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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34802.1.1 (U-2412A)	1	3

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
U-2412A	STP-4121(1)	P.E.
		R/W & UTIL.

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34802.1.1 (U-2412A) F.A. PROJ. STP-4121(1)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO/HIGH POINT - SR 4121 (GREENSBORO/HIGH POINT RD.) FROM THE PROPOSED US 311 BYPASS TO SR 1480 (VICKERY CHAPEL ROAD)

SITE DESCRIPTION RETAINING WALL 1- RIGHT OF -Y7- STA. 18+50

RETAINING WALL INVENTORY

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO 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.

NCDOT PERSONNEL

N.D. MOHS

J. I. MILKOVITS

C.D. CZAJKA

TRIGON/KLEINFELDER

H. HICKS

K. HUEN

R. TOOTHMAN

B. DUNCAN

INVESTIGATED BY N. D. MOHS

CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE NOVEMBER, 2008

NORTH CAROLINA LICENSED SEAL 1912 GEOLOGIST NEIL T. ROBERSON

DocuSigned by: Neil Roberson 4061D9A8C6C649C... 1/17/2018

PROJECT: 34802.1.1

ID: U-2412A

DRAWN BY: N. D. MOHS, W. D. FIELDS

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] MOBILE B-57
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [ ] AUTOMATIC [X] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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. 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 REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

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.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

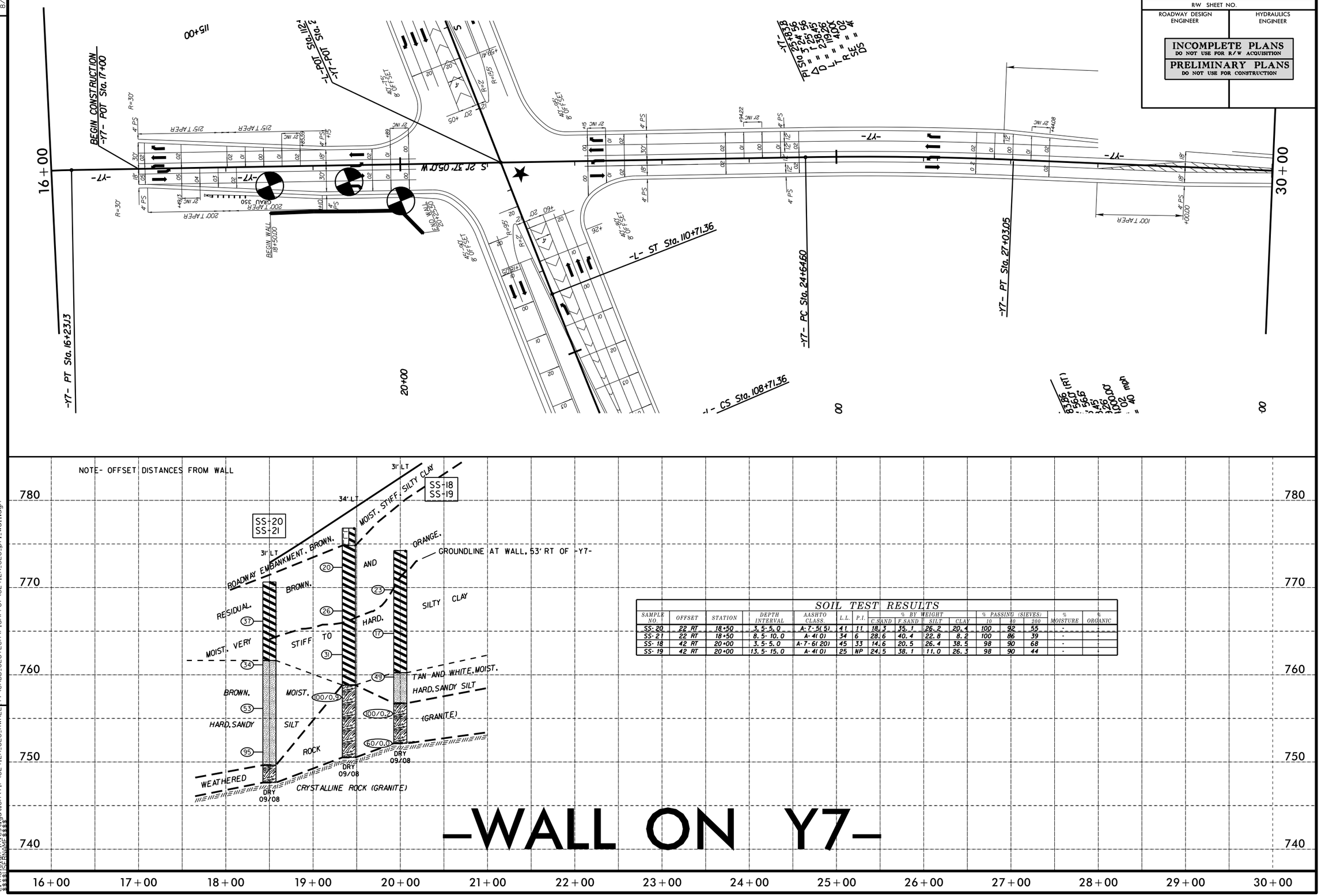
NOTES: ELEVATION OBTAINED FROM .tin FILE DATES 4/26/17

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	90
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-20	22 RT	18+50	3.5-5.0	A-7-5(5)	41	11	18.3	35.1	26.2	20.4	100	92	55	-	-
SS-21	22 RT	18+50	8.5-10.0	A-4(0)	34	6	28.6	40.4	22.8	8.2	100	86	39	-	-
SS-18	42 RT	20+00	3.5-5.0	A-7-6(20)	45	33	14.6	20.5	26.4	38.5	98	90	68	-	-
SS-19	42 RT	20+00	13.5-15.0	A-4(0)	25	NP	24.5	38.1	11.0	26.3	98	90	44	-	-

-WALL ON Y7-

REVISIONS

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2412A	1	46

REFERENCE: U-2412A

PROJECT: 34802

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO/HIGH POINT – SR 1486/SR 4121 (GREENSBORO/HIGH POINT RD) FROM PROPOSED US 311 BYPASS TO WEST OF SR 1480 (VICKERY CHAPEL RD)

SITE DESCRIPTION STRUCTURE NO. 270 & 271 ON SR 4121 OVER NSRR AND UNNAMED TRIBUTARY TO DEEP RIVER

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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NOTES:
1. 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.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

M. ELLIS, E.I.

K. PLUMMER

N. MCLAREN

S. CARPENTER

M&W DRILLING

HPC

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE MAY 2018

Prepared in the Office of:

ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINERING
FIRM # F-1078

NORTH CAROLINA PROFESSIONAL SEAL 026917 ENGINEER MICHAEL J. WALKO

DocuSigned by:
Michael J. Walko, P.E. 6/11/2018
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SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
U-2412A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D-120
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [ ] TRICONE ____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q2

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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. 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 REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

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.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-157: N-814662.8619, E-1719563.3765 ELEV. 785.28
BL-158: N-814599.2473, E-1719995.5169 ELEV. 734.40
ELEVATION: N/A FEET

NOTES:

NORTHINGS AND EASTINGS OBTAINED WITH A TRIMBLE GEO 7X WITH SUB-METER ACCURACY.

ROADWAY DESIGN PLANS & ELECTRONIC FILES PROVIDED BY NCDOT ON 3/5/18.

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

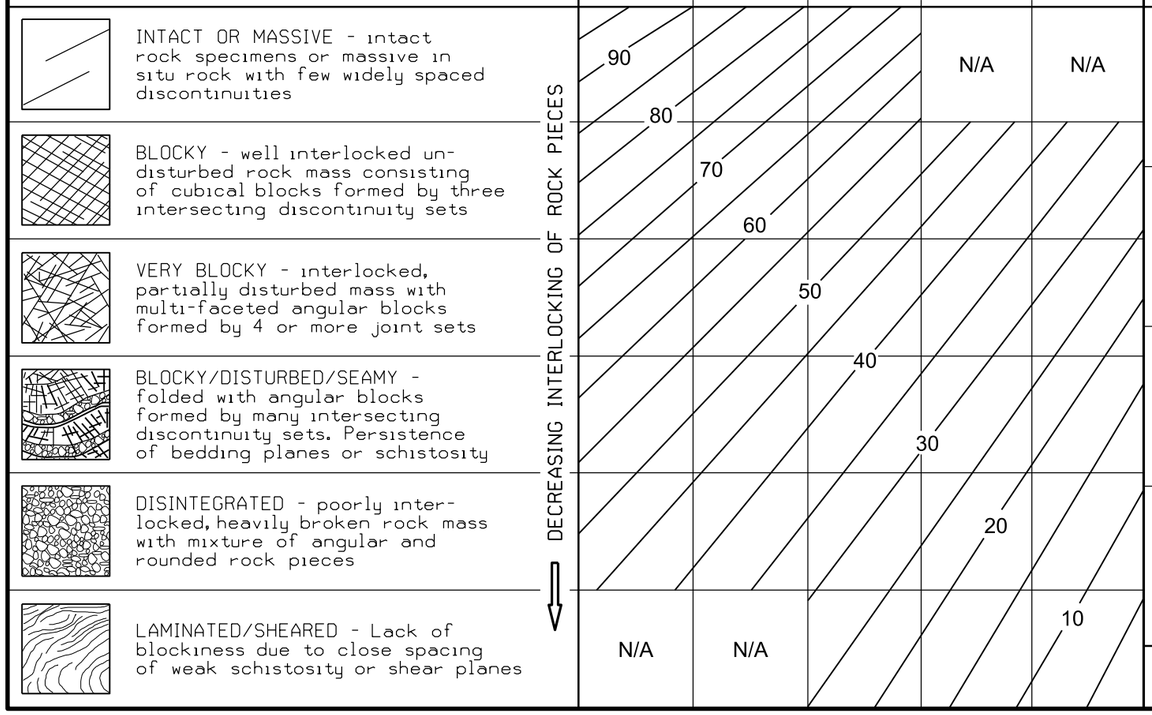
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

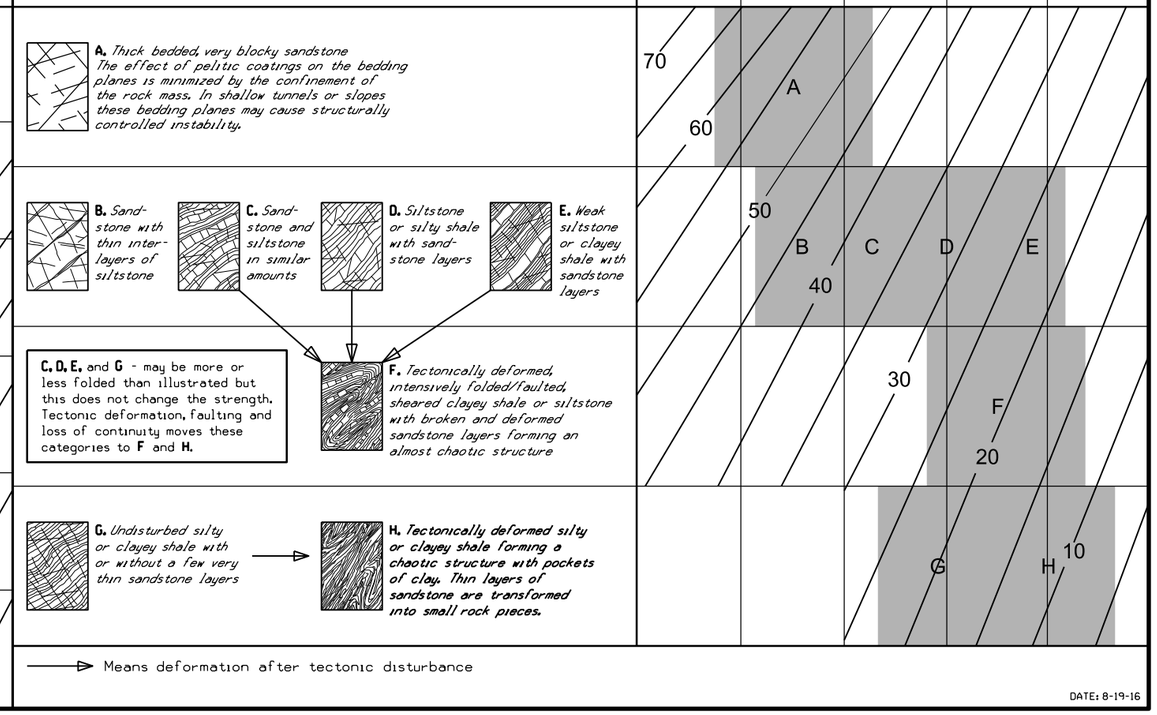


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

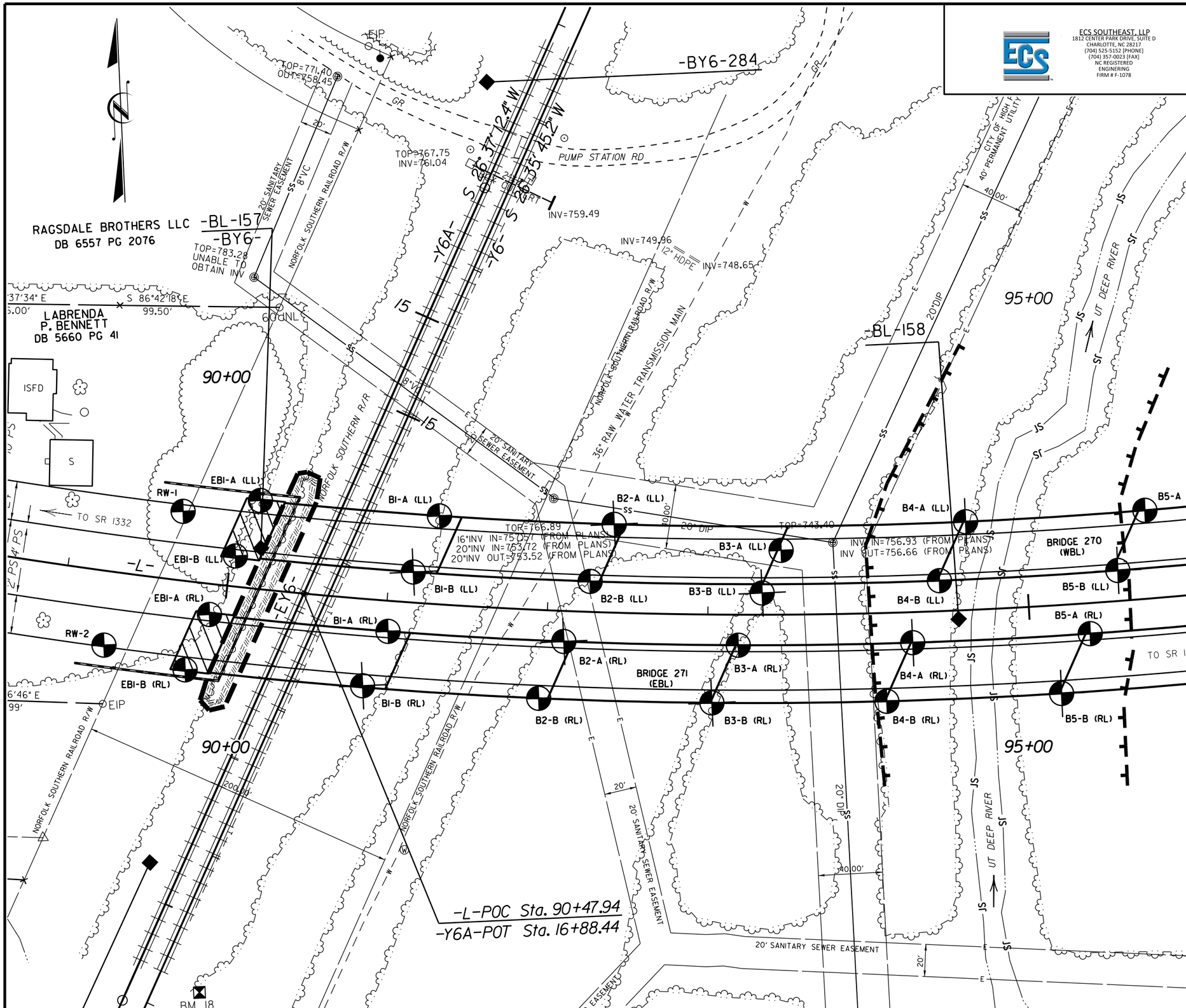
GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE



DATE: 8-19-16



ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
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FIRM # F-1078

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	3

SITE PLAN

0 60 120
FEET

STRUCTURE NO. 270 & 271 ON SR 4121 OVER NSRR AND UNNAMED TRIBUTARY TO DEEP RIVER

BRIDGE 270 & 271 SKEW

END BENT 1	108 DEGREES
BENT 1	110 DEGREES
BENT 2	112 DEGREES
BENT 3	114 DEGREES
BENT 4	116 DEGREES
BENT 5	118 DEGREES
END BENT 2	120 DEGREES

Prepared in the Office of:

ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1078

0 50 100

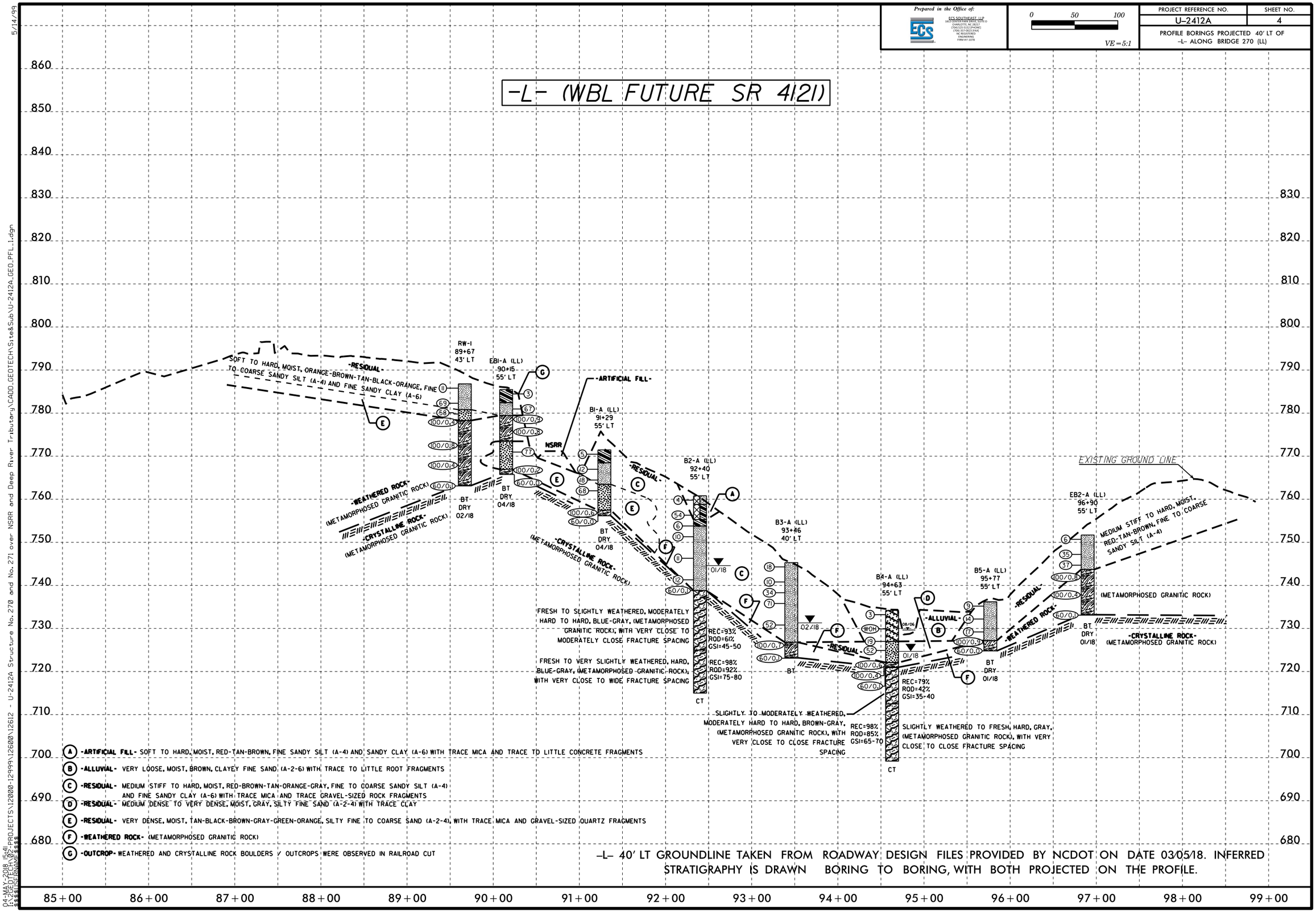
VE=5:1

PROJECT REFERENCE NO.	SHEET NO.
U–2412A	4

PROFILE BORINGS PROJECTED 40' LT OF
–L– ALONG BRIDGE 270 (LL)

5/14/99

-L- (WBL FUTURE SR 4121)



FRESH TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, BLUE-GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING

FRESH TO VERY SLIGHTLY WEATHERED, HARD, BLUE-GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO WIDE FRACTURE SPACING

SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD TO HARD, BROWN-GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO CLOSE FRACTURE SPACING

SLIGHTLY WEATHERED TO FRESH, HARD, GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO CLOSE FRACTURE SPACING

Ⓐ **-ARTIFICIAL FILL-** SOFT TO HARD, MOIST, RED-TAN-BROWN, FINE SANDY SILT (A-4) AND SANDY CLAY (A-6) WITH TRACE MICA AND TRACE TO LITTLE CONCRETE FRAGMENTS
Ⓑ **-ALLUVIAL-** VERY LOOSE, MOIST, BROWN, CLAYEY FINE SAND (A-2-6) WITH TRACE TO LITTLE ROOT FRAGMENTS
Ⓒ **-RESIDUAL-** MEDIUM STIFF TO HARD, MOIST, RED-BROWN-TAN-ORANGE-GRAY, FINE TO COARSE SANDY SILT (A-4) AND FINE SANDY CLAY (A-6) WITH TRACE MICA AND TRACE GRAVEL-SIZED ROCK FRAGMENTS
Ⓓ **-RESIDUAL-** MEDIUM DENSE TO VERY DENSE, MOIST, GRAY, SILTY FINE SAND (A-2-4) WITH TRACE CLAY
Ⓔ **-RESIDUAL-** VERY DENSE, MOIST, TAN-BLACK-BROWN-GRAY-GREEN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA AND GRAVEL-SIZED QUARTZ FRAGMENTS
Ⓕ **-WEATHERED ROCK-** (METAMORPHOSED GRANITIC ROCK)
Ⓖ **-OUTCROP-** WEATHERED AND CRYSTALLINE ROCK BOULDERS / OUTCROPS WERE OBSERVED IN RAILROAD CUT

–L– 40' LT GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.

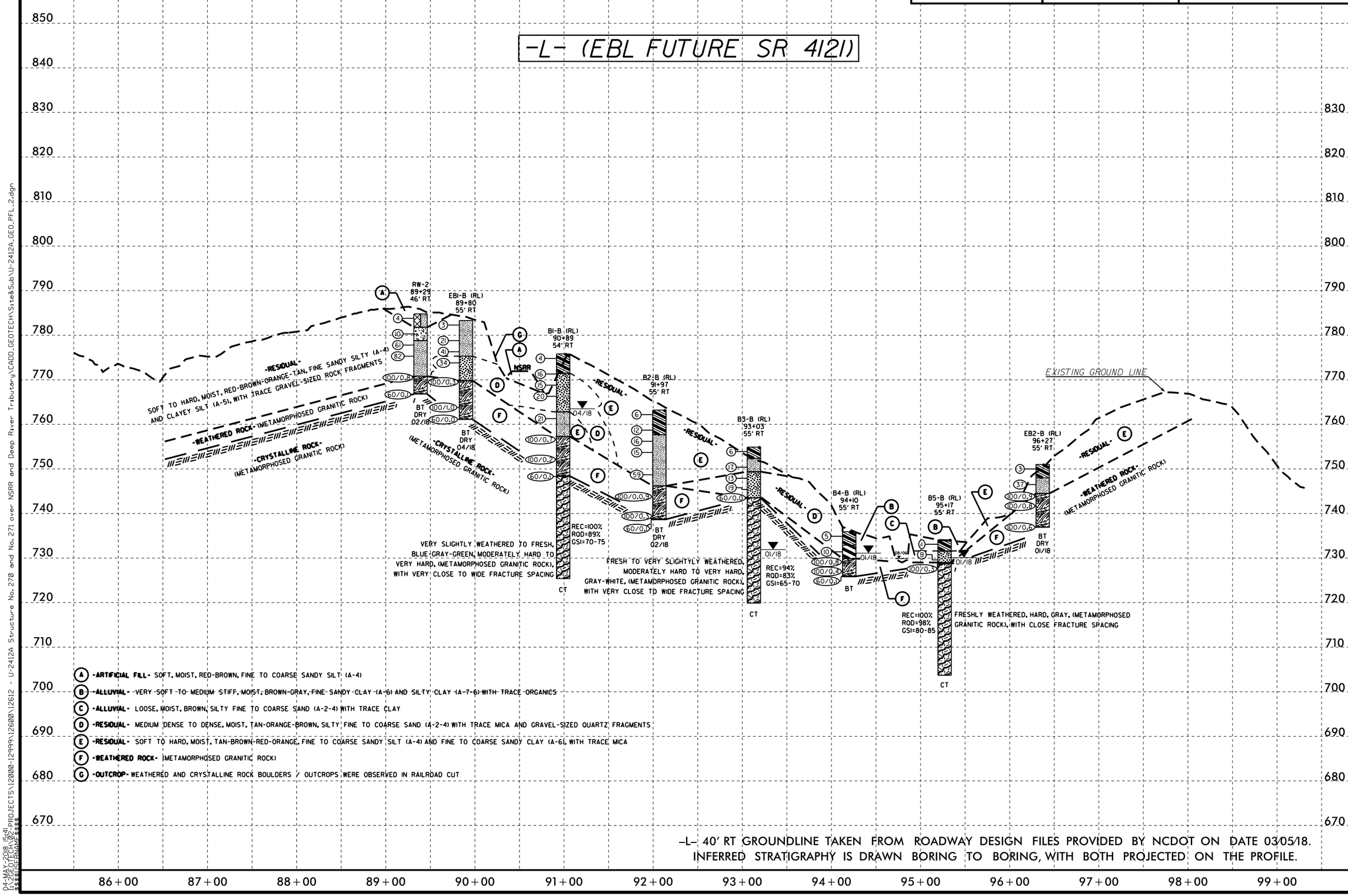
04-MAY-2018 15:41
I:\2GEOTECH\02-PROJECTS\12000-12999\12600\12612 - U-2412A Structure No. 270 and No. 271 over NSRR and Deep River Tributary\CADD_GEOTECH\Site&Sub\U-2412A_GEO_PFL_1.dgn
$$$$USERNAME$$$$

Prepared in the Office of:
ECS SOUTHEAST, LLP
14701 CHARLOTTE GRASS LAKE Dr.
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
GEOTECHNICAL
ENGINEERING
FIRM # F-1078

0 50 100
VE = 5:1

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	5

PROFILE BORINGS PROJECTED 40' RT OF -L- ALONG BRIDGE 271 (RL)



5/14/99

03-MAY-2018 15:41
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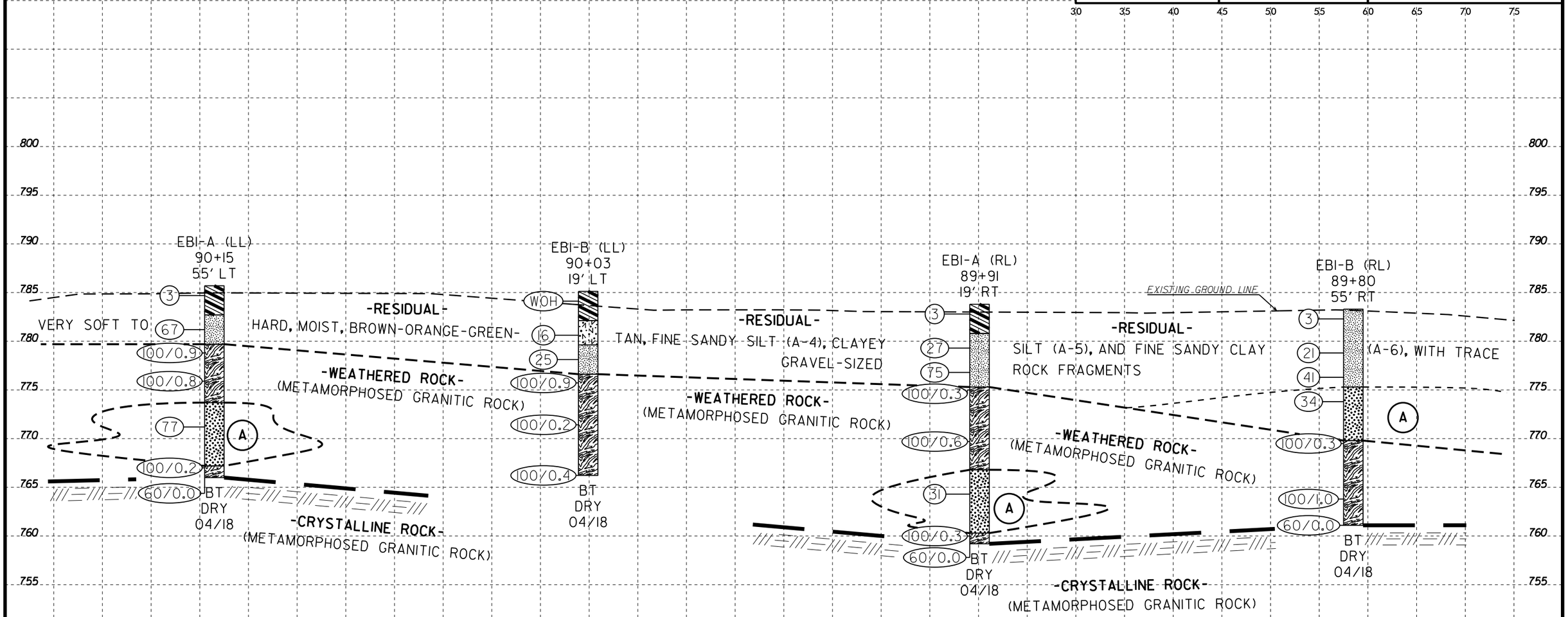
$$$$USERNAME$$$$

Prepared in the Office of:
ECS SOUTHEAST, LLP
1612 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # F-0708

0 5 10
VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	6

BRIDGE 270 & 271 ON SR 4121
END BENT 1 SKEW: 108 DEGREES



(A) -RESIDUAL- DENSE TO VERY DENSE, MOIST, GRAY-GREEN-BROWN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4)

90+12.24

℄

-L-

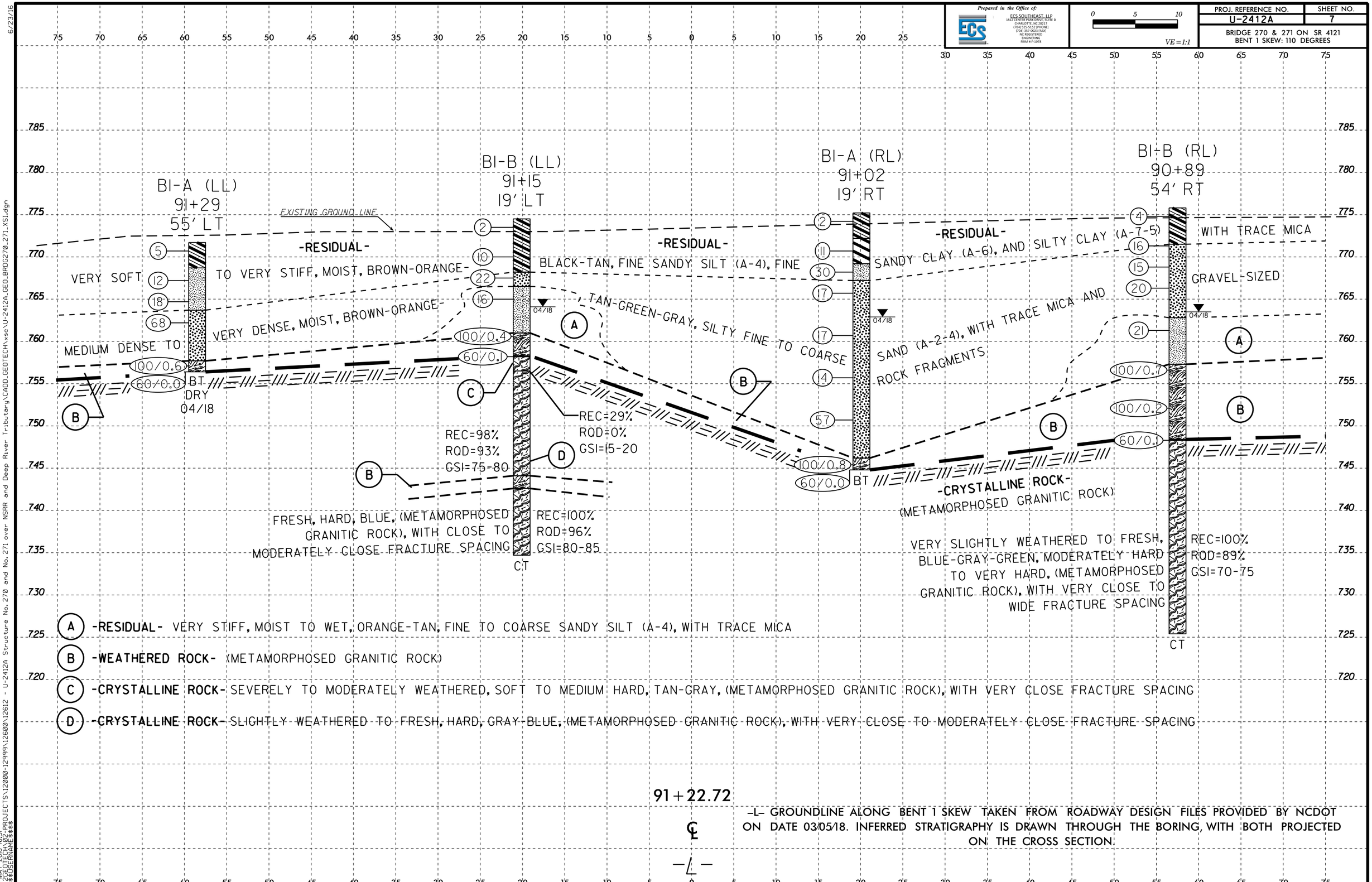
-L- GROUNDLINE ALONG END BENT 1 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1822 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # C-1078

VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	7

BRIDGE 270 & 271 ON SR 4121
BENT 1 SKEW: 110 DEGREES



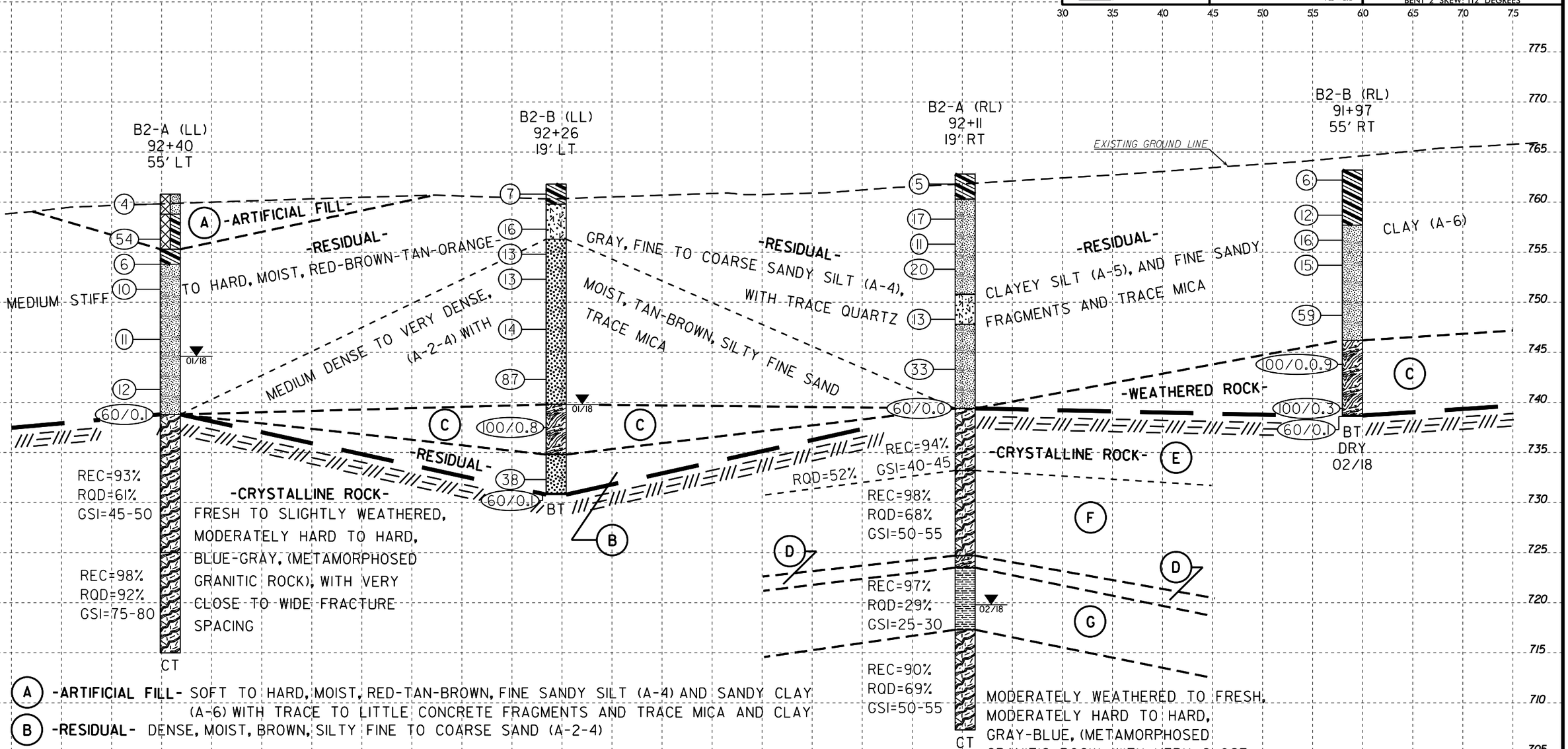
-L- GROUNDLINE ALONG BENT 1 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1822 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # C-1078

VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	8

BRIDGE 270 & 271 ON SR 4121 OVER NSRR & DEEP RIVER TRIBUTARY
BENT 2 SKEW: 112 DEGREES



(A) **-ARTIFICIAL FILL-** SOFT TO HARD, MOIST, RED-TAN-BROWN, FINE SANDY SILT (A-4) AND SANDY CLAY (A-6) WITH TRACE TO LITTLE CONCRETE FRAGMENTS AND TRACE MICA AND CLAY

(B) **-RESIDUAL-** DENSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4)

(C) **-WEATHERED ROCK-** (METAMORPHOSED GRANITIC ROCK)

(D) **-WEATHERED ROCK-** (PHYLLITE)

(E) **-CRYSTALLINE ROCK-** VERY SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD TO HARD, GRAY-GREEN, (METAVOLCANIC ROCK), WITH VERY CLOSE TO CLOSE FRACTURE SPACING

(F) **-CRYSTALLINE ROCK-** VERY SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, GRAY-BLUE, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING

(G) **-NON-CRYSTALLINE ROCK-** VERY SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD, GREEN-GRAY, (PHYLLITE), WITH VERY CLOSE TO CLOSE FRACTURE SPACING

92+24.10
℄
-L-

-L- GROUNDLINE ALONG BENT 2 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1822 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
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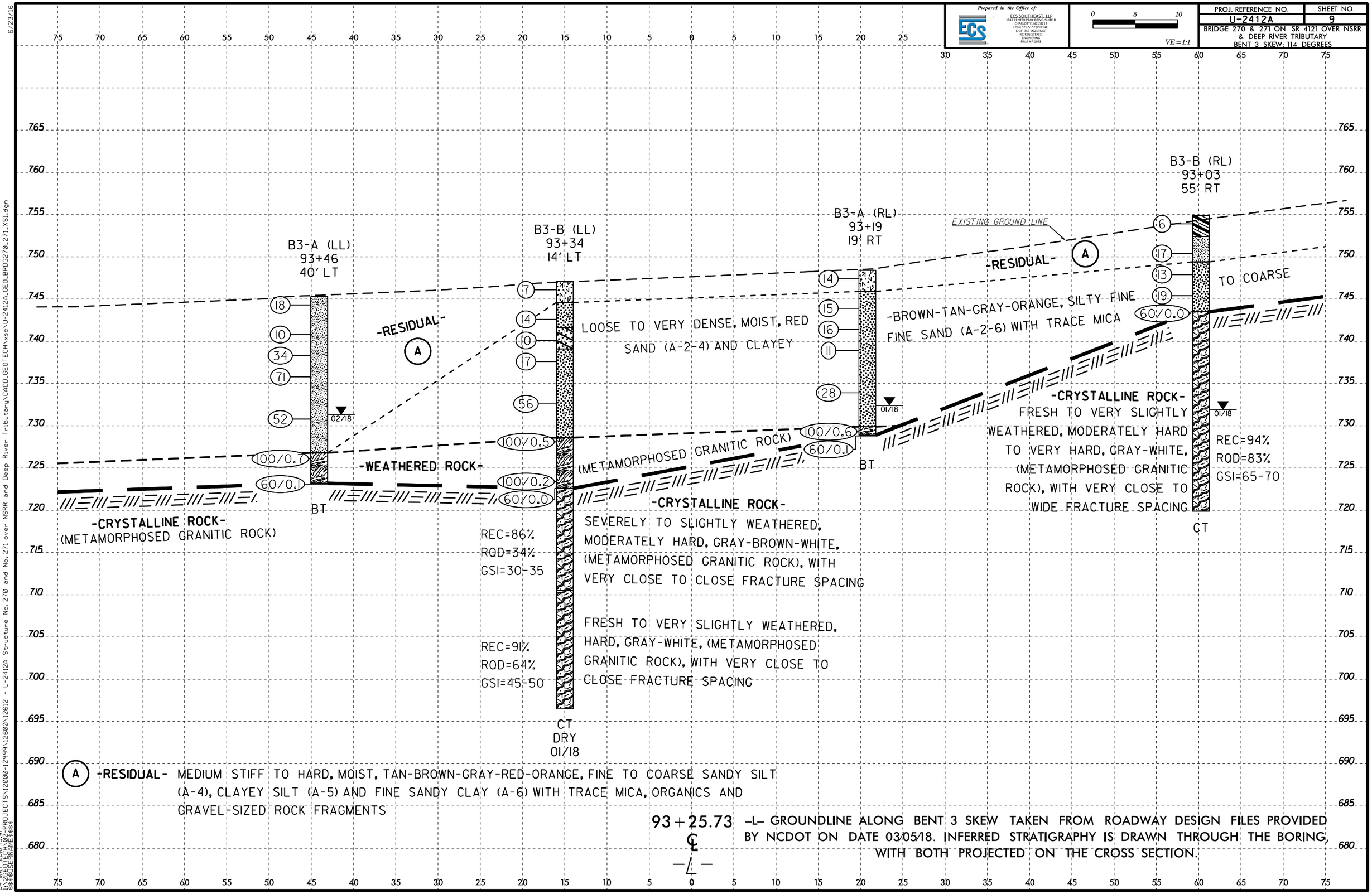
ENGINEERING
FIRM # C-1078

VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	9

BRIDGE 270 & 271 ON SR 4121 OVER NSRR
& DEEP RIVER TRIBUTARY
BENT 3 SKEW: 114 DEGREES



A -RESIDUAL- MEDIUM STIFF TO HARD, MOIST, TAN-BROWN-GRAY-RED-ORANGE, FINE TO COARSE SANDY SILT (A-4), CLAYEY SILT (A-5) AND FINE SANDY CLAY (A-6) WITH TRACE MICA, ORGANICS AND GRAVEL-SIZED ROCK FRAGMENTS

-L- GROUNDLINE ALONG BENT 3 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1822 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
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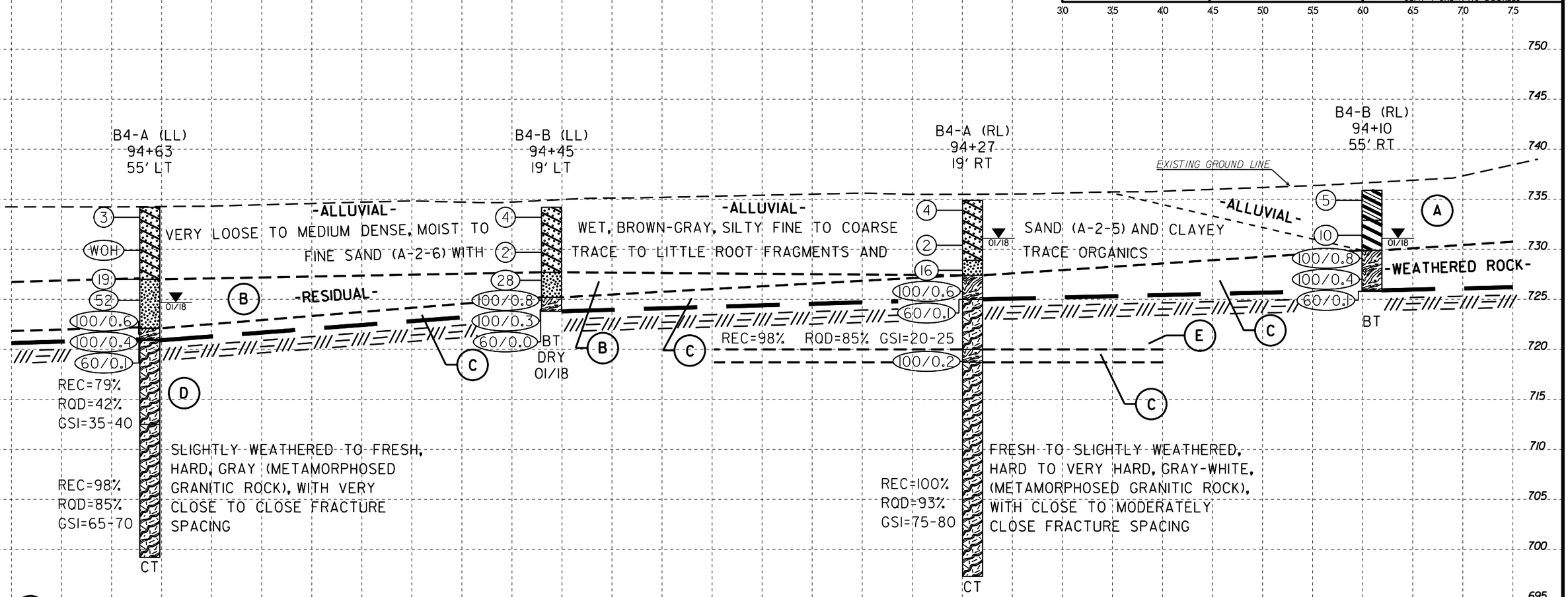
FIRM # C-1078

VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	10

BRIDGE 270 & 271 ON SR 4121 OVER NSRR
& DEEP RIVER TRIBUTARY
BENT 4 SKEW: 116 DEGREES



(A) **-ALLUVIAL-** MEDIUM STIFF TO STIFF, MOIST, GRAY-BROWN, FINE SANDY CLAY (A-6) AND SILTY CLAY (A-7-5)

(B) **-RESIDUAL-** MEDIUM DENSE TO VERY DENSE, MOIST TO WET, GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE CLAY

(C) **-WEATHERED ROCK-** (METAMORPHOSED GRANITIC ROCK)

(D) **-CRYSTALLINE ROCK-** SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD TO HARD, BROWN-GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE TO CLOSE FRACTURE SPACING

(E) **-CRYSTALLINE ROCK-** SEVERELY TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, GRAY, (METAMORPHOSED GRANITIC ROCK), WITH VERY CLOSE FRACTURE SPACING

94+34.43
℄
-L-

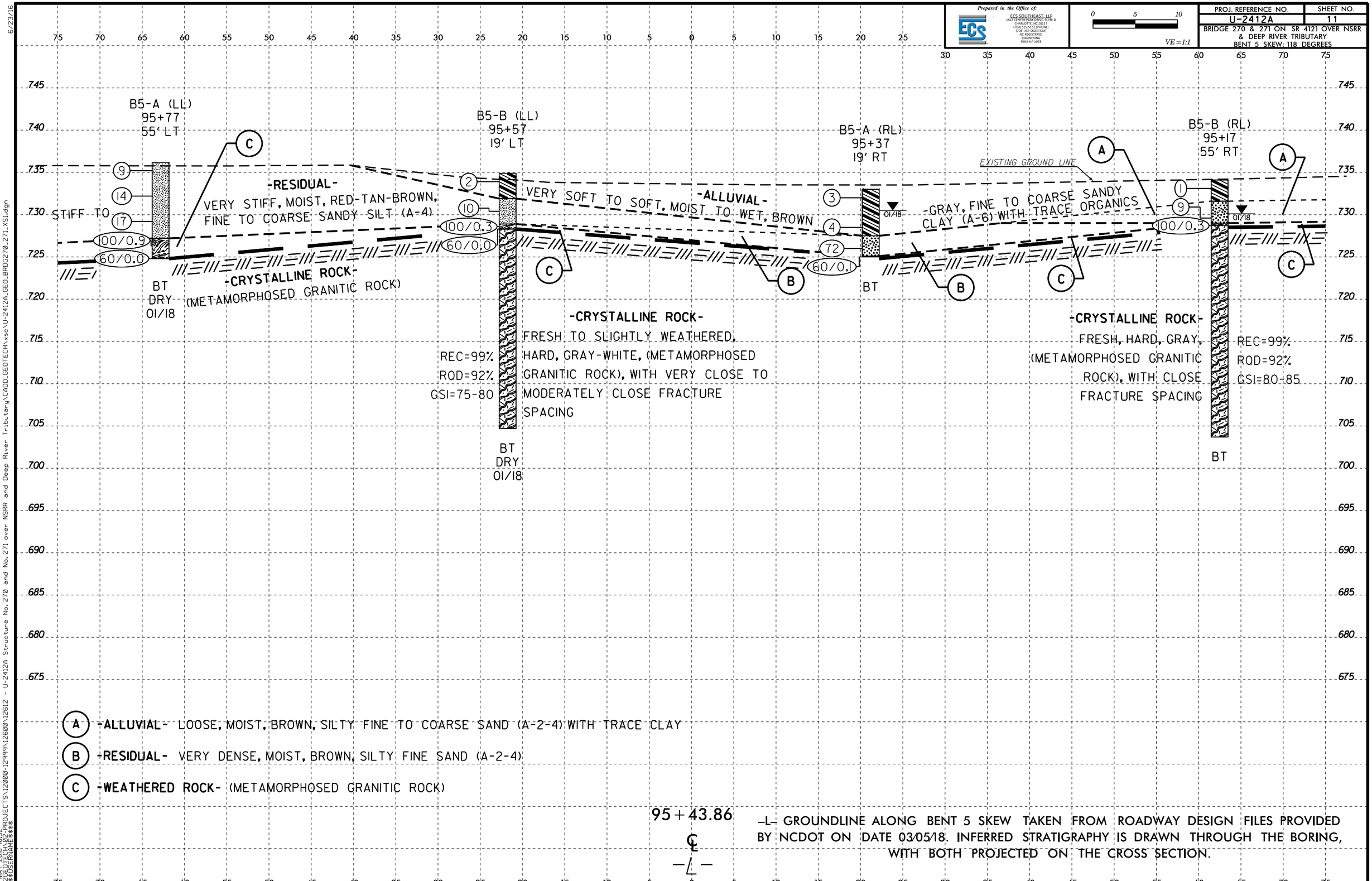
-L- GROUNDLINE ALONG BENT 4 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1822 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # C-1078

VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	11

BRIDGE 270 & 271 ON SR 4121 OVER NSRR & DEEP RIVER TRIBUTARY
BENT 5 SKEW: 118 DEGREES



(A) **-ALLUVIAL-** LOOSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE CLAY

(B) **-RESIDUAL-** VERY DENSE, MOIST, BROWN, SILTY FINE SAND (A-2-4)

(C) **-WEATHERED ROCK-** (METAMORPHOSED GRANITIC ROCK)

-L- GROUNDLINE ALONG BENT 5 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Prepared in the Office of:
ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
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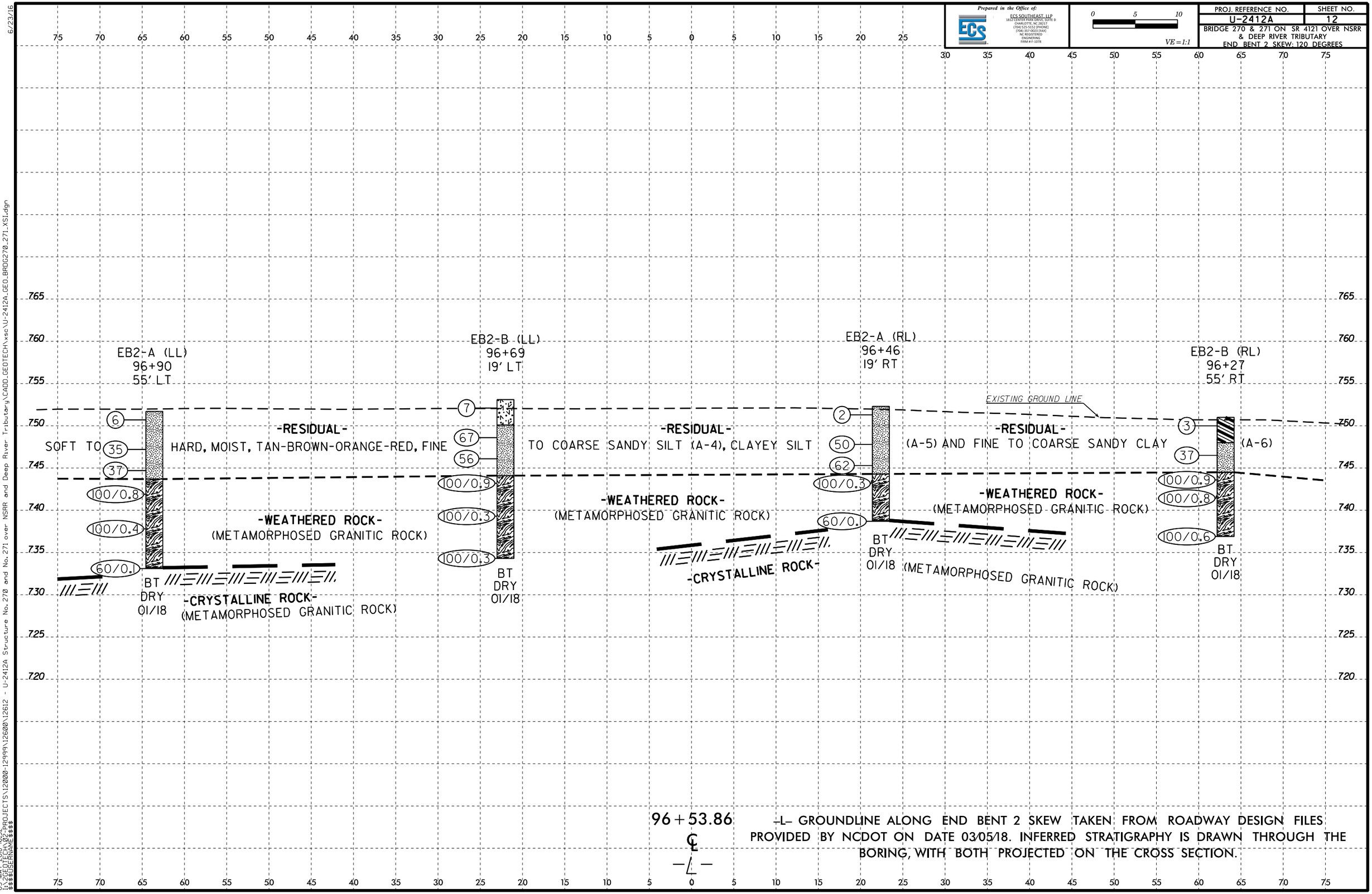
FIRM # C-1078

0 5 10
VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	12

BRIDGE 270 & 271 ON SR 4121 OVER NSRR
& DEEP RIVER TRIBUTARY
END BENT 2 SKEW: 120 DEGREES



-L- GROUNDLINE ALONG END BENT 2 SKEW TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 03/05/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. RW-1	**STATION** 89+67	**OFFSET** 43 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 786.8 ft	**TOTAL DEPTH** 23.7 ft	**NORTHING** 814,688	**EASTING** 1,719,516	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/02/18	**COMP. DATE** 02/02/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790											
	786.8	0.0								786.8 GROUND SURFACE	0.0
785			1	5	6	11		M		**RESIDUAL** Stiff to Hard, Orange-Brown-Tan-Black, Fine to Coarse Sandy SILT (A-4)	
	783.3	3.5	18	28	41	69		M			
780	780.8	6.0	15	26	32	58		M		780.8 Very Dense, Tan-Black-Brown, Silty Fine to Coarse SAND (A-2-4)	6.0
	778.3	8.5	100/0.4			100/0.4				778.3 **WEATHERED ROCK** Tan-Brown (METAMPRPHOSED GRANITIC ROCK)	8.5
775											
	773.3	13.5	38	62/0.3		100/0.8					
770											
	768.3	18.5	100/0.4			100/0.4					
765											
	763.2	23.6	60/0.1			60/0.1				763.2 / 763.1 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK)	23.6 / 23.7

Boring Terminated with Standard Penetration Test Refusal at Elevation 763.1 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.
Weathered and Crystalline Rock Boulders / Outcrpos were observed in the Railroad Cut.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB1-A (LL)	**STATION** 90+15	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 785.7 ft	**TOTAL DEPTH** 19.7 ft	**NORTHING** 814,693	**EASTING** 1,719,564 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790											
785	785.7	0.0	1	1	2	3		M		785.7 GROUND SURFACE	0.0
										RESIDUAL Soft, Brown-Orange, Fine Sandy CLAY (A-6)	
	782.2	3.5	10	18	49	67		M		782.7 Hard, Brown-Green, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized quartz fragments	3.0
780	779.7	6.0	37	63/0.4		100/0.9				779.7 **WEATHERED ROCK** Gray-Brown-Green, (METAMORPHOSED GRANITIC ROCK)	6.0
	777.2	8.5	33	57	43/0.3	100/0.8					
775										773.7 **RESIDUAL** Very Dense, Gray-Green-Brown, Silty Fine to Coarse SAND (A-2-4)	12.0
	772.2	13.5	16	21	56	77		M			
770	767.2	18.5	100/0.2			100/0.2				767.2 **WEATHERED ROCK** Gray-Greeen, (METAMORPHOSED GRANITIC ROCK)	18.5
	766.0	19.7	60/0.0			60/0.0				766.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 766.0 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	19.7

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB1-B (LL)	**STATION** 90+03	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 785.2 ft	**TOTAL DEPTH** 18.9 ft	**NORTHING** 814,659	**EASTING** 1,719,547 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
790										
785	785.2	0.0	WOH	WOH	WOH	0		W		785.2 GROUND SURFACE 0.0
										RESIDUAL Very Soft, Brown-Orange, Fine Sandy CLAY (A-6)
	781.7	3.5	4	6	10	16		M		782.2 3.0 Very Stiff, Orange, Clayey SILT (A-5)
780	779.2	6.0	8	12	13	25		M		779.7 5.5 Very Stiff, Tan-Orange, Fine Sandy SILT (A-4)
	776.7	8.5	54	46/0.4		100/0.9				776.7 8.5 **WEATHERED ROCK** Gray-Green, (METAMORPHOSED GRANITIC ROCK)
775										
	771.7	13.5	100/0.2			100/0.2				
770	766.7	18.5	100/0.4			100/0.4				766.3 18.9 Boring Terminated at Elevation 766.3 ft In Weathered Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-A (LL)	**STATION** 91+29	**OFFSET** 55 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 771.7 ft	**TOTAL DEPTH** 15.3 ft	**NORTHING** 814,678	**EASTING** 1,719,675	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)		DEPTH (ft)
775												
	771.7	0.0								771.7	GROUND SURFACE	0.0
770			2	2	3	5		M			**RESIDUAL** Medium Stiff, Brown-Orange, Fine Sandy CLAY (A-6)	
	768.2	3.5								768.7		3.0
			3	5	7	12		M			Stiff to Very Stiff, Orange, Fine Sandy SILT (A-4)	
765	765.7	6.0										
			5	9	9	18		M		763.7		8.0
	763.2	8.5									Very Dense, Orange-Tan, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized quartz fragments and mica	
			20	44	24	68		M				
760												
	758.2	13.5								757.7		14.0
			23	67	33/0.1	100/0.6				756.4	**WEATHERED ROCK** Tan-White-Orange, (METAMORPHOSED GRANITIC ROCK)	15.3
	756.4	15.3	60/0.0			60/0.0						
											Boring Terminated with Standard Penetration Test Refusal at Elevation 756.4 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-B (LL)	**STATION** 91+15	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 774.5 ft	**TOTAL DEPTH** 39.8 ft	**NORTHING** 814,644	**EASTING** 1,719,658 / **24 HR.** 10.4
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/25/18	**COMP. DATE** 04/25/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
775											
	774.5	0.0	1	1	1	2		M		774.5 GROUND SURFACE	0.0
770	771.0	3.5	2	4	6	10		M		**RESIDUAL** Very Soft to Stiff, Black-Brown-Orange, Fine Sandy CLAY (A-6)	
	768.5	6.0	7	12	10	22		M		768.2	6.3
765	766.0	8.5	5	6	10	16		W		766.5 Medium Dense, Orange-Tan, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized quartz fragments and mica	8.0
										Very Stiff, Orange-Tan, Fine Sandy SILT (A-4), with trace mica	
	761.0	13.5	100/0.4			100/0.4				761.0	13.5
760	758.3	16.2	60/0.1			60/0.1				**WEATHERED ROCK** Tan, (METAMORPHOSED GRANITIC ROCK) 758.3 / 758.2	16.2 / 16.3
755										756.5 **CRYSTALLINE ROCK** Severely to Moderately Weathered, Soft to Medium Hard, Tan-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close Fracture Spacing	18.0
										REC = 29%, RQD = 0%, GSI = 15 to 20	
750										Slightly Weathered to Fresh, Medium Hard to Hard, Gray-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing	
745										744.1 REC = 98%, RQD = 93%, GSI = 75 to 80	30.4
										742.6 **WEATHERED ROCK** (METAMORPHOSED GRANITIC ROCK)	31.9
740							RS-9			REC = 0%	
										CRYSTALLINE ROCK Fresh, Hard, Blue, (METAMORPHOSED QUARTZ DIORITE), with Close to Moderately Close Fracture Spacing	
735										734.7 REC = 100%, RQD = 96%, GSI = 80 to 85	39.8
										Boring Terminated at Elevation 734.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	

NCDOT BORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

GEOTECHNICAL BORING REPORT
CORE LOG

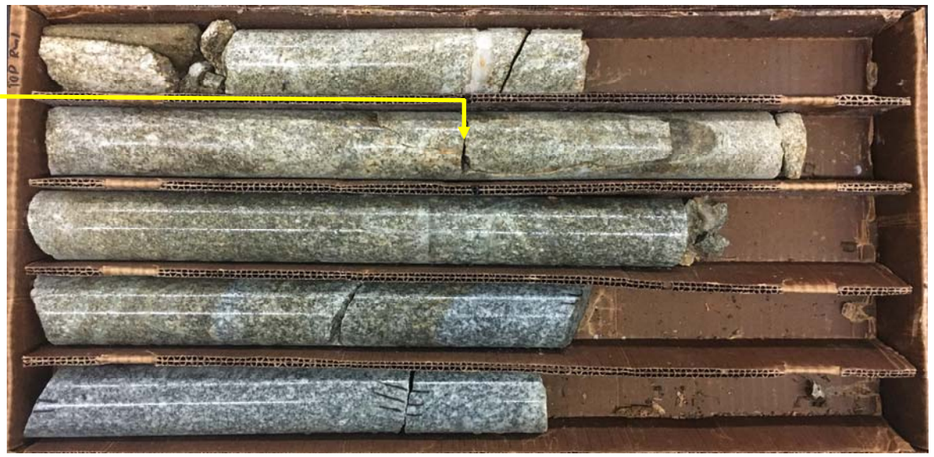
WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-B (LL)	**STATION** 91+15	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 774.5 ft	**TOTAL DEPTH** 39.8 ft	**NORTHING** 814,644	**EASTING** 1,719,658 / **24 HR.** 10.4
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/25/18	**COMP. DATE** 04/25/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 23.5 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
758.17											Begin Coring @ 16.3 ft	
	758.2	16.3	3.5	0:48/0.5 0:42/1.0 1:41/1.0 2:01/1.0	(2.3) 66%	(1.6) 46%		(0.5) 29%	(0.0) 0%		758.2 **CRYSTALLINE ROCK** Severely to Moderately Weathered, Soft to Medium Hard, Tan-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close Fracture Spacing	16.3
755	754.7	19.8						(12.1) 98%	(11.5) 93%		756.5	18.0
			5.0	2:03/1.0 2:53/1.0 2:36/1.0 3:13/1.0 3:52/1.0	(4.7) 94%	(4.3) 86%					GSI = 15 to 20 Slightly Weathered to Fresh, Hard, Gray-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing	
750	749.7	24.8									GSI = 75 to 80	
			5.0	3:56/1.0 3:27/1.0 1:47/1.0 2:31/1.0 2:47/1.0	(5.0) 100%	(5.0) 100%						
745	744.7	29.8									744.1	30.4
			5.0	0:50/1.0 0:48/1.0 1:27/1.0 1:31/1.0 1:44/1.0	(3.5) 70%	(3.2) 64%		(0.0) 0%	(0.0) 0%		742.6 **WEATHERED ROCK** (METAMORPHOSED GRANITIC ROCK)	31.9
740	739.7	34.8					RS-9	(7.9) 100%	(7.6) 96%		**CRYSTALLINE ROCK** Fresh, Hard, Blue, (METAMORPHOSED GRANITIC ROCK), with Close to Moderately Close Fracture Spacing	
			5.0	1:54/1.0 1;42/1.0 1:35/1.0 1:52/1.0 1:35/1.0	(5.0) 100%	(5.0) 100%					RS-9: 33.1' - 33.5' Unit Weight: 191.4 pcf	
735	734.7	39.8									734.7 Unconfined Compressive Strength: 19,780 psi (2848 ksf)	39.8
											GSI = 80 to 85 Boring Terminated at Elevation 734.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	

NCDOT CORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River
ECS Southeast Project No. 08:12612
WBS: 34802.1.1 Tip No.: U-2412A
Rock Core Photographs: Boring - B1-B (LL)
Station: 91+15 Offset: 19' LT

Begin Run 1
16.3'
Begin Run 2
19.8'



0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0
SCALE IN FEET

Begin Run 5
34.8'

End Run 5
39.8'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0
SCALE IN FEET

Begin Run 3
24.8 ft

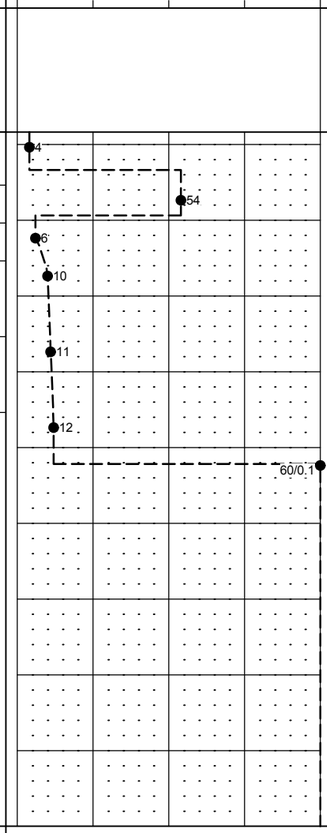
Begin Run 4
29.8'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0
SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-A (LL)	**STATION** 92+40	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 760.8 ft	**TOTAL DEPTH** 45.8 ft	**NORTHING** 814,668	**EASTING** 1,719,784 / **24 HR.** 16.2
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/30/18	**COMP. DATE** 01/30/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
760.8		0.0						GROUND SURFACE
758.3		2.5	2	2	2		M	**ARTIFICIAL FILL** Soft, Red-Tan, Fine Sandy SILT (A-4) with trace mica and clay
755.3		5.5	2	4	50		M	Hard, Brown, Fine Sandy CLAY (A-6) with trace to little concrete fragments (High N-value likely influenced by concrete debris)
752.8		8.0	3	3	3		M	**RESIDUAL** Medium Stiff, Red-Brown, Fine Sandy CLAY (A-6) with trace mica
747.3		13.5	5	6	4		M	Stiff, Tan-Orange, Fine to Coarse Sandy SILT (A-4) with trace mica
742.3		18.5	4	5	6		M	
738.9		21.9	5	6	6		M	
738.8		22.0	60/0.1					**CRYSTALLINE ROCK** Fresh to Slightly Weathered, Moderately Hard to Hard, Blue-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing REC = 93%, RQD = 61%, GSI = 45 - 50
725.0		35.8				RS-1		Fresh to Very Slightly Weathered, Hard, Blue-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing REC = 98%, RQD = 92%, GSI = 75 - 80
715.0		45.8						Boring Terminated at Elevation 715.0 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organic Soils from 0.0 to 0.2 ft



GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-A (LL)	**STATION** 92+40	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 760.8 ft	**TOTAL DEPTH** 45.8 ft	**NORTHING** 814,668	**EASTING** 1,719,784 / **24 HR.** 16.2
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/30/18	**COMP. DATE** 01/30/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 23.8 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
738.82										Begin Coring @ 22.0 ft
	738.8	22.0	3.8	1:39/1.0 2:21/1.0 2:32/1.0 2:05/0.8	(3.3) 87%	(1.8) 47%		(12.9) 93%	(8.4) 61%	738.8 / 22.0 **CRYSTALLINE ROCK** Fresh to Slightly Weathered, Moderately Hard to Hard, Blue-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing RS-1: 29.0' - 29.4' Unit Weight: 170.9 pcf Unconfined Compressive Strength: 20,850 psi (3002 ksf) GSI = 45 - 50
735	735.0	25.8								
			5.0	2:22/1.0 2:50/1.0 2:53/1.0 2:48/1.0 3:08/1.0	(4.8) 96%	(4.2) 84%				
730	730.0	30.8					RS-1			
			5.0	2:40/1.0 3:54/1.0 4:20/1.0 4:37/1.0 5:55/1.0	(4.8) 96%	(2.4) 48%				
725	725.0	35.8								725.0 / 35.8 Fresh to Very Slightly Weathered, Hard, Blue-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing GSI = 75 - 80
			5.0	3:52/1.0 3:27/1.0 3:19/1.0 3:24/1.0 3:26/1.0	(5.0) 100%	(5.0) 100%		(9.8) 98%	(9.2) 92%	
720	720.0	40.8								
			5.0	3:41/1.0 5:12/1.0 5:05/1.0 5:02/1.0 5:11/1.0	(4.8) 96%	(4.2) 84%				
	715.0	45.8								715.0 / 45.8 Boring Terminated at Elevation 715.0 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organic Soils from 0.0 to 0.2 ft

Bridge No. 270 (WBL) on SR 4121over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08:12612

WBS: 34802.1.1 Tip No.: U-2412-A

Rock Core Photographs: Boring - B2-A (LL)

Station: 92+40 Offset: 55' LT

Begin Run 1
22.0'

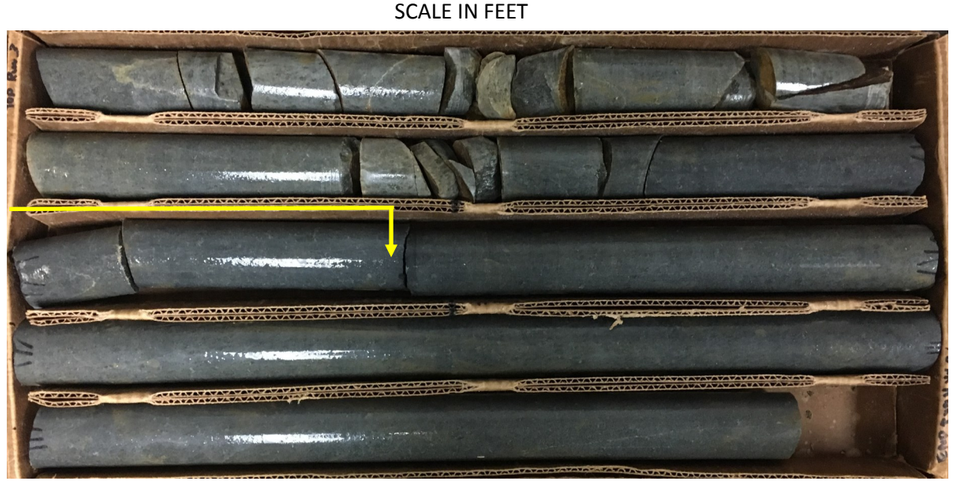
Begin Run 2
25.8'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
30.8'

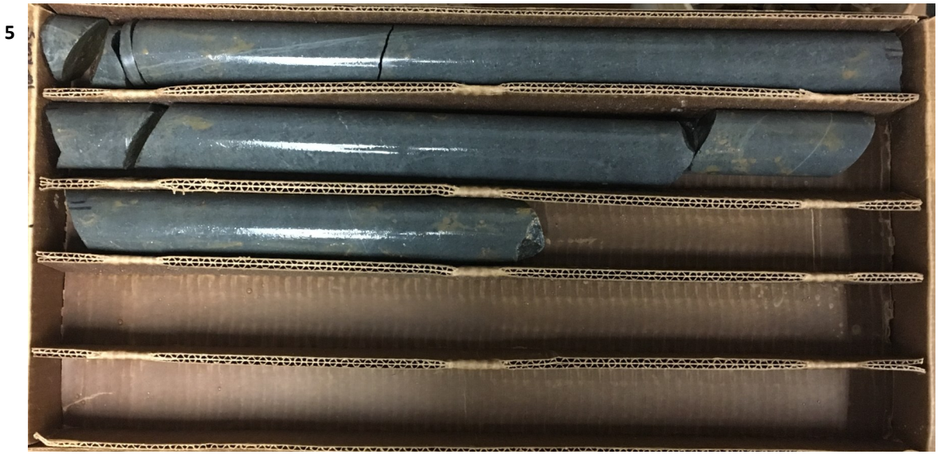
Begin Run 4
35.8'



0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
40.8'



End Run 5
45.8'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-B (LL)	**STATION** 92+26	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** 26.9
COLLAR ELEV. 761.8 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 814,633	**EASTING** 1,719,767 / **24 HR.** 22.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/31/18	**COMP. DATE** 01/31/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765											
	761.8	0.0								761.8 GROUND SURFACE	0.0
760			2	3	4	7		M		**RESIDUAL** Medium Stiff, Red-Brown, Fine Sandy CLAY (A-6) with trace organics	759.8 / 2.0
	758.3	3.5	5	7	9	16		M		Very Stiff, Red-Tan, Clayey SILT (A-5)	756.3 / 5.5
755	755.8	6.0	5	6	7	13		M		Medium Dense to Very Dense, Tan-Brown, Silty Fine SAND (A-2-4) with trace mica	
	753.3	8.5	5	6	7	13		M			
750	748.3	13.5	6	6	8	14		M			
745	743.3	18.5	18	29	58	87		M			
740	738.3	23.5	39	61/0.3		100/0.8		M		**WEATHERED ROCK** Brown (METAMORPHOSED GRANITIC ROCK)	738.3 / 23.5
735	733.3	28.5	19	18	20	38		M		**RESIDUAL** Dense, Brown, Silty Fine to Coarse SAND (A-2-4)	734.8 / 27.0
	730.9	30.9	60/0.1			60/0.1				**CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 730.8 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	730.9 / 30.9 / 730.8 / 31.0

Notes:
Surficial Organic Soils from 0.0 to 0.2 ft.

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-A (LL)	**STATION** 93+46	**OFFSET** 40 ft LT	**ALIGNMENT** -L- / **0 HR.** 27.8
COLLAR ELEV. 745.3 ft	**TOTAL DEPTH** 22.2 ft	**NORTHING** 814,647	**EASTING** 1,719,887 / **24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/02/18	**COMP. DATE** 02/02/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	745.3	0.0								745.3 GROUND SURFACE 0.0
745			7	12	6	18		M		**RESIDUAL** Stiff to Hard, Tan-Brown-Gray-Orange, Fine to Coarse Sandy SILT (A-4) with trace gravel-sized rock fragments
	741.8	3.5	2	4	6	10		M		
740	739.3	6.0	8	9	25	34		M		
	736.8	8.5	15	29	42	71		M		
735	731.8	13.5	21	28	24	52		M		
730	726.8	18.5	48	52/0.2		100/0.7				726.8 / 18.5 **WEATHERED ROCK** Tan (METAMORPHOSED GRANITIC ROCK)
725	723.2	22.1	60/0.1			60/0.1				723.2 / 22.1 / 723.1 / 22.2 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 723.1 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-B (LL)	**STATION** 93+34	**OFFSET** 14 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 747.1 ft	**TOTAL DEPTH** 50.6 ft	**NORTHING** 814,621	**EASTING** 1,719,874 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/23/18	**COMP. DATE** 01/24/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
750								
	747.1	0.0						747.1 GROUND SURFACE 0.0
745			1	2	5		M	**RESIDUAL** Medium Stiff, Red-Brown, Clayey SILT (A-5) with trace organics 744.6 / 2.5
	743.6	3.5						
			6	6	8		M	Medium Dense, Red-Brown, Silty Fine SAND (A-2-5) with trace clay 741.6 / 5.5
	741.1	6.0						
740			3	4	6		M	Loose, Red-Brown, Clayey Fine SAND (A-2-6) 739.1 / 8.0
	738.6	8.5						
			6	9	8		M	Medium Dense to Very Dense, Tan-Gray, Silty Fine to Coarse SAND (A-2-5) with trace clay
735								
	733.6	13.5						
			8	23	33		M	
730								
	728.6	18.5						728.6 18.5
			100/0.5					**WEATHERED ROCK** Gray (METAMORPHOSED GRANITIC ROCK)
725								
	723.6	23.5						
	722.6	24.5	100/0.2					722.6 24.5
			60/0.0					**CRYSTALLINE ROCK** Severely to Slightly Weathered, Moderately Hard, Gray-Brown-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing REC = 86%, RQD = 34%, GSI = 30 - 35
720								
715						RS-3		
710								710.5 36.6
								Fresh to Very Slightly Weathered, Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing REC = 91%, RQD = 64%, GSI = 45 - 50
705								
700								696.5 50.6
								Boring Terminated at Elevation 696.5 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0 to 0.3 ft.

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-B (LL)	**STATION** 93+34	**OFFSET** 14 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 747.1 ft	**TOTAL DEPTH** 50.6 ft	**NORTHING** 814,621	**EASTING** 1,719,874 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/23/18	**COMP. DATE** 01/24/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 26.1 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
722.61										Begin Coring @ 24.5 ft
	722.6 – 721.5	24.5 – 25.6	1.1	*N=60/0.0*	(0.5)	(0.0)		(10.4)	(4.1)	722.6 24.5 **CRYSTALLINE ROCK** Severely to Slightly Weathered, Moderately Hard, Gray-Brown-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing RS-3: 32.6' - 33.0' Unit Weight: 166.7 pcf Unconfined Compressive Strength: 4,140 psi (596 ksf) GSI = 30 - 35
720			5.0	3:30/1.1 2:00/1.0 1:30/1.0 1:30/1.0 1:15/1.0 2:00/1.0	45%	0%		86%	34%	
	716.5	30.6			(4.4) 88%	(0.9) 18%				
715			5.0	1:30/1.0 2:30/1.0 2:30/1.0 2:00/1.0 2:30/1.0	(4.5) 90%	(2.8) 56%	RS-3			
	711.5	35.6								
710			5.0	2:45/1.0 2:00/1.0 2:15/1.0 2:50/1.0 2:50/1.0	(4.6) 92%	(3.6) 72%		(12.8) 91%	(9.0) 64%	710.5 36.6 Fresh to Very Slightly Weathered, Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing GSI = 45 - 50
	706.5	40.6								
705			5.0	2:50/1.0 2:15/1.0 1:50/1.0 1:50/1.0 2:00/1.0	(4.8) 96%	(2.9) 58%				
	701.5	45.6								
700			5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(4.4) 88%	(2.9) 58%				
	696.5	50.6								696.5 50.6 Boring Terminated at Elevation 696.5 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0 to 0.3 ft.

Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08:12612

WBS: 34802.1.1 Tip No.: U-2412A

Rock Core Photographs: Boring - B3-B (LL)

Station: 93+34 Offset: 14' LT

Begin Run 1
24.5'
Begin Run 2
25.6'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
30.6'
Begin Run 4
35.6'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
40.6'
Begin Run 6
45.6

End Run 6
50.6'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B4-A (LL)	**STATION** 94+63	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.2 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 814,660	**EASTING** 1,720,003 / **24 HR.** 9.5
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/16/18	**COMP. DATE** 01/16/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
735											
	734.2	0.0								734.2 GROUND SURFACE	0.0
			1	1	2	3		M		**ALLUVIAL** Very Loose, Brown, Clayey Fine Sand (A-2-6), with trace root fragments	
730	730.9	3.3									
			2	1	0	1		W			
	728.0	6.2									
			4	6	13	19		W		727.0 **RESIDUAL** Medium Dense to Very Dense, Gray, Silty Fine Sand (A-2-4), with trace clay	7.2
725	725.9	8.3									
			14	14	38	52		M			
	722.1	12.1								722.1	12.1
	721.5	12.7	70	30/0.1		100/0.6				721.0 **WEATHERED ROCK** Gray, (METAMORPHOSED GRANITIC ROCK)	13.2
720	721.0	13.2	100/0.4			100/0.4				720.9	13.3
			60/0.1			60/0.1				**CRYSTALLINE ROCK** Slightly to Moderately Weathered, Moderately Hard to Hard, Brown-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing	
715										712.5 REC = 79%, RQD = 42%, GSI = 35 - 40	21.7
710							RS-5			Slightly Weathered to Fresh, Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing REC = 98%, RQD = 85%, GSI = 65 - 70	
705											
700										699.2 Boring Terminated at Elevation 699.2 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0-0.2 ft.	35.0

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B4-A (LL)	**STATION** 94+63	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.2 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 814,660	**EASTING** 1,720,003 / **24 HR.** 9.5
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/16/18	**COMP. DATE** 01/16/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 21.7 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
720.9											Begin Coring @ 13.3 ft	
720	720.9	13.3	1.7	3:00/1.0	(1.2)	(0.3)		(6.6)	(3.5)		720.9 Slightly to Moderately Weathered, Moderately Hard to Hard, Brown-Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing	13.3
	719.2	15.0		2:00/0.7	71%	18%		79%	42%			
			5.0	1:40/1.0	(4.0)	(2.2)					GSI = 35 - 40	
				1:20/1.0	80%	44%						
				2:00/1.0								
715				1:40/1.0								
	714.2	20.0		1:30/1.0								
			5.0	1:30/1.0	(4.8)	(3.0)					712.5	21.7
				1:20/1.0	96%	60%					Slightly Weathered to Fresh, Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing	
				2:00/1.0				(13.0)	(11.3)			
710				3:00/1.0				98%	85%			
	709.2	25.0		3:15/1.0								
			5.0	3:15/1.0	(4.6)	(4.3)	RS-5				RS-5: 24.6' - 25.0' Unit Weight: 168.3 pcf Unconfined Compressive Strength: 11,770 psi (1,695 ksf)	
				4:00/1.0	92%	86%						
				3:30/1.0								
705				2:00/1.0								
	704.2	30.0		2:15/1.0								
			5.0	2:00/1.0	(5.0)	(5.0)					GSI = 65 - 70	
				2:00/1.0	100%	100%						
				2:30/1.0								
700				3:15/1.0								
	699.2	35.0		3:45/1.0							699.2 Boring Terminated at Elevation 699.2 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0-0.2 ft.	35.0

Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08:12612

WBS: 34802.1.1 Tip No.: U-2412A

Rock Core Photographs: Boring - B4-A (LL)

Station: 94+63 Offset: 55' LT

Begin Run 1
13.3'

Begin Run 2
15.0'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

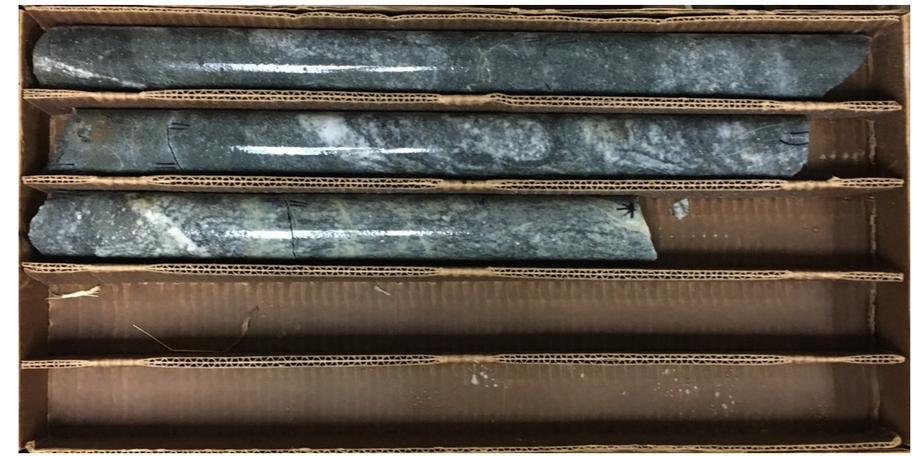
Begin Run 3
20.0'

Begin Run 4
25.0'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
30.0'



End Run 5
35.0'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B4-B (LL)	**STATION** 94+45	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** 3.5
COLLAR ELEV. 734.2 ft	**TOTAL DEPTH** 10.4 ft	**NORTHING** 814,624	**EASTING** 1,719,985 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/19/18	**COMP. DATE** 01/19/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
735										
	734.2	0.0								734.2 GROUND SURFACE 0.0
			1	2	2	4		M		**ALLUVIAL** Very Loose, Brown-Gray, Clayey Fine SAND (A-2-6) with trace organics
730	730.7	3.5	2	1	1	2		W		
	727.9	6.3	4	14	14	28		M		727.2 7.0 **RESIDUAL** Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-5) with trace clay
725	725.7	8.5	20	27	73/0.3	100/0.8				725.2 9.0
	724.3	9.9	100/0.3			100/0.3				723.8 10.4 **WEATHERED ROCK** Gray (METAMORPHOSED GRANITIC ROCK)
	723.8	10.4	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 723.8 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.3 ft.

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B5-A (LL)	**STATION** 95+77	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 736.2 ft	**TOTAL DEPTH** 11.4 ft	**NORTHING** 814,662	**EASTING** 1,720,114 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
740										
	736.2	0.0								736.2 GROUND SURFACE 0.0
735			2	3	6	9		M		**RESIDUAL** Stiff to Very Stiff, Red-Tan-Brown, Fine to Coarse, Sandy SILT (A-4)
	733.2	3.0	3	4	10	14		M		
730	730.2	6.0	5	8	9	17		M		
	727.7	8.5	20	24	76/0.4	100/0.9				727.2 9.0 **WEATHERED ROCK** Tan-Brown (METAMORPHOSED GRANITIC ROCK)
725	724.8	11.4	60/0.0			60/0.0				724.8 11.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 724.8 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B5-B (LL)	**STATION** 95+57	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.9 ft	**TOTAL DEPTH** 30.2 ft	**NORTHING** 814,625	**EASTING** 1,720,096 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/22/18	**COMP. DATE** 01/22/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
735										734.9 GROUND SURFACE 0.0
	734.9	0.0	1	1	1	●2		M		**ALLUVIAL** Very Soft, Brown, Fine to Coarse Sandy CLAY (A-6)
730	731.4	3.5	5	6	4	●10		M		731.9 3.0 **RESIDUAL** Stiff, Brown, Fine to Coarse Sandy SILT (A-4)
	728.9	6.0								728.9 6.0
	728.3	6.6	100/0.3 60/0.0			100/0.3 ● 60/0.0				728.3 6.6 **WEATHERED ROCK** Brown (METAMORPHOSED GRANITIC ROCK)
725										**CRYSTALLINE ROCK** Fresh to Slightly Weathered, Hard, Gray-White (METAMORPHOSED GRANITIC ROCK) with Very Close to Moderately Close Fracture Spacing
720										REC = 99%, RQD = 92%, GSI = 75 - 80
715							RS-7			
710										
705										704.7 30.2 Boring Terminated at Elevation 704.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

NCDOT BORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/3/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B5-B (LL)	**STATION** 95+57	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.9 ft	**TOTAL DEPTH** 30.2 ft	**NORTHING** 814,625	**EASTING** 1,720,096 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/22/18	**COMP. DATE** 01/22/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 23.6 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
728.3											Begin Coring @ 6.6 ft
	728.3	6.6	3.6	*N=60/0.0* 5:30/1.0 4:00/1.0 4:15/1.0 2:30/0.6	(3.5) 97%	(3.4) 94%		(23.3) 99%	(21.7) 92%		728.3 6.6 **CRYSTALLINE ROCK** Fresh to Slightly Weathered, Hard, Gray-White (METAMORPHOSED GRANITIC ROCK) with Very Close to Moderately Close Fracture Spacing
725	724.7	10.2	5.0	3:30/1.0 3:45/1.0 3:30/1.0 7:00/1.0 9:15/1.0	(5.0) 100%	(4.5) 90%					RS-7: 17.2' - 17.6' Unit Weight: 178.5 pcf Unconfined Compressive Strength: 8,840 psi (1,273 ksf)
720	719.7	15.2	5.0	7:30/1.0 6:30/1.0 6:00/1.0 6:45/1.0 4:30/1.0	(5.0) 100%	(5.0) 100%	RS-7				GSI = 75 - 80
715	714.7	20.2	5.0	5:25/1.0 5:01/1.0 5:00/1.0 5:45/1.0 6:50/1.0	(4.8) 96%	(4.6) 92%					
710	709.7	25.2	5.0	5:15/1.0 4:38/1.0 4:10/1.0 5:00/1.0 6:00/1.0	(5.0) 100%	(4.2) 84%					
705	704.7	30.2									704.7 30.2 Boring Terminated at Elevation 704.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

NCDOT CORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/3/18

Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08:12612

WBS: 34802.1.1 Tip No. : U-2412A

Rock Core Photographs: Boring - B5-B (LL)

Station: 95+57 Offset: 19' LT

Begin Run 1
6.6'

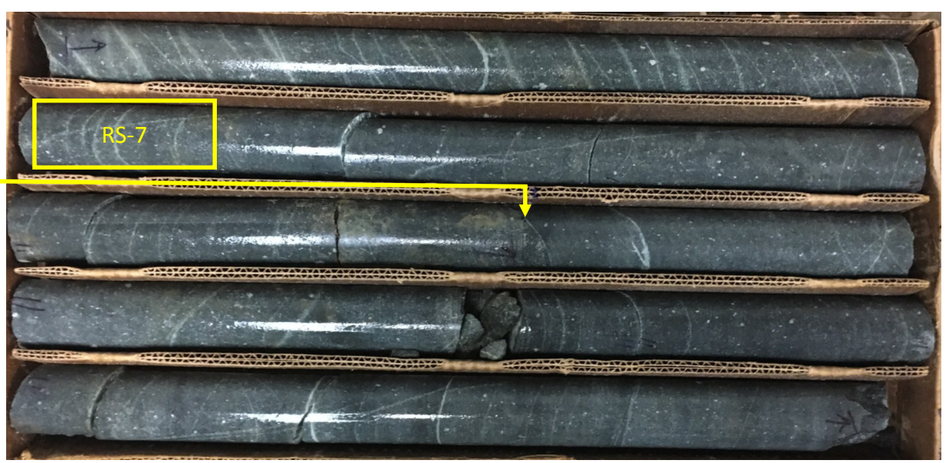
Begin Run 2
10.2'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
15.2'

Begin Run 4
20.2'



0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
25.2'

End Run 5
30.2'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB2-A (LL)	**STATION** 96+90	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 751.7 ft	**TOTAL DEPTH** 18.6 ft	**NORTHING** 814,668	**EASTING** 1,720,225 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	751.7	0.0								751.7 GROUND SURFACE	0.0
750			2	2	4	6		M		**RESIDUAL** Medium Stiff to Hard, Tan-Brown, Fine to Coarse Sandy SILT (A-4)	
	748.2	3.5	9	13	22	35		M			
745	745.7	6.0	15	16	21	37		M			
	743.2	8.5	27	40	60/0.3	100/0.8				742.7	9.0
740										**WEATHERED ROCK** Tan-Brown (METAMORPHOSED GRANITIC ROCK)	
	738.2	13.5	100/0.4			100/0.4					
735											
	733.2	18.5	60/0.1			60/0.1				733.2 / 733.1	18.5 / 18.6
										CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 733.1 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB2-B (LL)	**STATION** 96+69	**OFFSET** 19 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 753.1 ft	**TOTAL DEPTH** 18.8 ft	**NORTHING** 814,631	**EASTING** 1,720,207 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	753.1	0.0								753.1 GROUND SURFACE 0.0
750			2	3	4	7		M		**RESIDUAL** Medium Stiff, Orange-Brown, Clayey SILT (A-5)
	749.6	3.5	21	29	38	67		M		750.1 3.0 Hard, Tan, Fine to Coarse Sandy SILT (A-4)
745	747.1	6.0	20	27	29	56		M		
	744.6	8.5	27	51	49/0.4	100/0.9				744.1 9.0
740										**WEATHERED ROCK** Tan (METAMORPHOSED GRANITIC ROCK)
	739.6	13.5	100/0.3			100/0.3				
735										
	734.6	18.5	100/0.3			100/0.3				734.3 18.8
										Boring Terminated at Elevation 734.3 ft In Weathered Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. RW-2	**STATION** 89+29	**OFFSET** 46 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 784.8 ft	**TOTAL DEPTH** 18.1 ft	**NORTHING** 814,607	**EASTING** 1,719,463	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/02/18	**COMP. DATE** 02/02/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785										784.8 GROUND SURFACE	0.0
	784.8	0.0	1	1	3	4		M		**ARTIFICIAL FILL** Soft, Red-Brown, Fine to Coarse Sandy SILT (A-4)	
	781.3	3.5	5	3	7	10		M		781.8 **RESIDUAL** Stiff, Red-Brown, Clayey SILT (A-5)	3.0
780	778.8	6.0	20	29	32	61		M		778.8 Hard, Orange-Brown, Fine Sandy SILT (A-4)	6.0
	776.3	8.5	17	34	48	82		M			
775											
	771.3	13.5	30	55	45/0.3	100/0.8				770.8 **WEATHERED ROCK** Orange-Brown (METAMORPHOSED GRANITIC ROCK)	14.0
770	766.8	18.0	60/0.1			60/0.1				766.8 766.7 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK)	18.0 18.1

Boring Terminated with Standard Penetration Test Refusal at Elevation 766.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.
Weathered and Crystalline Rock Boulders / Outcrops were observed in the Railroad Cut.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. EB1-A (RL)	**STATION** 89+91	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 783.8 ft	**TOTAL DEPTH** 24.6 ft	**NORTHING** 814,623	**EASTING** 1,719,529	**24 HR.** 21.5
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785											
	783.8	0.0								783.8 GROUND SURFACE	0.0
			WOH	1	2	3		W		**RESIDUAL** Soft, Brown-Orange, Fine Sandy CLAY (A-6)	
780	780.3	3.5								780.8	3.0
			8	13	14	27		M		Very Stiff to Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized rock fragments	
	777.8	6.0									
			21	28	47	75		M			
775	775.3	8.5								775.3	8.5
			100/0.3			100/0.3				**WEATHERED ROCK** Tan-Brown-Gray, (METAMORPHOSED GRANITIC ROCK)	
770	770.3	13.5									
			64	36/0.1		100/0.6					
										766.8	17.0
765	765.3	18.5								**RESIDUAL** Dense, Brown, Silty Fine SAND (A-2-4)	
			7	10	21	31		M			
760	760.3	23.5								760.3	23.5
	759.2	24.6	100/0.3			100/0.3				759.2 **WEATHERED ROCK** Brown, (METAMORPHOSED GRANITIC ROCK)	24.6
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 759.2 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. EB1-B (RL)	**STATION** 89+80	**OFFSET** 55 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 783.3 ft	**TOTAL DEPTH** 22.2 ft	**NORTHING** 814,589	**EASTING** 1,719,513	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
785										
	783.3	0.0								783.3 GROUND SURFACE 0.0
			2	1	2	3		M		**RESIDUAL** Soft to Hard, Orange-Brown, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments
780	779.8	3.5								
			8	9	12	21		M		
	777.3	6.0								
			13	16	25	41		M		
775	774.8	8.5								775.3 8.0
			10	14	20	34		M		Dense, Brown-Orange, Silty Fine to Coarse SAND (A-2-4)
770	769.8	13.5								769.8 13.5
			100/0.3			100/0.3				**WEATHERED ROCK** Tan-Brown, (METAMORPHOSED GRANITIC ROCK)
765	764.8	18.5								
			11	89/0.5		100/1.0				
	761.1	22.2								761.1 22.2
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 761.1 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-A (RL)	**STATION** 91+02	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** 25.8
COLLAR ELEV. 775.2 ft	**TOTAL DEPTH** 30.4 ft	**NORTHING** 814,608	**EASTING** 1,719,640 / **24 HR.** 12.3
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
780										
775	775.2	0.0	WOH	WOH	2	2		M		775.2 GROUND SURFACE 0.0
	771.7	3.5	3	4	7	11		M		**RESIDUAL** Very Soft, Black-Brown-Orange, Fine Sandy CLAY (A-6) 772.2 3.0
770	769.2	6.0	8	12	18	30		M		Stiff, Orange, Silty CLAY (A-7-5) 769.2 6.0
	766.7	8.5	6	8	9	17		M		Very Stiff, Orange, Fine Sandy SILT (A-4), with trace mica 767.2 8.0
765										Medium Dense to Very Dense, Orange-Brown-Green-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized quartz fragments
	761.7	13.5	6	8	9	17		M		
760										
	756.7	18.5	6	7	7	14		M		
755										
	751.7	23.5	18	31	26	57		M		
750										
	746.7	28.5	25	30	70/0.3	100/0.8				746.2 29.0
745	744.8	30.4	60/0.0			60/0.0				744.8 30.4 **WEATHERED ROCK** Green-Gray, (METAMORPHOSED GRANITIC ROCK)

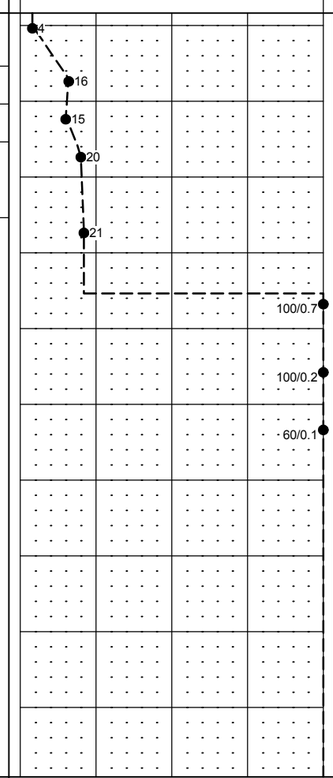
Boring Terminated with Standard Penetration Test Refusal at Elevation 744.8 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-B (RL)	**STATION** 90+89	**OFFSET** 54 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 775.8 ft	**TOTAL DEPTH** 50.4 ft	**NORTHING** 814,574	**EASTING** 1,719,623 / **24 HR.** 12.3
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/25/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
780								
775	775.8	0.0	1	1	3		M	775.8 / 0.0 GROUND SURFACE **RESIDUAL** Soft, Brown-Orange, Fine Sandy CLAY (A-6)
	772.3	3.5	3	6	10		M	771.5 / 4.3 Medium Dense, Orange-Tan, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized quartz fragments and mica
770	769.8	6.0	6	7	8		M	
	767.3	8.5	7	9	11		M	
765	762.3	13.5	8	9	12		M	762.8 / 13.0 Very Stiff, Orange-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica
760	757.3	18.5	47	53/0.2				757.3 / 18.5 **WEATHERED ROCK** Green-Gray, (METAMORPHOSED GRANITIC ROCK)
755	752.3	23.5	100/0.2					
750	748.4	27.4	60/0.1					748.4 / 27.4 748.3 / 27.5 **CRYSTALLINE ROCK** Very Slightly Weathered to Fresh, Blue-Gray-Green, Moderately Hard to Very Hard, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing REC = 100%, RQD = 89%, GSI = 70 to 75
745								
740						RS-10		
735								
730								725.4 / 50.4 Boring Terminated at Elevation 725.4 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

BLOWS PER FOOT: 0 25 50 75 100



NCDOT BORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B1-B (RL)	**STATION** 90+89	**OFFSET** 54 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 775.8 ft	**TOTAL DEPTH** 50.4 ft	**NORTHING** 814,574	**EASTING** 1,719,623 / **24 HR.** 12.3
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/25/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 22.9 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
748.31										Begin Coring @ 27.5 ft
	748.3	27.5	2.9	1:38/0.9 1:50/1.0 2:16/1.0	(2.9) 100%	(2.2) 76%		(22.8) 100%	(20.4) 89%	748.3 / 27.5 **CRYSTALLINE ROCK** Very Slightly Weathered to Fresh, Blue-Gray-Green, Moderately Hard to Very Hard, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing RS-10: 35.4' - 35.9' Unit Weight: 175.1 pcf Unconfined Compressive Strength: 10,810 psi (1557 ksf) GSI = 70 to 75
745	745.4	30.4	5.0	1:51/1.0 1:49/1.0 2:01/1.0 1:51/1.0 3:30/1.0	(5.0) 100%	(3.8) 76%				
740	740.4	35.4	5.0	3:48/1.0 3:43/1.0 3:06/1.0 2:06/1.0 2:18/1.0	(5.0) 100%	(5.0) 100%	RS-10			
735	735.4	40.4	5.0	2:21/1.0 2:17/1.0 2:06/1.0 2:03/1.0 2:07/1.0	(5.0) 100%	(4.8) 96%				
730	730.4	45.4	5.0	2:28/1.0 4:57/1.0 6:30/1.0 6:28/1.0 5:06/1.0	(4.9) 98%	(4.6) 92%				
	725.4	50.4								725.4 / 50.4 Boring Terminated at Elevation 725.4 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

NCDOT CORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08: 12612

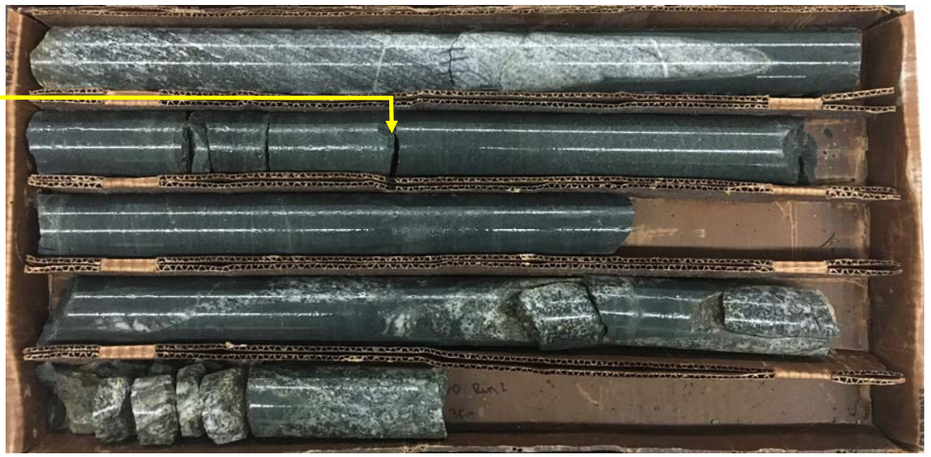
WBS: 34802.1.1 Tip No.: U-2412A

Rock Core Photographs: Boring - B1-B (RL)

Station: 90+89 Offset: 54' RT

Begin Run 1
27.5'

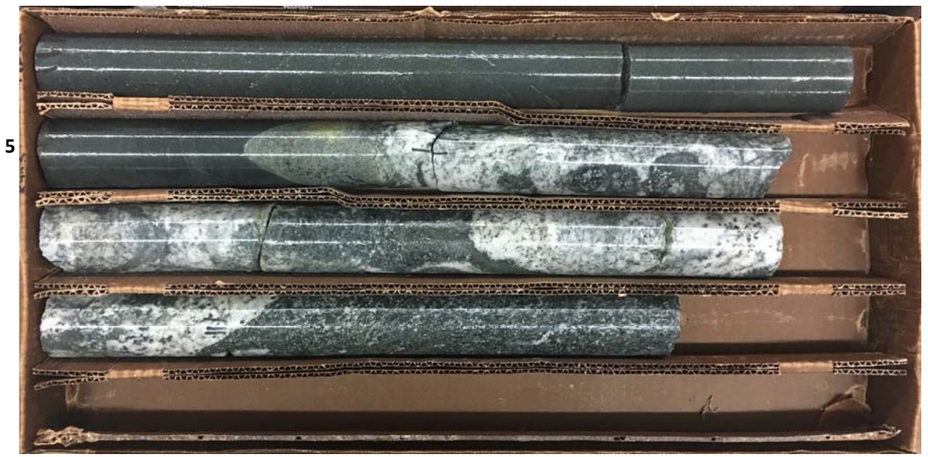
Begin Run 2
30.4'



0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
45.4'



End Run 5
50.4'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
35.4'

Begin Run 4
40.4'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-A (RL)	**STATION** 92+11	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 762.8 ft	**TOTAL DEPTH** 55.5 ft	**NORTHING** 814,596	**EASTING** 1,719,749 / **24 HR.** 43.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/01/18	**COMP. DATE** 02/01/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
762.8		0.0						GROUND SURFACE
	759.3	3.5	2	2	3		M	**RESIDUAL** Medium Stiff, Brown, Fine Sandy CLAY (A-6)
	756.8	6.0	6	8	9		M	Stiff to Very Stiff, Tan-Orange-Gray, Fine Sandy SILT (A-4) with trace clay
	754.3	8.5	6	5	6		M	
	749.3	13.5	6	7	13		M	
	744.3	18.5	5	6	7		M	Stiff, Tan-Orange-Brown-Gray, Clayey SILT (A-5)
	739.4	23.4	12	14	19		M	Hard, Brown-Gray, Fine to Coarse Sandy SILT (A-4) with trace mica
			60/0.0					**CRYSTALLINE ROCK** Very Slightly to Moderately Weathered, Moderately Hard to Hard, Gray-Green, (METAVOLCANIC ROCK), with Very Close to Close Fracture Spacing
								REC = 94%, RQD = 52%, GSI = 40 - 45
								Very Slightly to Freshly Weathered, Moderately Hard to Hard, Gray-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing
								REC = 98%, RQD = 68%, GSI = 50 - 55
						RS-2		**WEATHERED ROCK** Green-Gray (PHYLLITE) REC = 25%
								NON-CRYSTALLINE ROCK Very Slightly to Moderately Weathered, Moderately Hard, Green-Gray, (PHYLLITE), with Very Close to Close Fracture Spacing
								REC = 97%, RQD = 29%, GSI = 25 - 30
								CRYSTALLINE ROCK Very Slightly Weathered, Moderately Hard to Hard, Gray-Green-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing
								REC = 90%, RQD = 69%, GSI = 50 - 55
								Boring Terminated at Elevation 707.3 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Blows per foot: 0 25 50 75 100. Samples: 5, 17, 11, 20, 13, 33, 60/0.0.

Elevations: 765, 760, 755, 750, 745, 740, 735, 730, 725, 720, 715, 710.

Depths (ft): 762.8 – 0.0; 759.3 – 3.5; 756.8 – 6.0; 754.3 – 8.5; 749.3 – 13.5; 744.3 – 18.5; 739.4 – 23.4; 733.2 – 29.6; 724.7 – 38.1; 717.3 – 45.5; 707.3 – 55.5.

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-A (RL)	**STATION** 92+11	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 762.8 ft	**TOTAL DEPTH** 55.5 ft	**NORTHING** 814,596	**EASTING** 1,719,749 / **24 HR.** 43.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/01/18	**COMP. DATE** 02/01/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 32.1 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
739.37										Begin Coring @ 23.4 ft
	739.4	23.4	2.1	*N=60/0.0*	(2.0)	(1.7)		(5.8)	(3.2)	**CRYSTALLINE ROCK** Very Slightly to Moderately Weathered, Moderately Hard to Hard, Gray-Green, (METAVOLCANIC ROCK), with Very Close to Close Fracture Spacing
	737.3	25.5		3:34/1.0 4:49/1.0	95%	81%		94%	52%	
			5.0	0:19/0.1 3:23/1.0 3:13/1.0 3:59/1.0 3:23/1.0 3:52/1.0	(5.0) 100%	(1.8) 36%				GSI = 40 - 45
	732.3	30.5						(8.3) 98%	(5.8) 68%	Very Slightly to Freshly Weathered, Moderately Hard to Hard, Gray-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Moderately Close Fracture Spacing
			5.0	4:57/1.0 4:08/1.0 3:58/1.0 5:17/1.0 8:35/1.0	(4.9) 98%	(3.6) 72%				GSI = 50 - 55
	727.3	35.5								
			5.0	8:57/1.0 6:31/1.0 1:44/1.0 1:48/1.0 1:44/1.0	(4.0) 80%	(2.0) 40%				
	722.3	40.5						(0.3) 25%	(0.0) 0%	**WEATHERED ROCK** Green-Gray (PHYLLITE)
			5.0	2:04/1.0 1:24/1.0 2:34/1.0 1:49/1.0 1:02/1.0	(4.5) 90%	(1.7) 34%	RS-2	(6.0) 97%	(1.8) 29%	**NON-CRYSTALLINE ROCK** Very Slightly to Moderately Weathered, Moderately Hard, Green-Gray, (PHYLLITE), with Very Close to Close Fracture Spacing
	717.3	45.5								RS-2: 41.3' - 41.7' Unit Weight: 166.0 pcf Unconfined Compressive Strength: 720 psi (104 ksf)
			5.0	1:30/1.0 2:08/1.0 2:02/1.0 2:17/1.0 3:21/1.0	(4.0) 80%	(3.1) 62%		(9.0) 90%	(6.9) 69%	GSI = 25 - 30
	712.3	50.5								**CRYSTALLINE ROCK** Very Slightly Weathered, Moderately Hard to Hard, Gray-Green-Blue, (METAMORPHOSED GRANITIC ROCK), with Very Close to Close Fracture Spacing
			5.0	1:59/1.0 2:01/1.0 2:28/1.0 1:46/1.0 2:22/1.0	(5.0) 100%	(3.8) 76%				GSI = 50 - 55
	707.3	55.5								Boring Terminated at Elevation 707.3 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Elevations: 735, 730, 725, 720, 715, 710.

Depths (ft): 739.4 – 23.4; 737.3 – 25.5; 732.3 – 30.5; 727.3 – 35.5; 722.3 – 40.5; 717.3 – 45.5; 712.3 – 50.5; 707.3 – 55.5.

Depths (ft): 739.4 – 23.4; 733.2 – 29.6; 724.7 – 38.1; 723.5 – 39.3; 717.3 – 45.5; 707.3 – 55.5.

Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08: 12612

WBS: 34802.1.1 Tip No.: U-2412A

Rock Core Photographs: Boring - B2-A (RL)

Station: 92+11 Offset: 19' RT

Begin Run 1
23.4'

Begin Run 2
25.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
30.5'

Begin Run 4
35.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
40.5'

Begin Run 6
45.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 7
50.5'

End Run 7
55.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B2-B (RL)	**STATION** 91+97	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 763.2 ft	**TOTAL DEPTH** 24.6 ft	**NORTHING** 814,562	**EASTING** 1,719,732 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/31/18	**COMP. DATE** 02/01/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765											
	763.2	0.0								763.2 GROUND SURFACE	0.0
			1	2	4	6		M		**RESIDUAL** Medium Stiff to Stiff, Red-Brown, Fine Sandy CLAY (A-6) with trace quartz fragments	
760	759.7	3.5									
			4	5	7	12		M			
	757.2	6.0								757.7	5.5
			8	6	10	16		M		Very Stiff to Hard, Red-Tan-Gray, Fine Sandy SILT (A-4)	
755	754.7	8.5									
			4	6	9	15		M			
750	749.7	13.5									
			7	16	43	59		M			
745	744.7	18.5								744.2	19.0
			16	27	73/0.4	100/0.0.9				**WEATHERED ROCK** Gray-Green (METAMORPHOSED GRANITIC ROCK)	
740	739.7	23.5									
	738.7	24.5	100/0.3			100/0.3				738.7 / 738.6	24.5 / 24.6
			60/0.1			60/0.1				**CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK)	

Boring Terminated with Standard Penetration Test Refusal at Elevation 738.6 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organic Soils from 0.0 to 0.2 ft.

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-A (RL)	**STATION** 93+19	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 748.4 ft	**TOTAL DEPTH** 19.6 ft	**NORTHING** 814,589	**EASTING** 1,719,858 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/24/18	**COMP. DATE** 01/24/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	748.4	0.0								748.4 GROUND SURFACE 0.0
			WOH	7	7	14		M		**RESIDUAL** Stiff, Red-Brown, Clayey SILT (A-5)
745	744.9	3.5								745.9 2.5
			4	5	10	15		M		Medium Dense, Tan, Silty Fine SAND (A-2-4) with trace clay
	742.4	6.0								
			5	7	9	16		M		
740	739.9	8.5								
			5	5	6	11		M		
735	734.9	13.5								
			3	8	20	28		M		
730	729.9	18.5								729.9 18.5
	728.9	19.5	50	50/0.1		100/0.6				728.9 19.5 **WEATHERED ROCK** Brown (METAPHOSED GRANITIC ROCK)
			60/0.1			60/0.1				728.8 19.6 **CRYSTALLINE ROCK** METAPHOSED GRANITIC ROCK

Boring Terminated with Standard Penetration Test Refusal at Elevation 728.8 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.4 ft.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-B (RL)	**STATION** 93+03	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 754.9 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 814,554	**EASTING** 1,719,840 / **24 HR.** 23.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/29/18	**COMP. DATE** 01/30/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755										754.9 GROUND SURFACE	0.0
	754.9	0.0	2	3	3	6		M		**RESIDUAL** Medium Stiff, Red-Orange, Fine Sandy CLAY (A-6)	
	752.4										2.5
	751.4	3.5	5	6	11	17		M		Very Stiff, Red-Orange-Brown, Fine Sandy SILT (A-4) with trace mica and clay	
750											
	749.4										5.5
	748.9	6.0	4	5	8	13		M		Medium Dense, Tan-Orange, Silty Fine SAND (A-2-4) with trace mica	
	746.4	8.5	8	9	10	19		M			
745											
	743.5	11.4	60/0.0			60/0.0				743.5	11.4
740										**CRYSTALLINE ROCK** Fresh to Very Slightly Weathered, Moderately Hard to Very Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing	
										REC = 94%, RQD = 83%, GSI = 65 - 70	
735											
730											
							RS-4				
725											
720										719.9	35.0
										Boring Terminated at Elevation 719.9 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	
										Notes: Surficial Organic Soils from 0.0 to 0.2 ft.	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B3-B (RL)	**STATION** 93+03	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 754.9 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 814,554	**EASTING** 1,719,840 / **24 HR.** 23.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/29/18	**COMP. DATE** 01/30/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 23.6 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
743.54											Begin Coring @ 11.4 ft	
	743.5	11.4	4.8	*N=60/0.0* 2:48/1.0 2:33/1.0 1:38/1.0 1:49/1.0 0:52/0.8	(4.0) 83%	(2.0) 42%		(22.2) 94%	(19.6) 83%		743.5 **CRYSTALLINE ROCK** Fresh to Very Slightly Weathered, Moderately Hard to Very Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK), with Very Close to Wide Fracture Spacing	11.4
740											RS-4: 26.2' - 26.6' Unit Weight: 175.5 psi Unconfined Compressive Strength: 6,130 psi (883 ksf)	
	738.7	16.2	5.0	1:32/1.0 1:48/1.0 1:30/1.0 1:50/1.0 1:32/1.0	(4.7) 94%	(4.5) 90%					GSI = 65 - 70	
735												
	733.7	21.2	5.0	1:55/1.0 2:01/1.0 1:44/1.0 1:53/1.0 1:48/1.0	(4.8) 96%	(4.6) 92%						
730												
	728.7	26.2	5.0	2:24/1.0 2:00/1.0 2:17/1.0 2:37/1.0 2:29/1.0	(4.9) 98%	(4.7) 94%	RS-4					
725												
	723.7	31.2	3.8	2:28/1.0 1:46/1.0 2:10/1.0 2:23/0.8	(3.8) 100%	(3.8) 100%						
720	719.9	35.0									719.9	35.0
											Boring Terminated at Elevation 719.9 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	
											Notes: Surficial Organic Soils from 0.0 to 0.2 ft.	

Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08: 12612

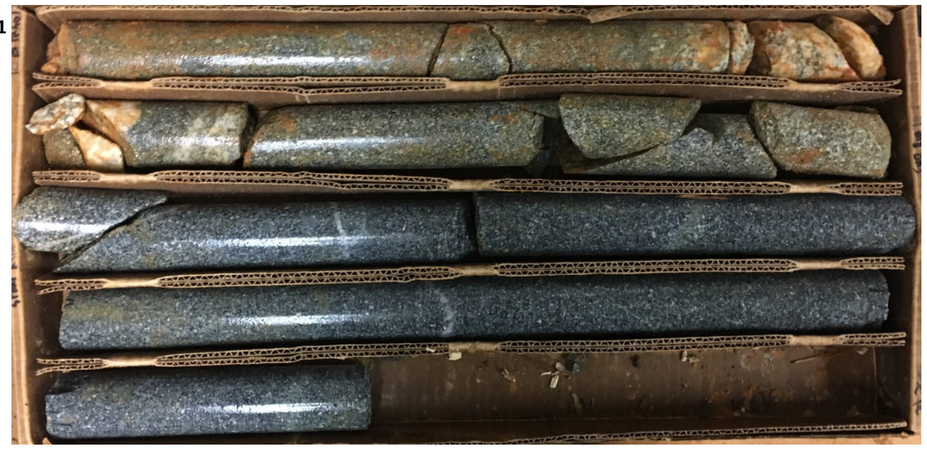
WBS: 34802.1.1 Tip No.: U-2412A

Rock Core Photographs: Boring - B3-B (RL)

Station: 93+03 Offset: 55' RT

Begin Run 1
11.4'

Begin Run 2
16.2'

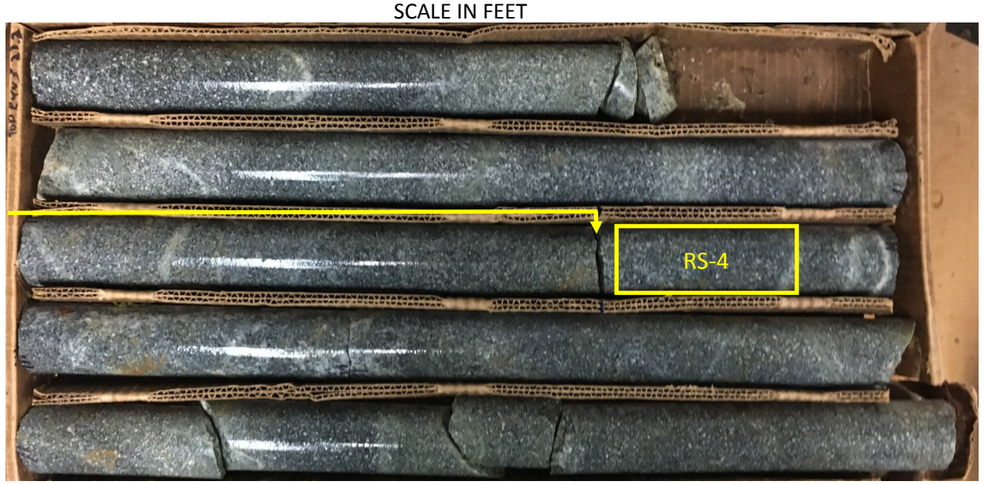


0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
21.2'

Begin Run 4
26.2' ft



0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
31.2'

End Run 5
35.0'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B4-A (RL)	**STATION** 94+27	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.9 ft	**TOTAL DEPTH** 37.5 ft	**NORTHING** 814,586	**EASTING** 1,719,966 / **24 HR.** 3.8
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/16/18	**COMP. DATE** 01/19/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
735										
	734.9	0.0	2	1	3	4		M		734.9 GROUND SURFACE 0.0 **ALLUVIAL** Very Loose, Brown, Clayey Fine SAND (A-2-6) with trace organics
730	731.4	3.5	1	1	1	2		W		
	728.9	6.0	7	10	6	16		W		728.9 6.0 Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-5) with trace clay
	726.4	8.5								726.4 8.5
725	725.1	9.8	70 60/0.1	30/0.1		100/0.6 60/0.1				725.1 9.8 **WEATHERED ROCK** Brown (METAMORPHOSED GRANITIC ROCK)
720	719.0	15.9	100/0.2			100/0.2				720.0 14.9 718.8 16.1 **CRYSTALLINE ROCK** Severely to Slightly Weathered, Medium Hard to Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close Fracture Spacing REC = 50%, RQD = 10%, GSI = 20 - 25
715										**WEATHERED ROCK** Gray (METAMORPHOSED GRANITIC ROCK) REC = 0%
710							RS-6			**CRYSTALLINE ROCK** Fresh to Slightly Weathered, Hard to Very Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK) with Close to Moderately Close Fracture Spacing REC = 100%, RQD = 93%, GSI = 75 - 80
705										
700										697.4 37.5 Boring Terminated at Elevation 697.4 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Possible Boulders at a depth of 5.6 to 7.5 ft

NCDOT BORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B4-A (RL)	**STATION** 94+27	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.9 ft	**TOTAL DEPTH** 37.5 ft	**NORTHING** 814,586	**EASTING** 1,719,966 / **24 HR.** 3.8
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/16/18	**COMP. DATE** 01/19/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 27.4 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
725											Begin Coring @ 9.9 ft
	725.0 724.0	9.9 10.9	1.0	2:45/1.0	(0.5) 50%	(0.0) 0%		(2.5) 50%	(0.5) 10%		**CRYSTALLINE ROCK** Severely to Slightly Weathered, Medium Hard to Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Very Close Fracture Spacing
720			5.0	2:00/1.0 1:20/1.0 1:20/1.0 1:20/1.0 0:20/1.0	(2.0) 40%	(0.5) 10%					720.0 14.9 GSI = 20 - 25
	719.0 718.8	15.9 16.1	4.4	N=100/0.2 1:45/0.4	(4.4) 100%	(3.5) 80%		(0.0) 0%	(0.0) 0%		718.8 16.1 **WEATHERED ROCK** Gray (METAMORPHOSED GRANITIC ROCK)
715	714.4	20.5		1:20/1.0 1:20/1.0 1:00/1.0 1:30/1.0				(21.4) 100%	(20.0) 93%		**CRYSTALLINE ROCK** Fresh to Slightly Weathered, Hard to Very Hard, Gray-White, (METAMORPHOSED GRANITIC ROCK) with Close to Moderately Close Fracture Spacing RS-6: 25.5' - 25.9' Unit Weight: 166.6 pcf Unconfined Compressive Strength: 7,890 psi (1,136 ksf)
710	709.4	25.5	5.0	1:40/1.0 2:00/1.0 2:10/1.0 3:30/1.0 4:00/1.0	(5.0) 100%	(5.0) 100%					
705	704.4	30.5	5.0	5:00/1.0 4:30/1.0 5:10/1.0 7:00/1.0 10:15/1.0	(5.0) 100%	(4.7) 94%	RS-6				GSI = 75 - 80
700	699.4	35.5	5.0	7:40/1.0 6:00/1.0 5:20/1.0 8:05/1.0 7:45/1.0	(5.0) 100%	(4.8) 96%					
	697.4	37.5	2.0	5:45/1.0 15:40/1.0	(2.0) 100%	(2.0) 100%					697.4 37.5 Boring Terminated at Elevation 697.4 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Possible Boulders at a depth of 5.6 to 7.5 ft

NCDOT CORE DOUBLE U2412A_GEO_BORELOGS.GPJ NC_DOT.GDT 5/4/18

Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River
ECS Southeast Project No. 08:12612
WBS: 34802.1.1 Tip No.: U-2412A
Rock Core Photographs: Boring - B4-A (RL)
Station: 94+27 Offset: 19' RT

Begin Run 1
9.9'

Begin Run 2
10.9'

End Run 2
15.9'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

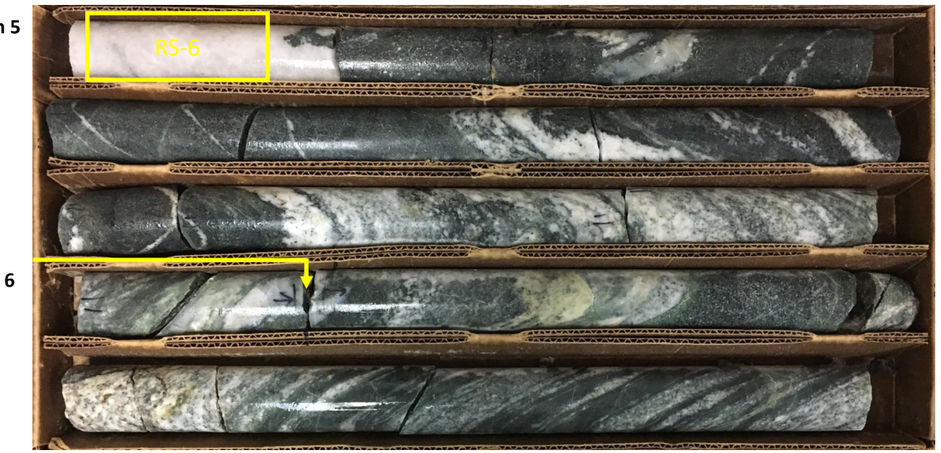
Begin Run 3
16.1'

Begin Run 4
20.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
25.5'

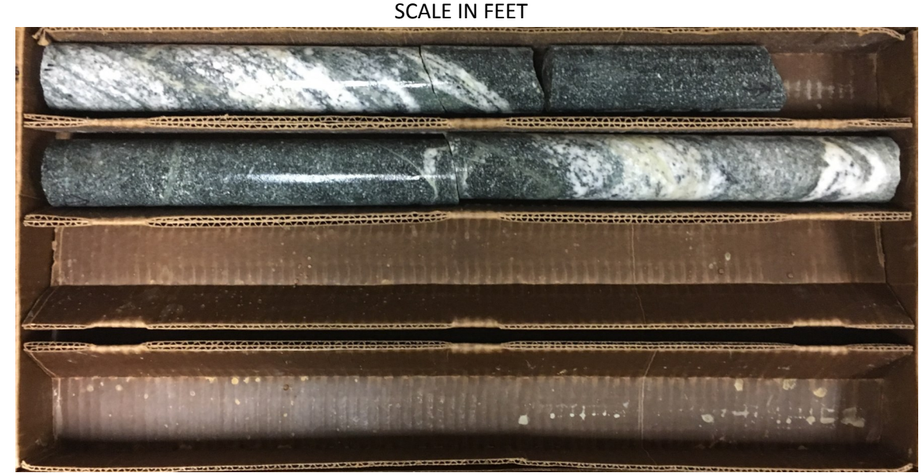


Begin Run 6
30.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 7
35.5'



End Run 7
37.5'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. B4-B (RL)	**STATION** 94+10	**OFFSET** 55 ft RT	**ALIGNMENT** -L-	**0 HR.** 8.6
COLLAR ELEV. 735.9 ft	**TOTAL DEPTH** 10.1 ft	**NORTHING** 814,550	**EASTING** 1,719,949	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
740											
	735.9	0.0								735.9 GROUND SURFACE	0.0
735			1	2	3	5, 10		M		**ALLUVIAL** Medium Stiff, Brown, Fine Sandy CLAY (A-6)	
	732.4	3.5	3	5	5					732.9 Stiff, Gray-Brown, Silty CLAY (A-7-5)	3.0
730	729.9	6.0	45	55/0.3		100/0.8		M		729.9 **WEATHERED ROCK** Brown (METAMORPHOSED GRANITIC ROCK)	6.0
	727.4	8.5	100/0.4			100/0.4					
	725.9	10.0	60/0.1			60/0.1				725.9	10.0
										725.8 **CRYSTALLINE ROCK** Brown (METAMORPHOSED GRANITIC ROCK)	10.1

Boring Terminated with Standard Penetration Test Refusal at Elevation 725.8 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. B5-A (RL)	**STATION** 95+37	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.5
COLLAR ELEV. 733.0 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 814,587	**EASTING** 1,720,077	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER B. Snow	**START DATE** 01/22/18	**COMP. DATE** 01/22/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
735										
	733.0	0.0								733.0 GROUND SURFACE 0.0
			1	1	2	3		M		**ALLUVIAL** Soft, Brown-Gray, Fine to Coarse Sandy CLAY (A-6), with trace organics
730	729.5	3.5								
			1	2	2	4		W		
	727.0	6.0								727.5 5.5
			31	25	47	72		M		**RESIDUAL** Very Dense, Brown, Silty Fine SAND (A-2-4)
725	725.1	7.9	60/0.1			60/0.1				725.1 7.9
										725.0 **CRYSTALLINE ROCK** Gray (METAMPRPHOSED GRANITIC ROCK) 8.0

Boring Terminated with Standard Penetration Test Refusal at Elevation 725.0 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.3 ft.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B5-B (RL)	**STATION** 95+17	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.1 ft	**TOTAL DEPTH** 30.4 ft	**NORTHING** 814,550	**EASTING** 1,720,058 / **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/22/18	**COMP. DATE** 01/23/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
735											
	734.1	0.0								734.1 GROUND SURFACE	0.0
			1	0	1	1		M		**ALLUVIAL** Very Soft, Brown, Fine Sandy CLAY (A-6), with trace organics	
730	730.6	3.5								731.6	2.5
	729.0	5.1	2	2	7	9		M		Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace clay	
	728.7	5.4	100/0.3 60/0.0			100/0.3 60/0.0				729.0 / 728.7	5.1 / 5.4
725										**WEATHERED ROCK** Brown (METAMORPHOSED GRANITIC ROCK)	
720										**CRYSTALLINE ROCK** Freshly Weathered, Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Close Fracture Spacing REC = 100%, RQD = 98%, GSI = 80 - 85	
715											
710											
705							RS-8			703.7	30.4
										Boring Terminated at Elevation 703.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0 to 0.3 ft.	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** K. Plummer
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. B5-B (RL)	**STATION** 95+17	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 734.1 ft	**TOTAL DEPTH** 30.4 ft	**NORTHING** 814,550	**EASTING** 1,720,058 / **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/22/18	**COMP. DATE** 01/23/18	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 25.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
728.73											Begin Coring @ 5.4 ft	
	728.7 / 728.3	5.4 / 5.8	0.4	N=60/0.0	(0.4)	(0.3)		(25.0)	(24.4)		728.7 **CRYSTALLINE ROCK**	5.4
			5.0	2:00/0.4 2:30/1.0 1:30/1.0 2:15/1.0 2:15/1.0	100% (5.0) 100%	75% (5.0) 100%		100%	98%		Freshly Weathered, Hard, Gray, (METAMORPHOSED GRANITIC ROCK), with Close Fracture Spacing	
725	723.3	10.8	5.0	2:30/1.0 2:30/1.0 3:30/1.0 4:15/1.0 4:00/1.0 6:45/1.0	(5.0) 100%	(4.7) 94%					RS-8: 25.8' - 26.2' Unit Weight: 169.4 psi Unconfined Compressive Strength: 5,210 psi (750 ksf)	
720	718.3	15.8	5.0	3:30/1.0 4:10/1.0 4:45/1.0 5:00/1.0 5:15/1.0	(5.0) 100%	(5.0) 100%					GSI = 80 - 85	
715	713.3	20.8	5.0	5:30/1.0 7:30/1.0 7:00/1.0 8:00/1.0 10:00/1.0	(5.0) 100%	(4.9) 98%						
710	708.3	25.8	4.6	11:00/1.0 10:00/1.0 10:15/1.0 15:30/1.0 20:45/0.6	(4.6) 100%	(4.5) 98%	RS-8					
705	703.7	30.4									703.7	30.4
											Boring Terminated at Elevation 703.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK) Notes: Surficial Organics Soils from 0.0 to 0.3 ft.	

Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Tributary to Deep River

ECS Southeast Project No. 08:12612

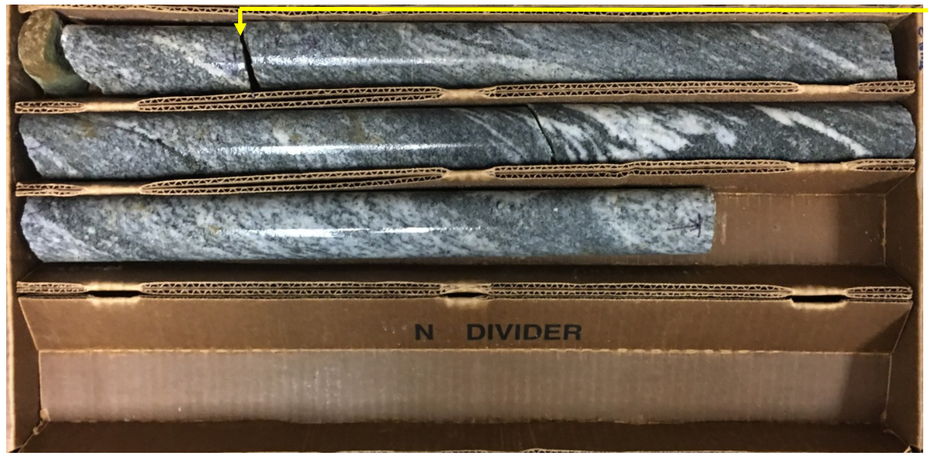
WBS: 34802.1.1 Tip No. : U-2412A

Rock Core Photographs: Boring - B5-B (RL)

Station: 95+17 Offset: 55' RT

Begin Run 1
5.4'

Begin Run 2
5.8'

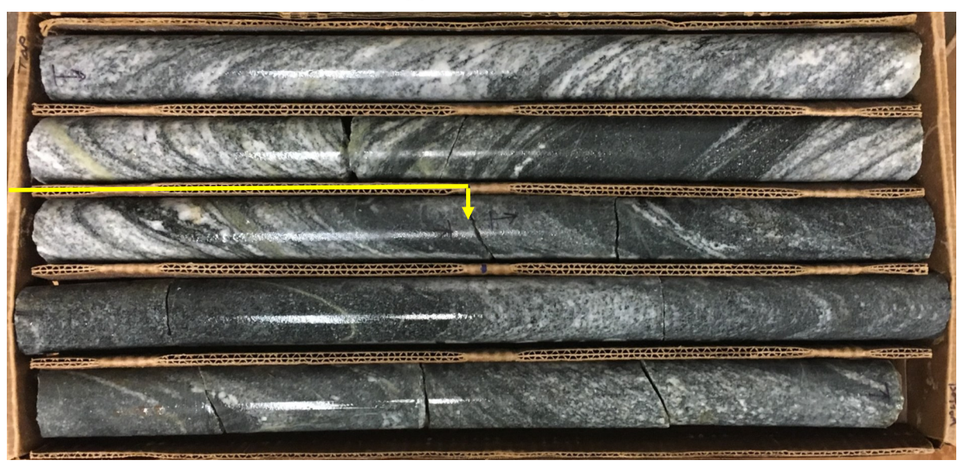


0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 3
10.8'

Begin Run 4
15.8'

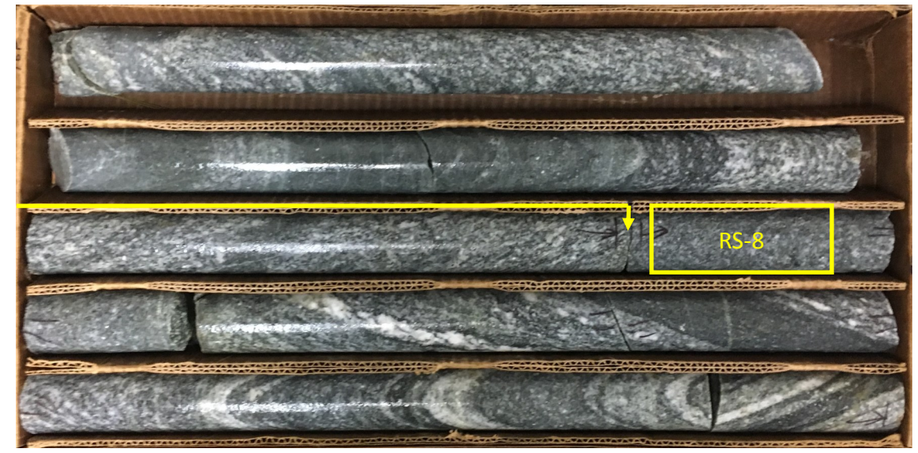


0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

Begin Run 5
20.8'

Begin Run 6
25.8'



End Run 6
30.4'

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB2-A (RL)	**STATION** 96+46	**OFFSET** 19 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 752.3 ft	**TOTAL DEPTH** 13.6 ft	**NORTHING** 814,591	**EASTING** 1,720,187 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
755										
	752.3	0.0								752.3 GROUND SURFACE 0.0
750			1	1	1	2		M		**RESIDUAL** Soft to Hard, Red-Brown-Tan, Fine to Coarse Sandy SILT (A-4)
	748.8	3.5	19	23	27	50		M		
	746.3	6.0	10	26	36	62		M		
745	743.8	8.5	100/0.3			100/0.3				743.8 8.5 **WEATHERED ROCK** Tan-Brown (METAMORPHOSED GRANITIC ROCK)
740	738.8	13.5	60/0.1			60/0.1				738.8 13.5 / 738.7 13.6 **CRYSTALLINE ROCK** Tan-Brown (METAMORPHOSED GRANITIC ROCK)

Boring Terminated with Standard Penetration Test Refusal at Elevation 738.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB2-B (RL)	**STATION** 96+27	**OFFSET** 55 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 751.0 ft	**TOTAL DEPTH** 14.1 ft	**NORTHING** 814,554	**EASTING** 1,720,169 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 01/21/18	**COMP. DATE** 01/21/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	751.0	0.0								751.0 GROUND SURFACE 0.0
750			1	1	2	3		M		**RESIDUAL** Soft, Tan-Brown, Fine to Coarse Sandy CLAY (A-6)
	747.5	3.5	9	15	22	37		M		748.0 3.0 Hard, Red-Tan-Brown, Fine to Coarse Sandy SILT (A-4)
745	745.0	6.0	30	60	40/0.4					744.5 6.5 **WEATHERED ROCK** Tan-Brown (METAMORPHOSED GRANITIC ROCK)
	742.5	8.5	24	76/0.3		100/0.9 100/0.8				
740	737.5	13.5	88	12/0.1		100/0.6				736.9 14.1

Boring Terminated at Elevation 736.9 ft In Weathered Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.

LAB TEST RESULTS

ROCK TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION -L-	DEPTH INTERVAL	Rock Type	Unit Weight LB/FT^3	Unconfined Compressive Stregth (PSI/KSF)
RS-9	B1-B (LL)	19' LT	91+15	33.1-33.5	Metamorphosed Granitic Rock	191.0	19,780 psi / 2,848 ksf
RS-10	B1-B (RL)	54' RT	90+89	35.4-35.8	Metamorphosed Granitic Rock	175.1	10,810 psi / 1,557 ksf
RS-1	B2-A (LL)	55' LT	92+40	29.0-29.4	Metamorphosed Granitic Rock	170.9	20,850 psi / 3,002 ksf
RS-2	B2-A (RL)	19' RT	92+11	41.3-41.7	Phyllite	166.0	720 psi / 104 ksf
RS-3	B3-B (LL)	14' LT	93+34	32.6-33.0	Metamorphosed Granitic Rock	166.7	4,140 psi / 596 ksf
RS-4	B3-B (RL)	55' RT	93+03	26.2-26.6	Metamorphosed Granitic Rock	175.4	6,130 psi / 883 ksf
RS-5	B4-A (LL)	55' LT	94+63	24.6-25.0	Metamorphosed Granitic Rock	168.3	11,770 psi / 1,695 ksf
RS-6	B4-A (RL)	19' RT	94+27	25.5-25.9	Metamorphosed Granitic Rock	166.6	7,890 psi / 1,136 ksf
RS-7	B5-B (LL)	19' LT	95+57	17.2-17.6	Metamorphosed Granitic Rock	178.5	8,840 psi / 1,273 ksf
RS-8	B5-B (RL)	55' RT	95+17	25.8-26.2	Metamorphosed Granitic Rock	169.4	5,210 psi / 750 ksf

RS = NQ2 Rock Core Barrel Sample (ASTM D-2113)

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	46

SITE PHOTOS

LOOKING DOWN STATION (WEST) FROM BENT 1 (LL) TO END BENT 1 (LL & RL)

LOOKING NORTH ALONG BENT 2 FROM (RL) TO (LL) ALONG SEWER EASEMENT

LOOKING DOWN STATION (WEST) FROM BENT 1 (RL) AT ROCK OUTCROP BELOW EB1-A (RL)

LOOKING SOUTH ALONG BENT 4 FROM (LL) TO (RL) AT DEEP RIVER TRIBUTARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2412A	1	30

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34802.1.1 (U-2412A) F.A. PROJ. STP-4121(1)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO/HIGH POINT RD. FROM PROPOSED US 311 BYPASS TO WEST OF ST 1480

SITE DESCRIPTION STRUCTURES NO. 3 & 4 ON -L- (SR 4121, GREENSBORO/HIGH POINT RD.) OVER DEEP RIVER AT STATION 140+22

CONTENTS

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PERSONNEL

N.D. MOHS

J. HOWARD

MACTEC

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE MAY 2009

NORTH CAROLINA LICENSED SEAL 1912 GEOLOGIST NEIL T. ROBERSON

DocuSigned by: Neil Roberson 4061D9A8C6C649C... 2/19/2018

PROJECT: 34802

ID: U-2412A

DRAWN BY: N.D. MOHS

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PROJECT REFERENCE NO.	SHEET NO.
U-2412A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-55
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 5/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -NQ_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION. AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM-1, 141+80, 20' LT

ELEVATION: 720.79 FT.

NOTES:

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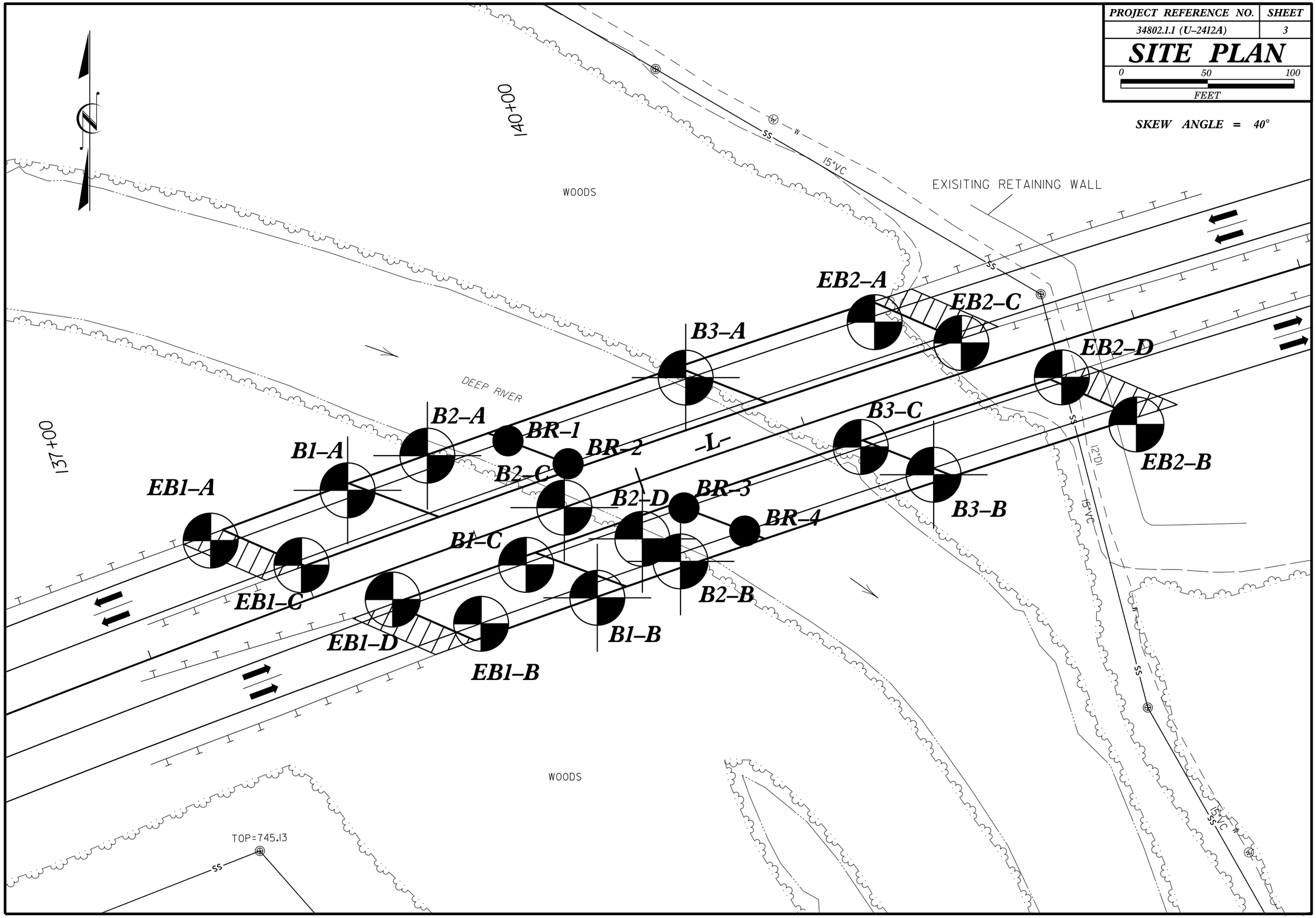
SITE PLAN

0 50 100
FEET

SKEW ANGLE = 40°

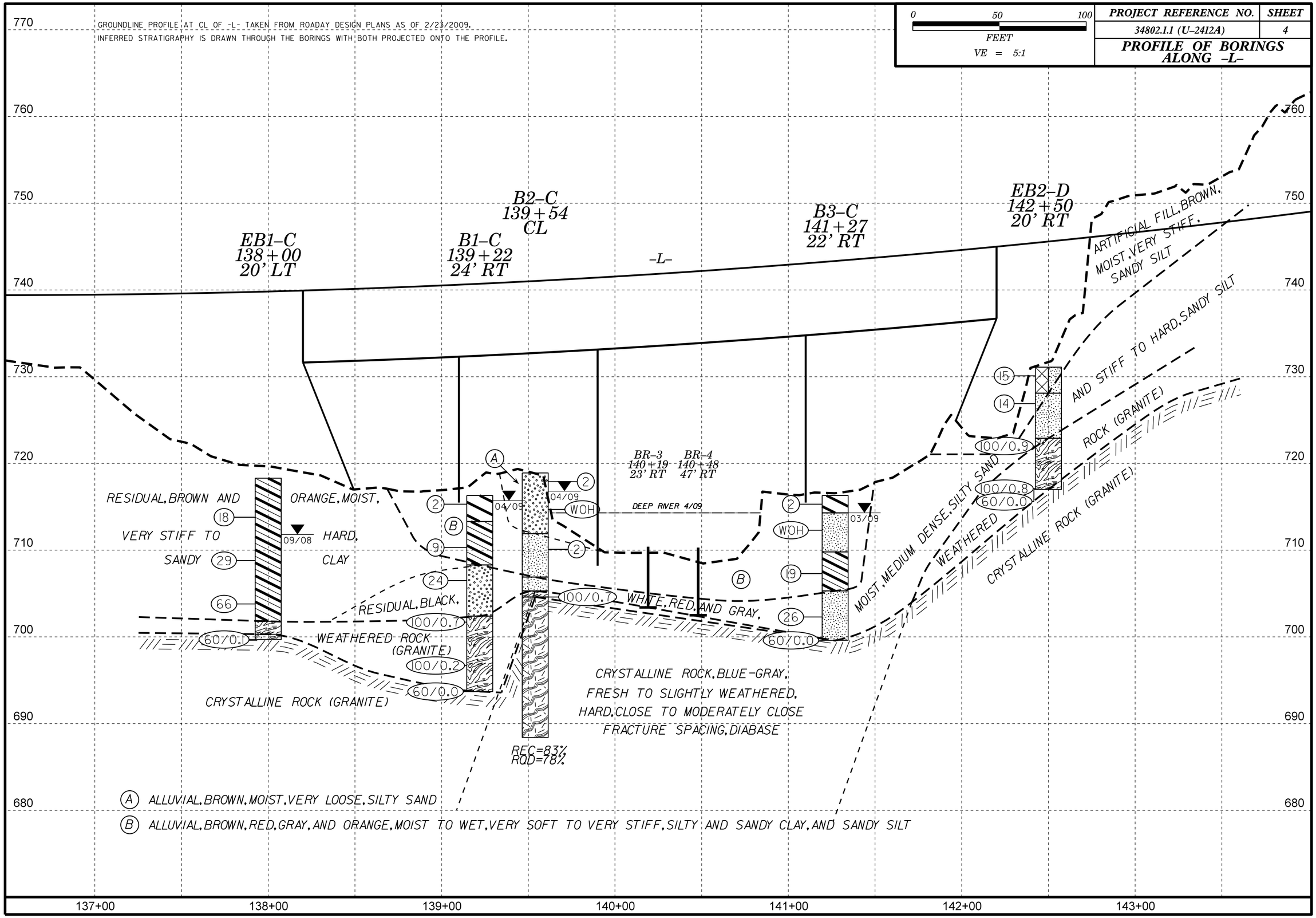


PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	4

PROFILE OF BORINGS ALONG -L-

0 50 100
FEET
VE = 5:1

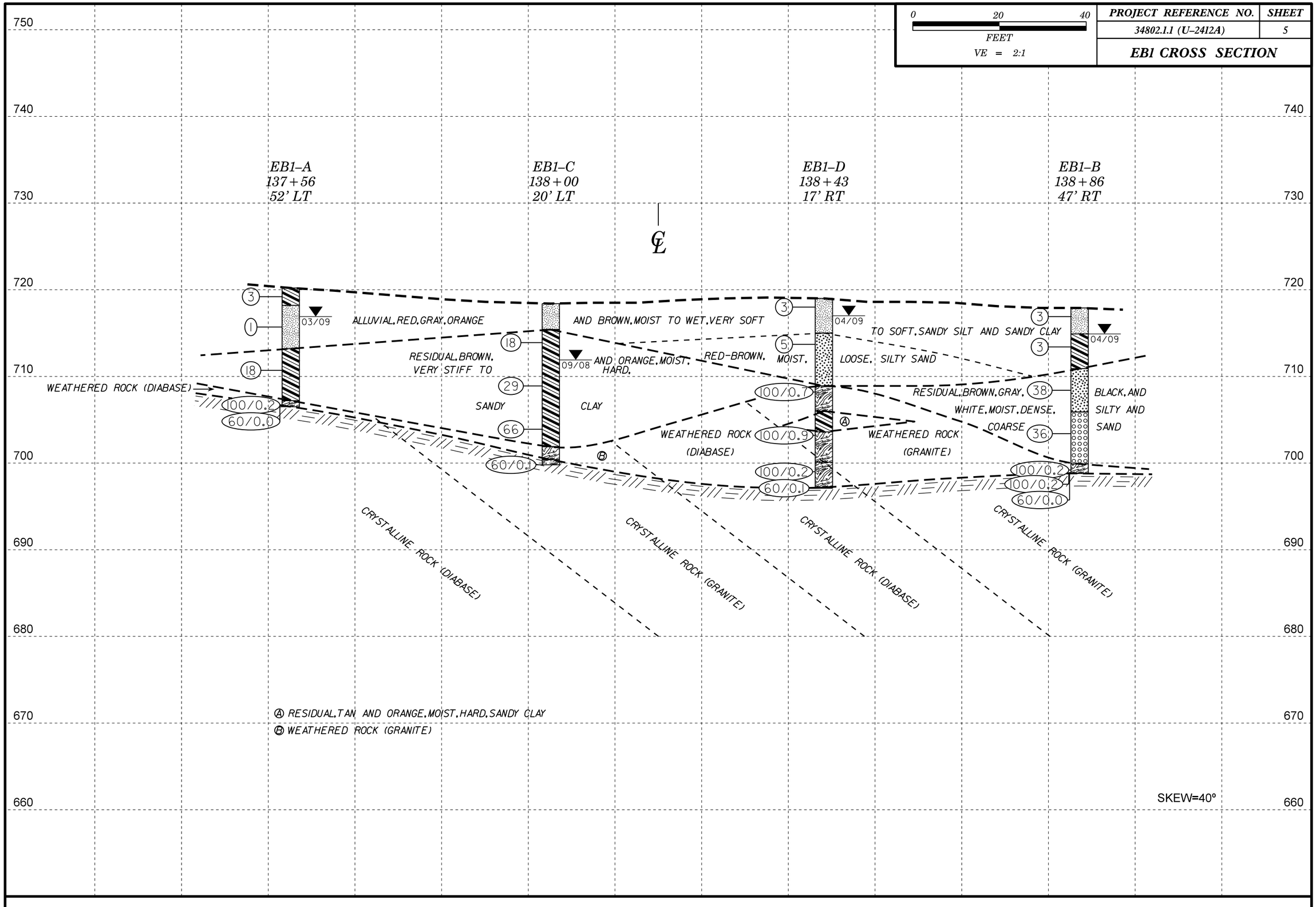
GROUNDLINE PROFILE AT CL OF -L- TAKEN FROM ROADAY DESIGN PLANS AS OF 2/23/2009.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.



PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	5

0 20 40
FEET
VE = 2:1

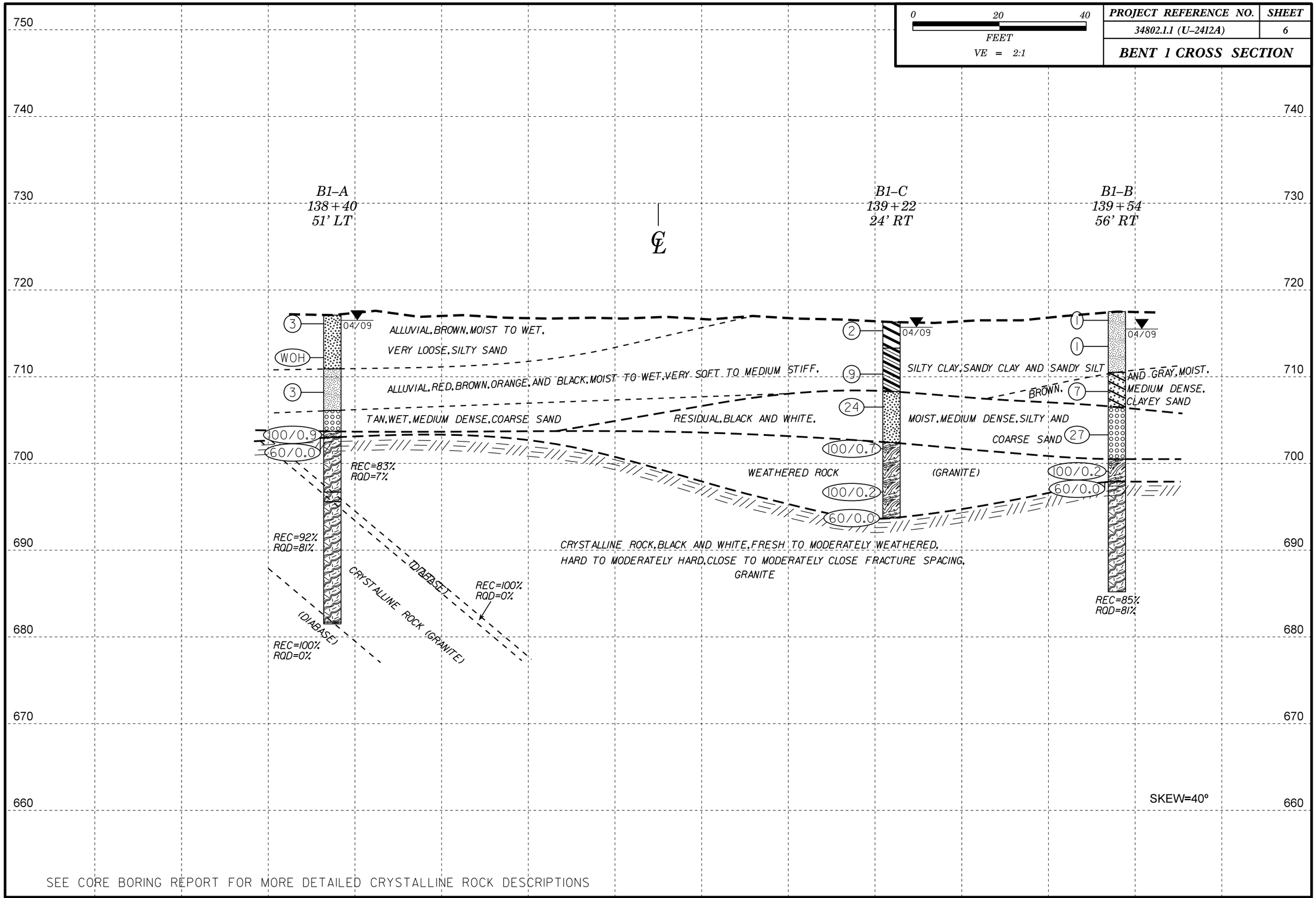
EB1 CROSS SECTION



PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	6

BENT 1 CROSS SECTION

0 20 40
FEET
VE = 2:1

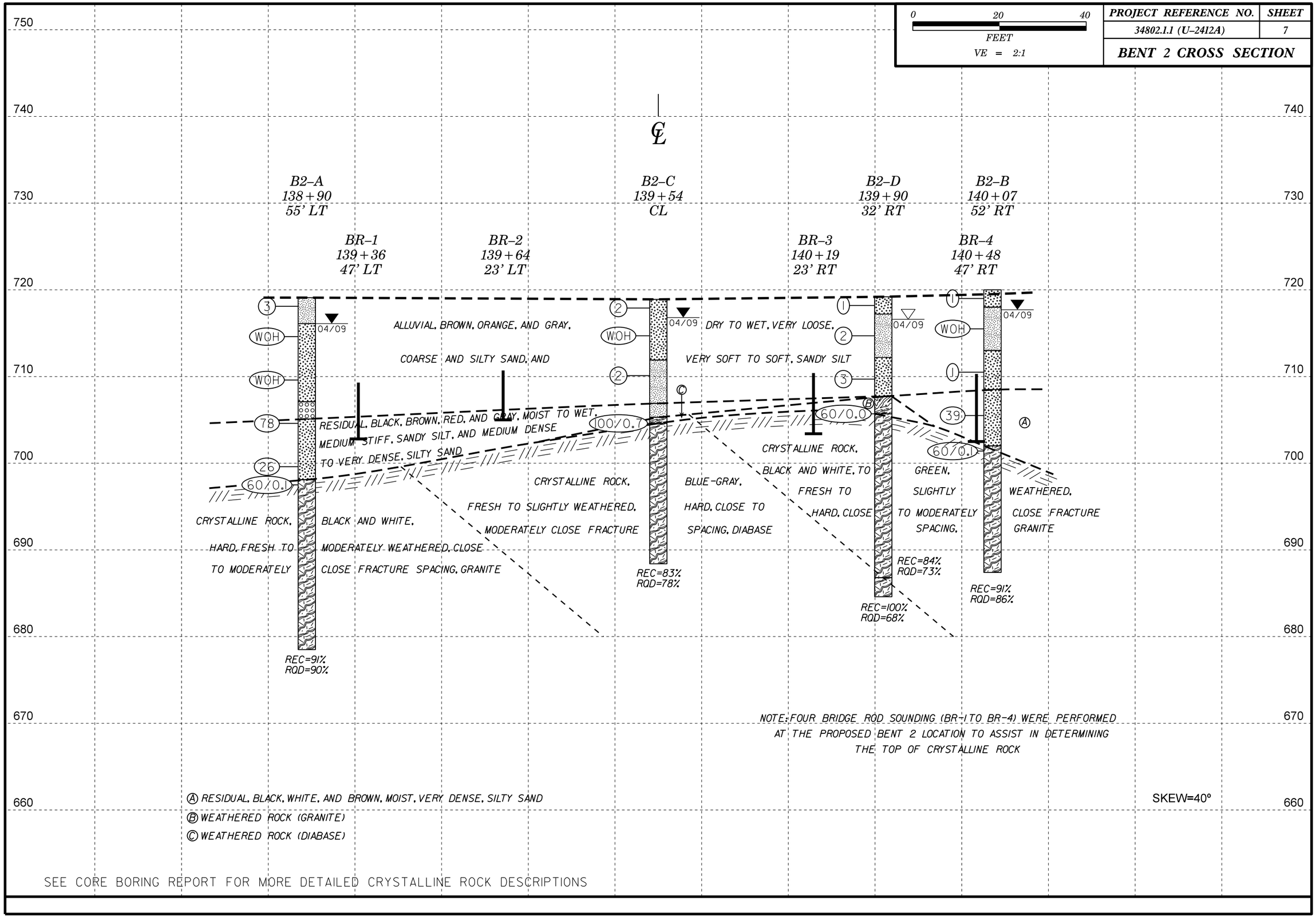


SEE CORE BORING REPORT FOR MORE DETAILED CRYSTALLINE ROCK DESCRIPTIONS

PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	7

BENT 2 CROSS SECTION

0 20 40
FEET
VE = 2:1

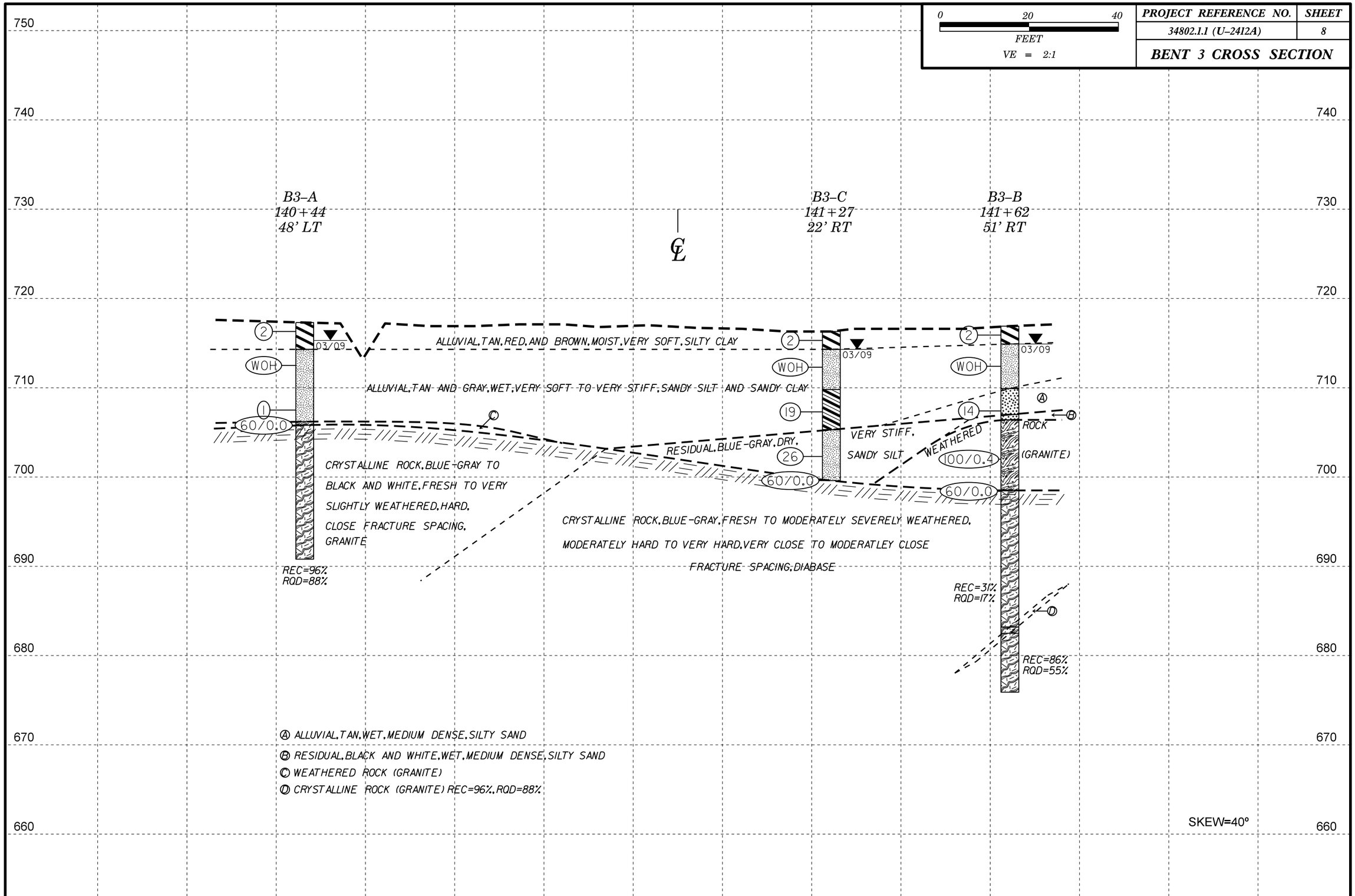


SEE CORE BORING REPORT FOR MORE DETAILED CRYSTALLINE ROCK DESCRIPTIONS

PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	8

BENT 3 CROSS SECTION

0 20 40
FEET
VE = 2:1



SEE CORE BORING REPORT FOR MORE DETAILED CRYSTALLINE ROCK DESCRIPTIONS

PROJECT REFERENCE NO.	SHEET
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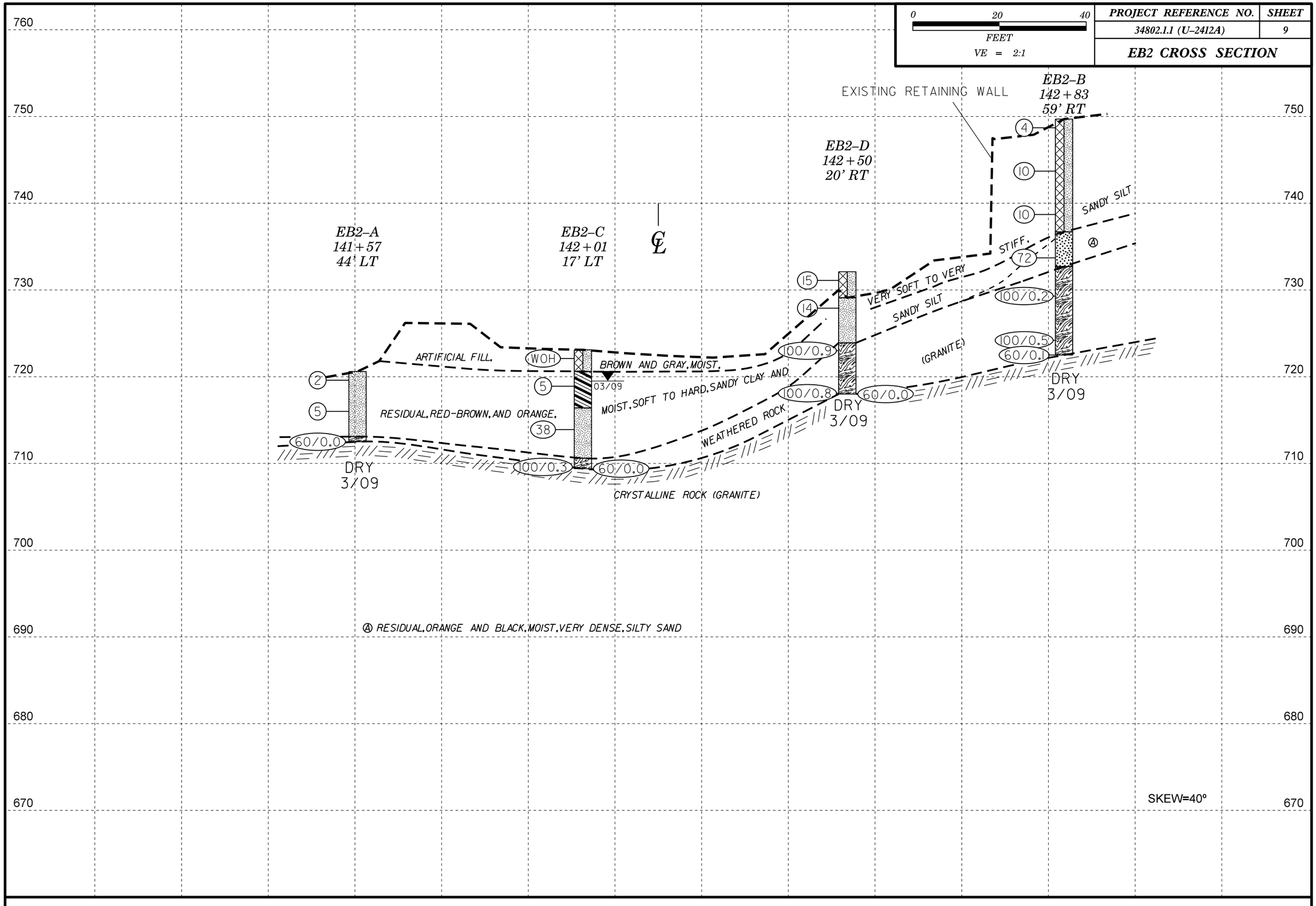
0 20 40
FEET
VE = 2:1

EB2 CROSS SECTION



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.	
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 137+56	**OFFSET** 52 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.1
COLLAR ELEV. 720.2 ft	**TOTAL DEPTH** 13.7 ft	**NORTHING** 815,257	**EASTING** 1,724,189	**24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/30/09	**COMP. DATE** 03/30/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725											
720	720.2	0.0	1	1	2	3	SS-1	M		720.2 GROUND SURFACE	0.0
	716.7	3.5	1	WOH	1	1	SS-2	M		718.2 **ALLUVIAL** Brown, Sandy Clay; Red-Brown, Sandy Silt	2.0
715											
	711.7	8.5	5	8	10	18	SS-3	M		713.2 **RESIDUAL** Brown and Gray, Sandy Clay	7.0
710											
	706.7	13.5	100/0.2			100/0.2				707.2 **WEATHERED ROCK** (Diabase)	13.0
	706.5	13.7	60/0.0			60/0.0				706.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 706.5 ft On Crystalline Rock (Diabase)	13.7

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.	
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 138+86	**OFFSET** 47 ft RT	**ALIGNMENT** -L-	**0 HR.** 2.5
COLLAR ELEV. 718.0 ft	**TOTAL DEPTH** 19.1 ft	**NORTHING** 815,209	**EASTING** 1,724,345	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
720											
	718.0	0.0	WOH	1	2	3	SS-1	M		718.0 GROUND SURFACE	0.0
715	714.5	3.5	WOH	1	2	3	SS-2	W		715.0 **ALLUVIAL** Brown, Sandy Silt; Orange, Gray and Brown, Sandy Clay	3.0
710	709.5	8.5	9	19	19	38	SS-3	M		711.0 **RESIDUAL** Brown and Gray, Silty Sand	7.0
705	704.5	13.5	16	19	17	36	SS-4	M		706.0 Black and White, Coarse Sand and Gravel	12.0
700	699.5	18.5	100/0.2			100/0.2				700.0 **WEATHERED ROCK** (Granite)	18.0
	699.2	18.8	100/0.2			100/0.2					
	698.9	19.1	60/0.0			60/0.0				698.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 698.9 ft On Crystalline Rock (Granite)	19.1

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 138+00	**OFFSET** 20 ft LT	**ALIGNMENT** -L- / **0 HR.** 15.5
COLLAR ELEV. 718.3 ft	**TOTAL DEPTH** 18.6 ft	**NORTHING** 815,243	**EASTING** 1,724,241 / **24 HR.** 6.5
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/04/08	**COMP. DATE** 09/04/08	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
720											
										718.3 GROUND SURFACE	0.0
										ALLUVIAL Brown, Sandy Silt	
715	714.8	3.5								715.3	3.0
			6	8	10	18	SS-16	M		**RESIDUAL** Brown and Orange, Sandy Clay	
710	709.8	8.5									
			7	12	17	29		M			
705	704.8	13.5									
			8	19	47	66		M			
										701.8	16.5
700	699.8	18.5								700.3 **WEATHERED ROCK** (Granite)	18.0
			60/0.1			60/0.1				699.7	18.6
										CRYSTALLINE ROCK (Granite)	
										Boring Terminated with Standard Penetration Test Refusal at Elevation 699.7 ft In Crystalline Rock (Granite)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB1-D	**STATION** 138+43	**OFFSET** 17 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.1
COLLAR ELEV. 719.0 ft	**TOTAL DEPTH** 21.9 ft	**NORTHING** 815,223	**EASTING** 1,724,294 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
720											
	719.0	0.0								719.0 GROUND SURFACE	0.0
			1	1	2	3	SS-1	M		**ALLUVIAL** Brown, Sandy Silt	
715	714.7	4.3								715.0	4.0
			2	2	3	5	SS-2	M		Red-Brown, Silty Sand	
710	709.4	9.6									
			6	9	91/0.2	100/0.7	SS-3	M		708.9	10.1
										WEATHERED ROCK (Granite)	
705	704.6	14.4								706.0	13.0
			8	10	90/0.4	100/0.9	SS-4			704.1 **RESIDUAL** Tan and Orange, Sandy Clay	14.9
										WEATHERED ROCK (Granite)	
700	700.1	18.9								700.1	18.9
			22	38	62/0.2	100/0.7				(Diabase)	
	697.2	21.8	60/0.1			60/0.1				697.2	21.8
										697.1 **CRYSTALLINE ROCK** (Diabase)	21.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 697.1 ft In Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 138+40	**OFFSET** 51 ft LT	**ALIGNMENT** -L- / **0 HR.** 0.8
COLLAR ELEV. 717.1 ft	**TOTAL DEPTH** 35.6 ft	**NORTHING** 815,286	**EASTING** 1,724,268 / **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
720											
	717.1	0.0								717.1 GROUND SURFACE	0.0
			WOH	1	2	3	SS-1	M		**ALLUVIAL** Brown, Silty Sand	
715											
	713.2	3.9									
			WOH	WOH	WOH	0	SS-2	W			
710										710.9	6.2
	709.2	7.9								Red, Brown, and Black, Sandy Silt	
			1	1	2	3	SS-3	W			
										706.1	11.0
705										Tan, Coarse Sand and Gravel	
	704.2	12.9								703.7	13.4
	703.0	14.1	7	93/0.4		100/0.9	SS-4	W		703.0 **WEATHERED ROCK** (Granite)	14.1
			60/0.0			60/0.0	RS-1				
700										**CRYSTALLINE ROCK** Black and White, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, Granite REC=83% RQD=67%	
							RS-2			696.7	20.4
695										695.6 Blue-Gray, Very Slightly to Severely Weathered, Moderately Hard to Soft, Close Fracture Spacing, 2 Fractures at 40°, 3 at 10°, Diabase REC=100% RQD=0%	21.5
690										Black and White, Fresh to Moderately Weathered, Hard to Moderately Hard, Close to Moderately Close Fracture Spacing, 4 Fractures at 80°, Granite REC=92% RQD=81%	
685										681.7	35.4
										681.5 Blue-Gray, Very Slightly Weathered, Moderately Hard, Close Fracture Spacing, Diabase REC=100% RQD=0%	35.6
										Boring Terminated at Elevation 681.5 ft In Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 138+40	**OFFSET** 51 ft LT	**ALIGNMENT** -L- / **0 HR.** 0.8
COLLAR ELEV. 717.1 ft	**TOTAL DEPTH** 35.6 ft	**NORTHING** 815,286	**EASTING** 1,724,268 / **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 21.5 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
703											Begin Coring @ 14.1 ft	
	703.0	14.1	1.5	*N=60/0.0*	(1.5)	(1.3)		(5.2)	(4.2)		703.0 **CRYSTALLINE ROCK** Black and White, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, Granite	14.1
	701.5	15.6		2:30/1.0 :45/0.5	100%	87%	RS-1	83%	67%			
700			5.0	1:15/1.0 1:30/1.0 1:45/1.0	(3.9) 78%	(2.9) 58%						
	696.5	20.6		2:00/1.0 1:00/1.0			RS-2				696.7	20.4
695			5.0	2:30/1.0 1:15/1.0 1:45/1.0 1:30/1.0 1:00/1.0	(4.4) 88%	(3.0) 60%		(1.1) 100%	(0.0) 0%		695.6 Blue-Gray, Very Slightly to Severely Weathered, Moderately Hard to Soft, Close Fracture Spacing, 2 Fractures at 40°, 3 at 10°, Diabase	21.5
								(12.8) 92%	(11.3) 81%		Black and White, Fresh to Moderately Weathered, Hard to Moderately Hard, Close to Moderately Close Fracture Spacing, 4 Fractures at 80°, Granite	
	691.5	25.6										
690			5.0	2:30/1.0 2:00/1.0 2:15/1.0 2:30/1.0 2:00/1.0	(4.8) 96%	(3.8) 76%						
	686.5	30.6										
685			5.0	2:15/1.0 1:45/1.0 1:30/1.0 1:30/1.0 1:30/1.0	(4.8) 96%	(4.5) 90%						
	681.5	35.6									681.7	35.4
								(0.2) 100%	(0.0) 0%		681.5 Blue-Gray, Very Slightly Weathered, Moderately Hard, Close Fracture Spacing, Diabase	35.6
											Boring Terminated at Elevation 681.5 ft In Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 139+54	**OFFSET** 56 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.3
COLLAR ELEV. 717.5 ft	**TOTAL DEPTH** 32.3 ft	**NORTHING** 815,224	**EASTING** 1,724,412 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	717.5	0.0								717.5 — GROUND SURFACE — 0.0
			WOH	WOH	1	1	SS-1	M		**ALLUVIAL** Red-Brown and Orange, Sandy Silt
715	714.5	3.0								
			1	WOH	1	1	SS-2	W		
710										710.5 — 7.0
	709.3	8.2								Brown and Gray, Clayey Sand
			1	3	4	7	SS-3	M		
										706.5 — 11.0
705										**RESIDUAL** Black, White and Brown, Coarse Sand
	704.3	13.2								
			8	10	17	27	SS-4	M		
700										700.5 — 17.0
	699.3	18.2								**WEATHERED ROCK** (Granite)
			100/0.2			100/0.2				
	697.9	19.6	60/0.0			60/0.0	RS-3			697.9 — 19.6
695										**CRYSTALLINE ROCK** Black and White, Fresh to Moderately Weathered, Hard, Close to Moderately Close Fracture Spacing, 1 Fracture at 45º, Granite REC=85% RQD=81%
690							RS-4			
										685.2 — 32.3
										Boring Terminated at Elevation 685.2 ft In Crystalline Rock (Granite)

NCDOT BORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 139+54	**OFFSET** 56 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.3
COLLAR ELEV. 717.5 ft	**TOTAL DEPTH** 32.3 ft	**NORTHING** 815,224	**EASTING** 1,724,412 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 12.7 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
697.9											Begin Coring @ 19.6 ft
	697.9	19.6	2.7	*N=60/0.0* 2:30/1.0 3:00/1.0 :45/0.7	(2.3) 85%	(2.2) 81%	RS-3	(10.8) 85%	(10.3) 81%		697.9 — 19.6 **CRYSTALLINE ROCK** Black and White, Fresh to Moderately Weathered, Hard, Close to Moderately Close Fracture Spacing, 1 Fracture at 45º, Granite
695	695.2	22.3									
			5.0	1:30/1.0 3:00/1.0 2:45/1.0 2:30/1.0 2:15/1.0	(3.6) 72%	(3.6) 72%					
690	690.2	27.3									
			5.0	3:15/1.0 2:30/1.0 2:30/1.0 2:15/1.0 2:00/1.0	(4.9) 98%	(4.5) 90%	RS-4				
	685.2	32.3									685.2 — 32.3
											Boring Terminated at Elevation 685.2 ft In Crystalline Rock (Granite)

NCDOT CORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 139+22	**OFFSET** 24 ft RT	**ALIGNMENT** -L- / **0 HR.** 0.6
COLLAR ELEV. 716.3 ft	**TOTAL DEPTH** 22.6 ft	**NORTHING** 815,243	**EASTING** 1,724,371 / **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	716.3	0.0								716.3 — GROUND SURFACE — 0.0
715			WOH	1	1	2	SS-1	M		**ALLUVIAL** Red, Brown and Orange, Silty Clay
	713.3	3.0								Brown, Sandy Clay
	711.3	5.0								
710			3	4	5	9	SS-2	M		
	708.3	8.0								**RESIDUAL** Black and White, Silty Sand
	707.5	8.8								
			5	13	11	24	SS-3	M		
705										
	702.4	13.9								**WEATHERED ROCK** (Granite)
			48	52/0.2		100/0.7				
700										
	696.9	19.4								
			100/0.2			100/0.2				
695										
	693.7	22.6								693.7 — 22.6
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 693.7 ft On Crystalline Rock (Granite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 138+90	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** 3.0
COLLAR ELEV. 719.1 ft	**TOTAL DEPTH** 40.6 ft	**NORTHING** 815,306	**EASTING** 1,724,314 / **24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/02/09	**COMP. DATE** 04/02/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	719.1	0.0	1	1	2	3	SS-1	W		719.1 / 0.0 GROUND SURFACE
										ALLUVIAL Brown, Sandy Silt
715	715.6	3.5								716.1 / 3.0
			1	WOH	WOH	0	SS-2	W		Brown and Gray, Silty Sand
710	710.6	8.5								
			1	WOH	WOH	0	SS-3	W		
										707.1 / 12.0 Brown, Coarse Sand
705	705.6	13.5								705.1 / 14.0
			1	29	49	78	SS-4	W		**RESIDUAL** Black, Brown and White, Silty Sand
700	700.6	18.5								
			4	7	19	26	SS-5	M		
	697.6	21.5	60/0.1			60/0.1				698.1 / 21.0
695							RS-5			697.5 / 21.6 **CRYSTALLINE ROCK** (Granite) Black and White, Fresh to Moderately Weathered, Hard, Close to Moderately Close Fracture Spacing, 7 Fractures at 10º, 1 at 70º, Granite REC=92% RQD=90%
690							RS-6			
685										
680										678.5 / 40.6
										Boring Terminated at Elevation 678.5 ft In Crystalline Rock (Granite)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 138+90	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** 3.0
COLLAR ELEV. 719.1 ft	**TOTAL DEPTH** 40.6 ft	**NORTHING** 815,306	**EASTING** 1,724,314 / **24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/02/09	**COMP. DATE** 04/02/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 19.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
697.5											Begin Coring @ 21.6 ft
	697.5	21.6	4.0	2:15/1.0 1:30/1.0 1:30/1.0 1:15/1.0	(4.0) 100%	(4.0) 100%	RS-5	(17.5) 92%	(17.1) 90%		697.5 / 21.6 Black and White, Fresh to Moderately Weathered, Hard, Close to Moderately Close Fracture Spacing, 7 Fractures at 10º, 1 at 70º, Granite
695	693.5	25.6									
			5.0	1:45/1.0 1:45/1.0 1:45/1.0 1:00/1.0 :45/1.0	(4.1) 82%	(4.0) 80%					
690	688.5	30.6					RS-6				
			5.0	1:30/1.0 1:45/1.0 1:15/1.0 1:30/1.0 1:15/1.0	(4.4) 88%	(4.1) 82%					
685	683.5	35.6									
			5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:30/1.0 2:00/1.0	(5.0) 100%	(5.0) 100%					
680	678.5	40.6									678.5 / 40.6
											Boring Terminated at Elevation 678.5 ft In Crystalline Rock (Granite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 140+07	**OFFSET** 52 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.1
COLLAR ELEV. 720.0 ft	**TOTAL DEPTH** 32.6 ft	**NORTHING** 815,245	**EASTING** 1,724,460 / **24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/09	**COMP. DATE** 04/06/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										720.0 / 0.0 GROUND SURFACE
	720.0	0.0	1	WOH	1	1	SS-1	M		**ALLUVIAL** 718.0 / 2.0 Brown, Silty Sand
	716.5	3.5								Brown, Sandy Silt
715			1	1	WOH	1	SS-2	M		713.0 / 7.0 Gray, Silty Sand
	711.5	8.5								
710			WOH	WOH	1	1	SS-3	W		708.5 / 11.5 **RESIDUAL** Brown, Black and White, Silty Sand
	706.5	13.5								
705			16	19	20	39	SS-4	M		
	701.5	18.5								702.0 / 18.0
700			60/0.1			60/0.1				701.4 / 18.6 **CRYSTALLINE ROCK** (Diabase) Green to Blue-Gray, Fresh to Very Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 2 Fractures at 45°, 1 at 20°, 1 at 80°, Diabase REC=91% RQD=86%
695										
690										687.4 / 32.6 Boring Terminated at Elevation 687.4 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 140+07	**OFFSET** 52 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.1
COLLAR ELEV. 720.0 ft	**TOTAL DEPTH** 32.6 ft	**NORTHING** 815,245	**EASTING** 1,724,460 / **24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/09	**COMP. DATE** 04/06/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 14.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
701.4											Begin Coring @ 18.6 ft
700	701.4	18.6	4.0	1:15/1.0 2:30/1.0 3:30/1.0 4:15/1.0	(2.8) 70%	(2.2) 55%		(12.8) 91%	(12.0) 86%		701.4 / 18.6 Green to Blue-Gray, Fresh to Very Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 2 Fractures at 45°, 1 at 20°, 1 at 80°, Diabase
	697.4	22.6									
695			5.0	3:45/1.0 2:45/1.0 2:30/1.0 5:00/1.0 6:30/1.0	(5.0) 100%	(5.0) 100%					
	692.4	27.6									
690			5.0	7:30/1.0 3:30/1.0 11:00/1.0 1:45/1.0 1:45/1.0	(5.0) 100%	(4.8) 96%					
	687.4	32.6									687.4 / 32.6 Boring Terminated at Elevation 687.4 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 139+54	**OFFSET** CL	**ALIGNMENT** -L- / **0 HR.** 1.3
COLLAR ELEV. 718.9 ft	**TOTAL DEPTH** 30.5 ft	**NORTHING** 815,276	**EASTING** 1,724,393 / **24 HR.** 2.1
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/09	**COMP. DATE** 04/06/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	718.9	0.0								718.9 — GROUND SURFACE — 0.0
			WOH	1	1	2	SS-1	M		**ALLUVIAL** Brown and Orange, Silty Sand
715	715.7	3.2								
			WOH	1	WOH	1	SS-2	W		
	711.1	7.8								711.9 — 7.0
710			WOH	1	1	2	SS-3	W		Gray, Sandy Silt
										706.9 — 12.0
	705.8	13.1								**RESIDUAL**
705	704.6	14.3	15	24	76/0.2		SS-4	M		705.3 — 13.6 Red and Gray, Sandy Silt
			60/0.0			100/0.7 60/0.0				704.6 — 14.3 **WEATHERED ROCK** (Diabase)
700										**CRYSTALLINE ROCK** Blue-Gray, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 3 Fractures at 40º, Diabase REC=83% RQD=78%
695										
690										688.4 — 30.5
										Boring Terminated at Elevation 688.4 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 139+54	**OFFSET** CL	**ALIGNMENT** -L- / **0 HR.** 1.3
COLLAR ELEV. 718.9 ft	**TOTAL DEPTH** 30.5 ft	**NORTHING** 815,276	**EASTING** 1,724,393 / **24 HR.** 2.1
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/06/09	**COMP. DATE** 04/06/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 16.2 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
704.6											Begin Coring @ 14.3 ft
	704.6	14.3	1.2	N=60/0.0	(0.8)	(0.3)		(13.5)	(12.7)		704.6 — 14.3 **CRYSTALLINE ROCK**
	703.4	15.5	5.0	2:15/1.0 :15/0.2	67%	25%		83%	78%		Blue-Gray, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 3 Fractures at 40º, Diabase
700				2:45/1.0 1:00/1.0 2:00/1.0 2:15/1.0 2:00/1.0	(4.3) 86%	(4.1) 82%					
	698.4	20.5	5.0	2:00/1.0 1:30/1.0 1:15/1.0 1:30/1.0 1:30/1.0	(5.0) 100%	(5.0) 100%					
695											
	693.4	25.5	5.0	1:00/1.0 1:30/1.0 1:00/1.0 1:00/1.0 1:15/1.0	(3.4) 68%	(3.3) 66%					
690											
	688.4	30.5									688.4 — 30.5
											Boring Terminated at Elevation 688.4 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 139+90	**OFFSET** 32 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.6
COLLAR ELEV. 719.2 ft	**TOTAL DEPTH** 34.6 ft	**NORTHING** 815,258	**EASTING** 1,724,438 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/08/09	**COMP. DATE** 04/08/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	719.2	0.0								719.2 GROUND SURFACE 0.0
			1	WOH	1	1.	SS-1	D		**ALLUVIAL**
										717.2 Red-Brown, Silty Sand 2.0
715	715.7	3.5								Red-Brown, Sandy Silt
			1	1	1	2	SS-2	W		
										712.2 Gray, Silty Sand 7.0
710	710.7	8.5								
			1	WOH	3	3	SS-3	W		
										707.7 **WEATHERED ROCK** (Granite) 11.5
705	705.7	13.5	60/0.0			60/0.0				705.7 **CRYSTALLINE ROCK** 13.5
							RS-7			Black and White, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 2 Fractures at 80º, Granite REC=75% RQD=64%
700										
										697.6 Blue-Gray, Fresh to Slightly Weathered, Hard, Close Fracture Spacing, Diabase REC=92% RQD=78% 21.6
695							RS-8			
690										
685										684.6 Boring Terminated at Elevation 684.6 ft In Crystalline Rock (Diabase) 34.6

NCDOT BORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 139+90	**OFFSET** 32 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.6
COLLAR ELEV. 719.2 ft	**TOTAL DEPTH** 34.6 ft	**NORTHING** 815,258	**EASTING** 1,724,438 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/08/09	**COMP. DATE** 04/08/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 21.1 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
705.7											Begin Coring @ 13.5 ft
705	705.7	13.5	1.1	N=60/0.0	(0.2)	(0.0)		(6.1)	(5.2)		705.7 **CRYSTALLINE ROCK** 13.5
	704.6	14.6	5.0	1:00/1.1	18%	0%		75%	64%		Black and White, Fresh to Slightly Weathered, Hard, Close to Moderately Close Fracture Spacing, 2 Fractures at 80º, Granite
				:30/1.0							
				1:30/1.0	(3.9)	(3.2)	RS-7				
				2:00/1.0	78%	64%					
				2:15/1.0							
700	699.6	19.6		2:30/1.0							
			5.0	3:45/1.0	(4.6)	(4.5)					697.6 21.6
				3:00/1.0	92%	90%					
				3:15/1.0				(11.9)	(10.1)		Blue-Gray, Fresh to Slightly Weathered, Hard, Close Fracture Spacing, Diabase
				3:15/1.0				92%	78%		
695	694.6	24.6		3:30/1.0			RS-8				
			5.0	2:15/1.0	(4.8)	(3.8)					
				3:15/1.0	96%	76%					
				1:45/1.0							
				1:30/1.0							
690	689.6	29.6		2:15/1.0							
			5.0	2:45/1.0	(5.0)	(4.3)					
				2:45/1.0	100%	86%					
				3:45/1.0							
				4:00/1.0							
685	684.6	34.6		4:30/1.0							684.6 34.6
											Boring Terminated at Elevation 684.6 ft In Crystalline Rock (Diabase)

NCDOT CORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 140+44	**OFFSET** 48 ft LT	**ALIGNMENT** -L- / **0 HR.** 2.3
COLLAR ELEV. 717.3 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 815,351	**EASTING** 1,724,463 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	717.3	0.0								717.3 GROUND SURFACE 0.0
			WOH	1	1	2	SS-1	M		**ALLUVIAL** Brown, Silty Clay
715										714.3 3.0
	713.5	3.8	WOH	WOH	WOH	0	SS-2	W		Gray, Sandy Silt
710										
	708.5	8.8	WOH	WOH	1	1	SS-3	W		
	705.8	11.5	60/0.0			60/0.0				706.2 11.1
705							RS-9			705.8 11.5 **WEATHERED ROCK** (Granite)
700							RS-10			**CRYSTALLINE ROCK** Blue-Gray to Black and White, Fresh to Very Slightly Weathered, Hard, Close Fracture Spacing, Granite REC=96% RQD=88%
695										690.8 26.5
										Boring Terminated at Elevation 690.8 ft In Crystalline Rock (Granite)

NCDOT BORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 140+44	**OFFSET** 48 ft LT	**ALIGNMENT** -L- / **0 HR.** 2.3
COLLAR ELEV. 717.3 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 815,351	**EASTING** 1,724,463 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 15.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
705.8											Begin Coring @ 11.5 ft
705	705.8	11.5	5.0	*N=60/0.0* 2:30/1.0 2:45/1.0 2:45/1.0 2:45/1.0 4:00/1.0	(5.0) 100%	(4.3) 86%	RS-9	(14.4) 96%	(13.2) 88%		705.8 **CRYSTALLINE ROCK** Blue-Gray to Black and White, Fresh to Very Slightly Weathered, Hard, Close Fracture Spacing, Granite 11.5
	700.8	16.5	5.0	2:15/1.0 1:30/1.0 1:30/1.0 1:30/1.0 1:30/1.0	(4.4) 88%	(4.4) 88%	RS-10				
700											
	695.8	21.5	5.0	1:45/1.0 1:45/1.0 1:45/1.0 1:45/1.0 1:30/1.0	(5.0) 100%	(4.5) 90%					
695											
	690.8	26.5									690.8 26.5
											Boring Terminated at Elevation 690.8 ft In Crystalline Rock (Granite)

NCDOT CORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 141+62	**OFFSET** 51 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.0
COLLAR ELEV. 716.9 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 815,295	**EASTING** 1,724,606 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	716.9	0.0								716.9 GROUND SURFACE 0.0
715			1	1	1	2	SS-1	M		**ALLUVIAL** Brown, Silty Clay 714.9 2.0
	713.4	3.5	WOH	WOH	WOH	0	SS-2	W		Tan and Gray, Sandy Silt
710										709.9 7.0
	708.4	8.5	13	6	8	14	SS-3	W		Tan, Silty Sand 707.0 9.9
705										706.4 10.5 **RESIDUAL** Black and White, Silty Sand
	703.4	13.5	18	37	63/0.4	100/0.4				**WEATHERED ROCK** (Granite)
700										
	698.4	18.5	60/0.0			60/0.0				698.5 18.4 **CRYSTALLINE ROCK** Blue-Gray, Fresh to Weathered, Hard to Very Hard, Close Fracture Spacing, Diabase REC=31% RQD=17%
695										
690										
685										683.2 33.7
										682.5 34.4 Black and White, Slightly Weathered, Hard, Close Fracture Spacing, Granite REC=100% RQD=71%
680										Blue-Gray, Fresh to Moderately Severe Weathering, Moderately Hard to Hard, Very Close to Moderately Close Fracture Spacing, Diabase REC=86% RQD=55% 675.9 41.0
										Boring Terminated at Elevation 675.9 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 141+62	**OFFSET** 51 ft RT	**ALIGNMENT** -L- / **0 HR.** 2.0
COLLAR ELEV. 716.9 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 815,295	**EASTING** 1,724,606 / **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 22.6 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
698.5											Begin Coring @ 18.4 ft
	698.5	18.4	2.6	4:15/1.0 N=60/0.0 3:15/1.0	(2.6) 100%	(0.4) 15%		(4.8) 31%	(2.6) 17%		698.5 **CRYSTALLINE ROCK** 18.4 Blue-Gray, Fresh to Weathered, Hard to Very Hard, Close Fracture Spacing, Diabase
695	695.9	21.0	5.0	2:00/0.6 3:45/1.0 2:00/1.0 3:00/1.0 3:00/1.0 2:30/1.0	(4.6) 92%	(2.4) 48%					
690	690.9	26.0	5.0	2:15/1.0 2:15/1.0 2:000/1.0 1:30/1.0 1:45/1.0	(5.0) 100%	(5.0) 100%					
685	685.9	31.0	5.0	2:30/1.0 3:00/1.0 3:40/1.0 2:30/1.0 4:00/1.0	(4.5) 90%	(2.3) 46%					683.2 33.7
								(0.7) 100%	(0.5) 71%		682.5 34.4 Black and White, Slightly Weathered, Hard, Close Fracture Spacing, Granite
680	680.9	36.0	5.0	3:00/1.0 2:15/1.0 2:30/1.0 2:30/1.0 2:45/1.0	(4.7) 94%	(3.0) 60%		(5.7) 86%	(3.6) 55%		Blue-Gray, Fresh to Moderately Severe Weathering, Moderately Hard to Hard, Very Close to Moderately Close Fracture Spacing, Diabase
	675.9	41.0									675.9 41.0
											Boring Terminated at Elevation 675.9 ft In Crystalline Rock (Diabase)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. B3-C	**STATION** 141+27	**OFFSET** 22 ft RT	**ALIGNMENT** -L-	**0 HR.** 2.0
COLLAR ELEV. 716.3 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 815,311	**EASTING** 1,724,564	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/25/09	**COMP. DATE** 03/25/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)		DEPTH (ft)
720												
	716.3	0.0								716.3	GROUND SURFACE	0.0
715			WOH	1	1	2	SS-1	M		714.3	**ALLUVIAL** Tan and Red, Silty Clay	2.0
	713.3	3.0	1	WOH	WOH	0	SS-2	W			Tan and Gray, Sandy Silt	
710										709.8		6.5
	708.3	8.0	34	13	6	19	SS-3	W			Tan and Gray, Sandy Clay	
705										705.3		11.0
	703.3	13.0	7	11	15	26	SS-4	D			**RESIDUAL** Blue-Gray, Sandy Silt	
700	699.6	16.7	60/0.0			60/0.0				699.6		16.7
											Boring Terminated with Standard Penetration Test Refusal at Elevation 699.6 ft On Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 141+57	**OFFSET** 44 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 720.6 ft	**TOTAL DEPTH** 8.1 ft	**NORTHING** 815,383	**EASTING** 1,724,572
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/26/09	**COMP. DATE** 03/26/09	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. Dry; 24 HR. Dry

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
725										
720	720.6	0.0	WOH	1	1	2	SS-1	M		720.6 GROUND SURFACE 0.0
										RESIDUAL Red-Brown, Sandy Silt
	717.0	3.6	2	3	2	5	SS-2	M		
715										713.1 7.5
	712.5	8.1	60/0.0			60/0.0				712.5 8.1 **WEATHERED ROCK** (Granite)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 712.5 ft On Crystalline Rock (Granite)

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 142+83	**OFFSET** 59 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 27.2 ft	**NORTHING** 815,324	**EASTING** 1,724,723
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/09	**COMP. DATE** 03/23/09	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. Dry; 24 HR. Dry

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	749.7	0.0	1	2	2	4	SS-1	D		749.7 GROUND SURFACE 0.0
										ARTIFICIAL FILL Orange, Brown and Gray, Sandy Silt
745	744.7	5.0	4	4	6	10	SS-2	M		
740	739.7	10.0	2	6	4	10	SS-3	M		736.7 13.0
										RESIDUAL Orange and Black, Silty Sand
735	734.7	15.0	9	31	41	72	SS-4	M		732.7 17.0
										WEATHERED ROCK (Granite)
730	729.5	20.2	100/0.2			100/0.2				
725	724.7	25.0	100/0.5			100/0.5				
	722.5	27.2	60/0.0			60/0.0				722.5 27.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 722.5 ft On Crystalline Rock (Granite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Howard, J.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 142+01	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 723.1 ft	**TOTAL DEPTH** 13.7 ft	**NORTHING** 815,371	**EASTING** 1,724,622	**24 HR.** 3.6
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/26/09	**COMP. DATE** 03/26/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725											
	723.1	0.0								723.1 GROUND SURFACE	0.0
			1	1	WOH	1	SS-1	W		**ARTIFICIAL FILL** Red, Tan and Gray, Sandy Silt	
720	719.9	3.2								720.6	2.5
			WOH	2	3	5	SS-2	M		**RESIDUAL** Red-Brown and Orange, Sandy Clay	
										716.4	6.7
715	714.9	8.2								Red-Orange, Sandy Silt	
			9	18	20	38	SS-3	M			
710	710.6	12.5									
	709.9	13.2								**WEATHERED ROCK** (Granite)	
	709.4	13.7	100/0.3			100/0.3				709.4	13.7
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 709.4 ft On Crystalline Rock (Granite)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Structures No. 3 & 4 on -L- (Greensboro/High Point Rd.) over Deep River at Sta. 140+22			**GROUND WTR (ft)**
BORING NO. EB2-D	**STATION** 142+50	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 731.1 ft	**TOTAL DEPTH** 14.1 ft	**NORTHING** 815,351	**EASTING** 1,724,680	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-45C		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/24/08	**COMP. DATE** 09/24/08	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
735											
	731.1	0.0								731.1 GROUND SURFACE	0.0
730			4	5	10	15	SS-168	M		**ARTIFICIAL FILL** Brown, Sandy Silt	
	727.9	3.2								728.1	3.0
			7	8	6	14	SS-169	M		**RESIDUAL** Brown, Sandy Silt	
725											
	722.9	8.2								722.9	8.2
			54	46/0.4		100/0.9				**WEATHERED ROCK** (Granite)	
720											
	717.9	13.2									
	717.0	14.1	30	70/0.3		100/0.8				717.0	14.1
			60/0.0			60/0.8				Boring Terminated with Standard Penetration Test Refusal at Elevation 717.0 ft On Crystalline Rock (Granite)	

EB1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	52 LT	137+56	0.0-1.5	A-6(5)	37	12	23.0	23.0	29.7	24.2	94	79	56	-	-
SS-2	52 LT	137+56	3.5-5.0	A-4(2)	24	8	21.0	26.1	30.7	22.2	94	80	56	-	-
SS-3	52 LT	137+56	8.5-10.0	A-6(3)	30	15	21.0	38.4	14.3	26.3	100	88	47	-	-

EB1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	47 RT	138+86	0.0-1.5	A-4(4)	34	9	27.1	15.8	32.9	24.2	97	78	59	-	-
SS-2	47 RT	138+86	3.5-5.0	A-6(3)	31	12	13.5	42.2	18.0	26.3	100	95	52	-	-
SS-3	47 RT	138+86	8.5-10.0	A-2-4(0)	29	10	48.7	23.2	9.9	18.2	79	50	25	-	-
SS-4	47 RT	138+86	13.5-15.0	A-1-a(0)	24	2	48.3	24.6	19.0	8.1	43	27	14	-	-

EB1-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-16	20 LT	138+00	3.5-5.0	A-6(5)	33	13	18.2	25.1	28.3	28.4	94	83	58	-	-

EB1-D

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	17 RT	138+43	0.0-1.5	A-4(0)	28	5	38.2	29.1	18.6	14.1	96	75	36	-	-
SS-2	17 RT	138+43	4.3-5.8	A-2-4(0)	18	NP	31.7	41.0	17.2	10.1	100	85	33	-	-
SS-3	17 RT	138+43	9.6-10.6	A-2-4(0)	23	NP	63.6	22.9	5.4	8.1	97	57	15	-	-
SS-4	17 RT	138+43	14.4-15.4	A-6(6)	40	12	18.4	26.3	39.2	16.2	100	91	61	-	-

B1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	51 LT	138+40	0.0-1.5	Material	Not	Enoug	26.4	24.8	32.5	16.3	97	75	55	-	-
SS-2	51 LT	138+40	3.9-5.4	A-2-4(0)	19	NP	38.4	39.2	12.2	10.2	100	78	27	-	-
SS-3	51 LT	138+40	7.9-9.4	A-4(2)	30	8	4.9	49.2	23.6	22.4	100	99	57	-	-
SS-4	51 LT	138+40	12.9-13.4	A-1-b(0)	21	NP	56.9	25.8	9.1	8.1	57	32	12	-	-

B1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	56 RT	139+54	0.0-1.5	Material	Not	Enoug	8.5	54.9	16.3	20.3	100	98	43	-	-
SS-2	56 RT	139+54	3.0-4.5	A-4(0)	25	7	39.8	23.6	18.3	18.3	100	78	40	-	-
SS-3	56 RT	139+54	8.2-9.7	A-2-6(0)	29	11	36.8	32.3	8.5	22.4	92	71	32	-	-
SS-4	56 RT	139+54	13.2-14.7	A-1-b(0)	27	2	57.3	25.6	11.0	6.1	85	50	18	-	-

B1-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	24 RT	139+22	0.0-1.5	A-7-6(11)	43	15	10.0	22.4	37.2	30.5	100	94	74	-	-
SS-2	24 RT	139+22	5.0-6.5	A-6(2)	34	12	16.7	44.5	10.4	28.5	100	93	45	-	-
SS-3	24 RT	139+22	8.8-10.3	A-2-4(0)	22	2	36.8	38.8	14.2	10.2	69	54	21	-	-

B2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	55 LT	138+90	0.0-1.5	A-4(0)	28	4	12.8	52.3	20.7	14.2	100	97	42	-	-
SS-2	55 LT	138+90	3.5-5.0	A-2-4(0)	24	2	39.1	30.3	22.5	8.1	100	83	35	-	-
SS-3	55 LT	138+90	8.5-10.0	Material	Not	Enoug	56.2	25.2	14.5	4.1	82	55	18	-	-
SS-4	55 LT	138+90	13.5-14.0	A-1-b(0)	18	2	62.5	21.6	9.9	6.1	70	35	14	-	-
SS-5	55 LT	138+90	18.5-20.0	A-2-4(0)	28	NP	13.4	59.8	22.7	4.1	95	89	35	-	-

B2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	52 RT	140+07	0.0-1.5	A-2-4(0)	26	NP	35.4	44.6	11.9	8.1	100	88	24	-	-
SS-2	52 RT	140+07	3.5-5.0	A-4(0)	25	5	31.3	32.1	24.3	12.2	100	84	43	-	-
SS-3	52 RT	140+07	8.5-10.0	A-2-4(0)	21	NP	44.4	41.7	7.8	6.1	100	84	17	-	-
SS-4	52 RT	140+07	13.5-15.0	A-2-4(0)	31	9	39.7	21.0	29.2	10.2	54	37	24	-	-

B2-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	CL	139+54	0.0-1.5	A-2-4(0)	29	5	22.8	46.2	18.8	12.2	96	88	35	-	-
SS-2	CL	139+54	3.2-4.7	A-2-4(0)	23	NP	43.3	33.0	15.6	8.1	100	84	27	-	-
SS-3	CL	139+54	7.8-9.3	A-4(0)	27	6	28.9	37.8	15.0	18.3	100	85	39	-	-
SS-4	CL	139+54	13.1-13.6	A-4(1)	31	3	2.8	36.0	53.0	8.1	92	91	67	-	-

B2-D

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	32 RT	139+90	0.0-1.5	A-2-4(0)	23	NP	36.0	40.9	15.0	8.1	100	82	28	-	-
SS-2	32 RT	139+90	3.5-5.0	A-4(0)	25	3	37.2	29.5	23.1	10.2	100	77	40	-	-
SS-3	32 RT	139+90	8.5-10.0	A-2-4(0)	20	NP	50.3	34.8	8.9	6.1	100	76	18	-	-

B3-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	48 LT	140+44	0.0-1.5	A-7-6(13)	45	17	3.2	28.5	38.0	30.3	100	99	76	-	-
SS-2	48 LT	140+44	3.8-5.3	A-4(6)	30	9	3.2	28.3	40.2	28.3	100	99	77	-	-
SS-3	48 LT	140+44	8.8-10.3	A-4(0)	20	1	22.8	46.9	14.1	16.2	100	93	37	-	-

B3-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	51 RT	141+62	0.0-1.5	A-7-6(12)	42	16	12.9	15.8	41.0	30.3	98	89	74	-	-
SS-2	51 RT	141+62	3.5-5.0	A-4(1)	25	7	12.5	39.2	22.0	26.3	100	95	56	-	-
SS-3	51 RT	141+62	8.5-9.9	A-2-4(0)	28	9	32.3	36.2	11.3	20.2	79	66	28	-	-

B3-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	22 RT	141+27	0.0-1.5	A-7-5(21)	49	19	3.4	8.3	43.8	44.4	100	98	91	-	-
SS-2	22 RT	141+27	3.0-4.5	A-4(0)	26	6	36.8	19.6	25.5	18.2	94	69	45	-	-
SS-3	22 RT	141+27	8.0-9.5	A-6(3)	33	13	19.4	36.8	13.5	30.3	98	91	48	-	-
SS-4	22 RT	141+27	13.0-14.5	A-4(4)	32	5	5.7	23.2	52.9	18.2	98	94	79	-	-

EB2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	44 LT	141+57	0.0-1.5	A-4(0)	24	5	28.5	25.1	26.3	20.2	95	76	50	-	-
SS-2	44 LT	141+57	3.6-5.1	A-4(2)	27	10	27.9	22.2	23.6	26.3	98	80	53	-	-

EB2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	59 RT	142+83	0.0-1.5	A-4(1)	29	8	30.7	25.5	23.6	20.2	96	76	48	-	-
SS-2	59 RT	142+83	5.0-6.5	A-4(2)	30	7	24.0	26.3	29.5	20.2	95	78	54	-	-
SS-3	59 RT	142+83	10.0-11.5	A-4(0)	29	8	37.6	24.2	22.0	16.2	93	67	40	-	-
SS-4	59 RT	142+83	15.0-16.5	A-2-4(0)	19	NP	36.1	39.0	15.9	9.1	100	82	32	-	-

EB2-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	17 LT	142+01	0.0-1.5	A-4(1)	30	5	21.6	26.1	32.1	20.2	99	84	59	-	-
SS-2	17 LT	142+01	3.2-4.7	A-6(5)	29	12	21.0	21.4	27.3	30.3	99	85	62	-	-
SS-3	17 LT	142+01	8.2-9.7	A-4(3)	27	9	22.6	21.8	27.3	28.3	100	85	61	-	-

EB2-D

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-168	20 RT	142+50	0.0-1.5	A-4(2)	28	9	28.1	23.0	24.8	24.0	95	76	51	-	-
SS-169	20 RT	142+50	3.2-4.7	A-4(2)	29	9	29.9	22.0	24.0	24.0	95	74	50	-	-

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	H/D RATIO	UNIT WT lbs/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	Sec. Mod. @ 40% Mpsi
RS-1	51 LT	138+40	14.8-15.4	SAMPLE DAMAGED					
RS-2	51 LT	138+40	19.7-20.3	2.21	182.5	66900	24.6	24.9	6.37
RS-3	56 RT	139+54	19.6-20.3	2.15	184.1	62700	23.1	23.3	8.59
RS-4	56 RT	139+54	28.7-29.3	2.19	168.8	60900	22.4	22.6	7.43
RS-5	55 LT	138+90	22.9-23.5	2.19	184.4	65200	24.0	24.2	8.06
RS-6	55 LT	138+90	29.9-30.5	2.15	182.5	43200	15.9	16.0	6.07
RS-7	32 RT	139+90	15.7-16.3	2.24	166.7	35300	13.0	13.2	4.30
RS-8	32 RT	139+90	22.9-23.6	2.21	178.2	90200	33.2	33.6	7.22
RS-9	48 LT	140+44	12.9-13.4	2.21	178.2	55400	20.4	20.6	6.60
RS-10	48 LT	140+44	16.5-17.0	2.16	182.7	48200	18.3	18.5	6.70

CORE PHOTOGRAPHS

B1-A

BOXES 1 & 2: 14.1 - 35.6 FEET

0 1 2
FEET

B1-B

BOXES 1 & 2: 19.6 - 32.3 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B2-A

BOXES 1 & 2: 21.6 - 40.6 FEET

0 1 2
FEET

B2-B

BOXES 1 & 2: 18.6 - 32.6 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B2-C

BOXES 1 & 2: 14.3 - 30.5 FEET

0 1 2
FEET

B2-D

BOXES 1 & 2: 13.5 - 34.6 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B3-A

BOXES 1 & 2: 11.5 - 26.5 FEET

0 1 2
FEET

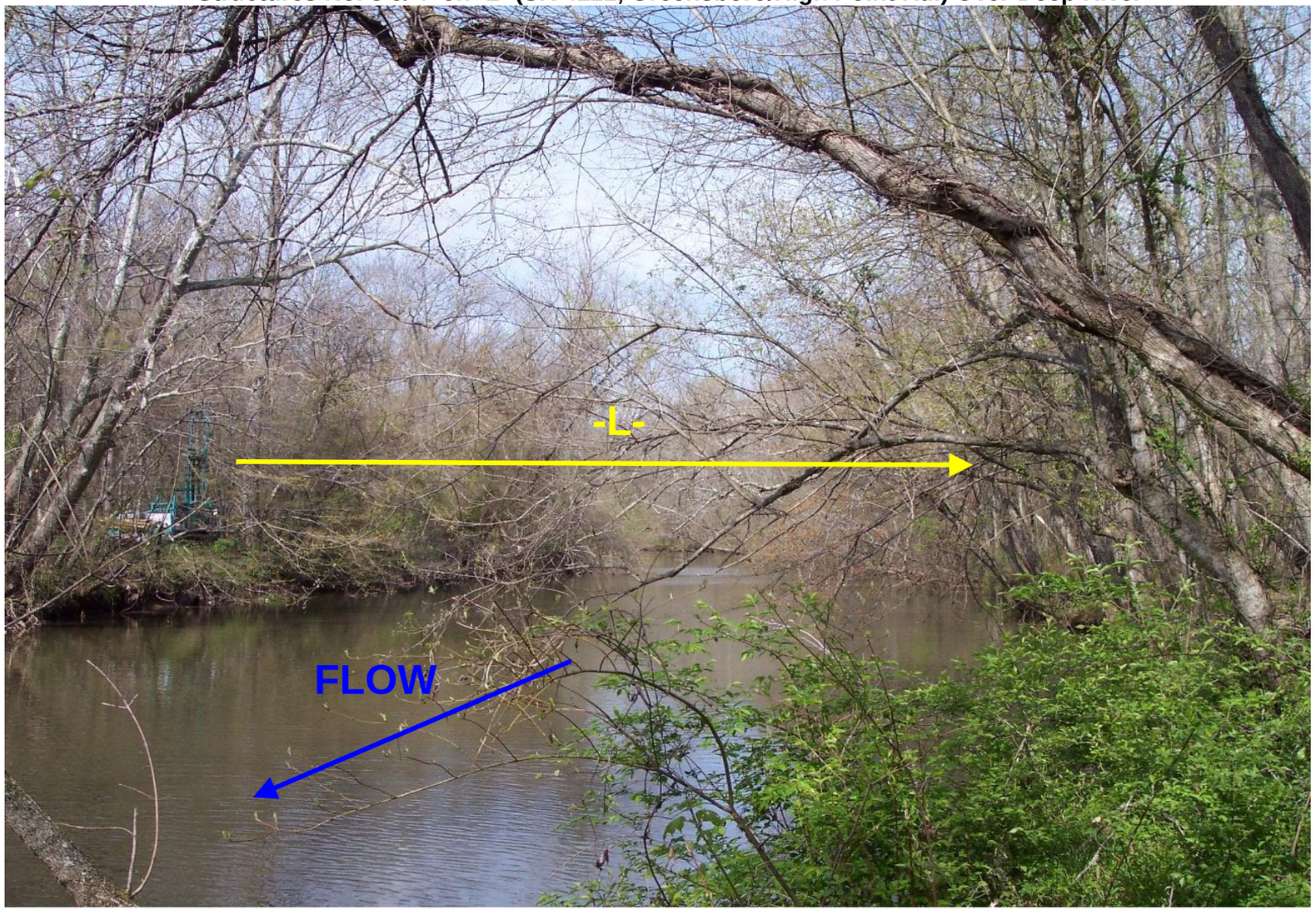
B3-B

BOXES 1, 2 & 3: 18.4 - 41.0 FEET

0 1 2
FEET

Site Photograph

Structures No. 3 & 4 on -L- (SR 4121, Greensboro/High Point Rd.) Over Deep River



Looking North

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34802.1.1 (U-2412A)	1	19

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34802.1.1 (U-2412A) F.A. PROJ. STP-4121(1)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO/HIGH POINT RD. FROM PROPOSED US 311 BYPASS TO WEST OF SR 1480

SITE DESCRIPTION STRUCTURES NO. 5 & 6 ON -L- (SR 4121, GREENSBORO/HIGH POINT RD.) OVER BULL RUN CREEK AT STATION 155+03

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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PERSONNEL

N.D. MOHS

T.T. WALKER

MACTEC

INVESTIGATED BY N.D. MOHS

CHECKED BY C.D. CZAJKA

SUBMITTED BY N.T. ROBERSON

DATE MAY 2009

NORTH CAROLINA LICENSED SEAL 1912 GEOLOGIST NEIL T. ROBERSON

DocuSigned by: Neil Roberson
1D9A8C6C649C...
1/31/2018

PROJECT: 34802.1.1

ID: U-2412A

DRAWN BY: N.D. MOHS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
34802.1.1 (U-2412A)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-55
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [X] TRICONE 2 5/8 " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -NQ_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION. AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-175, 150+62.58, 752.80 FEET
BL-177, 156+88.80, 759.66 FEET

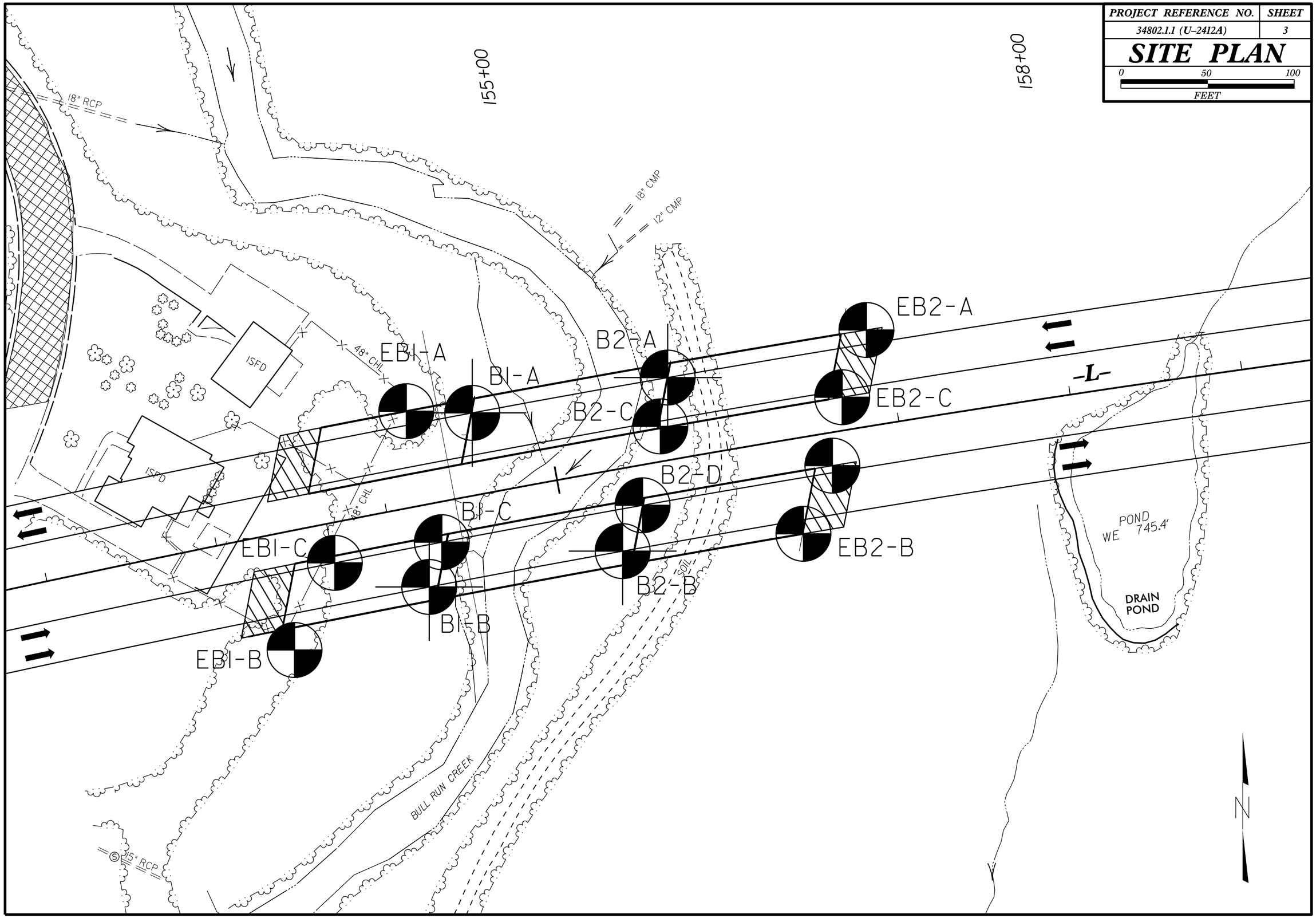
NOTES:

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	3

SITE PLAN

0 50 100
FEET

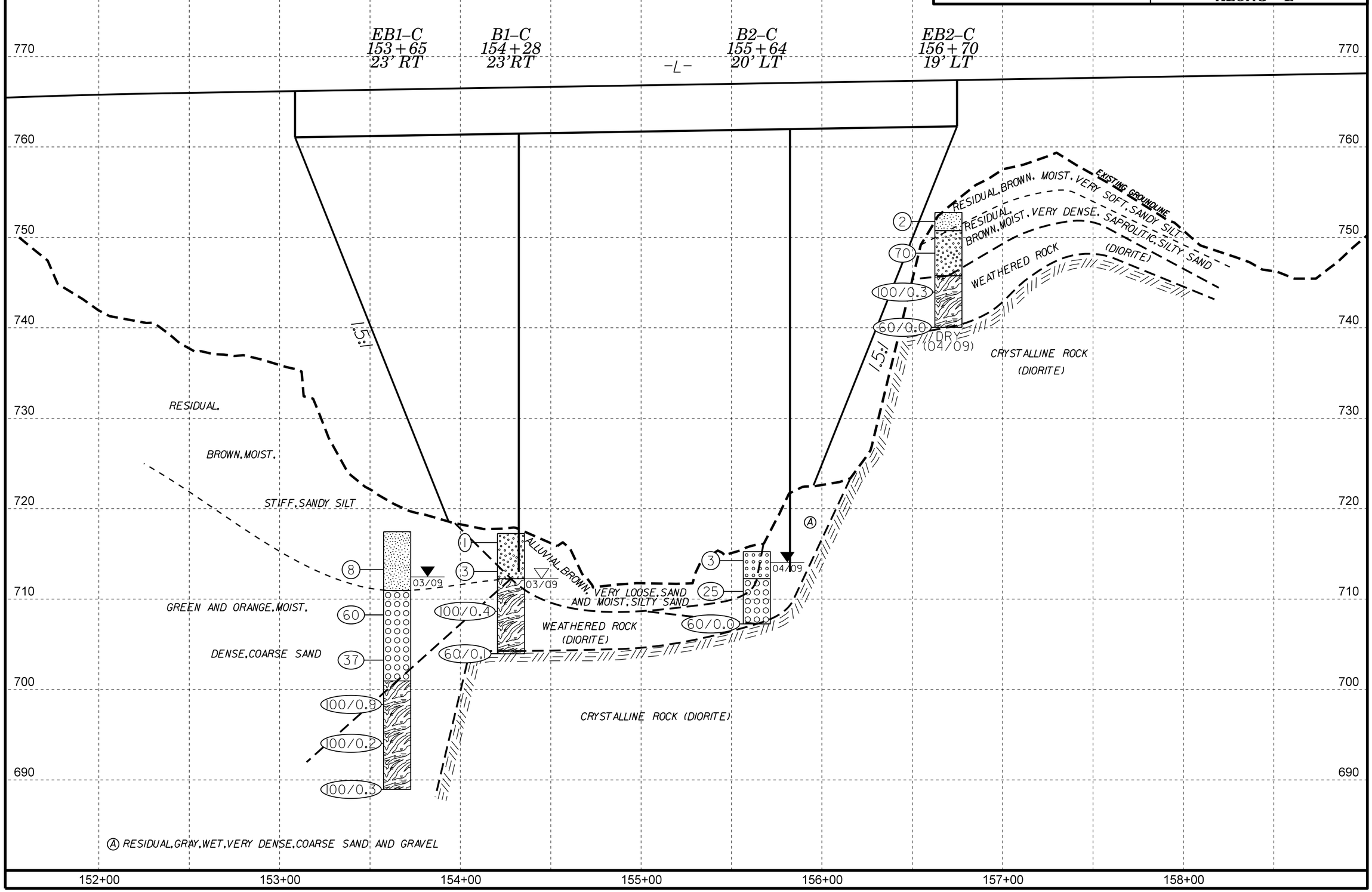


PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	4

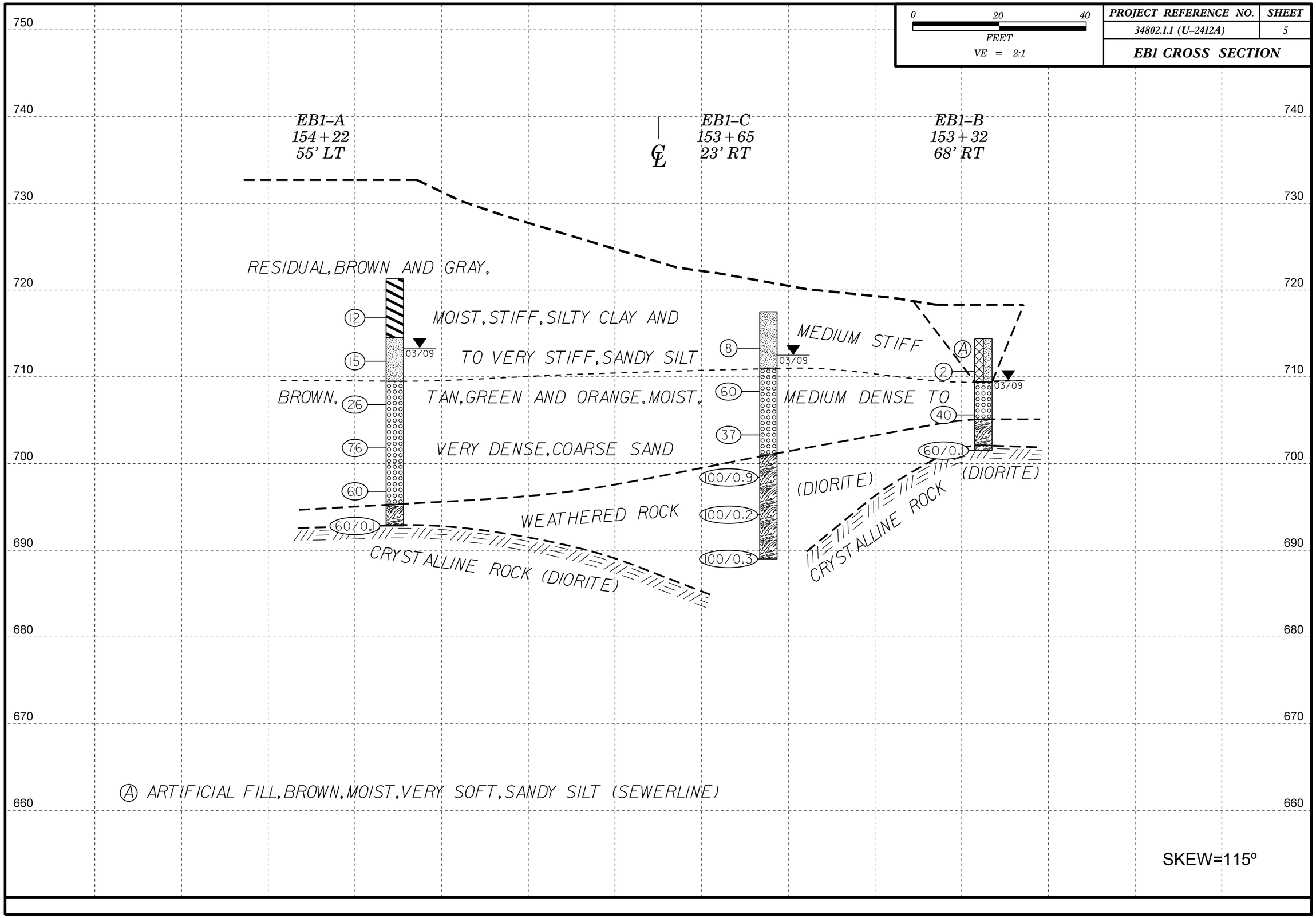
PROFILE OF BORINGS ALONG -L-

0 50 100
FEET
VE = 5:1

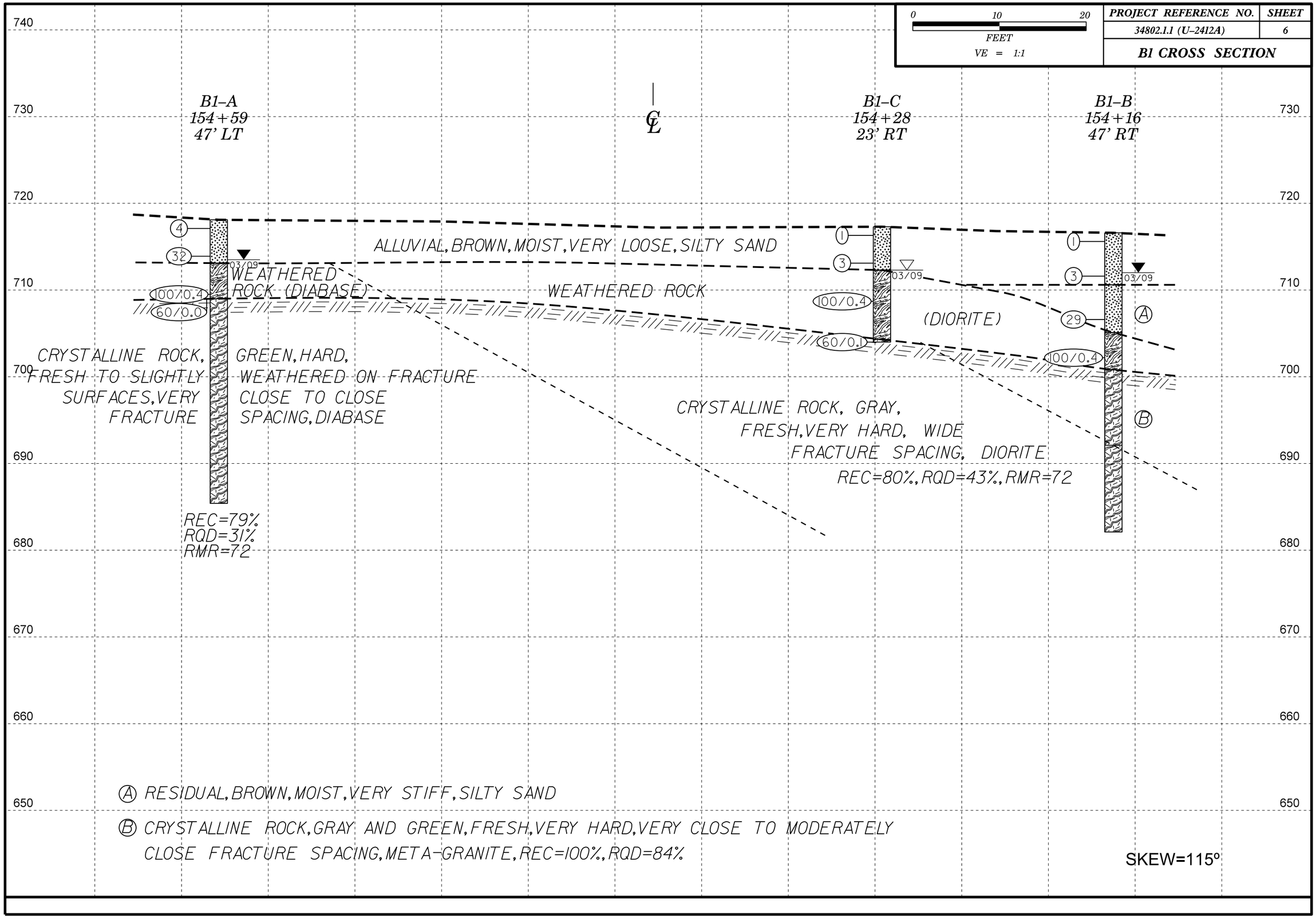
GROUNDLINE PROFILE AT CL OF -L- TAKEN FROM ROADWAY DESIGN PLANS AS OF 2/23/2009.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.



PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	5
EB1 CROSS SECTION	

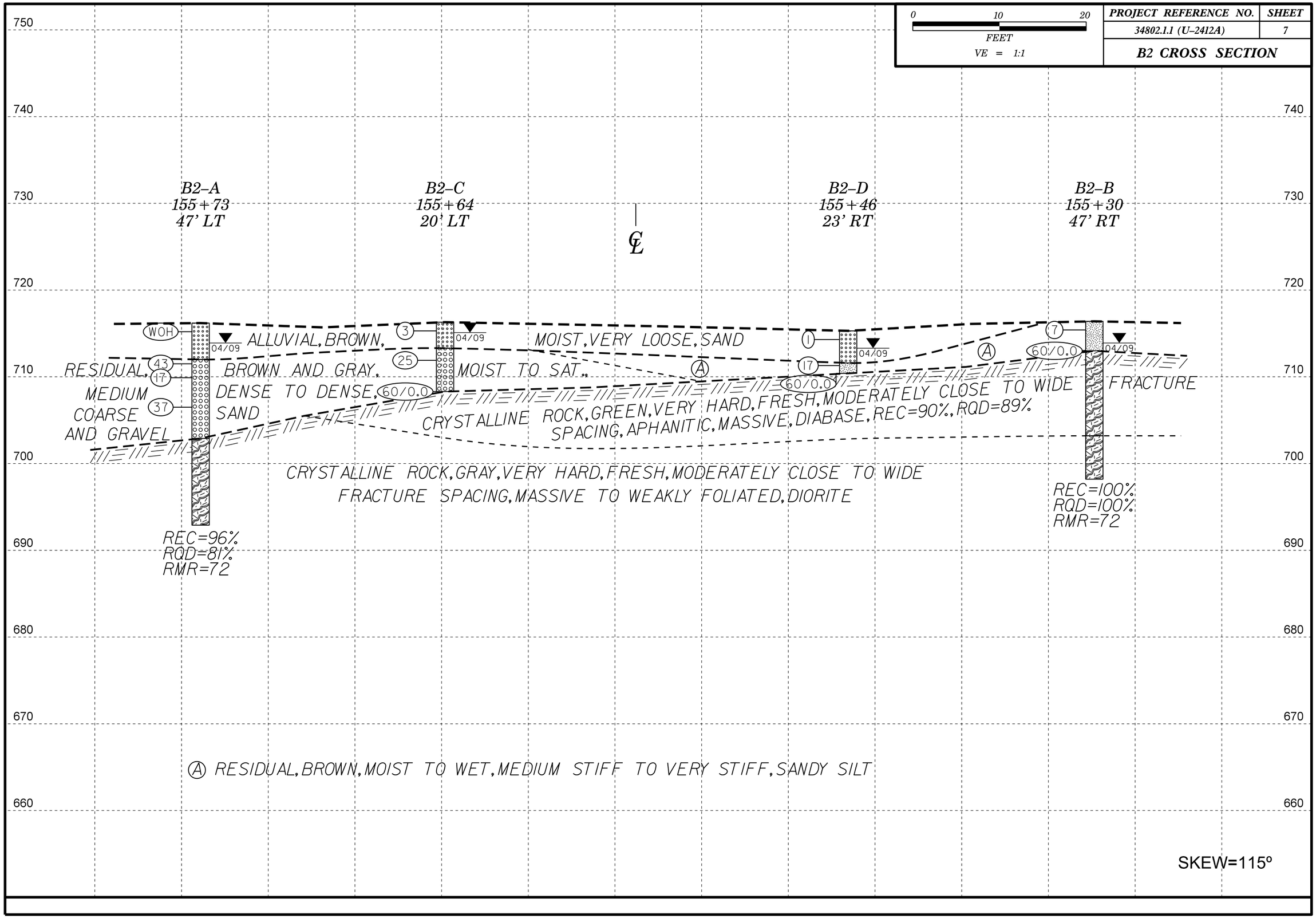


PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	6
B1 CROSS SECTION	

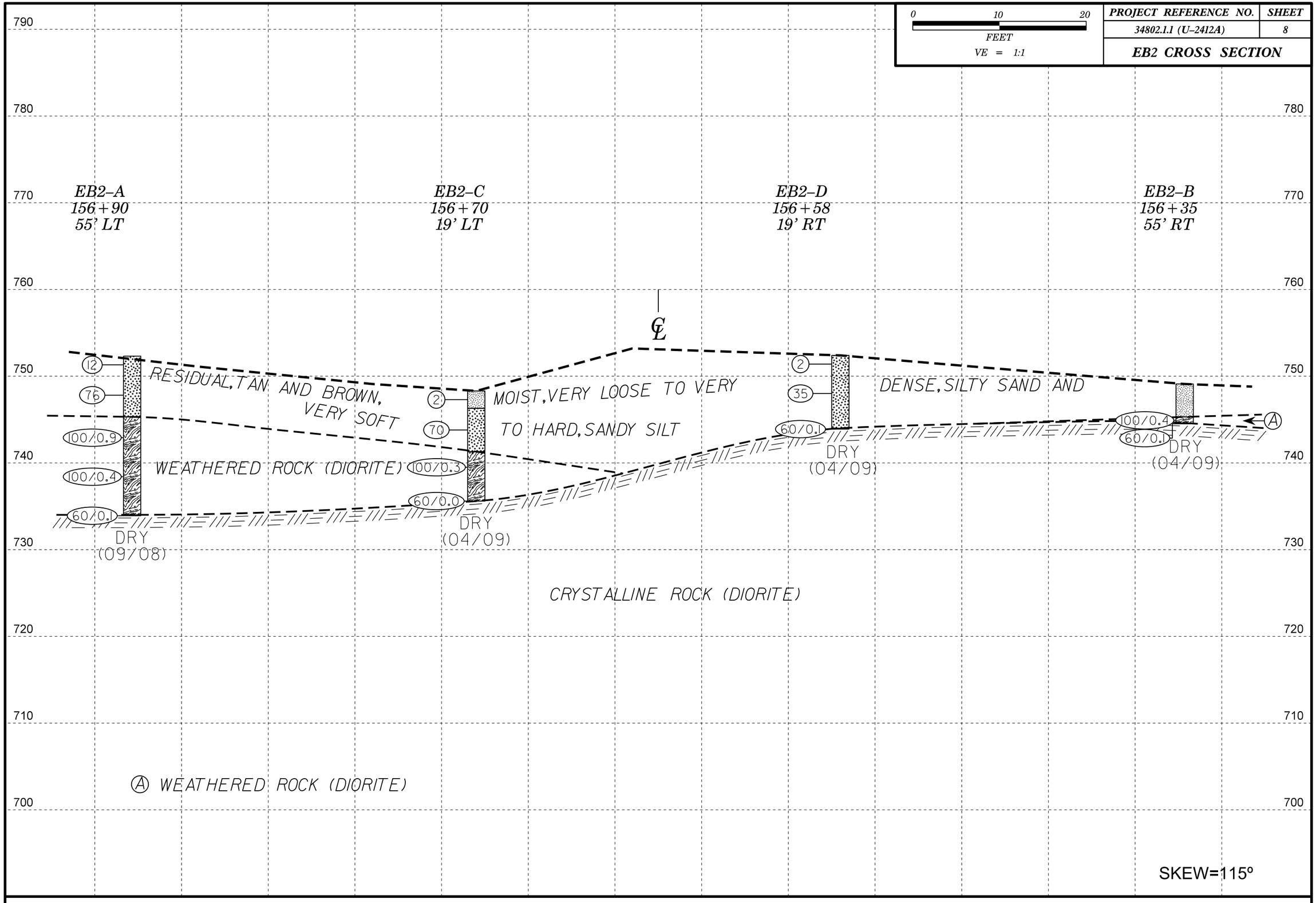


PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	7
B2 CROSS SECTION	

0 10 20
FEET
VE = 1:1



PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	8
EB2 CROSS SECTION	



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 154+22	**OFFSET** 55 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.0
COLLAR ELEV. 721.3 ft	**TOTAL DEPTH** 28.6 ft	**NORTHING** 815,712	**EASTING** 1,725,799	**24 HR.** 8.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725											
										721.3 GROUND SURFACE	0.0
720										**RESIDUAL** Brown, Silty Clay	
	717.8	3.5	4	5	7	12	SS-4	M			
715										714.5	6.8
	712.8	8.5	3	6	9	15	SS-5	M		Gray, Sandy Silt	
710										709.5	11.8
	707.8	13.5	11	11	15	26		M		Tan, Coarse Sand	
705											
	702.8	18.5	14	28	48	76		M			
700											
	697.8	23.5	18	34	26	60		M			
695										695.3	26.0
										WEATHERED ROCK (Diorite)	
	692.8	28.5	60/0.1			60/0.1				692.8	28.5
										692.7 **CRYSTALLINE ROCK** (Diorite)	28.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 692.7 ft in Crystalline Rock (Diorite)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 153+32	**OFFSET** 68 ft RT	**ALIGNMENT** -L-	**0 HR.** 5.0
COLLAR ELEV. 714.4 ft	**TOTAL DEPTH** 12.9 ft	**NORTHING** 815,574	**EASTING** 1,725,734	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
715										
										714.4 GROUND SURFACE 0.0
	711.6	2.8	WOH	1	1	2	SS-3	M		**ARTIFICIAL FILL** Brown, Sandy Silt
710										709.4 5.0
	706.6	7.8	6	16	24	40		Sat.		**RESIDUAL** Brown, Coarse Sand
705										705.1 9.3
	701.6	12.8	60/0.1			60/0.1				**WEATHERED ROCK** (Diorite) 702.1 12.3
										701.5 12.9 **CRYSTALLINE ROCK** (Diorite)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 701.5 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 153+65	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 717.5 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 815,624	**EASTING** 1,725,758	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
720											717.5	0.0
										GROUND SURFACE		
715	714.3	3.2	5	4	4	8	SS-1	M		**RESIDUAL** Brown, Sandy Silt	711.0	6.5
710	709.3	8.2	36	28	32	60	SS-2	M		Green and Orange, Coarse Sand	701.0	16.5
705	704.3	13.2	10	16	21	37		M				
700	699.3	18.2	37	63/0.4		100/0.9				**WEATHERED ROCK** (Diorite)		
695	694.3	23.2	100/0.2			100/0.2						
690	689.3	28.2	100/0.3			100/0.3				Boring Terminated at Elevation 689.0 ft in Weathered Rock (Diorite)	689.0	28.5

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 154+59	**OFFSET** 47 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 718.1 ft	**TOTAL DEPTH** 32.7 ft	**NORTHING** 815,711	**EASTING** 1,725,837 / **24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/27/09	**COMP. DATE** 03/27/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
720											
	718.1	0.0								718.1 GROUND SURFACE	0.0
			WOH	1	3	4		M		**ALLUVIAL** Brown, Silty Sand	
715	714.9	3.2									
			1	2	30	32		M		713.1	5.0
										WEATHERED ROCK (Diabase)	
710	709.9	8.2									
	709.0	9.1	100/0.4			100/0.4				709.0	9.1
			60/0.0			60/0.0				**CRYSTALLINE ROCK** Green,Fresh to Slightly Weathered on Fracture Surfaces, Hard, Very Close to Close Fracture Spacing, Massive, Aphanitic, Diabase REC=79% RQD=31% RMR=72	
705											
							RS-3				
700											
695											
690											
										685.4	32.7
										Boring Terminated at Elevation 685.4 ft in Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 154+59	**OFFSET** 47 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 718.1 ft	**TOTAL DEPTH** 32.7 ft	**NORTHING** 815,711	**EASTING** 1,725,837 / **24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/27/09	**COMP. DATE** 03/27/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 23.6 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
709											Begin Coring @ 9.1 ft	
	709.0	9.1	3.6	*N=60/0.0* 2:47/1.0 3:30/1.0 4:11/1.0	(3.6) 100%	(1.8) 50%		(18.6) 79%	(7.2) 31%		709.0 **CRYSTALLINE ROCK** Green,Fresh to Slightly Weathered on Fracture Surfaces, Hard, Very Close to Close Fracture Spacing, Massive, Aphanitic, Diabase REC=79% RQD=31% RMR=72	9.1
705	705.4	12.7	5.0	1:00/0.6 2:46/1.0 2:21/1.0 3:36/1.0 3:11/1.0 2:52/1.0	(5.0) 100%	(2.7) 54%	RS-3					
700	700.4	17.7	5.0	2:36/1.0 3:14/1.0 3:02/1.0 2:31/1.0 2:04/1.0	(4.0) 80%	(2.7) 54%						
695	695.4	22.7	5.0	2:38/1.0 2:00/1.0 2:33/1.0 2:50/1.0 1:30/1.0	(4.0) 80%	(0.5) 10%						
690	690.4	27.7	5.0	2:15/1.0 2:27/1.0 2:03/1.0 1:54/1.0 2:16/1.0	(2.0) 40%	(0.5) 10%						
	685.4	32.7									685.4	32.7
											Boring Terminated at Elevation 685.4 ft in Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 154+16	**OFFSET** 47 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 716.6 ft	**TOTAL DEPTH** 34.5 ft	**NORTHING** 815,611	**EASTING** 1,725,812 / **24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/25/09	**COMP. DATE** 03/25/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	716.6	0.0								716.6 — GROUND SURFACE — 0.0
715			WOH	WOH	1	1		M		**ALLUVIAL** Brown, Silty Sand
	712.6	4.0						Sat.		710.6 — 6.0
710			2	1	2	3				**RESIDUAL** Brown, Silty Sand
	707.6	9.0								
705			8	11	18	29	SS-7	M		705.1 — 11.5
	702.6	14.0								**WEATHERED ROCK** (Diorite)
700			100/0.4			100/0.4				700.8 — 15.8
							RS-4			**CRYSTALLINE ROCK** Gray and Green, Very Hard, Fresh, Very Close to Moderately Close Fracture Spacing, Weakly Foliated, Meta-Granite REC=80% RQD=43% RMR=72
695										
										692.1 — 24.5
690										Gray, Very Hard, Fresh, Wide Fracture Spacing, Massive, Phaneritic, Diorite REC=100% RQD=84% RMR=72
685										682.1 — 34.5
										Boring Terminated at Elevation 682.1 ft in Crystalline Rock (Diorite)

NCDOT BORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 154+16	**OFFSET** 47 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 716.6 ft	**TOTAL DEPTH** 34.5 ft	**NORTHING** 815,611	**EASTING** 1,725,812 / **24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/25/09	**COMP. DATE** 03/25/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 18.7 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
700.8											Begin Coring @ 15.8 ft
700	700.8	15.8	3.7	3:10/1.0 3:20/1.0 2:33/1.0 3:15/0.7	(2.0) 54%	(0.0) 0%		(7.0) 80%	(3.7) 43%		700.8 — **CRYSTALLINE ROCK** Gray and Green, Very Hard, Fresh, Very Close to Moderately Close Fracture Spacing, Weakly Foliated, Meta-Granite REC=80% RQD=43% RMR=72 — 15.8
	697.1	19.5									
695			5.0	1:48/1.0 3:20/1.0 2:58/1.0 3:07/1.0 3:10/1.0	(5.0) 100%	(3.7) 74%	RS-4				
	692.1	24.5									692.1 — 24.5
690			5.0	2:50/1.0 2:20/1.0 3:20/1.0 3:46/1.0 4:18/1.0	(5.0) 100%	(3.4) 68%		(10.0) 100%	(8.4) 84%		Gray, Very Hard, Fresh, Wide Fracture Spacing, Massive, Phaneritic, Diorite REC=100% RQD=84% RMR=72
	687.1	29.5									
685			5.0	5:20/1.0 5:23/1.0 6:28/1.0 7:50/1.0 6:30/1.0	(5.0) 100%	(5.0) 100%					
	682.1	34.5									682.1 — 34.5
											Boring Terminated at Elevation 682.1 ft in Crystalline Rock (Diorite)

NCDOT CORE DOUBLE U2412A_GEO_BH.GPJ NC_DOT.GDT 1/30/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 154+28	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** 5.0
COLLAR ELEV. 717.3 ft	**TOTAL DEPTH** 13.3 ft	**NORTHING** 815,636	**EASTING** 1,725,820	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/24/09	**COMP. DATE** 03/24/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
720											
	717.3	0.0								717.3 GROUND SURFACE	0.0
			WOH	WOH	1	1.	SS-6	M		**ALLUVIAL** Brown, Silty Sand	
715	714.1	3.2	1	2	1	3		M7		712.3	5.0
										WEATHERED ROCK (Diorite)	
710	709.1	8.2	100/0.4			100/0.4					
705	704.1	13.2	60/0.1			60/0.1				704.3	13.0
										704.0 **CRYSTALLINE ROCK** (Diorite)	13.3

Boring Terminated with Standard Penetration Test Refusal at Elevation 704.0 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 155+73	**OFFSET** 47 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 716.4 ft	**TOTAL DEPTH** 23.3 ft	**NORTHING** 815,731	**EASTING** 1,725,950 — **24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	716.4	0.0								716.4 — GROUND SURFACE — 0.0
715			WOH	WOH	WOH		S-8	M		**ALLUVIAL** Brown, Sand
	712.7	3.7								
	711.1	5.3	1	16	27			M		712.2 — 4.2
710			6	7	10			Sat.		**RESIDUAL** Brown, Coarse Sand, Gravel, and Boulders
	707.7	8.7								
			5	14	23		SS-9	Sat.		
705										
700							RS-1			703.1 — 13.3 **CRYSTALLINE ROCK** Gray, Fresh, Very Hard, Moderately Close Fracture Spacing, Massive to Weakly Foliatied, Phaneritic, Diorite REC=96% RQD=81% RMR=72
695										693.1 — 23.3 Boring Terminated at Elevation 693.1 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 155+73	**OFFSET** 47 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 716.4 ft	**TOTAL DEPTH** 23.3 ft	**NORTHING** 815,731	**EASTING** 1,725,950 — **24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 10.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
703.1											Begin Coring @ 13.3 ft
	703.1	13.3	5.0	2:05/1.0 4:07/1.0 4:06/1.0 4:03/1.0 6:03/1.0	(4.6) 92%	(4.0) 80%	RS-1	(9.6) 96%	(8.1) 81%		703.1 — 13.3 **CRYSTALLINE ROCK** Gray, Fresh, Very Hard, Moderately Close Fracture Spacing, Massive to Weakly Foliatied, Phaneritic, Diorite REC=96% RQD=81% RMR=72
700											
	698.1	18.3	5.0	6:13/1.0 6:22/1.0 7:45/1.0 13:12/1.0 17:00/1.0	(5.0) 100%	(4.1) 82%					
695											
	693.1	23.3									693.1 — 23.3 Boring Terminated at Elevation 693.1 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 155+30	**OFFSET** 47 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 716.2 ft	**TOTAL DEPTH** 18.2 ft	**NORTHING** 815,631	**EASTING** 1,725,924 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										
	716.2	0.0								716.2 GROUND SURFACE 0.0
715			2	2	5	7	SS-10	M		**RESIDUAL** Brown, Sandy Silt and Gravel
	712.8	3.4	60/0.0			60/0.0	RS-2			712.8 3.4 **CRYSTALLINE ROCK** Green, Fresh, Very Hard, Moderately Close to Wide Fracture Spacing, Massive, Aphanitic, Diabase REC=90% RQD=89% RMR=72
710										
705										
										703.0 13.2 Gray, Fresh, Very Hard, Wide Fracture Spacing, Massive, Phaneritic, Diorite REC=90% RQD=89% RMR=72
700										698.0 18.2 Boring Terminated at Elevation 698.0 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 155+30	**OFFSET** 47 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 716.2 ft	**TOTAL DEPTH** 18.2 ft	**NORTHING** 815,631	**EASTING** 1,725,924 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/31/09	**COMP. DATE** 03/31/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 14.8 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
712.8											Begin Coring @ 3.4 ft
710	712.8	3.4	4.8	*N=60/0.0* 4:54/1.0 3:58/1.0 3:17/1.0 2:56/1.0 2:16/0.8	(4.0) 83%	(3.9) 81%	RS-2	(8.8) 90%	(8.7) 89%		712.8 3.4 **CRYSTALLINE ROCK** Green, Fresh, Very Hard, Moderately Close to Wide Fracture Spacing, Massive, Aphanitic, Diabase REC=90% RQD=89% RMR=72
	708.0	8.2	5.0	2:41/1.0 2:36/1.0 2:51/1.0 2:32/1.0 2:30/1.0	(4.8) 96%	(4.8) 96%					
705	703.0	13.2	5.0	2:51/1.0 2:53/1.0 3:20/1.0 3:10/1.0 3:10/1.0	(5.0) 100%	(5.0) 100%		(5.0) 100%	(5.0) 100%		703.0 13.2 Gray, Fresh, Very Hard, Wide Fracture Spacing, Massive, Phaneritic, Diorite REC=90% RQD=89% RMR=72
700	698.0	18.2									698.0 18.2 Boring Terminated at Elevation 698.0 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 155+64	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** 1.4
COLLAR ELEV. 715.3 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 815,703	**EASTING** 1,725,946	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
720											
715	715.3	0.0	WOH	1	2	3		M		715.3 GROUND SURFACE	0.0
										ALLUVIAL Brown, Sand	
	711.9	3.4	14	13	12	25		W		712.3 **RESIDUAL** Gray, Coarse Sand and Gravel	3.0
710											
	707.3	8.0	60/0.0			60/0.0				707.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 707.3 ft on Crystalline Rock (Diabase)	8.0

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek				**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 155+46	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 716.3 ft	**TOTAL DEPTH** 4.9 ft	**NORTHING** 815,658	**EASTING** 1,725,935	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
720											
	716.3	0.0								716.3 GROUND SURFACE	0.0
715			3	0	1	1		M		**ALLUVIAL** Brown, Sand	
	713.3	3.0	WOH	6	11			W		712.6	3.7
	711.4	4.9	60/0.0			17 60/0.0				711.4 **RESIDUAL** Brown, Sandy Silt and Gravel	4.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 711.4 ft on Crystalline Rock (Diabase)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 156+90	**OFFSET** 55 ft LT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 752.3 ft	**TOTAL DEPTH** 18.4 ft	**NORTHING** 815,759	**EASTING** 1,726,064 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/22/08	**COMP. DATE** 09/22/08	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	752.3	0.0	1	4	8	12 76	SS-154	M		752.3 GROUND SURFACE	0.0
750										**RESIDUAL** Tan-Brown, Silty Sand	
	748.8	3.5	16	30	46		SS-155	M			
745										745.3 **WEATHERED ROCK** (Diorite)	7.0
	743.8	8.5	41	59/0.4		100/0.9					
740											
	738.8	13.5	100/0.4			100/0.4					
735											
	734.0	18.3	60/0.1			60/0.1				734.0 / 733.9 **CRYSTALLINE ROCK** (Diorite)	18.3 / 18.4

Boring Terminated with Standard Penetration Test Refusal at Elevation 733.9 ft in Crystalline Rock (Diorite)

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 156+35	**OFFSET** 55 ft RT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 4.6 ft	**NORTHING** 815,641	**EASTING** 1,726,028 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										749.1 GROUND SURFACE 0.0
										RESIDUAL Brown, Sandy Silt
	745.8	3.3					S-11			745.3 3.8
745	744.6	4.5	2	100/0.4		100/0.4				744.6 4.5 **WEATHERED ROCK** (Diorite)
			60/0.1			60/0.1				744.5 4.6 **CRYSTALLINE ROCK** (Diorite)

Boring Terminated with Standard Penetration Test Refusal at Elevation 744.5 ft in Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 156+70	**OFFSET** 19 ft LT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 752.8 ft	**TOTAL DEPTH** 12.7 ft	**NORTHING** 815,720	**EASTING** 1,726,050 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
755											
	752.8	0.0	1	1	1	2		M		752.8 GROUND SURFACE	0.0
750										750.8 **RESIDUAL** Brown, Sandy Silt	2.0
	749.3	3.5	13	25	45	70	SS-12	M		Brown, Saprolitic, Silty Sand	
745										745.8 **WEATHERED ROCK** (Diorite)	7.0
	744.3	8.5	100/0.3			100/0.3					
	740.1	12.7	60/0.0			60/0.0				740.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 740.1 ft on Crystalline Rock (Diorite)	12.7

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structures No. 5 & 6 on -L- (SR 4121, Greensboro/High Point Rd.) Over Bull Run Creek			**GROUND WTR (ft)**
BORING NO. EB2-D	**STATION** 156+58	**OFFSET** 19 ft RT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 752.4 ft	**TOTAL DEPTH** 8.5 ft	**NORTHING** 815,680	**EASTING** 1,726,045 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 04/01/09	**COMP. DATE** 04/01/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
755											
	752.4	0.0	WOH	1	1	2		M		752.4 GROUND SURFACE	0.0
750										**RESIDUAL** Brown, Silty Sand	
	749.0	3.4	14	14	21	35		M			
745											
	744.0	8.4	60/0.1			60/0.1				744.0	8.4
										743.9 **CRYSTALLINE ROCK** (Diorite) Boring Terminated with Standard Penetration Test Refusal at Elevation 743.9 ft in Crystalline Rock (Diorite)	8.5

EB1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	55 LT	154+22	3.5-5.0	A-7-6(15)	41	22	13.1	14.9	29.8	42.3	99	91	75	-	-
SS-5	55 LT	154+22	8.5-10.5	A-4(0)	35	NP	12.9	47.7	31.4	8.0	100	97	50	-	-

EB1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3	68 RT	153+32	2.8-4.3	A-4(0)	25	6	33.8	26.8	19.3	20.1	97	78	41	-	-

EB1-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	23 RT	153+65	3.2-4.7	A-4(0)	25	7	31.6	33.6	16.7	18.1	98	79	39	-	-
SS-2	23 RT	153+65	8.2-9.7	A-1-b(0)	20	NP	49.7	25.4	16.9	8.0	58	37	17	-	-

B1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	47 RT	154+16	9.0-10.5	A-2-4(0)	28	NP	51.3	24.9	15.7	8.0	92	56	27	-	-

B1-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-6	23 RT	154+28	0.0-1.5	A-2-4(0)	24	NP	47.9	33.2	12.9	6.0	98	77	22	-	-

B2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-8	47 LT	155+73	0.0-3.7	A-3(0)	29	NP	37.9	55.5	2.6	4.0	100	96	9	-	-
SS-9	47 LT	155+73	8.7-10.2	A-1-b(0)	22	2	42.2	24.6	21.0	12.1	50	35	19	-	-

B2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-10	47 RT	155+30	0.0-1.5	A-4(0)	27	6	23.0	23.4	31.3	22.2	79	67	47	-	-

EB2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-154	55 LT	156+90	0.0-1.5	A-2-4(0)	26	NP	47.3	25.6	15.1	12.0	92	61	29	-	-
SS-155	55 LT	156+90	3.5-5.0	A-2-4(0)	25	4	49.5	23.9	13.5	13.0	93	60	29	-	-

EB2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-11	55 RT	156+35	0.0-3.8	A-4(2)	29	5	16.0	23.0	36.8	24.2	97	87	66	-	-

EB2-C

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-12	19 LT	156+70	3.5-5.0	A-2-4(0)	23	3	40.6	28.2	19.1	12.1	95	71	34	-	-

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	H/D RATIO	UNIT WT lbs/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	Sec. Mod. @ 40% Mpsi
RS-1	47 LT	155+73	15.0-15.5	2.44	168.3	65600	23.9	24.4	8.47
RS-2	47 RT	155+30	4.4-5.2	.717	629	92400	33.7	27.7	13.13
RS-3	47 LT	154+59	15.3-16.1	.701	629	92200	33.6	27.5	11.04
RS-4	47 RT	154+16	19.5-20.1	2.41	166.4	69600	25.4	25.9	0.27

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34802.1.1 (U-2412A)	1	13

PROJECT: 34802.1.1

ID: U-2412A

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34802.1.1 (U-2412A) F.A. PROJ. STP-4121(1)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO/HIGH POINT RD. FROM PROPOSED US 311 BYPASS TO WEST OF SR 1480

SITE DESCRIPTION STRUCTURE NO. 7 ON -Y8- (SR 1352, OAKDALE RD.) OVER -L- (GREENSBORO/HIGH POINT RD.) AT STATION 14+98

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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PERSONNEL

N.D. MOHS

MACTEC

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE APRIL 2009

NORTH CAROLINA LICENSED SEAL 1912 GEOLOGIST NEIL T. ROBERSON

DocuSigned by:
Neil Roberson
4061D9A8C6C649C...
1/23/2018

DRAWN BY: N.D. MOHS

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PROJECT REFERENCE NO.	SHEET NO.
34802.1.1 (U-2412A)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-55
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 5/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -NQ_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION. AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-173, -L- STA. 145+64, 13.6' LT

ELEVATION: 783.23 FT.

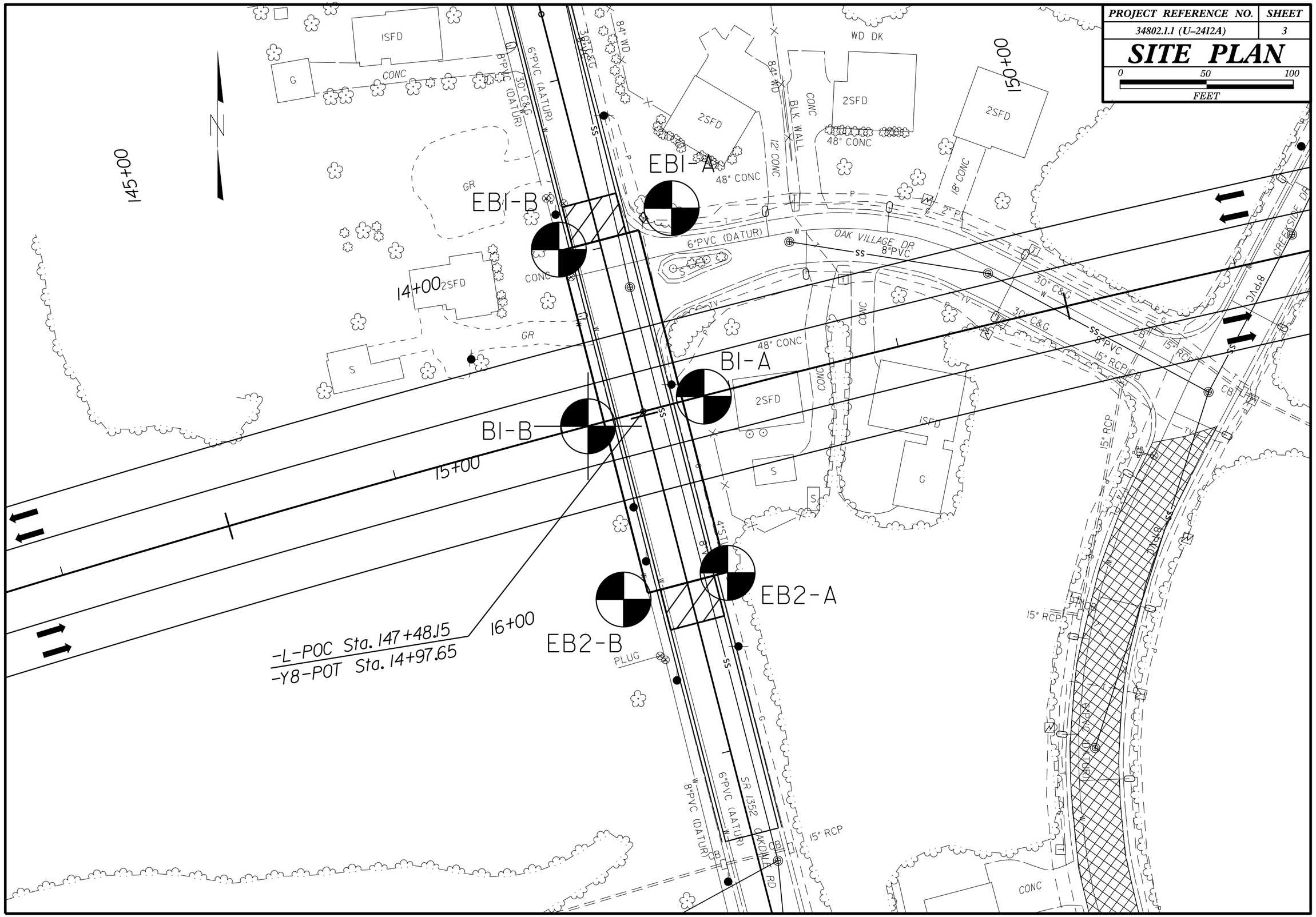
NOTES:

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	3

SITE PLAN

0 50 100
FEET

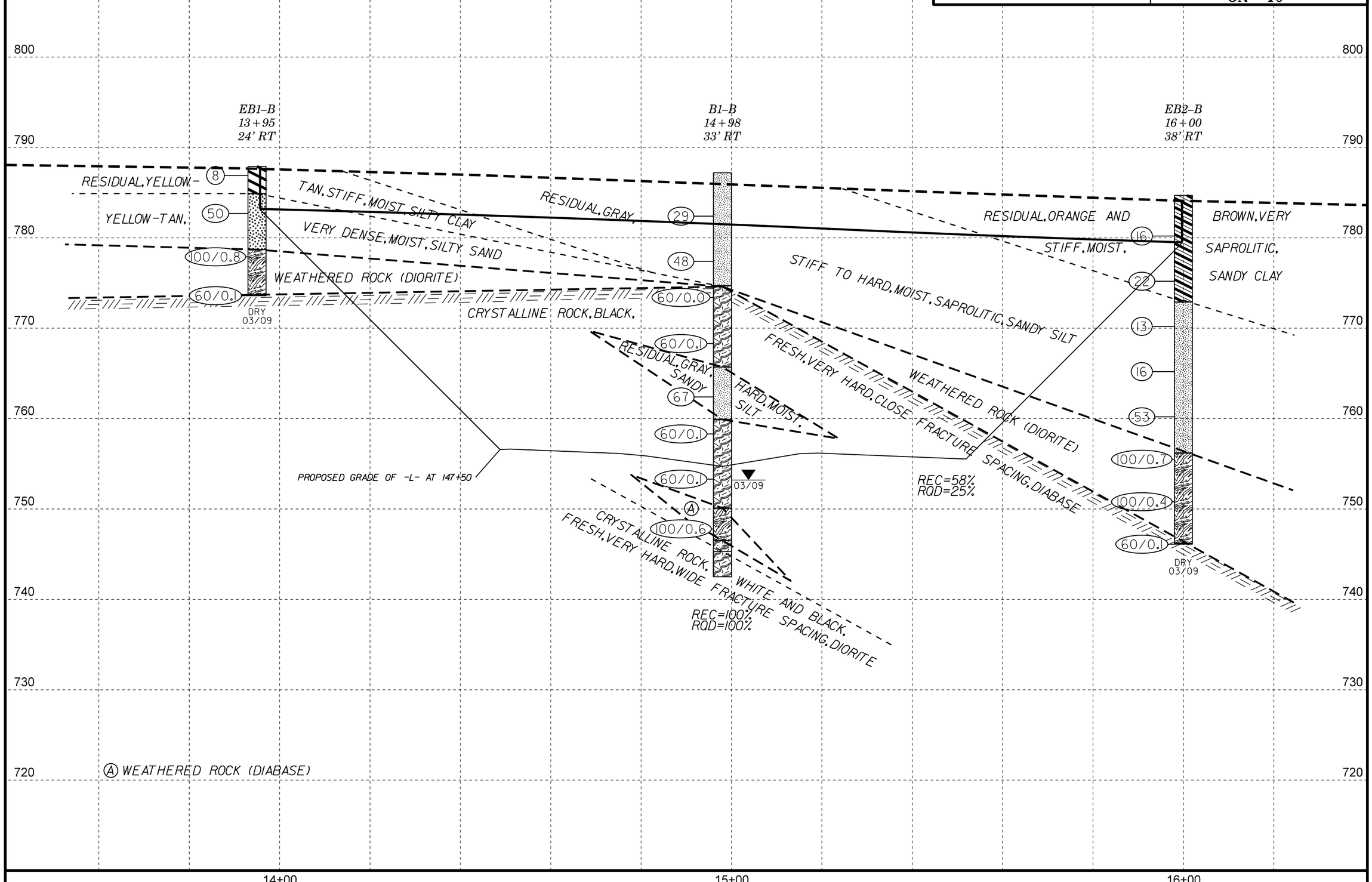


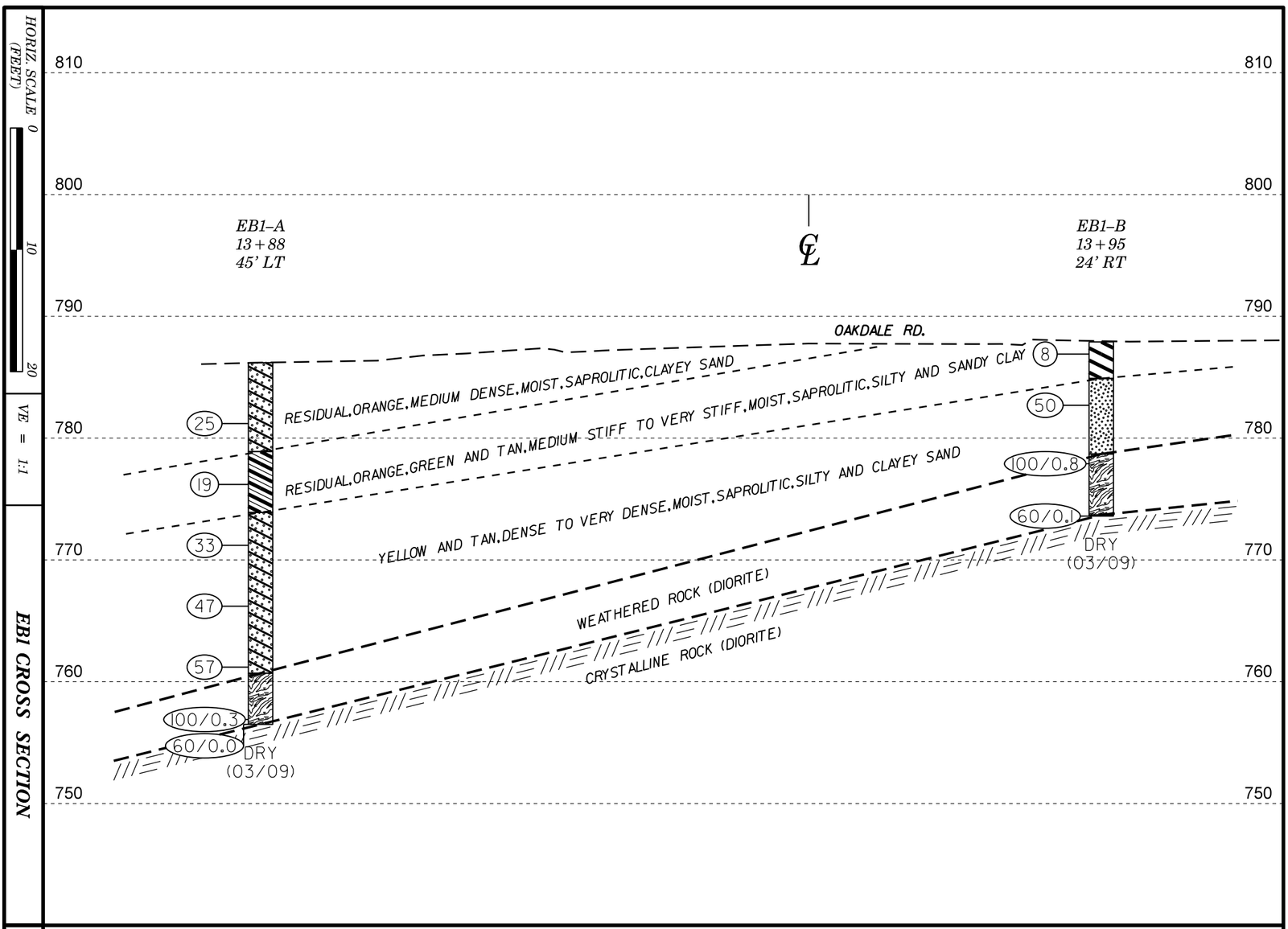
PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	4

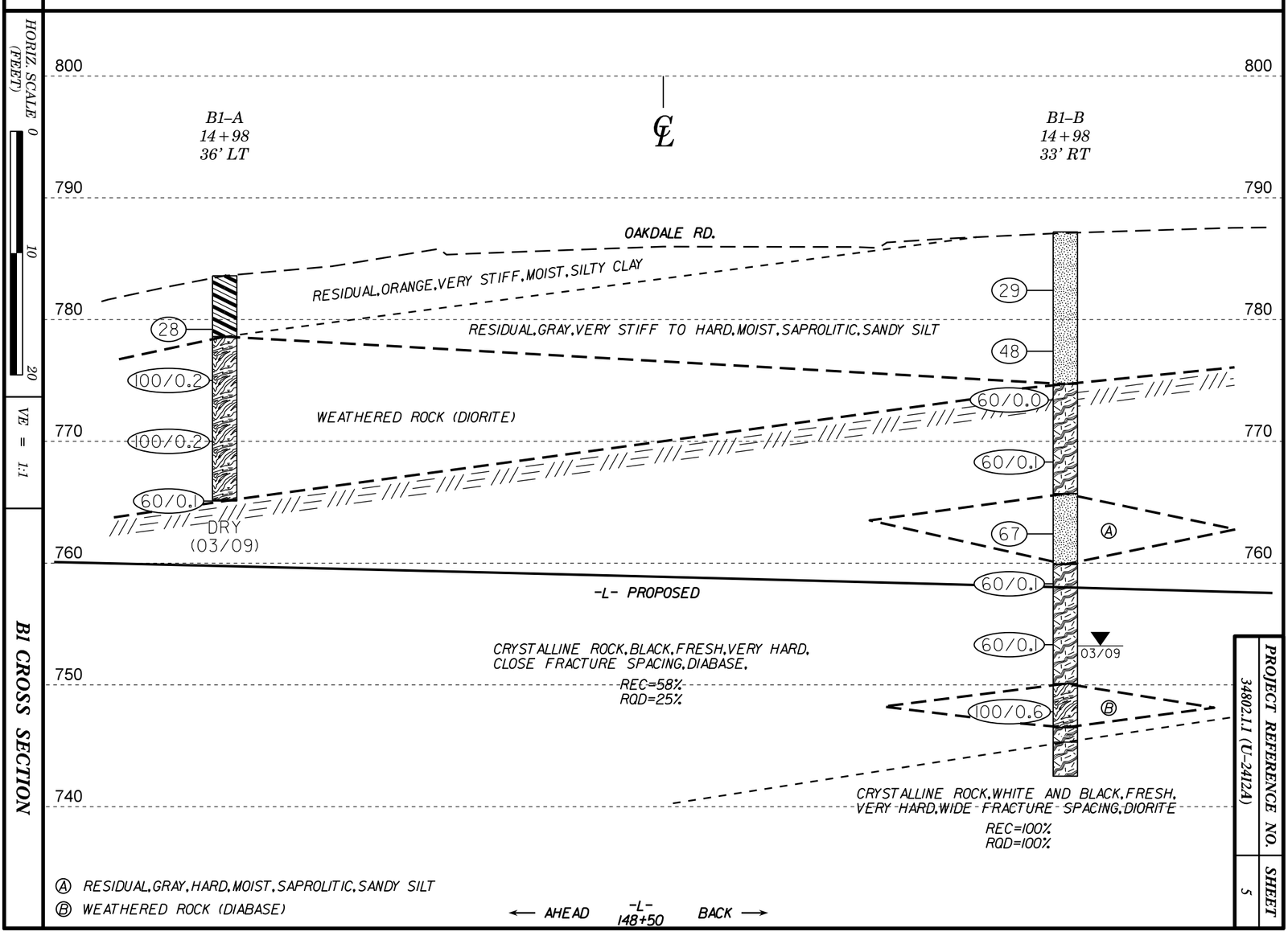
PROFILE OF BORINGS ON -Y8-

0 20 40
FEET
VE = 2:1

GROUNDLINE PROFILE AT CL OF -Y8- TAKEN FROM ROADWAY DESIGN PLANS AS OF 2/23/2009.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

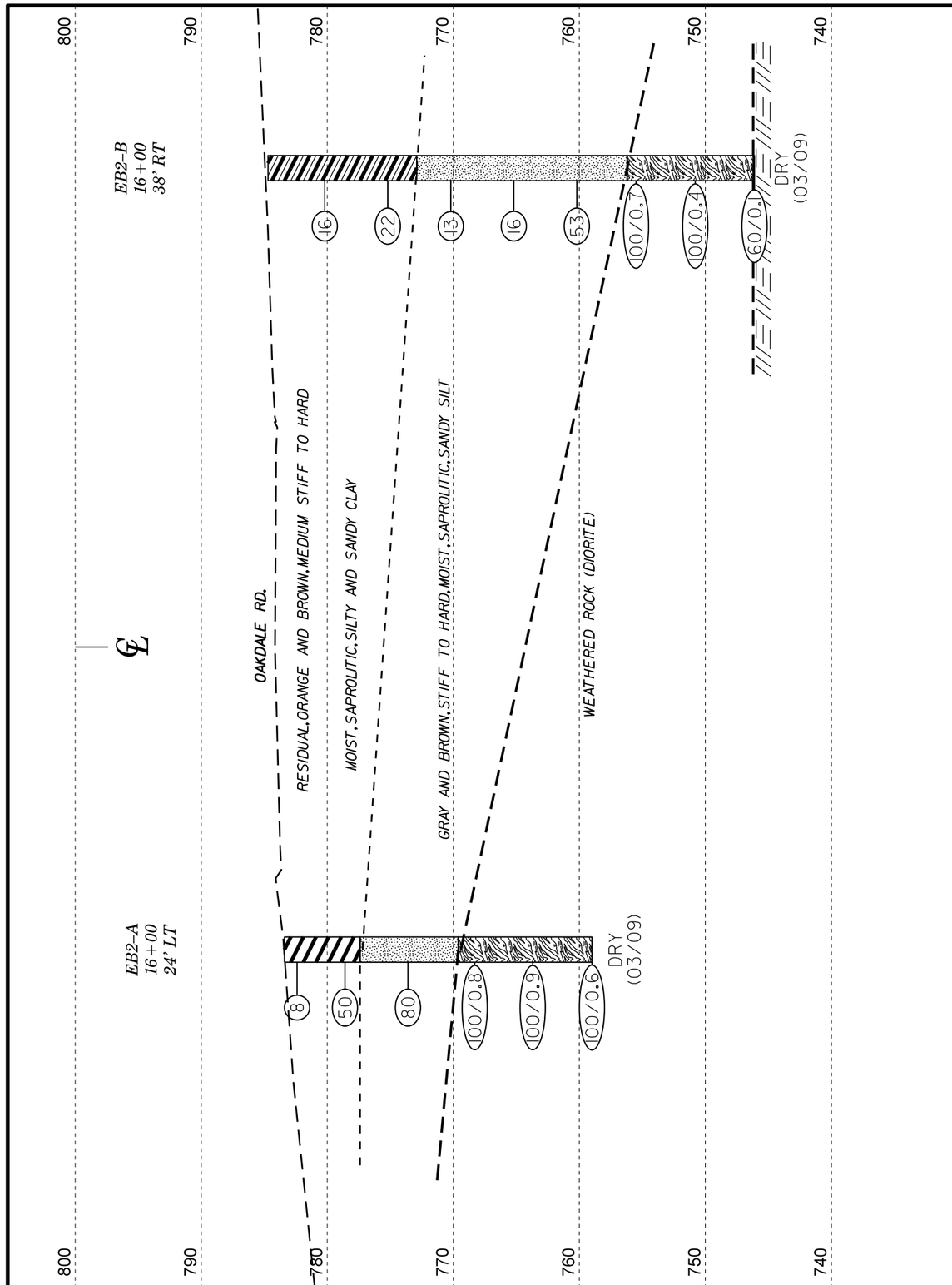






PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	5

PROJECT REFERENCE NO.	SHEET
34802.1.1 (U-2412A)	6



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

EB2 CROSS SECTION

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 13+88	**OFFSET** 45 ft LT	**ALIGNMENT** -Y8- — **0 HR.** Dry
COLLAR ELEV. 786.2 ft	**TOTAL DEPTH** 29.7 ft	**NORTHING** 815,626	**EASTING** 1,725,169 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/09	**COMP. DATE** 03/23/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
790											
										786.2 GROUND SURFACE	0.0
785										**RESIDUAL** Orange, Saprolitic, Clayey Sand	
	782.2	4.0	5	11	14	25	SS-4	M			
780										778.9 Orange and Green, Saprolitic, Sandy Clay	7.3
	777.2	9.0	5	7	12	19	SS-5	M			
775										773.9 Tan, Saprolitic, Clayey Sand	12.3
	772.2	14.0	5	14	19	33		M			
770											
	767.2	19.0	10	14	33	47		M			
765											
	762.2	24.0	15	38	19	57		M		760.7 **WEATHERED ROCK** (Diorite)	25.5
760											
	757.2	29.0									
	756.5	29.7	100/0.3			100/0.3				756.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 756.5 ft On Crystalline Rock (Diorite)	29.7
			60/0.0			60/0.0					

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 13+95	**OFFSET** 24 ft RT	**ALIGNMENT** -Y8- — **0 HR.** Dry
COLLAR ELEV. 787.9 ft	**TOTAL DEPTH** 14.3 ft	**NORTHING** 815,603	**EASTING** 1,725,103 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/23/08	**COMP. DATE** 09/23/08	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
790											
	787.9	0.0								787.9 GROUND SURFACE	0.0
			4	4	4	8	SS-160	24%		**RESIDUAL** Yellow-Tan, Silty Clay	
785										784.9 Yellow-Tan, Silty Sand	3.0
	783.7	4.2	22	26	24	50	SS-161	M			
780										778.7 **WEATHERED ROCK** (Diorite)	9.2
	778.7	9.2	25	75/0.3		100/0.8					
775										773.7	14.2
	773.7	14.2	60/0.1			60/0.1				773.6 **CRYSTALLINE ROCK** (Diorite)	14.3
										Boring Terminated with Standard Penetration Test Refusal at Elevation 773.6 ft In Crystalline Rock (Diorite)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+98	**OFFSET** 36 ft LT	**ALIGNMENT** -Y8-	**0 HR.** Dry
COLLAR ELEV. 783.6 ft	**TOTAL DEPTH** 18.5 ft	**NORTHING** 815,518	**EASTING** 1,725,187	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/09	**COMP. DATE** 03/23/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785										783.6 GROUND SURFACE	0.0
780	780.2	3.4	6	9	19	28	SS-3	M		**RESIDUAL** Orange, Silty Clay	
										778.6 **WEATHERED ROCK** (Diorite)	5.0
775	775.2	8.4	100/0.2			100/0.2					
770	770.2	13.4	100/0.2			100/0.2					
	765.2	18.4	60/0.1			60/0.1				765.2	18.4
										765.1 **CRYSTALLINE ROCK** (Diorite)	18.5

Boring Terminated with Standard Penetration Test Refusal at Elevation 765.1 ft In Crystalline Rock (Diorite)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+98	**OFFSET** 33 ft RT	**ALIGNMENT** -Y8- / **0 HR.** N/A
COLLAR ELEV. 787.2 ft	**TOTAL DEPTH** 44.7 ft	**NORTHING** 815,500	**EASTING** 1,725,120 / **24 HR.** 34.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/30/09	**COMP. DATE** 03/30/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790											
										787.2 GROUND SURFACE	0.0
785										**RESIDUAL** Gray, Saprolitic, Sandy Silt	
	783.4	3.8	6	11	18	29		M			
780											
	778.4	8.8	14	21	27	48		M			
775										774.7	12.5
	773.4	13.8	60/0.0			60/0.0				**CRYSTALLINE ROCK** (Diabase)	
770											
	768.4	18.8	60/0.1			60/0.1					
765										765.7	21.5
	763.4	23.8	20	32	35	67		M		**RESIDUAL** Gray, Saprolitic, Sandy Silt	
760										759.9	27.3
	758.4	28.8	60/0.1			60/0.1				**CRYSTALLINE ROCK** (Diabase)	
755											
	753.4	33.8	60/0.1			60/0.1					
750										750.1	37.1
	748.4	38.8	65	35/0.1		100/0.6				**WEATHERED ROCK** (Diabase)	
										746.5	40.7
745							RS-1			745.3 **CRYSTALLINE ROCK** (Diabase)	41.9
										(Diorite)	
							RS-2			742.5	44.7
										Boring Terminated at Elevation 742.5 ft In Crystalline Rock (Diorite)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+98	**OFFSET** 33 ft RT	**ALIGNMENT** -Y8- / **0 HR.** N/A
COLLAR ELEV. 787.2 ft	**TOTAL DEPTH** 44.7 ft	**NORTHING** 815,500	**EASTING** 1,725,120 / **24 HR.** 34.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/30/09	**COMP. DATE** 03/30/09	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 4.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
746.5											Begin Coring @ 40.7 ft	
745	746.5	40.7	4.0	2:38/1.0 2:35/1.0 3:47/1.0 4:47/1.0	(3.4) 85%	(2.9) 73%	RS-1	(0.7) 58%	(0.3) 25%		746.5 **CRYSTALLINE ROCK**	40.7
											745.3 Crystalline Rock, Black, Fresh, Very Hard, Close Fracture Spacing, Diabase	41.9
	742.5	44.7					RS-2	(2.8) 100%	(2.8) 100%		742.5 Crystalline Rock, White and Black, Fresh, Very Hard, Wide Fracture Spacing, Diorite	44.7
											Boring Terminated at Elevation 742.5 ft In Crystalline Rock (Diorite)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 16+00	**OFFSET** 24 ft LT	**ALIGNMENT** -Y8- / **0 HR.** Dry
COLLAR ELEV. 783.4 ft	**TOTAL DEPTH** 24.4 ft	**NORTHING** 815,416	**EASTING** 1,725,201 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/23/09	**COMP. DATE** 09/23/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785											
	783.4	0.0	5	5	3	8		M		783.4 GROUND SURFACE	0.0
780	779.6	3.8	9	19	31	50	SS-162	M		**RESIDUAL** Yellow and Orange, Silty Clay	
										777.4	6.0
775	774.6	8.8	21	34	46	80	SS-163	M		Tan-Brown, Sandy Silt	
770	769.6	13.8	55	43	57/0.3	100/0.8				769.6	13.8
										WEATHERED ROCK (Diorite)	
765	764.6	18.8	39	61/0.4		100/0.9					
760	759.6	23.8	91	9/0.1		100/0.6				759.0	24.4
										Boring Terminated at Elevation 759.0 ft In Weathered Rock (Diorite)	

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** Guilford	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION Structure NO. 7 on -Y8- (SR 1352, Oakdale Rd.) over -L- (Greensboro/High Point Rd.) at Sta. 14+98			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 16+00	**OFFSET** 38 ft RT	**ALIGNMENT** -Y8- / **0 HR.** Dry
COLLAR ELEV. 784.7 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 815,400	**EASTING** 1,725,141 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 03/23/09	**COMP. DATE** 03/23/09	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
785										784.7 GROUND SURFACE	0.0
	781.2	3.5	5	7	9	16	SS-1	M		**RESIDUAL** Orange and Brown, Saprolitic, Sandy Clay	
780											
	776.2	8.5	9	11	11	22		M			
775										772.9	11.8
	771.2	13.5	4	5	8	13	SS-2	M		Gray, Saprolitic, Sandy Silt	
770											
	766.2	18.5	4	7	9	16		M			
765											
	761.2	23.5	11	19	34	53		M			
760											
	756.2	28.5	32	68/0.2		100/0.7				756.2	28.5
755										**WEATHERED ROCK** (Diorite)	
	751.2	33.5	100/0.4			100/0.4					
750											
	746.2	38.5	60/0.1			60/0.1				746.2 / 746.1	38.5 / 38.6
										CRYSTALLINE ROCK (Diorite)	
										Boring Terminated with Standard Penetration Test Refusal at Elevation 746.1 ft In Crystalline Rock (Diorite)	

EB1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	**45 LT**	**13+88**	**4.0-5.5**	**A-2-6(1)**	**38**	**19**	**48.6**	**19.5**	**13.8**	**18.1**	**82**	**51**	**29**	**-**	**-**
SS-5	**45 LT**	**13+88**	**9.0-10.5**	**A-6(5)**	**36**	**13**	**22.5**	**25.3**	**30.1**	**22.1**	**96**	**84**	**55**	**-**	**-**

EB1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-160	**24 RT**	**13+95**	**0.0-1.5**	**A-7-6(11)**	**43**	**23**	**27.3**	**16.2**	**12.4**	**44.1**	**97**	**80**	**58**	**24**	**-**
SS-161	**24 RT**	**13+95**	**4.2-5.7**	**A-2-4(0)**	**28**	**7**	**50.7**	**21.3**	**12.9**	**15.0**	**90**	**56**	**29**	**-**	**-**

B1-A

SOIL TEST RESULTS

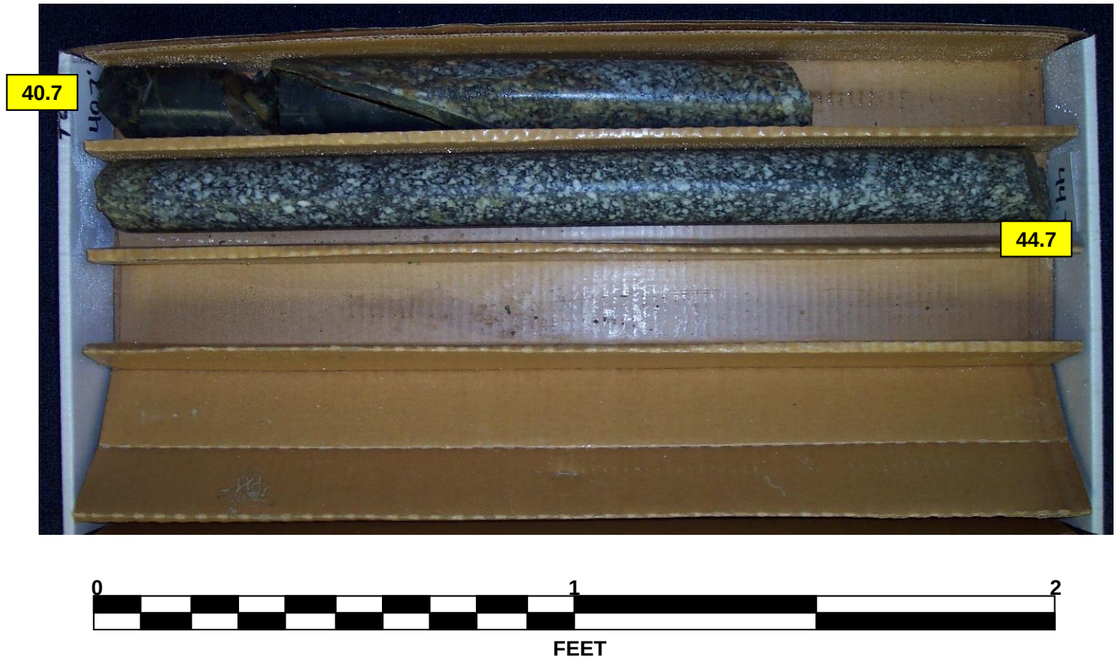
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3	**36 LT**	**14+98**	**3.4-4.9**	**A-7-6(5)**	**42**	**21**	**32.6**	**26.5**	**16.8**	**24.1**	**100**	**81**	**45**	**-**	**-**

EB2-B

SOIL TEST RESULTS

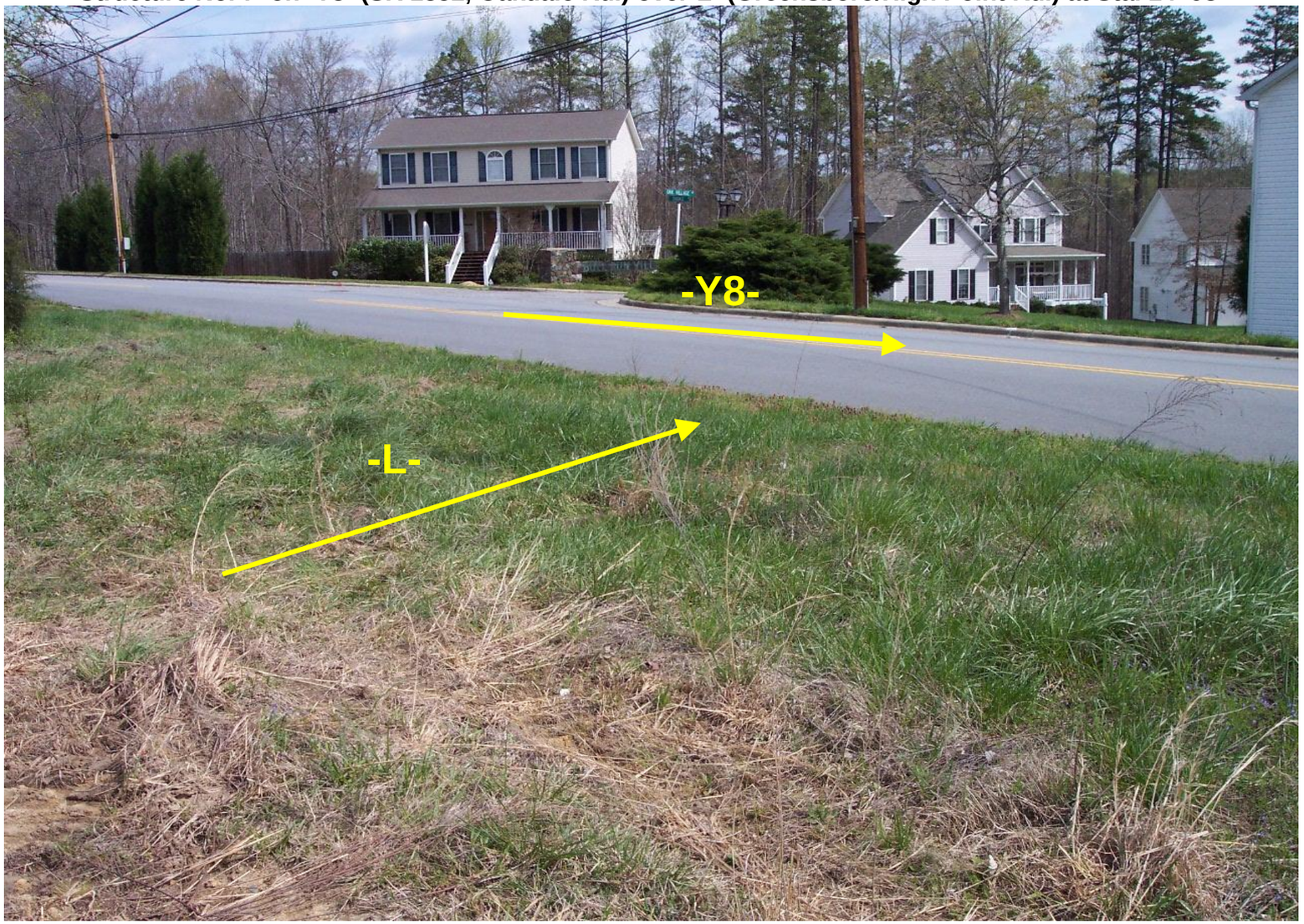
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	**38 RT**	**16+00**	**3.5-5.0**	**A-6(11)**	**38**	**13**	**1.8**	**24.1**	**47.9**	**26.1**	**100**	**99**	**82**	**-**	**-**
SS-2	**38 RT**	**16+00**	**13.5-15.0**	**A-4(5)**	**36**	**9**	**12.3**	**30.2**	**43.5**	**14.1**	**100**	**97**	**65**	**-**	**-**

CORE PHOTOGRAPH
B1-B
BOX 1: 40.7 - 44.7 FEET



Site Photograph

Structure No. 7 on -Y8- (SR 1352, Oakdale Rd.) over-L- (Greensboro/High Point Rd.) at Sta. 14+98



Looking East

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2412A	1	8

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY GUILFORD

PROJECT DESCRIPTION FOR BRIDGE OVER NSRR & DEEP RIVER TRIBUTARY ON SR 4121 BETWEEN SR 1332 AND SR 1334

SITE DESCRIPTION MSE WALL AT SITE 1, END BENT 1

REFERENCE: U-2412A

PROJECT: 34802

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

M. ELLIS, E.I.

K. PLUMMER

N. MCLAREN

S. CARPENTER

M&W DRILLING

HPC

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE MAY 2018

Prepared in the Office of:

ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1078

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:

5/17/2018

EC2ABBEE99DB48C...

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [x] DIEDRICH D-120
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [x] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [ ] TRICONE ____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [x] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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. 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 REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

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.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

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.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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 FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

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.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-157: N-814662.8619, E-1719563.3765

ELEVATION: 785.28 FEET

NOTES:

NORTHINGS AND EASTINGS OBTAINED WITH A TRIMBLE GEO 7X WITH SUB-METER ACCURACY.

WALL DESIGN PLANS & ELECTRONIC FILES PROVIDED BY NCDOT ON 02/26/18.

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-2412A	3

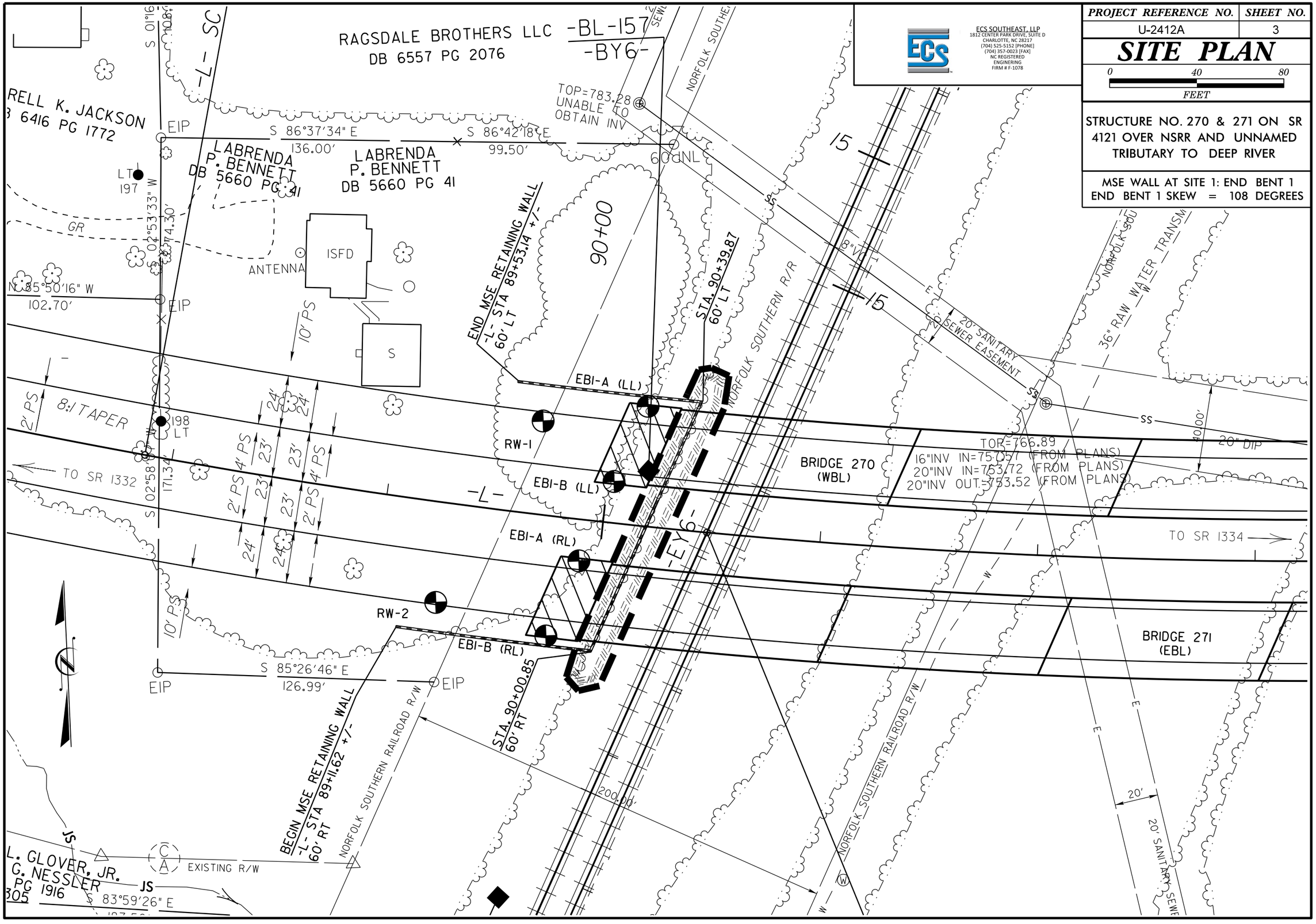
SITE PLAN

0 40 80
FEET

STRUCTURE NO. 270 & 271 ON SR 4121 OVER NSRR AND UNNAMED TRIBUTARY TO DEEP RIVER

MSE WALL AT SITE 1: END BENT 1
END BENT 1 SKEW = 108 DEGREES

ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINERING FIRM # F-1078

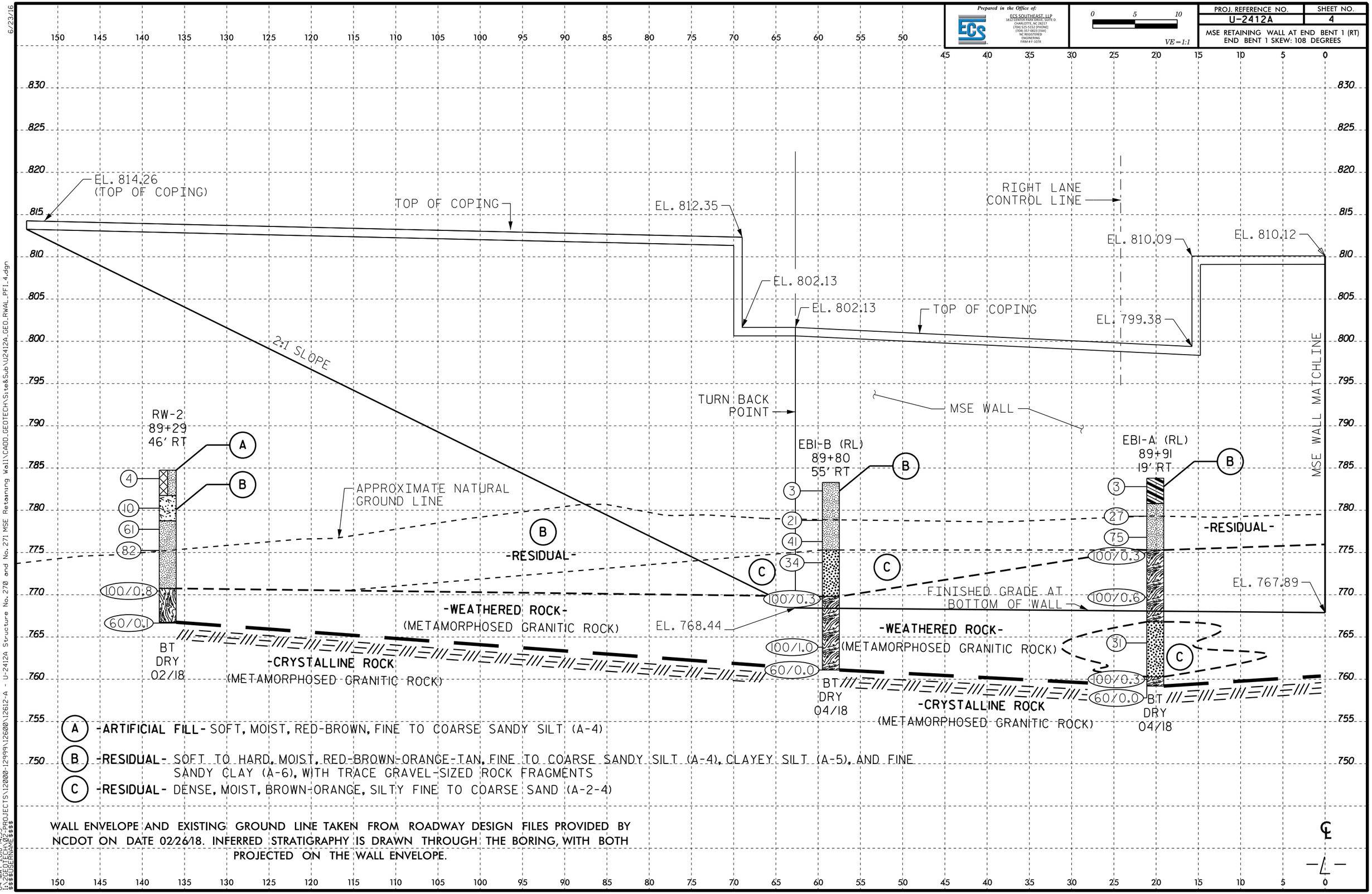


Prepared in the Office of:
ECS SOUTHEAST, LLP
1612 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-0708

0 5 10
VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	4

MSE RETAINING WALL AT END BENT 1 (RT)
END BENT 1 SKEW: 108 DEGREES



(A) -ARTIFICIAL FILL- SOFT, MOIST, RED-BROWN, FINE TO COARSE SANDY SILT (A-4)

(B) -RESIDUAL- SOFT TO HARD, MOIST, RED-BROWN-ORANGE-TAN, FINE TO COARSE SANDY SILT (A-4), CLAYEY SILT (A-5), AND FINE SANDY CLAY (A-6), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

(C) -RESIDUAL- DENSE, MOIST, BROWN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4)

WALL ENVELOPE AND EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 02/26/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE WALL ENVELOPE.

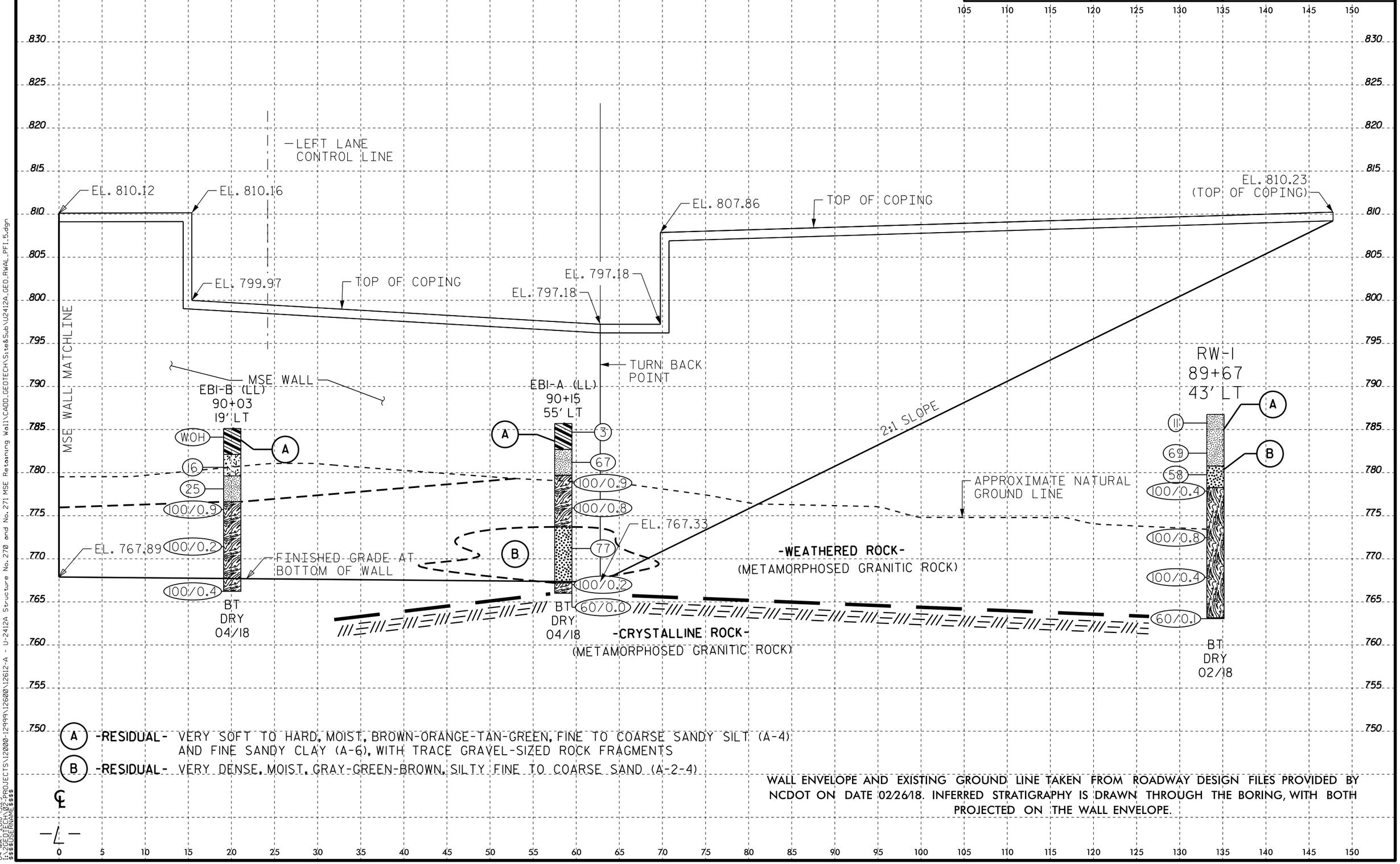
℄

Prepared in the Office of:
ECS SOUTHEAST, LLP
3832 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-0708

0 5 10
VE = 1:1

PROJ. REFERENCE NO.	SHEET NO.
U-2412A	5

MSE RETAINING WALL AT END BENT 1 (LT)
END BENT 1 SKEW: 108 DEGREES



(A) -RESIDUAL- VERY SOFT TO HARD, MOIST, BROWN-ORANGE-TAN-GREEN, FINE TO COARSE SANDY SILT (A-4) AND FINE SANDY CLAY (A-6), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

(B) -RESIDUAL- VERY DENSE, MOIST, GRAY-GREEN-BROWN, SILTY FINE TO COARSE SAND (A-2-4)

WALL ENVELOPE AND EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 02/26/18. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE WALL ENVELOPE.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. RW-1	**STATION** 89+67	**OFFSET** 43 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 786.8 ft	**TOTAL DEPTH** 23.7 ft	**NORTHING** 814,688	**EASTING** 1,719,516 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER B. Snow	**START DATE** 02/02/18	**COMP. DATE** 02/02/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790											
	786.8	0.0								786.8 GROUND SURFACE	0.0
785			1	5	6	11		M		**RESIDUAL** Stiff to Hard, Orange-Brown-Tan-Black, Fine to Coarse Sandy SILT (A-4)	
	783.3	3.5	18	28	41	69		M			
780	780.8	6.0	15	26	32	58		M		780.8 Very Dense, Tan-Black-Brown, Silty Fine to Coarse SAND (A-2-4)	6.0
	778.3	8.5	100/0.4			100/0.4				778.3 **WEATHERED ROCK** Tan-Brown (METAMPRPHOSED GRANITIC ROCK)	8.5
775											
	773.3	13.5	38	62/0.3		100/0.8					
770	768.3	18.5	100/0.4			100/0.4					
765	763.2	23.6	60/0.1			60/0.1				763.2 / 763.1 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK)	23.6 / 23.7

Boring Terminated with Standard Penetration Test Refusal at Elevation 763.1 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.
Weathered and Crystalline Rock Boulders / Outcrpos were observed in the Railroad Cut.

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary			**GROUND WTR (ft)**
BORING NO. EB1-A (LL)	**STATION** 90+15	**OFFSET** 55 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 785.7 ft	**TOTAL DEPTH** 19.7 ft	**NORTHING** 814,693	**EASTING** 1,719,564 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
790										
	785.7	0.0								785.7 GROUND SURFACE 0.0
785			1	1	2	3		M		**RESIDUAL** Soft, Brown-Orange, Fine Sandy CLAY (A-6)
	782.2	3.5	10	18	49	67		M		782.7 3.0 Hard, Brown-Green, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized quartz fragments
780	779.7	6.0	37	63/0.4		100/0.9				779.7 6.0 **WEATHERED ROCK** Gray-Brown-Green, (METAMORPHOSED GRANITIC ROCK)
	777.2	8.5	33	57	43/0.3	100/0.8				
775										773.7 12.0 **RESIDUAL** Very Dense, Gray-Green-Brown, Silty Fine to Coarse SAND (A-2-4)
	772.2	13.5	16	21	56	77		M		
770	767.2	18.5	100/0.2			100/0.2				767.2 18.5
	766.0	19.7	60/0.0			60/0.0				766.0 19.7 **WEATHERED ROCK** Gray-Greeen, (METAMORPHOSED GRANITIC ROCK)

Boring Terminated with Standard Penetration Test Refusal at Elevation 766.0 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis	
SITE DESCRIPTION Bridge No. 270 (WBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. EB1-B (LL)	**STATION** 90+03	**OFFSET** 19 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 785.2 ft	**TOTAL DEPTH** 18.9 ft	**NORTHING** 814,659	**EASTING** 1,719,547	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790											
785	785.2	0.0	WOH	WOH	WOH	0		W		785.2 GROUND SURFACE	0.0
										RESIDUAL Very Soft, Brown-Orange, Fine Sandy CLAY (A-6)	
	781.7	3.5	4	6	10	16		M		782.2 Very Stiff, Orange, Clayey SILT (A-5)	3.0
780	779.2	6.0	8	12	13	25		M		779.7 Very Stiff, Tan-Orange, Fine Sandy SILT (A-4)	5.5
	776.7	8.5	54	46/0.4		100/0.9				776.7 **WEATHERED ROCK** Gray-Green, (METAMORPHOSED GRANITIC ROCK)	8.5
775											
	771.7	13.5	100/0.2			100/0.2					
770											
	766.7	18.5	100/0.4			100/0.4				766.3 Boring Terminated at Elevation 766.3 ft In Weathered Rock (METAMORPHOSED GRANITIC ROCK)	18.9

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. EB1-A (RL)	**STATION** 89+91	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 783.8 ft	**TOTAL DEPTH** 24.6 ft	**NORTHING** 814,623	**EASTING** 1,719,529	**24 HR.** 21.5
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
785											
	783.8	0.0	WOH	1	2	3		W		783.8 GROUND SURFACE	0.0
										RESIDUAL Soft, Brown-Orange, Fine Sandy CLAY (A-6)	
780	780.3	3.5	8	13	14	27		M		780.8 Very Stiff to Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized rock fragments	3.0
	777.8	6.0	21	28	47	75		M			
775	775.3	8.5	100/0.3			100/0.3				775.3 **WEATHERED ROCK** Tan-Brown-Gray, (METAMORPHOSED GRANITIC ROCK)	8.5
770	770.3	13.5	64	36/0.1		100/0.6					
										766.8 **RESIDUAL** Dense, Brown, Silty Fine SAND (A-2-4)	17.0
765	765.3	18.5	7	10	21	31		M			
760	760.3	23.5	100/0.3			100/0.3				760.3	23.5
	759.2	24.6	60/0.0			60/0.0				759.2 **WEATHERED ROCK** Brown, (METAMORPHOSED GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 759.2 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	24.6

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** M. Ellis	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. EB1-B (RL)	**STATION** 89+80	**OFFSET** 55 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 783.3 ft	**TOTAL DEPTH** 22.2 ft	**NORTHING** 814,589	**EASTING** 1,719,513	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 85% 01/10/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Cain	**START DATE** 04/26/18	**COMP. DATE** 04/26/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785											
	783.3	0.0	2	1	2	3		M		783.3 GROUND SURFACE	0.0
780	779.8	3.5	8	9	12	21		M		**RESIDUAL** Soft to Hard, Orange-Brown, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments	
	777.3	6.0	13	16	25	41		M			
775	774.8	8.5	10	14	20	34		M		775.3 Dense, Brown-Orange, Silty Fine to Coarse SAND (A-2-4)	8.0
770	769.8	13.5	100/0.3			100/0.3				769.8 **WEATHERED ROCK** Tan-Brown, (METAMORPHOSED GRANITIC ROCK)	13.5
765	764.8	18.5	11	89/0.5		100/1.0					
	761.1	22.2	60/0.0			60/0.0				761.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 761.1 ft On Crystalline Rock (METAMORPHOSED GRANITIC ROCK)	22.2

WBS 34802.1.1	**TIP** U-2412A	**COUNTY** GUILFORD	**GEOLOGIST** S. Carpenter	
SITE DESCRIPTION Bridge No. 271 (EBL) on SR 4121 over NSRR and Unnamed Deep River Tributary				**GROUND WTR (ft)**
BORING NO. RW-2	**STATION** 89+29	**OFFSET** 46 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 784.8 ft	**TOTAL DEPTH** 18.1 ft	**NORTHING** 814,607	**EASTING** 1,719,463	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE M&W1491 Diedrich D-120-029 95% 06/02/2017		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER B. Snow	**START DATE** 02/02/18	**COMP. DATE** 02/02/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
785										
	784.8	0.0	1	1	3	4		M		784.8 GROUND SURFACE 0.0
780	781.3	3.5	5	3	7	10		M		**ARTIFICIAL FILL** Soft, Red-Brown, Fine to Coarse Sandy SILT (A-4) 781.8 3.0
	778.8	6.0	20	29	32	61		M		**RESIDUAL** Stiff, Red-Brown, Clayey SILT (A-5) 778.8 6.0
775	776.3	8.5	17	34	48	82		M		Hard, Orange-Brown, Fine Sandy SILT (A-4)
770	771.3	13.5	30	55	45/0.3	100/0.8				770.8 14.0 **WEATHERED ROCK** Orange-Brown (METAMORPHOSED GRANITIC ROCK)
	766.8	18.0	60/0.1			60/0.1				766.8 18.0 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITIC ROCK) 766.7 18.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 766.7 ft In Crystalline Rock (METAMORPHOSED GRANITIC ROCK)

Notes:
Surficial Organics Soils from 0.0 to 0.2 ft.
Weathered and Crystalline Rock Boulders / Outcrops were observed in the Railroad Cut.