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REFERENCE: B-5360

PROJECT: 46074

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-5360	1	21

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ROADWAY SUBSURFACE INVESTIGATION

COUNTY RANDOLPH
PROJECT DESCRIPTION BRIDGE NO. 374 OVER SANDY
CREEK ON SR 2481 (LOW BRIDGE RD.)

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

B. BOYCE

S. CROCKETT

P. ZHANG

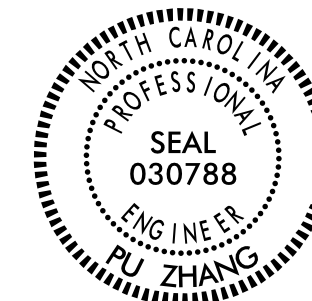
INVESTIGATED BY S. CROCKETT

DRAWN BY S. CROCKETT

CHECKED BY P. ZHANG

SUBMITTED BY P. ZHANG

DATE NOVEMBER 2014



DocuSigned by:

Paul Zhang

12/12/2014

SIGNATURE

DATE

SIGNATURE

DATE

**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 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 (ROD) - 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>									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)									
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p>										<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>									
MINERALOGICAL COMPOSITION										COMPRESSION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)									
<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>									
COMPRESSIBILITY										PERCENTAGE OF MATERIAL										WEATHERING										FRESH									
<p>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</p>										<p>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</p>										<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>										<p>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.</p>									
GROUND WATER										MISCELLANEOUS SYMBOLS										MODERATE (MOD.)										MODERATELY SEVERE (MOD. SEV.)									
<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p>										<p>DIP & DIP DIRECTION OF ROCK STRUCTURES SPT DMT VST TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION</p>										<p>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.</p>										<p>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>									
CONSISTENCY OR DENSENESS										RECOMMENDATION SYMBOLS										SEVERE (SEV.)										VERY SEVERE (V. SEV.)									
<p>PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</p>										<p>UNDERCUT EXCAVATION UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>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</p>										<p>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</p>									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS										VERY HARD										HARD									
<p>U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>										<p>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 WE. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>										<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>										<p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>									
SOIL MOISTURE - CORRELATION OF TERMS										TEXTURE OR GRAIN SIZE										MODERATELY HARD										MEDIUM HARD									
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p>										<p>BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)</p>										<p>CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>										<p>CAN BE GROUDED 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.</p>									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT										SOFT										VERY SOFT									
<p>LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT</p>										<p>DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST 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</p>										<p>CAN BE GROUDED OR GOUGED 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>										<p>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 FINGER NAIL.</p>									
FRACATURE SPACING										BEDDING										INDURATION										EXTREMELY INDURATED									
<p>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>										<p>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</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>									
COLOR										INDURATION										FRAGILE										MODERATELY INDURATED									
<p>DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>FRAGILE 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.</p>										<p>NOTES: FIAD - BORING FILLED IN AFTER DRILLING HAR - HAND AUGER REFUSAL</p>										<p>FRACATURE SPACING</p>									
ELEVATION: 494.77 FEET										INDURATION										FRAGILE										MODERATELY INDURATED									

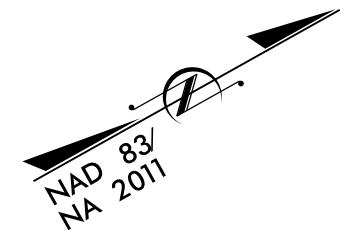
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5360	2A	21
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46074.1.1	BRZ-2481(2)	PE	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

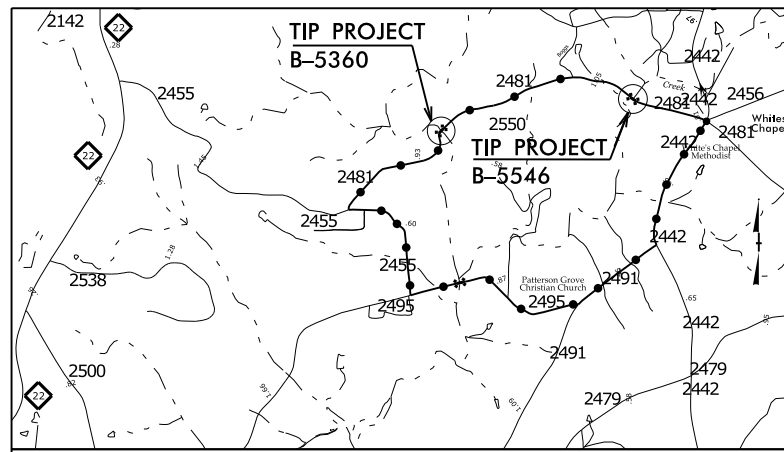
RANDOLPH COUNTY

LOCATION: BRIDGE NO 374 OVER SANDY CREEK ON SR 2481 (LOW BRIDGE RD.)

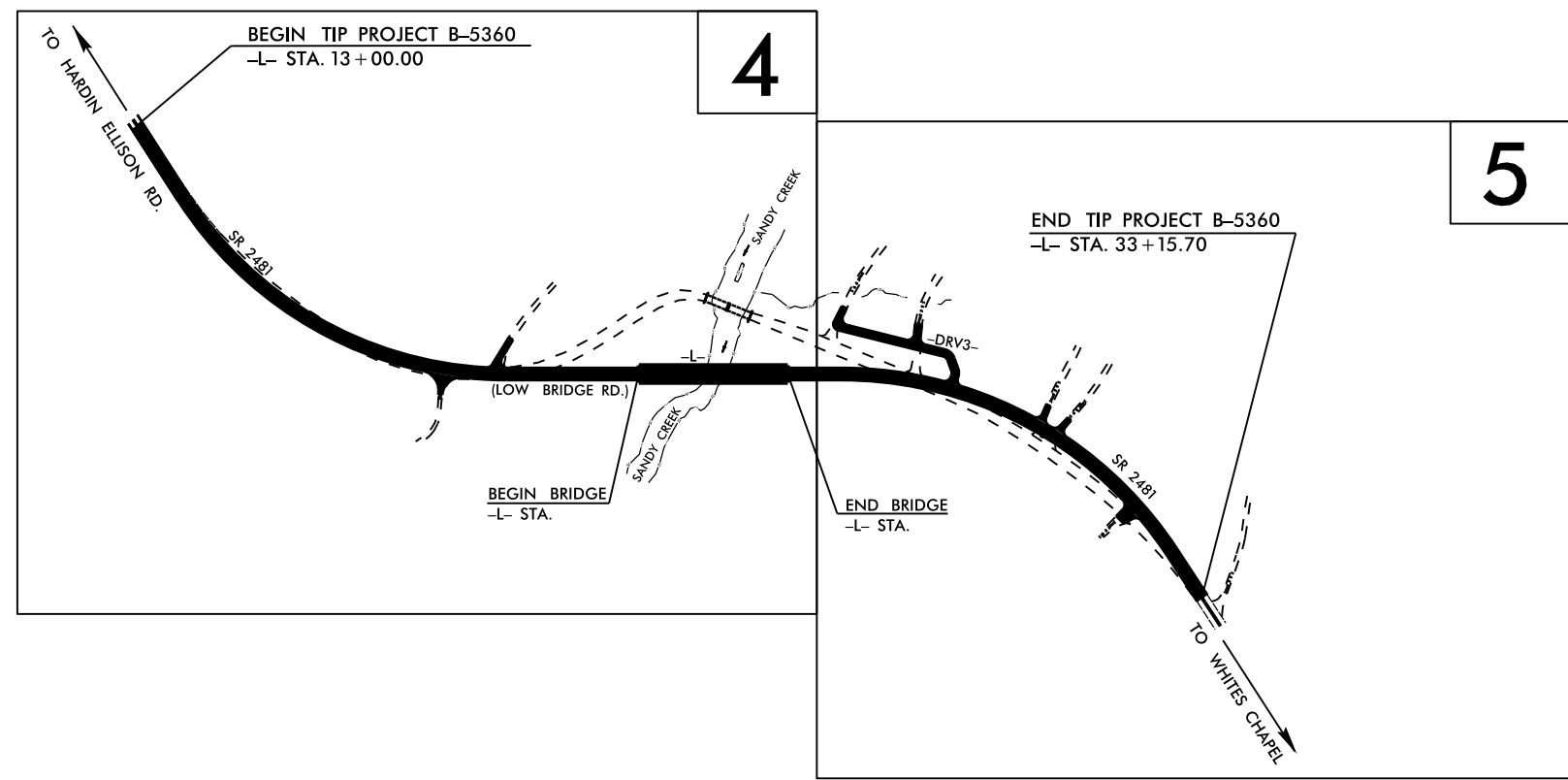
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



See Sheet 1-A For Index of Sheets



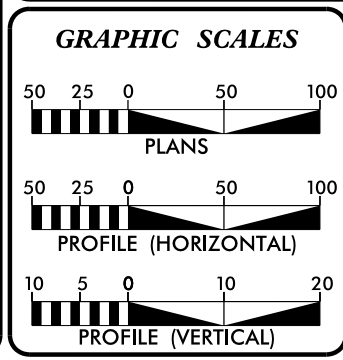
CONTRACT: TIP PROJECT: B-5360



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

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED AND SAG VERTICAL CURVE
AND NIGHTTIME STOPPING SIGHT DISTANCE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DESIGN DATA

ADT 2014 =	420 VPD
ADT 2040 =	700 VPD
K =	13 %
D =	60 %
T =	9 % *
**V =	40 MPH
* TTST =	1% DUAL 8%
FUNC CLASS =	RURAL, LOCAL
SUBREGIONAL TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5360 =	MI
LENGTH OF STRUCTURE TIP PROJECT B-5360 =	MI
TOTAL LENGTH OF STATE TIP PROJECT B-5360 =	0.379 MI

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

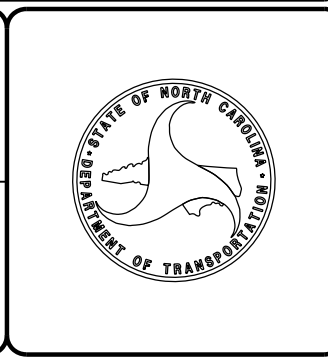
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: OCTOBER 16, 2015	JAMES A. SPEER, PE PROJECT ENGINEER
LETTING DATE: OCTOBER 18, 2016	ALLISON K. WHITE PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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URS Corporation – North Carolina
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560
Tel: 919-461-1100
Fax: 919-46-1415

November 12, 2014

STATE PROJECT: 46074.1.1 (B-5360)
FEDERAL PROJECT: BRZ-2481(2)
COUNTY: Randolph

DESCRIPTION: Bridge No. 374 over Sandy Creek on SR 2481 (Low Bridge Rd)

SUBJECT: Geotechnical Report –Inventory

Project Description

The project consists of the replacement of the existing bridge currently crossing Sandy Creek and associated roadway construction. The project begins at SR 2481 (Low Bridge Rd.), approximately 1,000 feet southwest of Sandy Creek, and extends northeast for approximately 2,000 feet in Randolph County. The existing SR 2481 within the project limits consists of an asphalt paved section at the beginning of the project, a single lane two span bridge, and gravel surfaced sections for the remaining of the project. The proposed facility consists of a two lane paved road with a single span bridge crossing Sandy Creek at the location of approximately 120 feet south of the existing bridge.

A geotechnical investigation was conducted in August of 2014. Borings were advanced utilizing an ATV mounted CME-550 drill machine with an automatic hammer or by hand auger. Standard Penetration Tests were performed at selected locations and additional borings were advanced using hand augers. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis. The following alignments were investigated.

<u>Line</u>	<u>Station(±)</u>
-L-	13+00 to 33+16
-DRV3-	10+00 to 12+39

Areas of Special Geotechnical Interest

- 1) Highly Plastic Clays: Highly plastic ($PI \geq 26$) clays were encountered on the project at the following intervals.

<u>Line</u>	<u>Stations (±)</u>	<u>Offsets</u>
-L-	18+10 to 20+10	LT to RT
-L-	29+25 to 33+16	LT to RT

- 2) Artificial Fill: Several small areas of artificial fill are present throughout the project corridor and are related to gravel and soil driveways, as well as previous construction of utility lines.

- 3) Crystalline Rock: Crystalline rock was encountered within 6 feet of proposed grade at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offset</u>
-DRV3-	10+50 to 11+20	RT

Physiography and Geology

The project is located in the Piedmont Physiographic Province. Land use along the project corridor consists of residential, commercial businesses and woods. Geologically, the project is located within the Carolina Slate Belt. Felsic metavolcanic rock (CZfv) was encountered at the project site. Sandy Creek and a few ditches drain the project towards southeast.

Soil Properties

Soils encountered at the project site include roadway embankment, artificial fill, alluvial, residual, weathered rock and crystalline rock of felsic metavolcanic tuff.

Roadway Embankment soils are present along the existing SR 2481. These soils consist of red and brown, medium stiff to stiff, silty clay and sandy silt (A-7-5, A-4) with Plasticity Index ranging from 5 to 20.

Alluvial deposits are located within the floodplain of Sandy Creek.

Residual soils were encountered throughout the project. These soils consist primarily of red, brown and gray, medium stiff to hard silt and clay (A-4, A-5, A-6, A-7) with Liquid Limit ranging from non-plastic to 73 and Plasticity Index ranging from non-plastic to 43, to gray, dense, silty sand (A-2-4).

Rock Properties

Weathered rock was encountered during the roadway investigation at elevations ranging from 486.3 to 543.7 feet. It originates from the underlying felsic tuff.

Crystalline rock was encountered during the roadway investigation at elevations ranging from 485.1 to 542.3 feet, and consists of felsic tuff. Refer to the "Areas of Special Geotechnical Interest" for areas of encountered within 6 feet of proposed grade.

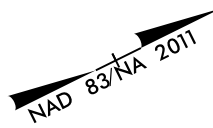
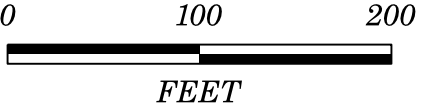
Ground Water

Groundwater was not encountered during the roadway investigation. However, groundwater may fluctuate with seasonal precipitation.

Prepared by,

Pu Zhang, P.E.
Geotechnical Engineer

PROJECT REFERENCE NO.	SHEET NO.
B-5360	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

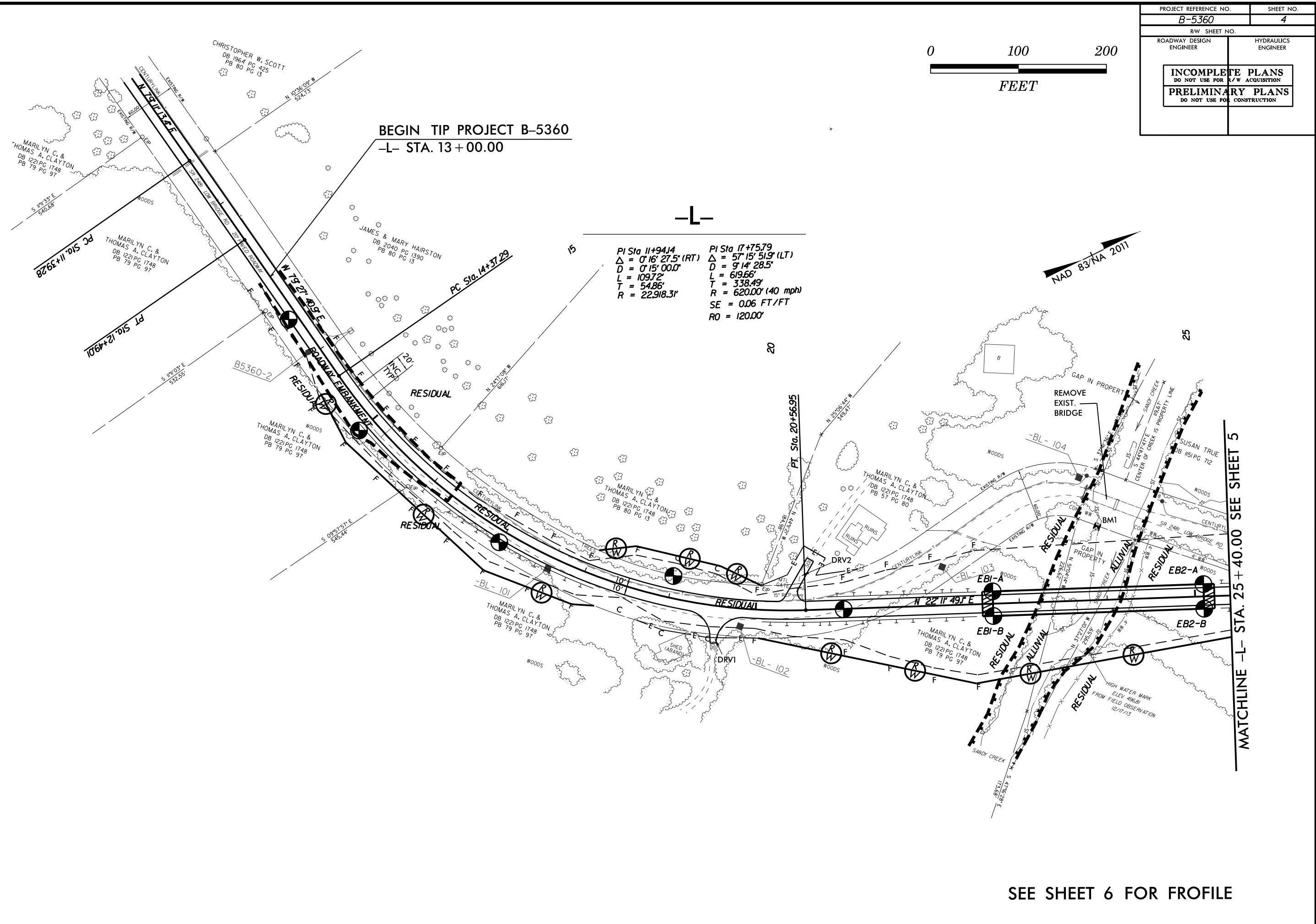


BEGIN TIP PROJECT B-5360
 -L- STA. 13+00.00

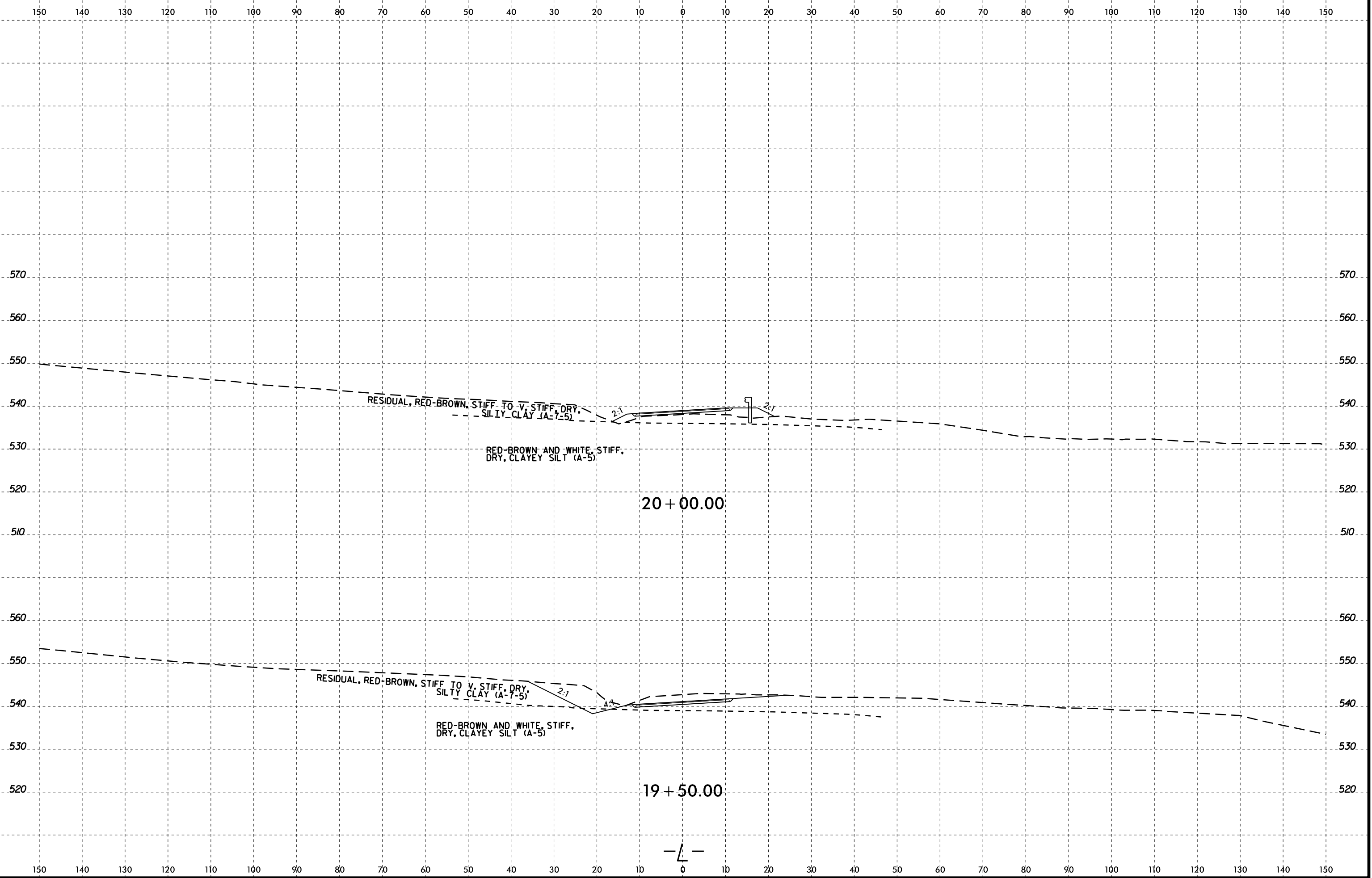
-L-

PI Sta 11+94.14	PI Sta 17+75.79
$\Delta = 0^\circ 16' 27.5''$ (RT)	$\Delta = 57^\circ 15' 51.9''$ (LT)
$D = 0^\circ 15' 00.0''$	$D = 9^\circ 14' 28.5''$
$L = 109.72'$	$L = 619.66'$
$T = 54.86'$	$T = 338.49'$
$R = 22,918.31'$	$R = 620.00'$ (40 mph)
	$SE = 0.06$ FT/FT
	$RO = 120.00'$

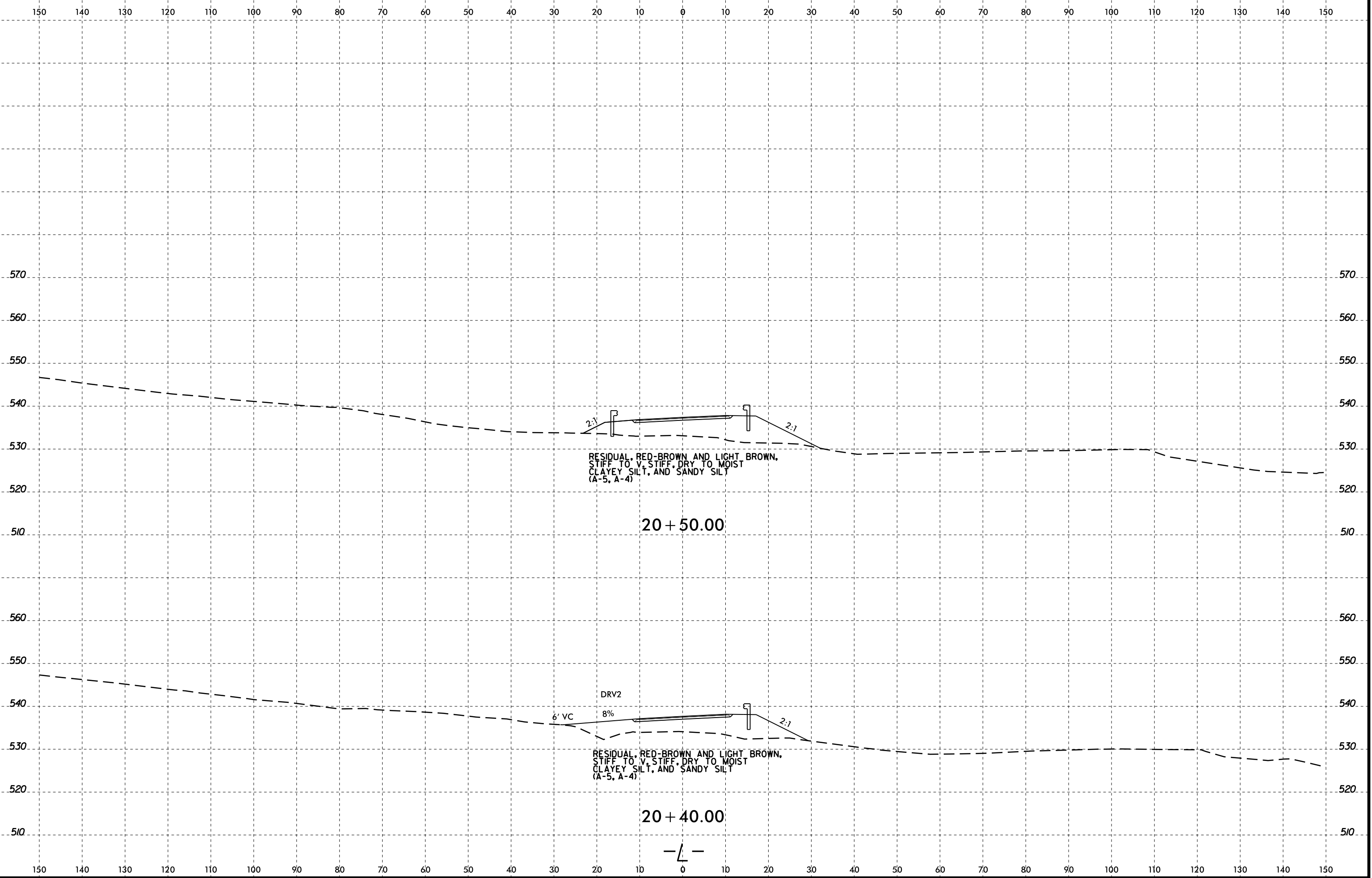
REVISIONS
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 Stephen Crockett



SEE SHEET 6 FOR PROFILE

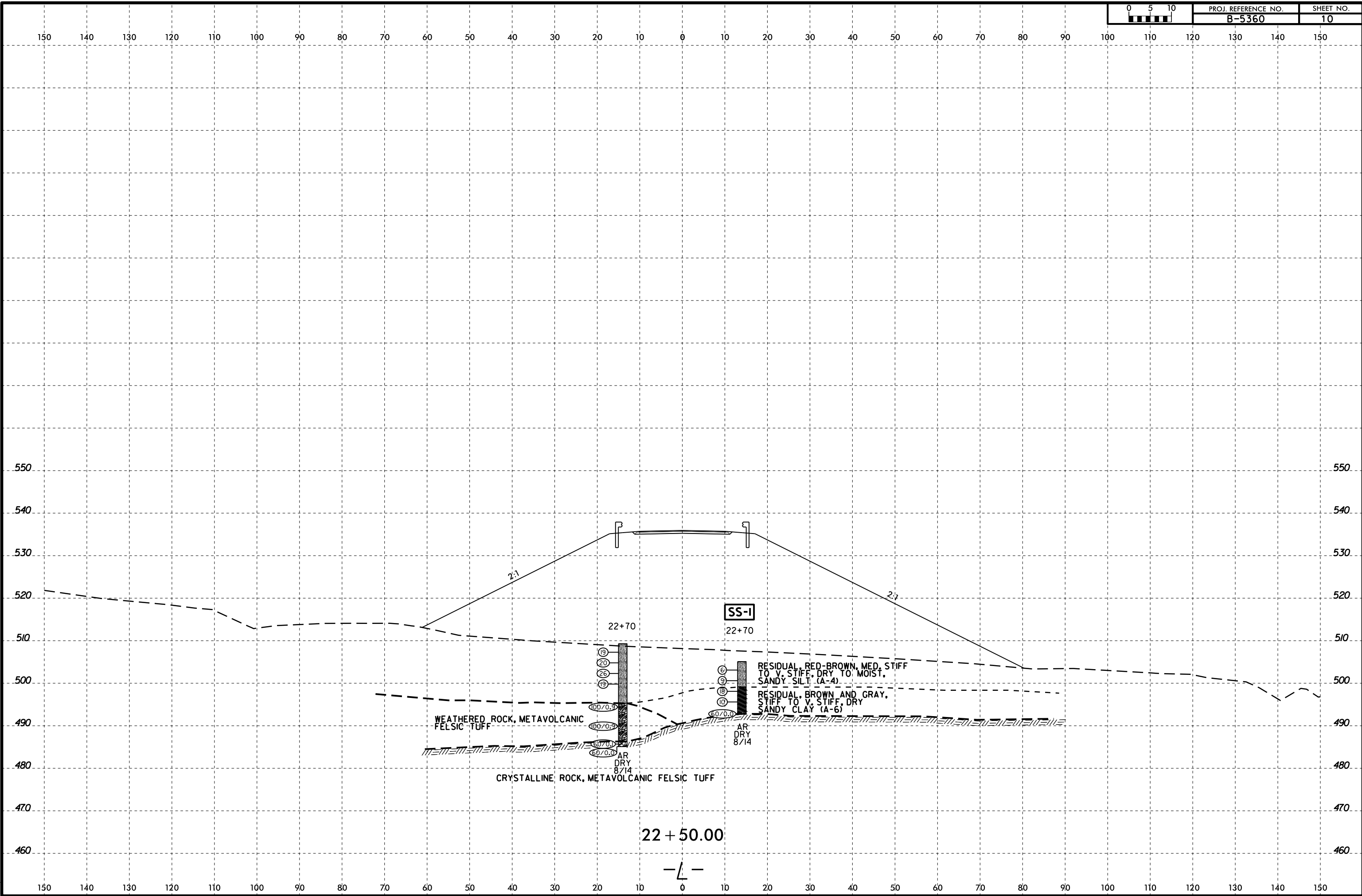


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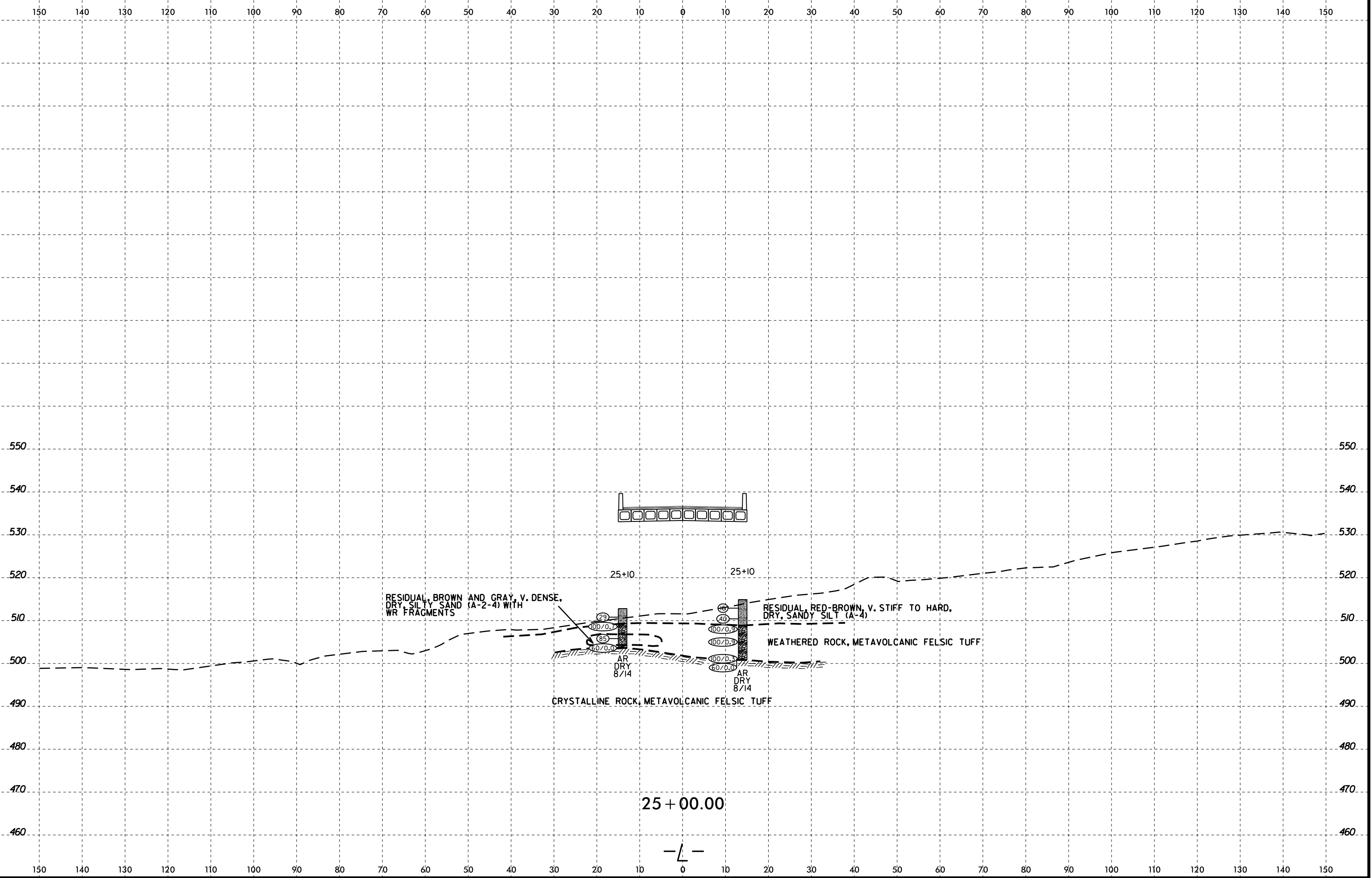
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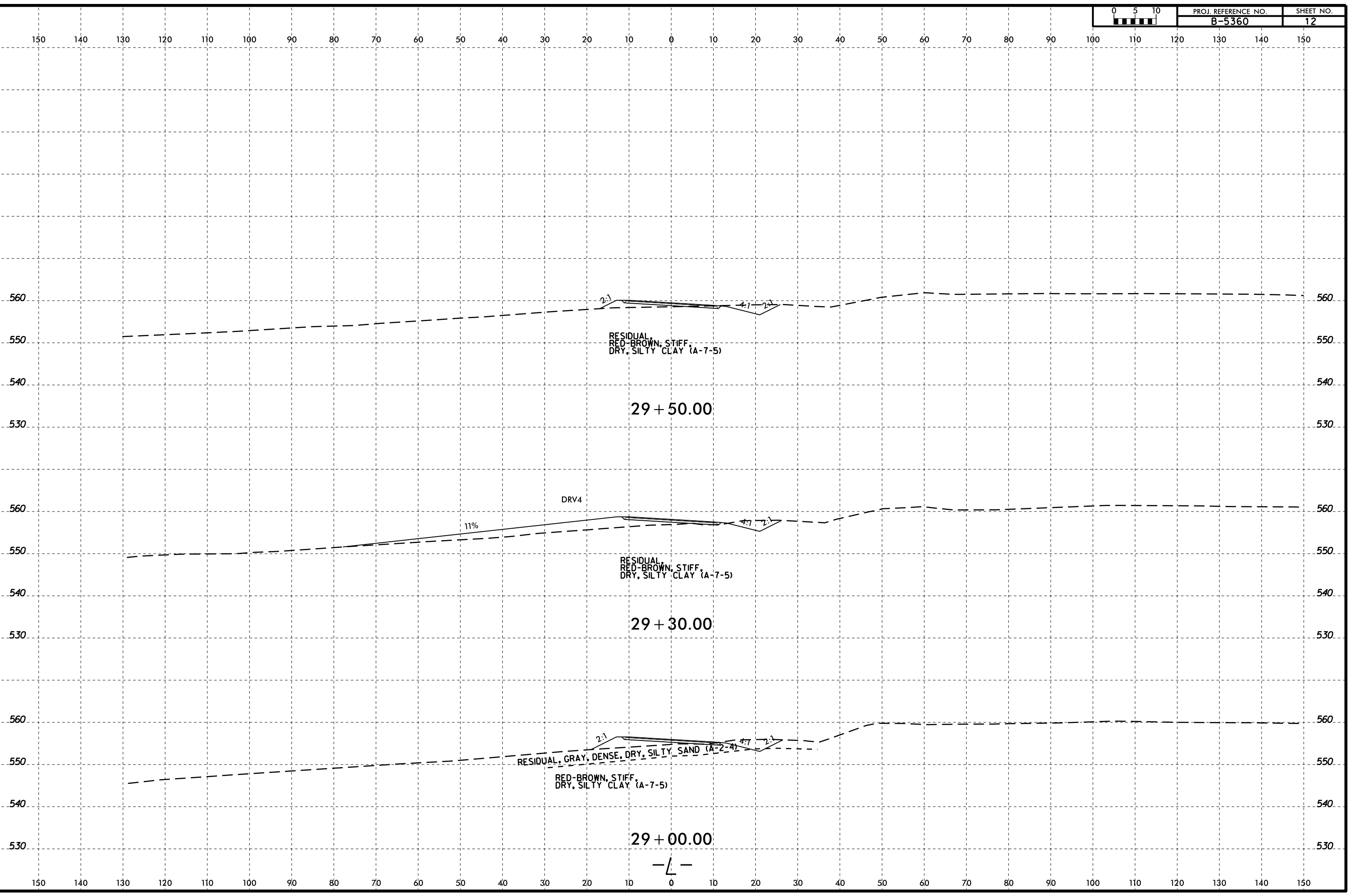
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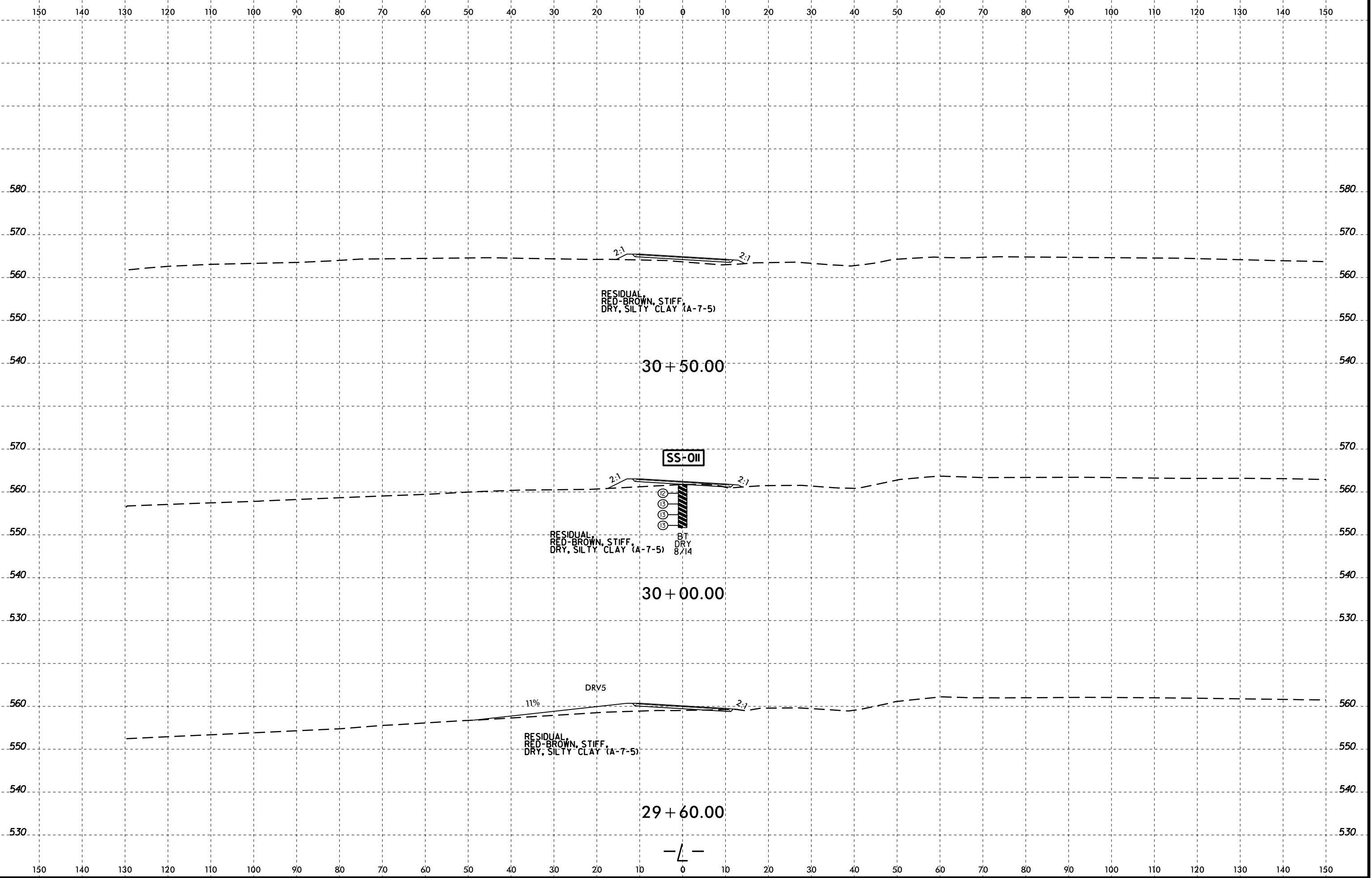


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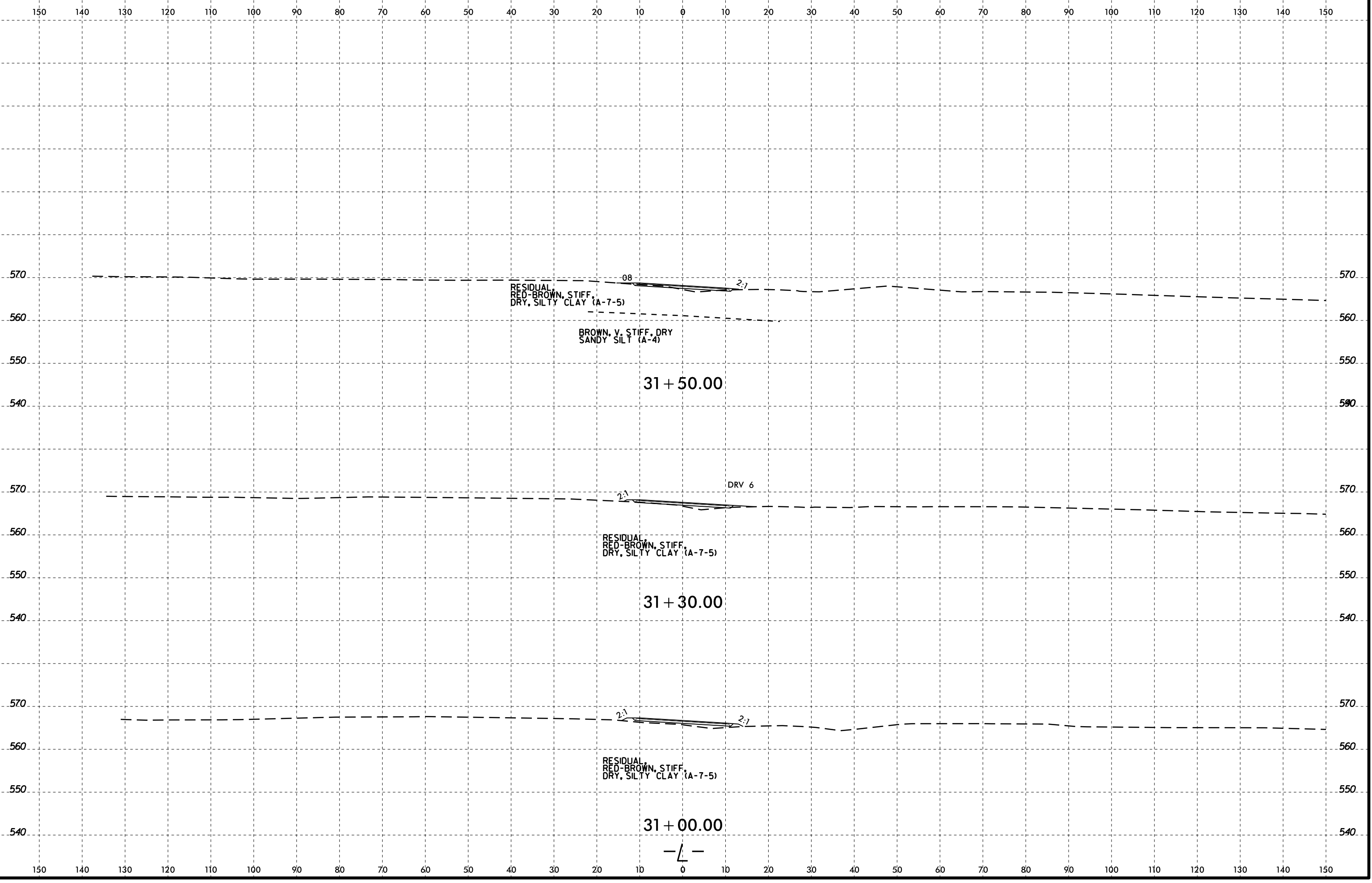


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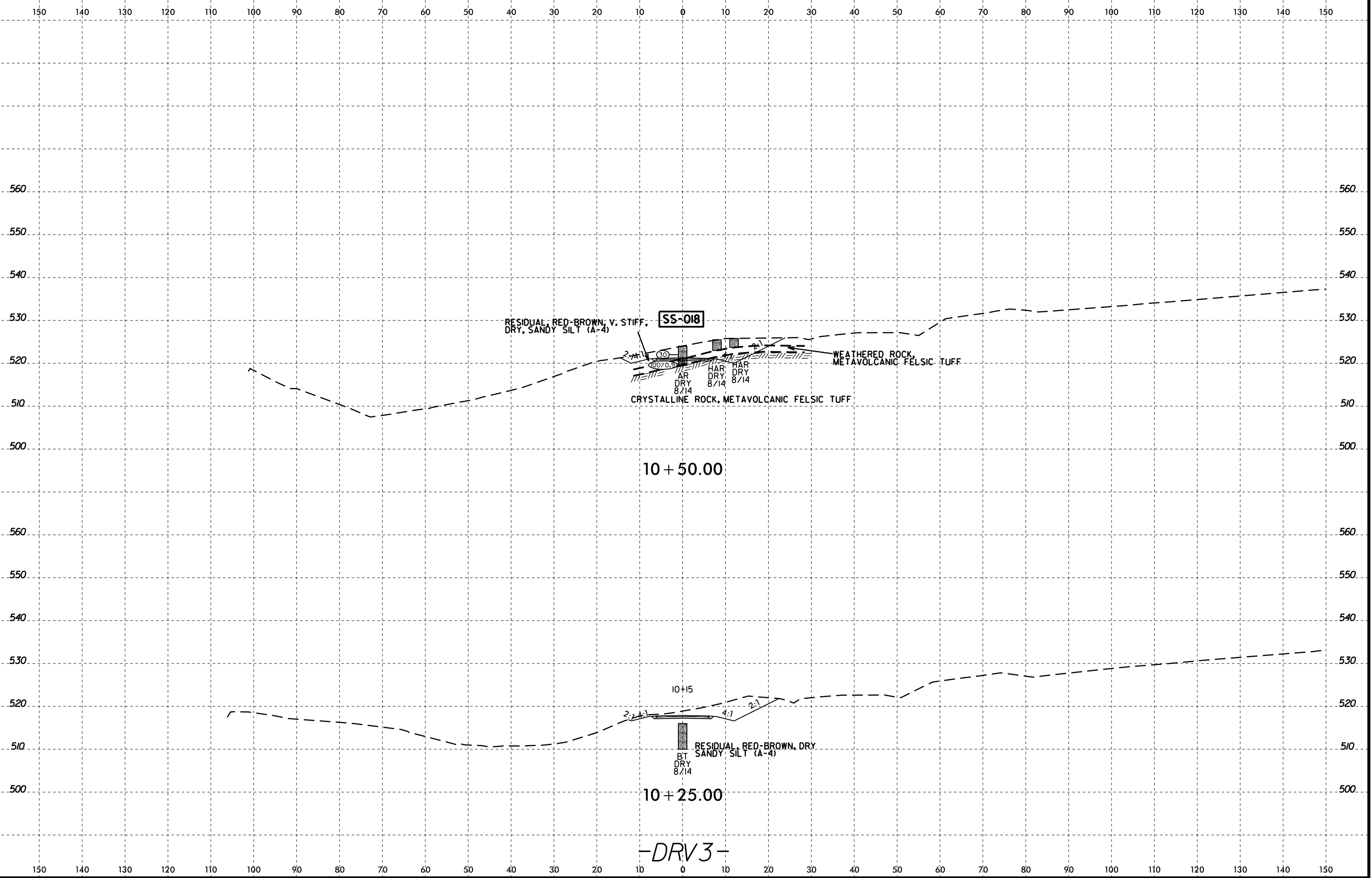


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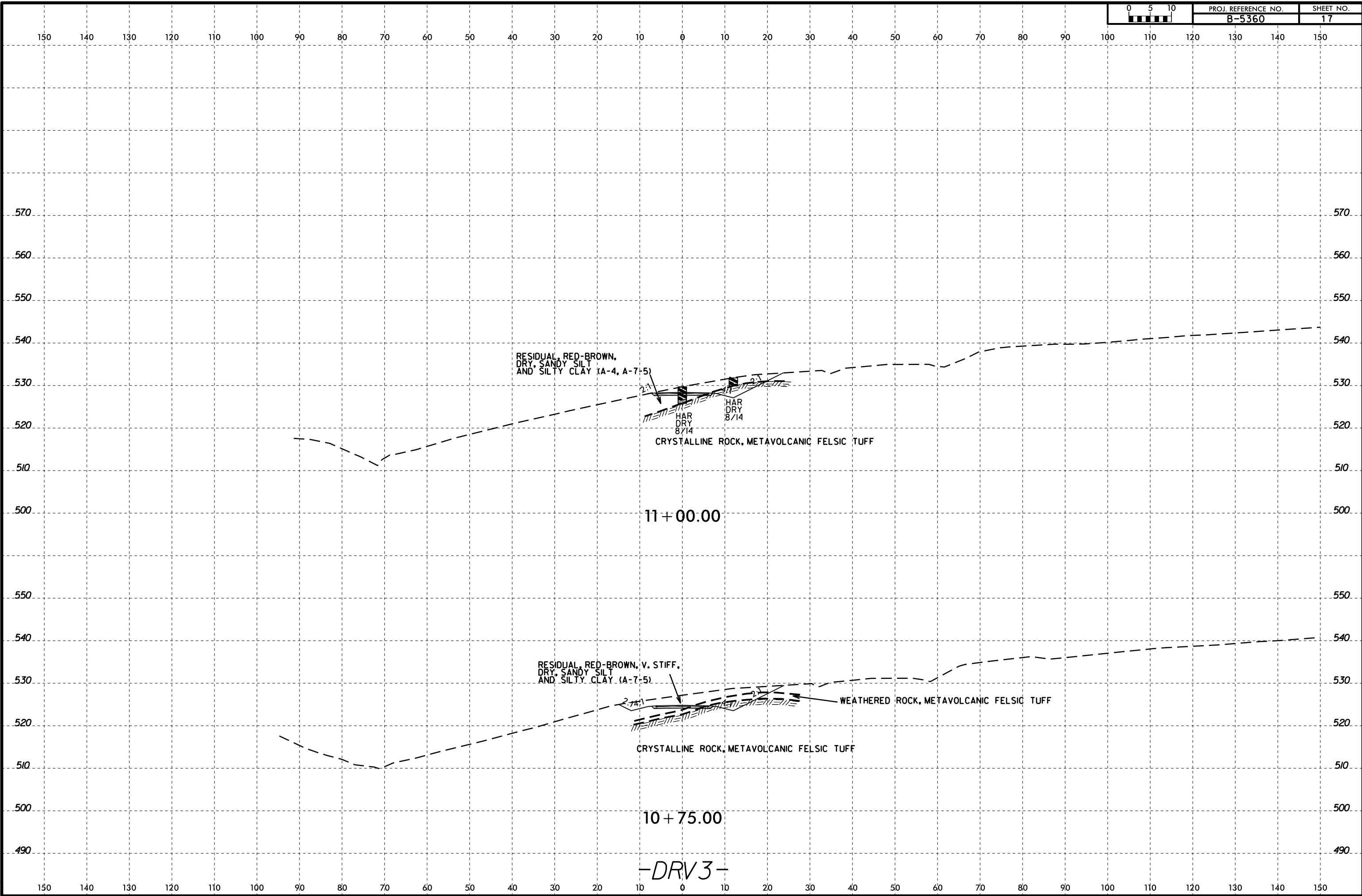


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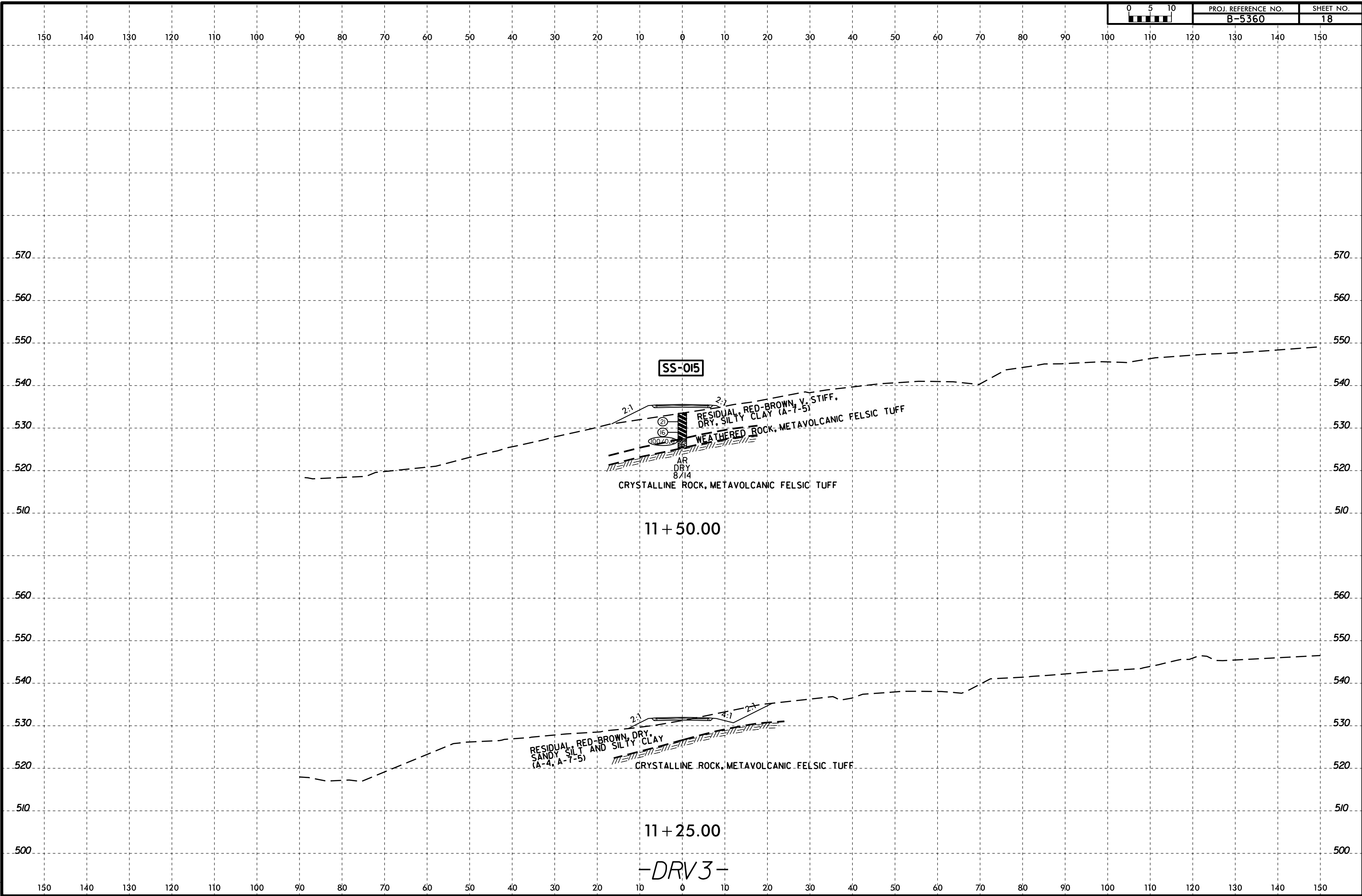
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 Stephen_Crockett

11 + 50.00

11 + 25.00

-DRV3-

SS-015

2:1
 2:1
 RESIDUAL, RED-BROWN, V. STIFF,
 DRY, SILTY CLAY (A-7-5)
 WEATHERED ROCK, METAVOLCANIC FELSIC TUFF
 AR
 DRY
 8/14
 CRYSTALLINE ROCK, METAVOLCANIC FELSIC TUFF

2:1
 4:1
 2:1
 RESIDUAL, RED-BROWN, DRY,
 SANDY SILT AND SILTY CLAY
 (A-4, A-7-5)
 CRYSTALLINE ROCK, METAVOLCANIC FELSIC TUFF

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	ALIGNMENT	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*	14' RT	22+70	- L -	1.0-2.5	A-4	0	NP	9.0	55.7	22.2	13.1	100	99.2	42.7	6.1	-
SS-001	CL	32+00	- L -	1.0-2.5	A-7-5	64	23	4.3	9.0	37.9	48.8	99.7	97.6	89.3	38.8	-
SS-005	30' RT	27+00	- L -	1.0-2.5	A-4	31	4	16.9	39.9	21.7	21.6	98.1	92.6	42.5	20.5	-
SS-011	CL	30+00	- L -	1.0-2.5	A-7-5	73	30	4.1	12.8	28.1	55.0	99.9	98.7	86.1	34.3	-
SS-015	CL	11+50	- DRV3-	1.0-2.5	A-7-5	49	19	9.4	21.9	28.6	40.1	99.6	96.6	68.5	18.0	-
SS-018	CL	10+50	- DRV3-	1.0-2.5	A-4	37	7	7.7	18.5	35.0	38.7	86.8	83.6	64.0	20.5	-
SS-022	CL	21+00	- L -	6.0-7.5	A-5	53	9	3.9	12.2	55.1	28.8	100.0	99.0	85.8	35.4	-
SS-026	25' LT	19+00	- L -	1.0-2.5	A-7-5	73	43	7.6	15.3	14.4	62.7	99.0	96.6	80.3	27.5	-
SS-028	25' LT	19+00	- L -	6.0-7.5	A-5	45	8	4.6	15.0	50.0	30.4	97.7	96.3	81.4	18.1	-
SS-036	20' RT	15+00	- L -	1.0-2.5	A-4	26	5	12.8	32.7	32.3	22.2	94.1	90.3	56.8	16.2	-
SS-040	10' RT	13+50	- L -	1.0-2.5	A-7-6	45	20	10.3	19.9	29.6	40.2	92.4	88.4	68.3	18.4	-

*SAMPLE IS FROM BRIDGE BORING EB1-B.

TESTED BY: Michael P. Sumner

NCDOT NO.: 129-03-0411