)	35	13	8.3	10.1	61.3	20. 3	100	94	85	_	-
SS-55	58 RT	52+49	0.0-1.5	A-2-4(0)	31	7	47.3	20.1	<i>24</i> . 5	8.1	66	40	25	_	_
SS-56	58 RT	52+49	<i>3</i> . 5−5. 0	A-2-4(0)	32	4	54.6	18.7	22.7	4.1	81	46	26	_	-
SS-58	48 RT	58+05	0.0-1.5	A-6(8)	35	18	20.5	25.4	<i>35.</i> 9	18.3	100	89	60	_	-
SS-59	48 RT	58+05	4.8-6.3	A-7-6(21)	45	22	0.8	14.8	47.9	<i>3</i> 6. 5	100	100	90	_	-
SS-60	46 RT	58+56	0.0-1.5	A-6(4)	29	11	16.6	<i>32. 3</i>	30.8	20. 3	99	90	58	_	-
SS-61	46 RT	58+56	6.0-7.5	A-2-4(0)	27	6	41.4	26.8	19.7	12.2	100	80	35	_	-
SS-81	35 LT	59+00	0.0-1.5	A-4(0)	20	6	27.7	32.8	7.2	32. 4	87	75	39	_	-
SS-82	35 LT	59+00	<i>3.</i> 5 <i>-</i> 5. <i>0</i>	A-7-6(10)	48	27	32. 2	19.6	5.8	<i>42.</i> 5	100	87	50	_	-
SS-83	35 LT	59+00	6.0-7.5	A-2-4(0)	25	6	60.1	13.3	4. 3	22. 2	99	56	29	_	-

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DIVISION OF HIGHWAYS
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STATE OF NORTH CAROLINA

PROJ. REFERENCE NO. 34915.1.1 (U-3308)

COUNTY DURHAM

PROJECT DESCRIPTION WIDENING OF NC 55 (ALSTON AVE.) FROM

NC 147 (BUCK DEAN FREEWAY) TO US 70 BUS/NC 98

(HOLLOWAY ST.)

SITE DESCRIPTION BRIDGES ON -NSRR- AND -CSX- OVER -L(NC 55)

STATE	STATE PROJECT REFERENCE NO.	SHBBT NO.	TOTAL
N.C.	34915.1.1 (U-3308)	1	28

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, CEDITECHNICAL EMONETRING UNIT AT 1999 707-6865. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOL TEST DATA ARE PATT OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BORENOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACE/TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INVERENT IN THE STANDARD TEST METHOD. THE DESERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATIONS THE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND WARP CONDITIONS ABOUNDED AND THE SUBSURFACE INVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND WARP CONDITIONS AND WARP CONDITIONS AND WARP CONDITIONS AND ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN ORTHICS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE OFFARTMENT BOES NOT WARRANT OR CLIARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPPONO OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED. THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL CONDENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE OFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J. L. PEDRO

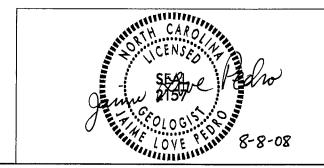
CONSULTANT: TIERRA

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

ATE **JULY 2008** 



**PROJECT: 34915.1.** 

3308

PROJECT REFERENCE NO. 34915.1.1 (U-3308) SHEET NO.

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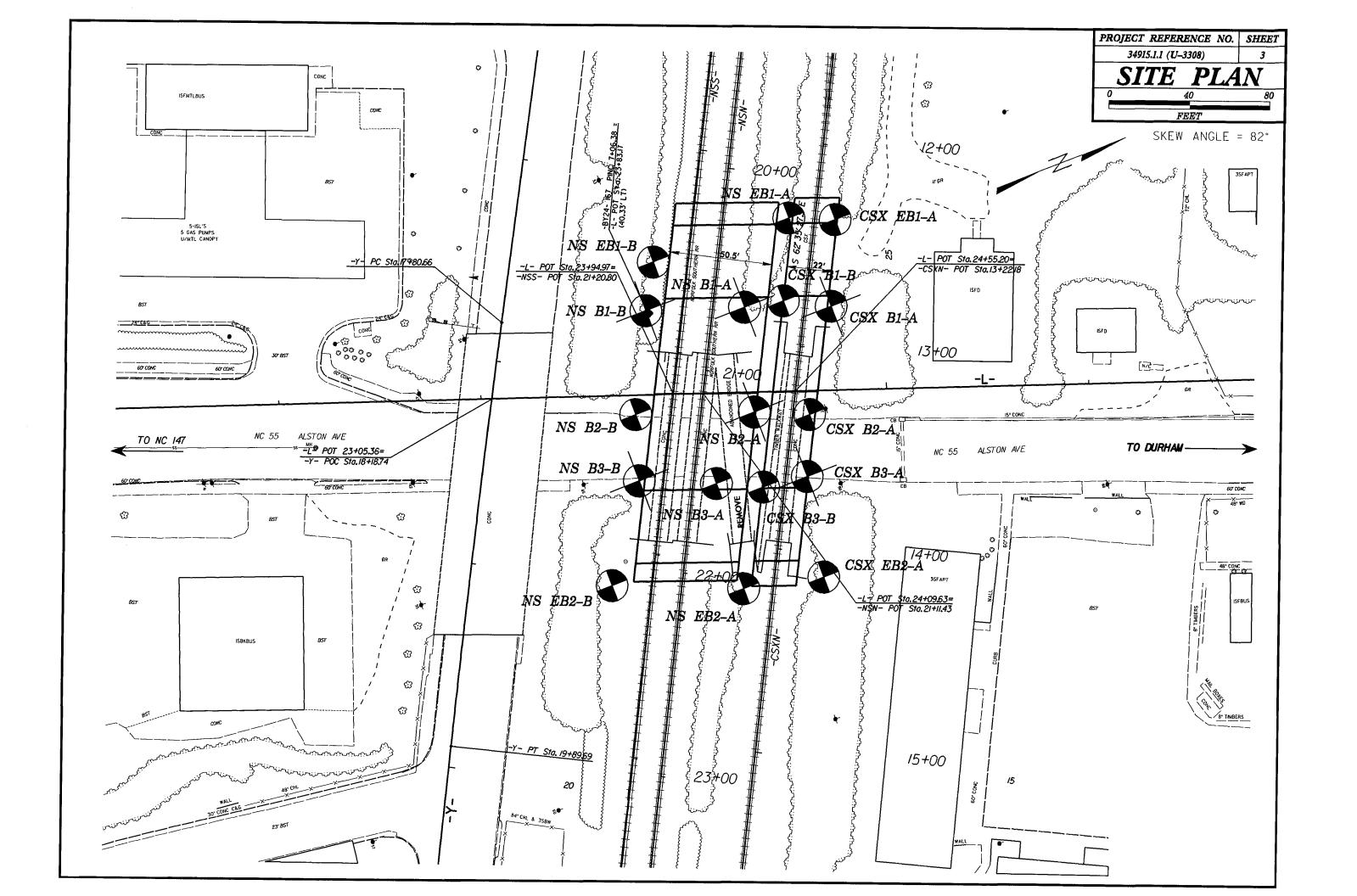
#### DIVISION OF HIGHWAYS

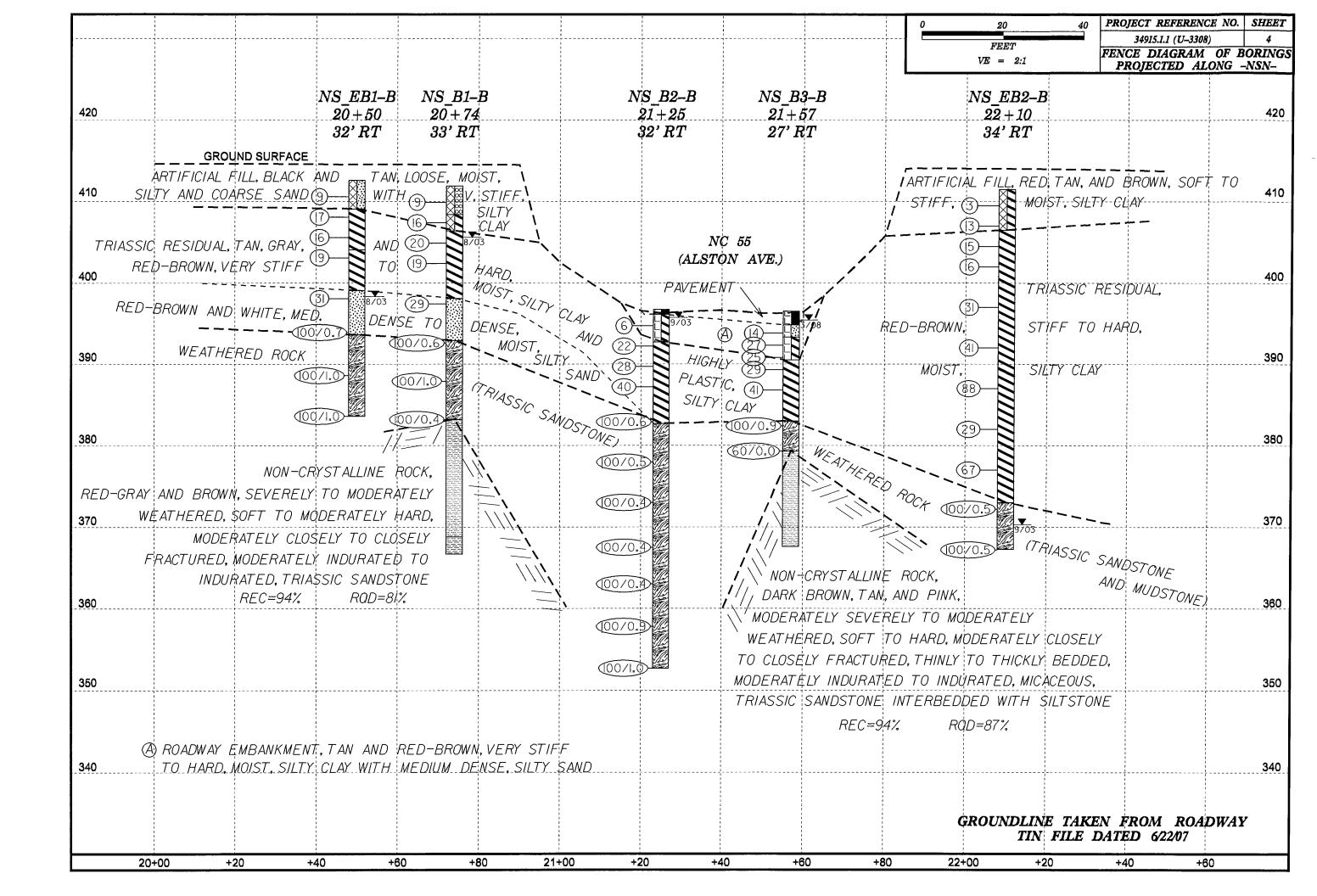
#### GEOTECHNICAL ENGINEERING UNIT

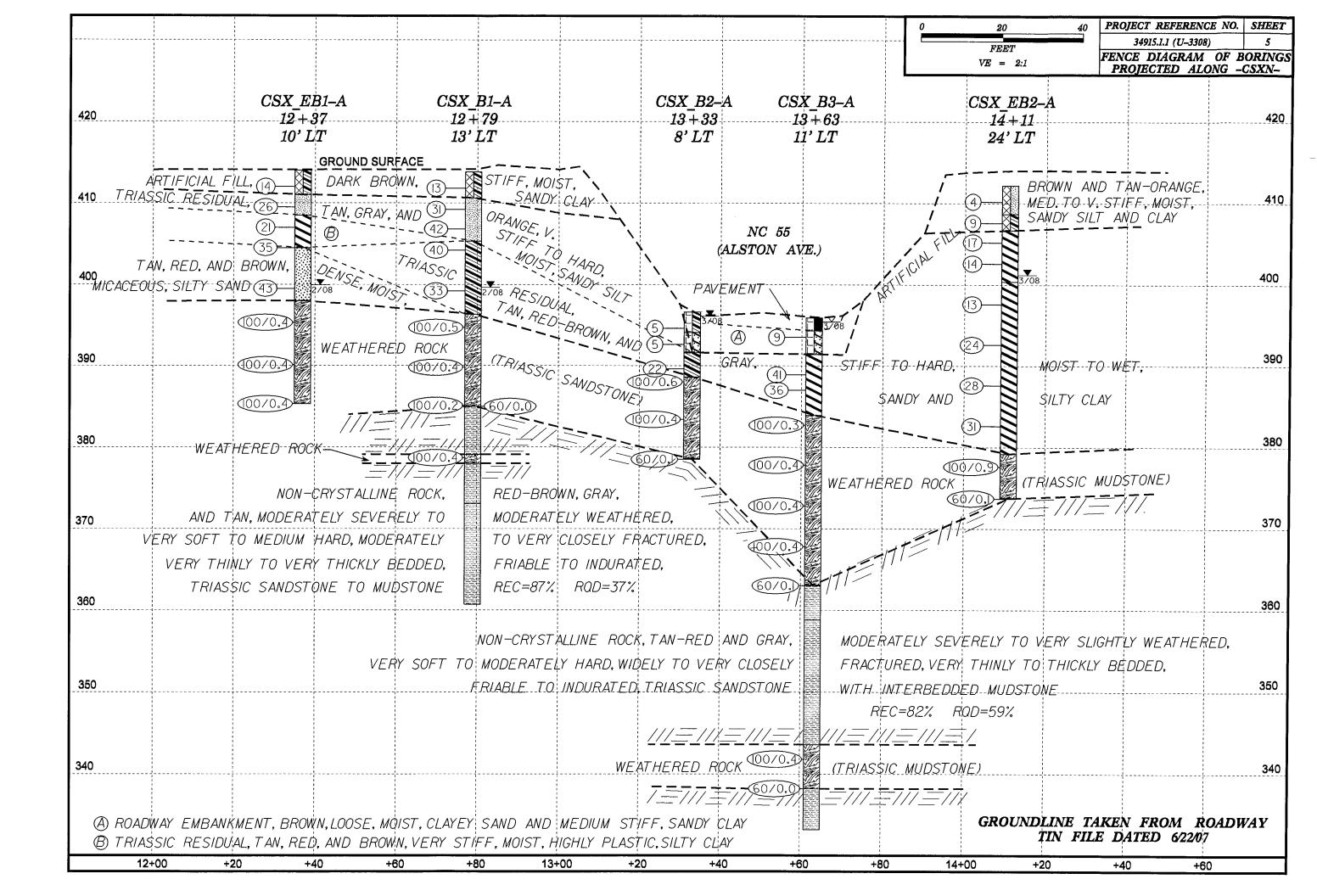
### SUBSURFACE INVESTIGATION

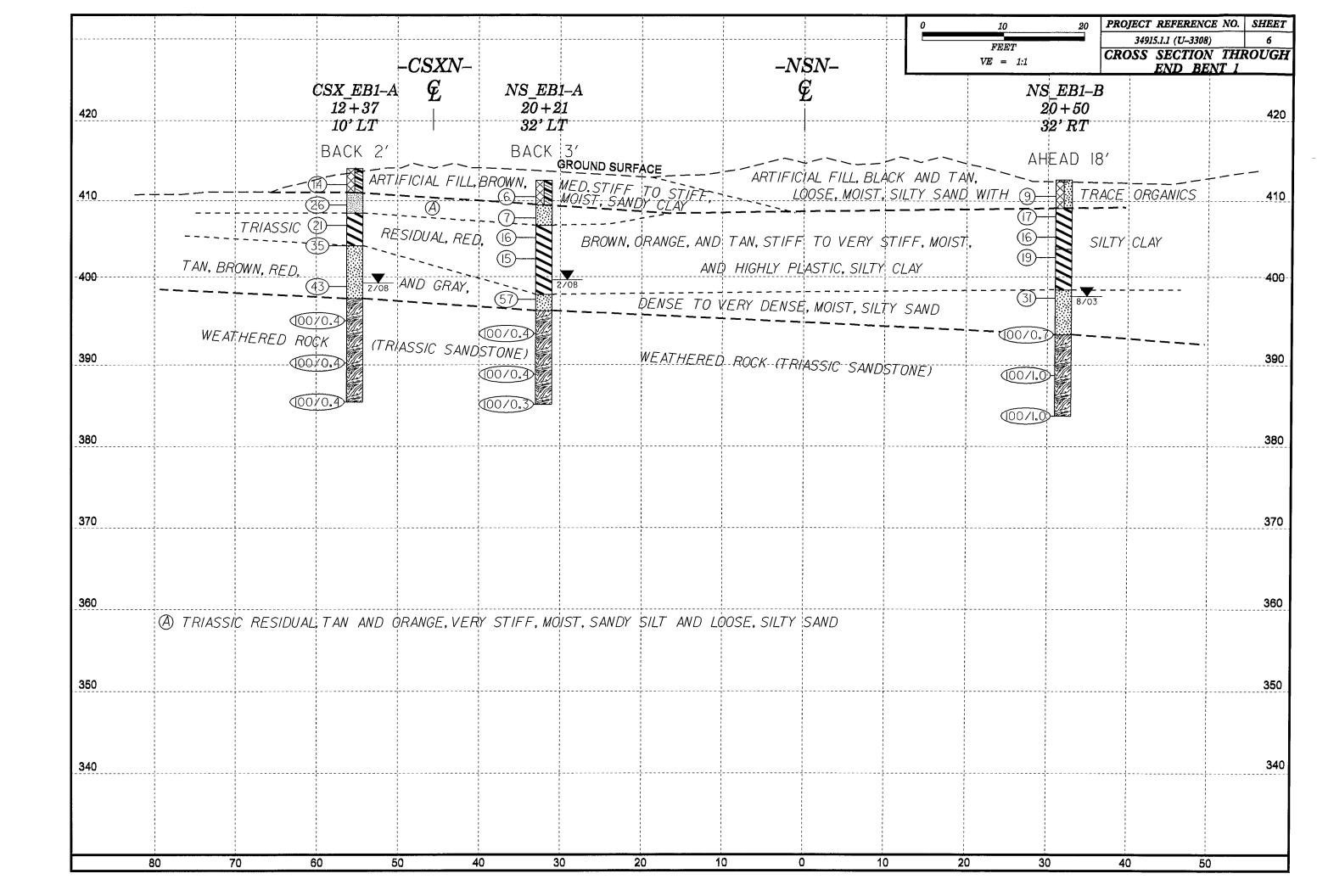
#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

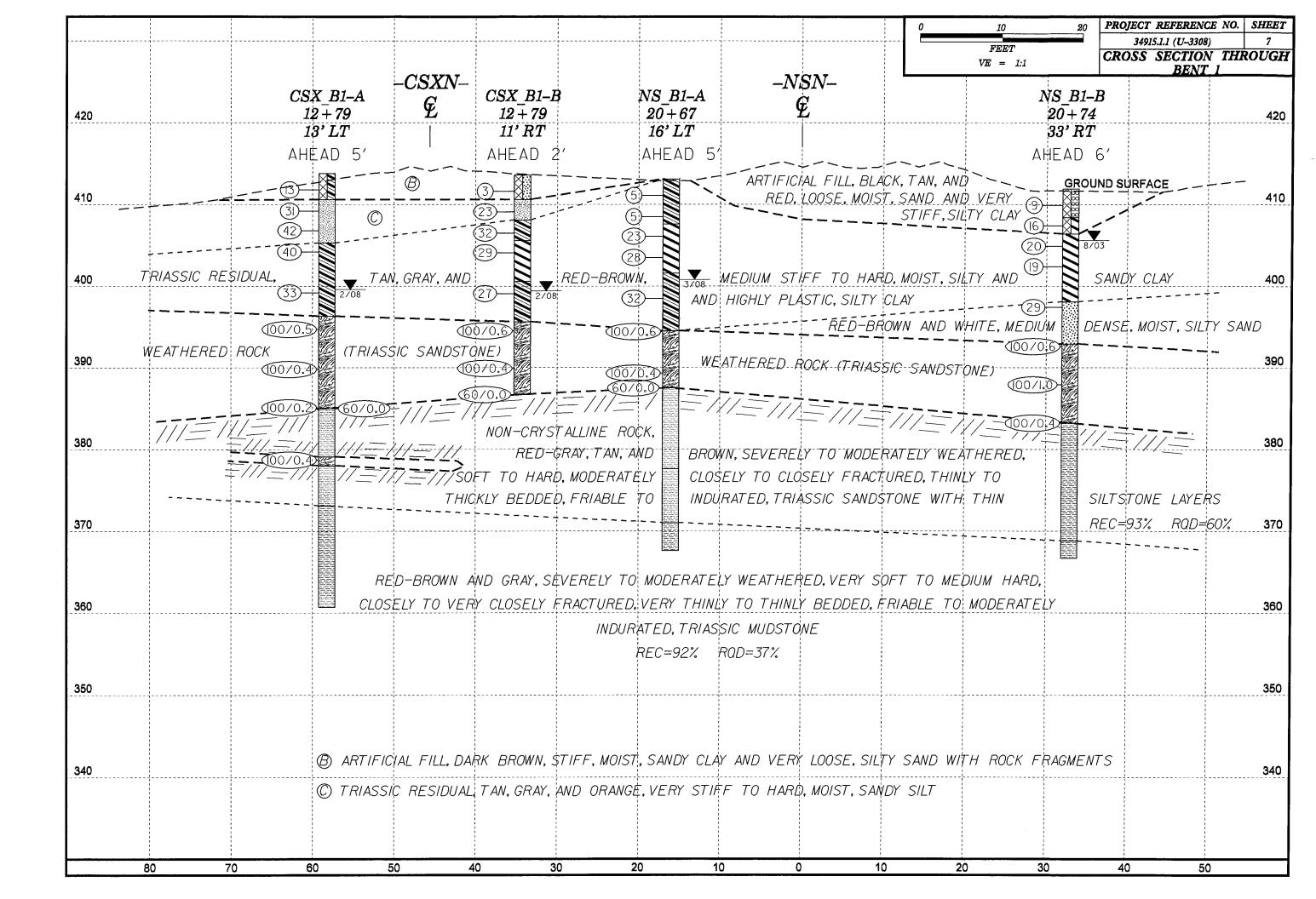
			CK DEGISTO, I DICE	10, 51 MBOD5,				TERMO AND DESINITIONS			
SOIL DESCRIPTION	WELL GRADED - INDICATES	GRADATION A GOOD REPRESENTATION OF PARTICLE SIZES	FROM FINE TO COARSE.		CDASTAL PLAIN MATER	OCK DESCRIPTION  IAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INF		TERMS AND DEFINITIONS  ALLINGUM (ALLIV) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATE THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	UNIFORM - INDICATES THAT	SOIL PARTICLES ARE ALL APPROXIMATELY TH	E SAME SIZE. (ALSO	ROCK LINE INDICATE	ES THE LEVEL AT WHIC	CH NON-COASTAL PLAIN MATERIAL WOULO YIELO SPT REF I SPOON SAMPLER EOUAL TO OR LESS THAN ØJ FOOT PE	FUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ADUJEER - A WATER BEARING FORMATION OR STRATA.			
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTD T206, ASTM D-1586). S	IL <u>Gap-Graded</u> - Indicates a	MIXTURE OF UNIFORM PARTICLES OF TWO DR	MDRE SIZES.	IN NON-COASTAL PL	.AIN MATERIAL, THE T	RANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENT					
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUI CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS	JCH	ANGULARITY OF GRAINS		OF WEATHERED ROCK ROCK MATERIALS AF	K. RE TYPICALLY DIVIDED	AS FOLLOWS:		ARGILLACEOUS - APPLIED TO ALL ROCKS DR SUBSTANCES COMPOSED OF CLAY MINERALS,			
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:		ONESS OF SOIL GRAINS IS DESIGNATED BY THE	TERMS: ANGULAR,	WEATHERED	NON-CO	ASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUE	ES > 100	DR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.			
VERY STOFF, GRAY, SHITY CLAY, MOST WITH WITERBEDDED FAVE SAND LATERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDEO		ON	ROCK (WR) BLOWS PER FOOT IF TESTED.			ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL				
SOIL LEGEND AND AASHTO CLASSIFICATION	MINEDAL MANES SUCH AS (	MINERALOGICAL COMPOSITION OF THE ARE	FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN DESCRIPTIONS			) CDARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES OF	RANTTF.	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.			
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING *200) (> 35% PASSING *200)	TERIALS WHENEVER THEY ARE CONS		USED IN DESCRIPTIONS	ROCK (CR)	GNEISS.	GABBRO, SCHIST, ETC.	ICHIEZ I E.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
GRDUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4,	-5	COMPRESSIBILITY		NON-CRYSTALLINE	FINE TO	COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN TARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED	D. ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM			
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-8 A-3 A-6,	-7 SLIGHTLY COMPF	ESSIBLE LIQUID LIMIT	LESS THAN 31	ROCK (NCR)	INCLU0E	S PHYLLITE, SLATE, SANDSTONE, ETC.		OF SLOPE.			
SYMBOL DOOD DOOD SOOD SOOD SOOD SOOD SOOD SO	MODERATELY CO		T EDUAL TO 31-50 T GREATER THAN 50	COASTAL PLAIN SEOIMENTARY ROCK		. PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT USAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEM		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.			
V POCCINC		PERCENTAGE OF MATERIA		(CP)	SHELL B	SHELL BEDS, ETC.		OIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT			
" 10 58 MX GRANULAR CLA	MULK, ODCANIC MATERIAL	GRANULAR SILT - CLAY	OTHER MATERIAL			WEATHERING		ROCKS OR CUTS MASSIVE ROCK.			
* 40 38 MX 58 MX 51 MN S0ILS SOILS SOILS SOILS SOILS		SDILS SOILS 2 - 3% 3 - 5% TR	RACE 1 - 10%		RESH, CRYSTALS BRIGHT IF CRYSTALLINE.	, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS (	UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE			
	LITTLE ORGANIC MATTER	3 - 5% 5 - 12% LI	TTLE 10 - 20%			S STAINED, SOME JOINTS MAY SHOW THIN CLAY COATING	C IF OPEN	HORIZONTAL.			
LIOUID LIMIT   48 MX 41 MN 50 ILS WITH PLASTIC INDEX 6 MX NP 18 MX 11 MN LITTLE OR	MODERATELY ORGANIC HIGHLY ORGANIC		DME 20 - 35% GHLY 35% AND ABOVE			MEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER		<u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.			
GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE	HIGHLY TASKET CHOPAGE	GROUND WATER	OILT 33% AND ABOVE	1	RYSTALLINE NATURE.			FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE			
AMOUNTS OF	SDTI S	LEVEL IN BORE HOLE IMMEDIATELY AFTER	DRILLING			'S STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TAIN CLAY, IN GRANITOIO ROCKS SOME DCCASIONAL FELD		SIDES RELATIVE TO DNE ANOTHER PARALLEL TO THE FRACTURE.			
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER	_ I	WATER LEVEL AFTER 24 HOURS	on the state of th			OLDREO, CRYSTALLINE ROCKS RING UNDER HAMMER BLDW		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.			
MATERIALS SAND SHIPD STATE HIS SAND SOLES		, WATER LEVEL AFTER HOURS				K SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	N HAE	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR DRIGINAL POSITION AND DISLODGED FROM			
AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR	R UNSUITABLE PERCH	ED WATER, SATURATED ZONE, OR WATER BEAR	ING STRATA			PARS ARE DULL AND DISCOLOREO, SOME SHOW CLAY, ROCI LOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS CO		PARENT MATERIAL.			
SUBGRADE	SPRIN	OR SEEP			RESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL -	30 000	MISCELLANEOUS SYMBOL	c	MDDERATELY ALL ROO SEVERE AND DIS	CK EXCEPT OWARTZ OIS	COLORED OR STAINEO. IN GRANITDID ROCKS, ALL FELOSPA ITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF	ARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN			
CONSISTENCY OR DENSENESS  RANGE OF STANDARD   RANGE OF UN	ONFINED ED		TEST BORING	(MDD. SEV.) AND CAN	N BE EXCAVATED WITH	A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN S		THE FIELO.			
PRIMARY SOIL TYPE COMPRESSIVE PENETRATION RESISTENCE COMPRESSIVE			ING -W/ CDRE		ED, WOULD YIELD SPT			JOINT - FRACTURE IN RDCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS DCCURRED,			
VERY LOOSE 44	<u> </u>	AUGER BORING	SPT N-VALUE			COLOREO OR STAINED, ROCK FABRIC CLEAR AND EVIDENT. IN GRANITDID ROCKS ALL FELOSPARS ARE KAOLINIZED		LEDGE - A SHELF-LIKE RIDGE OF PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO			
CRANIII AD LODSE 4 TO 10	SOIL SYMBOL	1 1100211 2010110	O 0.1 1. 1,1202	EXTENT.	SOME FRAGMENTS OF	STRONG ROCK USUALLY REMAIN.		ITS LATERAL EXTENT.			
MATERIAL MEDIUM DENSE 10 10 30	ARTIFICIAL FI		REF SPT REFUSAL		TED, YIELDS SPT N VAL			LENS - A BOOY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN			
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	MT	HAN MONITORING ME				COLDRED OR STAINED. ROCK FABRIC ELEMENTS ARE DISC DUCED TO SOIL STATUS, WITH DNLY FRAGMENTS OF STROI		SDILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.			
VERY SOFT <2 <0.2	INFERRED SOII	BOUNDARY "ONITORING WE	ELL.	REMAINI	NG. SAPROLITE IS AN E	EXAMPLE DF ROCK WEATHERED TO A DEGREE SUCH THAT	ONLY MINDR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.			
GENERALLY   SOFT   2 TO 4   0.25 TO SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO		⟨LINE				ICK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.			
MATERIAL STIFF B TO 15 1 TO			OR			FABRIC NOT DISCERNIBLE, DR DISCERNIBLE DNLY IN SMAI DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPRO		ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF			
(CDHESIVE) VERY STIFF 15 TO 30 2 TO 44	4 25/825 DIP & DIP 01	INSTALLATION		ALSO AN	EXAMPLE.			ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND			
	ROCK STRUCTI		METER TEST			ROCK HARDNESS		EXPRESSED AS A PERCENTAGE,			
TEXTURE OR GRAIN SIZE	¹					RIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQU	DUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.			
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		SOUNDING ROD			AL HARD BLOWS OF THE			SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND			
		ABBREVIATIONS			E BCRATCHED BY KNIFE FACH HAND SPECIMEN.	DR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS I	REOUIRED	RELATIVELY THIN COMPARED WITH JTS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL			
BOULOER COBBLE GRAVEL COARSE FINE SILT	CLAY AR - AUGER REFUSAL	MEO MEOIUM	VST - VANE SHEAR TEST	1		OR PICK, GDUGES OR GRODVES TO 0.25 INCHES DEEP CA	AN RF	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.			
(BLOR,) (COB.) (GR.) (CSE, SD.) (F SD.) (SL.)	(CL.) BT - BORING TERMINAT	O MICA MICACEOUS MOD MDOERATELY	WEA WEATHEREO	HARO EXCAVA	ATEO BY HARD BLOW OF	A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACH		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT DR   SLIP PLANE.			
514 LL	005 CPT - CONE PENETRATI	ON TEST NP - NON PLASTIC	$\hat{\gamma}_{\!\scriptscriptstyle d}$ - DRY UNIT WEIGHT		DERATE BLDWS.	THE THEFT OFFE BY FIRM DESCRIBE OF MATER OF DIC	DOINT	STANDARO PENETRATION TEST (PENETRATION RESISTANCE) (6PT) - NUMBER OF BLOWS (N OR BPF) DF			
SIZE IN. 12 3	CSE COARSE OMT - DILATOMETER TE	ORG DRGANIC ST PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS	MEDIUM CAN BE GRODVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF TH				A 140 LB. HAMMER FALLING 30 INCHES REDUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO DR LESS			
SOIL MOISTURE - CORRELATION OF TERMS	DPT - DYNAMIC PENETR	ATION TEST SAP SAPROLITIC	S - BULK		OF A GEOLOGIST'S PIC			THAN 0.1 FOOT PER 60 BLOWS.			
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE (ATTERBERG LIMITS)  GUIDE FOR FIELD MOISTURE	OESCRIPTION 8 - VOID RATIO F - FINE	SO SAND, SANDY SL SILT, SILTY	SS - SPLIT SPOON ST - SHELBY TUBE			IEAOILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGI HES IN SIZE BY MODERATE BLOWS DF A PICK POINT. SMA		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH			
- SATURATEO - USUALLY LIDUIO; VERY WET	Ence - Enceti (EEDOLIC	SLI SLIGHTLY	RS - ROCK		CAN BE BROKEN BY F		,	OF STRATUM AND EXPRESSED AS A PERCENTAGE.			
(SAT.) FROM BELOW THE GROUND	ATER TABLE   FRAC FRACTURED, FRA		RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING			CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECE		STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK DUALITY DESCRIBED BY THE TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE			
PLASTIC PLASTIC PROJUCTS OPEN	FRAGS FRAGMENTS HI HIGHLY		RATIO	SDFT OR MOF		BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED RE	:AUILT BI	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.			
RANGE SEMISOLID: REQUIRES ORYIN ATTAIN OPTIMUM MOISTURE		OUIPMENT USED ON SUBJECT	PROJECT		RE SPACING	BEDDING		<u>IOPSDIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING DRGANIC MATTER.			
(PI) PL PLASTIC LIMIT			HAMMER TYPE:	TERM	SPACING	TERM IHICKNE		BENCH MARK: BY24-167 at -L- Sta. 23+83.17, 40.33' LT			
- ODTAMUM MOJETURE - MOJET - (M) SOLID; AT OR NEAR OPTIM	DRILL UNITS	ADVANCING TOOLS:	X AUTOMATIC X MANUAL	VERY WIDE	MDRE THAN 10 FE	YERY THICKLY BEODED 3.5 - 4 FEE					
OM DPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIM	MOBILE B	CLAY BITS		WIDE MODERATELY CLOSI	3 TO 10 FEET E 1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5	FEET	ELEVATION: 411.96 FT.			
REQUIRES ADDITIONAL WAT	0.70	6 CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDOED 0.03 - 0.16 THICKLY LAMINATED 0.028 - 0.0		NOTES:			
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51	X 8' HOLLOW AUGERS		VERY CLOSE	LESS THAN 0.16 F	THINLY LAMINATED < 0.008 F					
PLASTICITY		HARD FACED FINGER BITS				INDURATION					
PLASTICITY INDEX (PI) ORY STRENGT	CME-45C	TUNGCARBIDE INSERTS	X-N_Q	FOR SEDIMENTARY ROCK	KS, INDURATION IS THE	HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRES	SSURE, ETC.				
NONPLASTIC 0-5 VERY LOW	CME-550	_ I	X-H_0	FRIABLE		RUBBING WITH FINGER FREES NUMEROUS GRAINS;					
LOW PLASTICITY 6-15 SLIGHT		CASING W/ ADVANCER	HAND TOOLS:	DENILE BLUW BY HAMMER DISINTEGRATES SAMPLE.							
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST	X TRICDNE . STEEL TEETH	POST HOLE DIGGER	MODERATELY		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PF BREAKS EASILY WHEN HIT WITH HAMMER.	ROBE;				
COLOR	X CME 45B	TRICONE TUNGCARB.	HAND AUGER				.				
	<del>-</del>	X CORE BIT	SOUNDING ROD	INDURATED		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	.				
DESCRIPTIONS MAY INCLUDE COLDR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, B MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE			VANE SHEAR TEST	EXTREMELY		SHARP HAMMER BLDWS REQUIRED TO BREAK SAMPLE;					
The state of the country of the coun			<u>                                     </u>			SAMPLE BREAKS ACROSS GRAINS.					

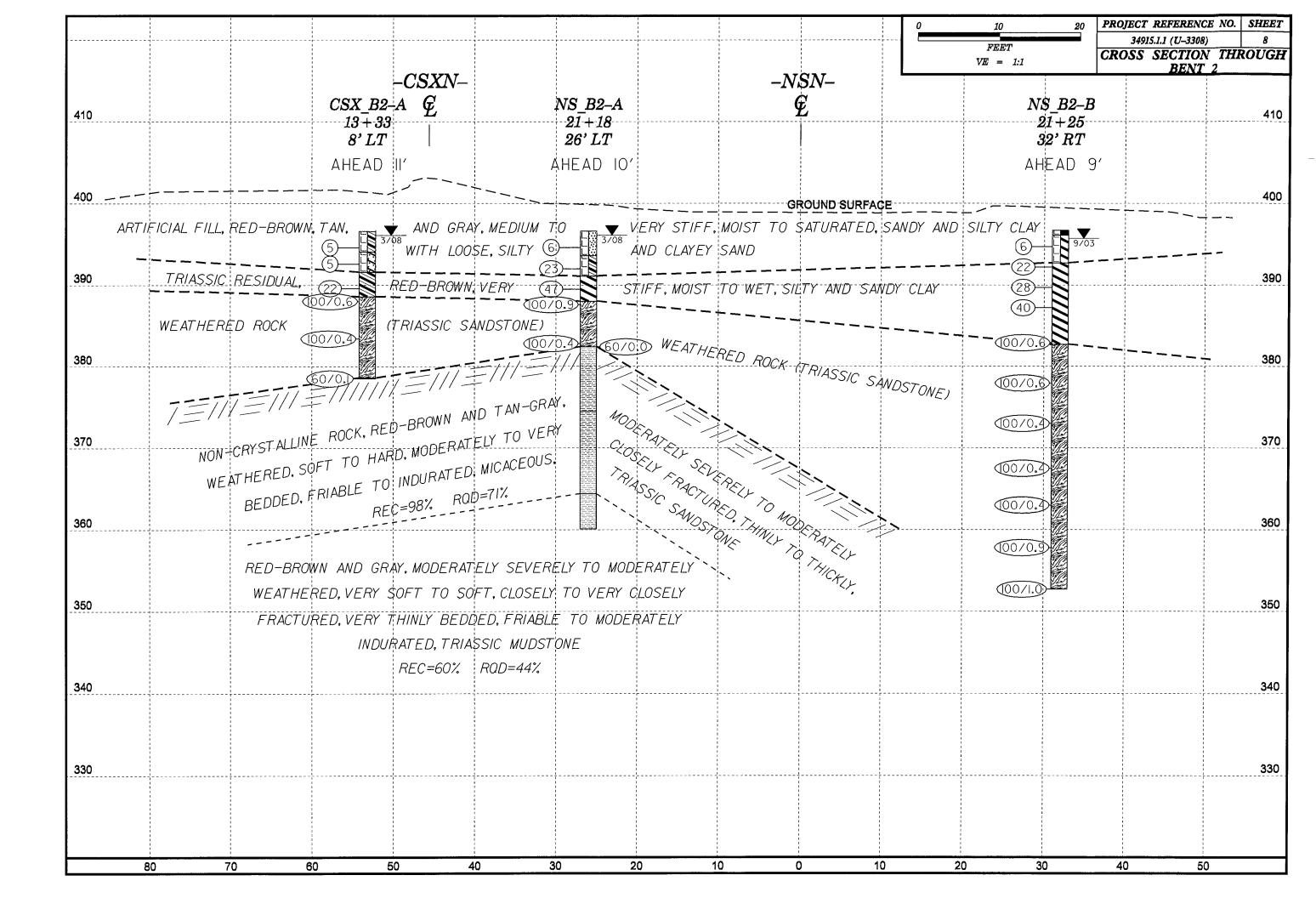


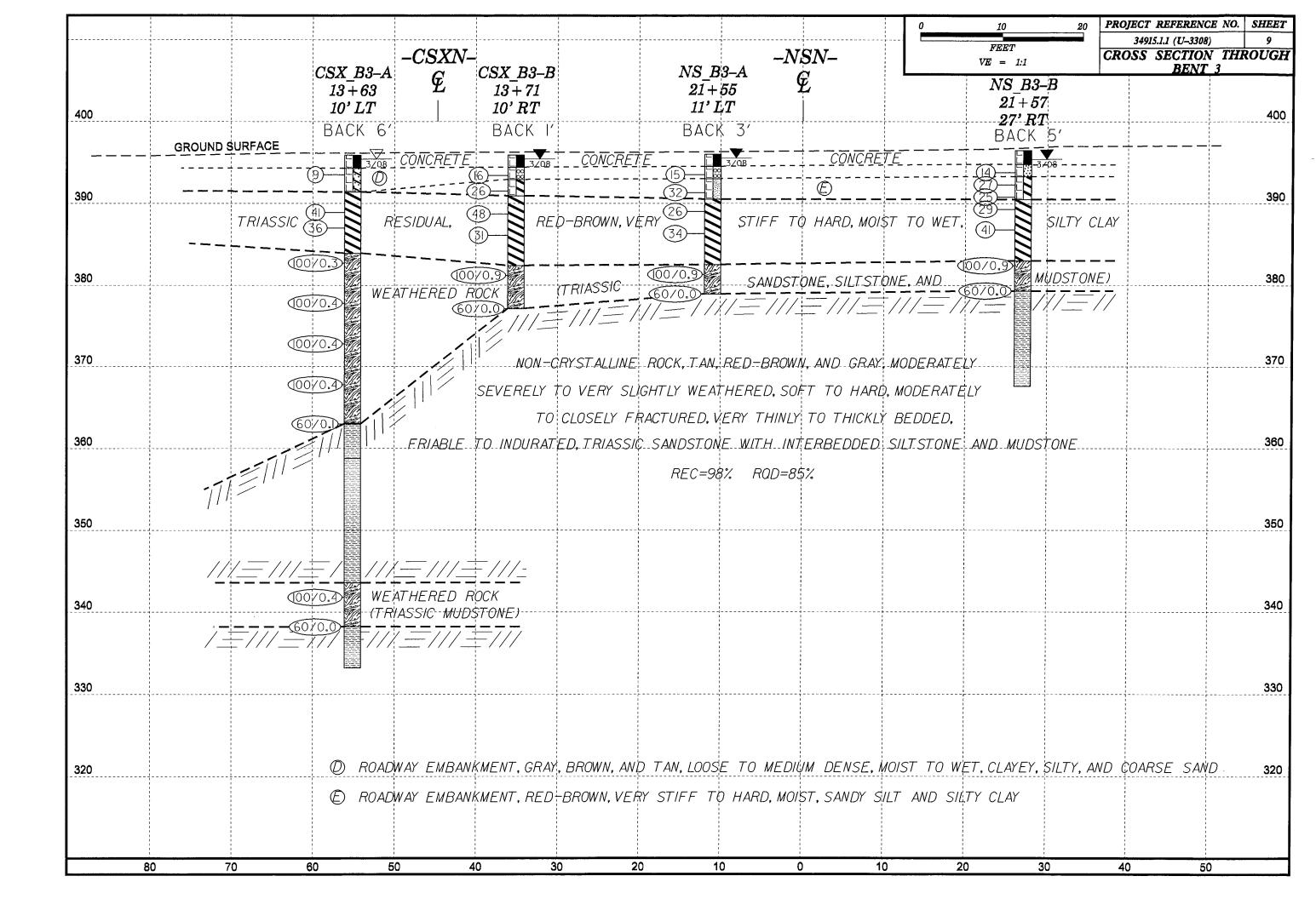


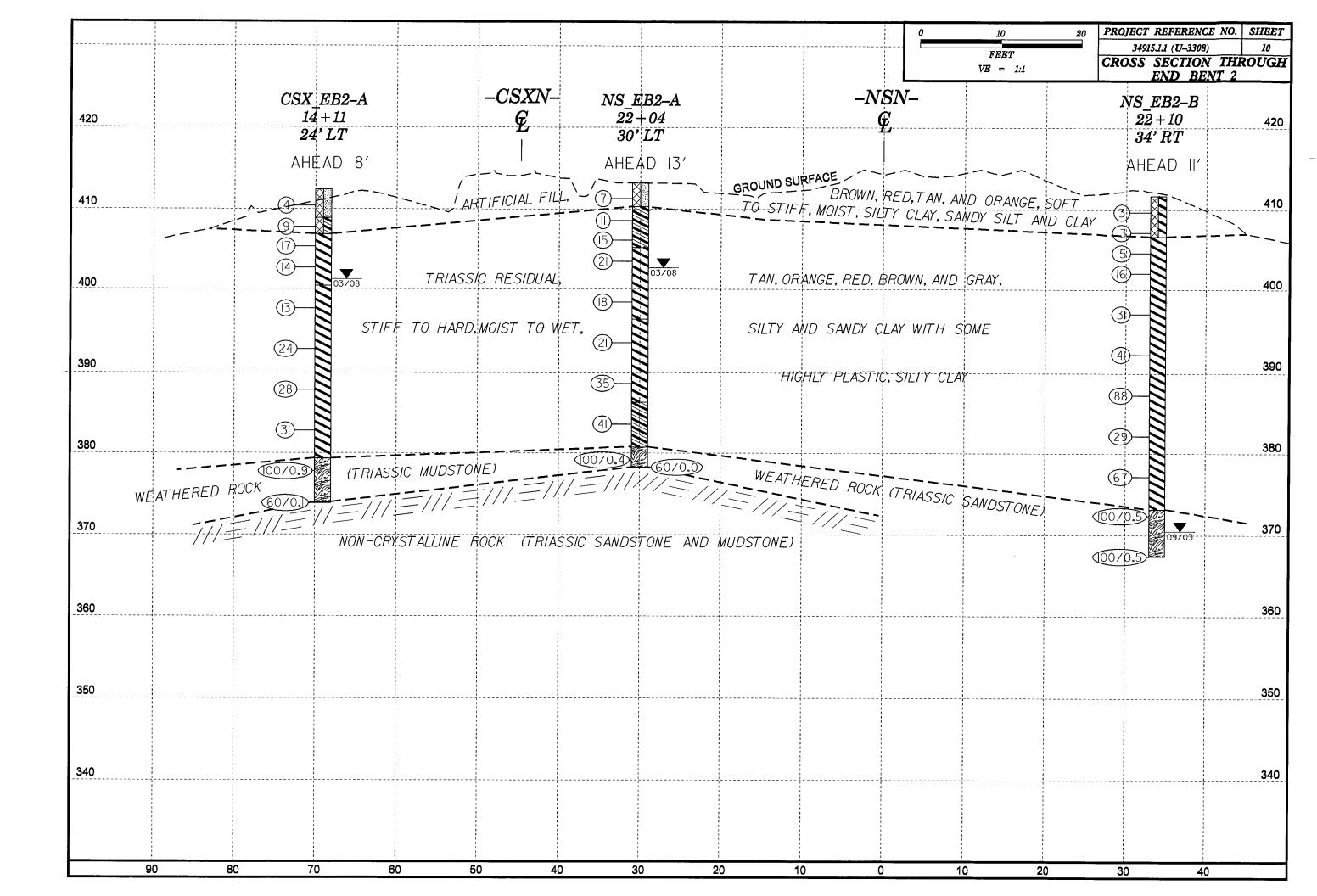


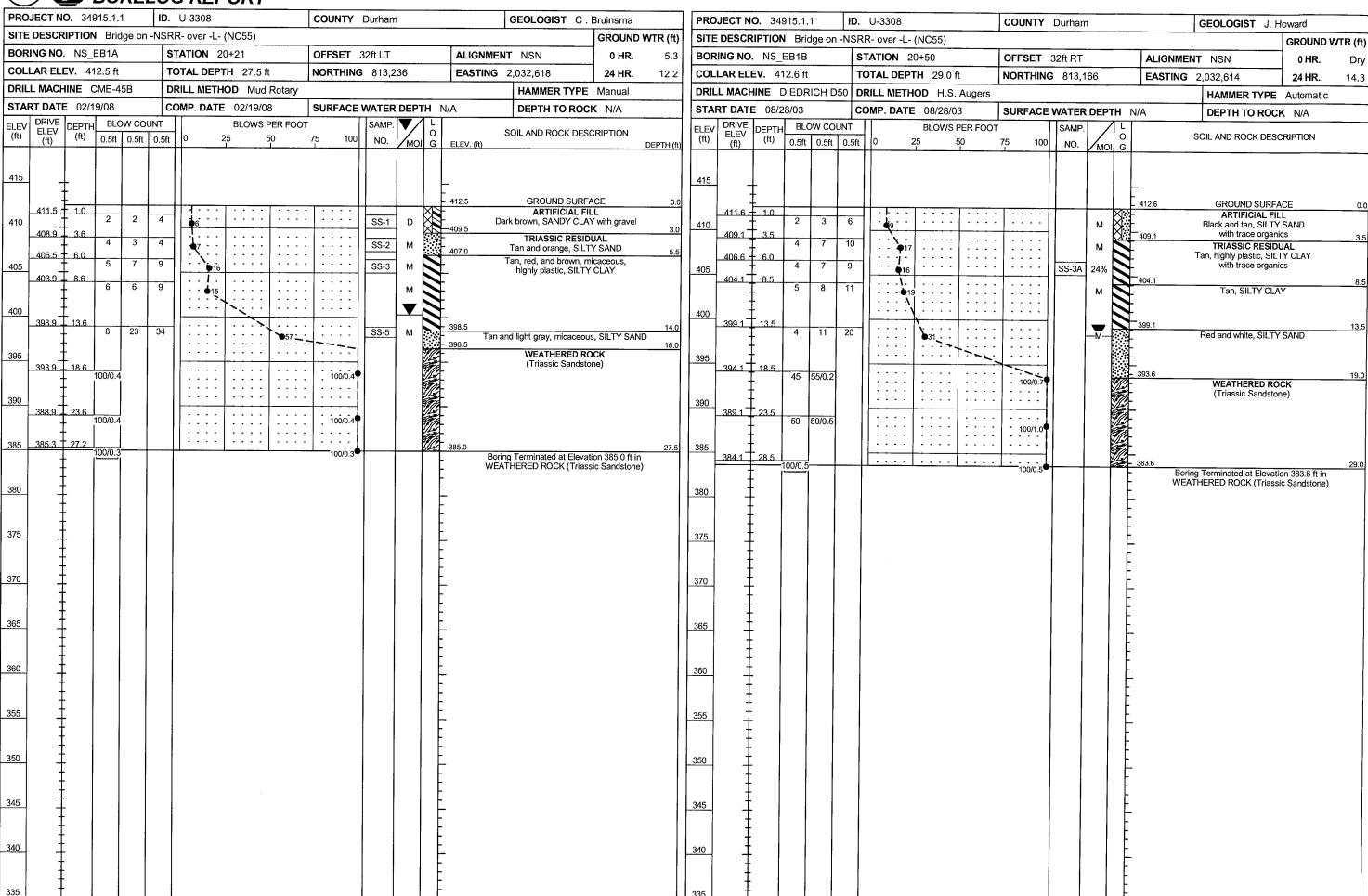












DRIVE DEPTH BLOW COUNT

(ft) 0.5ft 0.5ft 0.5ft

12 20

60 40/0.1

30

100/0.4

ELEV

415

410

405

400

395

390

385

380

375

370

365

360

355

350

345

340

412.1 I 1.0

404.5 + 8.6

399.5 + 13.6

394.5 - 18.6

 $389.5 \pm 23.6$ 

387.5 25.6 60/0.0

409.5

407.1

	T GEOTECHNICA LOG REPORT	AL ENGINEERING	G UNIT		
PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham		GEOLOGIST T	. Nielsen
SITE DESCRIPTION Bridge on	-NSRR- over -L- (NC55)				GROUND
BORING NO. NS_B1A	STATION 20+67	OFFSET 16ft LT	ALIGNME	NT NSN	0 HR.
COLLAR ELEV. 413.1 ft	TOTAL DEPTH 45.5 ft	NORTHING 813,200	EASTING	2,032,651	24 HR.
DRILL MACHINE CME-45B	DRILL METHOD Mud Rota	ry		HAMMER TYP	E Manual
START DATE 02/28/08	COMP. DATE 03/03/08	SURFACE WATER DEPTH	I N/A	DEPTH TO RO	OCK 25.6 ft

SAMP.

MOI G

М

 $\blacksquare$ 

ELEV. (ft)

413.1

394.5

371.0

NO.

SS-31

SS-32

SS-33

SS-35

RS-1

RS-2

- 100/0.6°

- 100/0.4¶

. . 60/0.0¶

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BLOWS PER FOOT

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SOIL AND ROCK DESCRIPTION

GROUND SURFACE TRIASSIC RESIDUAL

Tan-orange, SANDY CLAY

Tan and red-gray, SILTY CLAY

Red-brown to gray, SANDY CLAY

WEATHERED ROCK

(Triassic Sandstone)

NON-CRYSTALLINE ROCK Red-gray, tan, and brown, moderately

severely weathered, soft to hard, moderately

closely to closely fractured, very thickly bedded, friable to indurated,

TRIASSIC SANDSTONE

REC=93% RQD=70%

Red-gray to tan, moderately severely to

moderately weathered, soft to hard,

moderately closely to very closely fractured,

thinly to thickly bedded, indurated to friable,

micaceous, interbedded
TRIASSIC SANDSTONE and SILTSTONE

REC=98% RQD=61% Red-gray, moderately severely to moderately weathered, very soft to medium hard, closely to very closely fractured, very thinly to thinly bedded, moderately indurated to friable,

TRIASSIC MUDSTONE REC=85% RQD=53% Boring Terminated at Elevation 367.6 ft in

NON-CRYSTALLINE ROCK (Triassic Mudstone)

	NCDOT GEOTECHNICAL ENGINEERING UNIT
W	CORE BORING REPORT

			1	2	ĮVŲ	V	CO	RE E	BOF	R/N	G RE	PC	RT	•						
Ni	elsen		7	PRO	JECT N					-3308		···			DUNTY	Durham		GEOLOGIST T	. Nielsen	
	GROUND W	/TR (ft)	1 -	SITE	DESCI	RIPTIO	N Brid	ige on -N	ISRR-	over -	L- (NC55	)							GROUND W	/TR (ft)
7	0 HR.	12.4		BOR	ING NC	D. NS_	B1A		STA	TION	20+67			OF	FSET	16ft LT	ALIGNMEN	Γ NSN	0 HR.	12.4
	24 HR.	12.3		COLI	LAR EL	EV. 4	13.1 ft		тот	AL DE	PTH 45	.5 ft		NORTHING 813,200 EASTING 2,032,651 24						
:	Manual		1 [	DRIL	L MAC	HINE	CME-4	5B	DRII	L ME	THOD N	lud Ro	tary		PE Manual					
CK	25.6 ft		1 [	STAF	RT DAT	E 02/2	28/08	-	CON	IP. DA	TE 03/0	3/08		SU	JRFACE	WATER DEPTH N/	Α	DEPTH TO RO	OCK 25.6 ft	
	DIDTION			COR	E SIZE	NQ ·			тот	OTAL RUN 19.9 ft DRILLER Contract Driller										
50	RIPTION E	DEPTH (ft)	) [	ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	UN RQD	SAMP.	STF REC.	RATA	Ľ			FOODIDTION A	ND D5111 D160	<del></del>	
				(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	O G	ELEV.		ESCRIPTION A	ND REMARKS	D	EPTH (ft)
			] 3	87.5													Begin Coring	@ 25.6 ft		
ΞAi	Œ	0.0		385	387.5 - 385.1	+ 25.6 T 28.0	2.4	1:13/1.0 1:05/1.0	(2.3) 96%	(2.1) 88%		(9.2) 93%	(6.9) 70%		- 387.5 -	Red-gray, tan, and	NON-CRYSTA	LLINE ROCK	ered soft to hard	25.6
	AL CLAY		lŀ	300	-	Ī	2.5	0.28/0.4	(2.2)	(1.9)	RS-1				-	moderately closely	to closely fract			
•	<i>3211</i>		$\  \cdot \ $	}	382.6 -	30.5	5.0	0:30/0.5 2:51/1.0 3:36/1.0	88%	76%						)) iv	uulaleu, TRIASS	SIC SANDSTONE		
		5.5		380		‡		3:50/1.0 7:39/1.0 2:05/1.0 1:52/1.0	94%	58%					_					
LT	Y CLAY				377.6 -	35.5		2:05/1.0 1:52/1.0 2:32/1.0							377.6					35 6
				_		1	5.0	8:30/1.0 6:30/1.0	(4.7) 94%	(3.1) 62%		(6.5)			- 5, 7.0	Red-gray to tan, mode	erately severely	o moderately wea	thered, soft to hard	35.5
		11.5		375	-	+		5:51/1.0 6:02/1.0	54%	02%	DO 0	98%	61%		<u> </u>	moderately closely indura	ted to friable, mi	caceous, interbedd	led	
N	OY CLAY		11	-	372.6 -	40.5	5.0	4:39/1.0	(4.7)	(0.7)	RS-2	1		藍		TRIAS	SSIC SANDSTC	NE and SILTSTON	NE	
			$\ \cdot\ $	370	-	F	5.0	6:00/1.0 6:00/1.0	(4.7) 94%	(2.7) 54%		(2.9)	(1.8)		371.0	Red-gray, modera	taly saveraly to	noderately weather	rod you soft to	42.1
					007.0	1 45 5		6:00/1.0 6:00/1.0				85%	53%		<del></del>	medium hard, closely	to very closely	ractured, very thinl	y to thinly bedded,	,
-	CK	18.6	1	F	367.6 - -	45.5		6:00/1.0							- 367.6 -	Boring Terminated		le, TRIASSIC MUL 6 ft in NON-CRYS		45.5
ton			:	365	1	<u> </u>								•	-		(Triassic M	udstone)		
				•	-	‡									<u>-</u> -					
			Ш,	360	-	-									-					
	ROCK	25.6	╁┝	300	-	- 1									<u> </u>					
	noderately d, moderately				-	_								ļ	-					
d,	very thickly rated,			355	1	-									-					
	ONE				}	-								ŀ	-					
=7	0%				f	_								-	-					
elv	severely to	35.5	H	350	$\pm$	_								F	-					
so	ft to hard, ely fractured,				-									F	-					
ura	ted to friable,		3	345	Ţ	-						ļ		F	-					
	SILTSTONE	42.1	$\prod$		7	-				ł				ļ						
=6	1%				‡	- 1					1			F	•					
	to moderately hard, closely		3	340	‡	-	ĺ							ļ	<del>-</del>					
ry '	thinly to thinly d to friable,				‡	-					İ				•					
	NE		,	335	‡	- .														
	3%		"	,	+	-	]							ļ	<del></del>					
	n 367.6 ft in K (Triassic				1	.	ĺ													
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			3	25	+	.				[				F	-					
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			L		<u>_</u>									F					· · · · · · · · · · · · · · · · · · ·	

PRO	DJECT N	O. 34					U-3308			COUNT	γr	Jurhan				GEOLOGIST J. H	Howard	
							R- over -L-	(NC55)	<del>-</del>	100111		- unall				GEOLOGIST J. F	GROUND V	VTD /
	RING NO.			<u> </u>			TATION 2			OFFSE	 Г 3	3ft R <b>T</b>		···	ALIGNMEN	IT NON	O HR.	-
COL	LAR ELI	EV. 4	= 111.9 f	<del></del>			OTAL DEP		ft	NORTH			54		<del></del>	24 HR.	0.0	
	LL MACH						RILL METH		1.0.0.					EASTING 2,032,635 HAMMER TYPE A			6.3	
~	RT DATE									SURFA	`F V	VATER	DED	TLL A	Ν/Λ			
ELEV	DRIVE	DEPTI	<del></del>	OW CO		T	OMP. DATE 08/29/03 SURFACE WATER DEPTH N/A DEPTH TO  BLOWS PER FOOT SAMP. ▼ L							DEPTH TO ROC	<b>κ</b> 28.7 π			
(ft)	ELEV (ft)	(ft)	0.5ft	7-		ift	0 2		50		00	NO.	МО	0	ELEV. (ft)	SOIL AND ROCK DES		
415									·	<u> </u>		<b>-</b> , , , , , , , , , , , , , , , , , , ,	VIMO		LLEV. (II)			DEPTH (f
440	410.9	1.0_	<u> </u>			$\pm$	1.1	· · · · ·	Т	1	$\mathbb{H}$			XIO	411.9	GROUND SURFA		0.
410	400.4		2	3	6		9						М		-	Black, SAND		
	408.4	3.5	5	7	9	-	16				:		М	X	408.4	with trace organi Tan and red, SILTY		3.5
105	405.9	6.0	8	8	12	$\dashv$	1		: : : :		:		V		<del>- 406.4</del> -	TRIASSIC RESID		5.5
	403.4	- - 8.5	"	°	'2			j <del></del>	1	†	-		М		<del>-</del>	Tan and gray, SILTY		
	1	-	5	8	11	7	19			: : :	:		M					
00	1 1	_		İ							.				•			
	398.4	13.5	ļ	10-	1	4,	• • • • }	(							398.1			13.
	1 7	-	5	13	16		: : : :	29	: : : :		:		М			ed-brown and white, SII	TY SAND	10.
95	1	-			1				<u> </u>		41				<del>-</del>			
	393.4	18.5	29	84	16/0.	1				7					392.9			19.
90	‡		İ	ł						. 100/0	6					WEATHERED RO (Triassic Sandstor		
<del>,</del>	388.4	- . 23.5							<del> </del>		-	ŀ			_	( That so out has to	,	
	300.4		50	50/0.5		П				100/1.	0							
35	Ŧ	•																
	383.4	28.5			1					<b> </b>	11				<del>-</del> 383.2			
	‡		100/0.2	<u> </u>						100/0.	- 1 L					NON-CRYSTALLINE		28.7
30_		•									_] [4	RS-1A			Red-gr we	ay and brown, severely athered, soft to modera	to moderately ately hard.	
	±										11	j			mod	lerately closely to closel oderately indurated to in	y fractured.	
	+											ı			111	TRIASSIC SANDST	ONE	
5	<b></b>					$\ \cdot\ $					41				-	REC=94% RQD=8	1%	
	‡										П		į					
_	‡			l		П				: : : :								
0	士					$\ \cdot\ $					-    -	RS-2A			368.8			40.4
	Ŧ									: : : :					Red-gr	ay, severely weathered		43.1
5	7					╁	• • • • •	· · · · ·		<del></del>	┵┼			-		closely fractured, friable lurated, TRIASSIC MUI		45.2
	7				!											REC=100% RQD=2	l l	
l	‡												ľ	ŀ	Boring	Terminated at Elevation	n 366.7 ft in	
0	‡													F	NON	N-CRYSTALLINE ROCH Mudstone)	(Triassic	
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

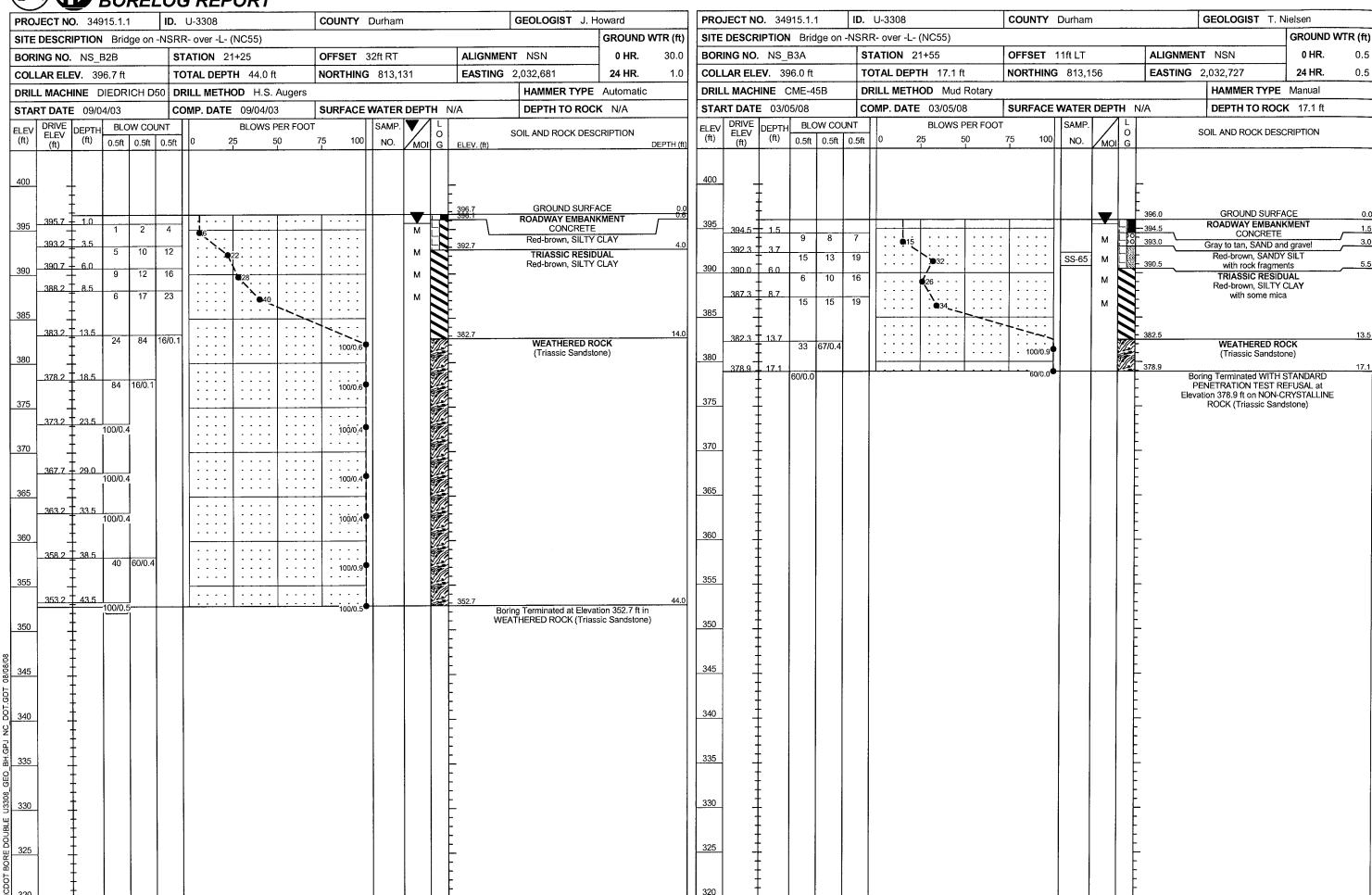
6	YŲ	V	CO	RE E	3OF	RING	G RE	PO	RT	•									
PRO	DJECT NO		-		ID. U					7	DUNTY Durham		GEOLOGIST J. H	loward					
SITI	DESCR	IPTION	<b>N</b> Brid	dge on -N	ISRR-	over -	L- (NC55	)				L		GROUND W	TR (ft)				
ВОР	RING NO.	NS_	B1B		STA	TION	20+74		***************************************	OF	FSET 33ft RT	ALIGNMEN	T NSN	0 HR.	0.0				
COL	LAR ELE	EV. 4	11.9 ft		тот	AL DE	<b>PTH</b> 45	.2 ft		NC	ORTHING 813,154	EASTING :	2,032,635	24 HR.	6.3				
DRI	LL MACH	INE [	DIEDR	ICH D50	DRII	L ME	THOD H	l.S. Aı	ıgers			HAMMER TYPE Automatic							
STA	RT DATE	08/2	28/03		COM	IP. DA	<b>TE</b> 08/2	9/03		SL	SURFACE WATER DEPTH N/A DEPTH TO ROCK 28.7 ft								
COF	RE SIZE	HQ					<b>N</b> 16.51			DF	RILLER Contract Driller								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	UN RQD (ft) %	SAMP. NO.	STF REC. (ft) %	RATA RQD (ft) %	LOG	Di ELEV. (ft)	ESCRIPTION A	ND REMARKS	De	EPTH (ft)				
383.2												, Di							
	383.2 381.4	28.7 - 30.5	1.8	4:00/1.0 1:15/0.8	(1.6) 89%	(1.5)	RS-1A	(13.6) 94%	(11.7) 81%		383.2 Red-gray and brown, s	Begin Coring NON-CRYSTA	LLINE ROCK	to moderately	28.7				
380	<b>∤                                    </b>	-	4.8	4:45/1.0 13:00/1.0	(4.5) 94%	(3.2)	1.0-17				hard, moderately cle	osely to closely	fractured, moderately in SIC SANDSTONE						
	376.6	. 35.3		7:00/1.0 3:30/1.0	3476	0778					-	idiated, Transe	ON ON TOTAL						
375	370.0	. 55.5	4.9	2:00/0.8 4:00/1.0 4:00/1.0	(4.9)	(4.9)					-								
	1 Ŧ	•		2:45/1.0	100%	100%					-								
	371.7	40.2	5.0	2:30/1.0 2:30/0.9	(4.7)	(2.6)													
370	}	•	3.0	3:45/1.0 4:00/1.0 11:30/1.0	94%	52%	RS-2A								42.4				
	366.7	45.2		20:00/1.0 4:30/1.0				(2.1) 100%	(0.5) 24%	蓋	<ul> <li>Red-gray, severely wea</li> </ul>		osely to very closely fra TRIASSIC MUDSTONE		43.1				
365	1			4.50/1.0				10070	2.470			t Elevation 366.	7 ft in NON-CRYSTALI		45.2				
	1 1										<del>-</del> -	(Triassic M	ludstone)						
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360	1 ±										- - -								
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# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PRO	JECT NO	<b>).</b> 34	915.1.	.1	ID.	U-3308		COUNTY	Durham	ı			GEOLOGIST T. N	lielsen	
SITE	DESCRI	PTIO	<b>V</b> Bri	dge or	-NSR	R- over -L- (1	VC55)							GROUND W	/TR (ft
BOR	ING NO.	NS_	B2A		s	TATION 21	+18	OFFSET	26ft LT			ALIGNMEN	T NSN	0 HR.	0.5
COL	LAR ELE	<b>V</b> . 39	96.6 ft		T	OTAL DEPTH	d 36.5 ft	NORTHIN	G 813,1	86		EASTING	2,032,701	24 HR.	0.5
DRIL	Ľ MACH	INE (	CME-4	45B	D	RILL METHO	D Mud Rotary					<u> </u>	HAMMER TYPE	Manual	-
STA	RT DATE	03/0	05/08		C	OMP. DATE	03/06/08	SURFACE	WATER	DEP	1 HT	N/A	DEPTH TO ROCI	<b>K</b> 14.2 ft	
ELEV	DRIVE ELEV	DEPTH	BL	ow co	UNT		BLOWS PER FO	DT T	SAMP.	<b>V</b> /			COLL AND DOOK DECK	NDIDTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	МО	O     G	ELEV. (ft)	SOIL AND ROCK DESC		EPTH (f
400 395	395.6	1.0	3	3	3	1				Sat.		- - - 396.6	GROUND SURFA ROADWAY EMBANI Tan-gray, SILTY S.	KMENT	0.
	393.0	3.6	<u> </u>									- 393.6	Red-brown, SILTY		3.0
	390.5	: 6.1	8	10	13		3		SS-75	М		391.1	with rock fragmer	nts	5.
390_	390.5	<u>D. I</u>	13	19	28		47_		SS-76	w		<u>-</u>	TRIASSIC RESIDE Red-brown, SILTY (		
	388.0	8.6_	33	67/0.4	-			100/0.4		]		388.0	with mica WEATHERED RO		8.
385	Ŧ								[ ]			•	(Triassic Sandsto		
	383 0	13.6									鯯	<del>-</del> ·			
	383.9		100/0.4					100/0.4				382.4	NON-CRYSTALLINE	ROCK	14
30	#		60/0.0	"					RS-3				and tan-gray, moderat red, soft to hard, mode	tely severely	
	‡											close	ly fractured, thinly to th	ickly bedded,	
	±				•							,	friable to indurated, mid TRIASSIC SANDST		
75	$\pm$			-								-374.5	REC=99% RQD=6	64%	22
	Ŧ		İ									Red-br	own and gray, moderat	tely severely to	,
70	‡											moder	oderately weathered, so ately closely to very clo	sely fractured.	
,0	‡											<ul><li>thinly t</li><li>mic</li></ul>	o thickly bedded, friable aceous, TRIASSIC SA	e to indurated, NDSTONE	
											量		REC=96% RQD=7		
35	<u> </u>								RS-4				NEC-30% NQD-	7 0 70	
	Ŧ											-364.4 Red-br	own and gray, moderat	ely severely to	32
60_	<del></del>											closel	erately weathered, very y to very closely fracture led, friable to moderate TRIASSIC MUDSTO	ed, very thinly lv indurated.	36
	Ŧ											Porin	REC=60% RQD=4	14%	
55	-												N-CRYSTALLINE ROC Mudstone)		
50	‡										-				
	7										-	<b>-</b>			
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

2	ツリ	T)	CC	RE	BOF	RIN	G RI	EPC	ORT	Γ				
PR	OJECT N					J-3308					DUNTY Durham		GEOLOGIST T. I	Vielsen
SIT	E DESC	RIPTIC	ON Br	idge on -	NSRR-	over-	L- (NC5	5)		1				GROUND WTR (ft)
во	RING NO	D. NS	B2A		STA	TION	21+18			OI	FSET 26ft LT	ALIGNMEN	IT NSN	0 HR. 0.5
СО	LLAR EL	<b>.EV.</b> 3	96.6 f	t	ТОТ	AL DI	EPTH 3	6.5 ft		NC	PRTHING 813,186	EASTING		24 HR. 0.5
DRI	LL MAC	HINE	CME-	45B	DRI	LL ME	THOD	Mud R	otary			L	HAMMER TYPE	
STA	ART DAT	E 03/	05/08		CON	IP. DA	TE 03/	06/08		St	RFACE WATER DEPTH N//	Α	DEPTH TO ROO	
CO	RE SIZE	NQ					JN 22.3	ft		DF	RILLER Contract Driller			
ELE\ (ft)	/ RUN ELEV (ft)	DEPTI (ft)	H RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	UN RQD (ft) %	SAMP. NO.	ST REC. (ft) %	RATA RQD (ft) %	L O G	DE	ESCRIPTION	AND REMARKS	DEPTH (ft)
382.4	382 4	14.5	<u> </u>			L						Begin Coring	a @ 14.2 ft	DEFIN (II)
380	382.4 381.4 376.4	<del> </del>	5.0	2:01/1.0 5:30/1.0 3:19/1.0 4:54/1.0 4:31/1.0 4:45/1.0	(4.9) 98%	(2.2) 44%	RS-3	99%	(5.1) 65%		382.4 Pink and tan-gray, mo closely to closely fra	NON-CRYST.  derately sever  actured, thinly t	ALLINE ROCK	14.2 hard, moderately le to indurated,
375	371.4	- 25.2	5.0	11:20/1.0 8:40/1.0 9:11/1.0 10:00/1.0 9:32/1.0 10:00/1.0	94%	(2.5) 50% (4.9)		(9.7) 96%	(7.9) 78%			elv to verv clos	verely to moderately w sely fractured, thinly to sus, TRIASSIC SANDS	thickly hedded
365	366.4	30.2	4.9	9:30/1.0 10:30/1.0 10:00/1.0 11:00/1.0 9:00/1.0 8:00/1.0	(3.7)	98% (3.3) 67%	RS-4				 - - - - - 364.4			
360	361.5 360.1	- 35,1 - 36.5	1.4	10:00/1.0 10:00/1.0 10:00/0.9 9:30/1.0		(0.9)		(2.6) 60%	(1.9) 44%		Red-brown and gray, soft to soft, closely to moderate	very closely fra	verely to moderately wastured, very thinly bed RIASSIC MUDSTONI	ded, friable to
_300_	- 300.1			0:45/0.4	93%	64%					360.1 Boring Terminated at	t Elevation 360	.1 ft in NON-CRYSTA	36.5 LLINE ROCK
		·								] }		(Triassic M	ludstone)	
355		-									_			
350	1									-  -  -	-			
345									į					
	<del> </del>									-	•			
340	+		į	3						-  -  -  -				
335	‡									E				
330	+			<u>,                                    </u>						<u>-</u> -	·			
325	+									-  -  -				
320	+				}									
315	‡									F				
-10	+									<u> </u>				
310	+									-				
305	† - - -													



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

<u> </u>	<b>y u</b>	ע	<u>BO</u>	RE	LO	G REF	PORT									
PRO	JECT N	0. 349	915.1.	1	ID.	U-3308		cour	NTY	Durham	1		7	GEOLOGIST C.	Bruinsma	
SITE	DESCR	IPTION	<b>I</b> Brid	dge on	-NSR	RR- over -L-	(NC55)				,				GROUND W	TR (ft)
BOR	ING NO.	NS_	взв		s	STATION 2	21+57	OFFS	ET 2	27ft RT			ALIGNMEN	IT NSN	0 HR.	1.1
COL	LAR ELE	E <b>V</b> . 39	96.5 ft	•	T	OTAL DEP	TH 28.9 ft	NORT	HING	813,1	21		EASTING	2,032,712	24 HR.	1.1
DRIL	L MACH	INE (	CME-4	15B	D	RILL METH	OD Mud Rotar	/						HAMMER TYPE	Manual	
STAI	RT DATE	03/0	4/08		c	OMP. DATI	E 03/04/08	SURF	ACE	WATER	DEP	TH I	N/A	DEPTH TO ROC	K 17.2 ft	
ELEV (ft)	DRIVE ELEV	DEPTH	' <del></del>	OW CO		1	BLOWS PER FO		400	SAMP.	<b>V</b> /			SOIL AND ROCK DES	CRIPTION	
(11)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25 50	75 I	100	NO.	/мо	I G	ELEV. (ft)		D	EPTH (ft)
400	-	_											_			
	-	F							ĺ				- - - 396.5	GROUND SURFA	NCE.	0.4
395	394.8	1.7	<del> </del>		<del> </del>	<del>                                     </del>	1			<del> </del>	V		394.8	ROADWAY EMBAN		1.7
	393.3	3.2	7	7	7	• • • 14				SS-58	м	-13	393.3	CONCRETE Tan-brown, SILTY	SAND	3.2
	391.8 -	4.7	9	12	15	: : : : : : : : : : : : : : : : : :	27	:: ::	: :	SS-59	М			Dark brown, SILTY with rock fragme		
390	390.3	6.2	11	16	13	<b>┤</b> ├	<b>Q</b> 25			SS-61	M M	1	- 390.5 	TRIASSIC RESID	UAL	6.0
	387.8	8.7	8	19	22	_  ::::				-			-	Red-brown, SILTY	CLAY	
385	-	-	ľ	19	22		●41				М		<del>-</del> -			
	200.0	-											- 383.0			13.5
	_382.8	- 13.7 -	49	51/0.4	}			. 10	0/0.9				-	WEATHERED RO (Triassic Mudsto		10.0
380	379.3	17.2											<del>-</del> 379.3	( massic iniugsio	ie)	17.2
	-	-	60/0.0	1				6	0/0.0				- Da	NON-CRYSTALLINE rk-brown, tan, and pink		
375	-	-											sev	erely to moderately wear moderately closely to cl	hered, soft to	
570	-	-											thinly	to thickly bedded, mode indurated, micaceous,	rately indurated	
	1	-							::					DINGUIALEO, MICACEOUS, DSTONE interbedded wi		
370		_								RS-5			- <del>-</del>	REC=94% RQD=	87%	
		-							1				- - 367.6			28.9
205		- -						•					- Bori - No	ng Terminated at Elevat ON-CRYSTALLINE ROO	ion 367.6 ft in	
365	-	_ -												Sandstone and Silts	tone)	
		_											<b>-</b>			
360		_											_			
	1	_											- -			
	1	-										<u> </u>	-			
355	-	-														
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350		_											-			
	7	- -											<del>-</del> -			
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345	-	-											<del>-</del>			
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	$\frac{1}{1}$	-										[	<u>.</u>			
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

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PRO	JECT N	O. 349	915.1.	1   1	D. U	3308				СС	UNTY Durham	GEOLOGIST C.I	Bruinsma	
SITE	DESC	RIPTIO	N Brid	lge on -N	SRR-	over -l	(NC55)	)					GROUND WTR	(ft)
BOR	ING NO	. NS_I	взв		STA	TION	21+57			OF	FSET 27ft RT ALIGNMENT	r nsn	0 HR. 1	1.1
COL	LAR EL	<b>EV.</b> 39	96.5 ft		TOT	AL DE	PTH 28	.9 ft		NO	RTHING 813,121 EASTING 2	,032,712	24 HR. 1	1.1
DRIL	L MAC	HINE (	ME-4	5B	DRIL	L ME	THOD M	lud Ro	tary			HAMMER TYPE	Manual	
STA	RT DAT	E 03/0	4/08		COM	P. DA	TE 03/0	4/08		รบ	RFACE WATER DEPTH N/A	DEPTH TO ROC	K 17.2 ft	
COR	E SIZE	NQ		_	тот	AL RU	N 11.7 f			DR	ILLER Contract Driller			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION A	ND REMARKS	DEPTI	H (ft)
379.3									<u> </u>		Begin Coring	@ 17.2 ft		
375	379.3 376.1	20.4	5.0	0:20/0.2 3:50/1.0 1:27/1.0 2:47/1.0 1:40/1.0 1:50/1.0 2:00/1.0	(2.5) 78% (5.0) 100%	(2.3) 72% (4.7) 94%		(11.0) 94%	(10.2) 87%		379.3 NON-CRYSTA  Dark-brown, tan, and pink, moderate soft to hard, moderately closely to clo moderately indurated to indurated, n interbedded wit	ely severely to modera sely fractured, thinly to nicaceous, TRIASSIC	ately weathered, o thickly bedded,	17.2
370	371.1	25.4	3.5	2:14/1.0 2:15/1.0 3:00/1.0 4:15/1.0	(3.5) 100%	(3.2) 91%	RS-5				REC=94%	RQD=87%		
	367.6 -	28.9		3:45/1.0 5:00/0.5	<b> </b>						- 367.6 - Boring Terminated at Elevation 367	6 ft in NON-CRYSTA	ALLINE ROCK	28.9
365	- - -	- - - -									- (Triassic Sandstor			
360	- - -										- - - -			
355	- - - -	-									<u>-</u> - - -			:
350	- - - -	- - -									· <del>-</del> ·			
345	- - -	-									· - ·			
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335	- - - -	<del> </del>  -  -  -									· · · · · · · · · · · · · · · · · · ·			
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300	-	-									_			

PROJECT NO. 34915.1.1         ID. U-3308         COUNTY Durham         GEOLOGIST T. Nielsen         PROJECT NO. 34915.1.1         ID. U-3308           SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)         GROUND WTR (ft)         SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)         SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)           BORING NO. NS_EB2A         STATION 22+04         OFFSET 30ft LT         ALIGNMENT NSN         0 HR. 5.3         BORING NO. NS_EB2B         STATION 22+10           COLLAR ELEV. 413.1 ft         TOTAL DEPTH 35.0 ft         NORTHING 813,150         EASTING 2,032,780         24 HR. 10.5         COLLAR ELEV. 411.5 ft         TOTAL DEPTH 35.0 ft           DRILL MACHINE CME-45B         DRILL METHOD Mud Rotary         HAMMER TYPE Manual         DRILL MACHINE DIEDRICH D50         DRILL METHOD	OFFSET         34ft RT         ALIGNMENT         NSN         0 HR.         Dry           44.3 ft         NORTHING         813,090         EASTING         2,032,755         24 HR.         41.2           H.S. Augers         HAMMER TYPE         Automatic
BORING NO. NS_EB2A         STATION 22+04         OFFSET 30ft LT         ALIGNMENT NSN         0 HR.         5.3         BORING NO. NS_EB2B         STATION 22+10           COLLAR ELEV. 413.1 ft         TOTAL DEPTH 35.0 ft         NORTHING 813,150         EASTING 2,032,780         24 HR.         10.5         COLLAR ELEV. 411.5 ft         TOTAL DEPTH	OFFSET         34ft RT         ALIGNMENT         NSN         0 HR.         Dry           44.3 ft         NORTHING         813,090         EASTING         2,032,755         24 HR.         41.2           H.S. Augers         HAMMER TYPE         Automatic           0/02/03         SURFACE WATER DEPTH         N/A         DEPTH TO ROCK         N/A
COLLAR ELEV. 413.1 ft TOTAL DEPTH 35.0 ft NORTHING 813,150 EASTING 2,032,780 24 HR. 10.5 COLLAR ELEV. 411.5 ft TOTAL DEPTH	44.3 ft NORTHING 813,090 EASTING 2,032,755 24 HR. 41.2  H.S. Augers HAMMER TYPE Automatic  0/02/03 SURFACE WATER DEPTH N/A DEPTH TO ROCK N/A
	H.S. Augers HAMMER TYPE Automatic 0/02/03 SURFACE WATER DEPTH N/A DEPTH TO ROCK N/A
DRILL MACHINE CME-45B DRILL METHOD Mud Rotary HAMMER TYPE Manual DRILL MACHINE DIEDRICH D50 DRILL METHOD	0/02/03 SURFACE WATER DEPTH N/A DEPTH TO ROCK N/A
DESCRIPTION OF STREET COLORS	
START DATE 02/29/08 COMP. DATE 02/29/08 SURFACE WATER DEPTH N/A DEPTH TO ROCK 35.0 ft START DATE 09/02/03 COMP. DATE 05/02/03 COMP. DATE 05/02/03 DEPTH BLOW COUNT BLOW SPER FOOT SAMP. V L SOULAND BOCK DESCRIPTION BLOW COUNT BLOW CO	
ELEV (ft) (ft)   DRIVE (ft)   DEPTH   BLOW COUNT   BLOWS PER FOOT   SAMP.   V   C   C   C   C   C   C   C   C   C	50 75 100 NO. MOI G SOIL AND ROCK DESCRIPTION
(ii) SEI M(ii)	
415 415 415	
+	
412.1 1.0 ARTIFICIAL FILL Dark brown, SANDY SILT	- 411.5 GROUND SURFACE 0.1
410 409.4 3.7 With rock fragments 3.0 410 410.5 1.0 1 1 2 3	M Red and tan, SILTY CLAY
2 5 6 111	M
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	TRIASSIC RESIDUAL Brown, SILTY CLAY
404.4 8.7 7 10 11 SS-41 M/ Red-brown, tan, orange, and gray, highly plastic, SILTY CLAY 403.0 8.5 4 7 9	
	::: :::: ::::
400 399.4 13.7 6 9 9 · · · · · · · · · · · · · · · · ·	
396.3	SS-5A 15%
395 394.4 18.7 Red-brown, SILTY CLAY	
7 8 13 21 SS-43 M 393.0 18.5 8 17 24	:\\\
$\begin{vmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 $	
389.4 23.7 11 15 20 \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{35} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{36.0 \tag{35}}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{36.0 \tag{35}}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ \tag{36.0 \tag{35}} \\ 36.0 \tag{36.0 \	
385 Telephone Te	M M
385 384 4 28.7 Red-brown, SANDY CLAY 385 383.0 28.5 383.0 28.5	
	F (
380 379.4 33.7 WEATHERED ROCK (Triassic Sandstone) 35.0 378.	
378.1 35.0 100/0.4 100/0.4 378.1 (Triassic Sandstone) 35.0 378.0 33.5 378.0 33.5 9 28 39 1	M M
375 PENETRATION TEST REFUSAL at Elevation 378.1 ft on NON-CRYSTALLINE 375	
ROCK (Triassic Sandstone)	373.0 38.5 WEATHERED ROCK
	WEATHERED ROCK (Triassic Sandstone)
$\begin{vmatrix} 370 \end{vmatrix} + \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \begin{vmatrix} 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{vmatrix}$	
368.0 <u>43.5 33</u> 67/0.3 1 · · · · · · ·	367.3 44.3 Boring Terminated at Elevation 367.2 ft in
365	WEATHERED ROCK (Triassic Sandstone)
$\begin{bmatrix} \frac{3}{2} \\ \frac{3}{2} \end{bmatrix} = \begin{bmatrix} $	
	]
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#### SHEET 18 OF 28

PPO	JECT N	<b>n</b> 340	215 1 ·	 1	Tin	1	J-3308				COL	UNTY	Durhai	n			GEOLOGIST T.	Nielsen	
							ver -L- (N	JC55)				•	2 2				1		D WTR (ft)
	ING NO.						ATION 1				OFF	SET	10ft LT			ALIGNMEN	IT CSX	0 HR.	` '
	LAR ELI			<u> </u>			TAL DEP		.7 ft			RTHING		 257	·	EASTING		24 HR.	14.1
	L MACH			5B			LL METH			otary	J		<u>.</u>			I	HAMMER TYPE	Manual	
	RT DATI						MP. DATE				SUF	RFACE	WATE	R DEP	TH I	V/A	DEPTH TO RO	CK N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	51.6	0.5ft	UNT 0.5ft	-	0 2	BLOV	VS PEI	R FOOT	75	100	SAMF NO.	1/	L O G		SOIL AND ROCK DE	SCRIPTION	
415	413.0	1.0	5	7	7			: : :			:			М		- - 411.0	GROUND SUR ARTIFICIAL F Dark-brown, SAND	ILL	0.0
410	410.5	3.5	18	14	12	┨╏	,		-		<u> </u> :		SS-10	м		411.0	TRIASSIC RESI		3.0
405	408.0 - - - 405.5 -	Ļ	5	10	11			26			:		SS-11	1		- - 404.5	Tan, SANDY S Red, tan, and brown, h SILTY CLA	ighly plastic, Y	5.5 9.5
400	400.5	13.5_						. • • • • • • • • • • • • • • • • • • •									Tan, red, and brown, SILTY SAN		
	-	F	14	20	23				●43		<b>-</b>		SS-13	S - M-		398.0			16.0
395	395.5	18.5	100/0.4	 							-	 -100/0.4	,			- - -	WEATHERED F (Triassic Sands		
390	390.5	23.5	100/0								:					- - -			
385	385.5	28.5	100/0.4								-	100/0.4				- - - - 385.3			28.7
		† †	100/0.2									¯100/0.2 <b>¯</b>				Borii - WEA - -	ng Terminated at Elev ATHERED ROCK (Tria	ation 385.3 ft ssic Sandstor	in ne)
380	-	<u> </u>														_ - -			
375	-	<u> </u>														- -			
370	-															- - - -			
365		-														- - - <del>-</del>			
360		† - - -			:											- - - -			
355	-	<u> </u>														- - - -			
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340	-	<u> </u>														- - -			
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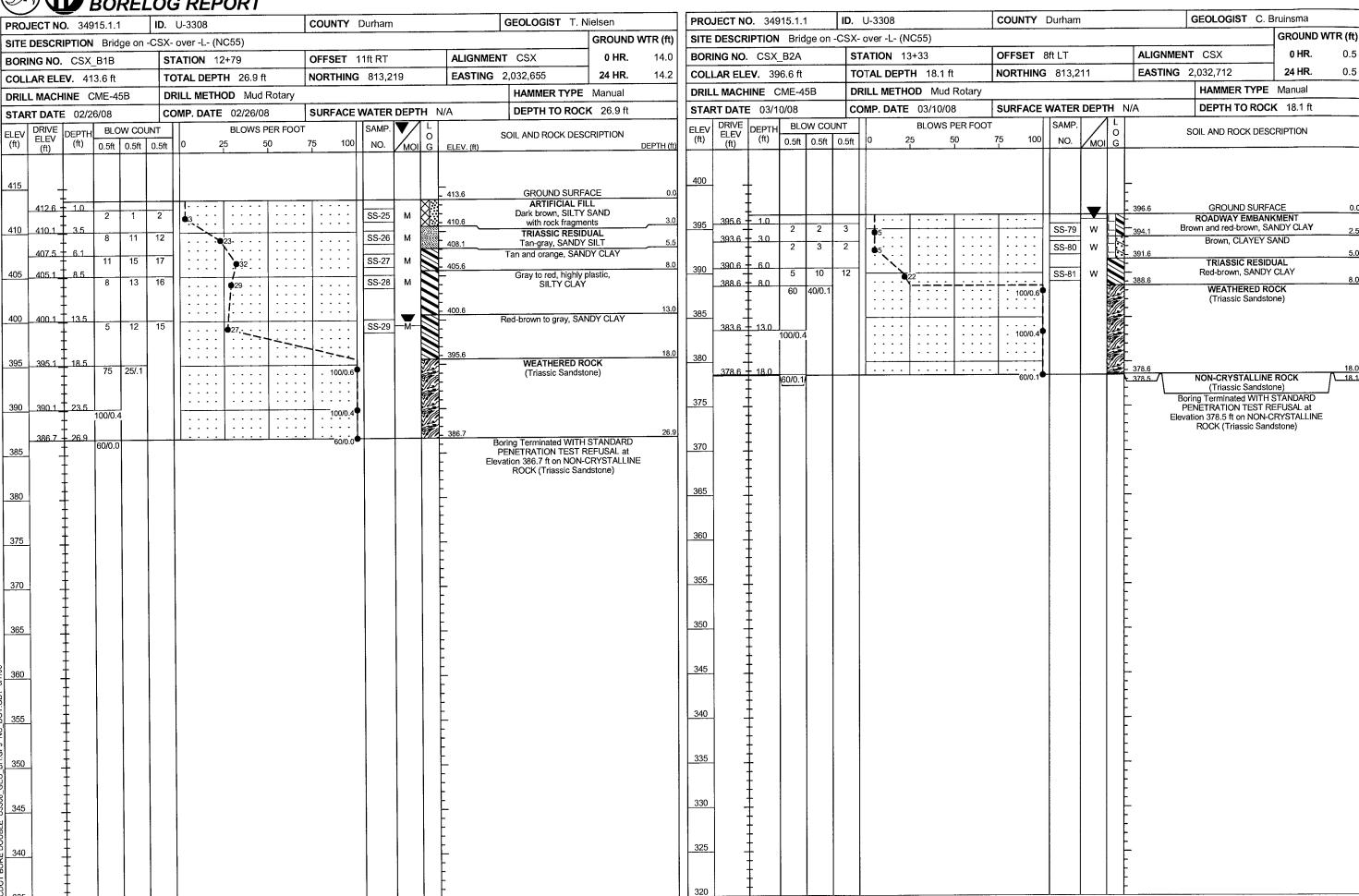
## NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

ID. U-3308 COUNTY Durham GEOLOGIST T. Nielsen PROJECT NO. 34915.1.1 SITE DESCRIPTION Bridge on -CSX- over -L- (NC55) GROUND WTR (ft) ALIGNMENT CSX 0 HR. 14.0 OFFSET 13ft LT BORING NO. CSX\_B1A **STATION** 12+79 COLLAR ELEV. 413.8 ft TOTAL DEPTH 53.1 ft **NORTHING** 813,240 **EASTING** 2,032,666 24 HR. 14.2 **HAMMER TYPE** Manual DRILL MACHINE CME-45B DRILL METHOD Mud Rotary **START DATE 02/26/08** COMP. DATE 02/27/08 SURFACE WATER DEPTH N/A DEPTH TO ROCK 28.8 ft ELEV DRIVE DEPTH SAMP. **BLOWS PER FOOT** SOIL AND ROCK DESCRIPTION ELEV (ft) (ft) 0.5ft 0.5ft 0.5ft 50 75 100 NO. MOI G (ft) 415 **GROUND SURFACE** 413.8 ARTIFICIAL FILL 412.8 + 1.0 Dark brown, SANDY CLAY М ·**6**13· 410.6 with rock fragments 410.2 3.6 TRIASSIC RESIDUAL М **1**31 . Tan, gray, and orange, SANDY SILT 407.8 4 6.0 20 22 М 405 405.2 Tan, red-brown, and gray, micaceous, SANDY CLAY 20 20 М SS-20 . . . . 400 400.2 13.6 12 21 SS-21 - 433.\_\_. WEATHERED ROCK 395 395.2 18.6 (Triassic Sandstone) 100/0.5 . . . . 390 390.2 1 23.6 100/0.4 100/0.4 - - - -. . . . . . . . . . . . 385.2 <sup>†</sup> 28.6 | 100/0.2 . . . . 385 100/0.2 NON-CRYSTALLINE ROCK Red-gray, tan, brown, moderately severely weathered, soft to medium hard, closely to very closely fractured, very thickly bedded, . . . . . . . . 380 friable to indurated, TRIASSIC SANDSTONE 379.1 378.0 379.1 34.7 100/0.4 35.8 REC=80% RQD=53% . . . . WEATHERED ROCK . . . . (Triassic Sandstone) 375 NON-CRYSTALLINE ROCK . . . . . . . 373.1 Red-brown to tan, moderately severely to moderately weathered, soft to medium hard, moderately closely to very closely fractured, . . . thinly to thickly bedded, friable to indurated, 370 TRIASSIC SANDSTONE REC=100% RQD=33% RS-6 Red-brown and green-gray, moderate 365 severely to moderately weathered, very soft . . . . to medium hard, closely to very closely . . . . . . . . fractured, very thinly to thinly bedded, friable to moderately indurated, TRIASSIC MUDSTONE 360 REC=92% RQD=35% Boring Terminated at Elevation 360.7 ft in NON-CRYSTALLINE ROCK (Triassic 355 Mudstone) 픎 350 345 340

NCDOT GEOTECHNICAL ENGINEERING UNIT

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2	少U	D	CO	RE E	BOF	RIN	G RE	PO	RT	•						
PRO	JECT N			·		-3308				$\tau$	OUNTY I	Durham		GEOLOGIST T.	Nielsen	
SITE	DESC	RIPTIO	N Brid	dge on -C	SX- o	ver -L-	(NC55)								GROUND W	TR (ft)
BOR	ING NO	. csx	_B1A		STA	TION	12+79			OF	FSET 1	3ft LT	ALIGNMEN	T CSX	0 HR.	14.0
COL	LAR EL	EV. 4	13.8 ft		тот	AL DE	PTH 53	.1 ft		NC	ORTHING	813,240	EASTING 2	2,032,666	24 HR.	14.2
DRIL	L MAC	HINE	CME-4	15B	DRII	LL ME	THOD N	lud Ro	tary					HAMMER TYP	E Manual	
STA	RT DAT	E 02/2	26/08		CON	IP. DA	TE 02/2	7/08		SL	JRFACE '	WATER DEPTH N//	A	DEPTH TO RO	CK 28.8 ft	
COR	E SIZE	NQ					IN 24.31			DF	RILLER	Contract Driller				
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	RQD (ft) %	SAMP. NO.	STF REC. (ft) %	RATA RQD (ft) %	L O G	ELEV. (ft)		ESCRIPTION A	AND REMARKS		DEPTH (ft
385													Begin Coring	(@ 28.8 ft		
380	385.0 384.0 7	29.8	1.0 4.9	0;30/1.0 0:30/1.0 1:00/1.0 0;53/1.0 1:48/1.0	(0.0) 0% (4.7) 96%	(0.0) 0% (3.1) 63%		(4.7) 80%	(3.1) 53%		385.0	Red-gray, tan, brown, closely to very close	moderately selly fractured, ve			
	379.1~ 378.7	34.7 35.1	4.4	1:03/0.9 N=100/0.4	(3.5)	(1.2)		(0.2)	(0.0)	110	379.1 378.0		WEATHER	RED ROCK		34.7 35.8
			"-	N=100/0.4 1:30/1.0 1:33/1.0 1:56/1.0	80%	27%		(4.9)	0% (1.6)		<u> </u>	L	(Triassic S	andstone)		]
375	374.7 <u> </u>	39.1 39.5	4.0	1:37/1.0	<u> </u>	(0.4)		100%			_	Red-brown to tan, m medium hard, moder	noderately seve	rely to moderately w		.,
	_		4.0	2:50/1.0 3:03/1.0	78%			(11.4)	(4.3)		373.1	bedded, fria	able to indurate	d, TRIASSI <b>C</b> SAND	STONE	<u> 40.7</u>
370	370.7	43.1	5.0	3:00/1.0 3:34/1.0	(5.0)	(2.0)		92%	35%		L	Red-brown and gree very soft to medium	hard, closely to	very closely fractur	ed, very thinly to	
	_		0.0	5:05/1.0 7:02/1.0	100%					蓋	L	thinly bedded, friable	le to moderately	indurated, TRIASS	IC MODSTONE	
	365.7	- - 48.1		6:14/1.0 5:48/1.0			RS-6									
365	_	1	5.0	8:02/1.0 6:30/1.0	(4.9) 98%	(2.3) 46%	110-0	1			_					
	-	_		8:41/1.0 9:45/1.0							L					
360	360.7 -	<u> 53.1</u>		11:20/1.0							_ 360.7 	Boring Terminated a	at Elevation 360	0.7 ft in NON-CRYS	TALLINE ROCK	53.1
	-	_									-	3	(Triassic N			
	-	_									-					
355	_	_									_					
	-	-									_					
350	-										_					
	-	- -									_					
0.45	-	<u>-</u> -									<del></del>					
345	-	_									_					
	1	-									_					
340	-	- -									_					
	†	- -									<u>-</u> -					
	1	-														
335	4	-									_					
	1	-									- -					
330		-									_					
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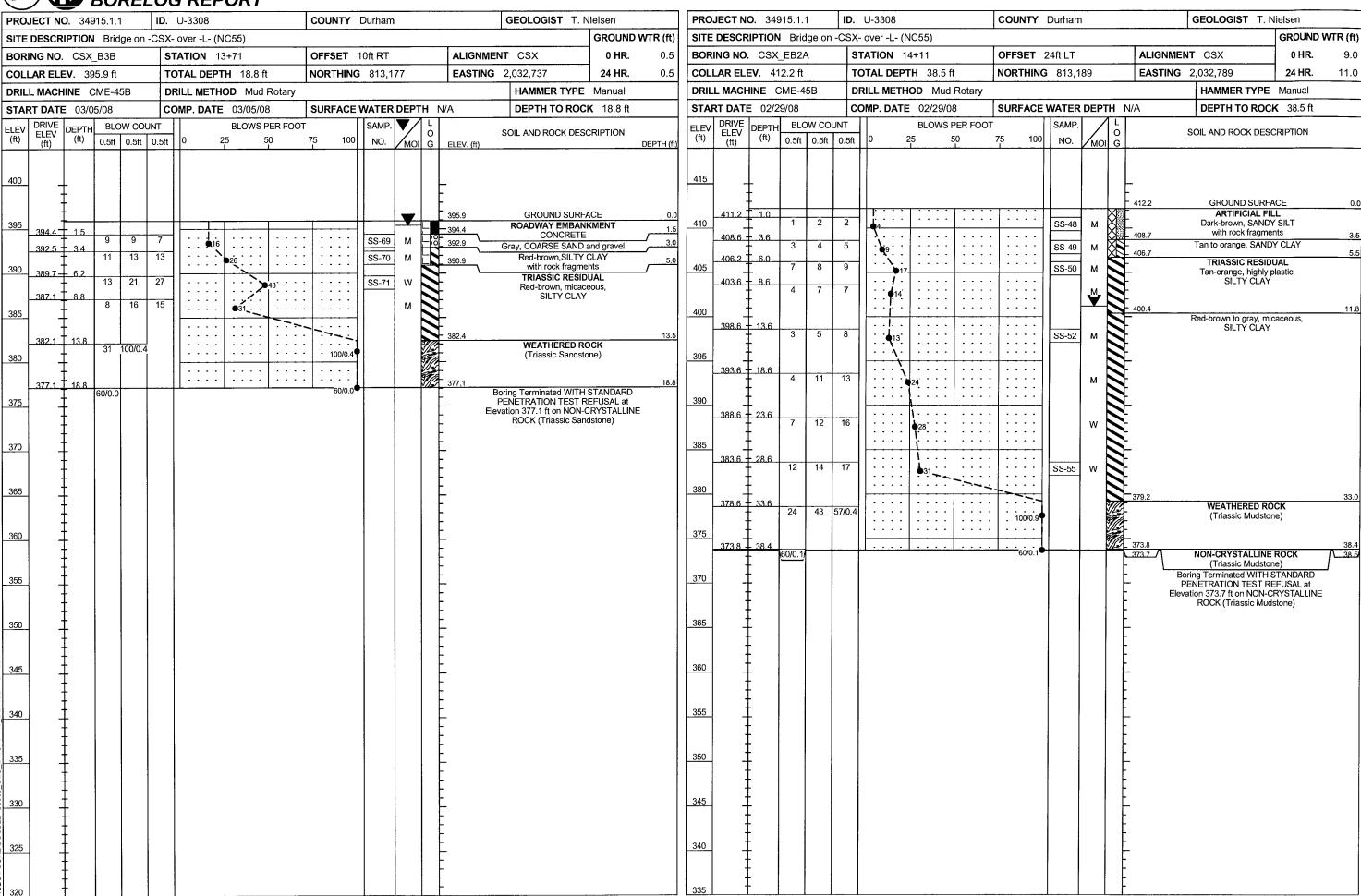


# NCDOT GEOTECHNICAL ENGINEERING UNIT

ID. U-3308 **COUNTY** Durham GEOLOGIST C. Bruinsma PROJECT NO. 34915.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge on -CSX- over -L- (NC55) ALIGNMENT CSX BORING NO. CSX B3A **STATION** 13+63 OFFSET 10ft LT 0 HR. 0.5 FIAD **EASTING** 2,032,740 24 HR. COLLAR ELEV. 395.9 ft TOTAL DEPTH 62.7 ft **NORTHING** 813,199 HAMMER TYPE Manual **DRILL MACHINE** CME-45B **DRILL METHOD** Wash Boring DEPTH TO ROCK 32.8 ft SURFACE WATER DEPTH N/A **COMP. DATE** 03/11/08 **START DATE** 03/10/08 DRIVE SAMP. BLOW COUNT BLOWS PER FOOT DEPTH SOIL AND ROCK DESCRIPTION ELEV (ft) (ft) 0.5ft 0.5ft 0.5ft 75 100 NO. (ft) ∕moil g DEPTH (ft) ELEV. (ft) 400 **GROUND SURFACE** 395.9 ROADWAY EMBANKMENT 395 394.5 + 1.4 CONCRETE and ABO 4 SS-84 W Brown, CLAYEY SAND with gravel TRIASSIC RESIDUAL 390 389.9 Red-brown, SILTY CLAY 10 21 20 . . . . SS-85 388.0 7.9 12 24 8 **6**36 . . . 385 WEATHERED ROCK 383.0 T 12.9 . . . . 100/0.3 (Triassic Sandstone and Siltstone) 380 . . . . 378.0 T 17.9 100/0.4 100/0.4 375 373.0 22.9 100/0.4 100/0.4 . . . . 370 . . . . . . . . 368.0 7 27.9 . . . . 100/0.4 100/0.4 365 . . . . . . . . 363.1 T 32.8 NON-CRYSTALLINE ROCK 60/0.1 60/0.1 32.9 (Triassic Sandstone) 360 RS-7 Tan and red, slightly to very slightly 37.1 weathered, moderately hard, widely . . . fractured, thickly bedded, indurated, TRIASSIC SANDSTONE 355 REC=98% RQD=98% . . . . . . Red-gray, moderately severely weathered, . . . . very soft to medium hard, closely to very closely fractured, very thinly to thinly bedded, friable to moderately indurated, TRIASSIC MUDSTONE 350 . . . . RS-8 . . . REC=99% RQD=55% 345 WEATHERED ROCK 342.2 (Triassic Mudstone) 100/0.4 100/0.4 340 338.2 \$ 57.7 60/0.0 NON-CRYSTALLINE ROCK 60/0.0 Red-brown and gray, moderately to slightly weathered, soft to moderately hard, widely 335 fractured, thickly bedded, indurated, . . . . 333.2 TRIASSIC SANDSTONE REC=100% RQD=100% 330 Boring Terminated at Elevation 333.2 ft in NON-CRYSTALLINE ROCK (Triassic 325

# NCDOT GEOTECHNICAL ENGINEERING UNIT

GEOLOGIST C. Bruinsma ID. U-3308 **COUNTY** Durham PROJECT NO. 34915.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge on -CSX- over -L- (NC55) ALIGNMENT CSX 0 HR. BORING NO. CSX\_B3A **STATION** 13+63 OFFSET 10ft LT 0.5 **EASTING** 2,032,740 24 HR. FIAD COLLAR ELEV. 395.9 ft TOTAL DEPTH 62.7 ft **NORTHING 813.199** HAMMER TYPE Manual **DRILL MACHINE CME-45B DRILL METHOD** Wash Boring **START DATE 03/10/08** COMP. DATE 03/11/08 **SURFACE WATER DEPTH N/A DEPTH TO ROCK 32.8 ft** TOTAL RUN 29.4 ft **DRILLER** Contract Driller CORE SIZE NQ STRATA
REC. RQD
(ft) (ft)
% % REC. I ROD DEPTH RUN SAMP. ELEV ELEV DESCRIPTION AND REMARKS RATE (ft) (ft) (ft) (ft) % (ft) NO. G ELEV. (ft) (Min/ft) DEPTH (ft) (ft) 363 Begin Coring @ 32.9 ft 363.0 32.9 1.6 4:30/1.0 (1.5) (1.5) 361.4 34.5 2:00/0.6 0.10 Tan and red, slightly to very slightly weathered, moderately hard, widely fractured, thickly bedded, indurated, TRIASSIC SANDSTONE (4.1) (4.1)2:00/0.6 94% 94% 5:00/1.0 (4.9) (4.3) RS-7 5:00/1.0 98% 86% 5.0 360 Red-gray, moderately severely weathered, very soft to medium hard, closely (15.0) (8.3) 99% 55% 8:15/1.0 to very closely fractured, very thinly to thinly bedded, friable to moderately 356.4 + 39.5 10:00/1.0 indurated, TRIASSIC MUDSTONE 7:41/1.0 (4.9) (1.6) 3:21/1.0 98% 32% 5.0 355 5:00/1.0 7:00/1.0 8:10/1.0 5.0 6:45/1.0 (5.0) (4.6) 7:45/1.0 100% 92% RS-8 8:10/1.0 351.4 + 44.5 350 6:30/1.0 4.2 6:45/1.0 (2.8) (0.4) 6:15/1.0 67% 10% 346.4 + 49.5 345 7:15/1.0 WEATHERED ROCK 342.2 † 53.7 341.8 † 54.1 4:30/1.0 3.6 V=100/0.2 (0.0) (0.0) 4:00/1.0 0% 0% 4:00/1.0 0% 0% 4:00/1.0 0% 0% 5.0 \[ \frac{1.65}{1.450.0} \] (5.0) (5.0) \[ \frac{\sqrt{0.00}}{5:1541.0} \] 100% 100% `0% 0% (Triassic Mudstone) 340 338.2 + 57.7 (5.0) (5.0) 100% 100% NON-CRYSTALLINE ROCK Red-brown and gray, moderately to slightly weathered, soft to moderately hard, widely fractured, thickly bedded, indurated, TRIASSIC SANDSTONE 335 333.2 + 62.7 Boring Terminated at Elevation 333.2 ft in NON-CRYSTALLINE ROCK (Triassic Sandstone and Siltstone) 330 325 320 315 310 305 300 295 ፬ 290 285



PROJECT NO. - 34915.1.1 ID. NO. - U-3308 COUNTY- DURHAM

NS EB1-A

INO ED	1-/1					_						-			
			S	OIL 7	TE.	ST	RE	SUI	TS						
SAMPLE			DEPTH	AASHTO				% BY W	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-1	32 LT	20+21	1.0-2.5	A-6(4)	29	14	24.9	26.5	6.1	42.5	100	88	53	•	-
SS-2	32 LT	20+21	3.6-5.1	A-2-4(0)	23	NP	43.7	28.5	17.6	10.1	100	73	32	-	•
SS-3	32 LT	20+21	6.0-7.5	A-7-5(21)	56	26	6.7	21.1	19.6	52.6	100	95	76	•	-
SS-5	32 LT	20+21	14.0-15.1	A-2-4(0)	21	3	51.4	19.8	18.6	10.1	100	74	32	-	•

NS EB1-B

			S	OIL T	TE.	ST	RE	SUI	LTS						
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	SIEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-3A	32 RT	20+50	6.0-7.5	A-7-6	65	37	-	-	-	-	-	-	74	24	-

NS B1-A

<u> </u>			S	OIL T	TE.	ST	RE	SUI	LTS		-		-		
SAMPLE			DEPTH	AASHTO		ľ		% BY W	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-31	16 LT	20+67	1.0-2.5	A-6(4)	38	15	22.9	26.7	20.0	30.4	93	77	49	-	•
SS-32	16 LT	20+67	3.6-5.1	A-6(2)	24	11	31.0	25.3	19.4	24.3	99	82	46		•
SS-33	16 LT	20+67	6.0-7.5	A-7-6(11)	45	18	17.8	20.0	17.6	44.5	100	90	65	-	•
SS-35	16 LT	20+67	13.6-15.1	A-6(6)	34	13	2.0	42.5	31.2	24.3	100	99	62	-	-

NS B1-A

			R	OCK TEST	RESU	LTS	
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	16 LT	20+67	28.3-29.0	TRIASSIC SANDSTONE	153.1	2.56	0.38
RS-2	16 LT	20+67	38.6-39.0	TRIASSIC SANDSTONE	168.0	8.37	2.11

NS B1-B

			R	OCK TEST	RESU	LTS	
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, PSI	SECTION MOD. @ 40% MPSI
RS-1A	33 RT	20+74	30.0-30.6	TRIASSIC SANDSTONE	142.1	1286	
RS-2A	33 RT	20+74	41.8-42.5	TRIASSIC MUDSTONE	152.6	3503	•

NS B2-A

/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			S	OIL T	TE.	ST	RE	SUL	TS						
SAMPLE			DEPTH	AASHTO				% BY W	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-75	26 LT	21+18	3.6-5.1	A-6(10)	33	12	3.3	5.7	45.8	45.1	96	94	89	•	-
SS-76	26 LT	21+18	6.1-7.6	A-7-6(12)	45	19	0.4	43.9	31.1	24.6	100	100	67	-	-

NS B2-A

			R	OCK TEST	RESU	LTS	
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	26 LT	21+18	15.9-16.7	TRIASSIC SANDSTONE	149.1	1.76	0.40
RS-4	26 LT	21+18	30.5-31.0	TRIASSIC SANDSTONE	176.2	7.31	2.22

NS B3-A

			S	OIL 7	TE.	ST	RE	SUI	LTS						
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	SIEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-65	11 LT	21+55	3.7-5.2	A-4(4)	31	10	4.9	27.1	33.1	34.9	84	82	61	-	-

NS\_B3-B

			S	OIL 7	TE.	ST	RE	SUI	TS						
SAMPLE															
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-58	27 RT	21+57	1.7-3.2	A-2-4(0)	24	8	49.0	15.4	23.5	12.1	53	32	20	-	
SS-59	27 RT	21+57	3.2-4.7	A-7-6(13)	42	17	5.9	7.0	31.7	55.4	84	80	75	-	
SS-61	27 RT	21+57	6.2-7.7	A-7-6(22)	44	21	1.2	3.1	34.2	61.5	98	97	95	*	•

NS B3-B

<u> </u>			R	OCK TEST	RESU	LTS	
SAMPLE			DEPTH	ROCK	UNIT WT	UNCONFINED COMP.	SECTION MOD.
NO.	OFFSET	STATION	INTERVAL	TYPE	LB/FT <sup>3</sup>	STRENGTH, KSI	@ 40% MPSI
RS-5	27 RT	21+57	25.4-25.8	TRIASSIC SANDSTONE	162.6	4.29	1.49

NS\_EB2-A

			S	OIL T	TE.	ST	RE	SUL	TS	_					
SAMPLE			DEPTH	AASHTO				% BY W	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-38	30 LT	22+04	1.0-2.5	A-4(0)	25	7	25.5	31.2	31.2	12.1	95	77	44	-	-
SS-39	30 LT	22+04	3.7-5.2	A-6(4)	31	13	27.3	22.9	17.4	32.4	97	82	51	-	•
SS-41	30 LT	22+04	8.7-10.2	A-7-6(51)	74	45	1.6	3.6	27.9	66.8	100	99	96	•	-
SS-43	30 LT	22+04	18.7-20.2	A-7-6(16)	41	16	0.2	16.4	47.0	36.4	100	100	90	-	•
SS-45	30 LT	22+04	28.7-30.2	A-6(13)	37	15	0.4	16.8	38.3	44.5	100	100	87	-	•

NS EB2-B

			S	OIL T	TE	ST	RE	SUL	TS						
SAMPLE			DEPTH	AASHTO				% BY W	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-5A	34 RT	22+10	13.5-15.0	A-7-6	37	12		•	•	•	-	-	95	14.8	-

PROJECT NO. - 34915.1.1 ID. NO. - U-3308 COUNTY- DURHAM

CSX EB1-A

	<u> </u>	· · · · · · · · · · · · · · · · · · ·	(	OII	$\Gamma E$	CT	DF	CIII	TC						
	SAMPLE DEPTH AASHTO % BY WEIGHT % PASSING (SIEVES) % %														
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-10	10 LT	12+36	3.5-5.0	A-4(0)	12	3	32.6	35.0	20.2	12.1	100	84	37	•	-
SS-11	10 LT	12+36	6.0-7.5	A-7-6(18)	52	28	20.4	15.4	19.6	44.5	100	93	67		•
SS-13	10 LT	12+36	13.5-15.0	A-2-4(0)	26	6	35.2	35.0	17.6	12.1	100	71	33		-

CSX B1-A

			S	OIL T	TE.	ST	RE	SUL	TS						
SAMPLE															
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-20	13 LT	12+79	6.6-8.1	A-6(8)	37	14	17.0	22.5	20.0	40.5	100	93	65	-	-
SS-21	13 LT	12+79	13.6-15.1	A-6(11)	40	19	2.4	39.7	27.5	30.4	100	99	66	-	-

CSX R1-4

	<u>1-A</u>		R	OCK TEST	RESU	LTS	
SAMPLE			DEPTH	ROCK	UNIT WT	UNCONFINED COMP.	SECTION MOD.
NO.	OFFSET	STATION	INTERVAL	TYPE	LB/FT <sup>3</sup>	STRENGTH, KSI	@ 40% MPSI
RS-6	13 LT	12+79	47.3-47.9	TRIASSIC MUDSTONE	155.8	0.66	0.06

CSX B1-B

CBZY			S	OIL T	TE.	ST	RE	SUI	TS		·		_		
SAMPLE			DEPTH	AASHTO				% BY W	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-25	11 RT	12+79	1.0-2.5	A-2-4(0)	27	7	34.8	21.7	21.3	22.3	73	56	34	-	-
SS-26	11 RT	12+79	3.5-5.0	A-4(0)	13	NP	22.5	44.7	20.6	12.1	100	84	37	-	-
SS-27	11 RT	12+79	6.1-7.6	A-6(9)	39	16	17.8	21.5	20.2	40.5	100	91	64	-	-
SS-28	11 RT	12+79	8.5-10.0	A-7-6(17)	47	26	14.2	20.2	23.1	42.5	100	93	69	•	-
SS-29	11 RT	12+79	13.5-15.0	A-6(6)	35	12	2.2	42.7	28.7	26.3	100	100	62	-	•

CSX B2-A

	SOIL TEST RESULTS														
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-79	8 LT	13+33	1.0-2.5	A-6(5)	35	14	21.7	21.3	24.1	32.8	87	74	53	-	-
SS-80	8 LT	13+33	3.0-4.5	A-2-6(1)	37	19	40.4	17.6	21.4	20.5	68	47	30	-	-
SS-81	8 LT	13+33	6.0-7.5	A-6(14)	40	19	2.9	31.6	36.8	28.7	100	98	78	-	

CSX B3-A

				OIL T	TE	ST	RE	SUL	77S						
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-84	10 LT	13+63	1.4-2.9	A-2-6(1)	Not	noug	26.3	16.0	16.7	41.0	19	15	11	-	-
SS-85	10 LT	13+63	6.0-7.5	A-7-6(17)	41	18	3.1	10.1	39.7	47.2	100	99	90	-	-

CSX B3-A

	ROCK TEST RESULTS													
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI							
RS-7	10 LT	13+63	35.0-35.6	TRIASSIC SANDSTONE	170.7	8.33	-29.70							
RS-8	10 LT	13+63	46.2-46.7	TRIASSIC MUDSTONE	154.5	1.15	0.02							

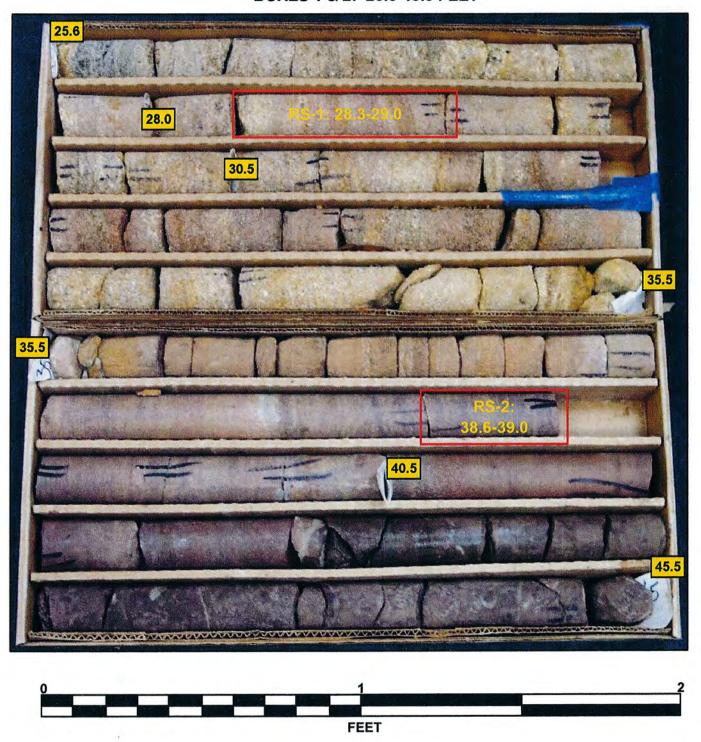
CSX B3-B

		·	S	OIL T	TE.	ST	RE	SUL	TS						
SAMPLE			DEPTH	AASHTO					% PAS	SING (S	SIEVES)	%	%		
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-69	10 RT	13+71	1.5-3.0	A-1-b(0)	20	3	49.4	30.6	9.7	10.3	56	30	12	•	
SS-70	10 RT	13+71	3.4-4.9	A-7-6(16)	45	21	3.7	8.6	40.5	47.2	85	83	77	•	-
SS-71	10 RT	13+71	6.2-7.7	A-7-6(16)	41	15	1.0	7.2	42.6	49.2	98	97	92	-	-

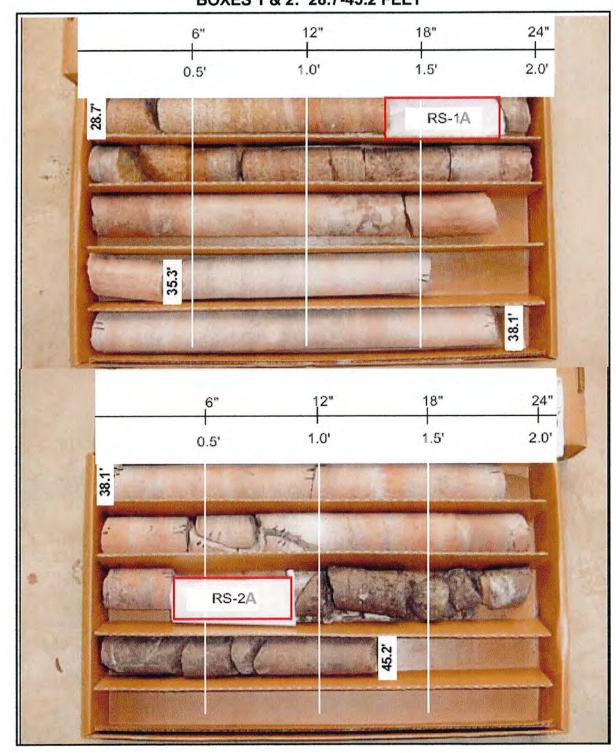
CSX E	B2-A														
	SOIL TEST RESULTS														
SAMPLE			DEPTH	AASHTO				% PASSING (SIEVES)			%	%			
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-48	24 LT	14+11	1.0-2.5	A-4(1)	27	10	32.4	25.1	20.2	22.3	94	75	44	-	•
SS-49	24 LT	14+11	3.6-5.1	A-6(9)	38	20	21.9	23.5	18.2	36.4	99	87	58		•
SS-50	24 LT	14+11	6.0-7.5	A-7-6(23)	58	29	13.6	13.2	14.6	58.7	98	90	74	-	•
SS-52	24 LT	14+11	13.6-15.1	A-7-6(18)	45	22	1.2	22.3	32.0	44.5	97	96	81	•	-
SS-55	24 LT	14+11	28.6-30.1	A-7-6(24)	43	23	0.4	2.0	36.8	60.7	100	100	98	-	

## **CORE PHOTOGRAPHS**

**NS\_B1-A**BOXES 1 & 2: 25.6-45.5 FEET



**NS\_B1-B**BOXES 1 & 2: 28.7-45.2 FEET

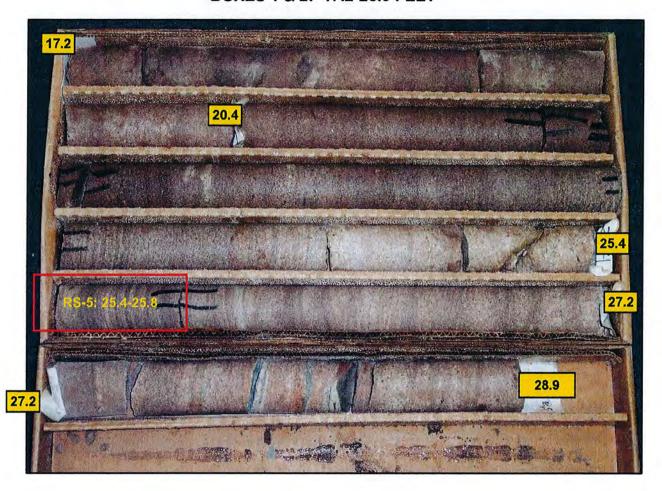


## **CORE PHOTOGRAPHS**

**NS\_B2-A**BOXES 1, 2, & 3: 14.2-36.5 FEET



NS\_B3-B BOXES 1 & 2: 17.2-28.9 FEET





## **CORE PHOTOGRAPHS**

**CSX\_B1-A**BOXES 1,2, & 3: 28.8-53.1 FEET



CSX\_B3-A BOXES 1, 2, & 3: 32.9-62.7 FEET



## **SITE PHOTOGRAPH**

Bridges on -NSRR- and -CSX- over -L- (NC 55/Alston Ave.)

