STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5825	1	4

REFERENCE: B-5825

PROJECT: 45778

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *FORSYTH*

SITE DESCRIPTION *STRUCTURE BP-034-2103 ON SR 1600 (DONNAHA RD) BETWEEN NC 67 (REYNOLDA RD) AND SR 1602 (MARTIN FERRY RD)*

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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C.L. SMITH

B. FOSTER

INVESTIGATED BY *J.K. STICKNEY*

DRAWN BY *J.E. BEVERLY*

CHECKED BY *JEB /KBM*

SUBMITTED BY *K.B. MILLER*

DATE *APRIL 2019*

NORTH CAROLINA LICENSED SEAL 2029 GEOLOGIST KEVIN BENNETT MILLER

DocuSigned by:

957A789AED704CB...

SIGNATURE

10/14/2019

DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5825	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 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX			— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
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
	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
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-550X
- [ ] _____

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: BY-26 - N 900709.0862 E 1578216.2099, STA. 12+13.49

ELEVATION: 756.6 FEET

NOTES:

FIAD= FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5825	03

RW SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

-L-

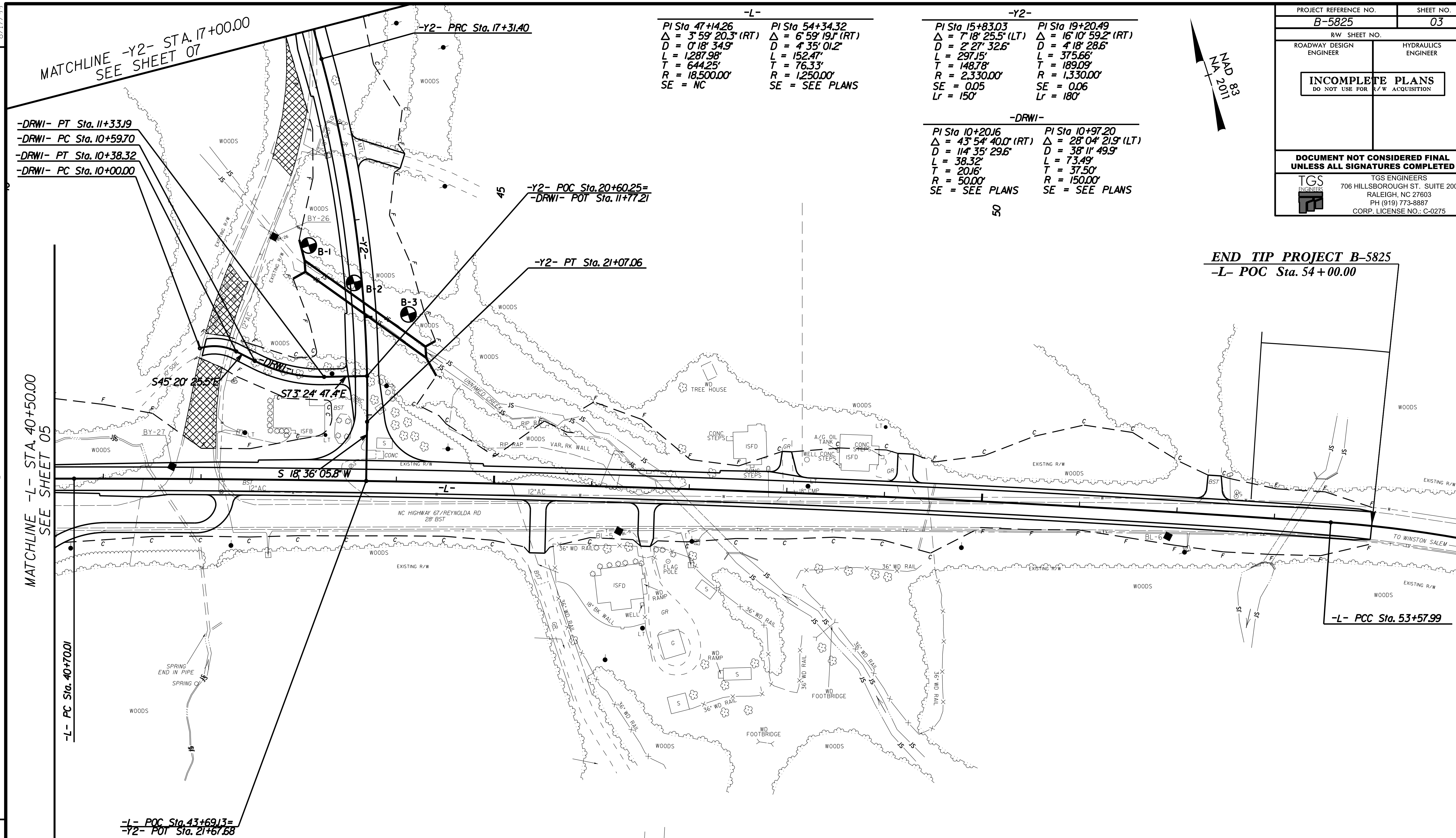
PI Sta 47+14.26	PI Sta 54+34.32
Δ = 3° 59' 20.3" (RT)	Δ = 6° 59' 19.1" (RT)
D = 0° 18' 34.9"	D = 4° 35' 01.2"
L = 1,287.98'	L = 152.47'
T = 644.25'	T = 76.33'
R = 18,500.00'	R = 1,250.00'
SE = NC	SE = SEE PLANS

-Y2-

PI Sta 15+83.03	PI Sta 19+20.49
Δ = 7° 18' 25.5" (LT)	Δ = 16° 10' 59.2" (RT)
D = 2° 27' 32.6"	D = 4° 18' 28.6"
L = 297.15'	L = 375.66'
T = 148.78'	T = 189.09'
R = 2,330.00'	R = 1,330.00'
SE = 0.05	SE = 0.06
Lr = 150'	Lr = 180'

-DRW1-

PI Sta 10+20.16	PI Sta 10+97.20
Δ = 43° 54' 40.0" (RT)	Δ = 28° 04' 21.9" (LT)
D = 114° 35' 29.6"	D = 38° 11' 49.9"
L = 38.32'	L = 73.49'
T = 20.16'	T = 37.50'
R = 50.00'	R = 150.00'
SE = SEE PLANS	SE = SEE PLANS



-Y2-
DONNAHA RD

		1,933 / 2,100
	1,217 / 1,300	717 / 800
-L- NC 67		-L- NC 67
	5,100 / 5,600	4,600 / 5,100
		2020 / 2040 ADT

SEE SHEET 10 FOR -Y2- PROFILE
SEE SHEET 09 FOR -L- & -DRW1- PROFILES

REVISIONS

8/17/99

10-OCT-2019 08:36

0	20	40

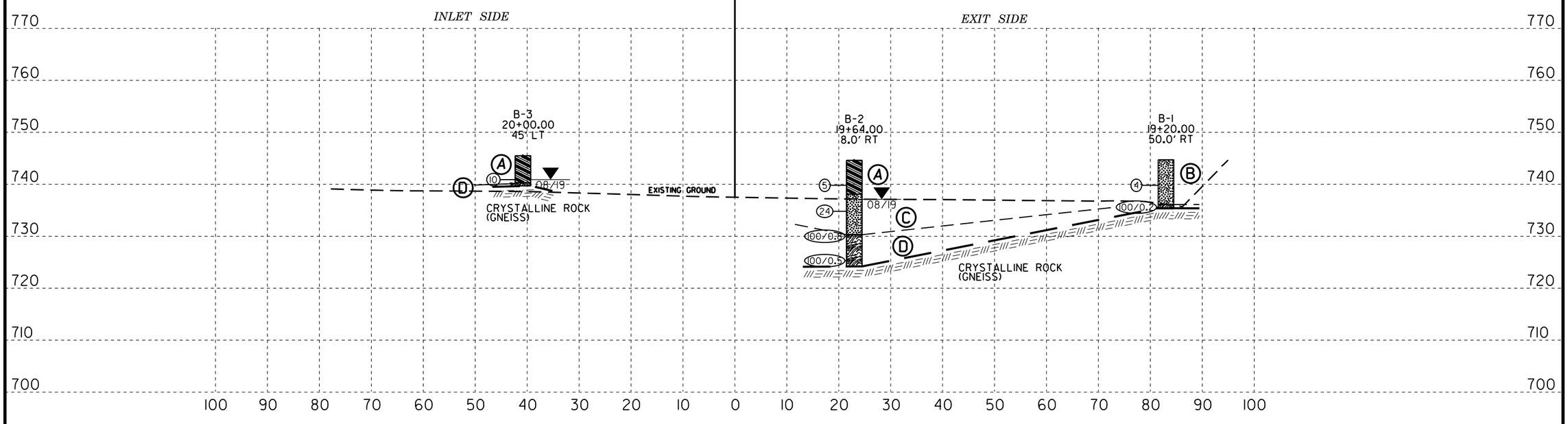
FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET NO.
45778.1.1	4

PROFILE ALONG CENTERLINE OF PROPOSED CULVERT
SKEW = 129 DEGREES

19+90.68
-Y2-



(A) ALLUVIAL- MEDIUM STIFF TO STIFF, RED-ORANGE, SILTY SANDY CLAY

(B) ALLUVIAL - LOOSE, RED-ORANGE, CLAYEY SILTY SAND

(C) RESIDUAL - MEDIUM DENSE, TAN-WHITE, CLAYEY SILTY SAND WITH SOME MICA

(D) WEATHERED CRYSTALLINE ROCK (GNEISS)

REFERENCE: B-5825

PROJECT: 45778

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5825	1	46

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *YADKIN*

PROJECT DESCRIPTION *BRIDGE NO. 35 ON NC 67 OVER YADKIN 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.

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 THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

INVESTIGATED BY *J.K. STICKNEY*

DRAWN BY *S. PAPKE/C. DRISCOLL*

CHECKED BY *J.E. BEVERLY*

SUBMITTED BY *K.B. MILER*

DATE *NOVEMBER 2019*

Prepared in the Office of:

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Bright People. Right Solutions.
7343 WEST FRIENDLY AVE.
GREENSBORO, NC 27410
NC FIRM LICENSE NO. F-1312

NORTH CAROLINA LICENSED SEAL 2029 GEOLOGIST KEVIN BENNETT MILLER

DocuSigned by:
957A789AED704CB...

11/13/2019

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5825	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 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	6 MX			NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
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
	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:
- [X] CME-45C
- [ ] CME-55
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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: SEE NOTES

ELEVATION: N/A FEET

NOTES: FIAD - FILLED IMMEDIATELY AFTER DRILLING

B5825-2 GPS AT STA. 18+18.53 -L- (900,836 FT. N., 1,576,810 FT. E.)
ELEVATION: 769.45
BL-4 AT STA. 29+61.97 -L- (900,488 FT. N., 1,577,899 FT. E.)
ELEVATION: 769.60
BY-26 AT STA. 12+13.49 -L- (900,709 FT. N., 1,578,216 FT. E.)
ELEVATION: 756.60

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5825	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

- INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
- BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
- VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
- BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
- DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
- LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ⇩

SURFACE CONDITIONS

- **VERY GOOD** Very rough, fresh unweathered surfaces
- **GOOD** Rough, slightly weathered, iron stained surfaces
- **FAIR** Smooth, moderately weathered and altered surfaces
- **POOR** Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments
- **VERY POOR** Slickensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY ⇨

	VERY GOOD	GOOD	FAIR	POOR	VERY POOR
90			N/A	N/A	
80					
70					
60					
50					
40					
30					
20					
10					N/A
	N/A	N/A			

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

- **A.** *Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.*
- **B.** *Sandstone with thin interlayers of siltstone*
- **C.** *Sandstone and siltstone in similar amounts*
- **D.** *Siltstone or silty shale with sandstone layers*
- **E.** *Weak siltstone or clayey shale with sandstone layers*
- **C, D, E,** and **G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H.**
- **F.** *Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure*
- **G.** *Undisturbed silty or clayey shale with or without a few very thin sandstone layers* → **H.** ***Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.***

→ Means deformation after tectonic disturbance

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

- **VERY GOOD** - Very Rough, fresh unweathered surfaces
- **GOOD** - Rough, slightly weathered surfaces
- **FAIR** - Smooth, moderately weathered and altered surfaces
- **POOR** - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments
- **VERY POOR** - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

	VERY GOOD	GOOD	FAIR	POOR	VERY POOR
70					
60		A			
50					
40		B	C	D	E
30					
20				F	
10			G		H

DATE: 8-19-16

PROJECT REFERENCE NO.	SHEET NO.
B-5825	3

SITE PLAN

0 60 120
FEET

SKEW: 90°

-Y1- PRC Sta. 10+48.94
-Y1- POC Sta. 10+61.19=
-DRW2- POT Sta. 10+00.00

-DRW2- PC Sta. 10+15.91
-DRW2- PT Sta. 11+16.31
-DRW2- PC Sta. 11+52.01

-DRW2- PT Sta. 12+21.85
END ASPHALT PAVING
END CONSTRUCTION
-DRW2- POT Sta. 12+85.31

-Y1- PT Sta. 11+75.91

-L- POC Sta. 27+33.00=
-Y1- POT Sta. 11+97.97

-L- PT Sta. 28+29.24

BEGIN BRIDGE
-L- POT 29+31.67

-L- BRIDGE NO. 35

MATCHLINE 35+00.00

TO NC HIGHWAY 67

DONNAHA PARK RD SR 1607

BM2

BY-24

BY-23

BY-22

BY-21

BL-3

MTL GATE

PICNIC SHELTER

WOODS

GR

SOIL

JS

36" 4SBW

36" CHL

24" CMP

WD POST & CABLE

19' BST

20' GR

BST

CONC

CONC MAY EXTEND (FILL ENCOUNTERED)

CONC SLOPE PROTECTION

24"CONC(SIDEWALK)

GPS B5825-2

CONC SPIGOT

NC HIGHWAY 67
23' BST

EB1-A EB1-B B1-A B1-B B2-A B2-B B3-A B3-B B4-A B4-B

30 34

PROJECT REFERENCE NO.	SHEET NO.
B-5825	4

SITE PLAN

0 60 120

FEET

SKEW: 90°

MATCHLINE STA. 35+00.00

FORSYTH COUNTY
YADKIN COUNTY

YADKIN RIVER

WOODS

B5-A B6-A B7-A B8-A EB2-A

B5-B B6-B B7-B B8-B EB2-B

36 40 41

BY-27

ISFB

HT LT

DONNAHA RD SR

24' BS

26'

10' SOIL

30" RCP

BL-4

GR

18" CMP

SPRING
END IN PIPE

SPRING

JS

END BRIDGE
-L- POT 39+98.33

YADKIN COUNTY
FORSYTH COUNTY

YADKIN RIVER

PROF

PROJECT REFERENCE NO.	SHEET NO.
B-5825	5

PROFILE OF BRIDGE NO. 35 ALONG -L-

0 50 100
FEET
VE = 5:1

(A) **ROADWAY EMBANKMENT:**
MOIST, MEDIUM STIFF, TAN TO ORANGE, CLAYEY SILT, HIGHLY MICACEOUS

(B) **ALLUVIAL:**
MOIST, MEDIUM STIFF TO STIFF, BROWN, GRAY, AND ORANGE, SANDY CLAY WITH TRACE MICA AND GRAVEL LAYER

(C) **RESIDUAL:**
MOIST, LOOSE TO VERY DENSE, TAN, YELLOW, ORANGE, GRAY, AND WHITE CLAYEY FINE SAND TO SILTY SAND, HIGHLY MICACEOUS

(D) **ALLUVIAL:**
MOIST, VERY LOOSE TO MEDIUM DENSE, BROWN, TAN, GRAY, AND ORANGE, SILTY FINE SAND TO SANDY GRAVEL WITH TRACE MICA AND ROUNDED QUARTZ FRAGMENTS

(E) **RESIDUAL:**
DRY, BROWN, FINE SANDY GRAVEL

(F) **CRYSTALLINE ROCK:**
GRANITIC GNEISS

EXISTING GROUNDLINE

EBI-B
29+32
36' RT

BT
FIAD
08/19

B1-B
30+68
23' RT

BT

B2-B
31+82
21' RT

BT

B3-B
33+08
21' RT

BT

B4-B
34+33
12' RT

BT

08/19

2/19/19
8/7/19
8/6/19

REC: 78%
RQD: 49%
GSI: 80-85

REC: 93%
RQD: 80%
GSI: 85-95

REC: 95%
RQD: 88%
GSI: 90-94

WEATHERED ROCK:
GRAY, WHITE, AND BLACK GRANITIC GNEISS

CRYSTALLINE ROCK:
FRESH TO SEVERE WEATHERING, HARD TO VERY HARD, WHITE, GRAY, AND BLACK, GRANITIC GNEISS TO BIOTITE GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACINGS

RESIDUAL:
BROWN, SILTY FINE SAND

NOTES: GROUNDLINE TAKEN FROM PROJECT TIN FILE B5825_LS_TIN.TIN RECIEVED ON 9/24/19.

MATCHLINE STA. 35+50.00

780 770 760 750 740 730 720 710 700 690 680

28+00 28+50 29+00 29+50 31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00 35+50

PROJECT REFERENCE NO.	SHEET NO.
B-5825	6

PROFILE OF BRIDGE NO. 35
ALONG -L-

0 50 100
FEET
VE = 5:1

Ⓐ **ALLUVIAL:**
MOIST, VERY LOOSE, TAN AND BROWN, SILTY FINE SAND

Ⓑ **ALLUVIAL**
MOIST TO WET, VERY SOFT TO VERY STIFF, GRAY TO TAN AND BROWN, SILTY CLAY TO SANDY CLAY WITH TRACE MICA

Ⓒ **ROADWAY EMBANKMENT:**
MOIST, LOOSE TO MEDIUM DENSE, GRAY, WHITE, TAN, BROWN AND ORANGE, SILTY FINE SAND WITH TRACE GRAVEL AND MICA

Ⓓ **ALLUVIAL:** GRAVEL

MATCHLINE STA. 35+50.00

EXISTING GROUNDLINE

B5-B
35+69
12' RT
2/19/19
8/6/19
8/7/19
REC: 98%
RQD: 92%
GSI: 90-92
BT

B6-B
36+84
19' RT
REC: 95%
RQD: 81%
GSI: 85-95
BT

B7-B
38+08
14' RT
08/19
REC: 100%
RQD: 76%
GSI: 86-95
BT

B8-B
39+34
19' RT
08/19
REC: 95%
RQD: 87%
GSI: 92-95
BT

EB2-B
40+03
35' RT
BT
FIAD

WEATHERED ROCK:
GRAY AND WHITE GRANITIC GNEISS

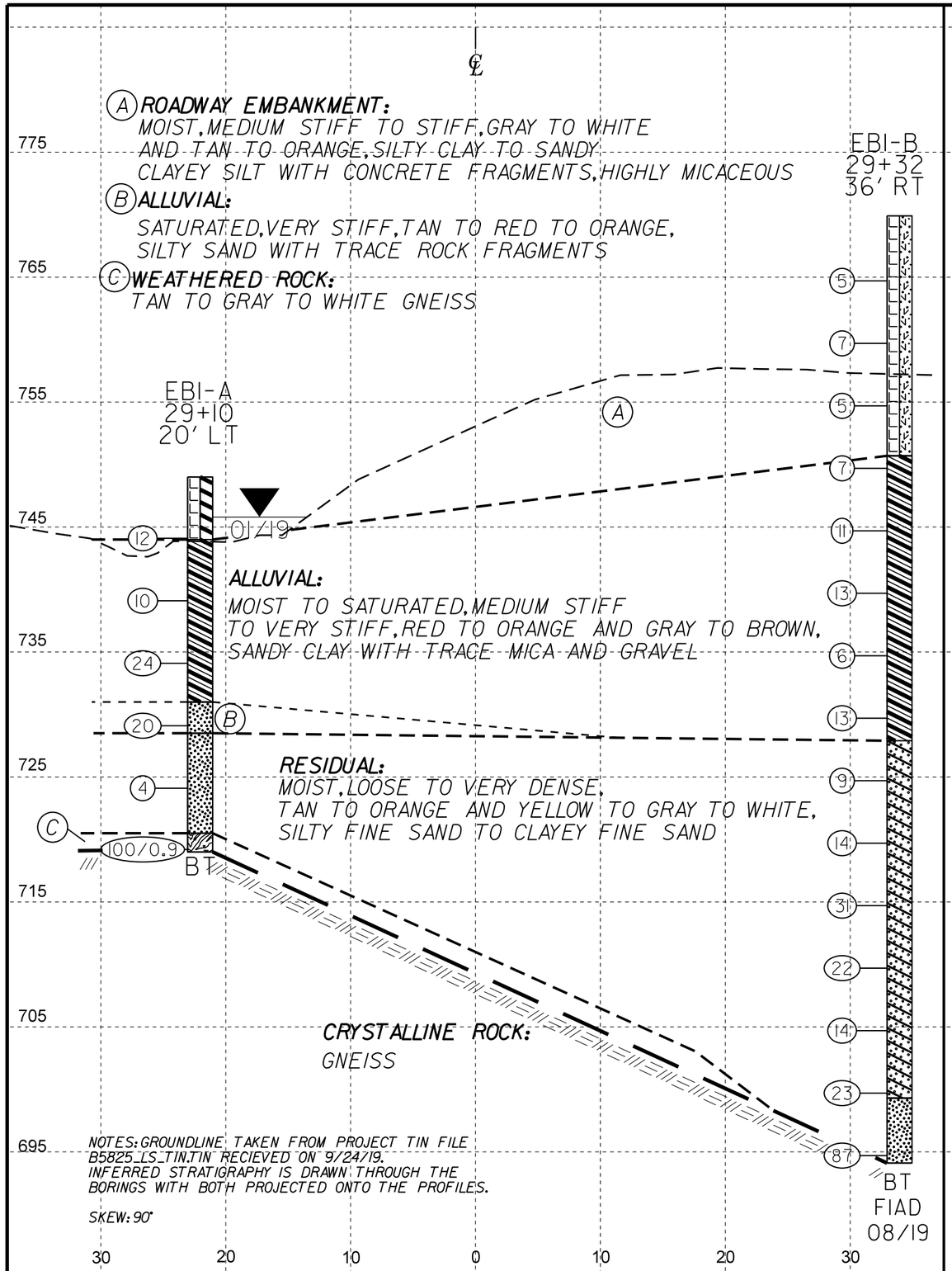
CRYSTALLINE ROCK:
FRESH TO SEVERE WEATHERING, HARD TO VERY HARD, WHITE, GRAY, AND BLACK, GRANITIC GNEISS TO BIOTITE GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACINGS

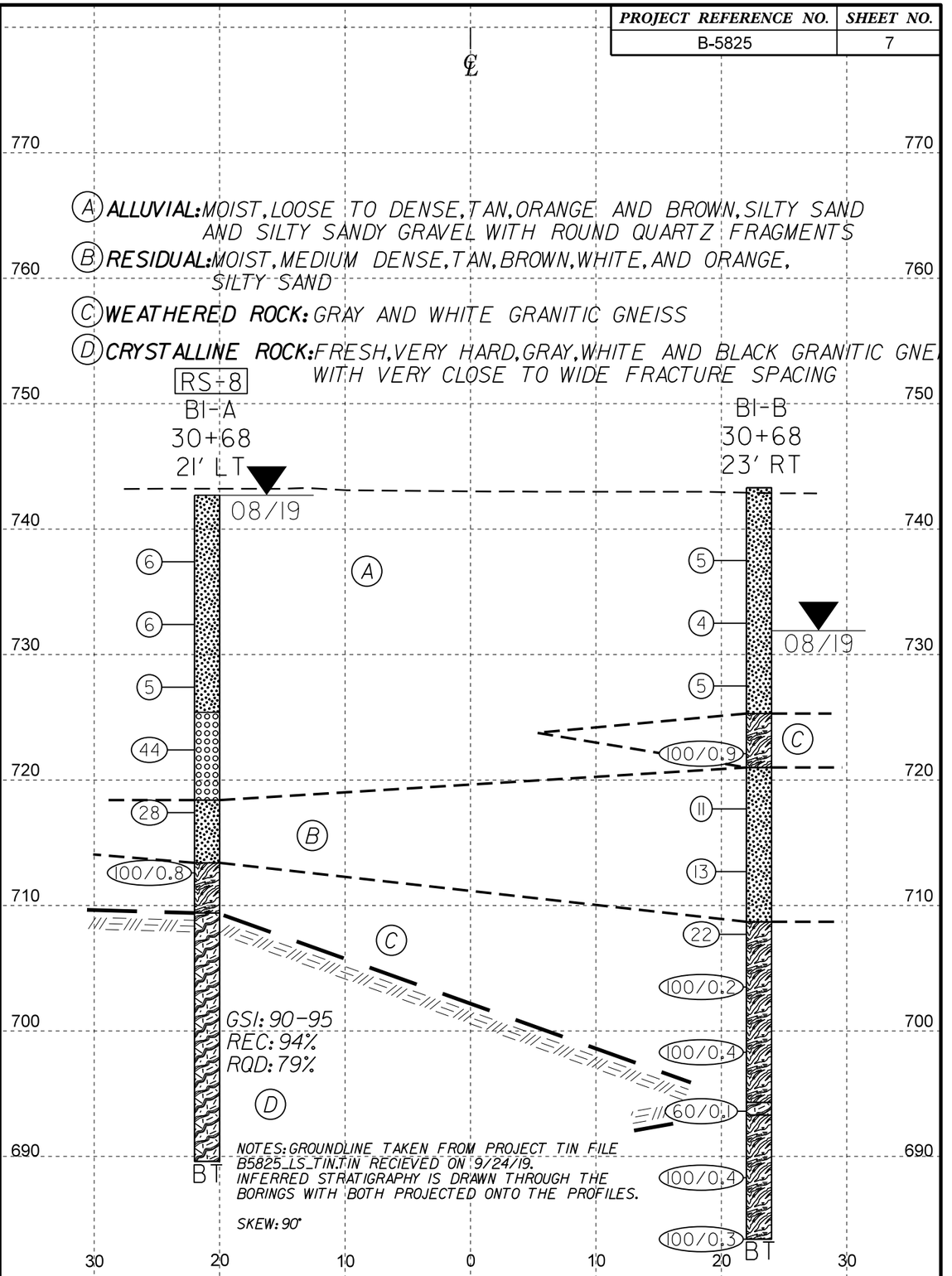
NOTES: GROUNDLINE TAKEN FROM PROJECT TIN FILE B5825_LS_TIN.TIN RECIEVED ON 9/24/19.

780 770 760 750 740 730 720 710 700 690 680

35+50 36+00 36+50 37+00 37+50 38+00 38+50 39+00 39+50 40+00 40+50 41+00 41+50 42+00

PROJECT REFERENCE NO.	SHEET NO.
B-5825	7





PROJECT REFERENCE NO.	SHEET NO.
B-5825	8

℄

(A) **ALLUVIAL:** MOIST, LOOSE TO MEDIUM DENSE, BROWN AND TAN, SILTY FINE SAND AND SILTY, FINE SANDY GRAVEL

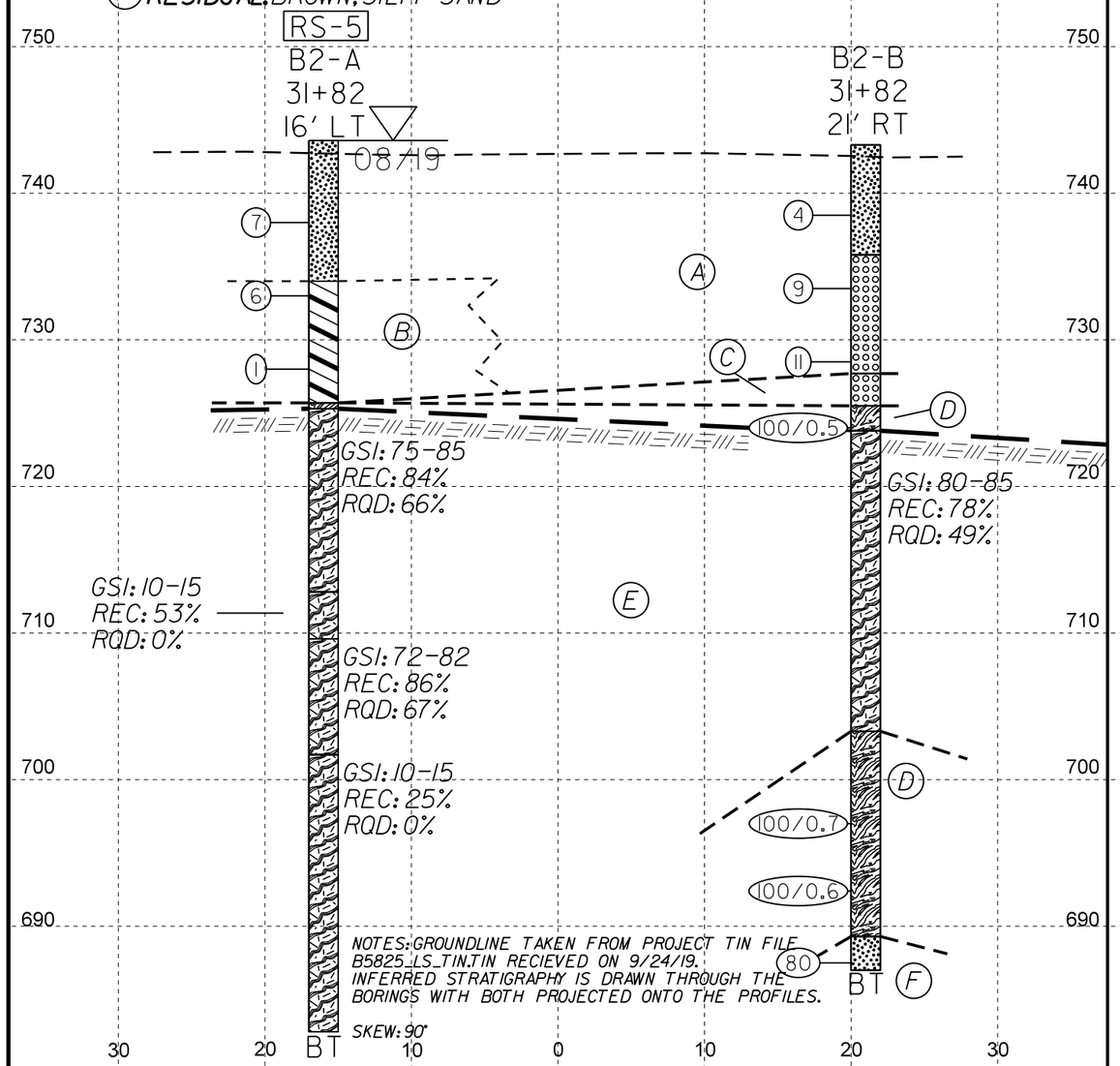
(B) **ALLUVIAL:** MOIST, MEDIUM STIFF TO VERY SOFT, BROWN AND TAN, SILTY, SANDY CLAY

(C) **RESIDUAL:** DRY, BROWN, SILTY, FINE SANDY GRAVEL

(D) **WEATHERED ROCK:** GRANITIC GNEISS

(E) **CRYSTALLINE ROCK:** FRESH TO COMPLETELY WEATHERED, VERY SOFT TO VERY HARD, WHITE, GRAY TO BLACK GRANITIC GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACING

(F) **RESIDUAL:** BROWN, SILTY SAND



HORIZ. SCALE (FEET) 0 10 20 | VE = 1:1

CROSS SECTION ALONG BENT 2 AT 31+83.00

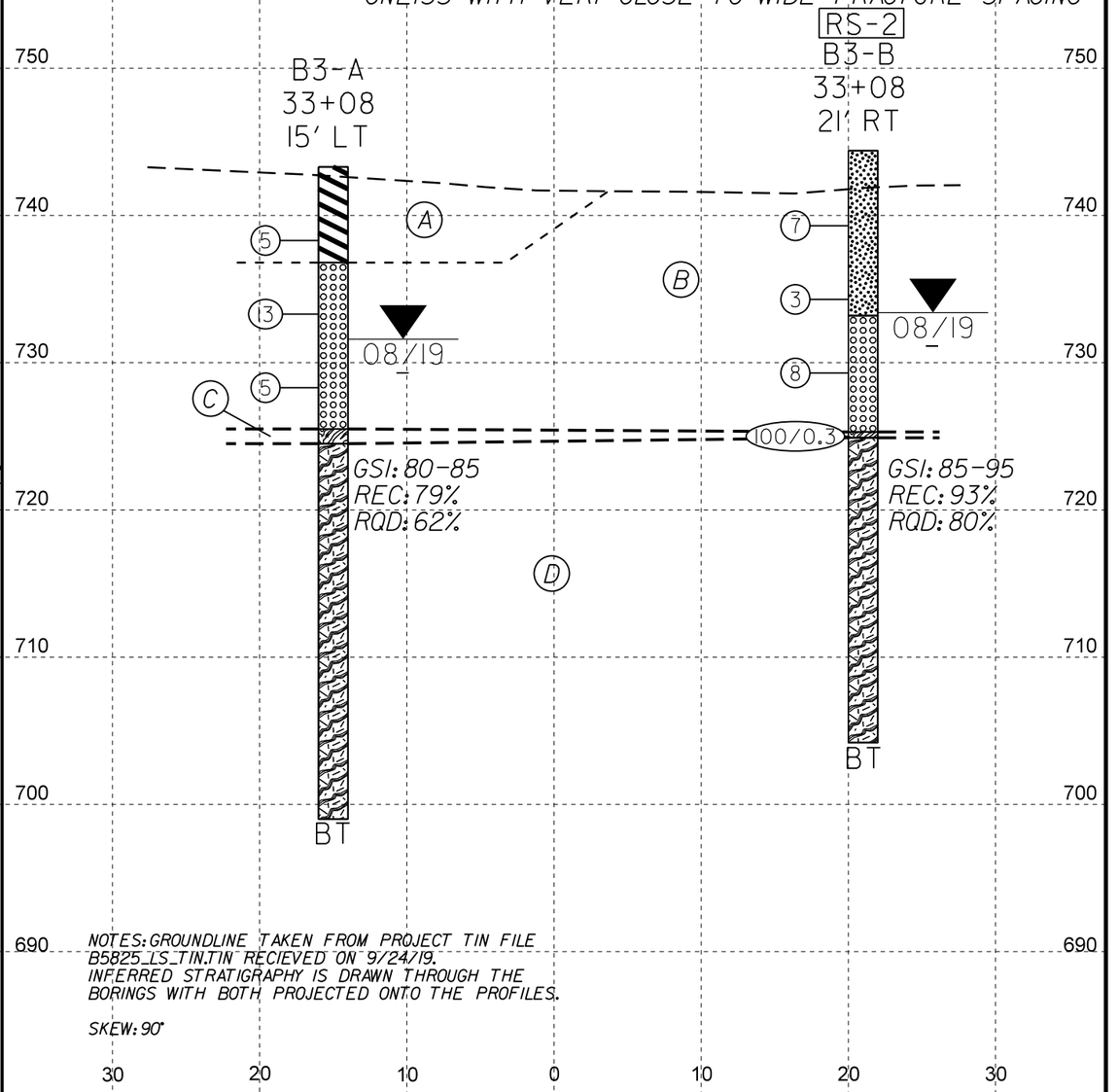
℄

(A) **ALLUVIAL:** MOIST, MEDIUM STIFF TO STIFF, TAN BROWN, SANDY, SILTY CLAY

(B) **ALLUVIAL:** MOIST, LOOSE AND MEDIUM DENSE, BROWN AND TAN, SILTY SAND AND SILTY, SANDY GRAVEL

(C) **WEATHERED ROCK:** GRAY, WHITE AND BLACK GRANITIC GNEISS

(D) **CRYSTALLINE ROCK:** SLIGHT WEATHERING TO FRESH, HARD TO VERY HARD, GRAY, WHITE AND BLACK, GRANITIC GNEISS AND META-BIOTITE GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACING



HORIZ. SCALE (FEET) 0 10 20 | VE = 1:1

CROSS SECTION ALONG BENT 3 AT STA. 33+08.00

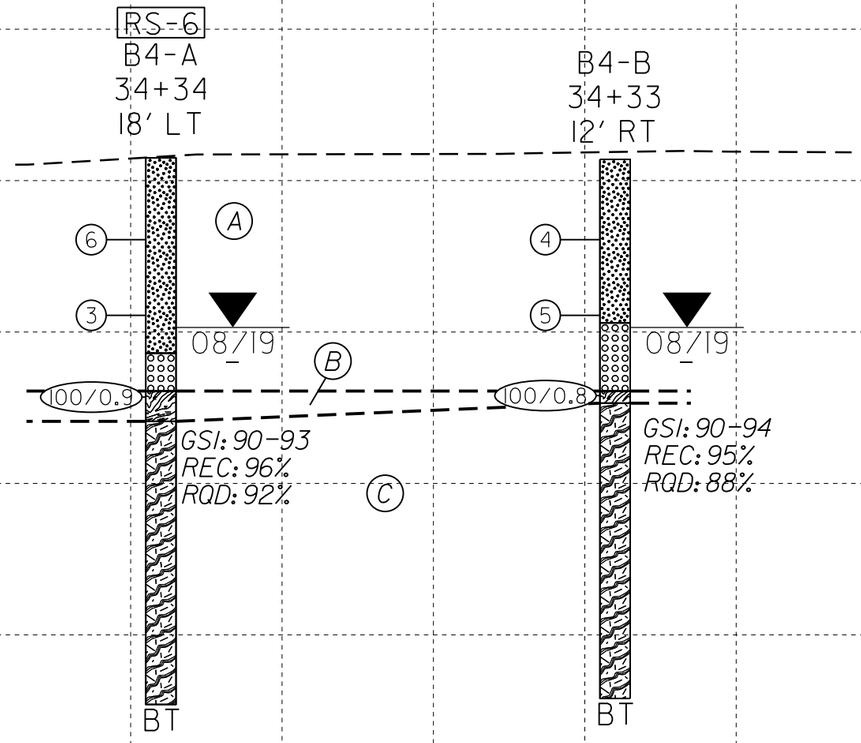
PROJECT REFERENCE NO.	SHEET NO.
B-5825	9

℄

(A) **ALLUVIAL:** *MOIST, LOOSE TO VERY LOOSE, TAN BROWN, SILTY SAND AND GRAVEL WITH TRACE MICA*

(B) **WEATHERED ROCK:** *GRAY AND WHITE GRANITIC GNEISS*

(C) **CRYSTALLINE ROCK:** *FRESH, VERY HARD, GRAY, WHITE AND BLACK, GRANITIC GNEISS WITH CLOSE TO WIDE FRACTURE SPACING*



NOTES: GROUNDLINE TAKEN FROM PROJECT TIN FILE B5825_LS_TIN.TIN RECIEVED ON 9/24/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILES.

SKEW: 90°

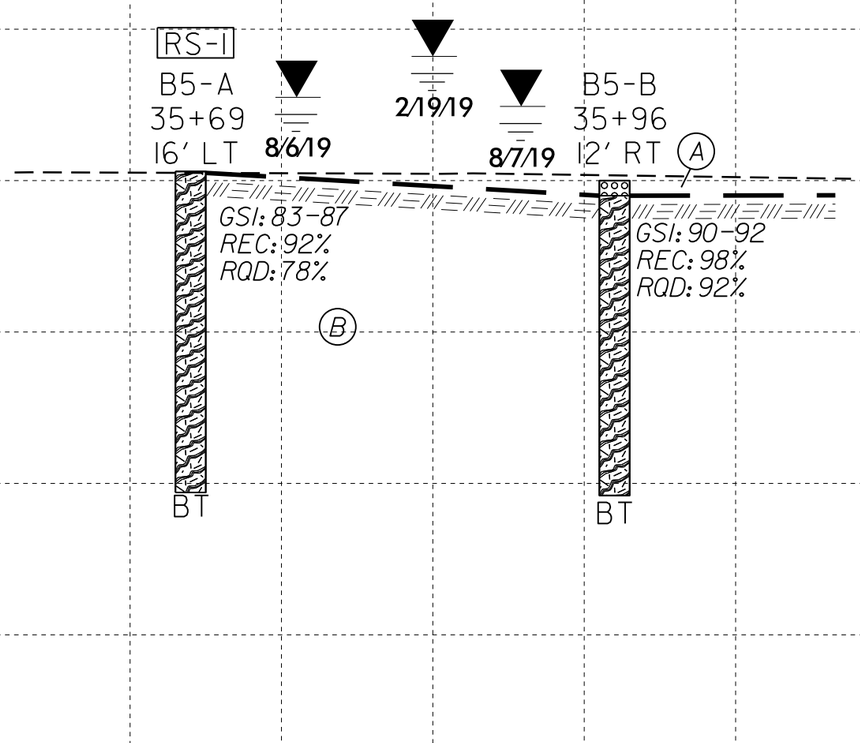
HORIZ. SCALE (FEET) 0 10 20 — VE = 1:1

CROSS SECTION ALONG BENT 4 AT 34+33.00

℄

(A) **ALLUVIAL:** *SAND, COBBLES AND GRAVEL*

(B) **CRYSTALLINE ROCK:** *VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, GRAY, WHITE AND BLACK GRANITIC GNEISS WITH CLOSE TO WIDE FRACTURE SPACING*



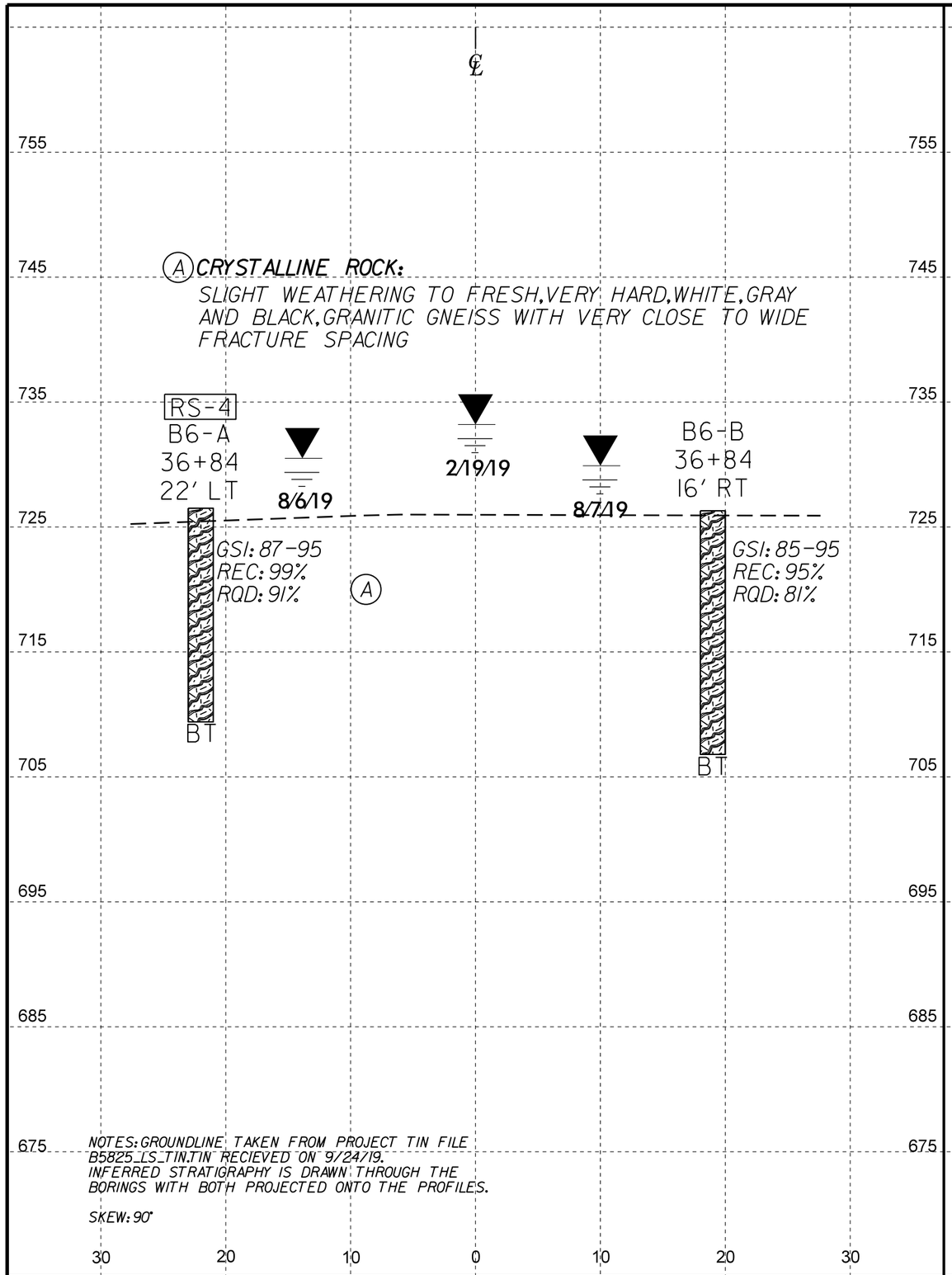
NOTES: GROUNDLINE TAKEN FROM PROJECT TIN FILE B5825_LS_TIN.TIN RECIEVED ON 9/24/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILES.

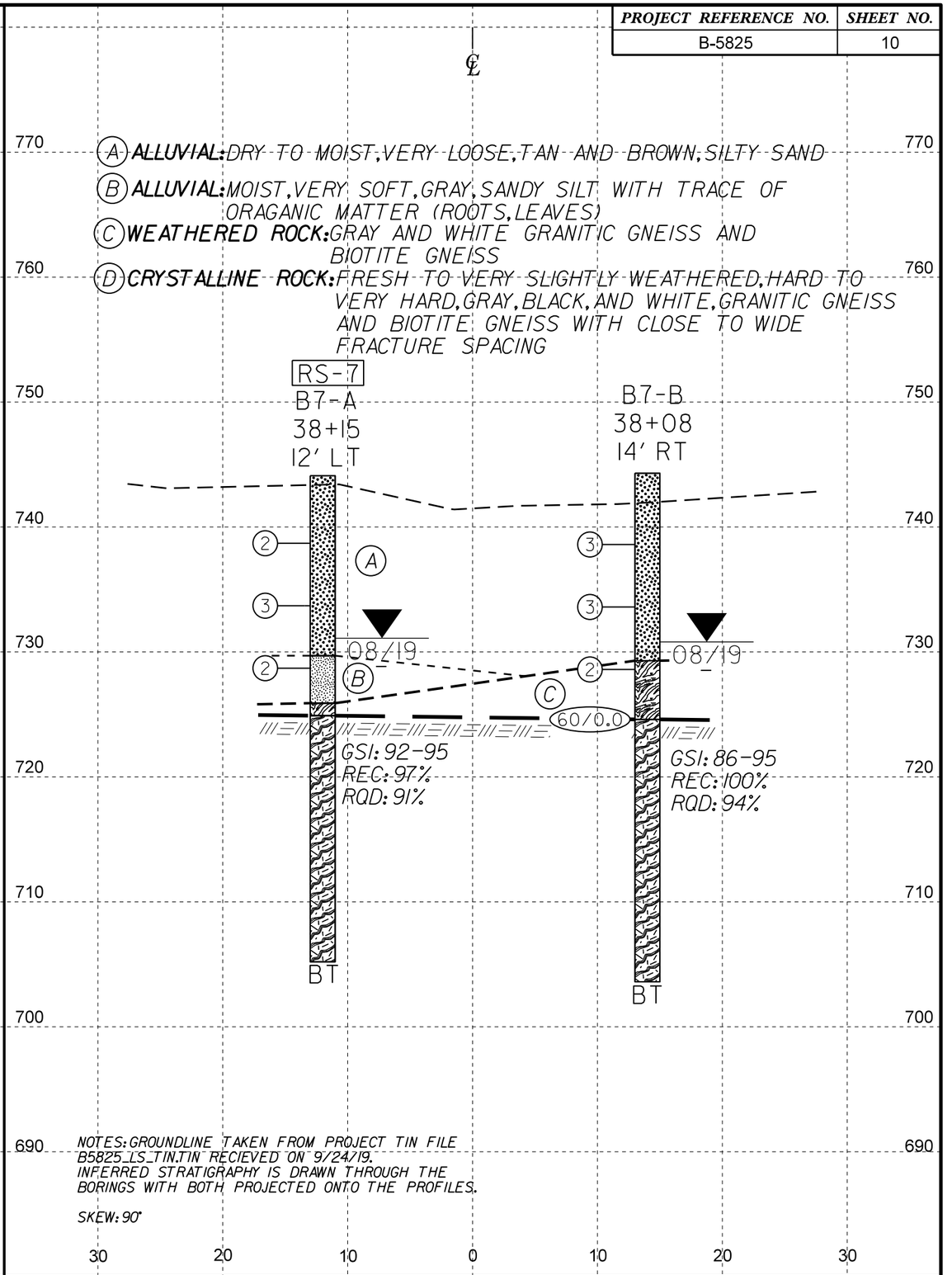
SKEW: 90°

HORIZ. SCALE (FEET) 0 10 20 — VE = 1:1

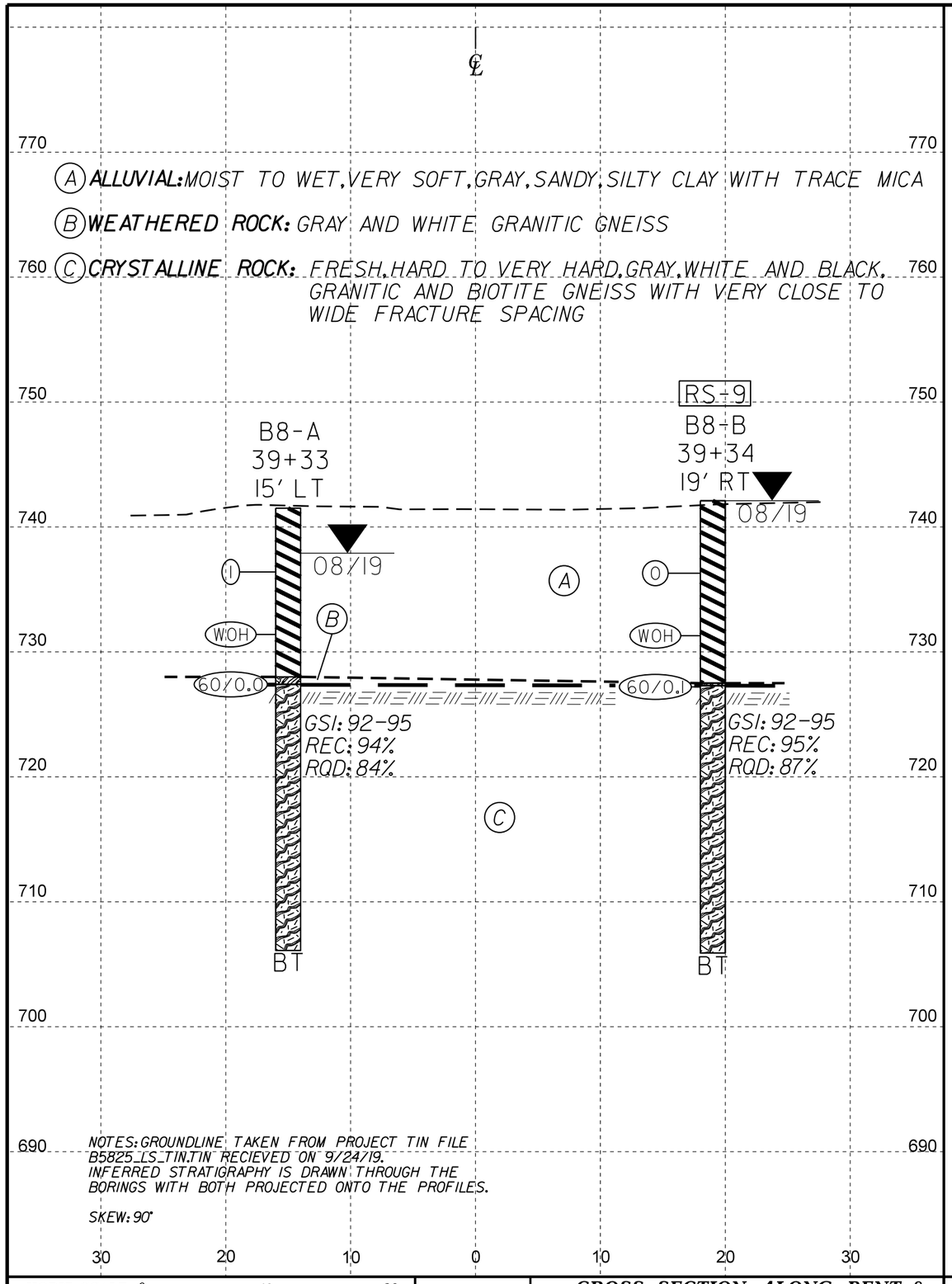
CROSS SECTION ALONG BENT 5 AT STA. 35+58.00

PROJECT REFERENCE NO.	SHEET NO.
B-5825	10





PROJECT REFERENCE NO.	SHEET NO.
B-5825	11



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION ALONG BENT 8 AT 39+33.00

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PROJECT REFERENCE NO.	SHEET NO.
B-5825	12

℄

(A) **ALLUVIAL:**
MOIST, VERY LOOSE, TAN AND ORANGE, SILTY SAND

(B) **ALLUVIAL:**
GRAVEL

(C) **ROADWAY EMBANKMENT:**
MOIST, LOOSE AND MEDIUM DENSE, GRAY TO WHITE, TAN AND ORANGE, SILTY FINE SAND WITH TRACE GRAVEL AND MICA

EB2-A
39+96
45' LT

EB2-B
40+03
35' RT

MOIST, SOFT TO VERY STIFF, GRAY TO TAN AND BROWN, SANDY, SILTY CLAY AND SILTY, SANDY CLAY WITH TRACE MICA

WEATHERED ROCK: GRAY TO WHITE, GRANITIC GNEISS

CRYSTALLINE ROCK:
GRAY AND WHITE, GRANITIC GNEISS

BT
FIAD

BT
FIAD

NOTES: GROUNDLINE TAKEN FROM PROJECT TIN FILE B5825_LS_TIN.TIN RECIEVED ON 9/24/19.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILES.

SKEW: 90°

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION ALONG END BENT 2 AT 39+98.33

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 29+10	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.0
COLLAR ELEV. 749.0 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 900,906	**EASTING** 1,576,846	**24 HR.** 3.2
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 01/29/19	**COMP. DATE** 01/29/19	**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)
750										749.0 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT Gray to White, Silty CLAY (A-7-5) with Concrete Fragments
745	745.1	3.9	1	10	2	12		M		744.0 5.0
										ALLUVIAL Red to Orange, Sandy CLAY (A-6)
740	740.1	8.9	3	4	6	10		W		
735	735.1	13.9	7	14	10	24		Sat.		731.0 18.0
										Tan to Red to Orange, Silty SAND (A-2-4) with Rock Fragments
730	730.1	18.9	6	10	10	20		Sat.		728.5 20.5
										RESIDUAL Tan to Orange, Silty SAND (A-2-4)
725	725.1	23.9	1	2	2	4		M		
720	720.1	28.9	11	89/0.4		100/0.9				720.5 28.5
										WEATHERED ROCK Tan to Gray to White, GNEISS 719.0 30.0
										Boring Terminated by Auger Refusal at Elevation 719.0 ft on CRYSTALLINE ROCK: GNEISS

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 29+32	**OFFSET** 36 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. 769.9 ft	**TOTAL DEPTH** 75.8 ft	**NORTHING** 900,846	**EASTING** 1,576,850	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/28/19	**COMP. DATE** 08/29/19	**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)
770										769.9 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT Tan, Orange, Sandy, Clayey SILT (A-5) Highly Micaceous
765	765.7	4.2	3	3	2	5		M		
760	760.7	9.2	3	3	4	7		M		
755	755.7	14.2	2	2	3	5		M		
750	750.7	19.2	3	3	4	7		M		750.7 19.2
										ALLUVIAL Brown, Gray and Orange, Sandy CLAY (A-6) with Trace Mica and Gravel Layer (37.8-40.7')
745	745.7	24.2	3	3	8	11		M		
740	740.7	29.2	3	6	7	13		M		
735	735.7	34.2	2	3	3	6		M		
730	730.7	39.2	31	8	5	13		M		727.9 42.0
										RESIDUAL Tan, Yellow and Orange, Silty, Clayey Fine SAND (A-2-6) Highly Micaceous
725	725.7	44.2	8	5	4	9		M		
720	720.7	49.2	7	8	6	14		M		
715	715.7	54.2	7	8	23	31		M		
710	710.7	59.2	5	10	12	22		M		
705	705.7	64.2	2	3	11	14		M		
700	700.7	69.2	3	4	19	23		M		699.3 70.6
										Tan, Orange, Gray and White, Silty SAND (A-2-4)
695	695.7	74.2	10	52	35	87		M		694.1 75.8
										Boring Terminated by NW Casing Refusal at Elevation 694.1 ft on CRYSTALLINE ROCK: GRANITIC GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 30+68	**OFFSET** 21 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 742.7 ft	**TOTAL DEPTH** 53.1 ft	**NORTHING** 900,859	**EASTING** 1,576,997	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/20/19	**COMP. DATE** 08/21/19	**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)
745											
										742.7	0.0
										GROUND SURFACE	
										ALLUVIAL	
740										Tan and Brown Silty SAND (A-2-4)	
	738.4	4.3	3	3	3	6		M			
735	733.4	9.3	3	3	3	6		M			
730	728.4	14.3	3	2	3	5		M			
725	723.4	19.3	12	32	12	44		W		725.4	17.3
										Tan, Brown and Orange, Silty, Sandy GRAVEL (A-1) with Round Quartz Fragments	
720	718.4	24.3	8	12	16	28				718.4	24.3
										RESIDUAL	
715										Tan, Brown and White, Silty SAND (A-2-4)	
	713.4	29.3	48	52/0.3		100/0.8				713.4	29.3
710										**WEATHERED ROCK**	
										Gray and White GRANITIC GNEISS	
										709.4	33.3
705										**CRYSTALLINE ROCK**	
										Gray, White and Black GRANITIC GNEISS	
700							RS-8				
695											
690										689.6	53.1
										Boring Terminated at Elevation 689.6 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

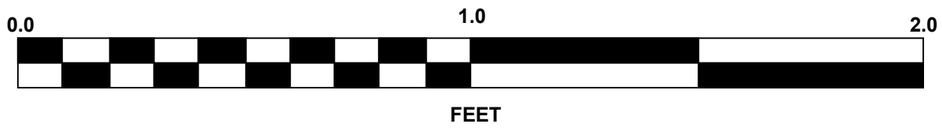
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 30+68	**OFFSET** 21 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 742.7 ft	**TOTAL DEPTH** 53.1 ft	**NORTHING** 900,859	**EASTING** 1,576,997	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/20/19	**COMP. DATE** 08/21/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NW2	**TOTAL RUN** 19.8 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)
709.4											Begin Coring @ 33.3 ft	
	709.4	33.3	2.3		(2.2) 96%	(1.5) 65%		(18.7) 94%	(15.6) 79%		709.4 **CRYSTALLINE ROCK**	33.3
	707.1	35.6									Fresh, Very Hard, Gray, White and Black GRANITIC GNEISS with Very Close to Wide Fracture Spacing	
705			5.0		(4.3) 86%	(3.0) 60%					GSI = 90 to 95	
	702.1	40.6										
700			5.0		(4.7) 94%	(4.6) 92%						
	697.1	45.6					RS-8					
695			5.0		(5.0) 100%	(4.2) 84%						
	692.1	50.6										
690	689.6	53.1	2.5		(2.5) 100%	(2.3) 92%					689.6	53.1
											Boring Terminated at Elevation 689.6 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

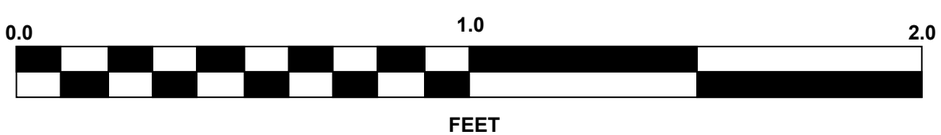
B1-A

BOX 1: 33.3 - 43.5 FEET



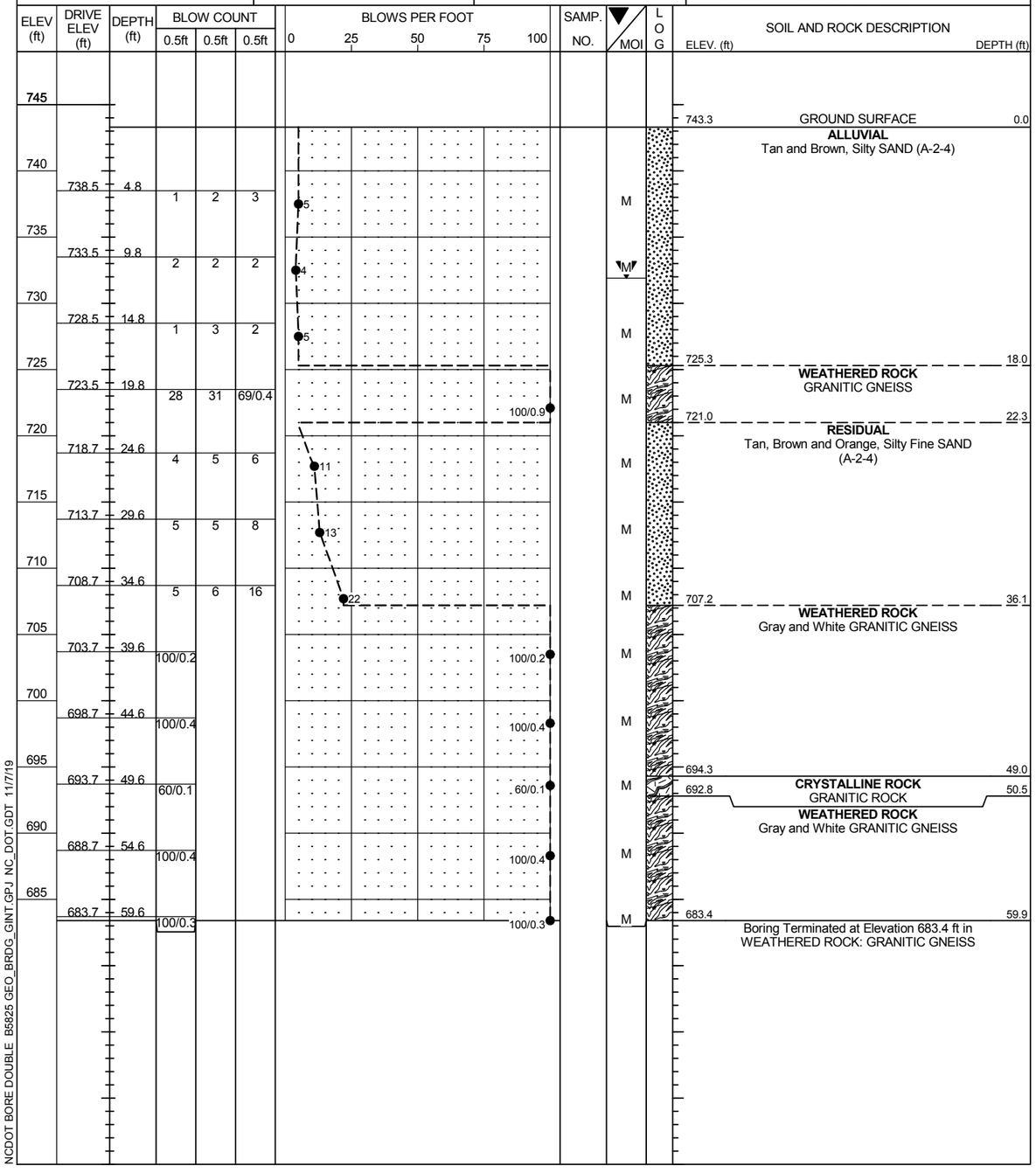
B1-A

BOX 2: 43.5 - 53.1 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 30+68	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 743.3 ft	**TOTAL DEPTH** 59.9 ft	**NORTHING** 900,817	**EASTING** 1,576,984	**24 HR.** 11.4
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/19/19	**COMP. DATE** 08/19/19	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE B5825 GEO_BRDG_GINT.GPJ NC_DOT.GDT 11/7/19

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 31+82	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 743.6 ft	**TOTAL DEPTH** 60.8 ft	**NORTHING** 900,820	**EASTING** 1,577,104	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/13/19	**COMP. DATE** 08/14/19	**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)
										743.6	0.0
										GROUND SURFACE	
										ALLUVIAL	
										Tan and Brown Silty SAND (A-2-4)	
740	739.0	4.6	5	4	3	7		M			
735	734.0	9.6	4	3	3	6		M		734.0	9.6
										Tan and Brown Silty Sandy CLAY (A-6)	
730	729.0	14.6	WOH	WOH	1	1		M			
725	725.7	17.9	100/0.1			100/0.1				725.7	17.9
										725.3	18.3
										WEATHERED ROCK	
										GRANITIC GNEISS	
720										**CRYSTALLINE ROCK**	
										White, Gray and Brown GRANITIC GNEISS	
715											
										712.8	30.8
710										Gray-Brown GRANITIC GNEISS	
										709.6	34.0
705										Gray, White and Black GRANITIC GNEISS	
										701.7	41.9
700										Brown and Gray GRANITIC GNEISS	
695											
690											
685										682.8	60.8
										Boring Terminated at Elevation 682.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 31+82	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 743.6 ft	**TOTAL DEPTH** 60.8 ft	**NORTHING** 900,820	**EASTING** 1,577,104	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/13/19	**COMP. DATE** 08/14/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NWL	**TOTAL RUN** 42.5 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)
725											Begin Coring @ 18.3 ft	
	725.3	18.3	2.5		(1.4) 56%	(0.0) 0%		(10.5) 84%	(8.2) 66%		725.3	18.3
	722.8	20.8	5.0		(4.9) 98%	(4.0) 80%					**CRYSTALLINE ROCK**	
720											Slight Weathering to Fresh, Hard, White, Gray and Black GRANITIC GNEISS with Close to Wide Fracture Spacing	
	717.8	25.8	5.0		(4.2) 84%	(4.2) 84%					(Soft Soil/Biotite Seam from 19.5-19.8')	
715											GSI = 75 to 85	
	712.8	30.8	5.0		(3.5) 70%	(1.6) 32%		(1.7) 53%	(0.0) 0%		712.8	30.8
710											Complete to Severe Weathering, Very Soft to Soft, Gray-Brown GRANITIC GNEISS	
	707.8	35.8	5.0		(3.8) 76%	(3.2) 64%		(6.8) 86%	(5.3) 67%		709.6	34.0
705											GSI = 10 -15	
	702.8	40.8	5.0		(2.3) 46%	(0.5) 10%					Moderate Weathering to Fresh, Hard to Very Hard, Gray, White and Black GRANITIC GNEISS with Very Close to Moderately Close Fractures	
700											GSI = 78 to 82	
	697.8	45.8	5.0		(0.8) 16%	(0.0) 0%		(4.7) 25%	(0.0) 0%		701.7	41.9
695											Complete to Moderate Severe Weathering, Very Soft to Medium Hard, Brown and Gray GRANITIC GNEISS with Very Close to Close Fracture Spacing	
	692.8	50.8	5.0		(1.4) 28%	(0.0) 0%					GSI = 10 to 15	
690												
	687.8	55.8	5.0		(1.4) 28%	(0.0) 0%						
685												
	682.8	60.8									682.8	60.8
											Boring Terminated at Elevation 682.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

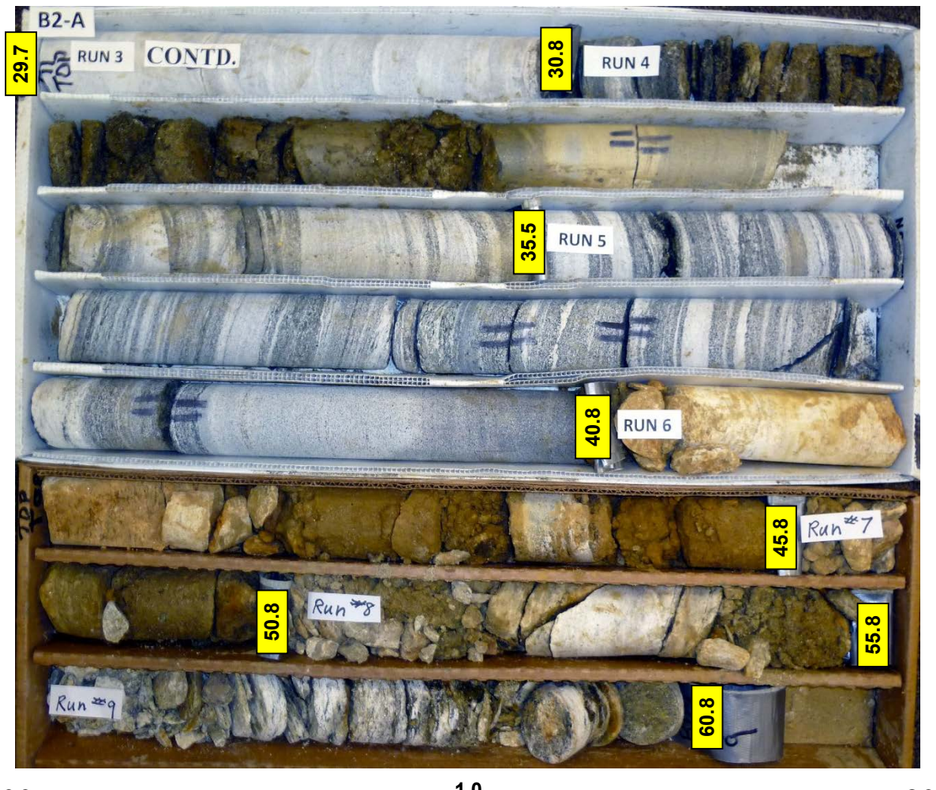
CORE PHOTOGRAPHS

B2-A

BOX 1: 18.3 - 29.7 FEET

B2-A

BOX 2: 29.7 - 60.8 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 31+82	**OFFSET** 21 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.3 ft	**TOTAL DEPTH** 56.3 ft	**NORTHING** 900,784	**EASTING** 1,577,093	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/14/19	**COMP. DATE** 08/14/19	**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)
745										743.3 GROUND SURFACE	0.0
										ALLUVIAL Brown, Silty Fine SAND (A-2-4)	
740	739.5	3.8	1	2	2	4		M			
735	734.5	8.8	5	5	4	9		M		735.8 Brown, Silty Fine Sandy GRAVEL (A-1)	7.5
730	729.5	13.8	7	6	5	11		D		727.7 **RESIDUAL**	15.6
725	724.5	18.8	100/0.5			100/0.5		D		725.5 Brown, Silty Fine Sandy GRAVEL (A-1)	17.8
										723.8 **WEATHERED ROCK** Gray and White GRANITIC GNEISS	19.5
720										**CRYSTALLINE ROCK** White, Gray and Black GRANITIC GNEISS	
715											
710											
705											
700	697.7	45.6	100/0.7			100/0.7 Adjusted				703.3 **WEATHERED ROCK** GRANITIC GNEISS	40.0
695	693.5	49.8	15	89	11/0.1	100/0.6 Adjusted				689.3 **RESIDUAL**	54.0
690	688.5	54.8	9	24	56	80				687.0 Brown, Silty SAND (A-2-4)	56.3
										Boring Terminated at Elevation 687.0 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

NCDOT BORE DOUBLE B5825 GEO_BRDG_GINT.GPJ NC_DOT.GDT 11/6/19

GEOTECHNICAL BORING REPORT
CORE LOG

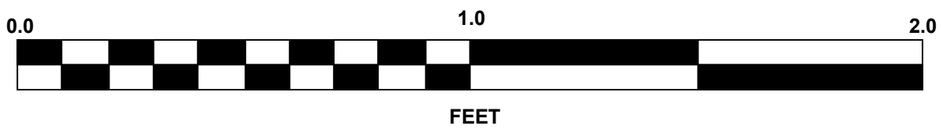
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 31+82	**OFFSET** 21 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.3 ft	**TOTAL DEPTH** 56.3 ft	**NORTHING** 900,784	**EASTING** 1,577,093	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/14/19	**COMP. DATE** 08/14/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NWL	**TOTAL RUN** 25.5 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)
723.8											Begin Coring @ 19.5 ft	
	723.8	19.5	0.5		(0.5) 100%	(0.0) 0%		(16.0) 78%	(10.0) 49%		723.8 **CRYSTALLINE ROCK**	19.5
	723.3	20.0	5.0		(4.6) 92%	(2.9) 58%					Slight Weathering to Fresh, Very Hard to Hard, White, Gray to Black GRANITIC GNEISS, Very Close to Moderately Close Fracture Spacing	
720	718.3	25.0	5.0		(4.6) 92%	(4.2) 84%					GSI = 80 to 85	
715	713.3	30.0	5.0		(3.7) 74%	(2.7) 54%						
710	708.3	35.0	5.0		(2.6) 52%	(0.4) 8%						
705	703.3	40.0	5.0		(0.0) 0%	(0.0) 0%					703.3 **WEATHERED ROCK** GRANITIC GNEISS	40.0
700	698.3	45.0		N=100/0.7								
695				N=100/0.6							689.3 **RESIDUAL**	54.0
690				N=80							687.0 Brown, Silty SAND (A-2-4)	56.3
											Boring Terminated at Elevation 687.0 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

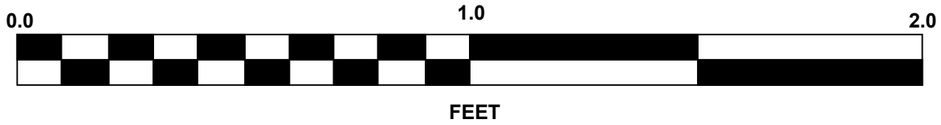
B2-B

BOX 1: 19.5 - 29.8 FEET



B2-B

BOX 2: 29.8 - 35.0 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 33+08	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.3 ft	**TOTAL DEPTH** 44.3 ft	**NORTHING** 900,781	**EASTING** 1,577,224	**24 HR.** 11.7
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/01/19	**COMP. DATE** 08/01/19	**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)
745											
										743.3 GROUND SURFACE	0.0
										ALLUVIAL Tan Brown, Sandy Silty CLAY (A-7)	
740	739.3	4.0	3	2	3	5		M			
										735.3 Tan, Brown, Silty, Sandy GRAVEL (A-1)	8.0
735	734.3	9.0	5	6	7	13		M			
730	729.3	14.0	4	3	2	5		M			
725										725.5	17.8
										724.5 **WEATHERED ROCK** Gray and White GRANITIC GNEISS	18.8
720										**CRYSTALLINE ROCK** Gray, White and Black GRANITIC GNEISS	
715											
710											
705											
700										699.0	44.3
										Boring Terminated at Elevation 699.0 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

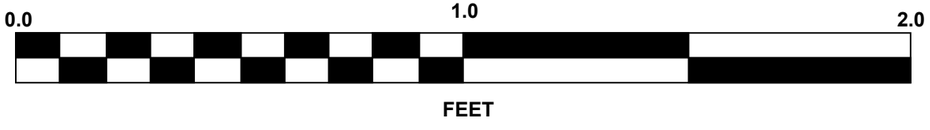
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 33+08	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.3 ft	**TOTAL DEPTH** 44.3 ft	**NORTHING** 900,781	**EASTING** 1,577,224	**24 HR.** 11.7
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/01/19	**COMP. DATE** 08/01/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NW2	**TOTAL RUN** 25.5 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)
724.5											Begin Coring @ 18.8 ft	
	724.5	18.8	0.5		(0.3) 60%	(0.0) 0%		(20.2) 79%	(15.9) 62%		724.5 **CRYSTALLINE ROCK**	18.8
	724.0	19.3	5.0		(3.8) 76%	(2.7) 54%					Slight Weathering to Fresh, Hard to Very Hard, Gray, White and Black GRANITIC GNEISS with Intermittent Zones of Biotite Gneiss and Schist with Very Close to Wide Fracture Spacing	
720	719.0	24.3	5.0		(2.3) 46%	(0.9) 18%					GSI = 80 to 85	
715	714.0	29.3	5.0	1:41/0.5 1:30/1.0 1:44/1.0 1:39/1.0 1:36/1.0	(4.7) 94%	(4.7) 94%					Predominantly Biotite Schist Zone from 23.5 ft to 28.2 ft, GSI = 40 to 45	
710	709.0	34.3	5.0	1:47/1.0 1:40/1.0 1:50/1.0 1:39/1.0 1:42/1.0	(4.5) 90%	(3.4) 68%						
705	704.0	39.3	5.0	1:50/1.0 1:45/1.0 1:37/1.0 1:41/1.0 1:44/1.0	(4.6) 92%	(4.2) 84%						
700	699.0	44.3									699.0	44.3
											Boring Terminated at Elevation 699.0 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

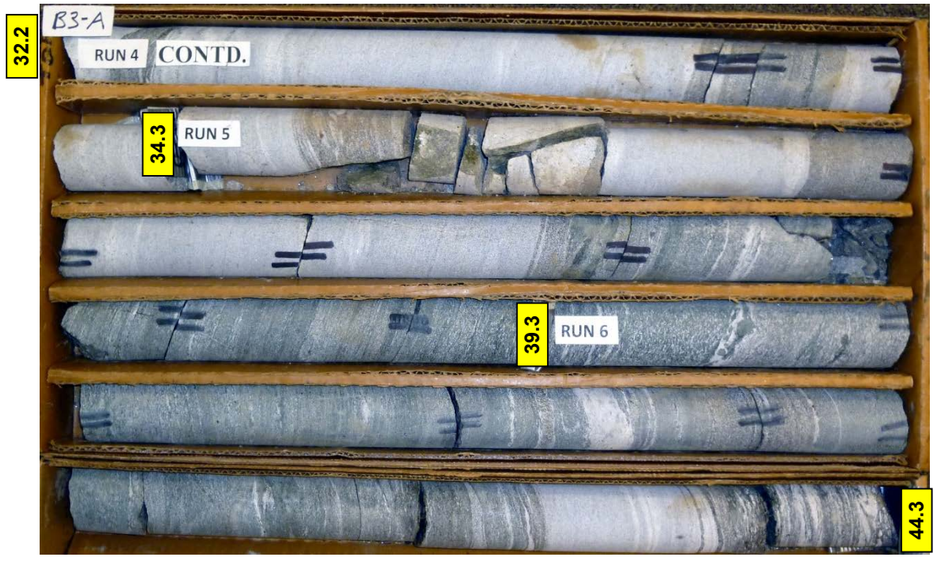
B3-A

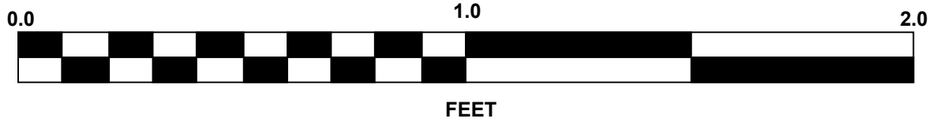
BOX 1: 18.8 - 32.2 FEET



B3-A

BOX 2: 32.2 - 44.3 FEET





GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 33+08	**OFFSET** 21 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 744.4 ft	**TOTAL DEPTH** 40.2 ft	**NORTHING** 900,746	**EASTING** 1,577,213	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/13/19	**COMP. DATE** 08/13/19	**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)
745										744.4 GROUND SURFACE	0.0
										ALLUVIAL Tan and Brown, Silty SAND (A-2-4)	
740	740.3	4.1	3	3	4	7					
735	735.3	9.1	4	2	1	3		M		733.2 Tan and Brown, Silty Sandy GRAVEL (A-1)	11.2
730	730.3	14.1	6	4	4	8		M			
725	725.3	19.1	100/0.3			100/0.3				725.3	19.1
										724.9 **WEATHERED ROCK** Gray, White and Black GRANTIC GNEISS	19.5
720										**CRYSTALLINE ROCK** Gray, White and Black GRANTIC GNEISS AND META-BIOTITE GNEISS	
715							RS-2				
710											
705										704.2	40.2
										Boring Terminated at Elevation 704.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

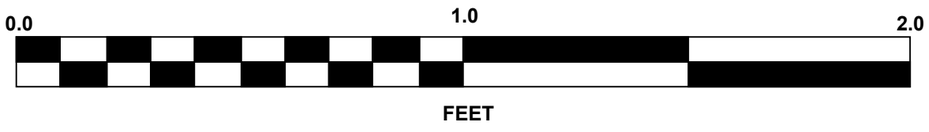
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 33+08	**OFFSET** 21 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 744.4 ft	**TOTAL DEPTH** 40.2 ft	**NORTHING** 900,746	**EASTING** 1,577,213	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/13/19	**COMP. DATE** 08/13/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NWL	**TOTAL RUN** 20.7 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)
724.9											Begin Coring @ 19.5 ft	
	724.9	19.5	0.7		(0.3) 43%	(0.0) 0%		(19.2) 93%	(16.5) 80%		724.9 **CRYSTALLINE ROCK** Fresh, Hard to Very Hard, Gray, White and Black GRANTIC GNEISS AND META-BIOTITE GNEISS with Very Close to Wide Fracture Spacing	19.5
	724.2	20.2	5.0		(4.7) 94%	(4.7) 94%					GSI = 85 to 95	
720	719.2	25.2	5.0		(4.7) 94%	(4.7) 94%					Soft, Severely Weathered Biotite Seam from 30.2 ft to 31.2 ft	
715	714.2	30.2	5.0		(4.8) 96%	(2.9) 58%	RS-2					
710	709.2	35.2	5.0		(4.7) 94%	(4.2) 84%						
705	704.2	40.2									704.2	40.2
											Boring Terminated at Elevation 704.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

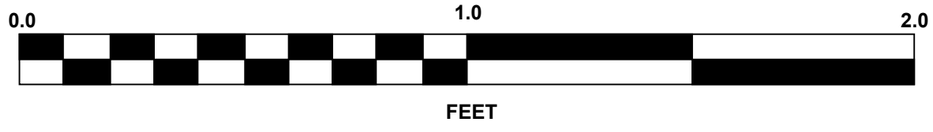
B3-B

BOX 1: 19.5 - 30.2 FEET



B3-B

BOX 2: 30.2 - 40.2 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 34+34	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.5 ft	**TOTAL DEPTH** 36.1 ft	**NORTHING** 900,745	**EASTING** 1,577,345	**24 HR.** 11.2
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 07/31/19	**COMP. DATE** 07/31/19	**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)
745											
										741.5	0.0
										GROUND SURFACE	
740										**ALLUVIAL**	
										Tan Brown, Silty SAND (A-2-4) with Trace Mica	
	737.1	4.4	2	3	3	6		M			
735											
	732.1	9.4	1	1	2	3		M			
730											
										728.6	12.9
	727.1	14.4								GRAVEL (A-1)	
			5	9	91/0.4	100/0.9		M		726.1	15.4
725										**WEATHERED ROCK**	
										724.1 Gray and White GRANITIC GNEISS	17.4
										CRYSTALLINE ROCK	
720										White, Black and Gray GRANITIC GNEISS	
715							RS-6				
710											
										705.4	36.1
										Boring Terminated at Elevation 705.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 34+34	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.5 ft	**TOTAL DEPTH** 36.1 ft	**NORTHING** 900,745	**EASTING** 1,577,345	**24 HR.** 11.2
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 07/31/19	**COMP. DATE** 07/31/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NW2	**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)
724.1											Begin Coring @ 17.4 ft	
	724.1	17.4	3.7	NM/0.7 2:00/1.0 2:05/1.0 NM/1.0	(3.2) 86%	(2.7) 73%		(17.9) 96%	(17.2) 92%		724.1 **CRYSTALLINE ROCK**	17.4
720	720.4	21.1	5.0	1:49/1.0 1:55/1.0 1:39/1.0 1:42/1.0 1:44/1.0	(4.8) 96%	(4.6) 92%					Fresh, Very Hard, White, Black and Gray GRANITIC GNEISS with Close to Wide Fracture Spacing	
											GSI = 90-93	
715	715.4	26.1	5.0	1:40/1.0 1:35/1.0 1:39/1.0 1:44/1.0 1:41/1.0	(4.9) 98%	(4.9) 98%	RS-6					
710	710.4	31.1	5.0	1:38/1.0 1:44/1.0 1:41/1.0 1:36/1.0 1:40/1.0	(5.0) 100%	(5.0) 100%						
	705.4	36.1									705.4	36.1
											Boring Terminated at Elevation 705.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

B4-A

BOX 1: 17.4 - 27.5 FEET

B4-A

BOX 2: 27.5 - 36.1 FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 34+33	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.4 ft	**TOTAL DEPTH** 35.6 ft	**NORTHING** 900,717	**EASTING** 1,577,335	**24 HR.** 11.1
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 07/31/19	**COMP. DATE** 07/31/19	**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)
745											
										741.4	0.0
										GROUND SURFACE	
740										**ALLUVIAL**	
										Tan Brown, Silty SAND (A-2-4) with Trace Mica	
	737.1	4.3	2	2	2	4		M			
735											
	732.1	9.3	1	2	3	5		M			
730										730.6	10.8
										GRAVEL (A-1)	
	727.1	14.3	4	7	93/0.3	100/0.8				726.1	15.3
725										725.3	16.1
										WEATHERED ROCK Gray and White GRANITIC GNEISS	
										CRYSTALLINE ROCK Gray, White and Black GRANTIC GNEISS	
720											
715											
710										705.8	35.6
										Boring Terminated at Elevation 705.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 34+33	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.4 ft	**TOTAL DEPTH** 35.6 ft	**NORTHING** 900,717	**EASTING** 1,577,335	**24 HR.** 11.1
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 07/31/19	**COMP. DATE** 07/31/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NW2	**TOTAL RUN** 19.5 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)
725											Begin Coring @ 16.1 ft	
	725.3	16.1	4.5	1:56/1.0 1:41/1.0 1:48/1.0	(4.0) 89%	(3.9) 87%		(18.5) 95%	(17.5) 90%		725.3 **CRYSTALLINE ROCK** Fresh, Very Hard, Gray, White, and Black GRANTIC GNEISS with Close to Wide Fracture Spacing	16.1
	720.8	20.6									GSI = 90 to 94	
720			5.0	1:54/1.0 1:59/1.0 2:03/1.0 2:00/1.0 2:09/1.0	(4.7) 94%	(4.2) 84%						
	715.8	25.6										
715			5.0	2:00/1.0 1:57/1.0 1:50/1.0 2:06/1.0 2:10/1.0	(4.9) 98%	(4.7) 94%						
	710.8	30.6										
710			5.0	2:01/1.0 1:57/1.0 1:50/1.0 2:07/1.0 2:11/1.0	(4.9) 98%	(4.7) 94%						
	705.8	35.6									705.8 Boring Terminated at Elevation 705.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	35.6

CORE PHOTOGRAPHS

B4-B

BOX 1: 16.1 - 30.0 FEET

B4-B

BOX 2: 30.0 - 35.6 FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B5-A	**STATION** 35+69	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 725.6 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 900,702	**EASTING** 1,577,473	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/07/19	**COMP. DATE** 08/07/19	**SURFACE WATER DEPTH** 4.3ft	

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)
730										WATER SURFACE (08/07/19)	
										725.6 GROUND SURFACE	0.0
725										**CRYSTALLINE ROCK** White, Gray and Black GRANITIC GNEISS	
720											
715											
710											
705										704.4	21.2
										Boring Terminated at Elevation 704.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

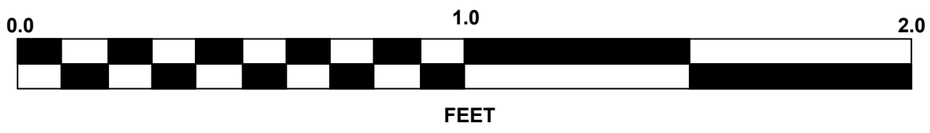
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B5-A	**STATION** 35+69	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 725.6 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 900,702	**EASTING** 1,577,473	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/07/19	**COMP. DATE** 08/07/19	**SURFACE WATER DEPTH** 4.3ft	
CORE SIZE NWL	**TOTAL RUN** 21.2 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)
725.6											Ground Surface	
725	725.6	0.0	1.2	NM/1.2	(1.0)	(0.0)		(19.6)	(16.6)		**CRYSTALLINE ROCK**	
	724.4	1.2	5.0	3:15/1.0 3:21/1.0 3:07/1.0 3:14/1.0 3:26/1.0	83%	0%		92%	78%		Very Slightly Weathered to Fresh, Very Hard, GRANITIC GNEISS with Close to Wide Fracture Spacing	
					(4.7) 94%	(3.4) 68%					GSI = 83-87	
720	719.4	6.2	5.0	3:11/1.0 3:19/1.0 3:27/1.0 3:07/1.0 3:15/1.0	(5.0) 100%	(4.6) 92%						
715	714.4	11.2	5.0	3:30/1.0 3:11/1.0 3:24/1.0 3:19/1.0 3:20/1.0	(4.8) 96%	(4.5) 90%						
710	709.4	16.2	5.0	3:32/1.0 3:30/1.0 3:18/1.0 3:23/1.0 3:25/1.0	(4.1) 82%	(4.1) 82%						
705	704.4	21.2									704.4	21.2
											Boring Terminated at Elevation 704.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

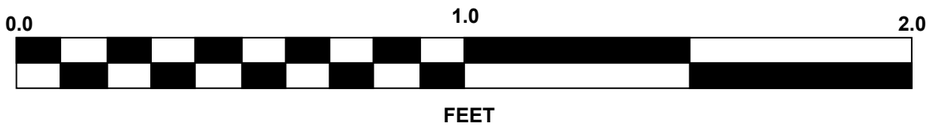
B5-A

BOX 1: 0.0 - 9.7 FEET



B5-A

BOX 2: 9.7 - 21.2 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 35+69	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 725.0 ft	**TOTAL DEPTH** 20.8 ft	**NORTHING** 900,676	**EASTING** 1,577,464	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/06/19	**COMP. DATE** 08/06/19	**SURFACE WATER DEPTH** 4.9ft	

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)
730										WATER SURFACE (08/06/19)	
725										725.0 GROUND SURFACE	0.0
										724.0 **ALLUVIAL** Sand, Cobbles, and Gravel	1.0
720										**CRYSTALLINE ROCK** Gray, White and Black GRANITIC GNEISS	
715											
710											
705										704.2	20.8
										Boring Terminated at Elevation 704.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

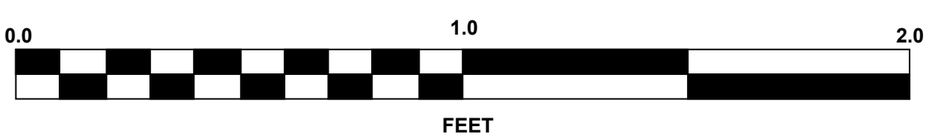
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 35+69	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 725.0 ft	**TOTAL DEPTH** 20.8 ft	**NORTHING** 900,676	**EASTING** 1,577,464	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/06/19	**COMP. DATE** 08/06/19	**SURFACE WATER DEPTH** 4.9ft	
CORE SIZE NW2	**TOTAL RUN** 19.8 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)
724											Begin Coring @ 1.0 ft	
	724.0	1.0	4.8		(4.6) 96%	(3.6) 75%		(19.4) 98%	(18.2) 92%		724.0 **CRYSTALLINE ROCK** Fresh, Hard to Very Hard, Gray, White and Black GRANITIC GNEISS with Close to Wide Fracture Spacing	1.0
720	719.2	5.8									GSI = 90 to 92	
			5.0		(4.8) 96%	(4.8) 96%						
715	714.2	10.8										
			5.0		(5.0) 100%	(4.9) 98%						
710	709.2	15.8										
			5.0		(5.0) 100%	(4.9) 98%						
705	704.2	20.8									704.2	20.8
											Boring Terminated at Elevation 704.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

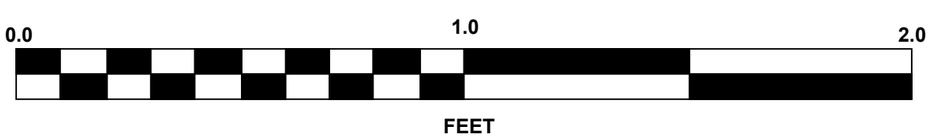
B5-B

BOX 1: 1.0 - 10.5 FEET



B5-B

BOX 2: 10.5 - 20.8 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 36+84	**OFFSET** 22 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 726.5 ft	**TOTAL DEPTH** 17.1 ft	**NORTHING** 900,673	**EASTING** 1,577,584	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0065 CME-45C 93% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/07/19	**COMP. DATE** 08/08/19	**SURFACE WATER DEPTH** 3.4ft	

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)
730								▼		WATER SURFACE (08/07/19)	
										726.5 GROUND SURFACE	0.0
725										**CRYSTALLINE ROCK** White, Gray and Black GRANITIC GNEISS	
720											
715							RS-4				
710										709.4	17.1
										Boring Terminated at Elevation 709.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

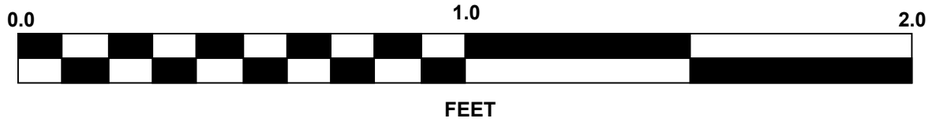
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 36+84	**OFFSET** 22 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 726.5 ft	**TOTAL DEPTH** 17.1 ft	**NORTHING** 900,673	**EASTING** 1,577,584	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0065 CME-45C 93% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/07/19	**COMP. DATE** 08/08/19	**SURFACE WATER DEPTH** 3.4ft	
CORE SIZE NWL	**TOTAL RUN** 17.1 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)
726.5											Ground Surface	
725	726.5	0.0	2.1		(2.0) 95%	(1.7) 81%		(17.0) 99%	(15.6) 91%		**CRYSTALLINE ROCK** Very Slight Weathering to Fresh, Very Hard, White, Gray and Black GRANITIC GNEISS with Close to Wide Fracture Spacing	
	724.4	2.1	5.0		(5.0) 100%	(4.2) 84%					GSI = 87 to 95	
720	719.4	7.1	5.0		(5.0) 100%	(4.9) 98%						
715	714.4	12.1	5.0		(5.0) 100%	(4.8) 96%	RS-4					
710	709.4	17.1									709.4	17.1
											Boring Terminated at Elevation 709.4 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

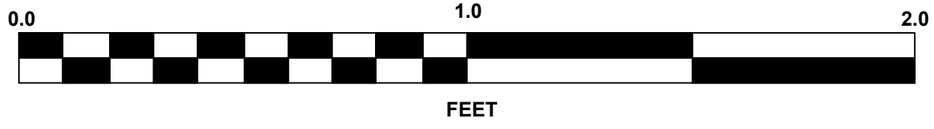
B6-A

BOX 1: 0.0 - 9.7 FEET



B6-A

BOX 2: 9.7 - 17.1 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 36+84	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 726.3 ft	**TOTAL DEPTH** 19.5 ft	**NORTHING** 900,634	**EASTING** 1,577,572	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0065 CME-45C 93% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/08/19	**COMP. DATE** 08/08/19	**SURFACE WATER DEPTH** 3.5ft	

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)
730								▼		WATER SURFACE (08/08/19)	
										726.3 GROUND SURFACE	0.0
725										**CRYSTALLINE ROCK** White, Gray and Black GRANITIC GNEISS	
720											
715											
710										706.8	19.5
										Boring Terminated at Elevation 706.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

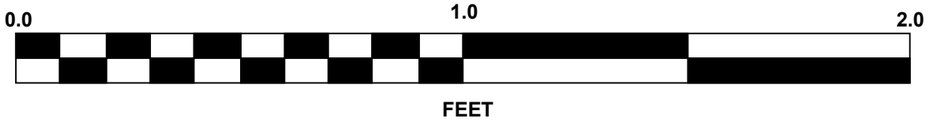
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 36+84	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 726.3 ft	**TOTAL DEPTH** 19.5 ft	**NORTHING** 900,634	**EASTING** 1,577,572	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0065 CME-45C 93% 08/15/2018		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/08/19	**COMP. DATE** 08/08/19	**SURFACE WATER DEPTH** 3.5ft	
CORE SIZE NWL	**TOTAL RUN** 19.5 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)
726.3											Ground Surface	
725	726.3	0.0	2.0		(1.6) 80%	(0.5) 25%		(18.6) 95%	(15.7) 81%		**CRYSTALLINE ROCK** Slight Weathering to Fresh, Very Hard, White, Gray and Black GRANITIC GNEISS with Very Close to Wide Fracture Spacing	
	724.3	2.0	5.0	3:07 3:24 3:17 3:40 3:46	(4.8) 96%	(3.1) 62%					GSI = 85 to 95	
720	719.3	7.0	5.0	4:10 3:50 3:41 3:33 3:52	(4.8) 96%	(4.8) 96%						
715	714.3	12.0	5.0	3:47 7:10 11:00 13:00 8:10	(5.0) 100%	(4.9) 98%						
710	709.3	17.0	2.5	11:00 9:45	(2.4) 96%	(2.4) 96%						
	706.8	19.5									706.8	19.5
											Boring Terminated at Elevation 706.8 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	

CORE PHOTOGRAPHS

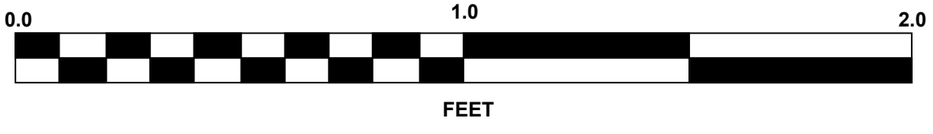
B6-B

BOX 1: 0.0 - 9.7 FEET



B6-B

BOX 2: 9.7 - 19.5 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 38+15	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** 8.0
COLLAR ELEV. 744.1 ft	**TOTAL DEPTH** 38.9 ft	**NORTHING** 900,624	**EASTING** 1,577,706	**24 HR.** 13.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/21/19	**COMP. DATE** 08/21/19	**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)
745										744.1 GROUND SURFACE	0.0
										ALLUVIAL Tan and Brown Silty SAND (A-2-4)	
740	739.7	4.4	1	1	1	2		D			
735	734.7	9.4	1	1	2	3		D			
730	729.7	14.4	1	1	1	2		M		729.7 Gray, Sandy Silty CLAY (A-7) with Trace of Organic Matter (Roots/Leaves)	14.4
725										725.9 / 724.9 **WEATHERED ROCK** Gray and White GRANITIC GNEISS	18.2 / 19.2
720										Gray, White and Black GRANITIC GNEISS to BIOTITE GNEISS	
715							RS-7				
710										705.2 Boring Terminated at Elevation 705.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	38.9

GEOTECHNICAL BORING REPORT
CORE LOG

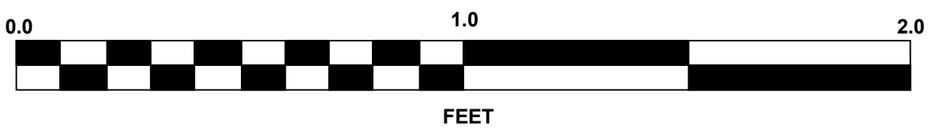
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 38+15	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** 8.0
COLLAR ELEV. 744.1 ft	**TOTAL DEPTH** 38.9 ft	**NORTHING** 900,624	**EASTING** 1,577,706	**24 HR.** 13.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/21/19	**COMP. DATE** 08/21/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 19.7 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)
724.9											Begin Coring @ 19.2 ft	
	724.9 / 723.2	19.2 / 20.9	1.7		(1.5) 88%	(0.7) 41%		(19.1) 97%	(17.9) 91%		724.9 Fresh, Very Hard, Gray, White and Black GRANITIC GNEISS to BIOTITE GNEISS with Close to Wide Fracture Spacing	19.2
720			5.0		(5.0) 100%	(4.6) 92%					GSI = 92 to 95	
	718.2	25.9										
			5.0		(4.9) 98%	(4.9) 98%						
715							RS-7					
	713.2	30.9										
			5.0		(4.9) 98%	(4.9) 98%						
710												
	708.2	35.9										
			3.0		(2.8) 93%	(2.8) 93%						
	705.2	38.9									705.2 Boring Terminated at Elevation 705.2 ft in CRYSTALLINE ROCK: GRANITIC GNEISS	38.9

CORE PHOTOGRAPHS

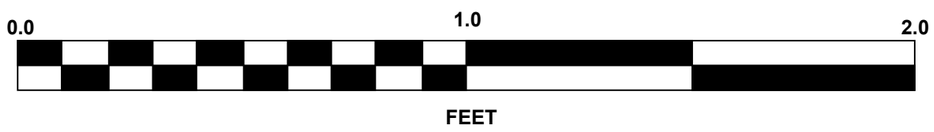
B7-A

BOX 1: 19.2 - 29.7 FEET



B7-A

BOX 2: 29.7 - 38.9 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 38+08	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** 11.0
COLLAR ELEV. 744.3 ft	**TOTAL DEPTH** 40.7 ft	**NORTHING** 900,601	**EASTING** 1,577,691	**24 HR.** 13.5
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/21/19	**COMP. DATE** 08/22/19	**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)
745										744.3	0.0
										GROUND SURFACE	
										ALLUVIAL	
										Tan and Brown Silty SAND (A-2-4)	
740	739.6	4.7	1	1	2	3		M			
735	734.6	9.7	2	1	2	3		M			
730	729.6	14.7	1	1	1	2		W			
725	724.6	19.7	60/0.0			60/0.0				724.6	19.7
										CRYSTALLINE ROCK	
										Gray, Black and White GRANITIC GNEISS AND BIOTITE GNEISS	
720											
715											
710											
705										703.6	40.7
										Boring Terminated at Elevation 703.6 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

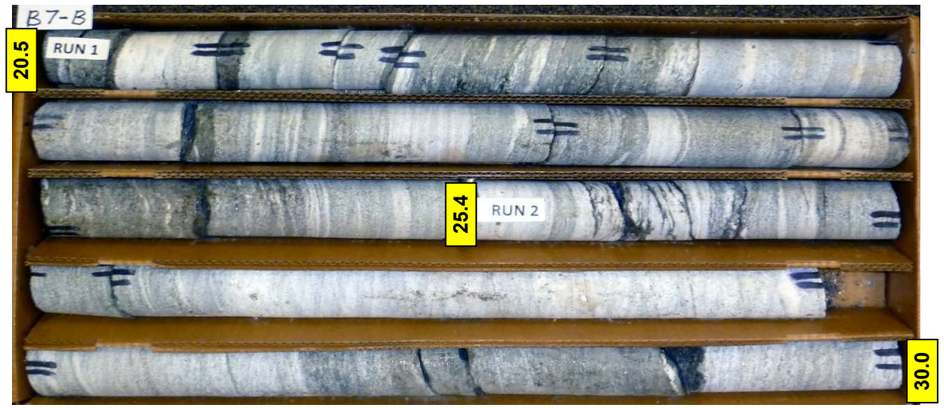
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 38+08	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** 11.0
COLLAR ELEV. 744.3 ft	**TOTAL DEPTH** 40.7 ft	**NORTHING** 900,601	**EASTING** 1,577,691	**24 HR.** 13.5
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/21/19	**COMP. DATE** 08/22/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NX	**TOTAL RUN** 20.2 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)
723.8											723.8	20.5
											Begin Coring @ 20.5 ft	
	723.8	20.5	4.9		(4.9) 100%	(4.5) 92%					**CRYSTALLINE ROCK**	
720	718.9	25.4	5.3		(5.2) 98%	(4.7) 89%					Very Slight Weathering to Fresh, Hard to Very Hard, Gray, Black and White GRANITIC GNEISS and BIOTITE GNEISS with Close to Wide Fracture Spacing	
715	713.6	30.7	5.0		(5.0) 100%	(3.1) 62%					GSI = 86 to 95	
710	708.6	35.7	5.0		(5.0) 100%	(4.7) 94%						
705	703.6	40.7									703.6	40.7
											Boring Terminated at Elevation 703.6 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

CORE PHOTOGRAPHS

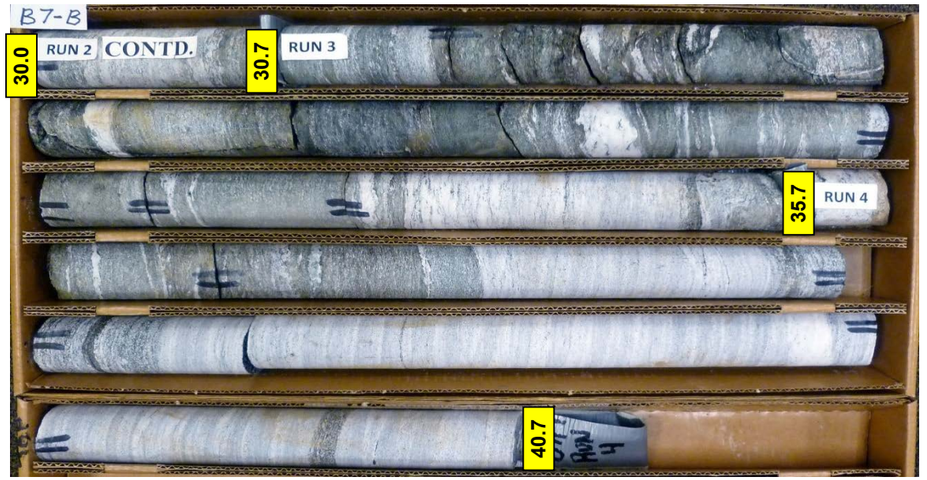
B7-B

BOX 1: 20.5 - 30.0 FEET



B7-B

BOX 2: 30.0 - 40.7 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 39+33	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 741.5 ft	**TOTAL DEPTH** 35.4 ft	**NORTHING** 900,591	**EASTING** 1,577,819	**24 HR.** 3.6
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/22/19	**COMP. DATE** 08/22/19	**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)
745											
										741.5 GROUND SURFACE	0.0
740										**ALLUVIAL** Gray, Sandy, Silty CLAY (A-7) with Trace Mica	
	737.4	4.1	WOH	1	0	1		W			
735											
	732.4	9.1	WOH	WOH	WOH	0		W			
730											
	727.4	14.1	60/0.0			60/0.0				728.0 / 727.5 **WEATHERED ROCK** Gray and White GRANITIC GNEISS	13.5 / 14.0
725										**CRYSTALLINE ROCK** Gray, White and Black GRANITIC GNEISS AND BIOTITE GNEISS	
720											
715											
710										706.1	35.4
										Boring Terminated at Elevation 706.1 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

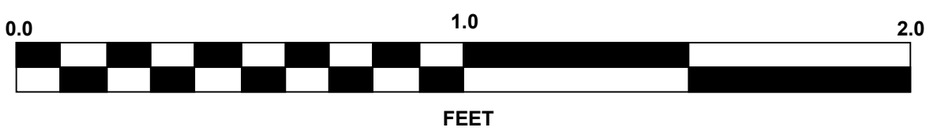
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 39+33	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 741.5 ft	**TOTAL DEPTH** 35.4 ft	**NORTHING** 900,591	**EASTING** 1,577,819	**24 HR.** 3.6
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/22/19	**COMP. DATE** 08/22/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.3 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)
726.4											Begin Coring @ 15.1 ft	
725	726.4	15.1	5.3		(5.0) 94%	(4.3) 81%					**CRYSTALLINE ROCK** Fresh, Hard to Very Hard, Gray, White and Black GRANITIC GNEISS and BIOTITE GNEISS with Very Close to Wide Fracture Spacing	
	721.1	20.4									GSI = 92 to 95	
720			5.0		(4.6) 92%	(3.9) 78%						
	716.1	25.4										
715			5.0		(4.4) 88%	(4.0) 80%						
	711.1	30.4										
710			5.0		(5.0) 100%	(4.8) 96%						
	706.1	35.4									706.1	35.4
											Boring Terminated at Elevation 706.1 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

CORE PHOTOGRAPHS

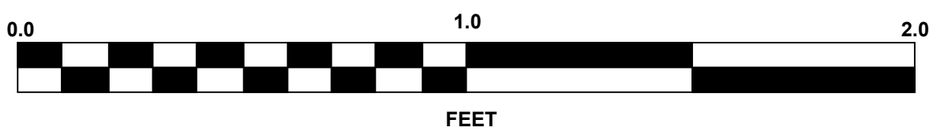
B8-A

BOX 1: 15.1 - 25.4 FEET



B8-A

BOX 2: 25.4 - 35.4 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B8-B	**STATION** 39+34	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 742.1 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 900,558	**EASTING** 1,577,810	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/22/19	**COMP. DATE** 08/22/19	**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)
745											
										742.1 GROUND SURFACE	0.0
740										**ALLUVIAL** Gray, Sandy, Silty CLAY (A-7) with Trace Mica	
	737.3	4.8	1	0	0	0		M			
735											
	732.3	9.8	WOH	WOH	WOH	0		W			
730											
	727.3	14.8	60/0.1			60/0.1				727.5 / 727.3 **WEATHERED ROCK** Gray and White GRANITIC GNEISS	14.6 / 14.8
725										**CRYSTALLINE ROCK** Gray, White and Black GRANITIC AND BIOTITE GNEISS	
720											
							RS-9				
715											
710											
										705.9	36.2
										Boring Terminated at Elevation 705.9 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

GEOTECHNICAL BORING REPORT
CORE LOG

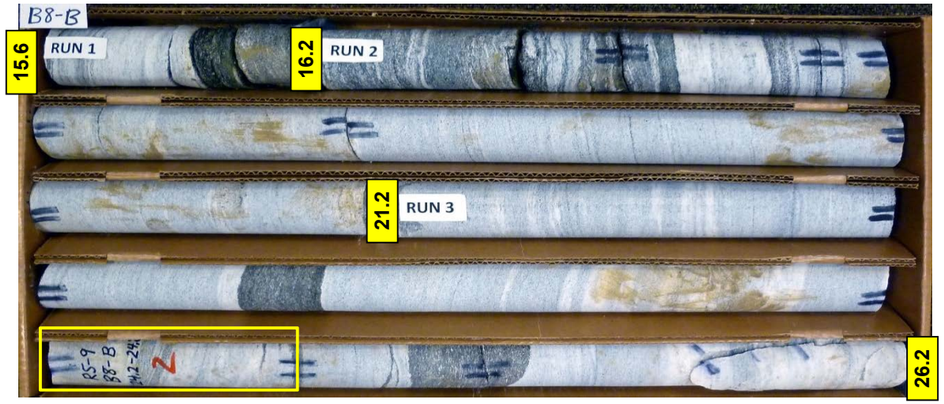
WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. B8-B	**STATION** 39+34	**OFFSET** 19 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0
COLLAR ELEV. 742.1 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 900,558	**EASTING** 1,577,810	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/22/19	**COMP. DATE** 08/22/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.6 ft			

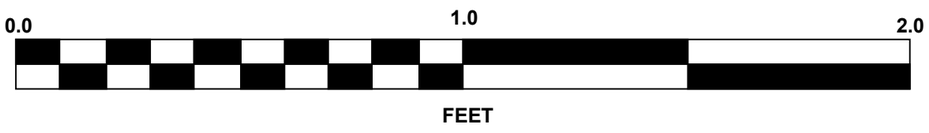
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
726.5												
725	726.5 / 725.9	15.6 / 16.2	0.6 / 5.0		(0.6) 100%	(0.0) 0%					Begin Coring @ 15.6 ft	
					(4.1) 82%	(4.0) 80%					**CRYSTALLINE ROCK** Fresh, Hard to Very Hard, Gray, White and Black GRANITIC GNEISS and BIOTITE GNEISS with Close to Wide Fracture Spacing	
720	720.9	21.2	5.0		(5.0) 100%	(5.0) 100%					GSI = 92 to 95 *(continued)*	
							RS-9					
715	715.9	26.2	5.0		(5.0) 100%	(4.3) 86%						
710	710.9	31.2	5.0		(4.9) 98%	(4.6) 92%						
	705.9	36.2									705.9	36.2
											Boring Terminated at Elevation 705.9 ft in CRYSTALLINE ROCK: GRANITIC AND BIOTITE GNEISS	

CORE PHOTOGRAPHS

B8-B

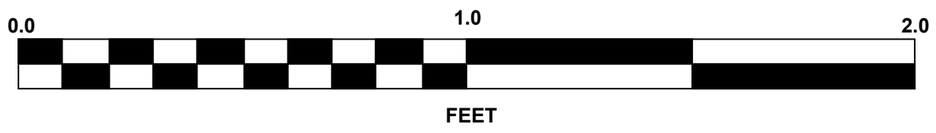
BOX 1: 15.6 - 26.2 FEET





B8-B

BOX 2: 26.2 - 36.2 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 39+96	**OFFSET** 45 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.6
COLLAR ELEV. 742.2 ft	**TOTAL DEPTH** 14.3 ft	**NORTHING** 900,600	**EASTING** 1,577,889	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/29/19	**COMP. DATE** 08/29/19	**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)
745										
										742.2 GROUND SURFACE 0.0
										ALLUVIAL Tan and Orange, Silty SAND (A-2-4)
740	738.5	3.7	1	1	2	3		M		
										734.2 8.0
735	733.5	8.7	2	4	4	8		M		Gray Sandy Silty CLAY (A-7) with Mica
										731.9 10.3
730	728.5	13.7	10	90/0.1		100/0.6				Gravel (A-1)
										728.5 13.7
										727.9 14.3 **WEATHERED ROCK** Gray and White GRANITIC ROCK
										Boring Terminated by Auger Refusal at Elevation 727.9 ft on CRYSTALLINE ROCK: GRANITIC GNEISS

WBS 45778.1.1	**TIP** B-5825	**COUNTY** YADKIN	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 35 on NC 67 over Yadkin River				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 40+03	**OFFSET** 35 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. 769.8 ft	**TOTAL DEPTH** 46.2 ft	**NORTHING** 900,522	**EASTING** 1,577,871	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 92% 08/15/2018		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, C. L.	**START DATE** 08/29/19	**COMP. DATE** 08/29/19	**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
770										
										769.8 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT Gray, White, Tan and Orange, Silty Fine SAND (A-2-4) with Trace Gravel and Mica
765	765.6	4.2	4	3	4	7		M		
760	760.6	9.2	3	4	4	8		M		
755	755.6	14.2	3	5	5	10		M		
750	750.6	19.2	4	3	4	7		M		
										745.6 24.2
745	745.6	24.2	2	2	3	5		M		**ALLUVIAL** Gray, Silty, Sandy CLAY (A-6)
										741.7 28.1
740	740.6	29.2	1	2	1	3		M		740.6 29.2 Gravel Layer (A-1)
										Tan and Brown, Sandy Silty CLAY (A-7)
735	735.6	34.2	16	12	8	20		M		
										731.8 38.0
730	730.6	39.2	100/0.2			100/0.2		M		**WEATHERED ROCK** Gray and White GRANITIC GNEISS
										725.6 44.2
725	725.6	44.2	60/0.0			60/0.0		M		**CRYSTALLINE ROCK** 723.6 Gray and White GRANITIC GNEISS 46.2
										Boring Terminated by Auger Refusal at Elevation 723.6 ft on CRYSTALLINE ROCK: GRANITIC GNEISS

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 45778.1.1 (B-5825) **SHEET 46**
COUNTY: FORSYTH/YADKIN
REPLACE BRIDGE NO. 35 ON NC 67 OVER YADKIN RIVER STA. 34+65.50

Sample No.	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (ksi)	Young's Modulus (MPSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B5-A	10.2 - 10.7	Granitic Gneiss	Vg	92	3.93	1.98	165.6	17.41	3.59	N/A	
RS-2	B3-B	29.7 - 30.2	Granitic Gneiss	Vg	94	3.93	1.98	162.8	18.77	4.91	N/A	
RS-4	B6-A	10.7 - 11.4	Granitic Gneiss	Vg	98	3.89	1.98	174.6	10.57	3.77	N/A	
RS-5	B2-A	29.3 - 29.7	Granitic Gneiss	Vg	84	3.75	1.98	155.6	14.24	4.64	N/A	
RS-6	B4-A	27.5 - 28.1	Granitic Gneiss	Vg	94	3.89	1.87	165.0	14.29	4.93	N/A	
RS-7	B7-A	28.2 - 28.6	Biotite Gneiss	Vg	98	3.35	1.87	161.5	6.29	1.188	N/A	
RS-8	B1-A	43.5 - 43.9	Granitic Gneiss	Vg	92	3.92	1.87	165.3	10.53	5.52	N/A	
RS-9	B8-B	24.2 - 24.8	Granitic Gneiss	Vg	100	3.90	1.87	167.8	12.39	2.68	N/A	