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REFERENCE: R-5719

PROJECT: 50473

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+00 TO 68+00	4 TO 8	11 TO 15
-RAMP A-	10+00 TO 25+12	7, 9	16
-RAMP B-	10+00 TO 29+94	5, 6, 9	17
-RAMP C-	10+00 TO 26+24	5, 6, 10	18
-RAMP D-	10+00 TO 29+55	7, 8, 10	19
-Y 1-	10+00 TO 26+35	6, 9, 10	20

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	10+00 TO 25+00	21 TO 28
-L-	37+00	29
-L-	38+00	30
-L-	40+00	31
-L-	42+00	32
-L-	57+50 TO 68+00	32 TO 38
-RAMP A-	23+50 TO 24+50	39
-RAMP B-	10+00 TO 14+50	40 TO 43
-RAMP C-	10+00 TO 14+00	44 TO 47
-RAMP C-	23+50 TO 25+50	48 TO 49
-RAMP D-	26+50 TO 29+00	50 TO 52
-Y 1-	11+00 TO 14+50	53 TO 55
-Y 1-	16+00 TO 19+50	55 TO 58
-Y 1-	24+00 TO 26+00	59 TO 60

APPENDICES

APPENDIX	TITLE	SHEETS
A	LABORATORY RESULTS	61 TO 62
B	CPT LOGS	63 TO 65

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *WAYNE*

PROJECT DESCRIPTION *DIVISION 4 - US 117 AND SR 1135 (COUNTRY CLUB ROAD) INTERCHANGE*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5719	1	65

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.

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PROJECT REFERENCE NO.	SHEET NO.
R-5719	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		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PLASTIC RANGE (PI)		
PL — PLASTIC LIMIT		
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — 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
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D-50
- [X] ACKER RENEGADE

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] 3¼" HOLLOW STEM AUGERS
- [X] TRICONE 3 7/8 " STEEL TEETH

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: N/A - SEE NOTES

ELEVATION: N/A FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

REPORT PREPARED USING PROVIDED TIN FILE (r5719_ls_tnl.tin)

DATE: 8-15-14

TIP PROJECT: R-5719

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

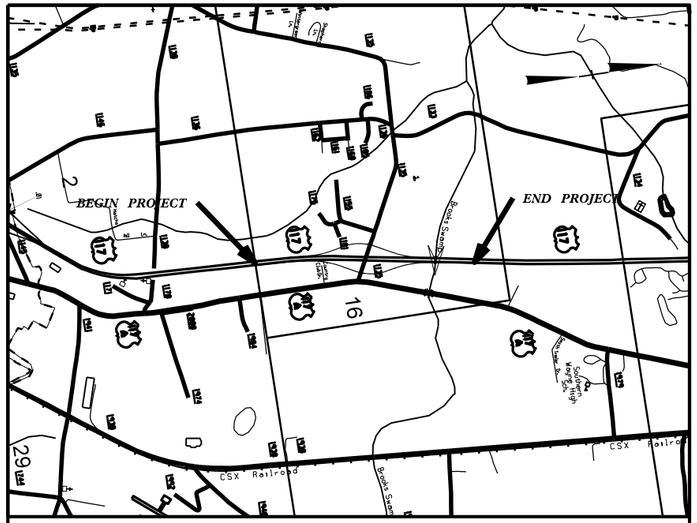
WAYNE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5719	3	65

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50473.1.FD1		PE

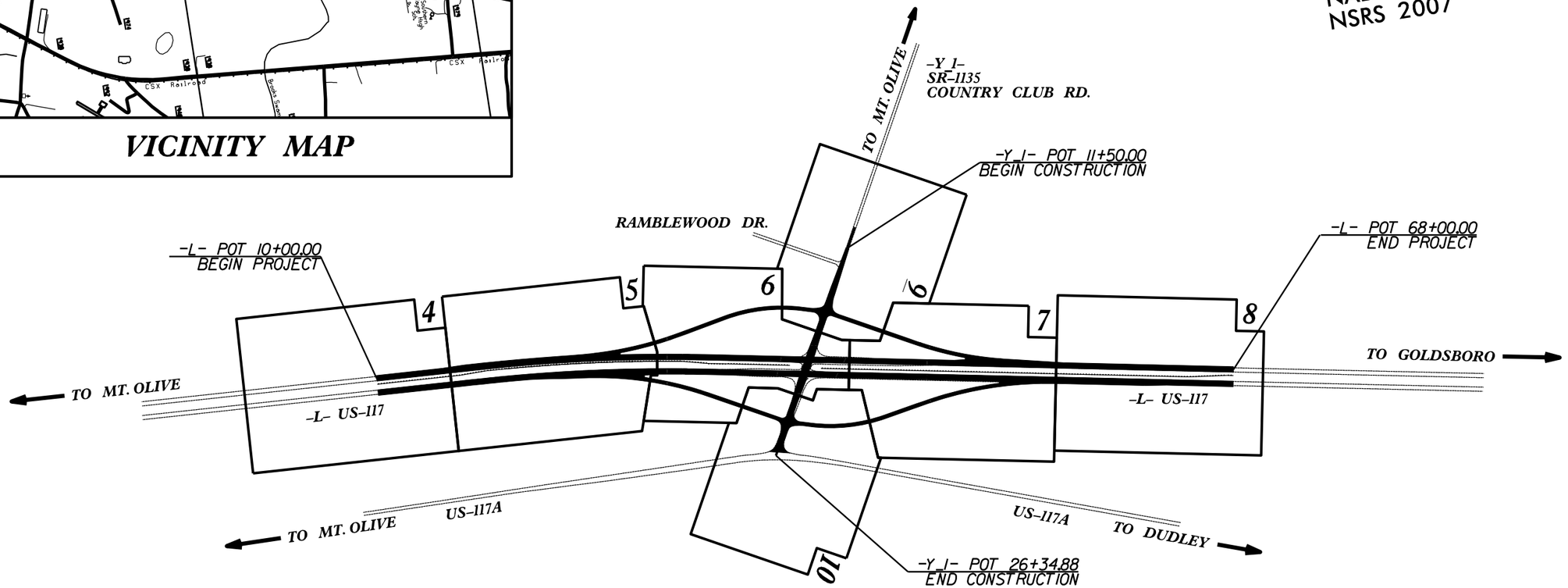
LOCATION: US-117 AND SR-1135 (COUNTRY CLUB RD.) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE



VICINITY MAP

NAD 83/
NSRS 2007



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 0 50 100

PROFILE (HORIZONTAL): 0 50 100

PROFILE (VERTICAL): 0 10 20

DESIGN DATA

ADT 2015 = 14400
ADT 2040 = 27700
K = 9 %
D = 55 %
T = 11 % *
V = 70 MPH

*TTST=8% DUAL=3%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5719 = 1.076 MI
LENGTH STRUCTURE TIP PROJECT R-5719 = 0.022 MI

TOTAL LENGTH TIP PROJECT R-5719 = 1.098 MI

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 2016

LETTING DATE: JUNE 2017

T.M. LITTLE, PE
PROJECT ENGINEER

D.R. ETHRIDGE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

PROJECT REFERENCE NO.	SHEET NO.
R-5719	3A

Date: January 2017
WBS Number: 50473
TIP Number: R-5719
County: Wayne
Description: US 117 and SR 1135 (Country Club Road) Interchange Improvements

Subject: Roadway Geotechnical Report - Inventory

Project Description

The project is located along the existing US 117 corridor between Goldsboro and Mt. Olive in Wayne County. On US 117 (-L-), the project begins approximately 0.6 miles south of the existing at-grade intersection of US 117 and SR 1135 (-Y1-) and continues north along US 117 for approximately 1.1 miles. The -L- alignment is proposed to cross over the -Y1- alignment on dual single-span structures. The proposed interchange also includes ramps in all four quadrants of the interchange on new location. On SR 1135 (-Y1-), the project begins approximately 0.2 miles west of the existing intersection and continues east for approximately 0.3 miles. The -Y1- alignment is proposed to remain in the same location and at nearly the same grade. The project corridor is in a rural setting and much of the surrounding land is undeveloped.

The geotechnical subsurface investigation was performed from January through May of 2016. Standard penetration test (SPT) borings were advanced using Diedrich D-50 and Acker Renegade rotary drill rigs equipped with recently calibrated automatic hammers. SPT borings were advanced utilizing wash boring and hollow stem auger drilling techniques to advance the borings to the necessary depths. Representative soil samples were collected in the field for visual classification and selected samples were submitted for laboratory analysis by Terracon's soil testing laboratory. Two Shelby tube samples were taken near the proposed structures for consolidation testing. Laboratory testing was performed in general accordance with the AASHTO specifications. In addition to the soil test borings performed along the corridor, a Pagani TG73-200 rig was utilized to perform four cone penetrometer (CPT) soundings. Supplemental hand auger borings were performed during October 2016. Excavated soils were visually classified in the field by a trained geologist. Select representative samples were submitted for laboratory analysis by Terracon's soil testing laboratory.

The following alignments were investigated by soil testing and visual reconnaissance:

Alignment	Stations
-L-	10+00 to 68+00
-RAMP A-	10+00 to 25+12
-RAMP B-	10+00 to 29+94
-RAMP C-	10+00 to 26+24
-RAMP D-	10+00 to 29+55
-Y 1-	10+00 to 26+35

Physiography and Geology

The site is located within the Inner Coastal Plain Physiographic and Geologic Province of North Carolina in Wayne County. The Coastal Plain Province is characterized by subdued topographic features. The existing elevations along the investigated corridor range from approximately 125 feet to 150 feet. In general, the topography at this site is slightly rolling with gentle slopes.

The project is located in the Inner Coastal Plain Physiographic Province with geology consisting of a wedge of unconsolidated sands, silt, and clays interbedded with occasional limestone strata, which rests atop crystalline basement rocks. Based on previous mapping (N.C. Geologic Map 1985) and our knowledge of the local geology, the site falls within the Cretaceous age Black Creek Formation. However, based on our site visit and subsurface conditions encountered, the near surface soils appear to be recent Coastal Plain deposits of alluvial origin and are consistent with interbedded sands, clayey sands and clays typical of Undivided Coastal Plain soils. This type of deposition has resulted in a highly variable subsurface profile along the project alignments. The Undivided Coastal Plain deposits overlie the denser, darker soils belonging to the Black Creek Formation. The Black Creek Formation soils are described as gray to black lignitic clay with thin beds and laminae of fine-grained micaceous sand and contains thin beds and laminae of fine-grained micaceous sand and thick lenses of cross-bedded sand. Glauconitic, fossiliferous clayey sand lenses are common in the upper part.

Soil Properties

Soils encountered during this investigation are separated into three categories based on their origin. The soils encountered consist of roadway embankment fill, Undivided Coastal Plain deposited soils and Formational soils.

Roadway embankment soils were encountered at the following approximate locations:

Alignment	Stations
-L-	10+00 to 16+50
-L-	18+23 to 21+26
-L-	48+79 to 68+00
-RAMP A-	10+00 to 14+40
-RAMP B-	10+00 to 10+30
-RAMP D-	10+00 to 15+79

The roadway embankment soils encountered appear to be derived from the nearby existing cuts along the -L- alignment. The roadway embankment soils predominately consist of medium stiff to very stiff, moist to wet, sandy clay (A-6) and medium stiff, moist, highly plastic silty clay (A-7-6). Some loose, moist, silty sand (A-2-4) was also encountered in the borings advanced through the existing roadway embankments.

Roadway embankment fill consisting of moderately plastic sandy clay (A-6) and moderately to highly plastic silty clay (A-7-6) was encountered along -L- between 10+00 and 16+50, 18+20 and 21+35, and from 57+50 to 68+00. In general, the cohesive roadway embankment soil extends to boring termination depths ranging

from 4 to 10 feet. The plasticity indices of the cohesive roadway embankment soils range from 16 to 31 based on laboratory testing.

A majority of existing US 117 through the project was cut below natural ground. Therefore, Undivided Coastal Plain deposits are present at the surface and beneath the roadway embankment soils and asphalt pavement sections. The Undivided Coastal Plain soils can be generalized as alternating layers of silt, clay, and sand extending to the maximum depths of exploration. The near surface Undivided Coastal Plain deposits along the -L-, -RAMP-, and -Y 1- alignments are generally medium stiff to stiff and consists of moist to wet, sandy silt (A-4), sandy clay (A-6) and moderately to highly plastic silty clay (A-7-6). These cohesive soils were encountered at or near the existing ground surface on a majority of the project. The cohesive soils are interbedded with laterally discontinuous, saturated, very loose to medium dense, silty and clayey sand (A-2-4 and A-2-6, respectively). The Undivided Coastal Plain soils encountered deeper than approximately 10 feet below existing grades were generally very soft to soft cohesive soils and very loose to loose granular soils which extend to the top of the Black Creek Formation.

Undivided Coastal Plain soils consisting of moderately plastic sandy clay (A-6) and moderately to highly plastic silty clay (A-7-6) were encountered at or near the existing ground surface between -L- 16+50 and 24+30. The plasticity indices of the cohesive soils range from 17 to 23 based on laboratory testing. The cohesive soils extend to approximately 10 feet below existing grades and are underlain by saturated, very loose to medium dense silty to clayey sand (A-2-4 and A-2-6, respectively) and fine sand (A-3) based on borings advanced to 15 feet below the existing ground surface.

Undivided Coastal Plain soils consisting of moderately plastic sandy clay (A-6) was encountered near the existing ground surface on -RAMP A- between 23+55 and 25+12 or existing SR 1135. The moderately plastic sandy clay extends to a depth of approximately 2 feet below existing grades and is underlain by moist and loose fine sand (A-3).

The Undivided Coastal Plain soils consisting of moderately plastic sandy clay encountered on the -L- alignment continue along the -RAMP B- and -RAMP C- alignments. Moderately plastic sandy clay was encountered near the existing ground surface between -RAMP B- 10+00 and 14+50 and on -RAMP C- between 10+00 and 14+00. Plasticity indices for these soils ranged from 20 to 23 based on laboratory testing.

Undivided Coastal Plain soils consisting of slightly to moderately plastic sandy clay (A-6) were encountered near proposed grade on -RAMP C- between 23+50 and 25+15. The slightly to moderately plastic sandy clay is underlain by soft to medium stiff, moist to wet, sandy silt (A-4).

Undivided Coastal Plain soils consisting of slightly to moderately plastic sandy clay (A-6) and highly plastic silty clay (A-7-6) were encountered on -RAMP D- between 26+70 and 29+30 near existing SR 1135. The sandy clay was encountered near the surface and transitions to highly plastic silty clay at depths of approximately 3 to 5 feet below existing grades between -RAMP D- 26+66 and 29+30. The plasticity indices of the cohesive soils range from 15 to 35 based on laboratory testing.

Undivided Coastal Plain soils consisting of moderately plastic sandy clay (A-6) was encountered along the -Y 1- alignment between 10+00 and 14+05. The cohesive soils extended to hand auger termination depth of 4 feet below the existing ground surface. Moderately plastic sandy clay (A-6) and highly plastic silty clay (A-7-6) were encountered along -Y 1- between 17+00 and 21+00. The cohesive soils extend to hand auger termination depth of 4 feet along -Y 1- although the borings along -L- encountered very loose to loose, saturated silty sand (A-2-4) approximately 18 feet below the existing ground surface. Moderately plastic sandy clay (A-6) and highly plastic silty clay (A-7-6) were encountered near the existing ground surface between 23+50 and 25+50. Some of this area coincides with the -RAMP C- and -RAMP D- alignments. The cohesive soils extend to boring termination depths ranging from 4 to 10 feet. The moderately plastic sandy clay and highly plastic silty clay are interbedded with sandy silt (A-4).

Formational soils of the Black Creek Formation were encountered in the deep borings along the -L- alignment between Elevation 94 and 60 feet. These soils are characterized by their black to gray color and consist of layers of loose to dense, saturated, silty to clayey sands (A-2-4 and A-2-6).

Groundwater

In general, the corridor drains to Brooks Swamp to the north and Lee Branch to the west. Groundwater was encountered during drilling and sampling along the -L- and -RAMP- alignments at depths ranging from 4 to 13 feet below existing grades. Groundwater was not encountered within 6 feet of proposed grades in the borings performed at the site. The depth of groundwater, beneath the ground surface, will fluctuate with seasonal precipitation and may occur a higher levels at other times of the year above less permeable clayey soils.

Areas of Special Geotechnical Interest

1) Plastic Soils - Moderately to highly plastic soils with plastic indices (PI) of 16 and greater were encountered near proposed subgrade at the following locations:

Alignment	Stations
-L-	10+00 to 24+30
-L-	57+75 to 68+00
-RAMP A-	23+75 to 24+92
-RAMP B-	10+00 to 13+15
-RAMP C-	10+00 to 13+70
-RAMP C-	23+90 to 25+05
-RAMP D-	26+70 to 29+30
-Y 1-	11+50 to 14+00
-Y 1-	17+00 to 21+00
-Y 1-	23+50 to 25+50

A discussion of these plastic soils is located above in the section titled “Soil Properties”.

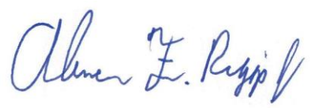
UNDISTRUBED SAMPLES

The following “Shelby” tube samples were taken to provide data for the in-situ strength of the soil.

Sample No.	Location	Offset	Depth (ft.)	Test
ST-1	38+83 -L-	68 ft. Left	13.5 - 15.0	Consolidation
ST-2	39+50 -L-	80 ft. Right	15.0 - 17.4	Consolidation

Sincerely,
Terracon Consultants, Inc.

Matthew J. Alexander, PE
Project Geotechnical Engineer



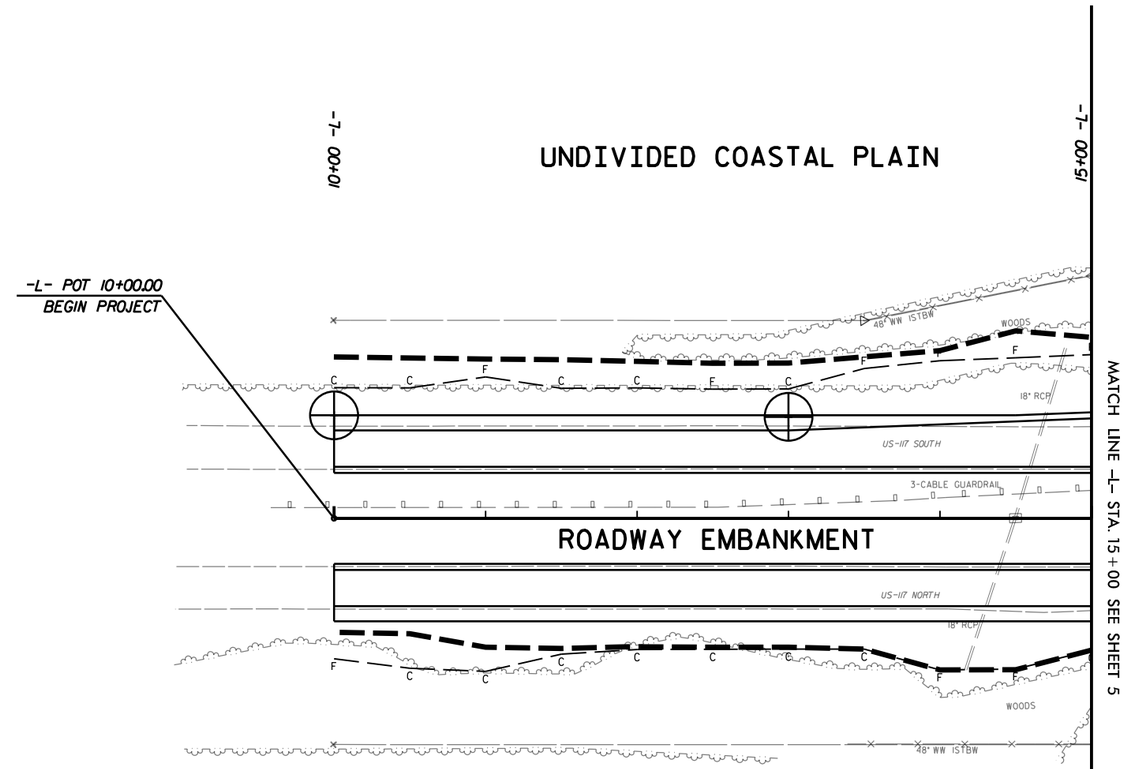
Abner F. Riggs, Jr., PE
Senior Geotechnical Engineer

PROJECT REFERENCE NO.	SHEET NO.
R-5719	4

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

KERMIT SHELTON PRICE
CAROL PRICE KALEEL
DB 1619 PG 663



KERMIT SHELTON PRICE
CAROL PRICE KALEEL
DB 1619 PG 663

PROJECT REFERENCE NO.	SHEET NO.
R-5719	5

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

MATCH LINE -L- STA. 15+00 SEE SHEET 4

-L- 15+00

-L- 20+00

-RAMP_B- 10+00

-RAMP_B- 15+00

-RAMP B- POT 10+00.00 =
-L- POC 20+96.59

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

MARGARET K. PRICE
DB 0855 PG 663

WOODS

48" WW ISTBW

MATCH LINE -RAMP B-
STA 18+00 SEE SHEET 6

30" RCP

30" RCP

ROADWAY EMBANKMENT

US-117 SOUTH

3-CABLE GUARDRAIL

30" RCP

15" RCP

US-117 SOUTH

US-117 NORTH

UNDVIDED COASTAL PLAIN

30" RCP

30" RCP

WOODS

EIP

US-117 NORTH

15" RCP

MATCH LINE -L- STA. 29+00
SEE SHEET 6

-RAMP C- POT 10+00.00 =
-L- POC 22+00.00

UNDIVIDED COASTAL PLAIN

MATCH LINE -RAMP C-
STA. 16+50 SEE SHEET 6

JACKIE L. GRAHAM
DB 2937 PG 299

JACKIE L. GRAHAM
&
BRENDA P. GRAHAM
DB 1244 PG 174
PC F PG 130

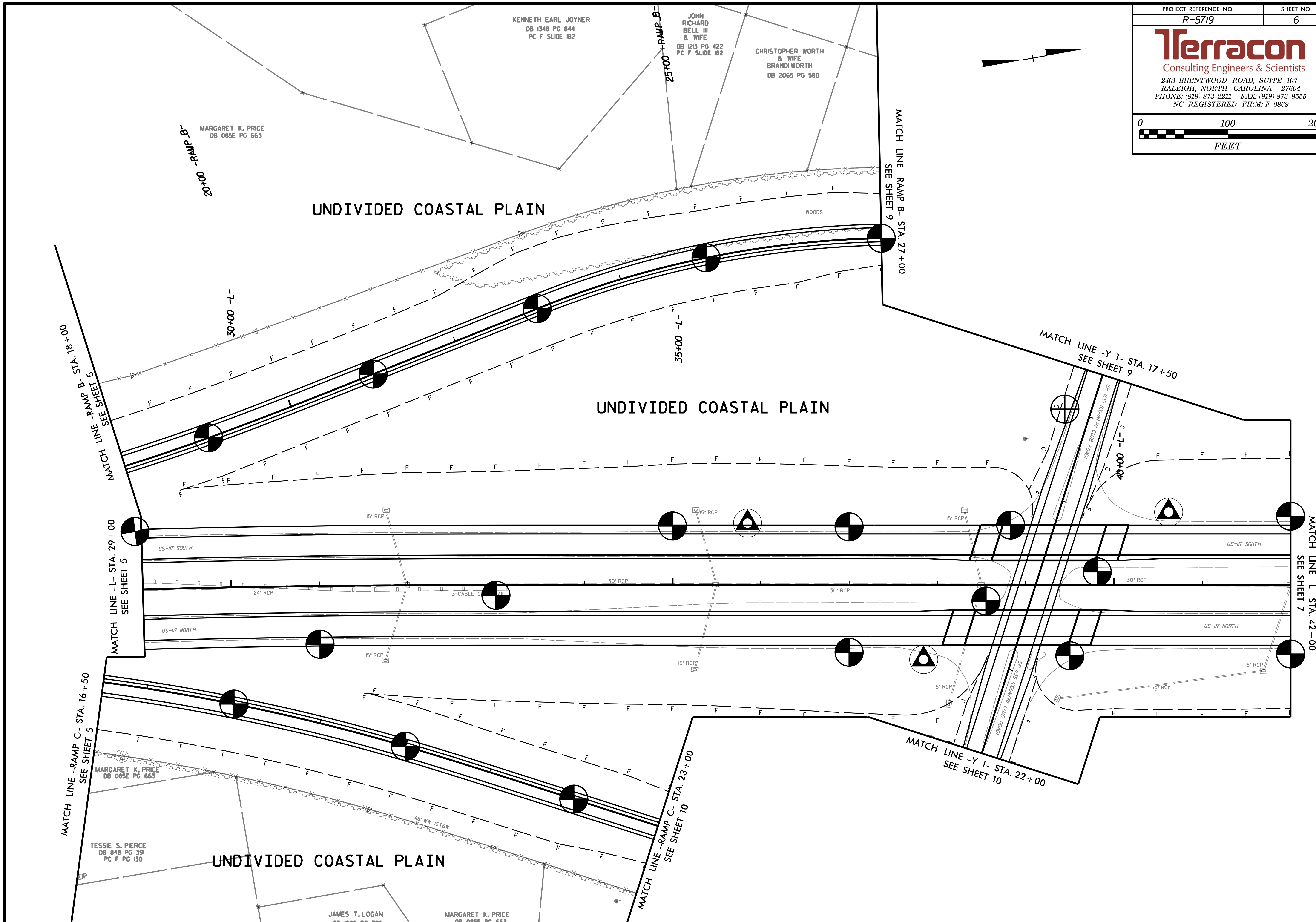
10+00 -RAMP_C-

15+00 -RAMP_C-

EIP

KERMIT SHELTON PRICE
CAROL PRICE KALEEL
DB 1619 PG 663

MARGARET K. PRICE
DB 0855 PG 663
PC M SLIDE 78J


PROJECT REFERENCE NO.
R-5719
SHEET NO.
6
Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869
0
100
200
FEET
KENNETH EARL JOYNER
DB 1348 PG 844
PC F SLIDE 182
JOHN RICHARD BELL III & WIFE
DB 1213 PG 422
PC F SLIDE 182
CHRISTOPHER WORTH & WIFE BRANDI WORTH
DB 2065 PG 580
MARGARET K. PRICE
DB 085E PG 663
20+00 -RAMP B-
25+00 -RAMP B-
UNDIVIDED COASTAL PLAIN
MATCH LINE -RAMP B- STA. 27+00
SEE SHEET 9
WOODS
30+00 -L-
35+00 -L-
MATCH LINE -RAMP B- STA. 18+00
SEE SHEET 5
UNDIVIDED COASTAL PLAIN
MATCH LINE -Y 1- STA. 17+50
SEE SHEET 9
SR 1135 (COUNTRY CLUB ROAD)
40+00 -L-
MATCH LINE -L- STA. 29+00
SEE SHEET 5
US-117 SOUTH
US-117 NORTH
15" RCP
30" RCP
24" RCP
3-CABLE
18" RCP
MATCH LINE -L- STA. 42+00
SEE SHEET 7
MATCH LINE -Y 1- STA. 22+00
SEE SHEET 10
MATCH LINE -RAMP C- STA. 16+50
SEE SHEET 5
MARGARET K. PRICE
DB 085E PG 663
48" WW ISTBW
TESSIE S. PIERCE
DB 848 PG 391
PC F PG 130
EIP
UNDIVIDED COASTAL PLAIN
MATCH LINE -RAMP C- STA. 23+00
SEE SHEET 10
JAMES T. LOGAN
DB 1296 PG 326
MARGARET K. PRICE
DB 085E PG 663

PROJECT REFERENCE NO.	SHEET NO.
R-5719	7

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

MATCH LINE -RAMP A- STA. 21+00
SEE SHEET 9

20+00 -RAMP_A-

45+00 -L-

50+00 -L-
15+00 -RAMP_A-

SOUTHERN WAYNE
RECREATION, INC.
DB 1551PG 797

UNDIVIDED COASTAL PLAIN

48" WW ISTBW

55+00 -L-
10+00 -RAMP_A-

-RAMP A- POT 10+00.00 =
-L- POT 55+00.00

30" RCP

30" RCP

18" RCP

15" RCP

US-117 SOUTH

US-117 SOUTH

ROADWAY EMBANKMENT

3-CABLE GUARDRAIL

MATCH LINE -L- STA. 42+00
SEE SHEET 6

MATCH LINE -L- STA. 56+00
SEE SHEET 8

US-117 NORTH

US-117 NORTH

18" RCP

15" RCP

WOODS

48" WW ISTBW

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

MATCH LINE -RAMP D- STA. 24+00
SEE SHEET 10

WOODS

15+00 -RAMP_D-

20+00 -RAMP_D-

ROBERT H. SHACKELFORD
DB 949 PG 597

PROJECT REFERENCE NO.	SHEET NO.
R-5719	8

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

MATCH LINE -L- STA. 56+00
SEE SHEET 7

SOUTHERN WAYNE RECREATION, INC. DB 1551PG 797

(OFFSET SURVEY LINE)

CENTER RUN OF BROOK'S SWAMP IS PROPERTY LINE

CHARLES E. SMITH & WIFE DOLLY T. SMITH DB 1674 PG 371

-L- 60+00

-L- 59+00

ALLEN S. & LAMURIEL W. SWINSON DB 2777 PG 404

UNDIVIDED COASTAL PLAIN

VARIABLE WIDTH RW

WOODS

15" CMP

US-117 SOUTH

ROADWAY EMBANKMENT

ROADWAY EMBANKMENT

3-CABLE GUARDRAIL

48" RCP

US-117 SOUTH

US-117 NORTH

30" RCP

US-117 NORTH

WOODS

VARIABLE WIDTH RW

UNDIVIDED COASTAL PLAIN

-RAMP D- TS 10+00.00 =
-L- POT 56+99.99

-L- POT 68+00.00
END PROJECT

(OFFSET SURVEY LINE)

CENTER RUN OF BROOK'S SWAMP IS PROPERTY LINE

20+00 -RAMP_D-

CHARLES EUGENE & DOLLY SMITH DB 1387 PG 013

SUSAN C. & DAVID PRICE DB 1811PG 785

CHARLES E. SMITH & WIFE DOLLY T. SMITH DB 1674 PG 371

PROJECT REFERENCE NO.	SHEET NO.
R-5719	9

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

MATCH LINE -RAMP A- STA. 21+00
SEE SHEET 7

-Y1- 10+00

-Y1- 15+00

DB 703 PG 338

DB 1469 PG 367

UNDIVIDED COASTAL PLAIN

-Y1- POT 16+10.00 =
-RAMP A- POT 25+12.18
-RAMP B- POT 29+94.38

-Y1- POT 11+50.00
BEGIN CONSTRUCTION

-Y1- POT 10+00.00

WOODS

POOL

CONC

ISBLK

BST

EXIST R/W

15" RCP

SR 1135 (COUNTRY CLUB ROAD)

15" CMP

24" RCP

18" RCP

ISFD

DB 1232 PG 452
PC F SLIDE 182

DB 1971 PG 660
PC F SLIDE 182

UNDIVIDED COASTAL PLAIN

ISBKD

DB 1450 PG 762
PC F SLIDE 182

DB 1213 PG 425

DB 1182 PG 889
PC F SLIDE 182

DB 703 PG 338

MATCH LINE -Y 1- STA. 17+50
SEE SHEET 6

MATCH LINE -RAMP B- STA. 27+00
SEE SHEET 6

PROJECT REFERENCE NO.	SHEET NO.
R-5719	10

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 100 200
FEET

MATCH LINE -RAMP D- STA. 24+00
SEE SHEET 7

25+00 -RAMP_D-

ELMA M. LANE HEIRS
DB 076E PG 280

UNDIVIDED
COASTAL PLAIN

WOODS

US-117 BUS.

25+00 -Y1-

ELMA M. LANE HEIRS
DB 076E PG 280

WOODS

-Y1- POT 23+90.00 =
-RAMP C- POT 26+24.35
-RAMP D- POT 29+55.19

-Y1- POT 26+34.88
END CONSTRUCTION

MATCH LINE -Y 1- STA. 22+00
SEE SHEET 6

SR 1135 (COUNTRY CLUB ROAD)

UNDIVIDED
COASTAL PLAIN

CONC

25+00 -RAMP_C-

MTL BUS

XEON ENTERPRISES INC.
DB 2626 PG 821

DB 2626 PG 824
XEON ENTERPRISES INC.

UNDIVIDED COASTAL PLAIN

MATCH LINE -RAMP C- STA. 23+00
SEE SHEET 6

GEORGE ALLEN FULGHUM
& WIFE
LYNNE W. FULGHUM
DB 2430 PG 554

MICHAEL BRENT WILLIAMS
DB 2629 PG 415

SHIRLEY ANN PIGFORD
DB 1750 PG 652
DB 1398 PG 82

CONC

15" RCP

24" RCP

PROJECT REFERENCE NO.	SHEET NO.
R-5719	11

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

S-1

68' LT
BT
DRY
10/16

ROADWAY EMBANKMENT, ORANGE AND GRAY, HIGHLY PLASTIC

67' LT
BT
DRY
10/16

MOIST, MEDIUM STIFF, SILTY CLAY

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, SILTY SAND AND FINE SAND

(A) UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00

PROJECT REFERENCE NO.	SHEET NO.
R-5719	12

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

S-4
70' LT
BT
DRY
10/16

SS-1
BT
FIAD
05/16

BT
FIAD
05/16

SS-2
BT
05/16

66' LT
BT
01/16

66' RT
BT
01/16

12' RT
BT
01/16

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, SOFT TO STIFF, SILTY CLAY, SANDY CLAY, AND SANDY SILT

GRAY, TAN, ORANGE, AND RED, SATURATED, VERY LOOSE TO MEDIUM DENSE, SAND, CLAYEY SAND, AND SILTY SAND

(B) UNDIVIDED COASTAL PLAIN, ORANGE, TAN, AND GRAY, WET, VERY SOFT TO SOFT, SILTY CLAY

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00

PROJECT REFERENCE NO.	SHEET NO.
R-5719	13

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

67' LT

66' LT

18' RT

15' LT

78' RT

93' RT

6' LT

68' LT

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND RED, LOOSE TO MEDIUM DENSE, SILTY SAND AND CLAYEY SAND

TAN, ORANGE, AND BROWN, DRY TO WET, VERY SOFT TO VERY STIFF, SANDY SILT, SILTY CLAY, AND SANDY CLAY

UNDIVIDED COASTAL PLAIN, SATURATED, LOOSE, GRAY, TAN, ORANGE, AND BROWN, SILTY SAND

COASTAL PLAIN, BLACK-OLIVE AND DARK GRAY, SATURATED, VERY LOOSE TO LOOSE, SILTY SAND (BLACK CREEK FORMATION)

TAN, ORANGE, AND GRAY, SATURATED, LOOSE TO MEDIUM DENSE, SILTY SAND

COASTAL PLAIN, BLACK-OLIVE AND DARK GRAY, SATURATED, VERY LOOSE TO DENSE, SILTY AND CLAYEY SAND (BLACK CREEK FORMATION)

BT

FIAD 01/16

35+00 36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00

PROJECT REFERENCE NO.	SHEET NO.
R-5719	14

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

17' RT 71' LT 17' RT 25' LT 22' RT 22' LT

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, LOOSE TO MEDIUM DENSE, TAN AND ORANGE, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY AND SANDY CLAY

ROADWAY EMBANKMENT, AND BROWN, SATURATED, VERY FINE SAND AND SILTY SAND

TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

BT
FIAD 01/16

(C) UNDIVIDED COASTAL PLAIN, BROWN, ORANGE, TAN, AND GRAY, DRY, MEDIUM STIFF, SANDY CLAY

49+00 50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00

PROJECT REFERENCE NO.	SHEET NO.
R-5719	15

0 100 200
FEET
VE = 5:1

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Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10

S-5
S-6
65' RT

67' LT

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

BT
DRY
10/16

BT
DRY
10/16

(D) ROADWAY EMBANKMENT, BROWN, MOIST, LOOSE, SILTY SAND

63+00 64+00 65+00 66+00 67+00 68+00

PROJECT REFERENCE NO.	SHEET NO.
R-5719	16

0 100 200
FEET
VE = 5:1

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Consulting Engineers & Scientists
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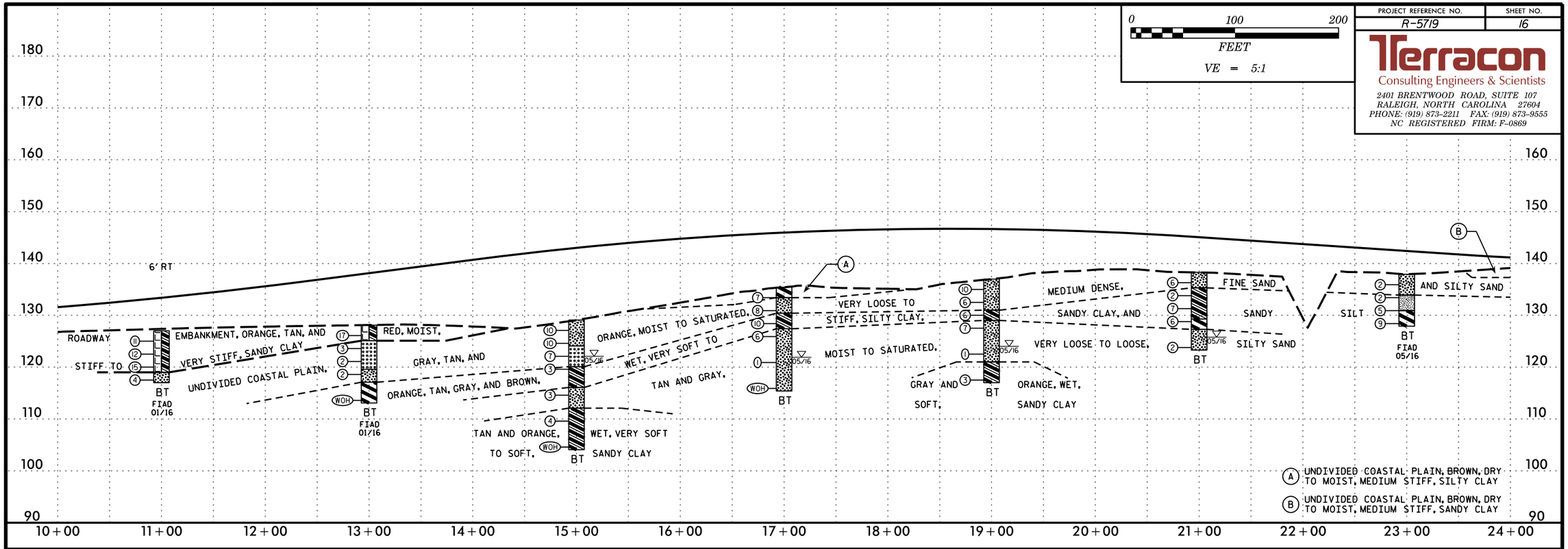
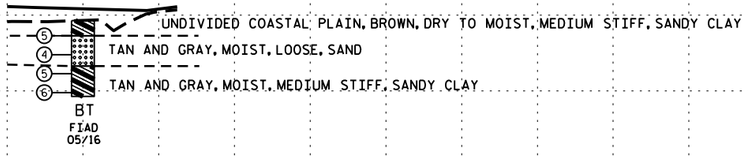
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869





–RAMP A–

PROJECT REFERENCE NO.	SHEET NO.
R-5719	17

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
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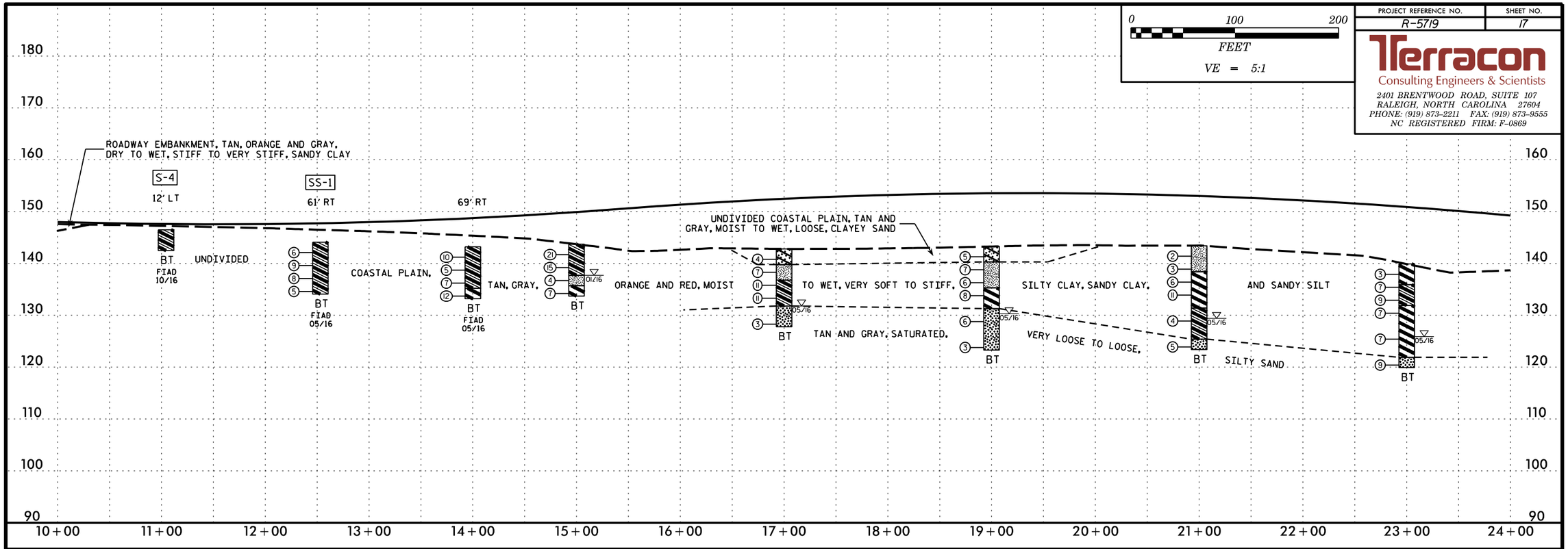
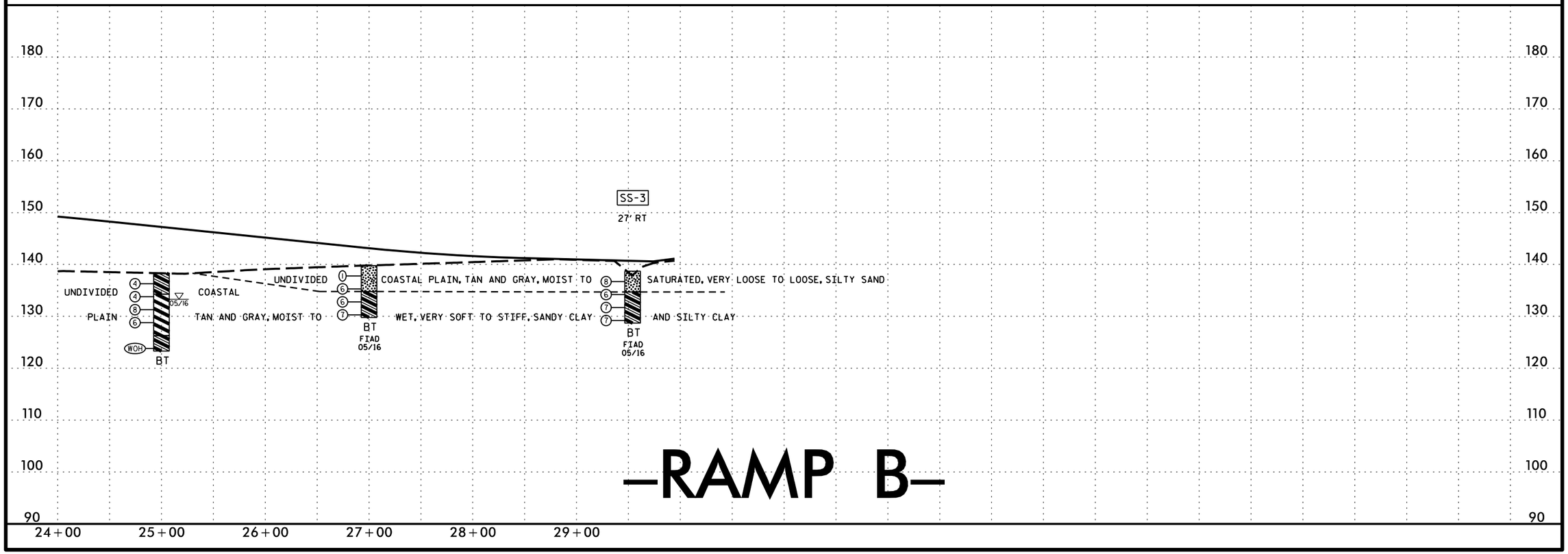
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869





–RAMP B–

5/28/99

0 100 200
FEET
VE = 5:1

PROJECT REFERENCE NO.	SHEET NO.
R-5719	18

Terracon
Consulting Engineers & Scientists
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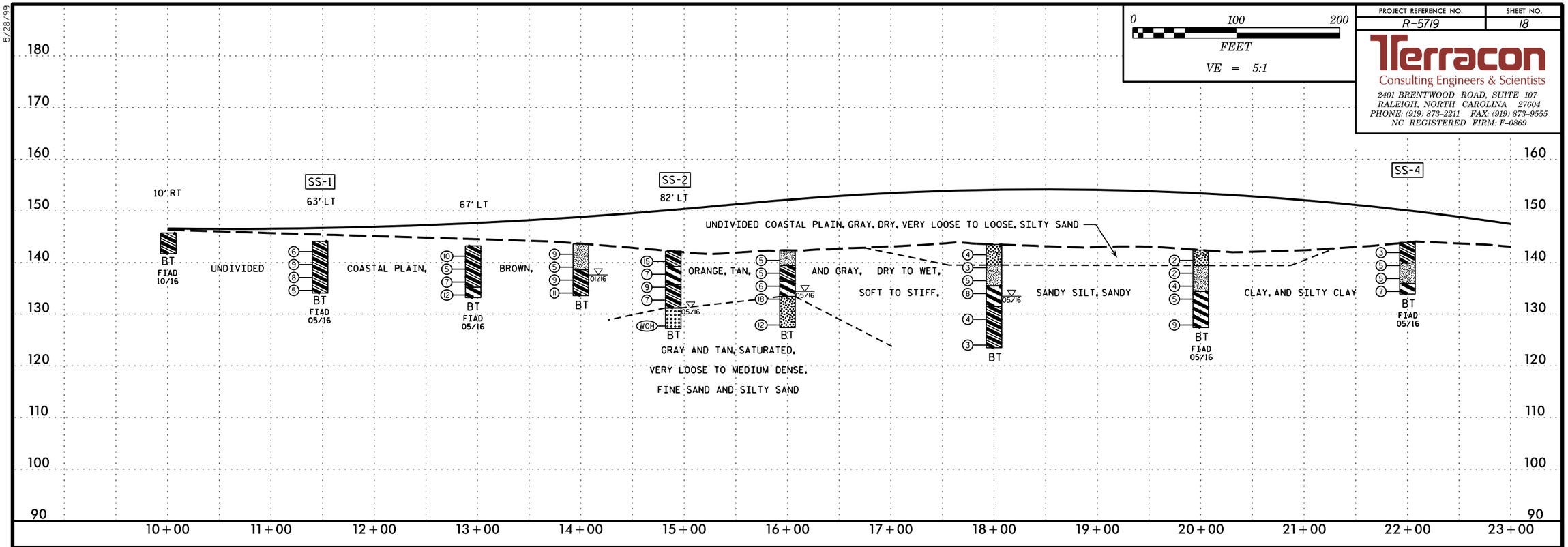
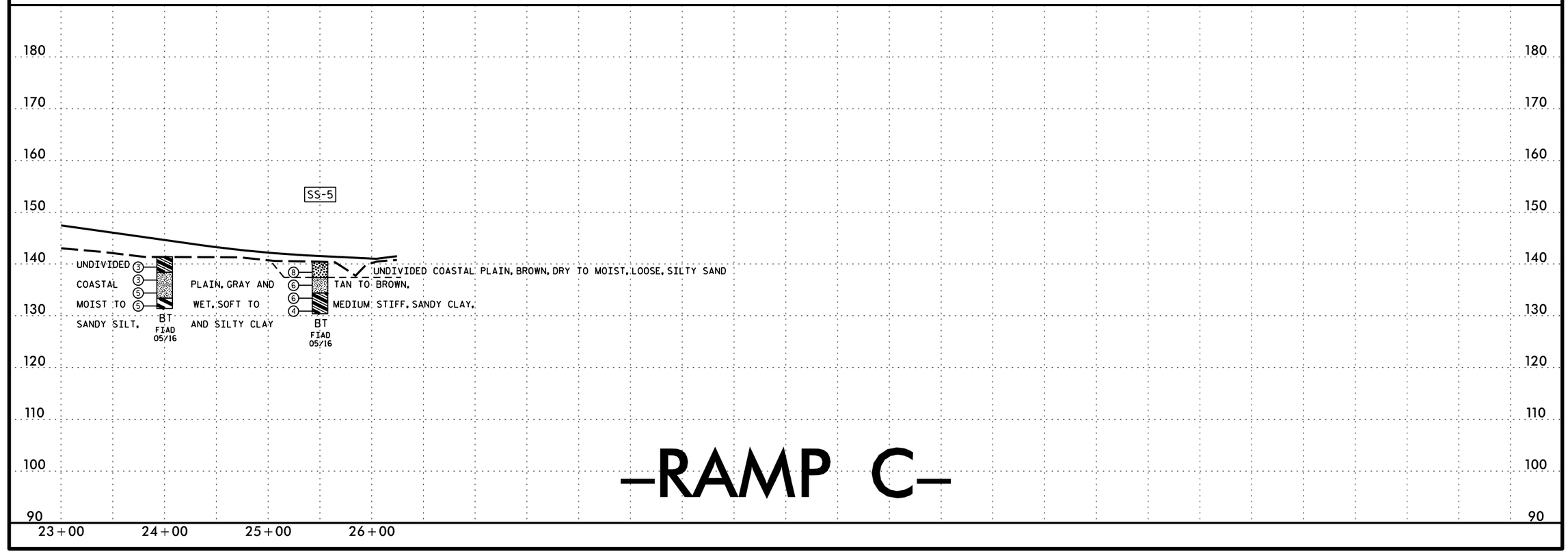
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



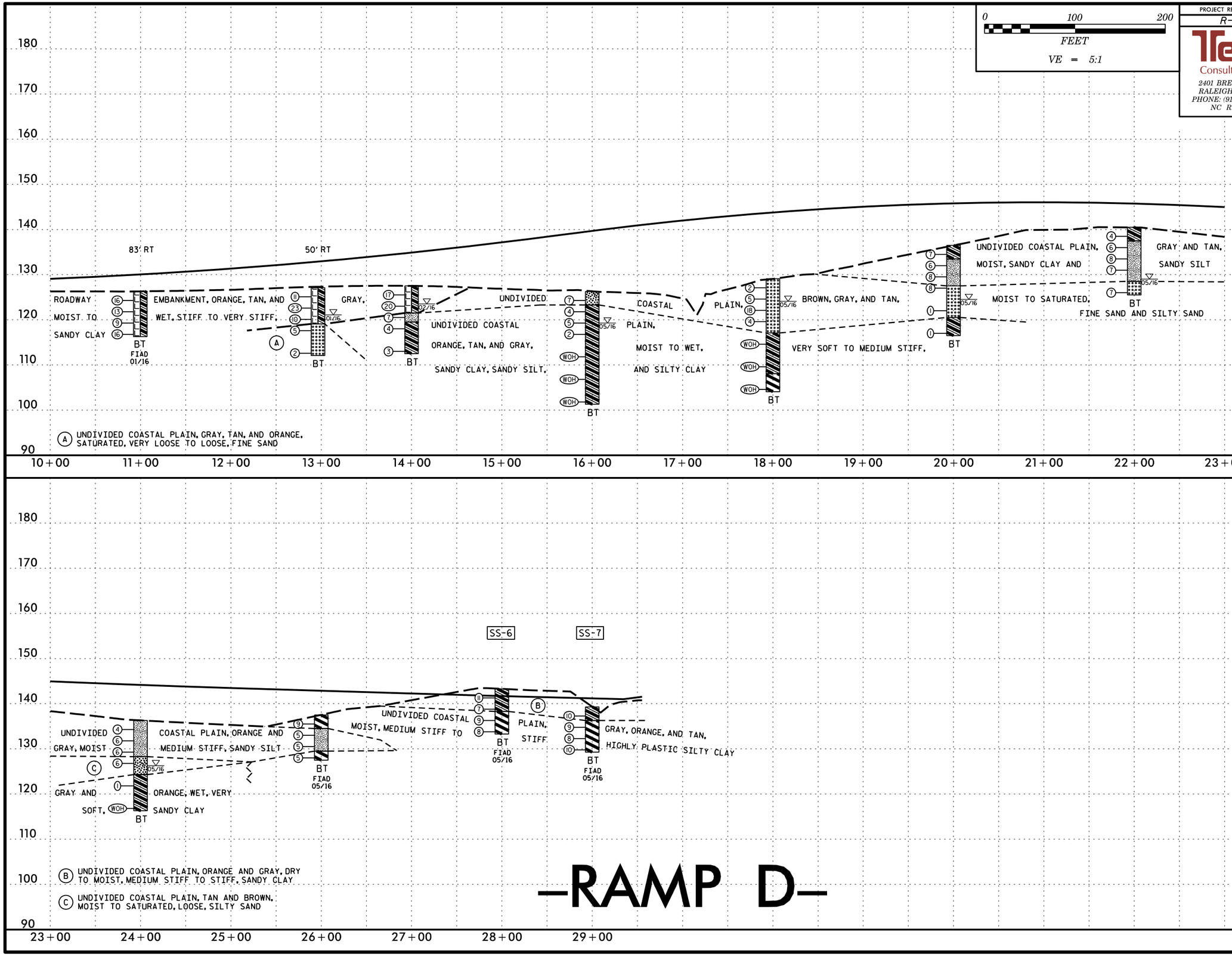


–RAMP C–

PROJECT REFERENCE NO.	SHEET NO.
R-5719	19

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



-RAMP D-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	20

0 100 200
FEET
VE = 5:1

Terracon
Consulting Engineers & Scientists
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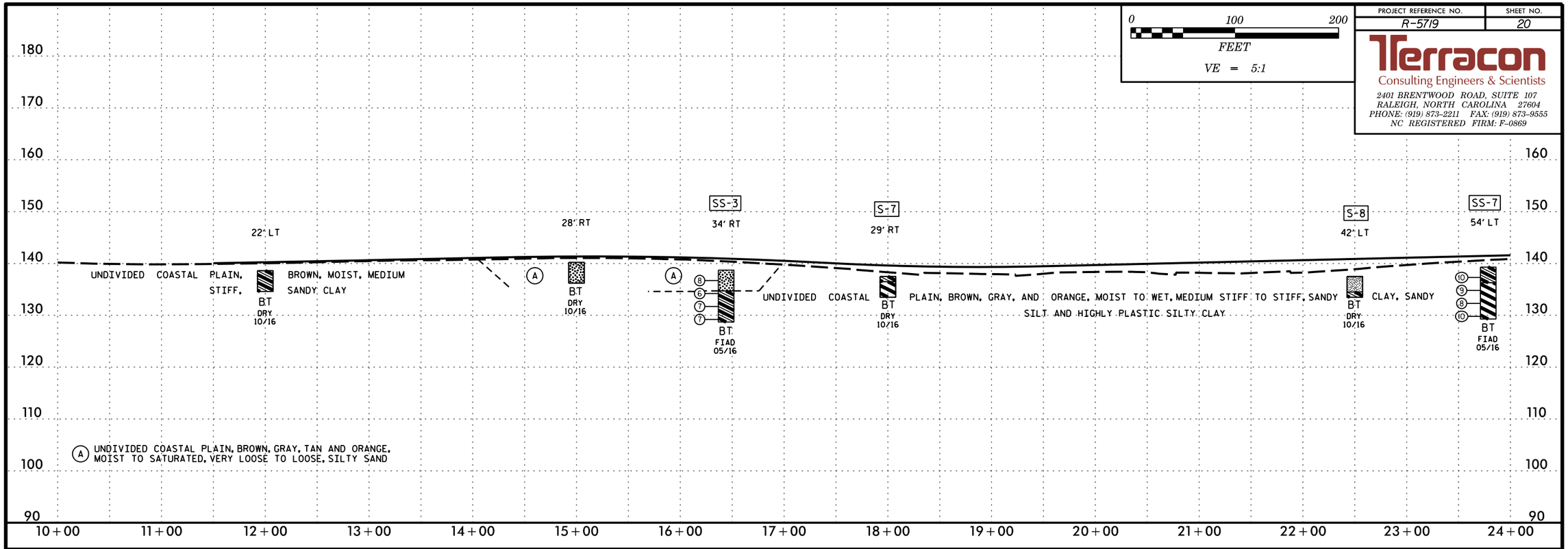
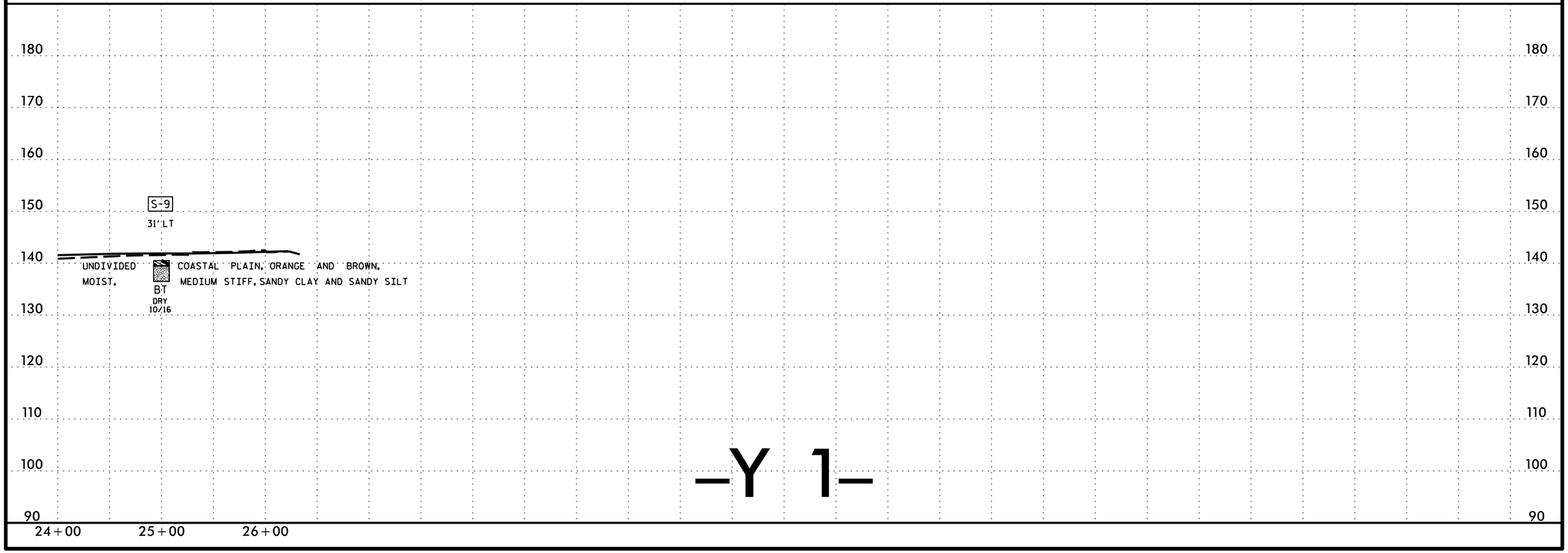
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



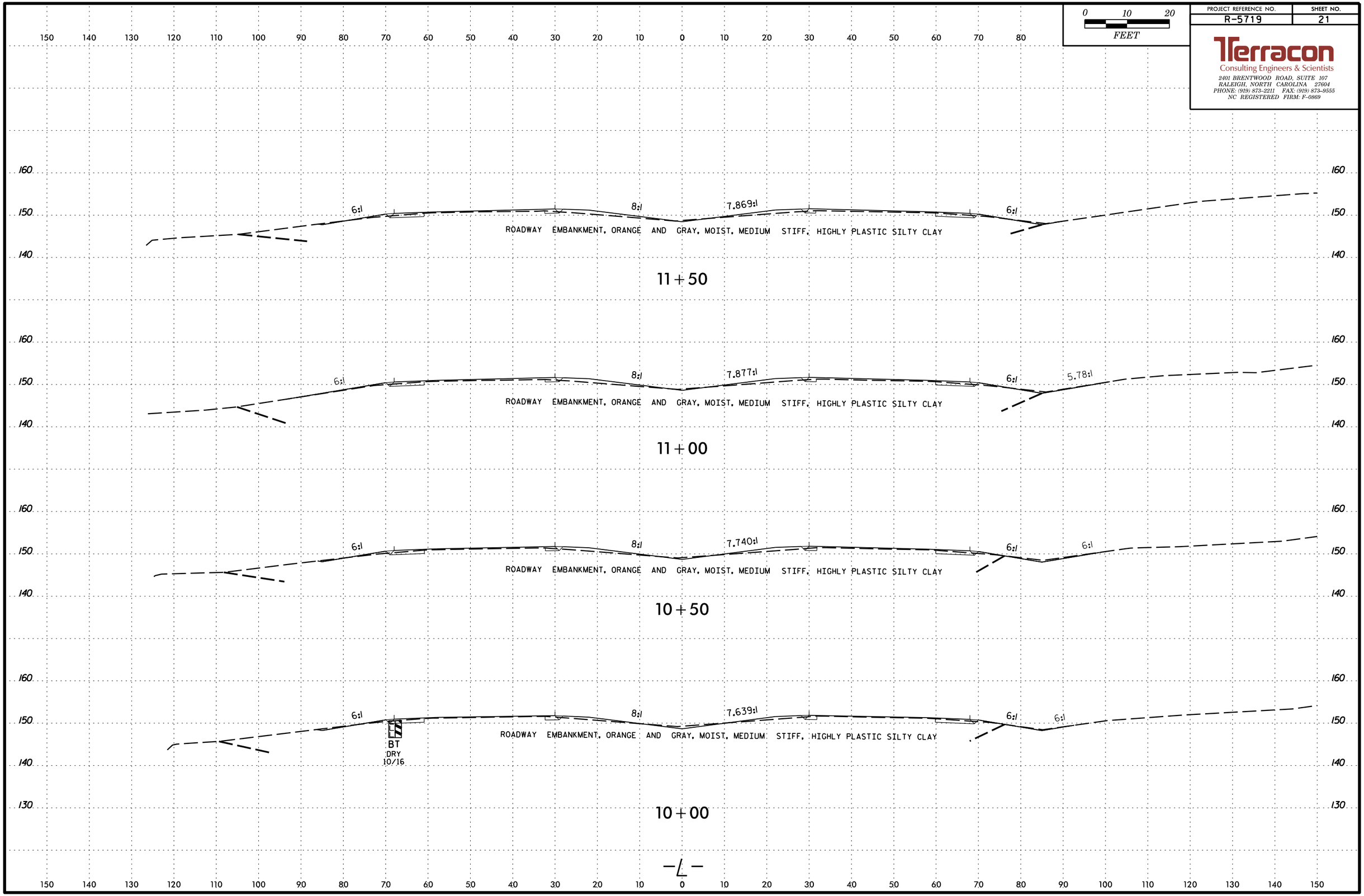


-Y 1-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	21

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-5719	22

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

160
150
140

6:1 8:1 7.573:1 6:1

ROADWAY EMBANKMENT, ORANGE AND GRAY, MOIST, MEDIUM STIFF, HIGHLY PLASTIC SILTY CLAY

13 + 50

S-1

6:1 8:1 7.725:1 6:1

ROADWAY EMBANKMENT, ORANGE AND GRAY, MOIST, MEDIUM STIFF, HIGHLY PLASTIC SILTY CLAY

BT
DRY
10/16

13 + 00

6:1 8:1 7.830:1 6:1

ROADWAY EMBANKMENT, ORANGE AND GRAY, MOIST, MEDIUM STIFF, HIGHLY PLASTIC SILTY CLAY

12 + 50

6:1 8:1 7.850:1 6:1

ROADWAY EMBANKMENT, ORANGE AND GRAY, MOIST, MEDIUM STIFF, HIGHLY PLASTIC SILTY CLAY

12 + 00

$-\mathit{L}-$

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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	23

Terracon
Consulting Engineers & Scientists
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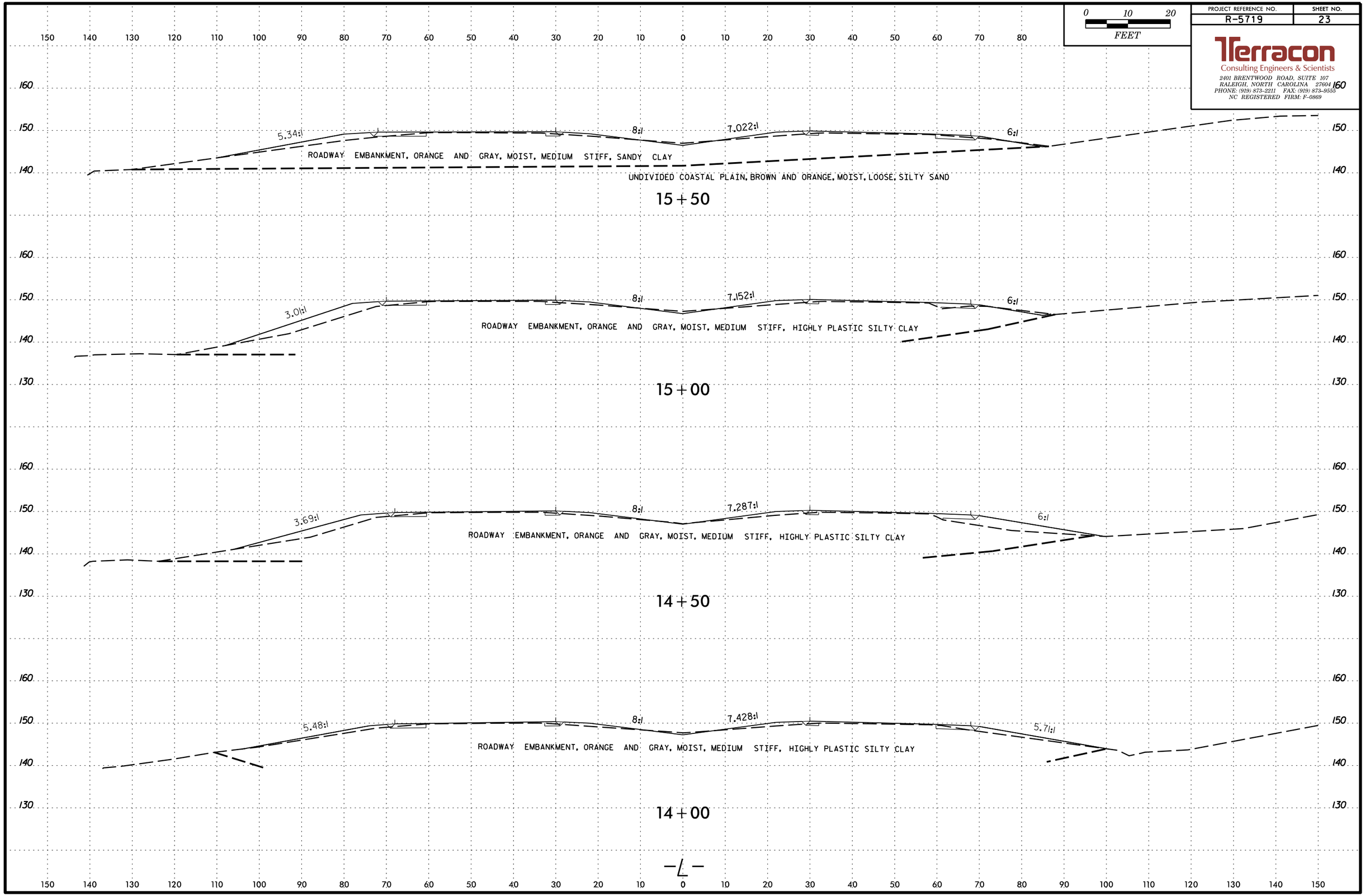
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

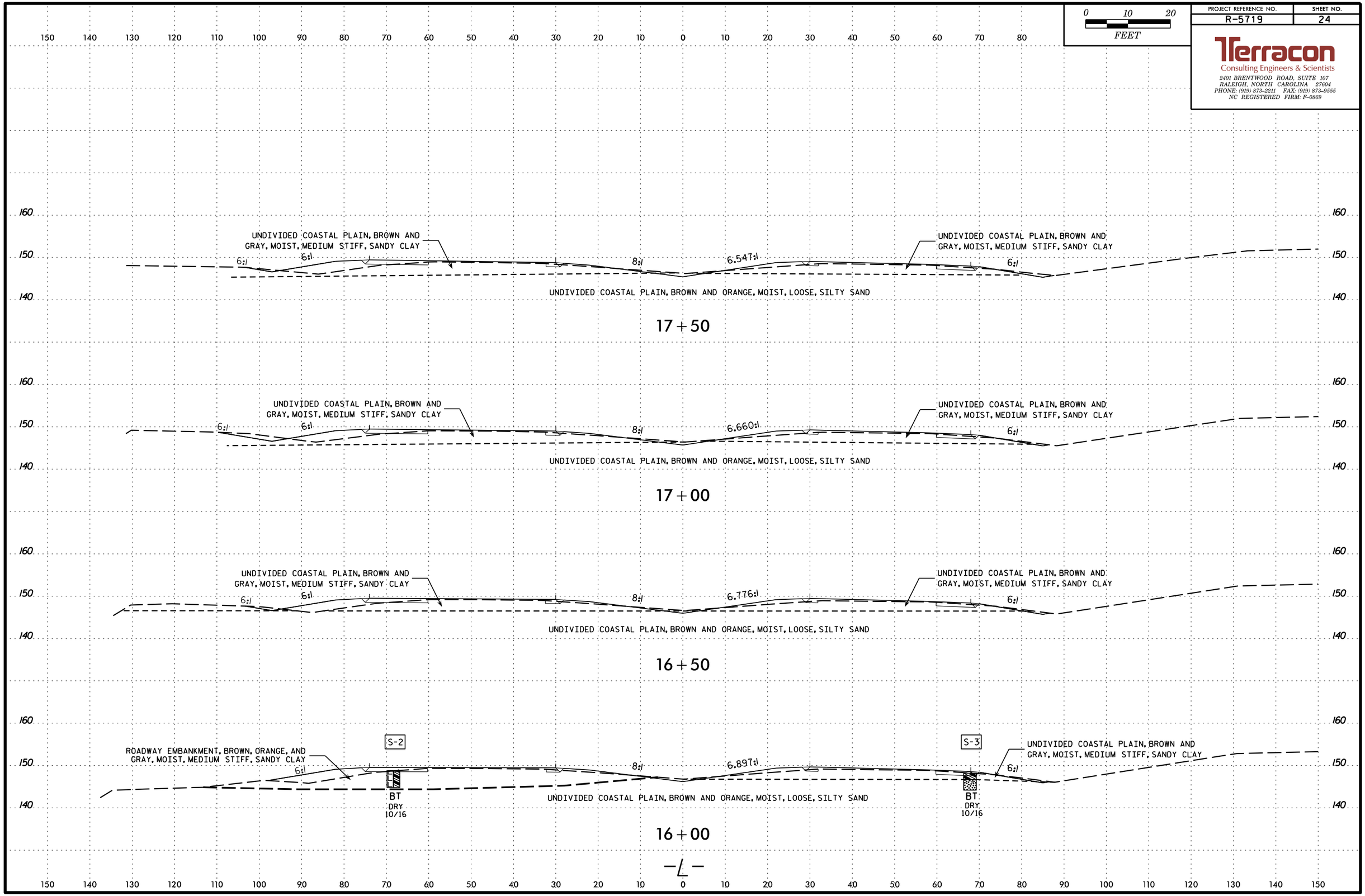
0 10 20
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-5719	24

0 10 20
FEET

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



PROJECT REFERENCE NO.	SHEET NO.
R-5719	25

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

160
150
140

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.345:1 6:1

UNDIVIDED COASTAL PLAIN, BROWN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, FINE SAND

19+50

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.358:1 6:1

BT
DRY
10/16

UNDIVIDED COASTAL PLAIN, BROWN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, FINE SAND

19+00

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.382:1 6:1 6:1

UNDIVIDED COASTAL PLAIN, BROWN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, SILTY SAND TO FINE SAND

18+50

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.438:1 6:1 6:1

UNDIVIDED COASTAL PLAIN, BROWN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, SILTY SAND TO FINE SAND

18+00

$-\underline{L}-$

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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	26

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

160
150
140

SEE RAMP B

8:1 6.294:1 6:1 3.21:1

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

21+50

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

SEE RAMP B

8:1 6.307:1 6:1 3.59:1

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

21+00

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.319:1 6:1 3.99:1

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

20+50

ROADWAY EMBANKMENT, BROWN AND ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

6:1 8:1 6.332:1 6:1 6:1

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

BROWN AND ORANGE, MOIST, LOOSE, FINE SAND

20+00

−L−

PROJECT REFERENCE NO.	SHEET NO.
R-5719	27

Terracon
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2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

160
150
140
130

SEE RAMP B

SS-1

8:1

6.387:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY

6
9
8
5

BT
FIAD
05/16

23 + 50

160
150
140

SEE RAMP B

8:1

6.361:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY

23 + 00

160
150
140

SEE RAMP B

8:1

6.337:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY

22 + 50

160
150
140

S-4

SEE RAMP B

8:1

6.313:1

SEE RAMP C

BT
DRY
10/16

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

BT
DRY
10/16

22 + 00

$-\underline{L}-$

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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	28

Terracon
Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
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NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

160
150
140
130

SEE RAMP B

8:1

6.473:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

10
5
7
12

BT
FIAD
05/16

25+00

160
150
140

SEE RAMP B

8:1

6.443:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

24+50

160
150
140

SEE RAMP B

8:1

6.414:1

SEE RAMP C

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, DRY TO WET, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

24+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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	29

Terracon
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PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

170 160 150 140 130 120 110 100 90

3:1 5.854:1 8:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN TO TAN, ORANGE, AND GRAY.

TAN, ORANGE, GRAY, SATURATED, LOOSE TO MEDIUM DENSE, SILTY SAND

DRY TO WET, VERY SOFT TO STIFF, SILTY CLAY AND SANDY CLAY

TAN, ORANGE, GRAY, SATURATED, VERY LOOSE TO LOOSE, SILTY SAND

8 7 8 12 — 01/16 — 11 4 5 2 WOH 5 — BT

15 7 7 7 — 01/16 — 2 2 3 WOH 3 3 — BT

37 + 00

—℄—

PROJECT REFERENCE NO.	SHEET NO.
R-5719	30

Terracon
Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

8:1

8.991:1

3:1

3:1

S.T.-1
38+83 -L-

38+55 -L-

ROADWAY EMBANKMENT (PAVEMENT)

UNDIVIDED COASTAL PLAIN,
ORANGE, RED, BROWN, AND GRAY, DRY TO WET,
MEDIUM STIFF TO STIFF, SANDY CLAY

TAN AND GRAY, SATURATED, LOOSE, SILTY SAND

ST-1

GRAY, TAN, AND BROWN, WET, MEDIUM STIFF, SANDY SILT

ORANGE, GRAY, AND BROWN, SATURATED,
VERY LOOSE TO LOOSE, CLAYEY SAND

ORANGE, TAN, AND BROWN, WET, VERY SOFT TO
MEDIUM STIFF, SANDY CLAY

ORANGE, BROWN, RED, AND TAN, SATURATED,
LOOSE TO MEDIUM DENSE, SILTY SAND

COASTAL PLAIN,
BLACK-OLIVE AND DARK GRAY, SATURATED,
MEDIUM DENSE TO DENSE, SILTY SAND
(BLACK CREEK FORMATION)

BT

BT

38+00
-L-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	31

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

9.988:1 8:1 3:1 3:1

ST-2
39+50 -L-

39+81 -L-

ROADWAY EMBANKMENT (PAVEMENT)

01/16

02/16

ST-2

UNDIVIDED COASTAL PLAIN,
ORANGE, TAN, AND GRAY, DRY TO WET,
SOFT TO STIFF, SANDY CLAY AND SANDY SILT

ORANGE, TAN, AND GRAY, SATURATED,
VERY LOOSE TO LOOSE, SILTY SAND

ORANGE, TAN, AND GRAY, WET,
VERY SOFT TO MEDIUM STIFF, SANDY CLAY

COASTAL PLAIN,
BLACK-OLIVE AND DARK-GRAY, SATURATED,
VERY LOOSE, TO DENSE,
CLAYEY SAND TO SILTY SAND
(BLACK CREEK FORMATION)

BT

BT

40+00
-L-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	32

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

140
130
120
110
100

7.849:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

57+50

170
160
150
140
130
120
110
100
90

8:1 4:1 3:1 3:1

COASTAL PLAIN, GRAY, TAN-ORANGE, AND RED, VERY SOFT

WHITE-GRAY AND TAN-ORANGE, LOOSE, SATURATED, SILTY SAND

TO STIFF, WET, SANDY CLAY AND SANDY SILT

7 7 7 6 2 3 4 WOH 3 8 — 01/16 — BT

10 7 11 3 7 2 2 3 4 4 — 01/16 — BT

OLIVE, BLACK AND GRAY, LOOSE, SATURATED, SILTY SAND (BLACK CREEK FORMATION)

42+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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	33

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

130
120
110

7.827:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

59+00

7.833:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

58+50

7.840:1 8:1 3:1 3:1

16 18 20 6 BT

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

FIAD 01/16

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

58+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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	34

Terracon
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0 10 20
FEET

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

130
120
110

7.82:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

61+00

7.815:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

60+50

7.818:1 8:1 3:1 3:1

18 15 18 6

BT
FIAD
01/16

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

60+00

7.822:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

59+50

-L-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	35

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0 10 20
FEET

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

140
130
120
110

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

7.869:1 8:1 3:1 3.09:1

S-5
S-6
BT
DRY
10/16

ROADWAY EMBANKMENT, BROWN, MOIST, LOOSE, SILTY SAND

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

63+00

130
120
110

7.863:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

62+50

130
120
110

7.856:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

62+00

130
120
110

7.839:1 8:1 3:1 3:1

ROADWAY EMBANKMENT, TAN, BROWN, AND RED, MOIST TO WET, MEDIUM STIFF TO VERY STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

61+50

—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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	36

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0 10 20
FEET

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

140
130
120

3.85:1 7.886:1 8:1 4.14:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

64+50

140
130
120
110

3.36:1 7.881:1 8:1 3.74:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

64+00

140
130
120
110

3.12:1 7.875:1 8:1 3.39:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

63+50

-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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	37

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NC REGISTERED FIRM: F-0869

0 10 20
FEET

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

140
130
120

5.08:1 8:1 7.892:1 3.77:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

66+50

4.99:1 8:1 7.902:1 6:1

BT
DRY
10/16

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

66+00

4.46:1 7.999:1 8:1 6:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

65+50

3.87:1 7.897:1 8:1 4.78:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

65+00

$-\not{L}-$

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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	38

0 10 20
FEET

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PHONE: (919) 873-2211 FAX: (919) 873-9555
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80

150
140
130
120

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

6:1 8:1 7.791:1 6:1

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

68+00

140
130
120

6:1 8:1 7.823:1 6:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

67+50

140
130
120

6:1 8:1 7.890:1 6:1

ROADWAY EMBANKMENT, ORANGE, BROWN, AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY AND SILTY CLAY

UNDIVIDED COASTAL PLAIN, GRAY, TAN, ORANGE, AND BROWN, SATURATED, LOOSE TO MEDIUM DENSE, FINE SAND AND SILTY SAND

67+00

$-\not{L}-$

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

PROJECT REFERENCE NO.	SHEET NO.
R-5719	39

0 5 10
FEET

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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

145 140 135 130 125

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, MEDIUM STIFF, SANDY CLAY

6:1 6:1 6:1 6:1

5 4 5 6

TAN AND GRAY, MOIST, LOOSE, SAND

TAN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

BT
FIAD
05/16

24+50

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, MEDIUM STIFF, SANDY CLAY

6:1 6:1 6:1

TAN AND GRAY, MOIST, LOOSE, SAND

TAN AND GRAY, MOIST, MEDIUM STIFF, SANDY CLAY

24+00

6:1 6:1

UNDIVIDED COASTAL PLAIN, TAN AND GRAY, DRY TO MOIST, VERY LOOSE, SILTY SAND

TAN AND GRAY, MOIST, SOFT TO MEDIUM STIFF, SANDY SILT AND SILTY CLAY

23+50

-RAMP A-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	40

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Consulting Engineers & Scientists
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PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

155
150
145
140

S-4
11+04
SEE LINE -L-
6:1
6:1
UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY
BT
DRY
10/16

11+00

SEE LINE -L-
6:1
UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY

10+50

SEE LINE -L-
6:1
ROADWAY EMBANKMENT, TAN, ORANGE, AND GRAY,
DRY TO WET, STIFF TO VERY STIFF, SANDY CLAY
UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY

10+00

-RAMP B-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	41

Terracon
Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

155 150 145 140 135

SEE LINE -L-

5.68:1

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY

SS-1
12+53

6
9
8
5

BT
FIAD
05/16

12 + 50

SEE LINE -L-

4.84:1

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY

12 + 00

SEE LINE -L-

5.08:1

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY

11 + 50

-RAMP B-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	42

0 5 10
FEET

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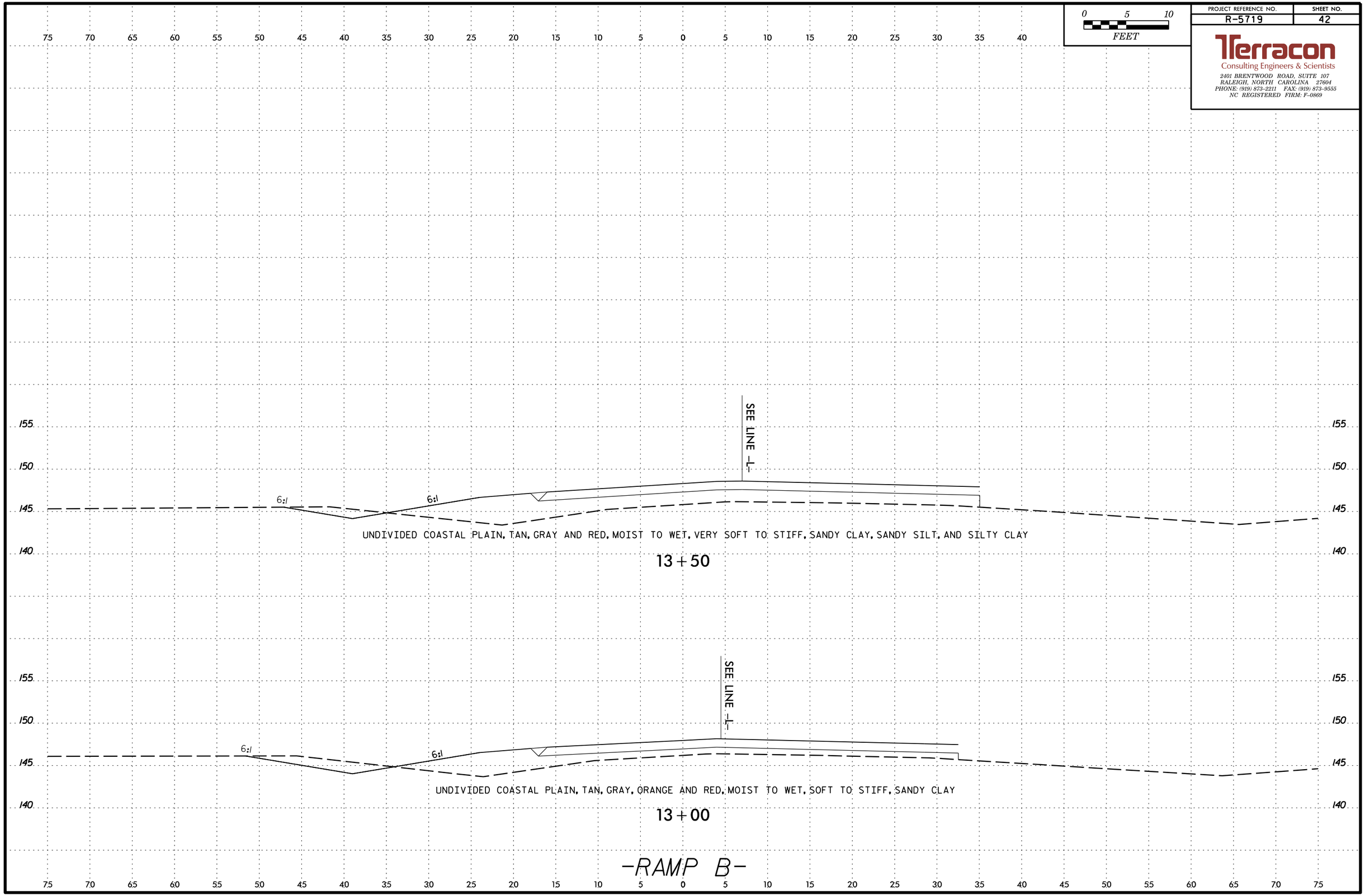
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



PROJECT REFERENCE NO.	SHEET NO.
R-5719	43

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PHONE: (919) 873-2211 FAX: (919) 873-9555
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0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

155
150
145
140

SEE LINE –L–

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY, SANDY SILT, AND SILTY CLAY

14 + 50

155
150
145
140
135
130

SEE LINE –L–

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND RED, MOIST TO WET, VERY SOFT TO STIFF, SANDY CLAY, SANDY SILT, AND SILTY CLAY

10
5
7
12
BT
FIAD
05/16

14 + 00

–RAMP B–

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	44

0 5 10
FEET

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NC REGISTERED FIRM: F-0869

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

160 155 150 145 140

SEE LINE -L-

6:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY

11+00

SEE LINE -L-

6:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, MOIST, MEDIUM STIFF, SANDY CLAY

10+50

SEE LINE -L-

6:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, MOIST, MEDIUM STIFF, SANDY CLAY

BT
DRY
10/16

10+00

-RAMP C-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	45

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0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

160 155 150 145 140

SEE LINE -L-

6:1 3:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY

12+00

160 155 150 145 140

SEE LINE -L-

SS-1
11+48

6:1 3:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY

6
9
8
5

BT
FIAD
05/16

160 155 150 145 140 135 130

11+50

-RAMP C-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	46

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NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

160 155 150 145 140 135 130 125

12+96

SEE LINE -L-

6:1

4.93:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY AND SILTY CLAY

10
5
7
12

BT
FIAD
05/16

13+00

SEE LINE -L-

6:1

3.39:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY AND SILTY CLAY

12+50

-RAMP C-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	47

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0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

160 155 150 145 140 135 130

SEE LINE -L-

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY, SILTY CLAY, AND SANDY SILT

9
5
9
11

01/16

BT

14+00

SEE LINE -L-

6:1

6:1

UNDIVIDED COASTAL PLAIN, TAN, GRAY AND ORANGE, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY, SILTY CLAY, AND SANDY SILT

13+50

-RAMP C-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	48

0 5 10
FEET

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75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

150
145
140
135

6:1 6:1 6:1

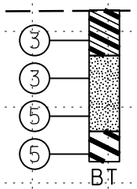
UNDIVIDED COASTAL PLAIN, GRAY AND TAN TO BROWN, MOIST TO WET, SOFT TO MEDIUM STIFF, SANDY CLAY, SANDY SILT, AND SILTY CLAY

24+50

150
145
140
135
130
125

6:1 6:1

UNDIVIDED COASTAL PLAIN, GRAY AND TAN TO BROWN, MOIST TO



WET, SOFT TO MEDIUM STIFF, SANDY CLAY, SANDY SILT, AND SILTY CLAY

24+00

150
145
140
135

6:1 6:1

UNDIVIDED COASTAL PLAIN, GRAY AND TAN TO BROWN, MOIST TO WET, SOFT TO MEDIUM STIFF, SANDY CLAY, SANDY SILT, AND SILTY CLAY

23+50

-RAMP C-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	49

0 5 10
FEET

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SS-5

6:1 6:1 5.32:1

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, LOOSE, SILTY SAND

8
6
6
4

GRAY AND TAN TO BROWN, MOIST TO WET, SOFT TO MEDIUM STIFF, SANDY CLAY AND SANDY SILT

BT
FIAD
05/16

25+50

6:1 6:1 4.92:1

UNDIVIDED COASTAL PLAIN, GRAY AND TAN TO BROWN, MOIST TO WET, SOFT TO MEDIUM STIFF, SANDY CLAY AND SANDY SILT

25+00

-RAMP C-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	50

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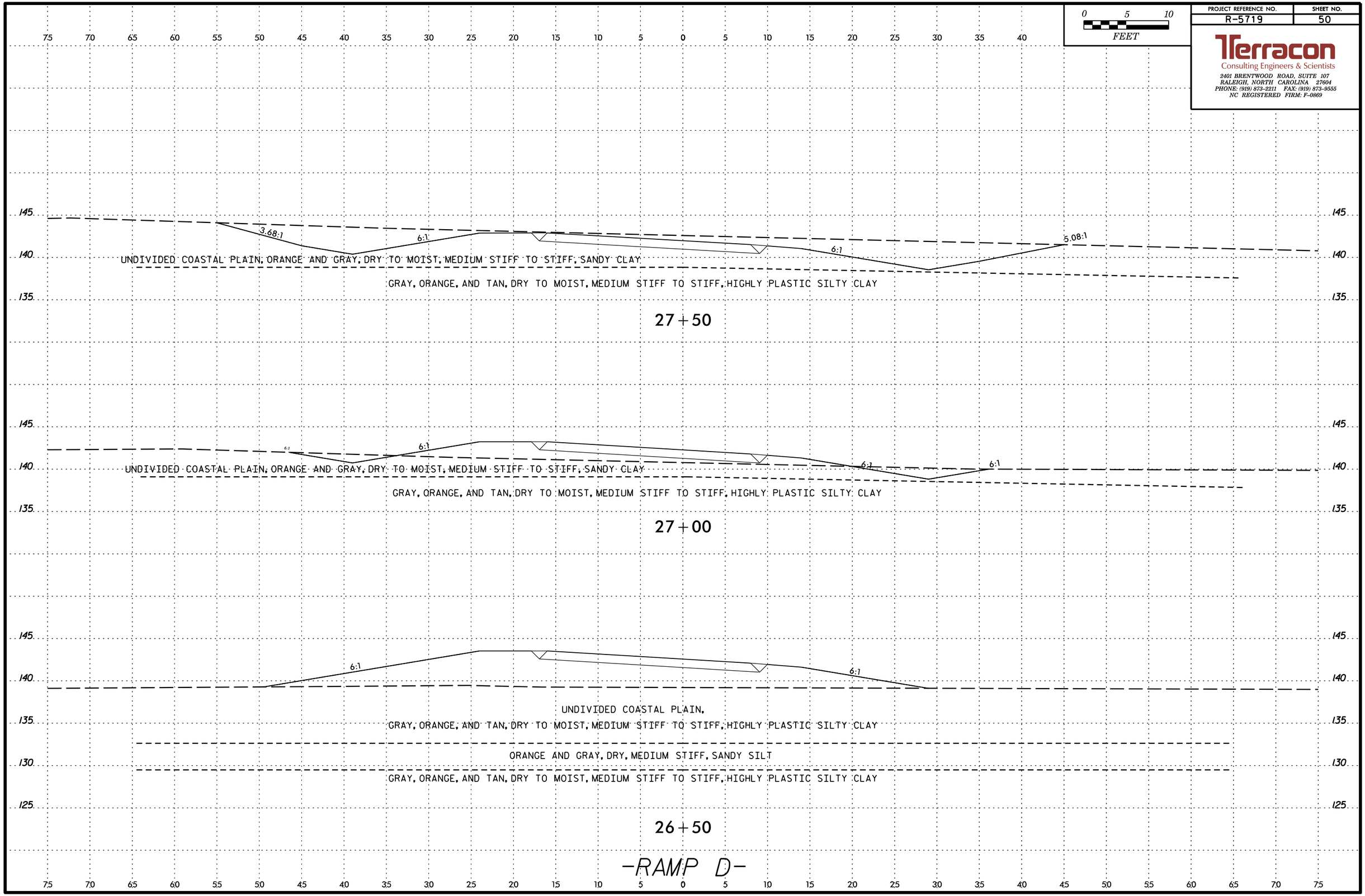
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

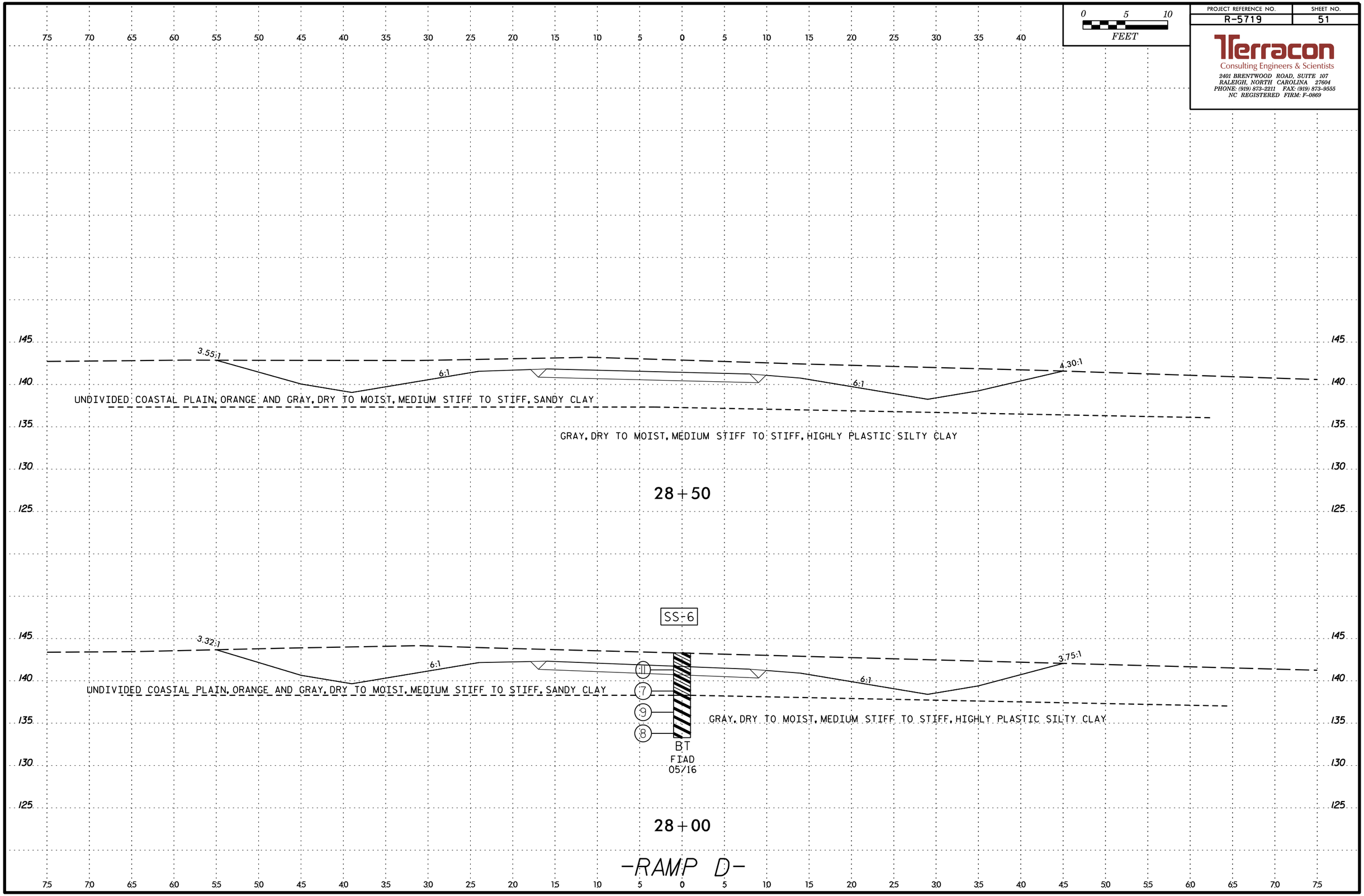
0 5 10
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-5719	51

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

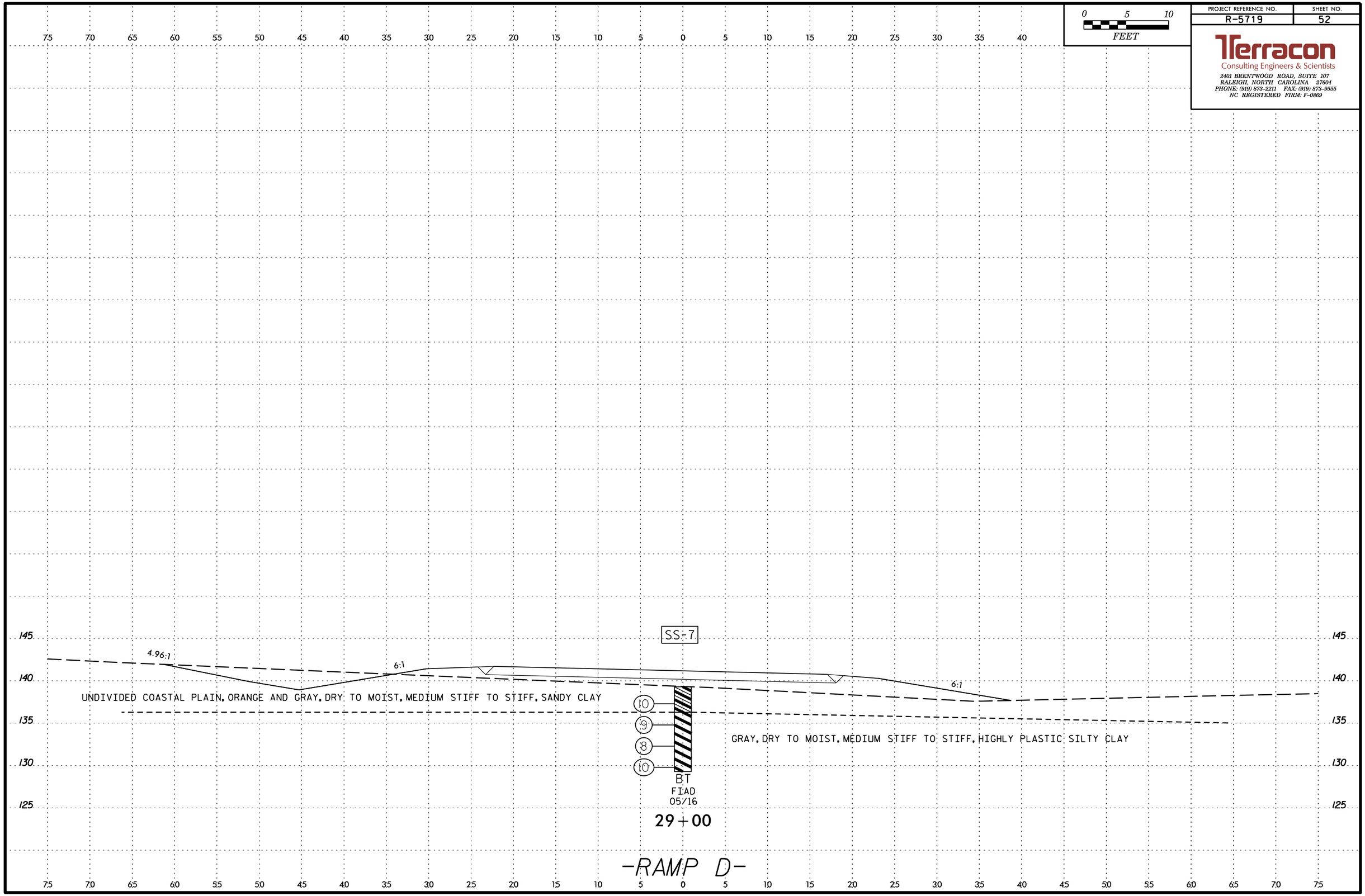
0 5 10
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-5719	52

0 5 10
FEET

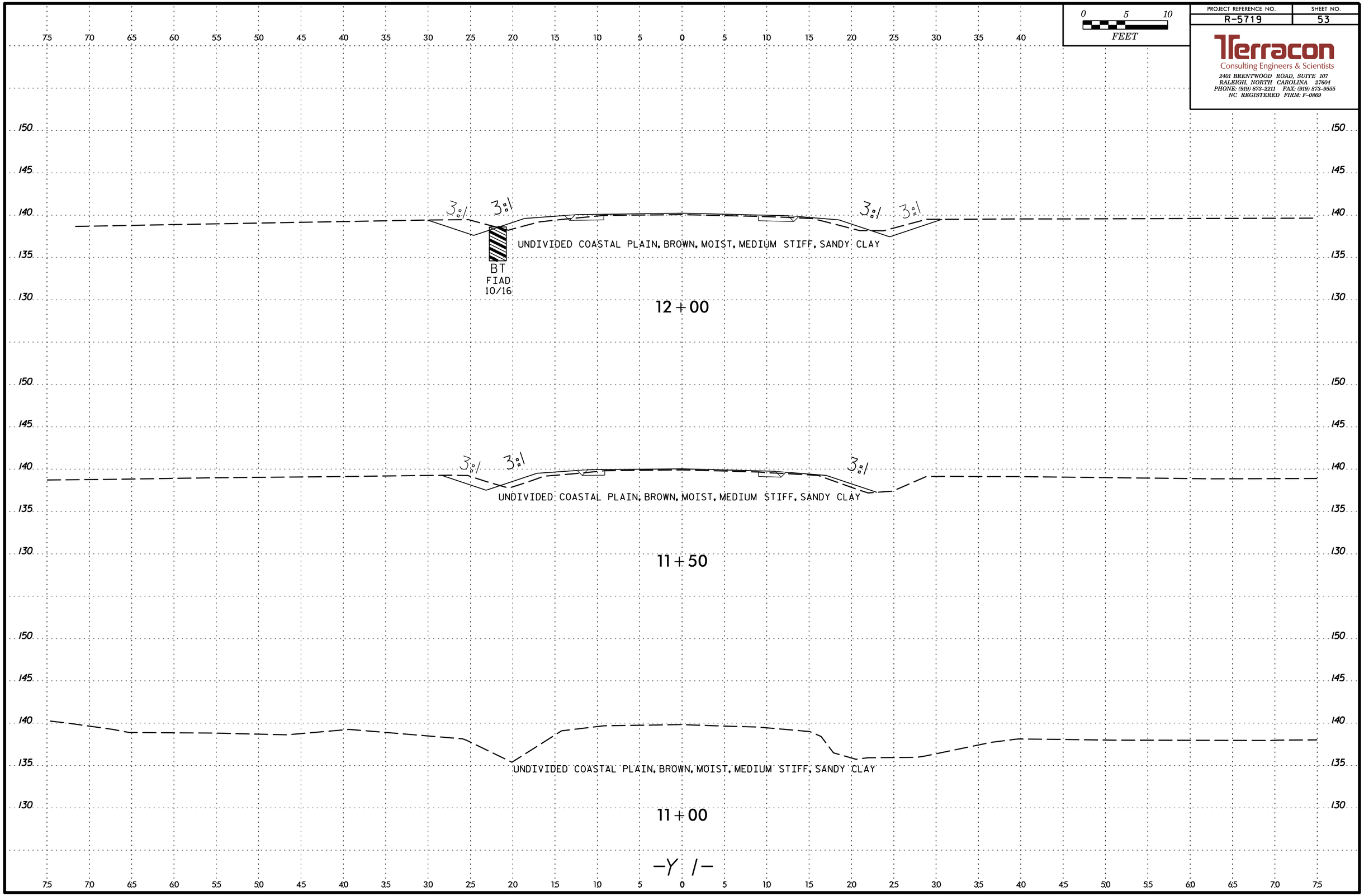
Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



PROJECT REFERENCE NO.	SHEET NO.
R-5719	53

0 5 10
FEET

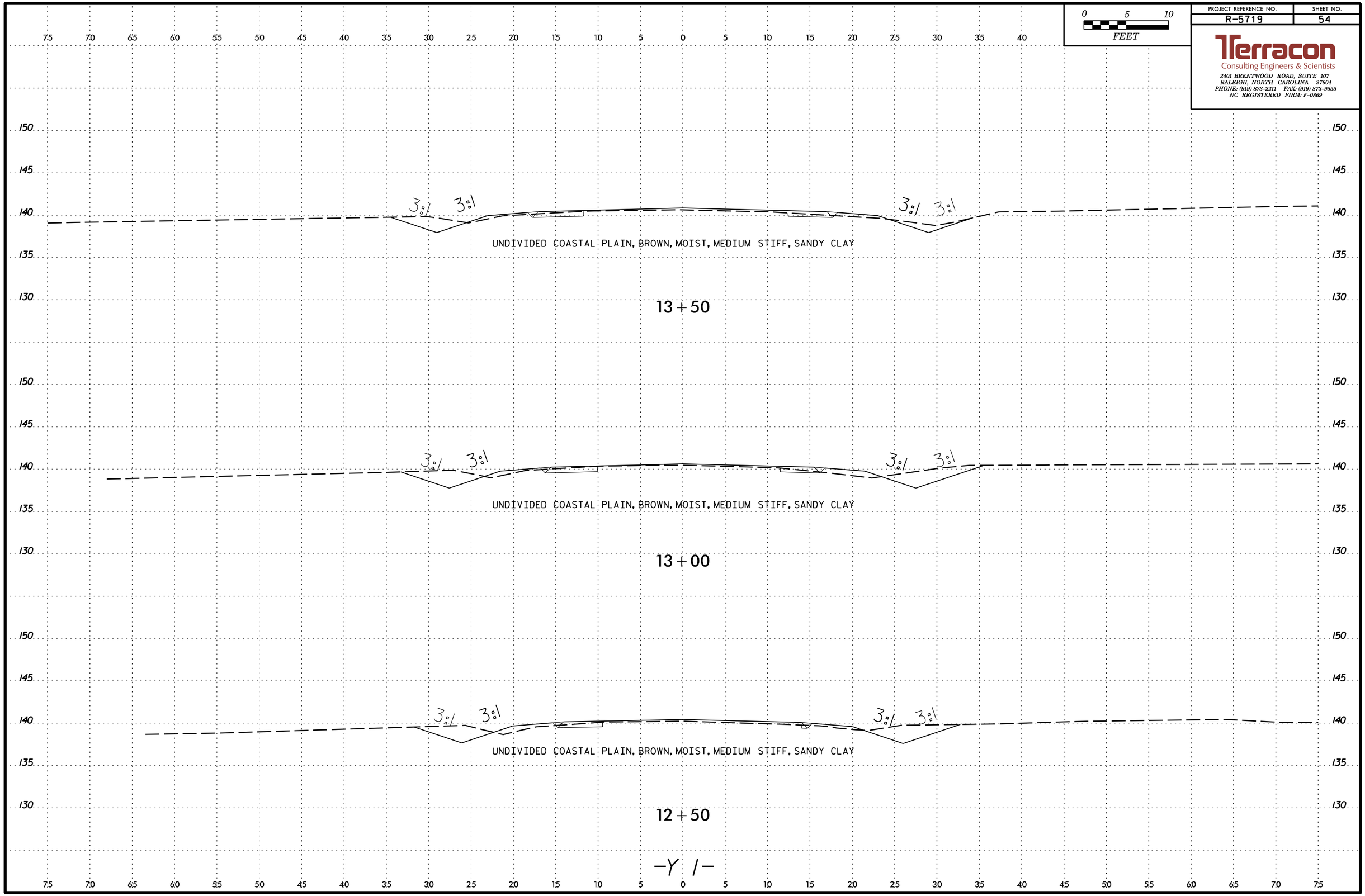
Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



PROJECT REFERENCE NO.	SHEET NO.
R-5719	54

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET



PROJECT REFERENCE NO.	SHEET NO.
R-5719	55

0 5 10
FEET

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

150 145 140 135 130

SEE RAMP A

SEE RAMP B

16+10

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, MEDIUM STIFF, SANDY CLAY

5
4
5
6

BT
FIAD
05/16

BROWN, GRAY, TAN, AND ORANGE, MOIST TO SATURATED, VERY LOOSE TO LOOSE, SILTY SAND

TAN AND GRAY, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

16 + 00

3:1 3:1 3:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, GRAY, TAN, AND ORANGE, MOIST TO SATURATED, VERY LOOSE TO LOOSE, SILTY SAND

14 + 50

3:1 3:1 3:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, MOIST, MEDIUM STIFF, SANDY CLAY

14 + 00

-Y /-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	56

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

150 145 140 135 130 125 120

3:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, GRAY, AND ORANGE, MOIST TO WET, MEDIUM STIFF, SANDY CLAY AND HIGHLY PLASTIC SILTY CLAY

3:1 3:1

17+00

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, MEDIUM STIFF, SANDY CLAY

3:1 3:1

SEE RAMP B

SS-3
16+44

BROWN, GRAY, TAN, AND ORANGE, MOIST TO SATURATED, VERY LOOSE TO LOOSE, SILTY SAND AND SAND

8
6
7
7

TAN AND GRAY, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

BT.
FIAD
05/16

16+50

-Y /-

PROJECT REFERENCE NO.	SHEET NO.
R-5719	57

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

150 145 140 135 130

3:1 3:1 3:1 3:1

UNDIVIDED COASTAL PLAIN, BROWN, GRAY, AND ORANGE, MOIST TO WET, MEDIUM STIFF, SANDY CLAY AND HIGHLY PLASTIC SILTY CLAY

18 + 50

S-7

BT
FIAD
10/16

18 + 00

UNDIVIDED COASTAL PLAIN, BROWN, GRAY, AND ORANGE, MOIST TO WET, MEDIUM STIFF, SANDY CLAY AND HIGHLY PLASTIC SILTY CLAY

17 + 50

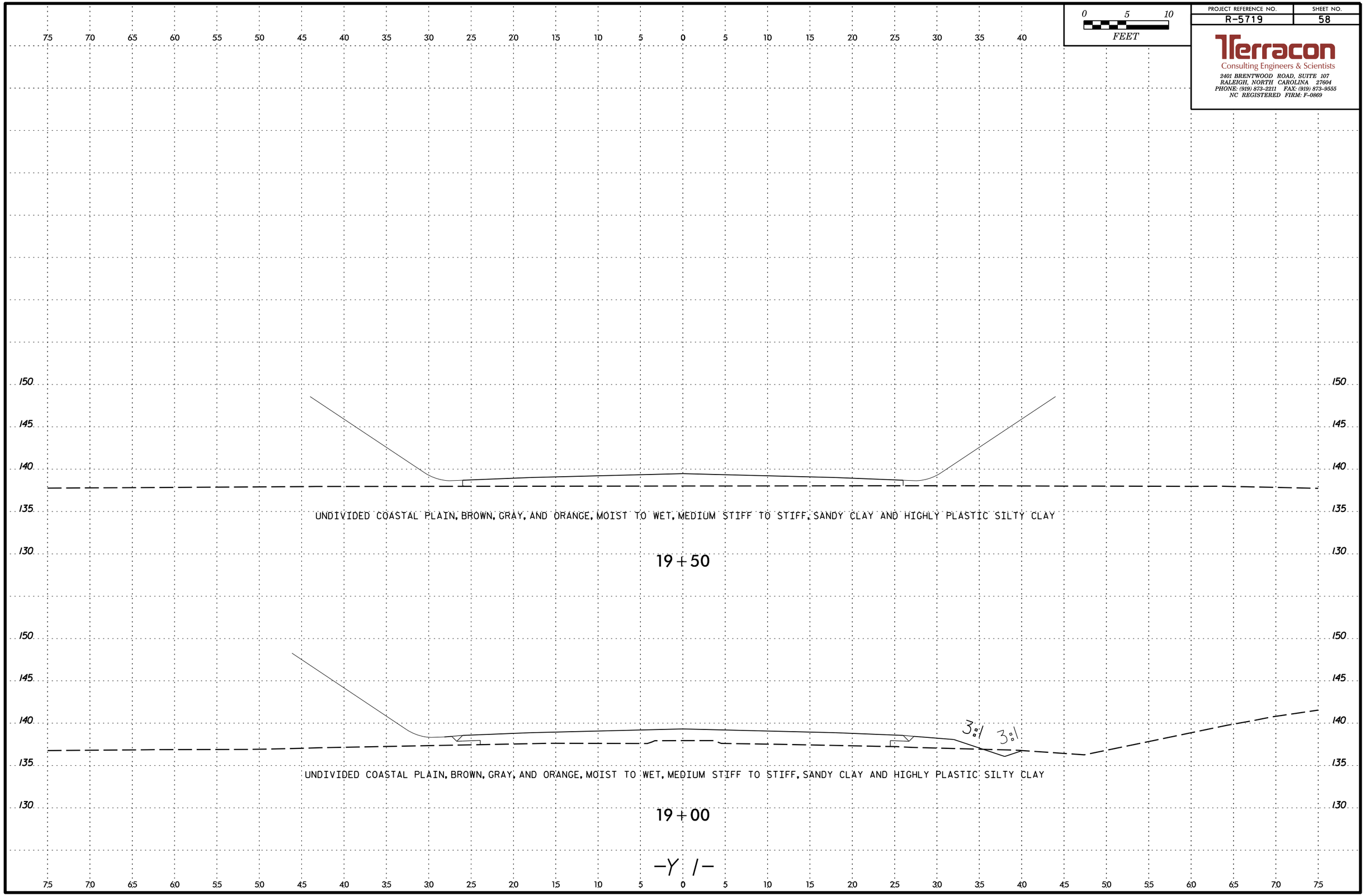
-Y /-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	58

0 5 10
FEET

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869



PROJECT REFERENCE NO.	SHEET NO.
R-5719	59

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

0 5 10
FEET

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40

150
145
140
135
130

SEE RAMP D

SEE RAMP C

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, LOOSE, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE, GRAY, AND BROWN, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY, SANDY SILT, AND HIGHLY PLASTIC SILTY CLAY

24+50

SS-7
23+79
(10) (9) (8) (10)
BT
FIAD
10/16

SEE RAMP D

SEE RAMP C

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, LOOSE, SILTY SAND

23+89
(8) (6) (6) (4)
BT
FIAD
10/16

UNDIVIDED COASTAL PLAIN, ORANGE, GRAY, AND BROWN, MOIST TO WET, MEDIUM STIFF TO STIFF, SANDY CLAY, SANDY SILT, AND HIGHLY PLASTIC SILTY CLAY

150
145
140
135
130
125
120

24+00

–Y /–

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PROJECT REFERENCE NO.	SHEET NO.
R-5719	60

0 5 10
FEET

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

UNDIVIDED COASTAL PLAIN, ORANGE AND BROWN, MOIST, MEDIUM STIFF, SANDY CLAY, AND SANDY SILT

26+00

UNDIVIDED COASTAL PLAIN, ORANGE AND BROWN, MOIST, MEDIUM STIFF, SANDY CLAY, AND SANDY SILT

25+50

SEE RAMP B

SS-3
16+44

UNDIVIDED COASTAL PLAIN, BROWN, DRY TO MOIST, MEDIUM STIFF, SANDY CLAY

BROWN, GRAY, TAN, AND ORANGE, MOIST TO SATURATED, VERY LOOSE TO LOOSE, SILTY SAND AND SAND

S-9

TAN AND GRAY, MOIST TO WET, MEDIUM STIFF, SANDY CLAY

UNDIVIDED COASTAL PLAIN, ORANGE AND BROWN, MOIST, MEDIUM STIFF, SANDY CLAY, AND SANDY SILT

8
6
7
7

BT
FIAD
10/16

BT
FIAD
05/16

25+00

-Y /-

PROJECT REFERENCE NO.	SHEET NO.
R–5719	61

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
LABORATORY RESULTS

REFERENCE: R–5719

PROJECT: 50473

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873–2211 FAX: (919) 873–9555
NC REGISTERED FIRM: F–0869

INITIALS DATE

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 50473 **TIP:** R-5719 **COUNTY:** WAYNE

DESCRIPTION: US 117 AND SR 1135 (COUNTRY CLUB ROAD) INTERCHANGE

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1	-L-	23+50	CL	1.0 - 2.5	A-6 (8)	36	20	8.6	44.7	19.3	27.4	0	100	97	58	19.1	ND
SS-2	-L-	27+00	CL	1.0 - 2.5	A-6 (2)	26	11	9.3	50.7	16.7	23.3	0	100	97	49	12.0	ND
SS-3	-RAMP B-	29+50	27 RT	6.0 - 7.5	A-6 (11)	40	25	5.4	45.9	18.8	29.9	0	100	98	59	22.9	ND
SS-4	-RAMP C-	22+00	CL	1.0 - 2.5	A-6 (4)	26	14	8.0	50.8	15.8	25.4	0	100	97	53	18.2	ND
SS-5	-RAMP C-	25+50	CL	3.5 - 5.0	A-4 (0)	19	5	7.7	56.2	16.7	19.4	0	100	98	48	13.2	ND
SS-6	-RAMP D-	28+00	CL	3.5 - 5.0	A-6 (3)	31	15	8.7	56.3	10.9	24.1	1	98	95	44	16.1	ND
SS-7	-RAMP D-	29+00	CL	3.5 - 5.0	A-7-6 (18)	53	35	6.8	40.6	14.6	38.0	0	100	98	61	20.1	ND
ST-1	-L-	38+83	68 LT	13.5 - 15.0	A-4 (0)	25	NP	0.4	66.4	20.8	12.4	0	100	100	51	31.4	ND
ST-2	-L-	39+50	80 RT	15.0 - 17.4	A-4 (0)	24	6	21.5	52.3	12.1	14.1	0	100	91	38	19.2	ND
S-1	-L-	13+00	67 LT	0 - 4.0	A-7-6 (11)	45	31	4.3	49.9	10.9	34.9	0	100	100	50	21.1	ND
S-2	-L-	16+00	68 LT	0 - 4.0	A-6 (4)	33	17	4.9	55.6	17.1	22.4	0	100	98	48	15.4	ND
S-3	-L-	16+00	68 RT	1.5 - 4.0	A-2-4 (0)	30	10	26.7	52.8	1.6	18.9	0	97	85	22	ND	ND
S-4	-L-	22+00	70 LT	0 - 4.0	A-6 (5)	38	23	26.3	36.6	4.5	32.6	0	100	90	41	13.7	ND
S-5	-L-	63+00	65 RT	0 - 2.0	A-6 (5)	28	16	7.8	50.3	12.6	29.3	0	100	97	52	13.7	ND
S-6	-L-	63+00	65 RT	2.0 - 4.0	A-2-4 (0)	26	9	15.8	58.2	6.4	19.6	0	100	94	31	ND	ND
S-7	-Y1-	18+00	29 RT	1.0 - 3.0	A-7-6 (30)	59	43	5.1	31.0	16.4	47.5	0	100	99	72	23.0	ND
S-8	-Y1-	22+50	42 LT	3.0 - 4.0	A-6 (4)	28	16	8.6	50.6	12.7	28.1	0	100	97	50	15.2	ND
S-9	-Y1-	25+00	31 LT	1.0 - 4.0	A-4 (1)	26	9	5.8	61.4	12.4	20.4	0	100	99	45	14.1	ND

NP - NONPLASTIC
ND - NOT DETERMINED
LABORATORY TESTING OF SHELBY TUBE SAMPLES, ST-1 AND ST-2, WAS PERFORMED BY GEOTECHNICS.

Stephanie H. Huffman
Certified Lab Technician Signature

114-01-1203
Certification Number

PROJECT REFERENCE NO.	SHEET NO.
R–5719	63

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
CPT LOGS

REFERENCE: R–5719

PROJECT: 50473

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873–2211 FAX: (919) 873–9555
NC REGISTERED FIRM: F–0869

INITIALS DATE

CPT LOG NO. C1

PROJECT: R-5719 - US-117 & SR-1135 (Country Club Road) Interchange

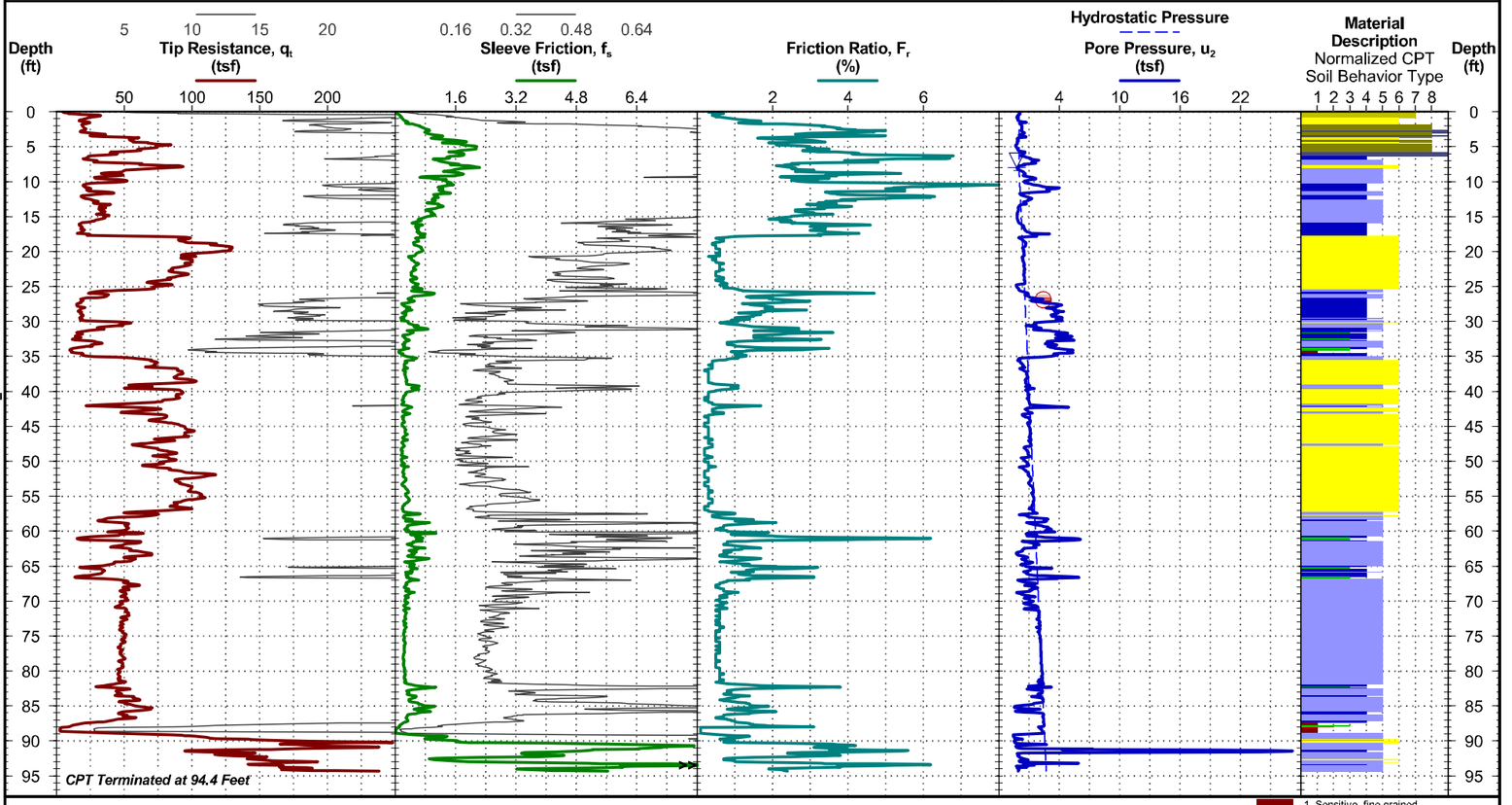
CLIENT: Wetherill Engineering
Raleigh, North Carolina

TEST LOCATION: (As-Tested Location)

SITE: US-117 & Country Club Road
Mount Olive, North Carolina

LL: 35.23915°,-78.05854°
NE: 543299,2281105

Station: 40+62 -L-
Offset: 83 ft Left



CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION
▽ 8 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

Terracon
2401 Brentwood Road, Suite 107
Raleigh, North Carolina

CPT Started: 2/18/2016
CPT Completed: 2/18/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: 50473.1.FD1
Exhibit: CPT-1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT R5716_CPT.GPJ TERRACON2015.GDT 3/1/16

CPT LOG NO. C2

PROJECT: R-5719 - US-117 & SR-1135 (Country Club Road) Interchange

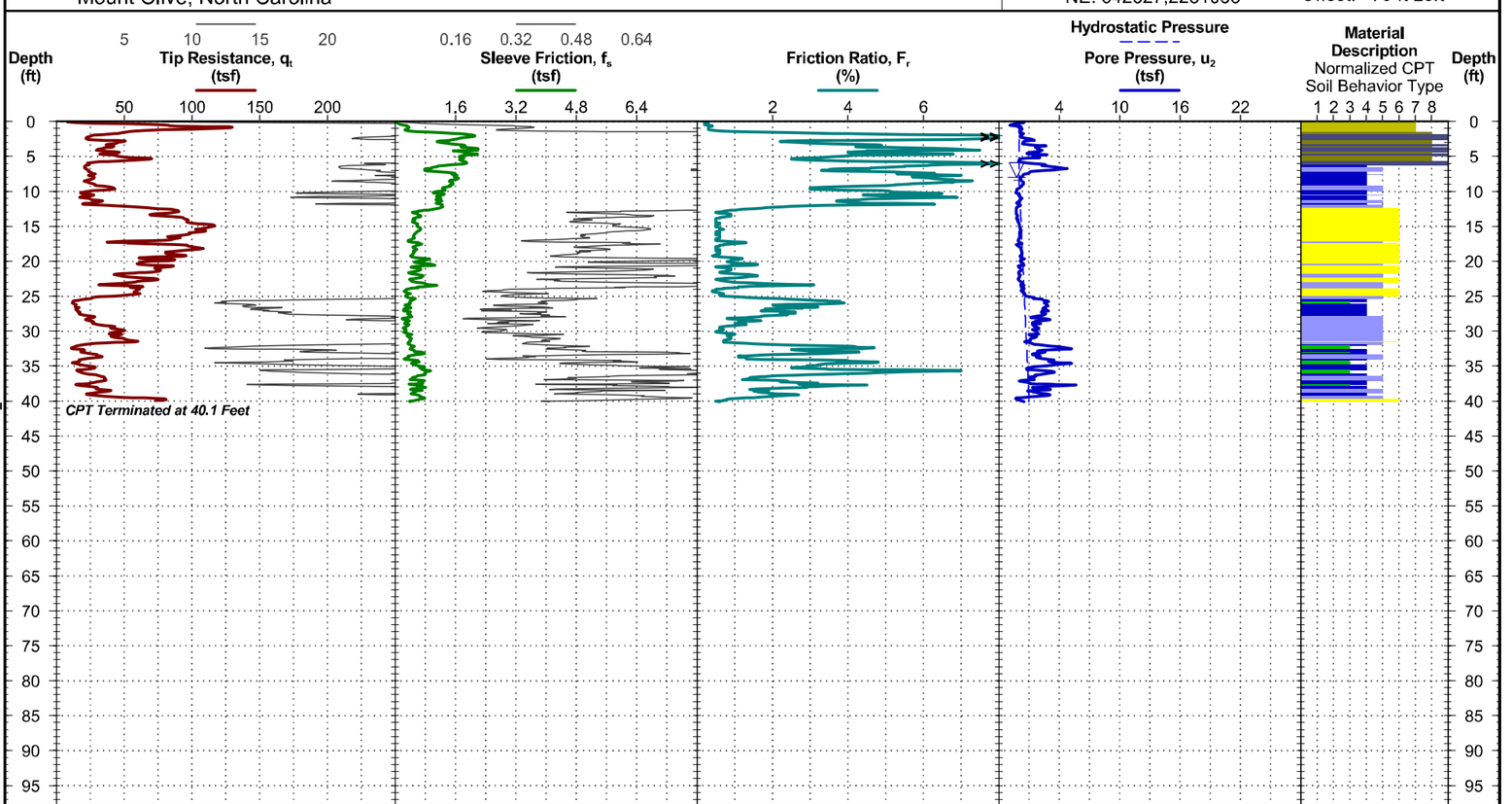
CLIENT: Wetherill Engineering
Raleigh, North Carolina

TEST LOCATION: (As-Tested Location)

SITE: US-117 & Country Club Road
Mount Olive, North Carolina

LL: 35.23786°,-78.0588°
NE: 542827,2281033

Station: 35+85 - L-
Offset: 70 ft Left



CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION
▽ 8 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

Terracon
2401 Brentwood Road, Suite 107
Raleigh, North Carolina

CPT Started: 2/18/2016
CPT Completed: 2/18/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: 50473.1.FD1
Exhibit: CPT-2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT R5716_CPT.GPJ TERRACON2015.GDT 3/1/16

CPT LOG NO. C3

PROJECT: R-5719 - US-117 & SR-1135 (Country Club Road) Interchange

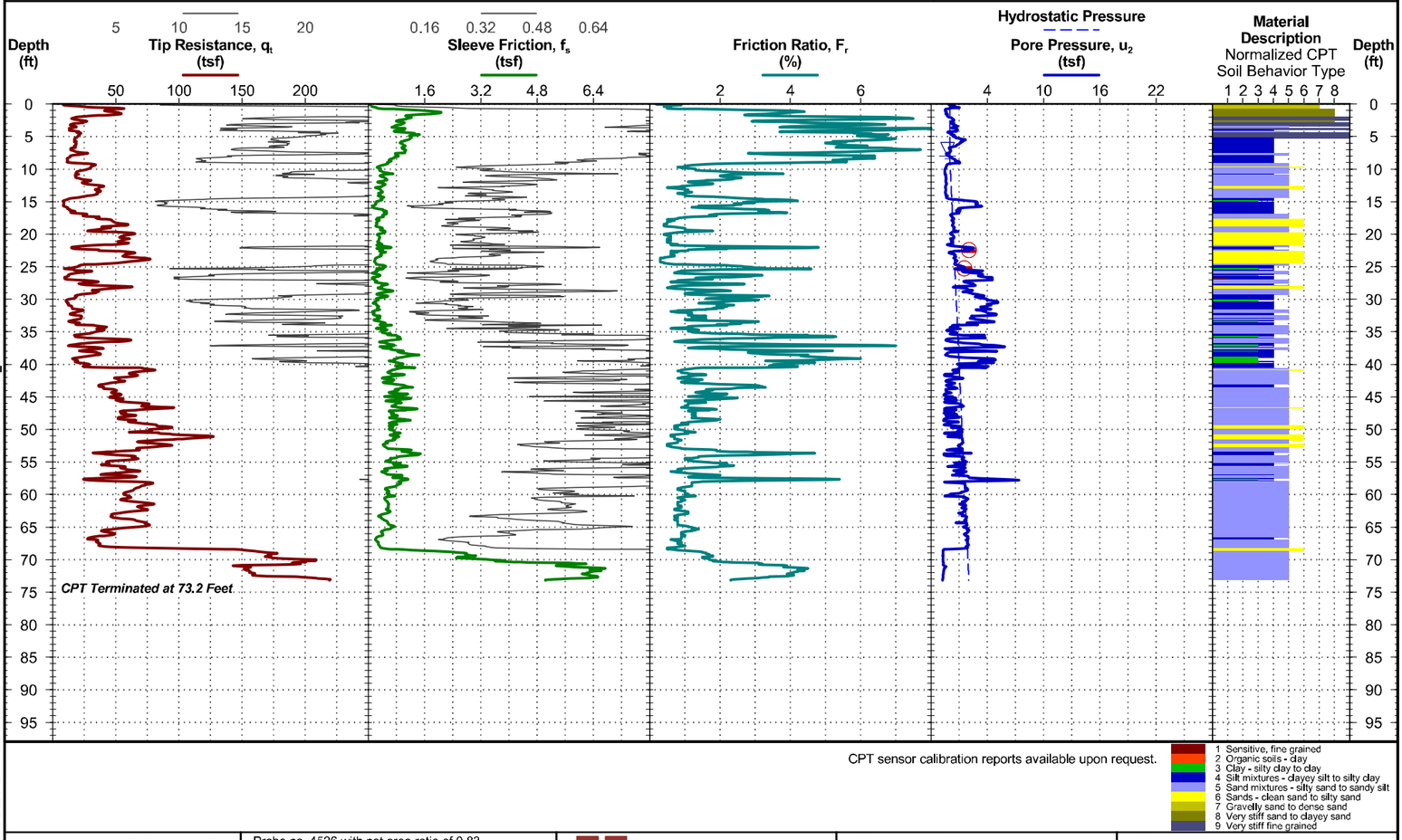
CLIENT: Wetherill Engineering
Raleigh, North Carolina

TEST LOCATION: (As-Tested Location)

SITE: US-117 & Country Club Road
Mount Olive, North Carolina

LL: 35.23832°,-78.05817°
NE: 542996,2281220

Station: 37+84 - L-
Offset: 84 ft Right



CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION	Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm² and 150 cm² Ring friction reducer with O.D. of 1.875 in	Terracon 2401 Brentwood Road, Suite 107 Raleigh, North Carolina	CPT Started: 2/18/2016	CPT Completed: 2/18/2016
▽ 8 ft estimated water depth (used in normalizations and correlations; see Appendix C)			Rig: Pagani TG73-200	Operator: JB
			Project No.: 50473.1.FD1	Exhibit: CPT-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT R5716_CPT.GPJ TERRACON2015.GDT 3/1/16

CPT LOG NO. C4

PROJECT: R-5719 - US-117 & SR-1135 (Country Club Road) Interchange

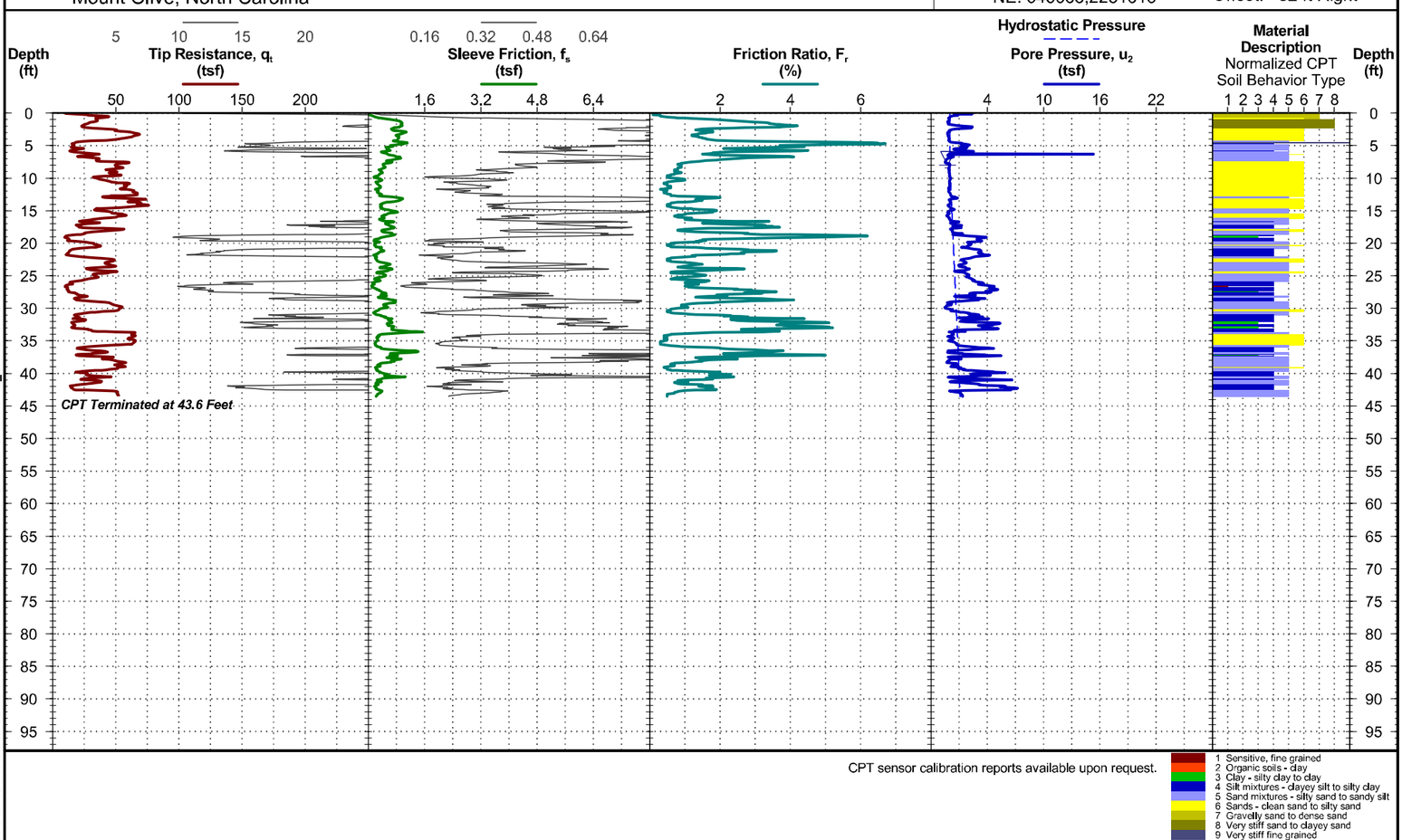
CLIENT: Wetherill Engineering
Raleigh, North Carolina

TEST LOCATION: (As-Tested Location)

SITE: US-117 & Country Club Road
Mount Olive, North Carolina

LL: 35.2398°,-78.05783°
NE: 543538,2281315

Station: 43+34 -L-
Offset: 82 ft Right



CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION	Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm² and 150 cm² Ring friction reducer with O.D. of 1.875 in	Terracon 2401 Brentwood Road, Suite 107 Raleigh, North Carolina	CPT Started: 2/18/2016	CPT Completed: 2/18/2016
▽ 8 ft estimated water depth (used in normalizations and correlations; see Appendix C)			Rig: Pagani TG73-200	Operator: JB
			Project No.: 50473.1.FD1	Exhibit: CPT-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT R5716_CPT.GPJ TERRACON2015.GDT 3/1/16