

REFERENCE: U-5810

PROJECT: 35993

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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-L-	44+00	50
-L-	45+00	51
-L-	46+00	52
-L-	49+00	53
-L-	50+50	54
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-L-	55+00	57
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-L-	61+00	61
-L-	64+00	62
-L-	66+50-78+50	63-78
-L-	83+00-86+00	79-82
-L-	87+00	83
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY WATAUGA
PROJECT DESCRIPTION WILSON RIDGE RD (SR 1523)
& BAMBOO RD (SR 1514) WIDENING

INVENTORY

-Y1-	15+50-18+00	108-110
-Y1-	19+50	110
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5810	1	

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

PERSONNEL
A. RODRIGUEZ
C. PHILLIPS
B. BLIZZARD
B. KEBEA

INVESTIGATED BY	S&ME Inc.
DRAWN BY	J. SWARTLEY
CHECKED BY	J. DAILY
SUBMITTED BY	S&ME, Inc.
DATE	MARCH 2025



3201 SPRING FOREST ROAD
RALEIGH, NC 27616
(919) 872-2660



DocuSigned by:
Thomas J. Daily
F29CA6BB83F449F...
3/6/2025

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5810	3	
WBS NO.	P.A. PROJ. NO.	DESCRIPTION	
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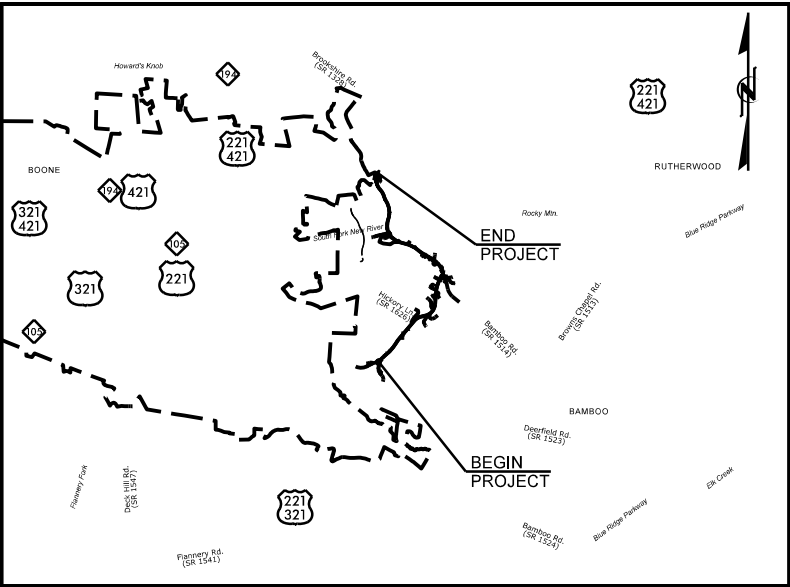


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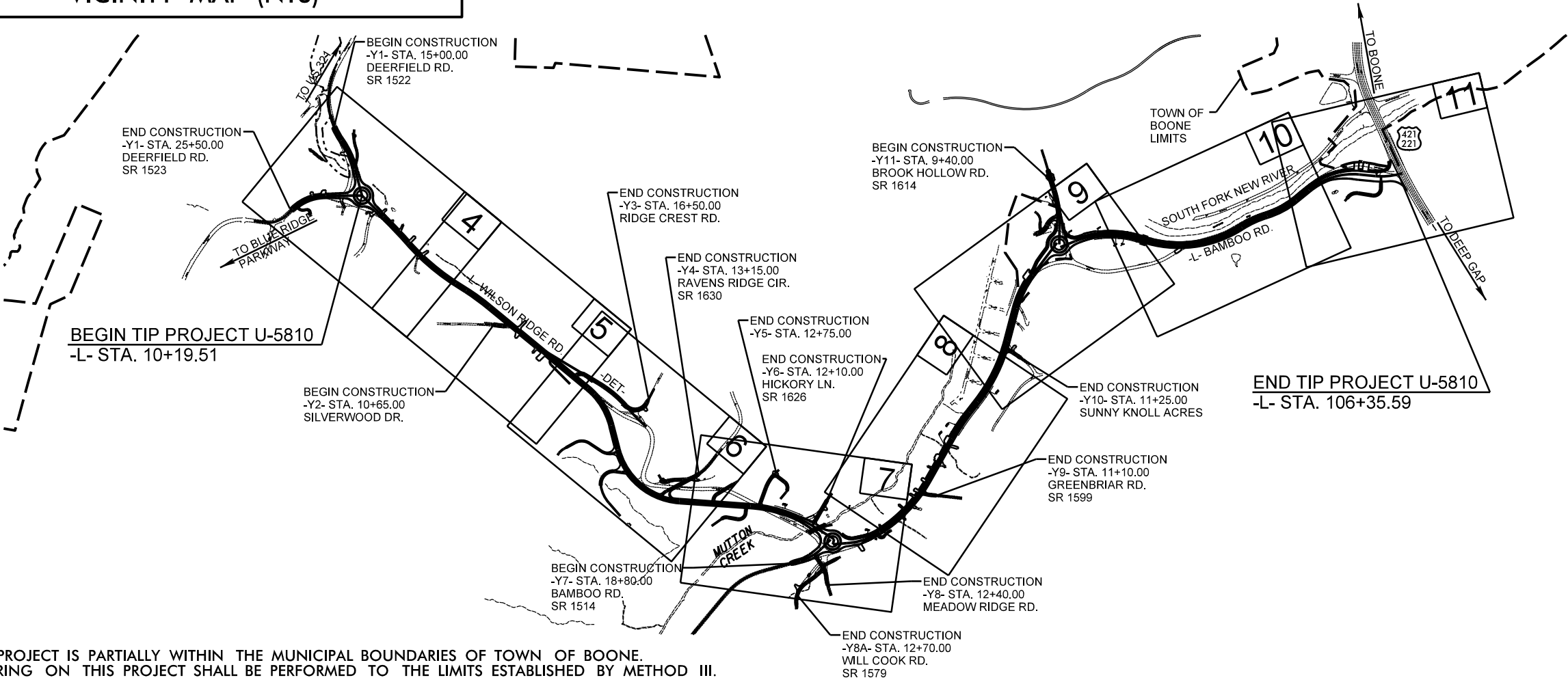
WATAUGA COUNTY

LOCATION: WILSON RIDGE RD. (SR 1523) & BAMBOO RD. (SR 1514) WIDENING

TYPE OF WORK: GRADING, PAVING, WIDENING, DRAINAGE,
RETAINING WALL, SIGNALS, & UTILITIES



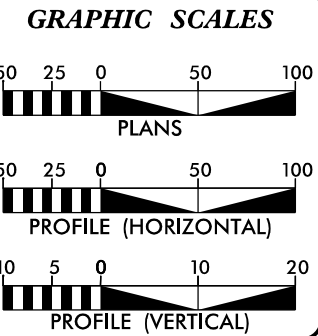
VICINITY MAP (NTS)



- NOTES:
1. THIS PROJECT IS PARTIALLY WITHIN THE MUNICIPAL BOUNDARIES OF TOWN OF BOONE.
2. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
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CONTRACT:



DESIGN DATA
ADT 2018 = 11,150
ADT 2040 = 16,100
V = 40 MPH
DHV = 9%
D = 60%
T = 8% *
(* TTST = 2% /* DUAL = 2%)
FUNC CLASS = URBAN
MAJOR COLLECTOR
STATEWIDE TIER
DESIGN EXCEPTIONS AS
NOTED ON PLANS

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT U-5810.....	1.825 miles
LENGTH STRUCTURE TIP PROJECT U-5810.....	0.000 miles
TOTAL LENGTH OF PROJECT U-5810.....	1.825 miles

PLANS PREPARED BY:

RK&K

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

NCDOT CONTACT:

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560

Brandon McInnis, P.E.
PROJECT ENGINEER

Mary Mays Yahl, P.E.
PROJECT DESIGN ENGINEER

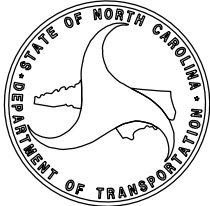
Ramie Shaw
DIVISION II

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





February 11, 2025

STATE PROJECT: 35993.1.1 (U-5810)
FEDERAL PROJECT: N/A
COUNTY: Watauga
DESCRIPTION: Wilson Ridge Rd (SR 1523) & Bamboo Rd (SR 1514) Widening

SUBJECT: Geotechnical Report – Inventory

S&ME, Inc. has completed a reconnaissance and subsurface investigation for the above roadway project and presents the following inventory. Plans, profiles and cross-sections included in this report are based off the 90% plan set. This report also includes the results of geophysical testing and geological mapping at select portions along the roadway.

Project Description

The project corridor is located in Watauga County near the town of Boone, NC. The project consists of widening, partial realignment, and improvements to Wilson Ridge Rd (-L-) and Bamboo Rd (-L-). The project begins south of the intersection of Deerfield Rd (-Y1-) and extends northwards towards US 221 for approximately 1.8 miles. A new roundabout (-RAB1-) is proposed at the T-junction intersection of Wilson Ridge Rd (-L-) and Deerfield Rd (-Y1-). The mainline then extends northeastwards along Wilson Ridge Rd (-L-) until it intersects Bamboo Rd (-L-) at another T-junction. Another newly proposed roundabout (-RAB2-) is planned to tie this intersection together. The mainline continues northwestwards along Bamboo Rd (-L-) until joining with US 221. A third roundabout (-RAB3-) is proposed before the mainline joins with US 221 where a neighborhood side street named Brook Hollow Rd (-Y11-) ties into Bamboo Rd (-L-). There is one newly proposed detour alignment (-DET-) that begins at approximate -L- station 26+00 and continues to the northeast adjacent to Wilson Ridge Rd (-L-) until merging back to the existing road just north of the intersection with Ridge Crest Rd (-Y3-). This temporary detour alignment is needed to construct part of the mainline in this vicinity. Throughout the project there are a multitude of driveway entrance alignments and minor Y lines that connect with the mainline. Some of these alignments were not investigated directly due to other borings being in close vicinity to these alignments. These borings were used to infer their stratigraphy. There were eight retaining walls associated with this roadway during the time of this investigation. These are needed to limit impacts to neighboring houses and reduce right of way needs. Some of these retaining walls were reduced or eliminated after additional geophysical testing was done in September of 2021 to determine if cut slopes could be established in these locations instead. There was also an investigation done in 2024 that included a geotechnical exploration of a newly proposed bridge inside the quarry and two MSE walls associated with it. There was a shift in the mainline in the vicinity of this bridge starting at the third roundabout (-RAB3-) and continuing up station until approximate -L- station 91+00±.

The geotechnical field investigation was conducted during the period of March 2020 through September 2024. Three S&ME drill crews were used to drill, sample, and log the borings in this report. The S&ME

equipment used for the drilling were ATV-mounted CME-550X and CME-750X rigs equipped with an automatic hammer. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers and hand augers. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the S&ME soils lab. Boring ID headers are left on in the cross-sections and profiles for clarification as some borings were used interchangeably between multiple alignments. Soil results are also referenced back to the original alignment the boring was assigned to during layout and drilling.

The following alignments, totaling 3.27 miles, were investigated during this investigation. Some of these alignments were removed or restationed since investigation began in 2020. Subsurface profiles and/or cross-sections of these alignments are included in this report.

<u>Line</u>	<u>Stations</u>		
-L-	10+95	to	106+35
-RAB1-	10+00	to	13+58
-RAB2-	10+00	to	13+58
-RAB3-	10+00	to	13+58
-Y1-	15+00	to	25+50
-Y2-	10+90	to	11+66
-Y3-	10+12	to	16+50
-Y4-	10+13	to	13+15
-Y5-	10+13	to	12+75
-Y6-	10+20	to	12+10
-Y7-	18+80	to	21+45
-Y8-	10+19	to	12+40
-Y8A-	10+10	to	12+70
-Y9-	10+13	to	11+10
-Y10-	10+13	to	11+25
-Y11-	12+75	to	14+54
-DR101_1-	10+00	to	13+34
-DR101_2-	10+90	to	14+39
-DR1-	10+07	to	11+75
-DR2-	10+15	to	14+73
-DR3-	12+95	to	15+16
-DR4-	10+12	to	12+10
-DR5-	10+40	to	12+11
-DR6-	10+13	to	12+15
-DR7-	10+13	to	10+45
-DR8-	10+85	to	13+21
-DR9-	10+12	to	11+50
-DR12-	10+12	to	10+70
-DR13-	10+12	to	11+25
-DR14-	10+12	to	11+35
-DR15-	10+13	to	11+20
-DR16-	10+10	to	11+27

Areas of Special Geotechnical Interest

- 1) The following borehole locations encountered soft, cohesive soils which have the potential to cause embankment stability and/or long-term settlement problems:

<u>Line</u>		<u>Stations</u>	
-L-	41+25	to	41+75
-Y3-	10+00	to	15+50

- 2) Crystalline Rock: Crystalline rock above or within 6 feet of grade was encountered in the following continuous intervals:

<u>Line</u>		<u>Stations</u>	
-L-	13+25	to	14+75
-L-	29+25	to	33+75
-L-	99+75	to	100+25
-Y1-	15+75	to	16+25
-DR2-	11+25	to	12+75

- 3) Groundwater: Groundwater above or within 6 feet of grade was encountered in the following continuous intervals:

<u>Line</u>		<u>Stations</u>	
-L-	32+50	to	36+50
-DR2-	10+00	to	14+50
-DR8-	11+00	to	11+75
-Y1-	17+75	to	18+50

- 4) Ponds: One pond occurs within proximity to right of way on this project. It was noted at the following location:

<u>Line</u>	<u>Stations</u>	<u>Offset (ft)</u>
-L-	48+85 to 50+30	357 LT to 568 LT

- 5) Springs & Seeps: One spring exists within the project corridor at the following location:

<u>Type</u>	<u>Station & Offset</u>	<u>Alignment</u>
Spring	27+52, 69 LT	-L-

- 6) Water wells: 16 water wells were found within or near the proposed right of way at the following locations (*inside prop. right of way):

<u>Line</u>	<u>Stations and Offsets (ft)</u>
-L-	31+70, 111 RT
-L-	50+46, 118 LT
-L-	51+28, 107 LT
-L-	57+43, 119 RT
-L-	59+88, 88 LT
-L-	63+00, 45 LT
-L-	63+29, 46 LT
-L-	64+04, 66 LT
-L-	65+92, 42 LT *
-Y1-	25+70, 146 LT
-Y1-	21+21, 161 LT
-Y1-	26+29, 119 LT
-Y1-	26+55, 88 LT
-Y1-	22+87, 72 LT
-DR2-	12+92, 30 RT *
-DR2-	10+14, 82 RT

- 7) Quarries: A quarry belonging to Radford Quarries, Inc. surrounds both sides of the mainline (-L-) from approximate -L- station 82+00 to 90+00. The quarry continues along the east side of the project from -L- station 90+00 to 96+00. The quarry’s property and service roads encompass all the land to the east of the project corridor from -L- station 96+00 (RT) up until the end of the project where it meets US 221. Care should be taken during the construction of the road and retaining walls in this area to ensure no conflicts arise with quarry operations.

Physiography and Geology

The project corridor is located in northwestern North Carolina in the Blue Ridge Physiographic Province of North Carolina just east of the town of Boone. A mixture of houses, fields, and wooded areas lie within the project corridor. The project corridor is predominately rural with single family homes and farm fields. Topography along the project is flat to steeply sloping with rolling hills and long low ridges. Elevations along the project range from 3,370± to 3,090± feet above sea level.

Geologically the project area is located within the Blue Ridge Belt and consists of Biotite Gneiss and Amphibolite. These are metamorphic bodies of rock that originated from intrusive and/or extrusive igneous bodies of rock. These source rocks were formed around the middle Proterozoic. These rocks were then subjected to folding, faulting and metamorphism during continental collision and mountain building episodes between the Ordovician and Permian periods. Various degrees of metamorphism can be present within the Blue Ridge Belt suite of rocks. The residual soils derived from these rocks can contain a high mica content in some locations. Weathered and Crystalline rock underlay these residual soils at depth. Some surface exposures of rock outcrops can be seen along the project corridor.

Water Bodies & Culverts

There are some creeks and streams that run through the project corridor. At the middle of the project, Mutton Creek enters the project from the east and flows from southeast to northwest, crossing underneath Wilson Ridge Rd through a dual 72” corrugated pipe. This creek intersects -L- at approximate station 52+00. A new 2 @ 8’x10’ reinforced concrete box culvert is proposed here, and additional borings were drilled at each end to investigate it. Mutton creek then continues to flow adjacently alongside Bamboo Rd for several hundred feet before joining with South Fork New River. From here South Fork New River flows east back into the project corridor before making a turn to the north where it flows adjacently with Bamboo Rd up to the end of the project. Several tributaries that feed into Mutton Creek are passing underneath Bamboo Rd between -L- stations 58+00 and 68+00 through small to medium sized corrugated pipes. A stream that is believed to be originating from a spring at approximate -L- station 28+00, LT side flows to the south adjacent to Wilson Ridge Rd before passing underneath Deerfield Rd through a 48” corrugated pipe at approximate -Y1- station 18+50.

There is one pond in close proximity to the project. This pond is noted above in the areas of special geotechnical interest. This pond is outside construction limits but should be monitored in case siltation should occur.

Soil Properties

Soils encountered during this investigation are separated into 3 categories: Roadway Embankment, Artificial Fill, Residual, and Alluvial soils.

Residual soils are derived from the weathering of underlying rock in the area. These soils consist of gray, tan, brown, pink, red, black, white and orange, soft to hard, saprolitic, micaceous, sandy silt (A-4), clayey silt (A-5), sandy clay (A-6), silty clay (A-7-5/A-7-6) and loose to very dense, saprolitic, micaceous, silty sand (A-2-4), clayey sand (A-2-6) and sand (A-3).

Roadway Embankment soils are similar in nature to Residual soils and may be derived from nearby sources. These soils consist of gray, tan, brown, red and orange, soft to medium stiff, sandy silt (A-4), clayey silt (A-5), sandy clay (A-6) and silty clay (A-7-6) and loose to dense, clayey sand (A-2-6) and silty sand (A-2-4).

Artificial Fill soils consist of gray, soft to stiff, sandy silt (A-4) and silty clay (A-7-6).

Alluvial soils are found in the floodplains from the nearby streams, brooks and creeks in the area. These soils consist of gray, black, tan, orange, black and brown, very soft to medium stiff, sandy clay (A-6), silty clay (A-7-6), sandy silt (A-4), clayey silt (A-5) and very loose to dense, silty sand (A-2-4), clayey sand (A-2-6), sand (A-3) and coarse sand (A-1-b).

Rock Properties

Weathered rock and crystalline rock occur throughout the project. The weathered rock is derived from the underlying Biotite Gneiss bedrock and ranges from inches to 15 feet or more in thickness. Crystalline rock occurs as surface outcrops in some locations. In most of the major road cuts weathered rock usually occurs near the ground surface. Discontinuous lenses of weathered rock at depth were seen in some locations and may occur in other areas that were not investigated. **Weathered rock and crystalline rock may require blasting and specialized excavation techniques.**

Ground Water

Ground water measurements were taken in March and May of 2020, November of 2021, and September of 2024 during average to below average rainfall conditions. Ground water is typically between 9’ and 25’ below the ground surface. Ground water was not encountered in many of the upland borings and recorded as dry at the bottom of the boring cylinder. Ground water is expected to have moderate impacts in large upland cut sections.

Undisturbed Samples

Two undisturbed thin wall Shelby tube samples were collected and submitted for testing at the following locations:

<u>Sample No.</u>	<u>Line</u>	<u>Station & Offset</u>	<u>Depth</u>	<u>Test</u>
ST-1	-Y3-	13+50, 25 RT	12.0-14.0	Consolidation, Triaxial CU
ST-101	-L-	83+00, 75 RT	4.0-6.0	Consolidation, Triaxial CU
ST-1	-L-	83+05, 20 RT	24.0-26.0	Consolidation

Bulk Samples

One bulk sample was collected for CBR and Proctor testing at the following location:

<u>Sample No.</u>	<u>Line</u>	<u>Station & Offset</u>	<u>Depth</u>	<u>Test</u>
S-1	-L-	27+50, 6’ RT	1.0-2.0	Proctor, CBR

Geophysical Testing

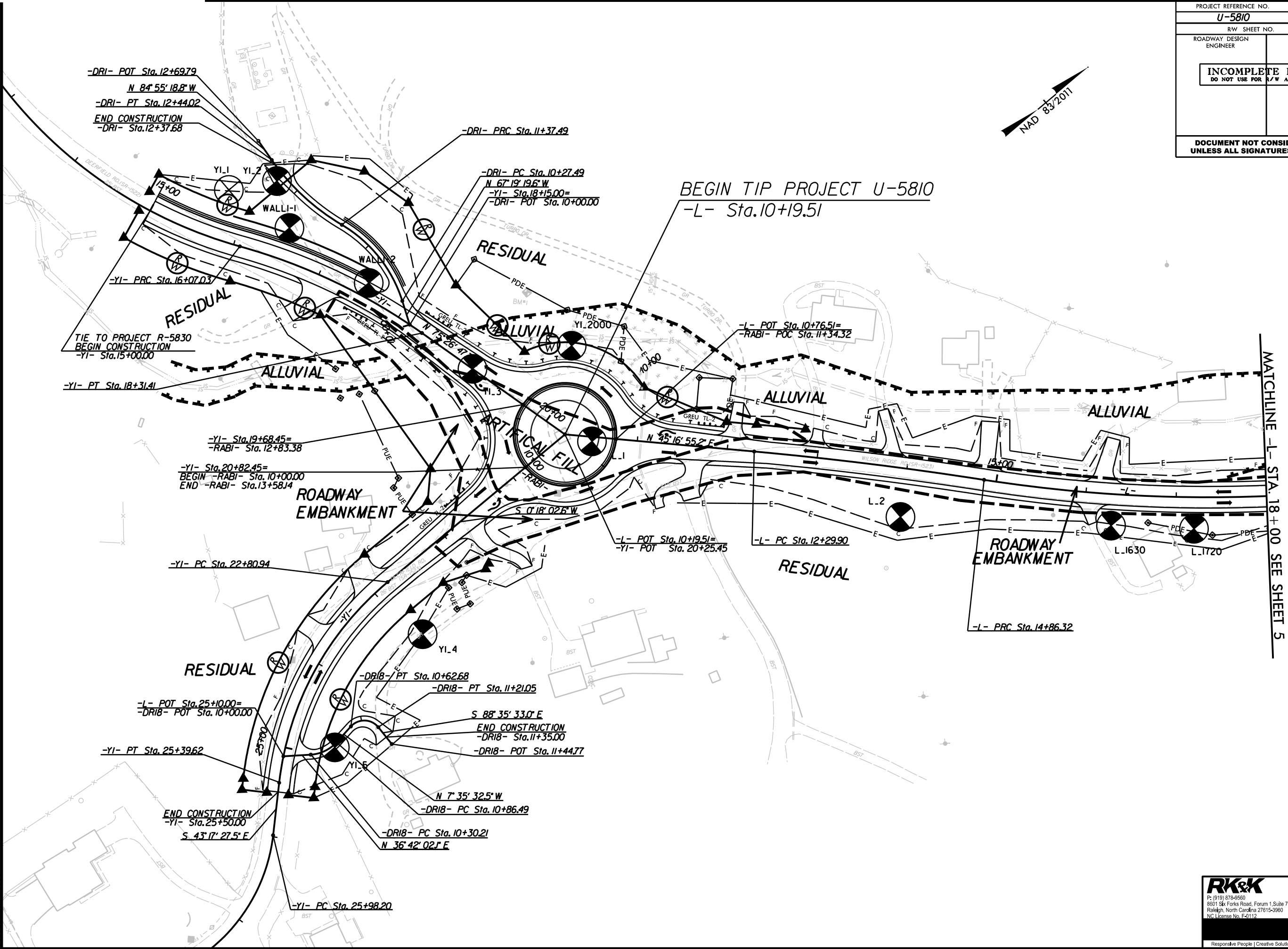
Seismic Refraction Tomography (SRT) surveying was performed for select -L- stations along the corridor where these areas were inaccessible with a drill rig. The SRT results are presented in the following sections of this report. These geophysical profiles/lines either transverse or transect the corridor’s cross-section views in the following locations. Line 1 transverses approximate -L- station 100+00±. Line 2 transverses approximate -L- station 97+00±. Line 3 transverses approximate -L- station 96+00±. Line 4 transects approximate -L- stations 93+50± through 95+00± longitudinally along the alignment. Lastly, line 5 transverses approximate -L- station 85+50.

Respectfully Submitted,



Jarett Swartley, PG
Senior Geologist

PROJECT REFERENCE NO.	SHEET NO.
U-5810	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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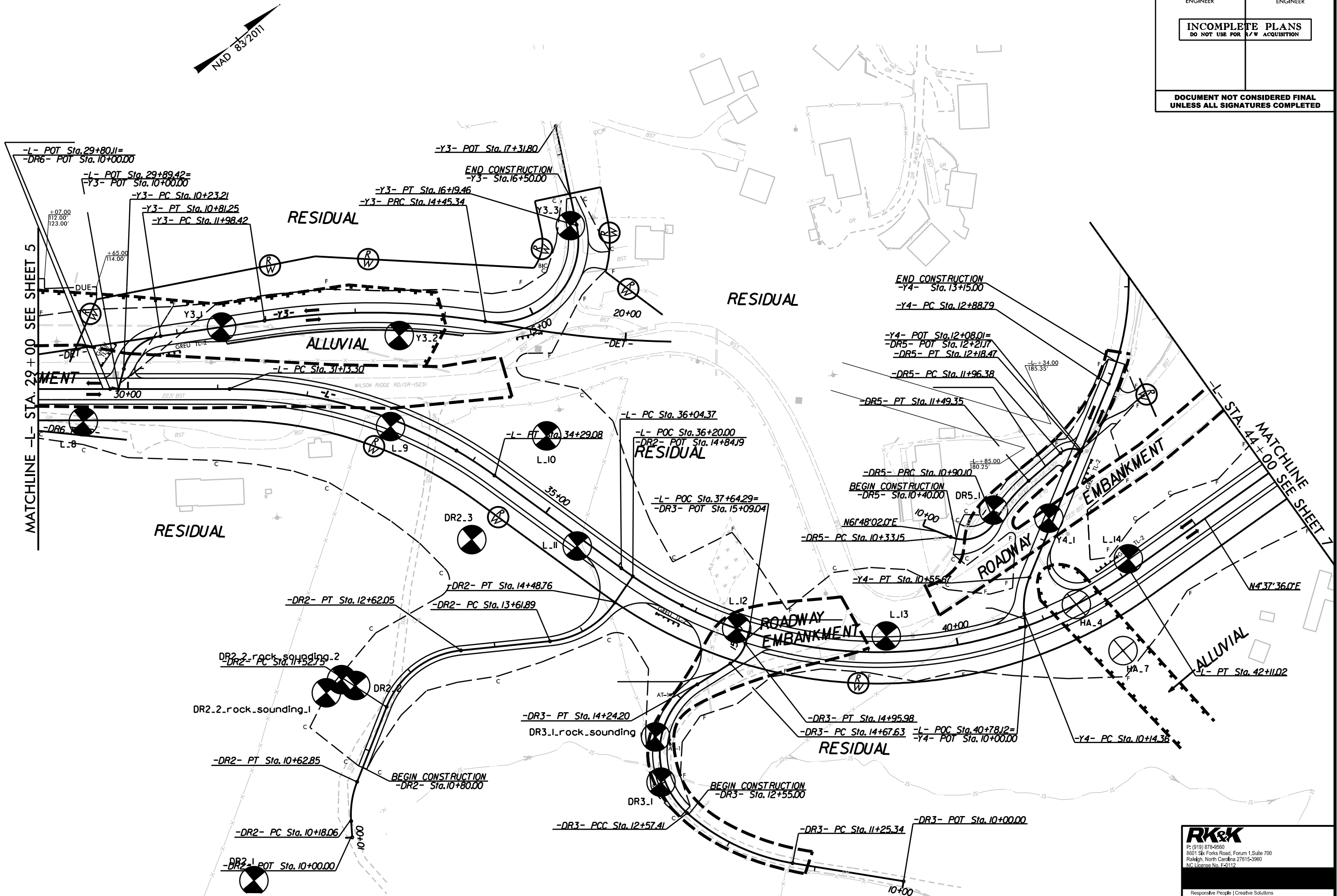


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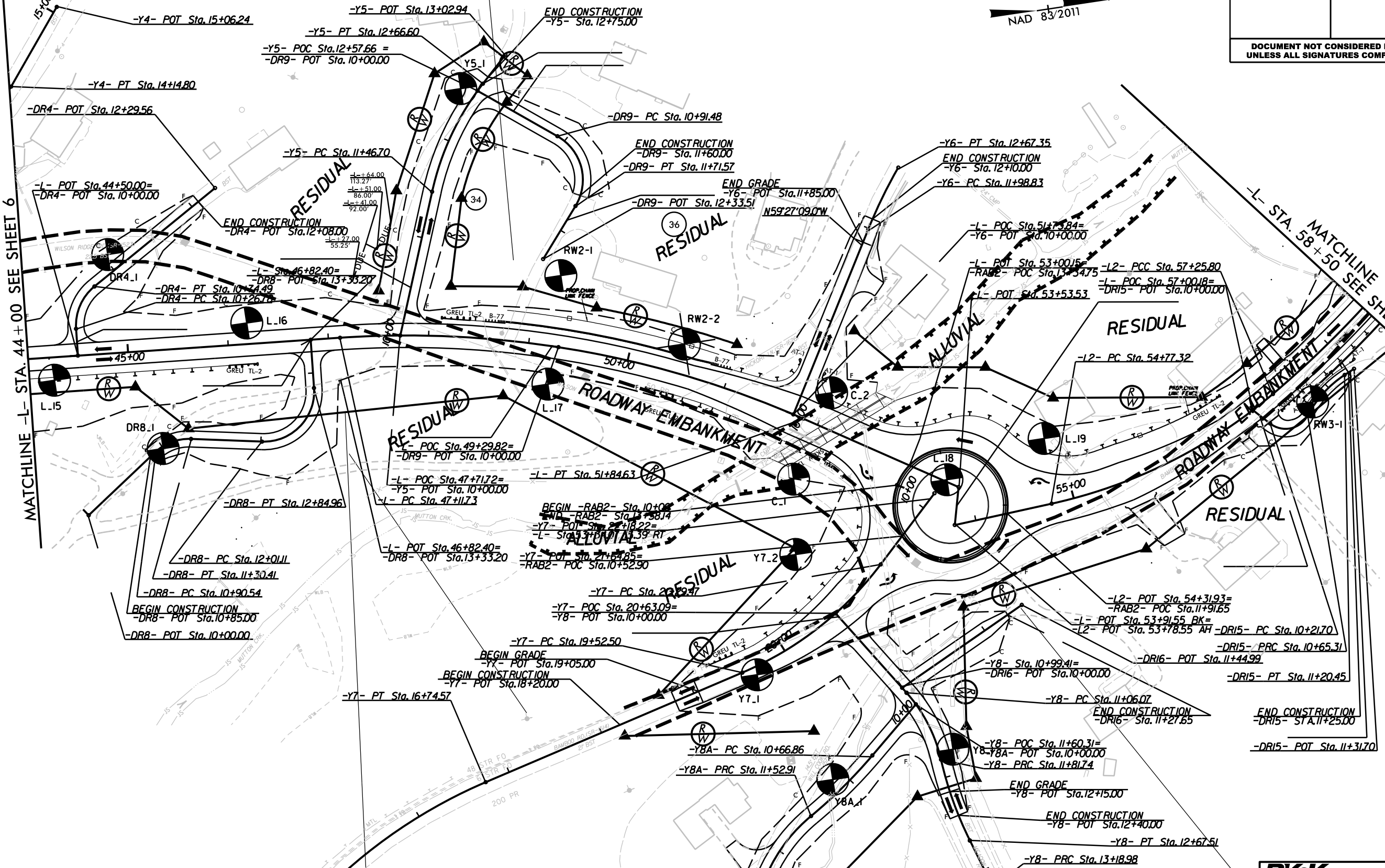


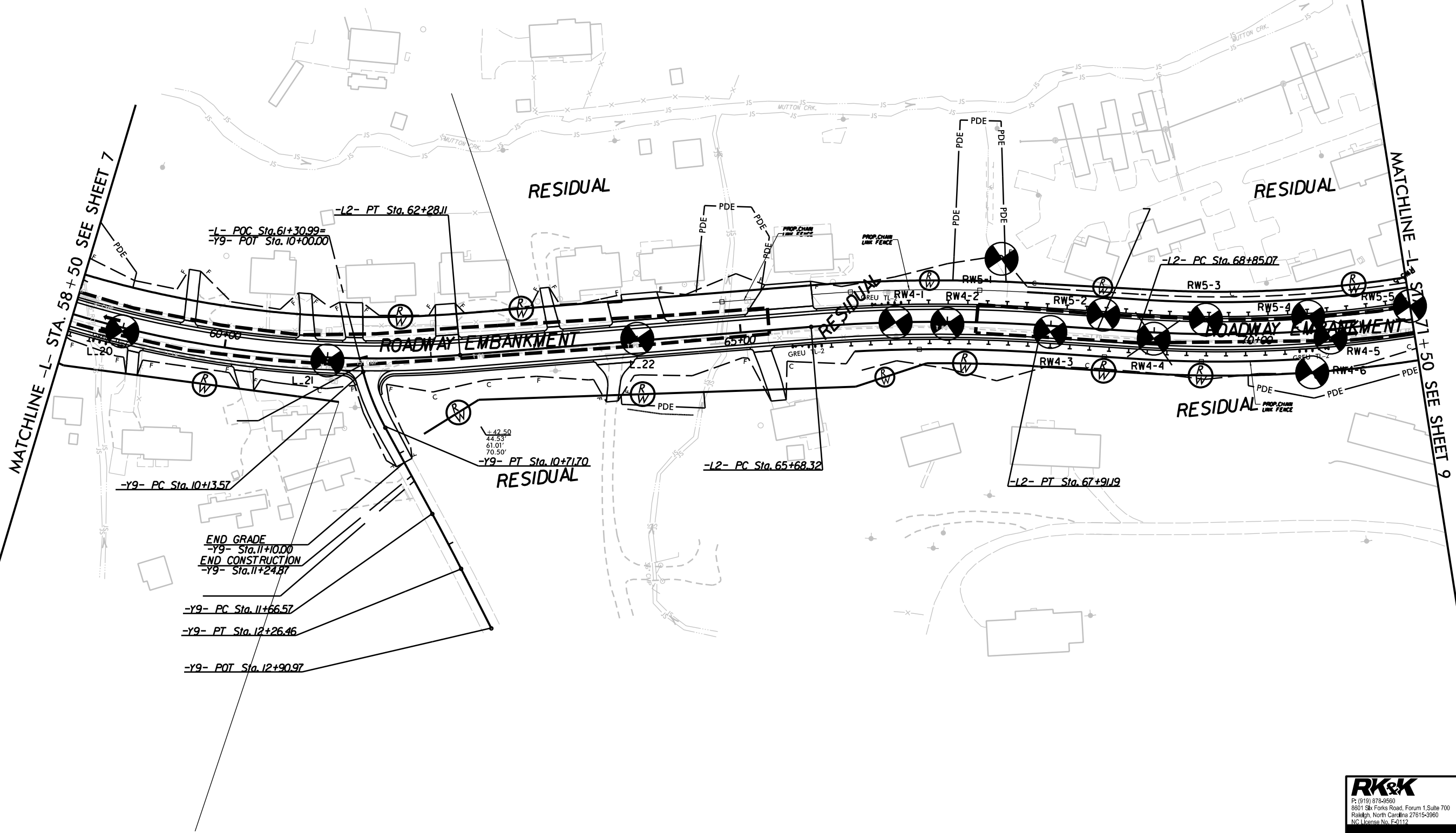
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PROJECT REFERENCE NO.		SHEET NO.	
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RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

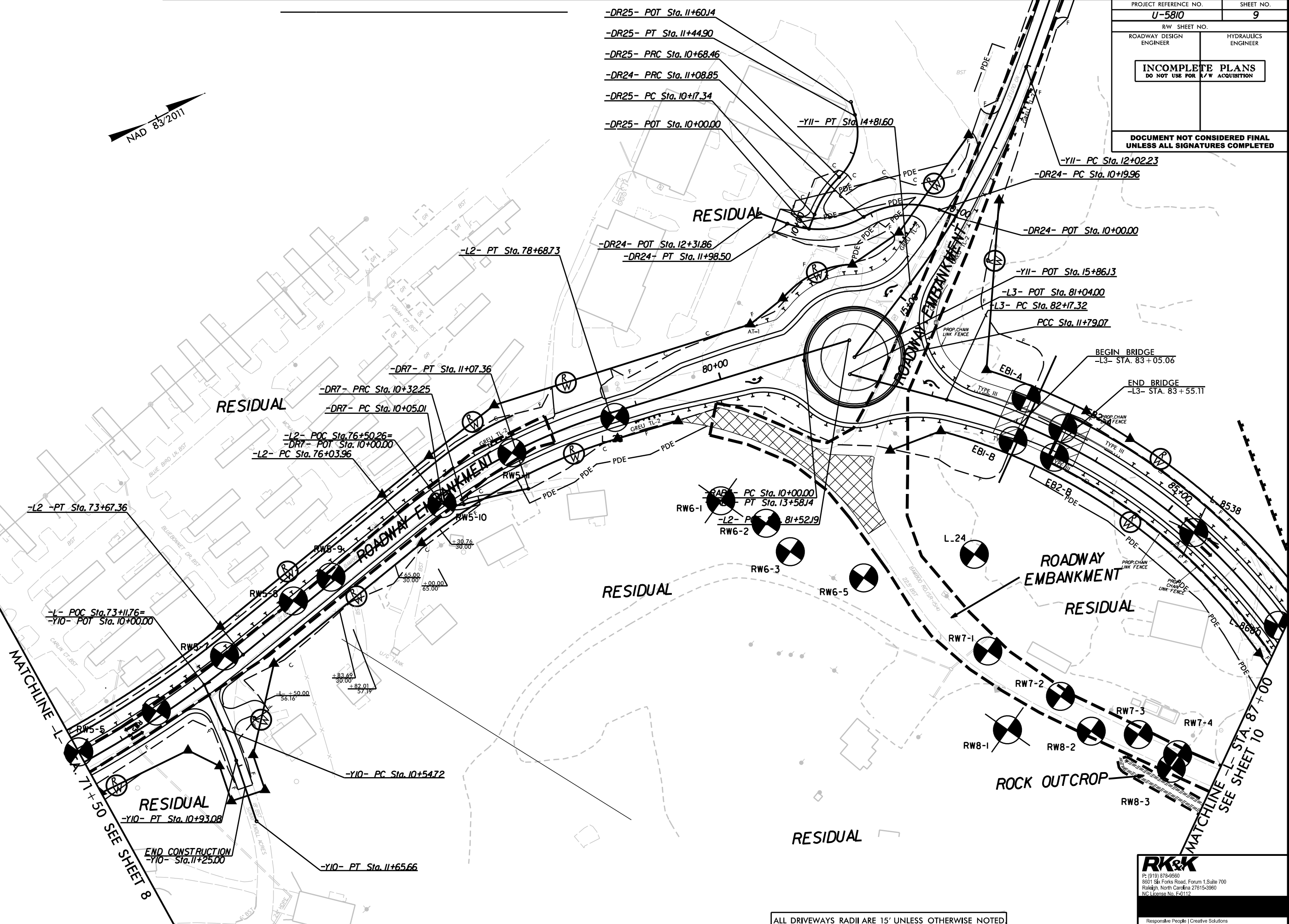




8/12/2011



PROJECT REFERENCE NO.	SHEET NO.
U-5810	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

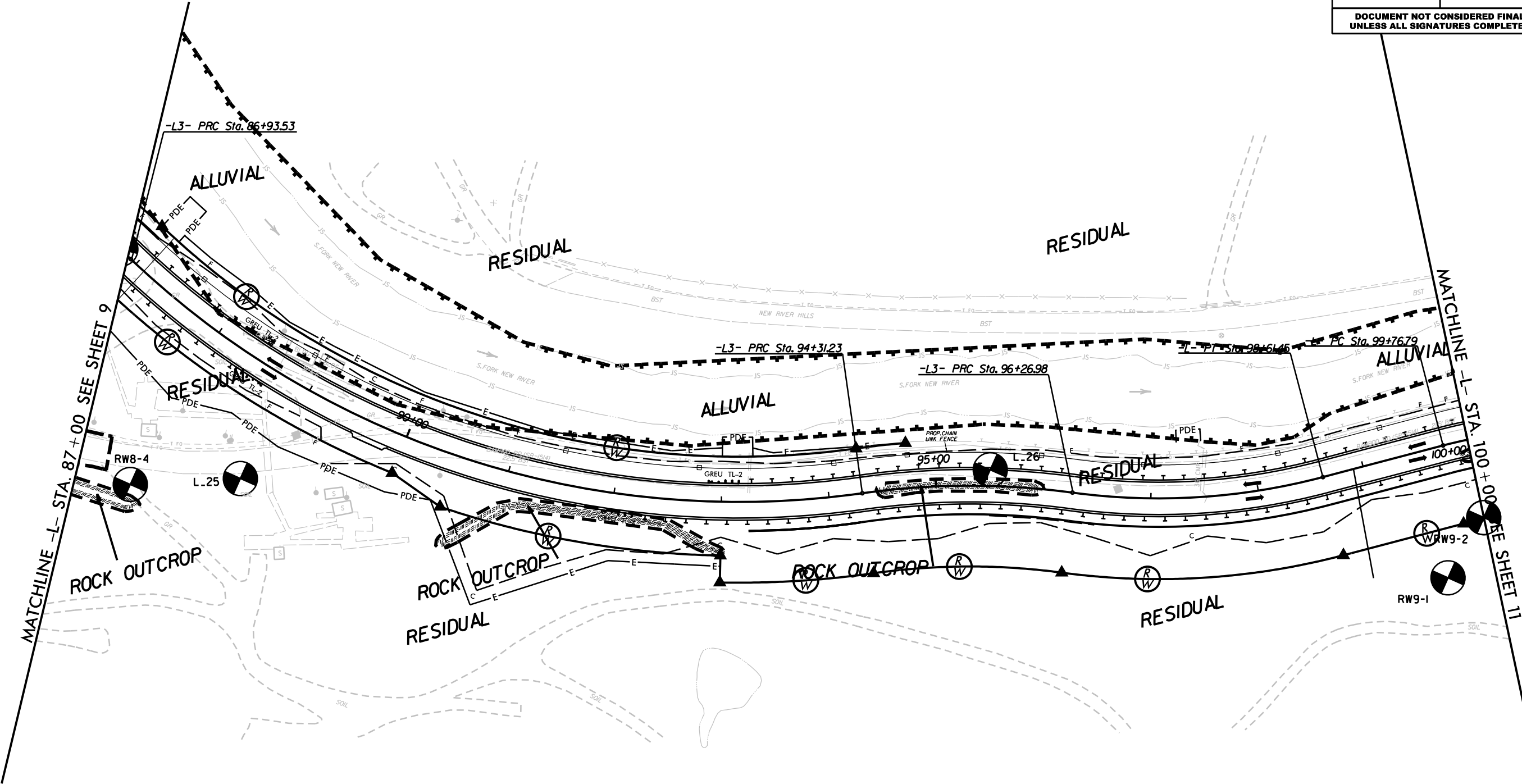


ALL DRIVEWAYS RADII ARE 15' UNLESS OTHERWISE NOTED

RK&K
P: (919) 878-9560
6601 Six Forks Road, Forum 1, Suite 700
Raleigh, North Carolina 27615-3960
NC License No. P-4112
Responsive People | Creative Solutions

8/12/2011

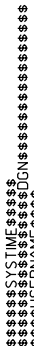
PROJECT REFERENCE NO.		SHEET NO.	
U-5810		10	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



ALL DRIVEWAYS RADII ARE 15' UNLESS OTHERWISE NOTED.

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PROJECT REFERENCE NO.
U-5810

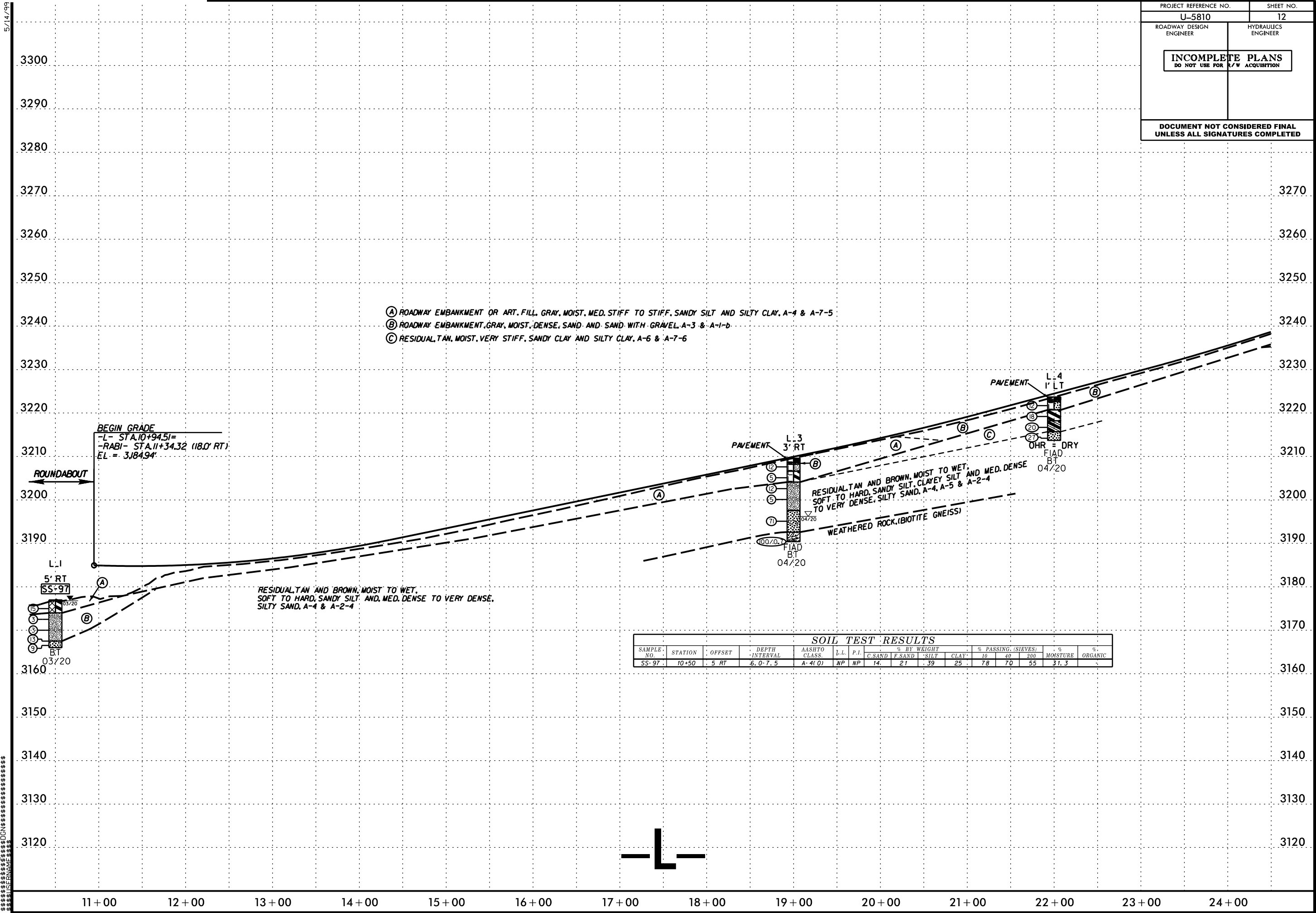
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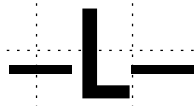
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED





PROJECT REFERENCE NO.
U-5810

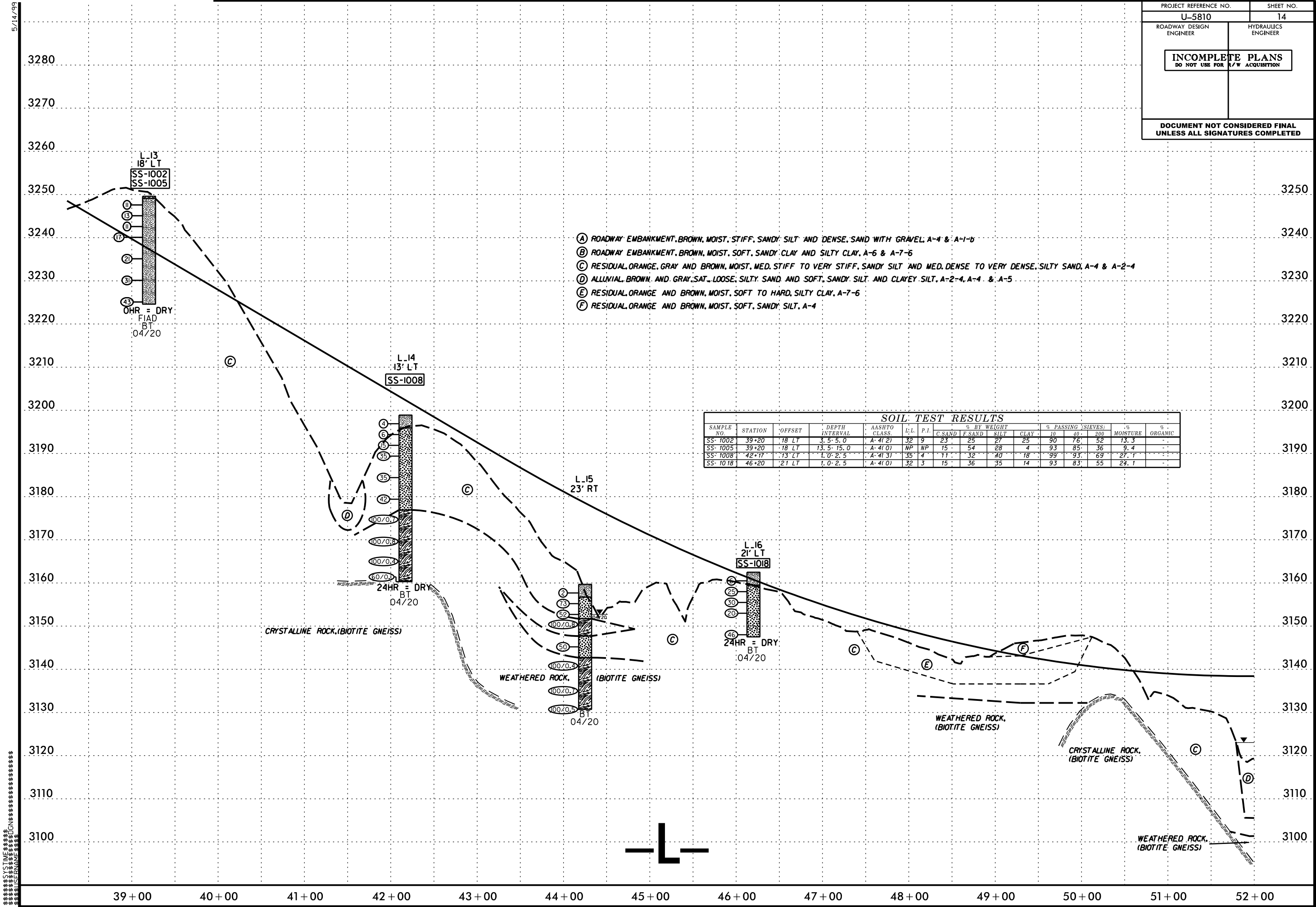
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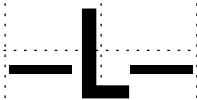
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED







5/28/98

PROJECT REFERENCE NO.
U-5810

SHEET NO.
17

ROADWAY DESIGN
ENGINEER

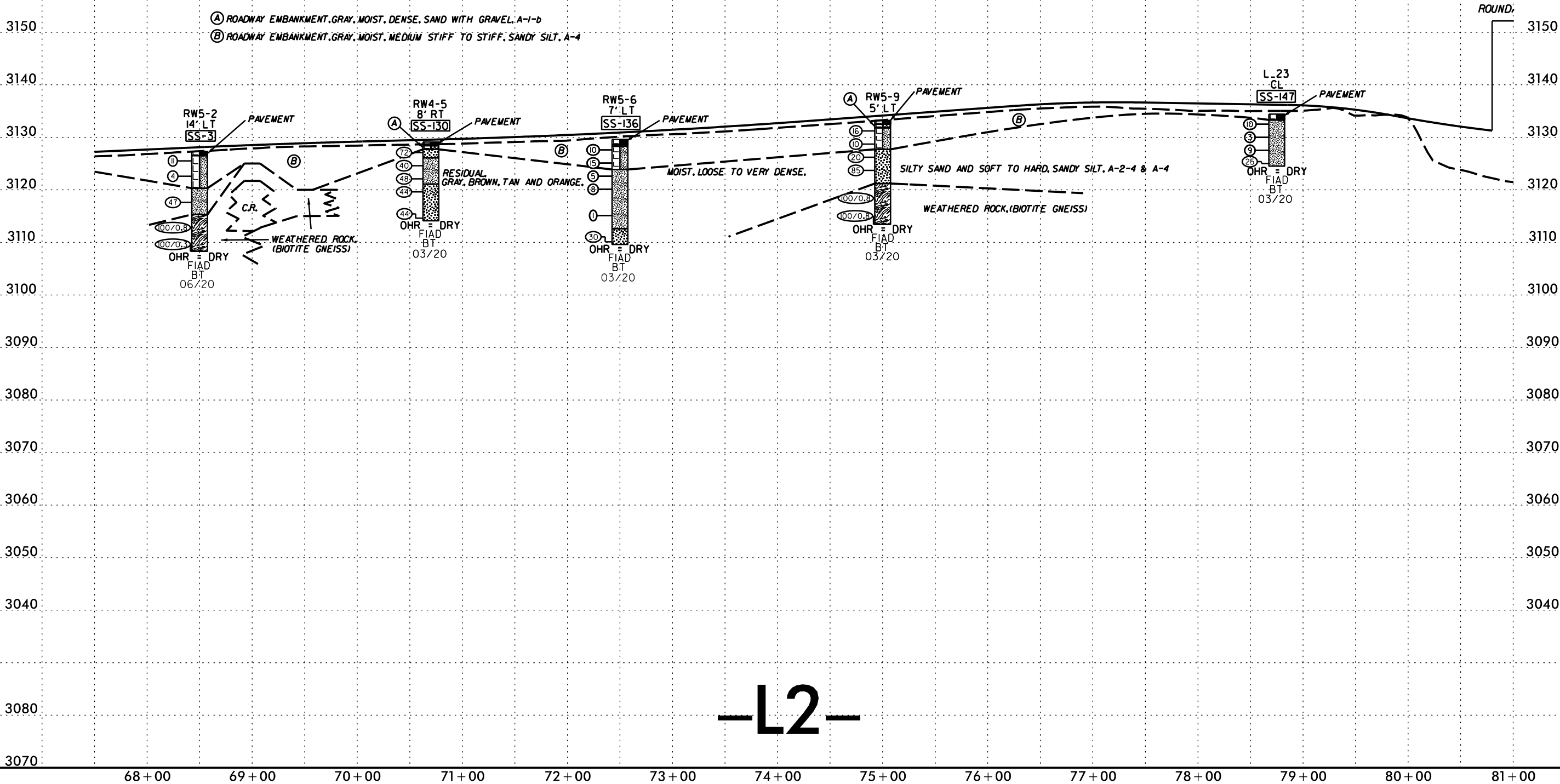
HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-3	68+50	14' LT	8.7'-10.2'	A-4(0)	NR	NR	26	42	29	3	91	75	39	9.1	--
SS-130	70+70	8 RT	3.5'-5.0'	A-4(0)	36	1	10	41	47	2	96	89	59	19.7	--
SS-136	72+50	7 LT	6.0'-7.5'	A-4(1)	33	8	19	34	22	25	85	74	47	23.4	--
SS-147	78+75	CL	3.5'-5.0'	A-4(3)	34	25	17	30	29	24	96	85	58	20.5	--

- (A) ROADWAY EMBANKMENT, GRAY, MOIST, DENSE, SAND WITH GRAVEL, A-1-b
- (B) ROADWAY EMBANKMENT, GRAY, MOIST, MEDIUM STIFF TO STIFF, SANDY SILT, A-4



-L2-

SYTIME
DESIGN
U.S. ROAD

5/28/98

PROJECT REFERENCE NO.
U-5810

SHEET NO.
18

ROADWAY DESIGN
ENGINEER

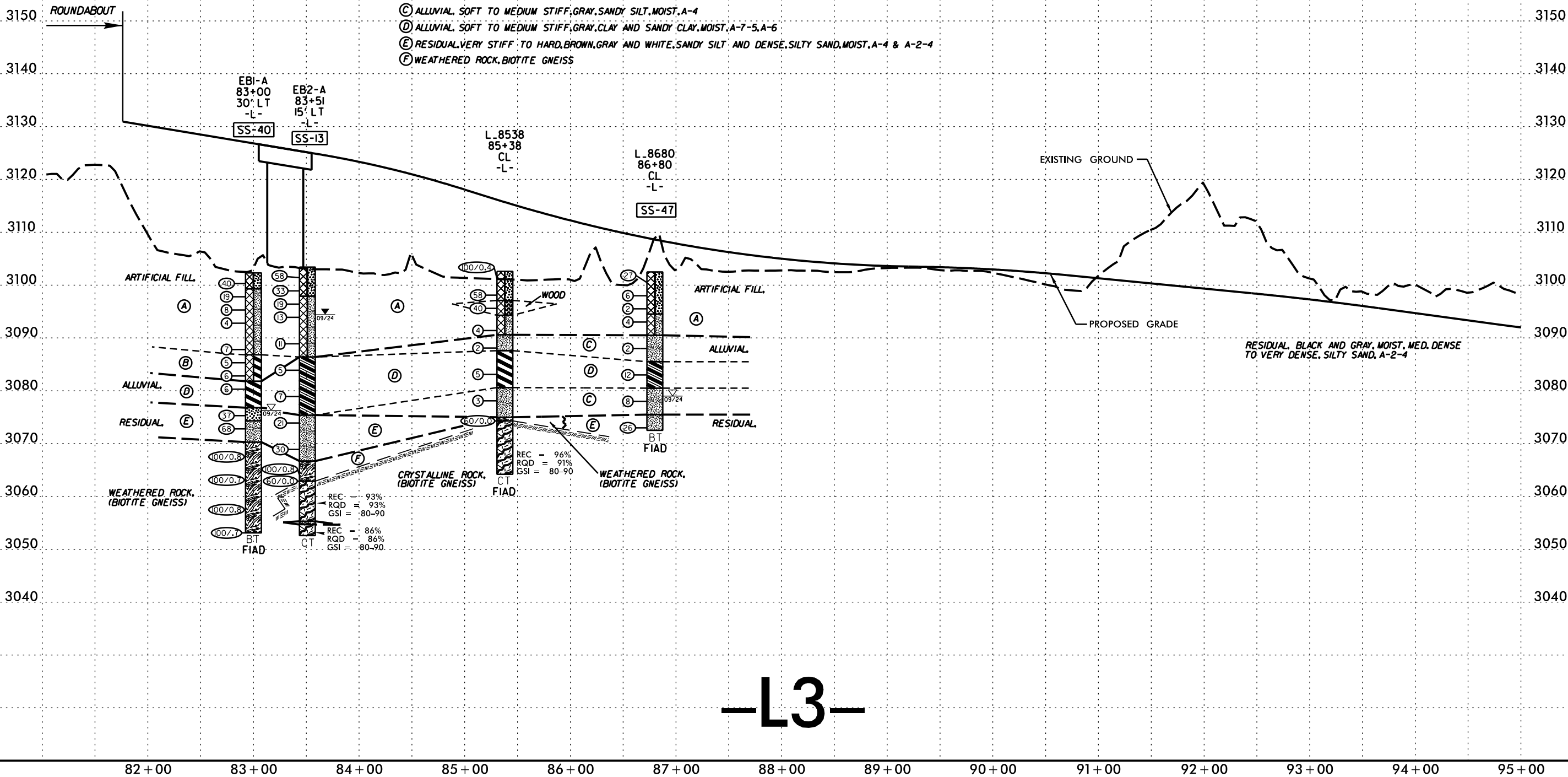
HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR A/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS														
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C.SAND	F.SAND	SILT	CLAY	#10	#40	#200	
SS-13	83+51	15' LT	18.5-20.0	A-6(8)	40	11	7	30	33	30	100	96	72	33.0
SS-40	83+00	30' LT	16.0-17.5	A-7-5(10)	48	12	7	31	36	26	100	97	71	43.2
SS-47	86+80	CL	6.0-7.5	A-2-4(0)	27	2	24	33	31	12	62	50	33	13.5

- (A) ARTIFICIAL FILL, MEDIUM STIFF TO VERY STIFF, BROWN, GRAY, AND RED, SANDY SILT, AND VERY LOOSE TO VERY DENSE, SILTY SAND, MOIST TO WET, A-4 & A-2-4
- (B) ARTIFICIAL FILL, MEDIUM STIFF, GRAY AND BROWN, CLAY, MOIST, A-7-5
- (C) ALLUVIAL, SOFT TO MEDIUM STIFF, GRAY, SANDY SILT, MOIST, A-4
- (D) ALLUVIAL, SOFT TO MEDIUM STIFF, GRAY, CLAY AND SANDY CLAY, MOIST, A-7-5, A-6
- (E) RESIDUAL, VERY STIFF TO HARD, BROWN, GRAY AND WHITE, SANDY SILT AND DENSE, SILTY SAND, MOIST, A-4 & A-2-4
- (F) WEATHERED ROCK, BIOTITE GNEISS



-L3-

5/28/98

PROJECT REFERENCE NO.
U-5810

SHEET NO.
19

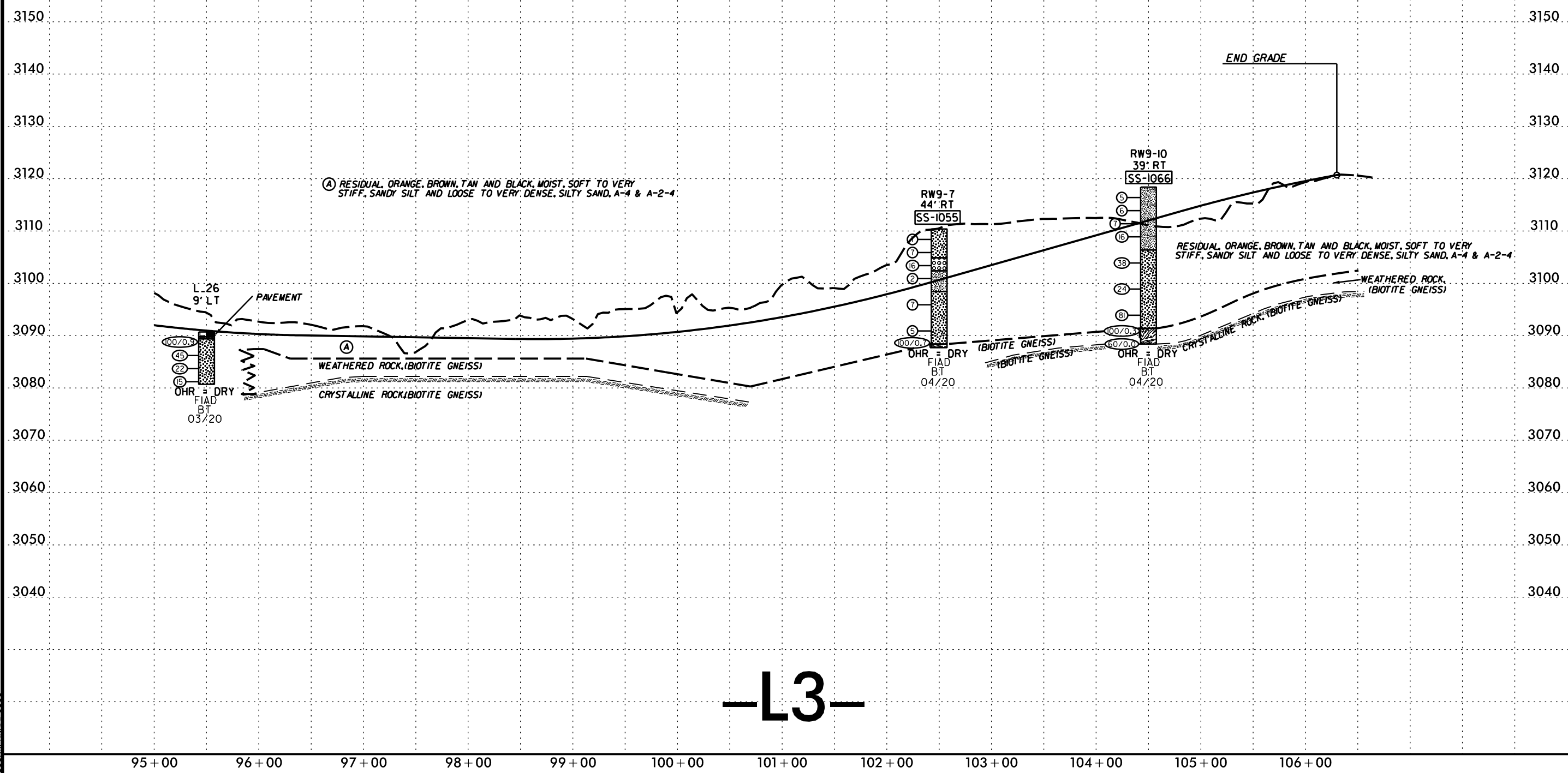
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

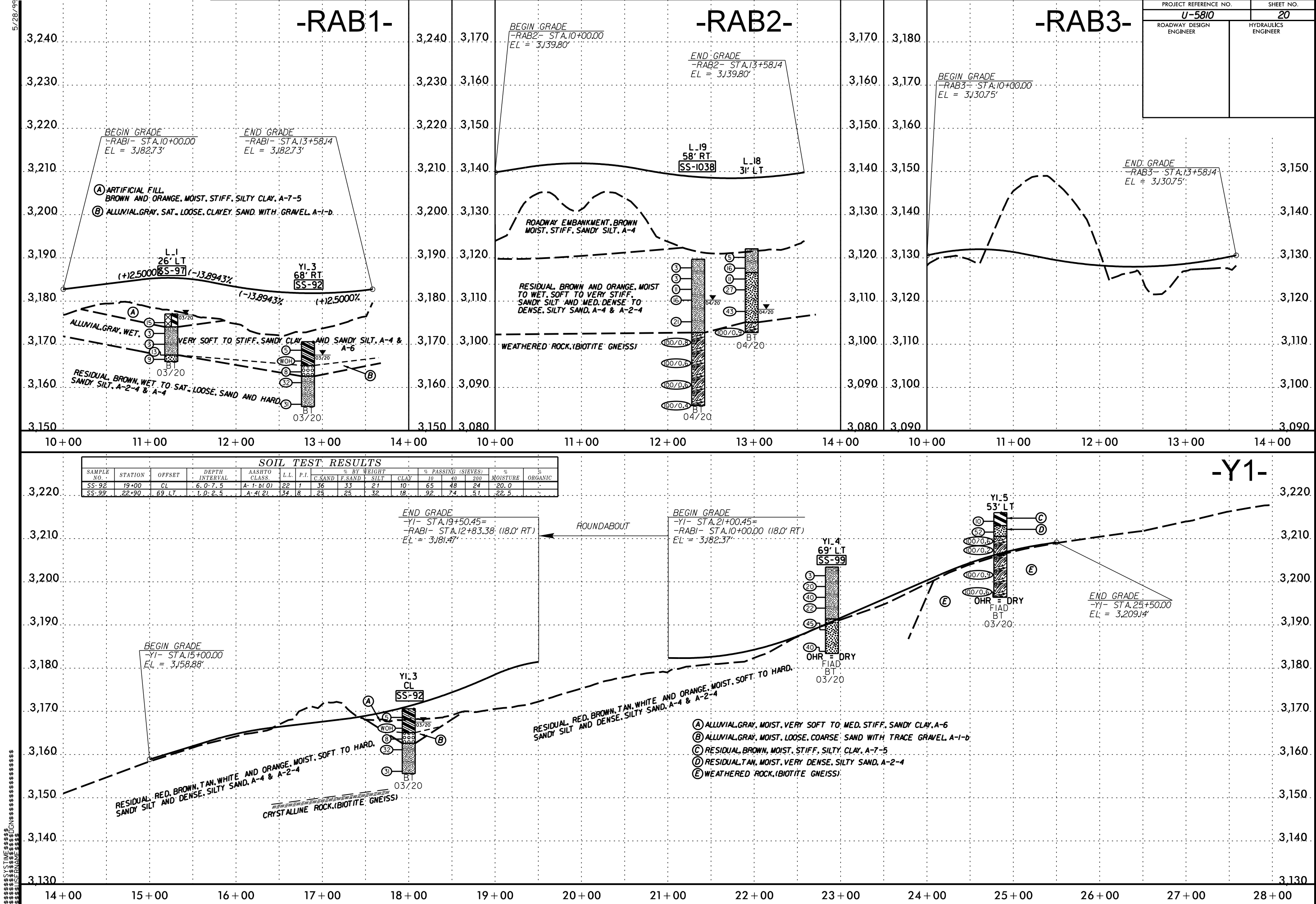
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

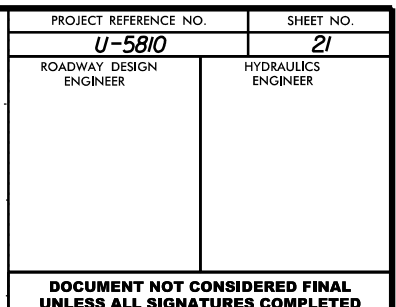
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

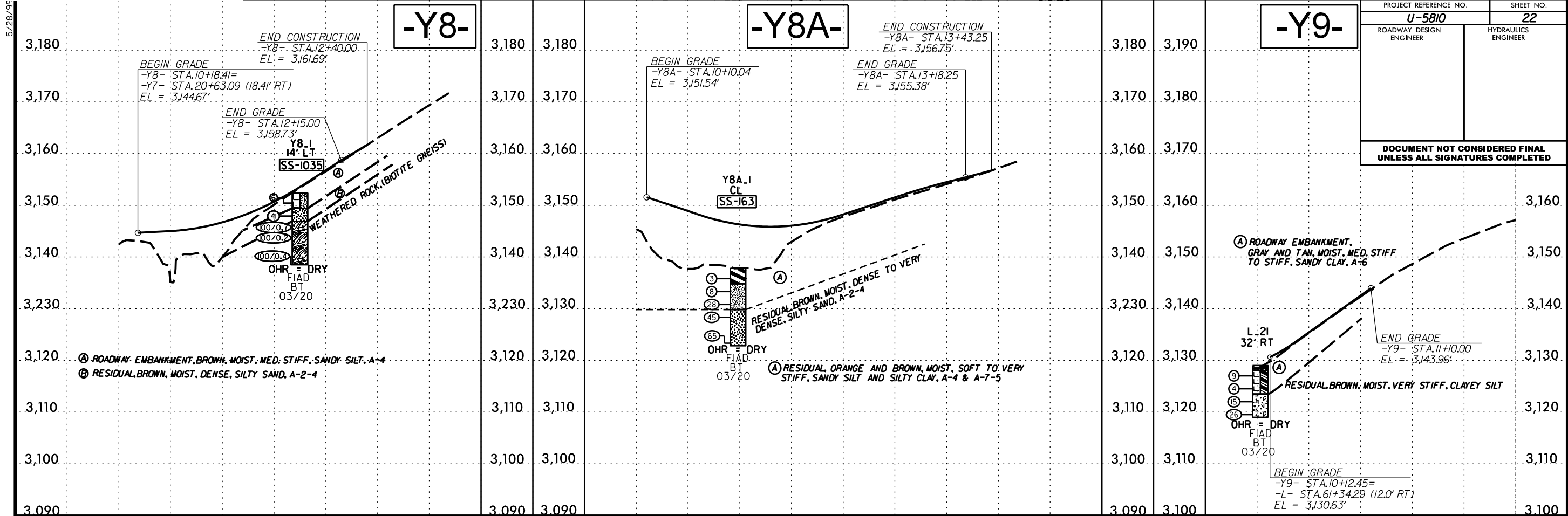
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SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.L.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1055	102+50	44 RT	6.0-7.5	A-1-b(0)	40	5	49	21	22	8	60	37	21	23.2	-
SS-1066	104+50	39 RT	6.0-7.5	A-1(0)	NP	NP	15	43	38	4	98	90	52	29.2	-



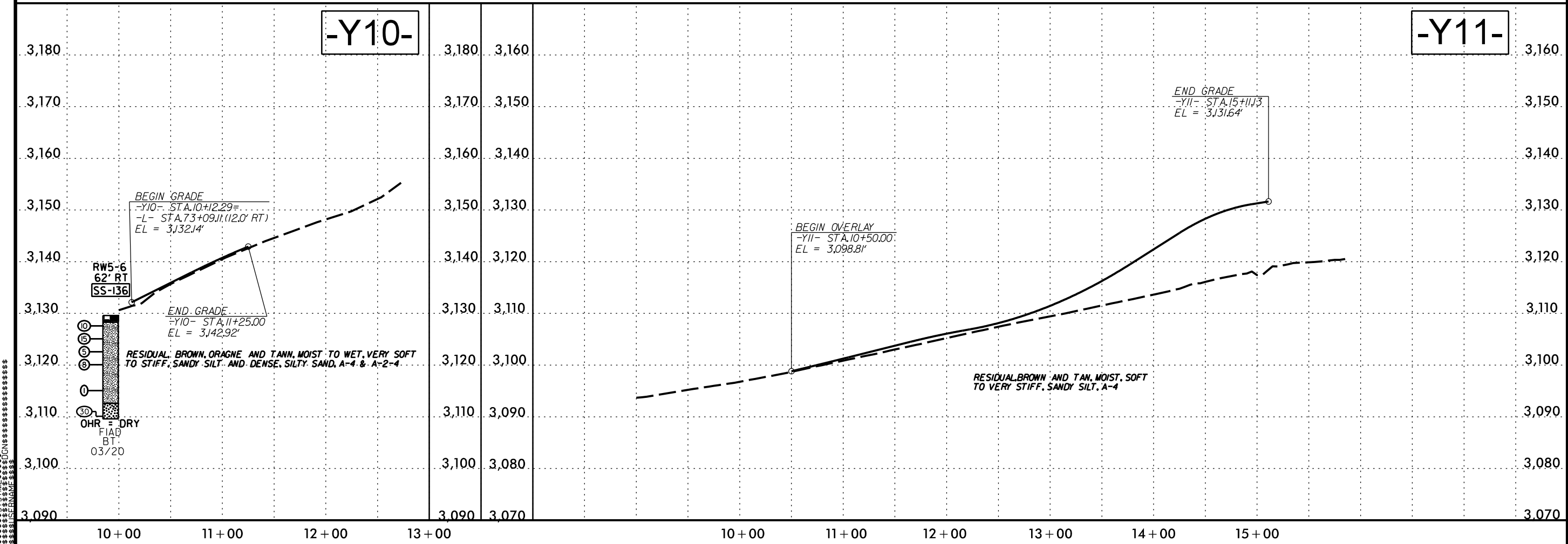
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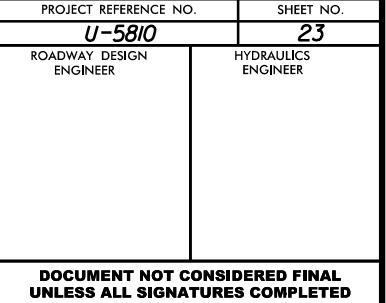


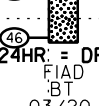


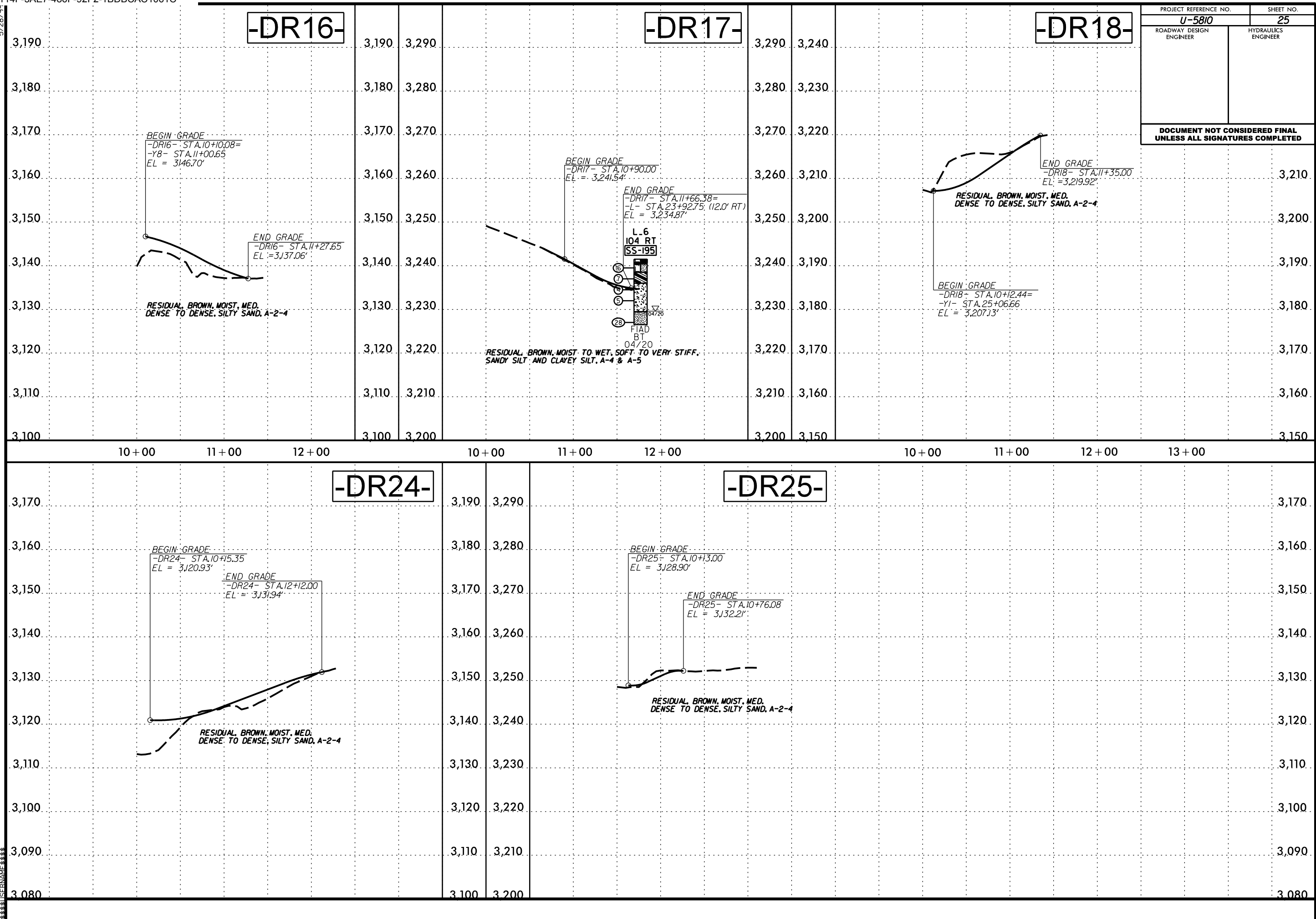


PROJECT REFERENCE NO.		SHEET NO.
U-5810		22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		









PROJECT REFERENCE NO.

U-5810

SHEET NO.

26

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS	LL	PI	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-8	13+50	25 RT	8.5-10.0	A-4(1)	31	5	18	28	35	19	90	79	56	25.2	-
SS-12	11+50	CL	3.5-5.0	A-4(0)	30	4	25	35	28	12	93	77	46	23.2	-
SS-14	11+50	CL	8.5-10.0	A-2-5(0)	43	7	33	28	28	12	75	57	34	31.5	-

- (A) ALLUVIAL BROWN AND GRAY, MOIST, VERY SOFT TO VERY STIFF, SANDY SILT, A-4
- (B) ALLUVIAL BROWN AND GRAY, MOIST, SOFT, SANDY CLAY, A-6

BEGIN GRADE
-DET- STA.11+52.29
EL = 3,257.72'

Y3-1
CL
SS-12
SS-14

Y3-2
25' RT
SS-8

RESIDUAL
BROWN AND TAN, MOIST, LOOSE,
SILTY SAND AND HARD, SANDY SILT, A-2-4 & A-4

END GRADE
-DET- STA.19+94.06
EL = 3,321.26'

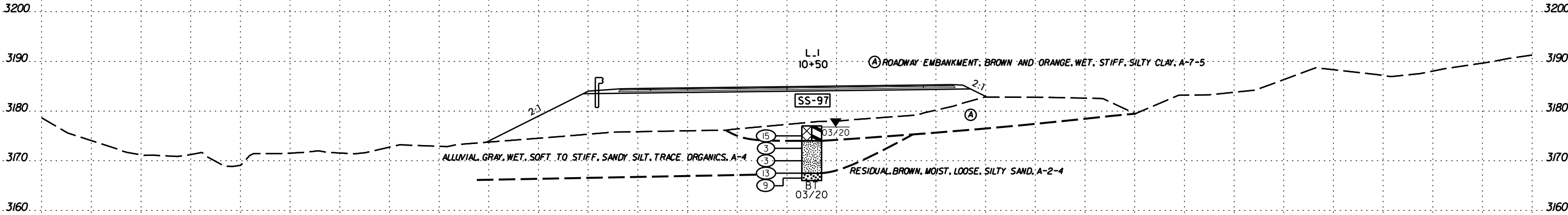
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6/23/16



PROJ. REFERENCE NO.	SHEET NO.
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11 + 00.00

— L —

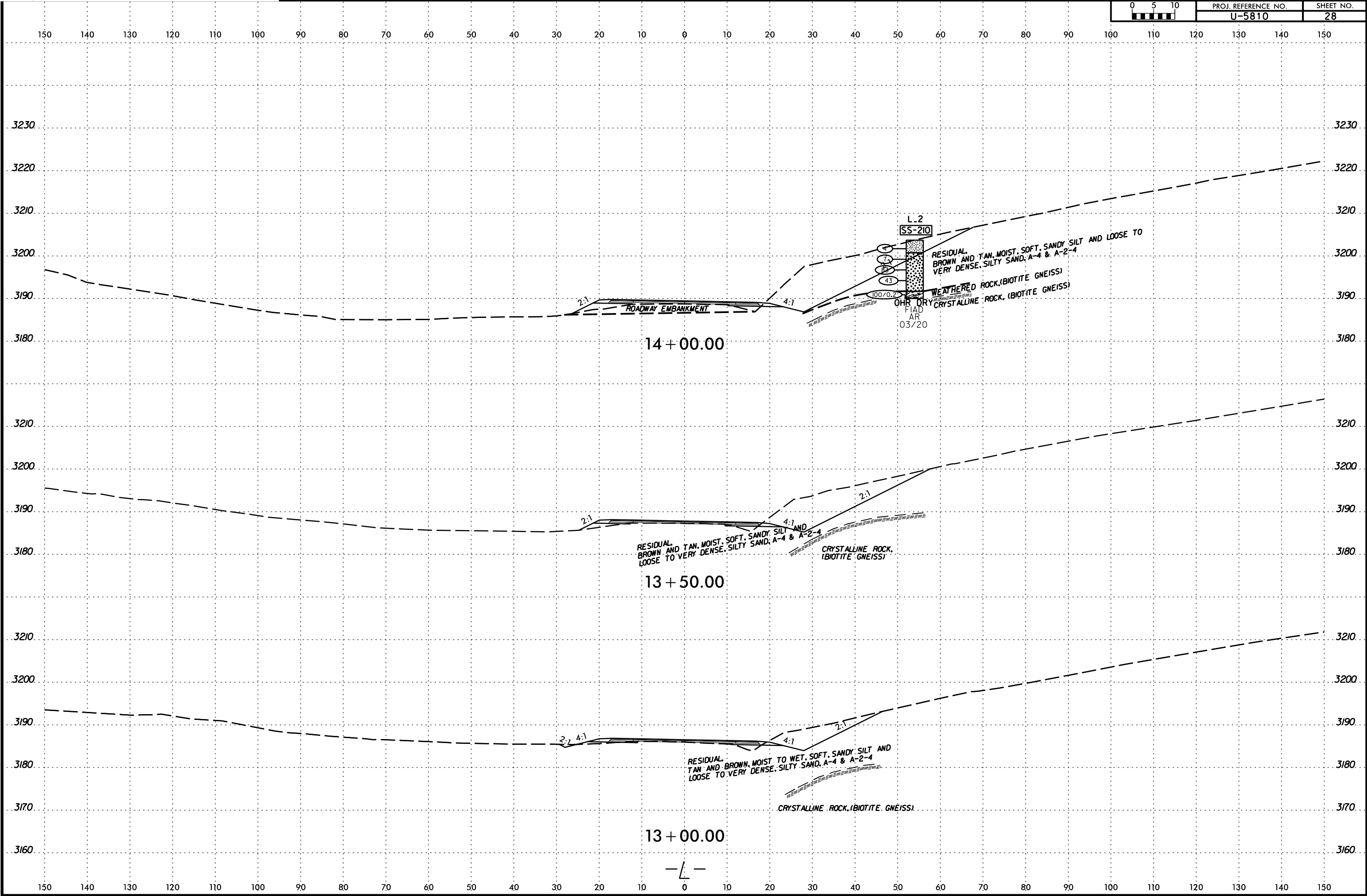
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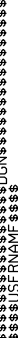
SECTION NAME
SUBSECTION NAME

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	28

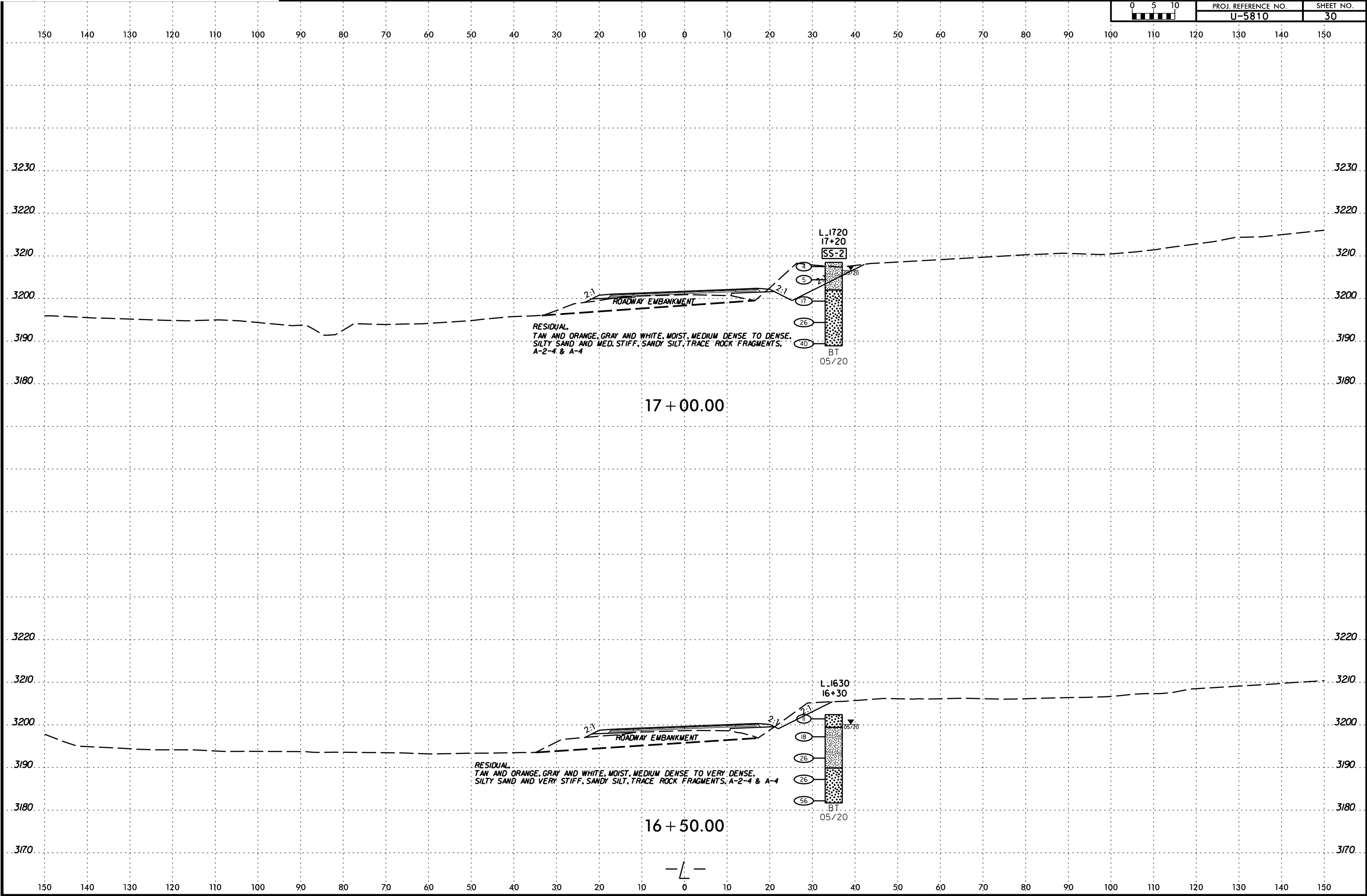




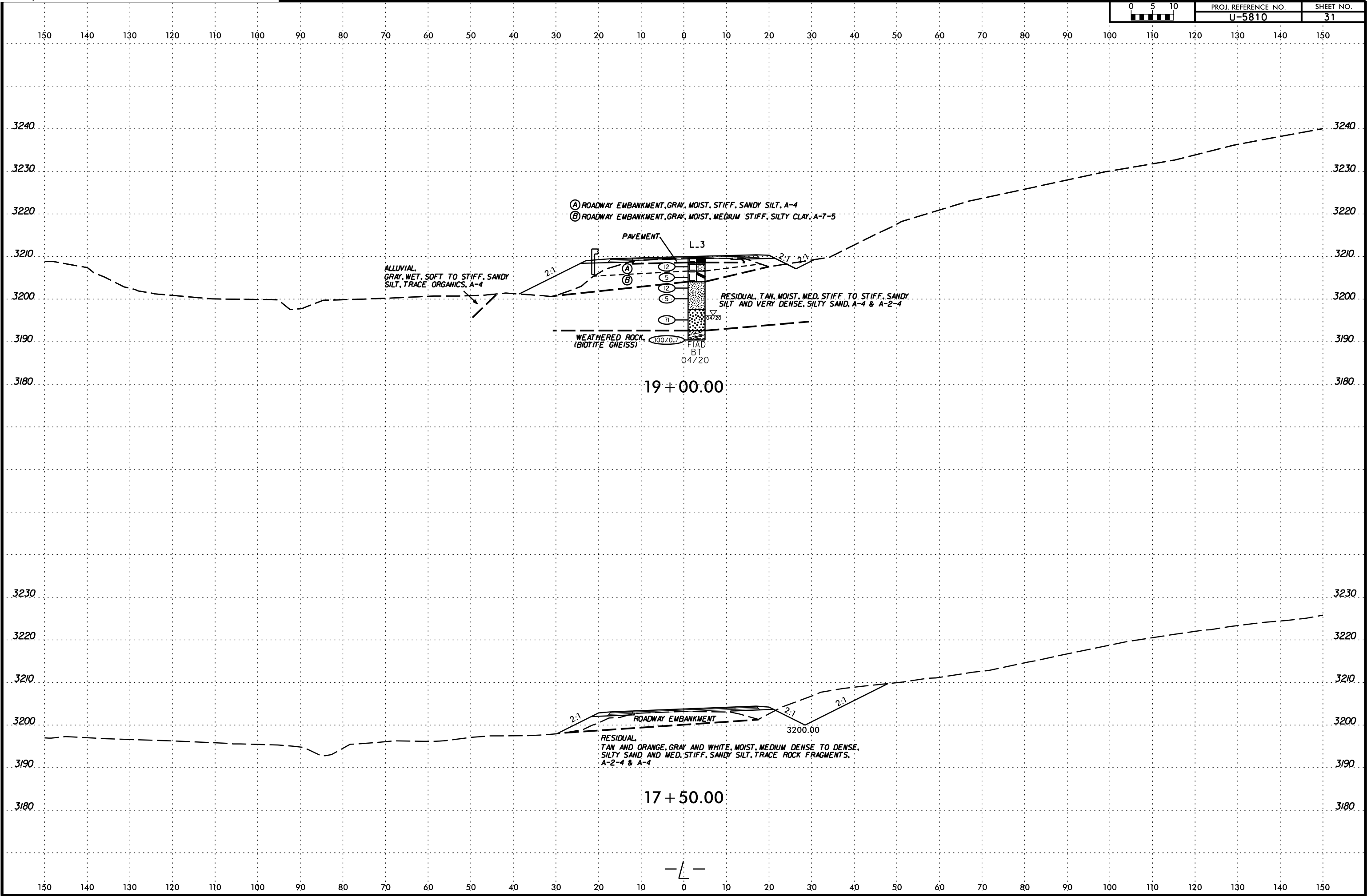
6/23/16

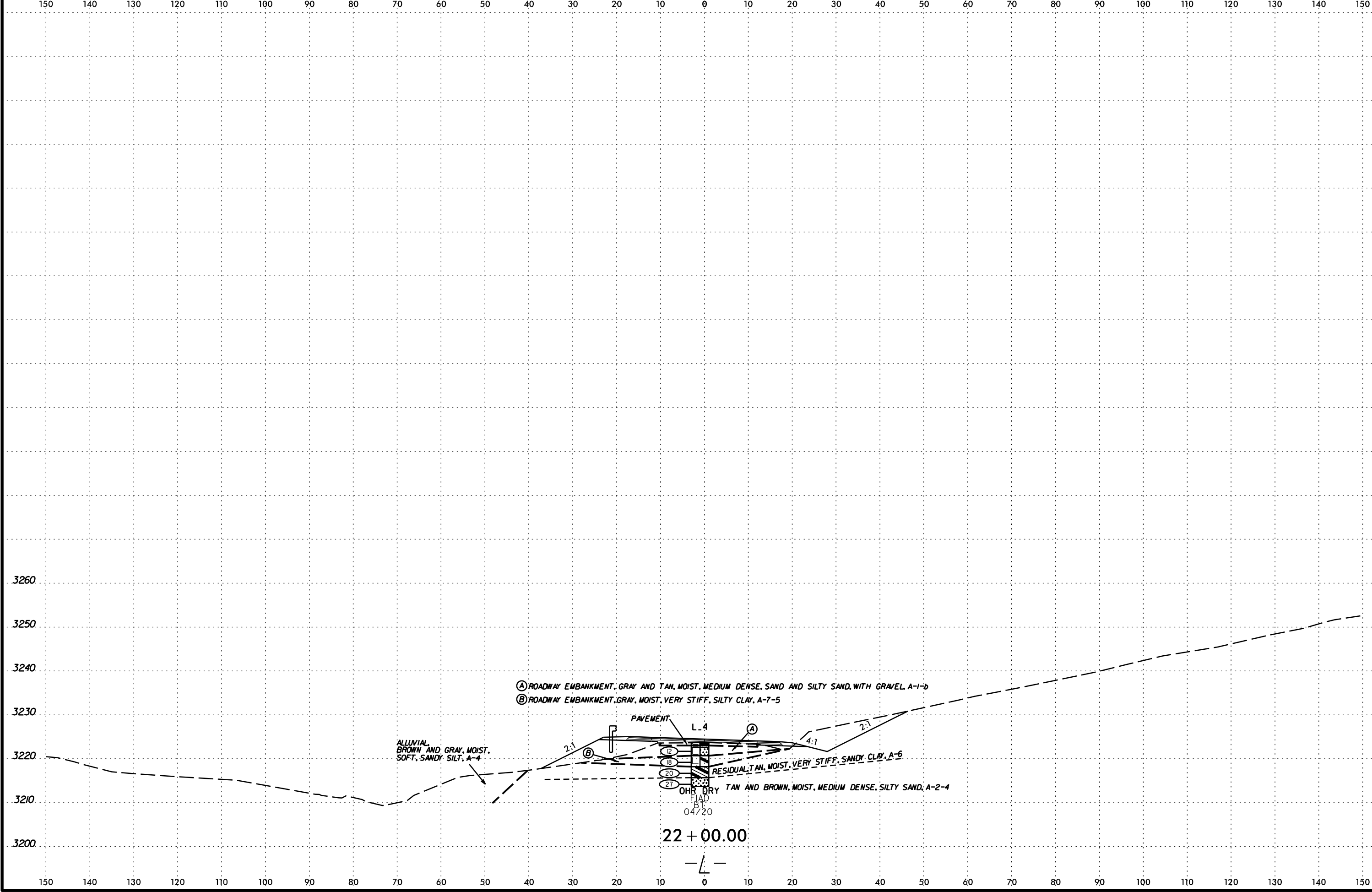


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U-5810	30

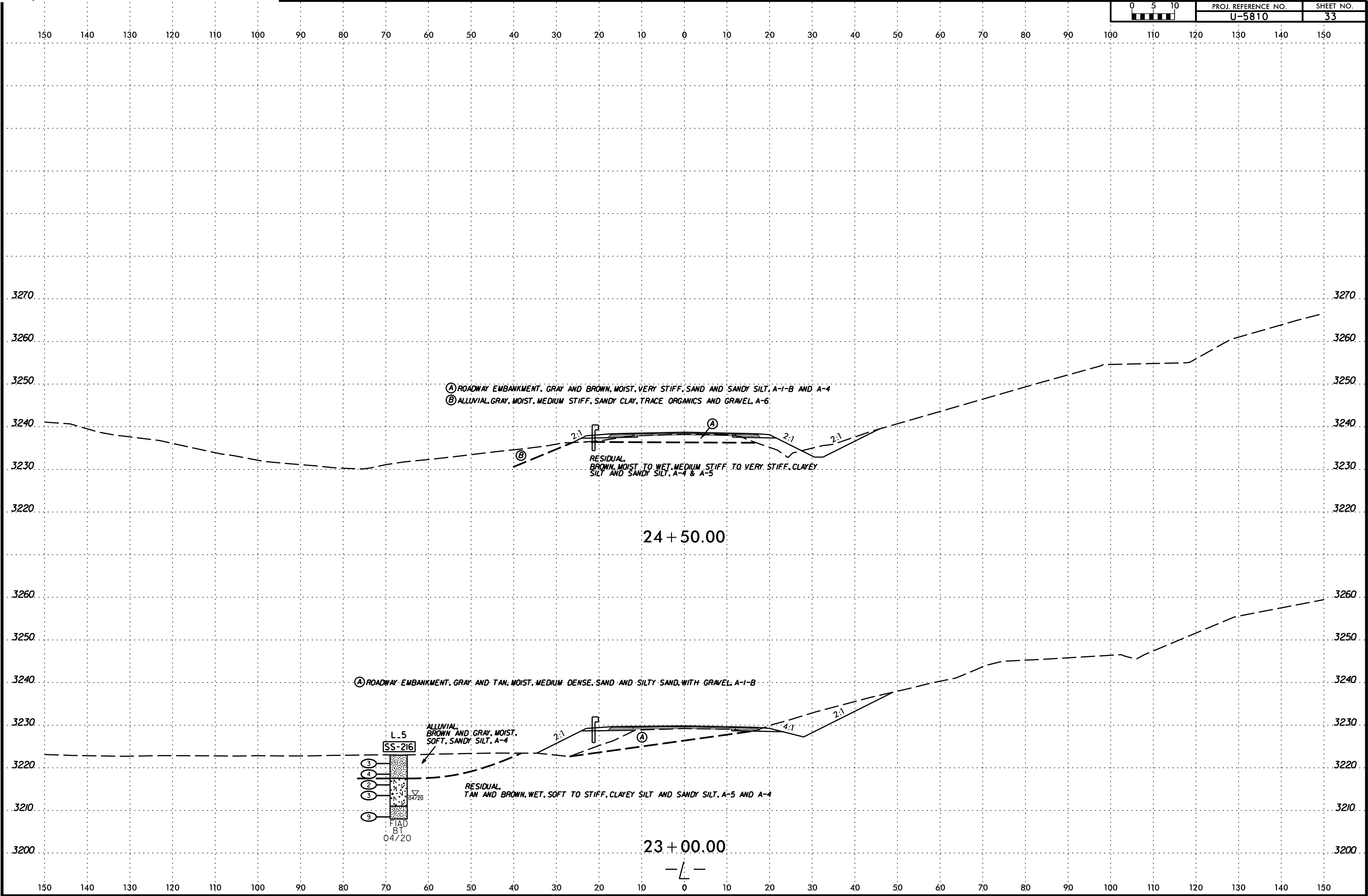


6/23/16





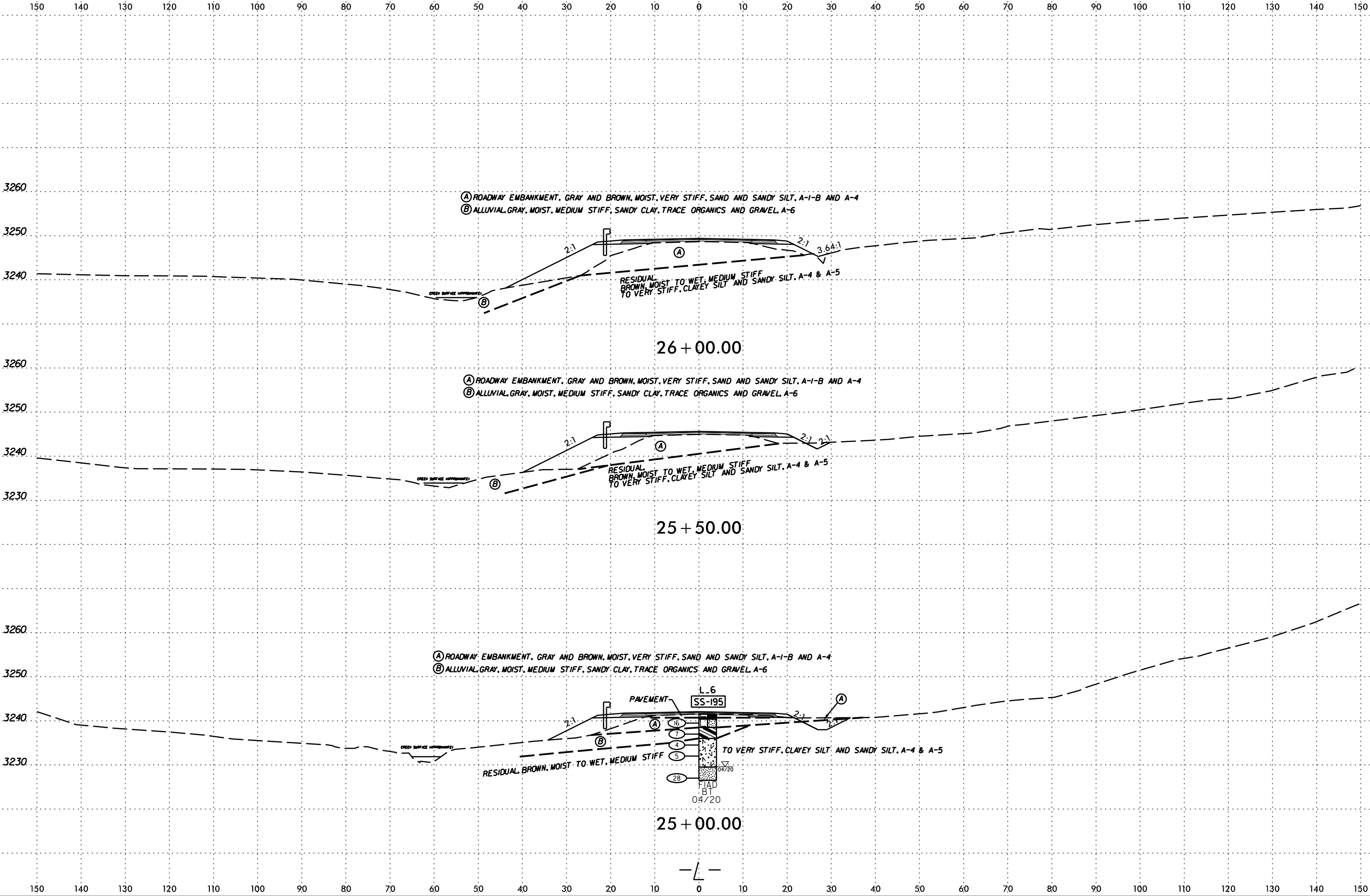
6/23/16



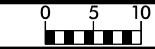
6/23/16



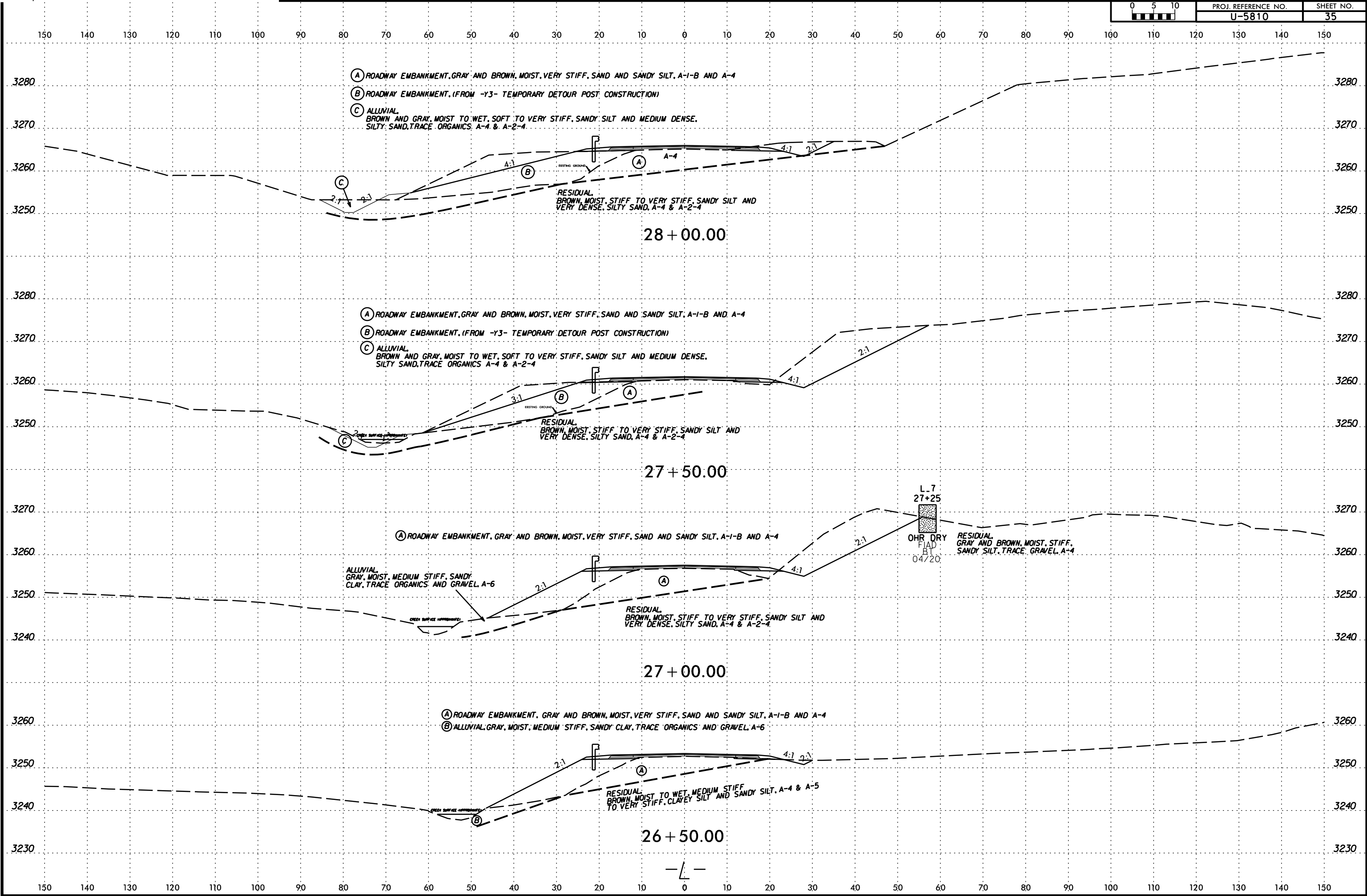
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U-5810	34



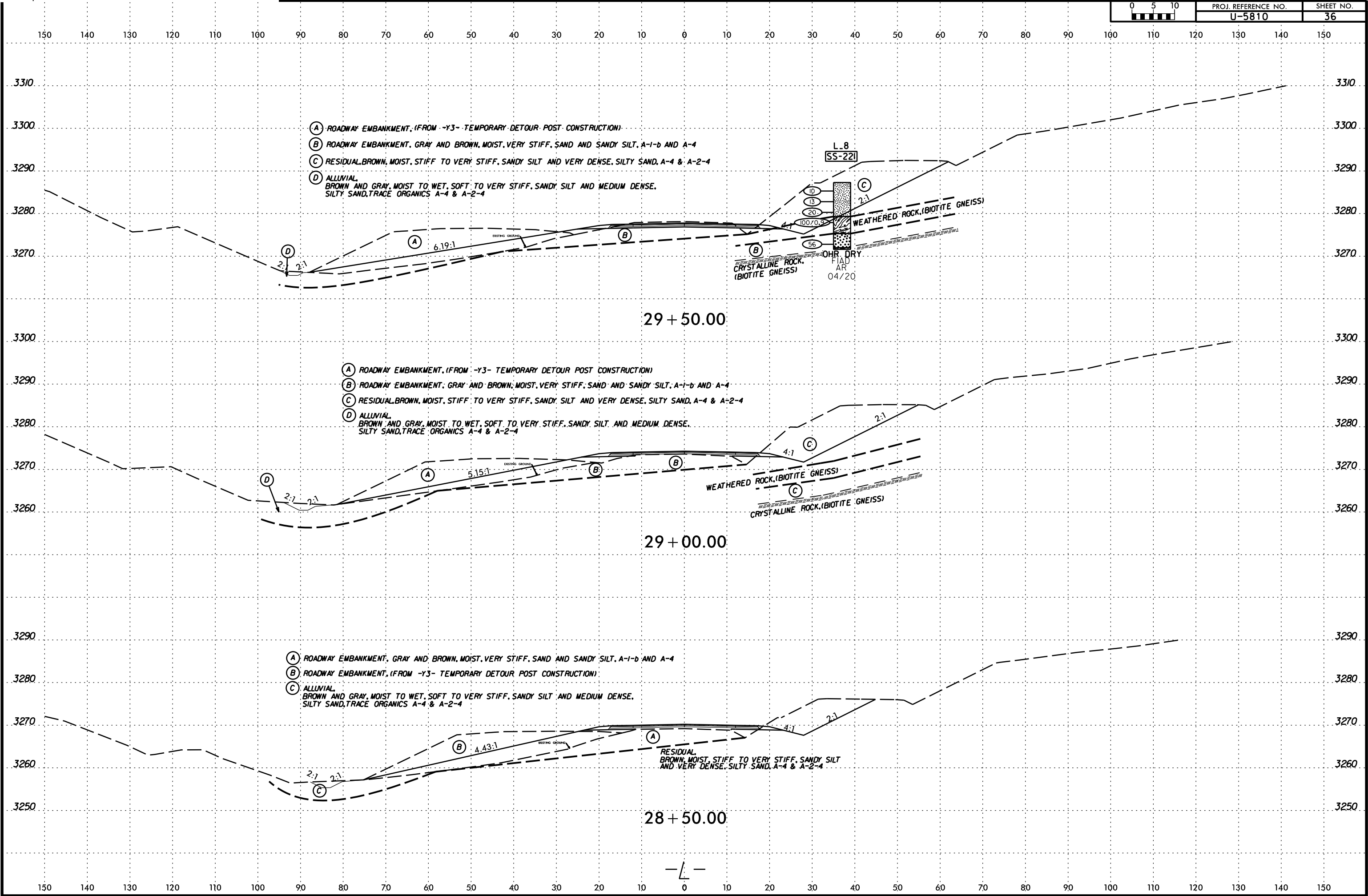
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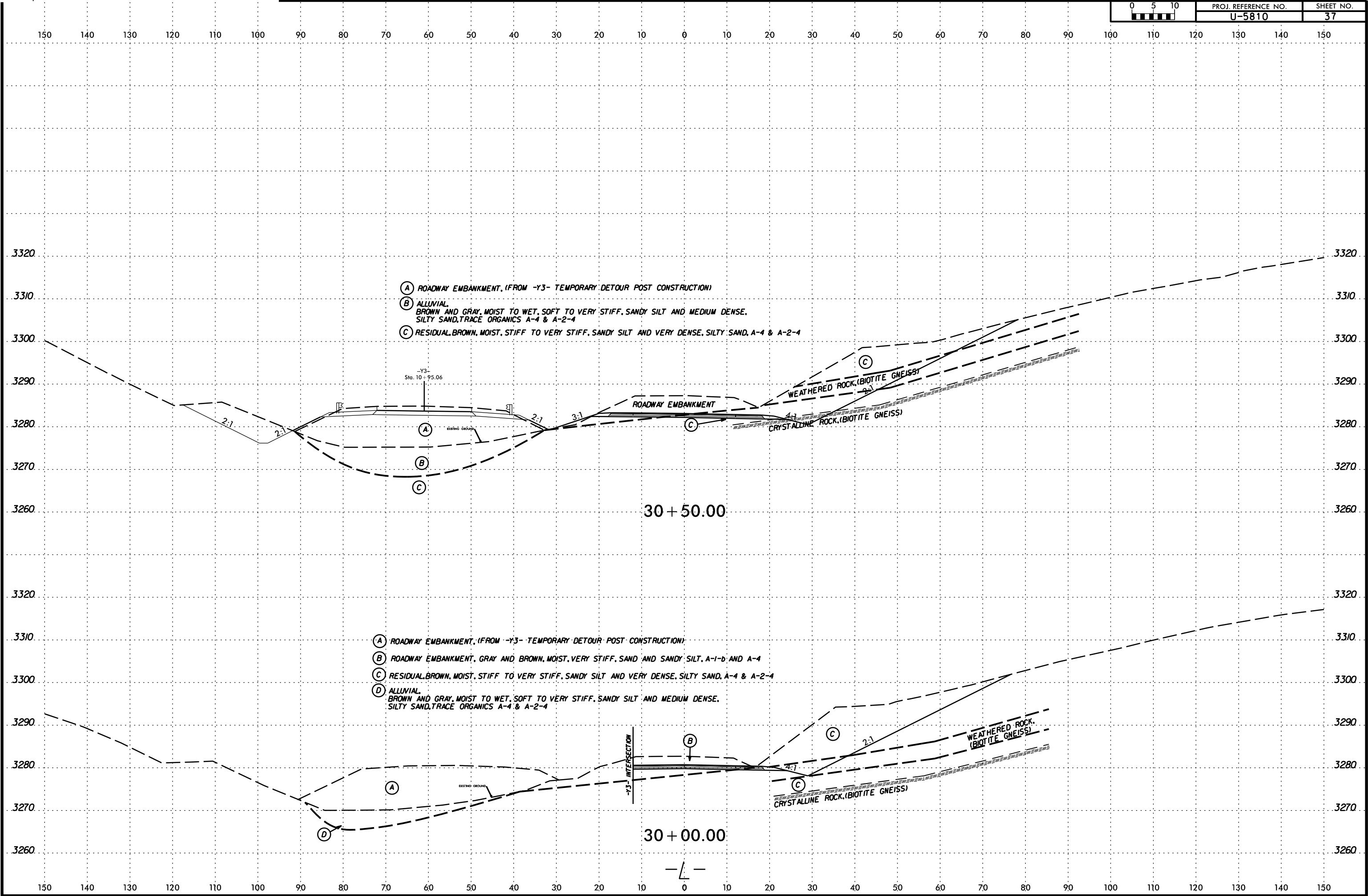
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U-5810	35



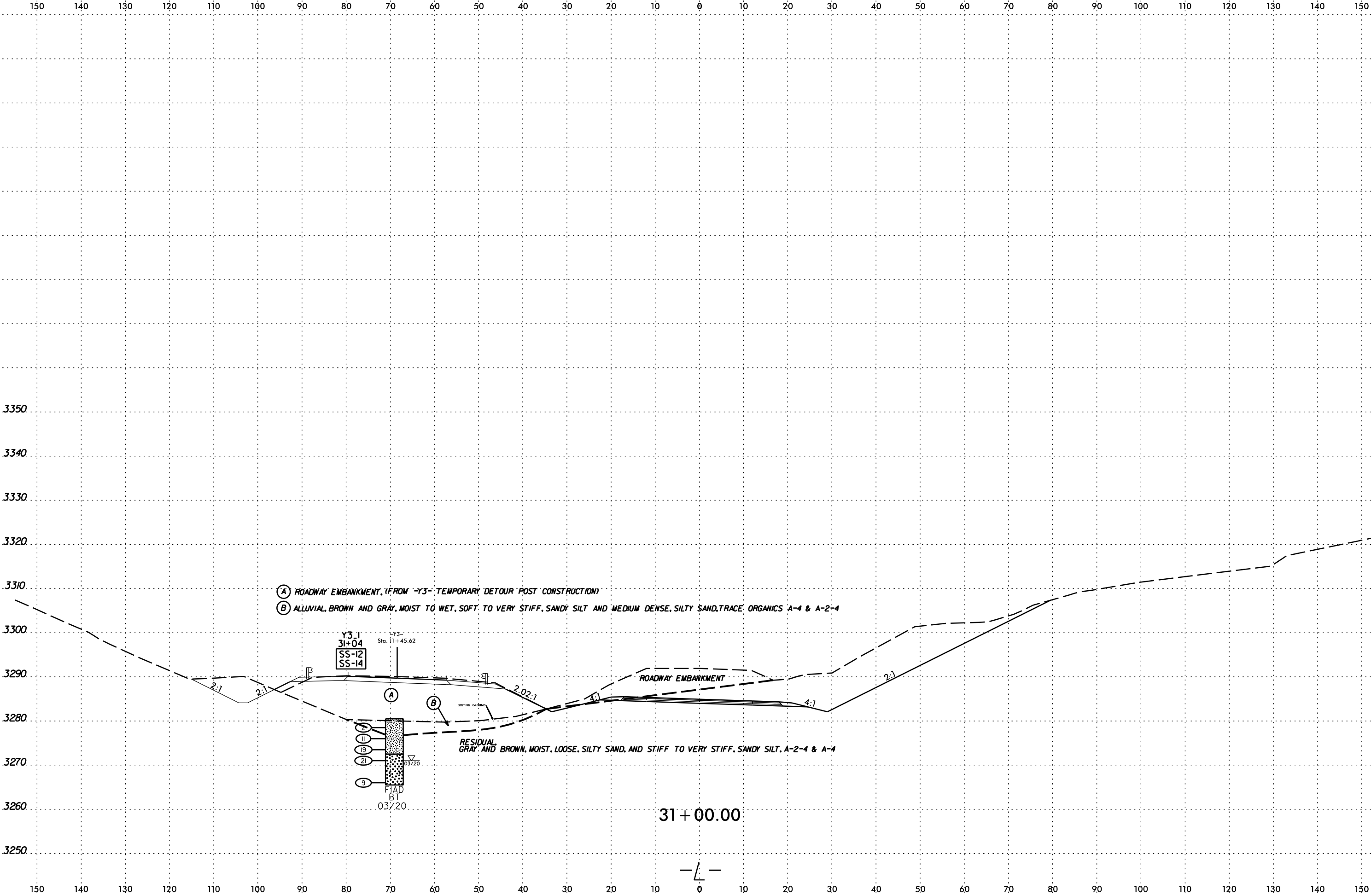
6/23/16



6/23/16



6/23/16



6/23/16



PROJ. REFERENCE NO.
U-5810

SHEET NO.
43

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3340 3340

3330 3330

3320 3320

3310 3310

3300 3300

3290 3290

3280 3280

3270 3270

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, BROWN AND TAN, MOIST, STIFF TO HARD, SANDY SILT AND LOOSE TO DENSE, SILTY SAND, A-4 & A-2-4

WEATHERED ROCK, (BIOTITE GNEISS)

RESIDUAL, GRAY, MOIST, DENSE TO VERY DENSE, SILTY SAND, A-2-4

WEATHERED ROCK, (BIOTITE GNEISS)

2:1

4:1

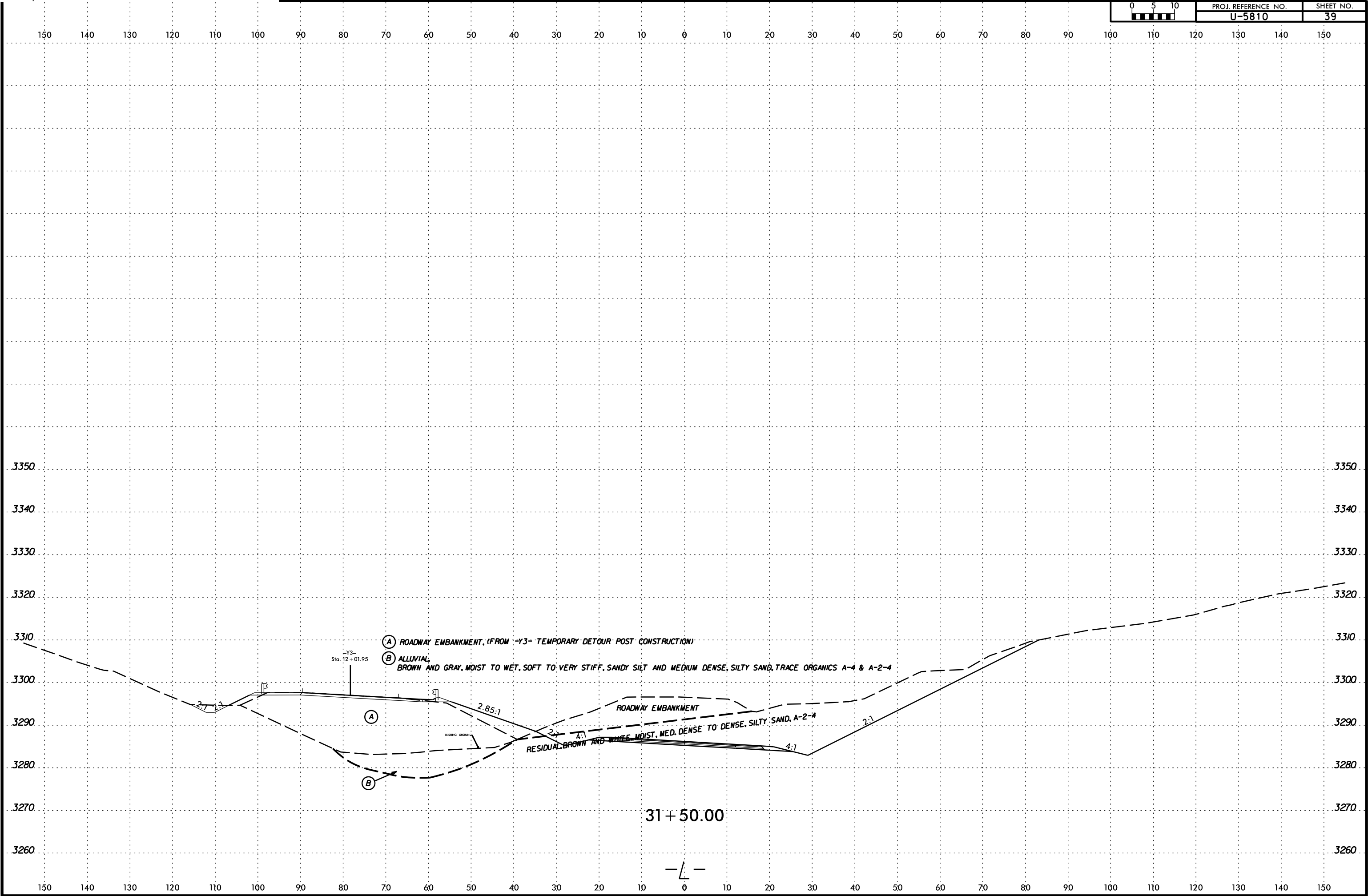
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34 + 00.00



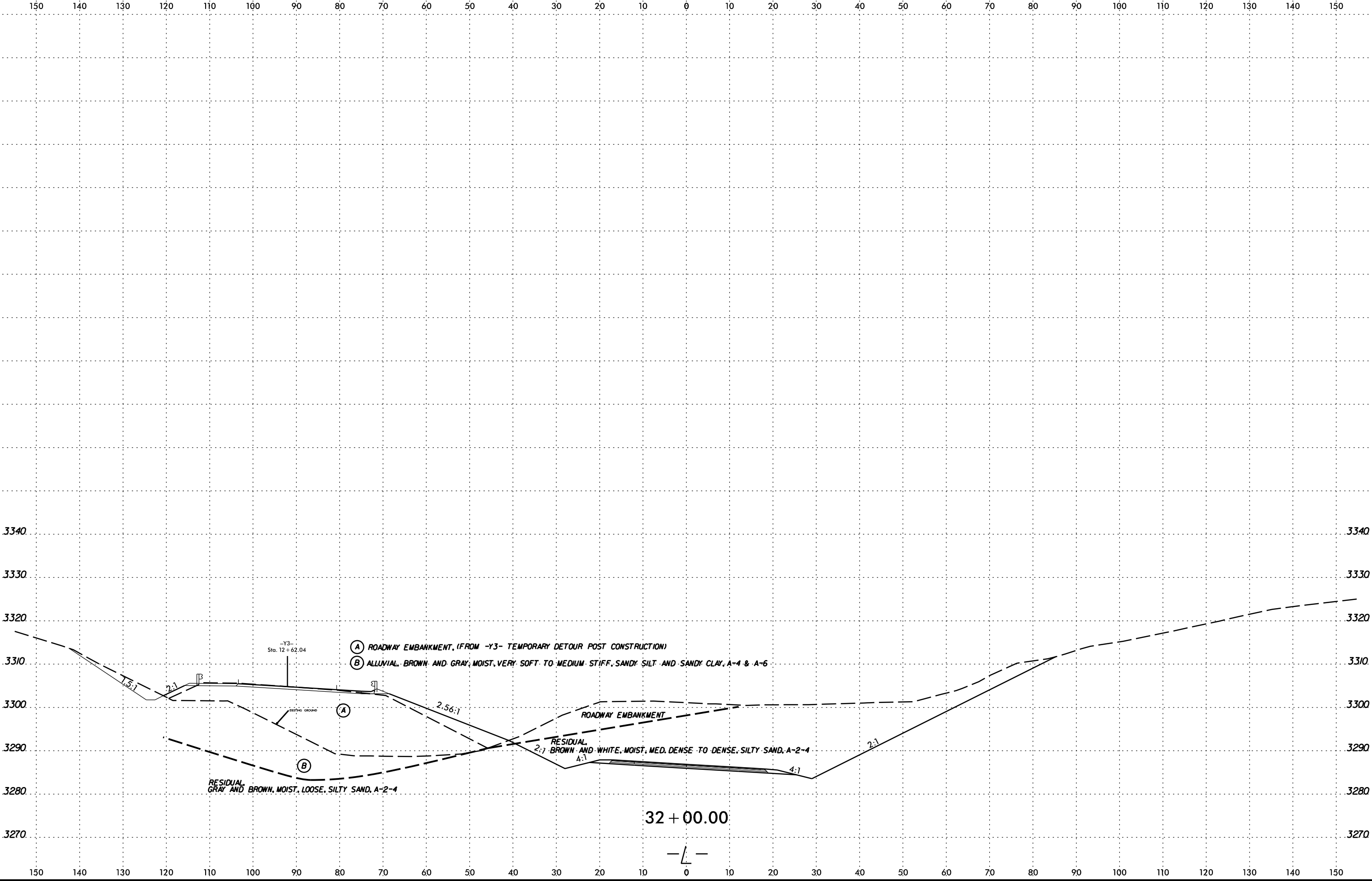
SYNTHETIC
STRUCTURE
REINFORCEMENT
CONCRETE
RETAINING WALL

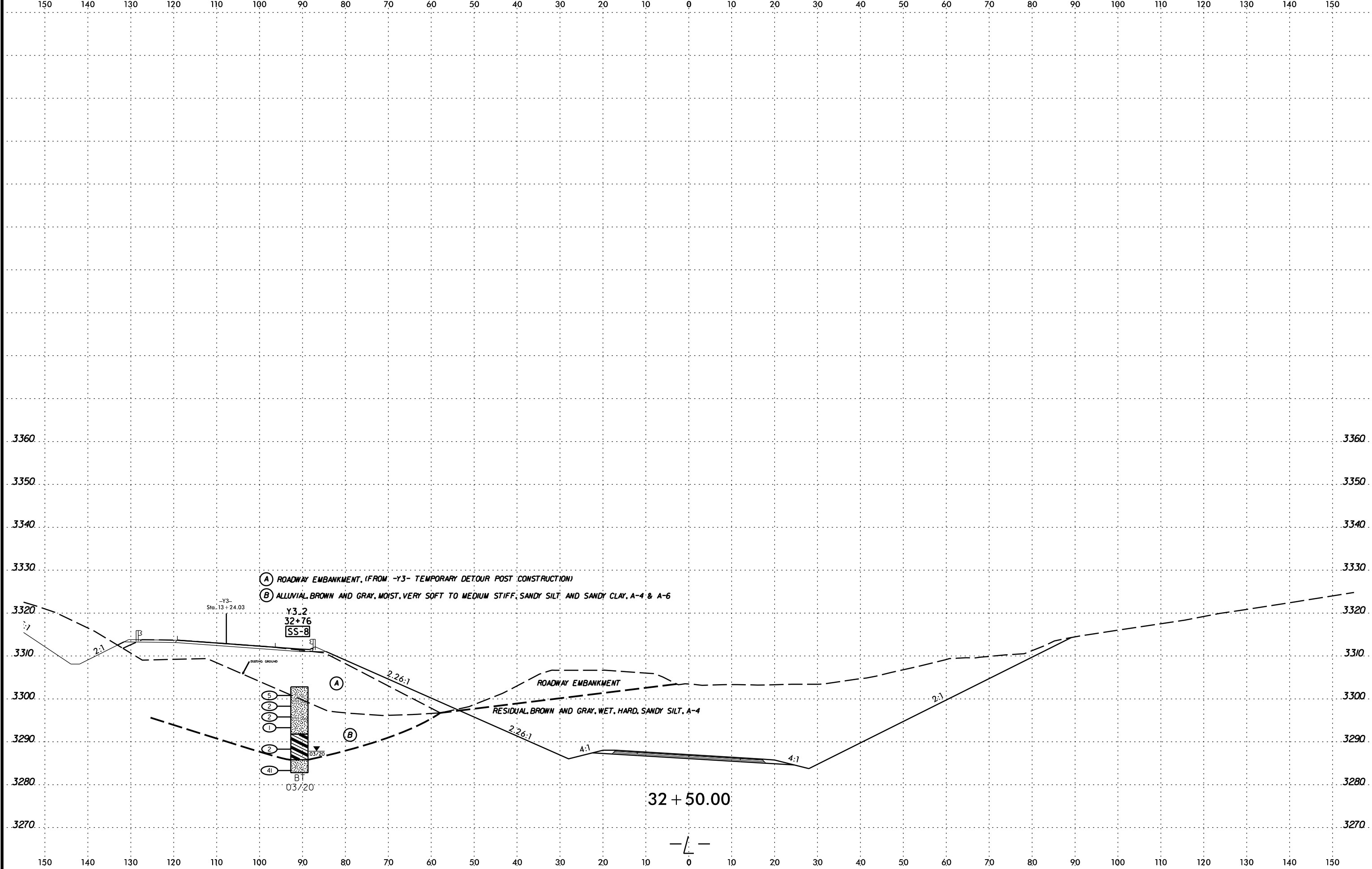
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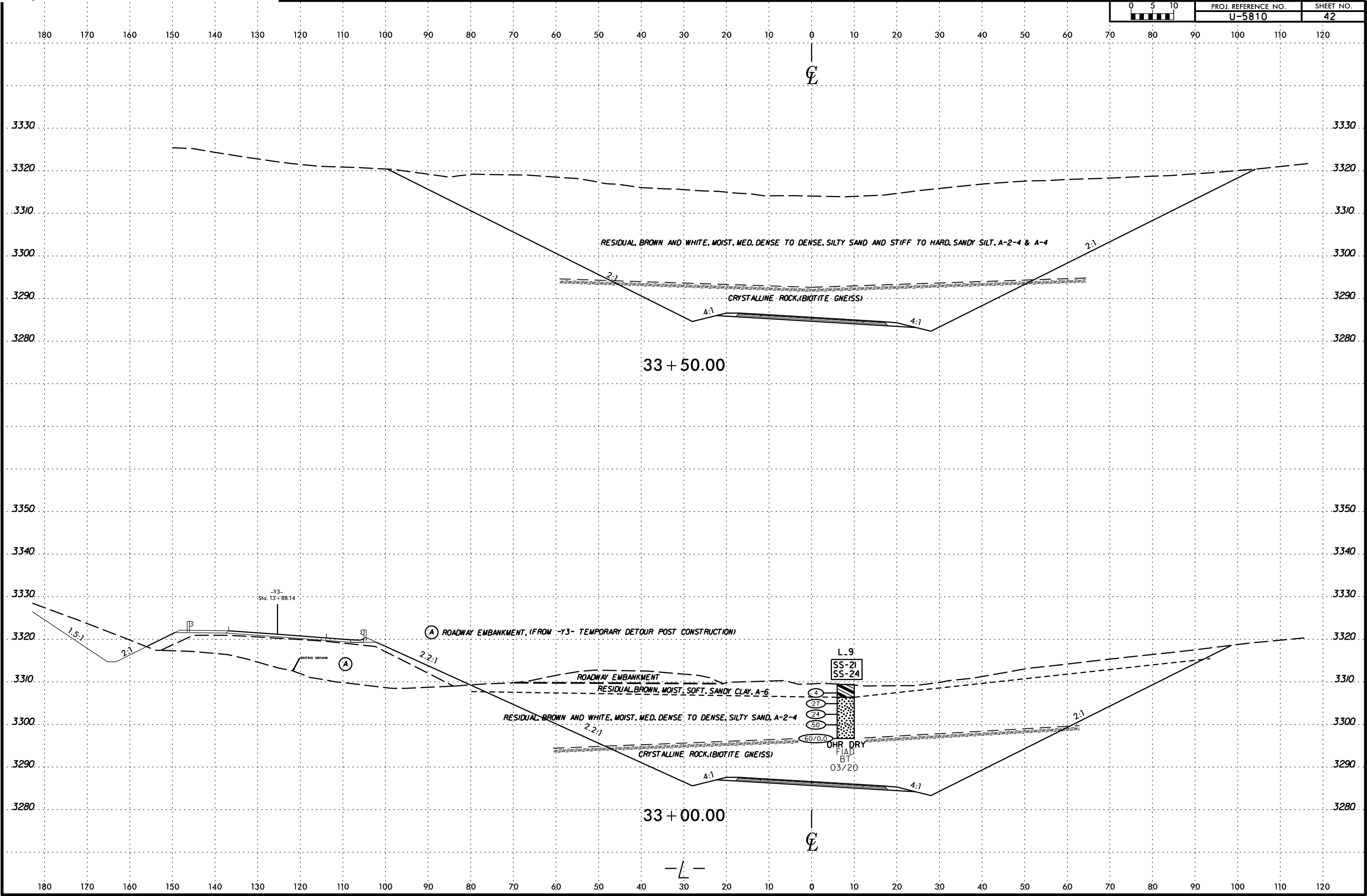
6/23/16

05	PROJ. REFERENCE NO.	SHEET NO.
	U-5810	40

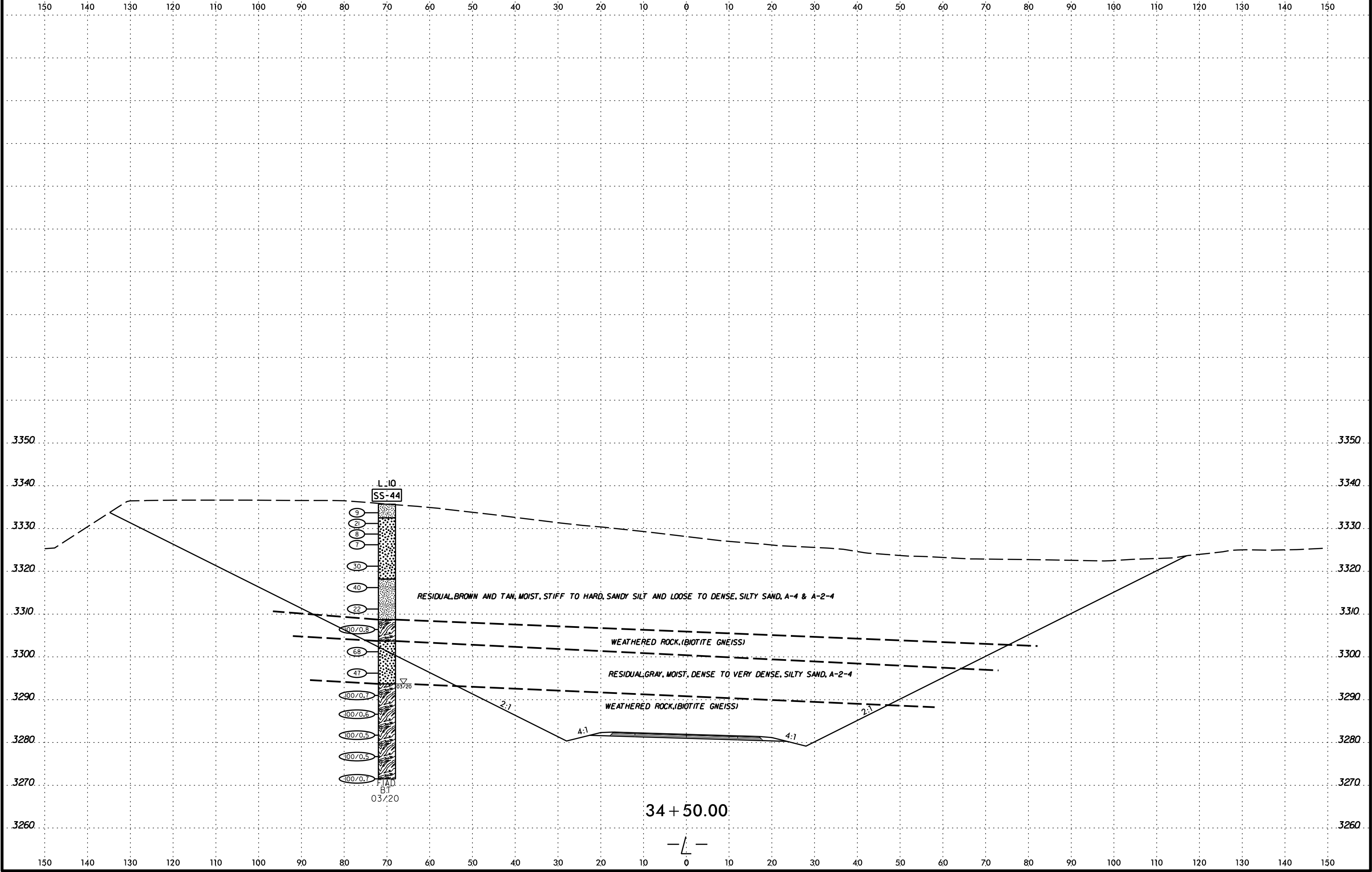


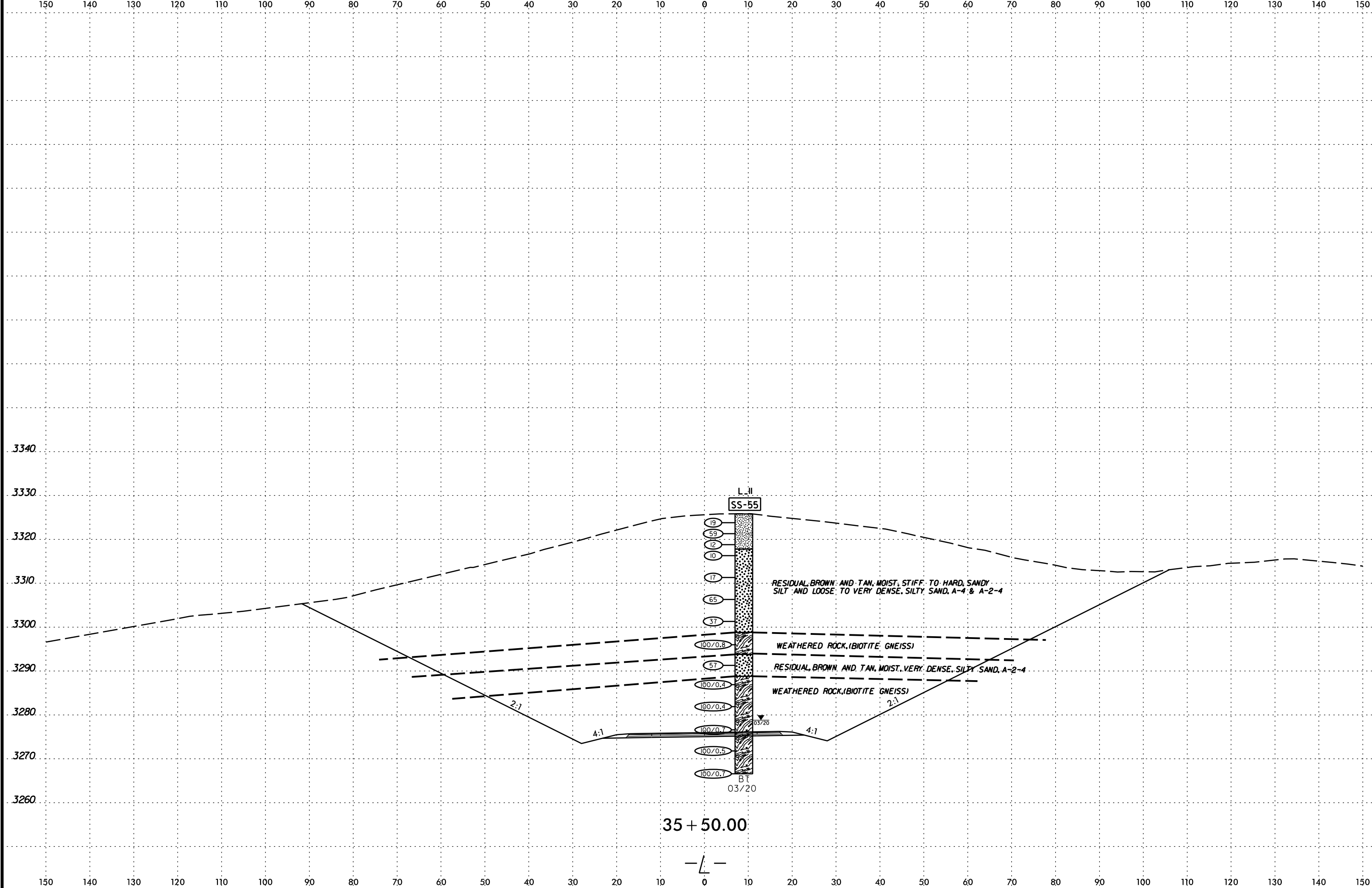


6/23/16

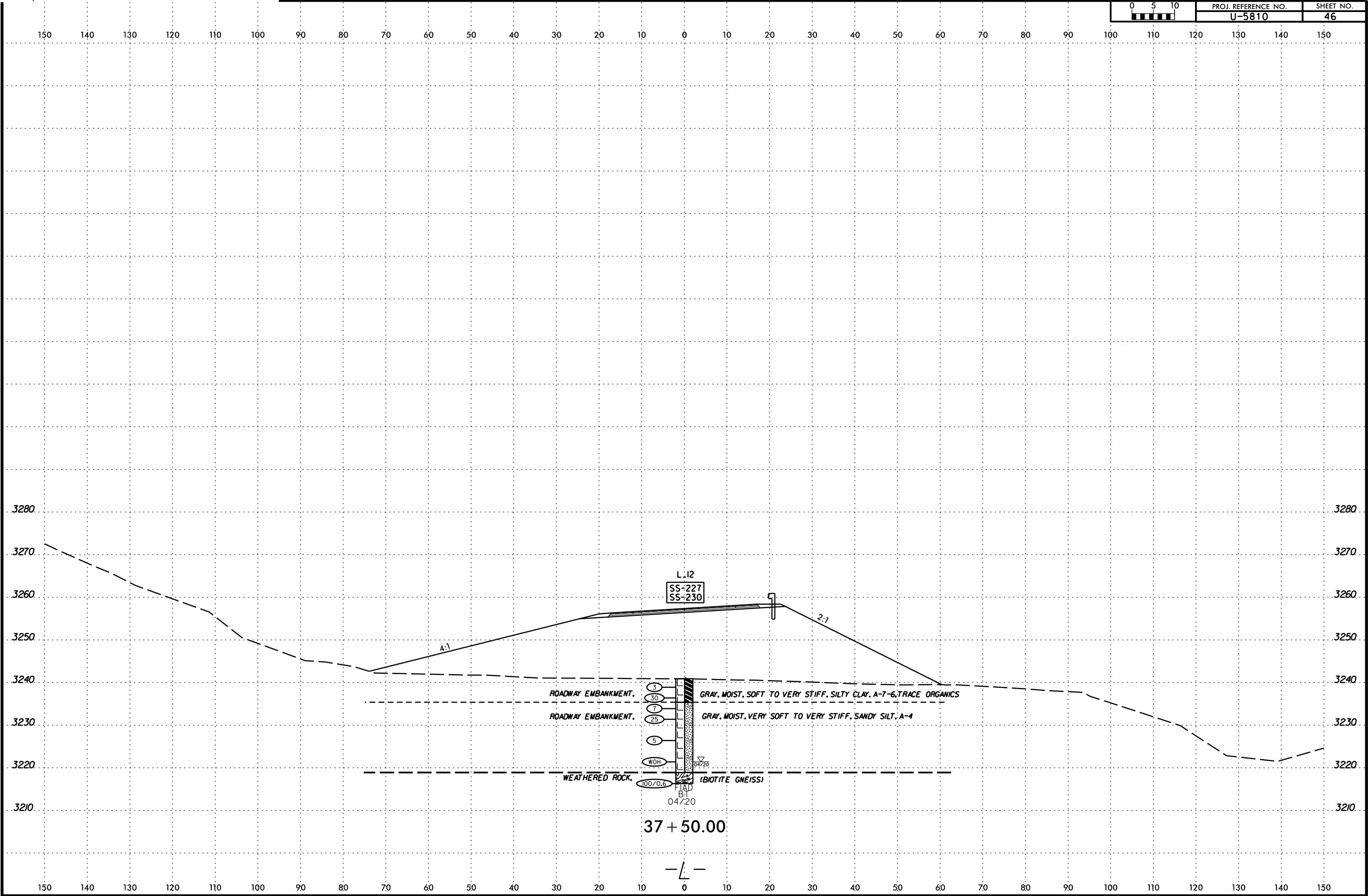


6/23/16





6/23/16

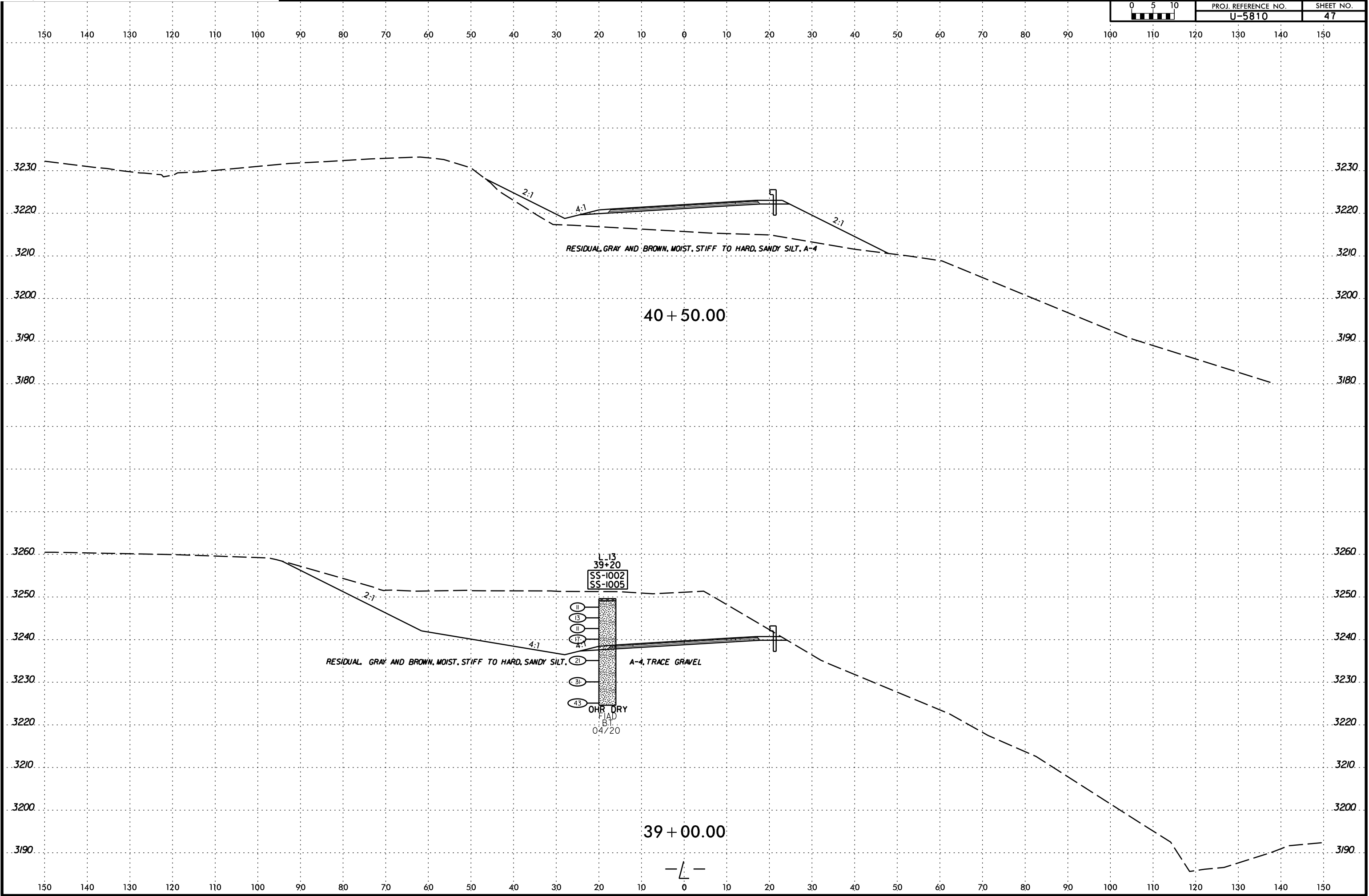


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PROJ. REFERENCE NO.
U-5810

SHEET NO.
47

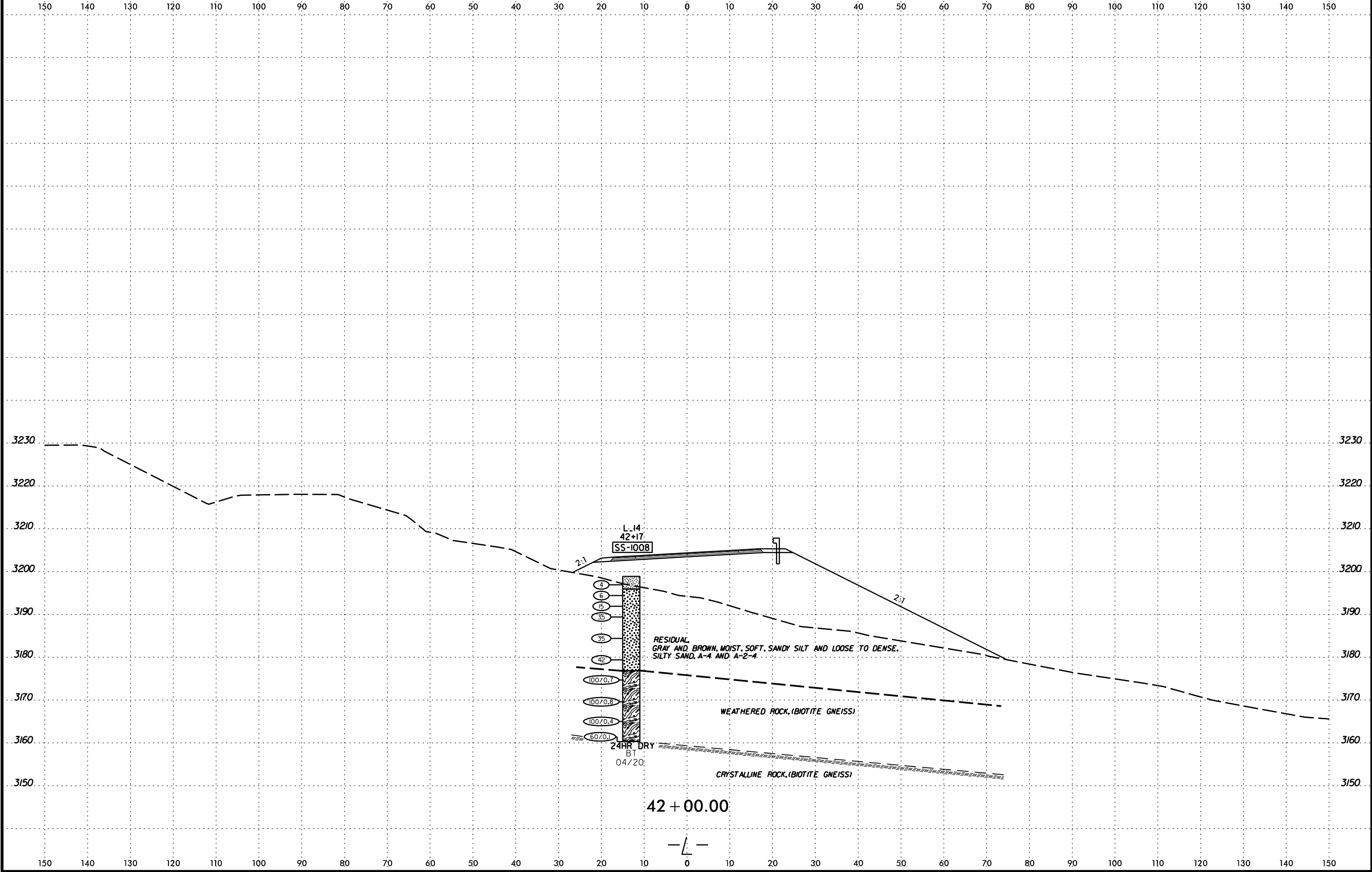


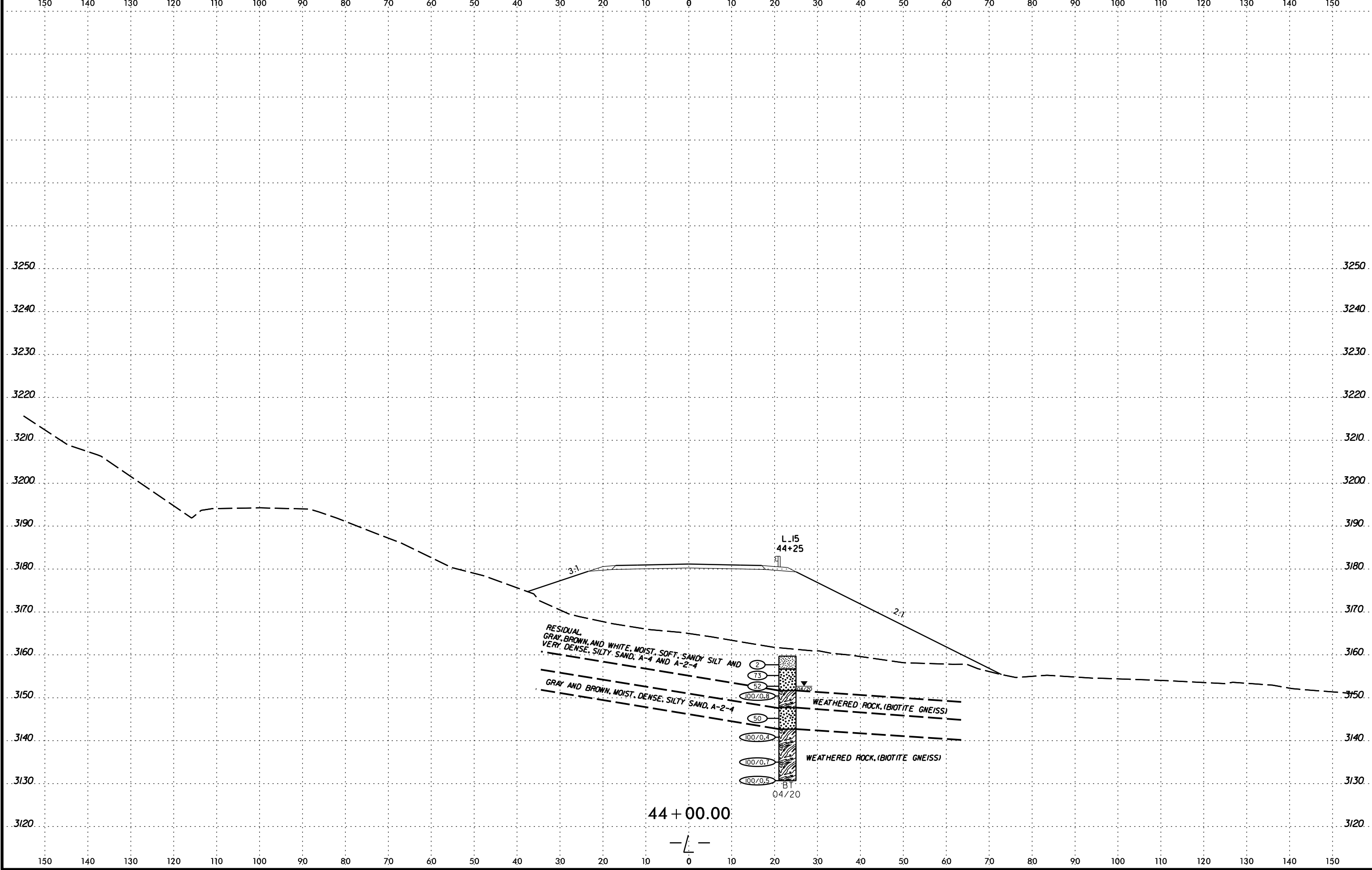


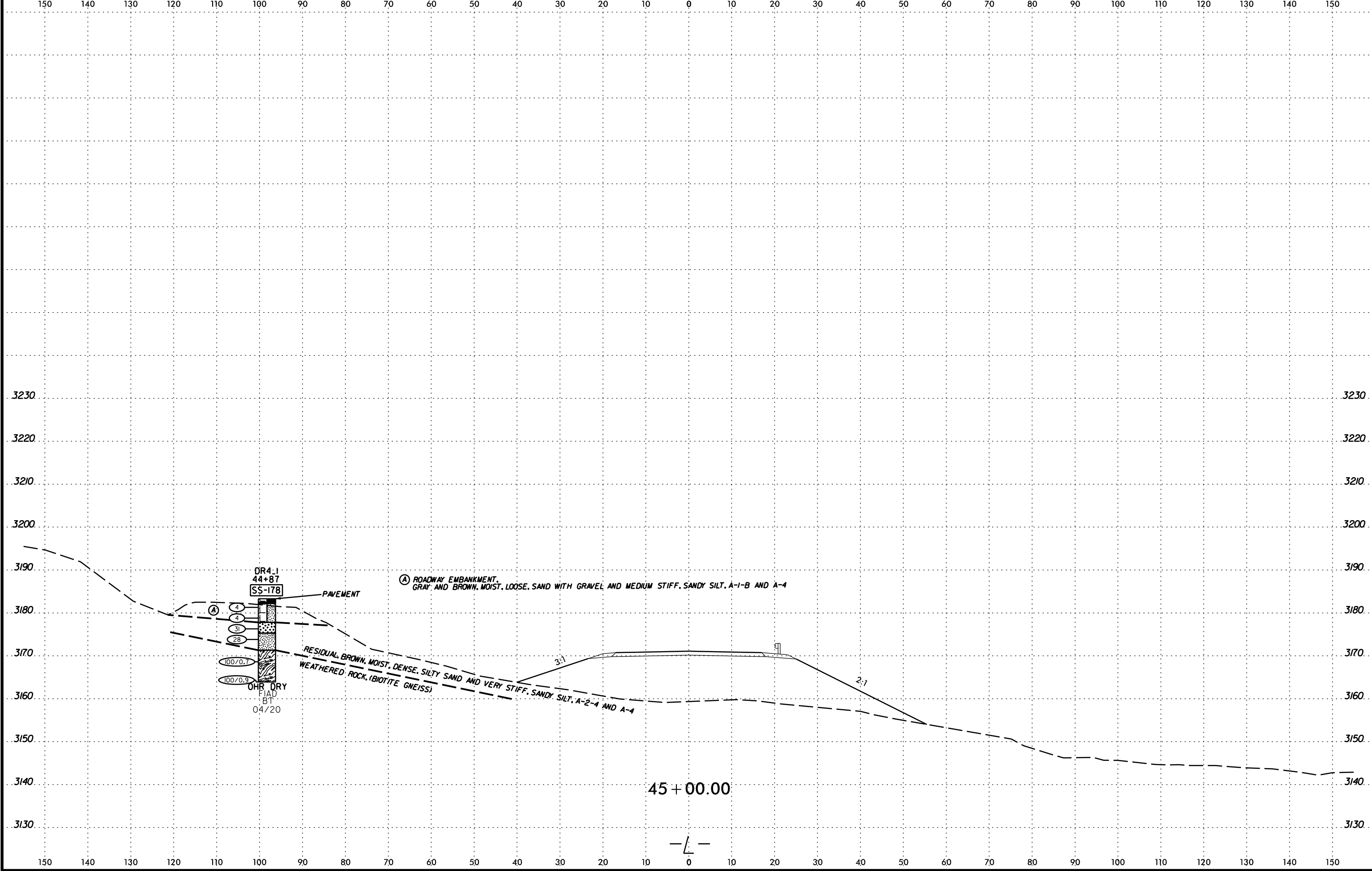
6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	49



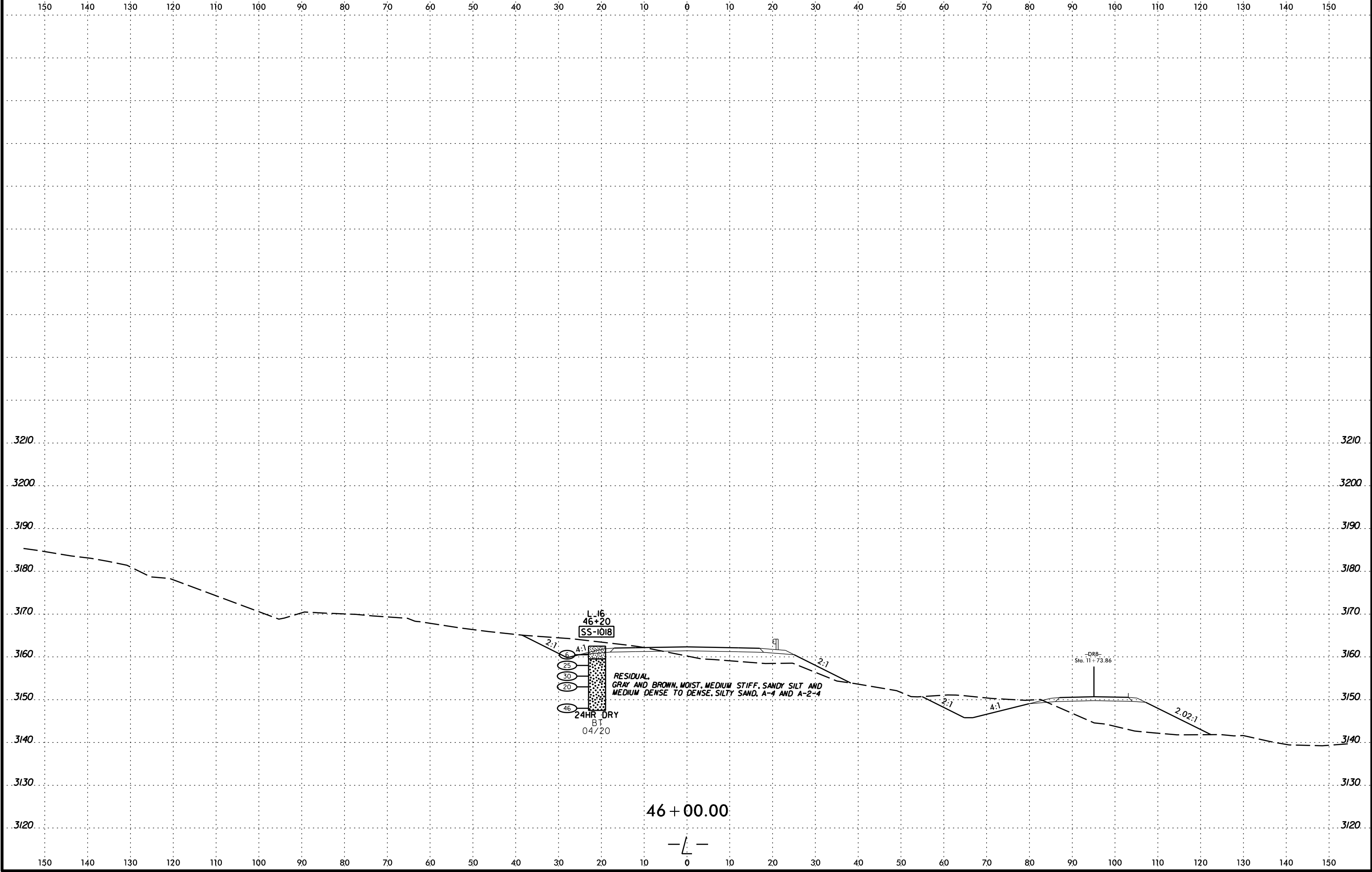




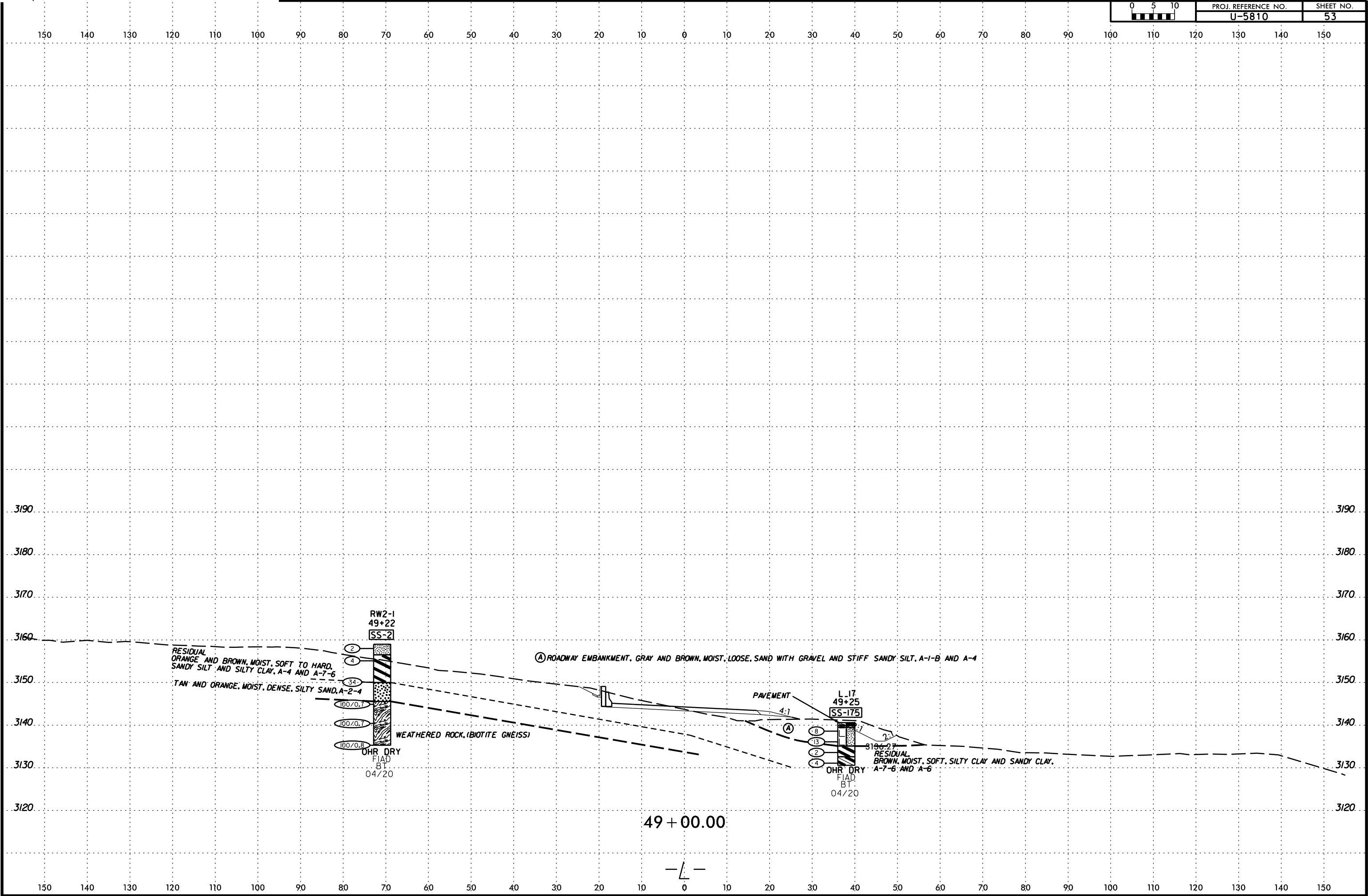
6/23/16

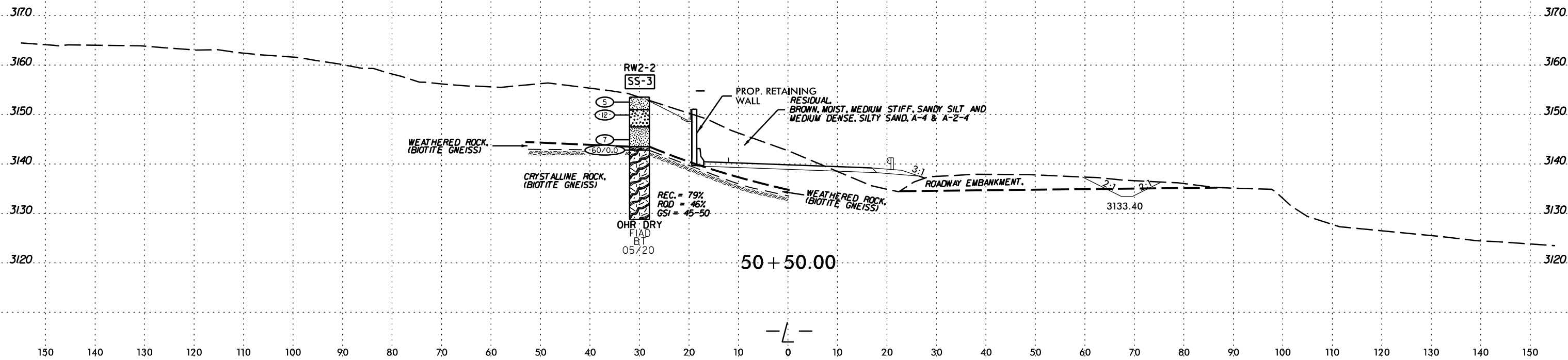
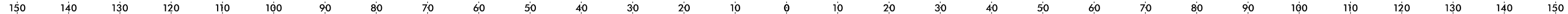


PROJ. REFERENCE NO.	SHEET NO.
U-5810	52

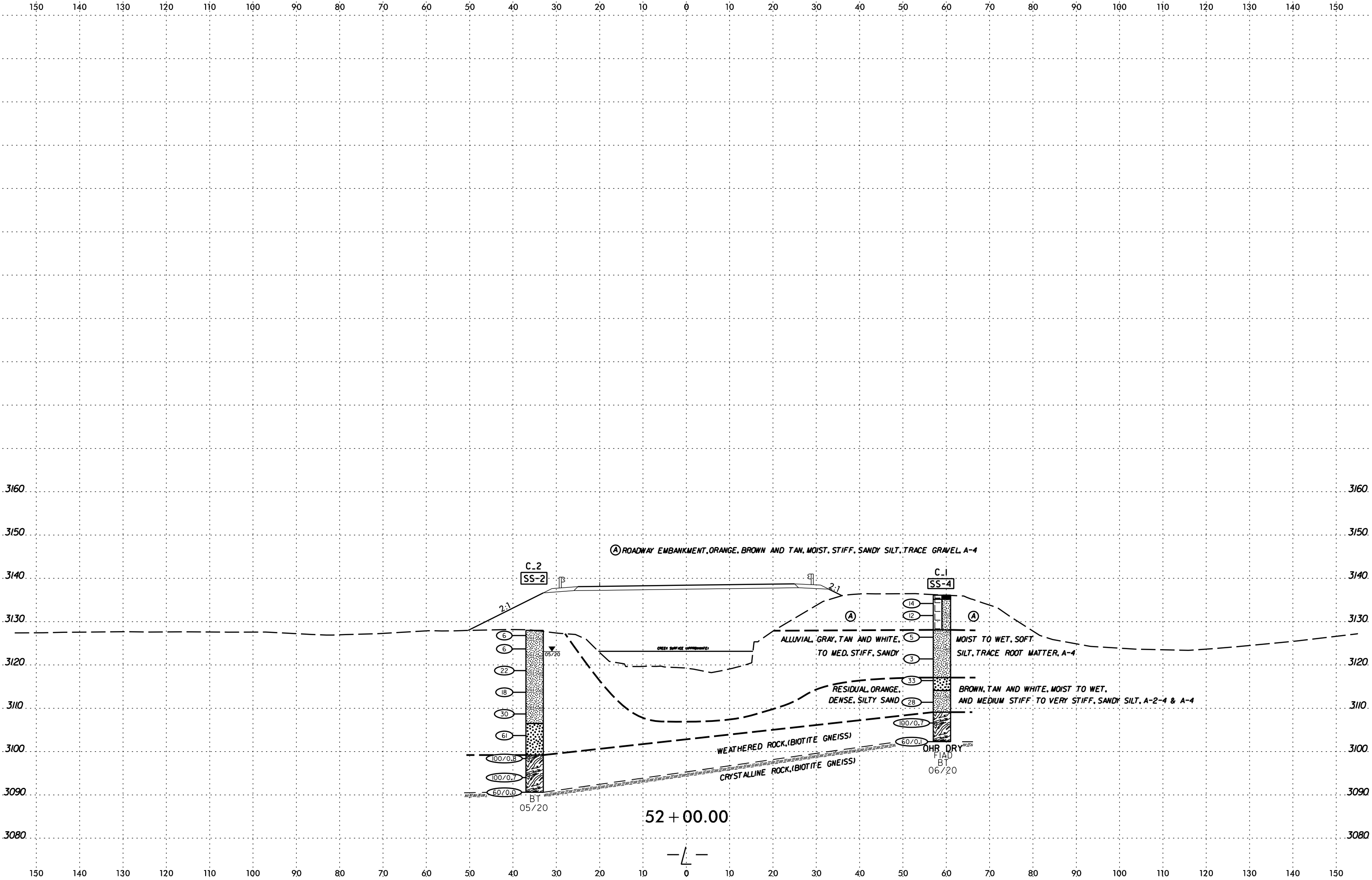


6/23/16





6/23/16

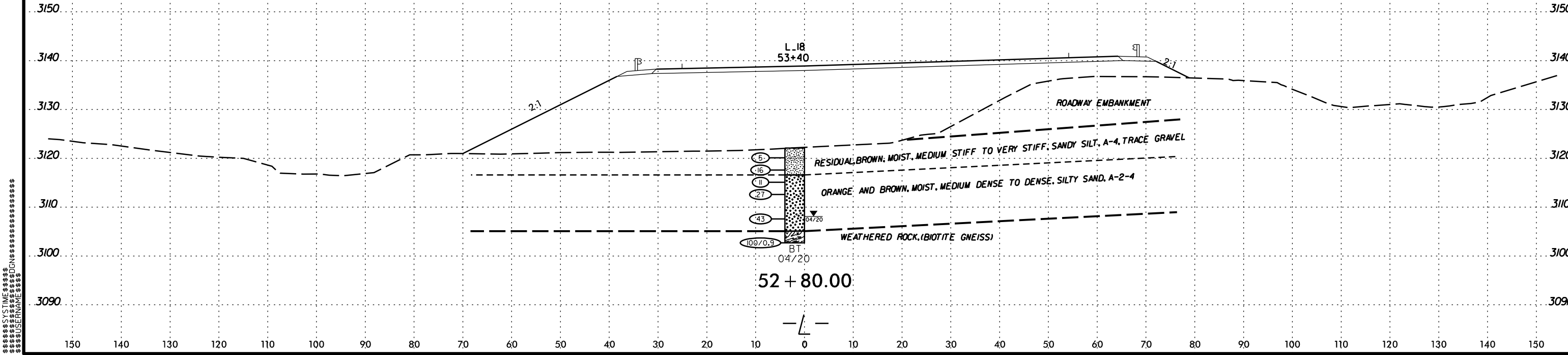


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	56

ROUNDABOUT (-RABI-) FROM 52+80 - 54+54



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	57

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

3170 3170

3160 3160

3150 3150

3140 3140

3130 3130

3120 3120

3110 3110

3100 3100

3090 3090

3080 3080

SYSTEMS
DESIGN
ENGINEERING
INC.



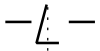
RESIDUAL ORANGE AND BROWN, MOIST, SOFT TO VERY STIFF, SANDY SILT, A-4

WEATHERED ROCK (BIOTITE GNEISS)

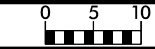
ROADWAY EMBANKMENT

3131.90

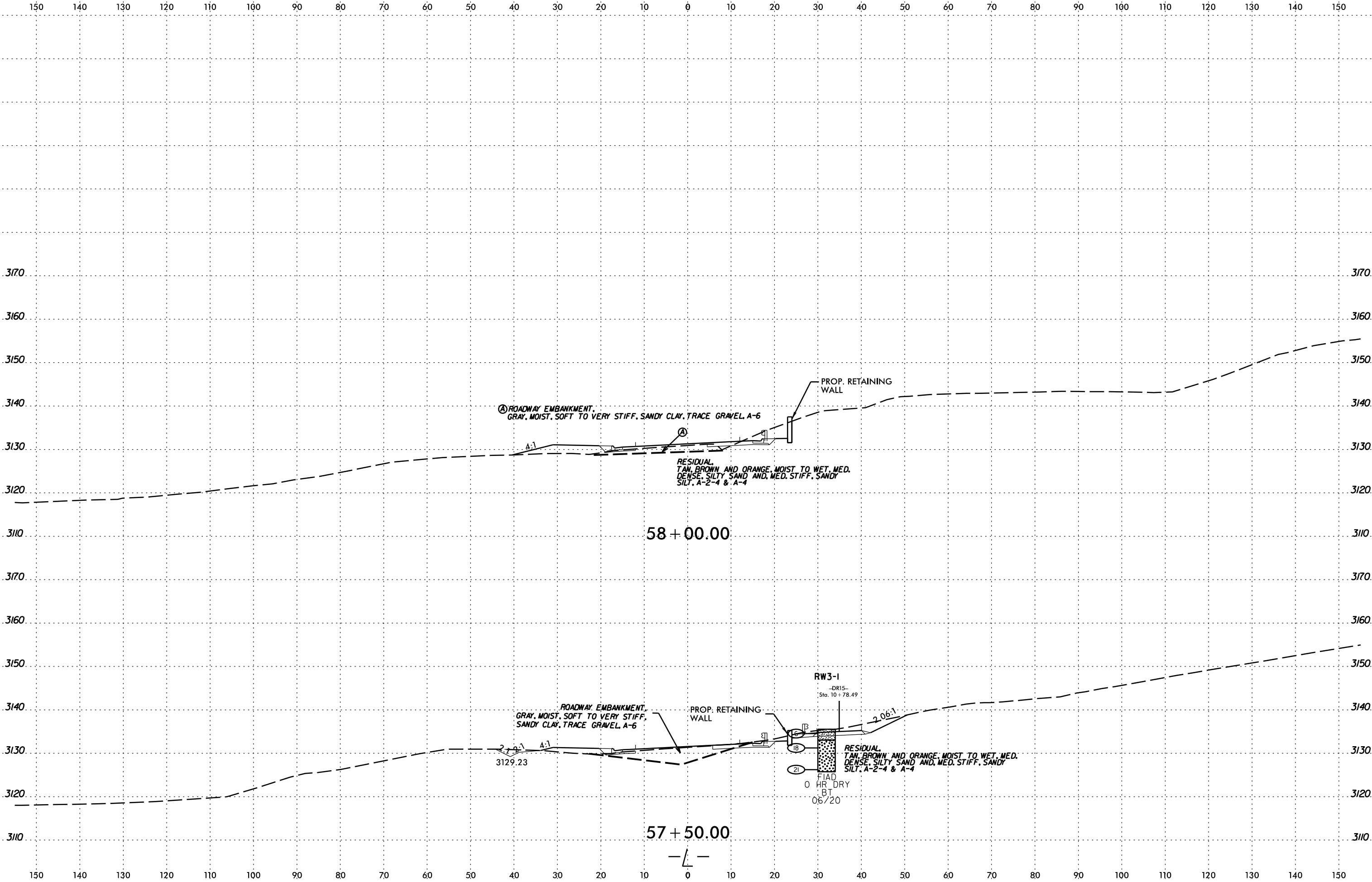
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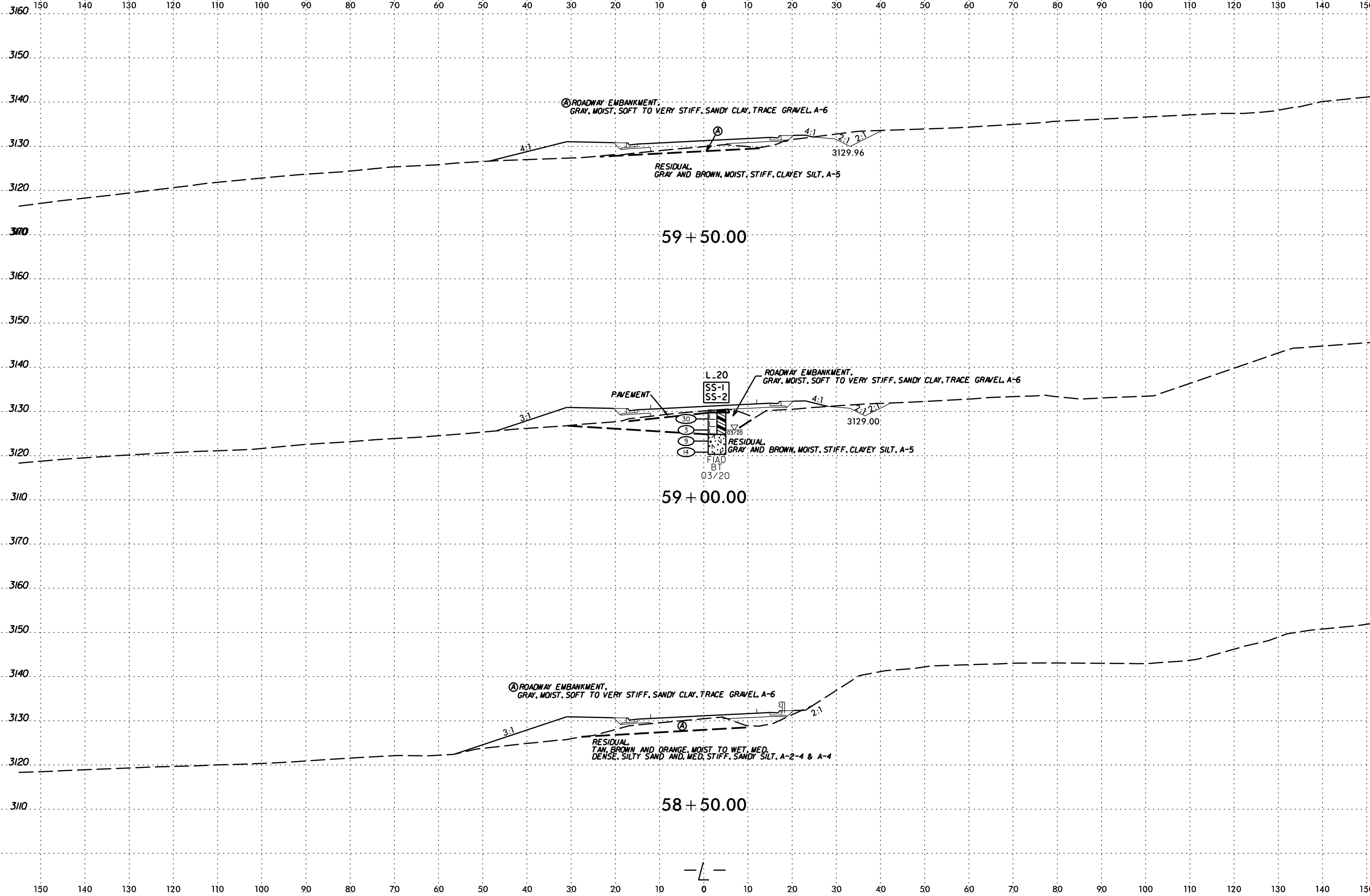


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	58

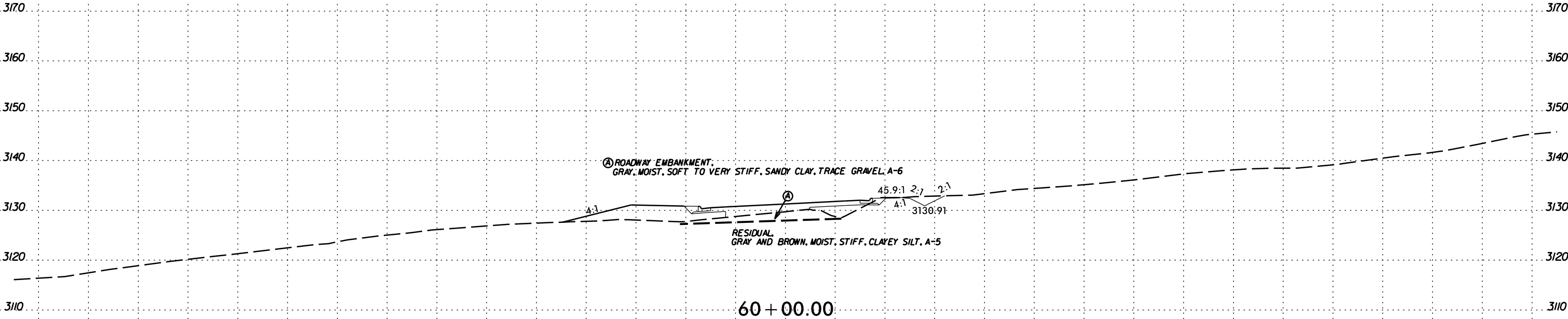




6/23/16

	PROJ. REFERENCE NO.	SHEET NO.
	U-5810	60

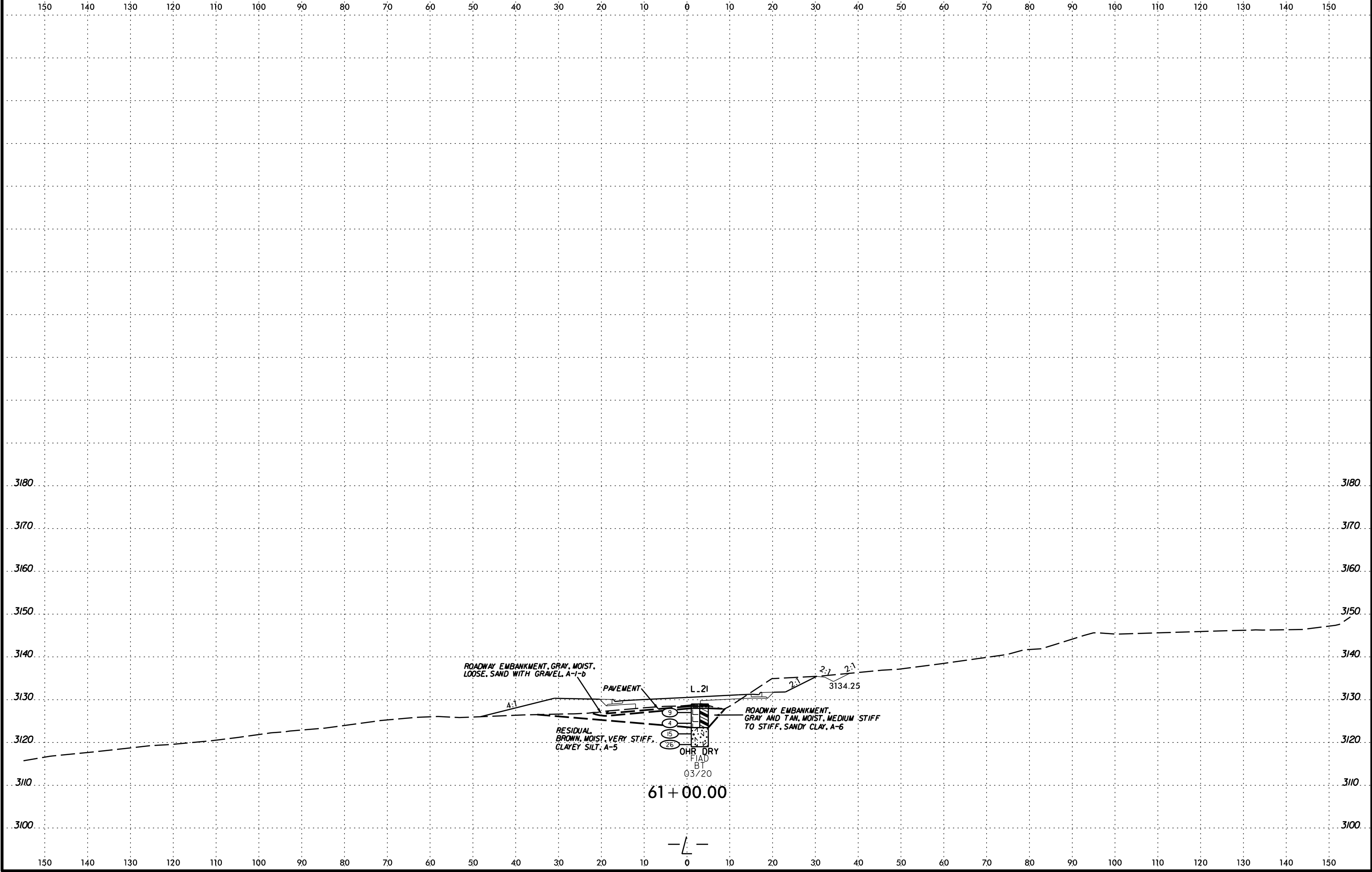
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	61



6/23/16



PROJ. REFERENCE NO.
U-5810

SHEET NO.
62

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

3140

3130

3120

3110

3100

3140

3130

3120

3110

3100

ROADWAY EMBANKMENT, GRAY, MOIST,
LOOSE, SAND WITH GRAVEL, A-1-B

PAVEMENT

L 22

Ⓐ ROADWAY EMBANKMENT, GRAY AND BROWN, MOIST, STIFF, SILTY CLAY, A-7-5

Ⓑ ROADWAY EMBANKMENT, BROWN, MOIST, STIFF, SANDY SILT, A-4

RESIDUAL BROWN AND GRAY, MOIST, MEDIUM DENSE, SILTY SAND, A-2-4

GRAY AND BROWN, WET, VERY STIFF, SANDY CLAY, A-6

OHR DRY

FIAD

BT

03/20

64 + 00.00

— L —

SYSTEMS
DESIGN
SUBMITTALS
DATE
6/23/16
BY
JL

6/23/16

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

3190 3190

3180 3180

3170 3170

3160 3160

3150 3150

3140 3140

3130 3130

3120 3120

3110 3110

3100 3100

SYSTEMS
SHEET
NO.
63

(A) RESIDUAL BROWN, ORANGE AND WHITE, MOIST, STIFF, SANDY SILT, A-4

PROP. RETAINING WALL

PAVEMENT RW4-1

WEATHERED ROCK, BIOTITE GNEISS

CRYSTALLINE ROCK, BIOTITE GNEISS

OHR DRY FIAD BT

06.720

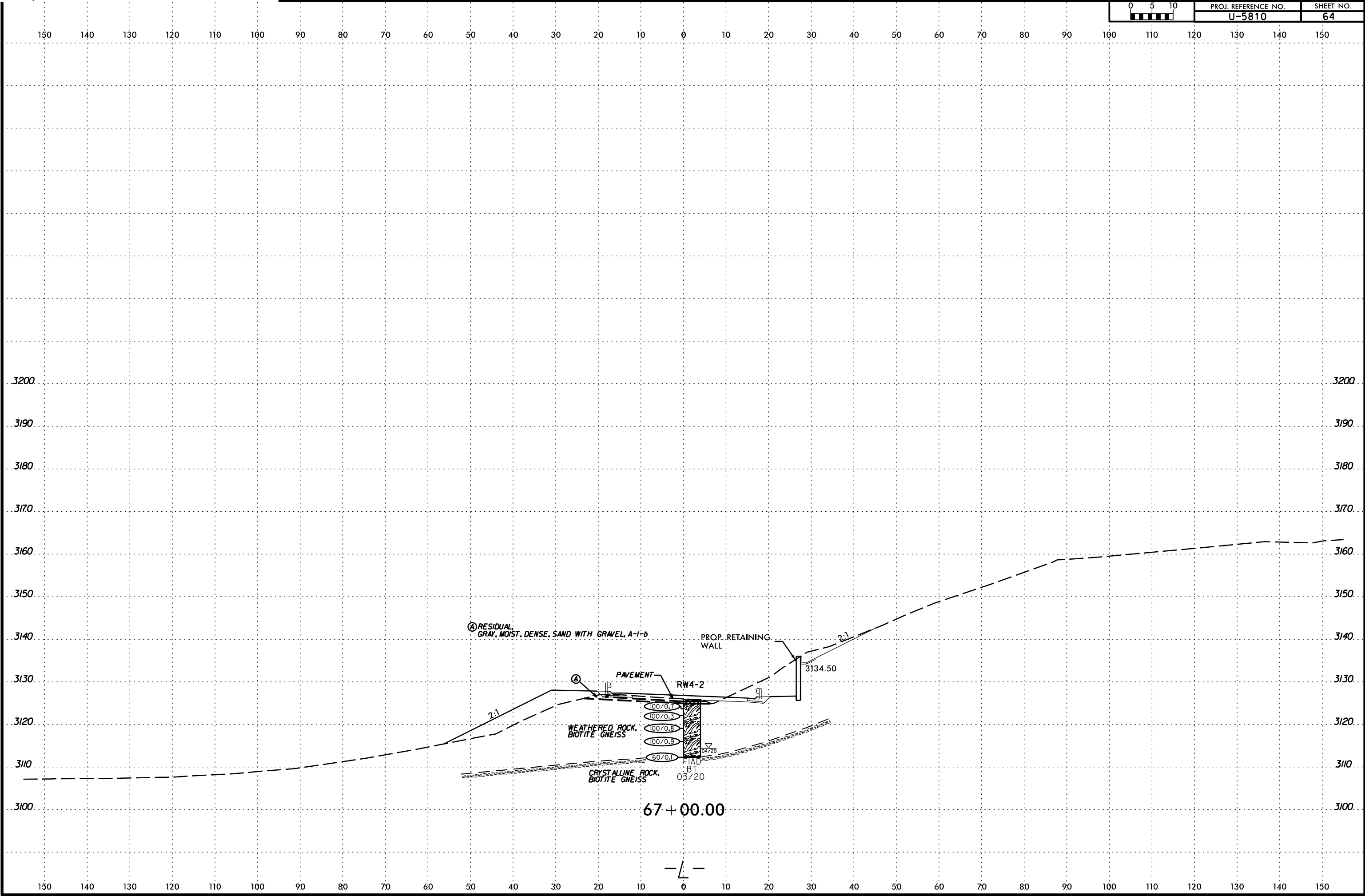
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— L —

6/23/16



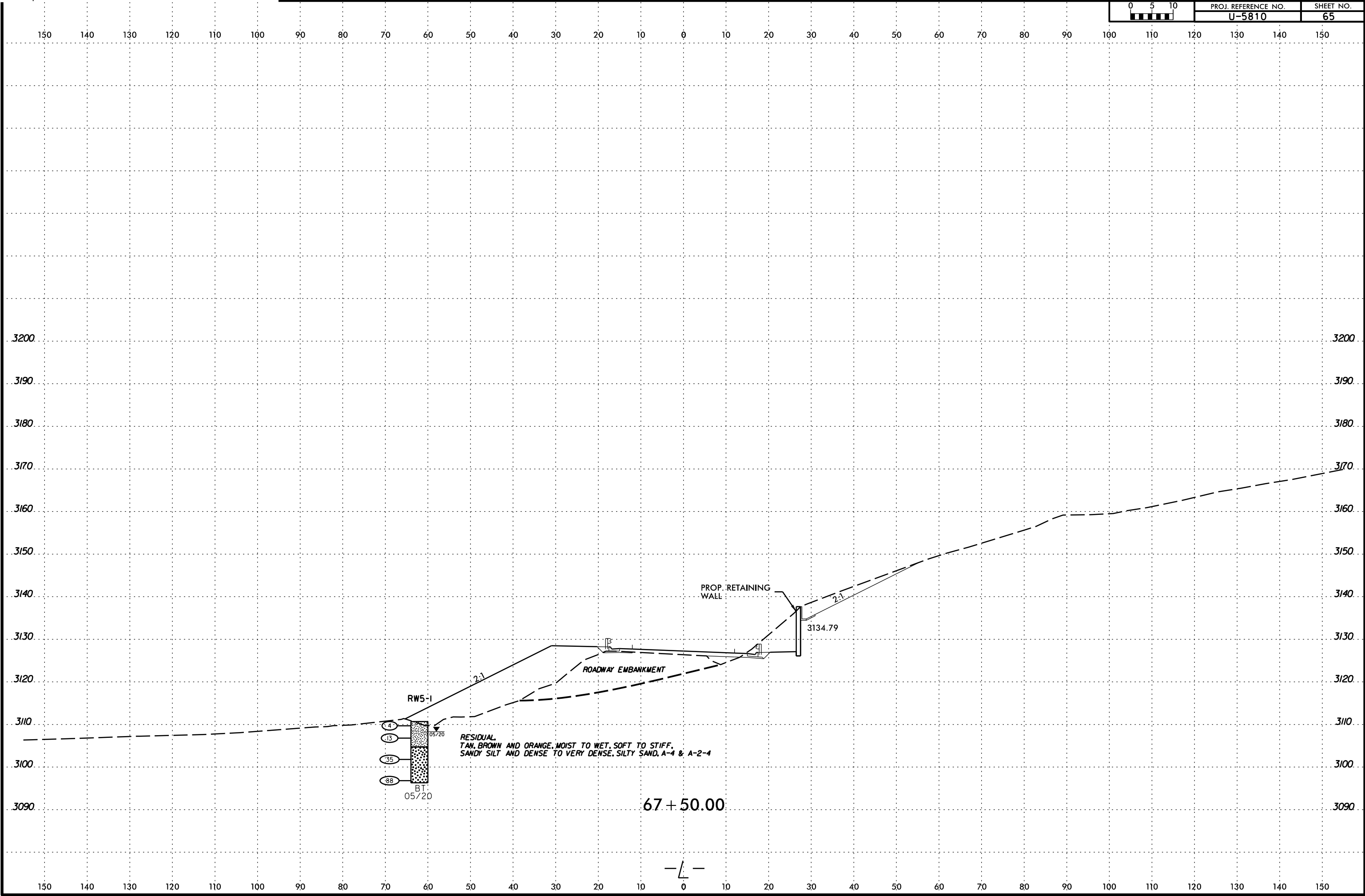
PROJ. REFERENCE NO.	SHEET NO.
U-5810	64



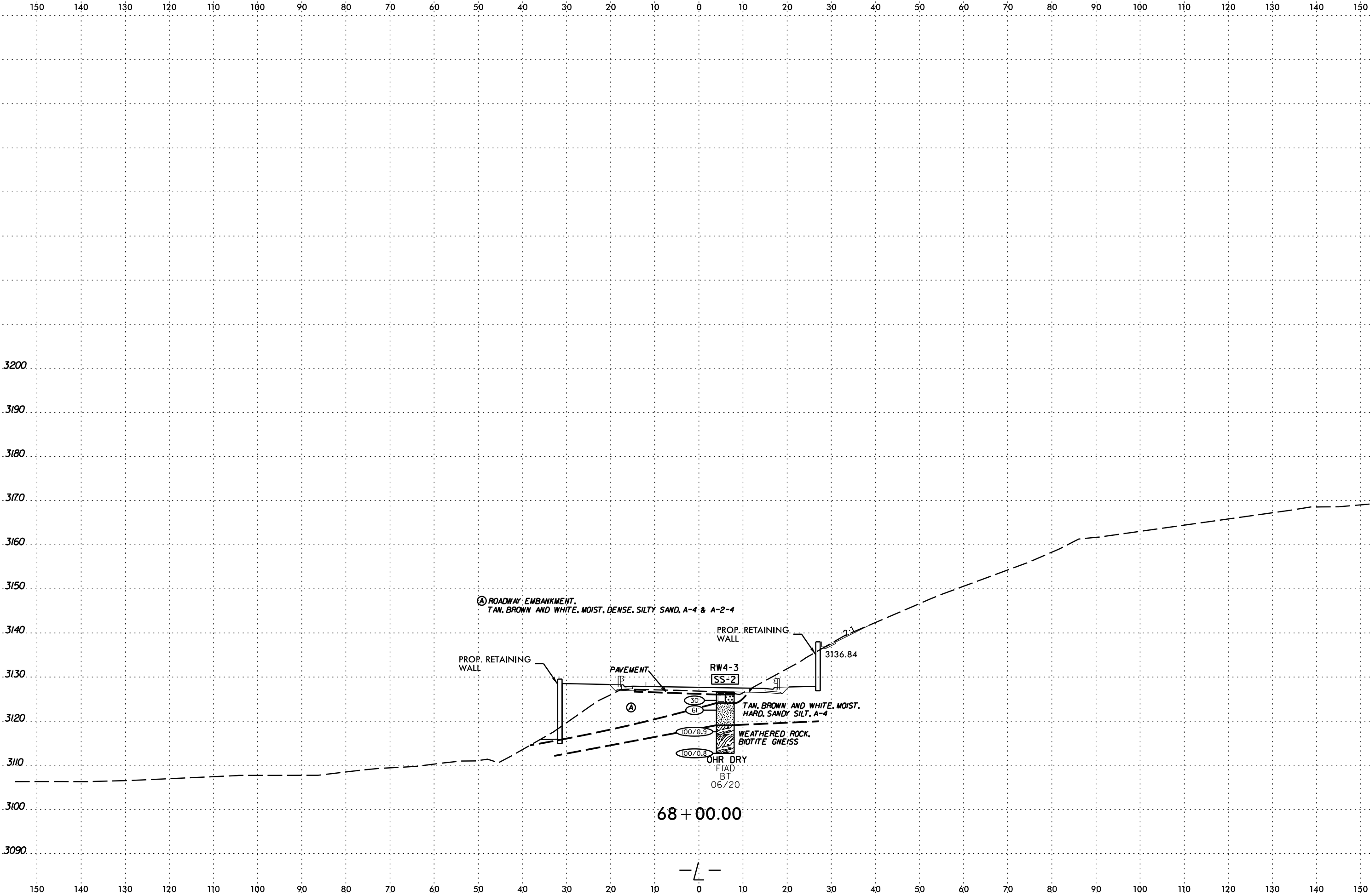
6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	65

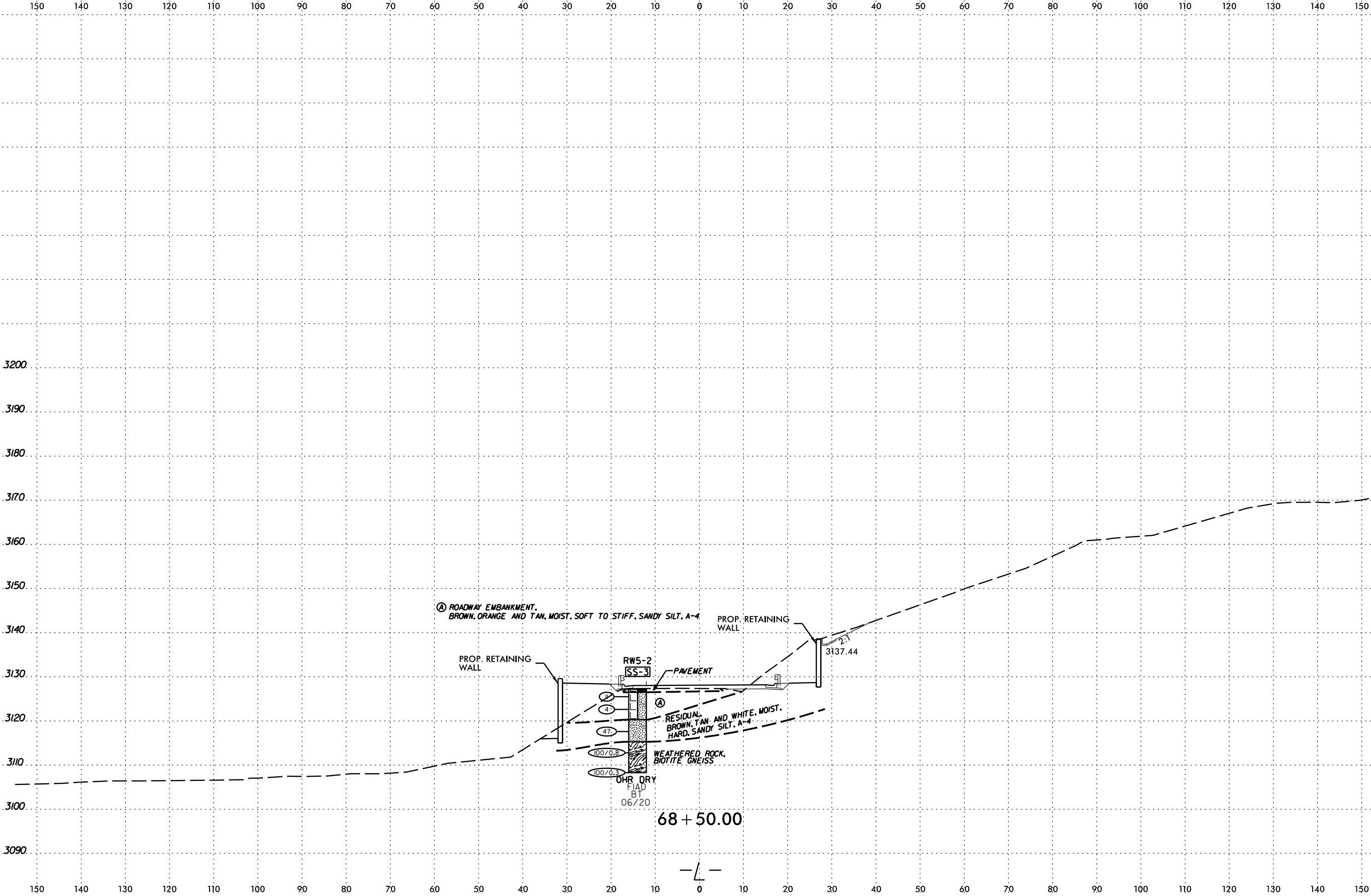


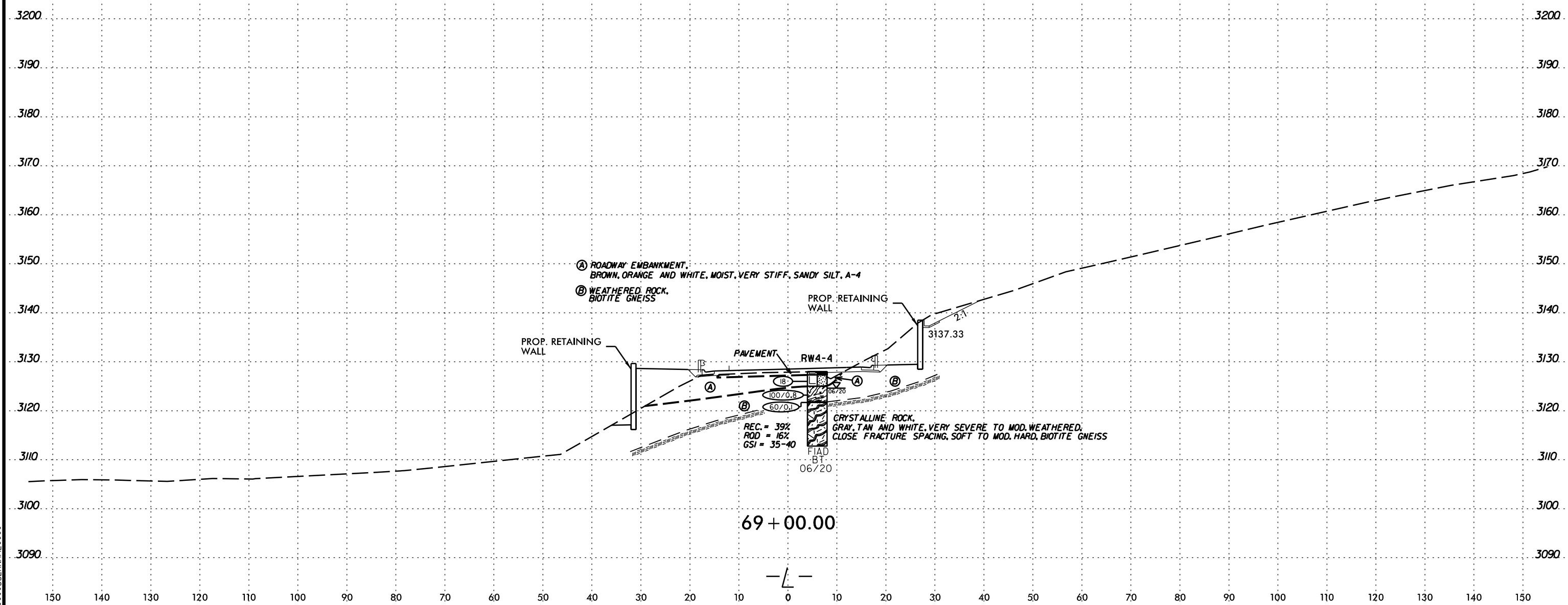
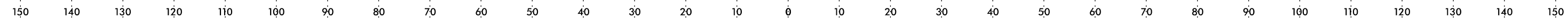
6/23/16

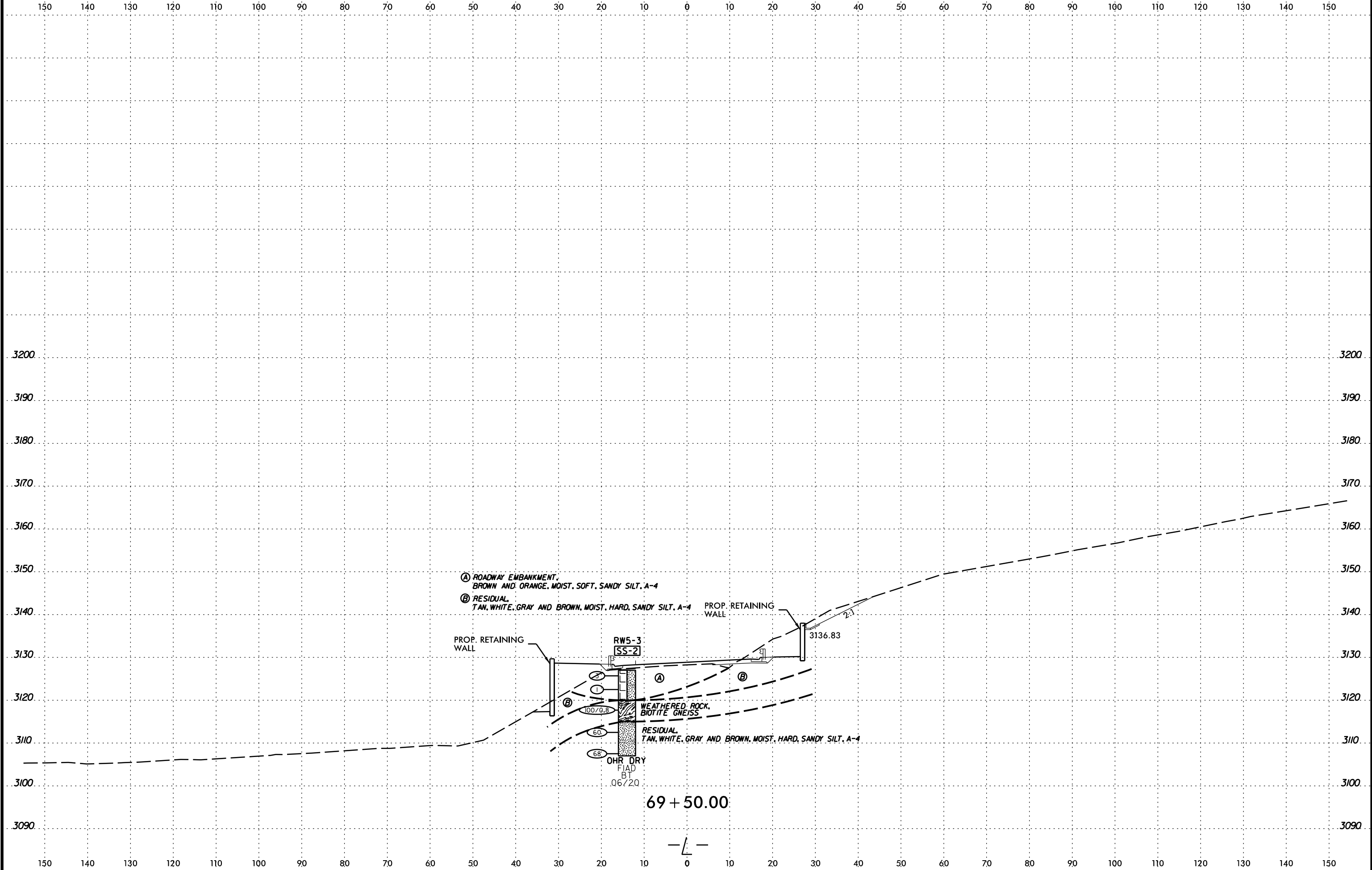


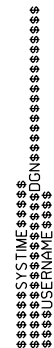
6/23/16

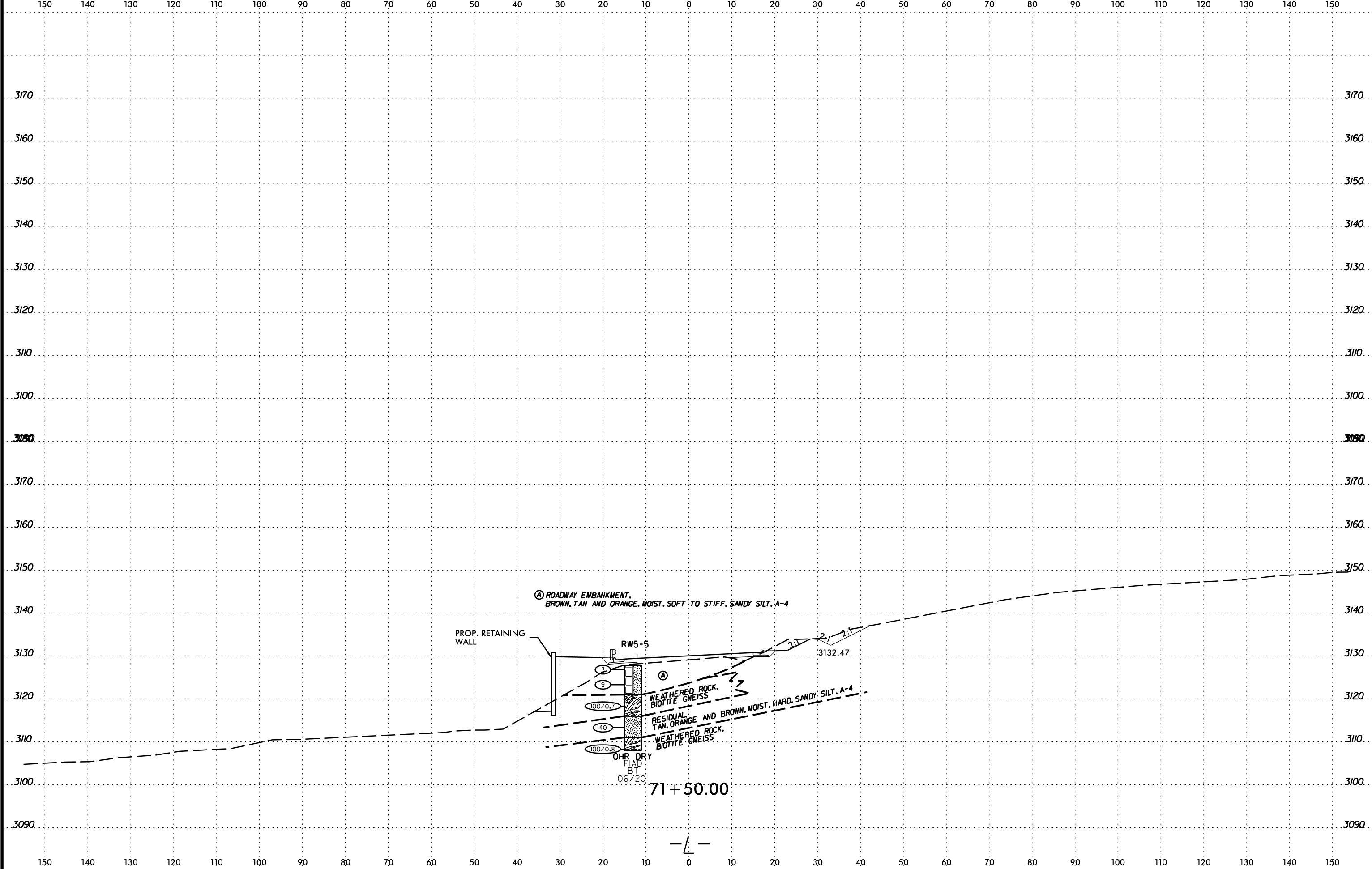
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	U-5810		67	

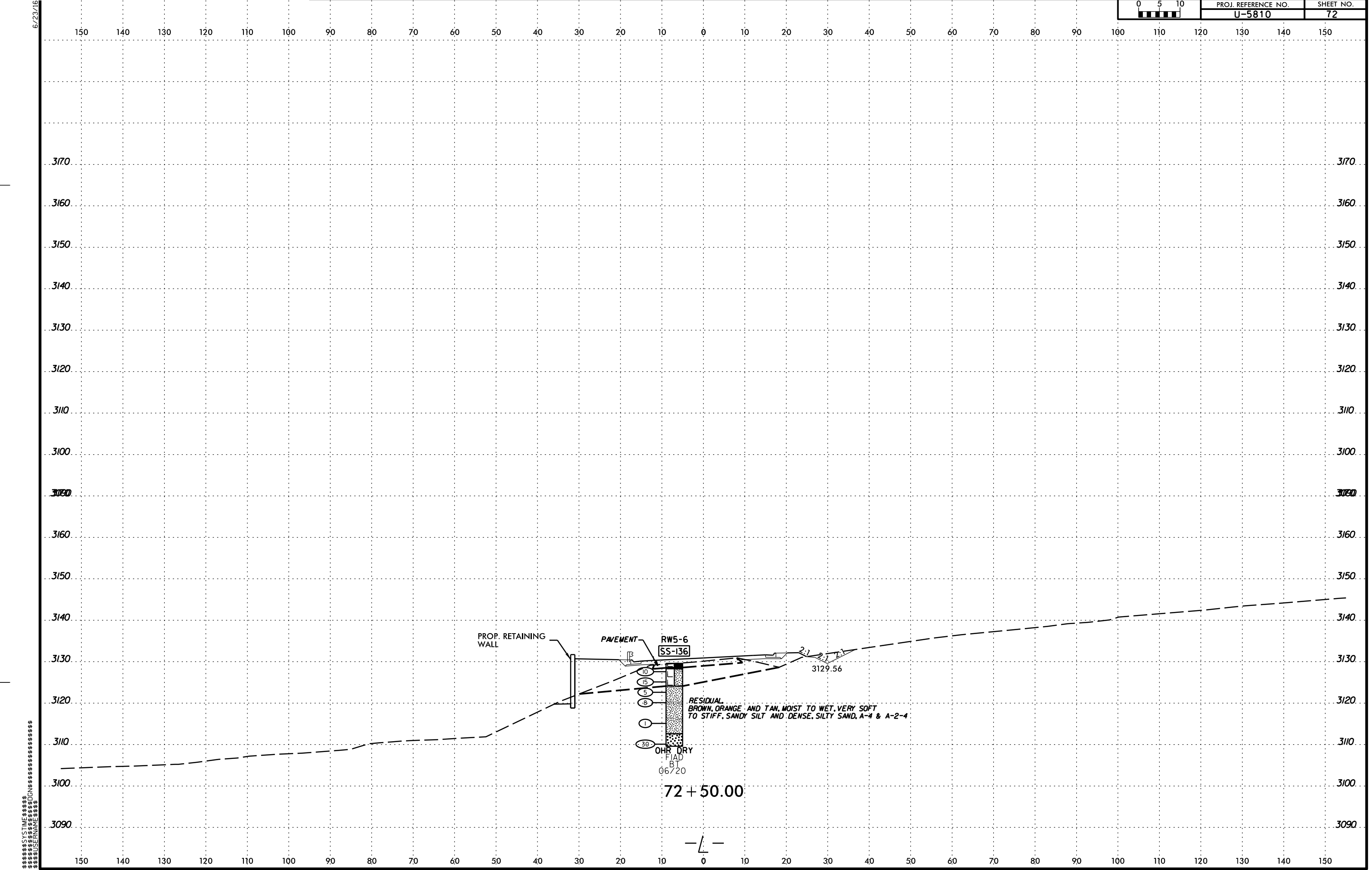




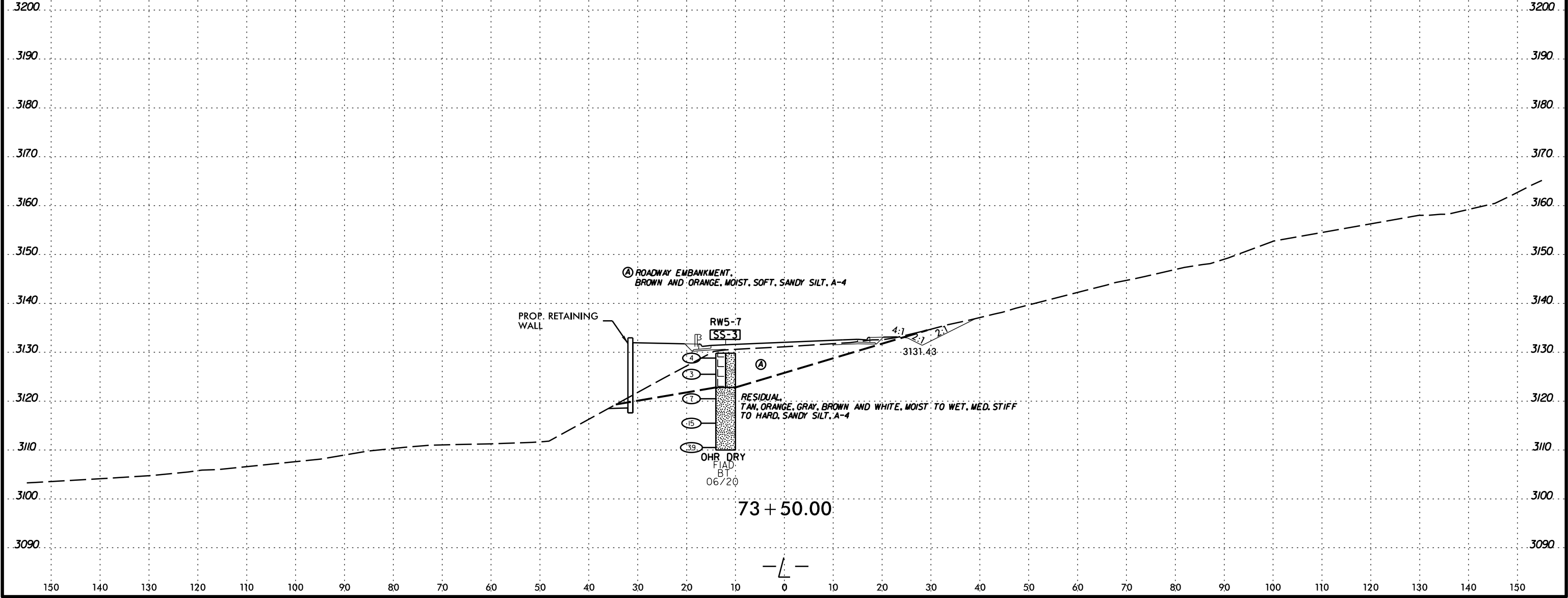


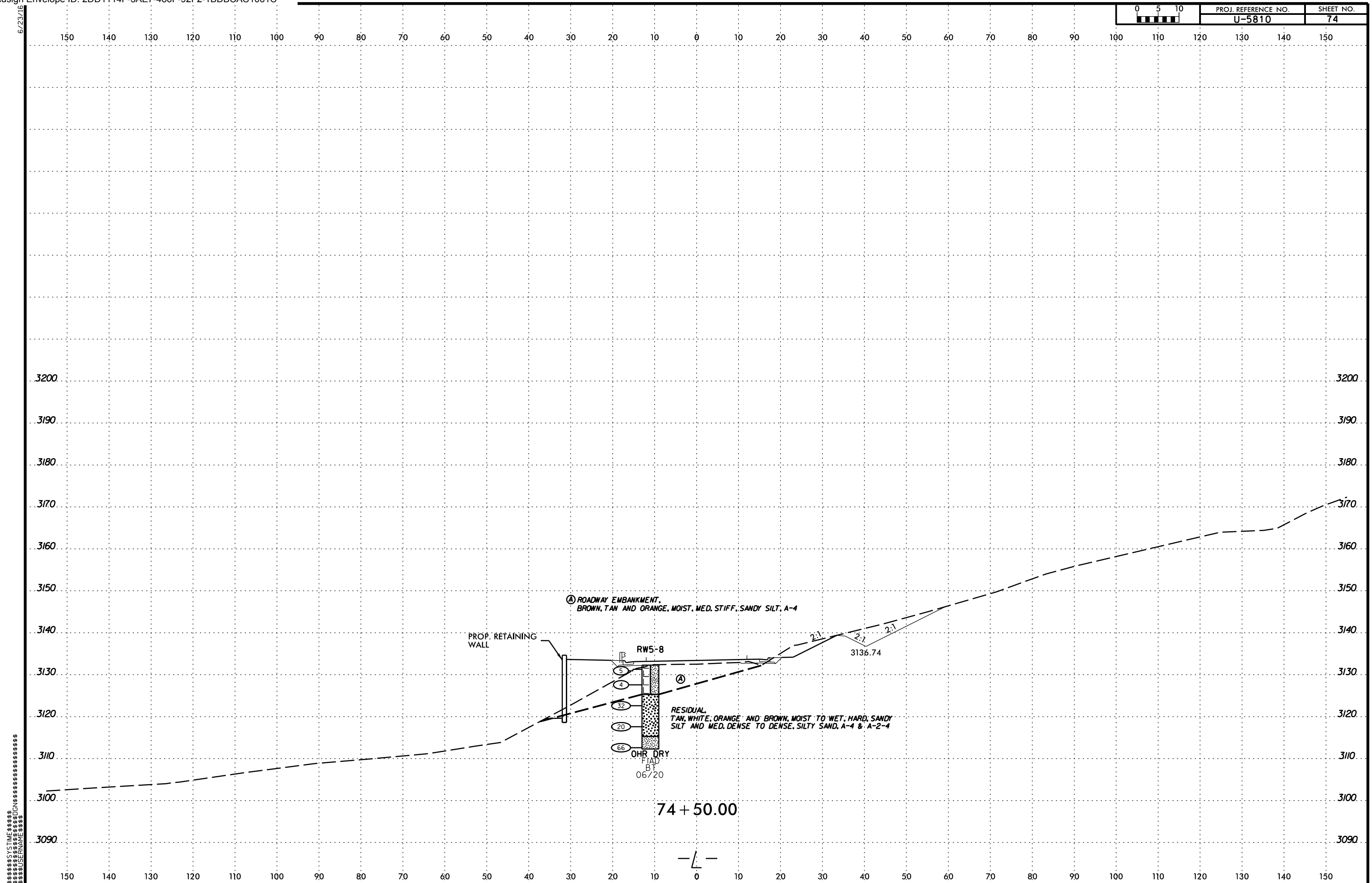


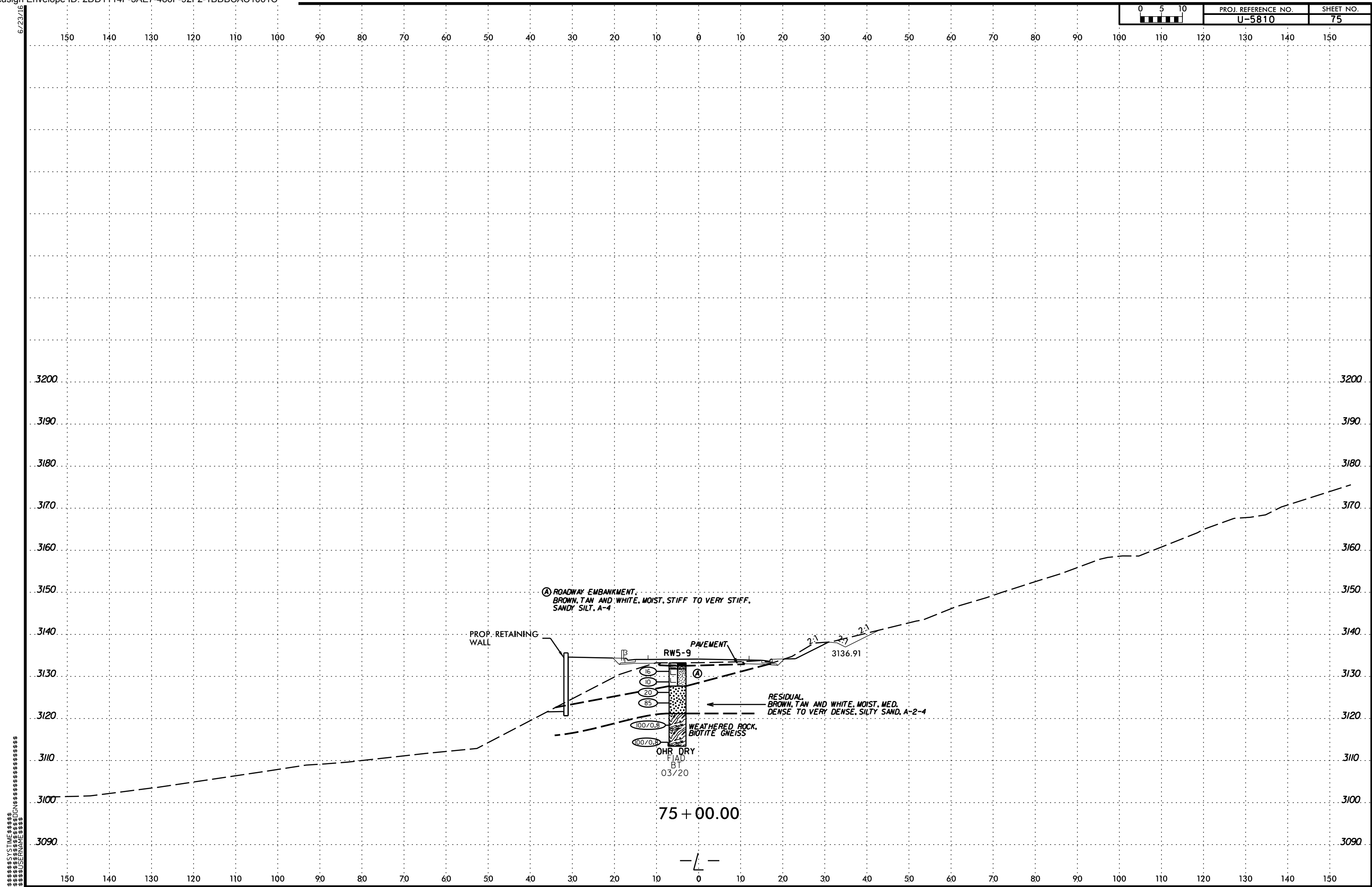




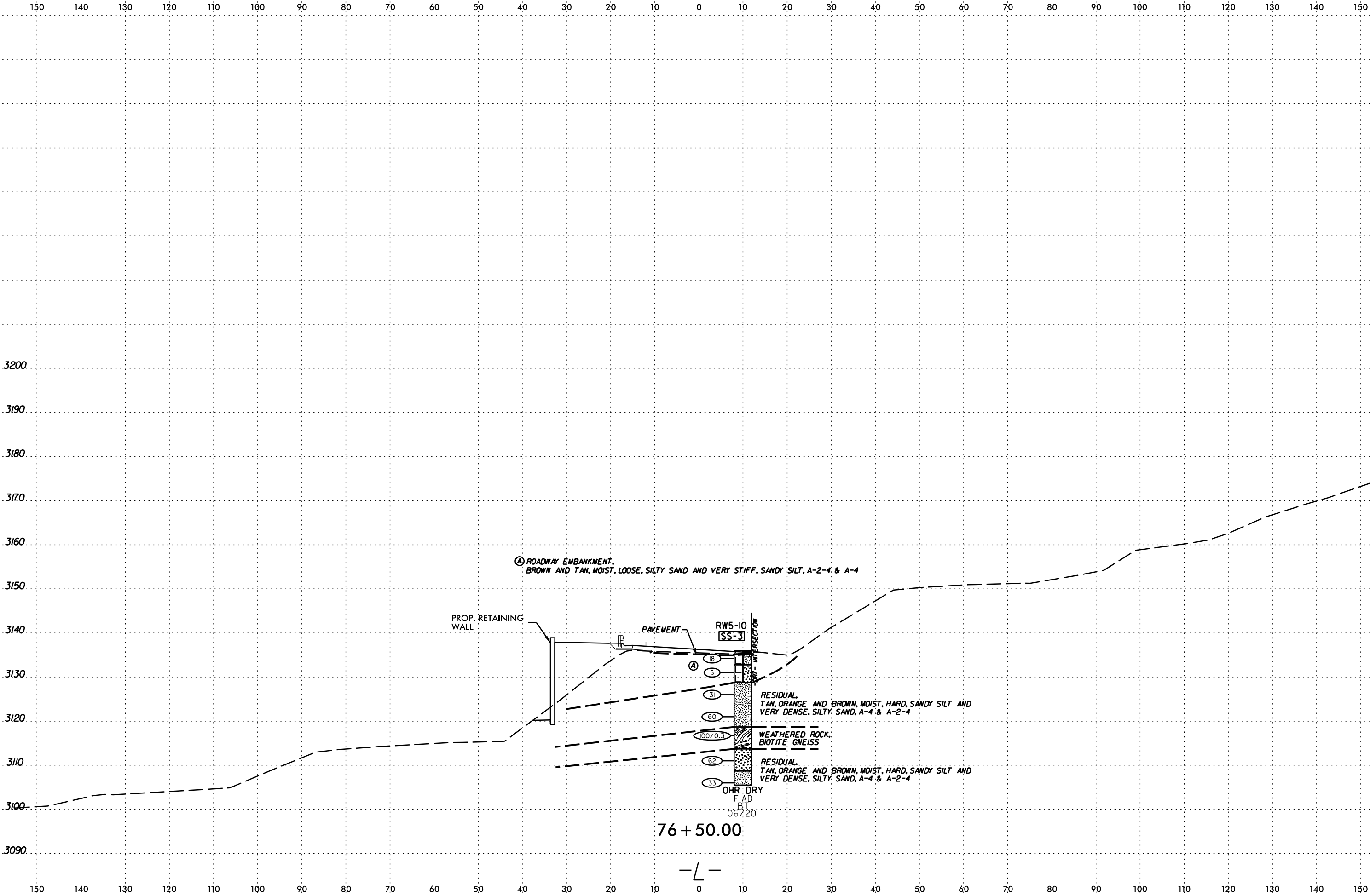
6/23/16



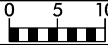


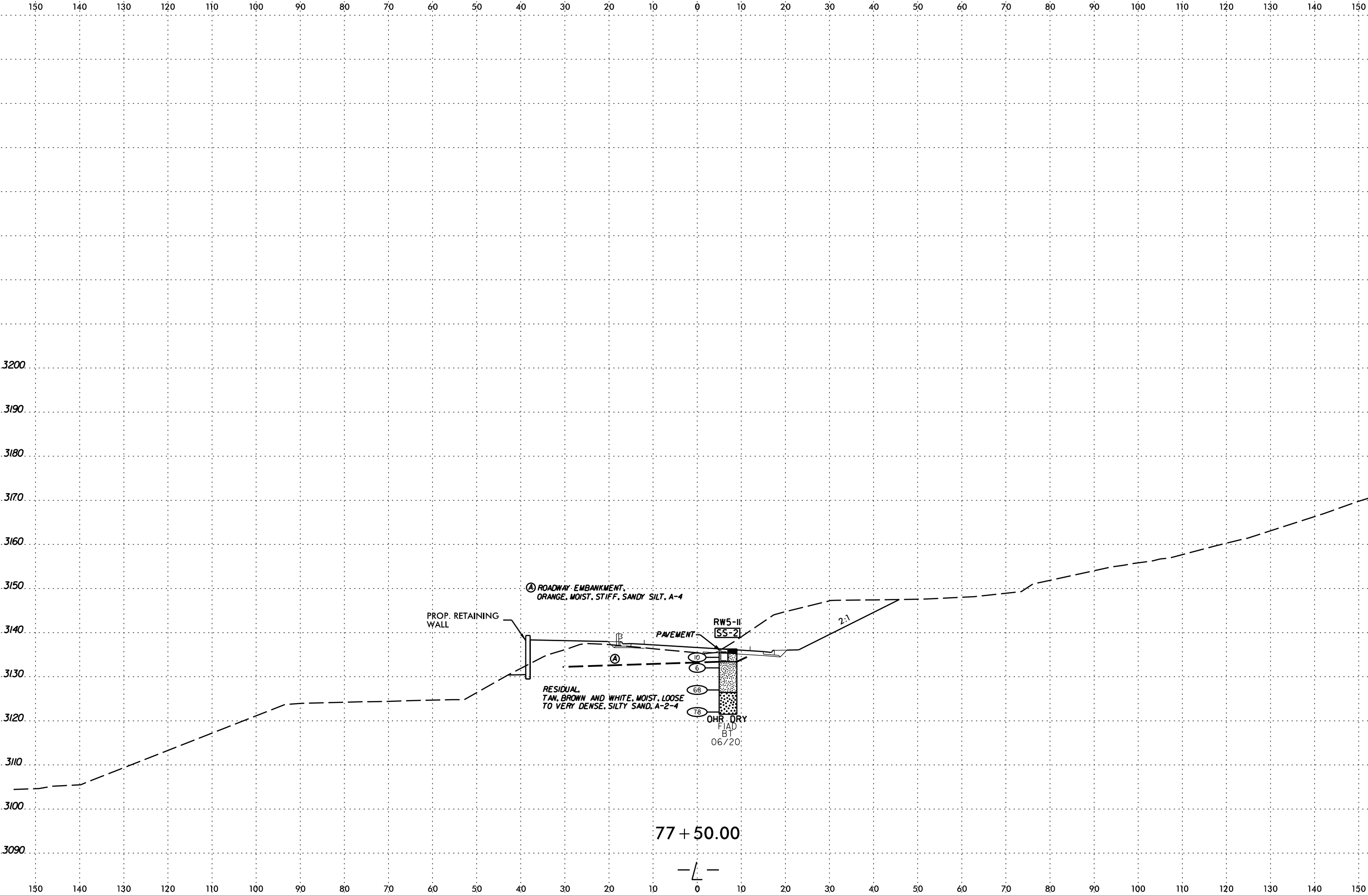


6/23/16



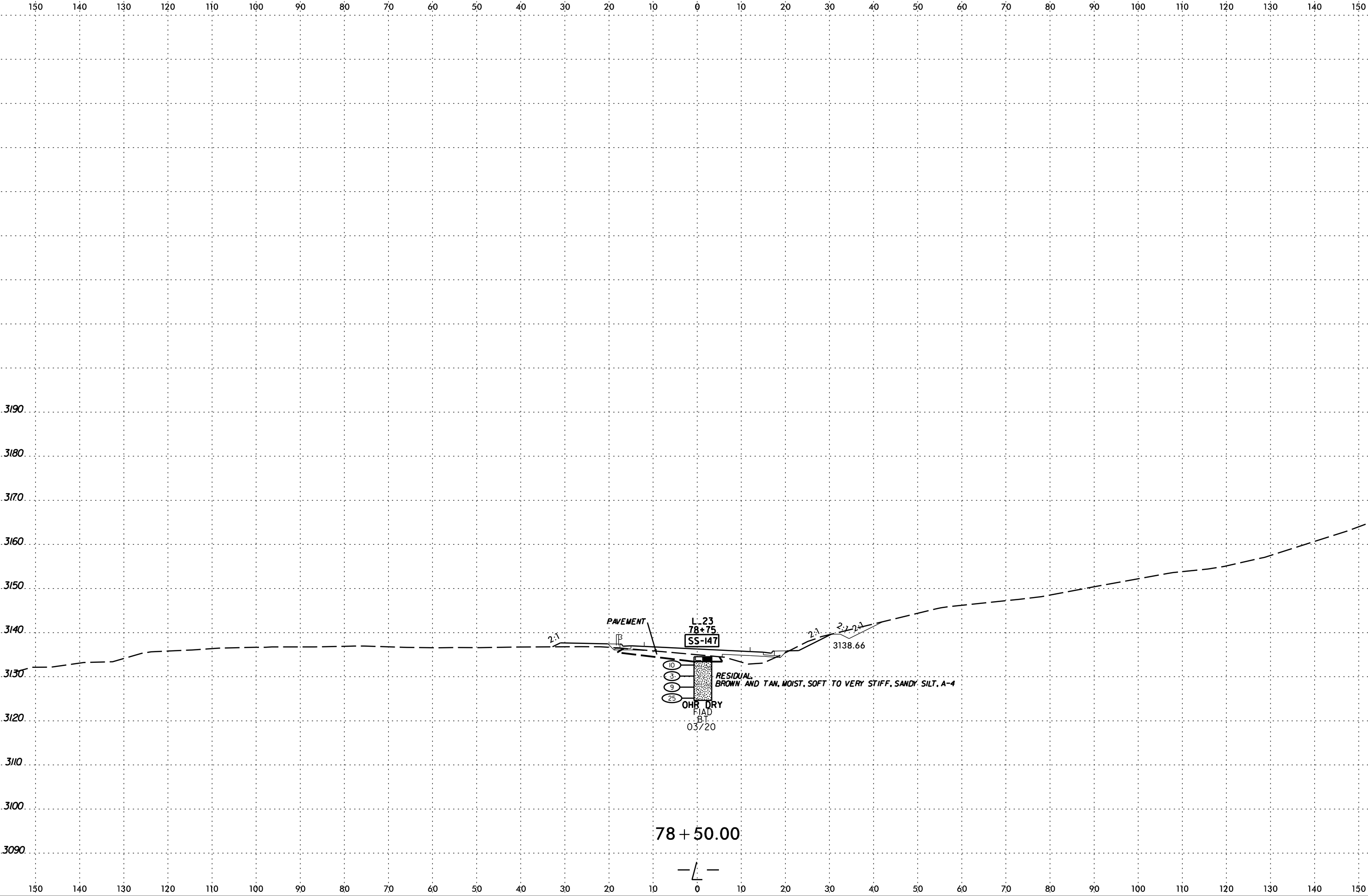
6/23/16

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	U-5810	77

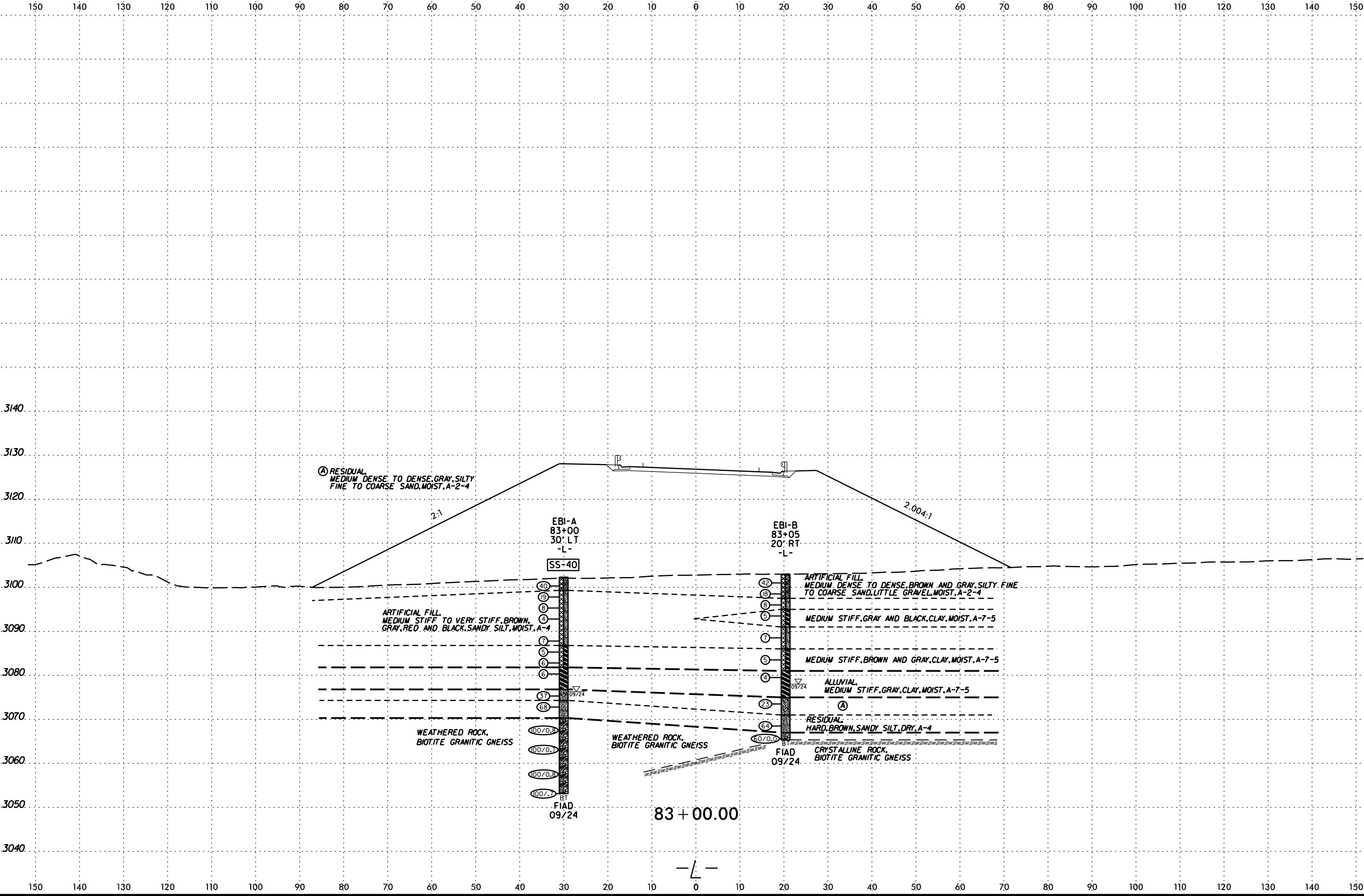


6/23/16

	PROJ. REFERENCE NO.	SHEET NO.
	U-5810	78



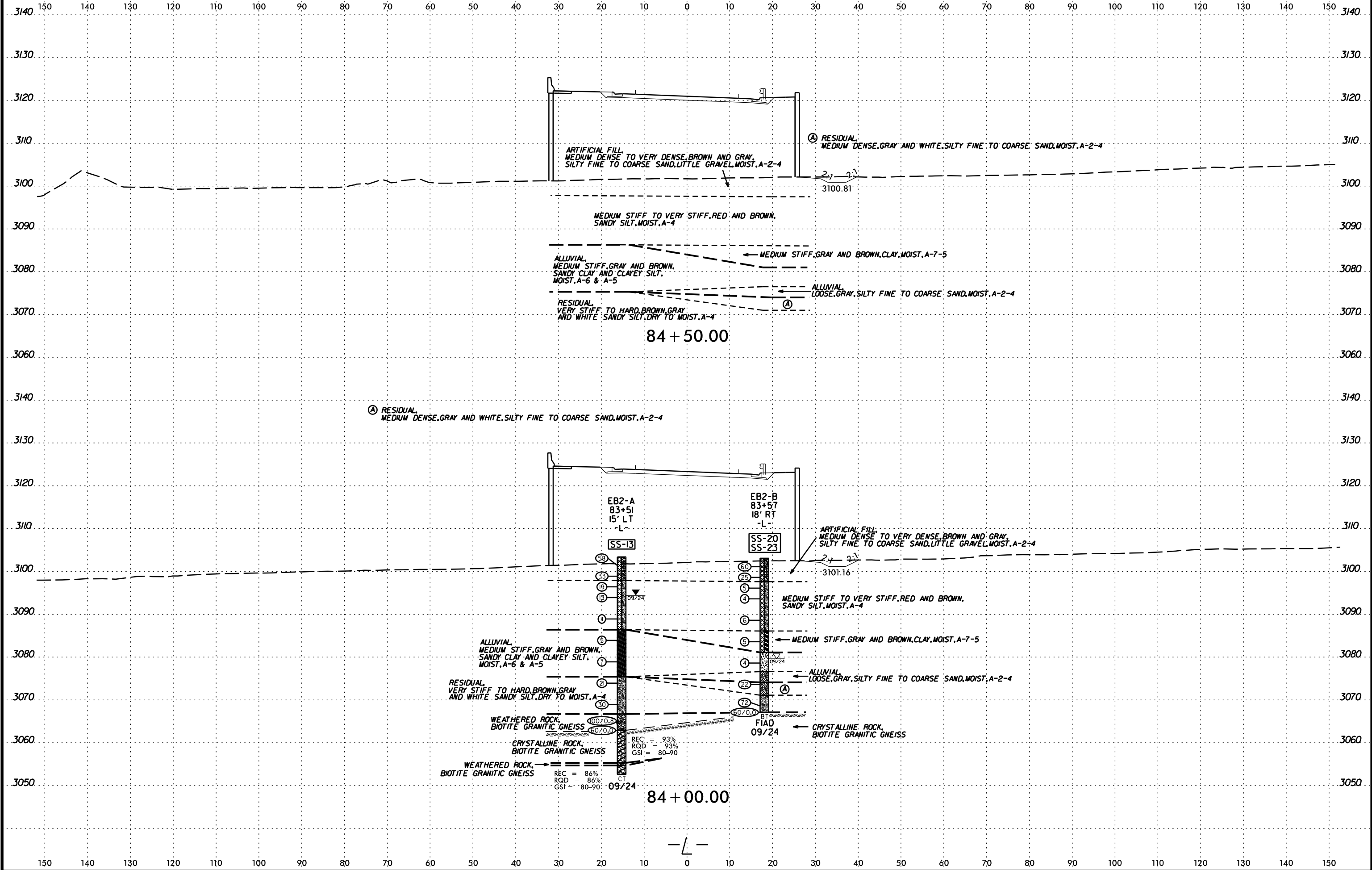
6/23/16



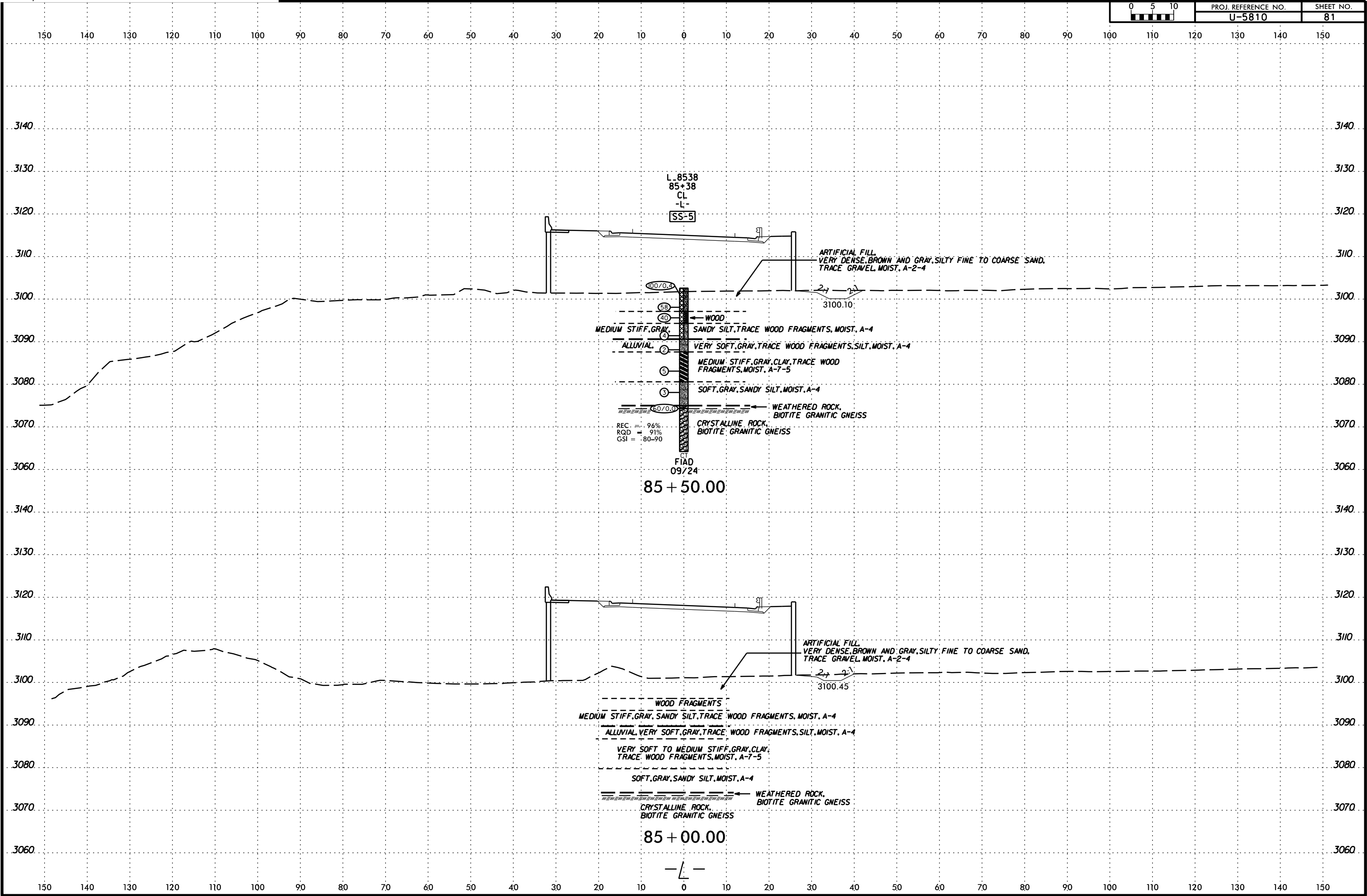
6/23/16



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U-5810	80

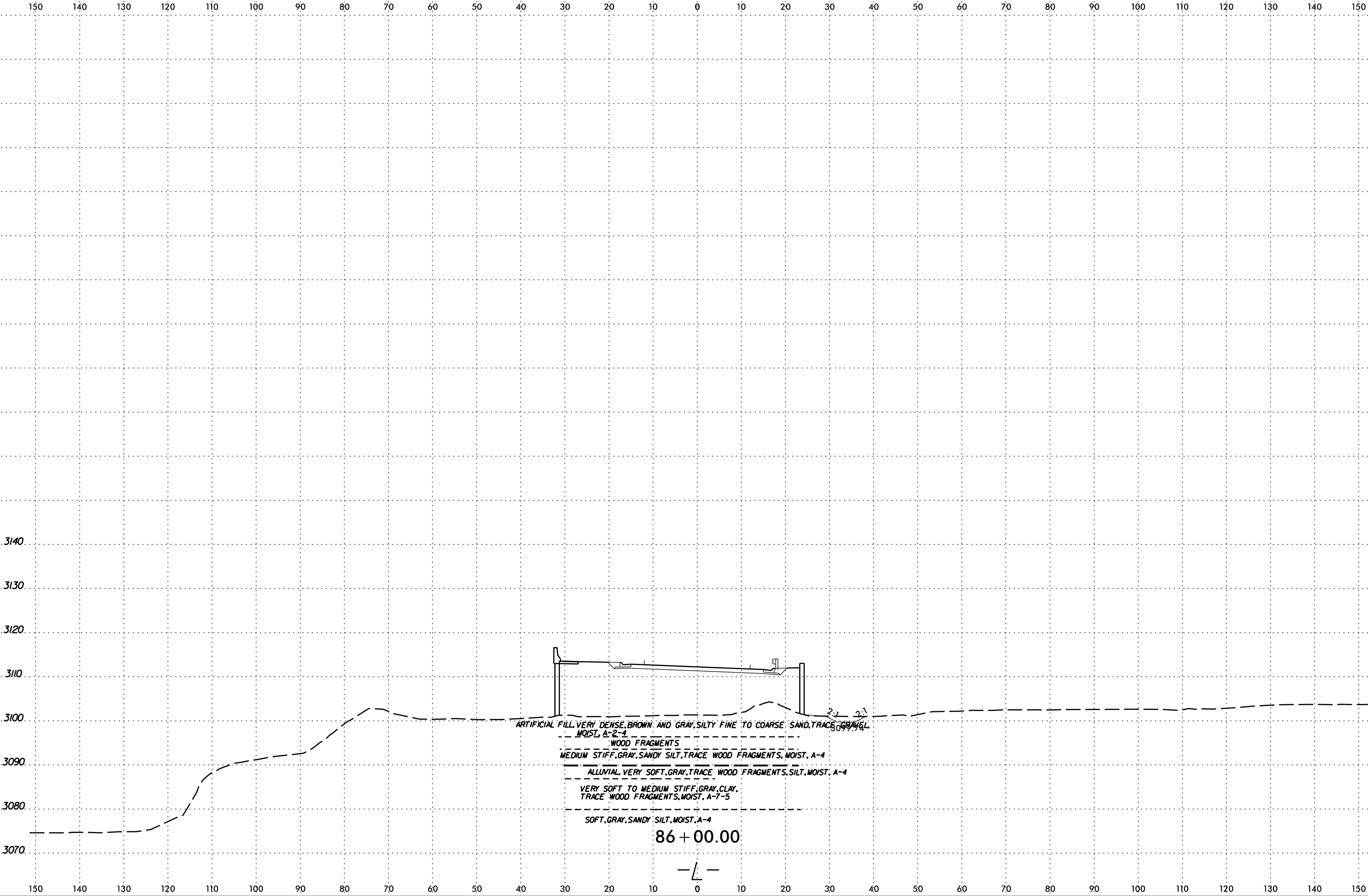


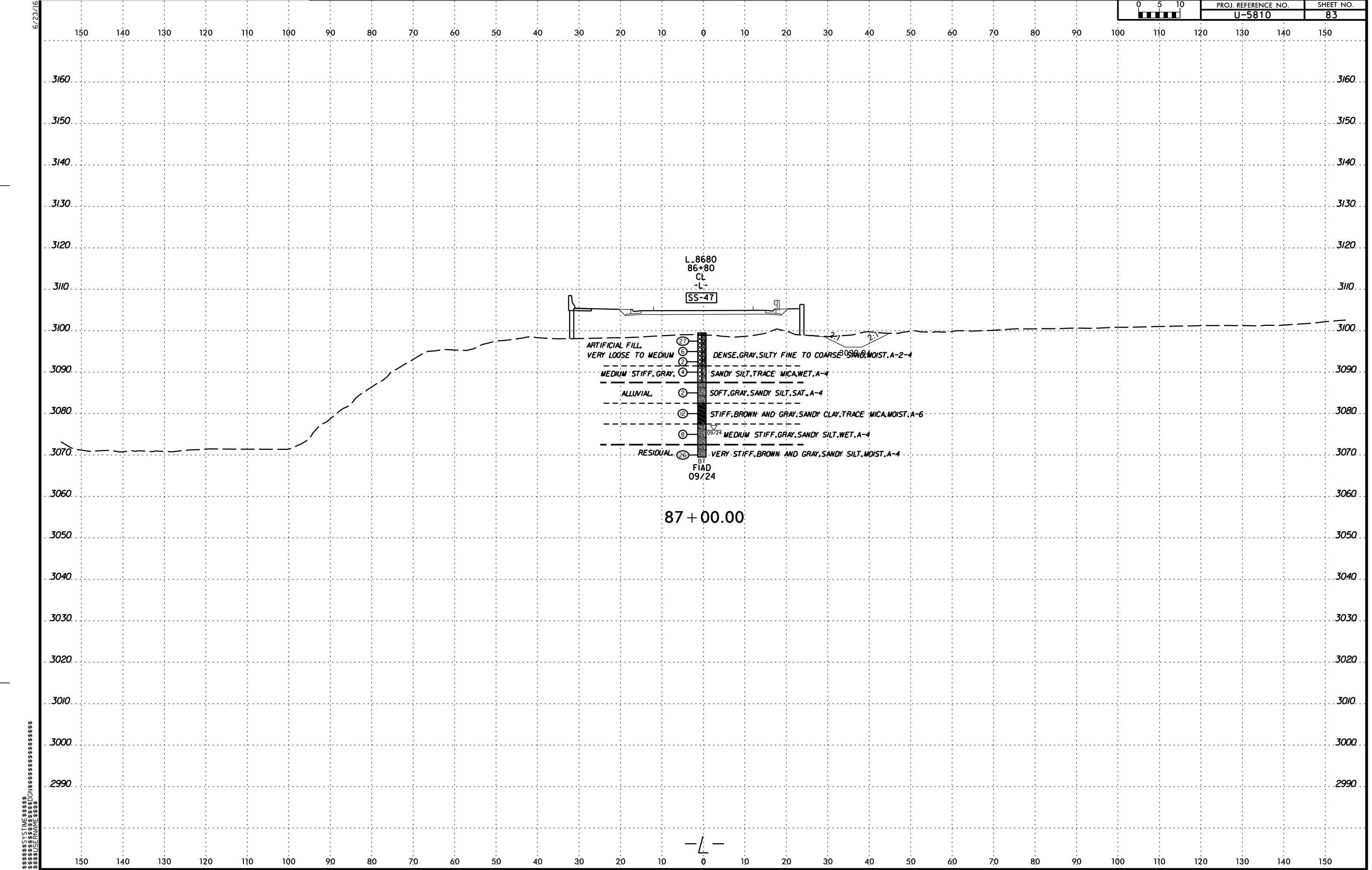
6/23/16



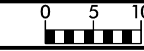
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PROJ. REFERENCE NO.	SHEET NO.
U-5810	82



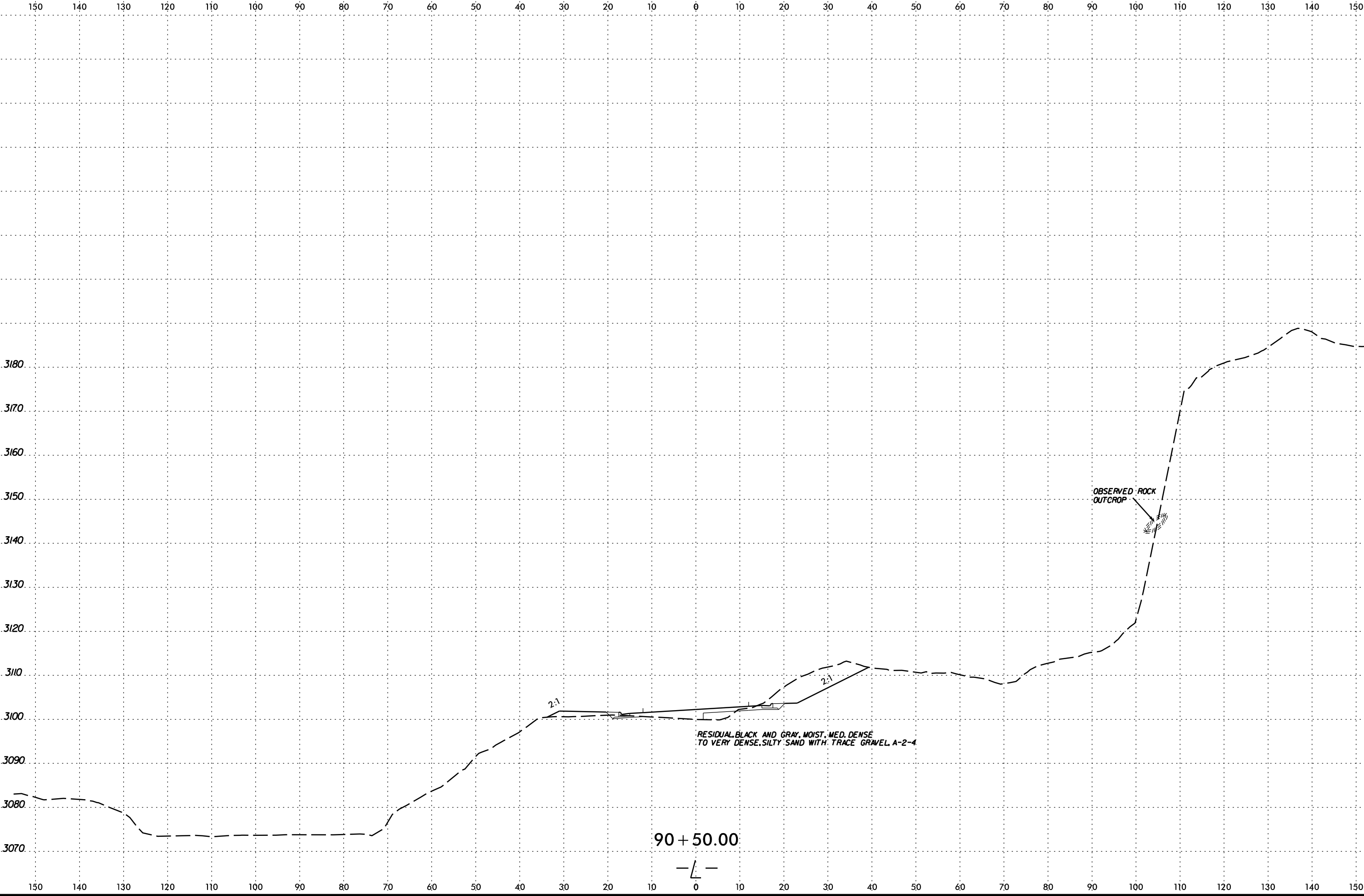


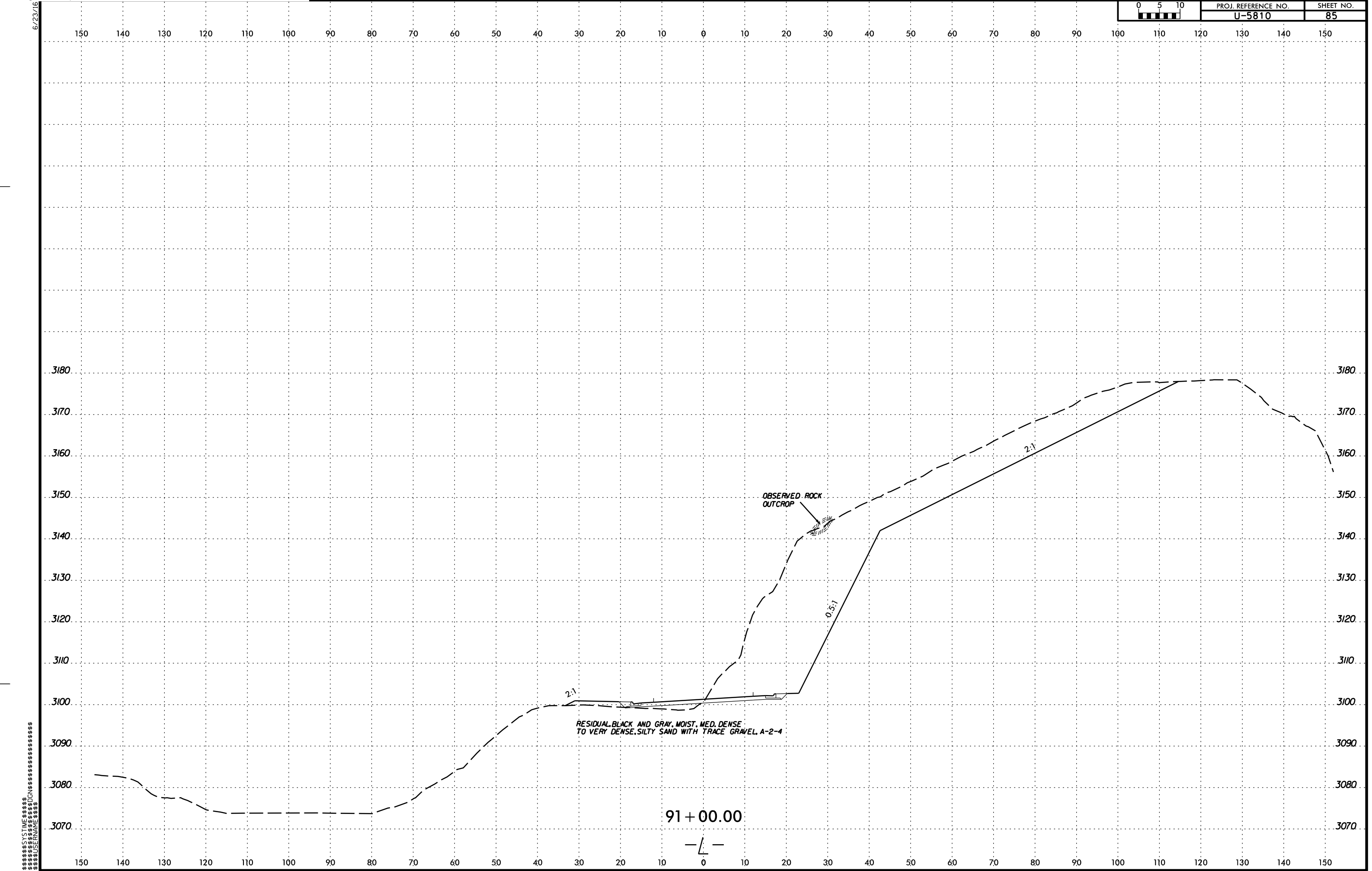
6/23/16

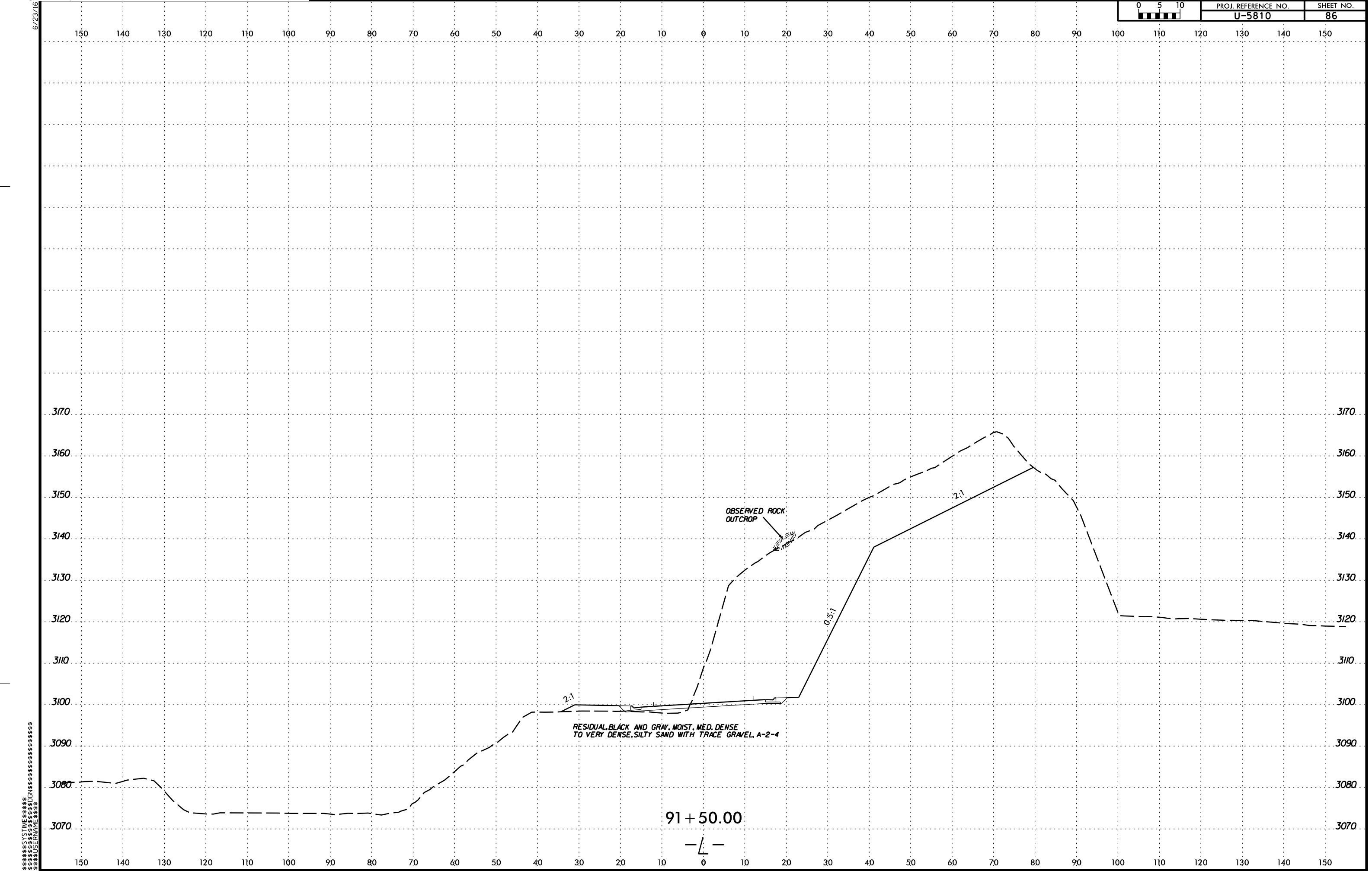


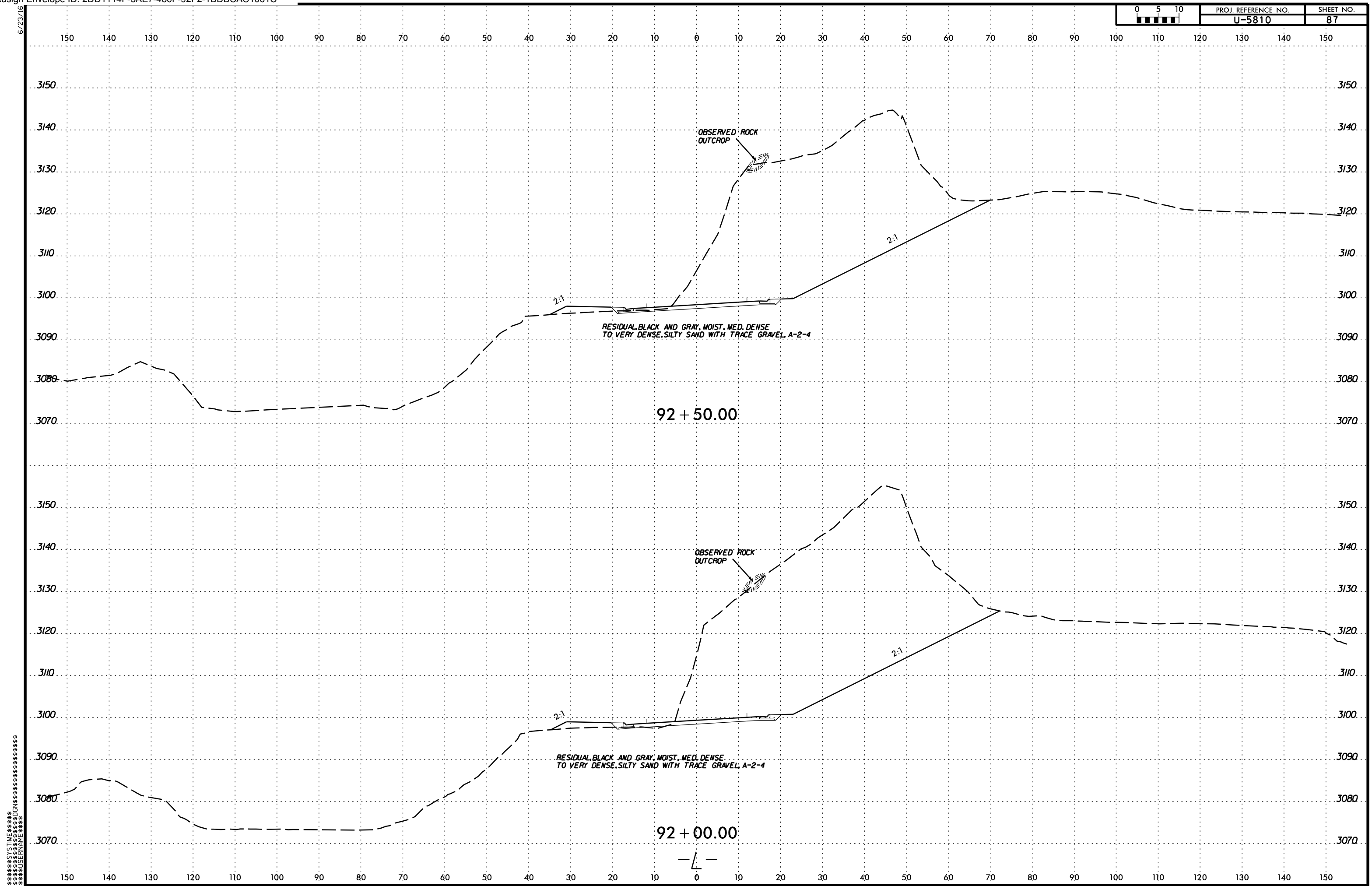
PROJ. REFERENCE NO.
U-5810

SHEET NO.
84

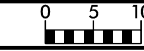




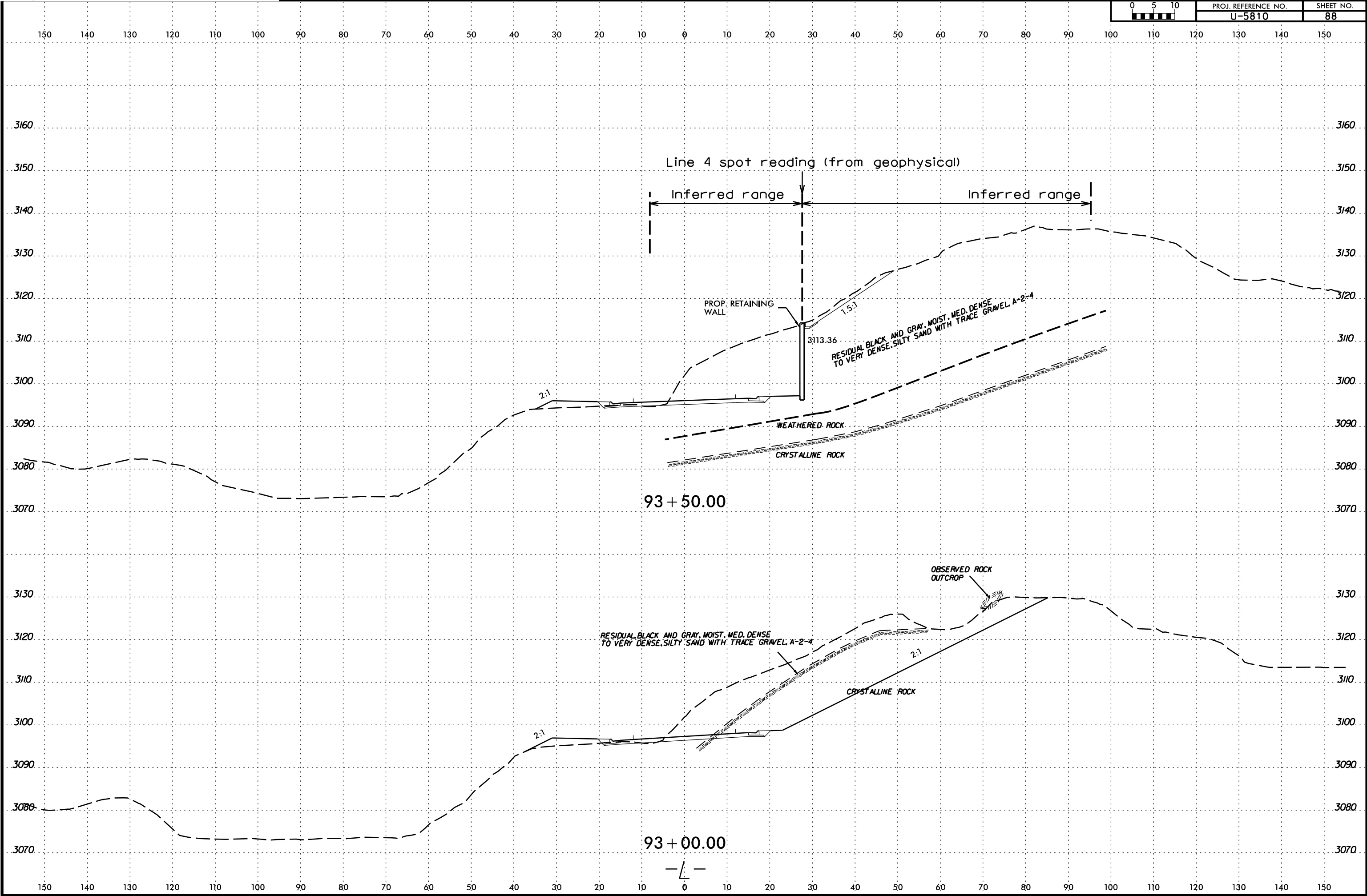




6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	88

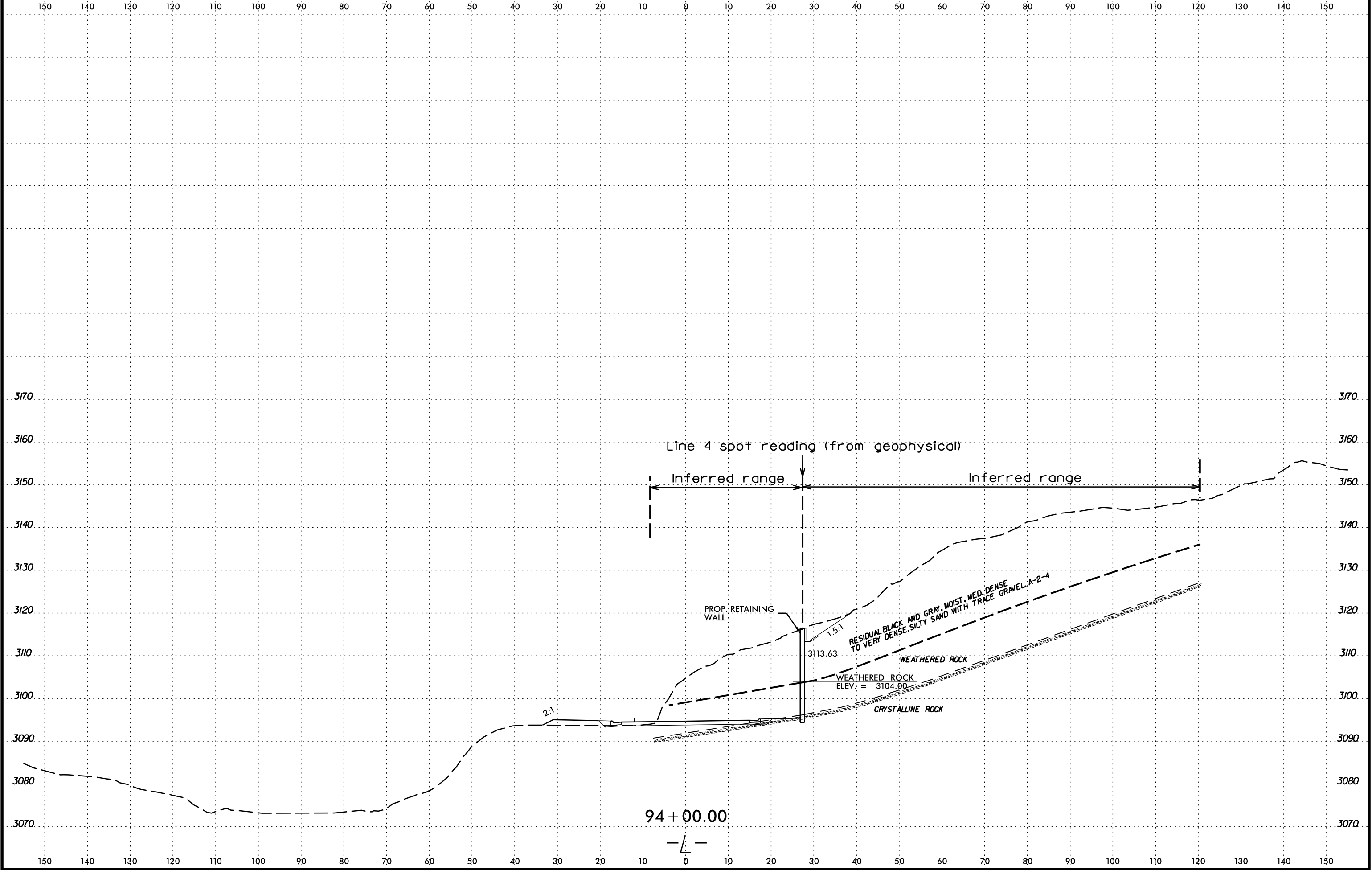


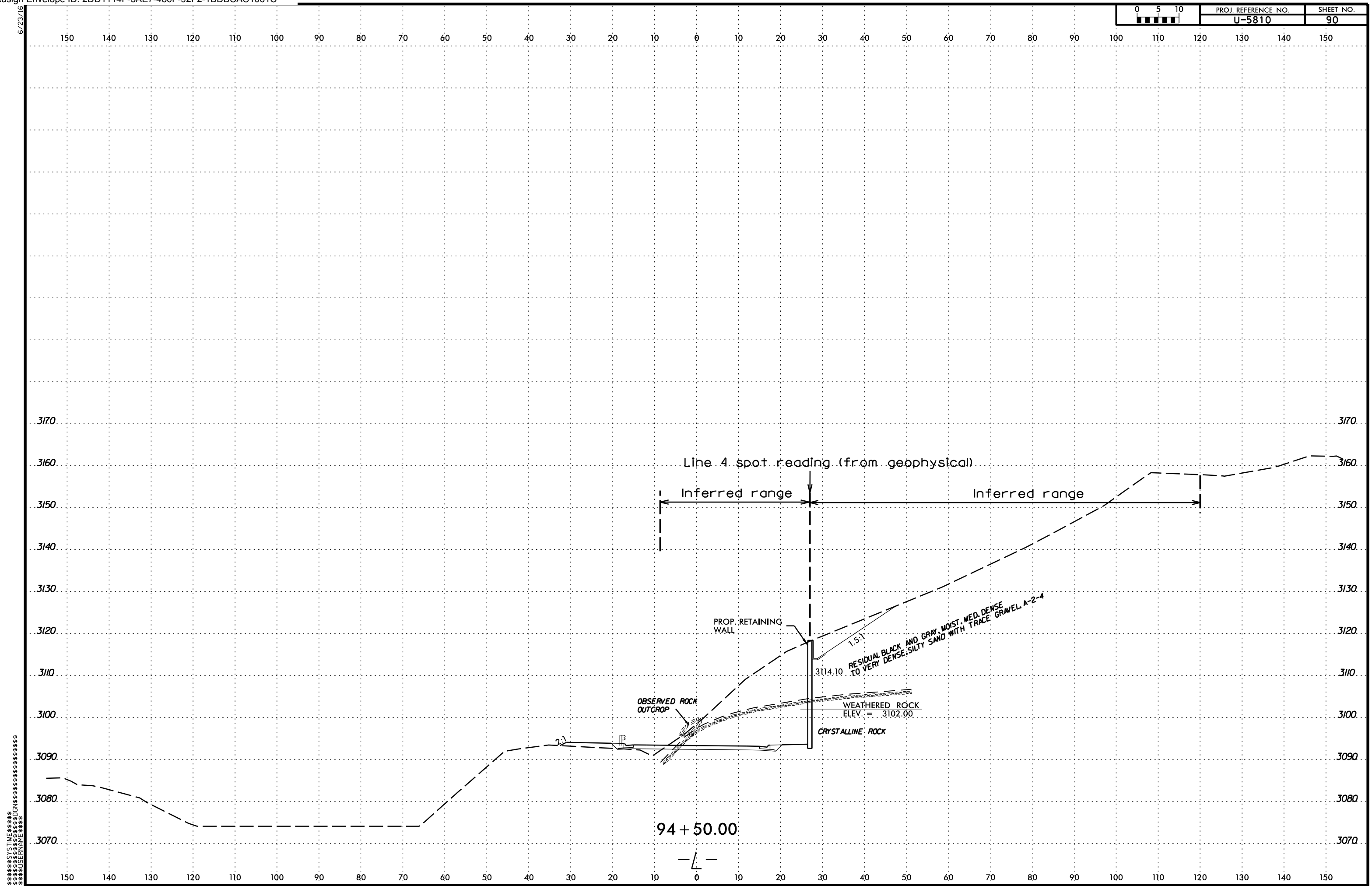
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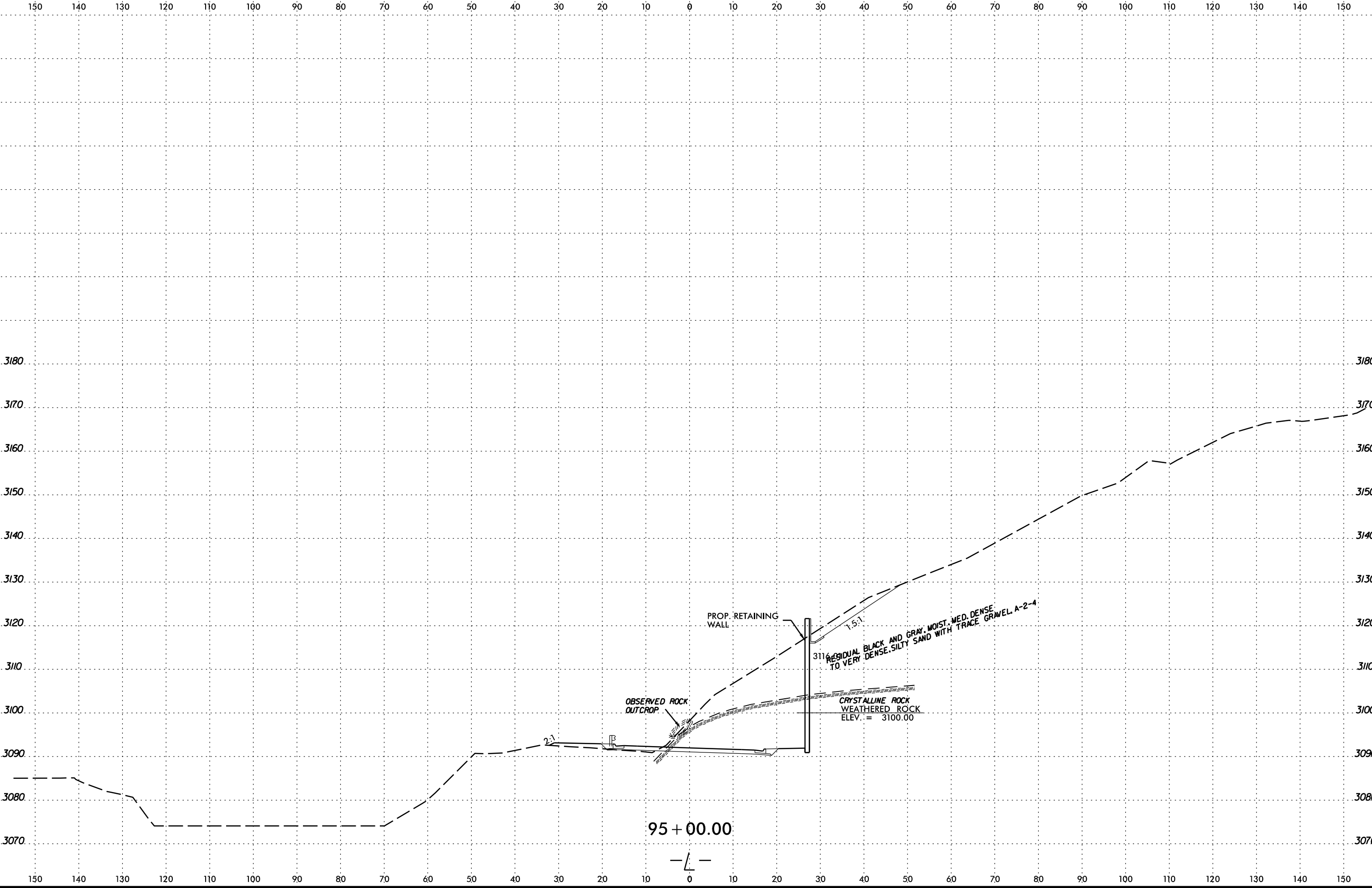
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U-5810

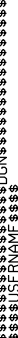
SHEET NO.
89





6/23/16

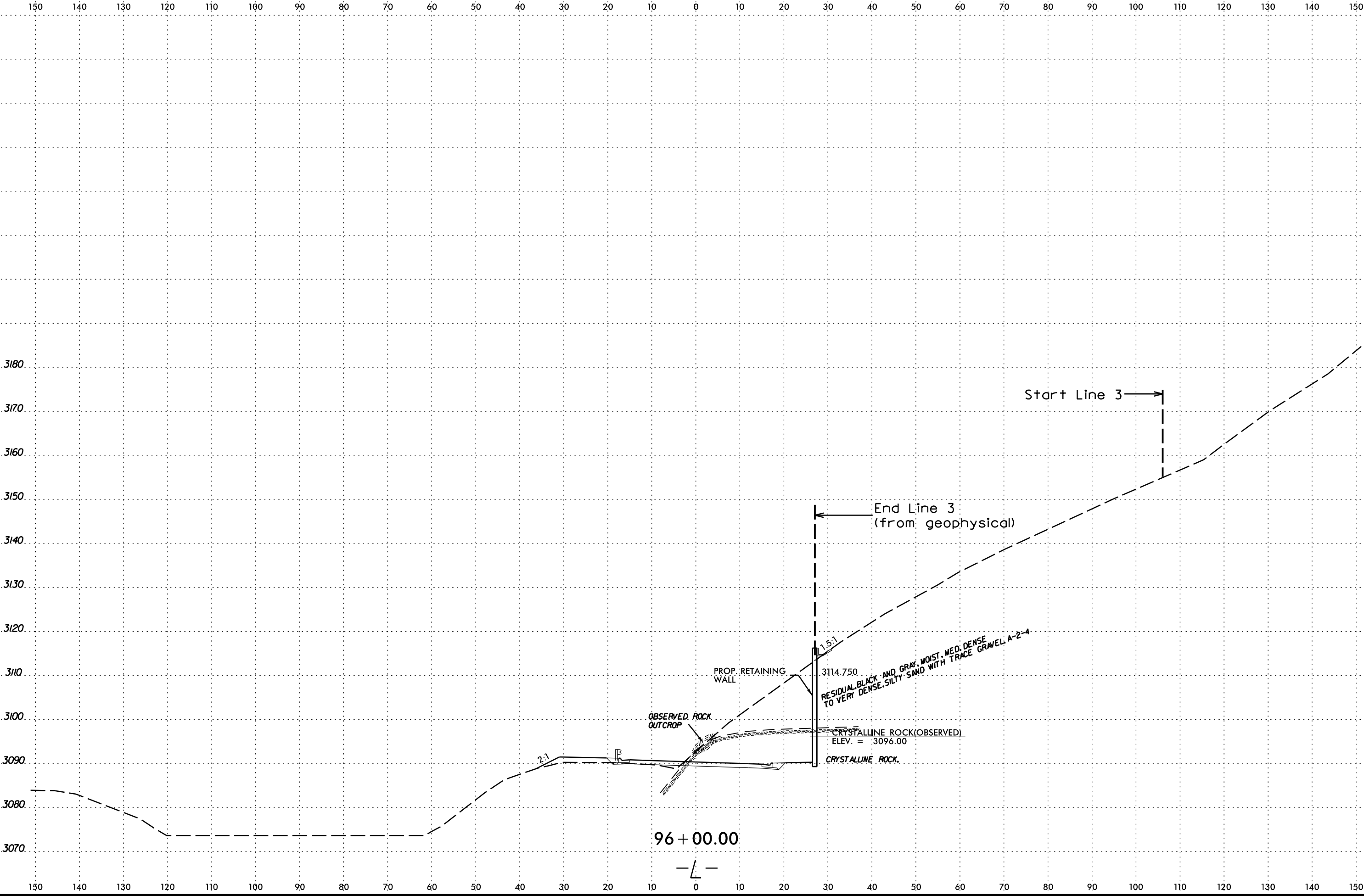




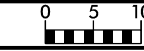
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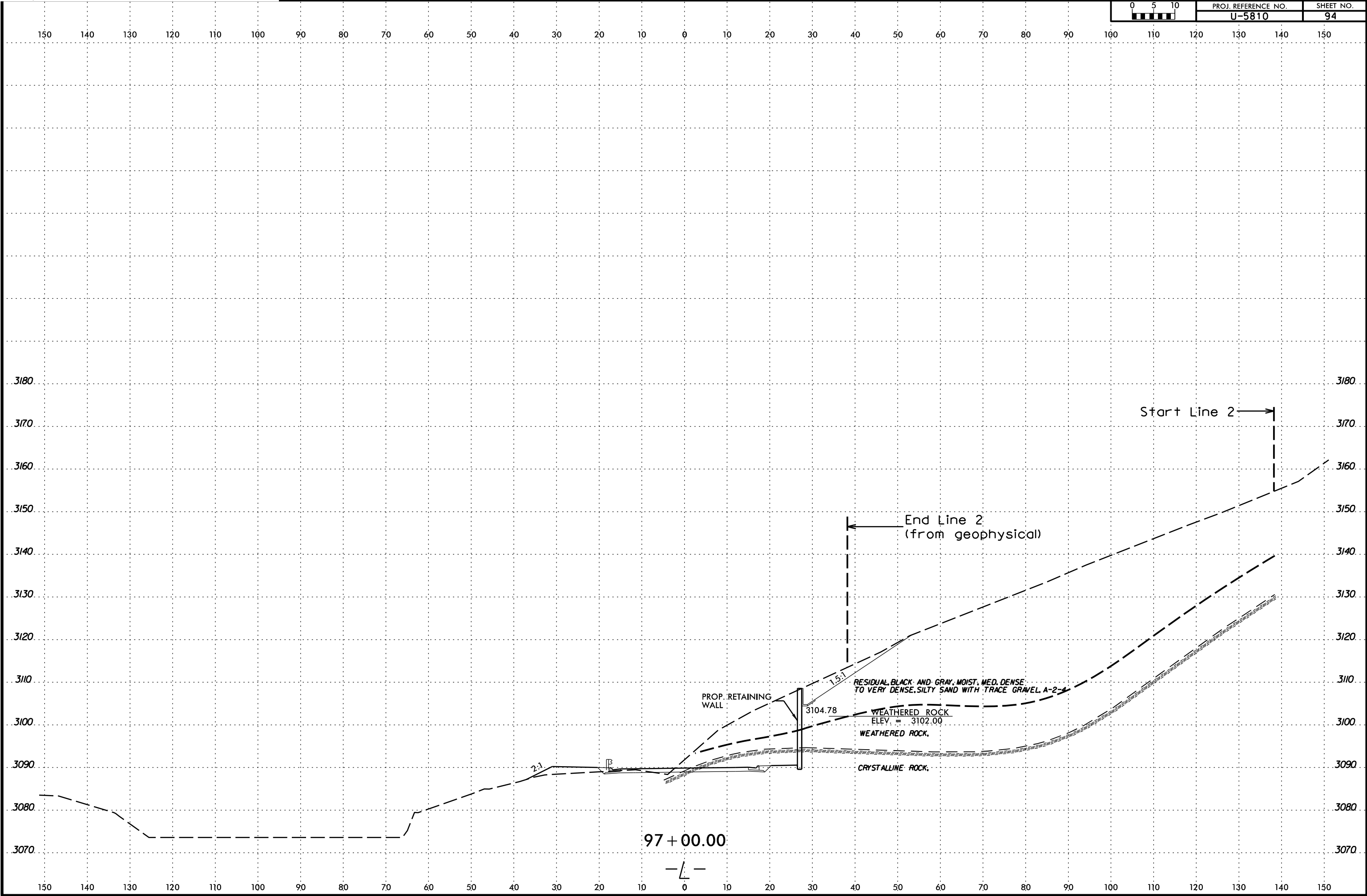
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U-5810	93



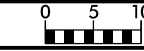
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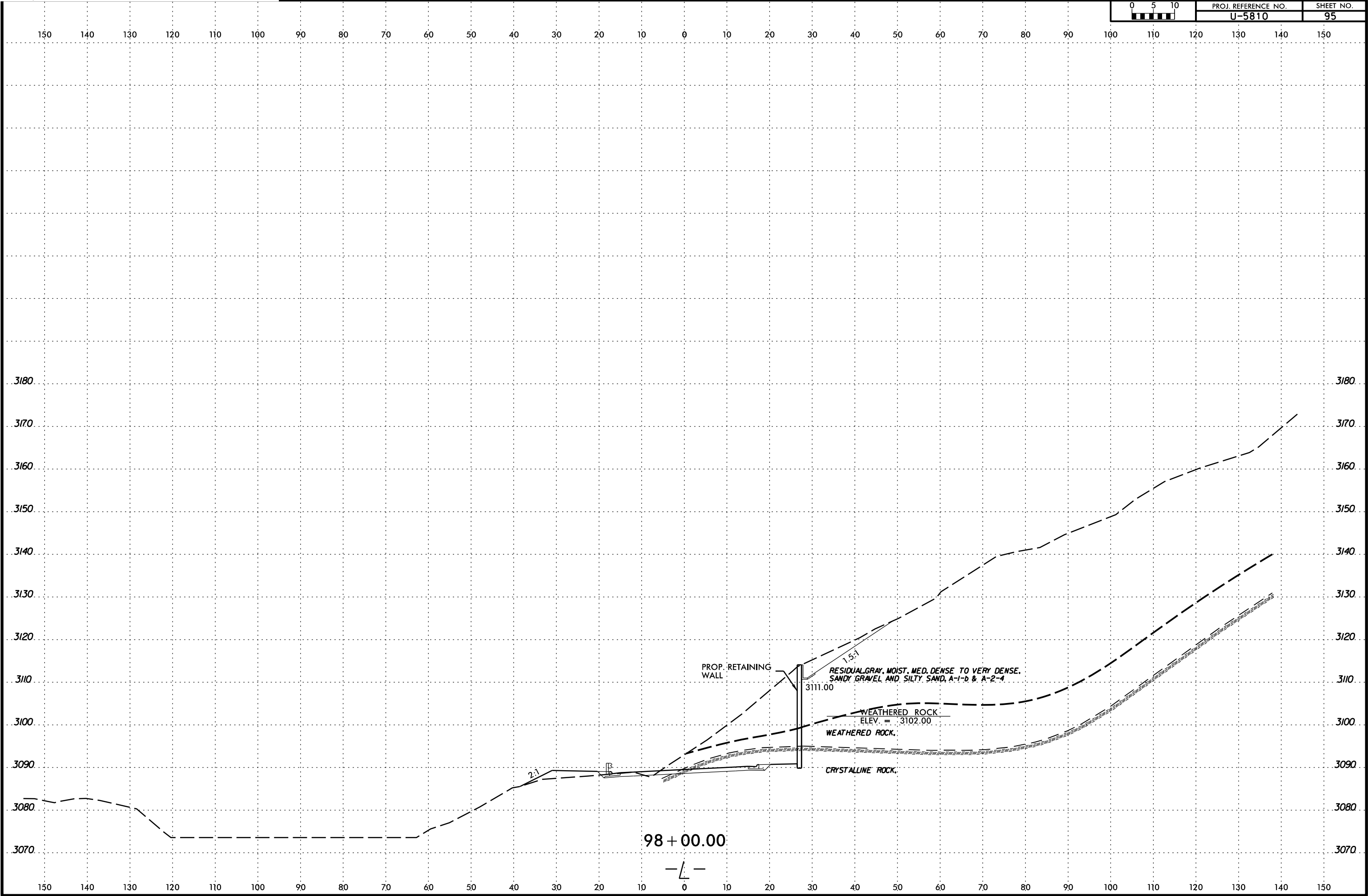
PROJ. REFERENCE NO.	SHEET NO.
U-5810	94



6/23/16



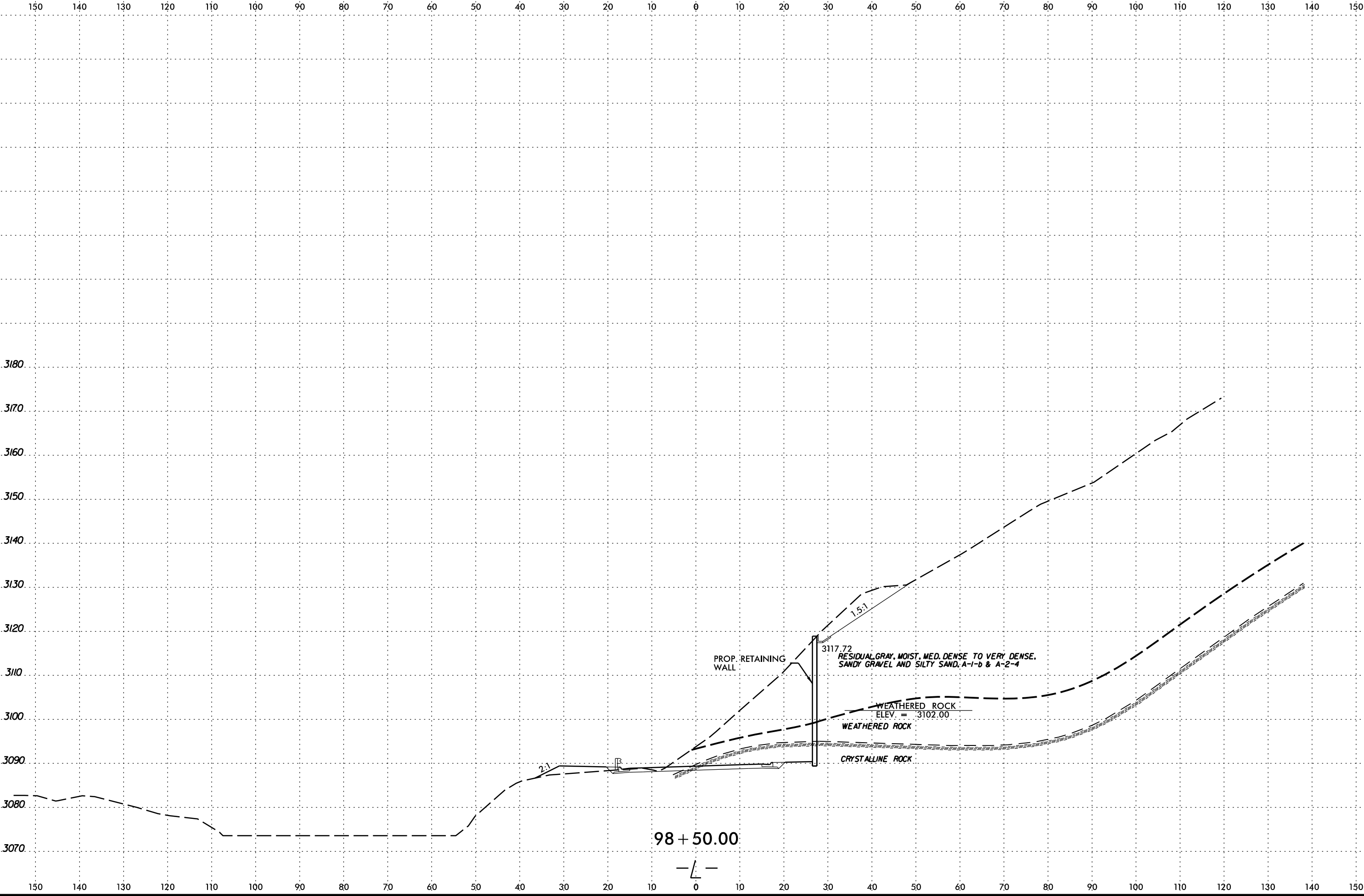
PROJ. REFERENCE NO.	SHEET NO.
U-5810	95



6/23/16

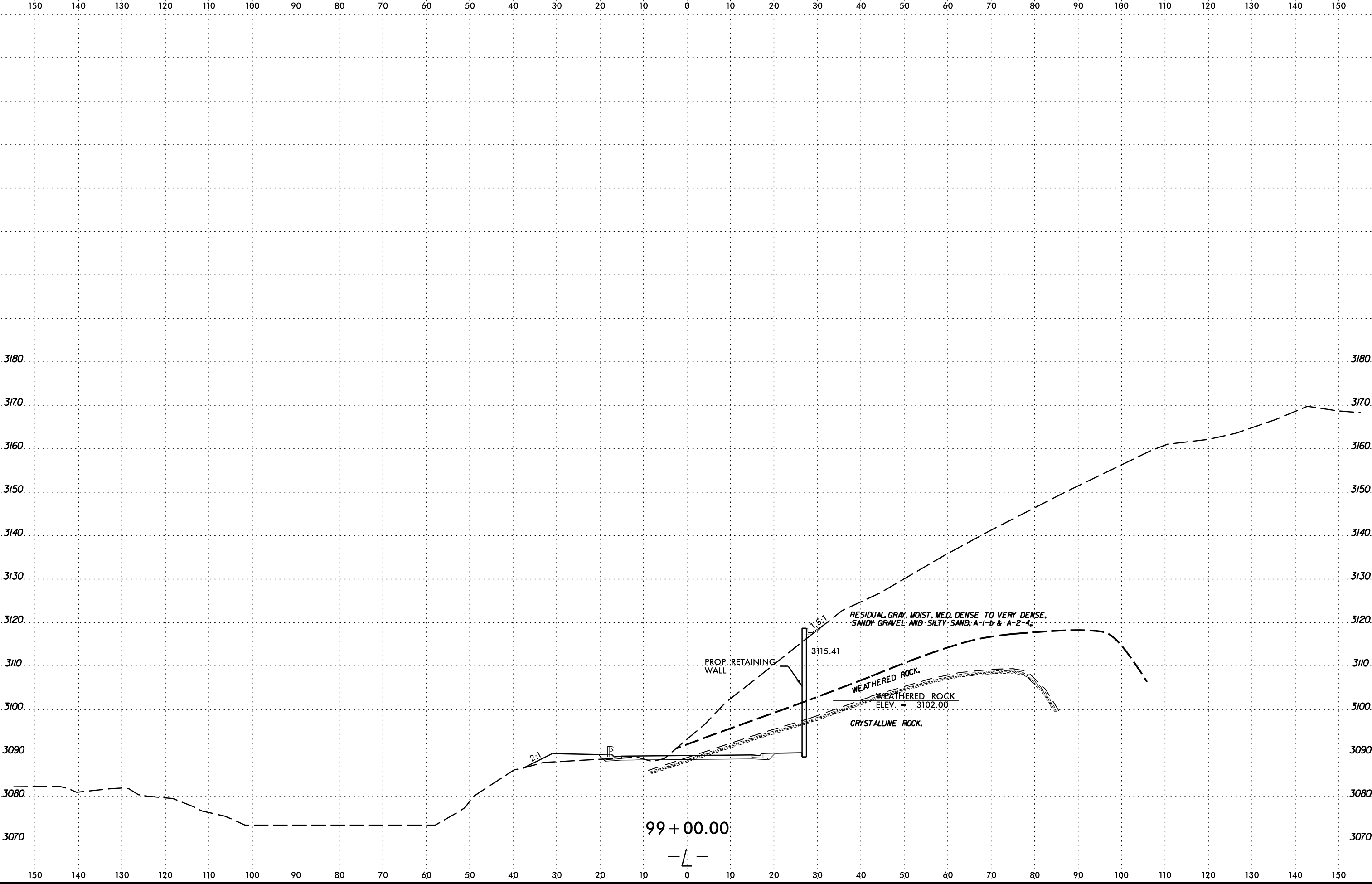


PROJ. REFERENCE NO.	SHEET NO.
U-5810	96



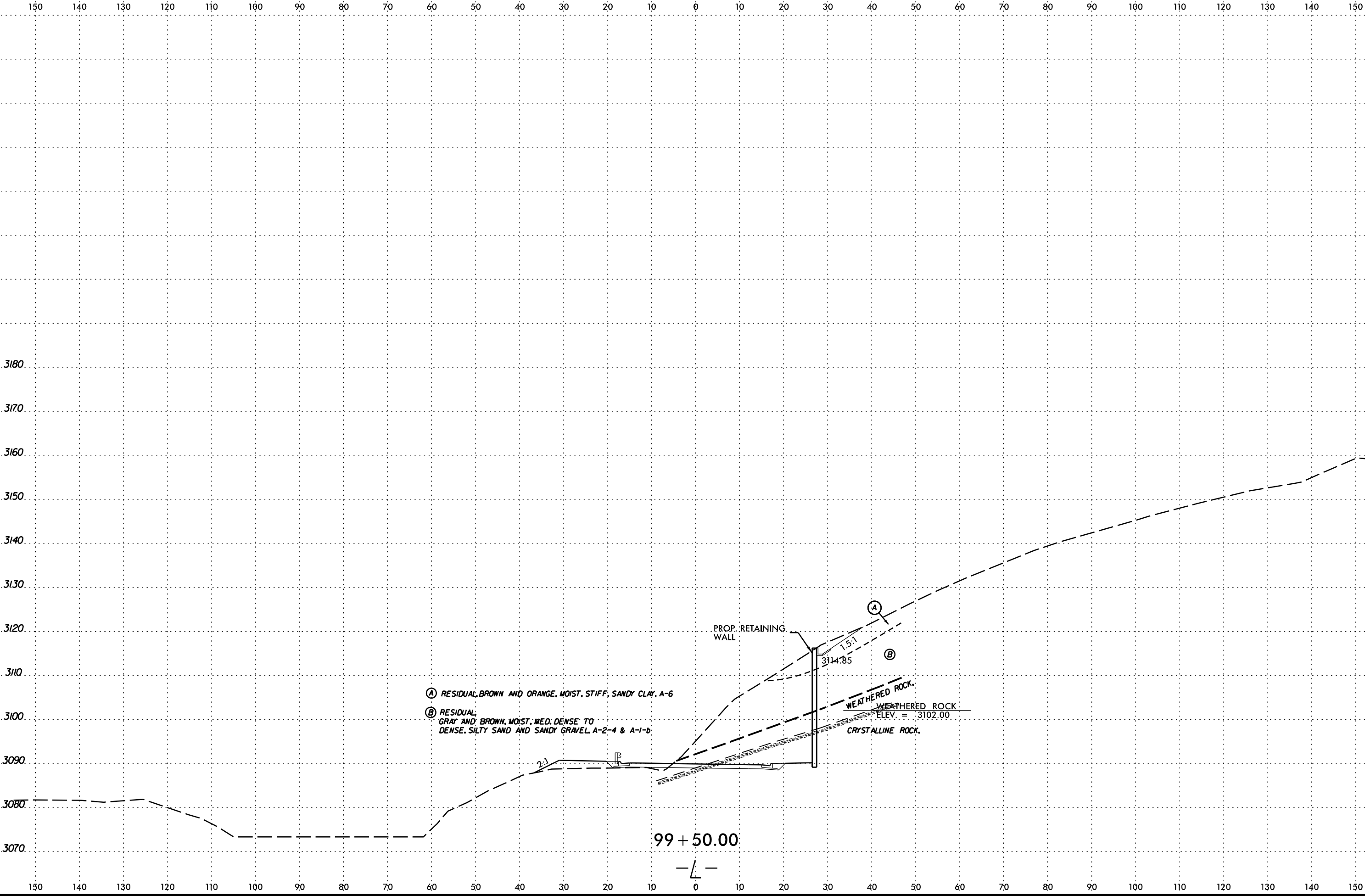
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-5810	97



6/23/16

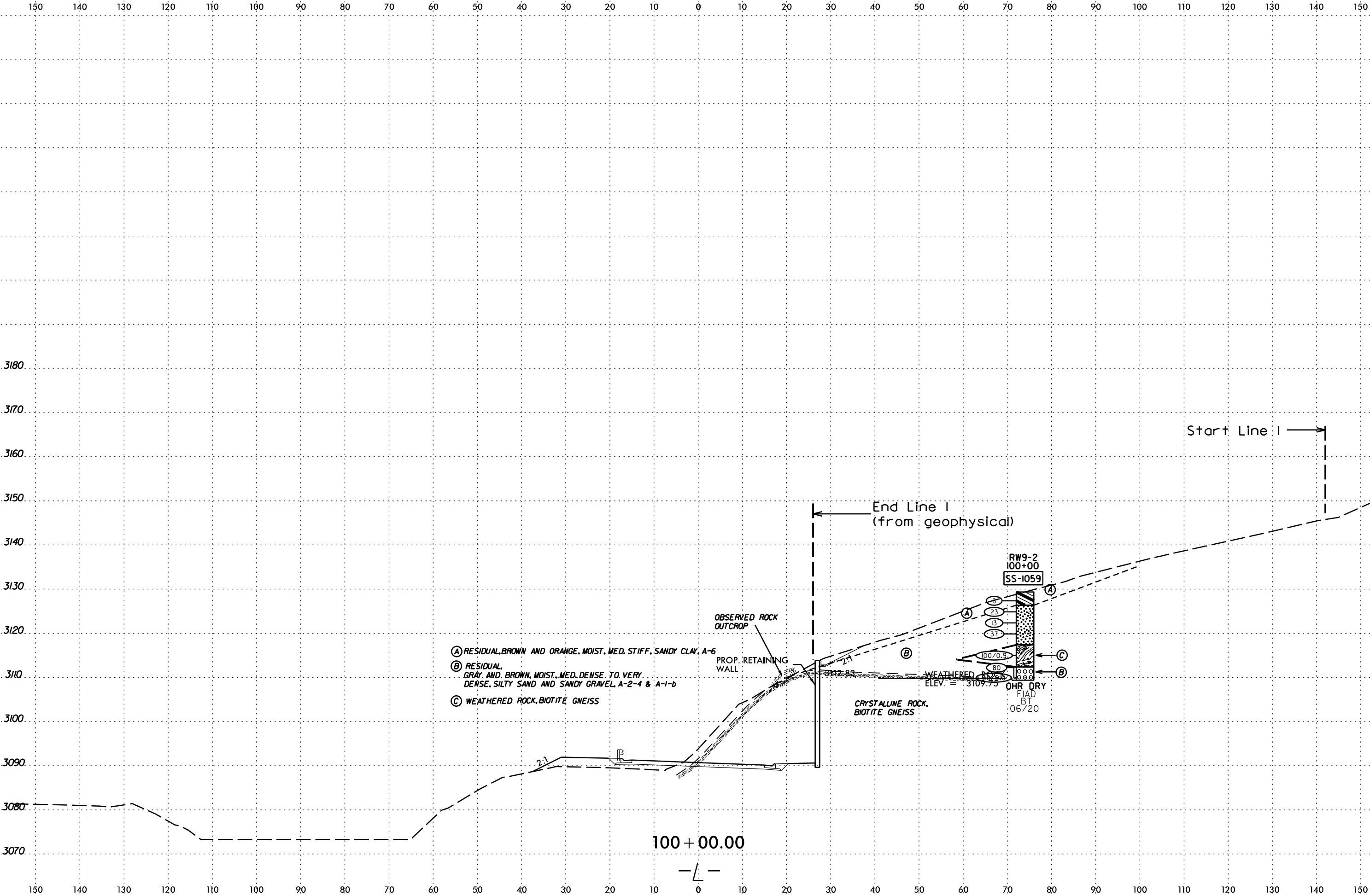
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U-5810	98

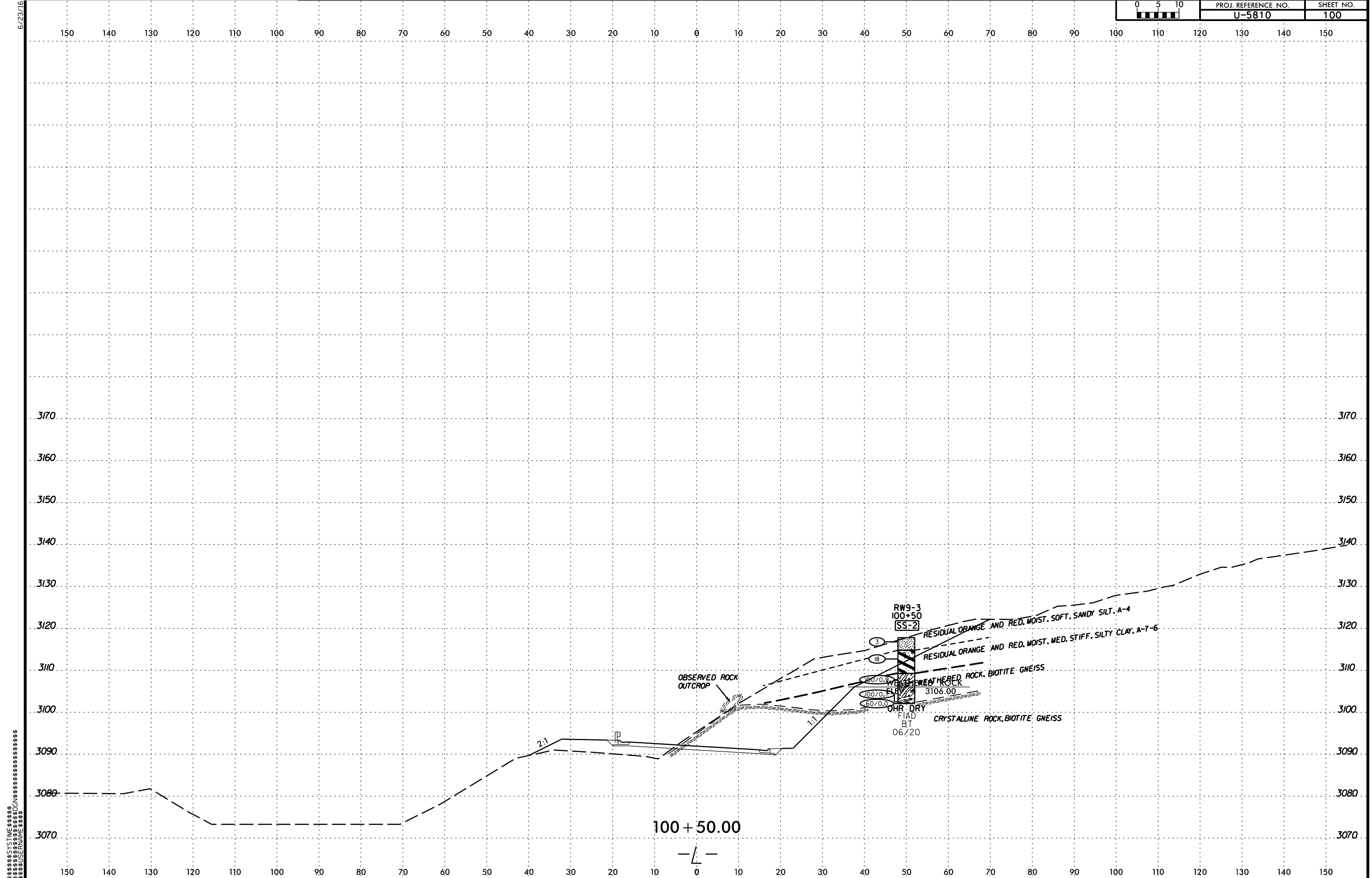


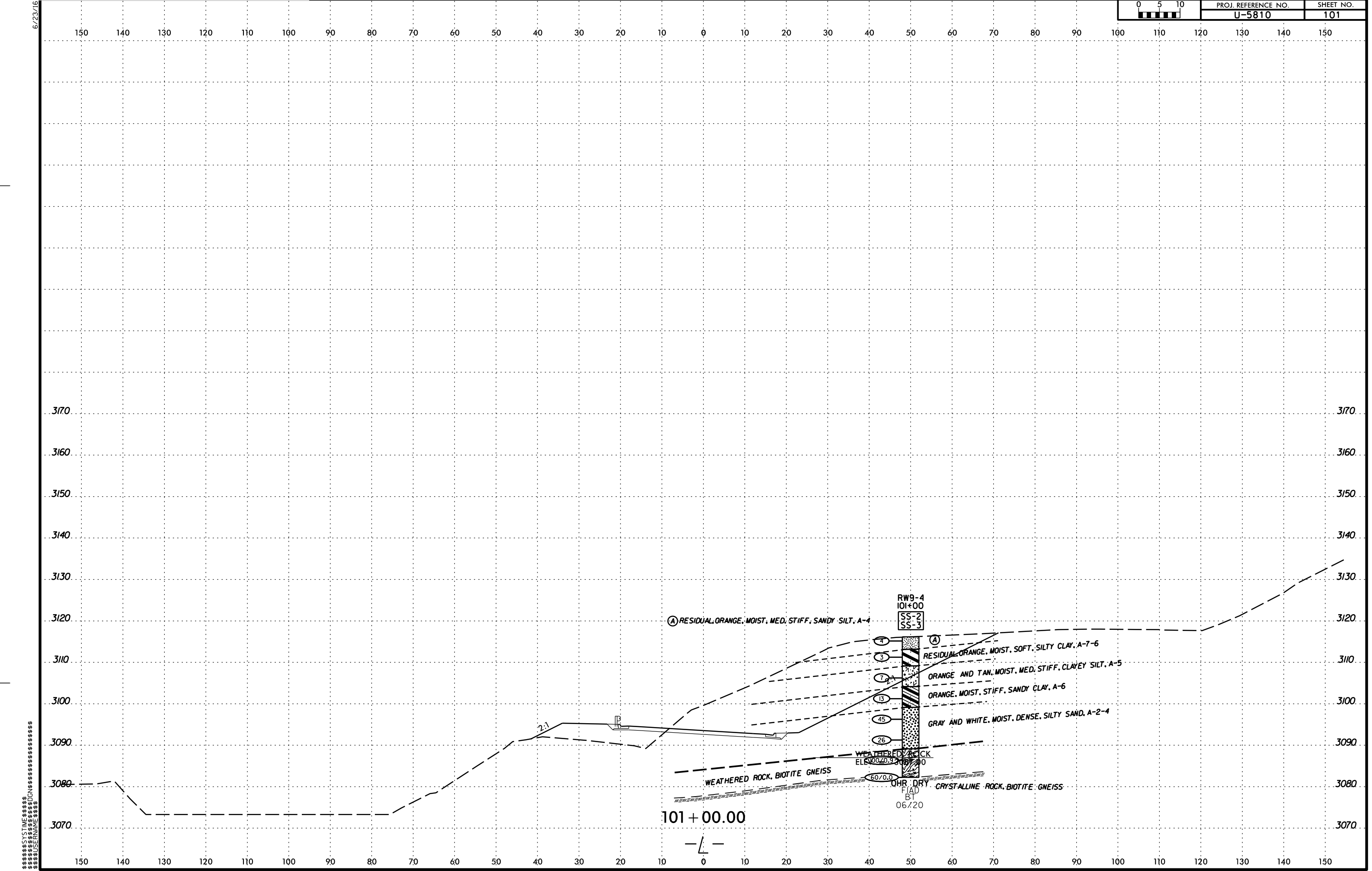
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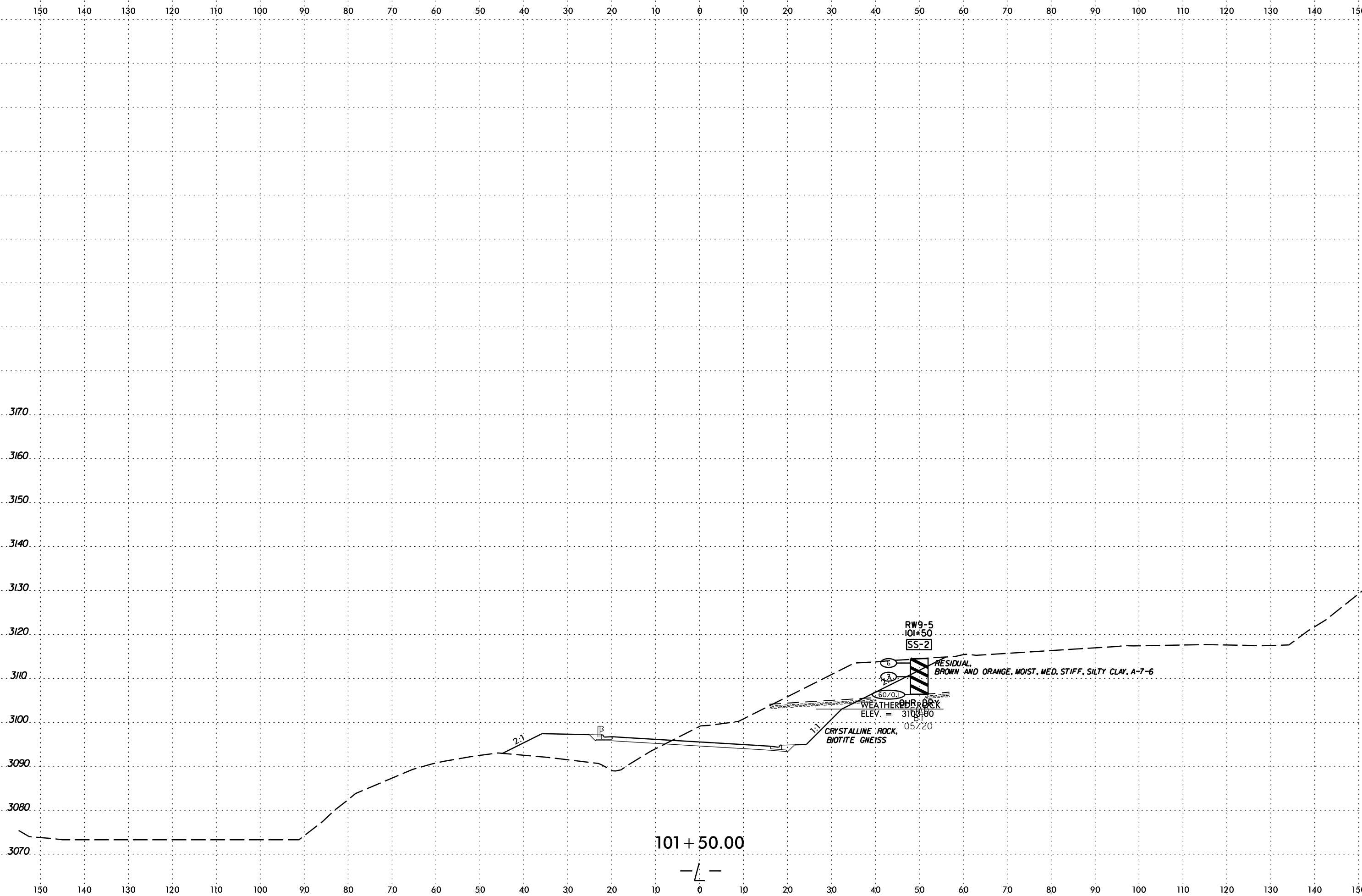


PROJ. REFERENCE NO.	SHEET NO.
U-5810	99





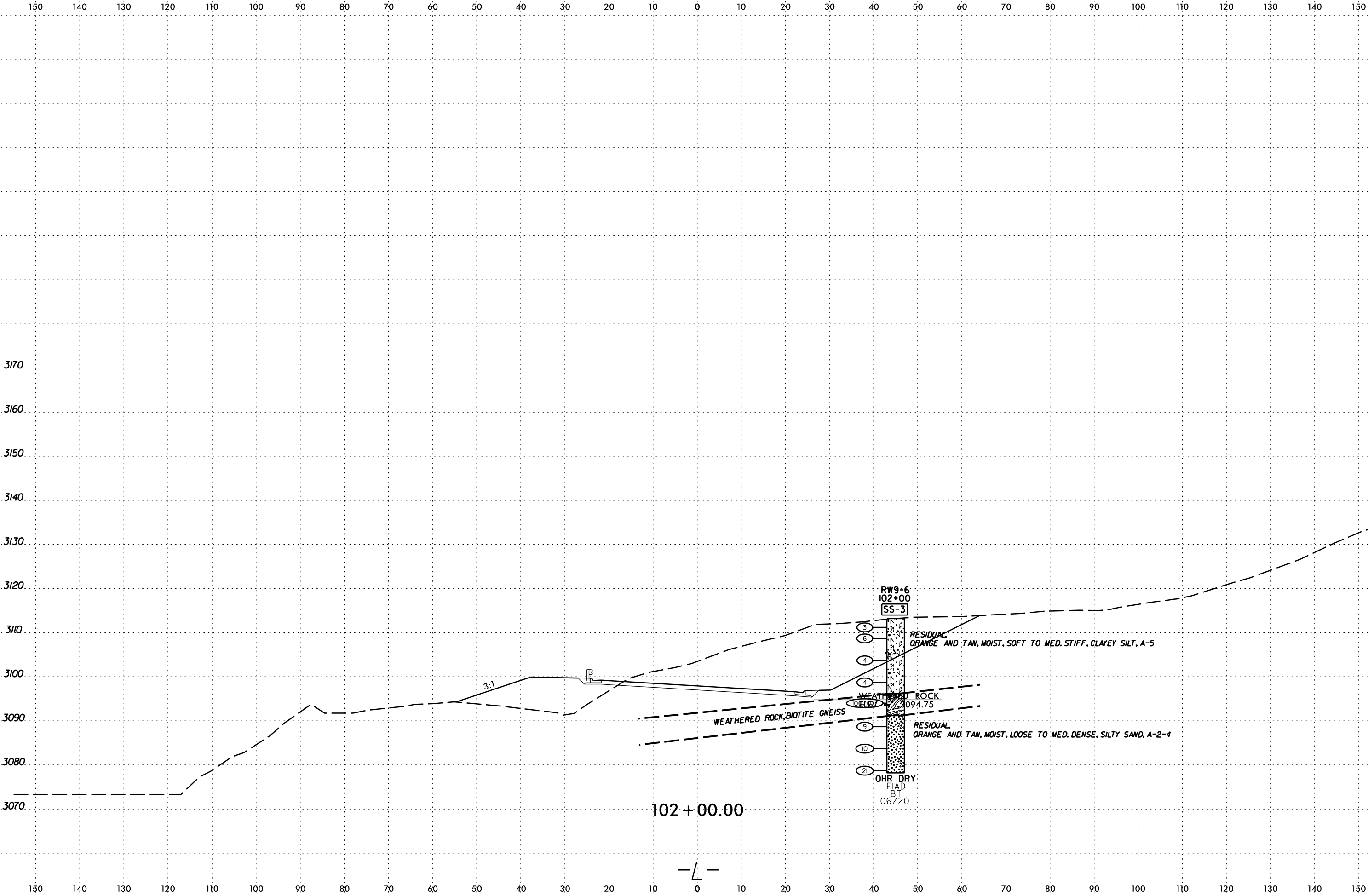


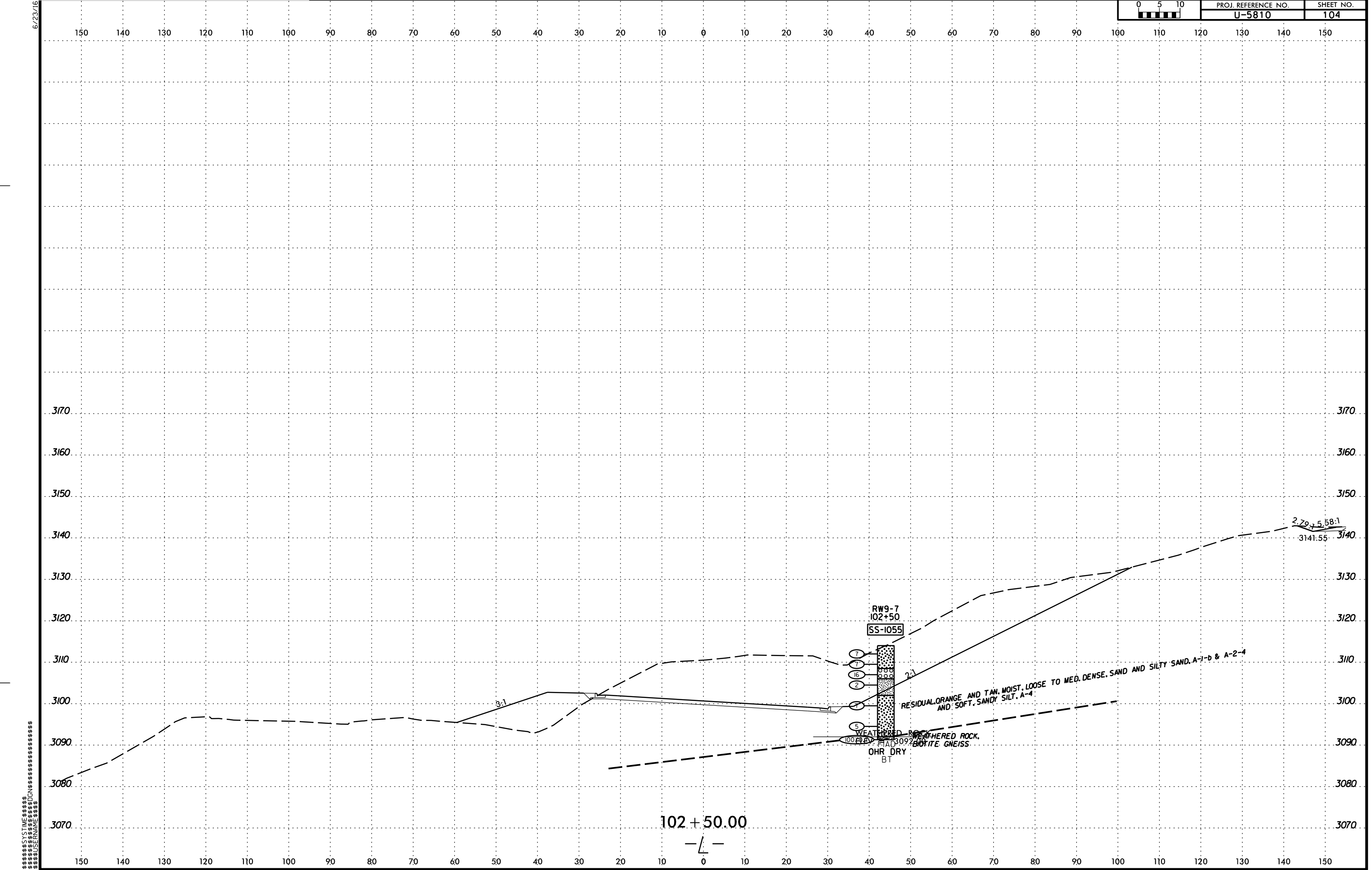


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	103

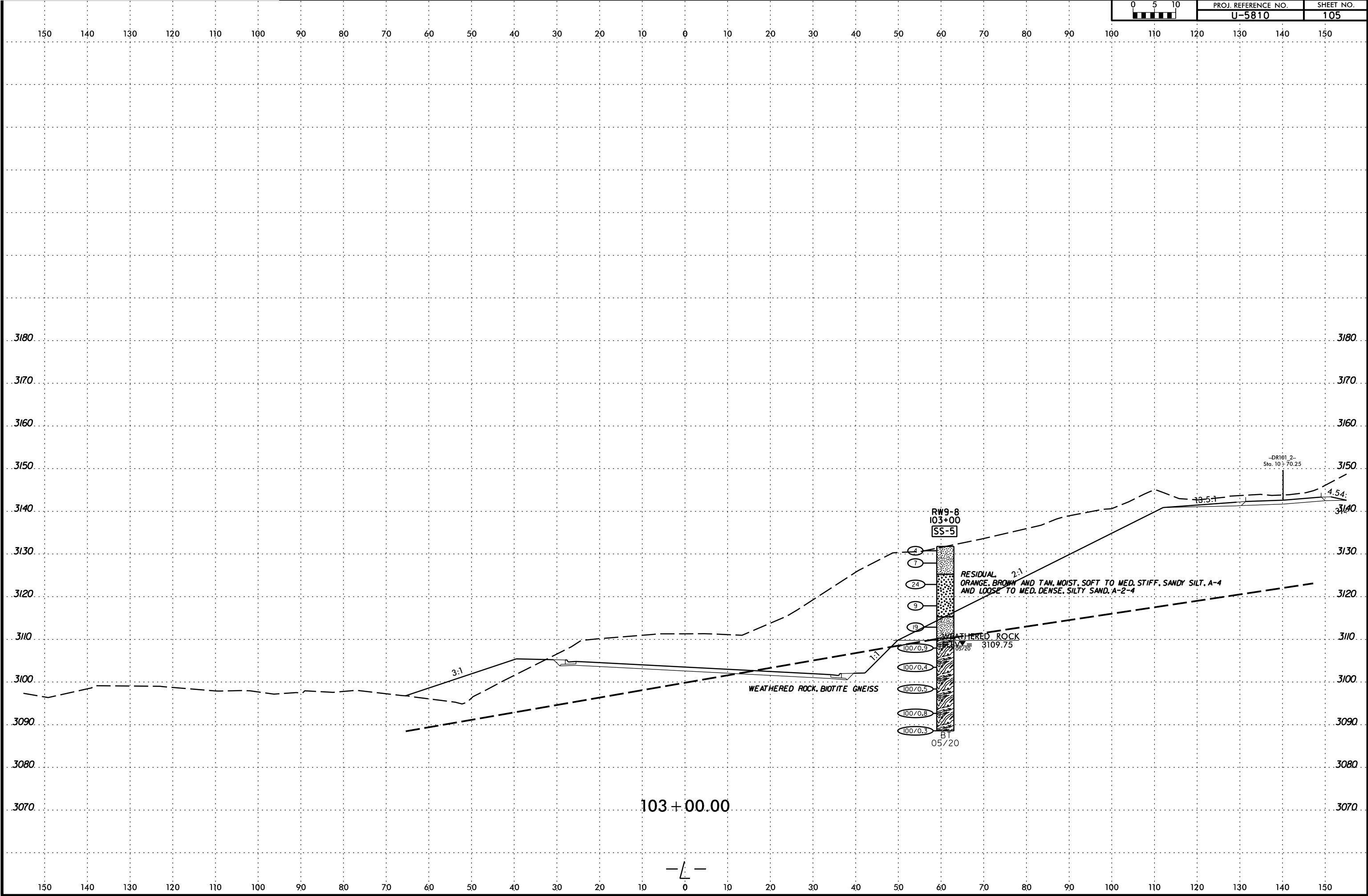




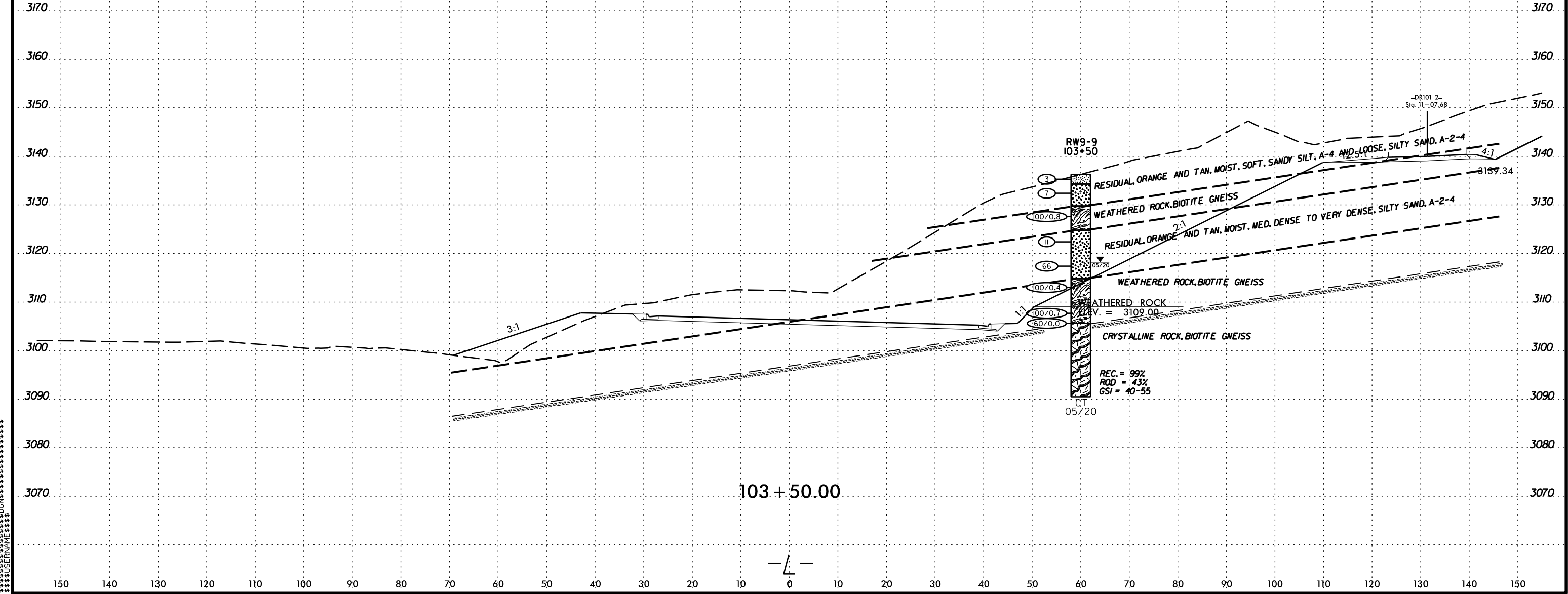
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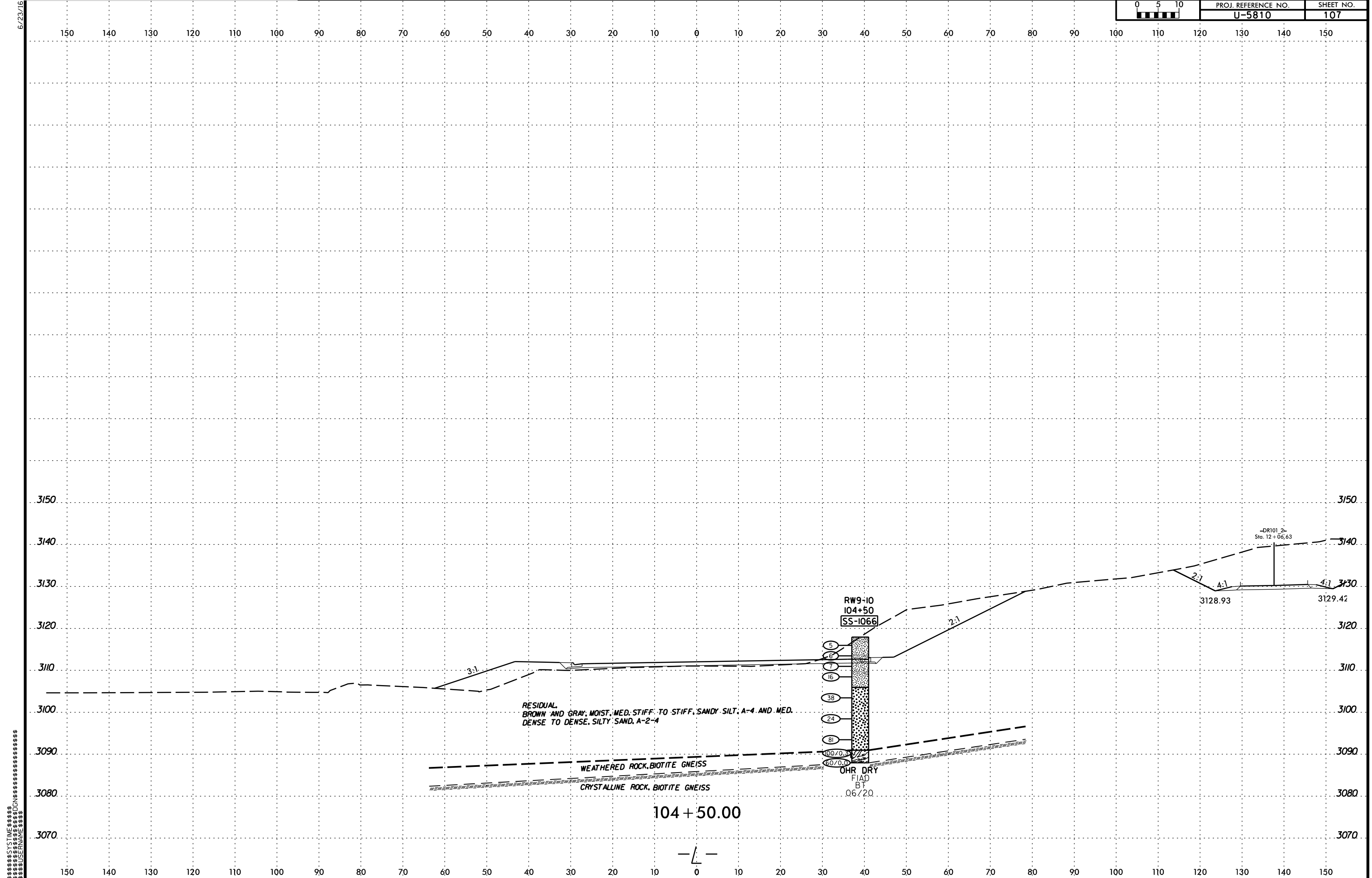


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U-5810	105



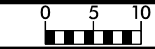
6/23/16



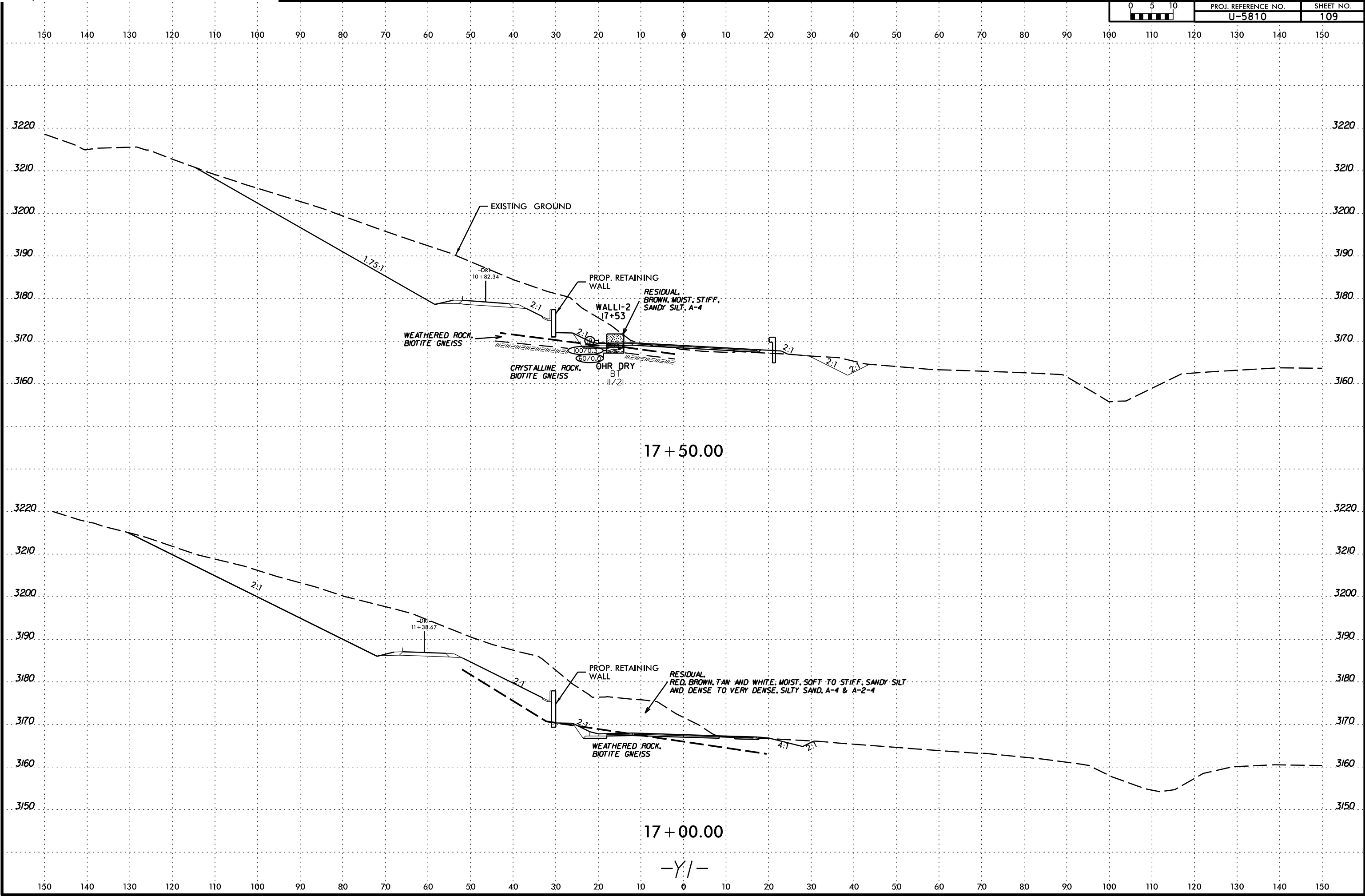




6/23/16



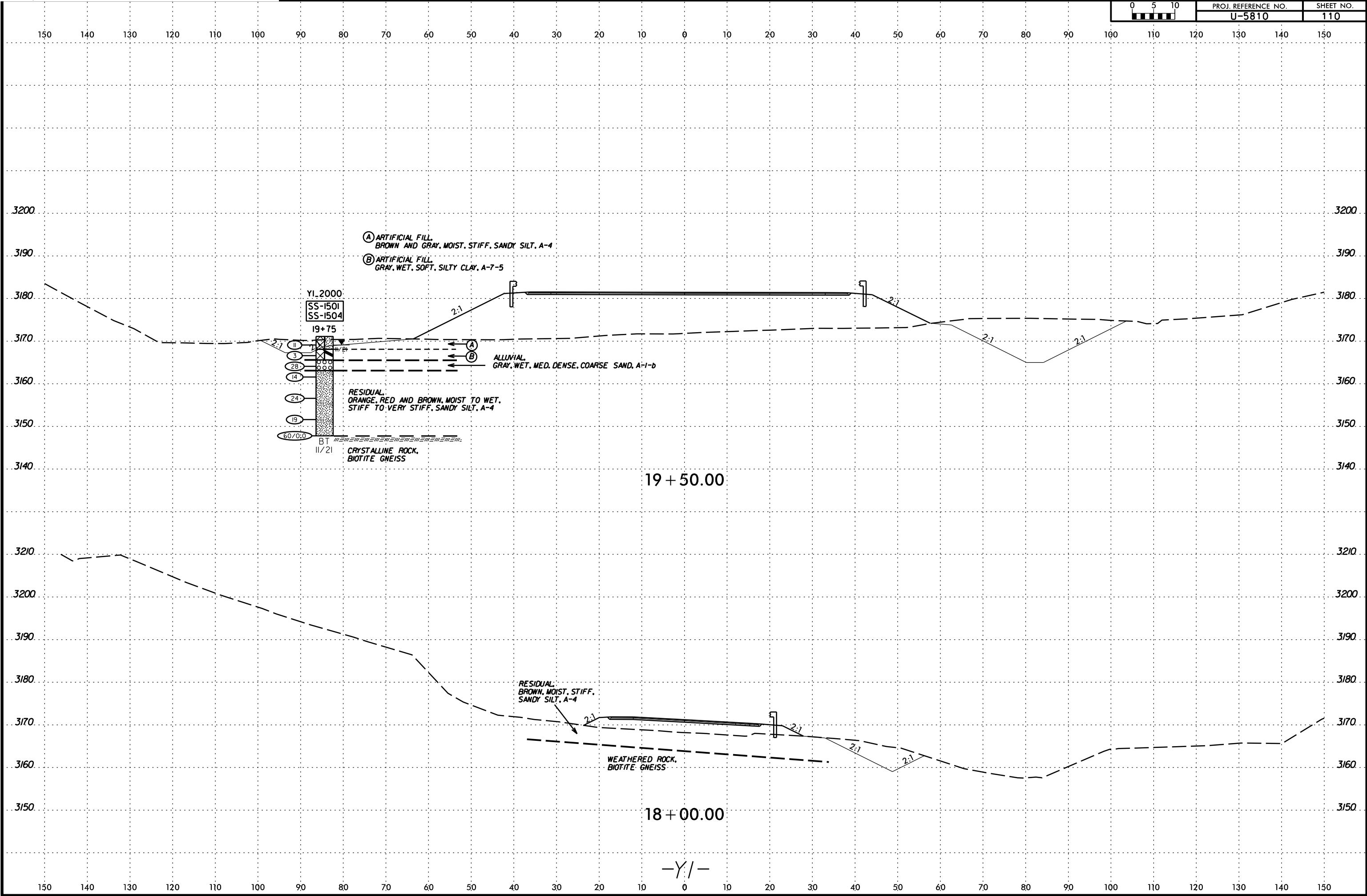
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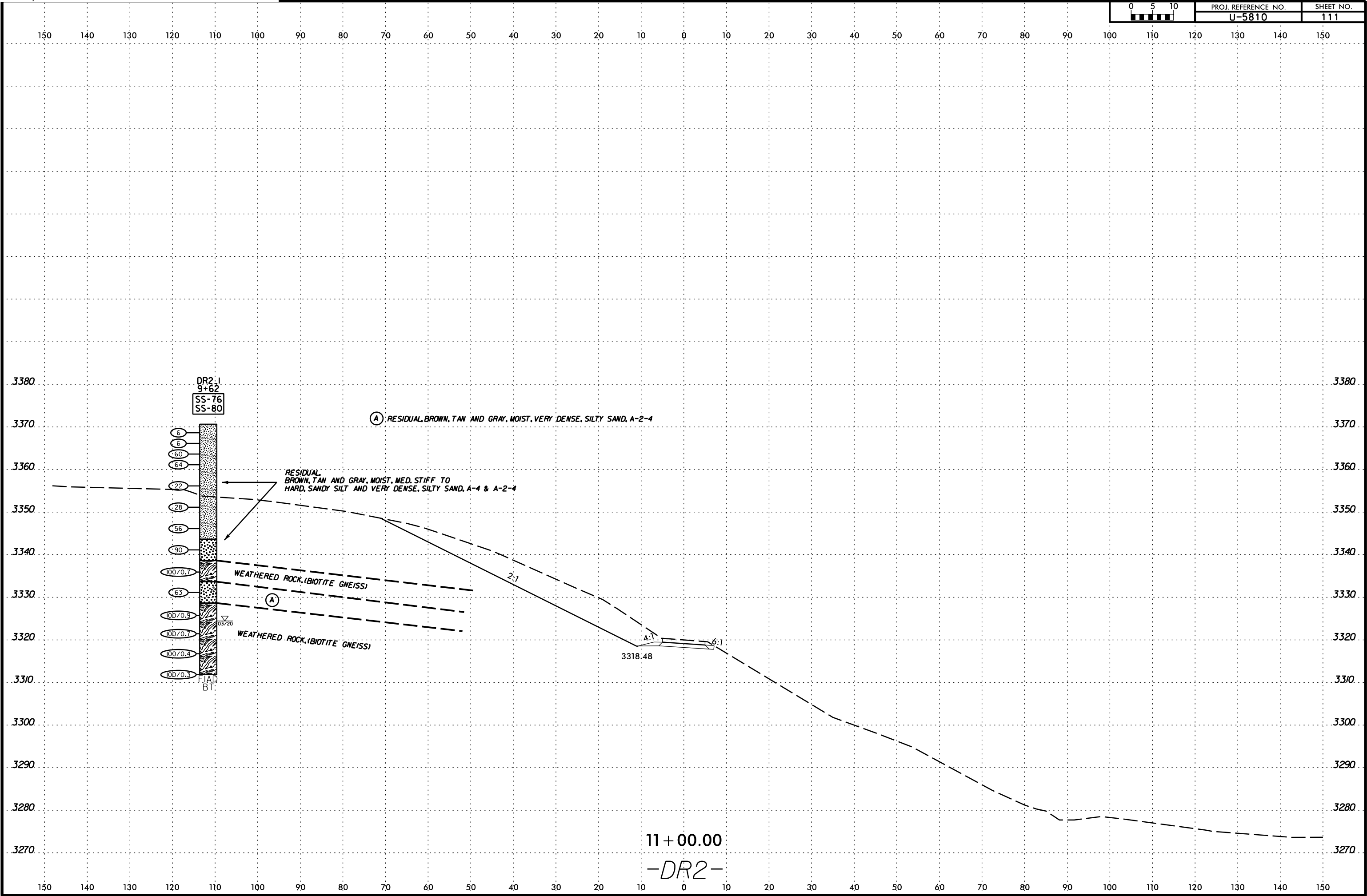
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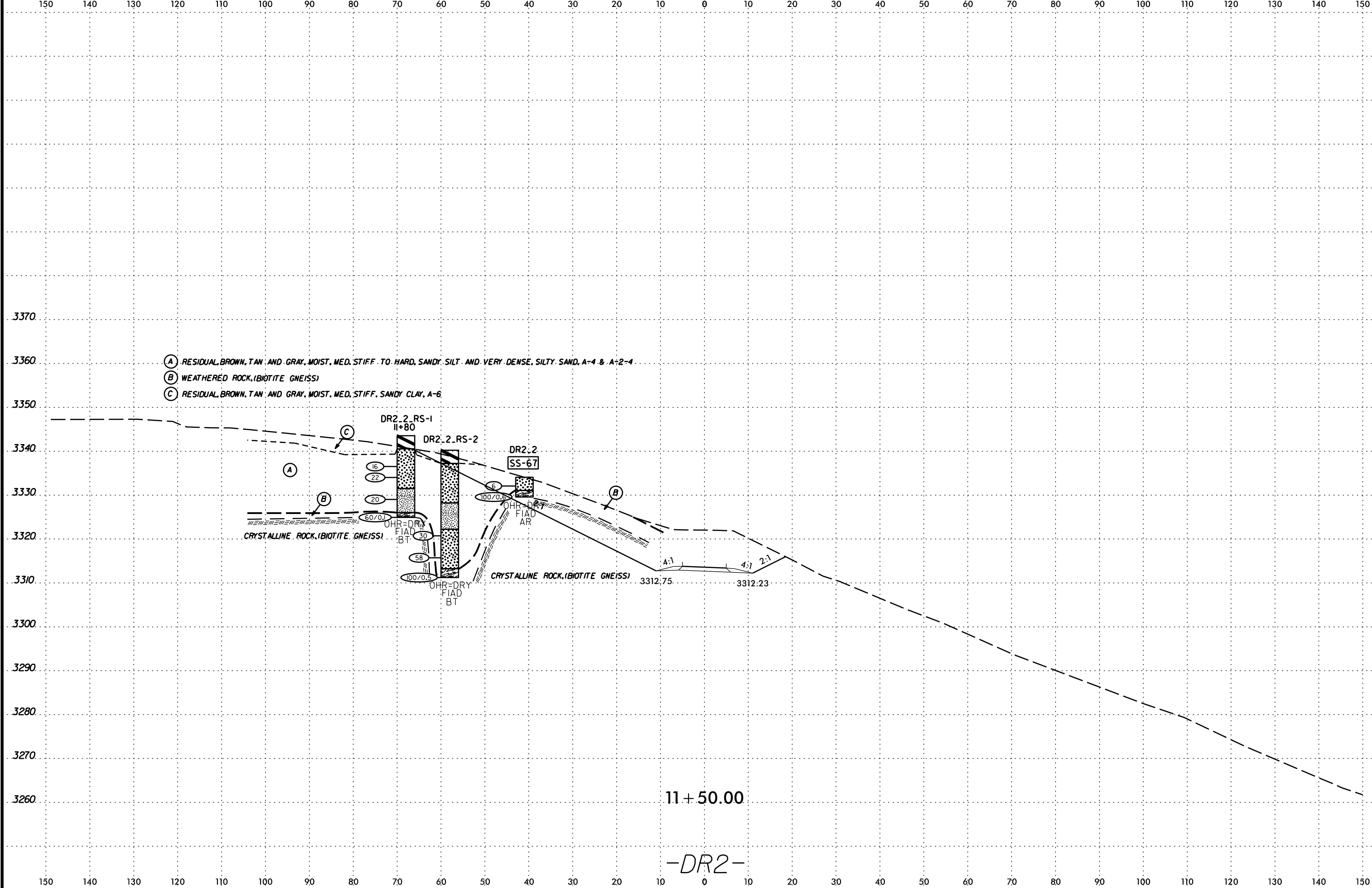


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U-5810	110



6/23/16

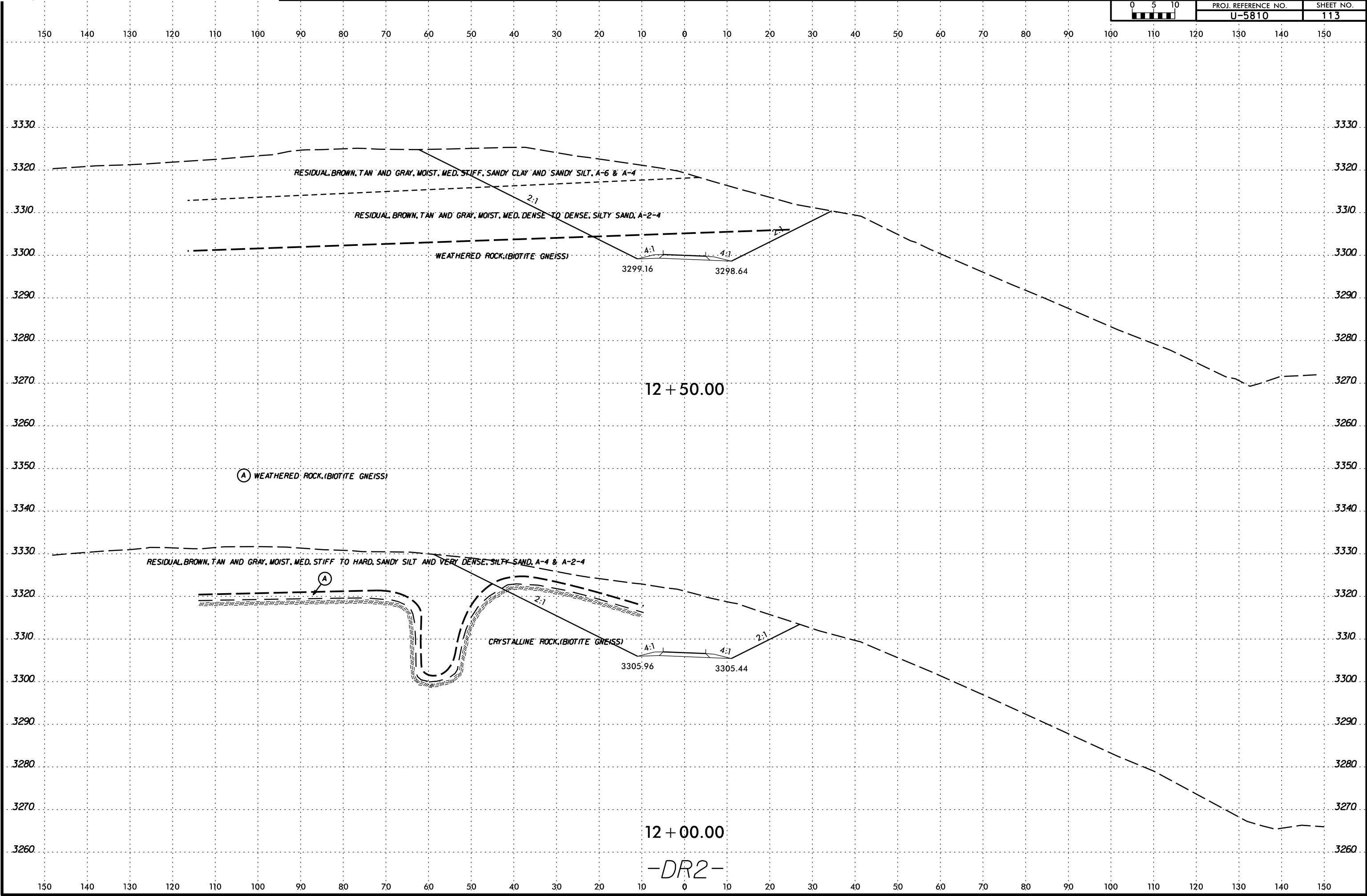




6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5810	113

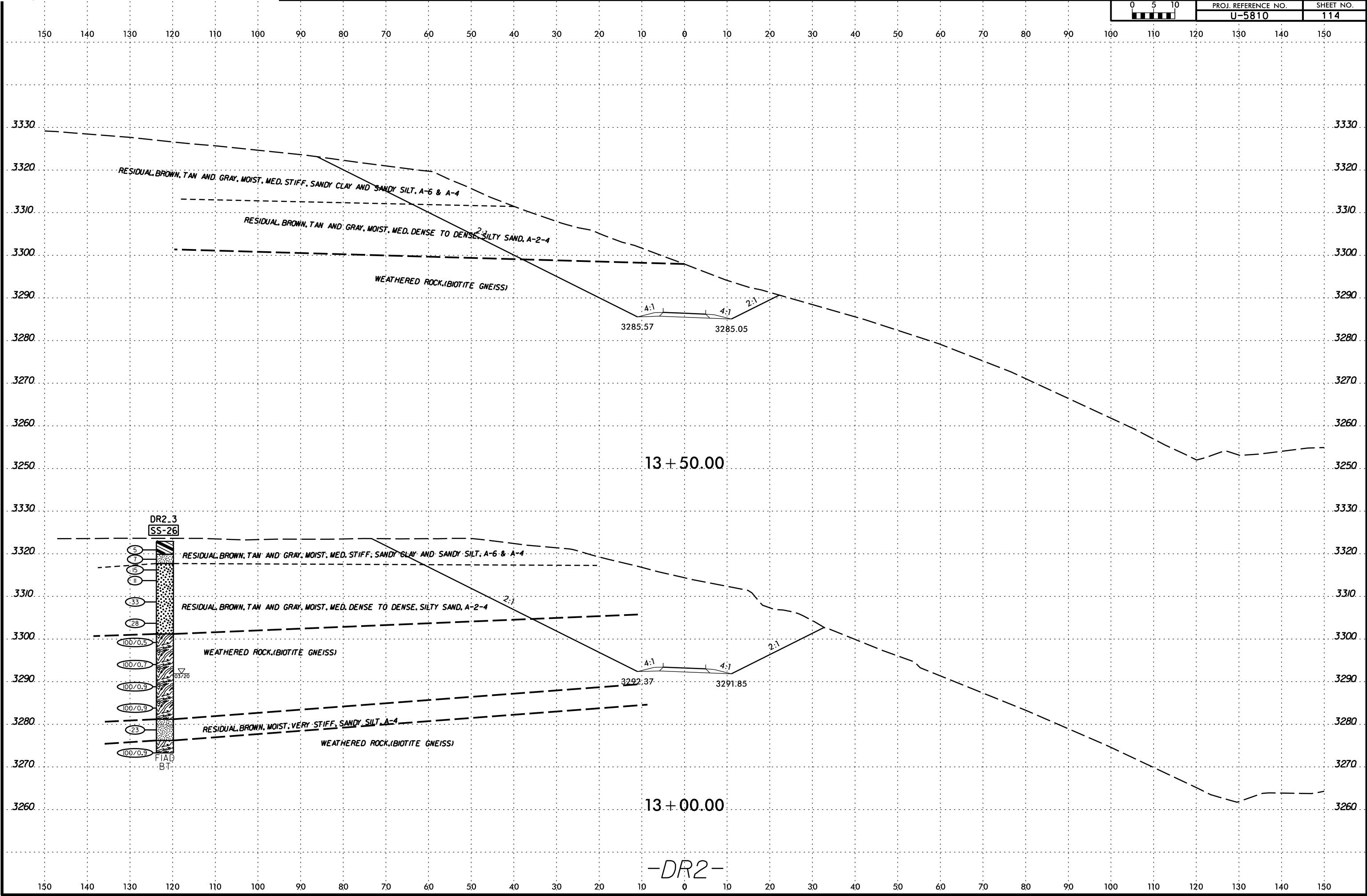


-DR2-

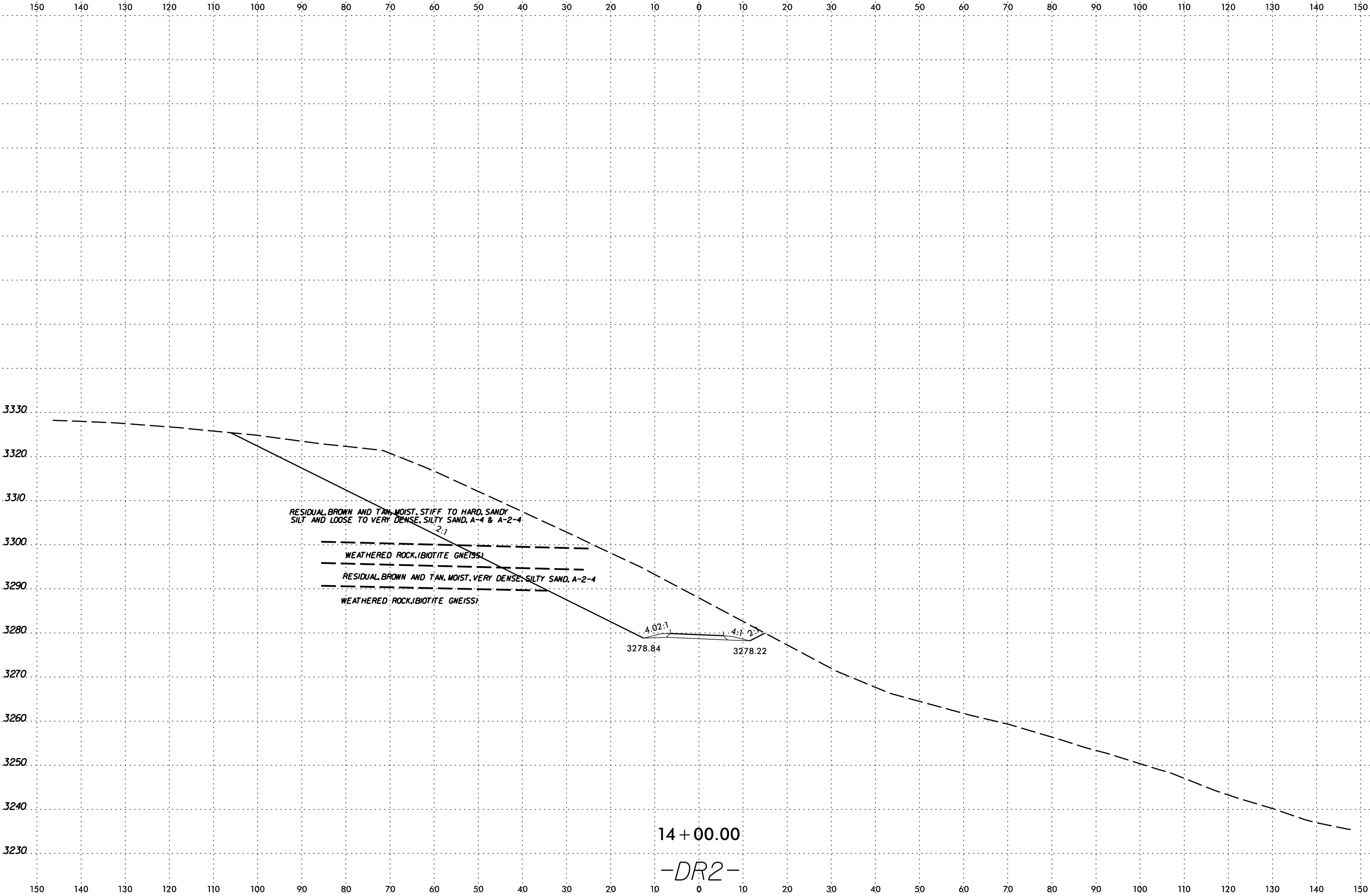
6/23/16



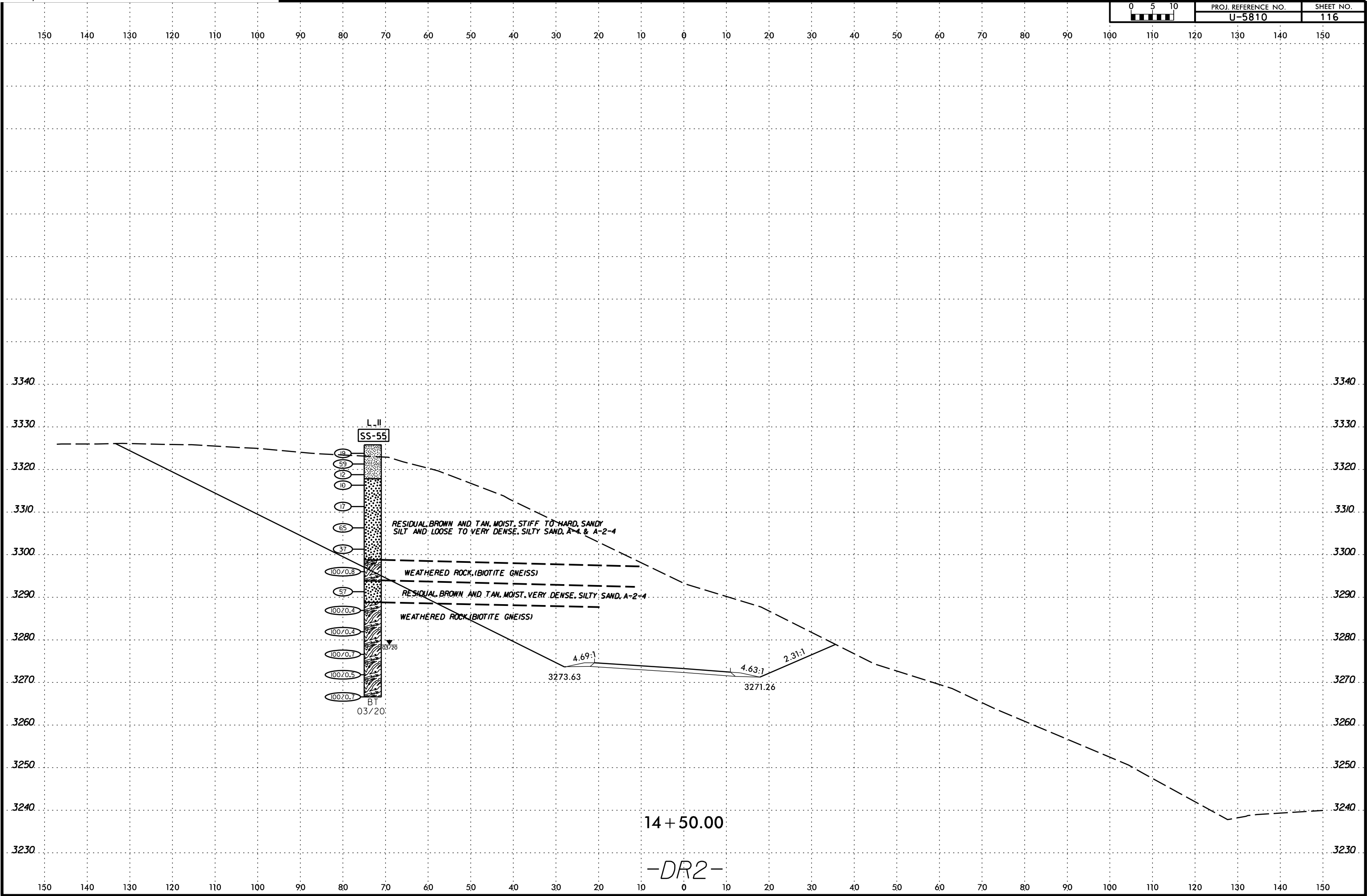
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U-5810	114

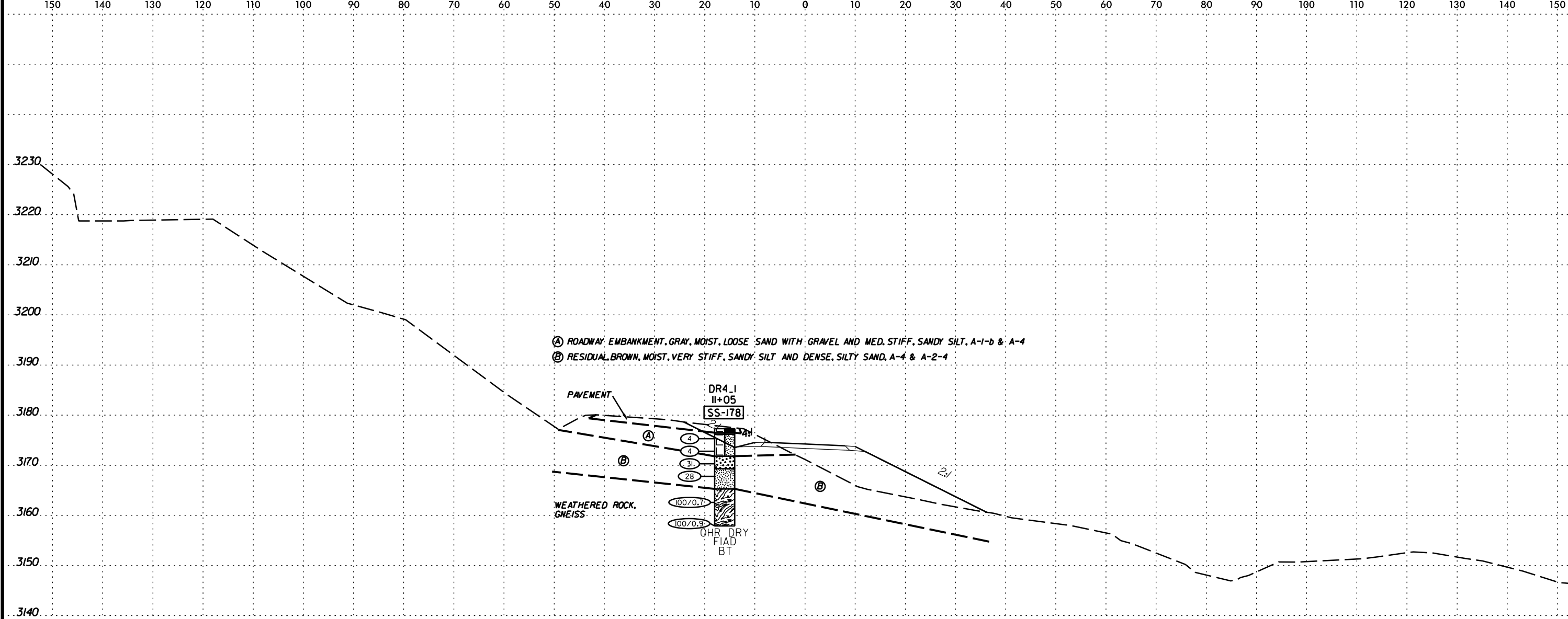


6/23/16



6/23/16

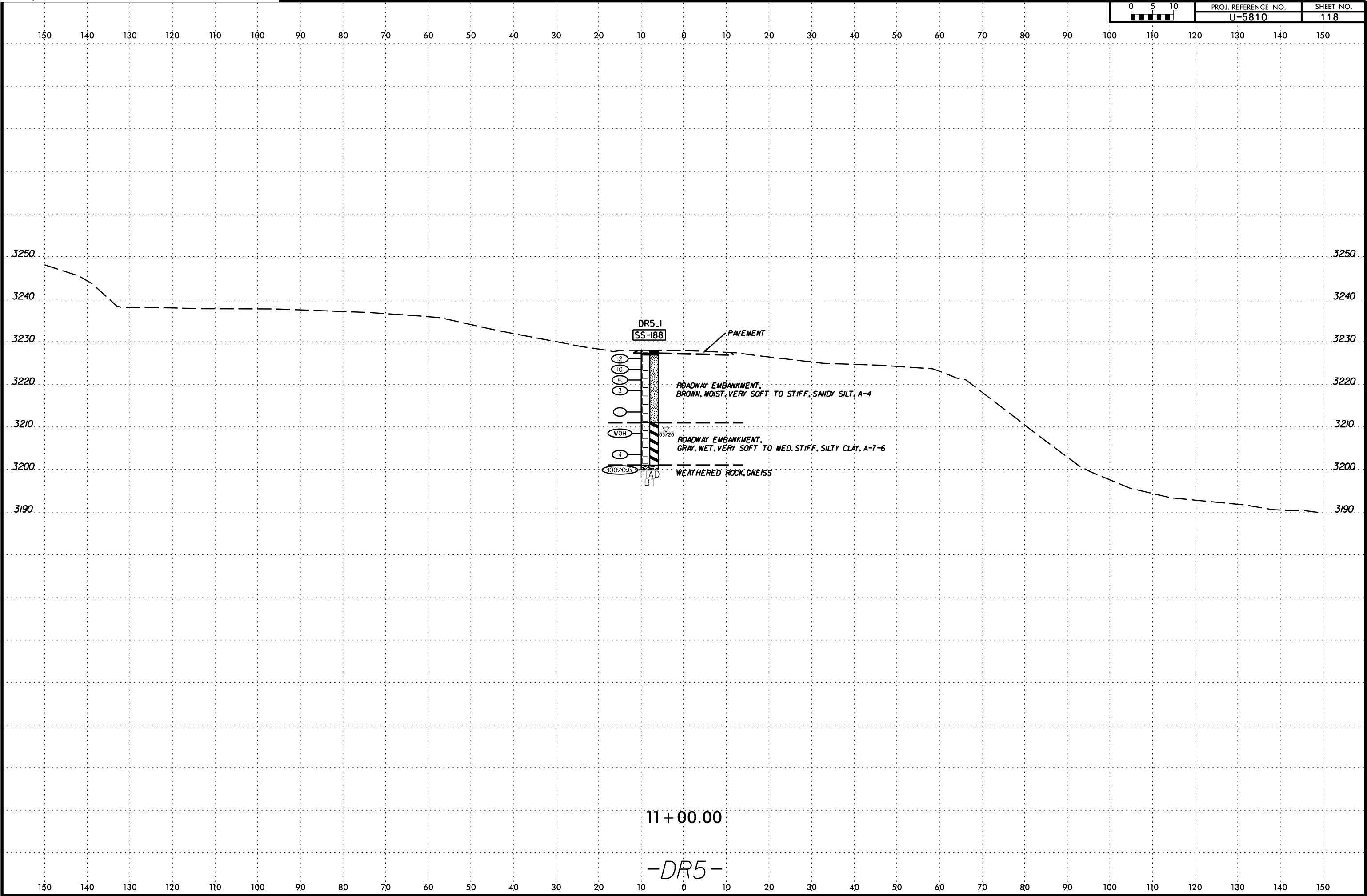




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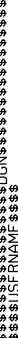
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6/23/16

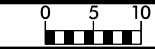


11+00.00

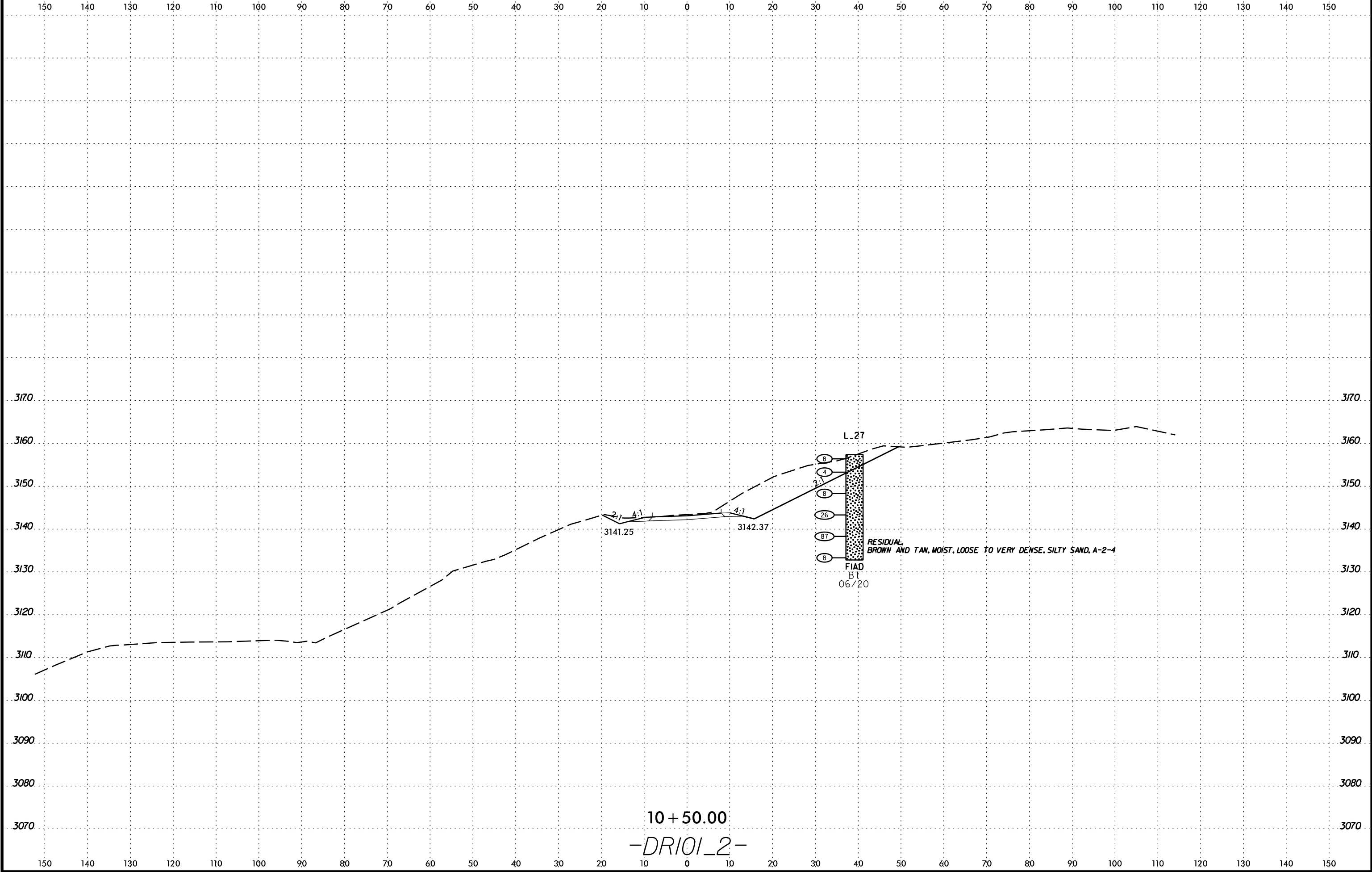
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6/23/16

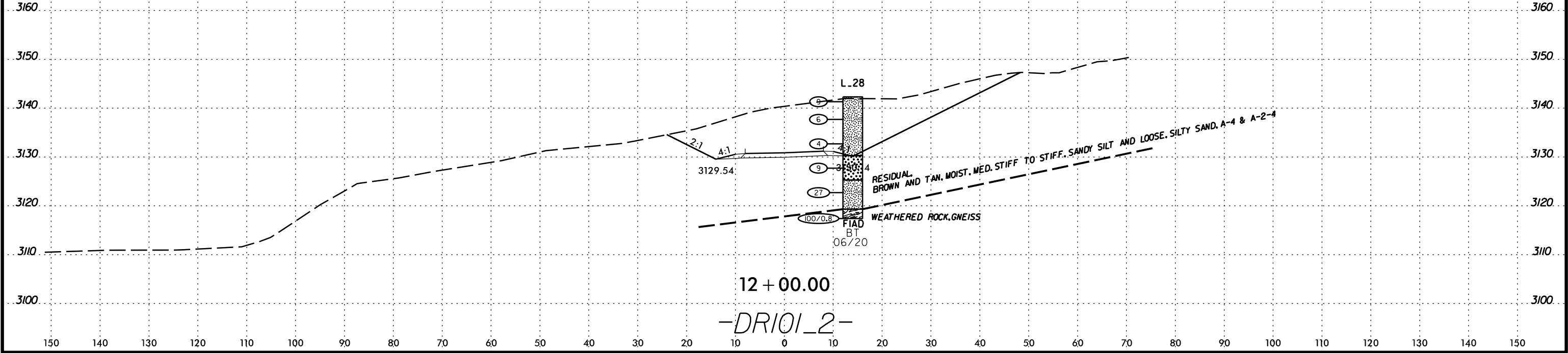


PROJ. REFERENCE NO.	SHEET NO.
U-5810	120

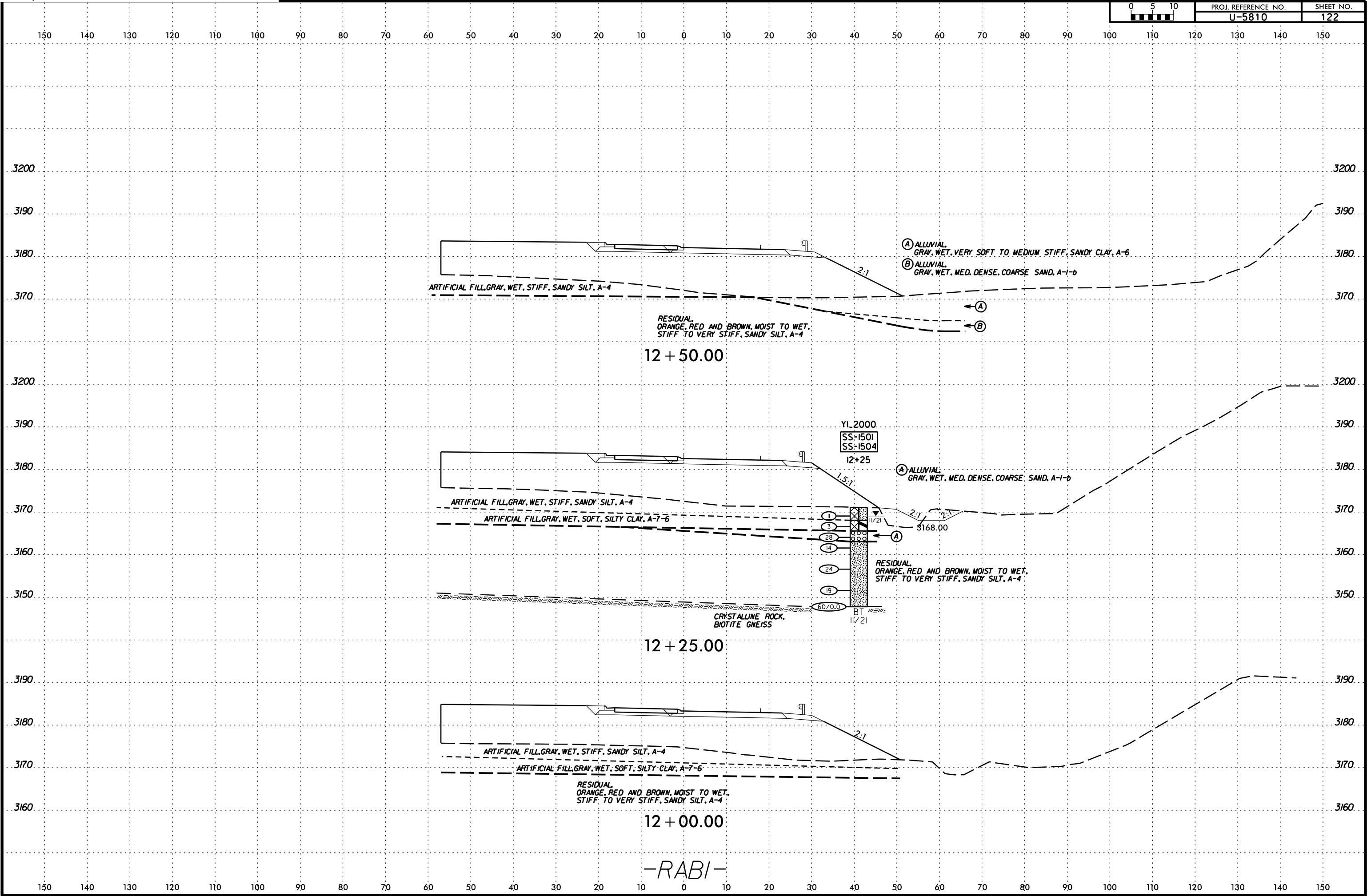


6/23/16

SYSTEMATICALLY CONDUCTED SURVEY



6/23/16



SYSTEMATICALLY CONDUCTED SURVEYING

-RABI-

SUMMARY OF LABORATORY TEST DATA
Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616																				
S&ME Project #:		6235-18-038														Date Report:		1/15/2025		
State Project No.:		35993.1.1				County:		Watauga				Date Tested:		4/5/2020 -1/14/2025						
Federal ID No.:		N/A				TIP No.:		U-5810												
Project Name:		Wilson Ridge Rd (SR 1523) & Bamboo Rd (SR 1514) Widening																		
Client Name:		Rummel, Klepper & Kahl, LLP									Client Address: Raleigh, NC									
Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing					Total Mortar Fraction (%)				LL	PL	PI	Organic Content %	Moist %
							Sieve #					Coarse Sand	Fine Sand	Silt	Clay					
							10	40	60	200	270									
SS-1	59+00	3 RT	-L-	1.0-2.5	A-6	(5)	88	79	74	56	49	16	28	26	30	36	24	12	-	28.5
SS-2	59+00	3 RT	-L-	3.5-5.0	A-6	(6)	93	86	82	63	56	12	28	28	32	39	27	12	-	35.1
SS-2	52+00	35 LT	-L-	3.3-4.8	A-4	(0)	91	75	69	47	38	24	35	32	9	NP	NP	NP	-	11.5
SS-4	52+00	59 RT	-L-	13.7-15.2	A-4	(0)	99	95	88	55	45	12	43	29	16	NP	NP	NP	-	33.4
SS-8	13+50	25 RT	-Y3-	8.5-10.0	A-4	(1)	90	79	74	56	49	18	28	35	19	31	26	5	-	25.2
SS-12	11+50	CL	-Y3-	3.5-5.0	A-4	(0)	93	77	69	46	37	25	35	28	12	30	26	4	-	23.2
SS-14	11+50	CL	-Y3-	8.5-10.0	A-2-5	(0)	75	57	50	34	30	33	28	28	12	43	36	7	-	31.5
SS-17	16+20	7 LT	-Y3-	3.5-5.0	A-4	(0)	97	86	81	46	36	17	46	32	5	NP	NP	NP	-	19.5
SS-21	33+00	8 RT	-L-	1.0-2.5	A-6	(3)	95	76	69	48	42	28	28	22	22	35	24	11	-	25.3
SS-24	33+00	8 RT	-L-	8.5-10	A-2-4	(0)	93	71	60	34	28	35	35	25	5	NP	NP	NP	-	17.9
SS-26	14+00	54 RT	-DR2-	1.0-2.5	A-6	(6)	90	77	72	58	54	20	20	25	34	39	26	13	-	22.4
SS-44	34+50	70 LT	-L-	23.5-25.0	A-4	(0)	98	79	72	46	36	27	36	34	3	36	33	3	-	22.5
SS-55	35+50	9 RT	-L-	6.0-7.5	A-4	(0)	94	75	67	39	30	28	40	27	5	NP	NP	NP	-	12.6
SS-67	12+00	3 LT	-DR2-	1.0-2.5	A-2-4	(0)	68	45	40	27	24	42	23	19	16	33	25	8	-	20.3
SS-76	10+25	120 LT	-DR2-	1.0-2.5	A-6	(0)	94	77	70	47	38	25	34	34	7	33	31	2	-	22.9
SS-80	10+25	120 LT	-DR2-	13.5-15.0	A-4	(0)	99	79	70	39	30	30	40	24	6	NP	NP	NP	-	19.5
SS-92	19+00	CL	-Y1-	6.0-7.5	A-1-b	(0)	65	48	41	24	20	36	33	21	10	22	21	1	-	20.0
SS-97	10+50	5 RT	-L-	6.0-7.5	A-4	(4)	78	70	67	55	51	14	21	39	25	40	30	10	-	31.3
SS-99	22+90	69 LT	-Y1-	1.0-2.5	A-4	(2)	92	74	69	51	46	25	25	32	18	34	26	8	-	22.5
SS-105	16+25	81 LT	-Y1-	1.0-2.5	A-4	(3)	85	71	67	54	50	22	20	29	29	40	32	8	-	20.7
SS-130	70+70	8 RT	-L-	3.5-5.0	A-4	(0)	96	89	87	59	47	10	41	47	2	36	35	1	-	19.7
SS-136	72+50	7 LT	-L-	6.0-7.5	A-4	(1)	85	74	69	47	40	19	34	22	25	33	25	8	-	23.4
SS-147	78+75	CL	-L-	3.5-5.0	A-4	(3)	96	85	80	58	51	17	30	29	24	34	25	9	-	20.5
SS-151	88+50	6 RT	-L-	3.5-5.0	A-1-b	(0)	64	47	41	24	19	35	36	23	6	NP	NP	NP	-	15.2
SS-159	86+00	19 LT	-L-	3.5-5.0	A-4	(0)	78	69	65	46	38	17	34	31	18	28	23	5	-	17.9
SS-163	11+10	CL	-Y8A-	1.0-2.5	A-7-5	(11)	97	91	87	67	59	11	28	36	25	65	53	12	-	61.6
SS-168	19+65	8 RT	-Y7-	1.0-2.5	A-4	(0)	79	66	61	40	33	23	35	28	14	28	24	4	-	22.1
SS-175	49+25	38 RT	-L-	6.0-7.5	A-7-5	(12)	99	90	86	71	65	13	22	29	36	48	32	16	-	35.6
SS-178	10+78	61 RT	-DR4-	3.5-5.0	A-4	(0)	99	86	79	53	39	20	41	36	3	NP	NP	NP	-	14.5
SS-184	11+25	5 LT	-Y4-	3.5-5.0	A-4	(2)	93	83	78	56	46	16	34	34	16	33	27	6	-	23.2
SS-188	11+00	8 LT	-DR5-	3.5-5.0	A-4	(0)	94	81	75	49	38	20	40	36	4	NP	NP	NP	-	17.2
SS-195	25+00	2 RT	-L-	1.0-2.5	A-4	(0)	87	76	71	50	41	19	35	37	10	28	26	2	-	18.6
SS-210	14+00	54 RT	-L-	1.0-2.5	A-4	(0)	91	77	72	53	43	21	32	35	12	33	32	1	-	27.7
SS-216	23+00	67 LT	-L-	3.5-5.0	A-4	(0)	82	69	62	42	37	24	32	31	13	37	33	4	-	39.3
SS-221	29+50	37 RT	-L-	3.5-5.0	A-4	(0)	95	86	81	49	39	14	45	37	4	NP	NP	NP	-	25.8

SUMMARY OF LABORATORY TEST DATA
Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616																				
S&ME Project #:		6235-18-038														Date Report:		1/15/2025		
State Project No.:		35993.1.1				County:		Watauga				Date Tested:		4/5/2020 -1/14/2025						
Federal ID No.:		N/A				TIP No.:		U-5810												
Project Name:		Wilson Ridge Rd (SR 1523) & Bamboo Rd (SR 1514) Widening																		
Client Name:		Rummel, Klepper & Kahl, LLP										Client Address: Raleigh, NC								
Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing					Total Mortar Fraction (%)				LL	PL	PI	Organic Content %	Moist. %
							Sieve #					Coarse Sand	Fine Sand	Silt	Clay					
							10	40	60	200	270									
SS-227	37+50	CL	-L-	6.0-7.5	A-4	(1)	94	79	74	58	50	21	25	31	22	32	27	5	-	23.6
SS-230	37+50	CL	-L-	18.5-20.0	A-4	(2)	96	81	75	55	48	22	28	25	25	30	23	7	-	30.2
SS-234	13+00	8 LT	-DR3-	3.5-5.0	A-4	(0)	80	64	59	43	38	26	26	27	20	36	30	6	-	28.7
SS-1002	39+20	18 LT	-L-	3.5-5.0	A-4	(2)	90	76	69	52	47	23	25	27	25	32	23	9	-	13.3
SS-1005	39+20	18 LT	-L-	13.5-15.0	A-4	(0)	93	85	79	37	29	15	54	28	4	NP	NP	NP	-	9.4
SS-1008	42+17	13 LT	-L-	1.0-2.5	A-4	(3)	99	93	89	69	57	11	32	40	18	35	31	4	-	27.1
SS-1018	46+20	21 LT	-L-	1.0-2.5	A-4	(0)	93	83	79	55	45	15	36	35	14	32	29	3	-	24.1
SS-1035	11+75	14 LT	-Y8-	1.0-2.5	A-4	(0)	92	79	73	49	39	21	37	33	10	31	30	1	-	20.7
SS-1038	54+85	65 LT	-L-	3.5-5.0	A-4	(0)	71	60	56	38	31	22	34	30	14	36	28	8	-	27.8
SS-1051	83+00	75 LT	-L-	13.5-15.0	A-4	(3)	91	84	80	58	49	12	34	30	24	33	25	8	-	27.5
SS-1055	102+50	44 RT	-L-	6.0-7.5	A-1-b	(0)	60	37	31	21	18	49	21	22	8	40	35	5	-	23.2
SS-1066	104+50	39 RT	-L-	6.0-7.5	A-4	(0)	98	90	84	52	41	15	43	38	4	NP	NP	NP	-	29.2
SS-1501	19+75	84 LT	-L-	3.5-5.0	A-4	(2)	82	75	70	55	50	15	25	32	28	34	28	6	-	27.3
SS-1504	19+75	84 LT	-L-	13.5-15.0	A-4	(3)	99	98	95	76	69	4	26	59	11	35	32	3	-	18.0
Ret. Wall Investigation Samples																				
SS-1	70+50	40' RT	-L-	0.0-1.5	A-7-5	(7)	98	88	84	65	58	15	26	30	29	44	32	12	-	27.9
SS-2	17+20	35' RT	-L-	3.1-5.6	A-4	(0)	100	90	85	65	55	15	29	47	9	NP	NP	NP	-	48.1
SS-2	10+67	10' RT	-DR9-	2.9-4.4	A-7-6	(8)	96	87	83	68	61	13	23	30	34	41	28	13	-	28.4
SS-2	68+00	6' RT	-L-	3.1-4.6	A-4	(0)	100	96	93	58	42	7	51	38	4	NP	NP	NP	-	-
SS-2	68+50	14' LT	-L-	8.7-10.2	A-4	(0)	91	75	68	39	29	26	29	42	3	NP	NP	NP	-	9.1
SS-2	69+50	14' LT	-L-	3.5-5.0	A-4	(20	90	78	72	50	41	2	35	29	16	34	26	8	-	21.5
SS-2	70+50	14' LT	-L-	3.2-4.7	A-4	(0)	92	75	69	40	29	25	44	27	4	NP	NP	NP	-	12.0
SS-2	77+50	7' RT	-L-	3.3-4.8	A-4	(0)	97	80	73	44	33	25	42	24	9	NP	NP	NP	-	17.9
SS-2	81+00	80' RT	-L-	2.9-4.4	A-4	(0)	100	86	78	41	30	22	48	26	4	NP	NP	NP	-	12.4
SS-2	84+00	12' LT	-L-	3.3-4.8	A-4	(0)	88	74	68	48	39	22	33	33	12	31	26	5	-	25.9
SS-2	85+00	19' LT	-L-	3.7-5.2	A-4	(0)	100	83	75	46	35	25	40	30	5	NP	NP	NP	-	12.3
SS-2	86+50	17' LT	-L-	3.1-4.6	A-6	(7)	98	90	87	71	64	11	24	33	32	36	25	11	-	29.4
SS-2	84+70	45' RT	-L-	2.9-4.4	A-4	(0)	99	83	76	38	29	24	47	27	2	NP	NP	NP	-	6.6
SS-2	86+50	CL	-L-	3.8-5.3	A-4	(0)	82	70	65	44	35	21	37	29	13	NP	NP	NP	-	20.2
SS-2	100+50	50' RT	-L-	4.1-5.6	A-7-5	(6)	75	61	58	51	48	22	14	26	38	52	37	15	-	64.5
SS-2	101+00	50' RT	-L-	3.9-5.4	A-7-5	(2)	72	58	53	41	38	26	22	19	33	47	34	13	-	27.9
SS-2	101+50	50' RT	-L-	3.1-4.6	A-7-5	(7)	91	74	66	52	48	28	19	30	23	65	50	15	-	37.1
SS-3	68+50	14' LT	-L-	8.7-10.2	A-4	(0)	91	75	68	39	29	26	42	29	3	NP	NP	NP	-	9.1
SS-3	50+50	30' LT	-L-	7.6-9.1	A-4	(0)	100	98	91	44	31	9	60	27	4	NP	NP	NP	-	28.3
SS-3	70+50	40' RT	-L-	8.7-10.2	A-4	(0)	100	88	80	48	35	20	45	30	5	NP	NP	NP	-	20.2

SUMMARY OF LABORATORY TEST DATA
Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-18-038	Date Report:	1/15/2025
State Project No.:	35993.1.1	County:	Watauga
Federal ID No.:	N/A	TIP No.:	U-5810
Project Name:	Wilson Ridge Rd (SR 1523) & Bamboo Rd (SR 1514) Widening		
Client Name:	Rummel, Klepper & Kahl, LLP	Client Address:	Raleigh, NC

Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing					Total Mortar Fraction (%)				LL	PL	PI	Organic Content %	Moist. %
							Sieve #					Coarse Sand	Fine Sand	Silt	Clay					
							10	40	60	200	270									
SS-3	70+50	14' LT	-L-	3.2-4.7	A-4	(0)	92	75	69	40	29	25	44	27	4	NP	NP	NP	-	12.0
SS-3	73+50	12' LT	-L-	8.3-9.8	A-4	(1)	83	76	70	45	36	15	41	26	18	37	31	6	-	35.5
SS-3	76+50	10' RT	-L-	9.0-10.5	A-4	(0)	100	79	72	39	25	28	47	25	0	NP	NP	NP	-	5.3
SS-3	81+00	80' RT	-L-	7.9-9.4	A-4	(0)	100	92	85	53	41	15	44	37	4	NP	NP	NP	-	14.3
SS-3	84+70	45' RT	-L-	7.9-9.4	A-4	(1)	98	88	84	49	37	15	48	33	4	32	27	5	-	8.2
SS-3	101+00	50' RT	-L-	8.9-10.4	A-5	(4)	100	75	66	51	46	34	20	30	17	55	47	8	-	48.9
SS-3	102+00	45' RT	-L-	8.5-10.0	A-5	(1)	100	78	66	46	40	34	27	31	8	49	44	5	-	42.8
SS-5	103+00	61' RT	-L-	17.9-19.4	A-4	(0)	83	61	55	43	38	34	20	38	8	NP	NP	NP	-	22.3
S-2	41+40	CL	-L-	1.5-2.5	A-5	(3)	91	85	82	63	56	10	41	29	20	41	37	4	-	63.0
S-5	41+60	70 RT	-L-	2.0-2.5	A-5	(1)	95	80	76	53	44	21	33	37	10	48	46	2	-	54.9
S-6	41+60	70 RT	-L-	4.0-4.5	A-2-4	(0)	79	59	52	30	25	35	33	21	11	NP	NP	NP	-	28.5
ST-1	13+50	25 RT	-Y3-	12.0-14.0	A-6	(9)	-	-	-	-	-	-	-	-	-	37	25	12	-	41.8
ST-101	83+00	75 LT	-L-	4.0-6.0	A-5	(6)	-	-	-	-	-	-	-	-	-	43	35	8	-	31.8
S-1 (Bulk)	27+50	6 RT	-L-	1.0-2.0	A-4	(2)	79	69	66	55	49	17	21	52	10	31	24	7	-	14.1
Bridge and Ret. Wall 10 & 11 Investigation																				
SS-5	85+38	CL	-L-	13.5-15.0	A-4	(0)	95	90	86	66	59	10	29	33	28	40	34	6	-	38.0
SS-13	83+51	15' LT	-L-	18.5-20.0	A-6	(8)	100	96	93	72	63	7	30	33	30	40	29	11	-	33.0
SS-20	83+57	18' RT	-L-	8.5-10.0	A-4	(0)	85	72	65	42	35	23	36	25	16	38	34	4	-	26.2
SS-23	83+57	18' RT	-L-	23.5-25.0	A-5	(2)	90	83	78	62	55	14	25	39	22	49	48	1	-	54.1
SS-40	83+00	30' LT	-L-	16.0-17.5	A-7-5	(10)	100	97	93	71	62	7	31	36	26	48	36	12	-	43.2
SS-47	86+80	CL	-L-	6.0-7.5	A-2-4	(0)	62	50	47	33	27	24	33	31	12	27	25	2	-	13.5

ND=Not Detemined. NP=Non-Plastic.

AASHTO T89: Determining the Liquid Limit of Soils
AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils
AASHTO T265: Laboratory Determination of Moisture Content of Soils
AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Mal Krajan, ET

Technician Name:

Signature

104-01-0703

Certification #

Joey Daily, PE

Technical Responsibility:

Project Manager

Position

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Form No. TR-D1883-T193-3

Revision No. 2

Revision Date: 08/11/17

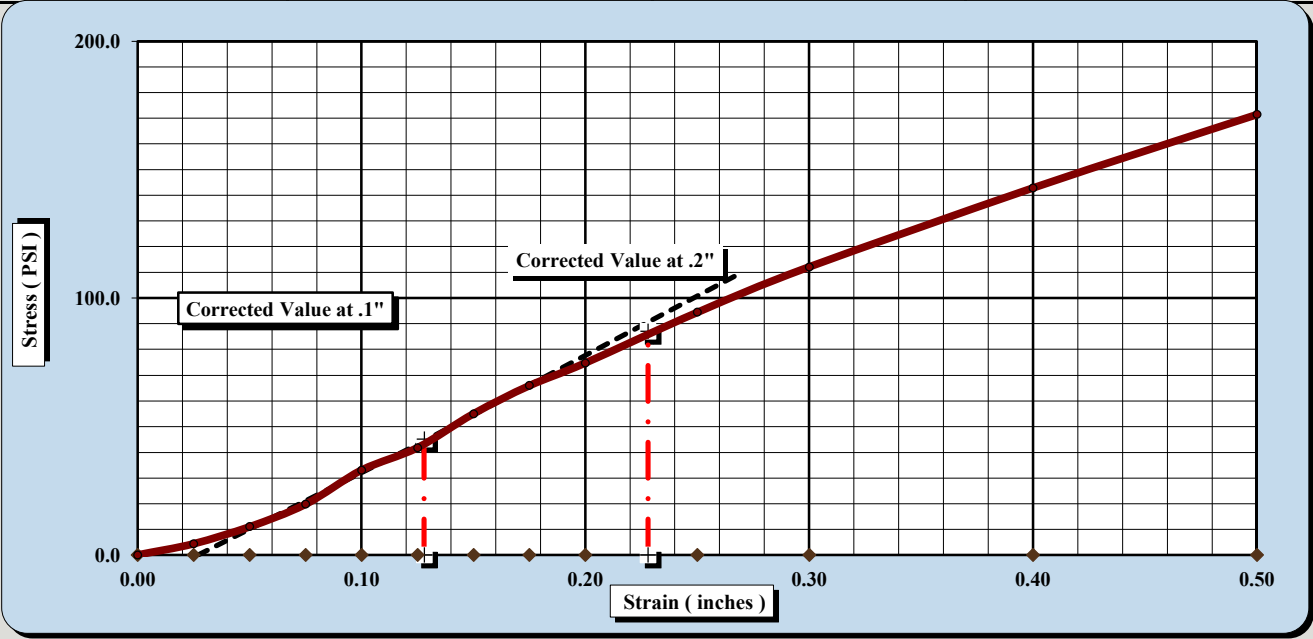
CBR (CALIFORNIA BEARING RATIO)
OF LABORATORY COMPACTED SOIL



AASHTO T 193

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
Project #:	6235-18-038 Phase 04	Report Date:	8/5/20
Project Name:	U-5810	Test Date(s)	7/2/20-8/4/20
Client Name:	RK&K		
Client Address:			
Boring #:	Sample #: S-1 (A)	Sample Date: 6/10/20	
Location: 27+50 (-L-)	Offset: 6' RT	Elevation: 3261.1 Feet	
Sample Description: A-4 (2)			
AASHTO T99	Method A	Maximum Dry Density: 116.7 PCF	Optimum Moisture Content: 13.1%
		% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	3.3	CBR at 0.1 in.	4.5
CBR at 0.2 in.	5.0	CBR at 0.2 in.	5.8



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	113.5
Initial Dry Density (PCF)	116.7	Moisture Content (top 1" after soaking)	19.1%
Moisture Content of the Compacted Specimen	13.1%	Percent Swell	2.7%
Percent Compaction	100.0%		

Soak Time:	96 Hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	31	Plastic Index	7	Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

Joey Daily, P.E.

Technical Responsibility

Project Manager

Signature

Position

Date

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Form No. TR-D1883-T193-3

Revision No. 2

Revision Date: 08/11/17

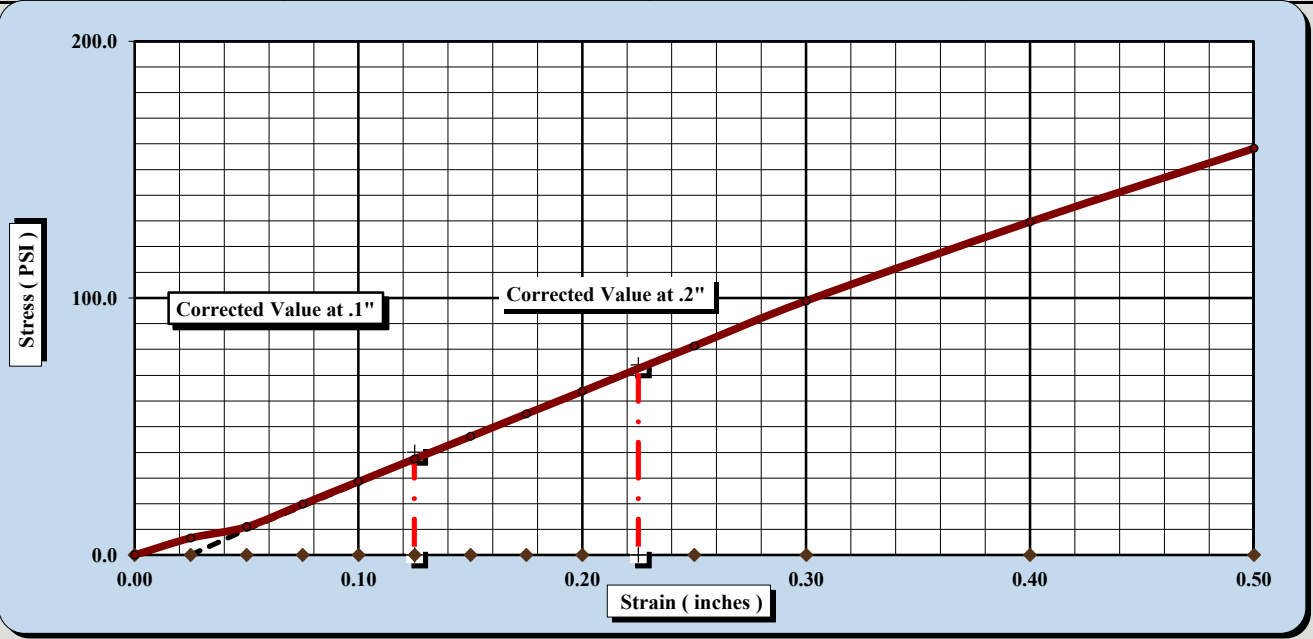
CBR (CALIFORNIA BEARING RATIO)
OF LABORATORY COMPACTED SOIL



AASHTO T 193

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
Project #:	6235-18-038 Phase 04	Report Date:	8/5/20
Project Name:	U-5810	Test Date(s)	7/2/20-8/4/20
Client Name:	RK&K		
Client Address:			
Boring #:	Sample #: S-1 (B)	Sample Date: 6/10/20	
Location: 27+50 (-L-)	Offset: 6' RT	Elevation: 3261.1 Feet	
Sample Description: A-4(2)			
AASHTO T99	Method A	Maximum Dry Density: 116.7 PCF	Optimum Moisture Content: 13.1%
		% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	2.9	CBR at 0.1 in.	4.0
CBR at 0.2 in.	4.2	CBR at 0.2 in.	4.9



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	113.5
Initial Dry Density (PCF)	116.6	Moisture Content (top 1" after soaking)	19.2%
Moisture Content of the Compacted Specimen	13.2%	Percent Swell	2.5%
Percent Compaction	100.0%		

Soak Time:	96 Hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	31	Plastic Index	7	Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

Joey Daily, P.E.

Technical Responsibility

Project Manager

Signature

Position

Date

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Form No. TR-D698-2

Revision No. : 1

Revision Date: 07/25/17

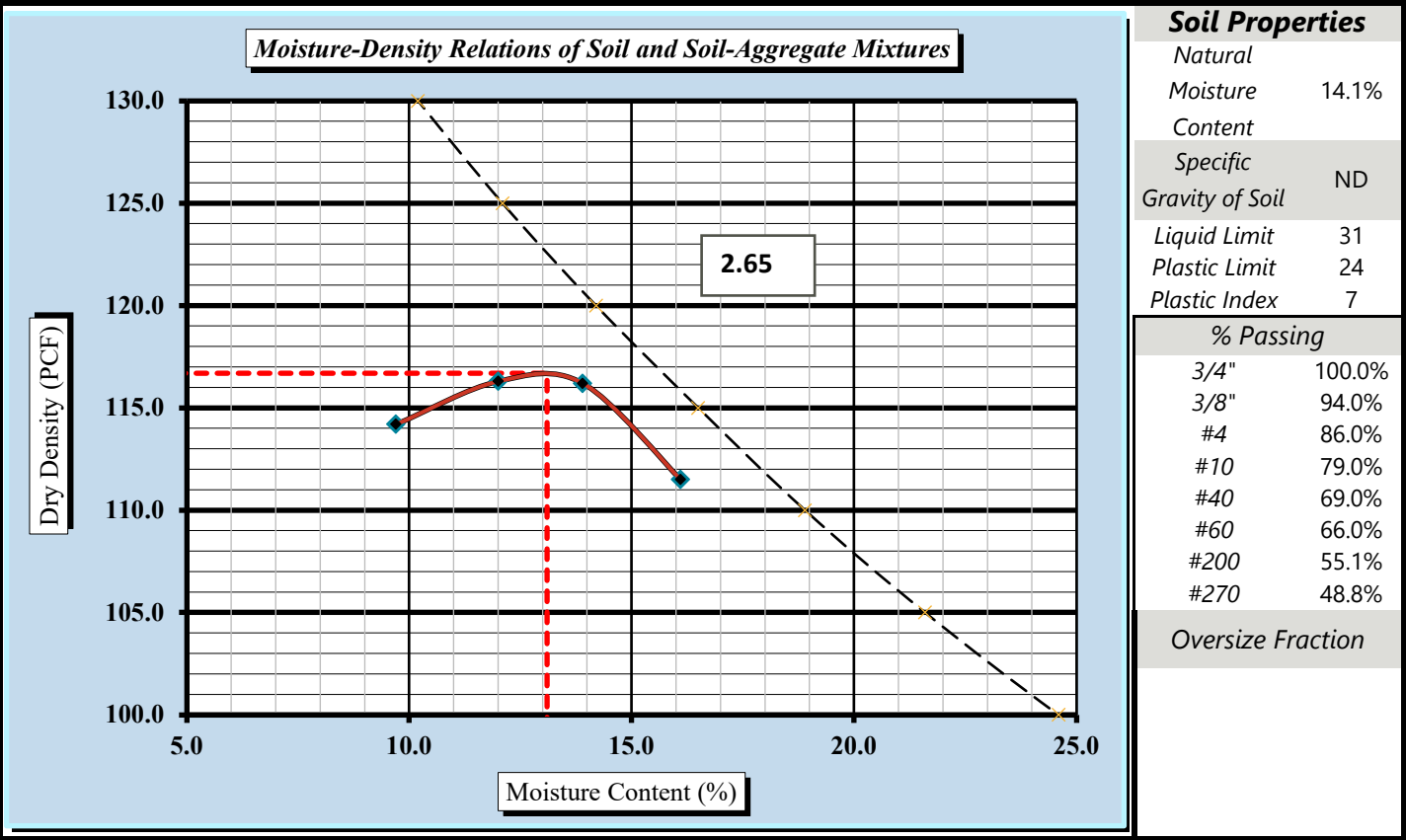
MOISTURE - DENSITY REPORT



Quality Assurance

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273					
S&ME Project #:		6235-18-038 Phase 04		Report Date:	8/5/2020
Project Name:		U-5810		Test Date(s):	7/2-5/20
Client Name:		RK&K			
Client Address:					
Boring #:		Sample #:	S-1	Sample Date:	6/10/2020
Location: 27+50		Offset:	6' RT	Depth:	1.0-2.0
Sample Description:		A-4(2)			

Maximum Dry Density	116.7	PCF.	Optimum Moisture Content	13.1%
AASHTO T99 - - Method A				



Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND: Not Determined NI: No Information Provided

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

<u>Joey Daily, P.E.</u>	<u>Project Manager</u>
Technical Responsibility	Signature
	Position
	Date

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CONSOLIDATION TEST DATA

5/12/2020

Client: Rummel, Klepper & Kahn, LLP
Project: U-5810 Watauga Co. SR 1514 and SR 1523
Project Number: 6235-18-038
Location: Borehole
Depth: 12.0-14.0'
Material Description: A-6(9)
Liquid Limit: 37
AASHTO: A-6(9)
Figure No.: Y3_2 ST-1
Testing Remarks: Tested Saturated
Tested by: Karen Warner

Sample Number: Y3_2 ST-1

Plasticity Index: 12

Checked by: Jason Reeves,P.E.

Test Specimen Data

NATURAL MOISTURE		VOID RATIO	AFTER TEST	
Wet w+t	= 308.73 g.	Spec. Gr.	= 2.60	Wet w+t = 227.60 g.
Dry w+t	= 242.19 g.	Est. Ht. Solids	= 0.415 in.	Dry w+t = 192.56 g.
Tare Wt.	= 82.82 g.	Init. V.R.	= 1.393	Tare Wt. = 106.24 g.
Moisture	= 41.8 %	Init. Sat.	= 77.9 %	Moisture = 40.6 %

UNIT WEIGHT		TEST START	Dry Wt.
Height	= 0.993 in.	Height	= 0.994 in.
Diameter	= 2.492 in.	Diameter	= 2.492 in.
Weight	= 131.47 g.		
Dry Dens.	= 73.0 pcf		

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Deformation (in.)	C _v (ft. ² /day)	C _α	Void Ratio	% Strain
start	0.00000	0.00000			1.393	
0.05	0.00020	0.00020			1.392	0.0 Compr.
0.25	0.00580	0.00580	1.577		1.379	0.6 Compr.
0.50	0.01040	0.01040	0.873		1.368	1.0 Compr.
1.00	0.01890	0.01890	1.070		1.347	1.9 Compr.
2.00	0.03290	0.03290	1.506		1.314	3.3 Compr.
0.50	0.02500	0.02500	1.119		1.333	2.5 Compr.
0.25	0.02080	0.02080	0.488		1.343	2.1 Compr.
1.00	0.02590	0.02590	3.131		1.331	2.6 Compr.
2.00	0.03310	0.03310	1.304		1.313	3.3 Compr.
4.00	0.05720	0.05720	0.757		1.255	5.8 Compr.
8.00	0.11340	0.11340	0.253		1.120	11.4 Compr.
16.00	0.18600	0.18600	0.154		0.945	18.7 Compr.

Compression index (C_c), ksf = 0.58 Preconsolidation pressure (P_p), ksf = 3.9 Void ratio at P_p (e_m) = 1.258
Recompression index (C_r) = 0.09

S & ME, INC.

Pressure: 0.05 ksf

TEST READINGS

Load No. 1

No.	Clock Time	Dial Reading
1	+0 00:00:00	0.00000
2	+0 00:00:06	0.00050
3	+0 00:00:15	0.00060
4	+0 00:00:30	0.00070
5	+0 00:00:60	0.00007
6	+0 00:04:00	0.00080
7	+0 00:08:00	0.00060
8	+0 00:15:00	0.00020

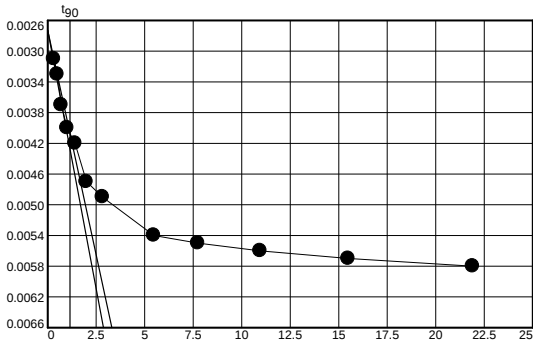
Void Ratio = 1.392 Compression = 0.0%

Pressure: 0.25 ksf

TEST READINGS

Load No. 2

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.00020	11	+0 02:00:00	0.00560
2	+0 00:00:06	0.00310	12	+0 04:00:00	0.00570
3	+0 00:00:15	0.00330	13	+0 08:00:00	0.00580
4	+0 00:00:30	0.00370			
5	+0 00:00:60	0.00400			
6	+0 00:02:00	0.00420			
7	+0 00:04:00	0.00470			
8	+0 00:08:00	0.00490			
9	+0 00:30:00	0.00540			
10	+0 00:60:00	0.00550			



Void Ratio = 1.379 Compression = 0.6%

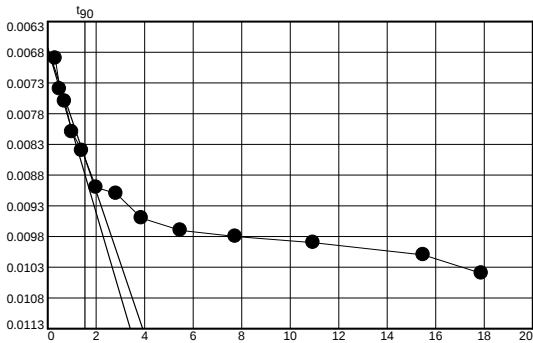
D₀ = 0.0027 D₉₀ = 0.0041 D₁₀₀ = 0.0042 C_v at 1.32 min. = 1.577 ft.²/day

Pressure: 0.50 ksf

TEST READINGS

Load No. 3

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.00580	11	+0 00:60:00	0.00980
2	+0 00:00:06	0.00690	12	+0 02:00:00	0.00990
3	+0 00:00:15	0.00740	13	+0 04:00:00	0.01010
4	+0 00:00:30	0.00760	14	+0 05:20:09	0.01040
5	+0 00:00:60	0.00810			
6	+0 00:02:00	0.00840			
7	+0 00:04:00	0.00900			
8	+0 00:08:00	0.00910			
9	+0 00:15:00	0.00950			
10	+0 00:30:00	0.00970			



Void Ratio = 1.368 Compression = 1.0%

D₀ = 0.0067 D₉₀ = 0.0085 D₁₀₀ = 0.0087 C_v at 2.36 min. = 0.873 ft.²/day

S & ME, INC.

Pressure: 1.00 ksf

TEST READINGS

Load No. 4

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.01040	11	+0 02:00:00	0.01870
2	+0 00:00:06	0.01310	12	+0 03:05:20	0.01890
3	+0 00:00:15	0.01400			
4	+0 00:00:30	0.01470			
5	+0 00:00:60	0.01550			
6	+0 00:02:00	0.01630			
7	+0 00:04:00	0.01710			
8	+0 00:08:00	0.01770			
9	+0 00:30:00	0.01830			
10	+0 00:60:00	0.01860			

Graph showing Dial Reading vs Time for Load No. 4. The y-axis ranges from 0.011 to 0.021, and the x-axis ranges from 0 to 15. A curve is plotted through the data points, showing a rapid initial increase in dial reading followed by a leveling off. A vertical line is drawn at $t_{90} = 1.90$ min.

Void Ratio = 1.347 Compression = 1.9%

$D_0 = 0.0125$ $D_{90} = 0.0162$ $D_{100} = 0.0166$ C_v at 1.90 min. = 1.070 ft.²/day

Pressure: 2.00 ksf

TEST READINGS

Load No. 5

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.01890	11	+0 00:60:00	0.03130
2	+0 00:00:06	0.02350	12	+0 02:00:00	0.03160
3	+0 00:00:15	0.02500	13	+0 04:00:00	0.03210
4	+0 00:00:30	0.02590	14	+0 08:00:00	0.03200
5	+0 00:00:60	0.02730	15	+0 14:30:16	0.03290
6	+0 00:02:00	0.02830			
7	+0 00:04:00	0.02910			
8	+0 00:08:00	0.02980			
9	+0 00:15:00	0.03040			
10	+0 00:30:00	0.03070			

Graph showing Dial Reading vs Time for Load No. 5. The y-axis ranges from 0.0210 to 0.0360, and the x-axis ranges from 0 to 40. A curve is plotted through the data points, showing a rapid initial increase in dial reading followed by a leveling off. A vertical line is drawn at $t_{90} = 1.32$ min.

Void Ratio = 1.314 Compression = 3.3%

$D_0 = 0.0222$ $D_{90} = 0.0277$ $D_{100} = 0.0283$ C_v at 1.32 min. = 1.506 ft.²/day

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Pressure: 0.50 ksf

TEST READINGS

Load No. 6

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.03290	11	+0 00:60:00	0.02500
2	+0 00:00:06	0.02950	12	+0 02:00:00	0.02500
3	+0 00:00:15	0.02880	13	+0 02:04:03	0.02500
4	+0 00:00:30	0.02810			
5	+0 00:00:60	0.02730			
6	+0 00:02:00	0.02660			
7	+0 00:04:00	0.02600			
8	+0 00:08:00	0.02570			
9	+0 00:15:00	0.02560			
10	+0 00:30:00	0.02540			

Graph showing Dial Reading vs Time for Load No. 6. The y-axis ranges from 0.023 to 0.033, and the x-axis ranges from 0 to 15. A curve is plotted through the data points, showing a rapid initial increase in dial reading followed by a leveling off. A vertical line is drawn at $t_{90} = 1.76$ min.

Void Ratio = 1.333 Compression = 2.5%

$D_0 = 0.0304$ $D_{90} = 0.0267$ $D_{100} = 0.0263$ C_v at 1.76 min. = 1.119 ft.²/day

Pressure: 0.25 ksf

TEST READINGS

Load No. 7

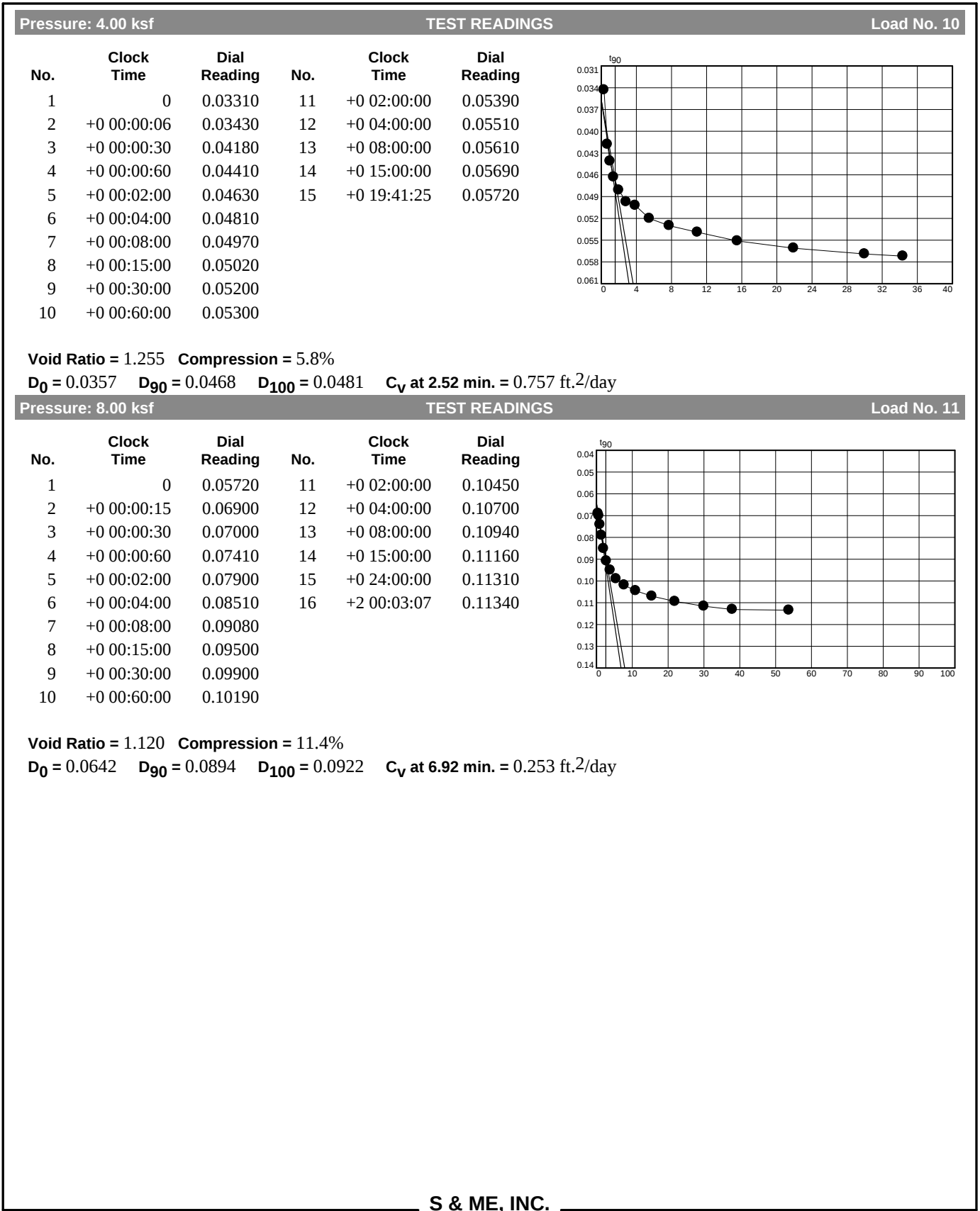
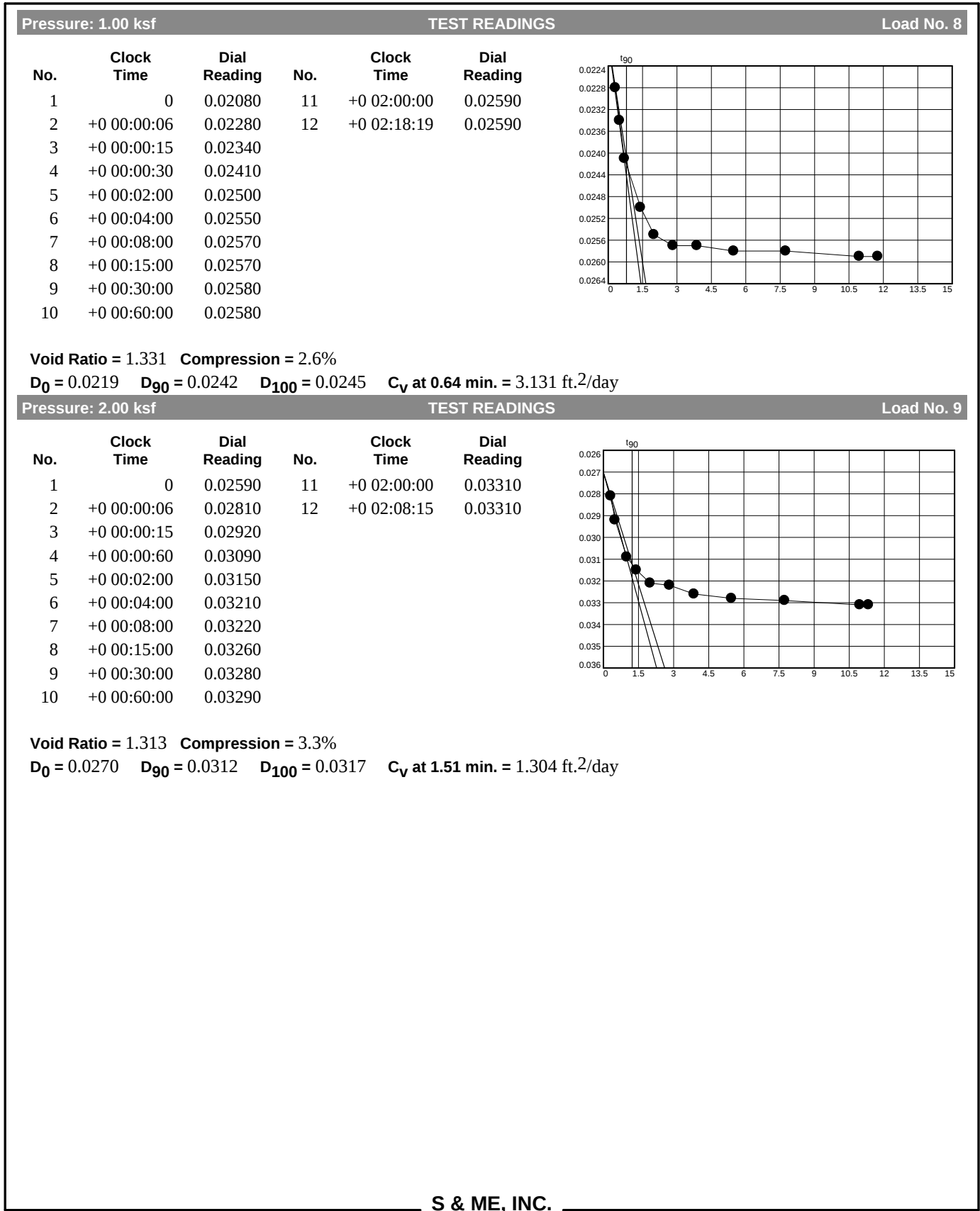
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.02500	11	+0 02:00:00	0.02080
2	+0 00:00:06	0.02410			
3	+0 00:00:30	0.02340			
4	+0 00:00:60	0.02320			
5	+0 00:02:00	0.02250			
6	+0 00:04:00	0.02200			
7	+0 00:08:00	0.02170			
8	+0 00:15:00	0.02150			
9	+0 00:30:00	0.02100			
10	+0 00:60:00	0.02090			

Graph showing Dial Reading vs Time for Load No. 7. The y-axis ranges from 0.0202 to 0.0252, and the x-axis ranges from 0 to 15. A curve is plotted through the data points, showing a rapid initial increase in dial reading followed by a leveling off. A vertical line is drawn at $t_{90} = 4.09$ min.

Void Ratio = 1.343 Compression = 2.1%

$D_0 = 0.0244$ $D_{90} = 0.0220$ $D_{100} = 0.0217$ C_v at 4.09 min. = 0.488 ft.²/day

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Pressure: 16.00 ksf

TEST READINGS

Load No. 12

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.11340	11	+0 00:60:00	0.17490
2	+0 00:00:06	0.12130	12	+0 02:00:00	0.17810
3	+0 00:00:15	0.12530	13	+0 04:00:00	0.18070
4	+0 00:00:30	0.12900	14	+0 08:00:00	0.18360
5	+0 00:00:60	0.13480	15	+0 15:01:24	0.18580
6	+0 00:02:00	0.14200	16	+0 15:58:42	0.18600
7	+0 00:04:00	0.15060			
8	+0 00:08:00	0.15910			
9	+0 00:15:00	0.16560			
10	+0 00:30:00	0.17090			

Void Ratio = 0.945 Compression = 18.7%

D₀ = 0.1184 D₉₀ = 0.1610 D₁₀₀ = 0.1658 C_v at 9.83 min. = 0.154 ft.²/day

S & ME, INC.

CONSOLIDATION TEST REPORT

Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C _v (ft. ² /day)	C _α	No.	Load (ksf)	C _v (ft. ² /day)	C _α	No.	Load (ksf)	C _v (ft. ² /day)	C _α
2	0.25	1.577		9	2.00	1.304					
3	0.50	0.873		10	4.00	0.757					
4	1.00	1.070		11	8.00	0.253					
5	2.00	1.506		12	16.00	0.154					
6	0.50	1.119									
7	0.25	0.488									
8	1.00	3.131									

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P _c (ksf)	C _c	Initial Void Ratio
Saturation	Moisture							
77.9 %	41.8 %	73.0	37	12	2.60	3.9	0.58	1.393

MATERIAL DESCRIPTION							USCS	AASHTO
A-6(9)								A-6(9)

Project No. 6235-18-038 Client: Rummel, Klepper & Kahn, LLP

Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1

S & ME, INC.

Charlotte, North Carolina

Remarks: Tested Saturated

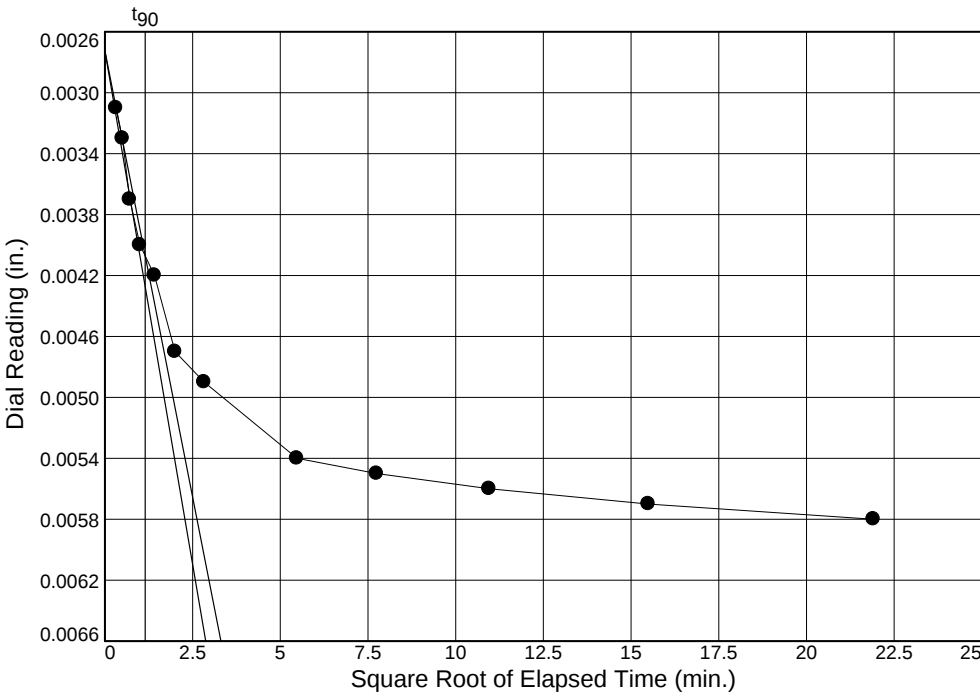
Figure Y3_2 ST-1

Tested By: Karen Warner Checked By: Jason Reeves,P.E.

Dial Reading vs. Time

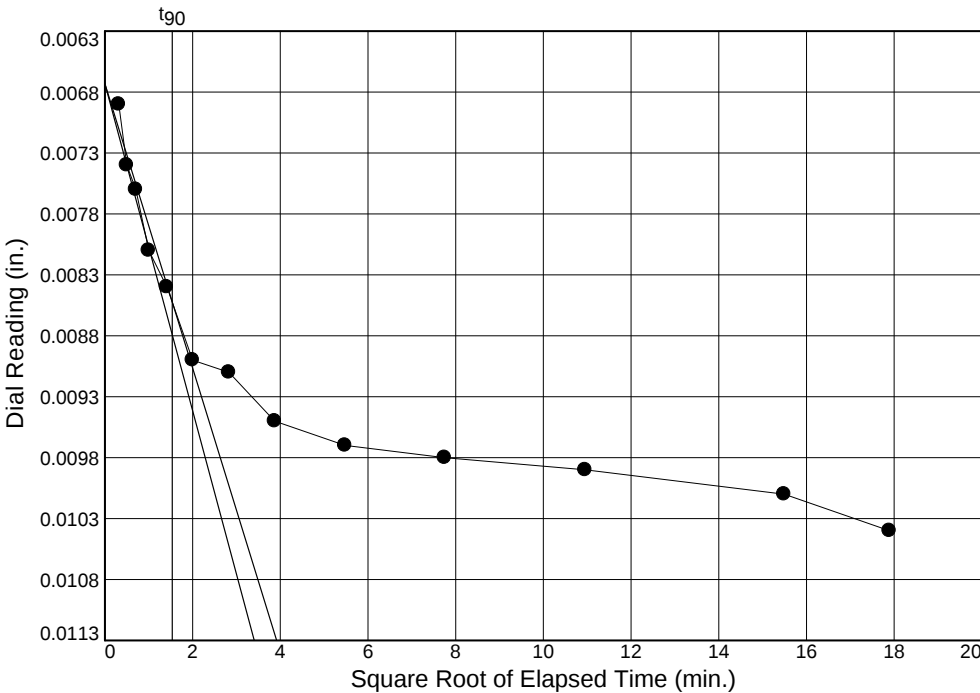
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1



Load No.= 2
Load= 0.25 ksf
 $D_0 = 0.0027$
 $D_{90} = 0.0041$
 $D_{100} = 0.0042$
 $T_{90} = 1.32 \text{ min.}$

$C_v @ T_{90}$
1.577 ft.²/day



Load No.= 3
Load= 0.50 ksf
 $D_0 = 0.0067$
 $D_{90} = 0.0085$
 $D_{100} = 0.0087$
 $T_{90} = 2.36 \text{ min.}$

$C_v @ T_{90}$
0.873 ft.²/day

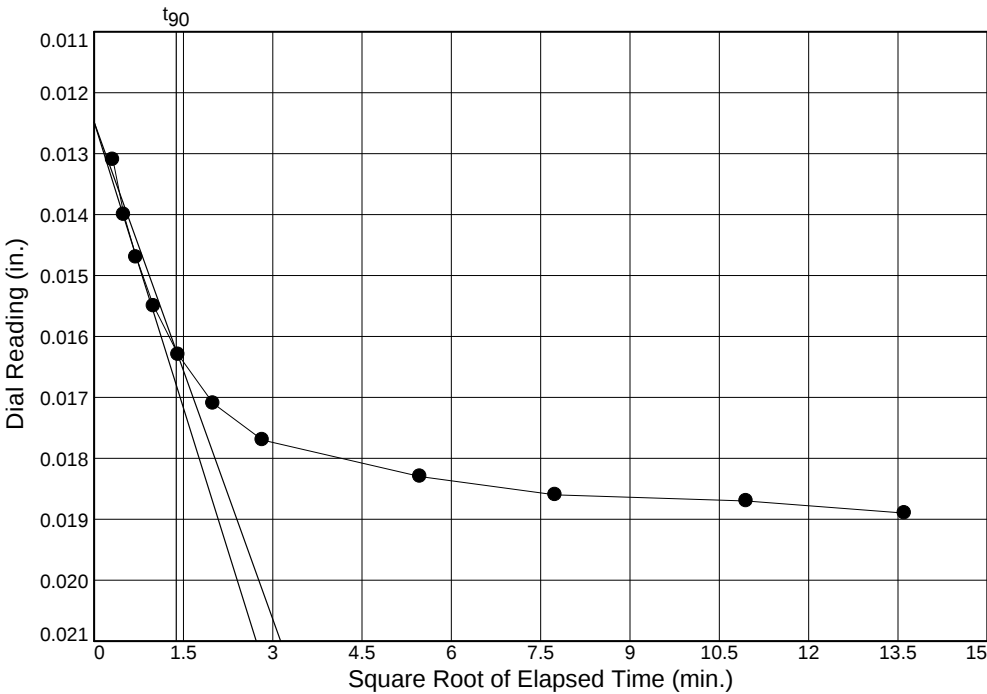
Figure Y3_2 ST-2

S & ME, INC.

Dial Reading vs. Time

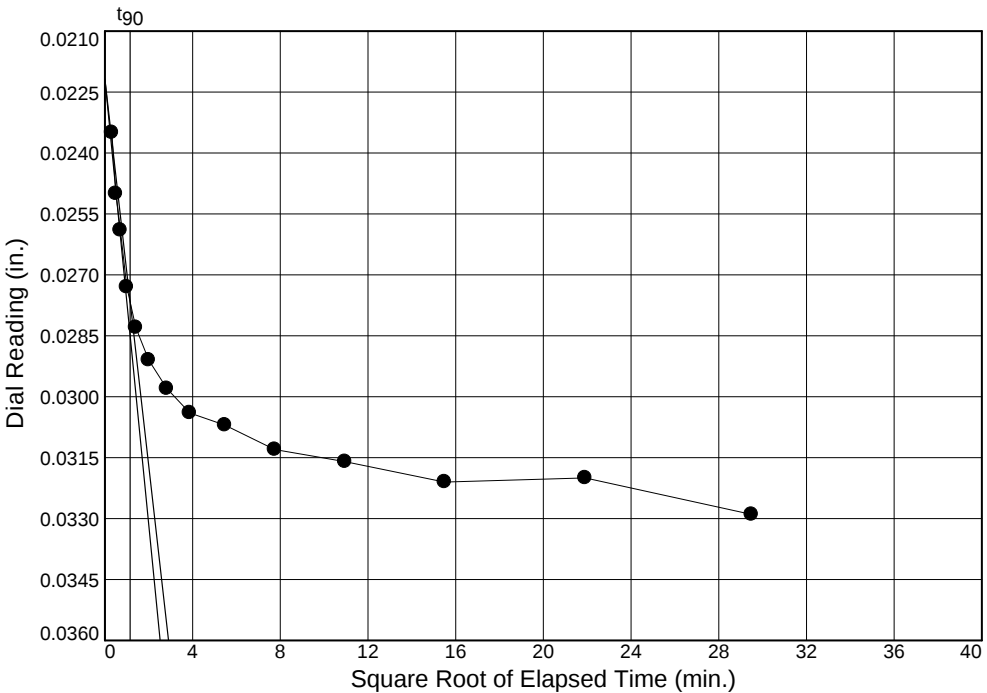
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1



Load No.= 4
Load= 1.00 ksf
 $D_0 = 0.0125$
 $D_{90} = 0.0162$
 $D_{100} = 0.0166$
 $T_{90} = 1.90 \text{ min.}$

$C_v @ T_{90}$
1.070 ft.²/day



Load No.= 5
Load= 2.00 ksf
 $D_0 = 0.0222$
 $D_{90} = 0.0277$
 $D_{100} = 0.0283$
 $T_{90} = 1.32 \text{ min.}$

$C_v @ T_{90}$
1.506 ft.²/day

Figure Y3_2 ST-3

S & ME, INC.

Dial Reading vs. Time

Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1

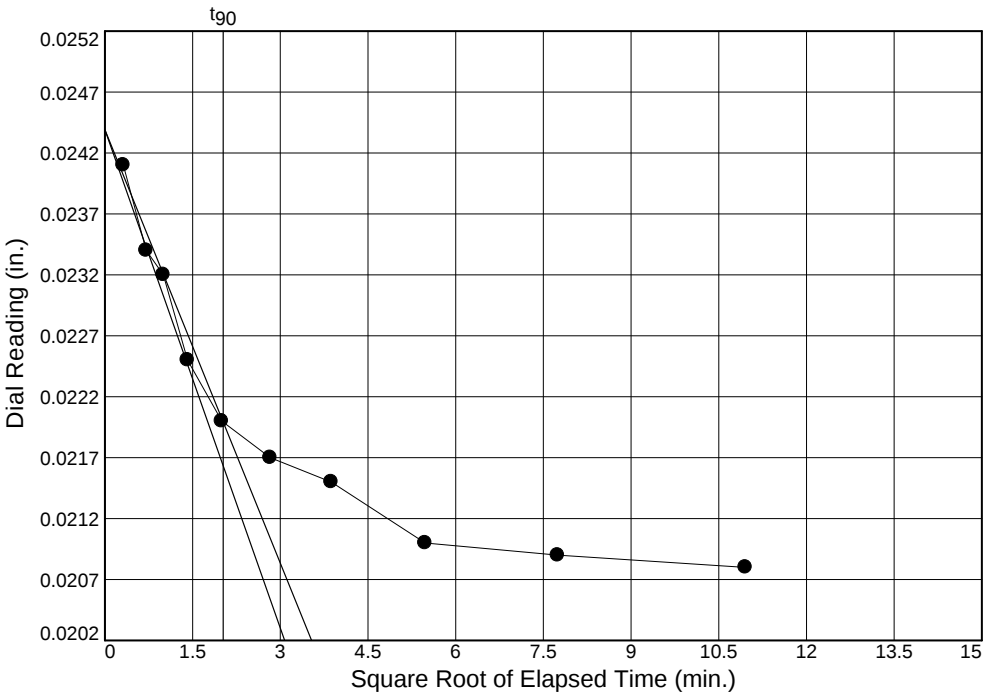
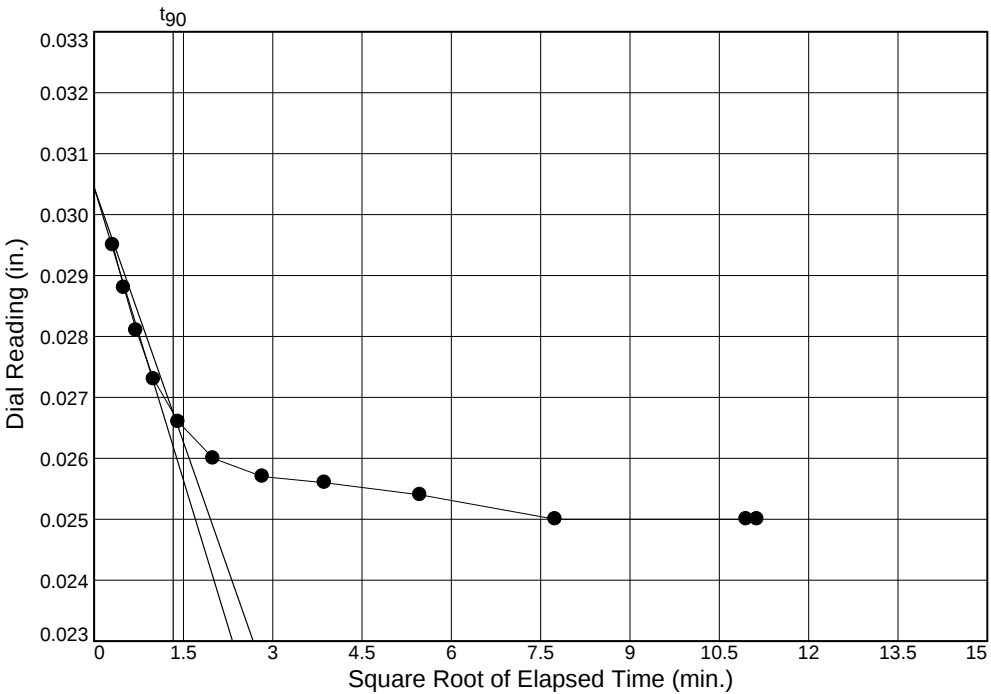


Figure Y3_2 ST-4

S & ME, INC.

Dial Reading vs. Time

Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1

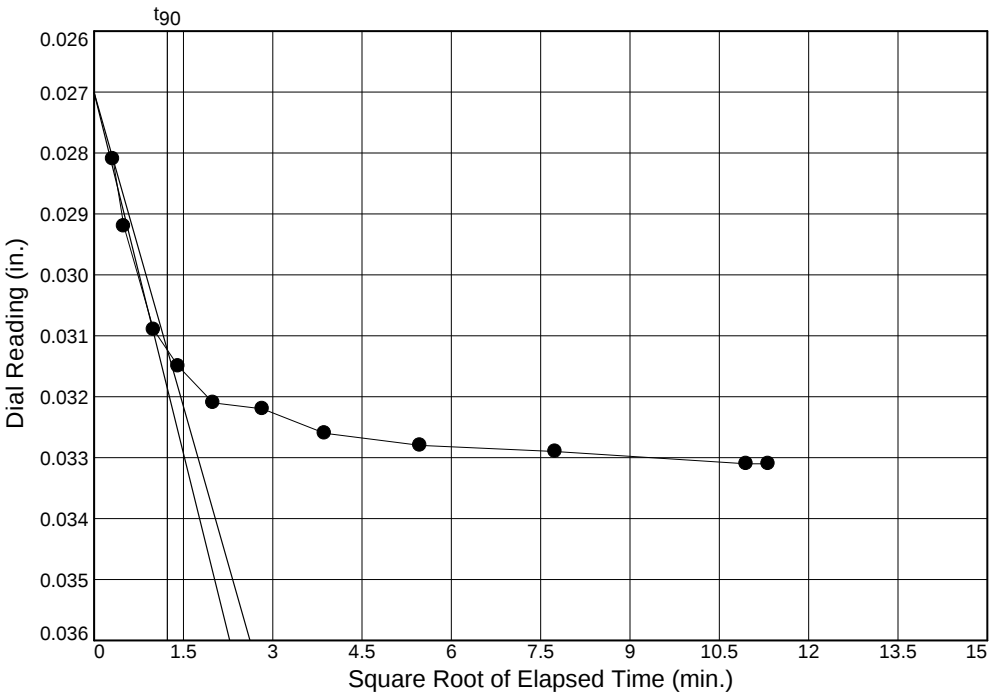
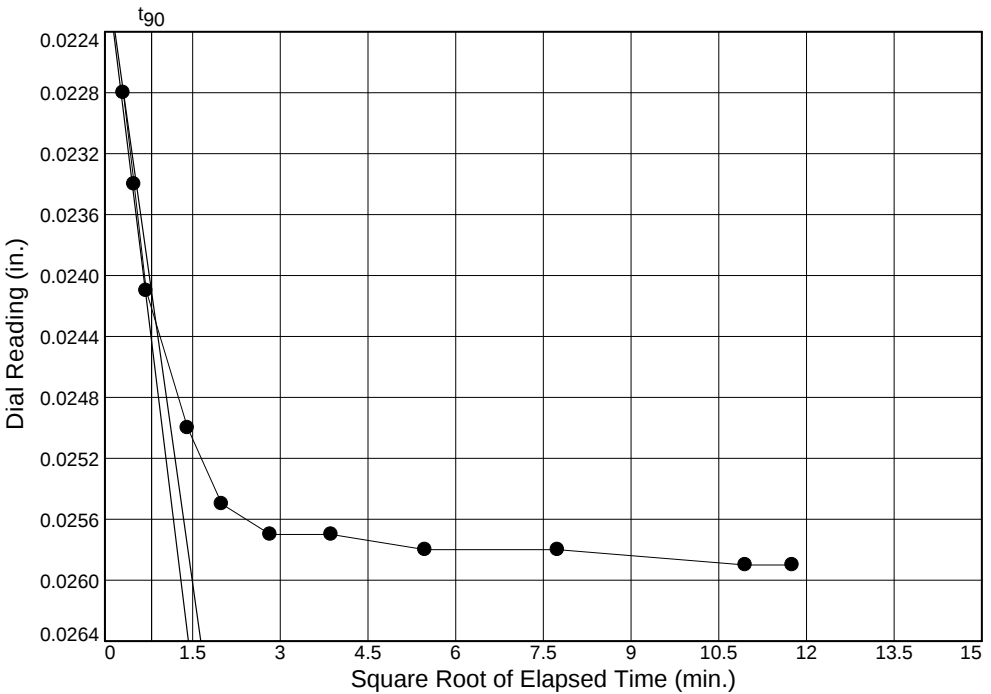


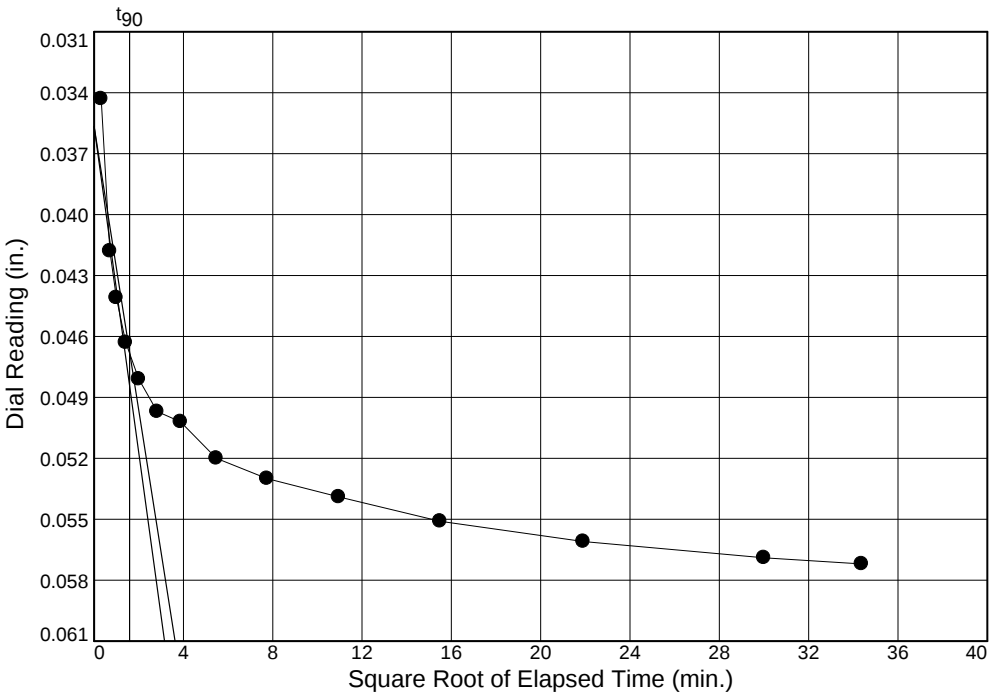
Figure Y3_2 ST-5

S & ME, INC.

Dial Reading vs. Time

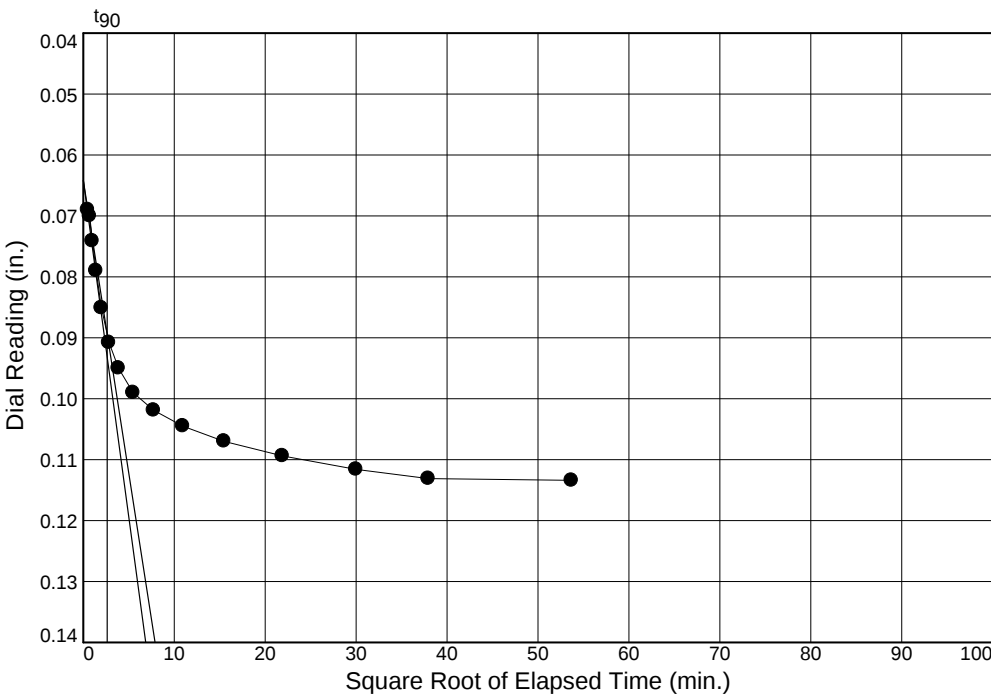
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1



Load No.= 10
Load= 4.00 ksf
 $D_0 = 0.0357$
 $D_{90} = 0.0468$
 $D_{100} = 0.0481$
 $T_{90} = 2.52$ min.

$C_v @ T_{90}$
0.757 ft.2/day



Load No.= 11
Load= 8.00 ksf
 $D_0 = 0.0642$
 $D_{90} = 0.0894$
 $D_{100} = 0.0922$
 $T_{90} = 6.92$ min.

$C_v @ T_{90}$
0.253 ft.2/day

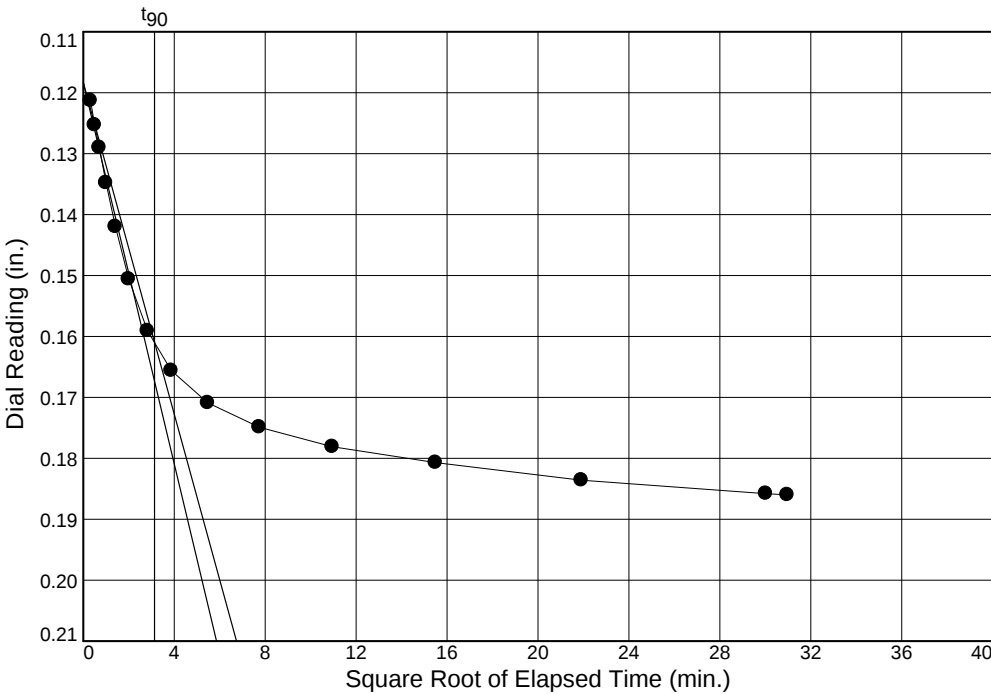
Figure Y3_2 ST-6

S & ME, INC.

Dial Reading vs. Time

Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 12.0-14.0' Sample Number: Y3_2 ST-1



Load No.= 12
Load= 16.00 ksf
 $D_0 = 0.1184$
 $D_{90} = 0.1610$
 $D_{100} = 0.1658$
 $T_{90} = 9.83$ min.

$C_v @ T_{90}$
0.154 ft.2/day

Figure Y3_2 ST-7

S & ME, INC.

CONSOLIDATION TEST DATA

5/28/2020

Client: Rummel, Klepper & Kahn, LLP
Project: U-5810 Watauga Co. SR 1514 and SR 1523
Project Number: 6235-18-038
Location: Borehole
Depth: 4-6'
Material Description: A-5(6)
Liquid Limit: 43
AASHTO: A-5(6)
Figure No.: L_24 ST-101
Testing Remarks: Tested Saturated
Method B

Sample Number: L_24 ST-101

Plasticity Index: 8

Tested by: Karen Warner

Checked by: Jason Reeves, P.E.

Test Specimen Data

NATURAL MOISTURE		VOID RATIO	AFTER TEST	
Wet w+t	= 452.03 g.	Spec. Gr.	= 2.75	Wet w+t = 238.22 g.
Dry w+t	= 365.69 g.	Est. Ht. Solids	= 0.451 in.	Dry w+t = 205.72 g.
Tare Wt.	= 112.71 g.	Init. V.R.	= 1.246	Tare Wt. = 106.23 g.
Moisture	= 34.1 %	Init. Sat.	= 75.3 %	Moisture = 32.7 %

UNIT WEIGHT		TEST START	Dry Wt.
Height	= 0.996 in.	Height	= 1.013 in.
Diameter	= 2.496 in.	Diameter	= 2.496 in.
Weight	= 134.91 g.		
Dry Dens.	= 78.7 pcf		

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Deformation (in.)	C _v (ft. ² /day)	C _α	Void Ratio	% Strain
start	0.00010	0.00000			1.246	
0.05	0.00010	0.00000	6.027		1.246	0.0 Compr.
0.25	0.00480	0.00470	0.112		1.236	0.5 Compr.
0.50	0.01000	0.00990	4.285		1.224	1.0 Compr.
1.00	0.02450	0.02440	2.548		1.192	2.4 Compr.
2.00	0.04620	0.04610	1.924		1.144	4.5 Compr.
0.50	0.04310	0.04300	0.940		1.151	4.2 Compr.
0.25	0.03920	0.03910	1.512		1.159	3.9 Compr.
1.00	0.04270	0.04260	3.276		1.152	4.2 Compr.
2.00	0.04860	0.04850	0.726		1.139	4.8 Compr.
4.00	0.08570	0.08560	1.760		1.056	8.4 Compr.
8.00	0.13390	0.13380	1.616		0.949	13.2 Compr.
16.00	0.18380	0.18370	1.500		0.839	18.1 Compr.

Compression index (C_c), ksf = 0.36 Preconsolidation pressure (P_p), ksf = 1.6 Void ratio at P_p (e_m) = 1.162
Recompression index (C_r) = 0.11

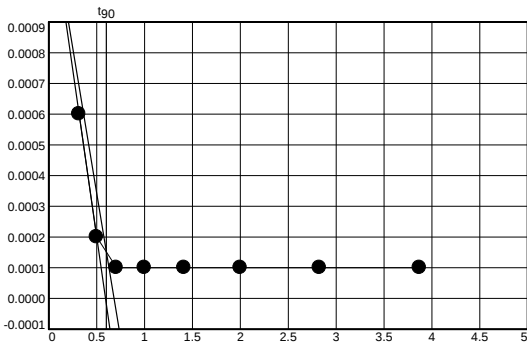
S & ME, INC.

Pressure: 0.05 ksf

TEST READINGS

Load No. 1

No.	Clock Time	Dial Reading
1	+0 00:00:00	0.00010
2	+0 00:00:06	0.00060
3	+0 00:00:15	0.00020
4	+0 00:00:30	0.00010
5	+0 00:00:60	0.00010
6	+0 00:02:00	0.00010
7	+0 00:04:00	0.00010
8	+0 00:08:00	0.00010
9	+0 00:15:00	0.00010



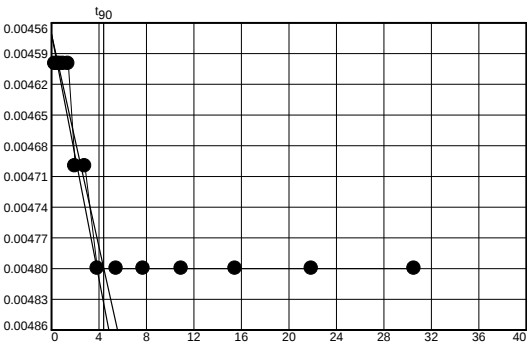
Void Ratio = 1.246 Compression = 0.0%
D₀ = 0.0013 D₉₀ = 0.0002 D₁₀₀ = 0.0000 C_v at 0.36 min. = 6.027 ft.²/day

Pressure: 0.25 ksf

TEST READINGS

Load No. 2

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.00010	11	+0 00:60:00	0.00480
2	+0 00:00:06	0.00460	12	+0 02:00:00	0.00480
3	+0 00:00:15	0.00460	13	+0 04:00:00	0.00480
4	+0 00:00:30	0.00460	14	+0 08:00:00	0.00480
5	+0 00:00:60	0.00460	15	+0 15:34:20	0.00480
6	+0 00:02:00	0.00460			
7	+0 00:04:00	0.00470			
8	+0 00:08:00	0.00470			
9	+0 00:15:00	0.00480			
10	+0 00:30:00	0.00480			



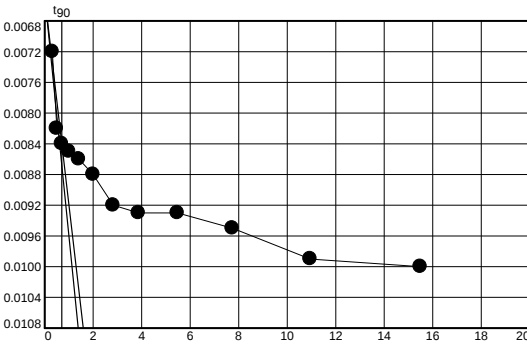
Void Ratio = 1.236 Compression = 0.5%
D₀ = 0.0046 D₉₀ = 0.0048 D₁₀₀ = 0.0048 C_v at 19.30 min. = 0.112 ft.²/day

Pressure: 0.50 ksf

TEST READINGS

Load No. 3

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.00480	11	+0 00:60:00	0.00950
2	+0 00:00:06	0.00720	12	+0 02:00:00	0.00990
3	+0 00:00:15	0.00820	13	+0 04:00:00	0.01000
4	+0 00:00:30	0.00840			
5	+0 00:00:60	0.00850			
6	+0 00:02:00	0.00860			
7	+0 00:04:00	0.00880			
8	+0 00:08:00	0.00920			
9	+0 00:15:00	0.00930			
10	+0 00:30:00	0.00930			



Void Ratio = 1.224 Compression = 1.0%
D₀ = 0.0065 D₉₀ = 0.0084 D₁₀₀ = 0.0086 C_v at 0.50 min. = 4.285 ft.²/day

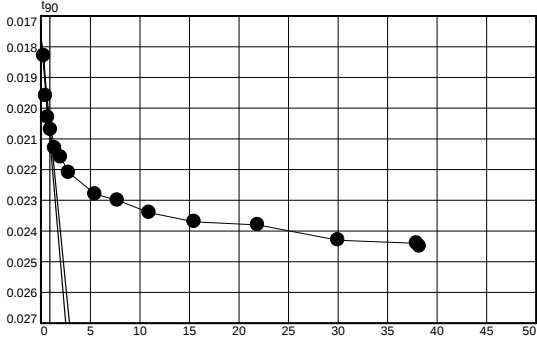
S & ME, INC.

Pressure: 1.00 ksf

TEST READINGS

Load No. 4

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.01000	11	+0 02:00:00	0.02340
2	+0 00:00:06	0.01830	12	+0 04:00:00	0.02370
3	+0 00:00:15	0.01960	13	+0 08:00:00	0.02380
4	+0 00:00:30	0.02030	14	+0 15:00:0	0.02430
5	+0 00:00:60	0.02070	15	+0 24:00:00	0.02440
6	+0 00:02:00	0.02130	16	+1 00:21:34	0.02450
7	+0 00:04:00	0.02160			
8	+0 00:08:00	0.02210			
9	+0 00:30:00	0.02280			
10	+0 00:60:00	0.02300			



Void Ratio = 1.192 Compression = 2.4%

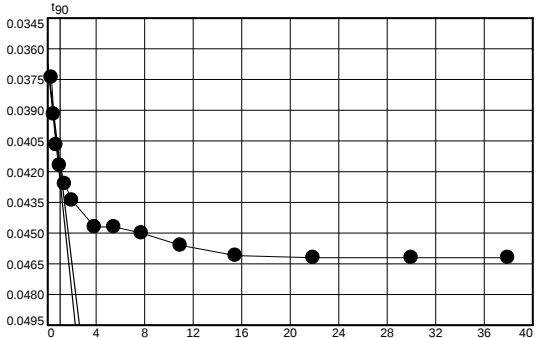
D₀ = 0.0176 D₉₀ = 0.0206 D₁₀₀ = 0.0209 C_v at 0.83 min. = 2.548 ft.²/day

Pressure: 2.00 ksf

TEST READINGS

Load No. 5

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.02450	11	+0 02:00:00	0.04560
2	+0 00:00:06	0.03740	12	+0 04:00:00	0.04610
3	+0 00:00:15	0.03920	13	+0 08:00:00	0.04620
4	+0 00:00:30	0.04070	14	+0 15:00:00	0.04620
5	+0 00:00:60	0.04170	15	+0 24:00:00	0.04620
6	+0 00:02:00	0.04260			
7	+0 00:04:00	0.04340			
8	+0 00:15:00	0.04470			
9	+0 00:30:00	0.04470			
10	+0 00:60:00	0.04500			



Void Ratio = 1.144 Compression = 4.5%

D₀ = 0.0368 D₉₀ = 0.0418 D₁₀₀ = 0.0423 C_v at 1.05 min. = 1.924 ft.²/day

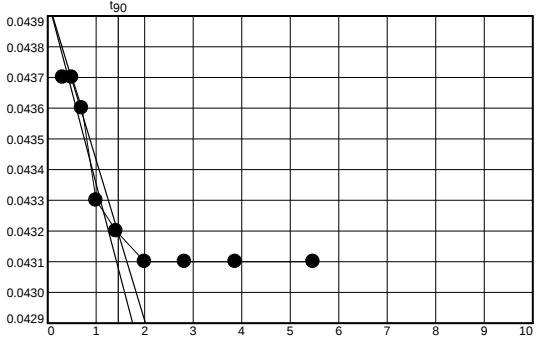
S & ME, INC.

Pressure: 0.50 ksf

TEST READINGS

Load No. 6

No.	Clock Time	Dial Reading
1	0	0.04620
2	+0 00:00:06	0.04370
3	+0 00:00:15	0.04370
4	+0 00:00:30	0.04360
5	+0 00:00:60	0.04330
6	+0 00:02:00	0.04320
7	+0 00:04:00	0.04310
8	+0 00:08:00	0.04310
9	+0 00:15:00	0.04310
10	+0 00:30:00	0.04310



Void Ratio = 1.151 Compression = 4.2%

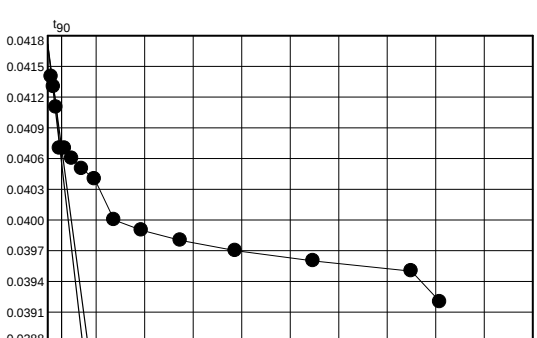
D₀ = 0.0440 D₉₀ = 0.0432 D₁₀₀ = 0.0431 C_v at 2.12 min. = 0.940 ft.²/day

Pressure: 0.25 ksf

TEST READINGS

Load No. 7

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.04310	11	+0 00:60:00	0.03990
2	+0 00:00:06	0.04140	12	+0 02:00:00	0.03980
3	+0 00:00:15	0.04130	13	+0 04:00:00	0.03970
4	+0 00:00:30	0.04110	14	+0 08:00:00	0.03960
5	+0 00:00:60	0.04070	15	+0 15:00:00	0.03950
6	+0 00:02:00	0.04070	16	+0 17:26:59	0.03920
7	+0 00:04:00	0.04060			
8	+0 00:08:00	0.04050			
9	+0 00:15:00	0.04040			
10	+0 00:30:00	0.04000			



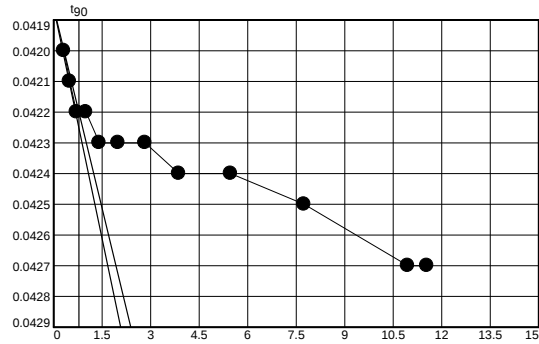
Void Ratio = 1.159 Compression = 3.9%

D₀ = 0.0417 D₉₀ = 0.0407 D₁₀₀ = 0.0406 C_v at 1.33 min. = 1.512 ft.²/day

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Pressure: 1.00 ksf TEST READINGS Load No. 8

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.03920	11	+0 00:60:00	0.04250
2	+0 00:00:06	0.04200	12	+0 02:00:00	0.04270
3	+0 00:00:15	0.04210	13	+0 02:13:21	0.04270
4	+0 00:00:30	0.04220			
5	+0 00:00:60	0.04220			
6	+0 00:02:00	0.04230			
7	+0 00:04:00	0.04230			
8	+0 00:08:00	0.04230			
9	+0 00:15:00	0.04240			
10	+0 00:30:00	0.04240			

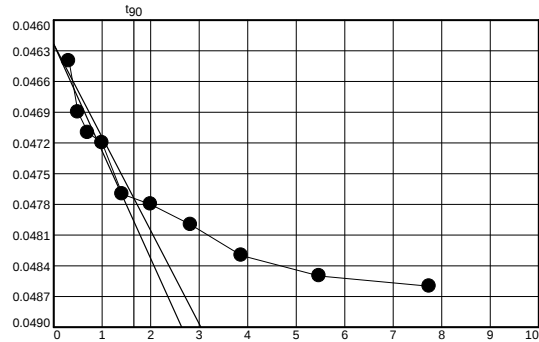


Void Ratio = 1.152 Compression = 4.2%

D₀ = 0.0419 D₉₀ = 0.0422 D₁₀₀ = 0.0422 C_v at 0.61 min. = 3.276 ft.²/day

Pressure: 2.00 ksf TEST READINGS Load No. 9

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.04270	11	+0 00:60:00	0.04860
2	+0 00:00:06	0.04640			
3	+0 00:00:15	0.04690			
4	+0 00:00:30	0.04710			
5	+0 00:00:60	0.04720			
6	+0 00:02:00	0.04770			
7	+0 00:04:00	0.04780			
8	+0 00:08:00	0.04800			
9	+0 00:15:00	0.04830			
10	+0 00:30:00	0.04850			



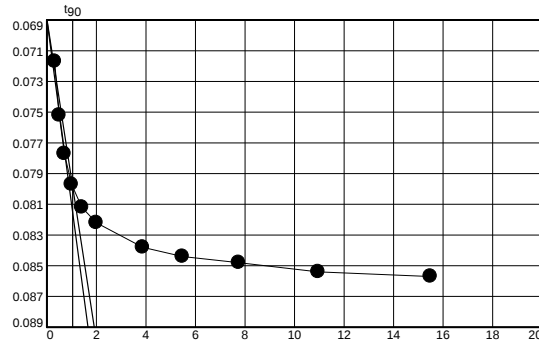
Void Ratio = 1.139 Compression = 4.8%

$D_0 = 0.0462$ $D_{90} = 0.0477$ $D_{100} = 0.0479$ C_v at 2.73 min. = 0.726 ft.²/day

S & ME, INC.

Pressure: 4.00 ksf TEST READINGS Load No. 10

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.04860	11	+0 02:00:00	0.08540
2	+0 00:00:06	0.07170	12	+0 04:00:00	0.08570
3	+0 00:00:15	0.07520			
4	+0 00:00:30	0.07770			
5	+0 00:00:60	0.07970			
6	+0 00:02:00	0.08120			
7	+0 00:04:00	0.08220			
8	+0 00:15:00	0.08380			
9	+0 00:30:00	0.08440			
10	+0 00:60:00	0.08480			

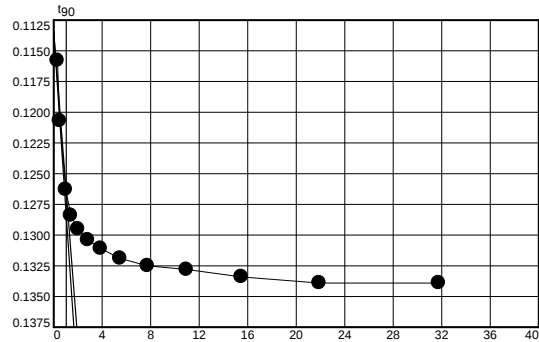


Void Ratio = 1.056 Compression = 8.4%

$D_0 = 0.0689$ $D_{90} = 0.0798$ $D_{100} = 0.0811$ $C_v \text{ at } 1.08 \text{ min.} = 1.760 \text{ ft.}^2/\text{day}$

Pressure: 8.00 ksf TEST READINGS Load No. 11

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.08570	11	+0 02:00:00	0.13280
2	+0 00:00:06	0.11580	12	+0 04:00:00	0.13340
3	+0 00:00:15	0.12070	13	+0 08:00:00	0.13390
4	+0 00:00:60	0.12630	14	+0 16:48:45	0.13390
5	+0 00:02:00	0.12840			
6	+0 00:04:00	0.12950			
7	+0 00:08:00	0.13040			
8	+0 00:15:00	0.13110			
9	+0 00:30:00	0.13190			
10	+0 00:60:00	0.13250			



Void Ratio = 0.949 Compression = 13.2%

$D_0 = 0.1134$ $D_{90} = 0.1265$ $D_{100} = 0.1279$ C_v at 1.07 min. = 1.616 ft.²/day

S & ME, INC.

Pressure: 16.00 ksf

TEST READINGS

Load No. 12

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.13390	11	+0 02:00:00	0.18220
2	+0 00:00:06	0.16330	12	+0 04:00:00	0.18280
3	+0 00:00:15	0.16850	13	+0 08:00:00	0.18310
4	+0 00:00:30	0.17200	14	+0 15:00:00	0.18360
5	+0 00:02:00	0.17730	15	+0 15:01:20	0.18360
6	+0 00:04:00	0.17890	16	+0 23:36:03	0.18380
7	+0 00:08:00	0.17980			
8	+0 00:15:00	0.18060			
9	+0 00:30:00	0.18130			
10	+0 00:60:00	0.18160			

Void Ratio = 0.839 Compression = 18.1%

D₀ = 0.1622 D₉₀ = 0.1743 D₁₀₀ = 0.1757 C_v at 1.03 min. = 1.500 ft.²/day

Time (min)	Dial Reading
0	0.13390
6	0.16330
15	0.16850
30	0.17200
2	0.17730
4	0.17890
8	0.17980
15	0.18060
30	0.18130
60	0.18160

S & ME, INC.

CONSOLIDATION TEST REPORT

Applied Pressure (ksf)	Percent Strain
0.05	0.0
0.1	-0.1
0.2	-0.2
0.5	-0.5
1.0	-1.0
2.0	-2.5
5.0	-6.0
10.0	-12.0
20.0	-18.0

Coefficients of Consolidation and Secondary Consolidation											
No.	Load (ksf)	C _v (ft. ² /day)	C _α	No.	Load (ksf)	C _v (ft. ² /day)	C _α	No.	Load (ksf)	C _v (ft. ² /day)	C _α
1	0.05	6.027		8	1.00	3.276					
2	0.25	0.112		9	2.00	0.726					
3	0.50	4.285		10	4.00	1.760					
4	1.00	2.548		11	8.00	1.616					
5	2.00	1.924		12	16.00	1.500					
6	0.50	0.940									
7	0.25	1.512									

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P _c (ksf)	C _c	Initial Void Ratio
Saturation	Moisture							
75.3 %	34.1 %	78.7	43	8	2.75	1.6	0.36	1.246

MATERIAL DESCRIPTION							USCS	AASHTO
A-5(6)								A-5(6)

Project No. 6235-18-038 Client: Rummel, Klepper & Kahn, LLP

Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101

S & ME, INC.

Charlotte, North Carolina

Remarks: Tested Saturated Method B

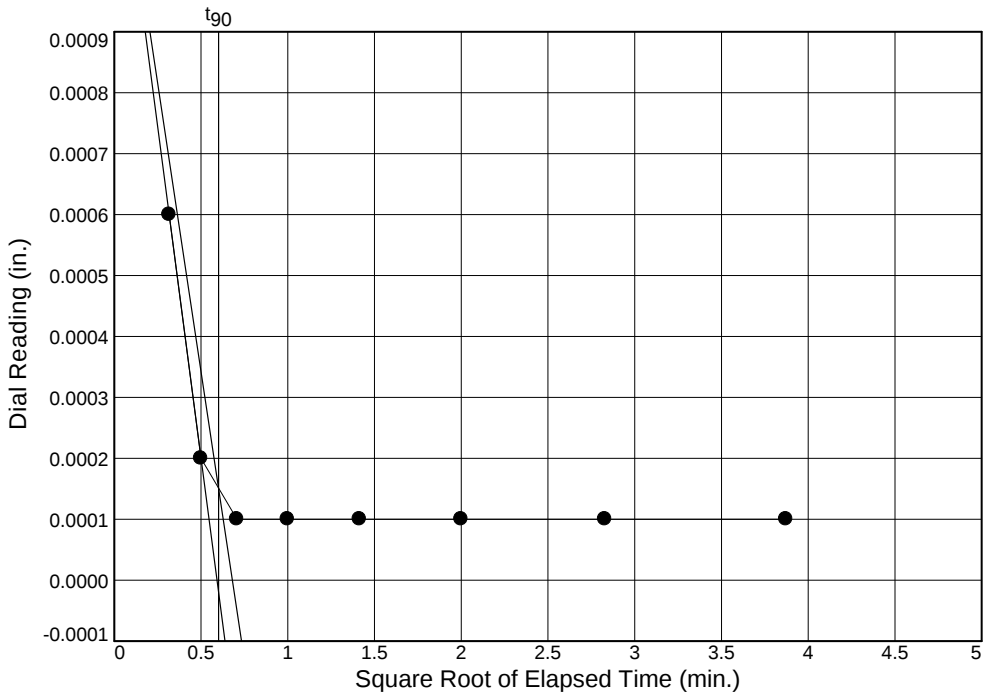
Figure L_24 ST-

Tested By: Karen Warner Checked By: Jason Reeves, P.E.

Dial Reading vs. Time

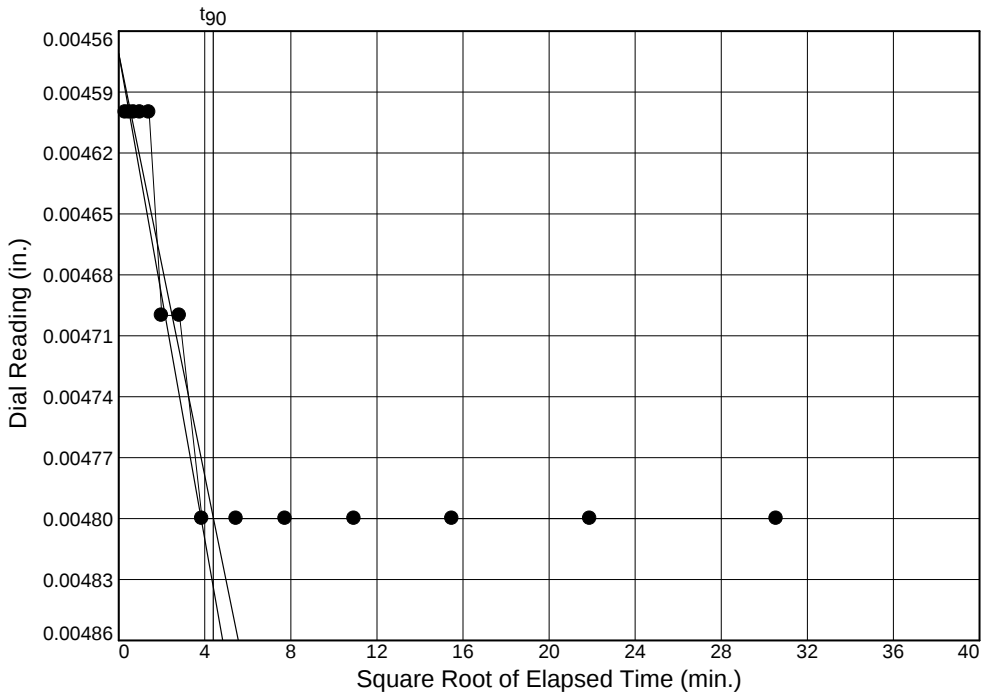
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 1
Load= 0.05 ksf
 $D_0 = 0.0013$
 $D_{90} = 0.0002$
 $D_{100} = 0.0000$
 $T_{90} = 0.36 \text{ min.}$

$C_v @ T_{90}$
6.027 ft.²/day



Load No.= 2
Load= 0.25 ksf
 $D_0 = 0.0046$
 $D_{90} = 0.0048$
 $D_{100} = 0.0048$
 $T_{90} = 19.30 \text{ min.}$

$C_v @ T_{90}$
0.112 ft.²/day

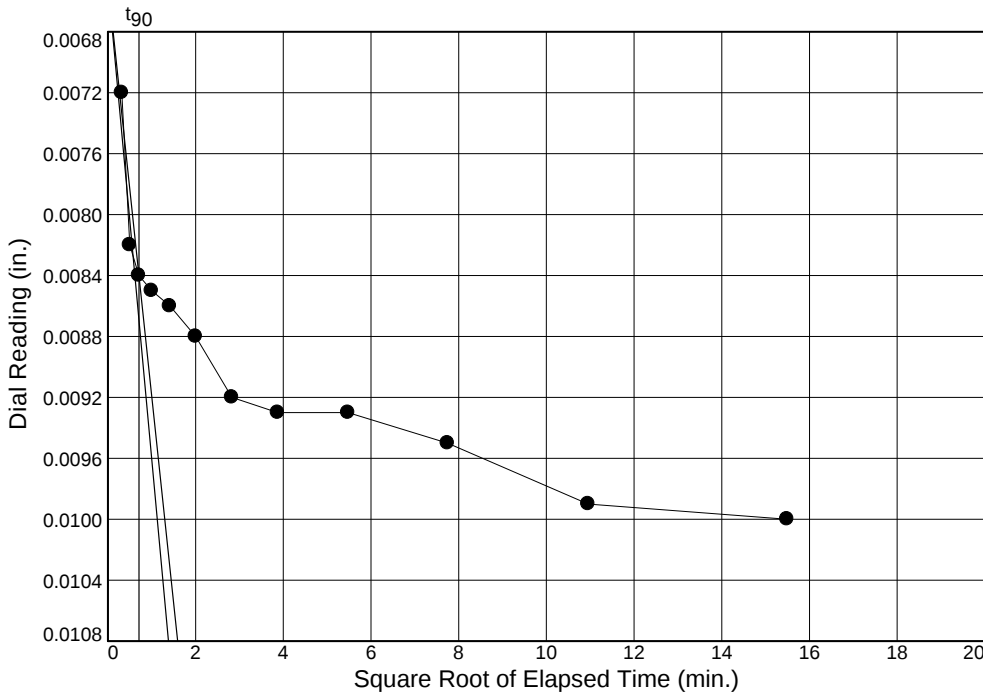
Figure L_24 ST-

S & ME, INC.

Dial Reading vs. Time

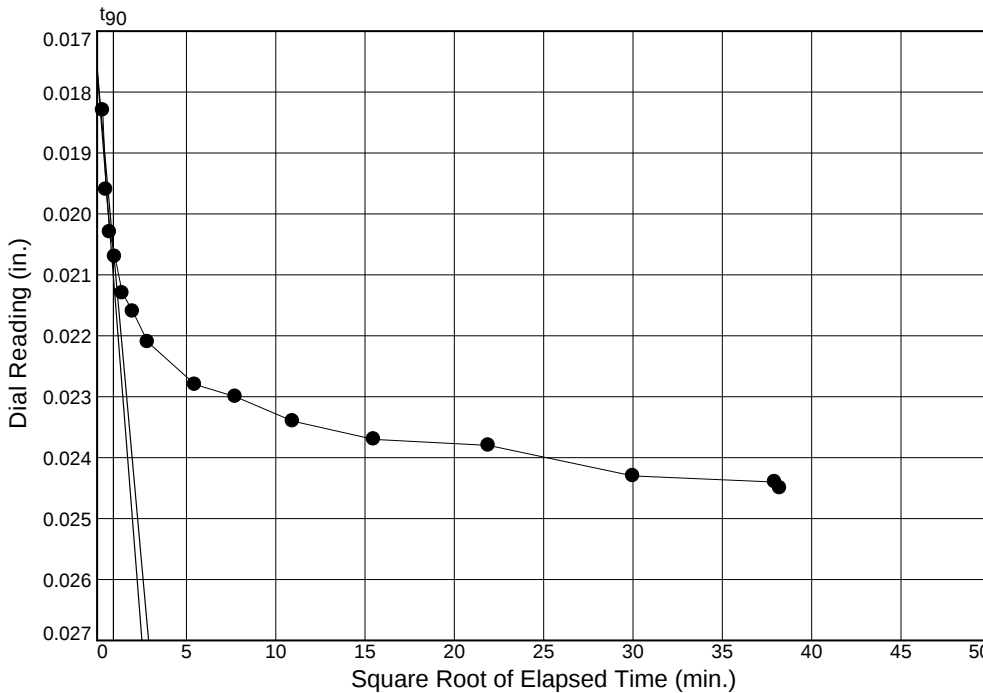
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 3
Load= 0.50 ksf
 $D_0 = 0.0065$
 $D_{90} = 0.0084$
 $D_{100} = 0.0086$
 $T_{90} = 0.50 \text{ min.}$

$C_v @ T_{90}$
4.285 ft.²/day



Load No.= 4
Load= 1.00 ksf
 $D_0 = 0.0176$
 $D_{90} = 0.0206$
 $D_{100} = 0.0209$
 $T_{90} = 0.83 \text{ min.}$

$C_v @ T_{90}$
2.548 ft.²/day

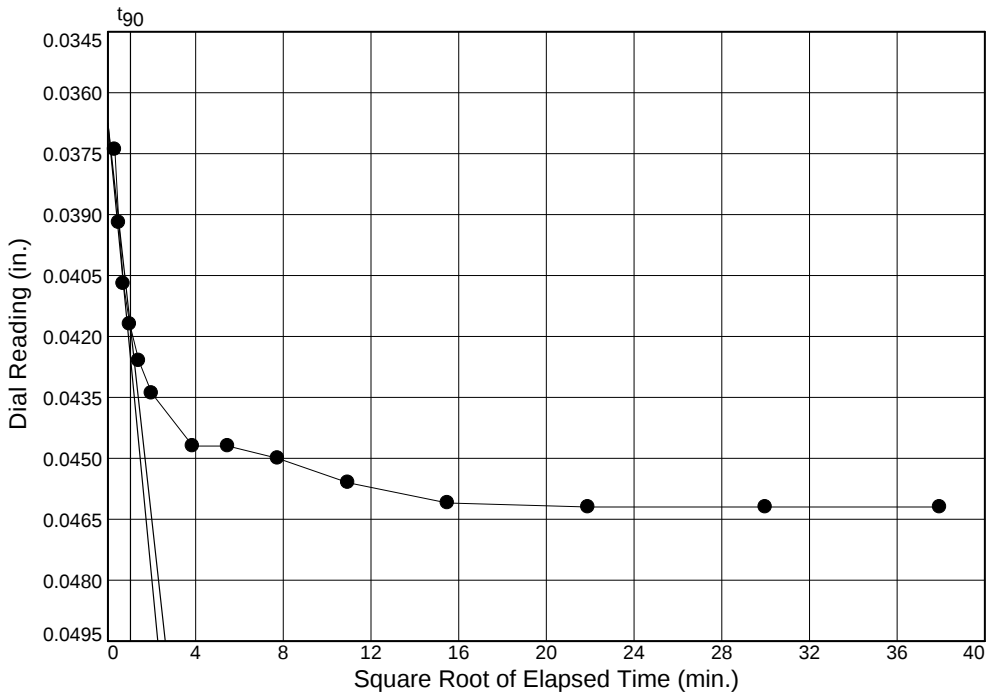
Figure L_24 ST-

S & ME, INC.

Dial Reading vs. Time

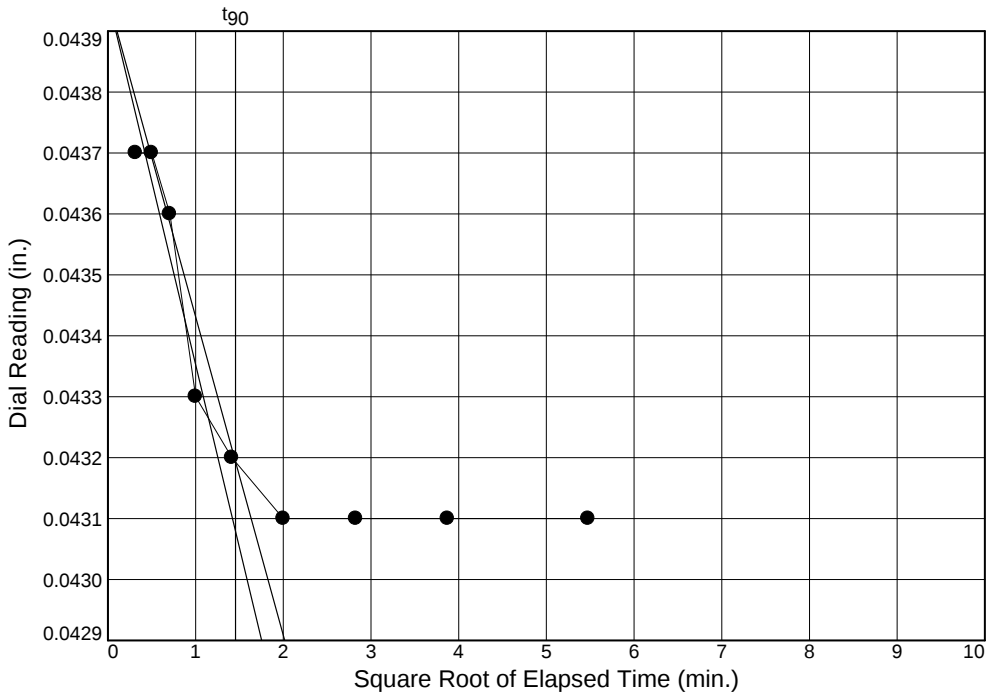
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 5
Load= 2.00 ksf
 $D_0 = 0.0368$
 $D_{90} = 0.0418$
 $D_{100} = 0.0423$
 $T_{90} = 1.05 \text{ min.}$

$C_v @ T_{90}$
1.924 ft.²/day



Load No.= 6
Load= 0.50 ksf
 $D_0 = 0.0440$
 $D_{90} = 0.0432$
 $D_{100} = 0.0431$
 $T_{90} = 2.12 \text{ min.}$

$C_v @ T_{90}$
0.940 ft.²/day

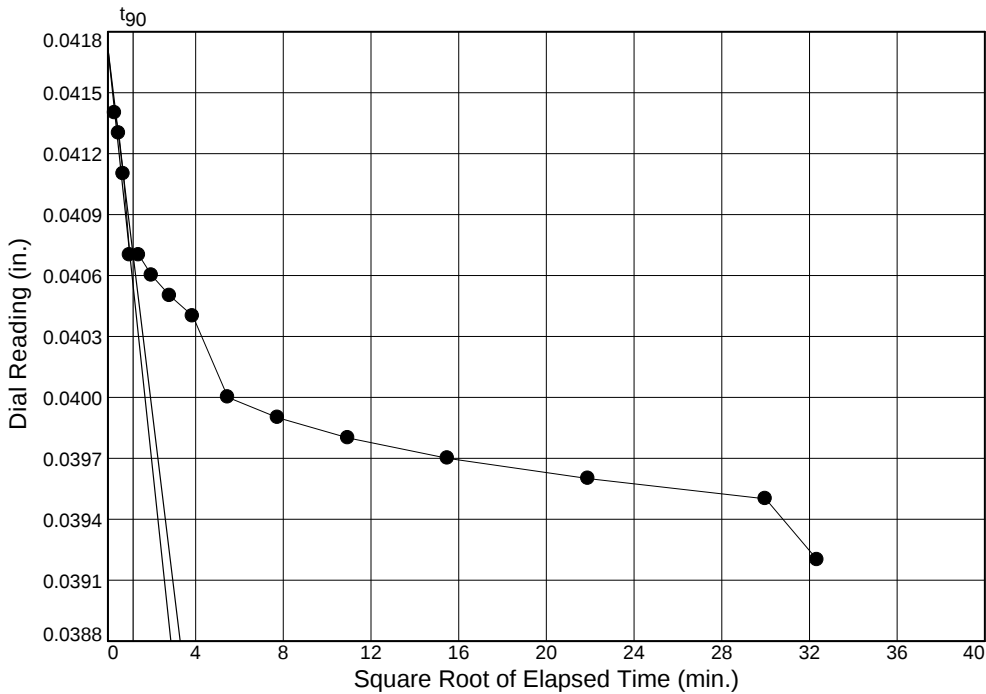
Figure L_24 ST-

S & ME, INC.

Dial Reading vs. Time

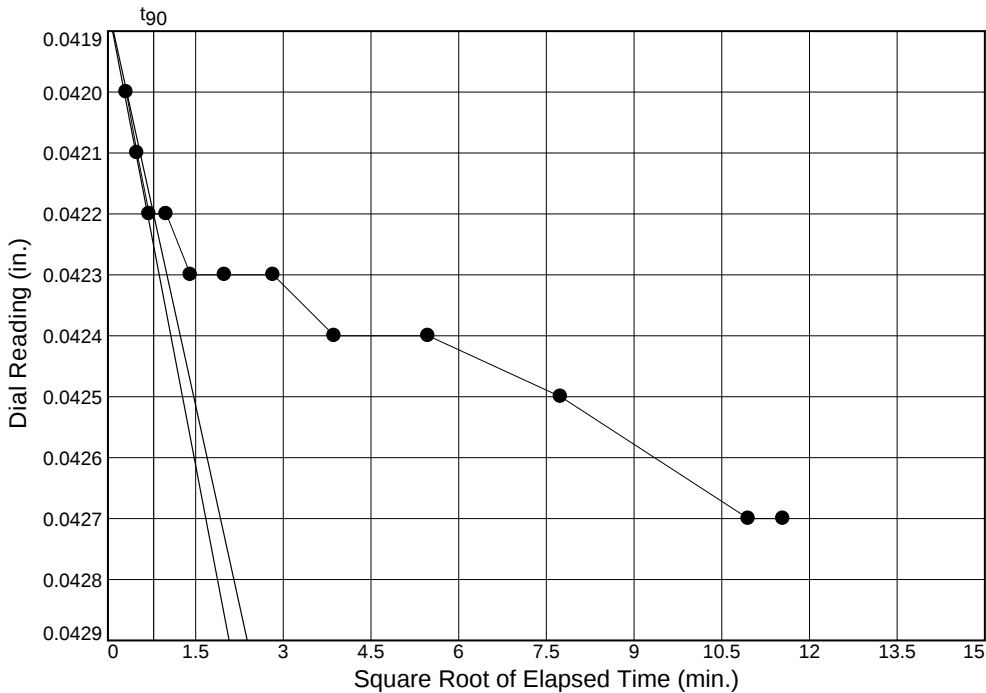
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 7
Load= 0.25 ksf
 $D_0 = 0.0417$
 $D_{90} = 0.0407$
 $D_{100} = 0.0406$
 $T_{90} = 1.33 \text{ min.}$

$C_v @ T_{90}$
1.512 ft.²/day



Load No.= 8
Load= 1.00 ksf
 $D_0 = 0.0419$
 $D_{90} = 0.0422$
 $D_{100} = 0.0422$
 $T_{90} = 0.61 \text{ min.}$

$C_v @ T_{90}$
3.276 ft.²/day

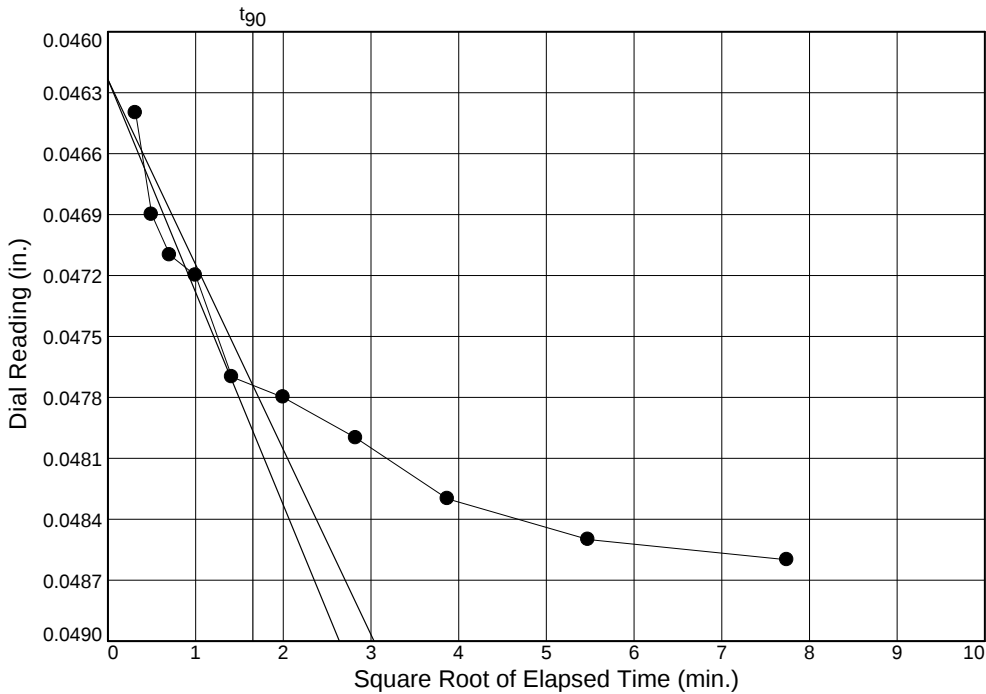
Figure L_24 ST-

S & ME, INC.

Dial Reading vs. Time

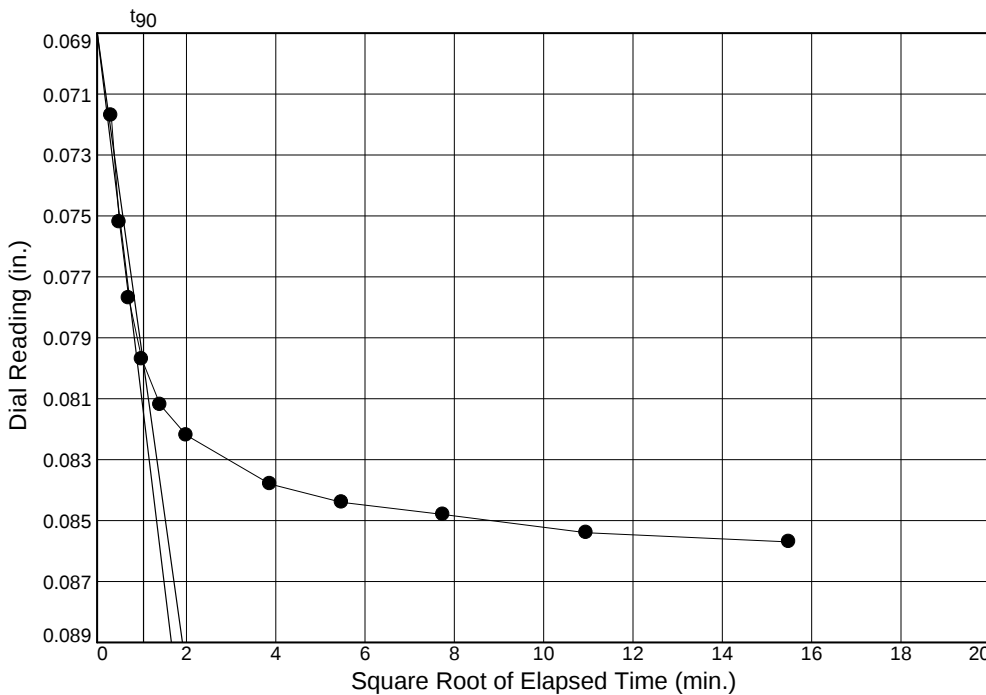
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 9
Load= 2.00 ksf
 $D_0 = 0.0462$
 $D_{90} = 0.0477$
 $D_{100} = 0.0479$
 $T_{90} = 2.73 \text{ min.}$

$C_v @ T_{90}$
0.726 ft.²/day



Load No.= 10
Load= 4.00 ksf
 $D_0 = 0.0689$
 $D_{90} = 0.0798$
 $D_{100} = 0.0811$
 $T_{90} = 1.08 \text{ min.}$

$C_v @ T_{90}$
1.760 ft.²/day

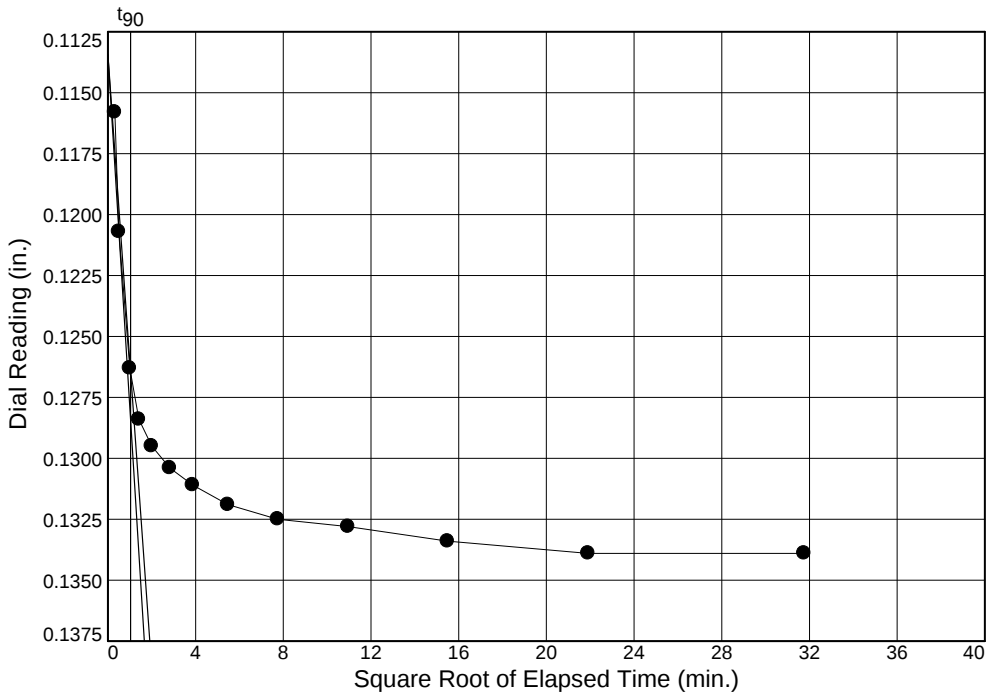
Figure L_24 ST-

S & ME, INC.

Dial Reading vs. Time

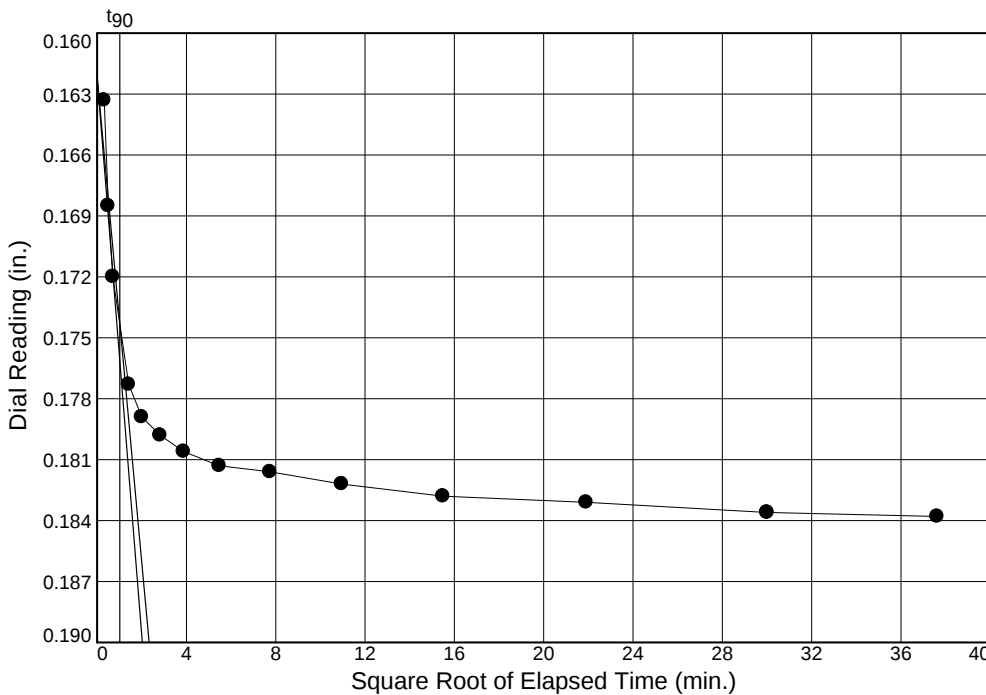
Project No.: 6235-18-038
Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole Depth: 4-6' Sample Number: L_24 ST-101



Load No.= 11
Load= 8.00 ksf
 $D_0 = 0.1134$
 $D_{90} = 0.1265$
 $D_{100} = 0.1279$
 $T_{90} = 1.07 \text{ min.}$

$C_v @ T_{90}$
1.616 ft.²/day



Load No.= 12
Load= 16.00 ksf
 $D_0 = 0.1622$
 $D_{90} = 0.1743$
 $D_{100} = 0.1757$
 $T_{90} = 1.03 \text{ min.}$

$C_v @ T_{90}$
1.500 ft.²/day

Figure L_24 ST-

S & ME, INC.

TRIAXIAL COMPRESSION TEST				5/13/2020			
CU with Pore Pressures				4:44 PM			
Date:	3/16/2020 - 4/6/2020						
Client:	Rummel, Klepper & Kahn, LLP						
Project:	U-5810 Watauga Co. SR 1514 and SR 1523						
Project No.:	6235-18-038						
Location:	Borehole						
Depth:	12.0-14.0'	Sample Number:	Y3_2 ST-1				
Description:	A-6(9)						
Remarks:	Due to limited material only 2 specimens were tested. Specimen S-1 was a softer material, S-3 contained stone fragments mixed through out. Both specimens failed in shear (ASTM D4767).						
Type of Sample:	Undisturbed						
Assumed Specific Gravity=	2.5	LL=	37	PL=	25	PI=	12
Test Method:	COE uniform strain						
Parameters for Specimen No. 1							
Specimen Parameter	Initial	Saturated	Consolidated	Final			
Moisture content: Moist soil+tare, gms.	224.700			349.510			
Moisture content: Dry soil+tare, gms.	195.690			273.190			
Moisture content: Tare, gms.	86.650			72.310			
Moisture, %	26.6	29.9	27.9	38.0			
Moist specimen weight, gms.	1101.54						
Diameter, in.	2.834	2.831	2.803				
Area, in. ²	6.308	6.293	6.171				
Height, in.	5.902	5.895	5.838				
Net decrease in height, in.		0.007	0.057				
Wet density, pcf	112.7	116.0	117.6				
Dry density, pcf	89.0	89.3	92.0				
Void ratio	0.7530	0.7468	0.6964				
Saturation, %	88.3	100.0	100.0				
Test Readings for Specimen No. 1							
Consolidation cell pressure = 70.00 psi (10.08 ksf)							
Consolidation back pressure = 60.00 psi (8.64 ksf)							
Consolidation effective confining stress = 1.44 ksf							
Strain rate, in./min. = 0.004							
Fail. Stress = 2.05 ksf at reading no. 72							
Ult. Stress = 2.12 ksf at reading no. 221							
S & ME, INC.							

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	22.400	0.0	0.0	0.00	1.44	1.44	1.00	60.00	1.44	0.00
1	0.0030	37.200	14.8	0.1	0.35	1.24	1.58	1.28	61.40	1.41	0.17
2	0.0070	44.100	21.7	0.1	0.51	1.15	1.66	1.44	62.00	1.40	0.25
3	0.0110	48.000	25.6	0.2	0.60	1.11	1.71	1.54	62.30	1.41	0.30
4	0.0150	51.100	28.7	0.3	0.67	1.08	1.75	1.62	62.50	1.41	0.33
5	0.0190	53.400	31.0	0.3	0.72	1.05	1.77	1.69	62.70	1.41	0.36
6	0.0230	55.000	32.6	0.4	0.76	1.02	1.78	1.74	62.90	1.40	0.38
7	0.0270	57.300	34.9	0.5	0.81	0.99	1.80	1.82	63.10	1.40	0.41
8	0.0310	59.600	37.2	0.5	0.86	0.98	1.84	1.88	63.20	1.41	0.43
9	0.0350	61.100	38.7	0.6	0.90	0.96	1.86	1.93	63.30	1.41	0.45
10	0.0390	63.500	41.1	0.7	0.95	0.94	1.89	2.02	63.50	1.41	0.48
11	0.0430	65.000	42.6	0.7	0.99	0.94	1.92	2.05	63.50	1.43	0.49
12	0.0470	66.700	44.3	0.8	1.03	0.92	1.95	2.11	63.60	1.43	0.51
13	0.0510	68.100	45.7	0.9	1.06	0.91	1.96	2.17	63.70	1.44	0.53
14	0.0550	69.700	47.3	0.9	1.09	0.89	1.99	2.22	63.80	1.44	0.55
15	0.0590	71.200	48.8	1.0	1.13	0.88	2.01	2.28	63.90	1.44	0.56
16	0.0630	72.800	50.4	1.1	1.16	0.88	2.04	2.32	63.90	1.46	0.58
17	0.0670	74.300	51.9	1.1	1.20	0.86	2.06	2.39	64.00	1.46	0.60
18	0.0710	75.100	52.7	1.2	1.21	0.86	2.08	2.41	64.00	1.47	0.61
19	0.0750	76.600	54.2	1.3	1.25	0.85	2.10	2.47	64.10	1.47	0.62
20	0.0780	78.200	55.8	1.3	1.28	0.85	2.13	2.51	64.10	1.49	0.64
21	0.0830	79.700	57.3	1.4	1.32	0.85	2.17	2.55	64.10	1.51	0.66
22	0.0870	80.500	58.1	1.5	1.34	0.85	2.19	2.57	64.10	1.52	0.67
23	0.0910	81.300	58.9	1.6	1.35	0.84	2.19	2.62	64.20	1.51	0.68
24	0.0950	82.800	60.4	1.6	1.39	0.84	2.22	2.66	64.20	1.53	0.69
25	0.0990	83.600	61.2	1.7	1.40	0.84	2.24	2.68	64.20	1.54	0.70
26	0.1030	85.100	62.7	1.8	1.44	0.82	2.26	2.75	64.30	1.54	0.72
27	0.1070	85.900	63.5	1.8	1.45	0.82	2.28	2.77	64.30	1.55	0.73
28	0.1100	87.500	65.1	1.9	1.49	0.82	2.31	2.82	64.30	1.57	0.75
29	0.1140	88.200	65.8	2.0	1.51	0.82	2.33	2.83	64.30	1.57	0.75
30	0.1180	89.000	66.6	2.0	1.52	0.82	2.34	2.86	64.30	1.58	0.76
31	0.1220	89.800	67.4	2.1	1.54	0.82	2.36	2.88	64.30	1.59	0.77
32	0.1270	91.300	68.9	2.2	1.57	0.82	2.39	2.92	64.30	1.61	0.79
33	0.1300	92.100	69.7	2.2	1.59	0.82	2.41	2.94	64.30	1.62	0.80
34	0.1340	92.900	70.5	2.3	1.61	0.82	2.43	2.96	64.30	1.62	0.80
35	0.1380	93.700	71.3	2.4	1.62	0.82	2.45	2.98	64.30	1.63	0.81
36	0.1420	94.400	72.0	2.4	1.64	0.82	2.46	3.00	64.30	1.64	0.82
37	0.1460	95.200	72.8	2.5	1.66	0.82	2.48	3.02	64.30	1.65	0.83
38	0.1500	96.000	73.6	2.6	1.67	0.82	2.49	3.04	64.30	1.66	0.84
39	0.1540	96.700	74.3	2.6	1.69	0.82	2.51	3.06	64.30	1.66	0.84
40	0.1580	98.300	75.9	2.7	1.72	0.82	2.54	3.10	64.30	1.68	0.86
41	0.1620	98.300	75.9	2.8	1.72	0.81	2.53	3.14	64.40	1.67	0.86
42	0.1660	99.100	76.7	2.8	1.74	0.81	2.55	3.16	64.40	1.68	0.87
43	0.1700	99.800	77.4	2.9	1.75	0.81	2.56	3.17	64.40	1.68	0.88
44	0.1740	100.600	78.2	3.0	1.77	0.81	2.58	3.20	64.40	1.69	0.89
45	0.1780	101.400	79.0	3.0	1.79	0.79	2.58	3.26	64.50	1.69	0.89
46	0.1820	102.200	79.8	3.1	1.80	0.81	2.61	3.24	64.40	1.71	0.90
S & ME, INC.											

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	0.1860	102.200	79.8	3.2	1.80	0.81	2.61	3.24	64.40	1.71	0.90
48	0.1900	103.700	81.3	3.3	1.84	0.81	2.64	3.28	64.40	1.72	0.92
49	0.1940	103.700	81.3	3.3	1.83	0.81	2.64	3.27	64.40	1.72	0.92
50	0.1980	104.500	82.1	3.4	1.85	0.81	2.66	3.30	64.40	1.73	0.93
51	0.2030	104.500	82.1	3.5	1.85	0.81	2.66	3.29	64.40	1.73	0.92
52	0.2070	105.300	82.9	3.5	1.87	0.81	2.67	3.31	64.40	1.74	0.93
53	0.2110	106.000	83.6	3.6	1.88	0.81	2.69	3.33	64.40	1.75	0.94
54	0.2140	106.800	84.4	3.7	1.90	0.81	2.70	3.35	64.40	1.76	0.95
55	0.2180	106.800	84.4	3.7	1.90	0.81	2.70	3.35	64.40	1.75	0.95
56	0.2230	107.600	85.2	3.8	1.91	0.81	2.72	3.37	64.40	1.76	0.96
57	0.2270	108.400	86.0	3.9	1.93	0.81	2.74	3.39	64.40	1.77	0.96
58	0.2310	108.400	86.0	4.0	1.93	0.81	2.73	3.39	64.40	1.77	0.96
59	0.2350	109.100	86.7	4.0	1.94	0.81	2.75	3.41	64.40	1.78	0.97
60	0.2390	109.900	87.5	4.1	1.96	0.81	2.76	3.43	64.40	1.79	0.98
61	0.2430	109.900	87.5	4.2	1.96	0.82	2.78	3.38	64.30	1.80	0.98
62	0.2470	110.700	88.3	4.2	1.97	0.82	2.79	3.40	64.30	1.81	0.99
63	0.2500	111.500	89.1	4.3	1.99	0.82	2.81	3.42	64.30	1.82	1.00
64	0.2540	111.500	89.1	4.4	1.99	0.82	2.81	3.42	64.30	1.82	0.99
65	0.2580	112.200	89.8	4.4	2.00	0.82	2.82	3.44	64.30	1.82	1.00
66	0.2620	112.200	89.8	4.5	2.00	0.82	2.82	3.44	64.30	1.82	1.00
67	0.2660	113.000	90.6	4.6	2.02	0.82	2.84	3.46	64.30	1.83	1.01
68	0.2700	113.000	90.6	4.6	2.02	0.82	2.84	3.46	64.30	1.83	1.01
69	0.2740	113.800	91.4	4.7	2.03	0.82	2.85	3.48	64.30	1.84	1.02
70	0.2770	113.800	91.4	4.7	2.03	0.82	2.85	3.48	64.30	1.84	1.02
71	0.2820	114.600	92.2	4.8	2.05	0.82	2.87	3.49	64.30	1.84	1.02
72	0.2860	114.600	92.2	4.9	2.05	0.82	2.87	3.49	64.30	1.84	1.02
73	0.2900	115.300	92.9	5.0	2.06	0.84	2.90	3.47	64.20	1.87	1.03
74	0.2940	115.300	92.9	5.0	2.06	0.84	2.89	3.46	64.20	1.86	1.03
75	0.2980	116.100	93.7	5.1	2.07	0.84	2.91	3.48	64.20	1.87	1.04
76	0.3020	116.100	93.7	5.2	2.07	0.84	2.91	3.48	64.20	1.87	1.04
77	0.3060	116.900	94.5	5.2	2.09	0.84	2.92	3.50	64.20	1.88	1.04
78	0.3100	116.900	94.5	5.3	2.09	0.84	2.92	3.50	64.20	1.88	1.04
79	0.3140	117.600	95.2	5.4	2.10	0.85	2.95	3.47	64.10	1.90	1.05
80	0.3180	117.600	95.2	5.4	2.10	0.85	2.95	3.47	64.10	1.90	1.05
81	0.3220	118.400	96.0	5.5	2.12	0.85	2.97	3.49	64.10	1.91	1.06
82	0.3260	117.600	95.2	5.6	2.10	0.85	2.95	3.47	64.10	1.90	1.05
83	0.3300	118.400	96.0	5.7	2.11	0.85	2.96	3.49	64.10	1.91	1.06
84	0.3340	118.400	96.0	5.7	2.11	0.85	2.96	3.49	64.10	1.91	1.06
85	0.3380	119.200	96.8	5.8	2.13	0.85	2.98	3.50	64.10	1.91	1.06
86	0.3420	119.200	96.8	5.9	2.13	0.85	2.98	3.50	64.10	1.91	1.06
87	0.3460	120.000	97.6	5.9	2.14	0.85	2.99	3.52	64.10	1.92	1.07
88	0.3500	120.000	97.6	6.0	2.14	0.86	3.00	3.48	64.00	1.93	1.07
89	0.3540	120.000	97.6	6.1	2.14	0.86	3.00	3.48	64.00	1.93	1.07
90	0.3580	120.700	98.3	6.1	2.15	0.86	3.02	3.49	64.00	1.94	1.08
91	0.3620	120.700	98.3	6.2	2.15	0.86	3.02	3.49	64.00	1.94	1.08
92	0.3660	121.500	99.1	6.3	2.17	0.86	3.03	3.51	64.00	1.95	1.08
93	0.3700	121.500	99.1	6.3	2.17	0.86	3.03	3.51	64.00	1.95	1.08
S & ME, INC.											

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
94	0.3740	121.500	99.1	6.4	2.16	0.88	3.04	3.46	63.90	1.96	1.08
95	0.3780	121.500	99.1	6.5	2.16	0.88	3.04	3.46	63.90	1.96	1.08
96	0.3820	122.300	99.9	6.5	2.18	0.88	3.06	3.48	63.90	1.97	1.09
97	0.3860	122.200	99.8	6.6	2.17	0.86	3.04	3.52	64.00	1.95	1.09
98	0.3900	122.300	99.9	6.7	2.18	0.86	3.04	3.52	64.00	1.95	1.09
99	0.3940	123.100	100.7	6.7	2.19	0.86	3.06	3.54	64.00	1.96	1.10
100	0.3980	123.100	100.7	6.8	2.19	0.86	3.05	3.53	64.00	1.96	1.09
101	0.4020	123.100	100.7	6.9	2.19	0.88	3.07	3.49	63.90	1.97	1.09
102	0.4060	123.800	101.4	7.0	2.20	0.88	3.08	3.51	63.90	1.98	1.10
103	0.4100	123.800	101.4	7.0	2.20	0.88	3.08	3.50	63.90	1.98	1.10
104	0.4140	124.600	102.2	7.1	2.22	0.88	3.09	3.52	63.90	1.99	1.11
105	0.4180	124.600	102.2	7.2	2.21	0.88	3.09	3.52	63.90	1.99	1.11
106	0.4220	124.600	102.2	7.2	2.21	0.88	3.09	3.52	63.90	1.98	1.11
107	0.4260	124.600	102.2	7.3	2.21	0.88	3.09	3.52	63.90	1.98	1.11
108	0.4300	125.400	103.0	7.4	2.23	0.88	3.10	3.53	63.90	1.99	1.11
109	0.4340	125.400	103.0	7.4	2.22	0.88	3.10	3.53	63.90	1.99	1.11
110	0.4380	125.400	103.0	7.5	2.22	0.88	3.10	3.53	63.90	1.99	1.11
111	0.4420	125.400	103.0	7.6	2.22	0.89	3.11	3.49	63.80	2.00	1.11
112	0.4460	126.200	103.8	7.6	2.24	0.89	3.13	3.51	63.80	2.01	1.12
113	0.4500	126.200	103.8	7.7	2.24	0.89	3.13	3.50	63.80	2.01	1.12
114	0.4540	126.200	103.8	7.8	2.23	0.89	3.13	3.50	63.80	2.01	1.12
115	0.4580	126.200	103.8	7.8	2.23	0.89	3.12	3.50	63.80	2.01	1.12
116	0.4620	126.200	103.8	7.9	2.23	0.89	3.12	3.50	63.80	2.01	1.12
117	0.4650	126.900	104.5	8.0	2.24	0.91	3.15	3.47	63.70	2.03	1.12
118	0.4690	126.900	104.5	8.0	2.24	0.91	3.15	3.47	63.70	2.03	1.12
119	0.4740	126.900	104.5	8.1	2.24	0.91	3.15	3.47	63.70	2.03	1.12
120	0.4780	127.700	105.3	8.2	2.26	0.91	3.16	3.49	63.70	2.04	1.13
121	0.4820	127.700	105.3	8.3	2.25	0.91	3.16	3.48	63.70	2.03	1.13
122	0.4860	127.700	105.3	8.3	2.25	0.91	3.16	3.48	63.70	2.03	1.13
123	0.4900	127.700	105.3	8.4	2.25	0.91	3.16	3.48	63.70	2.03	1.13
124	0.4940	127.700	105.3	8.5	2.25	0.91	3.16	3.48	63.70	2.03	1.12
125	0.4980	127.700	105.3	8.5	2.25	0.91	3.15	3.48	63.70	2.03	1.12
126	0.5020	128.500	106.1	8.6	2.26	0.92	3.18	3.46	63.60	2.05	1.13
127	0.5060	128.500	106.1	8.7	2.26	0.92	3.18	3.45	63.60	2.05	1.13
128	0.5100	128.500	106.1	8.7	2.26	0.92	3.18	3.45	63.60	2.05	1.13
129	0.5140	128.500	106.1	8.8	2.26	0.92	3.18	3.45	63.60	2.05	1.13
130	0.5180	128.500	106.1	8.9	2.26	0.92	3.18	3.45	63.60	2.05	1.13
131	0.5220	128.500	106.1	8.9	2.25	0.92	3.18	3.45	63.60	2.05	1.13
132	0.5260	129.300	106.9	9.0	2.27	0.94	3.21	3.42	63.50	2.07	1.13
133	0.5300	129.300	106.9	9.1	2.27	0.94	3.20	3.42	63.50	2.07	1.13
134	0.5340	129.300	106.9	9.1	2.27	0.94	3.20	3.42	63.50	2.07	1.13
135	0.5380	129.300	106.9	9.2	2.26	0.94	3.20	3.42	63.50	2.07	1.13
136	0.5420	129.300	106.9	9.3	2.26	0.94	3.20	3.42	63.50	2.07	1.13
137	0.5460	129.300	106.9	9.4	2.26	0.94	3.20	3.42	63.50	2.07	1.13
138	0.5500	130.000	107.6	9.4	2.27	0.94	3.21	3.43	63.50	2.07	1.14
139	0.5540	130.000	107.6	9.5	2.27	0.94	3.21	3.43	63.50	2.07	1.14
140	0.5580	130.000	107.6	9.6	2.27	0.95	3.22	3.39	63.40	2.09	1.14
S & ME, INC.											

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
141	0.5620	130.000	107.6	9.6	2.27	0.95	3.22	3.39	63.40	2.08	1.13
142	0.5660	130.000	107.6	9.7	2.27	0.95	3.22	3.39	63.40	2.08	1.13
143	0.5700	130.000	107.6	9.8	2.27	0.95	3.22	3.38	63.40	2.08	1.13
144	0.5740	130.000	107.6	9.8	2.26	0.95	3.21	3.38	63.40	2.08	1.13
145	0.5780	130.000	107.6	9.9	2.26	0.95	3.21	3.38	63.40	2.08	1.13
146	0.5820	130.000	107.6	10.0	2.26	0.96	3.23	3.34	63.30	2.10	1.13
147	0.5860	130.000	107.6	10.0	2.26	0.96	3.22	3.34	63.30	2.09	1.13
148	0.5900	130.000	107.6	10.1	2.26	0.96	3.22	3.34	63.30	2.09	1.13
149	0.5940	130.000	107.6	10.2	2.26	0.96	3.22	3.34	63.30	2.09	1.13
150	0.5980	130.000	107.6	10.2	2.25	0.96	3.22	3.34	63.30	2.09	1.13
151	0.6020	130.000	107.6	10.3	2.25	0.96	3.22	3.33	63.30	2.09	1.13
152	0.6060	130.800	108.4	10.4	2.27	0.96	3.23	3.35	63.30	2.10	1.13
153	0.6100	130.800	108.4	10.4	2.27	0.96	3.23	3.35	63.30	2.10	1.13
154	0.6140	130.000	107.6	10.5	2.25	0.96	3.21	3.33	63.30	2.09	1.12
155	0.6180	130.000	107.6	10.6	2.24	0.96	3.21	3.33	63.30	2.09	1.12
156	0.6230	130.800	108.4	10.7	2.26	0.96	3.22	3.34	63.30	2.09	1.13
157	0.6260	130.800	108.4	10.7	2.26	0.96	3.22	3.34	63.30	2.09	1.13
158	0.6300	130.800	108.4	10.8	2.26	0.96	3.22	3.34	63.30	2.09	1.13
159	0.6340	130.800	108.4	10.9	2.25	0.96	3.22	3.34	63.30	2.09	1.13
160	0.6380	130.000	107.6	10.9	2.24	0.96	3.20	3.32	63.30	2.08	1.12
161	0.6420	130.000	107.6	11.0	2.23	0.98	3.21	3.28	63.20	2.10	1.12
162	0.6460	130.000	107.6	11.1	2.23	0.98	3.21	3.28	63.20	2.10	1.12
163	0.6500	130.000	107.6	11.1	2.23	0.98	3.21	3.28	63.20	2.09	1.12
164	0.6530	130.000	107.6	11.2	2.23	0.98	3.21	3.28	63.20	2.09	1.11
165	0.6570	130.000	107.6	11.3	2.23	0.98	3.21	3.28	63.20	2.09	1.11
166	0.6610	130.000	107.6	11.3	2.23	0.98	3.21	3.27	63.20	2.09	1.11
167	0.6650	130.000	107.6	11.4	2.22	0.98	3.20	3.27	63.20	2.09	1.11
168	0.6690	130.000	107.6	11.5	2.22	0.98	3.20	3.27	63.20	2.09	1.11
169	0.6730	129.300	106.9	11.5	2.21	0.99	3.20	3.22	63.10	2.10	1.10
170	0.6770	129.300	106.9	11.6	2.21	0.99	3.20	3.22	63.10	2.10	1.10
171	0.6820	129.300	106.9	11.7	2.20	0.99	3.20	3.22	63.10	2.10	1.10
172	0.6860	129.300	106.9	11.8	2.20	0.99	3.19	3.22	63.10	2.09	1.10
173	0.6890	129.300	106.9	11.8	2.20	0.99	3.19	3.21	63.10	2.09	1.10
174	0.6930	129.300	106.9	11.9	2.20	0.99	3.19	3.21	63.10	2.09	1.10
175	0.6970	129.300	106.9	11.9	2.20	0.99	3.19	3.21	63.10	2.09	1.10
176	0.7010	129.300	106.9	12.0	2.19	1.01	3.20	3.18	63.00	2.11	1.10
177	0.7050	129.300	106.9	12.1	2.19	1.01	3.20	3.18	63.00	2.10	1.10
178	0.7090	129.300	106.9	12.1	2.19	1.01	3.20	3.17	63.00	2.10	1.10
179	0.7130	129.300	106.9	12.2	2.19	1.01	3.20	3.17	63.00	2.10	1.09
180	0.7170	129.300	106.9	12.3	2.19	1.01	3.20	3.17	63.00	2.10	1.09
181	0.7210	129.300	106.9	12.4	2.19	1.01	3.19	3.17	63.00	2.10	1.09
182	0.7250	129.300	106.9	12.4	2.18	1.01	3.19	3.17	63.00	2.10	1.09
183	0.7290	129.300	106.9	12.5	2.18	1.01	3.19	3.17	63.00	2.10	1.09
184	0.7330	129.300	106.9	12.6	2.18	1.01	3.19	3.16	63.00	2.10	1.09
185	0.7370	129.300	106.9	12.6	2.18	1.01	3.19	3.16	63.00	2.10	1.09
186	0.7410	129.300	106.9	12.7	2.18	1.01	3.19	3.16	63.00	2.10	1.09
187	0.7450	129.300	106.9	12.8	2.18	1.01	3.18	3.16	63.00	2.10	1.09
S & ME, INC.											

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
188	0.7490	129.300	106.9	12.8	2.17	1.02	3.20	3.13	62.90	2.11	1.09
189	0.7530	129.300	106.9	12.9	2.17	1.02	3.20	3.13	62.90	2.11	1.09
190	0.7570	129.300	106.9	13.0	2.17	1.02	3.19	3.12	62.90	2.11	1.09
191	0.7610	129.300	106.9	13.0	2.17	1.02	3.19	3.12	62.90	2.11	1.08
192	0.7650	129.300	106.9	13.1	2.17	1.02	3.19	3.12	62.90	2.11	1.08
193	0.7690	129.300	106.9	13.2	2.17	1.02	3.19	3.12	62.90	2.11	1.08
194	0.7730	129.300	106.9	13.2	2.16	1.02	3.19	3.12	62.90	2.10	1.08
195	0.7770	129.300	106.9	13.3	2.16	1.02	3.18	3.12	62.90	2.10	1.08
196	0.7810	129.300	106.9	13.4	2.16	1.04	3.20	3.08	62.80	2.12	1.08
197	0.7850	129.300	106.9	13.4	2.16	1.04	3.20	3.08	62.80	2.12	1.08
198	0.7890	129.300	106.9	13.5	2.16	1.04	3.19	3.08	62.80	2.12	1.08
199	0.7930	129.300	106.9	13.6	2.16	1.04	3.19	3.08	62.80	2.11	1.08
200	0.7970	129.300	106.9	13.7	2.15	1.04	3.19	3.08	62.80	2.11	1.08
201	0.8010	129.300	106.9	13.7	2.15	1.04	3.19	3.08	62.80	2.11	1.08
202	0.8050	129.300	106.9	13.8	2.15	1.04	3.19	3.07	62.80	2.11	1.08
203	0.8090	130.000	107.6	13.9	2.16	1.04	3.20	3.09	62.80	2.12	1.08
204	0.8130	129.300	106.9	13.9	2.15	1.04	3.18	3.07	62.80	2.11	1.07
205	0.8170	129.300	106.9	14.0	2.15	1.04	3.18	3.07	62.80	2.11	1.07
206	0.8210	129.300	106.9	14.1	2.14	1.04	3.18	3.07	62.80	2.11	1.07
207	0.8250	129.300	106.9	14.1	2.14	1.04	3.18	3.07	62.80	2.11	1.07
208	0.8290	130.000	107.6	14.2	2.15	1.04	3.19	3.08	62.80	2.11	1.08
209	0.8320	130.000	107.6	14.3	2.15	1.04	3.19	3.08	62.80	2.11	1.08
210	0.8360	129.300	106.9	14.3	2.14	1.04	3.17	3.06	62.80	2.11	1.07
211	0.8400	129.300	106.9	14.4	2.14	1.04	3.17	3.06	62.80	2.10	1.07
212	0.8440	129.300	106.9	14.5	2.13	1.04	3.17	3.06	62.80	2.10	1.07
213	0.8480	129.300	106.9	14.5	2.13	1.04	3.17	3.06	62.80	2.10	1.07
214	0.8520	129.300	106.9	14.6	2.13	1.04	3.17	3.05	62.80	2.10	1.07
215	0.8560	129.300	106.9	14.7	2.13	1.04	3.17	3.05	62.80	2.10	1.06
216	0.8590	129.300	106.9	14.7	2.13	1.04	3.16	3.05	62.80	2.10	1.06
217	0.8630	129.300	106.9	14.8	2.13	1.04	3.16	3.05	62.80	2.10	1.06
218	0.8670	129.300	106.9	14.9	2.12	1.04	3.16	3.05	62.80	2.10	1.06
219	0.8720	129.300	106.9	14.9	2.12	1.04	3.16	3.05	62.80	2.10	1.06
220	0.8760	129.300	106.9	15.0	2.12	1.04	3.16	3.04	62.80	2.10	1.06
221	0.8780	129.300	106.9	15.0	2.12	1.05	3.17	3.02	62.70	2.11	1.06
S & ME, INC.											

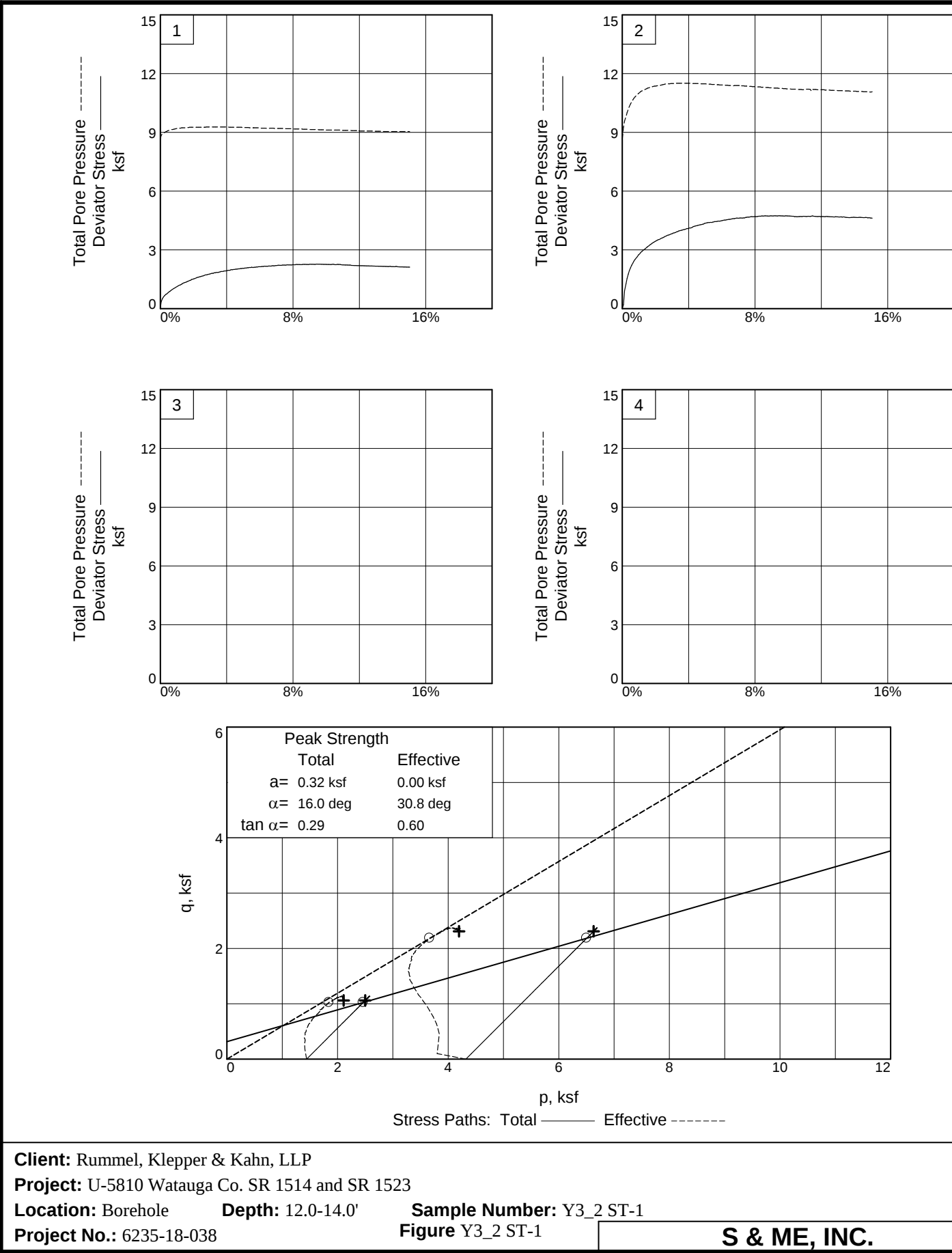
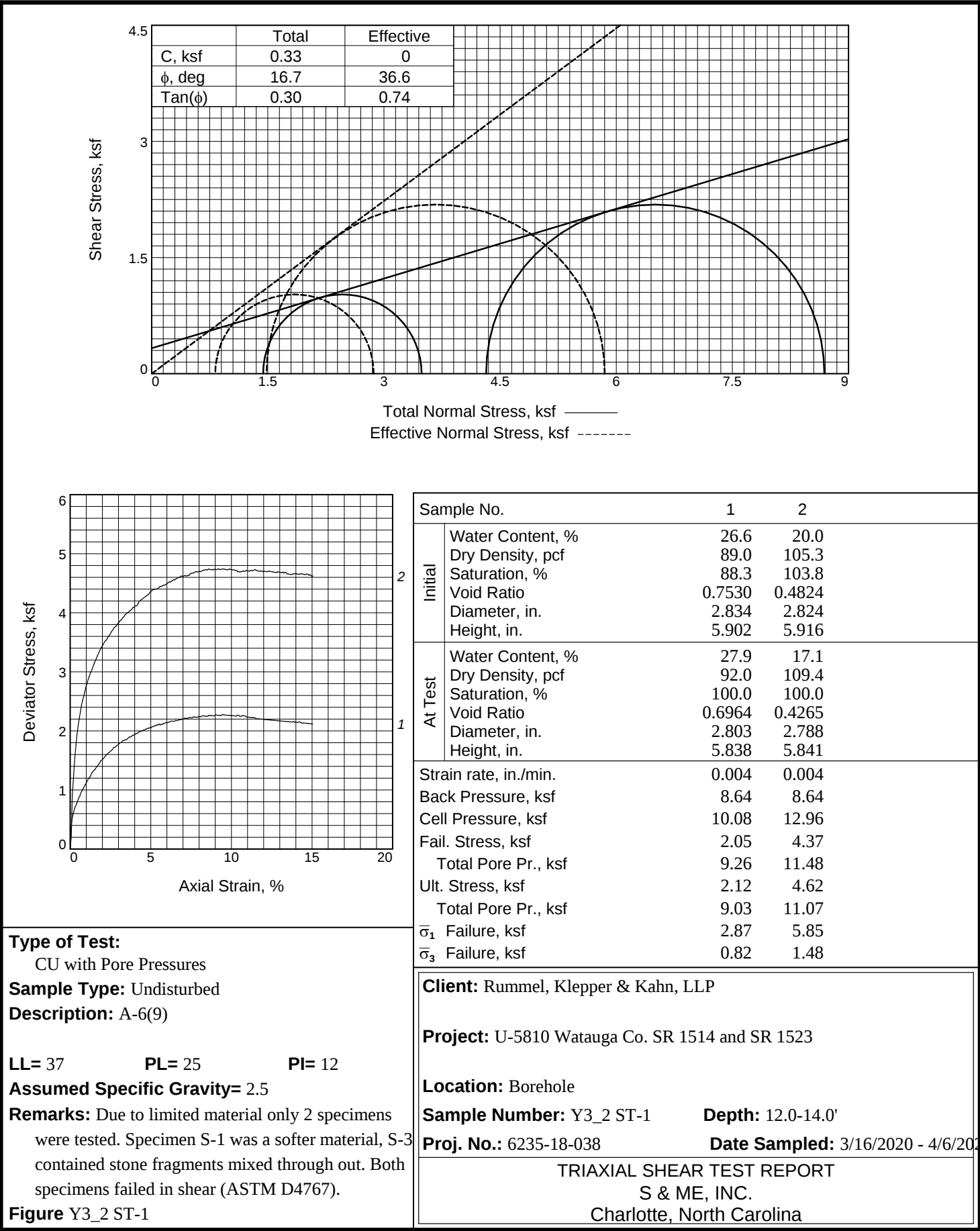
Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
26	0.1060	154.800	144.7	1.8	3.35	1.63	4.98	3.06	78.70	3.30	1.68
27	0.1100	156.300	146.2	1.9	3.38	1.61	5.00	3.10	78.80	3.30	1.69
28	0.1140	157.900	147.8	2.0	3.42	1.60	5.02	3.14	78.90	3.31	1.71
29	0.1180	159.400	149.3	2.0	3.45	1.60	5.05	3.16	78.90	3.32	1.73
30	0.1220	161.000	150.9	2.1	3.49	1.58	5.07	3.20	79.00	3.33	1.74
31	0.1260	162.500	152.4	2.2	3.52	1.57	5.09	3.24	79.10	3.33	1.76
32	0.1300	163.300	153.2	2.2	3.53	1.56	5.09	3.27	79.20	3.32	1.77
33	0.1350	164.900	154.8	2.3	3.57	1.56	5.12	3.29	79.20	3.34	1.78
34	0.1380	166.400	156.3	2.4	3.60	1.54	5.14	3.34	79.30	3.34	1.80
35	0.1420	167.200	157.1	2.4	3.62	1.53	5.14	3.37	79.40	3.33	1.81
36	0.1460	168.700	158.6	2.5	3.65	1.51	5.16	3.41	79.50	3.34	1.82
37	0.1500	170.300	160.2	2.6	3.68	1.50	5.18	3.46	79.60	3.34	1.84
38	0.1550	171.800	161.7	2.7	3.71	1.48	5.20	3.50	79.70	3.34	1.86
39	0.1590	173.400	163.3	2.7	3.75	1.48	5.23	3.53	79.70	3.36	1.87
40	0.1630	174.100	164.0	2.8	3.76	1.48	5.24	3.54	79.70	3.36	1.88
41	0.1670	174.900	164.8	2.9	3.78	1.48	5.26	3.55	79.70	3.37	1.89
42	0.1710	176.500	166.4	2.9	3.81	1.47	5.28	3.59	79.80	3.37	1.91
43	0.1750	177.200	167.1	3.0	3.82	1.47	5.29	3.60	79.80	3.38	1.91
44	0.1790	178.800	168.7	3.1	3.86	1.47	5.33	3.63	79.80	3.40	1.93
45	0.1830	179.600	169.5	3.1	3.87	1.47	5.34	3.64	79.80	3.41	1.94
46	0.1870	180.300	170.2	3.2	3.89	1.45	5.34	3.67	79.90	3.40	1.94
47	0.1910	181.900	171.8	3.3	3.92	1.45	5.37	3.70	79.90	3.41	1.96
48	0.1950	182.700	172.6	3.3	3.94	1.45	5.39	3.71	79.90	3.42	1.97
49	0.1990	184.200	174.1	3.4	3.97	1.45	5.42	3.73	79.90	3.44	1.98
50	0.2030	185.000	174.9	3.5	3.98	1.45	5.44	3.74	79.90	3.45	1.99
51	0.2070	185.800	175.7	3.5	4.00	1.45	5.45	3.75	79.90	3.45	2.00
52	0.2110	186.500	176.4	3.6	4.01	1.45	5.47	3.76	79.90	3.46	2.01
53	0.2140	187.300	177.2	3.7	4.03	1.45	5.48	3.77	79.90	3.47	2.01
54	0.2190	188.100	178.0	3.7	4.04	1.45	5.50	3.78	79.90	3.48	2.02
55	0.2230	188.900	178.8	3.8	4.06	1.45	5.51	3.79	79.90	3.48	2.03
56	0.2270	190.400	180.3	3.9	4.09	1.45	5.54	3.81	79.90	3.50	2.04
57	0.2310	190.400	180.3	4.0	4.08	1.45	5.54	3.81	79.90	3.50	2.04
58	0.2350	192.000	181.9	4.0	4.12	1.45	5.57	3.83	79.90	3.51	2.06
59	0.2390	192.000	181.9	4.1	4.12	1.45	5.57	3.83	79.90	3.51	2.06
60	0.2430	192.700	182.6	4.2	4.13	1.45	5.58	3.84	79.90	3.52	2.06
61	0.2470	194.300	184.2	4.2	4.16	1.47	5.63	3.83	79.80	3.55	2.08
62	0.2500	195.800	185.7	4.3	4.19	1.47	5.66	3.85	79.80	3.57	2.10
63	0.2540	196.600	186.5	4.3	4.21	1.47	5.68	3.86	79.80	3.57	2.10
64	0.2580	197.400	187.3	4.4	4.22	1.47	5.69	3.88	79.80	3.58	2.11
65	0.2620	198.100	188.0	4.5	4.24	1.47	5.70	3.88	79.80	3.59	2.12
66	0.2660	198.900	188.8	4.6	4.25	1.47	5.72	3.89	79.80	3.59	2.13
67	0.2700	199.700	189.6	4.6	4.27	1.47	5.73	3.90	79.80	3.60	2.13
68	0.2740	200.500	190.4	4.7	4.28	1.48	5.76	3.89	79.70	3.62	2.14
69	0.2790	201.200	191.1	4.8	4.29	1.48	5.78	3.89	79.70	3.63	2.15
70	0.2830	202.000	191.9	4.8	4.31	1.48	5.79	3.90	79.70	3.64	2.15
71	0.2860	202.800	192.7	4.9	4.32	1.48	5.81	3.91	79.70	3.64	2.16
72	0.2900	204.300	194.2	5.0	4.35	1.48	5.84	3.94	79.70	3.66	2.18
S & ME, INC.											

Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
73	0.2940	205.100	195.0	5.0	4.37	1.48	5.85	3.95	79.70	3.67	2.18
74	0.2980	205.900	195.8	5.1	4.38	1.50	5.88	3.93	79.60	3.69	2.19
75	0.3020	206.700	196.6	5.2	4.40	1.50	5.90	3.94	79.60	3.70	2.20
76	0.3060	206.700	196.6	5.2	4.39	1.50	5.89	3.93	79.60	3.69	2.20
77	0.3110	207.400	197.3	5.3	4.41	1.50	5.90	3.94	79.60	3.70	2.20
78	0.3150	207.400	197.3	5.4	4.40	1.51	5.91	3.91	79.50	3.71	2.20
79	0.3190	208.200	198.1	5.5	4.42	1.51	5.93	3.92	79.50	3.72	2.21
80	0.3230	209.000	198.9	5.5	4.43	1.51	5.94	3.93	79.50	3.73	2.22
81	0.3260	209.800	199.7	5.6	4.45	1.51	5.96	3.94	79.50	3.74	2.22
82	0.3300	209.800	199.7	5.6	4.44	1.51	5.96	3.94	79.50	3.73	2.22
83	0.3340	210.500	200.4	5.7	4.46	1.53	5.98	3.92	79.40	3.75	2.23
84	0.3390	211.300	201.2	5.8	4.47	1.53	6.00	3.93	79.40	3.76	2.24
85	0.3430	211.300	201.2	5.9	4.47	1.54	6.01	3.90	79.30	3.77	2.23
86	0.3470	212.100	202.0	5.9	4.48	1.54	6.02	3.91	79.30	3.78	2.24
87	0.3510	212.800	202.7	6.0	4.49	1.54	6.03	3.92	79.30	3.79	2.25
88	0.3550	213.600	203.5	6.1	4.51	1.54	6.05	3.93	79.30	3.80	2.25
89	0.3590	214.400	204.3	6.1	4.52	1.54	6.06	3.94	79.30	3.80	2.26
90	0.3630	214.400	204.3	6.2	4.52	1.56	6.07	3.91	79.20	3.81	2.26
91	0.3670	215.200	205.1	6.3	4.53	1.56	6.09	3.92	79.20	3.82	2.27
92	0.3710	215.900	205.8	6.4	4.55	1.56	6.10	3.92	79.20	3.83	2.27
93	0.3750	216.700	206.6	6.4	4.56	1.57	6.13	3.91	79.10	3.85	2.28
94	0.3790	216.700	206.6	6.5	4.56	1.57	6.13	3.90	79.10	3.85	2.28
95	0.3830	217.500	207.4	6.6	4.57	1.57	6.14	3.91	79.10	3.86	2.29
96	0.3870	218.300	208.2	6.6	4.59	1.58	6.17	3.90	79.00	3.88	2.29
97	0.3910	219.000	208.9	6.7	4.60	1.58	6.18	3.90	79.00	3.88	2.30
98	0.3950	219.000	208.9	6.8	4.59	1.57	6.16	3.93	79.10	3.87	2.30
99	0.3980	219.800	209.7	6.8	4.61	1.57	6.18	3.94	79.10	3.87	2.30
100	0.4030	220.600	210.5	6.9	4.62	1.57	6.19	3.95	79.10	3.88	2.31
101	0.4060	220.600	210.5	7.0	4.62	1.57	6.19	3.94	79.10	3.88	2.31
102	0.4100	220.600	210.5	7.0	4.62	1.57	6.19	3.94	79.10	3.88	2.31
103	0.4140	221.400	211.3	7.1	4.63	1.57	6.20	3.95	79.10	3.89	2.32
104	0.4180	221.400	211.3	7.2	4.63	1.58	6.21	3.92	79.00	3.90	2.31
105	0.4230	221.400	211.3	7.2	4.62	1.58	6.21	3.92	79.00	3.90	2.31
106	0.4270	222.100	212.0	7.3	4.64	1.58	6.22	3.93	79.00	3.90	2.32
107	0.4310	222.100	212.0	7.4	4.63	1.60	6.23	3.90	78.90	3.91	2.32
108	0.4350	223.700	213.6	7.4	4.66	1.60	6.26	3.92	78.90	3.93	2.33
109	0.4380	223.700	213.6	7.5	4.66	1.60	6.26	3.92	78.90	3.93	2.33
110	0.4420	224.500	214.4	7.6	4.67	1.60	6.27	3.92	78.90	3.94	2.34
111	0.4460	224.500	214.4	7.6	4.67	1.61	6.28	3.90	78.80	3.95	2.34
112	0.4500	225.200	215.1	7.7	4.68	1.61	6.30	3.90	78.80	3.95	2.34
113	0.4540	226.000	215.9	7.8	4.70	1.61	6.31	3.91	78.80	3.96	2.35
114	0.4580	226.000	215.9	7.8	4.69	1.63	6.32	3.88	78.70	3.97	2.35
115	0.4620	226.000	215.9	7.9	4.69	1.63	6.32	3.88	78.70	3.97	2.34
116	0.4660	226.800	216.7	8.0	4.70	1.63	6.33	3.89	78.70	3.98	2.35
117	0.4700	226.800	216.7	8.0	4.70	1.63	6.33	3.89	78.70	3.98	2.35
118	0.4740	226.800	216.7	8.1	4.70	1.64	6.34	3.86	78.60	3.99	2.35
119	0.4780	227.600	217.5	8.2	4.71	1.64	6.35	3.87	78.60	4.00	2.36
S & ME, INC.											

Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
120	0.4820	228.300	218.2	8.3	4.72	1.64	6.36	3.88	78.60	4.00	2.36
121	0.4860	228.300	218.2	8.3	4.72	1.64	6.36	3.87	78.60	4.00	2.36
122	0.4900	229.100	219.0	8.4	4.73	1.66	6.39	3.86	78.50	4.02	2.37
123	0.4940	229.100	219.0	8.5	4.73	1.66	6.38	3.86	78.50	4.02	2.36
124	0.4980	229.100	219.0	8.5	4.73	1.66	6.38	3.85	78.50	4.02	2.36
125	0.5020	229.900	219.8	8.6	4.74	1.66	6.40	3.86	78.50	4.03	2.37
126	0.5060	229.900	219.8	8.7	4.74	1.67	6.41	3.83	78.40	4.04	2.37
127	0.5110	229.900	219.8	8.7	4.73	1.67	6.40	3.83	78.40	4.04	2.37
128	0.5140	229.900	219.8	8.8	4.73	1.67	6.40	3.83	78.40	4.03	2.36
129	0.5180	229.900	219.8	8.9	4.72	1.68	6.41	3.80	78.30	4.05	2.36
130	0.5220	230.700	220.6	8.9	4.74	1.68	6.42	3.81	78.30	4.05	2.37
131	0.5260	230.700	220.6	9.0	4.73	1.68	6.42	3.81	78.30	4.05	2.37
132	0.5310	230.700	220.6	9.1	4.73	1.70	6.43	3.78	78.20	4.06	2.37
133	0.5350	231.400	221.3	9.2	4.74	1.70	6.44	3.79	78.20	4.07	2.37
134	0.5390	231.400	221.3	9.2	4.74	1.70	6.44	3.79	78.20	4.07	2.37
135	0.5430	231.400	221.3	9.3	4.73	1.70	6.43	3.79	78.20	4.07	2.37
136	0.5470	231.400	221.3	9.4	4.73	1.70	6.43	3.78	78.20	4.06	2.37
137	0.5510	232.200	222.1	9.4	4.74	1.71	6.46	3.77	78.10	4.09	2.37
138	0.5550	232.200	222.1	9.5	4.74	1.71	6.45	3.77	78.10	4.08	2.37
139	0.5590	232.200	222.1	9.6	4.74	1.71	6.45	3.76	78.10	4.08	2.37
140	0.5630	232.200	222.1	9.6	4.73	1.71	6.45	3.76	78.10	4.08	2.37
141	0.5670	232.200	222.1	9.7	4.73	1.73	6.46	3.74	78.00	4.09	2.37
142	0.5710	232.200	222.1	9.8	4.73	1.73	6.45	3.74	78.00	4.09	2.36
143	0.5750	233.000	222.9	9.8	4.74	1.73	6.47	3.74	78.00	4.10	2.37
144	0.5790	233.000	222.9	9.9	4.74	1.74	6.48	3.72	77.90	4.11	2.37
145	0.5830	233.000	222.9	10.0	4.73	1.74	6.48	3.72	77.90	4.11	2.37
146	0.5870	233.000	222.9	10.0	4.73	1.74	6.47	3.71	77.90	4.11	2.36
147	0.5910	233.000	222.9	10.1	4.73	1.74	6.47	3.71	77.90	4.11	2.36
148	0.5950	233.000	222.9	10.2	4.72	1.76	6.48	3.69	77.80	4.12	2.36
149	0.5990	233.000	222.9	10.3	4.72	1.76	6.48	3.69	77.80	4.12	2.36
150	0.6030	233.000	222.9	10.3	4.72	1.76	6.47	3.68	77.80	4.11	2.36
151	0.6070	232.200	222.1	10.4	4.69	1.76	6.45	3.67	77.80	4.10	2.35
152	0.6110	232.700	222.6	10.5	4.70	1.76	6.46	3.68	77.80	4.11	2.35
153	0.6150	232.200	222.1	10.5	4.69	1.77	6.46	3.65	77.70	4.11	2.34
154	0.6190	233.000	222.9	10.6	4.70	1.77	6.47	3.65	77.70	4.12	2.35
155	0.6230	233.000	222.9	10.7	4.70	1.77	6.47	3.65	77.70	4.12	2.35
156	0.6260	233.700	223.6	10.7	4.71	1.77	6.48	3.66	77.70	4.13	2.35
157	0.6300	233.700	223.6	10.8	4.71	1.77	6.48	3.66	77.70	4.12	2.35
158	0.6340	233.700	223.6	10.9	4.70	1.79	6.49	3.63	77.60	4.14	2.35
159	0.6380	234.500	224.4	10.9	4.72	1.79	6.50	3.64	77.60	4.14	2.36
160	0.6420	234.500	224.4	11.0	4.71	1.76	6.47	3.68	77.80	4.11	2.36
161	0.6460	234.500	224.4	11.1	4.71	1.76	6.46	3.68	77.80	4.11	2.35
162	0.6500	234.500	224.4	11.1	4.70	1.76	6.46	3.68	77.80	4.11	2.35
163	0.6540	235.300	225.2	11.2	4.72	1.76	6.47	3.69	77.80	4.12	2.36
164	0.6580	235.300	225.2	11.3	4.71	1.76	6.47	3.68	77.80	4.11	2.36
165	0.6620	235.300	225.2	11.3	4.71	1.77	6.48	3.66	77.70	4.13	2.36
166	0.6660	236.100	226.0	11.4	4.72	1.86	6.58	3.54	77.10	4.22	2.36
S & ME, INC.											

Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
167	0.6700	236.800	226.7	11.5	4.73	1.77	6.51	3.67	77.70	4.14	2.37
168	0.6740	236.100	226.0	11.5	4.72	1.77	6.49	3.66	77.70	4.13	2.36
169	0.6780	236.100	226.0	11.6	4.71	1.77	6.48	3.66	77.70	4.13	2.36
170	0.6820	236.100	226.0	11.7	4.71	1.77	6.48	3.66	77.70	4.13	2.35
171	0.6860	236.100	226.0	11.7	4.70	1.79	6.49	3.63	77.60	4.14	2.35
172	0.6900	236.100	226.0	11.8	4.70	1.79	6.49	3.63	77.60	4.14	2.35
173	0.6940	236.800	226.7	11.9	4.71	1.79	6.50	3.64	77.60	4.14	2.36
174	0.6980	236.100	226.0	12.0	4.69	1.79	6.48	3.63	77.60	4.13	2.35
175	0.7020	236.800	226.7	12.0	4.70	1.79	6.49	3.63	77.60	4.14	2.35
176	0.7060	236.800	226.7	12.1	4.70	1.79	6.49	3.63	77.60	4.14	2.35
177	0.7100	236.800	226.7	12.2	4.70	1.79	6.48	3.63	77.60	4.13	2.35
178	0.7140	236.800	226.7	12.2	4.69	1.80	6.49	3.61	77.50	4.15	2.35
179	0.7180	237.600	227.5	12.3	4.71	1.80	6.51	3.61	77.50	4.15	2.35
180	0.7220	237.600	227.5	12.4	4.70	1.80	6.50	3.61	77.50	4.15	2.35
181	0.7260	237.600	227.5	12.4	4.70	1.80	6.50	3.61	77.50	4.15	2.35
182	0.7300	237.600	227.5	12.5	4.70	1.80	6.50	3.61	77.50	4.15	2.35
183	0.7350	237.600	227.5	12.6	4.69	1.81	6.51	3.59	77.40	4.16	2.35
184	0.7380	237.600	227.5	12.6	4.69	1.81	6.50	3.58	77.40	4.16	2.34
185	0.7420	237.600	227.5	12.7	4.68	1.81	6.50	3.58	77.40	4.16	2.34
186	0.7470	237.600	227.5	12.8	4.68	1.81	6.49	3.58	77.40	4.15	2.34
187	0.7510	238.400	228.3	12.9	4.69	1.81	6.51	3.59	77.40	4.16	2.35
188	0.7550	238.400	228.3	12.9	4.69	1.81	6.50	3.58	77.40	4.16	2.34
189	0.7590	238.400	228.3	13.0	4.69	1.83	6.51	3.56	77.30	4.17	2.34
190	0.7630	238.400	228.3	13.1	4.68	1.83	6.51	3.56	77.30	4.17	2.34
191	0.7670	238.400	228.3	13.1	4.68	1.83	6.51	3.56	77.30	4.17	2.34
192	0.7710	239.200	229.1	13.2	4.69	1.83	6.52	3.56	77.30	4.17	2.35
193	0.7740	238.400	228.3	13.3	4.67	1.83	6.50	3.55	77.30	4.16	2.34
194	0.7780	239.200	229.1	13.3	4.68	1.84	6.53	3.54	77.20	4.19	2.34
195	0.7820	239.200	229.1	13.4	4.68	1.84	6.52	3.54	77.20	4.18	2.34
196	0.7860	238.400	228.3	13.5	4.66	1.84	6.50	3.53	77.20	4.17	2.33
197	0.7900	238.400	228.3	13.5	4.66	1.84	6.50	3.53	77.20	4.17	2.33
198	0.7940	238.400	228.3	13.6	4.65	1.84	6.50	3.52	77.20	4.17	2.33
199	0.7980	238.400	228.3	13.7	4.65	1.84	6.49	3.52	77.20	4.17	2.32
200	0.8020	238.400	228.3	13.7	4.65	1.86	6.50	3.50	77.10	4.18	2.32
201	0.8060	239.200	229.1	13.8	4.66	1.86	6.52	3.51	77.10	4.19	2.33
202	0.8100	239.200	229.1	13.9	4.65	1.86	6.51	3.51	77.10	4.18	2.33
203	0.8140	239.900	229.8	13.9	4.67	1.86	6.52	3.51	77.10	4.19	2.33
204	0.8180	239.900	229.8	14.0	4.66	1.86	6.52	3.51	77.10	4.19	2.33
205	0.8220	239.900	229.8	14.1	4.66	1.86	6.52	3.51	77.10	4.19	2.33
206	0.8260	239.900	229.8	14.1	4.65	1.87	6.53	3.49	77.00	4.20	2.33
207	0.8300	239.900	229.8	14.2	4.65	1.87	6.52	3.48	77.00	4.20	2.33
208	0.8340	240.700	230.6	14.3	4.66	1.87	6.53	3.49	77.00	4.20	2.33
209	0.8380	240.700	230.6	14.3	4.66	1.87	6.53	3.49	77.00	4.20	2.33
210	0.8410	240.700	230.6	14.4	4.66	1.87	6.53	3.49	77.00	4.20	2.33
211	0.8450	240.700	230.6	14.5	4.65	1.87	6.52	3.49	77.00	4.20	2.33
212	0.8490	240.700	230.6	14.5	4.65	1.89	6.54	3.46	76.90	4.21	2.32
213	0.8530	240.700	230.6	14.6	4.65	1.89	6.53	3.46	76.90	4.21	2.32
S & ME, INC.											

Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
214	0.8570	241.500	231.4	14.7	4.66	1.89	6.54	3.47	76.90	4.22	2.33
215	0.8610	241.500	231.4	14.7	4.65	1.89	6.54	3.47	76.90	4.21	2.33
216	0.8650	240.700	230.6	14.8	4.63	1.89	6.52	3.46	76.90	4.20	2.32
217	0.8690	241.500	231.4	14.9	4.65	1.90	6.55	3.44	76.80	4.22	2.32
218	0.8730	240.700	230.6	14.9	4.63	1.90	6.53	3.43	76.80	4.21	2.31
219	0.8770	240.700	230.6	15.0	4.62	1.90	6.52	3.43	76.80	4.21	2.31
220	0.8800	240.700	230.6	15.1	4.62	1.89	6.51	3.45	76.90	4.20	2.31



15

12

9

6

3

0

0%

8%

16%

Total Pore Pressure

Deviator Stress

ksf

6

4

2

0

0

2

4

6

8

10

12

q, ksf

Peak Strength

Total

Effective

a= 0.32 ksf0.00 ksf

α = 16.0 deg30.8 deg

tan α = 0.290.60

————

Stress Paths: Total

Effective

Client: Rummel, Klepper & Kahn, LLP

Project: U-5810 Watauga Co. SR 1514 and SR 1523

Location: Borehole

Depth: 12.0-14.0'

Sample Number: Y3_2 ST-1

Proj. No.: 6235-18-038

Figure Y3_2 ST-1

S & ME, INC.

5/12/2020

11:16 AM

Type of Sample: Undisturbed

Test Method: COE uniform strain (staged method triaxial test)

Specimen Parameter	Initial	Saturated	Consolidated	Final
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Moisture content: Dry soil+tare, gms.	265.600	n/a
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Moisture, %	31.8	38.2	36.6
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Diameter, in.	2.837	2.825	2.806
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Height, in.	5.917	5.893	5.852
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Wet density, pcf	106.0	112.5	113.6
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Void ratio	1.0182	0.9937	0.9521
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Test Readings for Specimen No. 1

Consolidation cell pressure = 68.00 psi (9.79 ksf)

Consolidation back pressure = 60.00 psi (8.64 ksf)

Consolidation effective confining stress = 1.15 ksf

Strain rate, in./min. = 0.004

Fail. Stress = 1.10 ksf at reading no. 76

Ult. Stress = 1.09 ksf at reading no. 85

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
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1	0.0020	22.400	10.0	0.0	0.23	0.89	1.13	1.26	61.80	1.01	0.12
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3	0.0060	32.500	20.1	0.1	0.47	0.84	1.30	1.56	62.20	1.07	0.23
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5	0.0100	39.500	27.1	0.2	0.63	0.78	1.41	1.81	62.60	1.09	0.32
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7	0.0140	41.800	29.4	0.2	0.68	0.75	1.43	1.91	62.80	1.09	0.34
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9	0.0180	44.100	31.7	0.3	0.74	0.72	1.46	2.02	63.00	1.09	0.37
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11	0.0230	45.700	33.3	0.4	0.77	0.69	1.46	2.12	63.20	1.08	0.39
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13	0.0260	47.200	34.8	0.4	0.81	0.68	1.48	2.19	63.30	1.08	0.40
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15	0.0300	48.000	35.6	0.5	0.82	0.66	1.49	2.25	63.40	1.07	0.41
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17	0.0340	49.500	37.1	0.6	0.86	0.63	1.49	2.36	63.60	1.06	0.43
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19	0.0390	50.300	37.9	0.7	0.88	0.62	1.50	2.42	63.70	1.06	0.44
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20	0.0410	51.100	38.7	0.7	0.89	0.60	1.50	2.48	63.80	1.05	0.45
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22	0.0170	51.900	39.5	0.8	0.91	0.59	1.50	2.55	63.90	1.05	0.46
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24	0.0400	52.000	40.2	0.0	0.55	0.55	1.52	2.57	55.50	1.05	0.40
25	0.0510	53.400	41.0	0.0	0.05	0.58	1.53	2.64	64.00	1.05	0.47

20	0.0550	55.400	41.0	0.9	0.55	0.50	1.92	2.04	64.00	1.05	0.47
37	0.0550	54.300	41.8	0.0	0.06	0.56	1.53	3.73	64.10	1.04	0.48

20	0.0370	34.200	41.0	1.0	0.90	0.90	1.93	2.72	04.10	1.04	0.40
30	0.0500	55.000	43.6	1.0	0.08	0.55	1.53	3.80	64.30	1.04	0.40

30	0.0010	55.000	42.0	1.0	0.50	0.55	1.55	2.75	64.20	1.04	0.49
31	0.0020	55.000	43.6	1.1	0.60	0.55	1.53	3.70	64.30	1.04	0.49

32	0.0050	55.700	43.3	1.1	1.00	0.53	1.53	2.87	04.50	1.03	0.50
33	0.0070	55.700	43.3	1.1	1.00	0.53	1.53	2.87	64.30	1.03	0.50

34	0.0090	50.500	44.1	1.2	1.02	0.52	1.55	2.90	64.40	1.05	0.51
35	0.00710	56.500	44.1	1.3	1.01	0.53	1.53	3.06	64.40	1.03	0.51

36	0.0730	56.500	44.1	1.2	1.01	0.52	1.55	2.96	64.40	1.05	0.51
37	0.0750	56.500	44.1	1.2	1.01	0.52	1.53	2.96	64.40	1.03	0.51

38	0.0770	57.300	44.9	1.3	1.03	0.50	1.54	3.05	64.50	1.02	0.52
39	0.0770	57.300	44.9	1.3	1.03	0.50	1.54	3.05	64.50	1.02	0.52

40	0.0800	57.300	44.9	1.4	1.03	0.50	1.54	3.05	64.50	1.02	0.52
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42	0.0840	58.000	45.6	1.4	1.05	0.49	1.54	3.14	64.60	1.01	0.52
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44	0.0880	58.000	45.6	1.5	1.05	0.49	1.54	3.14	64.60	1.01	0.52
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46	0.0920	58.800	46.4	1.6	1.06	0.49	1.55	3.17	64.60	1.02	0.53
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S & ME, INC.

Test Readings for Specimen No. 1											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	0.0950	58.800	46.4	1.6	1.06	0.49	1.55	3.17	64.60	1.02	0.53
48	0.0960	58.800	46.4	1.6	1.06	0.48	1.54	3.24	64.70	1.01	0.53
49	0.0980	59.600	47.2	1.7	1.08	0.48	1.56	3.27	64.70	1.02	0.54
50	0.1000	59.600	47.2	1.7	1.08	0.48	1.56	3.27	64.70	1.02	0.54
51	0.1020	59.600	47.2	1.7	1.08	0.48	1.56	3.27	64.70	1.02	0.54
52	0.1040	59.600	47.2	1.8	1.08	0.48	1.56	3.27	64.70	1.02	0.54
53	0.1060	59.600	47.2	1.8	1.08	0.46	1.54	3.34	64.80	1.00	0.54
54	0.1080	59.600	47.2	1.8	1.08	0.46	1.54	3.34	64.80	1.00	0.54
55	0.1100	59.600	47.2	1.9	1.08	0.46	1.54	3.34	64.80	1.00	0.54
56	0.1120	59.600	47.2	1.9	1.08	0.46	1.54	3.34	64.80	1.00	0.54
57	0.1140	59.600	47.2	1.9	1.08	0.46	1.54	3.34	64.80	1.00	0.54
58	0.1160	60.400	48.0	2.0	1.10	0.46	1.56	3.38	64.80	1.01	0.55
59	0.1180	59.600	47.2	2.0	1.08	0.45	1.52	3.41	64.90	0.99	0.54
60	0.1200	60.400	48.0	2.1	1.10	0.45	1.54	3.45	64.90	0.99	0.55
61	0.1220	60.400	48.0	2.1	1.09	0.45	1.54	3.45	64.90	0.99	0.55
62	0.1240	60.400	48.0	2.1	1.09	0.45	1.54	3.45	64.90	0.99	0.55
63	0.1260	60.400	48.0	2.2	1.09	0.45	1.54	3.45	64.90	0.99	0.55
64	0.1280	60.400	48.0	2.2	1.09	0.45	1.54	3.45	64.90	0.99	0.55
65	0.1300	60.400	48.0	2.2	1.09	0.45	1.54	3.45	64.90	0.99	0.55
66	0.1320	60.400	48.0	2.3	1.09	0.45	1.54	3.45	64.90	0.99	0.55
67	0.1340	60.400	48.0	2.3	1.09	0.45	1.54	3.45	64.90	0.99	0.55
68	0.1360	60.400	48.0	2.3	1.09	0.43	1.52	3.53	65.00	0.98	0.55
69	0.1380	60.400	48.0	2.4	1.09	0.43	1.52	3.53	65.00	0.98	0.55
70	0.1400	60.400	48.0	2.4	1.09	0.43	1.52	3.53	65.00	0.98	0.55
71	0.1420	60.400	48.0	2.4	1.09	0.43	1.52	3.53	65.00	0.98	0.55
72	0.1440	60.400	48.0	2.5	1.09	0.43	1.52	3.52	65.00	0.98	0.55
73	0.1460	60.400	48.0	2.5	1.09	0.43	1.52	3.52	65.00	0.98	0.55
74	0.1490	60.400	48.0	2.5	1.09	0.43	1.52	3.52	65.00	0.98	0.54
75	0.1500	60.400	48.0	2.6	1.09	0.43	1.52	3.52	65.00	0.98	0.54
76	0.1530	61.100	48.7	2.6	1.10	0.42	1.52	3.65	65.10	0.97	0.55
77	0.1550	61.100	48.7	2.6	1.10	0.42	1.52	3.64	65.10	0.97	0.55
78	0.1560	61.100	48.7	2.7	1.10	0.42	1.52	3.64	65.10	0.97	0.55
79	0.1590	61.100	48.7	2.7	1.10	0.42	1.52	3.64	65.10	0.97	0.55
80	0.1600	60.400	48.0	2.7	1.09	0.42	1.51	3.60	65.10	0.96	0.54
81	0.1630	60.400	48.0	2.8	1.09	0.42	1.50	3.60	65.10	0.96	0.54
82	0.1650	60.400	48.0	2.8	1.09	0.42	1.50	3.60	65.10	0.96	0.54
83	0.1670	60.400	48.0	2.9	1.09	0.42	1.50	3.60	65.10	0.96	0.54
84	0.1690	60.400	48.0	2.9	1.09	0.42	1.50	3.60	65.10	0.96	0.54
85	0.1710	60.400	48.0	2.9	1.09	0.42	1.50	3.60	65.10	0.96	0.54
S & ME, INC.											

Parameters for Specimen No. 2											
Specimen Parameter		Initial	Cum. for Test		Consolidated		Final				
Moisture content: Moist soil+tare, gms.		323.780					n/a				
Moisture content: Dry soil+tare, gms.		265.600					n/a				
Moisture content: Tare, gms.		82.900					n/a				
Moisture, %		31.8			36.4						
Moist specimen weight, gms.		1041.10									
Diameter, in.		2.837			2.845						
Area, in. ²		6.321			6.355						
Height, in.		5.917			5.675						
Net decrease in height, in.			0.236		0.006						
Wet density, pcf		106.0			113.8						
Dry density, pcf		80.4			83.4						
Void ratio		1.0182			0.9459						
Saturation, %		81.3			100.0						
Test Readings for Specimen No. 2											
Consolidation cell pressure = 75.00 psi (10.80 ksf)											
Consolidation back pressure = 60.00 psi (8.64 ksf)											
Consolidation effective confining stress = 2.16 ksf											
Strain rate, in./min. = 0.008											
Fail. Stress = 1.95 ksf at reading no. 56											
Ult. Stress = 1.95 ksf at reading no. 70											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0010	7.000	0.0	0.0	0.00	2.16	2.16	1.00	60.00	2.16	0.00
1	0.0040	9.300	2.3	0.1	0.05	2.02	2.07	1.03	61.00	2.04	0.03
2	0.0080	34.100	27.1	0.1	0.61	1.86	2.47	1.33	62.10	2.16	0.31
3	0.0120	48.800	41.8	0.2	0.95	1.71	2.66	1.55	63.10	2.19	0.47
4	0.0160	57.300	50.3	0.3	1.14	1.60	2.74	1.71	63.90	2.17	0.57
5	0.0200	63.500	56.5	0.3	1.28	1.50	2.77	1.85	64.60	2.14	0.64
6	0.0240	68.100	61.1	0.4	1.38	1.41	2.79	1.98	65.20	2.10	0.69
7	0.0280	72.000	65.0	0.5	1.47	1.34	2.81	2.09	65.70	2.07	0.73
8	0.0320	75.100	68.1	0.5	1.53	1.28	2.82	2.20	66.10	2.05	0.77
9	0.0360	77.400	70.4	0.6	1.59	1.24	2.82	2.28	66.40	2.03	0.79
10	0.0400	79.700	72.7	0.7	1.64	1.20	2.83	2.37	66.70	2.01	0.82
11	0.0440	81.300	74.3	0.8	1.67	1.15	2.82	2.45	67.00	1.99	0.84
12	0.0480	83.600	76.6	0.8	1.72	1.12	2.84	2.53	67.20	1.98	0.86
13	0.0520	85.100	78.1	0.9	1.75	1.09	2.85	2.60	67.40	1.97	0.88
14	0.0560	85.900	78.9	1.0	1.77	1.07	2.84	2.66	67.60	1.95	0.89
15	0.0600	86.700	79.7	1.0	1.79	1.04	2.82	2.72	67.80	1.93	0.89
16	0.0640	88.200	81.2	1.1	1.82	1.01	2.83	2.81	68.00	1.92	0.91
17	0.0680	89.000	82.0	1.2	1.84	0.99	2.83	2.85	68.10	1.91	0.92
18	0.0730	89.800	82.8	1.3	1.85	0.96	2.82	2.92	68.30	1.89	0.93
19	0.0770	89.800	82.8	1.3	1.85	0.95	2.80	2.95	68.40	1.88	0.93
20	0.0800	90.600	83.6	1.4	1.87	0.94	2.80	3.00	68.50	1.87	0.93
21	0.0840	91.300	84.3	1.5	1.88	0.92	2.80	3.04	68.60	1.86	0.94
22	0.0890	91.300	84.3	1.6	1.88	0.91	2.79	3.07	68.70	1.85	0.94
23	0.0930	92.100	85.1	1.6	1.90	0.89	2.79	3.12	68.80	1.84	0.95
24	0.0970	92.100	85.1	1.7	1.90	0.88	2.77	3.16	68.90	1.83	0.95
25	0.1010	92.900	85.9	1.8	1.91	0.86	2.78	3.21	69.00	1.82	0.96
S & ME, INC.											

Test Readings for Specimen No. 2											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
26	0.1050	93.700	86.7	1.8	1.93	0.86	2.79	3.23	69.00	1.83	0.96
27	0.1090	93.700	86.7	1.9	1.93	0.85	2.78	3.27	69.10	1.81	0.96
28	0.1140	93.700	86.7	2.0	1.93	0.84	2.76	3.31	69.20	1.80	0.96
29	0.1180	93.700	86.7	2.1	1.92	0.84	2.76	3.30	69.20	1.80	0.96
30	0.1220	94.400	87.4	2.1	1.94	0.82	2.76	3.36	69.30	1.79	0.97
31	0.1260	94.400	87.4	2.2	1.94	0.82	2.76	3.36	69.30	1.79	0.97
32	0.1300	95.200	88.2	2.3	1.95	0.81	2.76	3.42	69.40	1.78	0.98
33	0.1330	95.200	88.2	2.3	1.95	0.81	2.76	3.42	69.40	1.78	0.98
34	0.1380	95.200	88.2	2.4	1.95	0.79	2.74	3.46	69.50	1.77	0.98
35	0.1420	95.200	88.2	2.5	1.95	0.79	2.74	3.46	69.50	1.77	0.97
36	0.1460	95.200	88.2	2.6	1.95	0.79	2.74	3.46	69.50	1.77	0.97
37	0.1500	95.200	88.2	2.6	1.95	0.78	2.72	3.50	69.60	1.75	0.97
38	0.1540	95.200	88.2	2.7	1.94	0.78	2.72	3.50	69.60	1.75	0.97
39	0.1580	96.000	89.0	2.8	1.96	0.76	2.72	3.57	69.70	1.74	0.98
40	0.1620	96.000	89.0	2.8	1.96	0.76	2.72	3.57	69.70	1.74	0.98
41	0.1650	96.000	89.0	2.9	1.96	0.76	2.72	3.57	69.70	1.74	0.98
42	0.1690	96.000	89.0	3.0	1.96	0.76	2.72	3.56	69.70	1.74	0.98
43	0.1730	96.000	89.0	3.0	1.96	0.75	2.70	3.61	69.80	1.73	0.98
44	0.1770	96.000	89.0	3.1	1.95	0.75	2.70	3.61	69.80	1.73	0.98
45	0.1810	96.000	89.0	3.2	1.95	0.75	2.70	3.61	69.80	1.73	0.98
46	0.1850	96.000	89.0	3.2	1.95	0.73	2.69	3.66	69.90	1.71	0.98
47	0.1890	96.000	89.0	3.3	1.95	0.73	2.68	3.66	69.90	1.71	0.97
48	0.1920	96.700	89.7	3.4	1.96	0.73	2.70	3.67	69.90	1.72	0.98
49	0.1960	96.700	89.7	3.4	1.96	0.73	2.70	3.67	69.90	1.72	0.98
50	0.2010	96.700	89.7	3.5	1.96	0.73	2.70	3.67	69.90	1.71	0.98
51	0.2050	96.700	89.7	3.6	1.96	0.72	2.68	3.72	70.00	1.70	0.98
52	0.2090	97.500	90.5	3.7	1.98	0.72	2.70	3.74	70.00	1.71	0.99
53	0.2130	97.500	90.5	3.7	1.97	0.72	2.69	3.74	70.00	1.71	0.99
54	0.2170	97.500	90.5	3.8	1.97	0.72	2.69	3.74	70.00	1.71	0.99
55	0.2210	97.500	90.5	3.9	1.97	0.72	2.69	3.74	70.00	1.71	0.99
56	0.2250	96.700	89.7	3.9	1.95	0.71	2.66	3.77	70.10	1.68	0.98
57	0.2290	96.700	89.7	4.0	1.95	0.71	2.66	3.76	70.10	1.68	0.98
58	0.2320	97.500	90.5	4.1	1.97	0.71	2.67	3.79	70.10	1.69	0.98
59	0.2360	97.500	90.5	4.1	1.97	0.71	2.67	3.79	70.10	1.69	0.98
60	0.2400	97.500	90.5	4.2	1.96	0.71	2.67	3.78	70.10	1.69	0.98
61	0.2450	97.500	90.5	4.3	1.96	0.71	2.67	3.78	70.10	1.69	0.98
62	0.2490	97.500	90.5	4.4	1.96	0.71	2.67	3.78	70.10	1.69	0.98
63	0.2530	97.500	90.5	4.4	1.96	0.71	2.67	3.78	70.10	1.69	0.98
64	0.2570	97.500	90.5	4.5	1.96	0.71	2.66	3.78	70.10	1.68	0.98
65	0.2610	97.500	90.5	4.6	1.96	0.69	2.65	3.83	70.20	1.67	0.98
66	0.2650	97.500	90.5	4.7	1.96	0.69	2.65	3.83	70.20	1.67	0.98
67	0.2690	97.500	90.5	4.7	1.95	0.69	2.65	3.83	70.20	1.67	0.98
68	0.2730	97.500	90.5	4.8	1.95	0.69	2.64	3.82	70.20	1.67	0.98
69	0.2770	97.500	90.5	4.9	1.95	0.69	2.64	3.82	70.20	1.67	0.98
70	0.2810	97.500	90.5	4.9	1.95	0.69	2.64	3.82	70.20	1.67	0.97
S & ME, INC.											

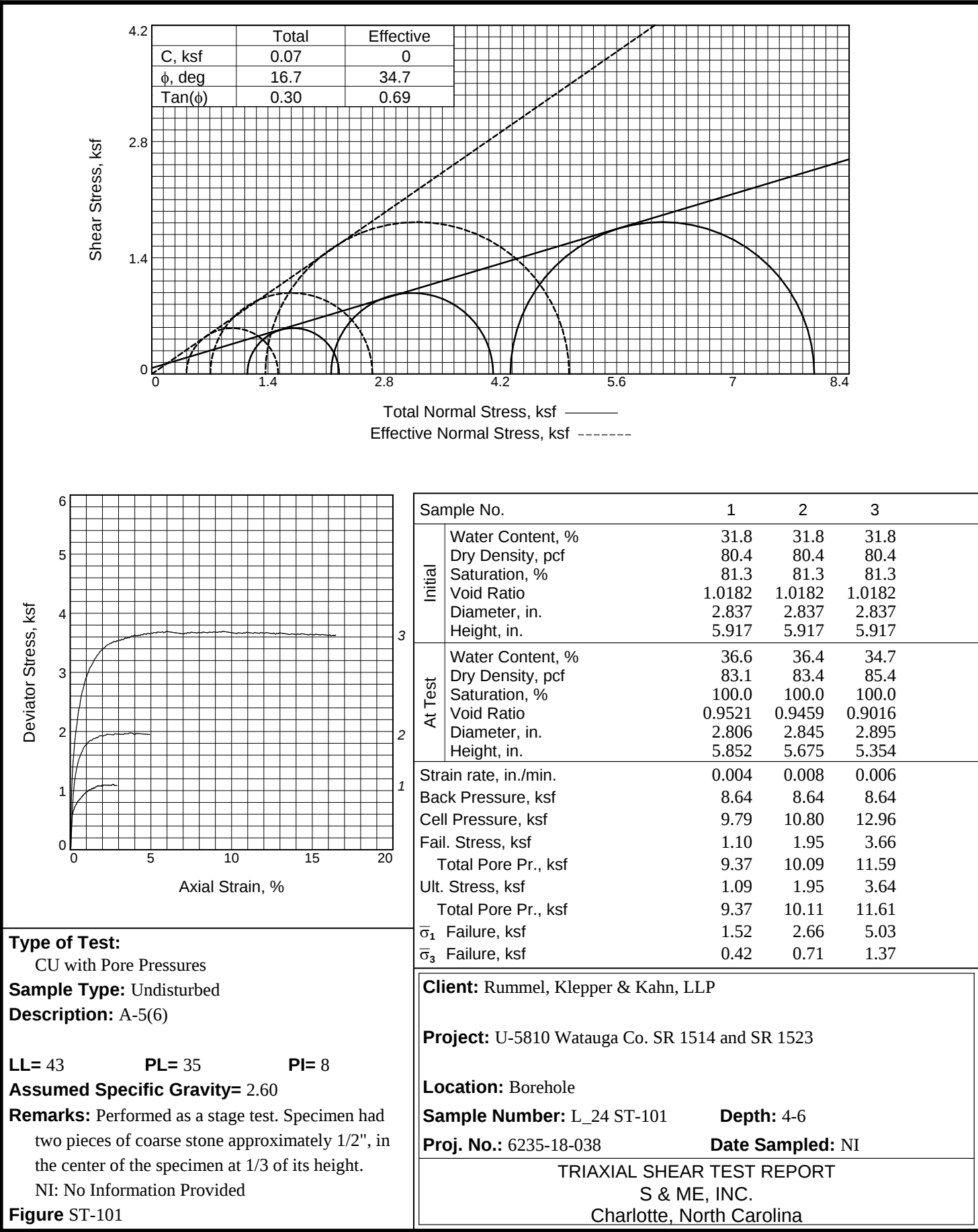
Parameters for Specimen No. 3											
Specimen Parameter		Initial	Cum. for Test	Consolidated				Final			
Moisture content: Moist soil+tare, gms.		323.780						n/a			
Moisture content: Dry soil+tare, gms.		265.600						n/a			
Moisture content: Tare, gms.		82.900						n/a			
Moisture, %		31.8			34.7						
Moist specimen weight, gms.		1041.10									
Diameter, in.		2.837			2.895						
Area, in. ²		6.321			6.583						
Height, in.		5.917			5.354						
Net decrease in height, in.			0.522		0.041						
Wet density, pcf		106.0			115.0						
Dry density, pcf		80.4			85.4						
Void ratio		1.0182			0.9016						
Saturation, %		81.3			100.0						
Test Readings for Specimen No. 3											
Consolidation cell pressure = 90.00 psi (12.96 ksf)											
Consolidation back pressure = 60.00 psi (8.64 ksf)											
Consolidation effective confining stress = 4.32 ksf											
Strain rate, in./min. = 0.006											
Fail. Stress = 3.66 ksf at reading no. 86											
Ult. Stress = 3.64 ksf at reading no. 295											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0010	10.100	0.0	0.0	0.00	4.32	4.32	1.00	60.00	4.32	0.00
1	0.0030	24.800	14.7	0.0	0.32	3.92	4.24	1.08	62.80	4.08	0.16
2	0.0050	48.800	38.7	0.1	0.85	3.77	4.62	1.22	63.80	4.20	0.42
3	0.0080	67.300	57.2	0.1	1.25	3.57	4.82	1.35	65.20	4.20	0.62
4	0.0110	78.900	68.8	0.2	1.50	3.38	4.89	1.44	66.50	4.14	0.75
5	0.0140	88.200	78.1	0.2	1.70	3.23	4.93	1.53	67.60	4.08	0.85
6	0.0170	96.000	85.9	0.3	1.87	3.08	4.96	1.61	68.60	4.02	0.94
7	0.0200	102.200	92.1	0.4	2.01	2.95	4.96	1.68	69.50	3.96	1.00
8	0.0240	108.400	98.3	0.4	2.14	2.84	4.98	1.75	70.30	3.91	1.07
9	0.0260	113.800	103.7	0.5	2.26	2.74	4.99	1.83	71.00	3.86	1.13
10	0.0290	118.400	108.3	0.5	2.36	2.64	4.99	1.89	71.70	3.81	1.18
11	0.0330	122.300	112.2	0.6	2.44	2.55	4.99	1.96	72.30	3.77	1.22
12	0.0350	126.200	116.1	0.6	2.52	2.48	5.00	2.02	72.80	3.74	1.26
13	0.0380	130.000	119.9	0.7	2.60	2.42	5.02	2.08	73.20	3.72	1.30
14	0.0410	133.100	123.0	0.7	2.67	2.35	5.02	2.14	73.70	3.68	1.34
15	0.0440	135.400	125.3	0.8	2.72	2.29	5.01	2.19	74.10	3.65	1.36
16	0.0470	138.500	128.4	0.9	2.78	2.23	5.02	2.25	74.50	3.62	1.39
17	0.0500	141.600	131.5	0.9	2.85	2.19	5.04	2.30	74.80	3.61	1.43
18	0.0530	144.000	133.9	1.0	2.90	2.15	5.05	2.35	75.10	3.60	1.45
19	0.0560	145.500	135.4	1.0	2.93	2.10	5.03	2.39	75.40	3.57	1.47
20	0.0590	147.800	137.7	1.1	2.98	2.06	5.04	2.45	75.70	3.55	1.49
21	0.0620	149.400	139.3	1.1	3.01	2.03	5.04	2.48	75.90	3.54	1.51
22	0.0650	151.700	141.6	1.2	3.06	1.99	5.05	2.54	76.20	3.52	1.53
23	0.0680	153.300	143.2	1.3	3.09	1.96	5.05	2.58	76.40	3.51	1.55

Test Readings for Specimen No. 3											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
26	0.0770	157.100	147.0	1.4	3.17	1.87	5.04	2.69	77.00	3.46	1.59
27	0.0800	158.700	148.6	1.5	3.20	1.84	5.05	2.74	77.20	3.44	1.60
28	0.0830	160.200	150.1	1.5	3.23	1.83	5.06	2.77	77.30	3.45	1.62
29	0.0860	161.000	150.9	1.6	3.25	1.80	5.05	2.80	77.50	3.42	1.62
30	0.0890	162.500	152.4	1.6	3.28	1.79	5.06	2.84	77.60	3.43	1.64
31	0.0920	163.300	153.2	1.7	3.29	1.76	5.05	2.88	77.80	3.40	1.65
32	0.0950	164.100	154.0	1.8	3.31	1.74	5.05	2.90	77.90	3.40	1.65
33	0.0980	165.600	155.5	1.8	3.34	1.73	5.07	2.93	78.00	3.40	1.67
34	0.1010	166.400	156.3	1.9	3.36	1.71	5.07	2.96	78.10	3.39	1.68
35	0.1040	167.200	157.1	1.9	3.37	1.70	5.07	2.98	78.20	3.38	1.69
36	0.1070	168.000	157.9	2.0	3.39	1.67	5.06	3.03	78.40	3.36	1.69
37	0.1100	168.700	158.6	2.0	3.40	1.66	5.05	3.05	78.50	3.36	1.70
38	0.1130	169.500	159.4	2.1	3.41	1.64	5.06	3.08	78.60	3.35	1.71
39	0.1170	170.300	160.2	2.2	3.43	1.63	5.06	3.11	78.70	3.34	1.71
40	0.1190	171.100	161.0	2.2	3.44	1.60	5.04	3.15	78.90	3.32	1.72
41	0.1230	171.800	161.7	2.3	3.46	1.60	5.06	3.16	78.90	3.33	1.73
42	0.1260	172.600	162.5	2.3	3.47	1.58	5.06	3.19	79.00	3.32	1.74
43	0.1280	172.600	162.5	2.4	3.47	1.57	5.04	3.21	79.10	3.30	1.74
44	0.1320	173.400	163.3	2.4	3.48	1.57	5.05	3.22	79.10	3.31	1.74
45	0.1350	174.100	164.0	2.5	3.50	1.56	5.05	3.25	79.20	3.30	1.75
46	0.1380	174.100	164.0	2.6	3.50	1.54	5.04	3.27	79.30	3.29	1.75
47	0.1410	174.900	164.8	2.6	3.51	1.54	5.05	3.28	79.30	3.30	1.76
48	0.1440	174.900	164.8	2.7	3.51	1.53	5.04	3.30	79.40	3.28	1.75
49	0.1470	175.700	165.6	2.7	3.52	1.51	5.04	3.33	79.50	3.27	1.76
50	0.1500	175.700	165.6	2.8	3.52	1.51	5.03	3.33	79.50	3.27	1.76
51	0.1530	175.700	165.6	2.8	3.52	1.51	5.03	3.33	79.50	3.27	1.76
52	0.1560	176.500	166.4	2.9	3.53	1.50	5.03	3.36	79.60	3.27	1.77
53	0.1590	176.500	166.4	3.0	3.53	1.48	5.02	3.38	79.70	3.25	1.77
54	0.1620	177.200	167.1	3.0	3.55	1.48	5.03	3.39	79.70	3.26	1.77
55	0.1650	177.200	167.1	3.1	3.54	1.48	5.03	3.39	79.70	3.25	1.77
56	0.1680	177.200	167.1	3.1	3.54	1.47	5.01	3.41	79.80	3.24	1.77
57	0.1710	178.000	167.9	3.2	3.56	1.47	5.03	3.42	79.80	3.25	1.78
58	0.1740	178.000	167.9	3.2	3.55	1.45	5.01	3.44	79.90	3.23	1.78
59	0.1770	178.000	167.9	3.3	3.55	1.45	5.01	3.44	79.90	3.23	1.78
60	0.1800	178.800	168.7	3.3	3.57	1.45	5.02	3.45	79.90	3.24	1.78
61	0.1830	179.600	169.5	3.4	3.58	1.45	5.04	3.46	79.90	3.25	1.79
62	0.1860	179.600	169.5	3.5	3.58	1.44	5.02	3.49	80.00	3.23	1.79
63	0.1890	179.600	169.5	3.5	3.58	1.44	5.02	3.48	80.00	3.23	1.79
64	0.1920	180.300	170.2	3.6	3.59	1.43	5.02	3.52	80.10	3.22	1.80
65	0.1950	180.300	170.2	3.6	3.59	1.43	5.01	3.52	80.10	3.22	1.79
66	0.1980	180.300	170.2	3.7	3.59	1.43	5.01	3.52	80.10	3.22	1.79
67	0.2010	181.100	171.0	3.7	3.60	1.43	5.03	3.53	80.10	3.23	1.80
68	0.2040	181.900	171.8	3.8	3.62	1.43	5.04	3.54	80.10	3.23	1.81
69	0.2070	181.900	171.8	3.8	3.61	1.41	5.02	3.56	80.20	3.22	1.81
70	0.2100	181.900	171.8	3.9	3.61	1.41	5.02	3.56	80.20	3.22	1.81
71	0.2130	182.700	172.6	4.0	3.63	1.41	5.04	3.57	80.20	3.22	1.81
72	0.2160	182.700	172.6	4.0	3.62	1.41	5.04	3.57	80.20	3.22	1.81
S & ME, INC.											

Test Readings for Specimen No. 3											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
73	0.2190	182.700	172.6	4.1	3.62	1.40	5.02	3.59	80.30	3.21	1.81
74	0.2220	182.700	172.6	4.1	3.62	1.40	5.02	3.59	80.30	3.21	1.81
75	0.2250	182.700	172.6	4.2	3.62	1.40	5.01	3.59	80.30	3.21	1.81
76	0.2270	183.400	173.3	4.2	3.63	1.40	5.03	3.60	80.30	3.21	1.82
77	0.2310	183.400	173.3	4.3	3.63	1.40	5.03	3.60	80.30	3.21	1.81
78	0.2340	183.400	173.3	4.4	3.63	1.40	5.02	3.60	80.30	3.21	1.81
79	0.2360	184.200	174.1	4.4	3.64	1.40	5.04	3.61	80.30	3.22	1.82
80	0.2400	184.200	174.1	4.5	3.64	1.38	5.02	3.63	80.40	3.20	1.82
81	0.2430	184.200	174.1	4.5	3.64	1.38	5.02	3.63	80.40	3.20	1.82
82	0.2450	185.000	174.9	4.6	3.65	1.38	5.03	3.64	80.40	3.21	1.83
83	0.2480	185.000	174.9	4.6	3.65	1.38	5.03	3.64	80.40	3.21	1.82
84	0.2520	185.000	174.9	4.7	3.65	1.38	5.03	3.64	80.40	3.21	1.82
85	0.2540	185.000	174.9	4.7	3.65	1.38	5.03	3.64	80.40	3.21	1.82
86	0.2570	185.800	175.7	4.8	3.66	1.37	5.03	3.68	80.50	3.20	1.83
87	0.2610	185.800	175.7	4.9	3.66	1.37	5.02	3.67	80.50	3.20	1.83
88	0.2630	185.800	175.7	4.9	3.66	1.37	5.02	3.67	80.50	3.20	1.83
89	0.2660	185.800	175.7	4.9	3.65	1.37	5.02	3.67	80.50	3.19	1.83
90	0.2690	186.500	176.4	5.0	3.67	1.37	5.03	3.68	80.50	3.20	1.83
91	0.2720	186.500	176.4	5.1	3.66	1.37	5.03	3.68	80.50	3.20	1.83
92	0.2750	186.500	176.4	5.1	3.66	1.37	5.03	3.68	80.50	3.20	1.83
93	0.2780	187.300	177.2	5.2	3.68	1.37	5.04	3.69	80.50	3.21	1.84
94	0.2810	187.300	177.2	5.2	3.67	1.37	5.04	3.69	80.50	3.20	1.84
95	0.2840	187.300	177.2	5.3	3.67	1.37	5.04	3.68	80.50	3.20	1.84
96	0.2880	187.300	177.2	5.4	3.67	1.37	5.04	3.68	80.50	3.20	1.83
97	0.2900	188.100	178.0	5.4	3.68	1.37	5.05	3.69	80.50	3.21	1.84
98	0.2930	188.100	178.0	5.5	3.68	1.37	5.05	3.69	80.50	3.21	1.84
99	0.2970	188.100	178.0	5.5	3.68	1.35	5.03	3.72	80.60	3.19	1.84
100	0.2990	188.100	178.0	5.6	3.68	1.37	5.05	3.69	80.50	3.21	1.84
101	0.3020	188.100	178.0	5.6	3.68	1.35	5.03	3.72	80.60	3.19	1.84
102	0.3060	188.900	178.8	5.7	3.69	1.35	5.04	3.73	80.60	3.20	1.84
103	0.3080	188.900	178.8	5.7	3.69	1.35	5.04	3.72	80.60	3.20	1.84
104	0.3110	188.100	178.0	5.8	3.67	1.35	5.02	3.71	80.60	3.19	1.83
105	0.3150	188.900	178.8	5.9	3.68	1.35	5.04	3.72	80.60	3.19	1.84
106	0.3170	188.900	178.8	5.9	3.68	1.35	5.03	3.72	80.60	3.19	1.84
107	0.3200	189.600	179.5	6.0	3.69	1.35	5.05	3.73	80.60	3.20	1.85
108	0.3240	189.600	179.5	6.0	3.69	1.35	5.04	3.73	80.60	3.20	1.84
109	0.3270	189.600	179.5	6.1	3.69	1.35	5.04	3.72	80.60	3.20	1.84
110	0.3300	189.600	179.5	6.1	3.69	1.35	5.04	3.72	80.60	3.20	1.84
111	0.3330	189.600	179.5	6.2	3.68	1.35	5.04	3.72	80.60	3.20	1.84
112	0.3360	189.600	179.5	6.3	3.68	1.35	5.03	3.72	80.60	3.19	1.84
113	0.3390	189.600	179.5	6.3	3.68	1.35	5.03	3.72	80.60	3.19	1.84
114	0.3420	189.600	179.5	6.4	3.68	1.35	5.03	3.72	80.60	3.19	1.84
115	0.3440	189.600	179.5	6.4	3.68	1.35	5.03	3.72	80.60	3.19	1.84
116	0.3480	189.600	179.5	6.5	3.67	1.35	5.03	3.71	80.60	3.19	1.84
117	0.3510	189.600	179.5	6.5	3.67	1.34	5.01	3.74	80.70	3.17	1.84
118	0.3540	189.600	179.5	6.6	3.67	1.35	5.02	3.71	80.60	3.19	1.83
119	0.3570	189.600	179.5	6.6	3.67	1.35	5.02	3.71	80.60	3.19	1.83
S & ME, INC.											

Test Readings for Specimen No. 3											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
214	0.6410	200.500	190.4	12.0	3.67	1.32	4.99	3.77	80.80	3.16	1.83
215	0.6440	200.500	190.4	12.0	3.66	1.32	4.99	3.77	80.80	3.16	1.83
216	0.6470	200.500	190.4	12.1	3.66	1.32	4.99	3.76	80.80	3.16	1.83
217	0.6500	201.200	191.1	12.1	3.67	1.32	5.00	3.77	80.80	3.16	1.84
218	0.6530	201.200	191.1	12.2	3.67	1.32	5.00	3.77	80.80	3.16	1.84
219	0.6560	201.200	191.1	12.2	3.67	1.32	4.99	3.77	80.80	3.16	1.83
220	0.6590	201.200	191.1	12.3	3.67	1.32	4.99	3.77	80.80	3.16	1.83
221	0.6620	201.200	191.1	12.3	3.66	1.34	5.00	3.74	80.70	3.17	1.83
222	0.6650	201.200	191.1	12.4	3.66	1.34	5.00	3.73	80.70	3.17	1.83
223	0.6680	201.200	191.1	12.5	3.66	1.34	5.00	3.73	80.70	3.17	1.83
224	0.6710	201.200	191.1	12.5	3.66	1.34	5.00	3.73	80.70	3.17	1.83
225	0.6740	201.200	191.1	12.6	3.66	1.34	4.99	3.73	80.70	3.17	1.83
226	0.6770	202.000	191.9	12.6	3.67	1.34	5.01	3.74	80.70	3.17	1.83
227	0.6800	201.200	191.1	12.7	3.65	1.34	4.99	3.73	80.70	3.16	1.83
228	0.6830	201.200	191.1	12.7	3.65	1.34	4.99	3.72	80.70	3.16	1.82
229	0.6860	202.000	191.9	12.8	3.66	1.34	5.00	3.73	80.70	3.17	1.83
230	0.6890	202.000	191.9	12.9	3.66	1.34	5.00	3.73	80.70	3.17	1.83
231	0.6920	202.000	191.9	12.9	3.66	1.34	5.00	3.73	80.70	3.17	1.83
232	0.6950	202.800	192.7	13.0	3.67	1.34	5.01	3.74	80.70	3.17	1.83
233	0.6980	202.800	192.7	13.0	3.67	1.34	5.01	3.74	80.70	3.17	1.83
234	0.7010	202.800	192.7	13.1	3.66	1.34	5.00	3.74	80.70	3.17	1.83
235	0.7040	202.800	192.7	13.1	3.66	1.34	5.00	3.73	80.70	3.17	1.83
236	0.7070	202.800	192.7	13.2	3.66	1.34	5.00	3.73	80.70	3.17	1.83
237	0.7100	202.800	192.7	13.2	3.66	1.34	5.00	3.73	80.70	3.17	1.83
238	0.7130	202.800	192.7	13.3	3.65	1.34	4.99	3.73	80.70	3.17	1.83
239	0.7170	202.800	192.7	13.4	3.65	1.34	4.99	3.73	80.70	3.17	1.83
240	0.7190	202.800	192.7	13.4	3.65	1.34	4.99	3.73	80.70	3.16	1.83
241	0.7220	202.800	192.7	13.5	3.65	1.34	4.99	3.72	80.70	3.16	1.82
242	0.7260	202.800	192.7	13.5	3.64	1.34	4.98	3.72	80.70	3.16	1.82
243	0.7280	202.800	192.7	13.6	3.64	1.34	4.98	3.72	80.70	3.16	1.82
244	0.7310	202.800	192.7	13.6	3.64	1.34	4.98	3.72	80.70	3.16	1.82
245	0.7350	203.600	193.5	13.7	3.65	1.34	4.99	3.73	80.70	3.17	1.83
246	0.7370	203.600	193.5	13.7	3.65	1.34	4.99	3.73	80.70	3.16	1.83
247	0.7400	203.600	193.5	13.8	3.65	1.34	4.99	3.72	80.70	3.16	1.82
248	0.7440	203.600	193.5	13.9	3.65	1.34	4.98	3.72	80.70	3.16	1.82
249	0.7460	203.600	193.5	13.9	3.64	1.34	4.98	3.72	80.70	3.16	1.82
250	0.7490	203.600	193.5	14.0	3.64	1.34	4.98	3.72	80.70	3.16	1.82
251	0.7520	203.600	193.5	14.0	3.64	1.35	4.99	3.69	80.60	3.17	1.82
252	0.7550	204.300	194.2	14.1	3.65	1.35	5.00	3.70	80.60	3.18	1.83
253	0.7580	204.300	194.2	14.1	3.65	1.35	5.00	3.69	80.60	3.18	1.82
254	0.7610	204.300	194.2	14.2	3.65	1.35	5.00	3.69	80.60	3.18	1.82
255	0.7640	204.300	194.2	14.3	3.64	1.35	5.00	3.69	80.60	3.18	1.82
256	0.7670	205.100	195.0	14.3	3.66	1.35	5.01	3.70	80.60	3.18	1.83
257	0.7710	205.100	195.0	14.4	3.65	1.35	5.01	3.70	80.60	3.18	1.83
258	0.7730	205.100	195.0	14.4	3.65	1.35	5.00	3.70	80.60	3.18	1.83
259	0.7760	205.100	195.0	14.5	3.65	1.35	5.00	3.70	80.60	3.18	1.82
260	0.7790	205.100	195.0	14.5	3.65	1.35	5.00	3.69	80.60	3.18	1.82
S & ME, INC.											

Test Readings for Specimen No. 3											
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
261	0.7820	205.100	195.0	14.6	3.64	1.35	5.00	3.69	80.60	3.18	1.82
262	0.7850	205.100	195.0	14.6	3.64	1.35	4.99	3.69	80.60	3.17	1.82
263	0.7880	205.100	195.0	14.7	3.64	1.35	4.99	3.69	80.60	3.17	1.82
264	0.7910	205.100	195.0	14.8	3.64	1.35	4.99	3.69	80.60	3.17	1.82
265	0.7940	205.100	195.0	14.8	3.63	1.35	4.99	3.68	80.60	3.17	1.82
266	0.7970	205.900	195.8	14.9	3.65	1.35	5.00	3.69	80.60	3.18	1.82
267	0.8000	205.900	195.8	14.9	3.64	1.35	5.00	3.69	80.60	3.18	1.82
268	0.8030	205.900	195.8	15.0	3.64	1.35	5.00	3.69	80.60	3.17	1.82
269	0.8060	205.900	195.8	15.0	3.64	1.35	4.99	3.69	80.60	3.17	1.82
270	0.8090	205.900	195.8	15.1	3.64	1.35	4.99	3.69	80.60	3.17	1.82
271	0.8120	205.900	195.8	15.1	3.63	1.35	4.99	3.69	80.60	3.17	1.82
272	0.8150	206.700	196.6	15.2	3.65	1.35	5.00	3.69	80.60	3.18	1.82
273	0.8180	206.700	196.6	15.3	3.64	1.35	5.00	3.69	80.60	3.18	1.82
274	0.8210	206.700	196.6	15.3	3.64	1.35	5.00	3.69	80.60	3.17	1.82
275	0.8240	206.700	196.6	15.4	3.64	1.35	4.99	3.69	80.60	3.17	1.82
276	0.8270	206.700	196.6	15.4	3.64	1.35	4.99	3.69	80.60	3.17	1.82
277	0.8300	206.700	196.6	15.5	3.63	1.35	4.99	3.69	80.60	3.17	1.82
278	0.8320	206.700	196.6	15.5	3.63	1.37	5.00	3.66	80.50	3.18	1.82
279	0.8360	207.400	197.3	15.6	3.64	1.37	5.01	3.66	80.50	3.19	1.82
280	0.8390	207.400	197.3	15.7	3.64	1.37	5.01	3.66	80.50	3.19	1.82
281	0.8410	207.400	197.3	15.7	3.64	1.37	5.01	3.66	80.50	3.19	1.82
282	0.8450	207.400	197.3	15.8	3.64	1.37	5.00	3.66	80.50	3.19	1.82
283	0.8480	207.400	197.3	15.8	3.63	1.37	5.00	3.66	80.50	3.18	1.82
284	0.8500	207.400	197.3	15.9	3.63	1.37	5.00	3.65	80.50	3.18	1.82
285	0.8540	207.400	197.3	15.9	3.63	1.37	5.00	3.65	80.50	3.18	1.81
286	0.8570	207.400	197.3	16.0	3.63	1.37	4.99	3.65	80.50	3.18	1.81
287	0.8590	207.400	197.3	16.0	3.62	1.37	4.99	3.65	80.50	3.18	1.81
288	0.8620	208.200	198.1	16.1	3.64	1.37	5.00	3.66	80.50	3.19	1.82
289	0.8660	207.400	197.3	16.2	3.62	1.37	4.99	3.65	80.50	3.18	1.81
290	0.8680	207.400	197.3	16.2	3.62	1.37	4.99	3.64	80.50	3.18	1.81
291	0.8710	208.200	198.1	16.2	3.63	1.37	5.00	3.65	80.50	3.18	1.81
292	0.8750	208.200	198.1	16.3	3.63	1.35	4.98	3.68	80.60	3.17	1.81
293	0.8770	208.200	198.1	16.4	3.62	1.35	4.98	3.68	80.60	3.17	1.81
294	0.8800	208.200	198.1	16.4	3.62	1.35	4.98	3.68	80.60	3.16	1.81
295	0.8820	209.000	198.9	16.5	3.64	1.35	4.99	3.69	80.60	3.17	1.82
S & ME, INC.											





REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH
(DATED NOVEMBER 7, 2013)



LEGEND

 Approximate SRT Profile Location

 Proposed Top of Cut Slope Location

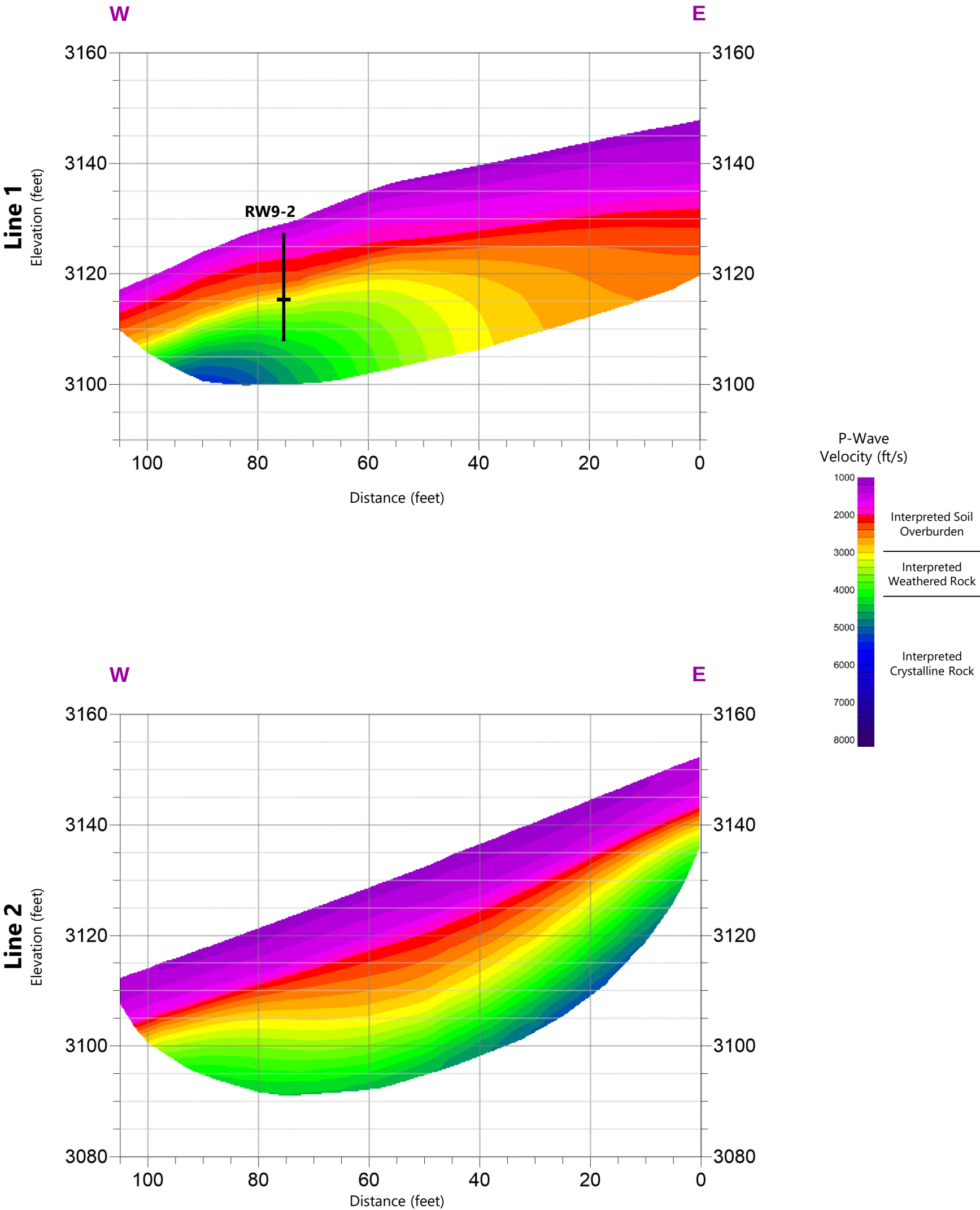
 Proposed Retaining Wall Location

GEOPHYSICAL SURVEY LOCATION PLAN

U-5810 WATAUGA COUNTY (SR 1514 & 1523)
BOONE, NORTH CAROLINA

SCALE:
AS SHOWN
DATE:
10/15/2021
PROJECT NUMBER
6235-18-038
FIGURE NO.

2



Approximate Soil Boring/Test Pit Location
(Black indicates refusal)

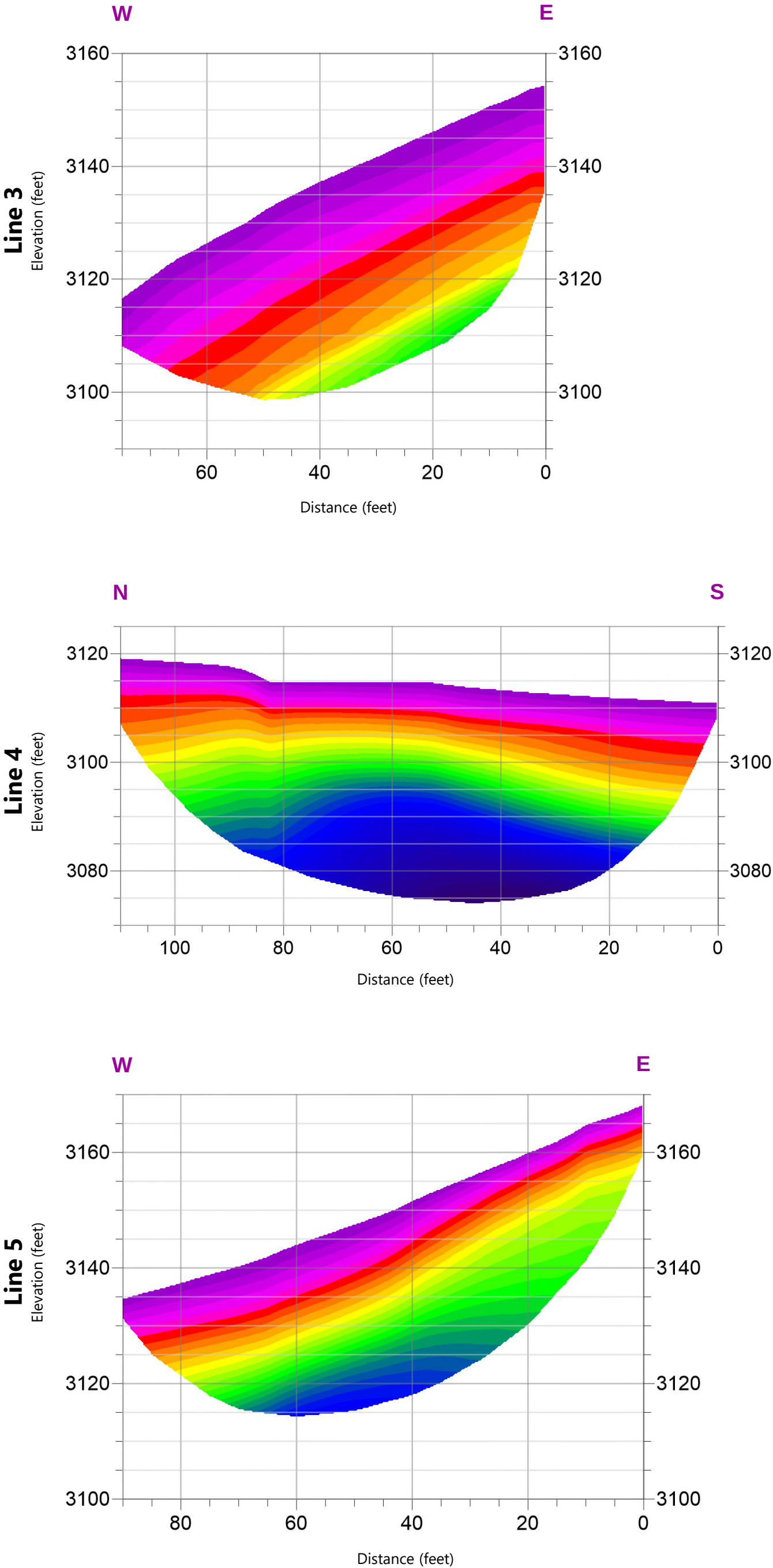


SRT PROFILES – LINES 1 AND 2

U-5810 WATAUGA COUNTY (SR 1514 & 1523)
BOONE, NORTH CAROLINA

SCALE:
AS SHOWN
DATE:
10/15/2021
PROJECT NUMBER
6235-18-038

FIGURE NO.
3



SRT PROFILES – LINES 3, 4, AND 5

U-5810 WATAUGA COUNTY (SR 1514 & 1523)
BOONE, NORTH CAROLINA

SCALE:
AS SHOWN

DATE:
10/15/2021

PROJECT NUMBER
6235-18-038

FIGURE NO.

4



U-5810 Rock Mapping – Representative Photographs

NCDOT SR 1514 and SR 1523

Watauga County, North Carolina

S&ME Project No. 6235-18-038

Page 1

1			Date: 5/25/2020
	Location / Orientation	Bamboo Road facing Northeast	Photographer: N. Peterson
	Remarks	View of outcrop from quarry office on Bamboo Road.	

2			Date: 5/25/2022
	Location / Orientation	Bamboo Road facing North	Photographer: N. Peterson
	Remarks	View of outcrop across from quarry office.	



U-5810 Rock Mapping – Representative Photographs

NCDOT SR 1514 and SR 1523

Watauga County, North Carolina

S&ME Project No. 6235-18-038

Page 2

		Date: 5/25/2020
		Photographer: N. Peterson
3	Location / Orientation	Quarry highwall facing Southeast
	Remarks	Quarry highwall on Northeast side of Bamboo Road.

		Date: 5/25/2020
		Photographer: N. Peterson
4	Location / Orientation	Quarry highwall facing East
	Remarks	View of outcrop on expose highwall.



U-5810 Rock Mapping – Representative Photographs

NCDOT SR 1514 and SR 1523

Watauga County, North Carolina

S&ME Project No. 6235-18-038

Page 3

			Date: 5/25/2020
			Photographer: N. Peterson
5	Location / Orientation	Quarry highwall facing North	
	Remarks	North end of quarry highwall.	

			Date: 5/25/2020
			Photographer: N. Peterson
6	Location / Orientation	North end of quarry facing Northeast	
	Remarks	Weathered rock on North end of quarry.	



Bamboo Road (Strike/Dip) Across from quarry office	
Strike/Dip	Joints
140/45 NW	170/72 NW
137/40 "	95/33 SW
130/42 "	25/29 SW
128/42 "	185/68 NW
150/40 "	170/70 SW
132/44 "	175/72 SW
132/45 "	
140/40 "	
142/39 "	
137/45 "	
145/40 "	
137/42 "	
132/44 "	

Quarry Hi-Wall	
Strike/Dip	Joints
140/40 NW	65/46 Slickensided SW
135/35 "	55/54 SW
120/24 "	65/67 "
155/30 "	20/49 Slickensided SW
138/45 "	215/65 SW
140/40 "	240/45 Slickensided SW
132/30 "	235/50 Slickensided SW
136/29 "	20/50 SW
139/40 "	55/30 "
151/42 "	220/70 "
154/45 "	70/40 "
140/44 "	220/65 "
140/42 "	
138/50 "	
137/44 "	
138/40 "	
139/45 "	
144/32 "	
152/40 "	
160/44 "	
150/42 "	
138/45 "	
137/44 "	
129/39 "	

North Side of road west of Quarry	
Strike/Dip	Joints
140/45 NW	62/55 SW
139/44 "	70/65 "
129/40 "	220/62 "
130/45 "	210/60 "
152/50 "	225/65 "
149/39 "	190/60 "
137/45 "	200/70 "
147/40 "	
140/35 "	
127/34 "	
129/45 "	
140/40 "	
138/45 "	
144/40 "	
129/38 "	
140/39 "	
144/42 "	
129/44 "	
140/40 "	