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REFERENCE: B-5717

PROJECT: 45673

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

APPENDICES

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY GUILFORD

PROJECT DESCRIPTION REPLACE BRIDGES 109 AND 121 ON SR 4240 (E. GATE CITY BLVD.) OVER SOUTH BUFFALO CREEK

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5717	1	26

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

P.M. WEAVER

C.R. PASTRANA

SUMMIT

INVESTIGATED BY ESP Associates, Inc.

DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, Inc.

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5/8/2020

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5717	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	< 4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	> 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	< 0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

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
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

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

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

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

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

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

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

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

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

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

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

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

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

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

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

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

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

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

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

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

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

BENCH MARK: BL-3: N 839124.4010, E 1781313.8740

ELEVATION: 715.91 FEET

NOTES:

F.I.A.D = FILLED IMMEDIATELY AFTER DRILLING

TIN FILE "B5717_LS_TIN_170209.tin" WAS USED TO DETERMINE ROADWAY BORING ELEVATIONS

DATE: 8-15-14

09/08/99

TIP PROJECT: B-5717

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

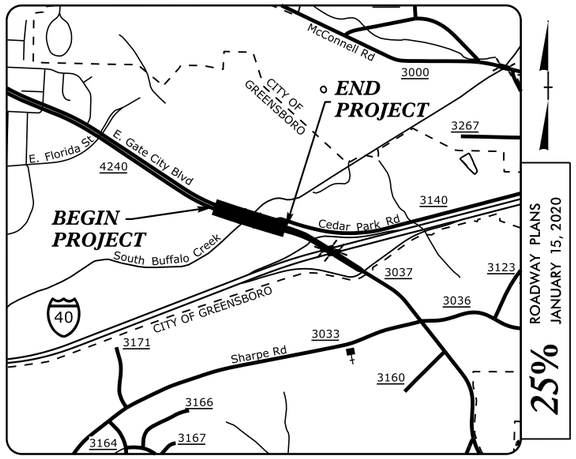
GUILFORD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5717	3	26

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45673.1.2		PE

LOCATION: BRIDGES 109 AND 121 ON SR 4240 (E. GATE CITY BLVD) OVER SOUTH BUFFALO CREEK

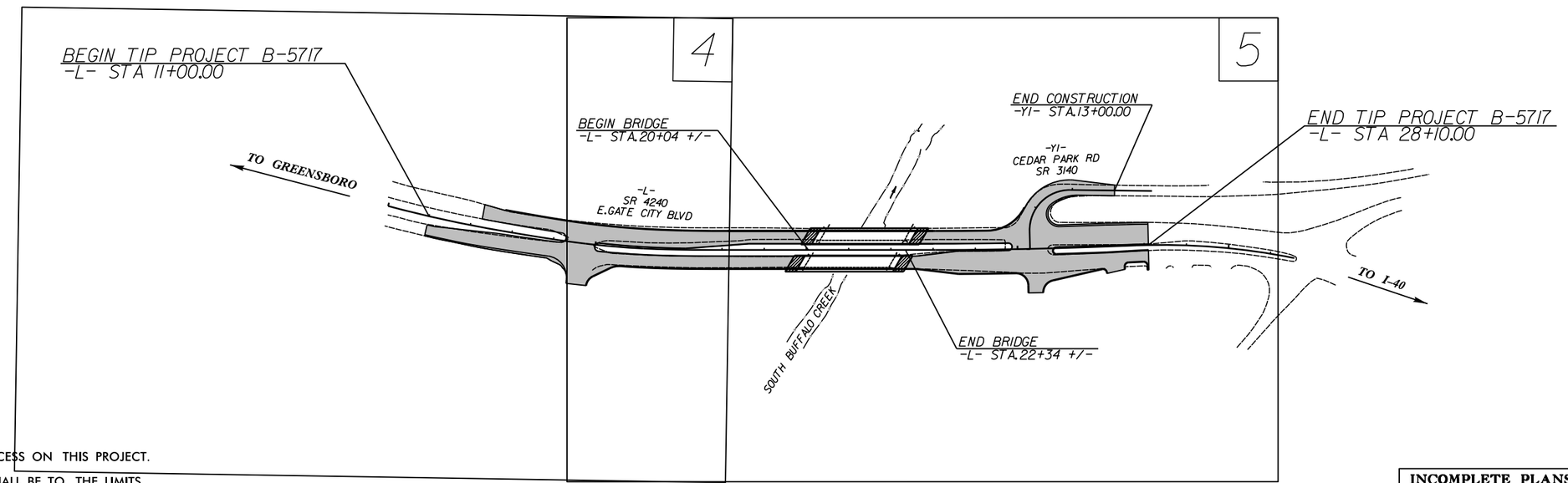
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES



VICINITY MAP

See Sheet 1A For Index of Sheets ***NOT TO SCALE***
See Sheet 1B For Conventional Symbols

NAD 83
NA 2011



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

CLEARING ON THE PROJECT SHALL BE TO THE LIMITS ESTABLISHED USING METHOD __.

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF GREENSBORO.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2020 = 18,184
ADT 2040 = 20,100
K = 11 %
D = 65 %
T = 5% % *
V = 50 MPH
* TTST =1% DUAL 4%
FUNC CLASS =
PRINCIPAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5717 = 0.280 MI
LENGTH STRUCTURE TIP PROJECT B-5717 = 0.044 MI
TOTAL LENGTH TIP PROJECT B-5717 = 0.324 MI

Prepared in the Office of :
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 15, 2020

LETTING DATE: FEBRUARY 16, 2021

NEIL J. DEAN, P.E.
PROJECT ENGINEER

TIMOTHY KLOTZ, P.E.
PROJECT DESIGN ENGINEER

DAVID STUTTS, P.E
NCDOT PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

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May 7, 2020

STATE PROJECT: 45673.1.2
TIP: B-5717
COUNTY: Guilford
DESCRIPTION: Replace Bridges 109 and 121 on SR 4240 (E. Gate City Blvd.) over South Buffalo Creek
SUBJECT: Geotechnical Report – Roadway Inventory

Project Description

This proposed project is located in Greensboro, North Carolina. It begins at Station 11+00 and continues to Station 28+10, which is approximately 280 feet east of the intersection of -L- (East Gate City Boulevard) and -Y1- (Cedar Park Road). The total project length is approximately 0.32 miles. The existing East Gate City Boulevard within the project corridor consist of a four-lane roadway with a grassed median between the westbound and eastbound lanes. Several businesses are located within the project corridor.

The proposed project construction consists of the following:

- The replacement of the existing dual bridges (Bridge Nos. 109 and 121) over South Buffalo Creek
- Raising the grade of the roadway approaches to the bridges to accommodate the increased heights of the proposed new bridges
- Raising the grade of -Y1- (Cedar Park Road) in the vicinity of its intersection with -L- to match the new grades of the -L- roadway
- Widening the existing roadway on each side of -L- to accommodate the construction of sidewalks with curb and gutter on both sides of the roadway
- Widening, raising the grade, and reworking the turn lanes at the -L- and -Y1- intersection

The proposed maximum new embankment fill heights are approximately 10 feet. The only proposed cuts along -L- are for the proposed curb and gutter, are less than 1 foot, and are only proposed in isolated areas, while a maximum proposed cut depth of approximately 2 feet is proposed for a side ditch on the right side of -Y1- in the vicinity of Station 11+00.

The drainage along the project is handled by concrete drains with catch basins within the median. It should be noted that there are numerous, significant gullies and holes all along the top of the existing embankment along the left side of the roadway beginning just inside the guardrails and continuing down the slope; this appears to indicate that significant water runoff from the left side of the existing road is going over the slopes instead of into the median.

The only intersection along the project is at Cedar Park Road (-Y1-) which intersects -L- at Station 25+29.55 -L- and Station 10+00 -Y1-.

This geotechnical investigation was confined to the areas of proposed construction.

Initial site scoping was performed on February 26, 2020. The field roadway investigation was performed from March 9 to March 16, 2020. Standard Penetration Test borings were advanced with a CME 550X drill machine equipped with an automatic hammer. Hand augers were utilized to gather subsurface information in areas not accessible to drilling equipment. Representative soil samples were collected for visual classification in the field and for laboratory analyses.

The following alignments were investigated. Subsurface cross sections of these alignments are included in this report.

Alignment	Station (±)
-L-	11+00 to 28+10
-Y1-	10+00 to 13+00

Physiography and Geography

The project corridor is located in the Carolina Slate Belt within the Piedmont Physiographic Province. The Carolina Slate Belt lies to the east of the Charlotte Metamorphic Belt and west of the Raleigh and Kiokee Metamorphic Belts. It is composed dominantly of Later Proterozoic to Cambrian age lower grade metamorphosed greenschist facies metavolcanic rocks, metasedimentary rocks, and several post-metamorphic plutons. The Geologic Map of North Carolina (1985) shows the project corridor area to consist of "Metamorphosed Granitic Rock (520-650 my) – Megacrystic, well-foliated, locally contains hornblende; Fountain intrusive". No rock coring was performed during ESP's exploration.

The roadway along East Gate City Boulevard (-L-) generally slopes up from the beginning (west end) of the project to the end (east end) of the project with elevations ranging from approximately 694 feet (MSL) at the bottom of the creek bed to approximately 726 feet (MSL) along the centerline at the end of the project. Swampy areas are present extending out from the toe of the existing embankment along the left side between approximately Station 12+50 and approximately Station 23+00, and along the right side between approximately Station 18+00 and approximately Station 19+40.

Soil Properties

Soils encountered within this project area have been divided into five categories: roadway embankment, artificial fill, alluvial deposits, residual soils, and weathered rock.

The roadway embankment ranged in thickness from approximately 5 feet to approximately 13 feet, and was generally composed of medium dense, silty sand (A-2-4) and of soft to very stiff, sandy silt (A-4), sandy clay (A-6), and silty clay (A-7). Plasticities within the cohesive roadway embankment material range from slightly plastic to highly plastic with laboratory plasticity index results ranging from 5 to 27. Boulders and/or rip rap was encountered in the lower portion of the roadway embankment within the median area at each end of the existing bridges extending out approximately 15 to 20 feet from each end of the bridges.

Artificial fill material is present right of the existing roadway embankment between approximately Station 12+50 and approximately Station 18+25. The artificial fill, where encountered in test borings, consists of medium stiff to stiff, silty clay (A-7-5) with wood fragments and asphalt pieces. This material encountered in the test borings extends to depths below the existing ground surface ranging from approximately 4 to 5.5 feet, and is most likely backfill in overexcavated areas for the water line. The majority of the artificial fill, which is right of the proposed

construction area and was therefore not tested, is fill placed to construct the pad for the Penske Truck business. Plasticities within the artificial fill ranged from slightly to moderately plastic.

Soils identified as alluvial deposits were encountered either beginning at the existing ground surface or underlying the roadway embankment in many of the borings drilled for this project. The alluvium extended to depths ranging from 3.2 feet to 28.2 feet below the existing ground surface. In borings where the alluvium was encountered underlying roadway embankment fill, the top of alluvium ranged from depths of 5.2 feet to 11.7 feet below the existing ground surface. The alluvial deposits encountered generally consist of very loose to loose, silty sand (A-2-4), and of very soft to stiff, sandy silt (A-4), sandy clay (A-6) and silty clay (A-7). Plasticity within the cohesive alluvium materials is slightly plastic with a laboratory plasticity index results ranging from 12 to 13. Trace organics were present within the some of the alluvial materials. With the exception of Boring L-1491, all of the borings west (downstation) of Station 19+80 were terminated in alluvium

Residual soils were encountered in the majority of the borings drilled for the bridges and in the borings drilled on the east (upstation) side of the existing bridges. The exceptions were Borings EB1-C through C3 and EB2-C which were terminated on rip rap/boulders, Boring EB2-A which encountered crystalline rock directly below the alluvium, and Borings EB2-C1 and EB2-B which encountered weathered rock directly underlying the alluvium. The residual soils consisted of medium dense to dense, silty sand (A-2-4), and of medium stiff to very stiff, sandy silt (A-4). sandy clay (A-6), and silty clay (A-7-5). Plasticities within the cohesive residual soils range from slightly plastic to highly plastic with laboratory plasticity index results ranging from 12 to 27.

The weathered rock was encountered at depths ranging from 8.3 feet to 27.9 feet below the existing ground surface which corresponds to elevations ranging from 713.8 feet to 688.2 feet.

Rock Properties

Crystalline rock was encountered either directly underlying the alluvium or underlying weathered rock in some of the borings drilled for this project. The crystalline rock was encountered at depths ranging from 8.3 feet to 29.7 feet below the existing ground surface which correspond with elevations ranging from 711.1 feet to 685.4 feet. The crystalline rock along the project corridor classifies as a Metamorphosed Granitic Rock.

Groundwater Properties

Ground water data was collected in March, 2020. Twenty-four-hour ground water depths ranged from 1.6± to 13.8± feet below the existing ground surface, and groundwater elevations ranged from 709.7± to 702.2± feet above sea level. It should be noted that heavy seasonal rains at the time of this investigation may have resulted in higher than average recorded ground water elevations.

Areas of Special Geotechnical Interest

1) The following areas contain soft and/or wet to saturated alluvial material at the base of the proposed embankment extensions for the project. These areas flood periodically.

Alignment	STA (±) to STA (±)	Offset (±)
-L-	12+50 to 17+75	65’ LT to +90’ LT
-L-	18+25 to 19+25	70’ RT to +80’ RT
-L-	19+25 to 20+30	70’ LT to +90’ LT
-L-	22+55 to 23+00	70’ LT to +90’ LT

2) The following area contains soils exhibiting a slight to strong petroleum odor indicating potential soil hydrocarbon contamination:

Alignment	STA to STA (±)	Offset (±)	Notes
-L-	23+00 to 27+00	CL to +110’ RT	Very strong petroleum odor with PID reading of 1352 ppm in sample from 8.5’ to 10.0’ at Sta. 23+95, 52’ Rt. Slight petroleum odor in sample from 3.5’ to 5.0’ at Sta. 25+95, 55’ Rt.

Water Wells

No water wells were identified in the field or on the project plans.

-L-

PI Sta 11+38.60
△ = 5° 20' 27.8" (LT)
D = 1° 55' 41.5"
L = 277.00'
T = 138.60'
R = 2,971.46'

PIs Sta 14+10.35
Θs = 2° 51' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 15+45.26
△ = 3° 54' 35.5" (LT)
D = 2° 51' 53.2"
L = 136.48'
T = 68.27'
R = 2,000.00'
e = 0.04 FT/FT
R.O. = 200'

PIs Sta 16+80.16
Θs = 2° 51' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PROJECT REFERENCE NO.	SHEET NO.
B-5717	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 FAX)

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NAD 83 / NA 2011

NORTH CAROLINA A & T STATE UNIVERSITY
DB 570 PG 364

BEGIN TIP PROJECT B-5717
-L- POC STA. 11+00.00

18" RCP END WALL
18" RCP
POSSIBLE JB
B5717-1
4 " PLASTIC
TO EAST FLORIDA ST
15" RCP
12 " DIP
CB CONC.
SR 4240 - LEE STREET
VAR. BST
48" WD RAIL & WD POST
VAR. PS
R/W LINE
ROADWAY EMBANKMENT
-L- PI
ALLUVIUM
WOODS
N 04°36'25" W 523.51'
N 04°25'52" W 517.24'
CAT-1
CS Sta. 12+77.00
END TAPER
+25.00
SC Sta. 14+77.00
CS Sta. 16+13.48
550'
STATE OF NORTH CAROLINA
DB 1056 PG 517
ALLUVIUM
50' INC. (TYP)
+13.48
L_1293
L_1500HA
L_1690HA
L_1700LT
L_1491
SIDEWALK
2'-6" C&G
1'-6" C&G
L_1600
R=11.3'
R=101'
R=50'
R=30'
MTL 5' SIDEWALK
L_1700RT
GREU, TL-3
72" CHL & 2SBW & RAZOR WIRE
REB
BFP
30" C&G
GATE
GATE
PENSKE TRUCK LEASING CO LP
DB 4229 PG 1416
PB 92 PG 58
ARTIFICIAL FILL
DI 18" RCP
FES
CONNECT
DUKE POWER EASMENT
150' R/W
+17.60
BEGIN TAPER
150'
+57.60
END TAPER
+00.00
BEGIN TAPER
300'
+40.00
END TAPER
PC Sta. 10+00.00
STATE OF NORTH CAROLINA
DB 1056 PG 517
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 4427 PG 330
185.60'
N 03°07'33" E
N001.4
N 03°01'

MATCHLINE -L- 17+00
SEE SHEET 5

FOR -L- PROFILE, SEE SHEET NO. 6
FOR -L_Rt- PROFILE, SEE SHEET NO. 6
FOR -L_Lt- PROFILE, SEE SHEET NO. 6

REVISIONS
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PROJECT REFERENCE NO.	SHEET NO.
B-5717	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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-L-

PIs Sta 16+80.16
Θs = 2° 51' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 24+44.47
Δ = 1° 35' 19.6" (LT)
D = 0° 34' 22.6"
L = 277.29'
T = 138.65'
R = 10,000.00'
e = NC

PIs Sta 26+49.78
Θs = 0° 34' 22.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 29+71.34
Δ = 13° 32' 43.3" (RT)
D = 3° 36' 53.6"
L = 374.71'
T = 188.23'
R = 1,585.00'

-Y1-

PI Sta 11+40.76
Δ = 91° 57' 38.2" (RT)
D = 60° 18' 40.8"
L = 152.48'
T = 98.31'
R = 95.00'
e = 0.04 FT/FT
R.O. = 68'

NAD 83 / NA 2011

PT Sta. 11+94.93

END CONSTRUCTION
-Y1- POT STA. 13+00.00

POT Sta. 13+88.60

END TIP PROJECT B-5717
-L- POC STA. 28+10.00

PC Sta. 10+42.46

CS Sta. 25+83.11

SC Sta. 27+83.11

ST Sta. 18+13.48

PC Sta. 23+05.82

-L- POC Sta. 25+29.55 =
-Y1- POT Sta. 10+00.00

MATCHLINE -L- 17+00
SEE SHEET 4

STATE OF NORTH CAROLINA
DB 1056 PG 517

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 3595 PG 392

RICHARD J GREENE
DB 5338 PG 272
PB 165 PG 52

RENSKE TRUCK LEASING CO LP
DB 4229 PG 1416
PB 92 PG 58

CITY OF GREENSBORO
PB 92 PG 58

NORTH CAROLINA STUDENT HOUSING LLC.
DB 5489 PG 1303

NORTH CAROLINA STUDENT HOUSING LLC.
DB 6850 PG 395

BULDING SOLUTIONS DEVELOPMENT INC.
DB 6326 PG 2558

M. M. FOWLER INC.
DB 5489 PG 1303

ROADWAY EMBANKMENT
ALLUVIUM
RESIDUAL
ARTIFICIAL FILL

TIE TO FUTURE CONSTRUCTION BY OTHERS

CEDAR PARK RD
25 BST

SR 4240 - LEE STREET
VAR, BST

DUKE POWER EASEMENT
150' R/W

DUKE POWER EASEMENT
100' R/W
DB 2578 PG 95

SOUTH BUFFALO CREEK

FOR -L_RT- PROFILE, SEE SHEET NO. 6
FOR -L_LT- PROFILE, SEE SHEET NO. 6
FOR -L- PROFILE, SEE SHEET NO. 7
FOR -Y1- PROFILE, SEE SHEET NO. 7

REVISIONS
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	B-5717	6

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

730 720 710 700

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown and Red, Stiff, Silty CLAY (A-7-6), Trace Gravel, Moist

EXIST — EEOP — 6:1 0.080 — EEOP — EXIST — EEOP

Ⓐ 716.28

ALLUVIUM: Gray and Brown to Tan, Medium Stiff to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Highly to Slightly Plastic, Trace Rock Fragments, Moist to Wet

12+25.00

730 720 710 700

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown and Red, Stiff, Silty CLAY (A-7-6), Trace Gravel, Moist

EEOP — EEOP — 6:1 0.080 — EXIST — EEOP

Ⓐ 716.37

ALLUVIUM: Gray and Brown to Tan, Medium Stiff to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Highly to Slightly Plastic, Trace Rock Fragments, Moist to Wet

12+00.00

730 720 710 700

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown and Red, Stiff, Silty CLAY (A-7-6), Trace Gravel, Moist

EEOP — EEOP — EXIST — EEOP

Ⓐ 716.37

ALLUVIUM: Gray and Brown to Tan, Medium Stiff to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Highly to Slightly Plastic, Trace Rock Fragments, Moist to Wet

11+50.00

730 720 710 700

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown and Red, Stiff, Silty CLAY (A-7-6), Trace Gravel, Moist

EEOP — EEOP — EXIST — EEOP

Ⓐ 717.09

ALLUVIUM: Gray and Brown to Tan, Medium Stiff to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Highly to Slightly Plastic, Trace Rock Fragments, Moist to Wet

11+00.00

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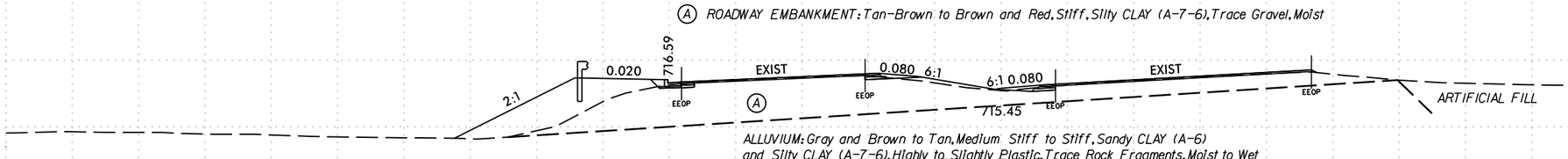

13+50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
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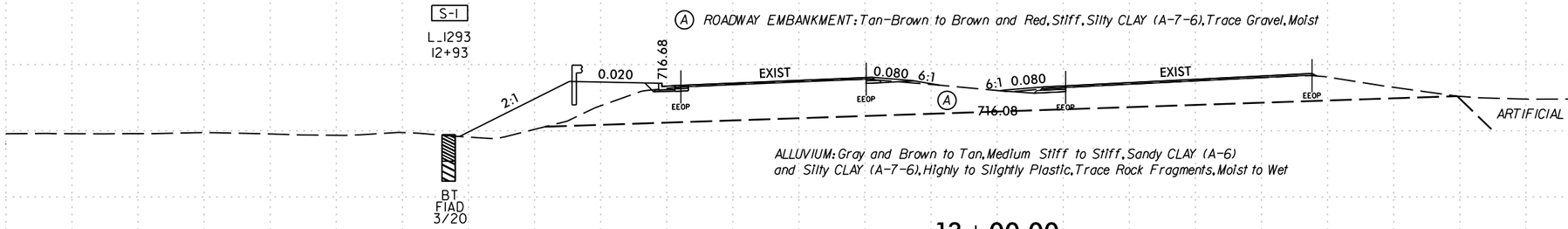
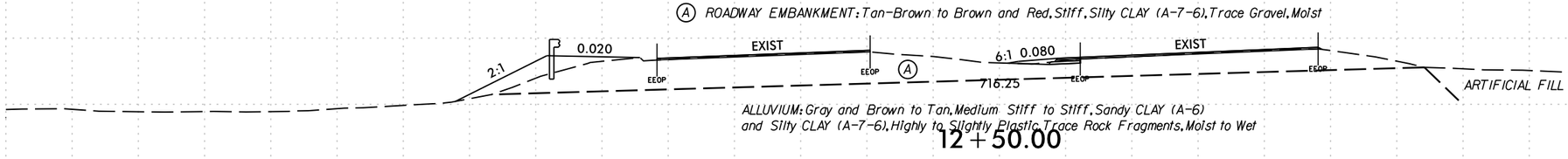


13+00.00



12+50.00

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6/23/16

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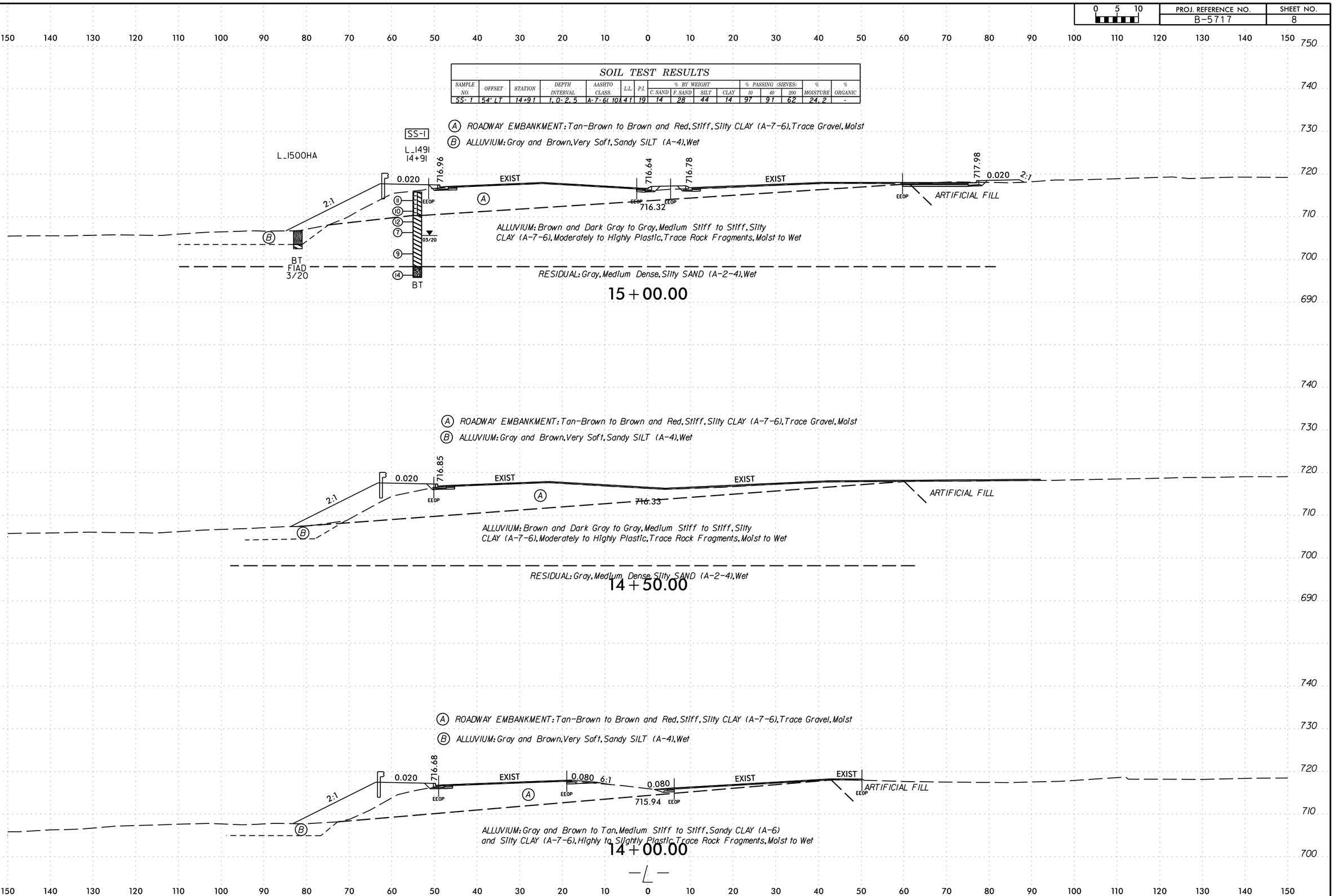
	B-5717	8

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-1	54' LT	14+91	1.0-2.5	A-7-6(10)	41	19	14	28	44	14	97	91	62	24.2	-



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6/23/16

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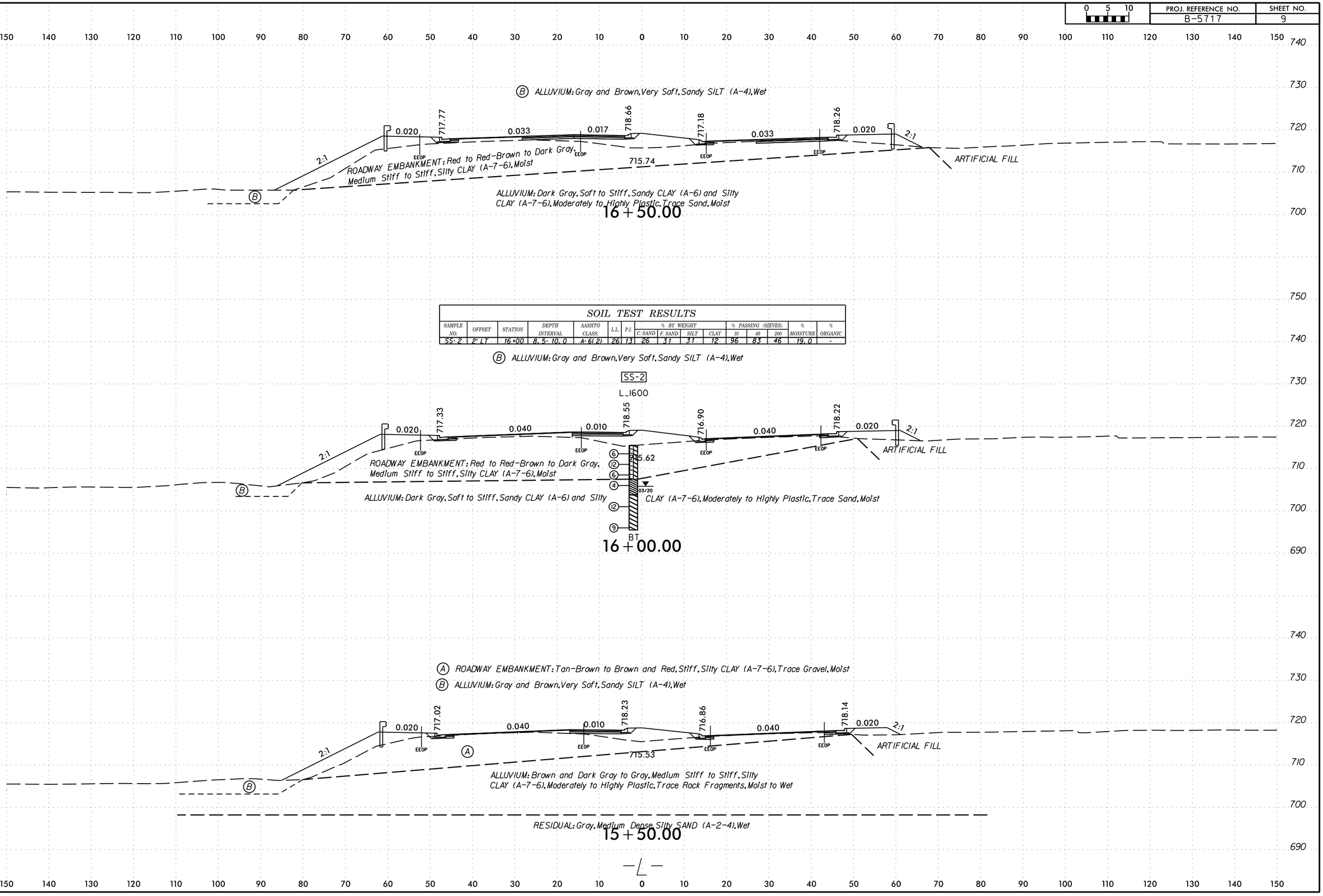
	B-5717	9



SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) #10	% PASSING (SIEVES) #40	% PASSING (SIEVES) #200	% MOISTURE	% ORGANIC
SS-2	2' LT	16+00	8.5-10.0	A-6(2)	26	13	26	31	31	12	96	83	46	19.0	-

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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

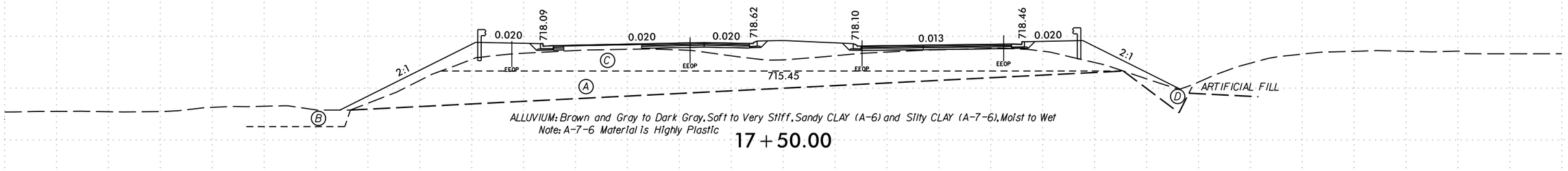
750 740 730 720 710 700

(A) ROADWAY EMBANKMENT: Red to Red-Brown, Stiff, Silty CLAY (A-7-6), Dry

(B) ALLUVIUM: Gray and Brown, Very Soft, Sandy SILT (A-4), Saturated

(C) ROADWAY EMBANKMENT: Brown, Medium Dense, Silty SAND (A-2-4), Moist

(D) ARTIFICIAL FILL: Brown to Red, Medium Stiff to Stiff, Silty CLAY (A-7-6), Little Wood Fragments, Trace Asphalt Pieces, Wet to Saturated
Note: Excavation Backfill for Water and Sewer Lines



17+50.00

770 760 750 740 730 720 710 700 690

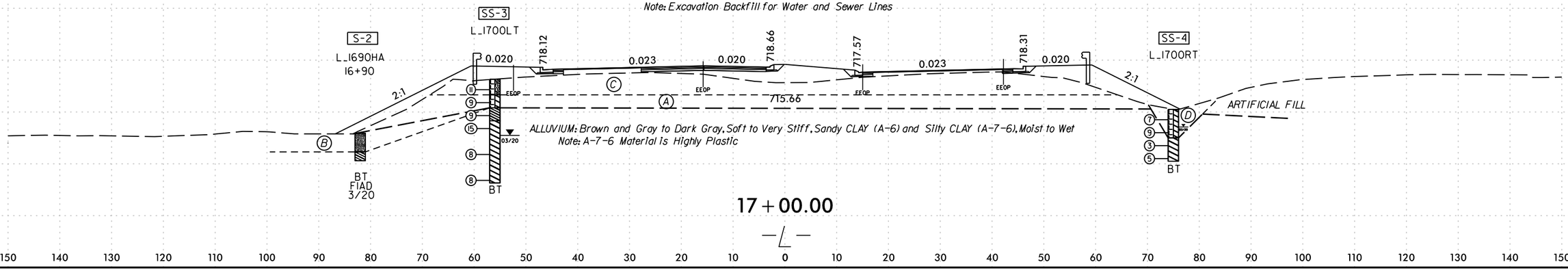
SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-2	82' LT	16+90	3.6-5.3	A-6(9)	29	14	1	30	53	16	100	99	80	21.4	-
SS-3	56' LT	17+00	3.5-5.0	A-7-6(13)	48	21	18	20	44	18	98	89	66	27.5	-
SS-4	75' RT	17+00	8.5-10.0	A-7-6(28)	46	27	1	7	68	24	100	100	96	31.3	-

(A) ROADWAY EMBANKMENT: Red to Red-Brown, Stiff, Silty CLAY (A-7-6), Dry

(B) ALLUVIUM: Gray and Brown, Very Soft, Sandy SILT (A-4), Saturated

(C) ROADWAY EMBANKMENT: Brown, Medium Dense, Silty SAND (A-2-4), Moist

(D) ARTIFICIAL FILL: Brown to Red, Medium Stiff to Stiff, Silty CLAY (A-7-6), Little Wood Fragments, Trace Asphalt Pieces, Wet to Saturated
Note: Excavation Backfill for Water and Sewer Lines



17+00.00

—L—

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6/23/16

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	B-5717	11

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

740 730 720 710 700

Ⓔ ROADWAY EMBANKMENT: Tan-Brown, Stiff, Sandy SILT (A-4), Dry

2.26:1 | 0.020 | 718.43 | 0.020 | 719.09 | 719.09 | 0.017 | 718.52 | 0.020 | 2:1

EEOP EEOP EEOP EEOP

Ⓔ 715.42

ROADWAY EMBANKMENT: Tan-Brown to Brown to Dark Gray, Stiff to Medium Stiff, Silty CLAY (A-7-6) and Sandy CLAY (A-6), Dry

ALLUVIUM: Gray, Very Soft to Stiff, Silty CLAY (A-7-6), Saturated

19+00.00

L_185l
18+51

2.65:1 | 0.020 | 718.19 | 0.020 | 718.87 | 718.81 | 0.007 | 718.57 | 0.020 | 2:1

EEOP EEOP EEOP EEOP

ROADWAY EMBANKMENT: Tan-Brown to Brown to Dark Gray, Stiff to 714.94 Medium Stiff, Silty CLAY (A-7-6) and Sandy CLAY (A-6), Dry

ROADWAY EMBANKMENT: Tan-Brown, Stiff, Sandy SILT (A-4), Dry

ALLUVIUM: Gray, Very Soft to Stiff, Silty CLAY (A-7-6), Saturated

⑫ ⑬ ⑧ ⑩ WOH ⑧

BT
FIAD
3/20

18+50.00

Ⓓ ARTIFICIAL FILL: Brown to Red, Medium Stiff to Stiff, Silty CLAY (A-7-6), Little Wood Fragments, Trace Asphalt Pieces, Wet to Saturated
Note: Excavation Backfill for Water and Sewer Lines

2.29:1 | 0.020 | 718.07 | 0.020 | 0.020 | 718.68 | 718.46 | 0.003 | 718.55 | 0.020 | 2:1

EEOP EEOP EEOP EEOP

ROADWAY EMBANKMENT: Tan-Brown to Brown to Dark Gray, Stiff to 715.27 Medium Stiff, Silty CLAY (A-7-6) and Sandy CLAY (A-6), Dry

ROADWAY EMBANKMENT: Tan-Brown, Stiff, Sandy SILT (A-4), Dry

ALLUVIUM: Gray, Very Soft to Stiff, Silty CLAY (A-7-6), Saturated

Ⓓ ARTIFICIAL FILL

18+00.00

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6/23/16

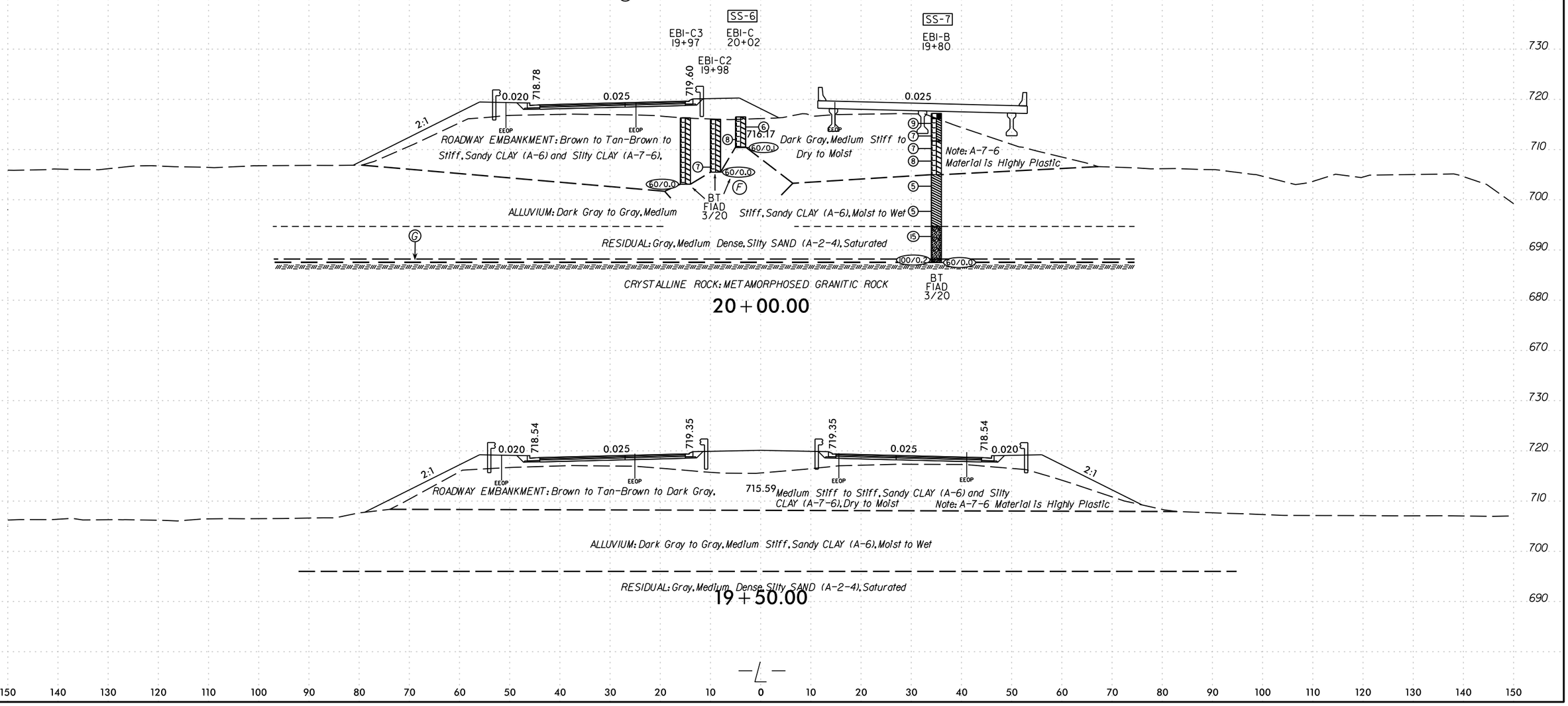
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	12

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-6	4' LT	20+02	1.0-2.5	A-7-6(16)	49	27	17	21	44	18	98	89	65	24.3	-
SS-7	35' RT	19+80	13.5-15.0	A-6(8)	28	13	1	29	55	15	100	100	81	21.6	-

(F) ROADWAY EMBANKMENT: RIP RAP /BOULDERS

(G) WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK



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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	13

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

730 720 710 700 690 680

Ⓖ WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK

0.025 0.025

ELEV: 696.6'

695.22

ALLUVIUM: Dark Gray with Brown, Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Organics, Moist to Wet

CRYSTALLINE ROCK: METAMORPHOSED GRANITIC ROCK

21+00.00

760 750 740 730 720 710 700 690 680 670

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-5	49' LT	20+28	3.5-5.0	A-7-6(9)	41	23	23	21	40	16	88	77	53	23.7	-

Ⓐ ROADWAY EMBANKMENT: Dark Gray, Medium Stiff to Stiff, Silty CLAY (A-7-6), Moist

Ⓖ WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK

SS-5
EBI-A
20+28

0.025 0.025

6 10 9 9 13 32 50/0.0

Ⓐ

707.92

ALLUVIUM: Dark Gray with Brown, Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Organics, Moist to Wet

RESIDUAL: Dark Gray, Dense, Silty SAND (A-2-4), Wet

BT
FIAD
3/20

CRYSTALLINE ROCK: METAMORPHOSED GRANITIC ROCK

20+50.00

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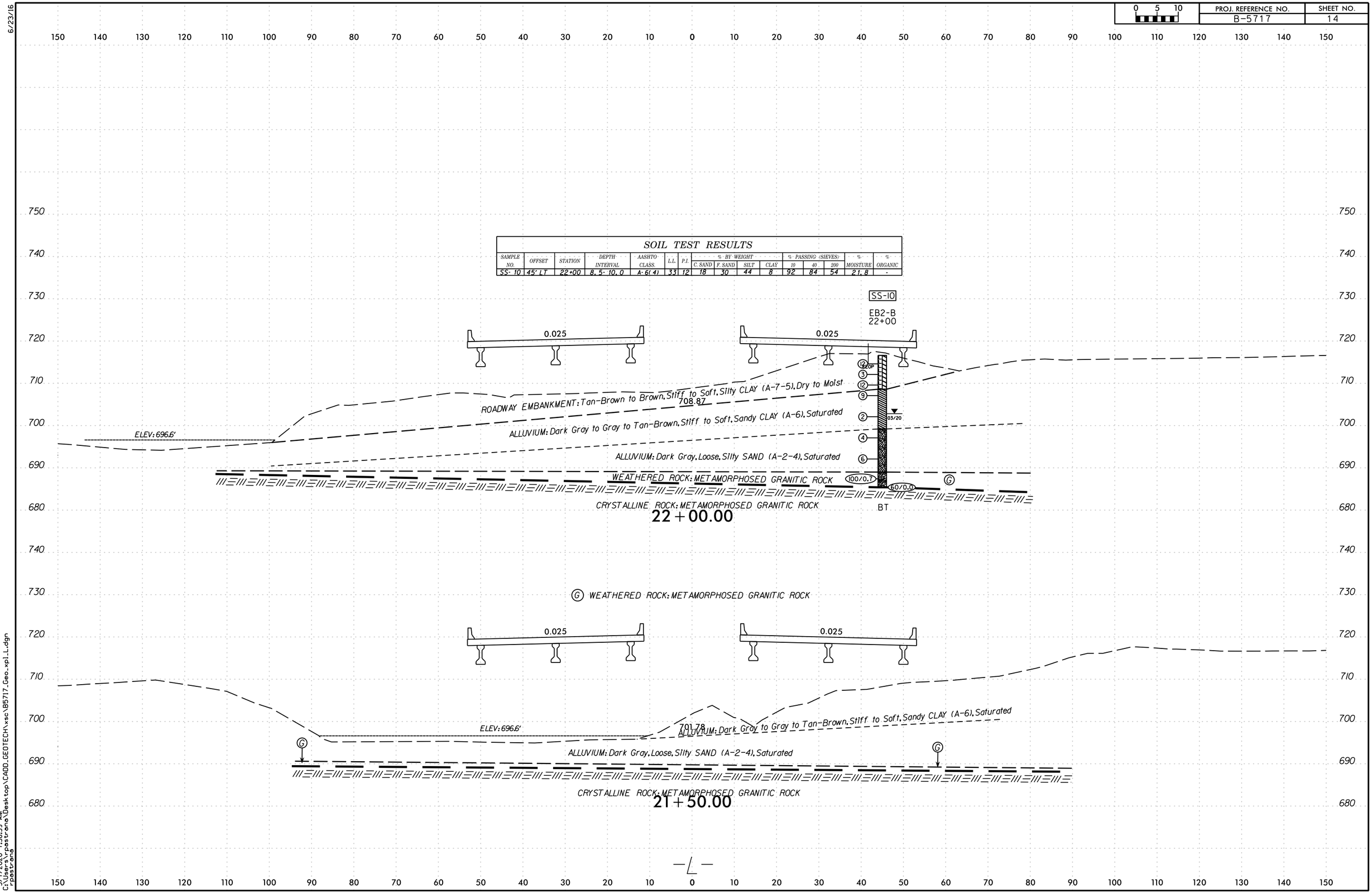
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	14

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-10	45' LT	22+00	8.5-10.0	A-6(4)	33	12	18	30	44	8	92	84	54	21.8	-



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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	15

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

740 730 720 710 700 690 770

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown to Dark Gray, Very Stiff to Medium Stiff, Sand CLAY (A-6) and Silty CLAY (A-7-5), Trace Gravel, Dry to Moist

0.020 720.18 0.023 720.94 721.05 0.023 720.07 0.020

2:1 4:1

EEOP EEOP EEOP EEOP

715.80

ALLUVIUM: Dark Gray to Gray, Soft to Medium Stiff, Silty CLAY (A-7-6), Trace Organics (Wood Fragments), Moist

RESIDUAL: Dark Gray, Very Stiff to Stiff, Silty CLAY (A-7-5), Dry

23+00.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-8	50' LT	20+55	6.0-7.5	A-6(2)	28	12	25	31	35	9	92	81	46	17.2	-
SS-9	5' LT	20+44	18.5-20.0	A-2-4(0)	NP	NP	50	34	7	9	97	77	18	-	-

Ⓐ ROADWAY EMBANKMENT: Tan-Brown to Brown to Dark Gray, Very Stiff to Medium Stiff, Sand CLAY (A-6) and Silty CLAY (A-7-5), Trace Gravel, Dry to Moist

Ⓕ ROADWAY EMBANKMENT: RIP RAP /BOULDERS

Ⓖ WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK

SS-8 EB2-A 22+55

SS-9 EB2-CI 22+44 EB2-C 22+29

0.020 720.04 0.025 720.86 720.86 0.025 720.04 0.020

2:1 4:1

EEOP EEOP EEOP EEOP

15 11 6 5 4 8 2

9 6 2 4 2 3

50/0.0 50/0.0 50/0.0

BT FIAD 3/20

BT 3/20

BT

ALLUVIUM: Dark Gray to Gray, Soft to Medium Stiff, Silty CLAY (A-7-6), Trace Organics (Wood Fragments), Moist to Saturated

ALLUVIUM: Gray, Loose to Very Loose, Silty SAND (A-2-4), Wet to Saturated

RESIDUAL: Dark Gray, Very Stiff to Stiff, Silty CLAY (A-7-5), Dry

CRYSTALLINE ROCK: METAMORPHOSED GRANITIC ROCK

22+50.00

760 750 740 730 720 710 700 690 680 670

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	16

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

740 730 720 710 760 750 740 730 720 710 700

Ⓔ ROADWAY EMBANKMENT: Tan-Brown to Brown to Gray, Stiff to Medium Stiff, Sandy SILT (A-4), Dry

3:1 0.020 719.93 Ⓔ 0.020 0.007 720.31 720.23 0.007 0.020 719.73 0.020 4:1

EEOP EEOP 717.91 EEOP EEOP

RESIDUAL: Dark Gray, Very Stiff to Stiff, Silty CLAY (A-7-5), Dry

24+50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-11	68' LT	24+04	1.0-2.5	A-4(0)	23	5	28	38	28	6	89	77	37	15.1	-
SS-12	52' RT	23+95	3.5-5.0	A-4(0)	27	8	30	33	30	7	86	71	38	18.8	-

SS-11
L_2404LT
24+04

SS-12
L_2395RT
23+95

2:1 0.020 720.07 0.020 0.003 720.53 720.57 0.003 0.020 719.83 0.020 4:1

EEOP EEOP 717.47 EEOP EEOP

6 5 3 5 — BT 03/20

ALLUVIUM: Dark Gray, Soft to Medium Stiff, Silty CLAY (A-7-6), Organic Odor, Wet

ROADWAY EMBANKMENT: Tan-Brown to Brown to Gray, Stiff to Medium Stiff, Sandy SILT (A-4), Dry

13 7 18 10 — EEOP BT FIAD 3/20

RESIDUAL: Dark Gray, Very Stiff to Stiff, Silty CLAY (A-7-5), Dry

Note: Strong Petroleum Odor at 8.5'. PID Reading =1352ppm (Sampled on 3/13/20)

24+00.00

Ⓔ ROADWAY EMBANKMENT: Tan-Brown to Brown to Gray, Stiff to Medium Stiff, Sandy SILT (A-4), Dry

2:1 0.020 720.25 0.020 0.013 720.83 720.97 0.013 0.020 720.04 0.020 4:1

EEOP Ⓔ EEOP 717.01 EEOP EEOP

ALLUVIUM: Dark Gray, Soft to Medium Stiff, Silty CLAY (A-7-6), Organic Odor, Wet

RESIDUAL: Dark Gray, Very Stiff to Stiff, Silty CLAY (A-7-5), Dry

23+50.00

—L—

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5717	17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

740 730 720 710 700

Ⓒ ROADWAY EMBANKMENT: Brown, Medium Dense, Silty SAND (A-2-4), Dry

0.080 | 0.020 | 0.007 | 721.80 | 721.88 | 0.007 | 0.020 | 721.27 | 0.020 | 2:1

EEOP EEOP EEOP EEOP

RESIDUAL: Brown and Gray, Hard, Sandy SILT (A-4), Dry 721.61

WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK

CRYSTALLINE ROCK: METAMORPHOSED GRANITIC ROCK

26+50.00

Ⓒ ROADWAY EMBANKMENT: Brown, Medium Dense, Silty SAND (A-2-4), Dry

4:1 | 0.080 | 0.020 | 0.017 | 720.87 | 721.08 | 0.017 | 0.020 | L_2595 25+95 | 720.39 | 0.020 | 4:1

EEOP EEOP EEOP

720.54

RESIDUAL: Brown and Gray, Hard, Sandy SILT (A-4), Dry

NOTE: Slight Petroleum Odor in 3.5' Sample

WEATHERED ROCK: METAMORPHOSED GRANITIC ROCK

25 / 57 / 100/0.3 / 50/0.0

CRYSTALLINE ROCK: METAMORPHOSED GRANITIC ROCK

BT FIAD 3/20

26+00.00

SHEAR LINE | 0.020 | 0.020 | 0.020 | 0.020 | 0.010

EEOP

719.28

RESIDUAL: Tan-Brown to Brown, Soft to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Rock Fragments and Sand, Dry to Moist

25+50.00

SHEAR LINE | 0.020 | 0.017 | 0.017 | 0.020 | 719.82 | 0.020 | 3:1

EEOP

718.54

RESIDUAL: Tan-Brown to Brown, Soft to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Rock Fragments and Sand, Dry to Moist

25+00.00

—L—

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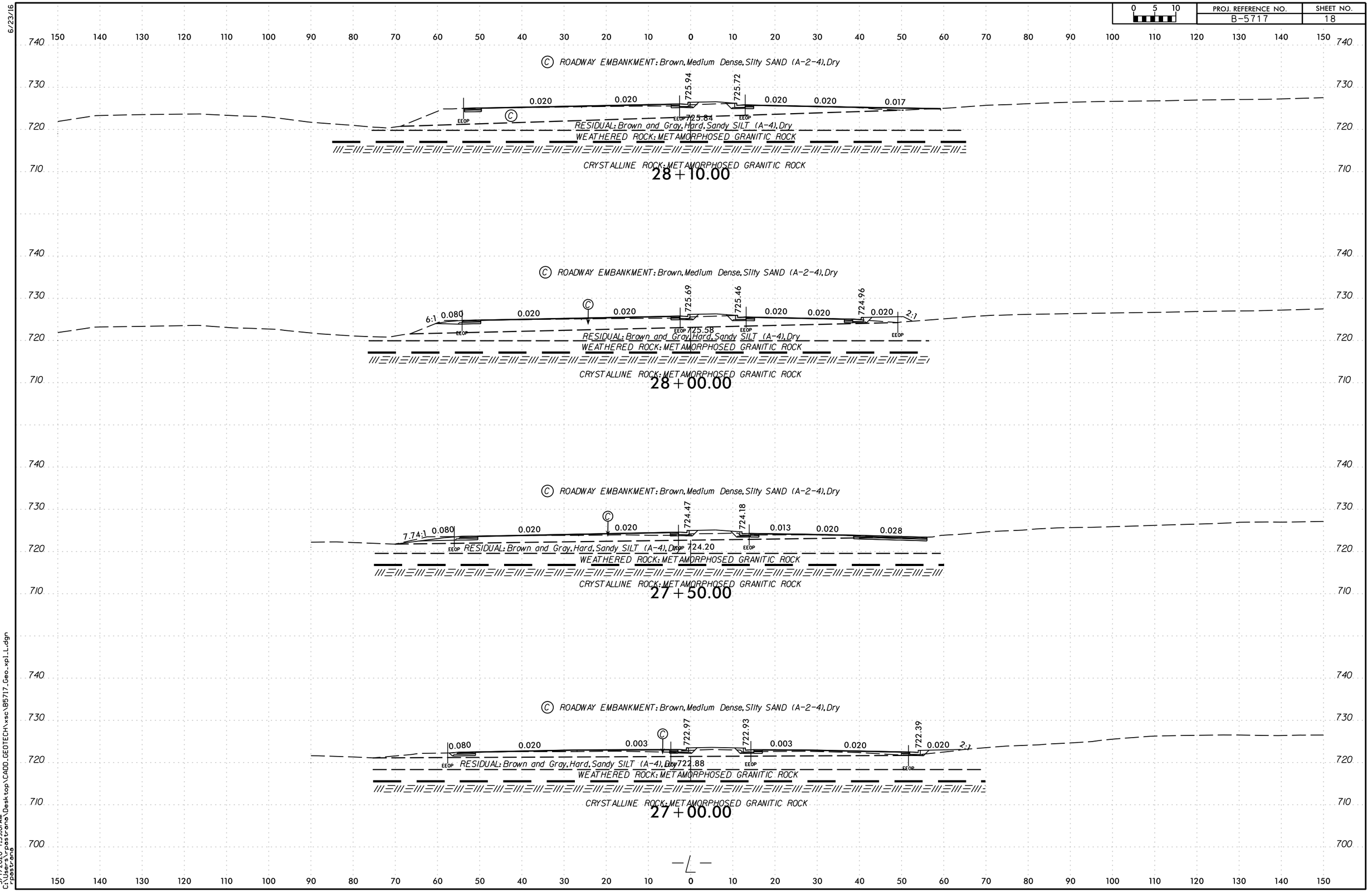
	B-5717	18



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6/23/16

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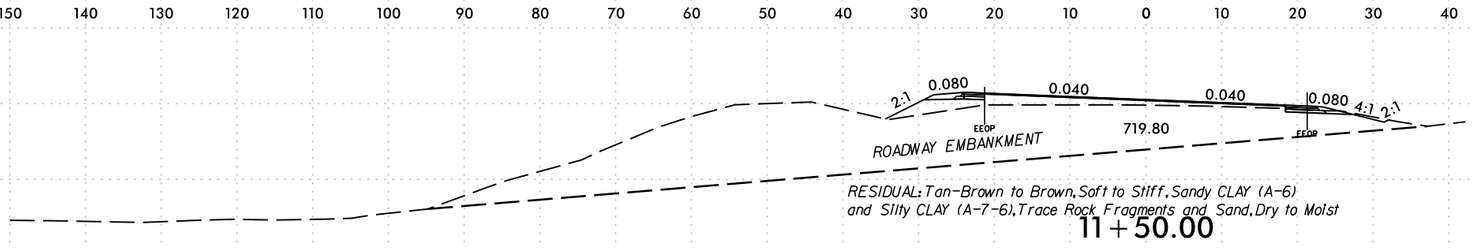
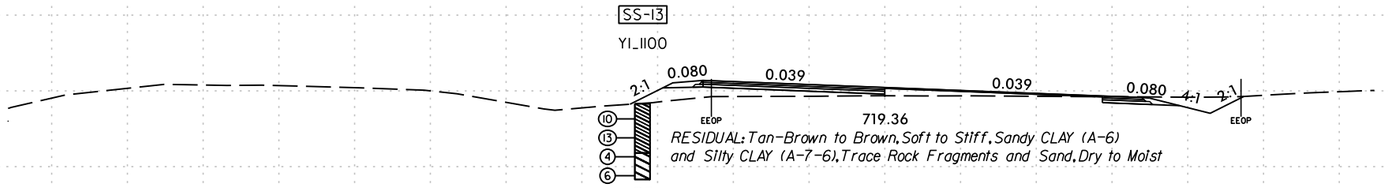
	B-5717	19



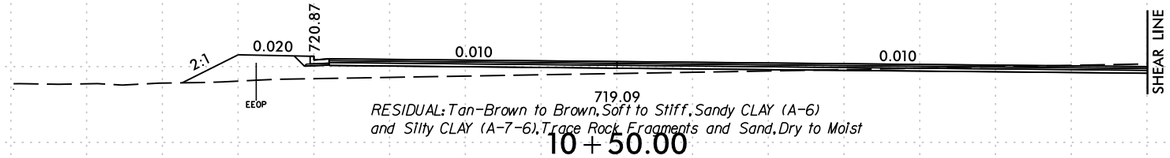
11+50.00

SOIL TEST RESULTS

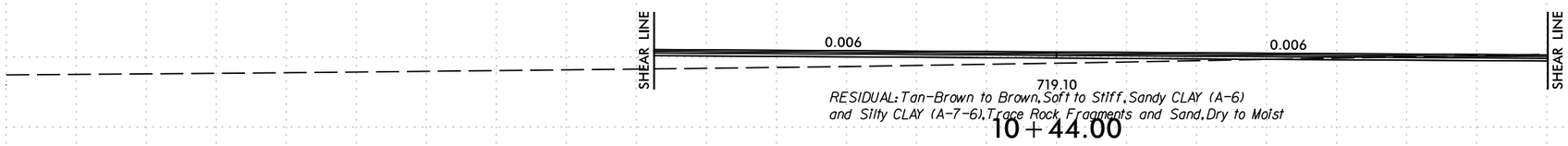
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-13	32' LT	11+00	1.0-2.5	A-6(1)	30	12	31	28	34	7	83	67	39	12.6	-



11+00.00



10+50.00



10+44.00

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6/23/16

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	B-5717	20

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

730
720
710
700

0.020 0.010
ROADWAY EMBANKMENT
EEOP 722.31 EEOP

RESIDUAL: Tan-Brown to Brown, Soft to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Rock Fragments and Sand, Dry to Moist

13+00.00

2:1 4:1 0.080 0.006 0.006 0.080 4:1 2:1
EEOP 721.30 EEOP
ROADWAY EMBANKMENT

RESIDUAL: Tan-Brown to Brown, Soft to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Rock Fragments and Sand, Dry to Moist

12+50.00

2:1 4:1 0.080 0.024 0.024 0.080 4:1 2:1
EEOP 720.47 EEOP
ROADWAY EMBANKMENT

RESIDUAL: Tan-Brown to Brown, Soft to Stiff, Sandy CLAY (A-6) and Silty CLAY (A-7-6), Trace Rock Fragments and Sand, Dry to Moist

12+00.00

—Y1—

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PROJECT REFERENCE NO.	SHEET NO.
B–5717	21

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
LABORATORY TEST RESULTS SUMMARY

REFERENCE: B–5717

PROJECT: 45673

ESP
ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM

SOILS LABORATORY TESTS RESULTS

WBS NO.: 45673.1.2

TIP NO.: B-5717

COUNTY: Guilford

SITE DESCRIPTION: Replace Bridges 109 and 121 on SR 4240 (E. Gate City Blvd.) over South Buffalo Creek

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
L_1293	S-1	-L- STA. 12+93, 83' LT	0.2-4.0	A-6 (2)	-	26	11	25	31	33	11	96	83	48	14.8	-
L_1491	SS-1	-L- STA. 14+91, 54' LT	1.0-2.5	A-7-6 (10)	11	41	19	14	28	44	14	97	91	62	24.2	-
L_1600	SS-2	-L-STA. 16+00, 2' LT	8.5-10.0	A-6 (2)	4	26	13	26	31	31	12	96	83	46	19.0	-
L_1690HA	S-2	-L- STA. 16+90, 82' LT	3.6-5.3	A-6 (9)	-	29	14	1	30	53	16	100	99	80	21.4	-
L_1700LT	SS-3	-L- STA. 17+00, 56' LT	3.5-5.0	A-7-6 (13)	9	48	21	18	20	44	18	98	89	66	27.5	-
L_1700RT	SS-4	-L- STA. 17+00, 75' RT	8.5-10.0	A-7-6 (28)	5	46	27	1	7	68	24	100	100	96	31.3	-
EB1-A	SS-5	-L- STA. 20+28, 49' LT	3.5-5.0	A-7-6 (9)	6	41	23	23	21	40	16	88	77	53	23.7	-
EB1-C	SS-6	-L- STA. 20+02, 4' LT	1.0-2.5	A-7-6 (16)	6	49	27	17	21	44	18	98	89	65	24.3	-
EB1-B	SS-7	-L- STA. 19+80, 35' RT	13.5-15.0	A-6 (8)	5	28	13	1	29	55	15	100	100	81	21.6	-
EB2-A	SS-8	-L- STA. 22+55, 50' LT	6.0-7.5	A-6 (2)	6	28	12	25	31	35	9	92	81	46	17.2	-
EB2-C1	SS-9	-L- STA. 22+44, 5' LT	18.5-20.0	A-2-4 (0)	2	NP	NP	50	34	7	9	97	77	18	-	-
EB2-B	SS-10	-L- STA. 22+00, 45' RT	8.5-10.0	A-6 (4)	9	33	12	18	30	44	8	92	84	54	21.8	-
L_2404LT	SS-11	-L- STA. 24+04, 68' LT	1.0-2.5	A-4 (0)	6	23	5	28	38	28	6	89	77	37	15.1	-
L_2395RT	SS-12	-L- STA. 23+95, 52' RT	3.5-5.0	A-4 (0)	7	27	8	30	33	30	7	86	71	38	18.8	-
Y1_1100	SS-13	-Y1 STA. 11+00, 32' LT	1.0-2.5	A-6 (1)	10	30	12	31	28	34	7	83	67	39	12.6	-

Tony Dunnavant

Certification No. 121-01-1108

PROJECT REFERENCE NO.	SHEET NO.
B–5717	23

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
BORING LOGS

REFERENCE: B–5717

PROJECT: 45673

ESP
ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45673.1.2	**TIP** B-5717	**COUNTY** GUILFORD	**GEOLOGIST** Pastrana, C.R.	
SITE DESCRIPTION Replace Bridges 109 and 121 on SR 4240 (E. Gate City Blvd.) over South Buffalo Creek				**GROUND WTR (ft)**
BORING NO. EB1-C1	**STATION** 19+97	**OFFSET** 4 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 716.1 ft	**TOTAL DEPTH** 6.2 ft	**NORTHING** 839,119	**EASTING** 1,781,368	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 90% 11/19/2018		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gonzales, L.	**START DATE** 03/10/20	**COMP. DATE** 03/10/20	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
720										
										716.1 GROUND SURFACE 0.0
715										**ROADWAY EMBANKMENT** Brown to Tan-Brown, Silty CLAY, Highly Plastic
710	709.9	6.2	60/0.0			60/0.0				709.9 6.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 709.9 ft on Rip Rap/Boulders