PROJECT: 38608 REFERENCE: B-4838

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

CROSS SECTIONS

LINE	STATION	SHEET
-L-	26+50	9
-L-	27+50	10
-L-	28+50	11
-L-	30+00	12
-L-	31+50	13
-L-	32+50	14
-L-	33+50	15
-L-	35+50	16
-L-	37+50	17
-L-	39+50	18
-L-	41+50	19
-L-	44+00	20

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *WAYNE*

PROJECT DESCRIPTION *BRIDGE NO. 20 ON US 70 BUSINESS OVER CSX RAILROAD*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4838	1	20

CAUTION NOTICE

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

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PERSONNEL

W. PESL

B. PAINTER

M. ARNOLD

D. TIGNOR

W. SHENBERGER

INVESTIGATED BY *F&R, Inc.*

DRAWN BY *M. ARNOLD*

CHECKED BY *M. ARNOLD*

SUBMITTED BY *P. ALTON, P.E.*

DATE *JANUARY 2020*

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Prepared in the Office of:

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302 | USA
T 919.828.3441 | F 919.828.5751
www.fandr.com

NORTH CAROLINA PROFESSIONAL SEAL 033758 ENGINEER W. PATRICK ALTON

DocuSigned by:
Patrick Alton
A270EF78...SIGNATURE

1/14/2020
DATE

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PROJECT REFERENCE NO.	SHEET NO.
B-4838	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		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	< 4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	N/A
	VERY DENSE	> 50	
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 SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 2.25" I.D. HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 5/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [ ] CORE BIT 4"
- [ ] 3" CONTINUOUS FLIGHT AUGER

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-4 BL STATION 27+79.51, N: 599977.3610, E: 2298286.1090

ELEVATION: 120.87 FEET

NOTES:

FIAD = FILLED IMMEDIATELY AFTER DRILLING

HABT = HAND AUGER BORING TERMINATED

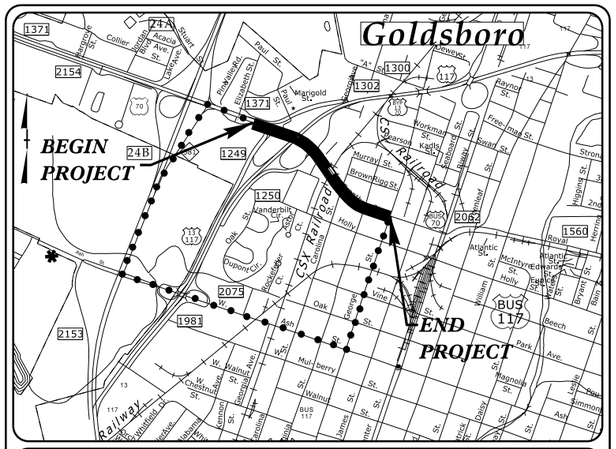
ROADWAY BORING ELEVATIONS OBTAINED FROM b4838_ls_rev_tin.tin FILE DATED 10/9/2019

DATE: 8-15-14

TIP PROJECT: B-4838

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP
NOT TO SCALE ●●●●● DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

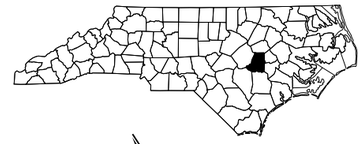
WAYNE COUNTY

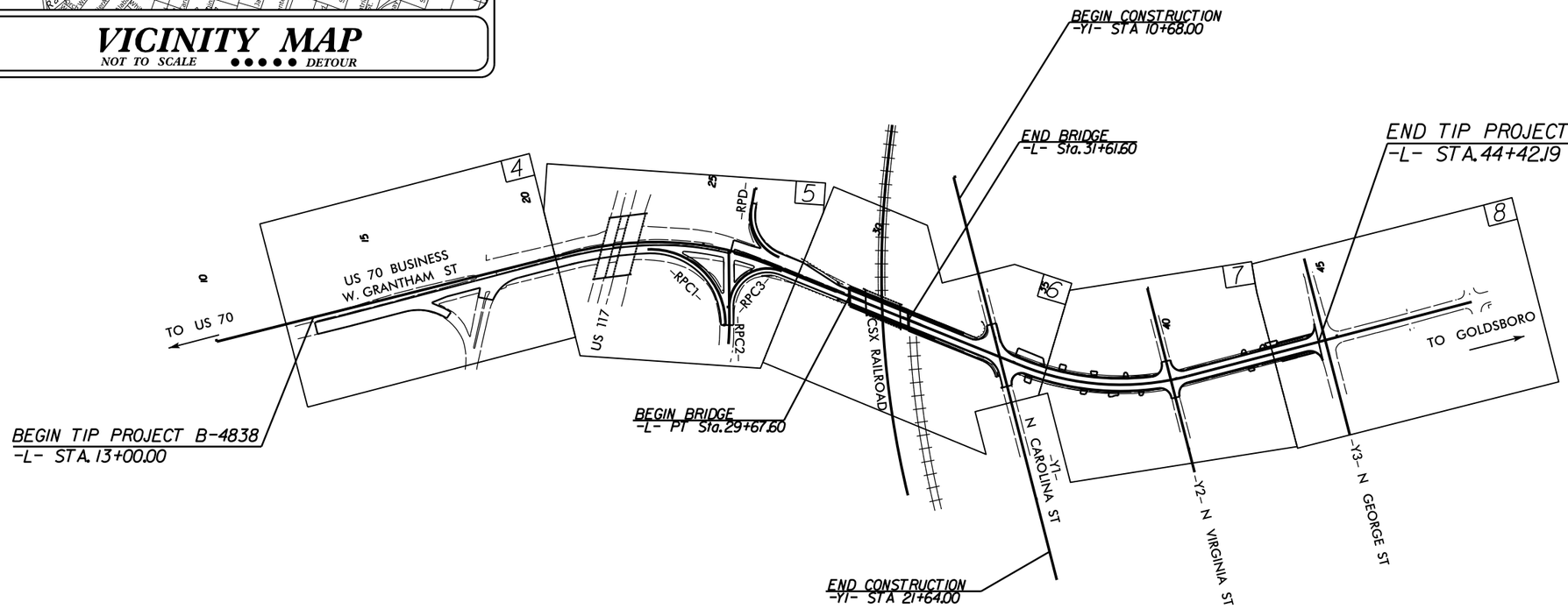
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4838	3	20

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38608.1.1	BRSTP-070B(7)	PE
38608.2.1		ROW/UTILITIES
38608.3.1		CONSTRUCTION

LOCATION: BRIDGE NO.20 ON US 70 BUSINESS (GRANTHAM ST) OVER CSX RAILROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE, AND SIGNALS





THIS MAINTAINS THE EXISTING ACCESS CONTROL THROUGH THE INTERCHANGE

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

PROJECT IS WITHIN GOLDSBORO CITY LIMITS.

SUBMITTAL: 65% ROADWAY PLANS
DATE: DECEMBER 5, 2019

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 30 15 0 30 60
PROFILE (HORIZONTAL): 30 15 0 30 60
PROFILE (VERTICAL): 6 3 0 6 12

DESIGN DATA

ADT 2018 = 9900
ADT 2040 = 11200
DHV = 10 %
D = 55 %
T = 5 % *
V = 40 MPH
* TTST = 2% DUAL 3%
FUNC CLASS = MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4838 = 0.558 MI
LENGTH STRUCTURE TIP PROJECT B-4838 = 0.037 MI
TOTAL LENGTH TIP PROJECT B-4838 = 0.595 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: FEBRUARY 21, 2020

LETTING DATE: FEBRUARY 16, 2021

KIMBERLY A. KOIVUNIEMI, PE
PROJECT ENGINEER

BENJAMIN I. DAWES, EI
PROJECT DESIGN ENGINEER

TIERRE PETERSON, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302
T 919.828.3441 | F 919.828.5751

NC Engineering License # F-0266

January 9, 2020

State Project No.: 38608.1.1
TIP No.: B-4838
F.A. Number: N/A
County: Wayne
Description: Bridge No. 20 on US 70 Business over CSX Railroad

SUBJECT: **Geotechnical Report – Inventory**

Project Description

This project consists of the replacement of the existing Bridge 20 on US 70 Business/West Grantham Street (-L-) over CSX Railroad in Goldsboro, Wayne County, North Carolina. The bridge replacement will necessitate: realignment of existing on and off ramps, construction of two retaining walls, vertical grade adjustments, and road widening. The projects extends from approximately 200 feet southeast of the intersection of US 70 and North Elizabeth Street (-L- station 13+00.00) to the intersection of US 70 and North George Street (-L- station 44+42.19)- a distance of approximately 0.6 miles. The new alignment will typically consist of one eastbound and one westbound lane separated by a center left turn lane or concrete island. More specifically, the typical section will incorporate 12-foot lanes and 4 to 8-foot paved shoulders.

The realignment of existing on and off ramps to US 117/13/70 is proposed along -RPC1-, -RPC3-, and -RPD-. The grade along US 70 in the vicinity of the bridge replacement is proposed to be raised by up to about 4 feet. The grade increase will necessitate the construction of two retaining walls. The walls are proposed on the left and right sides of -L- from proposed bridge End Bent 2 to approximately station 33+30, left and 32+50, right. The walls be located at the top of the existing embankments. The remainder of the proposed construction east of the bridge will generally consist of minor widening with fill depths on the order of 1 to 3 feet.

The geotechnical field investigation was performed from October 2019 to November 2019. During this time period, a total of eight Standard Penetration Tests (SPT) borings were advanced with an ATV-mounted CME-55 drill rig with an automatic hammer. In addition, eleven hand auger borings were completed due to restrictive underground and overhead utilities. Representative soil samples were collected from the split spoon and hand auger cuttings for visual classification in the field and for analysis by F&R's testing laboratory.

The following alignments were investigated:

Alignment	Station (±)
-L-	26+50 to 44+42.19
-RPC3-	10+00 to 12+25.81

Areas of Special Geotechnical Interest

1) Soft, Loose and/or Wet Soils: The following areas contain relatively soft or loose (SPT N<6 bpf) and/or wet, near-surface soils that have the potential to cause subgrade problems during construction:

Alignment	Station (±)
-L-	27+25 to 27+75 left
-L-	28+25 to 29+67.60
-L-	31+61.60 to 33+50
-L-	35+25 to 39+75
-L-	41+50 to 44+00, right

2) Cohesive Soils: The following areas contain cohesive soils (AASHTO A-5, A-6 & A-7 soils) at existing subgrade in fill areas or at/near proposed subgrade in cut areas that have the potential to cause subgrade problems during construction:

Alignment	Station (±)
-L-	26+25 to 26+75, right
-L-	39+25 to 39+75
-L-	43+50 to 44+00, left

3) Cohesive Soils: The following areas contain deeper deposits of relatively soft cohesive soils (AASHTO A-5, A-6 & A-7 soils) that have the potential to cause embankment instability or long-term settlement problems:

Alignment	Station (±)
-L-	29+25 to 29.67+60
-L-	31+61.60 to 33+50

Physiography and Geology

The proposed grade changes and re-alignment in the area of this project generally follows the existing roads and run in a northwest-to-southeast direction, primarily through residential and commercial properties. The existing ground surface along the proposed road generally slopes upward from an elevation (EL) of ±95 feet near -L- station 24+00 to EL ±123 feet around End Bent 1 of the existing bridge (-L- station 30+00). From there, the ground surface slopes downward to EL ±101 feet near -L- station 31+00, which is near the center

of the existing railroad tracks, and then back up to EL ±125 feet, near End Bent 2 of the existing bridge (-L- station 31+50). From there, the ground surface generally slopes downward to EL ±116 feet at the end of the project near station 44+00.

The project site is geologically located in the Coastal Plain physiographic province of North Carolina. The Coastal Plain Province is a broad, flat plain, with widely spaced low rolling hills, where the near surface soils have their origin from the deposition of sediments several million years ago during the period that the ocean receded from this area to its present location along the Atlantic Coast. According to the Geologic Map of North Carolina (1985), the site is within an area mapped as Cretaceous period deposits and is comprised of sediments that are identified as being located within the Yorktown Formation. The Yorktown Formation is described as blueish gray fossiliferous clay with varying amounts of fine-grained sand.

Soils Properties

The subsurface conditions discussed below and those shown on the attached drawings, represent an estimate of the subsurface conditions based on interpretation of the boring data using normally-accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown. Sometimes the relatively small sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Soils within the area of this project have been divided into two categories: roadway embankment and coastal plain soils.

Roadway Embankment: Roadway embankment (RE) soils were encountered at the surface of all SPT and hand auger borings. The RE was typically associated with existing US 70/West Grantham Street. The RE extended to depths up to 8 feet. The roadway embankment soil was variable and described as moist to wet, very loose to dense silty and clayey SAND (A-2-4 & A-2-6) and medium stiff to stiff sandy CLAY (A-6 & A-7). Most samples contained trace organic matter and gravel.

Coastal Plain Soils: A majority of the soils encountered on this project were coastal plain soils belonging to the Yorktown formation. The coastal plain soils were typically described as moist to saturated, very loose to very dense silty and clayey SAND (A-2-4 & A-2-6) and moist to wet, very soft to hard sandy and silty CLAY (A-6 & A-7). Some of the samples contained trace amounts of organics, mica, and gravel.

Groundwater Properties

Generally, groundwater measurements were attempted in a majority of the borings along the project immediately upon their completion. Eight of the hand auger borings and two of the SPT borings were backfilled immediately upon their completion. Groundwater was not encountered in any borings immediately after completion; however groundwater was not measured in 3 SPT borings due to using mud rotary drilling techniques. Stabilized groundwater was only encountered in one hand auger boring at a depth of 6.6 feet and an elevation of 109.1 feet. It should be noted that the groundwater levels fluctuate depending upon seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary or be different from those described in this report.

We appreciate the opportunity to work with you on this project. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,
FROEHLING & ROBERTSON, INC.

Meredith Arnold, G.I.T.
Staff Geologist

W. Patrick Alton, P.E.
Transportation Services Manager

Appendix A

Bulk Samples

The following bulk sample was obtained and transported to our laboratory for testing to determine the engineering properties of the soil:

Sample No.	Boring No.	Line	Station	Offset	Depth (ft)	Test(s) Performed
CBR-1	L4150R	-L-	41+75	38’ Rt.	0.5-2.0	Standard Proctor, CBR

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FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

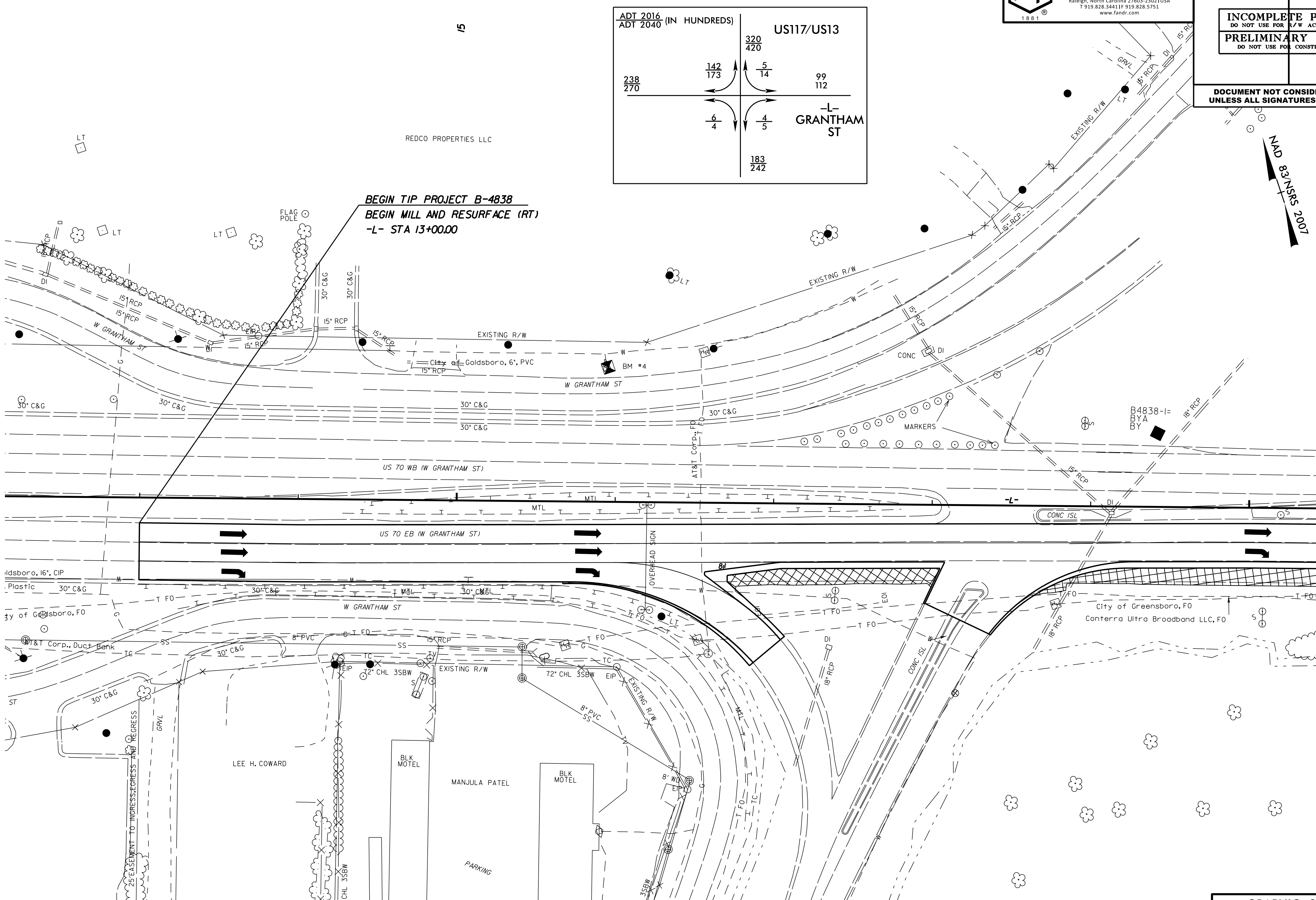
310 Hubert Street
Raleigh, North Carolina 27603-2302 | USA
T 919.828.3441 | F 919.828.5751
www.fandr.com

PROJECT REFERENCE NO.	SHEET NO.
B-4838	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



MATCH LINE -L- STA. 20+50 SEE SHEET 5

PAVEMENT REMOVAL

GRAPHIC SCALE

30 15 0 30 60

PLANS

5/14/99

10-JAN-2020 08:32
Wayne Co Rdwy\B-4838_GEO_RDWY\CADD_GEOTECH\PlanProf\B4838_rdy_psh04.dgn

5/14/99

ADT 2016 / ADT 2040 (IN HUNDREDS)		
	US117/US13	
	320 / 420	
238 / 270	142 / 173 — 5 / 14	99 / 112
	–L– GRANTHAM ST	
	6 / 4 — 4 / 5	
	183 / 242	

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PROJECT REFERENCE NO.	SHEET NO.
B-4838	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

BEGIN CONSTRUCTION
-RPD- STA 10+45.00

BEGIN GRADE
END MILL AND RESURFACE (RT)
-L- STA 25+85.00

-L- POC Sta.25+78.42 =
-RPC2- POT Sta.12+82.38

POT Sta. 10+00.00

-RPD- PT Sta.12+43.91=
-L- POT Sta.27+27.62 (30' LT)

PRIVATE VENTURES LLC

COASTAL PLAIN

ROADWAY EMBANKMENT

EXISTING R/W

B4838-2 BV-2

Conterra Ultra Broadband

L 2750L

CONCRETE MEDIAN

MATCH LINE -L- STA. 20+50 SEE SHEET 4

MATCH LINE -L- STA. 28+00 SEE SHEET 6

BY-6

US 13/70/117 MTL

US 70/US 13 NB

18" CMP

LOW BRUSH

15" CONC HW

CONC HW

18" RCP

US 70 WB (W GRANTHAM ST)

US 70 EB (W GRANTHAM ST)

24" RCP

C.P.

BM #1

54" RCP

CONC

FLUME

US 117 / US 13 SB

CONCRETE DITCH

US 13/70/117

US 70/US 13 WB

-RPC1- PT Sta.13+66.09 =
-L- POC Sta.23+31.27 (21.75' RT)

-RPC1-

-RPC3-

-RPC3- PT Sta.12+25.81 =
-L- POT Sta.27+50.27 (18' RT)

OTHER END NOT FOUND
-RPC2- Sta.12+50.00
BEGIN TAPER TO MATCH EXISTING

RPC_1100R

-RPC2-

-RPC3- PC Sta. 10+00.00 =
-RPC2- POC Sta.11+11.89
END TAPER TO MATCH EXISTING

SOIL

GR

TANK

ISBKD

TOS

CATHERINE P JONES

RUINS

BEGIN CONSTRUCTION
BEGIN MILL AND RESURFACE
-RPC1- PC Sta. 10+00.00=
-RPC2- POC Sta.10+57.24 (12' LT)

PC Sta. 10+00.00

BY1-9

PAVEMENT REMOVAL
PROPOSED SIGNAL
PAVEMENT REMOVAL

GRAPHIC SCALE
30 15 0 30 60
PLANS

10-JAN-2020 08:32
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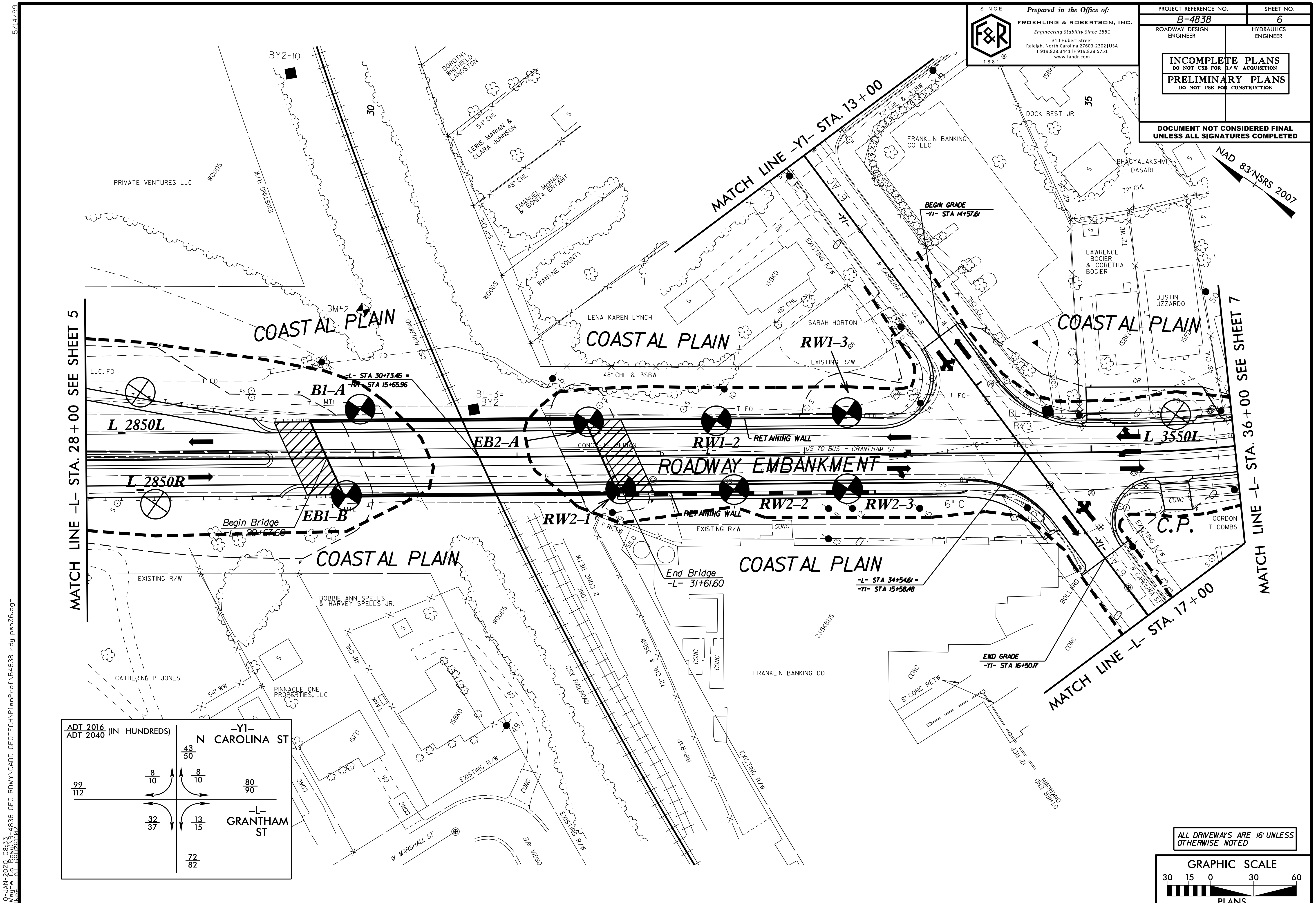

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SINCE 1881
PROJECT REFERENCE NO.
B-4838
SHEET NO.
6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
5/14/99
MATCH LINE -L- STA. 28+00 SEE SHEET 5
MATCH LINE -L- STA. 36+00 SEE SHEET 7
MATCH LINE -Y1- STA. 13+00
MATCH LINE -L- STA. 17+00
COASTAL PLAIN
ROADWAY EMBANKMENT
C.P.
B1-A
EB1-B
EB2-A
RW1-2
RW1-3
RW2-1
RW2-2
RW2-3
L_2850L
L_2850R
L_3550L
-L- STA 30+73.46 = -RR- STA 15+65.96
Begin Bridge -L- 29+67.60
End Bridge -L- 31+61.60
BEGIN GRADE -Y1- STA 14+57.61
END GRADE -Y1- STA 16+50.17
-L- STA 34+54.61 = -Y1- STA 15+58.48
RETAINING WALL
CONCRETE MEDIAN
US 70 BUS - GRANTHAM ST
N CAROLINA ST
CSX RAILROAD
W MARSHALL ST
GEORGIA AVE
BM#2
BY2-10
BL-3= BY2
BL-4= BY3
PRIVATE VENTURES LLC
DOROTHY WHITFIELD LANGSTON
LEWIS MARIAN & CLARA JOHNSON
EMANUEL McNAIR & BONITA BRYANT
WAYNE COUNTY
LENA KAREN LYNCH
SARAH HORTON
FRANKLIN BANKING CO LLC
DOCK BEST JR
BHAGYALAKSHMI DASARI
LAWRENCE BOGIER & CORETHA BOGIER
DUSTIN UZZARDO
GORDON T COMBS
BOBBIE ANN SPELLS & HARVEY SPELLS JR.
CATHERINE P JONES
PINNACLE ONE PROPERTIES, LLC
FRANKLIN BANKING CO
EXISTING R/W
WOODS
48" CHL & 3SBW
72" CHL & 3SBW
6" CI
1' RETW
8' CONC RETW
2' CONC RETW
RIP-RAP
12" RCP
OTHER END UNKNOWN
BOLLARD
2SBKBUS
ADT 2016 / ADT 2040 (IN HUNDREDS)
-Y1- N CAROLINA ST
-L- GRANTHAM ST
43/50
8/10
8/10
80/90
99/112
32/37
13/15
72/82
ALL DRIVEWAYS ARE 16' UNLESS OTHERWISE NOTED
GRAPHIC SCALE
30 15 0 30 60
PLANS
10-JAN-2020 08:13
B4838_rdy_psh06.dgn

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PROJECT REFERENCE NO.	SHEET NO.
B-4838	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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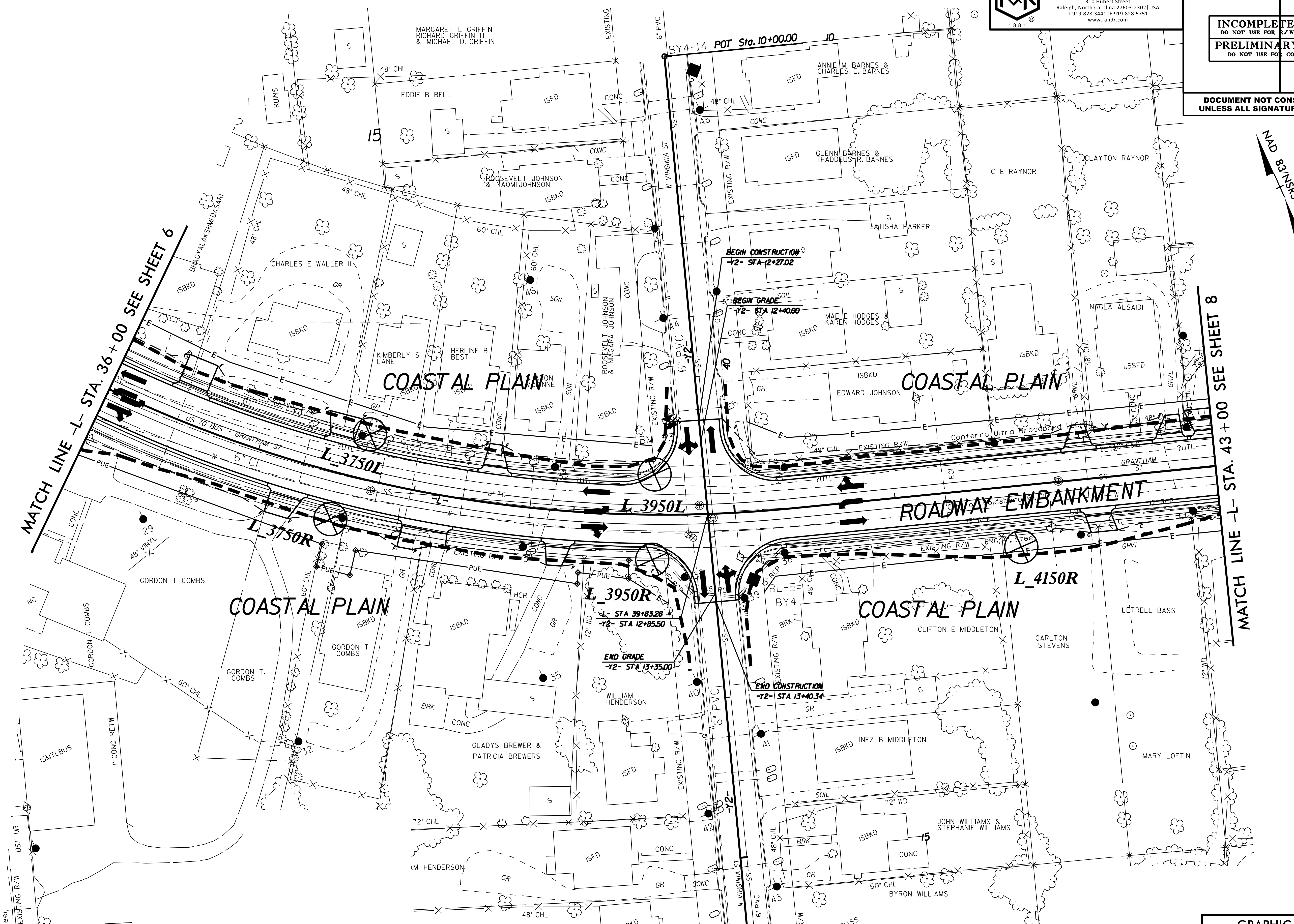

GRAPHIC SCALE

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PLANS

5/14/99

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5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
B-4838	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

MATCH LINE -L- STA. 43+00 SEE SHEET 7

POT Sta. 49+18.42

END TIP PROJECT B-4838
-L- STA 44+42.19

COASTAL PLAIN

ROADWAY EMBANKMENT

L_4350L

BM #6

BRENDA JOHNSTONE

ISFG

ISFD ABAND

48" CONC

FLAG POLE

48" CHL

S

ROGER ANDERSON

EOI

EXISTING R/W

48" CHL

CONC PNG. 4" Steel

ISBKBUS ABAND

48" CHL

NAGLA AL SAIDI

U/G GAS TANKS

MTL CANOPY 2 GAS PUMPS

ISBK BUS

MTL CANOPY 1 GAS PUMPS

CONC

15" RCP

8" CLAY

City of Goldsboro, 6" CIP

N GEORGE ST

-Y3-

TULL

8" RCP

60" CONC

48" CHL 3SBW

DI BUILDING DRAIN

GENERAL ELECTRIC COMPANY

DELMUS BRIDGERS FAMILY LP

Conterra Ultra Broadband LLC, FO

72" CHL 3SBW

ISBK WAREHOUSE

ISBK WAREHOUSE

EXISTING R/W

50" CONC

CONC PNG. 4" Steel

30" C&G

CB

15" RCP

8" CLAY

City of Goldsboro, 6" CIP

SS

GRANTHAM ST

City of Goldsboro, 2" Galvanized Steel

30" C&G

CONC

EXISTING R/W

ISFD

ISFD

48" WW

60" CHL 3SBW

ROBERT MCGOWAN

ISBLK BUS

ISBK BUS

JAMES WESTBROOK

JACK EDWARDS

GENERAL ELECTRIC COMPANY

ISBKD

ISBLK BUS

LETRELL BASS

GRVL

SPENCER SMITH

ISFD

60" CHL

HENRY BATTLE

ISFD

BK

72" WD

GRVL/ SOIL

EXISTING R/W

City of Goldsboro, 6" CIP

JACK EDWARDS

BARN

6" CONC CURB

★ PROPOSED SIGNAL

ALL DRIVEWAYS ARE 16' UNLESS OTHERWISE NOTED

GRAPHIC SCALE
30 15 0 30 60
PLANS

10-JAN-2020 08:13
B:\projects\B-4838_GEO_RDWY\CADD_GEOTECH\PlanProf\B4838_rdg_psh08.dgn
Roger Davis

PROJ. REFERENCE NO.	SHEET NO.
B-4838	9

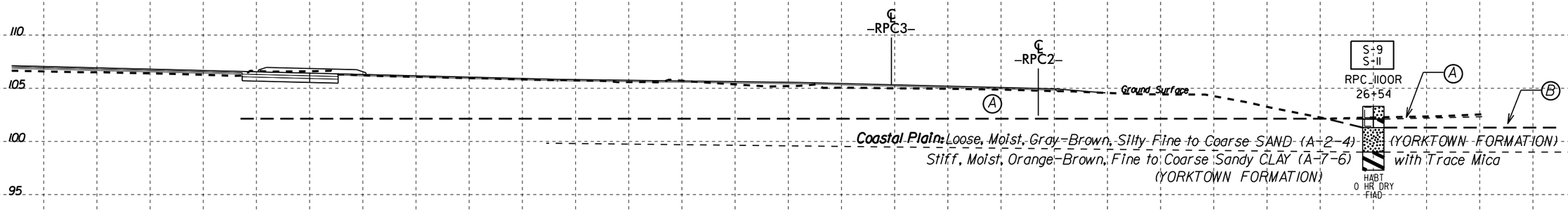
0 2.5 5

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
S-9	100' RT	26+54	1.2-2.0	A-6 (8)	33	15	17.5	18.4	23.9	40.2	99.5	89.2	67.5	13.9	-
S-11	100' RT	26+54	4.3-6.0	A-7-6 (4)	44	26	25.0	37.7	1.1	36.2	99.2	84.2	37.7	21.6	-

Ⓐ **Roadway Embankment:** Loose, Moist, Gray-Brown, Silty Fine SAND (A-2-4) with Trace Organics, Gravel, Clay, and Coarse Sand

Ⓑ **Roadway Embankment:** Stiff, Moist, Gray-Light Brown, Silty Fine to Coarse Sandy CLAY (A-6) with Trace Organics



GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

26+50.00
–L–

20 10 0 10 20 30 40 50 60 70 80 90 100 110

6/23/16

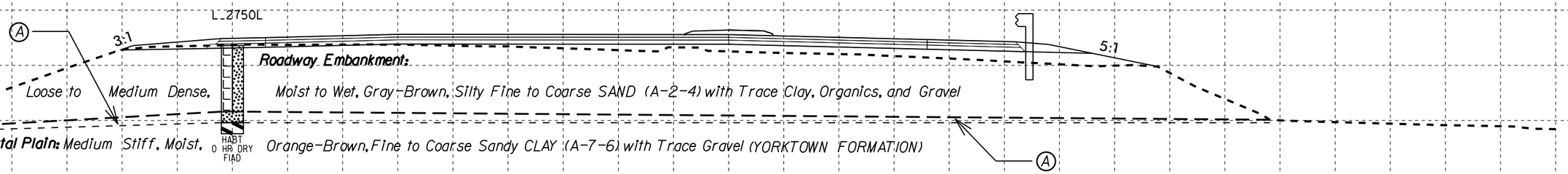
10-JAN-2020 15:42
I:\Projects\B-4838 Wayne Co Rdwy\B-4838_GEO_RDWY\CADD_GEOTECH\xsc\B-4838_geo_xsi_L.dgn
MArnold 6608861250
(NCDOT-B-4838 Wayne Co Rdwy\B-4838_GEO_RDWY\CADD_GEOTECH\xsc\B-4838_geo_xsi_L.dgn)

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4838	10

70 60 50 40 30 20 10 0 10 20 30 40

130 125 120 115 110 105 100 95 90

Ⓐ **Coastal Plain:** *Loose to Medium Dense, Moist, Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Gravel (YORKTOWN FORMATION)*



GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

27+50.00

-L-

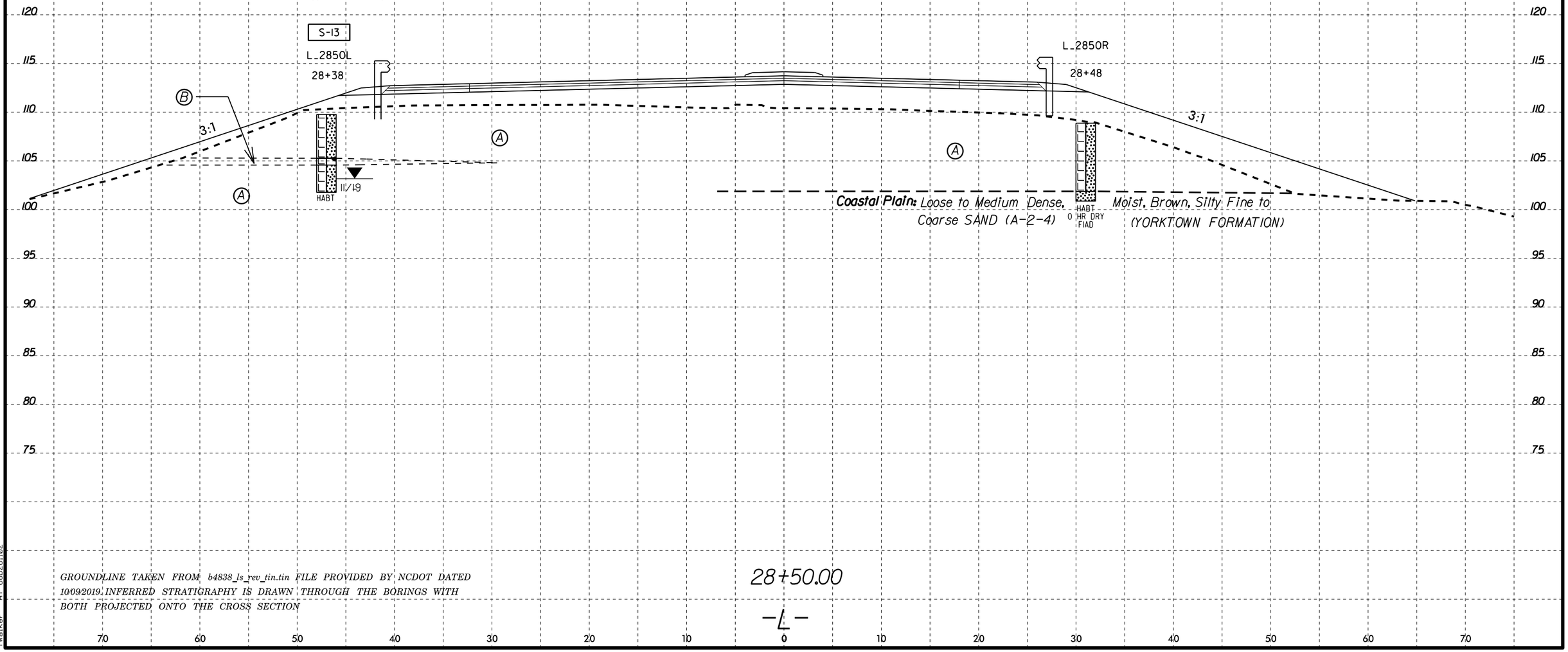
70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

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-13	47' LT	28+38	4.5-5.2	A-6 (1)	29	16	47.1	18.6	6.0	28.3	98.8	69.9	35.8	12.8	-

Ⓐ **Roadway Embankment:** *Loose, Moist to Wet, Brown-Gray-Tan, Silty Fine to Coarse SAND (A-2-4) with Trace Clay, Organics, and Gravel*

Ⓑ **Roadway Embankment:** *Medium Stiff, Moist, Gray-Tan, Fine to Coarse Sandy CLAY (A-6) with Trace Silt*



GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

28+50.00

-L-

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-30	26' RT	29+81	13.5-15.0	A-7-6 (7)	57	36	47.9	15.7	0.2	36.2	99.9	74.5	37.3	16.2	-

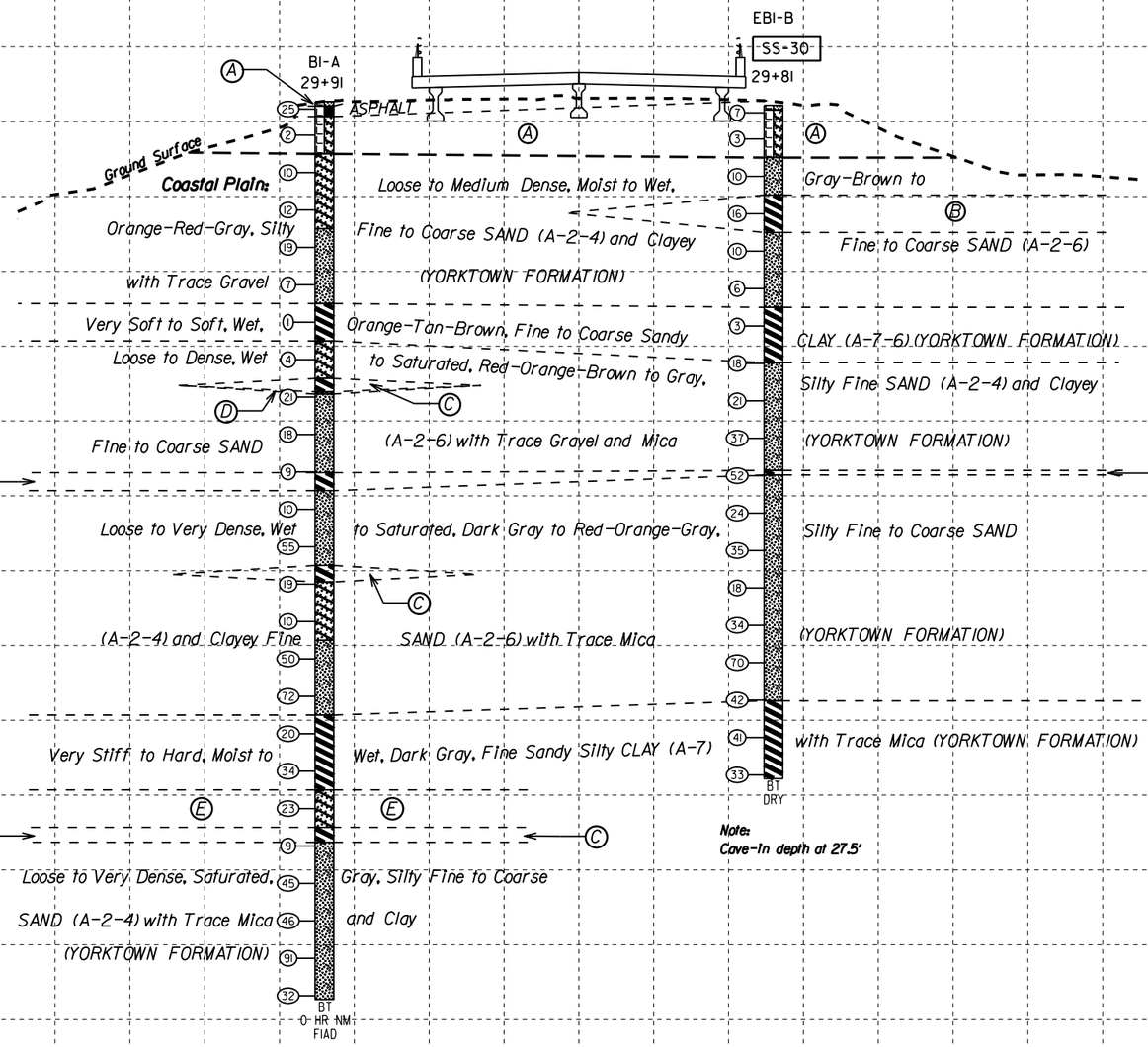
Ⓐ **Roadway Embankment:** Very Loose to Medium Dense, Moist to Wet, Gray-Brown-Black, Silty Fine to Coarse SAND (A-2-4) and Clayey Fine to Coarse SAND (A-2-6) with Trace Gravel and Organics

Ⓑ **Coastal Plain:** Very Stiff, Wet, Orange-Gray, Fine to Coarse Sandy CLAY (A-7-6) (YORKTOWN FORMATION)

Ⓒ **Coastal Plain:** Stiff to Hard, Wet, Dark Gray-Black, Silty Fine Sandy CLAY (A-7-6) with Trace Mica (YORKTOWN FORMATION)

Ⓓ **Coastal Plain:** Wood

Ⓔ **Coastal Plain:** Medium Dense, Saturated, Gray, Clayey Fine SAND (A-2-6) (YORKTOWN FORMATION)



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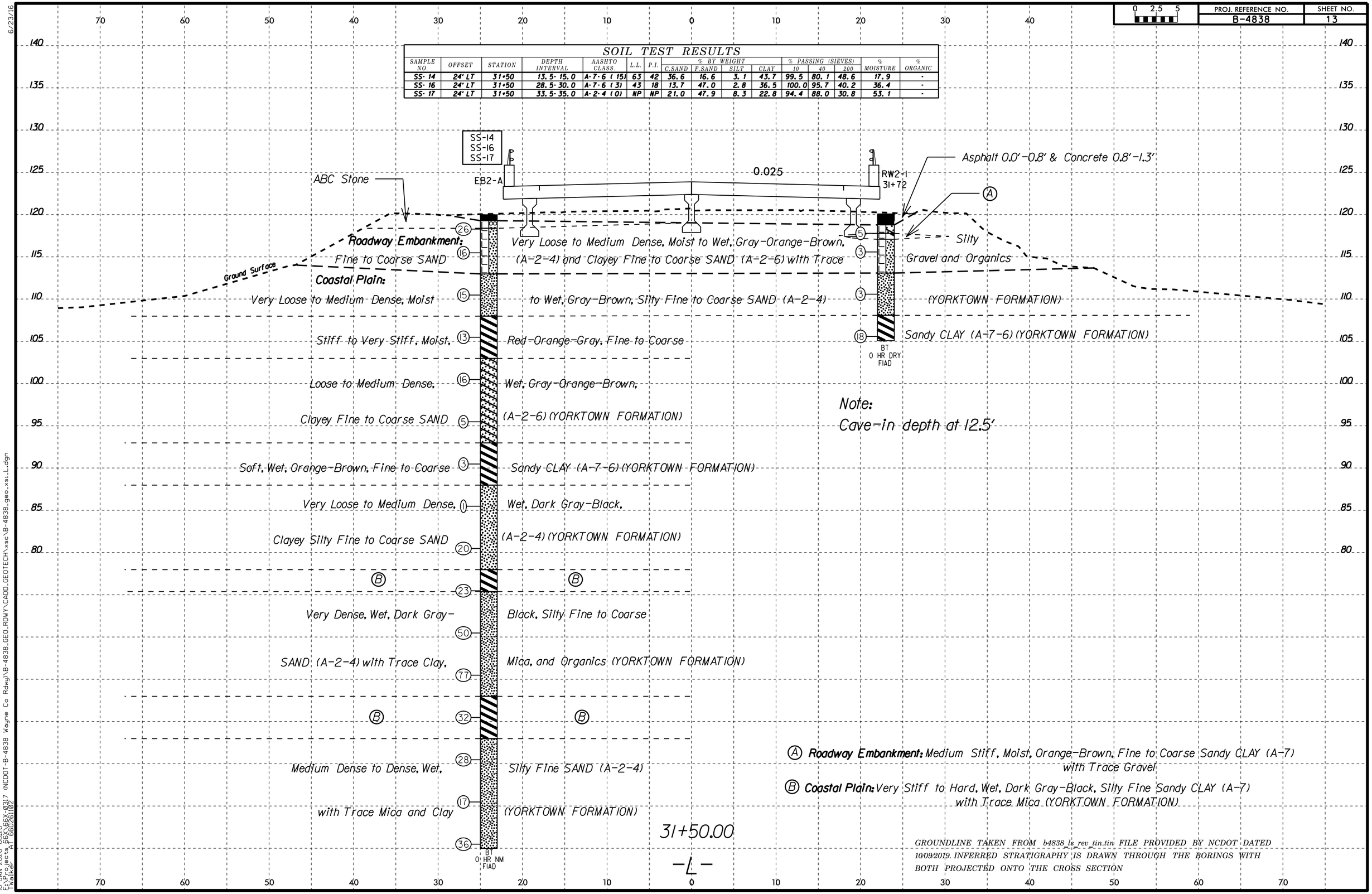
GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10092019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4838	13

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-14	24' LT	31+50	13.5-15.0	A-7-6 (15)	63	42	36.6	16.6	3.1	43.7	99.5	80.1	48.6	17.9	-
SS-16	24' LT	31+50	28.5-30.0	A-7-6 (3)	43	18	13.7	47.0	2.8	36.5	100.0	95.7	40.2	36.4	-
SS-17	24' LT	31+50	33.5-35.0	A-2-4 (0)	NP	NP	21.0	47.9	8.3	22.8	94.4	88.0	30.8	53.1	-



Note:
Cave-in depth at 12.5'

Ⓐ ***Roadway Embankment:*** *Medium Stiff, Moist, Orange-Brown, Fine to Coarse Sandy CLAY (A-7) with Trace Gravel*

Ⓑ ***Coastal Plain:*** *Very Stiff to Hard, Wet, Dark Gray-Black, Silty Fine Sandy CLAY (A-7) with Trace Mica (YORKTOWN FORMATION)*

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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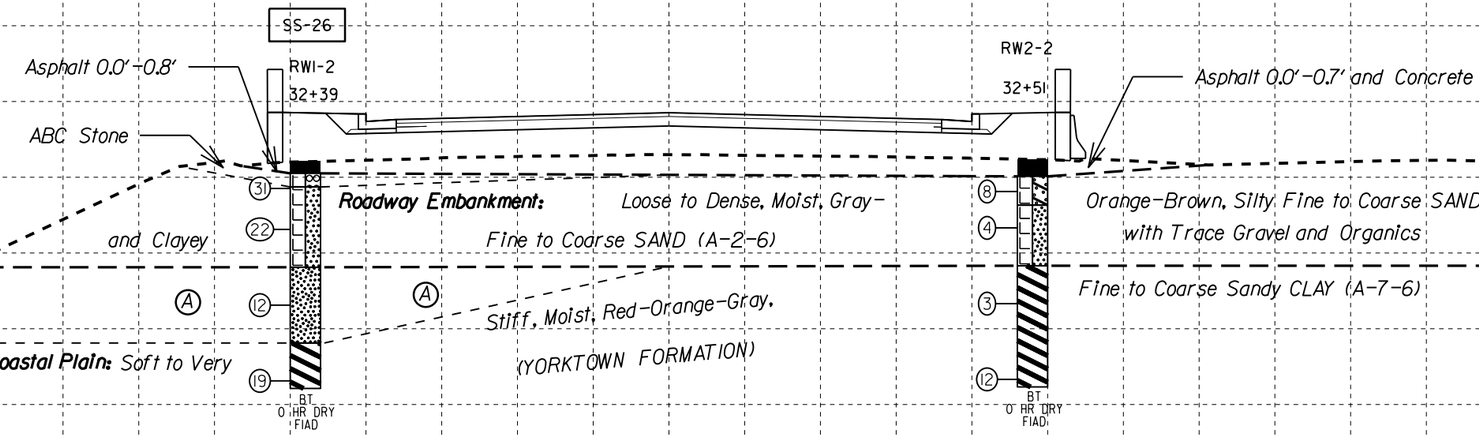
Walker
AT 6602611102

6/23/16

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-26	24' LT	32+39	13.5-15.0	A-7-6 (22)	71	43	28.4	15.8	4.0	51.8	99.6	82.2	58.1	22.9	-

Ⓐ **Coastal Plain:** Medium Dense, Moist, Light Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Organics (YORKTOWN FORMATION)



32+50.00

-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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Walker A1 66026102

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-60	29' LT	33+30	13.5-15.0	A-7-6 (14)	50	29	26.3	18.4	9.4	45.9	99.6	84.3	59.0	16.9	-
SS-9	24' RT	33+30	8.5-10.0	A-7-6 (11)	52	30	37.3	15.5	5.4	41.8	99.5	78.6	49.6	15.1	-

Ⓐ **Coastal Plain:** Loose to Medium Dense, Moist, Orange-Brown to Red-Brown-Gray, Clayey Silty Fine to Coarse SAND (A-2-4)(YORKTOWN FORMATION)

SS-60
RW1-3
33+30
3:1
Ground Surface
Asphalt 0.0'-1.1'
SS-9
RW2-3
33+30
4.42:1
ABC Stone
Roadway Embankment: Loose to Medium Dense, Moist to Wet, SAND (A-2-4) with Trace Organics
Gray-Orange-Brown, Silty Fine to Coarse
Soft to Very Stiff, Moist, Orange-Brown to Red-Orange-Gray,
Fine to Coarse Sandy CLAY (A-7-6) (YORKTOWN FORMATION)
Coastal Plain:
4, 14, 22
8, 8
18
13, 7
3
15
BT
0 HR DRY
FIAD

130 125 120 115 110 105 100 95 90

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

33+50.00
-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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Walker
kit 66026102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4838	16

70 60 50 40 30 20 10 0 10 20 30 40

140 135 130 125 120 115 110 105

Ⓐ **Roadway Embankment:** *Loose to Medium Dense, Moist, Gray-Brown, Silty Fine SAND (A-2-4) with Trace Gravel and Organics*

L_3550L
35+60

4:1 4:1

Ⓐ

Ground Surface

Coastal Plain: *Loose, Wet, Light Gray-Light Brown, Silty Fine SAND (A-2-4) with Trace Coarse Sand (YORKTOWN FORMATION)*

Medium Stiff, Moist, Red-Orange-Brown, Fine to Coarse Sandy CLAY (A-7-6) (YORKTOWN FORMATION)

HABT
0 HR DRY
FIAD

35+50.00
-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

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Walker AT 6602611102

70 60 50 40 30 20 10 0 10 20 30 40

140 135 130 125 120 115 110 105 100 95 90

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
S-14	28' LT	37+65	4.5-6.0	A-7-6 (11)	53	34	42.6	11.9	4.1	41.4	99.7	73.5	46.5	26.5	-

Ⓐ **Roadway Embankment:** Loose, Moist, Gray-Tan-Brown, Silty Fine SAND (A-2-4) with Trace Organics and Gravel

S-14
L-3750L
37+65
HABT DRY

L-3750R
37+54
HABT, 0 HR DRY FIAD

Ground Surface

4:1

4:1

Coastal Plain:

Soft to Medium Stiff, Moist,

Loose, Moist to Wet, Light Brown-Tan, Silty Fine to Coarse SAND (A-2-4)

Orange-Brown to Red-Brown-Gray, Silty Fine to

(YORKTOWN FORMATION)

with Trace Clay (YORKTOWN FORMATION)

Coarse Sandy CLAY (A-6) and (A-7-6)

37+50.00

-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10092019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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Walker, A T 6602611102

PROJ. REFERENCE NO.	SHEET NO.
B-4838	18

0 2.5 5

70 60 50 40 30 20 10 0 10 20 30 40

140 135 130 125 120 115 110 105 100

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
S-7	25' LT	39+50	5.0-6.0	A-7-6 (10)	60	39	38.9	19.7	3.3	38.1	99.2	74.4	42.4	18.7	-
S-15	28' RT	39+49	3.5-5.2	A-7-6 (6)	50	23	41.7	15.0	3.1	40.2	99.5	74.0	44.3	18.0	-

Ⓐ ***Roadway Embankment:*** *Loose, Moist, Gray-Brown-Black, Silty Fine SAND (A-2-4) with Trace Organics*

Ⓑ ***Coastal Plain:*** *Loose, Moist, Brown-Tan, Silty Fine to Coarse SAND (A-2-4) (YORKTOWN FORMATION)*

S-7
L_3950L

S-15
L_3950R
39+49

Ground Surface

4:1

4:1

Ⓐ

Coastal Plain: *Soft to Stiff, Moist, Orange-Brown to Red-Brown-Gray, Silty Fine to Coarse Sandy CLAY (A-6) and (A-7-6) (YORKTOWN FORMATION)*

Ⓑ

HABT
0 HR DRY
FIAD

HABT
DRY

39+50.00

-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4838	19

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
CBR-1	38' RT	41+75	0.5-2.0	A-2-4 (0)	NP	NP	58.4	20.3	6.1	15.2	99.5	64.4	23.7	10.8	-

Ⓐ **Roadway Embankment:** Loose, Moist, Black-Gray, Silty Fine SAND (A-2-4) with Trace Organics

CBR-1
L_4150R
41+75

Ground Surface

4:1

4:1

Coastal Plain: Very Loose to Loose, Wet, Light Brown-Brown, Silty Fine to Coarse SAND (A-2-4)
(YORKTOWN FORMATION)

HABT
0 HR DRY
FIAD

41+50.00
-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

130 125 120 115 110 105 100 95 90 85

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

PROJ. REFERENCE NO.	SHEET NO.
B-4838	20

0 2.5 5

70 60 50 40 30 20 10 0 10 20 30 40

135 130 125 120 115 110 105 100 95

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	27' LT	43+79	1.3-3.0	A-6 (4)	31	19	38.3	19.4	10.1	32.2	98.8	76.5	44.2	11.5	-

Ⓐ **Roadway Embankment:** *Loose, Moist, Gray-Brown, Silty Fine SAND (A-2-4) with Trace Organics, Gravel, and Coarse Sand*

S-2

L 4350L

43+79

Ⓐ

4:1

100:1

Ground Surface

Coastal Plain: *Soft to Stiff, Moist, Brown to Red-Brown-Gray, Silty Fine to Coarse Sandy CLAY (A-6) and (A-7-6) with Trace Organics (YORKTOWN FORMATION)*

HABT
0 HR DRY
FIAD

44+00.00

-L-

GROUNDLINE TAKEN FROM b4838_ls_rev_tin.tin FILE PROVIDED BY NCDOT DATED 10/09/2019. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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Walker
AT 6602611102