

REFERENCE: BR-0041

PROJECT: 67041

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.	BR-0041	1	41

**CONTENTS**

LINE	STATION	PLAN	XSC	PROFILE
-L-	16+00.00 to 42+00.00	4-5	6-22	-
-Y-	15+00.00 to 26+00.00	5	23-30	-
-YI-	11+00.00 to 12+49.26	4	31-32	-
-RPA-	12+50.00 to 13+85.28	5	33	-
-RPB-	15+00.00 to 16+69.85	5	34-35	-
-RPC-	12+20.00 to 13+94.24	5	36-37	-
-RPD-	11+70.00 to 14+12.70	5	38-39	-

**APPENDICES**

APPENDIX	TITLE	SHEETS
A	LABORATORY TESTS RESULTS SUMMARY	40-41

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY ROCKINGHAM  
PROJECT DESCRIPTION BRIDGE 780001 ON SR 2817  
(BARNES STREET) OVER US 29

**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

P.M. WEAVER

C.R. PASTRANA

A. ROSEMAN

Trigon Exploration, LLC

CG2 Explotation, LLC

INVESTIGATED BY ESP Associates, INC.

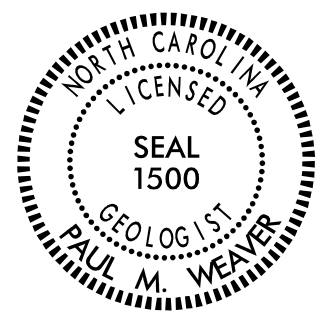
DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, INC.

DATE April 2022

**ESP ASSOCIATES, INC.**  
7011 ALBERT PICK RD  
SUITE E  
GREENSBORO, NC 27409  
WWW.ESPASSOCIATES.COM



DocuSigned by:  
Paul Weaver 04/14/2022  
01847D3738AD49C SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

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 208, 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

Table with columns for GENERAL CLASS., GRANULAR MATERIALS (<= 35% PASSING #200), SILT-CLAY MATERIALS (> 35% PASSING #200), ORGANIC MATERIALS, and various soil classification codes like A-1, A-2, A-3, etc.

CONSISTENCY OR DENSENESS

Table mapping soil types (e.g., Generally Granular Material) to consistency/denseness levels (e.g., Very Loose, Medium Dense) and unconfined compressive strength ranges.

TEXTURE OR GRAIN SIZE

Table showing U.S. Std. Sieve Size (mm) and corresponding grain size ranges for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating Soil Moisture Scale (Atterberg Limits), Field Moisture Description (Saturated, Wet, Moist, Dry), and Guide for Field Moisture Description (Liquid Limit, Plastic Limit, Optimum Moisture).

PLASTICITY

Table relating Plasticity Index (PI) to Plasticity (Non-plastic, Slightly plastic, Moderately plastic, Highly plastic) and Dry Strength (Very low, Slight, Medium, High).

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). 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

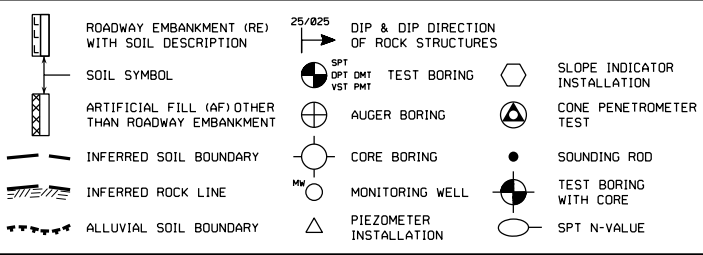
PERCENTAGE OF MATERIAL

Table showing percentages for Organic Material, Granular Soils, Silt-Clay Soils, and Other Material.

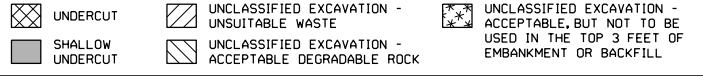
GROUND WATER

- Water level in bore hole immediately after drilling
Static water level after 24 hours
Perched water, saturated zone, or water bearing strata
Spring or seep

MISCELLANEOUS SYMBOLS



RECOMMENDATION SYMBOLS



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
UNIT WEIGHT
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, DIEDRICH D-50
ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT
HAMMER TYPE: AUTOMATIC, MANUAL
CORE SIZE: B, H, N, Q
HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL 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:

Table describing WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), and COASTAL PLAIN SEDIMENTARY ROCK (CP) with their respective characteristics and SPT values.

WEATHERING

- FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING.
VERY SLIGHT (IV SLI.): ROCK GENERALLY FRESH, JOINTS STAINED.
SLIGHT (SLI.): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH.
MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS.
MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED.
SEVERE (SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED.
VERY SEVERE (IV SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED.
COMPLETE: ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE.

ROCK HARDNESS

- VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK.
HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY.
MODERATELY HARD: CAN BE SCRATCHED BY KNIFE OR PICK.
MEDIUM HARD: CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP.
SOFT: CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK.
VERY SOFT: CAN BE CARVED WITH KNIFE.

FRACTURE SPACING

Table mapping fracture spacing terms (Very wide, Wide, Moderately close, Close, Very close) to spacing measurements (More than 10 feet, 3 to 10 feet, 1 to 3 feet, 0.16 to 1 foot, Less than 0.16 feet).

BEDDING

Table mapping bedding terms (Very thickly bedded, Thickly bedded, Thinly bedded, Very thinly bedded, Thickly laminated, Thinly laminated) to thickness measurements (4 feet, 1.5 - 4 feet, 0.16 - 1.5 feet, 0.03 - 0.16 feet, 0.008 - 0.03 feet, < 0.008 feet).

INDURATION

- FRIABLE: RUBBING WITH FINGER FREES NUMEROUS GRAINS.
MODERATELY INDURATED: GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE.
INDURATED: GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE.
EXTREMELY INDURATED: SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE.

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.
ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS.
ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED.
CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY.
CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL.
DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS.
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.
FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES.
FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION.
FLOOD PLAIN (FP) - LAND BORDERING A STREAM.
FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT.
JOINT - FRACTURE IN ROCK.
LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK.
LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS.
PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL.
RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OF THE PARENT ROCK.
SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK.
SLICKENSIDE - POLISHED AND STRIATED SURFACE.
STANDARD PENETRATION TEST (SPT) - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER.
STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED.
STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY.
TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
BENCH MARK: BY-18; N 937820.2655 E 1810379.3141
ELEVATION: 791.39 FEET

NOTES:

F.J.A.D. FILLED IN AFTER DRILLING
TIN FILE "br0041.is.tin.tin" WAS USED TO DETERMINE GROUND ELEVATION FOR ALL ROADWAY BORINGS
BY-18 WAS USED TO DETERMINE GROUND ELEVATION FOR ALL STRUCTURE BORINGS

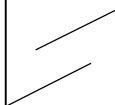
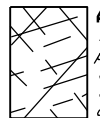
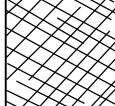
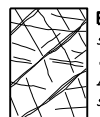
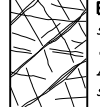



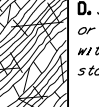
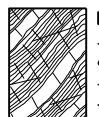
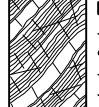

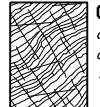

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)					
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE							
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A		A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.	70					
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80						B. Sandstone with thin inter-layers of siltstone	60					
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		70					C. Sandstone and siltstone in similar amounts	50					
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity		60					D. Siltstone or silty shale with sandstone layers	40					
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces		50					E. Weak siltstone or clayey shale with sandstone layers	30					
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes		40					F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure	20					
			30					G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers	10					
			20					H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.						
			10											
			N/A											
			N/A											

→ Means deformation after tectonic disturbance

4/6/2022 2:13:55 PM W:\Projects\2020\09\14\300 (NC DOT 2020-2022 On-Call Contract)\14.315 (BR-0041)RDWY and BRDGN\BR0041\_GEO\_BRDGN\PlanPr of \BR0041\_Rdy\_tsh.dgn  
 09/08/99

**CONTRACT: TIP PROJECT: BR-0041**

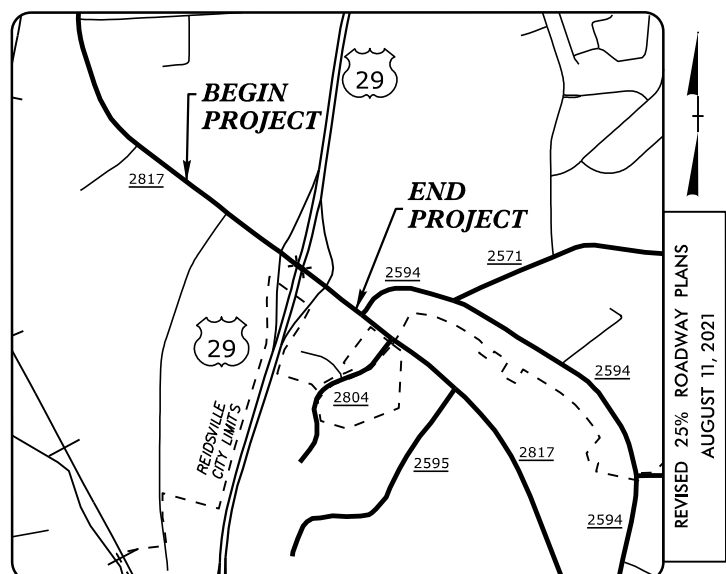
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ROCKINGHAM COUNTY**

LOCATION: BRIDGE 780001 ON SR 2817 (BARNES ST)  
OVER US 29

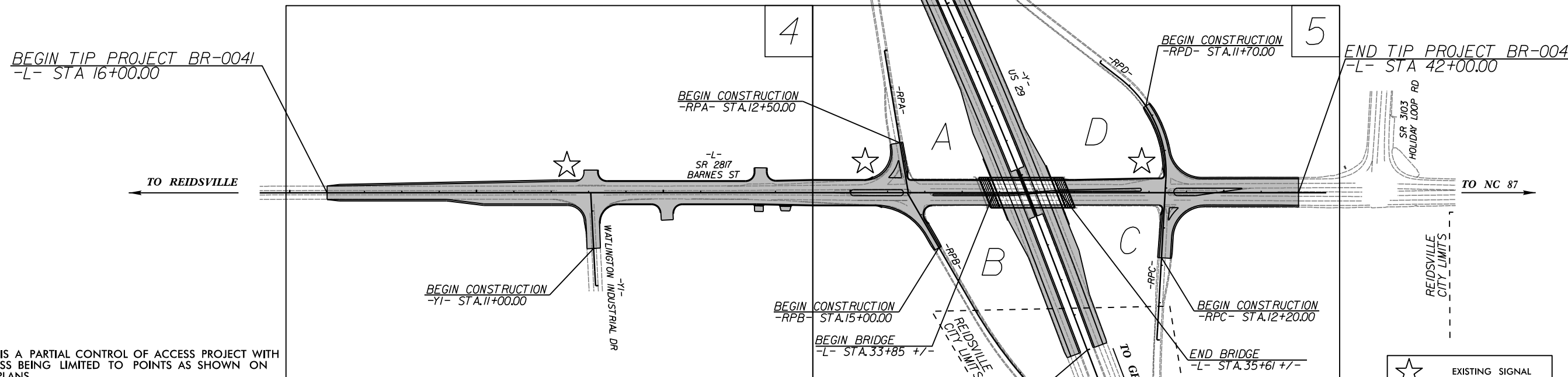
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0041	3	41
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67041.1.1		PE	



**VICINITY MAP**

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

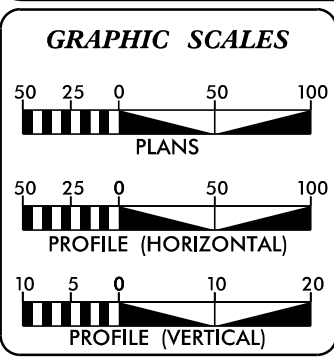


THIS IS A PARTIAL CONTROL OF ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

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

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF REIDSVILLE.

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



**DESIGN DATA**

ADT 2023 =	13,174
ADT 2043 =	15,087
K =	8 %
D =	55 %
T =	6 % *
V =	50 MPH
* TTST =	4% DUAL 2%
FUNC CLASS =	PRINCIPAL ARTERIAL REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT BR-0041 =	0.459 MI
LENGTH STRUCTURE TIP PROJECT BR-0041 =	0.033 MI
<b>TOTAL LENGTH TIP PROJECT BR-0041 =</b>	<b>0.492 MI</b>

Prepared in the Office of:

**AECOM**  
2018 STANDARD SPECIFICATIONS

NC FIRM LICENSE No: F-0342  
5438 Wade Park Blvd, Suite 200  
Raleigh, NC 27607  
(919) 854-6200 - (919) 854-6259(FAX)

**RIGHT OF WAY DATE:**  
JUNE 15, 2022

**LETTING DATE:**  
APRIL 18, 2023

**GREGORY COLS, P.E.**  
PROJECT ENGINEER

**TIMOTHY KLOTZ, P.E.**  
PROJECT DESIGN ENGINEER

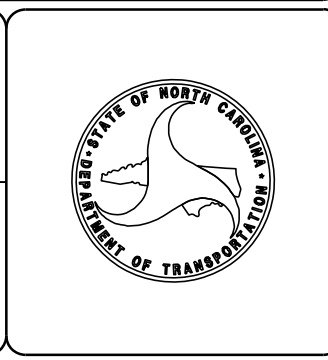
**DAVID STUTTS, P.E.**  
NCDOT PROJECT ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.



April 7, 2022

STATE PROJECT NO.: 67041.1.1  
 TIP: BR-0041  
 COUNTY: Rockingham  
 DESCRIPTION: Bridge No. 780001 on SR 2817 (Barnes Street) over US 29  
 SUBJECT: Geotechnical Report – Roadway Inventory

**Project Description**

This proposed project is located in Reidsville, North Carolina. The project begins at -L- Station 16+00.00 and continues to -L-Station 42+00.00. The total length of the project is 0.492 miles. The existing -L- west of the-Y- (US 29) bridge within the project corridor is generally a three-lane road while the existing -L- east of -Y- bridge within the project corridor is generally a three-lane road to -RPD- and -RPD- and a four to six-lane road east of -RPC- and -RPD-. The project area is commercial.

The proposed project construction consists of the following:

- Widening of -L- to five lanes west of the US 29 bridge
- The installation of curb and gutter along both sides of -L- west of the US 29 bridge and from the east end of the US 29 bridge to the -RPC- and -RPD- intersections on the east side of the US 29 bridge
- The replacement of the existing bridge on -L- over -Y- with a new bridge 179.0 feet in length and 83.6 feet in width (out to out)
- The construction of new approaches to the new bridge
- The construction of MSE retaining walls along each end bent of the new bridge with lengths of 222.33 feet (Wall No. 1) and 210.17 feet (Wall No. 2) and maximum wall heights of 28.66 feet (Wall No. 1) and 26.39 feet (Wall No. 2)
- Widening of the existing shoulder along -Y- in the vicinity of the bridge
- Improvements to existing street, ramps, and driveway intersections

The proposed maximum new embankment fill heights are approximately 14 feet. The maximum cuts proposed for the project are approximately 14 feet.

The drainage along the project is generally handled by side ditches.

The intersections along the project are as follows:

- -L- and Watlington Industrial Drive (-Y1-)
- -L- and Ramp A (-RPA-)
- -L- and Ramp B (-RPB-)
- -L- and Ramp C (-RPC-)
- -L- and Ramp D (-RPD-)

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

Initial site scoping was performed on January 26, 2022. The field investigation was performed from January 31, 2022 to March 15, 2022. Standard Penetration Test borings were advanced with a CME 55 drill machine and a

Diedrich D-50 drilling machine equipped with an automatic hammer. Eight borings were performed via hand auger due to underground and overhead utility concerns. Representative soil samples were collected for visual classification in the field and for laboratory analyses.

The following alignments were investigated. Subsurface cross sections of these alignments, as well as a subsurface profile for -L-, are included in this report:

Alignment	Station (±)
-L-	16+00.00 to 42+00.00
-Y-	15+00.00 to 26+00.00
-Y1-	11+00.00 to 12+49.26
-RPA-	12+50.00 to 13+85.28
-RPB-	15+00.00 to 16+69.85
-RPC-	12+20.00 to 13+94.24
-RPD	11+70.00 to 14+12.70

**Physiography and Geography**

The project corridor is located in the Milton Belt of the Piedmont physiographic province. “The Milton Belt is characterized by strongly foliated gneiss and schist, commonly with compositional layering and having felsic composition; quartzite, calc-silicate gneiss, and marble are minor units” (*The Geology of the Carolinas*, Horton and Zullo, 1991). Gneiss and schist of the Milton belt may overlie mafic intrusive rocks of the Charlotte Belt along part of the boundary with the Charlotte Belt. Sillimanite and kyanite zones of regional metamorphism comprise the majority of the Milton Belt and the eastern boundary with the Carolina Slate Belt is a lithologic discontinuity with locally sheared rocks indicating that the boundary may be a fault zone. Existing evidence suggest that the rocks of the Milton Belt are mainly Precambrian in age with metamorphosis and deformation occurring during the early to middle Paleozoic. According to the Geologic Map of North Carolina, 1985, the rock underlying the project corridor consists of biotite gneiss and schist which is inequigranular and magacrystic with abundant potassic feldspar and garnet, and that it is interlayered and gradational with calc-silicate rock, sillimanite-mica schist, mica schist, and amphibolite with small masses of granitic rock. The rock cored for two of the bridge borings classifies as Biotite Gneiss with some Granitic Rock.

The topography along the project corridor generally consists of gently rolling hills. The roadway along Barnes Street (-L-) slopes up from each end of the project to the bridge over US 29 with elevations ranging from approximately 795 feet (MSL) to approximately 819 feet (MSL), while the roadway along US 29 (-Y-) slopes down from south to north with elevations ranging from approximately 795 feet (MSL) to approximately 778 feet (MSL).

**Soil Properties**

Soils encountered within this project area have been divided into three categories: roadway embankment, residual soils, and weathered rock.

The roadway embankment ranges in thickness from less than 4 feet to approximately 12 feet. The roadway embankment soils encountered consist of stiff to very stiff sandy silt (A-4) and silty clay (A-7-5) and of loose to medium dense gravel and sand (A-1-a) and silty sand (A-2-4). The plasticity index in the lab test performed on a sample of cohesive roadway embankment material was 21.

Residual soils were encountered in all of the borings drilled for this project. The residual soils consist of loose to very dense silty sand (A-2-4) and of very soft to hard, sandy silt (A-4), clayey silt (A-5), sandy clay (A-6), and silty clay (A-7-5 and A-7-6). Plasticities within the cohesive residual soils range from slightly plastic to highly plastic with laboratory plasticity index results ranging from 6 to 37.

Weathered rock classified as Granitic Rock and Biotite Gneiss was encountered underlying the residual soils within the depths explored in 5 of the borings drilled as part of the bridge investigation. The top of the weathered rock was encountered at depths ranging from 4.0 feet to 37.4 feet below the existing ground surface and at elevations ranging from 785.7 feet to 763.2 feet above sea level.

**Rock Properties**

Crystalline rock classified as Biotite Gneiss with Granitic Rock was encountered underlying the weathered rock in 6 borings and directly underlying the residual soil in 9 borings drilled as part of the bridge investigation. The depth to the top of the crystalline rock ranged from 2.1 feet to 43.5 feet and at elevations ranging from 787.5 feet to 749.1 feet above sea level. It should be noted that the shallow weathered rock/rock was encountered under the existing bridge over US 29 in the area of the proposed left side of End Bent 1 and Bent 1. The crystalline rock was not encountered at depths that should affect project roadway construction based on the 25 percent project plans.

**Groundwater Properties**

Groundwater data was collected in February 2022. Twenty-four-hour ground water depths ranged from 0.0 (after 2 days of heavy rain at the project site) to 29.4 feet below the existing ground surface, and groundwater elevations ranged from 790.7 to 771.1 feet above sea level. It should be noted that groundwater generally slopes to the north across the site with an approximate elevation of 780 feet ±2 feet (MSL) in the vicinity of the bridge. Groundwater was encountered within 6 feet of the proposed grade in two roadway borings, L\_1727 and EB1-B.

**Areas of Special Geotechnical Interest**

1) The following area contains loose sands within 3 feet of the proposed grade or at the base of proposed embankments which have the potential to cause embankment, subgrade, and/or slope stability problems during construction:

Alignment	STA (±) to STA (±)	Offset (±)
-L-	16+25 to 18+75	50' left to 20' left

2) The following area contains wet to saturated soils within 3 feet of the proposed grade or at the base of proposed embankments which have the potential to cause embankment, subgrade, and/or slope stability problems during construction:

Alignment	STA (±) to STA (±)	Offset (±)
-L-	16+25 to 18+75	50' left to 20' left
-Y -	19+25 to 19+75	80' left to 50' left

3) The following areas contain soils with plasticity indexes greater than 25, liquid limits greater than 70, and/or percent passing the no. 200 sieve greater than 70 within 3 feet of the proposed grade or within cut areas which have the potential to cause embankment, subgrade, and/or slope stability problems during construction:

Alignment	STA (±) to STA (±)	Offset (±)
-L-	18+75 to 24+75	Across extents of construction
-L-	29+75 to 32+25	Across extents of construction
-Y-	17+25 to 18+75	Across extents of construction
-RPB-	15+25 to 16+16	42' left to 75' left

**Water Wells**

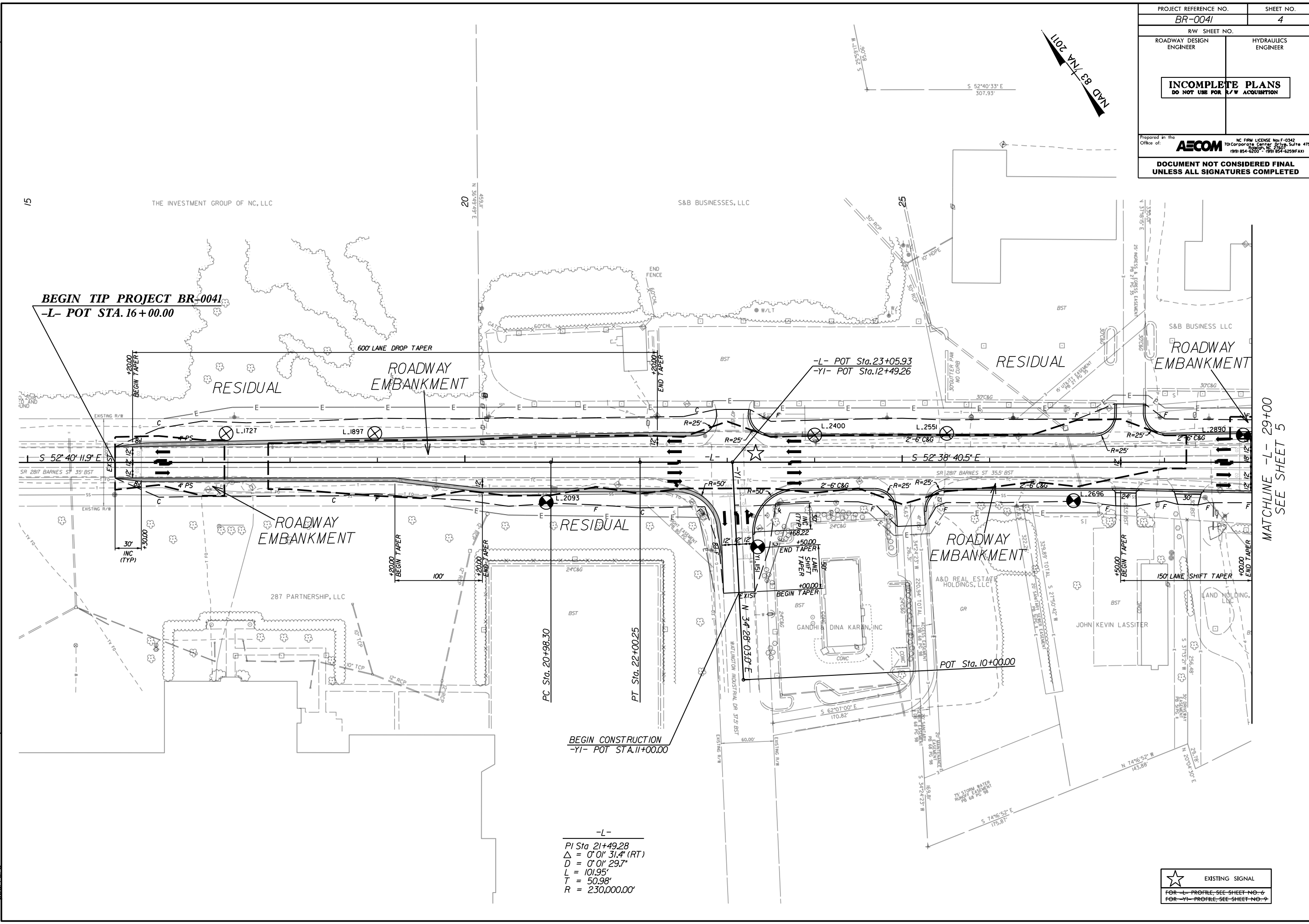
No water wells were identified within or adjacent to the proposed right-of-way on the plans provided to ESP or by ESP personnel in the field.

PROJECT REFERENCE NO. <i>BR-0041</i>		SHEET NO. 4	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION			
Prepared in the Office of: <b>AECOM</b> NC FIRM LICENSE NO. F-0342 70 Corporate Center Drive, Suite 475 Raleigh, NC 27601 (919) 854-2300 (919) 854-6259 FAX			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			

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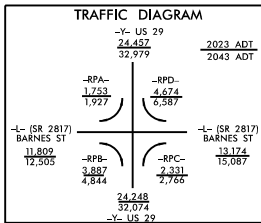
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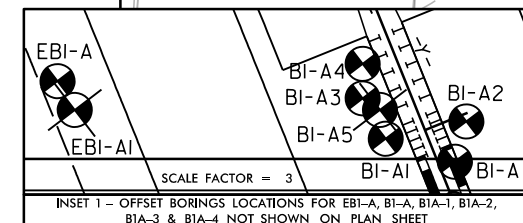
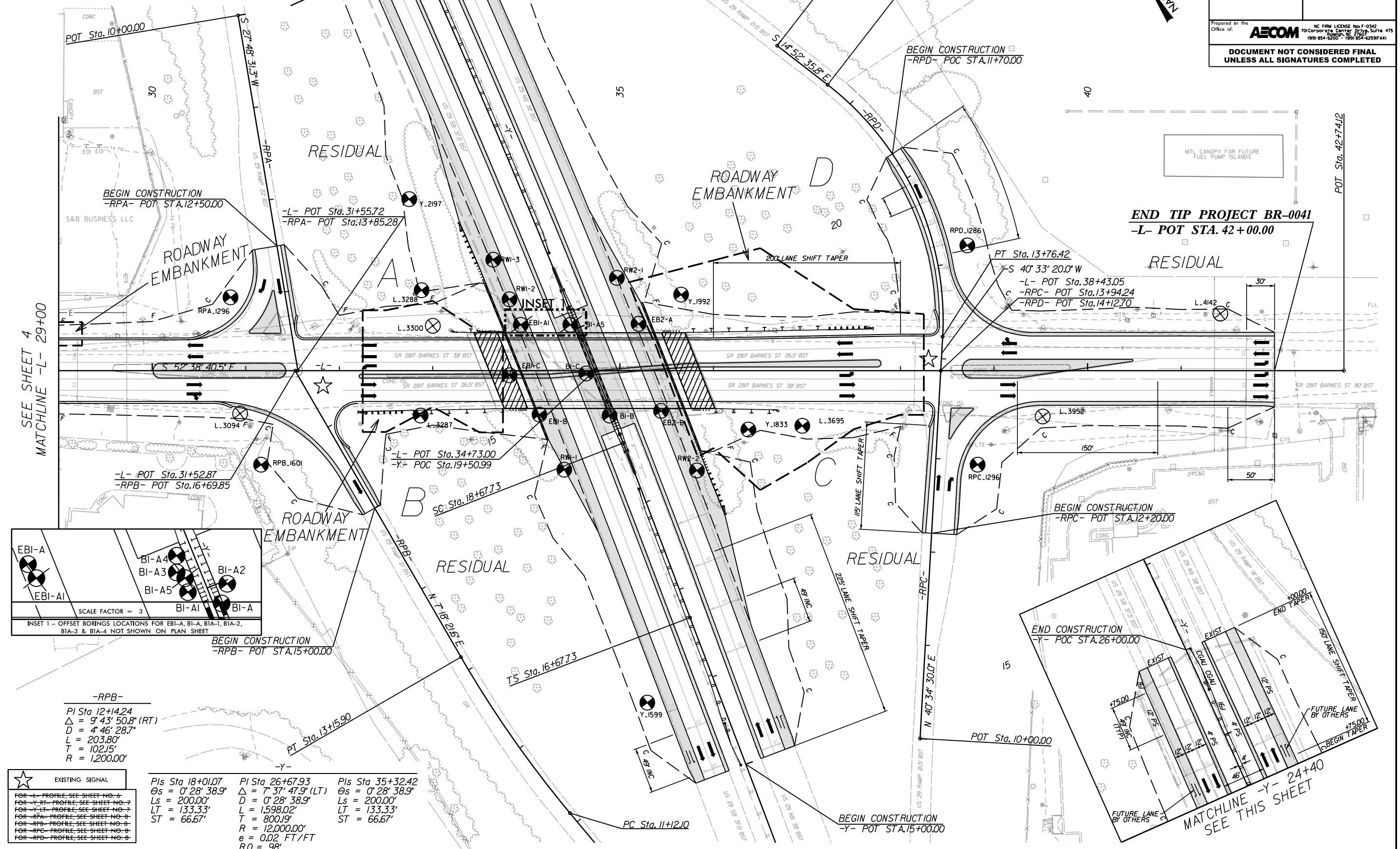


★ EXISTING SIGNAL  
FOR -L- PROFILE, SEE SHEET NO. 6  
FOR -YI- PROFILE, SEE SHEET NO. 9

PROJECT REFERENCE NO. <b>BR-0041</b>	SHEET NO. <b>5</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
Prepared in the Office of: <b>AECOM</b> NC FIRM LICENSE No: F-0342 70 Corporate Center Drive, Suite 475 Raleigh, NC 27601 (919) 854-6200 • (919) 854-6259 FAX	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



**-RPD-**  
 PI Sta 12+35.61  
 $\Delta = 55^\circ 25' 19.3''$  (RT)  
 $D = 17^\circ 59' 19.3''$   
 $L = 308.15'$   
 $T = 167.34'$   
 $R = 318.51'$   
 $e = 0.05$  FT/FT  
 $R.O. = 72'$



INSET 1 - OFFSET BORINGS LOCATIONS FOR EB1-A, BI-A1, BI-A2, BI-A3 & BI-A4 NOT SHOWN ON PLAN SHEET

**-RPB-**  
 PI Sta 12+14.24  
 $\Delta = 9^\circ 43' 50.8''$  (RT)  
 $D = 4^\circ 46' 28.7''$   
 $L = 203.80'$   
 $T = 102.15'$   
 $R = 1,200.00'$

★ EXISTING SIGNAL  
 FOR -L- PROFILE, SEE SHEET NO. 6  
 FOR -Y- RT- PROFILE, SEE SHEET NO. 7  
 FOR -Y- LT- PROFILE, SEE SHEET NO. 7  
 FOR -RPA- PROFILE, SEE SHEET NO. 8  
 FOR -RPD- PROFILE, SEE SHEET NO. 8  
 FOR -RPC- PROFILE, SEE SHEET NO. 8  
 FOR -RPB- PROFILE, SEE SHEET NO. 8

PIs Sta 18+01.07 Os = 0' 28' 38.9" Ls = 200.00' LT = 133.33' ST = 66.67'	PI Sta 26+67.93 $\Delta = 7^\circ 37' 47.9''$ (LT) D = 0' 28' 38.9" L = 1598.02' T = 800.19' R = 12,000.00' e = 0.02 FT/FT R.O. = 98'	PIs Sta 35+32.42 Os = 0' 28' 38.9" Ls = 200.00' LT = 133.33' ST = 66.67'
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REVISIONS

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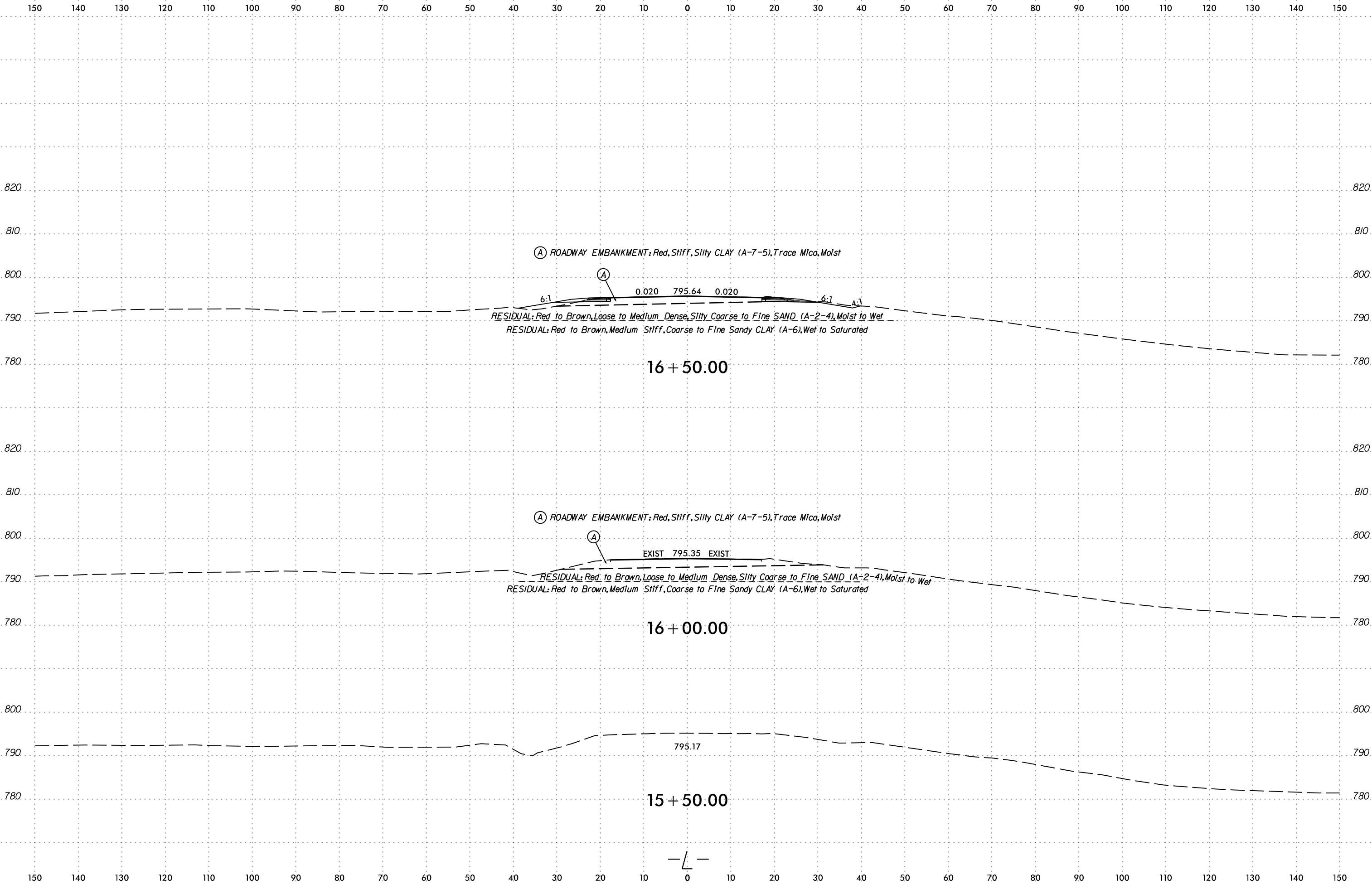
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MATCHLINE -L- 29+00

SEE INSET (THIS SHEET)  
MATCHLINE -Y- 24+40

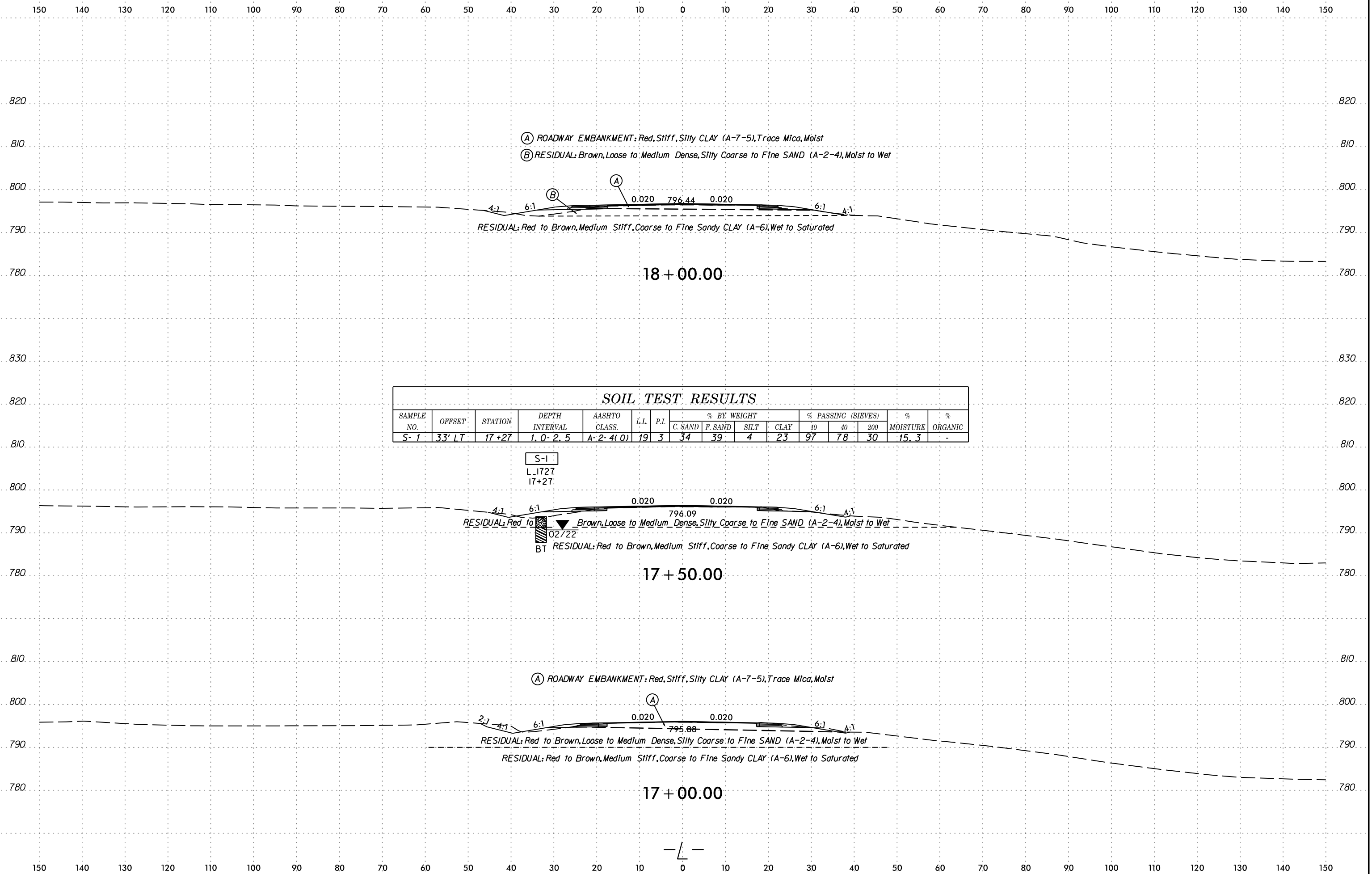
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-L- POT STA. 42+00.00

MATCHLINE -Y- 24+40  
SEE THIS SHEET





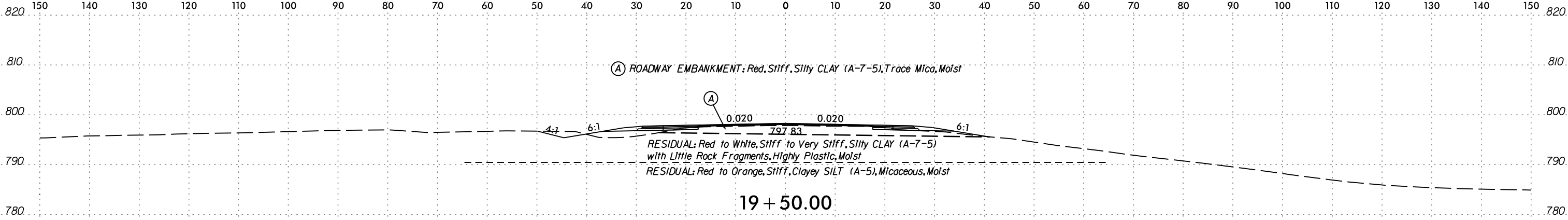
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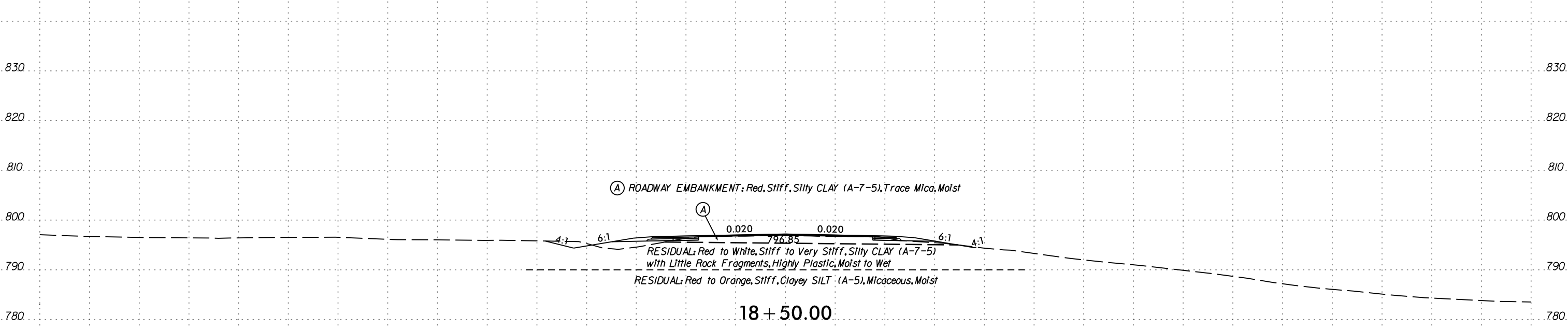
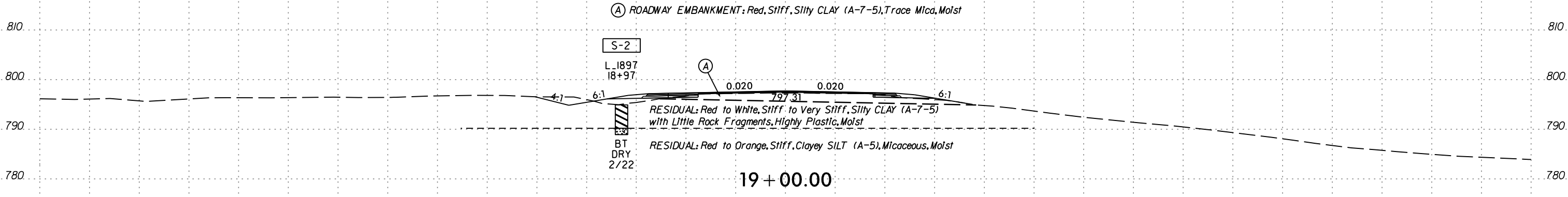
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE		% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
S-1	33' LT	17+27	1.0-2.5	A-2-4(O)	19	3	34	39	4	23	97	78	30	15.3	-	

S-1  
L.1727  
17+27

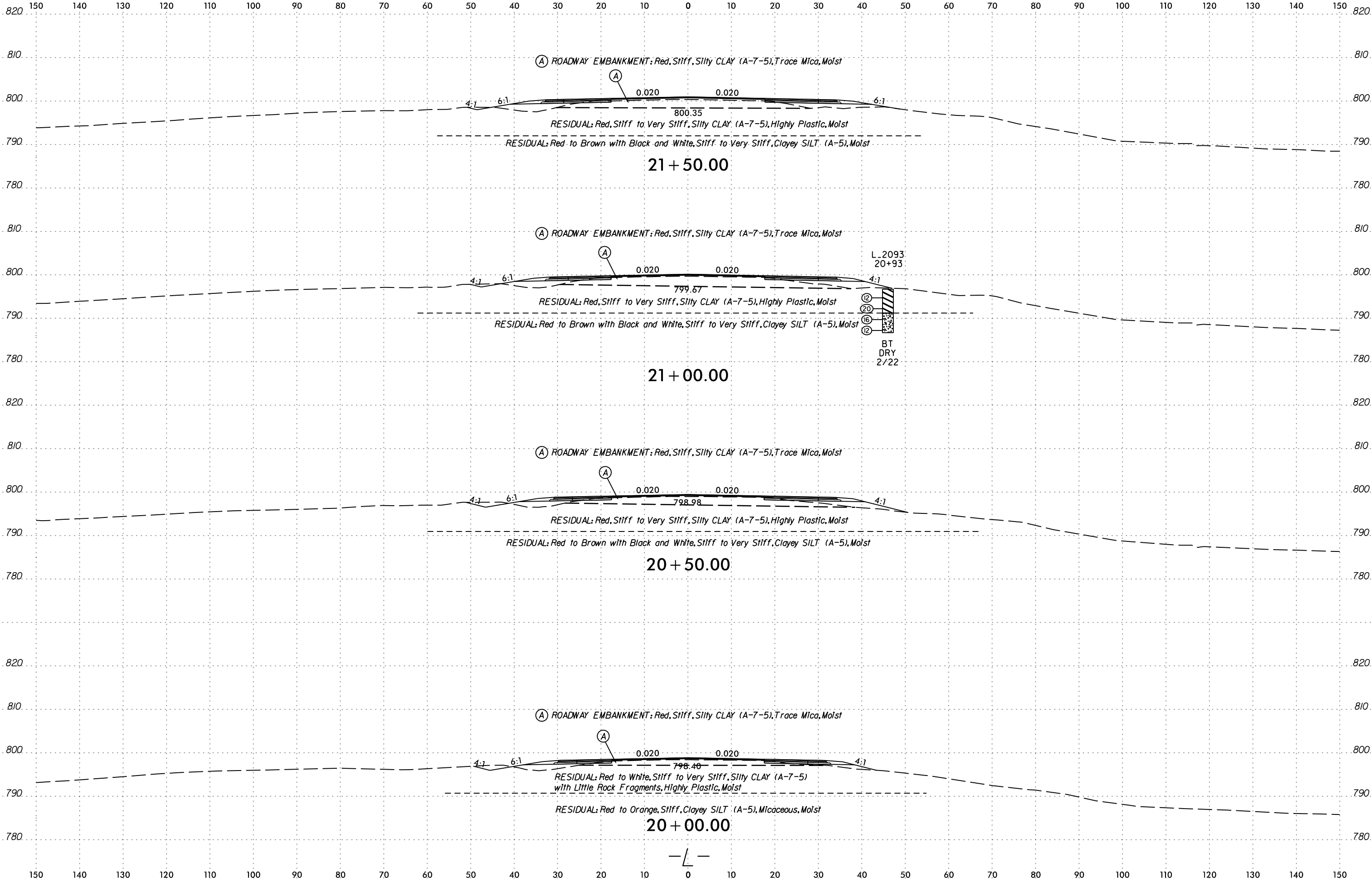
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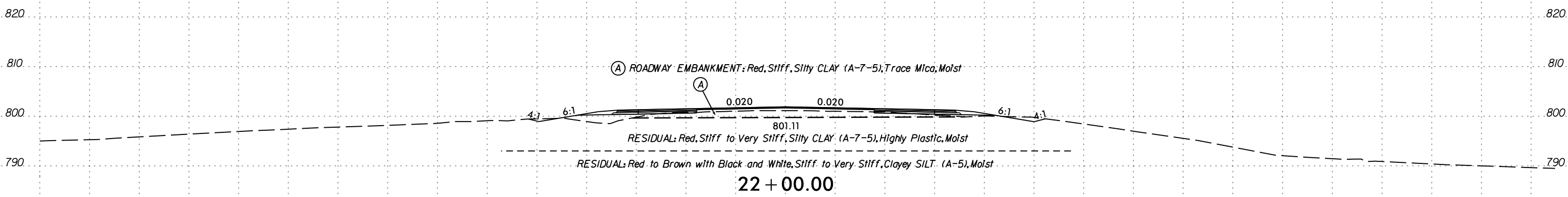
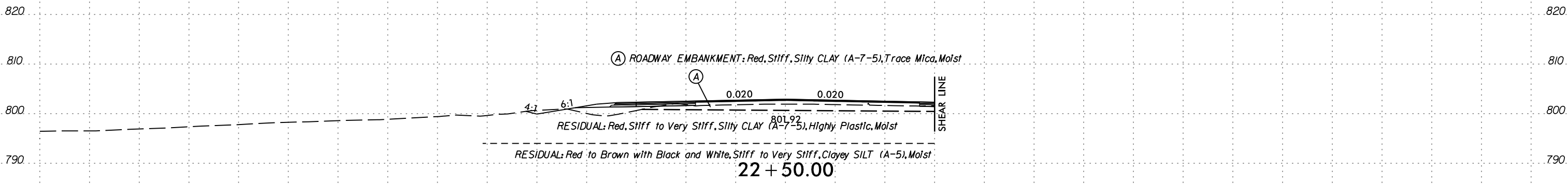
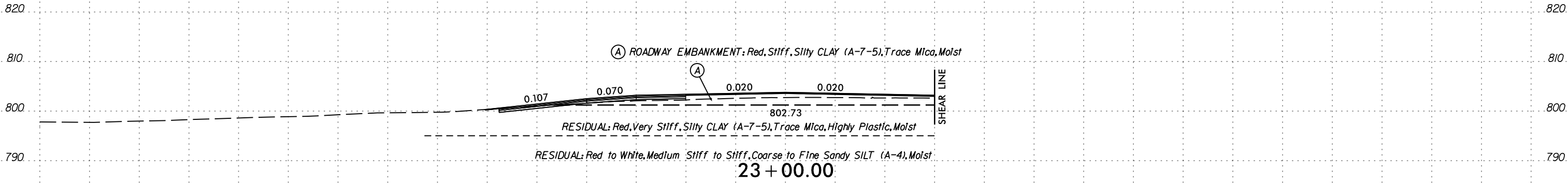
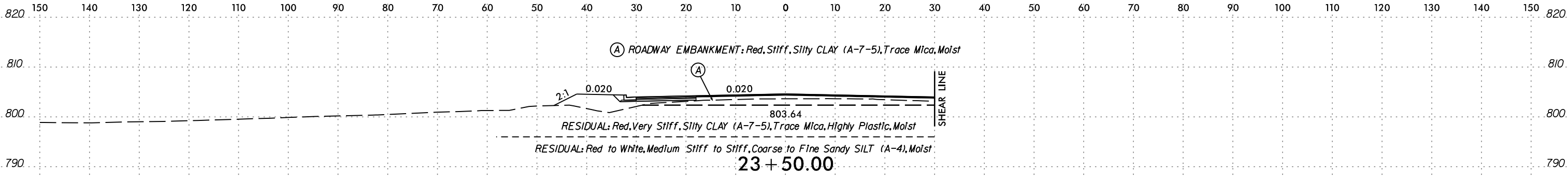


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-2	33' LT	18+97	1.0-2.0	A-7-5(11)	60	26	24	16	13	47	84	70	52	21.7	-



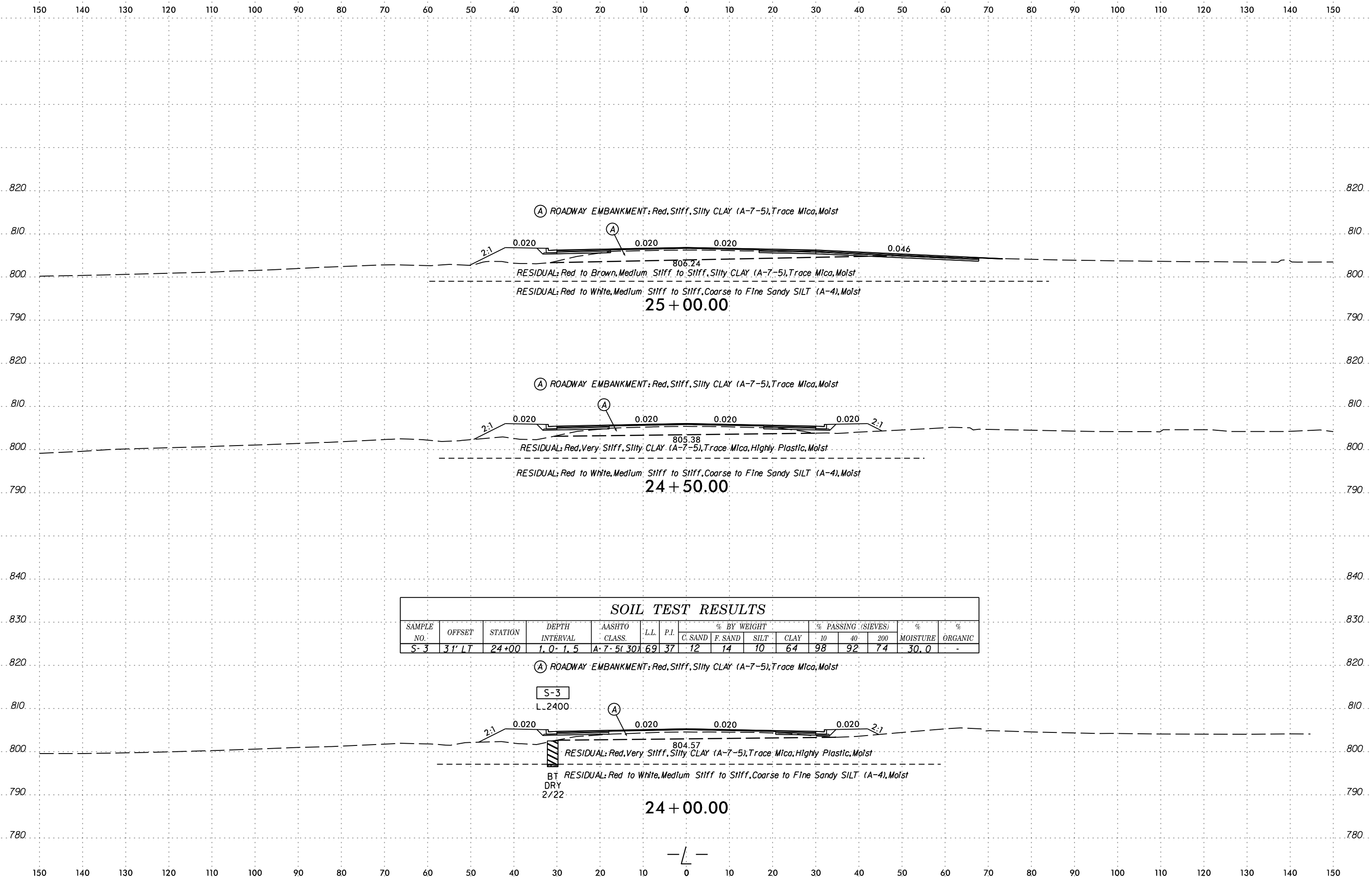
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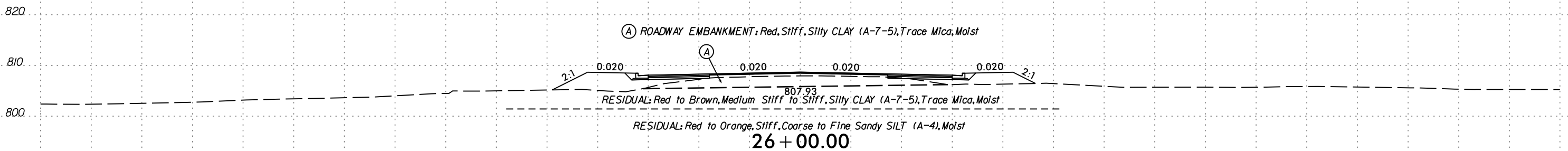
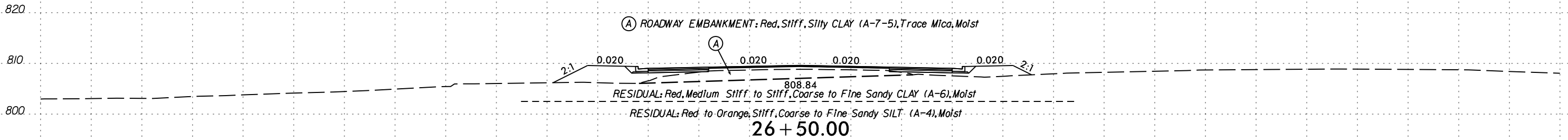


**SOIL TEST RESULTS**

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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-3	3' LT	24+00	1.0 - 1.5	A-7-5(30)	69	37	12	14	10	64	98	92	74	30.0	-

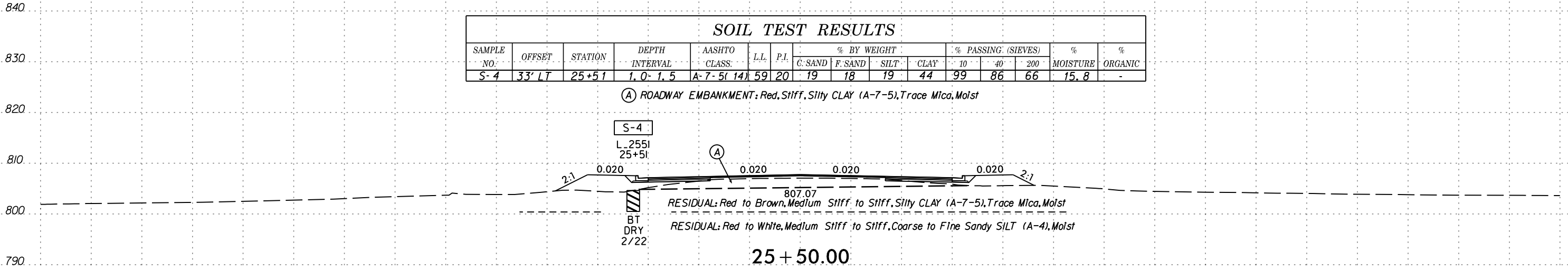
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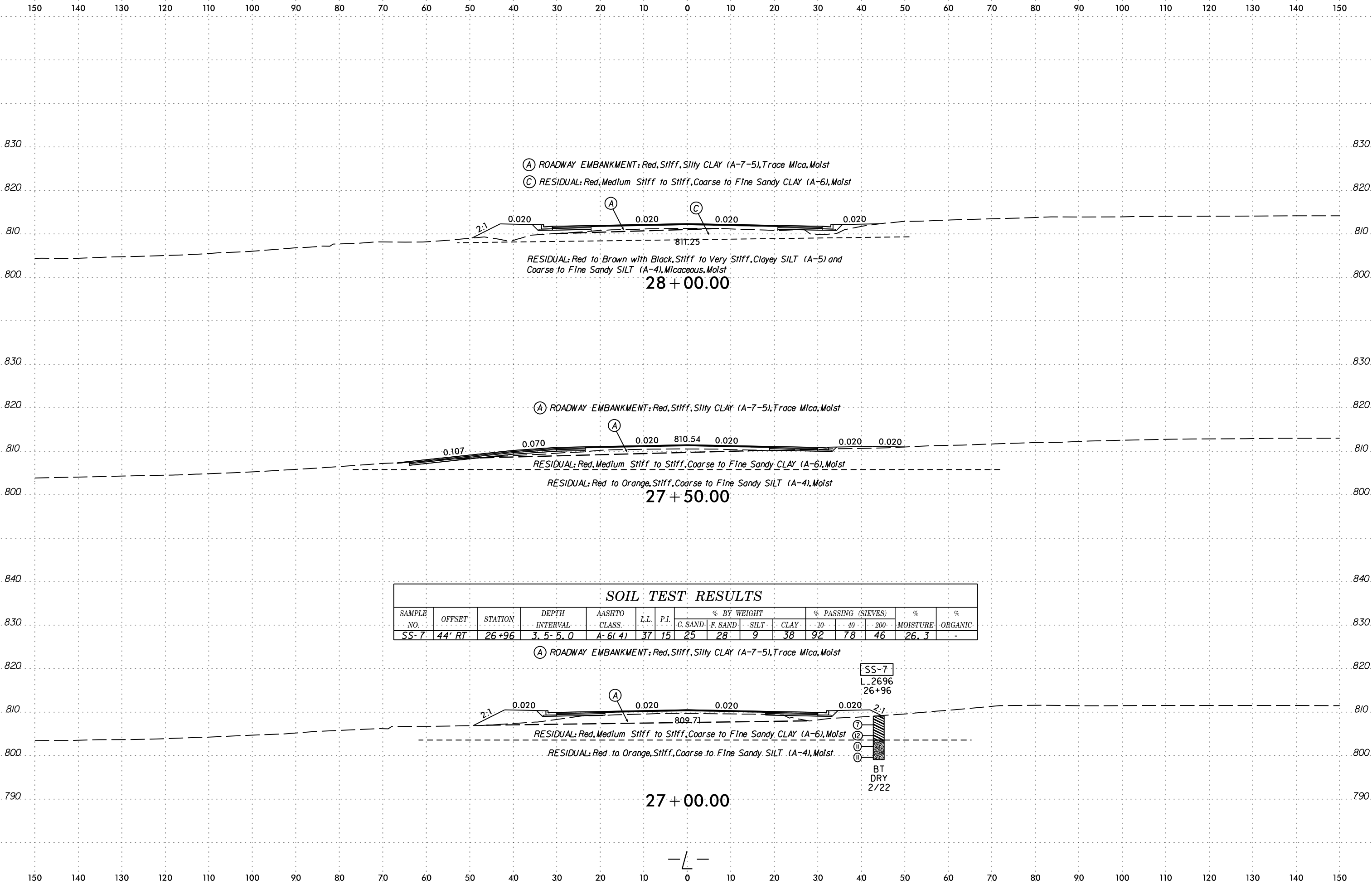


**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-4	33' LT	25+51	1.0- 1.5	A-7-5(14)	59	20	19	18	19	44	99	86	66	15.8	-

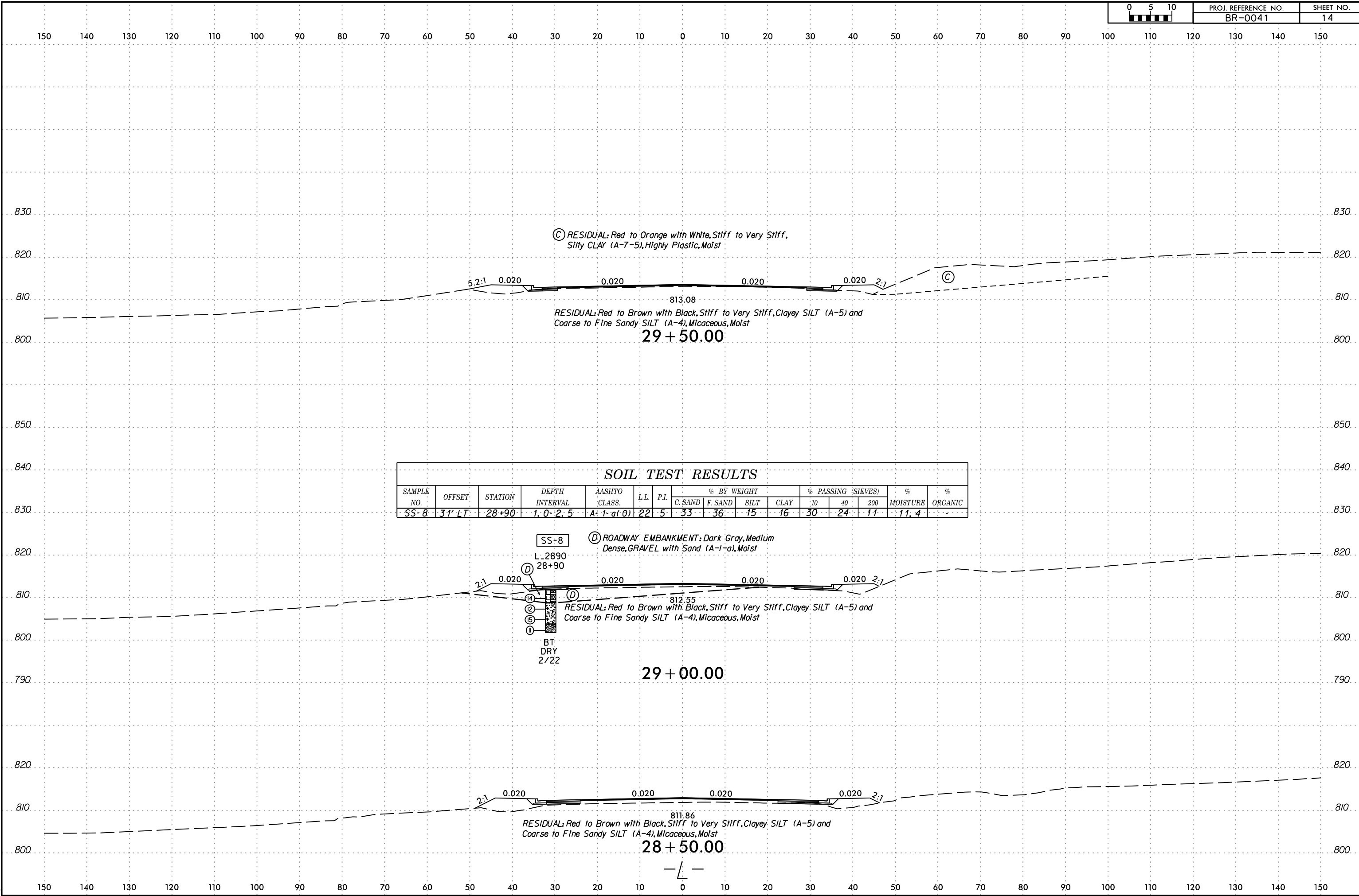


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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-7	44' RT	26+96	3.5-5.0	A-6(4)	37	15	25	28	9	38	92	78	46	26.3	-





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		
SS-8	3' LT	28+90	1.0'-2.5'	A-1-a(0)	22	5	33	36	15	16	30	24	11	11.4	-

Ⓒ RESIDUAL: Red to Orange with White, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

RESIDUAL: Red to Brown with Black, Stiff to Very Stiff, Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

Ⓓ ROADWAY EMBANKMENT: Dark Gray, Medium Dense, GRAVEL with Sand (A-1-a), Moist

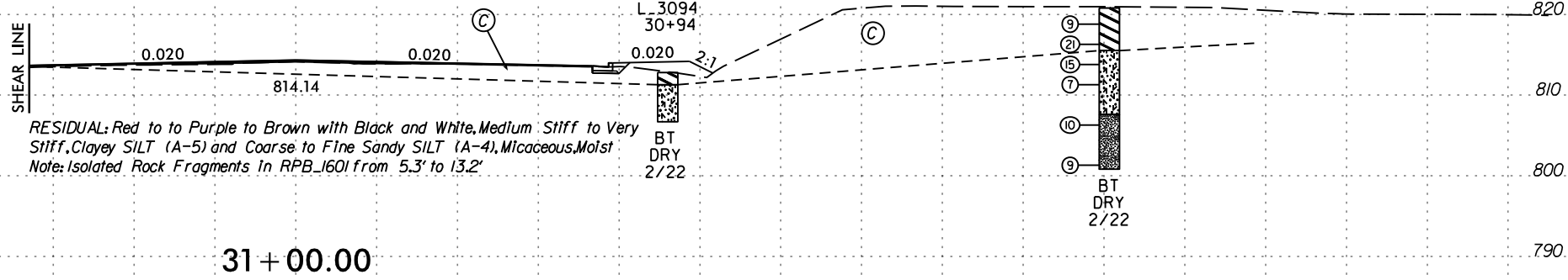
RESIDUAL: Red to Brown with Black, Stiff to Very Stiff, Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

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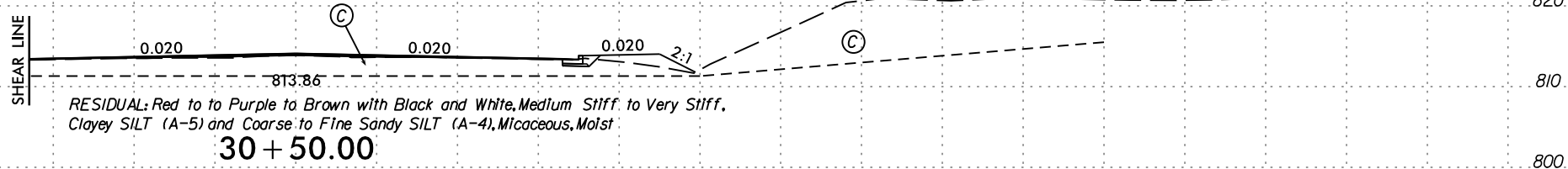
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							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-5	82' LT	16+01	3.5-5.0	A-7-5(37)	77	32	5	6	14	75	99	95	90	31.5	-

NOTE: STATION AND OFFSET REFER TO RPB ALIGNMENT

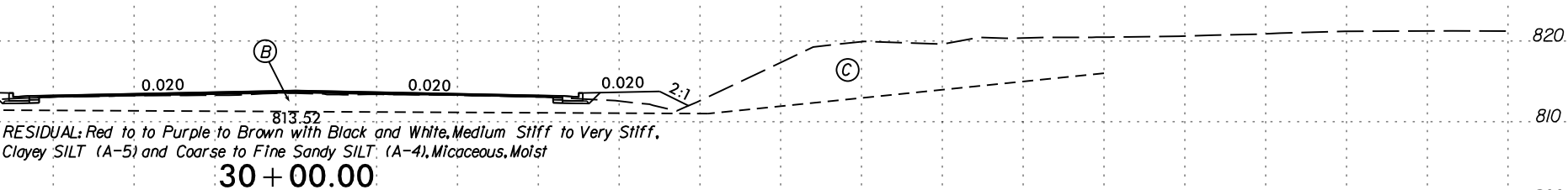
RESIDUAL: Red to Orange with White, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

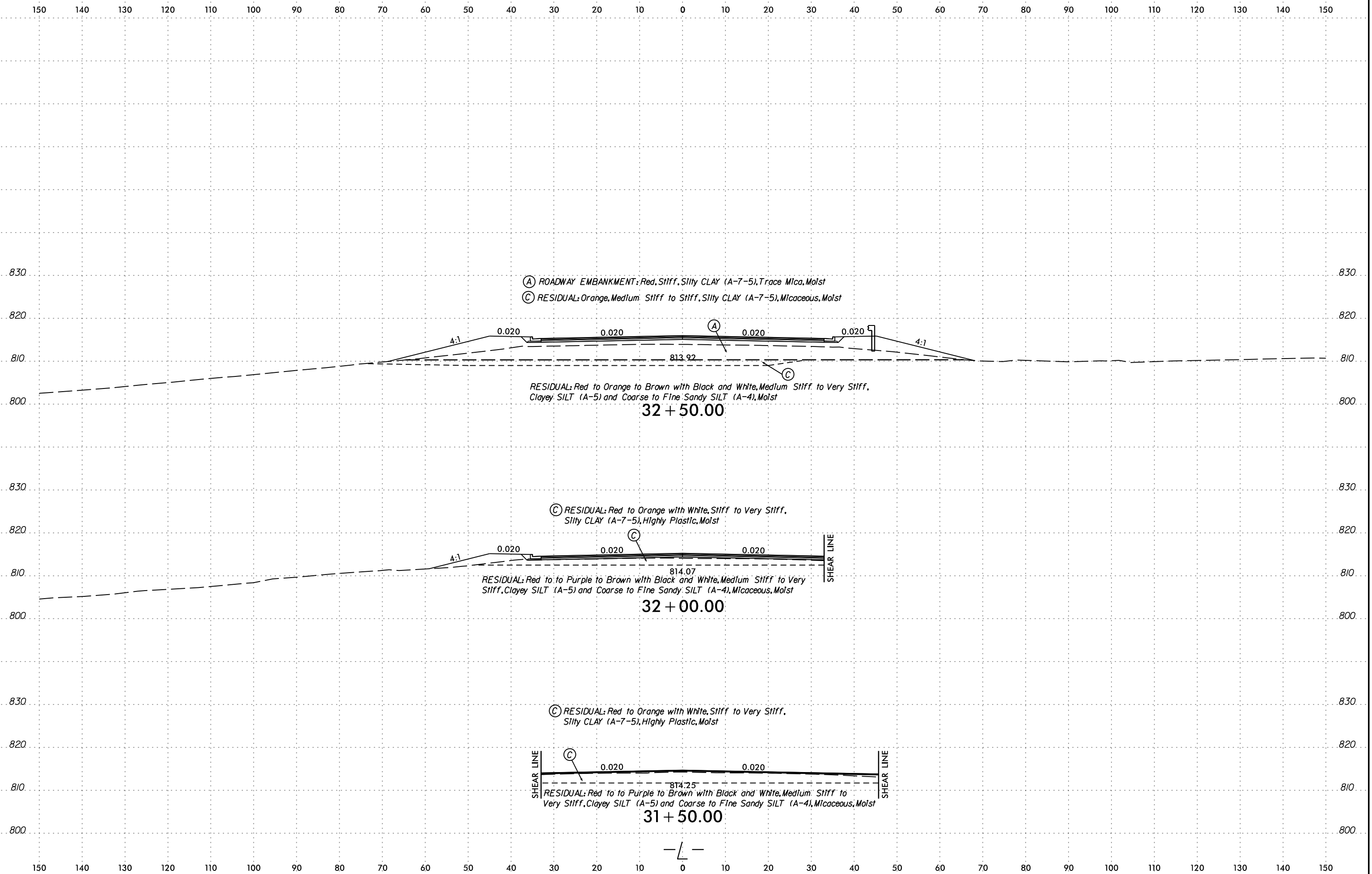


RESIDUAL: Red to Orange with White, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

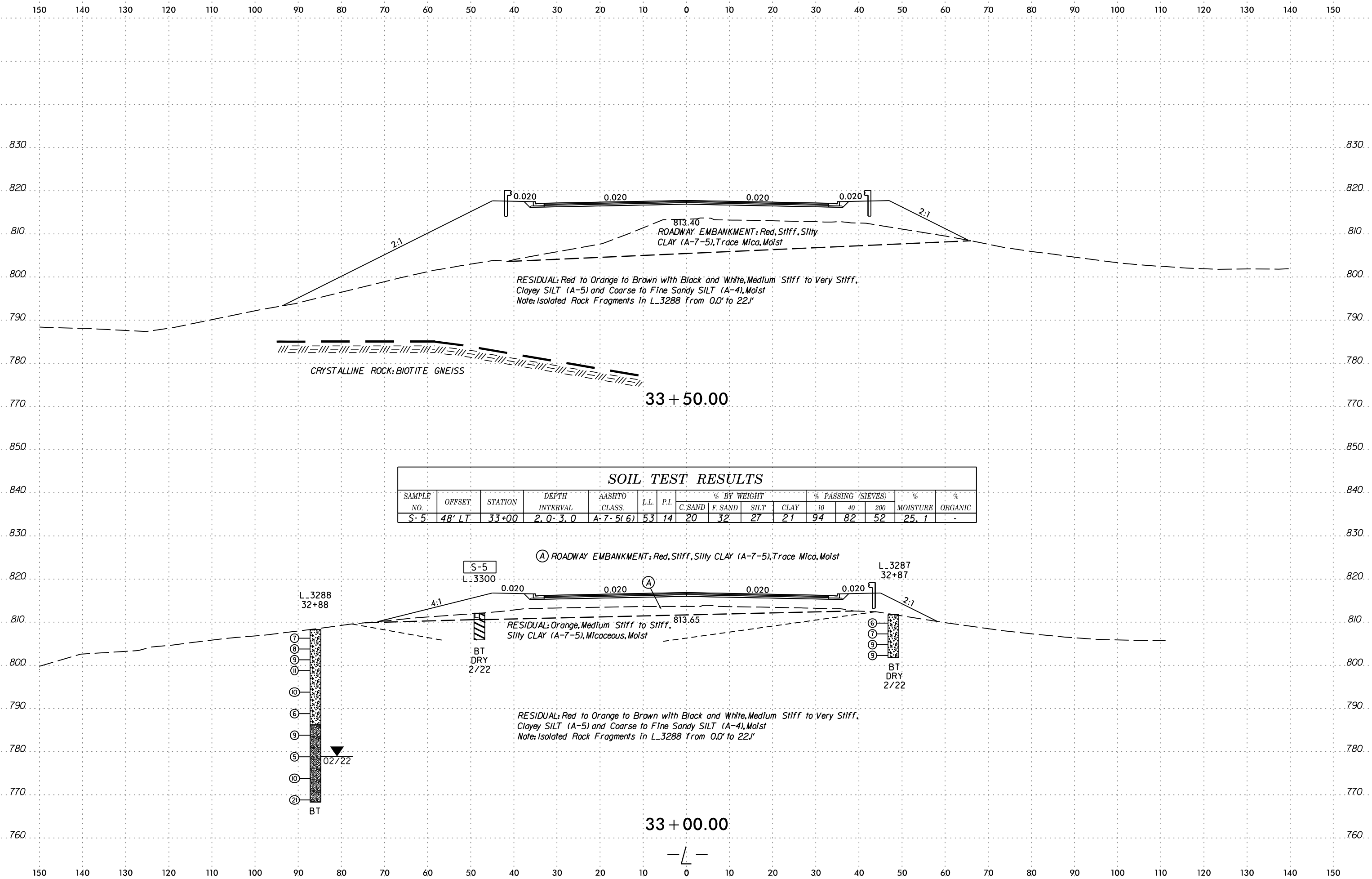


RESIDUAL: Red to Orange with White, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

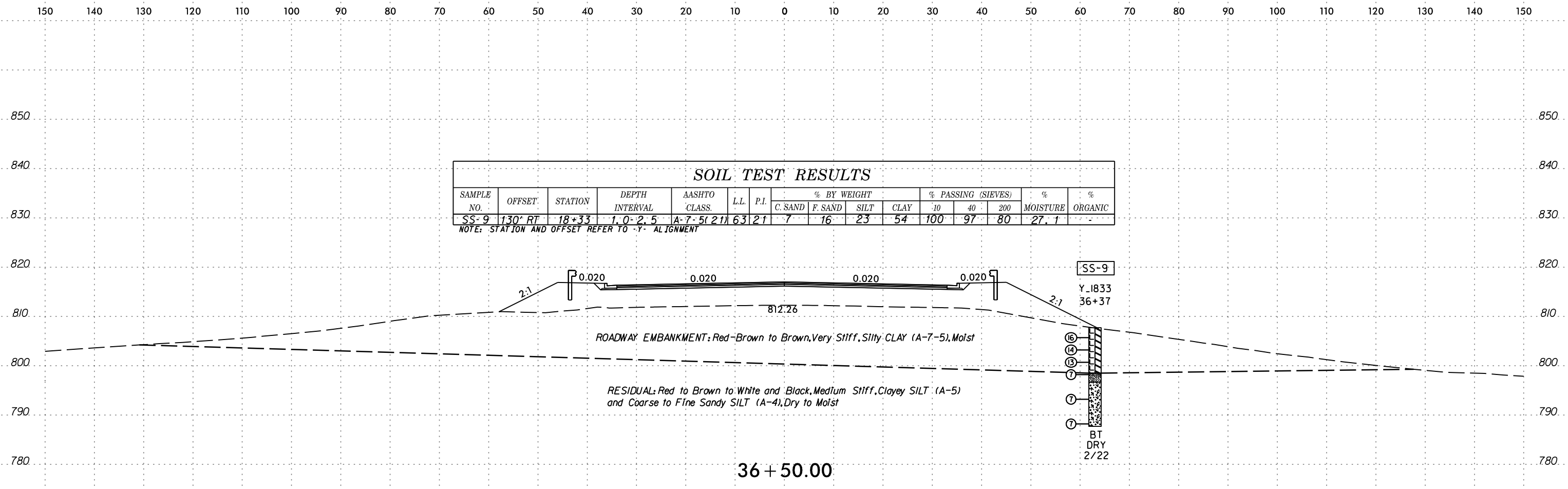




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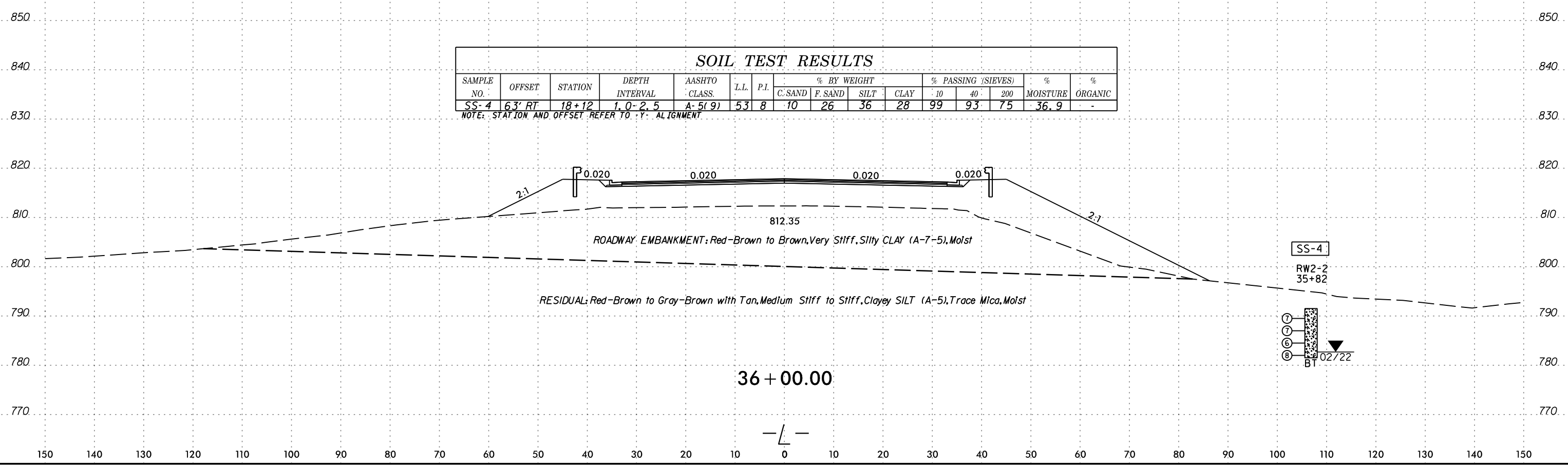


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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-9	130' RT	18+33	1.0-2.5	A-7-5(21)	63	21	7	16	23	54	100	97	80	27.1	-

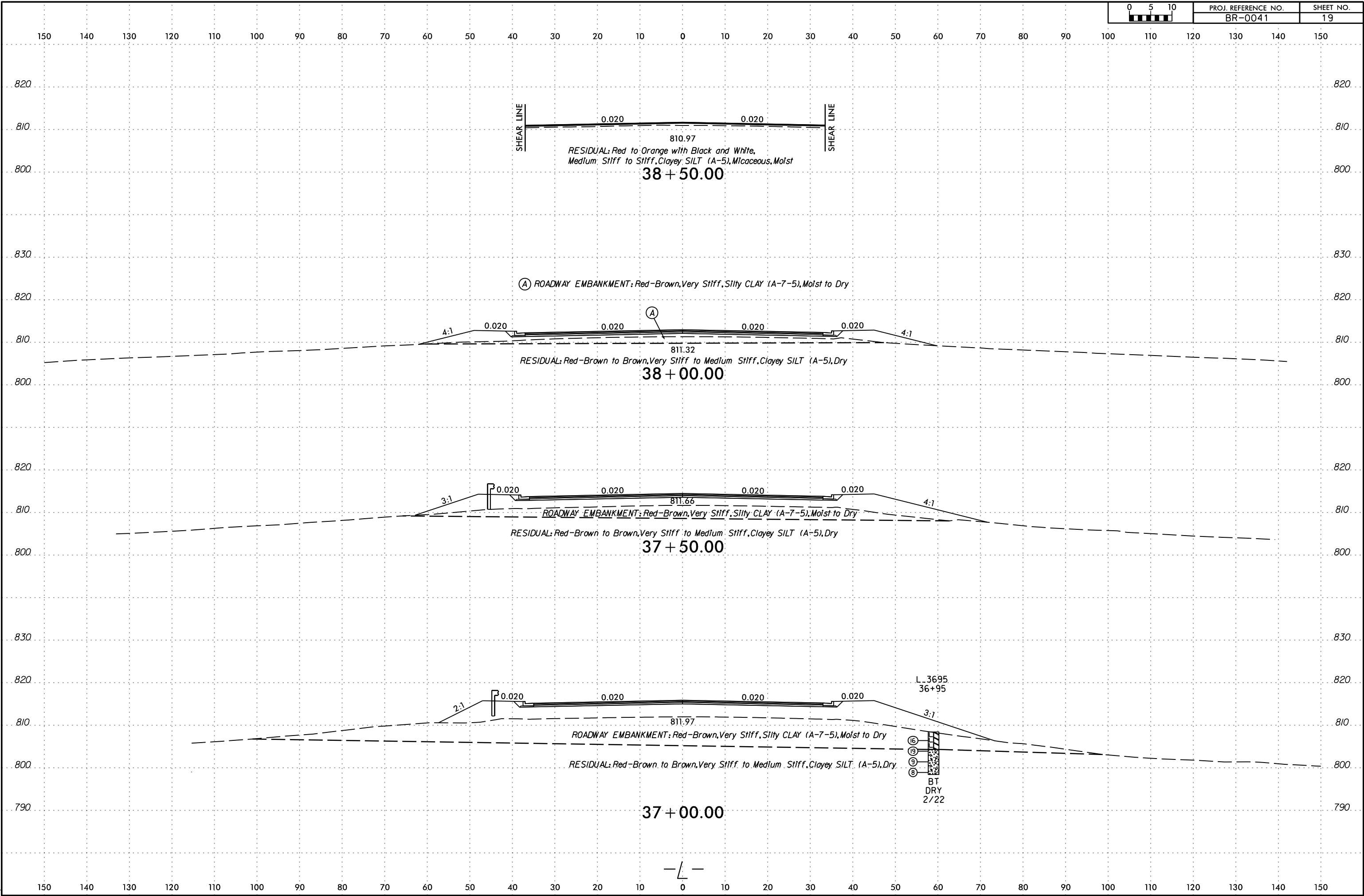
NOTE: STATION AND OFFSET REFER TO -Y- ALIGNMENT

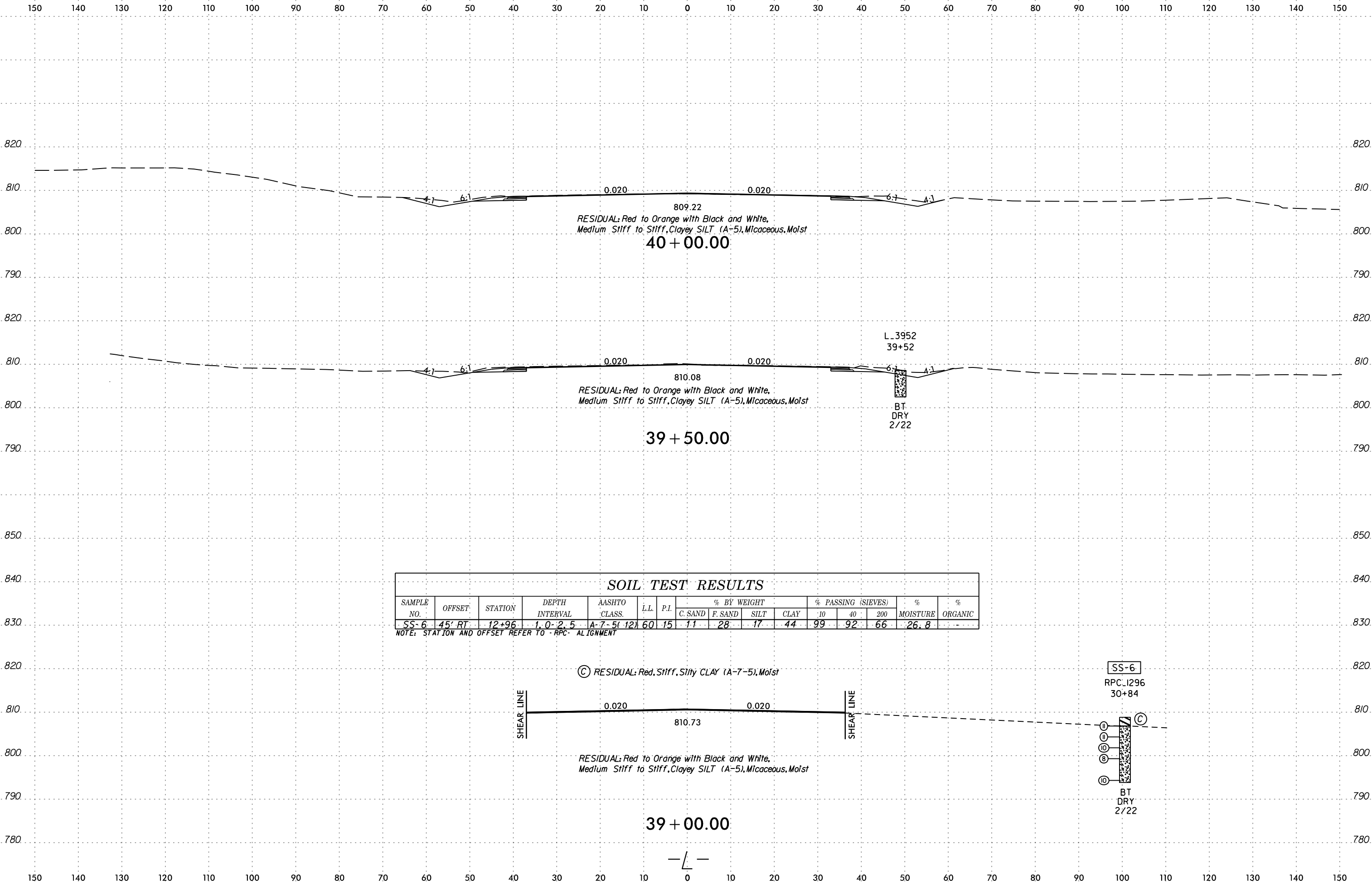


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-4	63' RT	18+12	1.0-2.5	A-5(9)	53	8	10	26	36	28	99	93	75	36.9	-

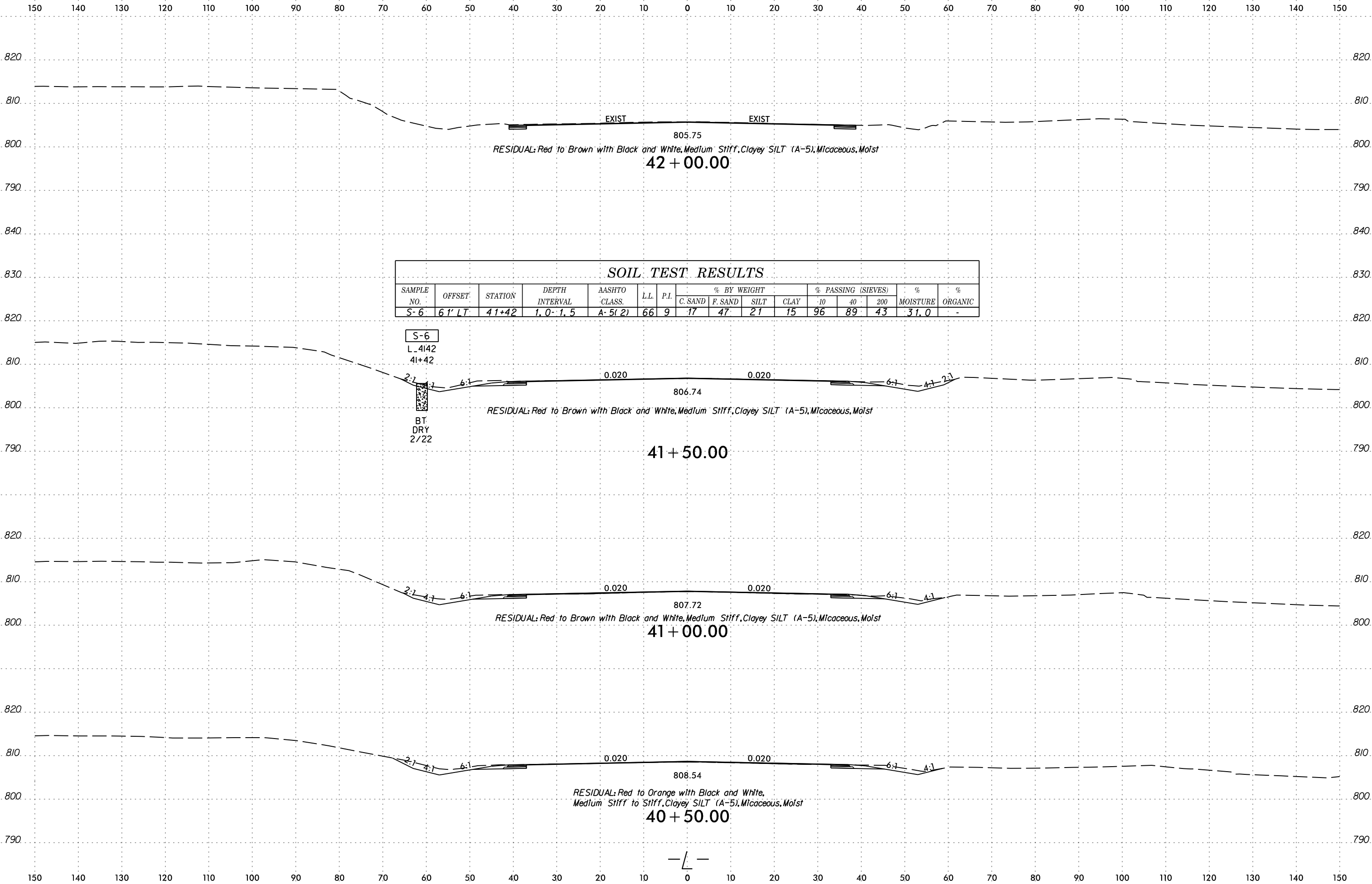
NOTE: STATION AND OFFSET REFER TO -Y- ALIGNMENT

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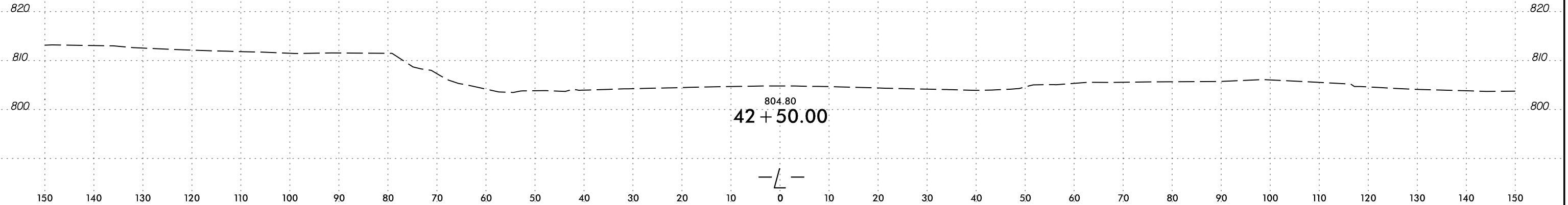
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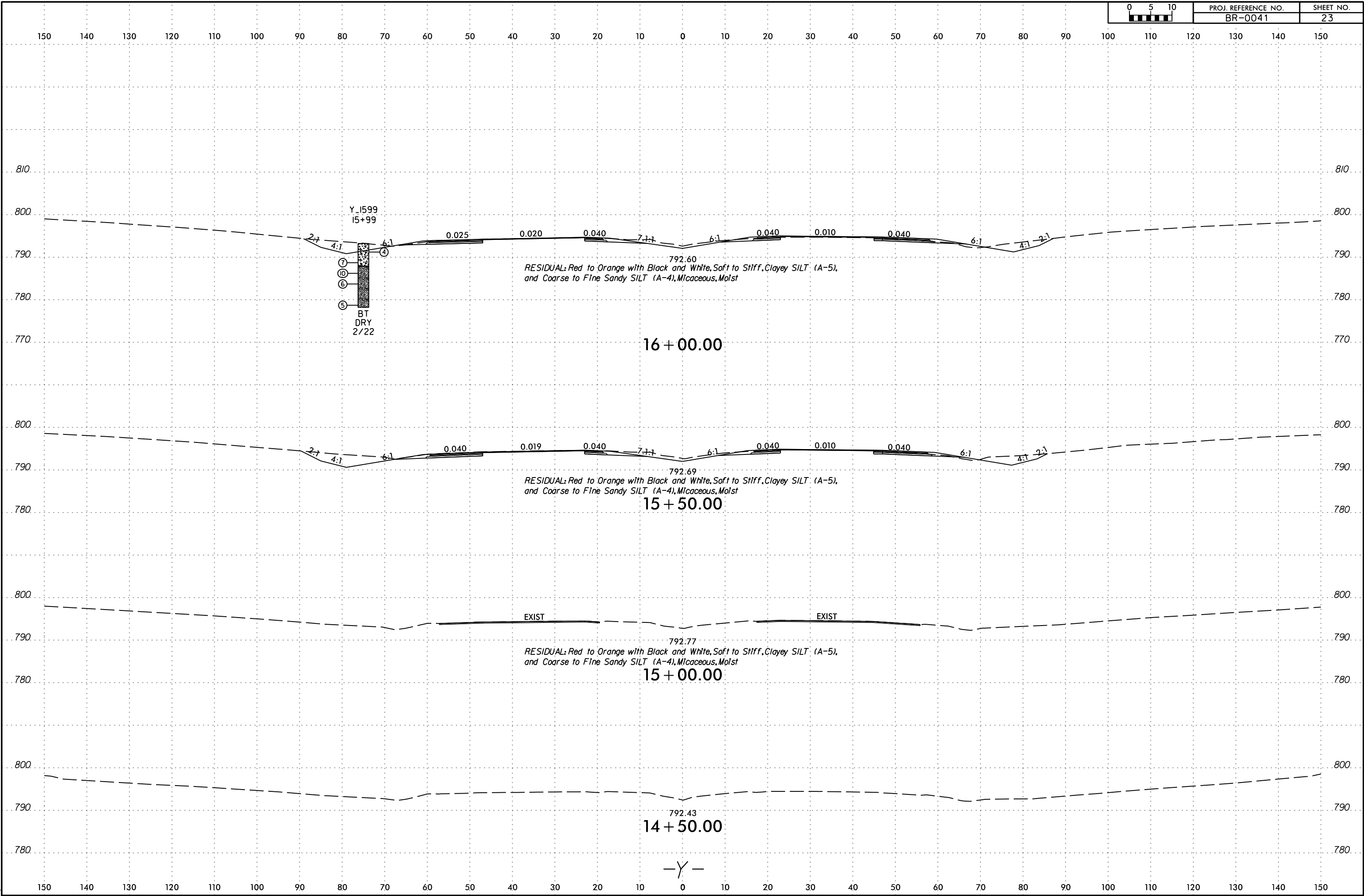




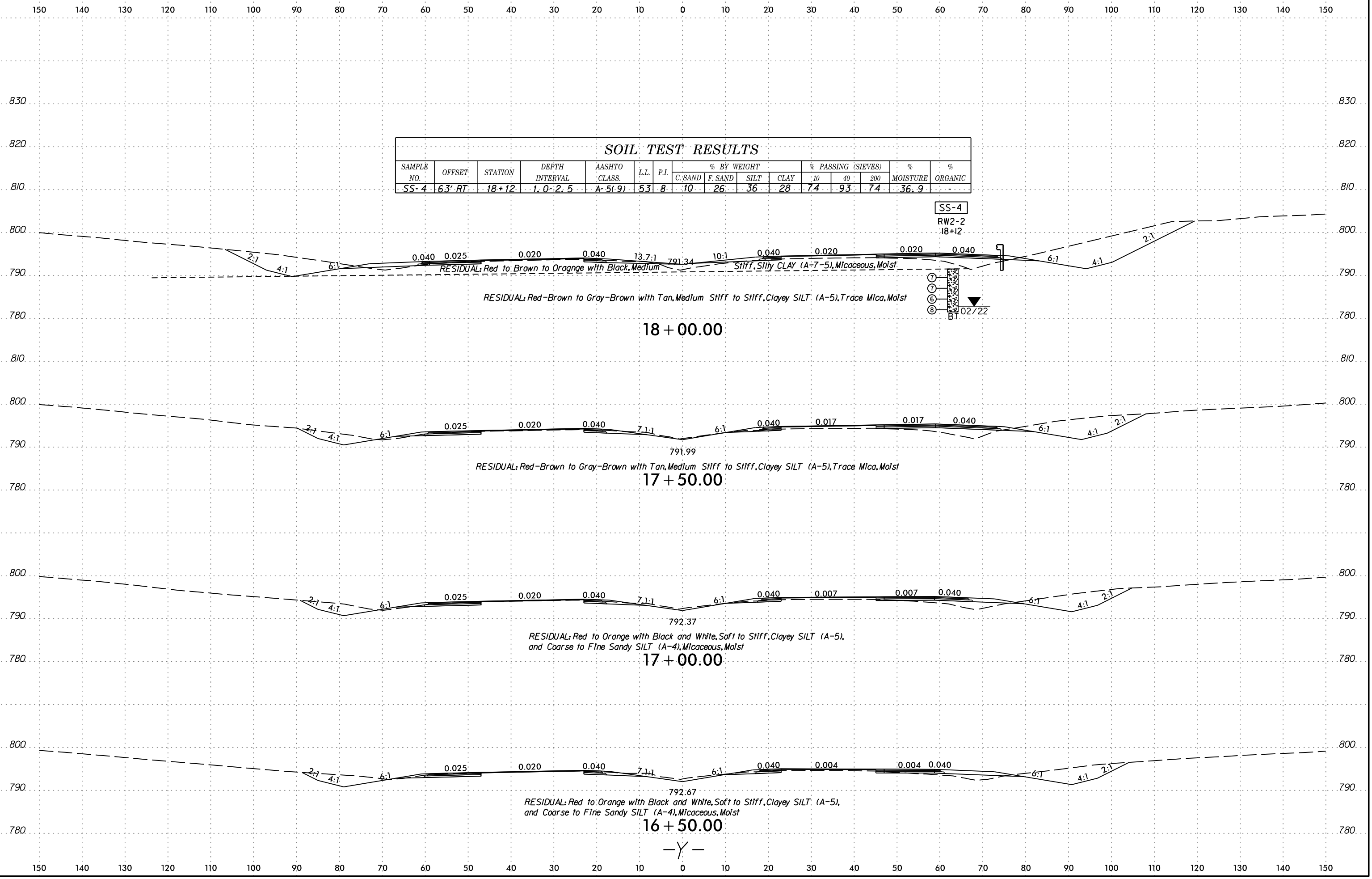
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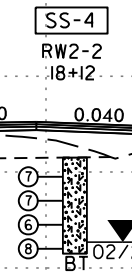


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**SOIL TEST RESULTS**

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		
SS-4	6.3' RT	18+12	1.0-2.5	A-5(9)	53	8	10	26	36	28	74	93	74	36.9	-



18 + 00.00

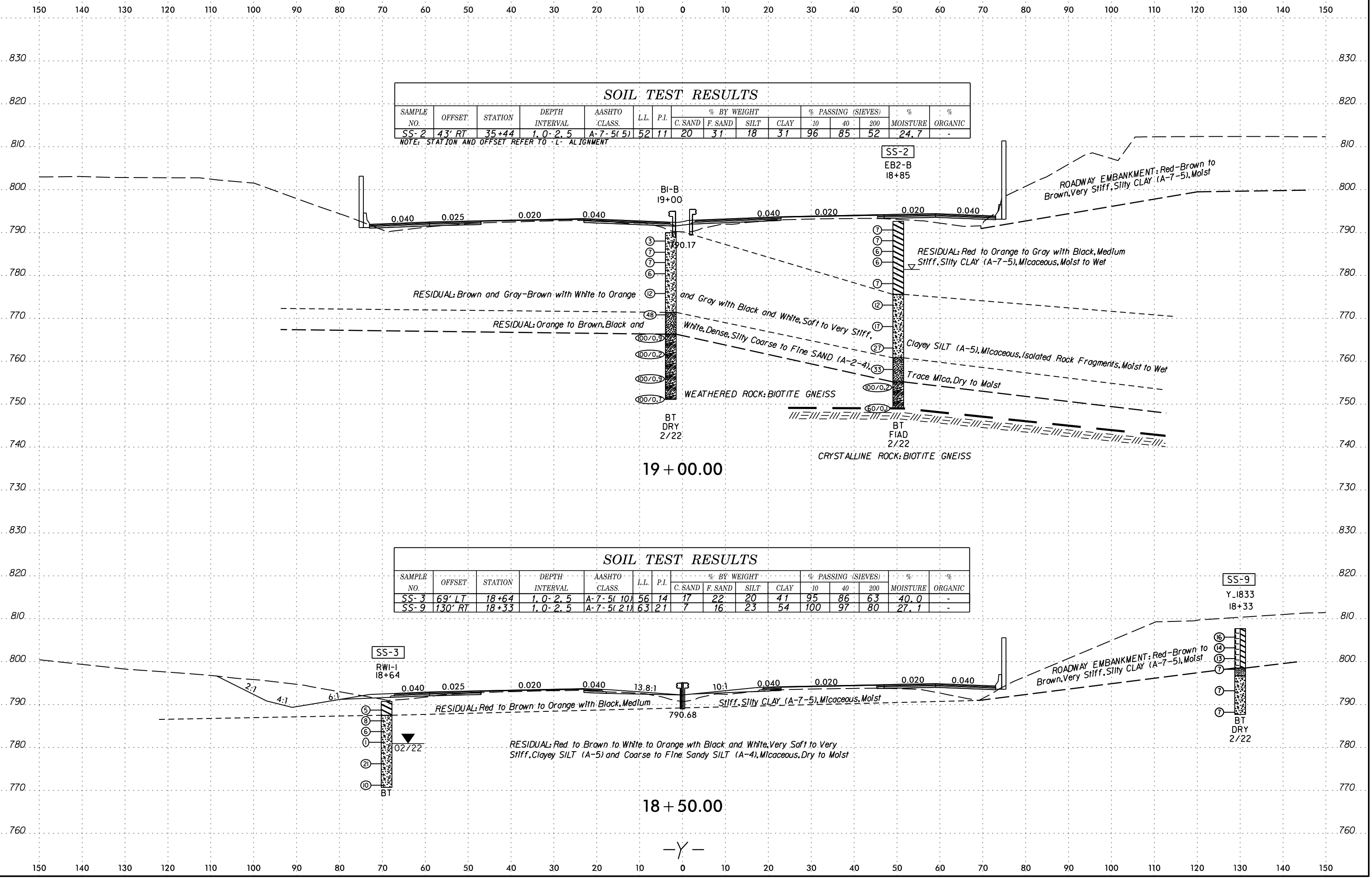
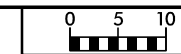
17 + 50.00

17 + 00.00

16 + 50.00

-Y-

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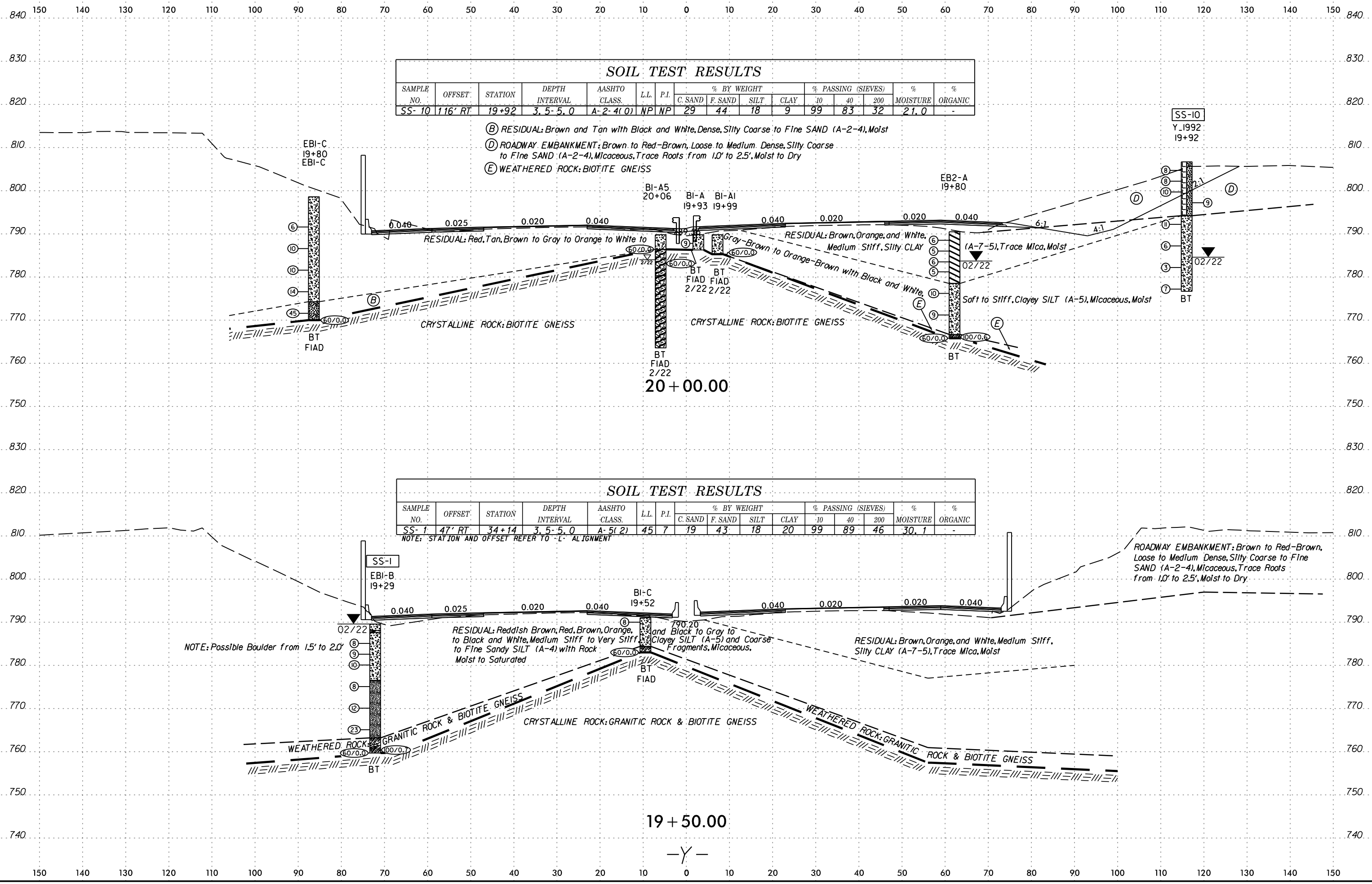


SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-2	43' RT	35+44	1.0-2.5	A-7-5(5)	52	11	20	31	18	31	96	85	52	24.7	-

NOTE: STATION AND OFFSET REFER TO -L- ALIGNMENT

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-3	69' LT	18+64	1.0-2.5	A-7-5(10)	56	14	17	22	20	41	95	86	63	40.0	-
SS-9	130' RT	18+33	1.0-2.5	A-7-5(21)	63	21	7	16	23	54	100	97	80	27.1	-

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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		
SS-10	116' RT	19+92	3.5-5.0	A-2-4(1)	NP	NP	29	44	18	9	99	83	32	21.0	-

- (B) RESIDUAL: Brown and Tan with Black and White, Dense, Silty Coarse to Fine SAND (A-2-4), Moist
- (D) ROADWAY EMBANKMENT: Brown to Red-Brown, Loose to Medium Dense, Silty Coarse to Fine SAND (A-2-4), Micaceous, Trace Roots from 1.0' to 2.5', Moist to Dry
- (E) WEATHERED ROCK: BIOTITE GNEISS

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		
SS-1	47' RT	34+14	3.5-5.0	A-5(2)	45	7	19	43	18	20	99	89	46	30.1	-

NOTE: STATION AND OFFSET REFER TO 'L' ALIGNMENT

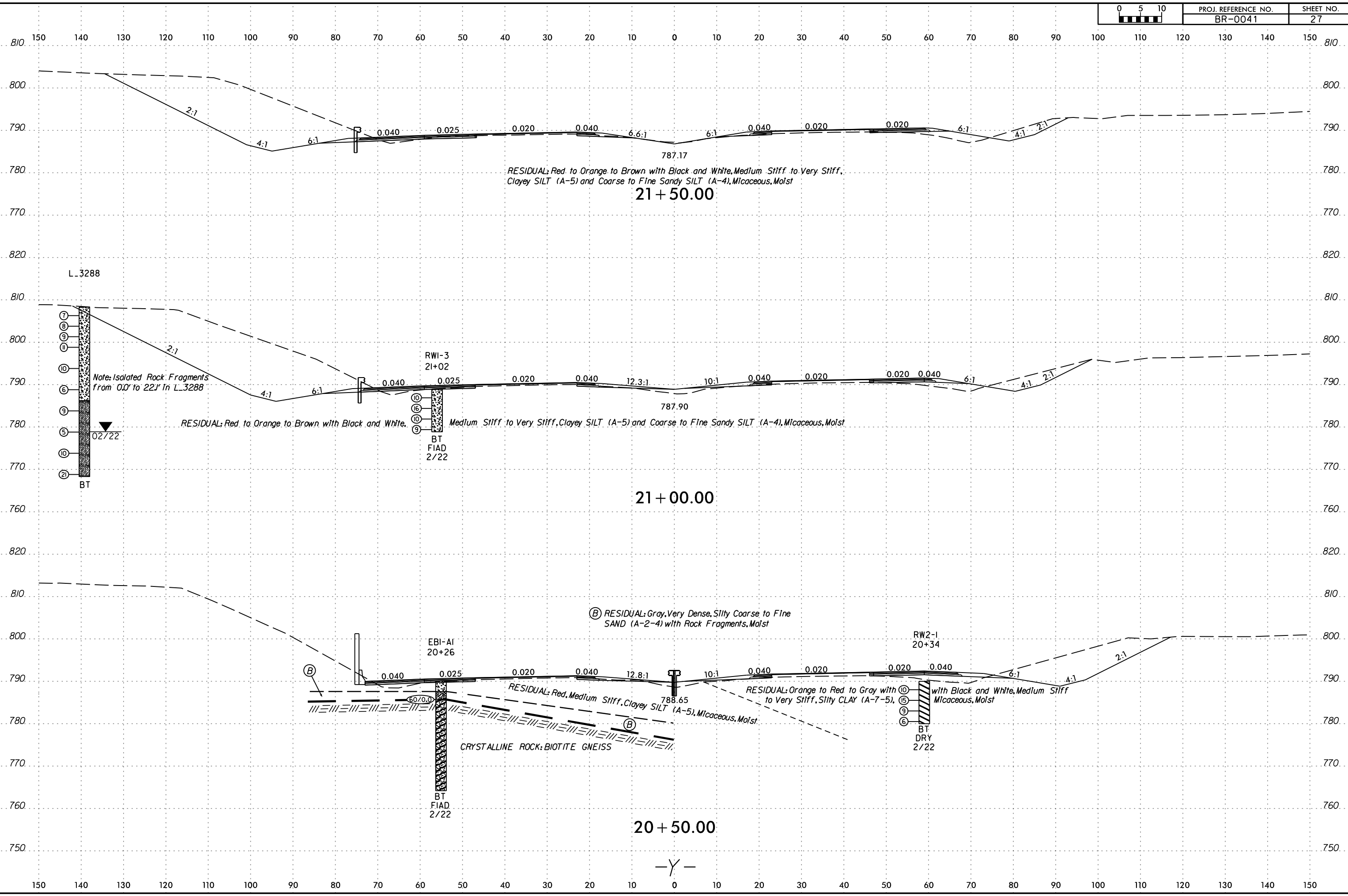
ROADWAY EMBANKMENT: Brown to Red-Brown, Loose to Medium Dense, Silty Coarse to Fine SAND (A-2-4), Micaceous, Trace Roots from 1.0' to 2.5', Moist to Dry.

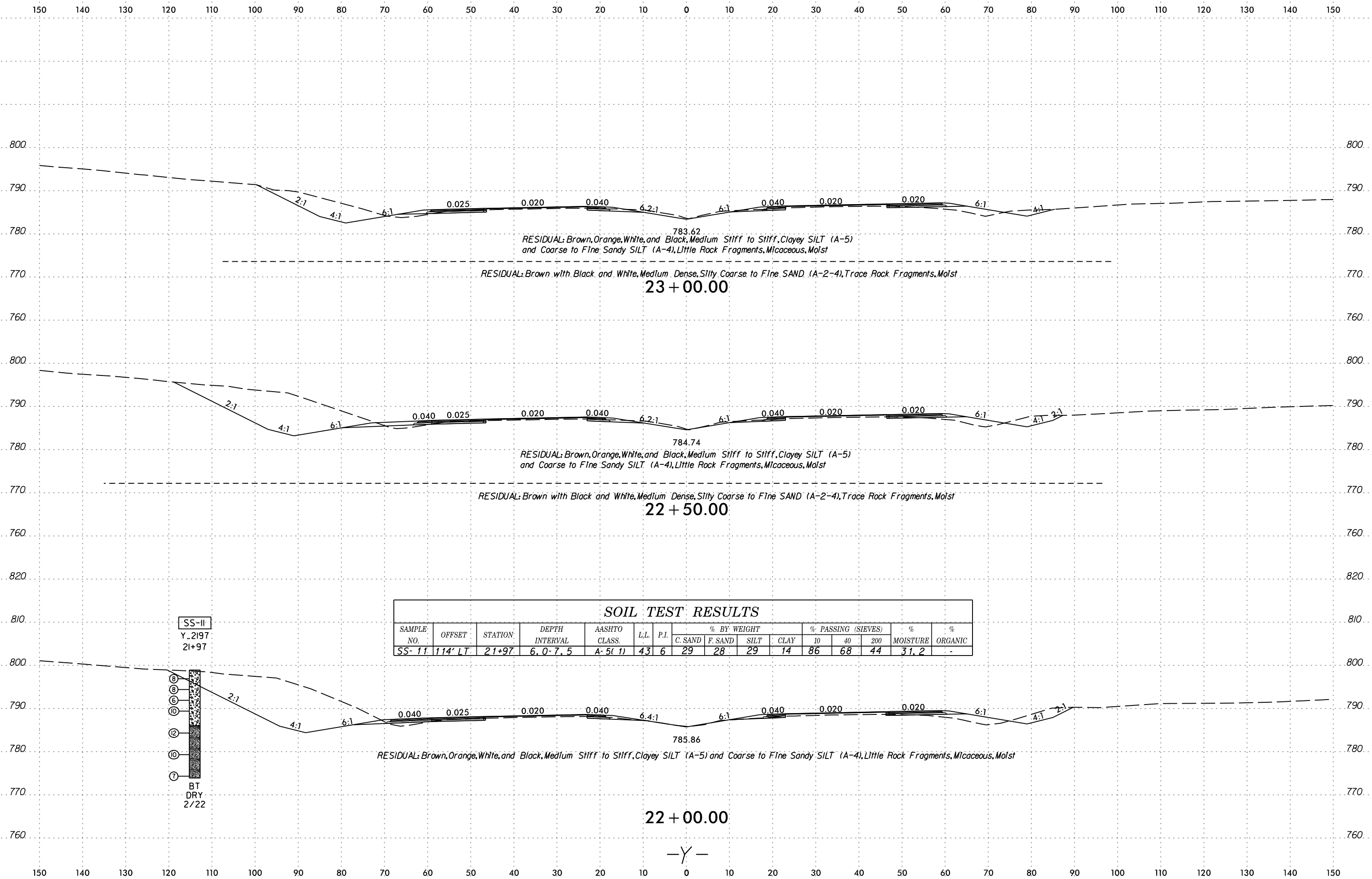
NOTE: Possible Boulder from 1.5' to 2.0'

19 + 50.00  
-Y-

6/23/16

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783.62  
 RESIDUAL: Brown, Orange, White, and Black, Medium Stiff to Stiff, Clayey SILT (A-5)  
 and Coarse to Fine Sandy SILT (A-4), Little Rock Fragments, Micaceous, Moist

RESIDUAL: Brown with Black and White, Medium Dense, Silty Coarse to Fine SAND (A-2-4), Trace Rock Fragments, Moist

23 + 00.00

784.74  
 RESIDUAL: Brown, Orange, White, and Black, Medium Stiff to Stiff, Clayey SILT (A-5)  
 and Coarse to Fine Sandy SILT (A-4), Little Rock Fragments, Micaceous, Moist

RESIDUAL: Brown with Black and White, Medium Dense, Silty Coarse to Fine SAND (A-2-4), Trace Rock Fragments, Moist

22 + 50.00

**SOIL TEST RESULTS**

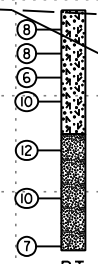
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-11	114' LT	21+97	6.0-7.5	A-5(1)	43	6	29	28	29	14	86	68	44	31.2	-

785.86  
 RESIDUAL: Brown, Orange, White, and Black, Medium Stiff to Stiff, Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Little Rock Fragments, Micaceous, Moist

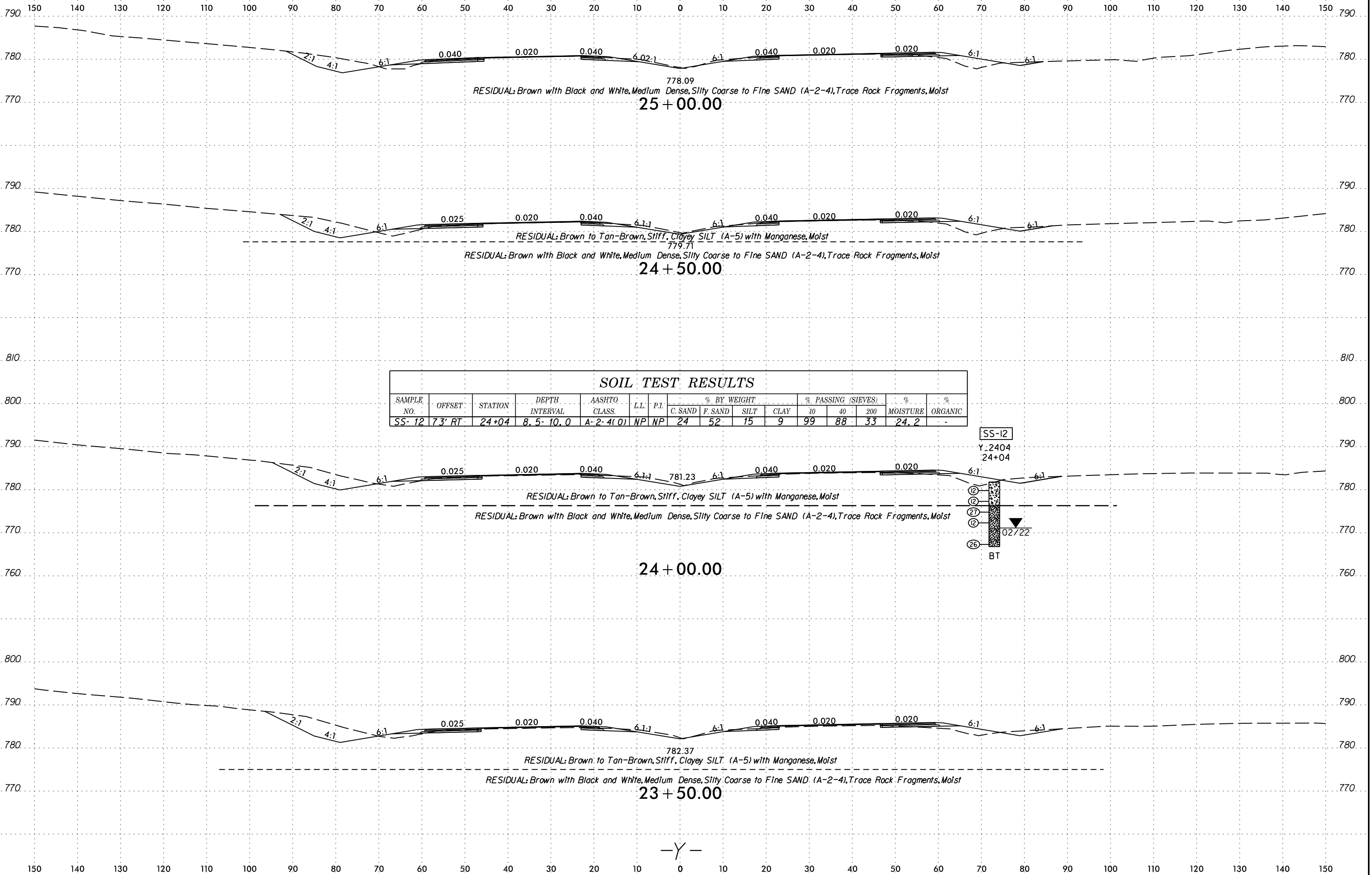
22 + 00.00

-Y-

SS-II  
 Y\_2197  
 21+97



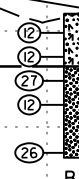
BT  
 DRY  
 2/22



### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-12	7.3' RT	24+04	8.5'-10.0'	A-2-4(0)	NP	NP	24	52	15	9	99	88	33	24.2	-

SS-12  
Y-2404  
24+04



24 + 00.00

23 + 50.00

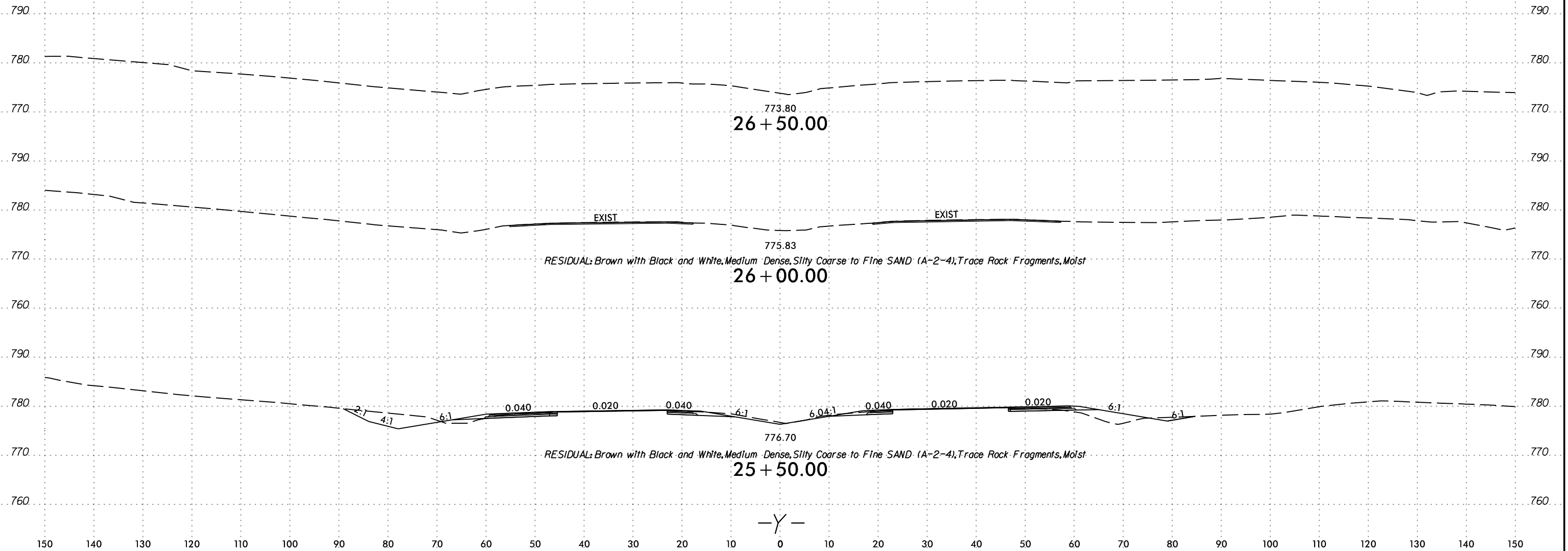
-Y-



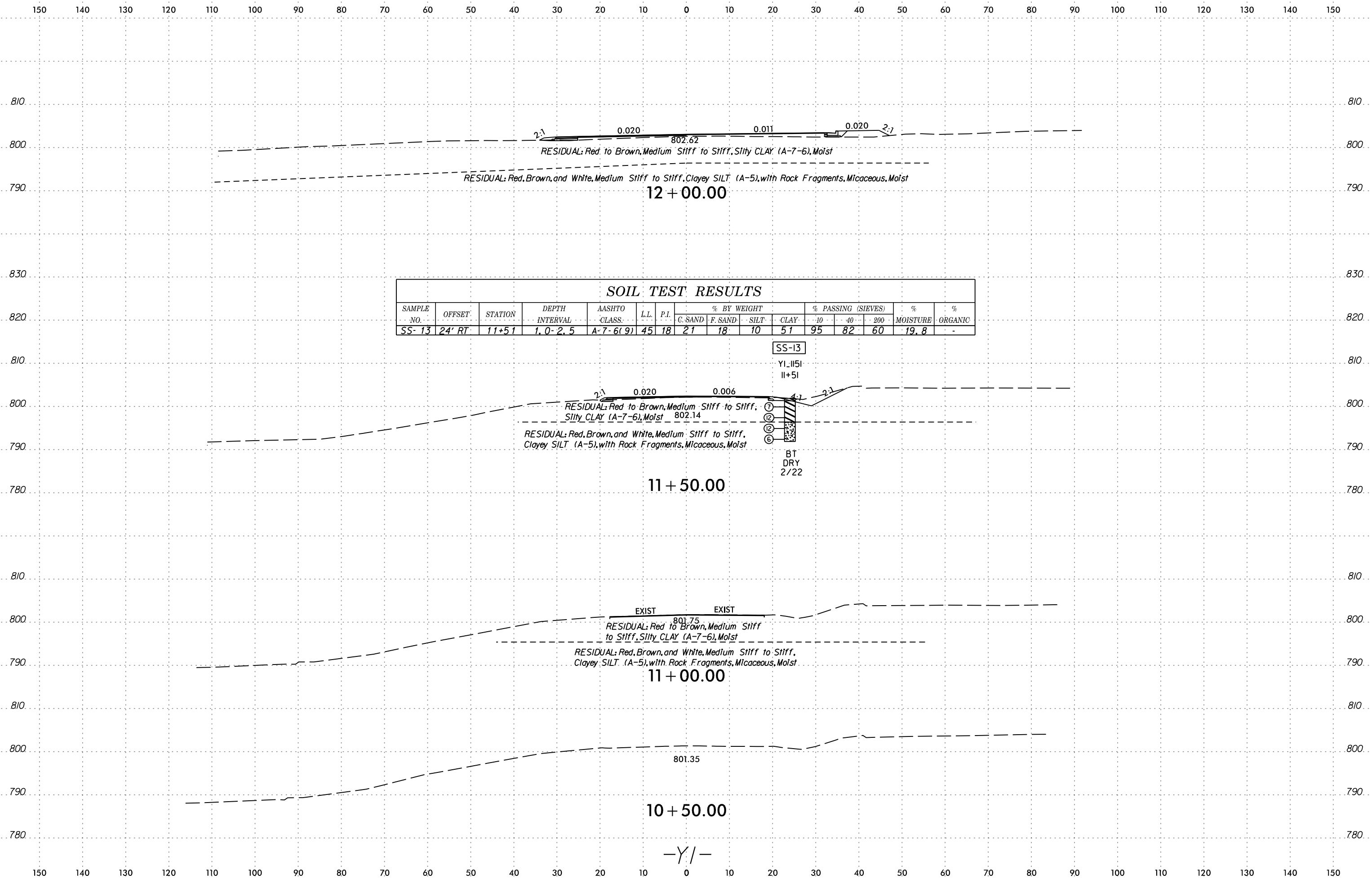


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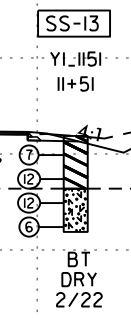


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**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-13	24' RT	11+51	1.0-2.5	A-7-6(9)	45	18	21	18	10	51	95	82	60	19.8	-

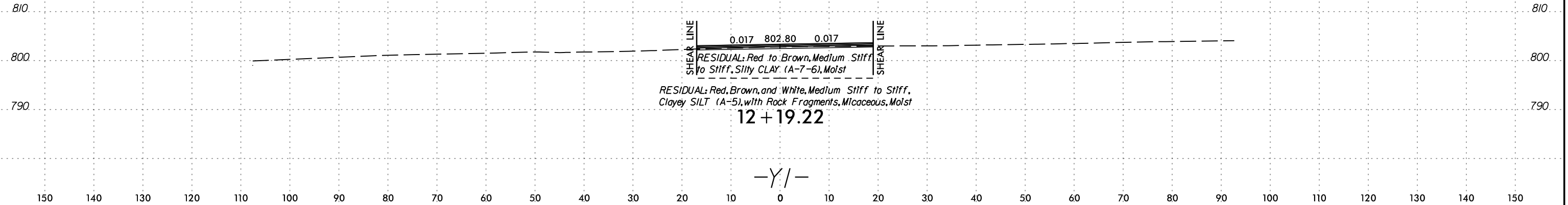


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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

820 820

810 810

800 800

830 830

820 820

810 810

800 800

790 790

820 820

810 810

800 800

820 820

810 810

800 800

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

0.010

813.58  
RESIDUAL: Red to Brown with Black and White, Medium Stiff to Stiff,  
Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

13 + 50.00

0.020

812.07  
RESIDUAL: Red to Brown with Black and White, Medium Stiff to Stiff,  
Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

13 + 00.00

EXIST

809.86  
RESIDUAL: Red to Brown with Black and White, Medium Stiff to Stiff,  
Clayey SILT (A-5) and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

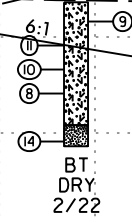
12 + 50.00

806.92

12 + 00.00

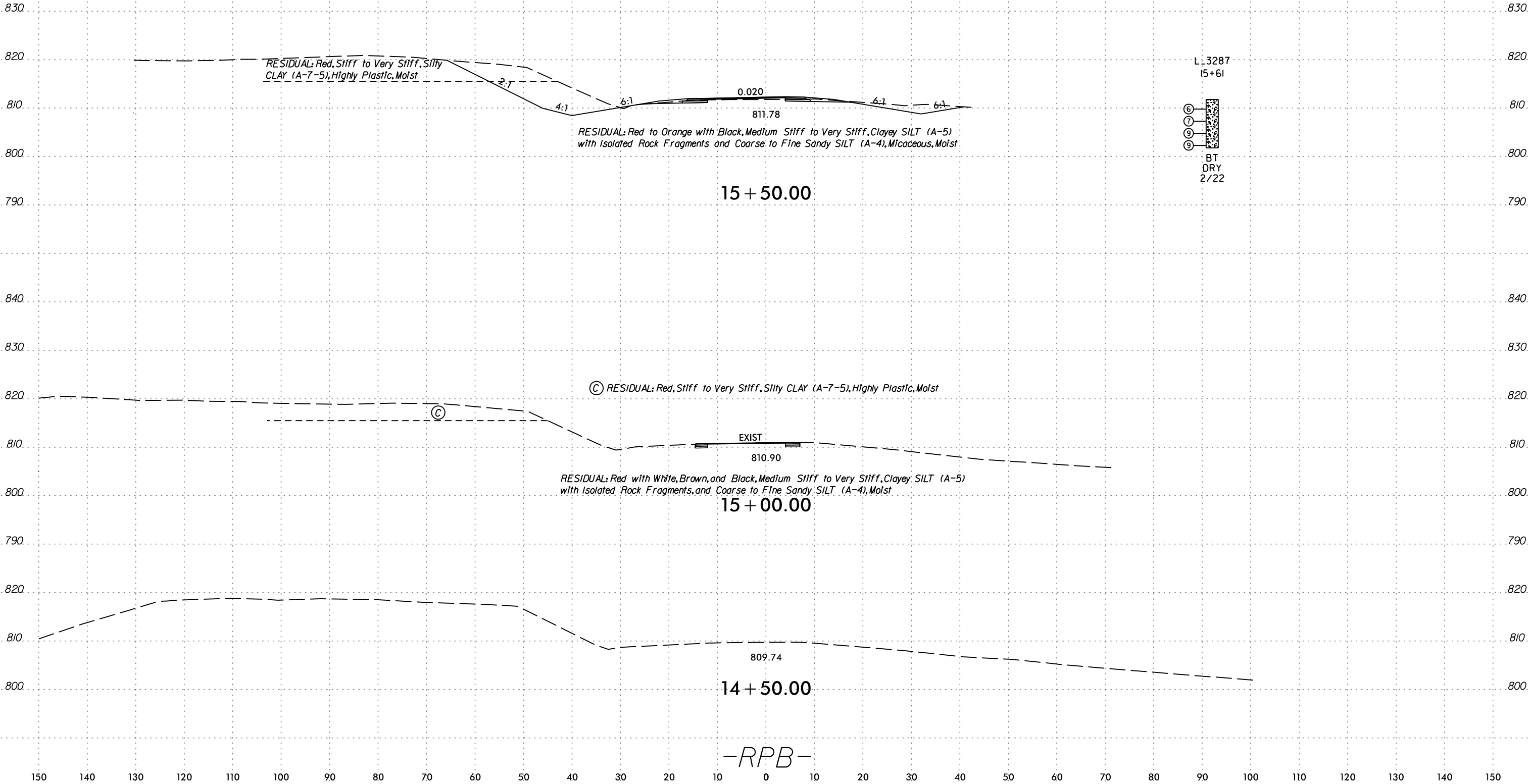
-RPA-

RPA.1296  
12+96



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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 90 100 110 120 130 140 150



RESIDUAL: Red, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

RESIDUAL: Red to Orange with Black, Medium Stiff to Very Stiff, Clayey SILT (A-5) with Isolated Rock Fragments and Coarse to Fine Sandy SILT (A-4), Micaceous, Moist

RESIDUAL: Red, Stiff to Very Stiff, Silty CLAY (A-7-5), Highly Plastic, Moist

RESIDUAL: Red with White, Brown, and Black, Medium Stiff to Very Stiff, Clayey SILT (A-5) with Isolated Rock Fragments, and Coarse to Fine Sandy SILT (A-4), Moist

L 3287  
15+61

- 6
- 7
- 8
- 9

BT  
DRY  
2/22

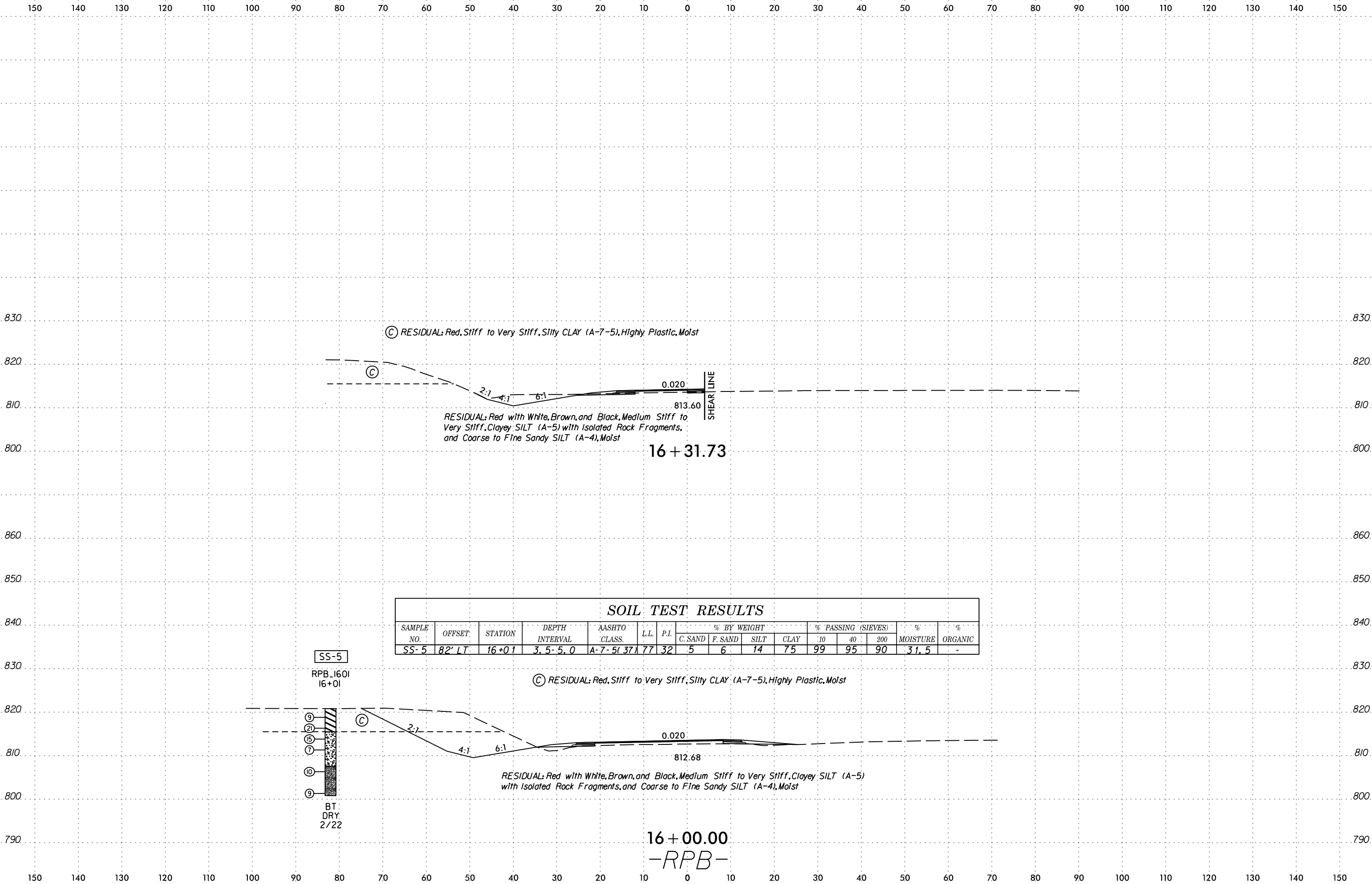
15 + 50.00

15 + 00.00

14 + 50.00

-RPB-

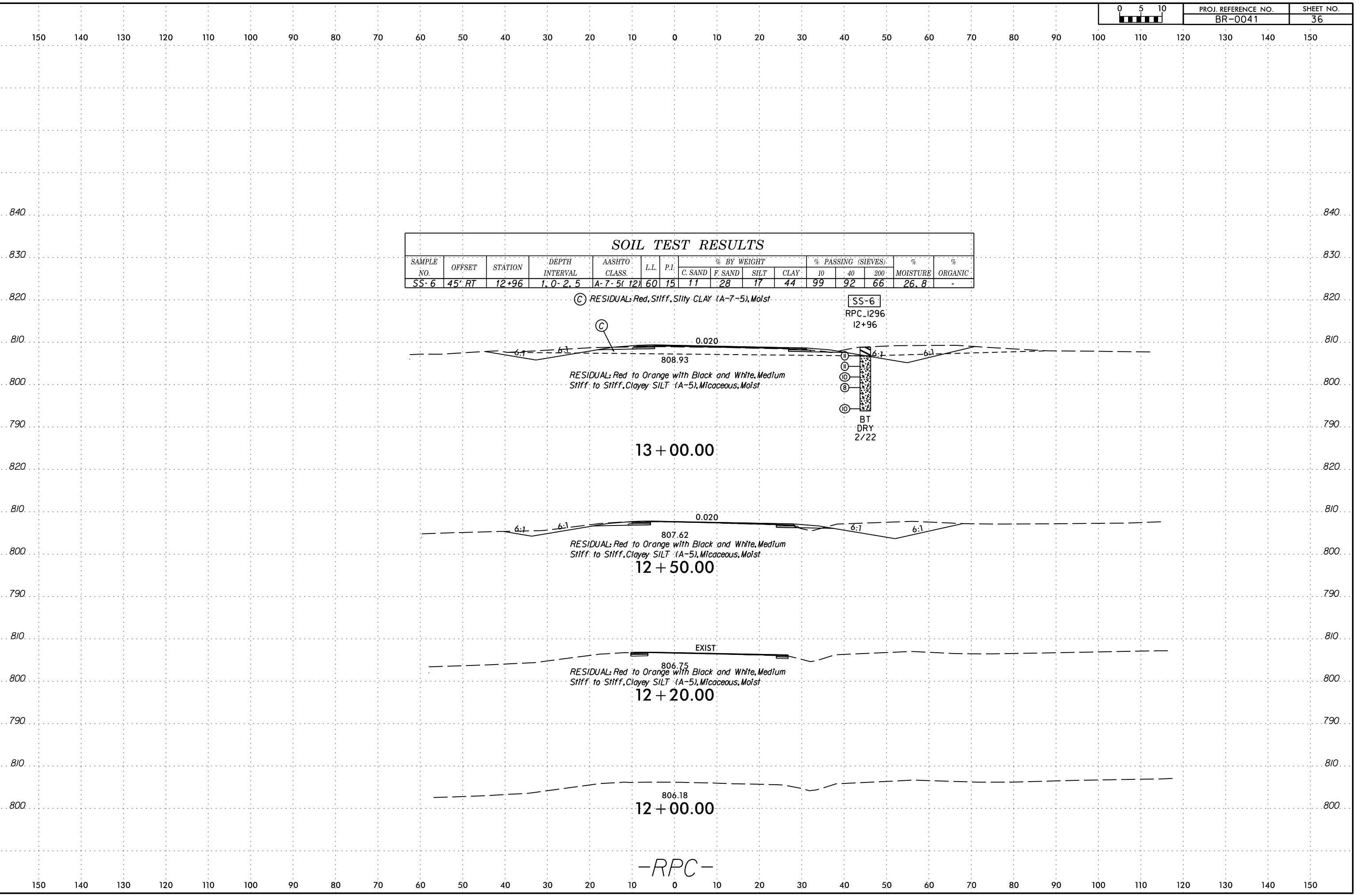
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-5	82' LT	16+01	3.5-5.0	A-7-5(37)	77	32	5	6	14	75	99	95	90	31.5	-

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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			
SS-6	45' RT	12+96	1.0-2.5	A-7-5(12)	60	15	11	28	17	44	99	92	66	26.8	-	

(C) RESIDUAL: Red, Stiff, Silty CLAY (A-7-5), Moist  
 SS-6  
 RPC\_1296  
 12+96  
 BT DRY  
 2/22

RESIDUAL: Red to Orange with Black and White, Medium Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist

RESIDUAL: Red to Orange with Black and White, Medium Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist

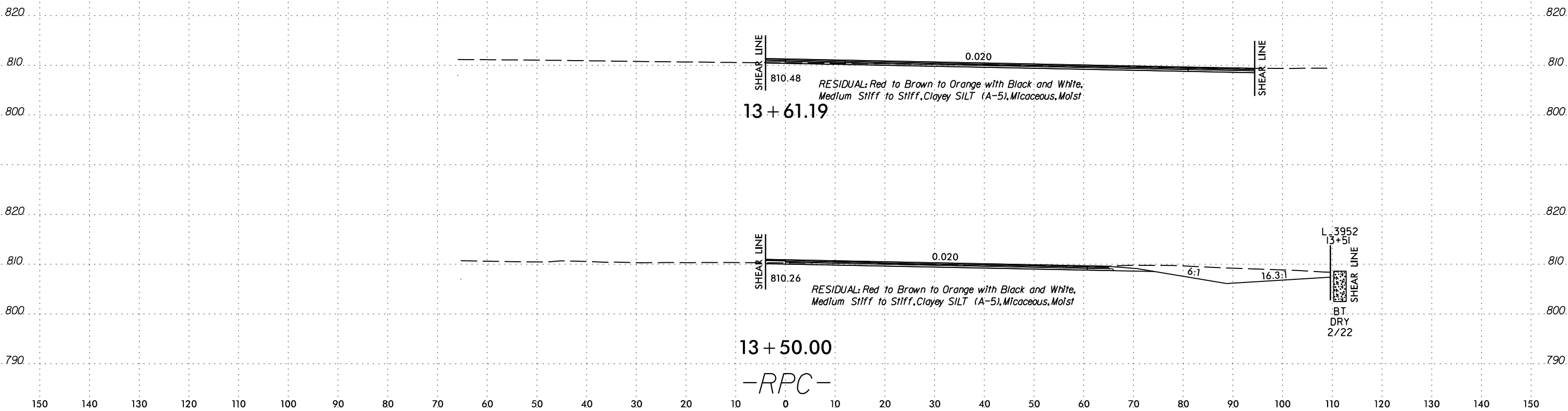
RESIDUAL: Red to Orange with Black and White, Medium Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist

-RPC-



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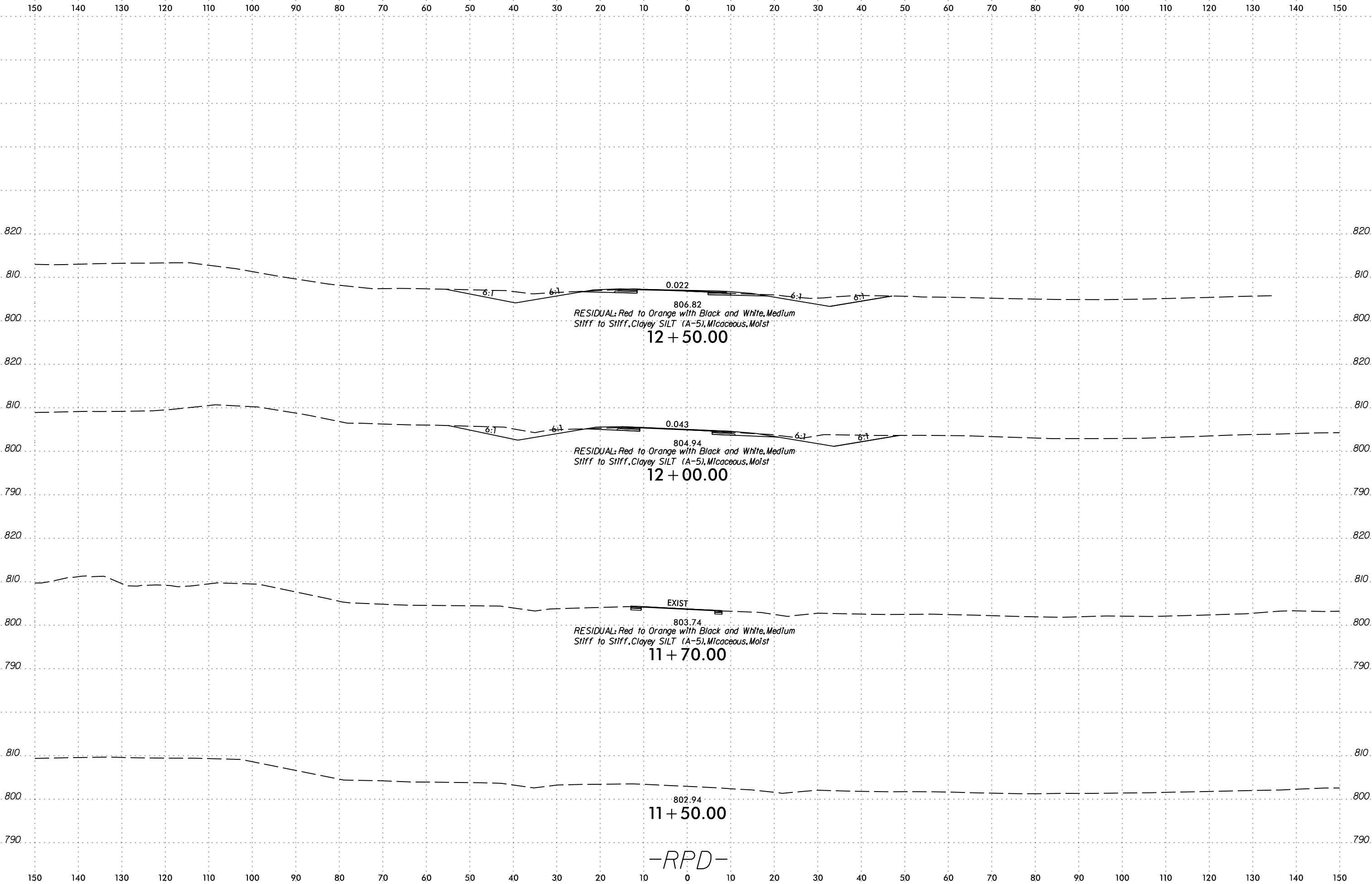
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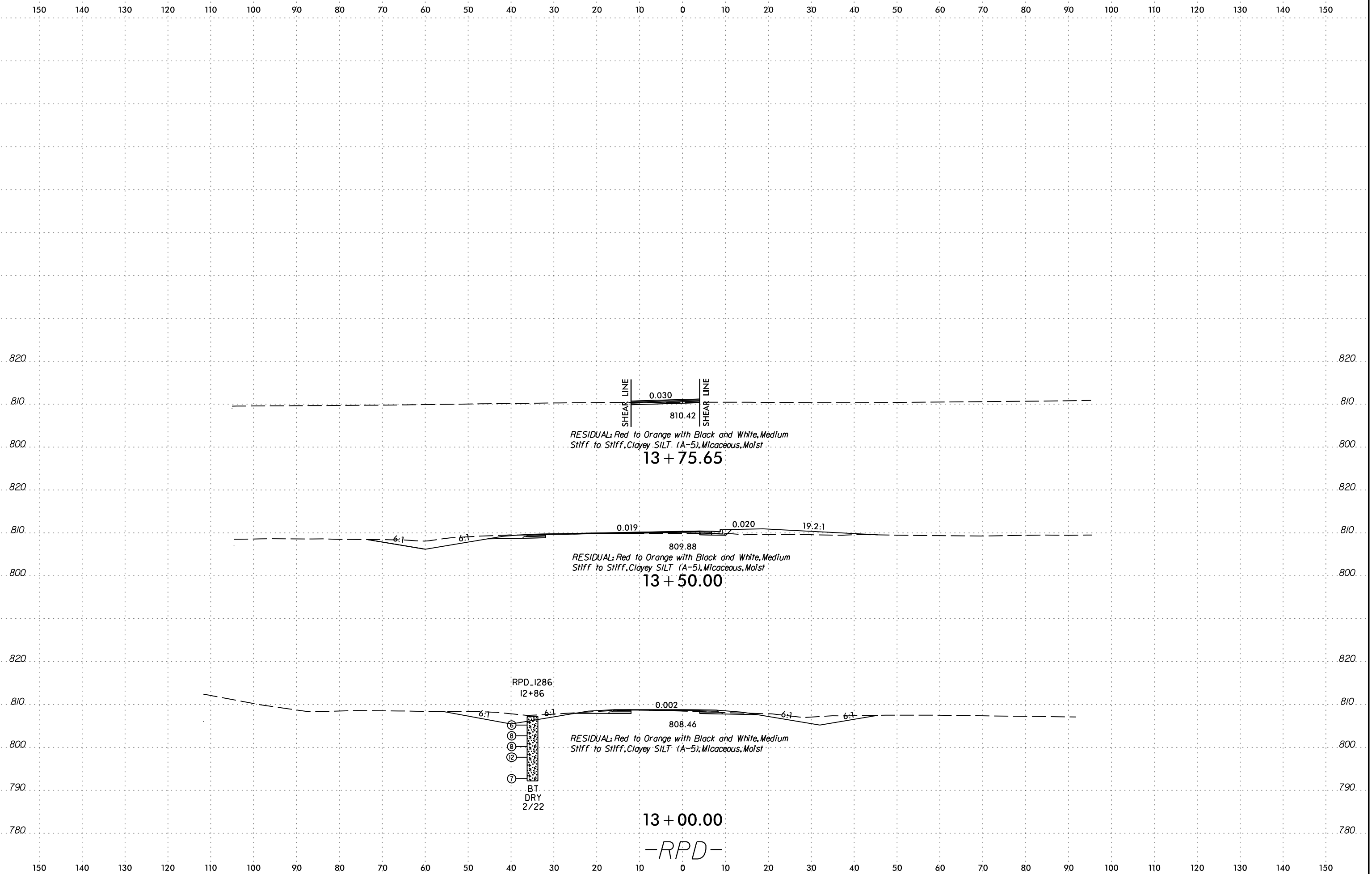
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-RPC-





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RESIDUAL: Red to Orange with Black and White, Medium  
 Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist  
 13 + 75.65

RESIDUAL: Red to Orange with Black and White, Medium  
 Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist  
 13 + 50.00

RESIDUAL: Red to Orange with Black and White, Medium  
 Stiff to Stiff, Clayey SILT (A-5), Micaceous, Moist  
 13 + 00.00

RPD\_1286  
 12+86  
 BT  
 DRY  
 2/22

13 + 00.00  
 -RPD-

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
**SUBSURFACE INVESTIGATION**  
APPENDIX A  
LABORATORY TESTS RESULTS SUMMARY

REFERENCE: BR-0041

PROJECT: 67041

## SOILS LABORATORY TESTS RESULTS


WBS NO.: 67041.1.1

TIP NO.: BR-0041

COUNTY: Rockingham

SITE DESCRIPTION: Bridge No. 780001 on SR 2817 (Barnes Street) Over US 29

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1_B	SS-1	-L- STA. 34+14, 47' RT	3.5-5.0	A-5 (2)	8	45	7	19	43	18	20	99	89	46	30.1	-
EB2_B	SS-2	-L- STA. 35+44, 43' RT	1.0-2.5	A-7-5 (5)	7	52	11	20	31	18	31	96	85	52	24.7	-
RW1_1	SS-3	-Y- STA. 18+64, 69' LT	1.0-2.5	A-7-5 (10)	5	56	14	17	22	20	41	95	86	63	40.0	-
RW2_2	SS-4	-Y- STA. 18+12, 63' RT	1.0-2.5	A-5 (9)	7	53	8	10	26	36	28	99	93	74	36.9	-
RPB_1601	SS-5	-RPB- STA. 16+01, 82' LT	3.5-5.0	A-7-5 (37)	21	77	32	5	6	14	75	99	95	90	31.5	-
RPC_1296	SS-6	-RPC- STA. 12+96, 45' RT	1.0-2.5	A-7-5 (12)	11	60	15	11	28	17	44	99	92	66	26.8	-
L_1727	S-1	-L- STA. 17+27, 33' LT	1.5-2.5	A-2-4 (0)	N/A	19	3	34	39	4	23	97	78	30	15.3	-
L_1897	S-2	-L- STA. 18+97, 33' LT	1.0-2.0	A-7-5 (11)	N/A	60	26	24	16	13	47	84	70	52	21.7	-
L_2400	S-3	-L- STA. 24+00, 31' LT	1.0-1.5	A-7-5 (30)	N/A	69	37	12	14	10	64	98	92	74	30.0	-
L_2551	S-4	-L- STA. 25+51, 33' LT	1.0-1.5	A-7-5 (14)	N/A	59	20	19	18	19	44	99	86	66	15.8	-
L_2696	SS-7	-L- STA. 26+96, 44' RT	3.5-5.0	A-6 (4)	12	37	15	25	28	9	38	92	78	46	26.3	-
L_2890	SS-8	-L- STA. 28+90, 31' LT	1.0-2.5	A-1-a (0)	14	22	5	33	36	15	16	30	24	11	11.4	-
L_3300	S-5	-L- STA. 33+00, 48' LT	2.0-3.0	A-7-5 (6)	N/A	53	14	20	32	27	21	94	82	52	25.1	-
L_4142	S-6	-L- STA. 41+42, 61' LT	1.0-1.5	A-5 (2)	N/A	66	9	17	47	21	15	96	89	43	31.0	-
Y_1833	SS-9	-Y- STA. 18+33, 130' RT	1.0-2.5	A-7-5 (21)	16	63	21	7	16	23	54	100	97	80	27.1	-
Y_1992	SS-10	-Y- STA. 19+92, 116' RT	3.5-5.0	A-2-4 (0)	8	NP	NP	29	44	18	9	99	83	32	21.0	-
Y_2197	SS-11	-Y- STA. 21+97, 114' LT	6.0-7.5	A-5 (1)	6	43	6	29	28	29	14	86	68	44	31.2	-
Y_2404	SS-12	-Y- STA. 24+04, 73' RT	8.5-10.0	A-2-4 (0)	12	NP	NP	24	52	15	9	99	88	33	24.2	-
Y1_1151	SS-13	-Y1- STA. 11+51, 24' RT	1.0-2.5	A-7-6 (9)	7	45	18	21	18	10	51	95	82	60	19.8	-


  
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