

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5833	1	12

CONTENTS

LINE	STATION	PLAN	X-SECT
-L-	10+50 - 41+00	4 - 6	7
RAMP A	10+00 - 15+80.42		8
RAMP D	10+00 - 22+38.90		9 - 11

SOIL TEST RESULTS - SHEET 12

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY YADKIN
PROJECT DESCRIPTION BRIDGE NO. 29 ON US 21
BUSINESS OVER I-77

INVENTORY

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:

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

PERSONNEL

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

INVESTIGATED BY J.E. BEVERLY

DRAWN BY J.E. BEVERLY

CHECKED BY C.R. LAVENDER III

SUBMITTED BY K.B. MILLER

DATE AUGUST 2020

DocuSigned by:

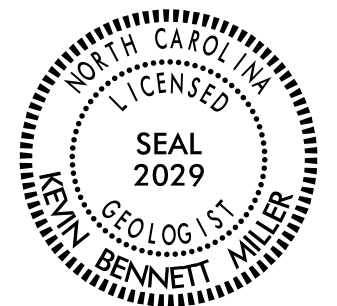

SIGNATURE

8/11/2020
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REFERENCE: B-5833

PROJECT: 45786



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

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																		
<p>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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>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.</p>										<p>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:</p>										<p>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 DISLOGGED 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 (SROD) - 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.</p>																																																																																																																																																																		
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CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>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.</p> <p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>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.</p>									
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<p style="text-align: center;">FRACTURE SPACING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>SPACING</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table>										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	<p style="text-align: center;">BEDDING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </tbody> </table>										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																																																																																																																																																			
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<p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE: RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED: GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED: GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED: SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p style="text-align: center;">NOTES:</p> <p>BENCH MARK: ELEVATIONS TAKEN FROM TIN FILE "B5833 LS TIN.TIN" DATED 10-17-19</p> <p style="text-align: right;">ELEVATION: FEET</p>																																																																																																																																																																																						
<p style="text-align: center;">COLOR</p> <p>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.</p>																																																																																																																																																																																																

09/08/99

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols
See Sheet RW01 thru RW04 For Survey Control & Right-of-Way Sheets

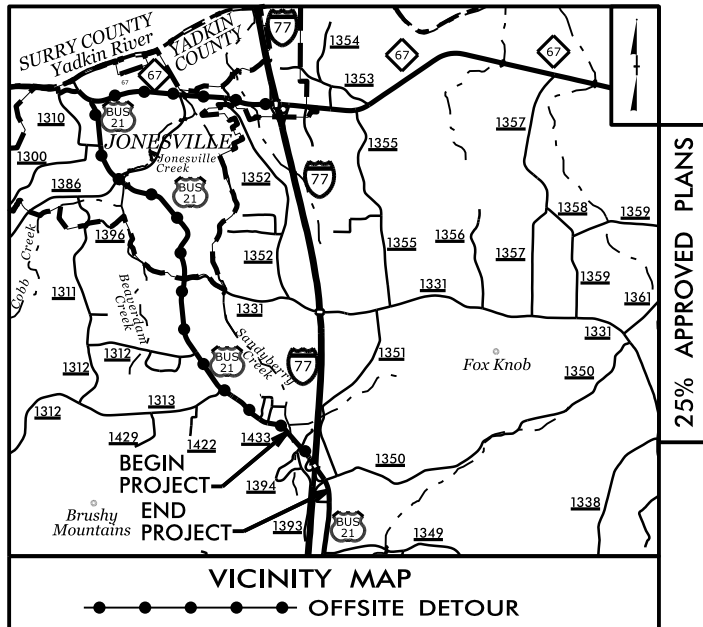
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

YADKIN COUNTY

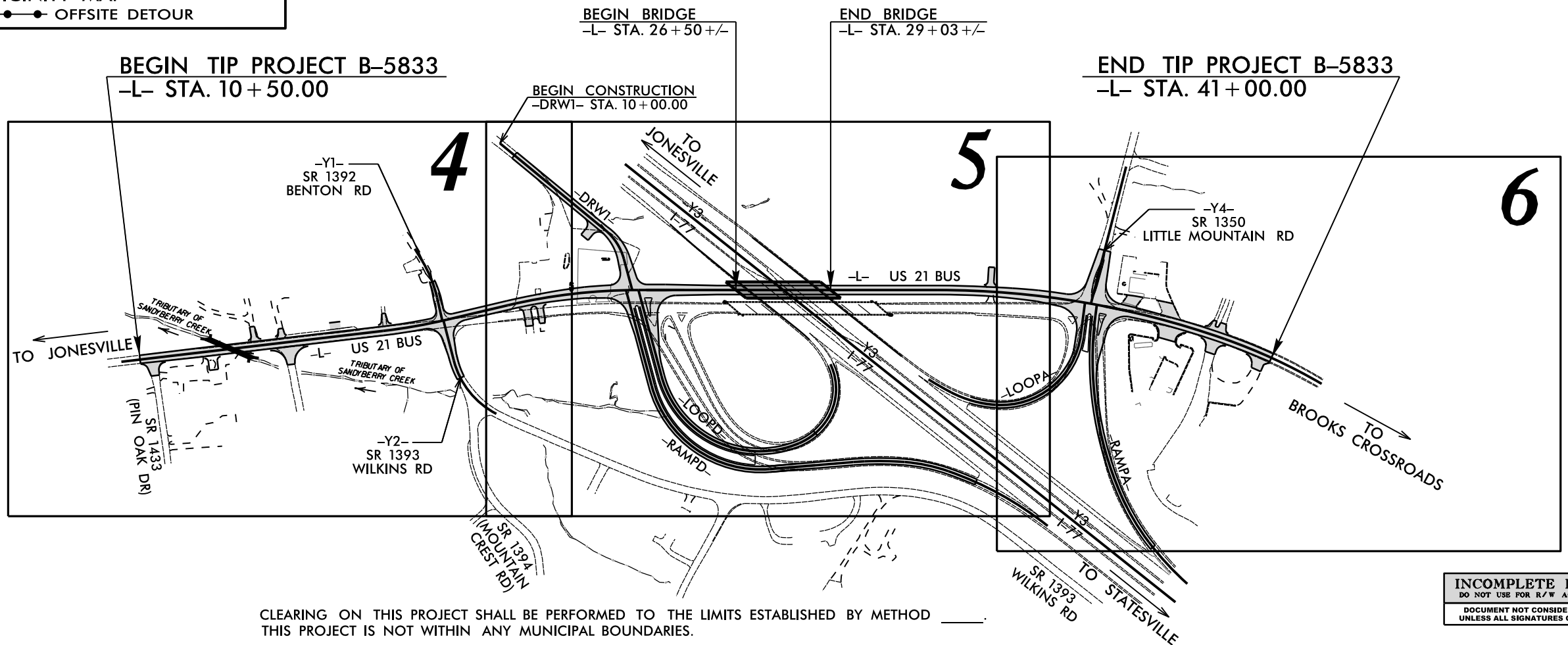
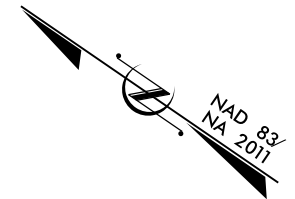
LOCATION: REPLACE BRIDGE NO. 29 OVER I-77 ON US 21 BUS
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALLS,
AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5833	3	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45786.1.1	NHP-0021(023)	PE	

TIP PROJECT: B-5833



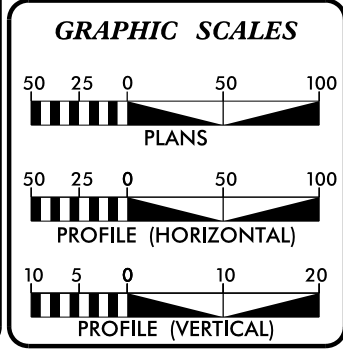
25% APPROVED PLANS



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

CONTRACT:



DESIGN DATA

ADT 2021 =	4100
ADT 2041 =	4550
K =	11 %
D =	65 %
T =	5 % *
V =	50 MPH
* (TTST 1% + DUAL 4%)	
FUNC CLASS = MAJOR COLLECTOR	
STATEWIDE TIER DESIGN	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5833	=	0.530 mile
LENGTH STRUCTURES TIP PROJECT B-5833	=	0.048 mile
TOTAL LENGTH TIP PROJECT B-5833	=	0.578 mile

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

By:
TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603

PH (919) 773-8887
CORP. LICENSE NO.: C-0275

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 16, 2020

LETTING DATE:
OCTOBER 19, 2021

V. MARCUS LOWERY, P.E.
PROJECT ENGINEER

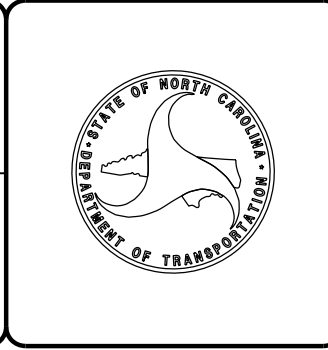
DAVID STUTTS, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

SHEET 3A

July 28, 2020

WBS NO: 45786.1.2
TIP NO: B-5833
COUNTY: Yadkin

DESCRIPTION: Bridge No. 29 on US 21 Business over I-77

SUBJECT: Geotechnical Inventory Report

Project Description

This report presents findings for the proposed roadway revisions associated with the relocation of Bridge No. 29. The newly proposed structure will be on new location to the North of the existing bridge over I-77. Shifting the new bridge to the North requires a portion of the roadway to be on new location. In addition to the newly proposed bridge there will be widening and drainage improvements, two retaining walls, a culvert, and ramp and loop improvements at the I-77 interchange. The roadway project trends west to east along US Business 21 and lies in the northwest quadrant of Yadkin County. Beginning and ending station limits along -L- are between 10+50 – 41+00. Total length of project is 0.58 miles.

The geotechnical field investigation was conducted during the month of June 2020. An ATV mounted CME 550X drill machine equipped with automatic drop hammer was utilized to perform 6 test borings along the proposed corridor. An abundance of utilities hampered drilling in many locations. The following survey lines are addressed in this report.

<u>Line</u>	<u>Station</u>
-L-	10+50 – 41+00
Ramp A	10+00 – 15+80.4
Ramp D	10+00 – 22+38.9

Physiography and Geography

The project area lies in northwestern Yadkin County along the US Business 21 highway corridor, between the cities of Jonesville and Brooks Crossroads. Topography is flat to rolling and traverses along open fields, residential structures, and businesses adjacent to I-77. Elevation ranges from approximately 1,065 to 1,130 feet.

Geologically, the project area falls within the Inner Piedmont Belt and is underlain by Cambrian to Ordovician age rock types (C-Cg) comprised of metamorphosed granite.

Soil Properties

1. Residual Soils:

These soils are derived from in place weathering of parent materials. They occur in a variety of consistencies, classifications, and stratigraphic sequences. Residual soils are further subdivided into clays, silts, and sands. In most instances residual soils in this area are micaceous with mica amounts ranging from trace to highly.

Predominant residual soils encountered were clayey sandy silt (A-4), clayey silty sand (A-2-4), and silty sandy clay (A-7-5, A-6). Generally residual soils seem to contain high percentages of sand with fair to good consistency and denseness. Plasticity index for clay soils range from 12 to 26.

2. Alluvial Soils:

Alluvial soils originate from water transportation and deposition in a floodplain environment. The potential for alluvial soils along the project is confined to the tributary of Sandyberry Creek which crosses US Business 21, and Wilkins Rd. (-Y2-). The creek terminates into a drainage feature at Ramp D and Loop D. No alluvial samples were taken; however, soil type is anticipated to be loose clayey silty or silty clayey sand.

3. Roadway Embankment:

Roadway embankment fill soils are present beneath existing US Business 21 and its connectors. Roadway embankment soils will be close in composition to the local residual soil it was sourced from.

Rock Properties

Crystalline rock and weathered crystalline rock were not encountered during the course of this investigation.

Areas of Special Geotechnical Interest

1. Groundwater:

There were two instances in which groundwater was encountered during this investigation. Static groundwater was encountered along Ramp D at 2.4 and 6.5 feet. The area between Ramp D stations 12+00 and 14+00 where groundwater was noted corresponds to a drainage basin for the project interchange. Groundwater in this location will be well below proposed grade.

2. Alluvial Soils:

The proposed culvert around -L- station 12+90 will encounter some alluvial soils associated with Sandberry Creek. This small area of alluvial soils should have little impact on road improvements in this location. A separate culvert report will further address this area.

The drainage basin between Ramp D stations 11+00 and 16+00, and Loop D stations 12+00 to 14+00 have the potential for some loose wet silty sandy soils. Drainage improvements installed in the fill beneath the roadway should mitigate any major impact. Maximum fill height at Loop D is approximately 15 feet. Max fill height at Ramp D is approximately 40 feet.

Bridge and Retaining Walls

There is a proposed bridge replacement between -L- stations 26+50.45 and 29+02.51. The new bridge will be relocated to the north of the existing structure. Preliminary data for the new bridge design has yet to be released. The structure will be accompanied by two proposed retaining walls at each end of the bridge. The bridge and walls will be addressed under a separate report once the PGD becomes available.

Respectfully Submitted,

DocuSigned by:

J. Eddie Beverly

8BF22D4890734D0...
Eddie Beverly

Project Geologic Engineer

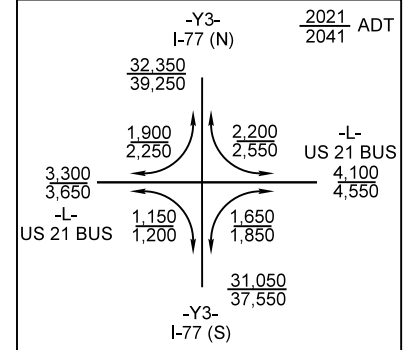
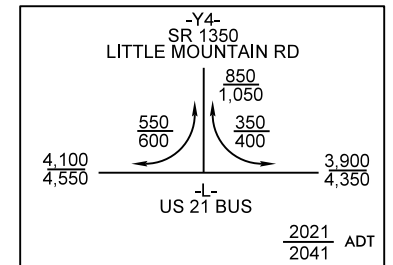


- ① = -L- POC Sta. 35+81.31 = -LOOPA- POT Sta. 10+00.00
- ② = -L- POC Sta. 35+97.31 = -Y4- POT Sta. 13+76.70
- ③ = -L- POC Sta. 36+13.35 = -RAMPA- POT Sta. 10+00.00
- ④ = -RAMPA- PC Sta. 10+29.17

-L-	
PI Sta 35+80.40	PI Sta 41+08.44
$\Delta = 19' 22' 00.5''$ (RT)	$\Delta = 10' 53' 48''$ (RT)
D = 2' 29' 28.0"	D = 3' 49' 11.0"
L = 777.43'	L = 285.27'
T = 392.46'	T = 143.07'
R = 2,300.00'	R = 1,500.00'
SE = 0.04	SE = EXIST.
Lr = 100'	

-RAMPA-		
PI Sta 12+79.27	PI Sta 15+90.37	PI Sta 17+39.05
$\Delta = 31' 03' 34.4''$ (LT)	$\Delta = 13' 37' 04.8''$ (LT)	$\Delta = 10' 51' 43.9''$ (LT)
D = 6' 21' 58.3"	D = 9' 19' 53.6"	D = 7' 09' 43.9"
L = 487.88'	L = 145.93'	L = 151.66'
T = 250.10'	T = 73.31'	T = 76.06'
R = 900.00'	R = 614.00'	R = 800.00'
SE = 0.06	(MATCH EXIST)	(MATCH EXIST)
(MATCH EXIST)		

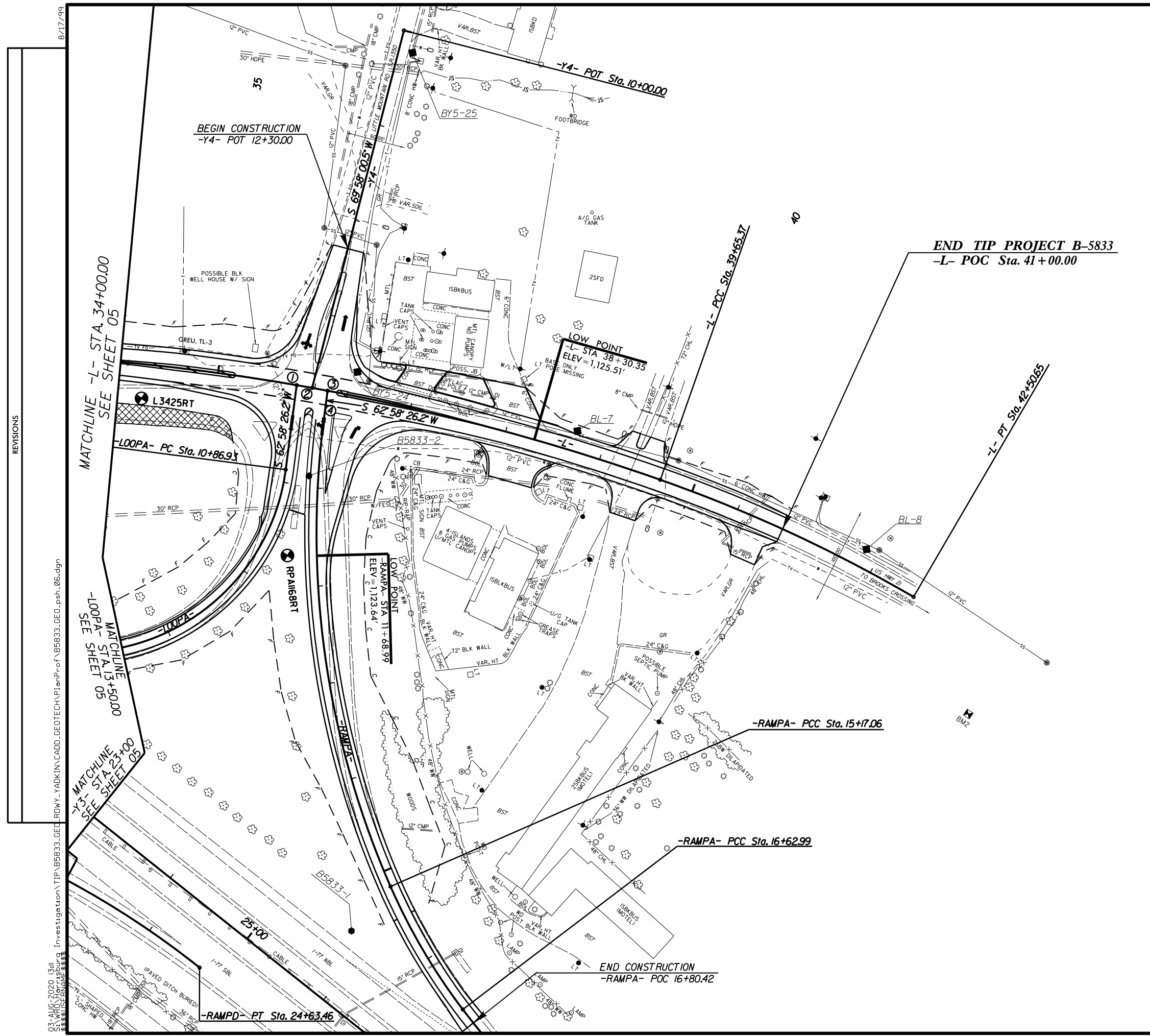
-LOOPA-	
PI Sta 12+88.19	
$\Delta = 86' 29' 04.5''$ (RT)	
D = 26' 46' 25.4"	
L = 323.02'	
T = 201.26'	
R = 214.00'	
SE = 0.08	
(MATCH EXIST)	



SEE SHEET 2B-1 FOR INTERSECTION DETAILS

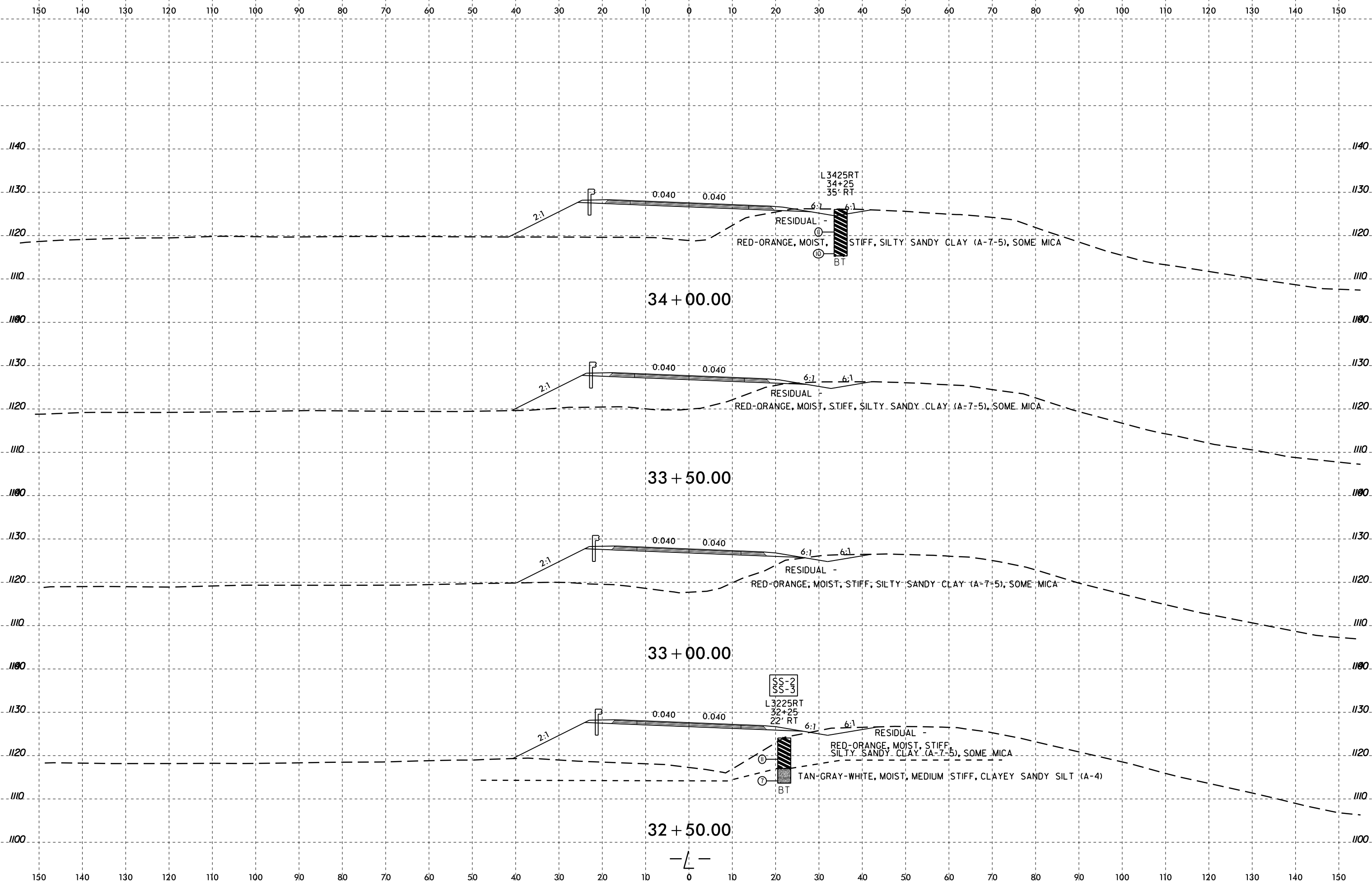
SEE SHEETS 07 & 08 FOR -L- PROFILE
 SEE SHEET 10 FOR -Y3- PROFILE
 SEE SHEET 10 FOR -Y4- PROFILE
 SEE SHEET 11 FOR -LOOPA- PROFILE
 SEE SHEET 11 FOR -RAMPA- PROFILE

DRIVE RADII ARE 10' UNLESS OTHERWISE NOTED
 CHANNELIZATION RADII ARE 3' UNLESS OTHERWISE NOTED
 RADII DIMENSIONS ARE TO FACE OF CURB (F/C) UNLESS OTHERWISE NOTED

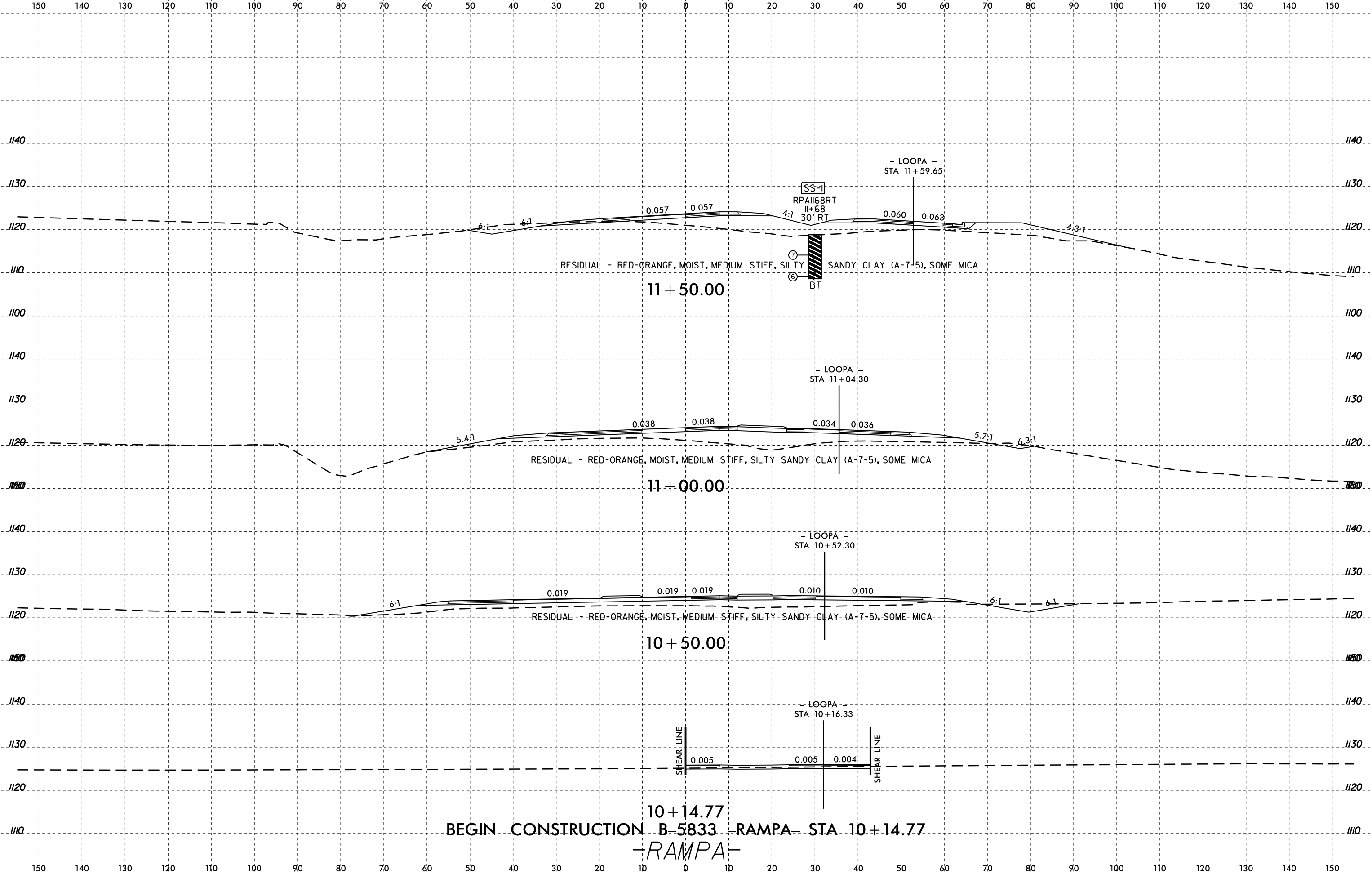


REVISIONS

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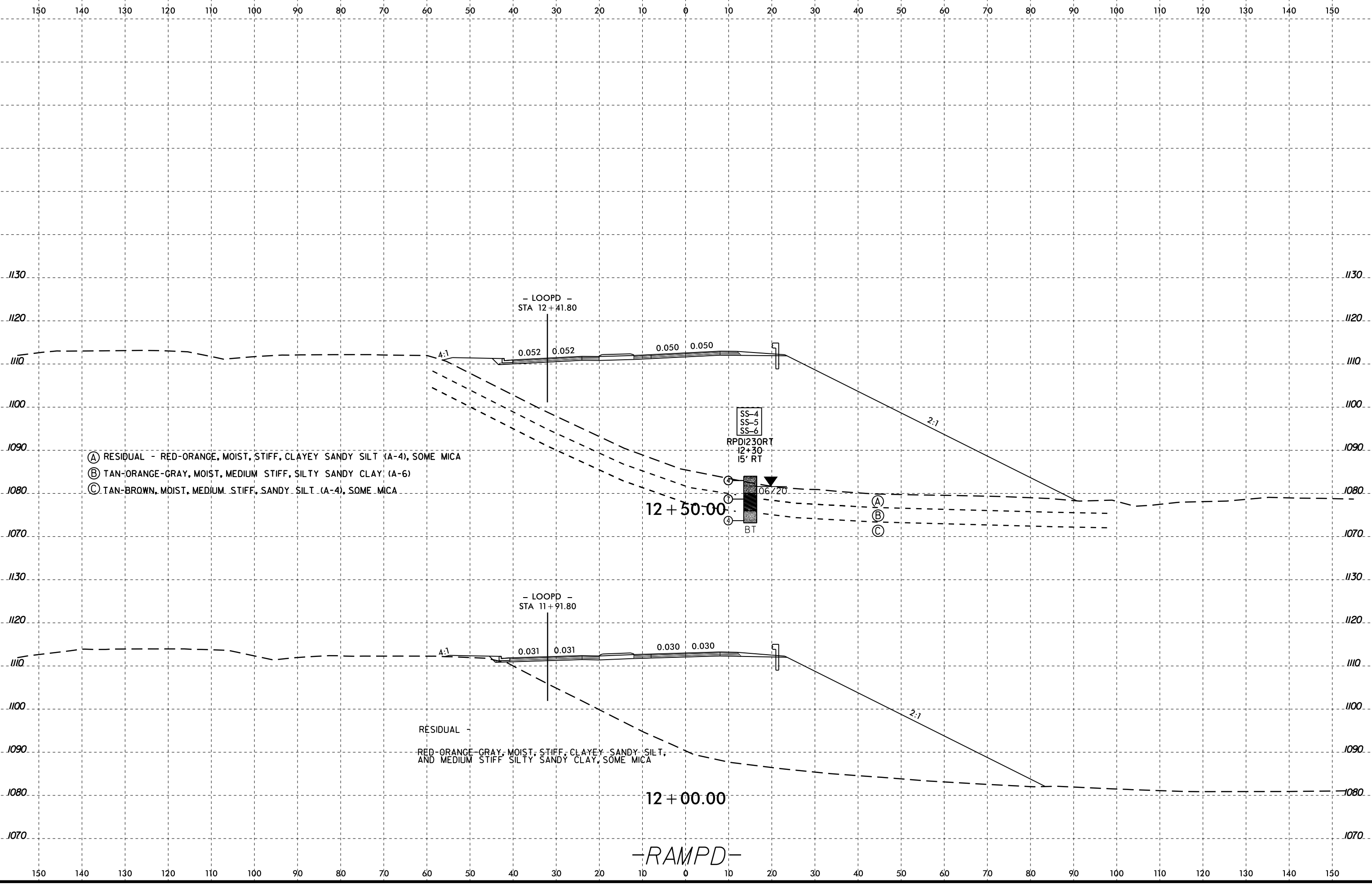
11 + 50.00

11 + 00.00

10 + 50.00

10 + 14.77

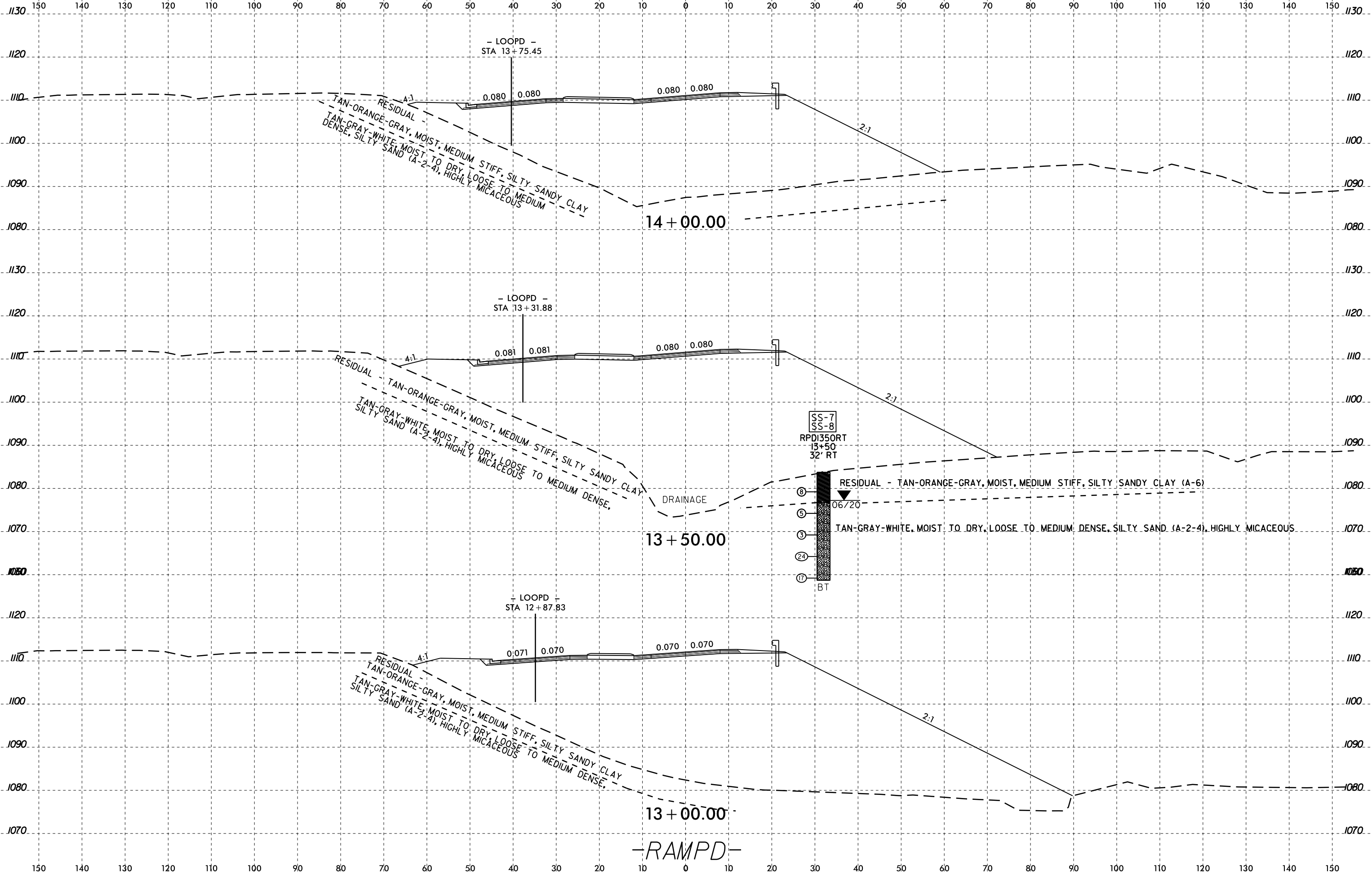
BEGIN CONSTRUCTION B-5833 -RAMPA- STA 10 + 14.77
-RAMPA-



- (A) RESIDUAL - RED-ORANGE, MOIST, STIFF, CLAYEY SANDY SILT (A-4), SOME MICA
- (B) TAN-ORANGE-GRAY, MOIST, MEDIUM STIFF, SILTY SANDY CLAY (A-6)
- (C) TAN-BROWN, MOIST, MEDIUM STIFF, SANDY SILT (A-4), SOME MICA

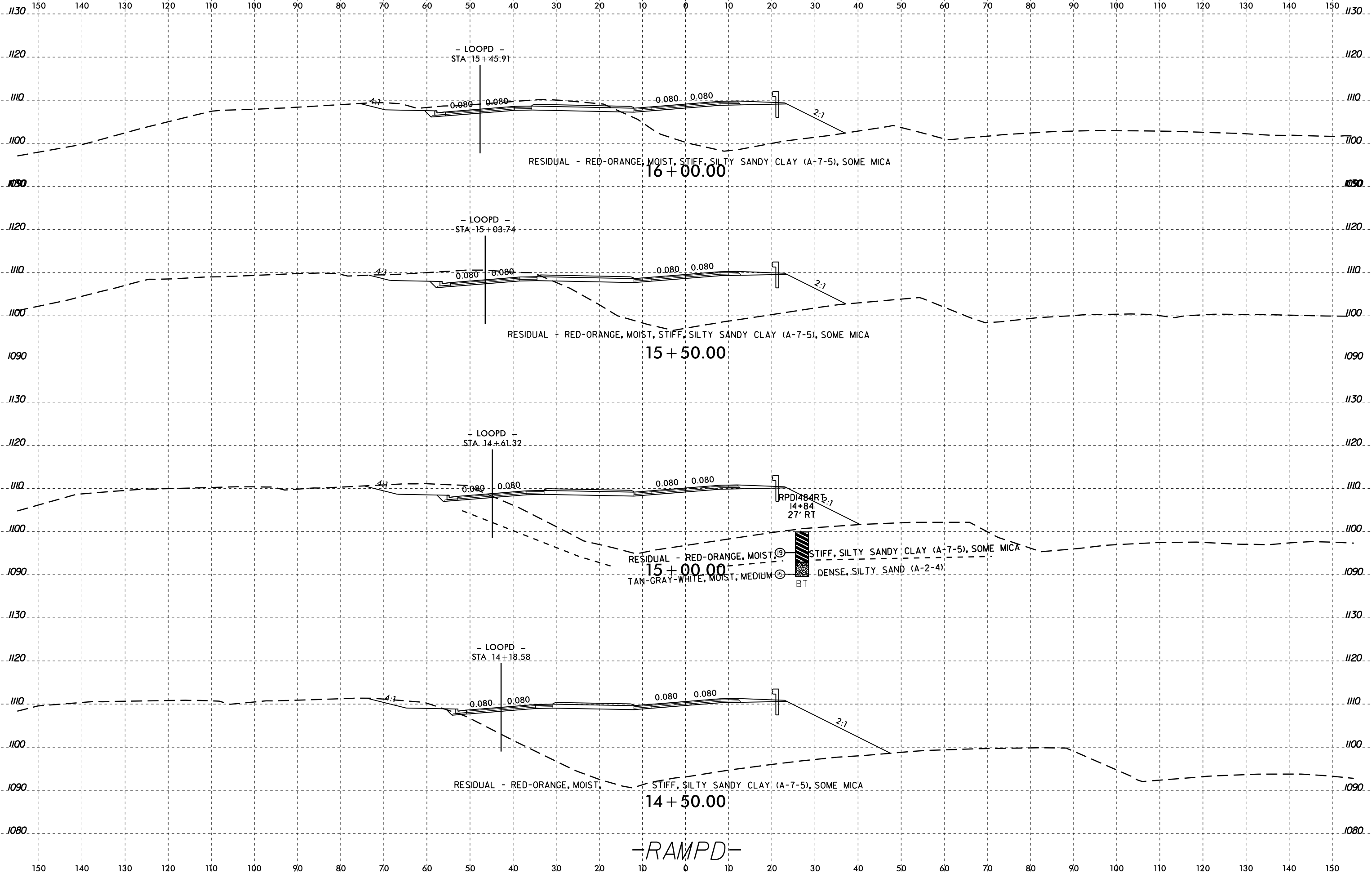
RESIDUAL -
 RED-ORANGE-GRAY, MOIST, STIFF, CLAYEY SANDY SILT,
 AND MEDIUM STIFF SILTY SANDY CLAY, SOME MICA

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. **B-5833**

REPORT ON SAMPLES OF **SOILS FOR QUALITY**

Project **45786.1.1** County **YADKIN** Owner
 Date: Sampled **6/2/20** Received **7/6/20** Reported **7/7/20**
 Sampled from **ROADWAY** By **K B MILLER**
 Submitted by **J L PILIPCHUK** **2012** Standard Specifications

813091 TO 813098
 7/27/20

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	813091	813092	813093	813094	813095	813096
Retained #4 Sieve %	-	-	-	1	-	-
Passing #10 Sieve %	98	100	100	98	99	100
Passing #40 Sieve %	88	97	90	88	86	98
Passing #200 Sieve %	60	67	36	54	48	52

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	17.7	8.8	24.1	19.1	24.7	8.4
Fine Sand Ret - #270 %	26.3	30.3	47.2	32.5	31.5	51.4
Silt 0.05 - 0.005 mm %	23.9	16.7	18.7	26.3	17.7	32.1
Clay < 0.005 mm %	32.1	44.2	10.0	22.1	26.1	8.0
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

L. L.	42	58			31	
P. I.	12	26	NP	NP	13	NP
AASHTO Classification	A-7-5(6)	A-7-5(18)	A-4(0)	A-4(0)	A-6(3)	A-4(0)
Station	11+68	32+25	32+25	12+30	12+30	12+30
Offset	30' RT	22' RT	22' RT	15' RT	15' RT	15' RT
Alignment	RP-A	-L-	-L-	RP-D	RP-D	RP-D
Location						
Depth (Ft)	4.20	4.40	9.40	0.00	4.80	9.80
to	5.20	5.40	10.40	1.50	5.80	10.80

cc: K B MILLER

Soils Engineer

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. **B-5833**

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 Submitted by **J L PILIPCHUK** **2012** Standard Specifications

813091 TO 813098
 7/27/20

TEST RESULTS

Proj. Sample No.	SS-7	SS-8				
Lab. Sample No.	813097	813098				
Retained #4 Sieve %	4	-				
Passing #10 Sieve %	91	98				
Passing #40 Sieve %	70	67				
Passing #200 Sieve %	33	27				

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	35.7	46.0				
Fine Sand Ret - #270 %	34.7	31.9				
Silt 0.05 - 0.005 mm %	21.5	16.1				
Clay < 0.005 mm %	8.0	6.0				
Passing #40 Sieve %	-	-				
Passing #200 Sieve %	-	-				

L. L.						
P. I.	NP	NP				
AASHTO Classification	A-2-4(0)	A-2-4(0)				
Station	13+50	13+50				
Offset	15' RT	32' RT				
Alignment	RP-D	RP-D				
Location						
Depth (Ft)	9.00	19.00				
to	10.00	20.00				

cc: K B MILLER

Soils Engineer