

REFERENCE: P-5707

PROJECT: 44643

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>
-L-	14+30 - 52+65	4 - 6
-Y3-	12+00 - 14+99	4
-Y5-	11+00 - 28+26	5 - 6
-DRI-	10+00 - 13+02	5 - 6
-DRY5-	10+27 - 13+00	5
-DRY5A-	10+25 - 11+28	6

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	20+00 - 48+50	7 - 58
-Y3-	12+50	59
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-DRI-	10+50 - 12+50	78 - 82

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	BORING LOGS	83 - 85
B	LAB RESULTS	86 - 107

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY WAKE
PROJECT DESCRIPTION ROGERS ROAD (SR 2052)
GRADE SEPARATION OVER CSX RAILROAD
(CROSSING NO. 633905Y) AT MILE POST S 142.53

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5707	1	

CAUTION NOTICE

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

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU UNPLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. Mize

C. Bryan

M. Schubert

M. Shipman

M. Sweitzer

M. Lisi

Terracon Personnel

INVESTIGATED BY RK&K, LLP

DRAWN BY J. Mize

CHECKED BY M. Sweitzer

SUBMITTED BY RK&K, LLP

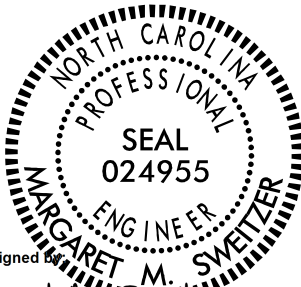
DATE FEBRUARY 2025



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DocuSigned by

Margaret M. Sweitzer

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3/5/2025

SIGNATURE

DATE

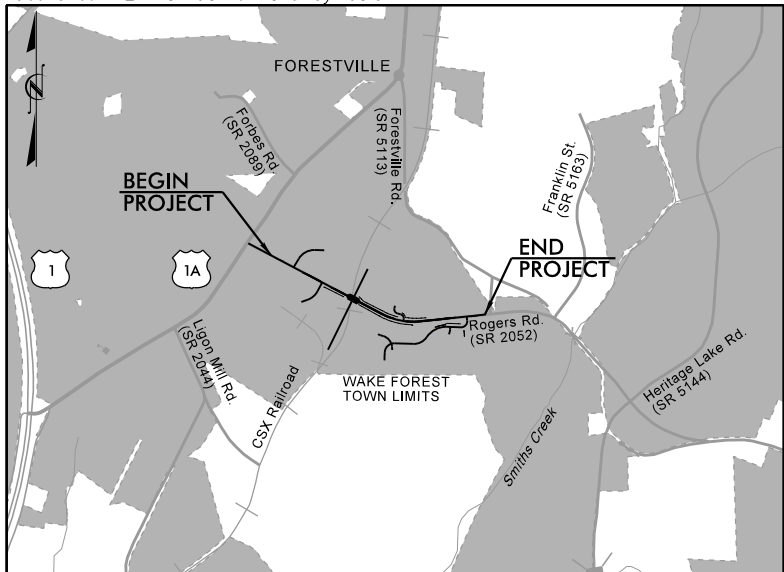
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TIP PROJECT: P-5707

CONTRACT: C204338

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



VICINITY MAP (NTS)

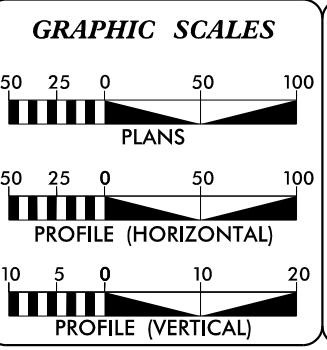
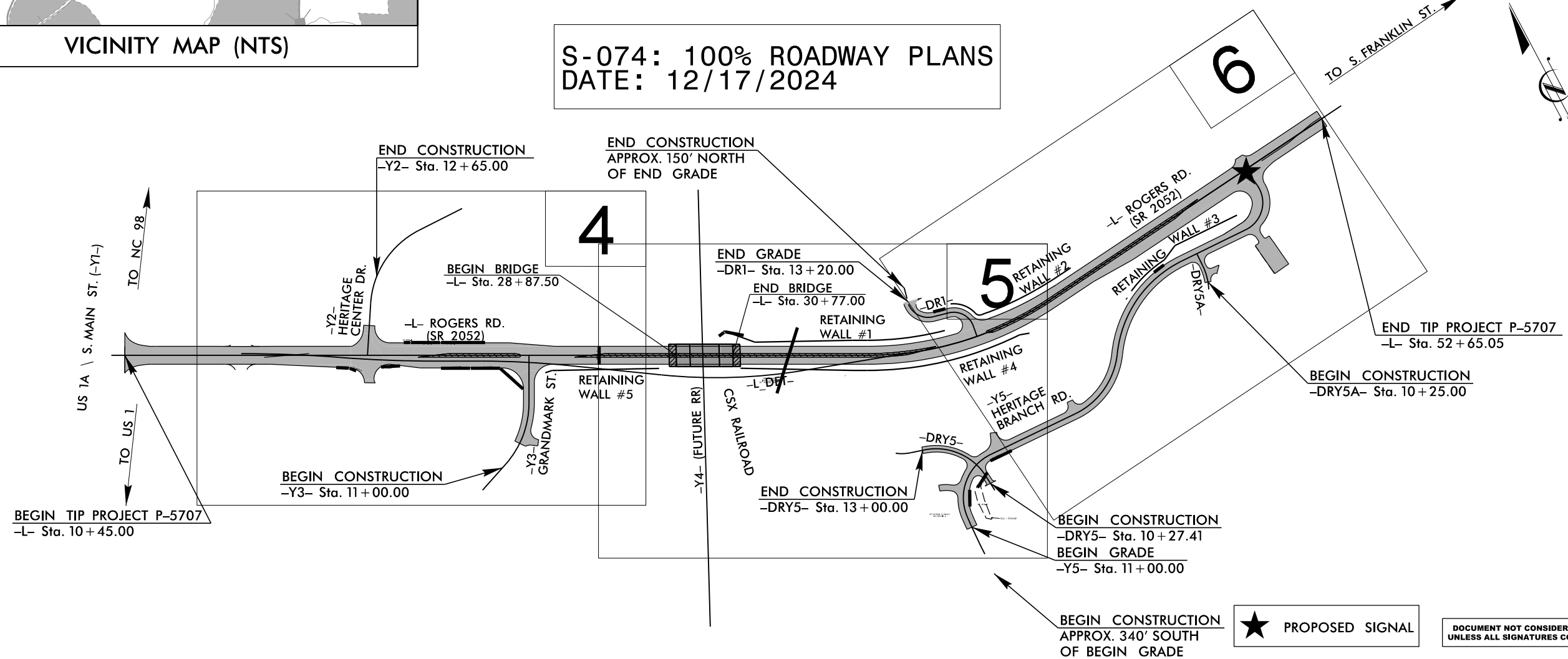
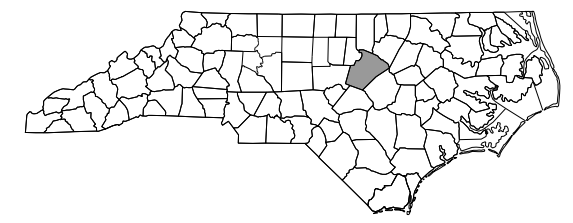
STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION
WAKE COUNTY

**LOCATION: ROGERS ROAD (SR 2052) GRADE SEPARATION
OVER CSX RAILROAD (CROSSING NO. 633905Y)
AT MILE POST S 142.53**

**TYPE OF WORK: DRAINAGE, GRADING, PAVING, SIGNALS,
STRUCTURE, WIDENING &
RETAINING WALLS**

**S-074: 100% ROADWAY PLANS
DATE: 12/17/2024**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5707	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
44643.1.1		PE	
44643.2.1		ROW & UTILITIES	
44643.3.1		CONSTRUCTION	



DESIGN DATA	
ADT 2025	= 27,905
ADT 2045	= 38,166
D	= 55%
K	= 8%
T	= 3% *
V	= 50 MPH
*TTST 1.0% / DUAL 2.0%	
FUNC CLASS = URBAN	
MAJOR COLLECTOR	
SUBREGIONAL TIER	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT P-5707	0.763 miles
LENGTH STRUCTURE TIP PROJECT P-5707	0.036 miles
TOTAL LENGTH OF PROJECT P-5707	0.799 miles

PLANS PREPARED BY:

RK&K
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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY DATE:
June 12, 2018

LETTING DATE:
JUNE 17, 2025

Brandon McInnis, P.E.
PROJECT ENGINEER

Jillian Huskey, E.I.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

RAIL DIVISION
ENGINEERING COORDINATION
AND SAFETY

2024 STANDARD SPECIFICATIONS

NCDOT RAIL DIVISION
CONTACT: Brian Gackstetter, E.I.

★ PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



February 26, 2025

WBS Number: 44643.1.1

TIP Number: P-5707

F.A. Number:

County: Wake

Description: Rogers Road (SR 2052) Grade Separation Over CSX Railroad (Crossing No. 633905Y) at Mile Post S 142.53

Subject: Roadway Subsurface Inventory Report – Draft 3

PROJECT DESCRIPTION

The proposed project consists of a two-lane widening with construction of a bridge over CSX Railroad and five (5) retaining walls, as well as fills up to 50 feet high. The proposed project is approximately 0.7 miles, running from US-1 Alternate to Capital Creek Drive along Rogers Road in Wake Forest, and intersects with Grandmark Street, Heritage Branch Rd., and a CSX railroad. The new bridge will replace an at grade railroad crossing. A detour alignment, approximately 70 feet south of the existing alignment, will conduct traffic along Rogers Road for the duration of construction.

Several drill rigs with automatic hammers were used for the geotechnical investigation from January of 2018 through October of 2024. Standard Penetration Tests (SPT) were performed and soil samples were collected for field visual classification and laboratory classification.

The following alignments were investigated. Selected subsurface cross sections of these alignments are included in this report.

<u>Alignment</u>	<u>Stations (±)</u>
-L-	14+30 – 52+65
-LDET-	20+28 – 30+84
-Y3-	12+00 – 14+99
-Y5-	11+00 – 28+26
-DR1-	10+00 – 13+02
-DRY5-	10+27 – 13+00
-DRY5A-	10+25 – 11+28

Four retaining walls are proposed along the project corridor, and are located as follows:

- Retaining Wall #1: -L- Sta. 30+46 LT – -L- Sta. 38+00 LT
- Retaining Wall #2: -DR1- Sta. 11+10 RT – -L- Sta. 42+90 LT
- Retaining Wall #3: -Y5- Sta. 21+60 – -Y5- Sta. 25+81 LT
- Retaining Wall #4: -L- Sta. 31+02 RT – -L- Sta. 40+60 RT
- Retaining Wall #5: -L- Sta. 24+50 RT – -L- Sta. 28+30 RT

The subsurface investigation for these retaining walls is covered in a separate report.

PHYSIOGRAPHY AND GEOLOGY

The proposed project is located within the Piedmont Physiographic Province. The terrain within the project corridor is gently sloping but turns to rolling hills immediately outside the right of way. Significant development in the area has reduced some of the rolling hills to flat terrain.

The project is located near the contact between Pennsylvanian to Permian-age (320 – 270 Ma) intrusive felsic igneous rocks and late-Proterozoic to Cambrian-age (1000 – 490 Ma) biotite schist. Local surficial soils, which are typically classified as residual or artificial fill, are underlain by intrusive felsic igneous rock. This rock is likely related to the Rolesville Batholith, which makes up the Pennsylvanian-Permian intrusive rocks in the area.

Typical residual soil profiles consist of a fine-grained surficial layer of clay, where soil weathering is more advanced. This surficial layer is underlain by coarser, saprolitic soils. The boundary between soil and rock is not sharply defined. This transitional zone, termed “weathered rock”, is found overlying the parent rock. Weathering is facilitated by local groundwater pathways, such as fractures, joints, and more permeable, less resistant rock types. Consequently, the boundary of weathered rock and crystalline rock can be erratic, even over short horizontal distances.

SOIL PROPERTIES

Soils encountered during the geotechnical investigation are separated into four categories based on origin. The origins consist of artificial fill, roadway embankment, alluvial soils, and residual soils.

Materials interpreted as artificial fill were encountered under the developed shopping centers and apartment complexes adjacent to the project. Artificial fill consists of very loose to medium dense, silty and clayey SAND (A-2-4, A-2-6, A-2-7). Artificial fill consisting of very soft to stiff, sandy SILT and CLAY (A-5, A-7-6) was also encountered. Measured plasticity indices ranged between 13 and 26. The thickness of the encountered artificial fill ranges from 3 to 17 feet.

Roadway embankment found throughout the project generally consists of loose to dense, gravelly, silty, and clayey SAND (A-1-b, A-2-4, A-2-5, A-2-6). Some thin layers of roadway embankment consist of soft to very stiff CLAY (A-7-6). Measured plasticity indices ranged between 12 and 38. The thickness of the encountered roadway embankment ranges from 2 to 32 feet.

Alluvial soils were encountered immediately surrounding the unnamed branch of Smith Creek that runs under the eastern side of the project. Alluvial soils consisting of very loose to medium dense, silty to clayey fine SAND (A-2-4, A-2-6), very soft to soft silty CLAY (A-7-5, A-7-6), and sandy SILT (A-4) with trace to little organic content were encountered. Measured plasticity indices ranged between 13 and 26. The thickness of the encountered alluvial soils ranges from 4 to 8 feet.

Residual soils cover much of the project, and they are frequently found underneath other soils. Residual soils of every primary grain size and stiffness/density can be found, though two types of residual soil appear much more frequently than all others. The first of these two is a saprolitic silty SAND (A-2-4) with relict structures resembling the granite underlying the project area. The second common residual soil is a highly micaceous silty SAND and sandy SILT (A-2-5, A-5), found throughout the project area in veins that snake through the saprolitic silty sand and underlying granite. Measured plasticity indices ranged between 0 and 33. The thickness of the residual soils ranges from 4 feet to greater than 28 feet.



ROCK PROPERTIES

In rock core, as well as rock shards taken from split spoons that encountered refusal, the rock encountered in this project is a coarse-grained granite composed primarily of quartz, potassium feldspar, plagioclase feldspar, and biotite. There are mica-rich veins running through this granite and the saprolitic soil that it weathers into. These veins consist of highly (up to 90%) micaceous soil. Both the granite and the soil veins within it produce mica when weathered, which can be observed in the residual soil found throughout the project. No rock was encountered within 6 feet of the proposed grade throughout the project. The elevation of the rock encountered ranged from 326 feet at the highest encountered location to lower than 233 feet, where it was not encountered.

As mentioned previously, the granite encountered in this project is interpreted as a part of the Rolesville Batholith. However, the project is located near the boundary of the Rolesville Batholith and it is possible that the local bedrock is instead related to an older (late Proterozoic to Cambrian) biotite schist. In either case, the local bedrock is composed primarily of granitoid rocks with veins of biotite mica running through it, congruent with field observations.

GROUNDWATER

Groundwater was encountered rarely during the geotechnical investigations. Groundwater elevations ranged from approximately 251 feet to 317 feet. No groundwater was found within 6 feet of proposed grade throughout the project.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

1. The following sections contain highly plastic and loose/wet soils, or highly micaceous soils. These soils have the potential to cause embankment/subgrade and/or slope stability problems during construction.

<u>Alignment</u>	<u>Stations (±)</u>
-L-	32+25 – 33+25
-Y5-	22+75 – 26+20

2. Artificial fills were encountered at the following locations:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	22+00
-L-	29+00 – 29+50
-L-	37+50 – 42+00
-Y5-	14+75 – 15+25
-Y5-	19+75 – 20+60
-Y5-	24+36 – 27+35

3. Alluvial soils were encountered at the following locations:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	41+75 – 43+75
-Y5-	22+85 – 24+00

4. Locations in cut areas or within 6 feet of grade with a measured Plasticity Index of 26 or higher are listed below:

<u>Alignment</u>	<u>Stations (±)</u>	<u>PI</u>
-L-	20+00	31
-L-	36+00	26
-Y5-	12+00	27

5. There is one existing retention pond within the bounds of the proposed project at station -Y5- 25+50 LT.

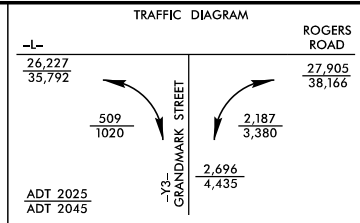
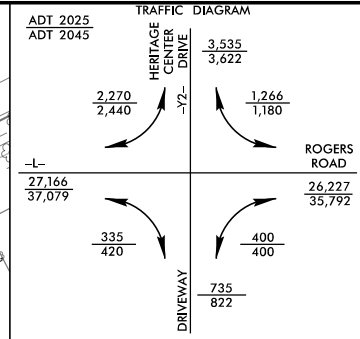
Prepared by,

Margaret M. Sweitzer, P.E.
Project Manager, Geotechnical
Registered, North Carolina 024955

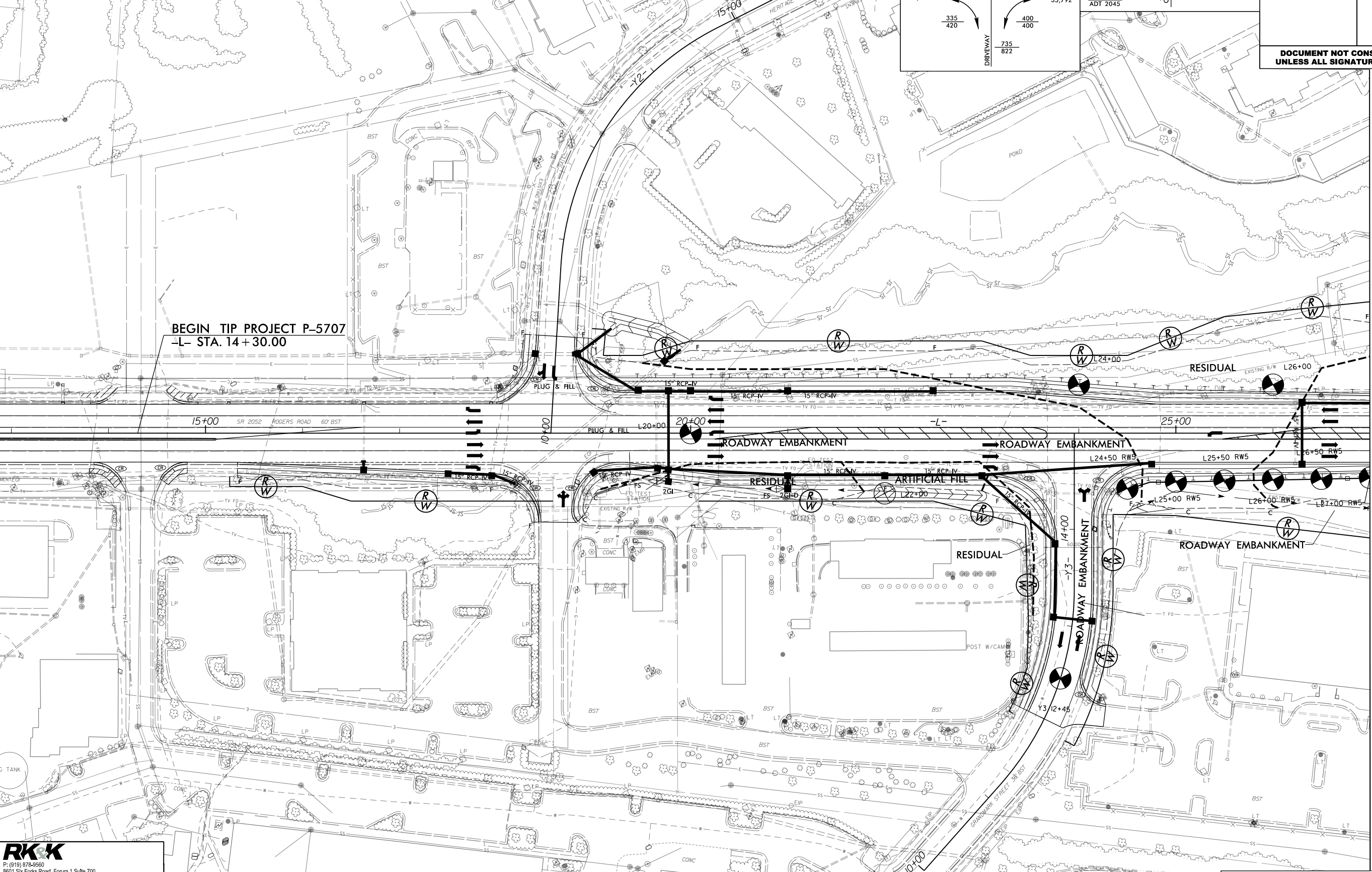
James W. Mize, P.G.
Project Geologist, Geotechnical
Registered, North Carolina 2688

-Y2-
PI Sta 13+41.55
 $\Delta = 59^{\circ} 37' 23.0''$ (RT)
 $D = 19^{\circ} 25' 20.3''$
 $L = 306.98'$
 $T = 169.03'$
 $R = 295.00'$

-Y3-
PI Sta 12+33.00
 $\Delta = 41^{\circ} 36' 09.2''$ (LT)
 $D = 18^{\circ} 47' 07.8''$
 $L = 221.46'$
 $T = 115.87'$
 $R = 305.00'$
 $e = NC$
Runout = N/A



PROJECT REFERENCE NO.	SHEET NO.
P-5707	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
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NAD 83 NRS 2007

MATCHLINE -L- STA. 27+00 SEE SHEET 5

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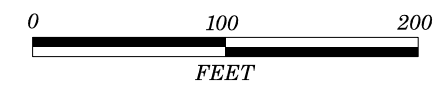
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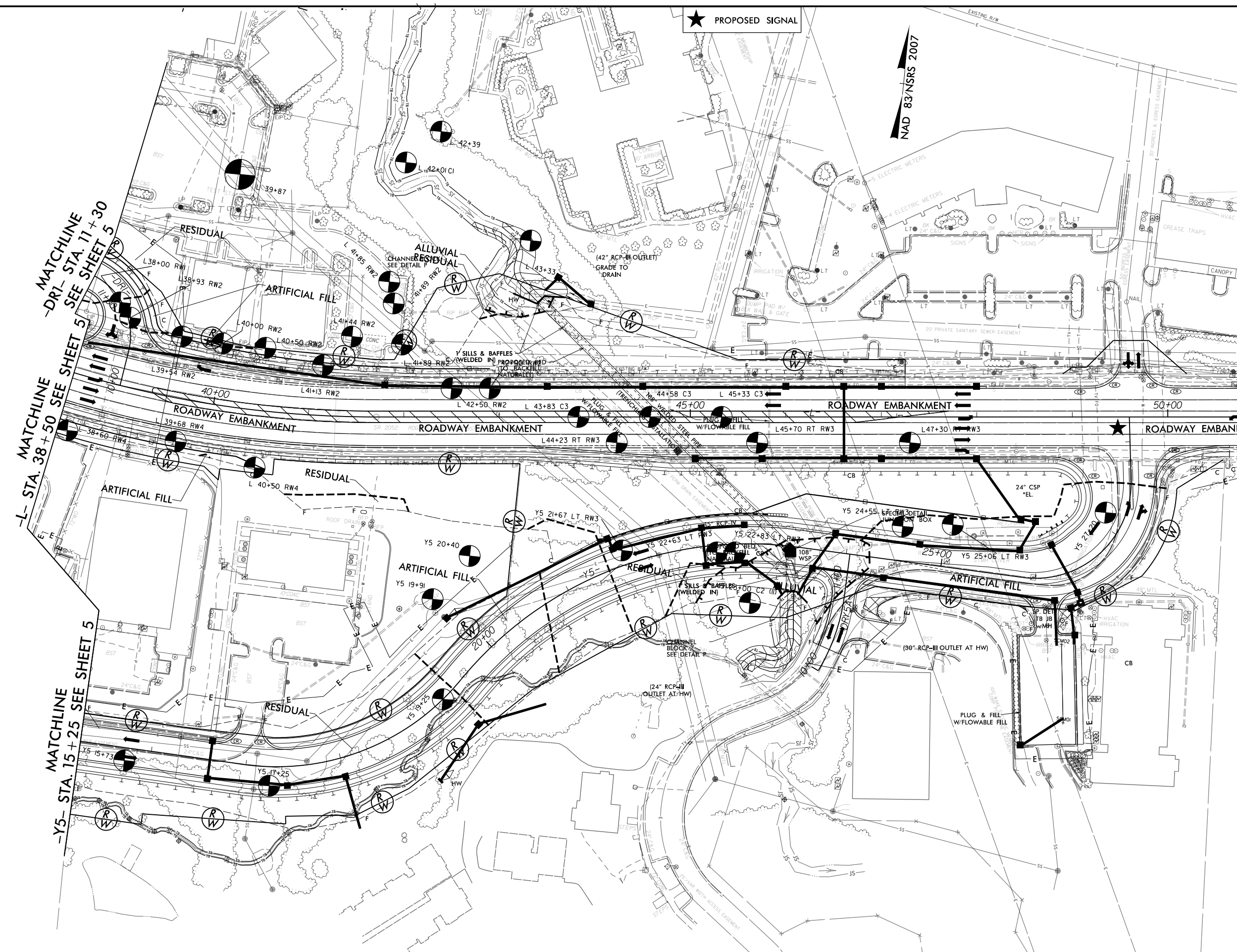
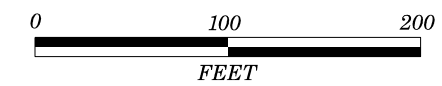
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PAVEMENT REMOVAL
BY OTHERS



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NAD 83 NRS 2007

PROJECT REFERENCE NO. P-5707		SHEET NO. 6	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		SEAL 29470 ENGINEER BRANDON J. MCINNIS	
DO NOT USE FOR R/W ACQUISITION		SEAL 51640 ENGINEER COURTLAND A. HORTMAN	
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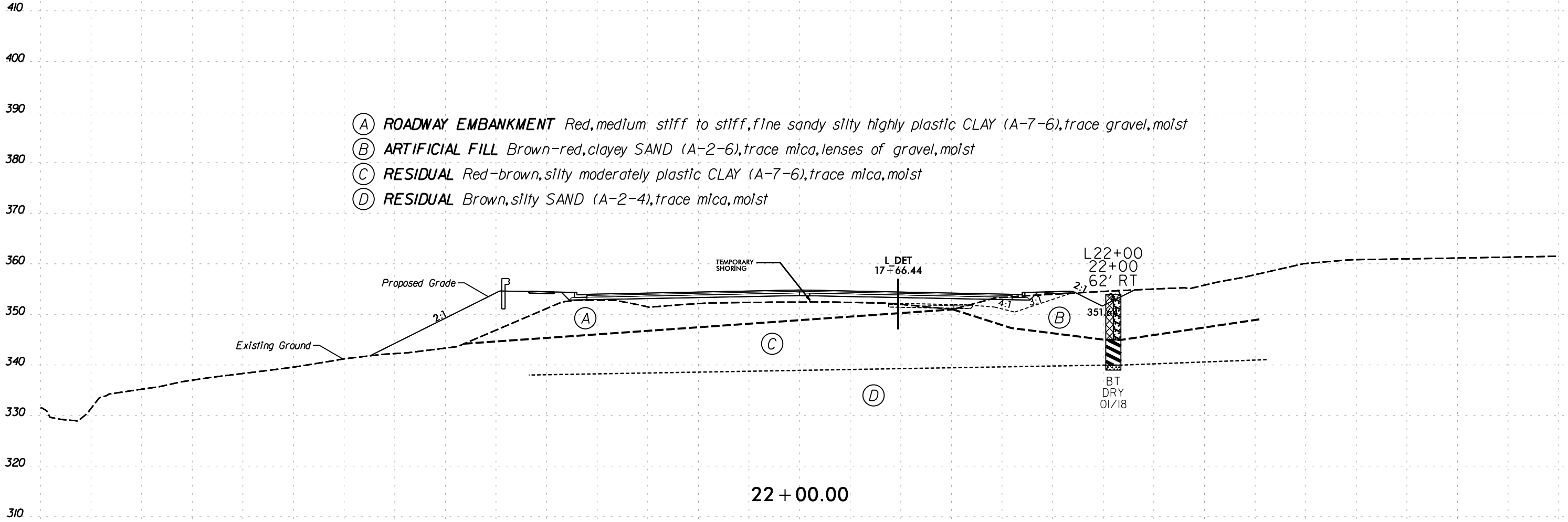
ADT 2025 ADT 2045	1,435 1,522	400 400	ROGERS ROAD
27,905 38,166	26,866 36,779		
ADT 2025 ADT 2045	N/A N/A	N/A N/A	ROGERS ROAD
27,905 38,166	2,418 3,440	1,914 2,680	HERITAGE BRANCH ROAD
	4,431 6,257		

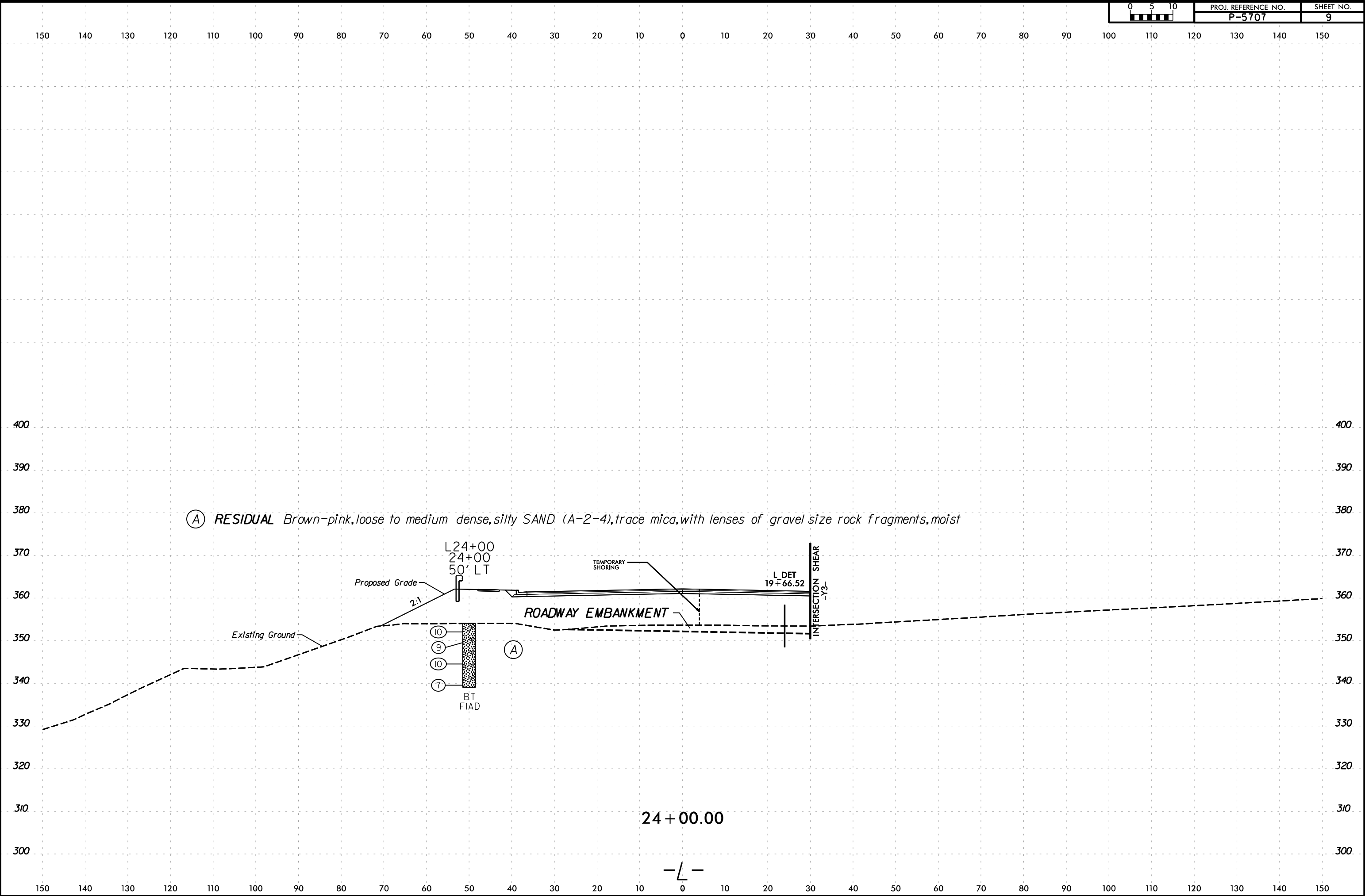
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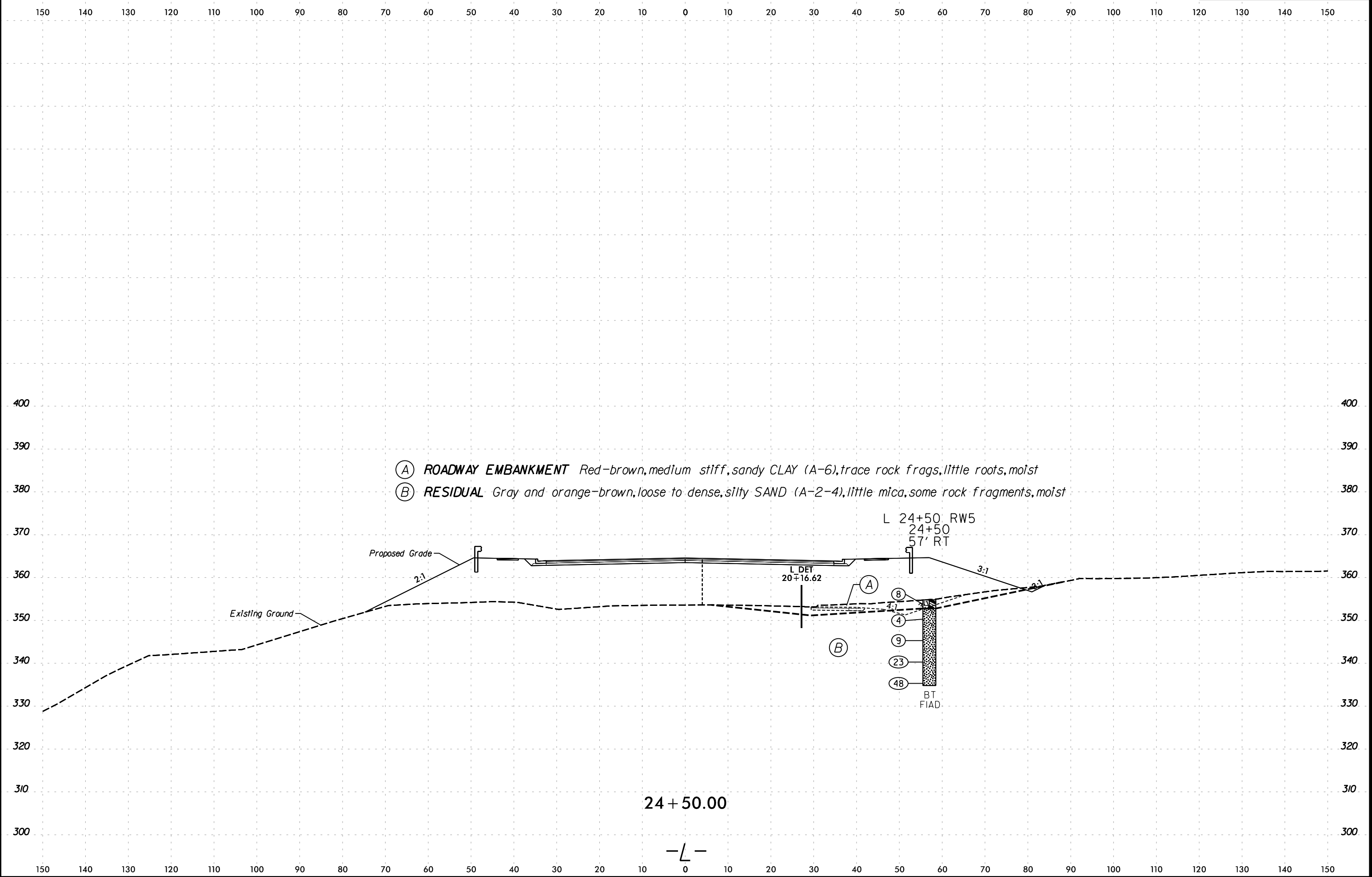


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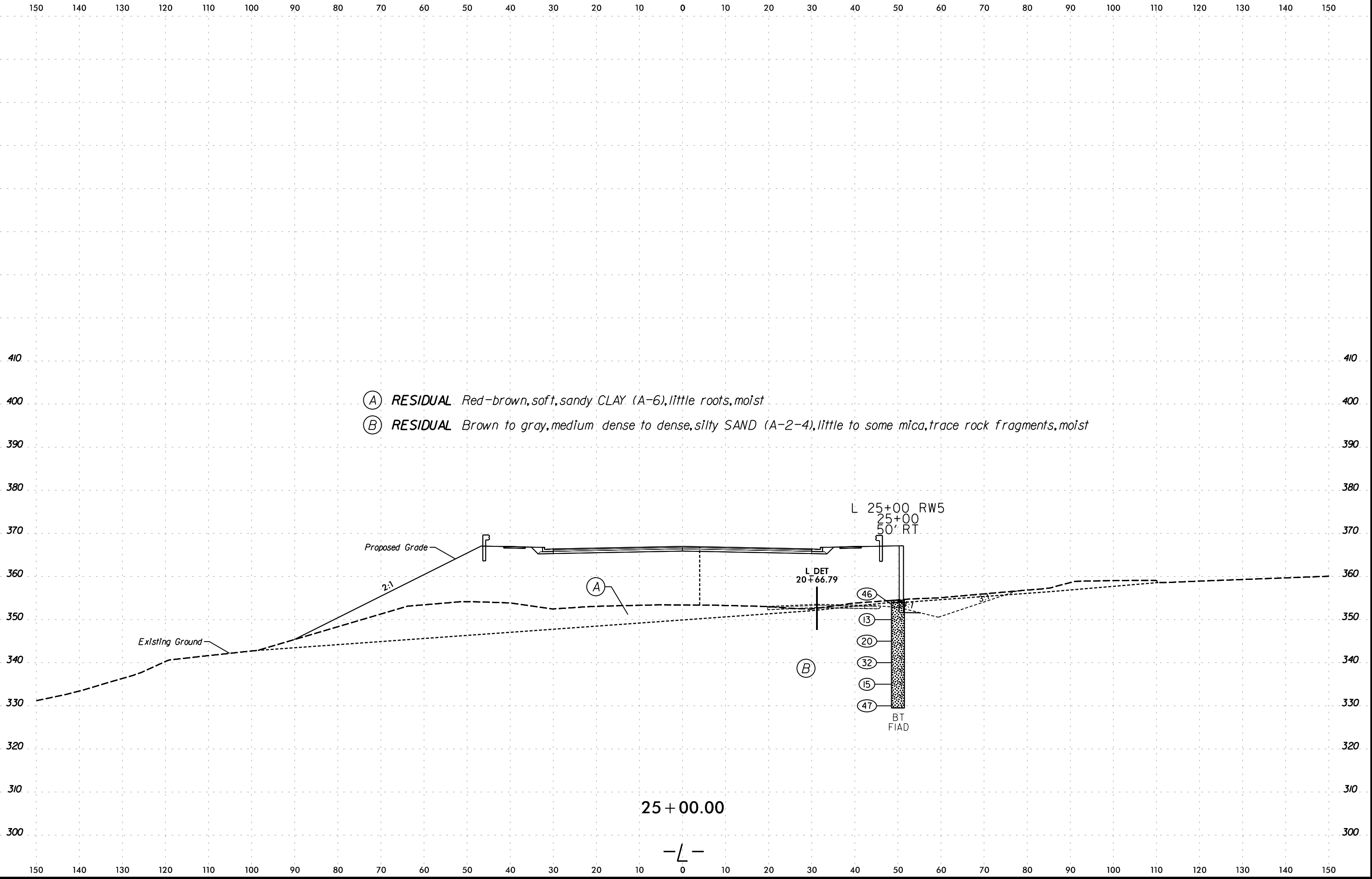




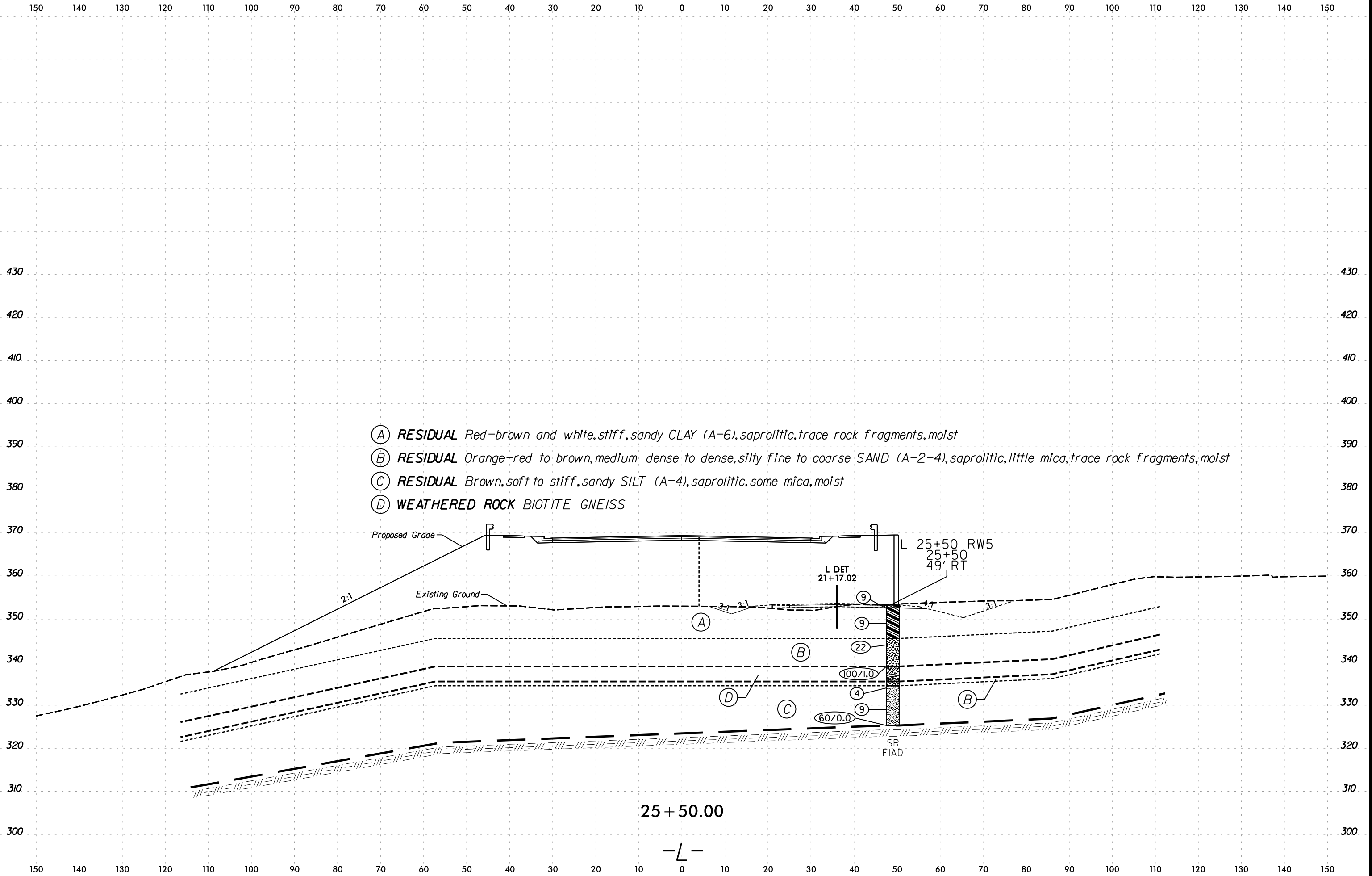


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400400

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340340

330330

320320

310310

300300

1501401301201101009080706050403020100102030405060708090100110120130140150

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-239	26+00	48 RT	0.0 - 1.5	A-4 (0)	NP	NP	23.3	40.7	16.2	19.8	97	88	39	28.2	--

- (A)

ROADWAY EMBANKMENT

Red, medium stiff, sandy non-plastic SILT (A-4), little roots
- (B)

RESIDUAL

Red, medium stiff to stiff, sandy silty CLAY (A-7-5), trace mica, moist
- (C)

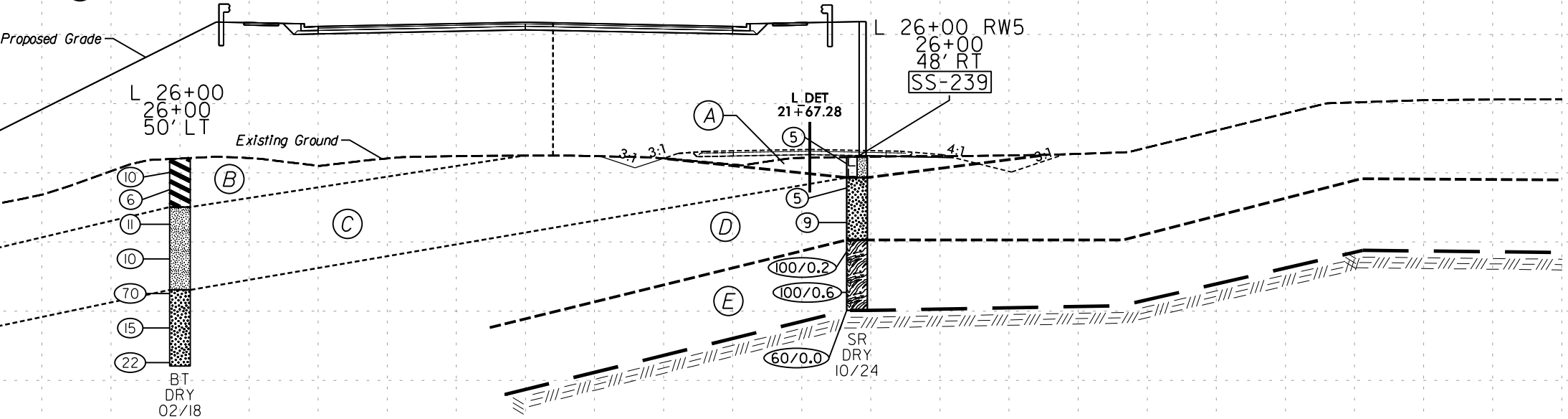
RESIDUAL

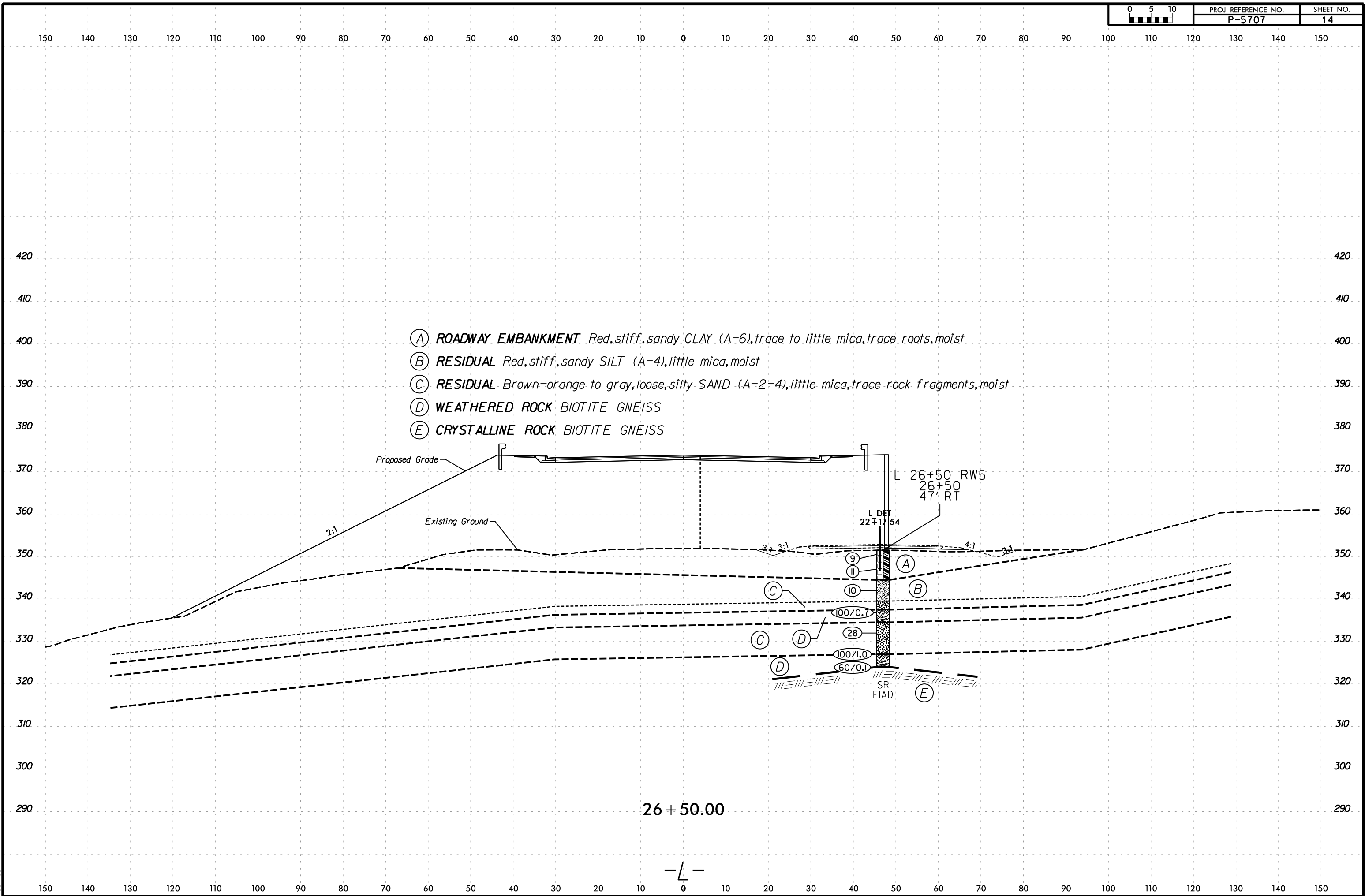
Red, stiff, clayey sandy SILT (A-4), highly micaceous, moist
- (D)

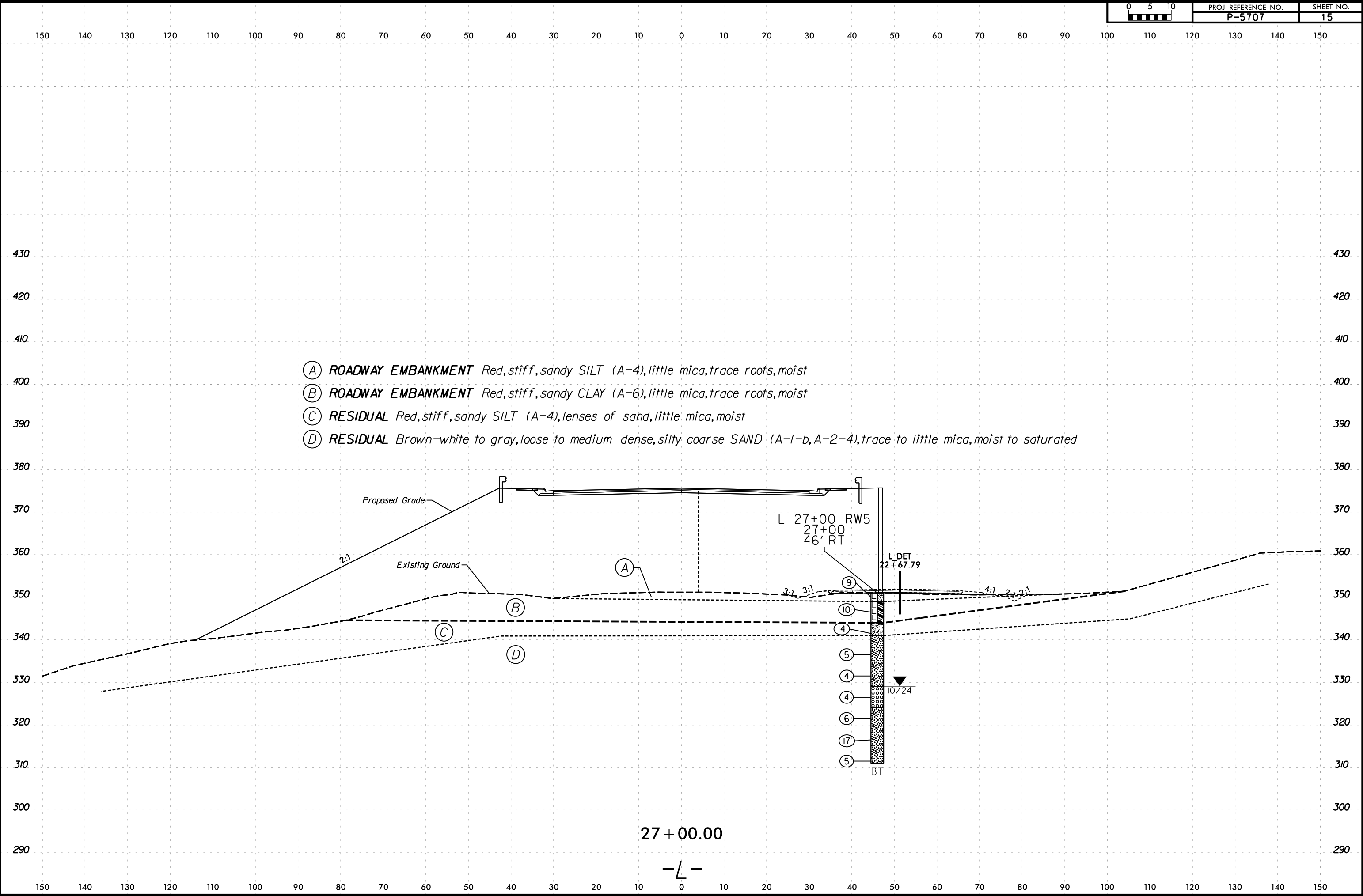
RESIDUAL

Brown and gray, loose to very dense, silty SAND (A-2-4), saprolitic, trace mica, moist
- (E)

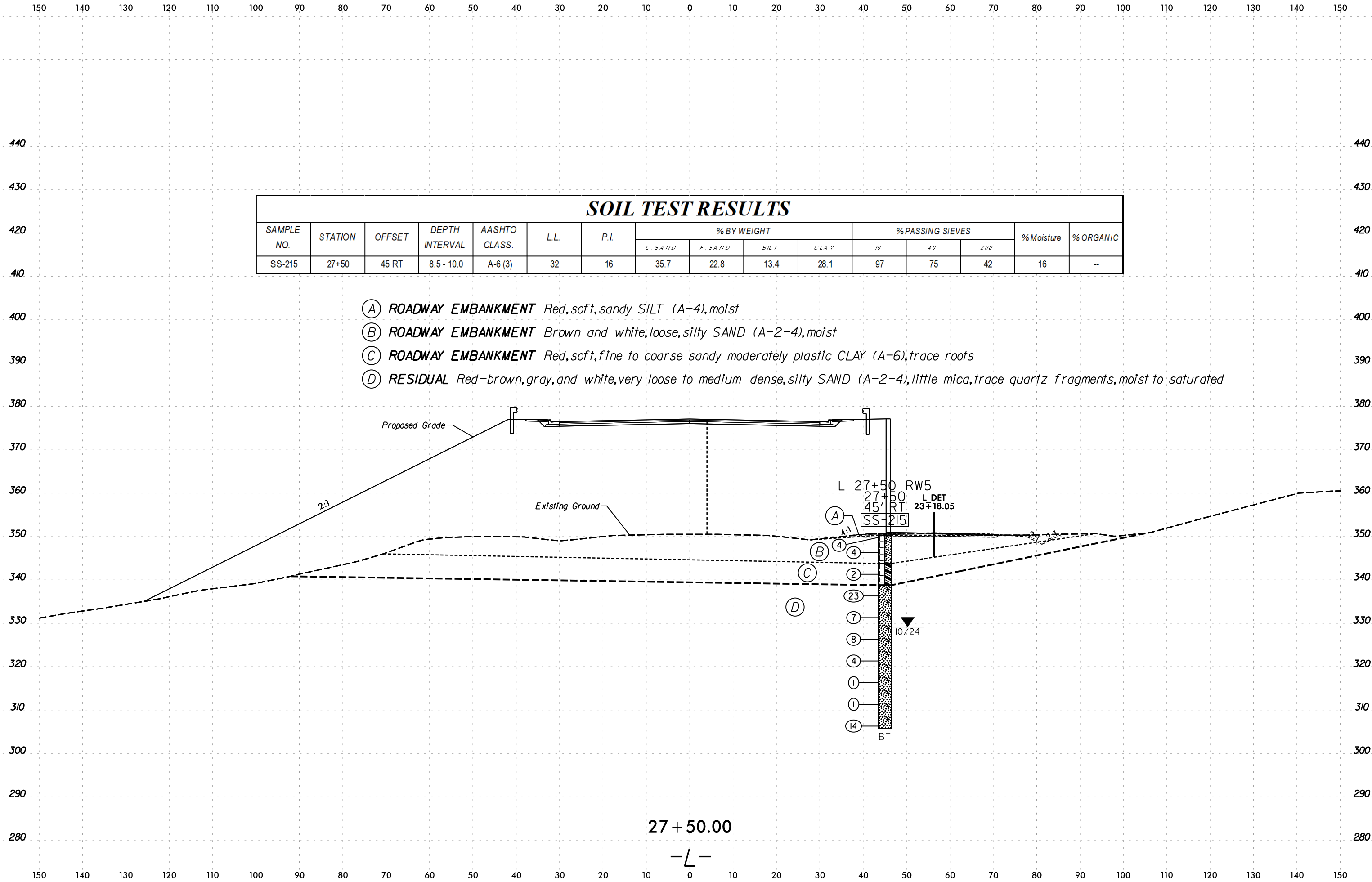
WEATHERED ROCK BIOTITE GNEISS







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6/23/16



6/23/16

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-203	28+00	44 RT	3.5 - 5.0	A-2-6 (0)	39	12	35.9	28.1	14.1	21.9	87	69	34	31.3	--
SS-209	28+00	44 RT	33.5 - 35.0	A-2-4 (0)	NP	NP	30.7	51	13.4	4.9	99	91	23	34.1	--

- (A)

ROADWAY EMBANKMENT

Light brown to red, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-6), trace mica, little gravel, moist
- (B)

ROADWAY EMBANKMENT

Tan to brown-red, very loose to loose, coarse SAND (A-1-b) and clayey fine to coarse SAND (A-2-6), trace to little gravel, trace rootlets moist
- (C)

RESIDUAL

Red, stiff, silty highly plastic CLAY (A-7-6), highly micaceous, saprolitic, moist
- (D)

RESIDUAL

Brown and red, very loose to medium dense, silty fine to coarse SAND (A-2-4), saprolitic, trace rock fragments, little to some mica
- (E)

RESIDUAL

Orange to brown-black, medium stiff to stiff, sandy and clayey SILT (A-4, A-5), saprolitic, little to highly micaceous, trace rock fragments, lenses of sand
- (F)

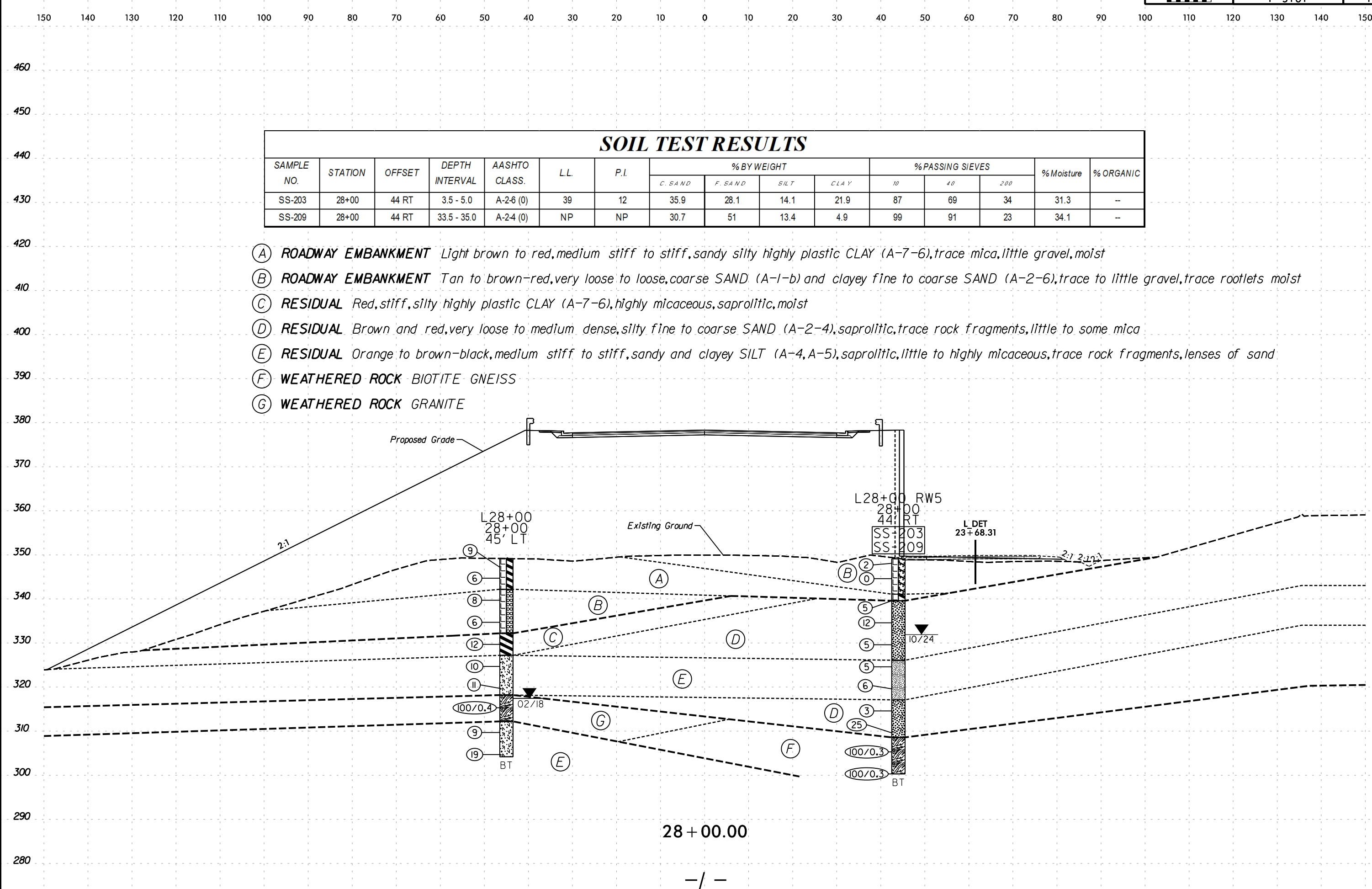
WEATHERED ROCK

BIOTITE GNEISS
- (G)

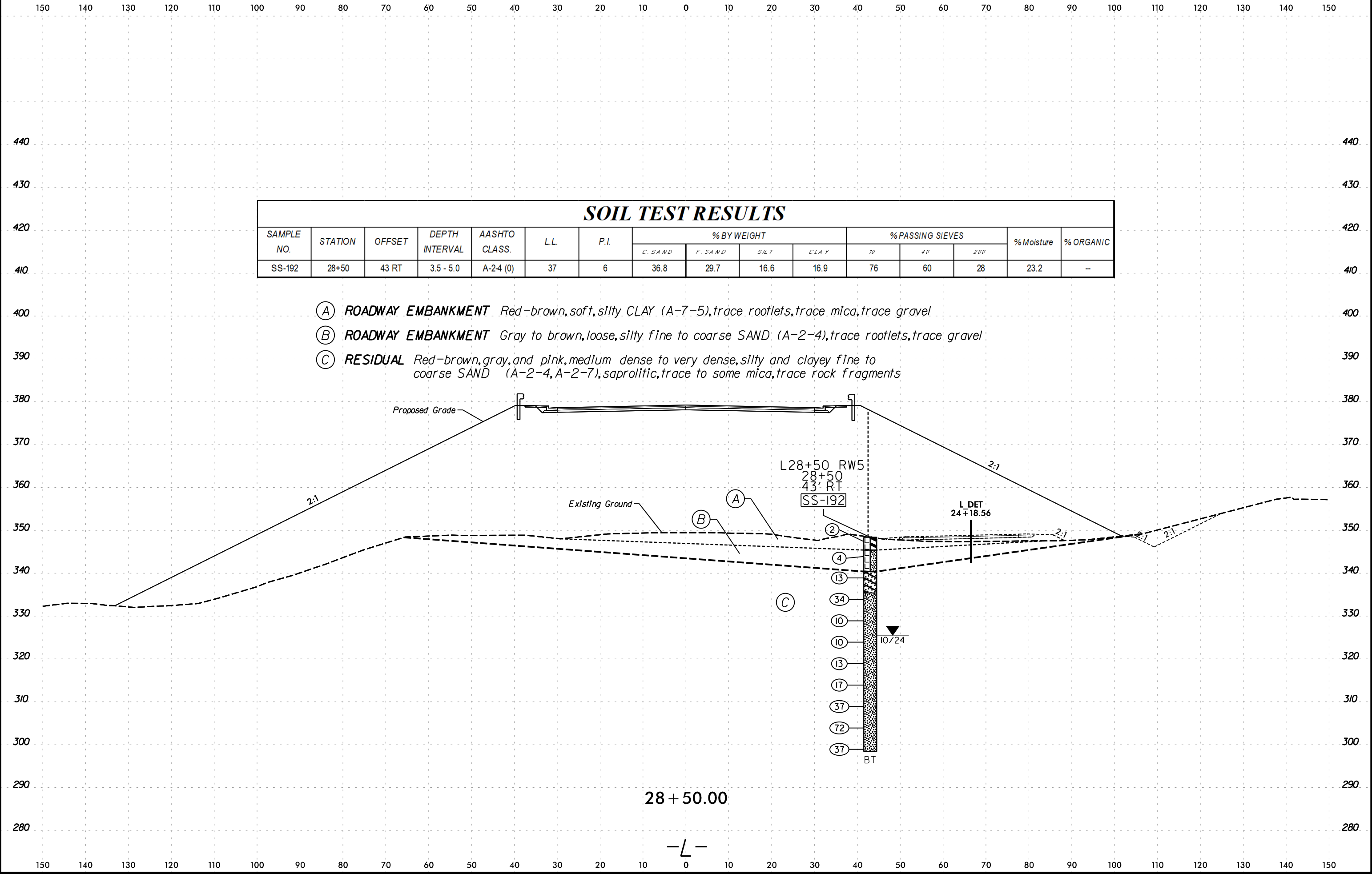
WEATHERED ROCK

GRANITE

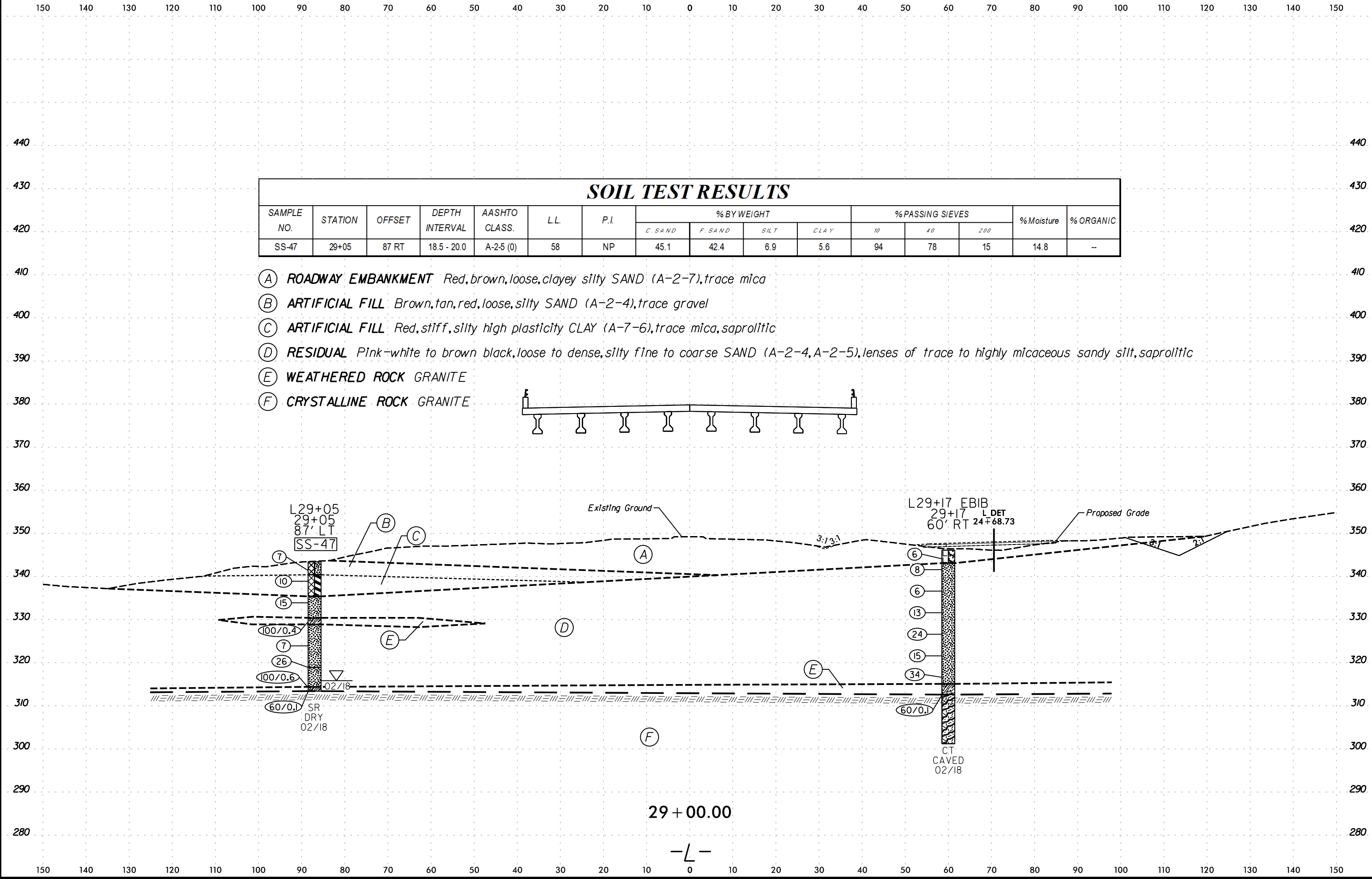
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SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-3	29+43	59 RT	1.0 - 2.5	A-7-6 (15)	57	32	26.1	19	12.3	42.6	95	78	55	26.3	--
SS-51	29+27	48 LT	1.0 - 2.5	A-7-6 (7)	48	25	32.3	21.8	12.3	33.6	93	72	46	22.2	--

- (A)

ROADWAY EMBANKMENT Red, medium stiff, sandy silty highly plastic CLAY (A-7-6), moist
- (B)

ROADWAY EMBANKMENT Pink, white, gray, dense, silty gravelly SAND (A-2-4), trace mica, moist
- (C)

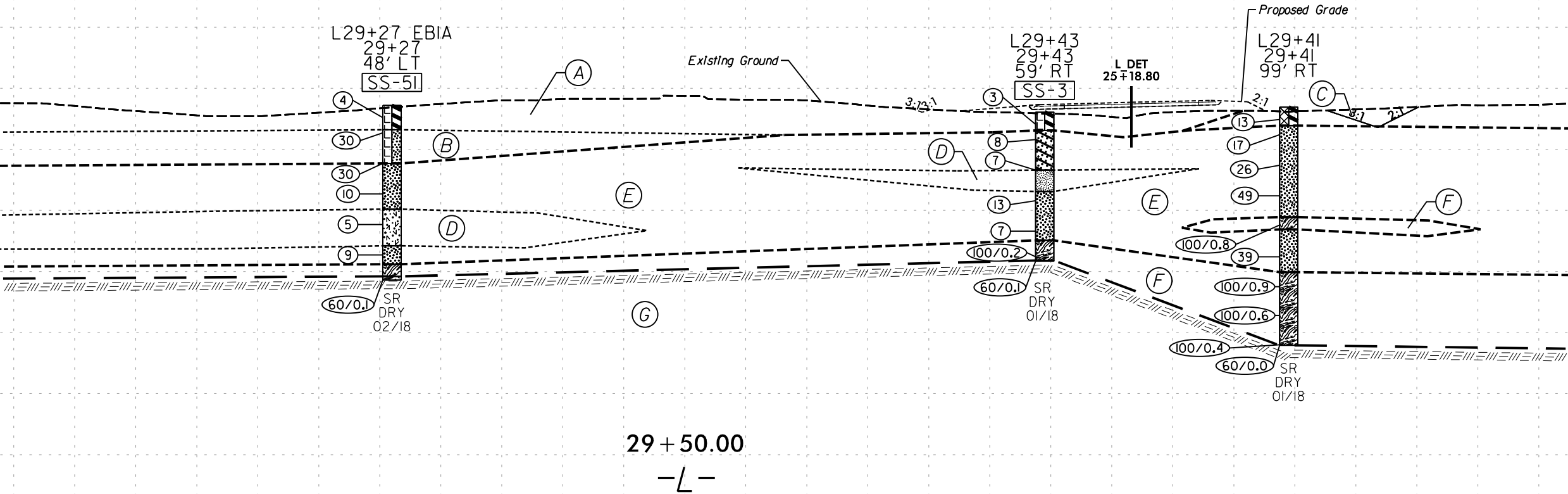
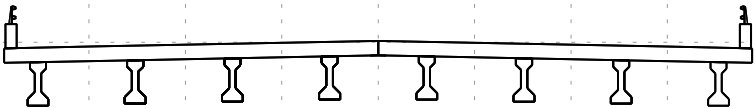
ARTIFICIAL FILL Red, soft to stiff, sandy silty highly plastic CLAY (A-7-6), trace mica, moist
- (D)

RESIDUAL Gray to white to red, medium stiff, fine sandy and clayey SILT (A-4, A-5), saprolitic, little mica, moist
- (E)

RESIDUAL Black-brown to white-pink-gray, loose to dense, clayey and silty SAND (A-2-4, A-2-6), trace to little mica, saprolitic, moist
- (F)

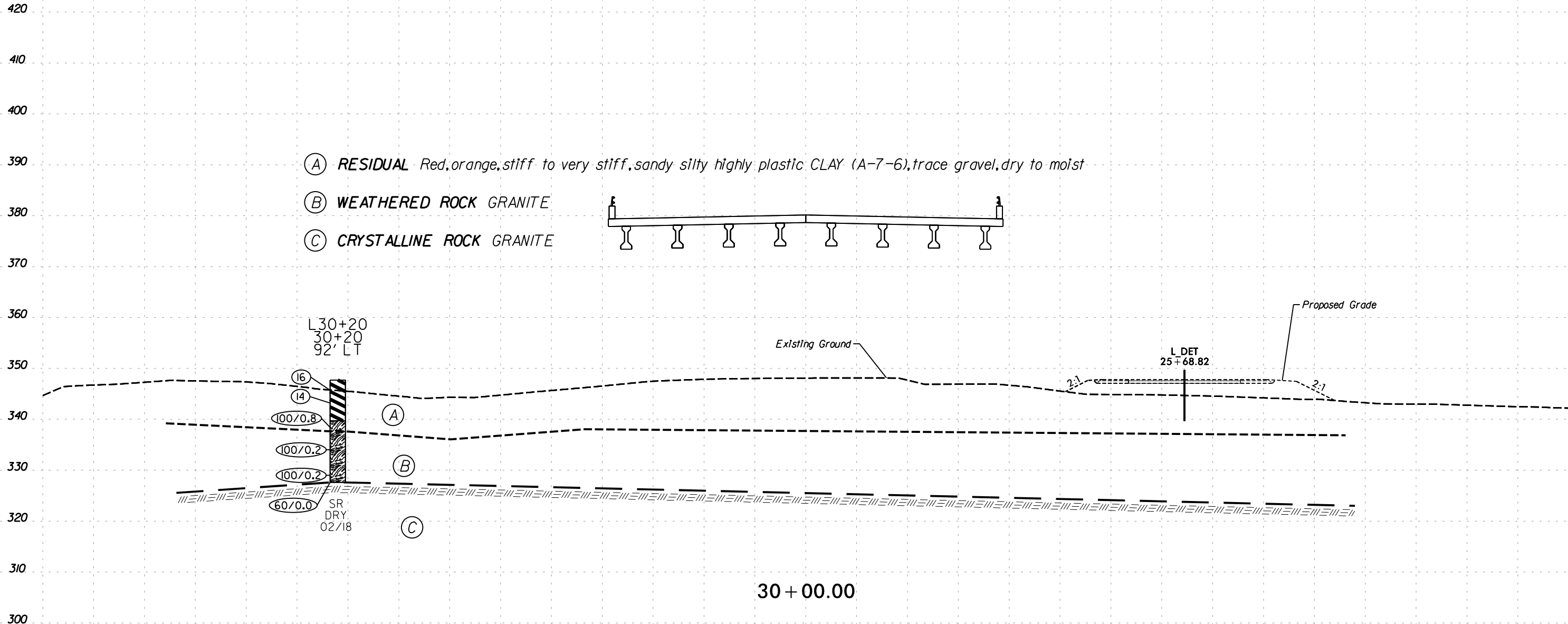
WEATHERED ROCK GRANITE
- (G)

CRYSTALLINE ROCK GRANITE



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SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-14A	30+74	63 RT	3.5 - 5.0	A-7-6 (18)	58	33	25.9	14.3	9.3	50.5	98	80	60	18	--
SS-18	30+74	63 RT	23.5 - 25.0	A-7-6 (15)	56	31	20.5	30.8	22.1	26.6	98	89	56	18.8	--
SS-26	30+66	102 RT	18.5 - 20.0	A-6 (1)	32	11	37.1	28.8	17.8	16.3	100	77	40	8.7	--
SS-31	30+64	29 RT	1.0 - 2.5	A-7-6 (6)	46	25	39.3	20.7	9.9	30.1	95	67	42	20	--
SS-106	30+27	44 LT	1.0 - 2.5	A-7-6 (4)	43	19	38.6	22.1	12.4	26.9	96	68	41	20.9	--

- (A) ROADWAY EMBANKMENT

Red,white,pink,soft to medium stiff,sandy and silty moderately plastic CLAY (A-7-6),trace mica,moist
- (B) ROADWAY EMBANKMENT

Red,white,brown,loose,silty coarse SAND (A-2-4),trace mica,moist
- (C) RESIDUAL

Brown to red-orange,stiff to hard,sandy and silty high plasticity CLAY (A-7-6),saprolitic,trace mica to highly micaceous,moist
- (D) RESIDUAL

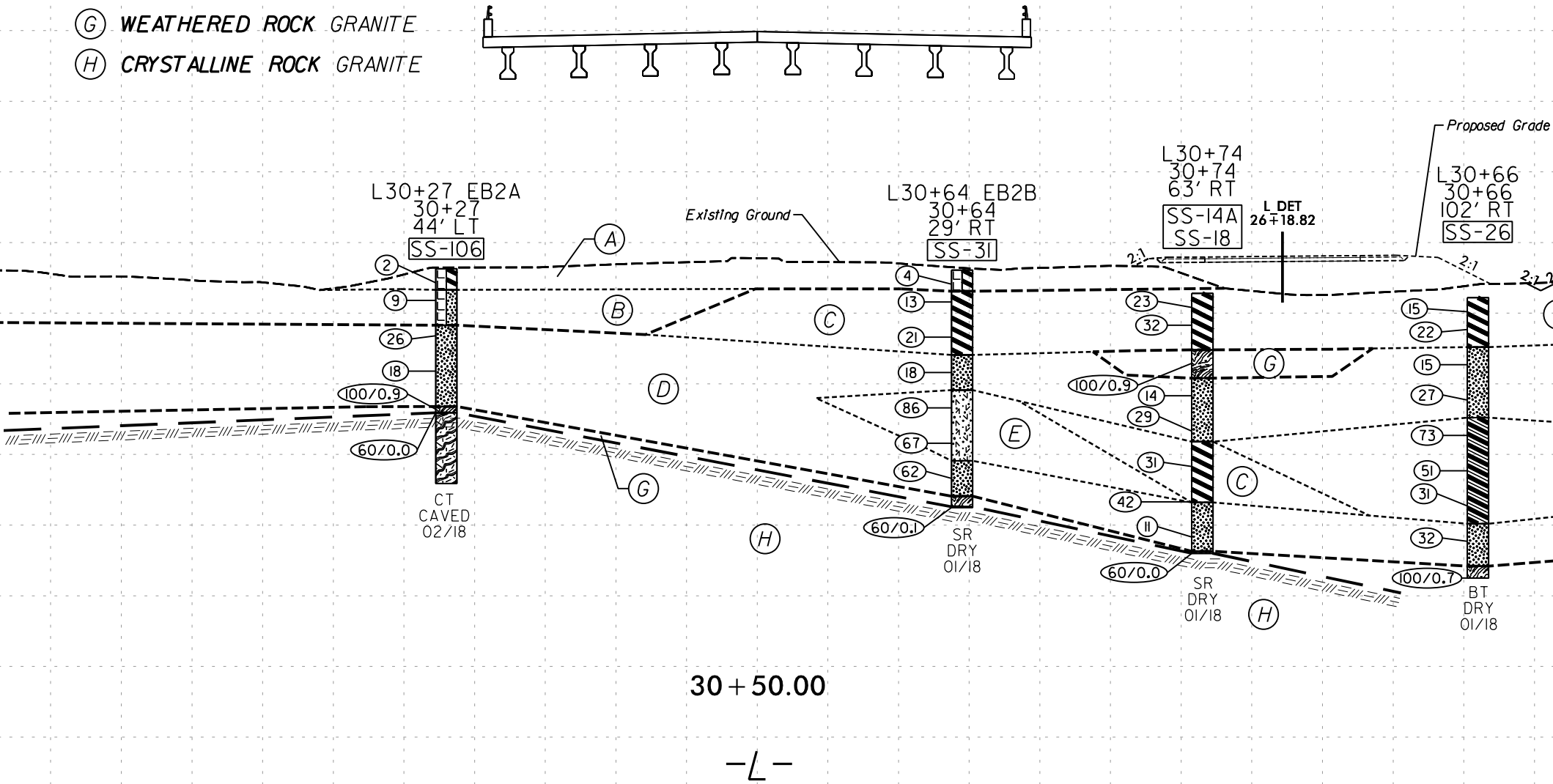
Pink-white-gray to orange-white-brown,medium dense to very dense,clayey and silty fine to coarse SAND (A-2-4,A-2-5),highly micaceous,saprolitic,moist
- (E) RESIDUAL

Orange,white,brown,hard,clayey SILT (A-5),saprolitic,highly micaceous
- (F) RESIDUAL

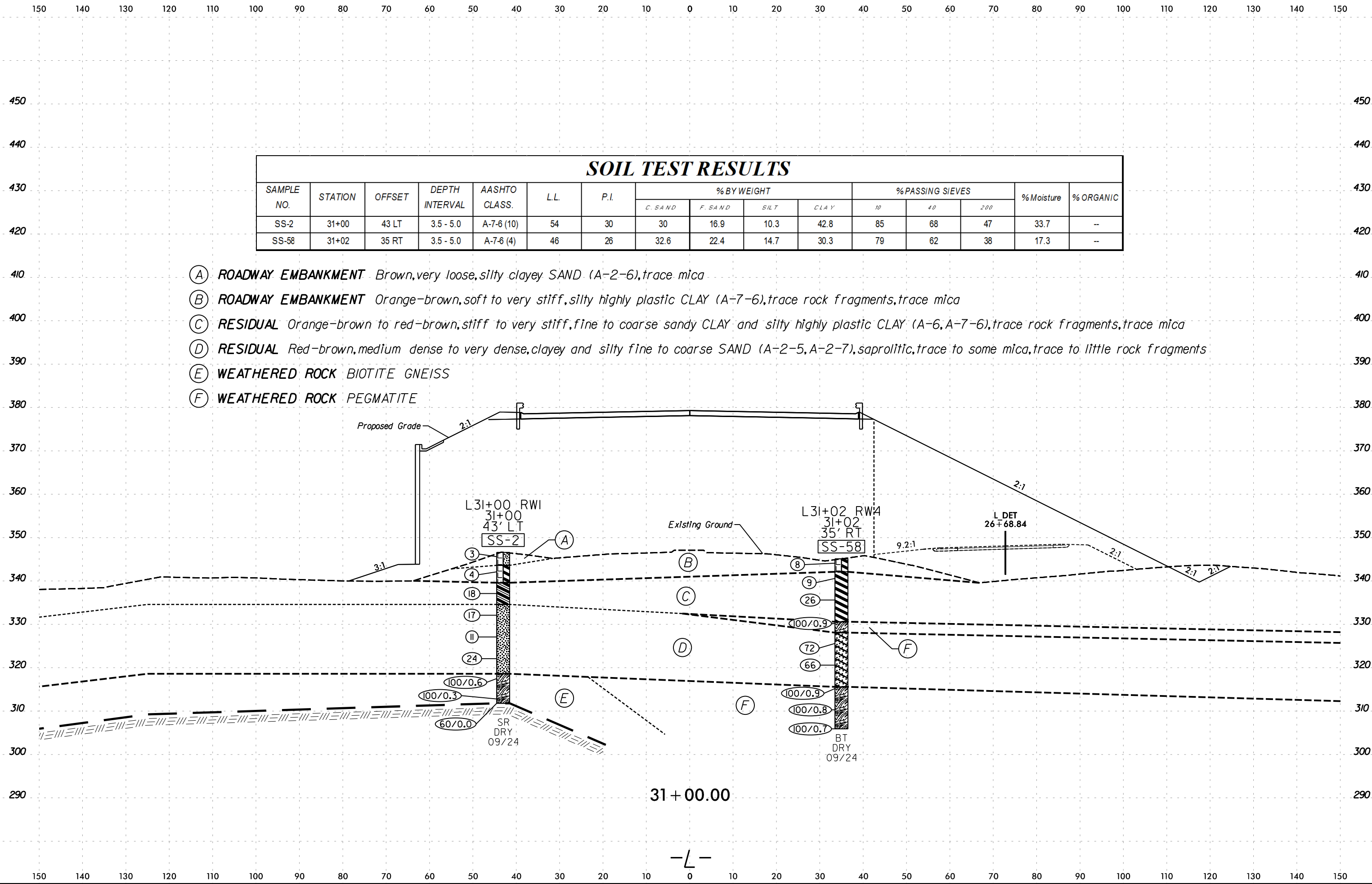
White,gray,orange,hard,coarse sandy slightly plastic CLAY (A-6),saprolitic,highly micaceous
- (G) WEATHERED ROCK

GRANITE
- (H) CRYSTALLINE ROCK

GRANITE



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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-10	31+50	44 LT	3.5 - 5.0	A-7-6 (9)	54	61	33.2	17.6	11.9	37.3	86	65	45	17.7	--
SS-14	31+50	44 LT	23.5 - 25.0	A-2-4 (0)	NP	NP	27.7	45.1	14.6	12.6	98	90	30	17.6	--
SS-67	31+50	35 RT	3.5 - 5.0	A-7-6 (6)	47	26	29.2	23.6	15.5	31.7	86	70	43	19.6	--

- (A)

ROADWAY EMBANKMENT

Brown to dark brown,very loose to medium dense,clayey and silty fine to coarse SAND (A-2-4,A-2-6),trace mica,little gravel
- (B)

ROADWAY EMBANKMENT

Brown to orange-brown,very soft to stiff,sandy CLAY and silty highly plastic CLAY (A-6,A-7-6),trace mica,trace gravel,trace rootlets,trace of organic matter
- (C)

RESIDUAL

Red-brown,very stiff,silty and sandy CLAY (A-6,A-7-6),saprolitic,trace mica
- (D)

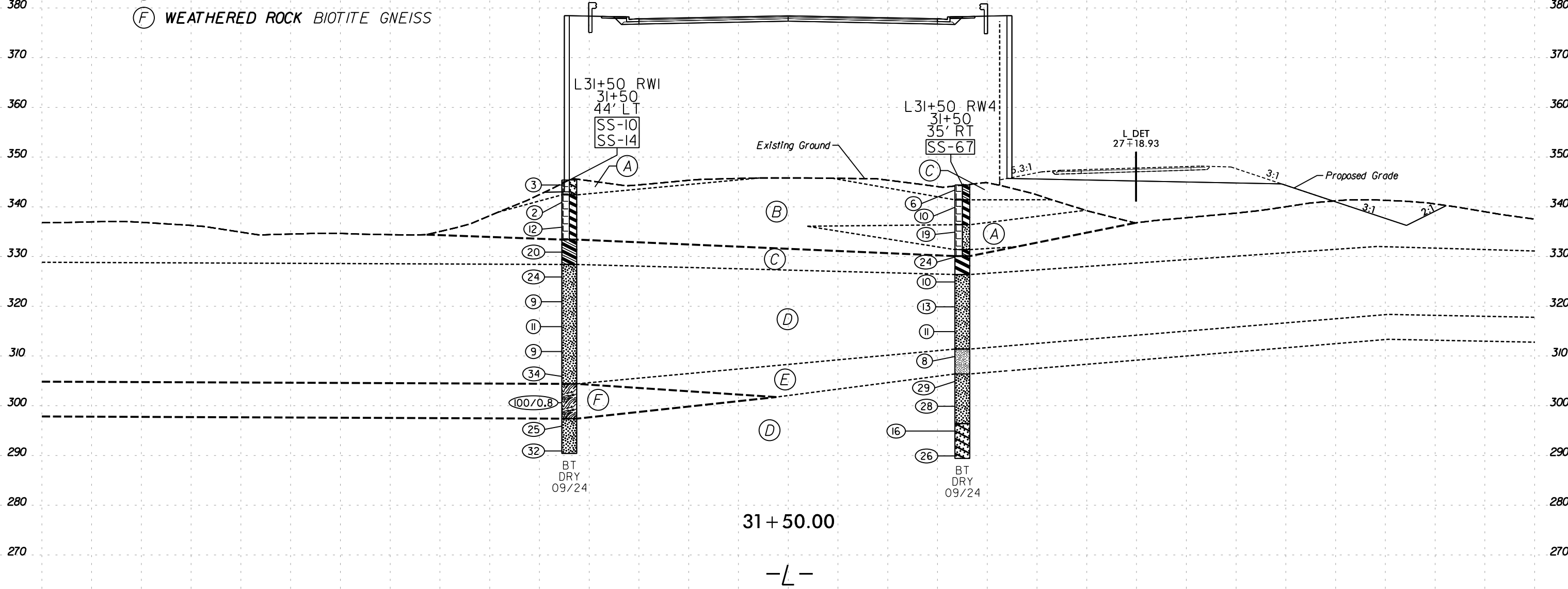
RESIDUAL

White to red-brown-black,loose to dense,clayey and silty fine to coarse SAND (A-2-4,A-2-5,A-2-6),saprolitic,trace to some rock fragments,trace to some mica
- (E)

RESIDUAL

Red-brown,medium stiff,sandy SILT (A-4),saprolitic,some mica
- (F)

WEATHERED ROCK BIOTITE GNEISS



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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-22	32+00	44 LT	3.5 - 5.0	A-7-6 (9)	55	31	35	13.8	11.5	39.7	82	60	44	23.7	--
SS-83	32+00	35 RT	18.5 - 20.0	A-7-5 (8)	47	15	10.3	35.4	24	30.3	99	97	60	31.2	--

- A

ROADWAY EMBANKMENT

Orange-brown, loose to medium dense, clayey and silty fine to coarse SAND (A-2-5, A-2-6, A-2-7), some mica, little gravel
- B

ROADWAY EMBANKMENT

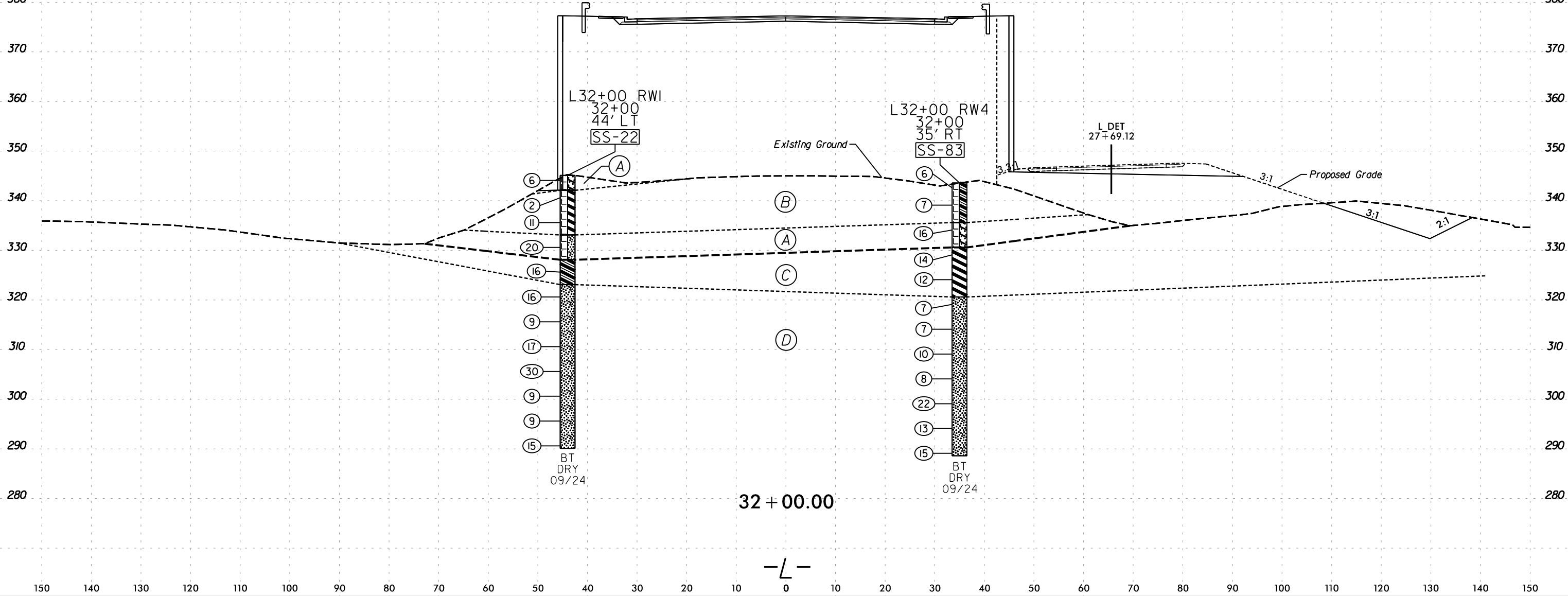
Brown to orange-brown, very soft to stiff, sandy CLAY and silty highly plastic CLAY (A-6, A-7-6), little to some mica, trace to little gravel
- C

RESIDUAL

Red-brown, stiff to very stiff, sandy CLAY and silty slightly plastic CLAY (A-6, A-7-5), trace mica, trace rock fragments
- D

RESIDUAL

Red-brown to tan-white, loose to dense, clayey and silty fine to coarse SAND (A-2-4, A-2-5), saprolitic, little to some mica, trace rock fragments



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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-78	32+70	85 LT	3.5 - 5.0	A-6 (2)	34	16	35.1	23.8	9.5	31.6	88	68	39	21.2	--
SS-92	32+50	35 RT	3.5 - 5.0	A-7-6 (7)	47	25	29.9	25	17.7	27.4	92	75	45	21.1	--

- (A)

ROADWAY EMBANKMENT

Red-brown, medium stiff, sandy silty moderately plastic CLAY (A-7-6), saprolitic, trace to some mica
- (B)

RESIDUAL

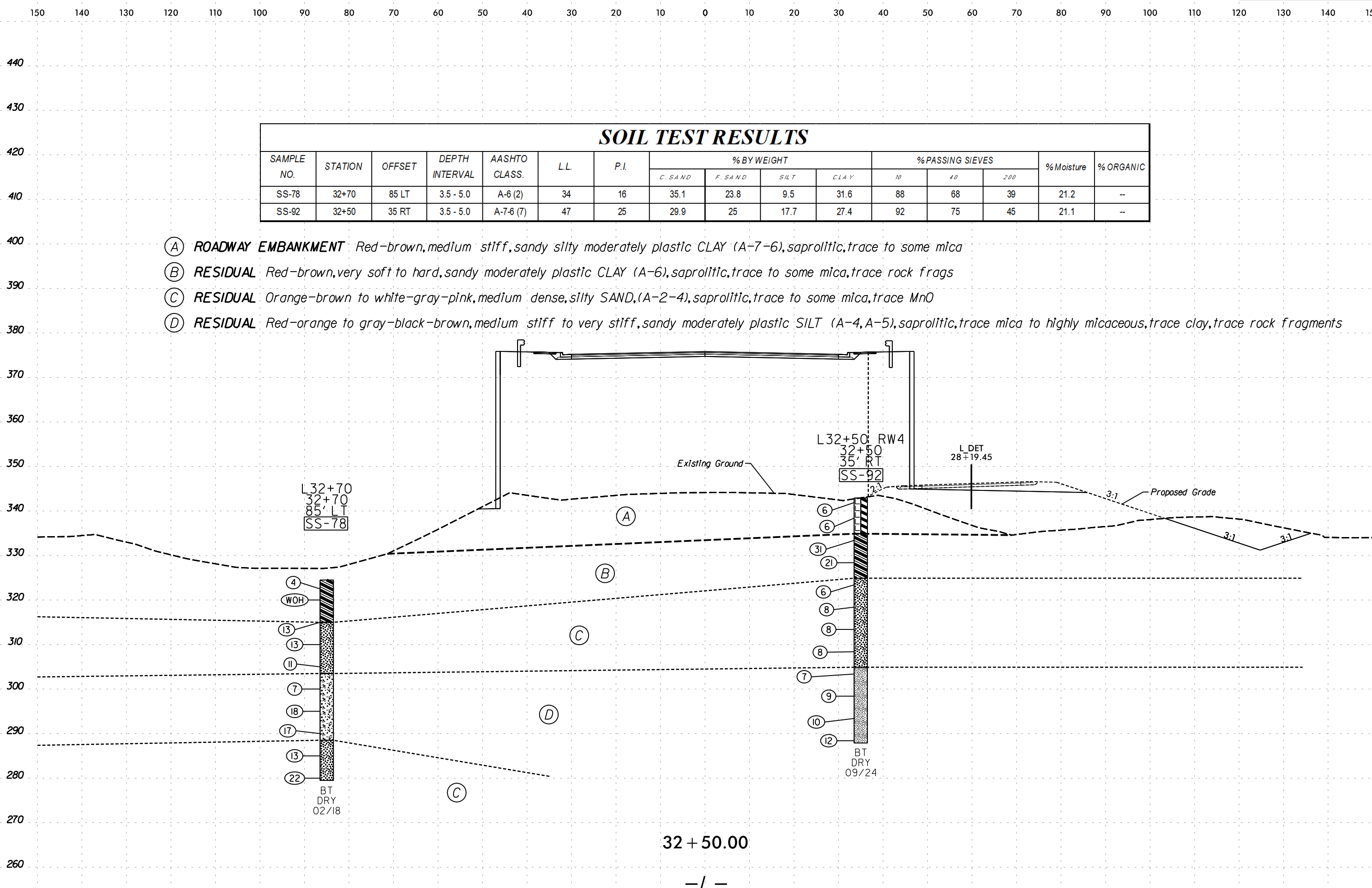
Red-brown, very soft to hard, sandy moderately plastic CLAY (A-6), saprolitic, trace to some mica, trace rock frags
- (C)

RESIDUAL

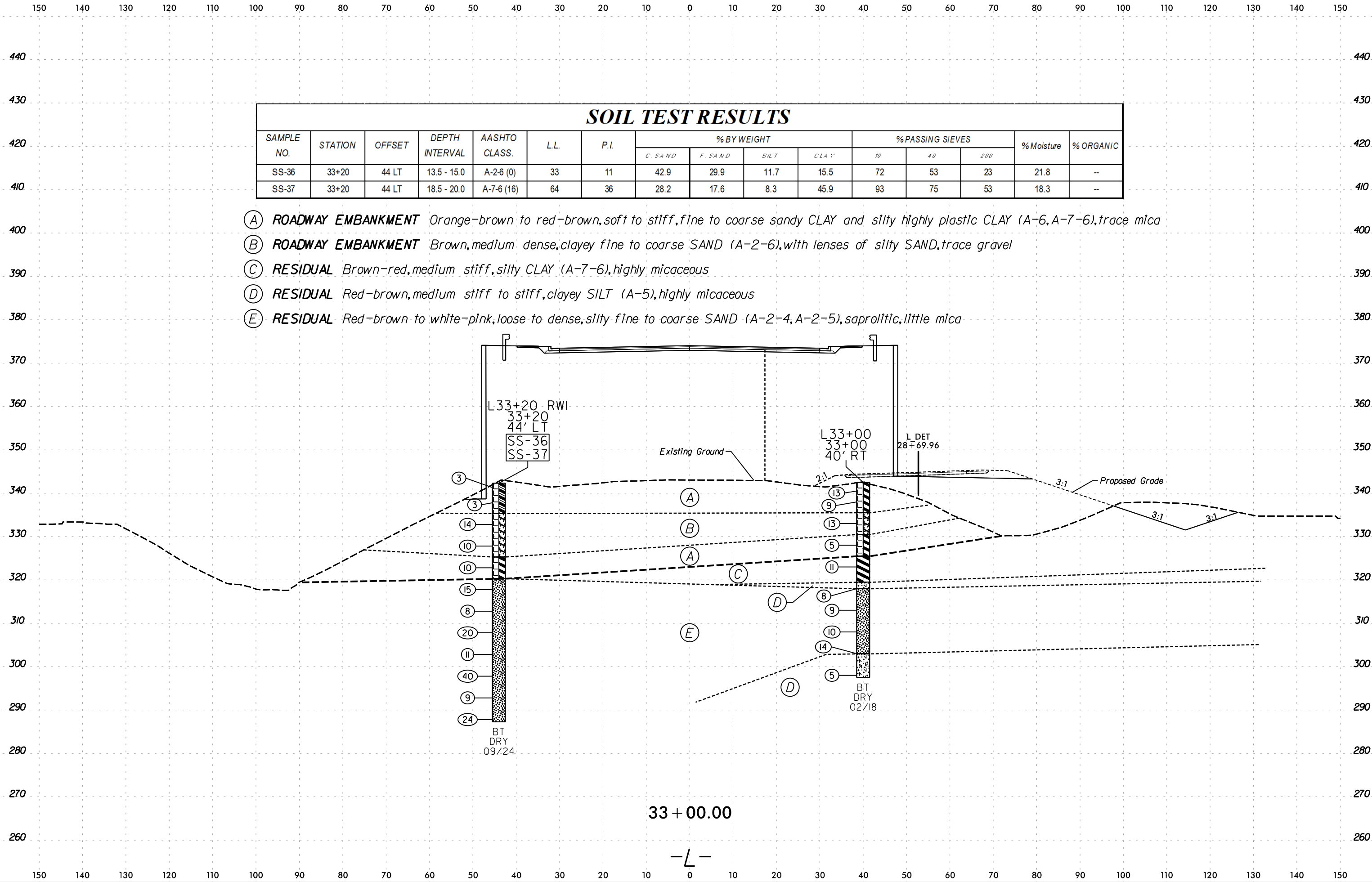
Orange-brown to white-gray-pink, medium dense, silty SAND, (A-2-4), saprolitic, trace to some mica, trace MnO
- (D)

RESIDUAL

Red-orange to gray-black-brown, medium stiff to very stiff, sandy moderately plastic SILT (A-4, A-5), saprolitic, trace mica to highly micaceous, trace clay, trace rock fragments



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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-46	33+70	44 LT	3.5 - 5.0	A-7-6 (4)	42	22	32.6	22	13.5	31.9	79	61	39	31.1	--

- (A)

ROADWAY EMBANKMENT

Brown,very loose,clayey fine to coarse SAND (A-2-6)
- (B)

ROADWAY EMBANKMENT

Red-gray to red-brown,medium stiff to very stiff,sandy CLAY and silty moderately plastic CLAY (A-6,A-7-5,A-7-6),saprolitic,trace mica,trace roots,trace of organic matter
- (C)

RESIDUAL

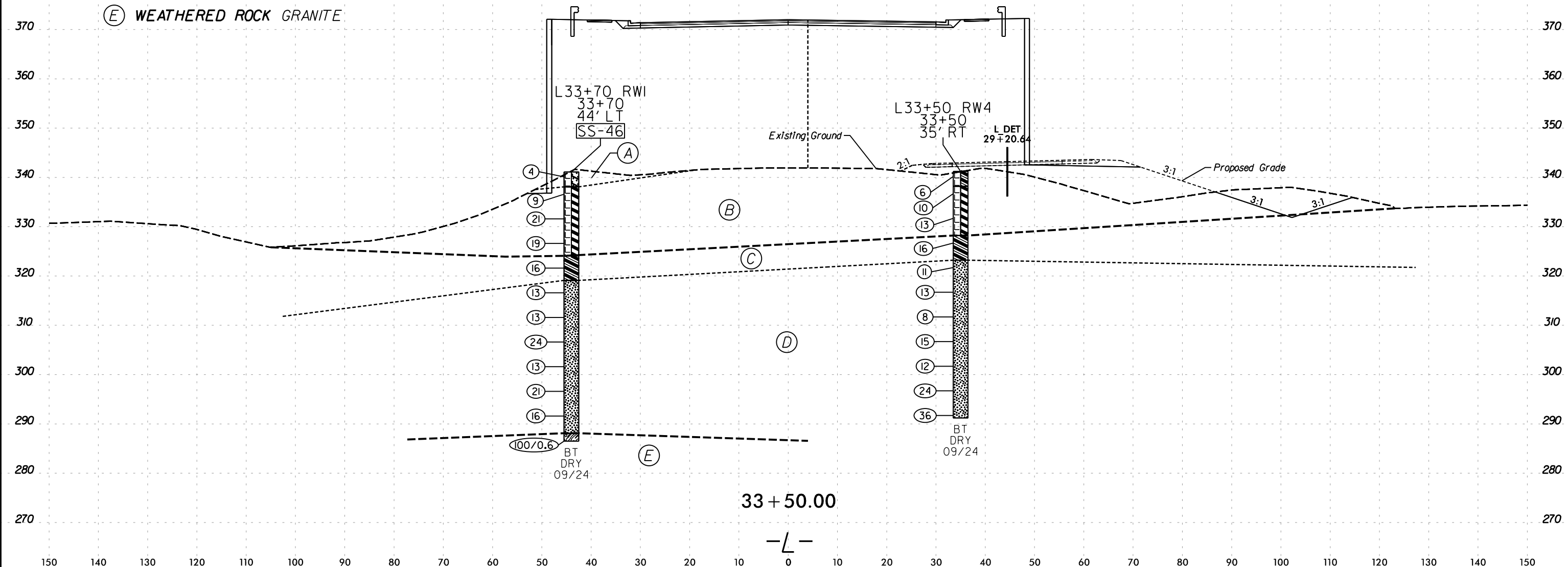
Red-tan-brown,very stiff,fine to coarse sandy CLAY (A-6),saprolitic,little mica,trace rock fragments
- (D)

RESIDUAL

Pink-gray-tan to brown-white,loose to dense,silty fine to coarse SAND (A-2-4,A-2-5),saprolitic,trace to some mica,trace to some rock fragments,trace clay
- (E)

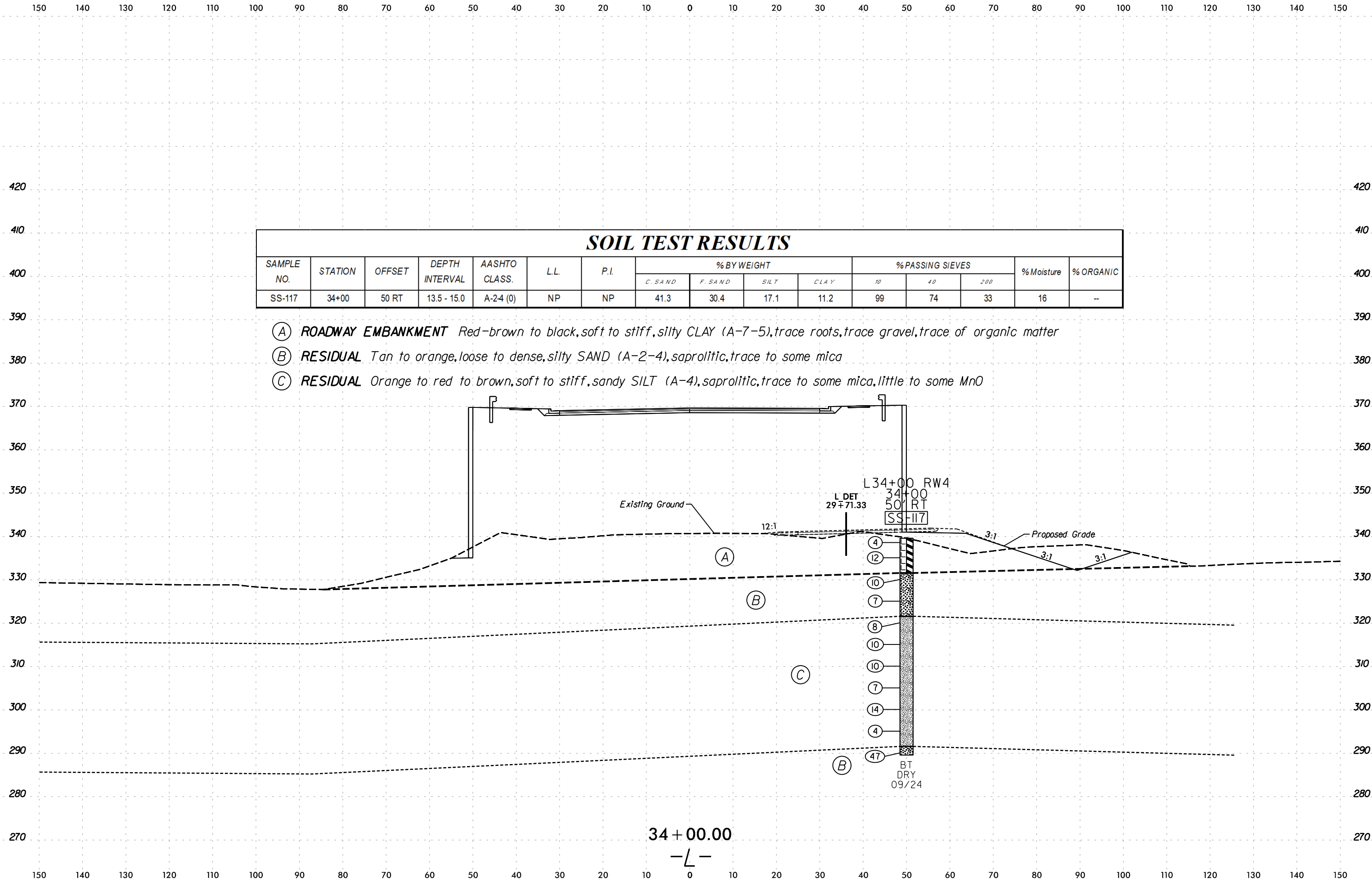
WEATHERED ROCK

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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-132	34+50	49 RT	33.5 - 35.0	A-7-5 (7)	46	16	11.9	40.3	33	14.8	100	95	56	48	--

- (A)

ROADWAY EMBANKMENT

Brown, medium dense, silty coarse SAND (A-2-4)
- (B)

ROADWAY EMBANKMENT

Red-brown-black, medium stiff to stiff, sandy CLAY and silty highly plastic CLAY (A-6, A-7-5, A-7-6), some mica, trace roots
- (C)

RESIDUAL

Red-black, Brown-orange to pink-white, loose to medium dense, silty clayey fine to coarse SAND (A-2-4, A-2-5, and A-2-6), saprolitic, trace to highly micaceous, lenses of black SILT, moist to wet
- (D)

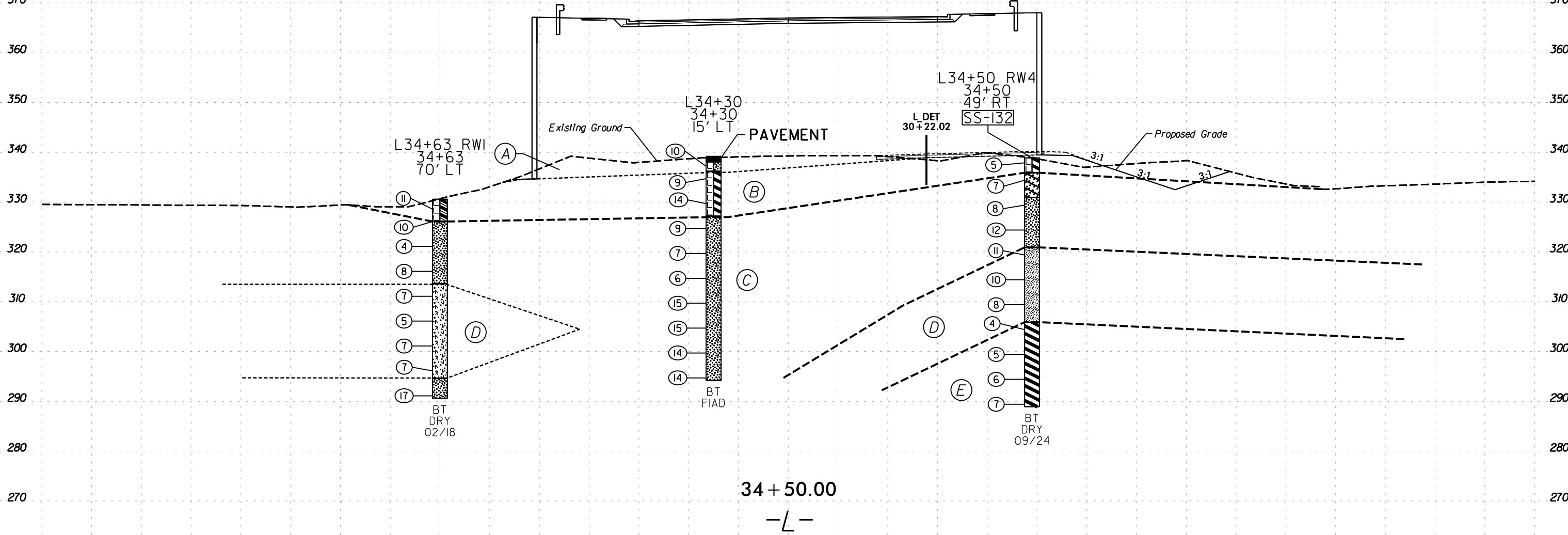
RESIDUAL

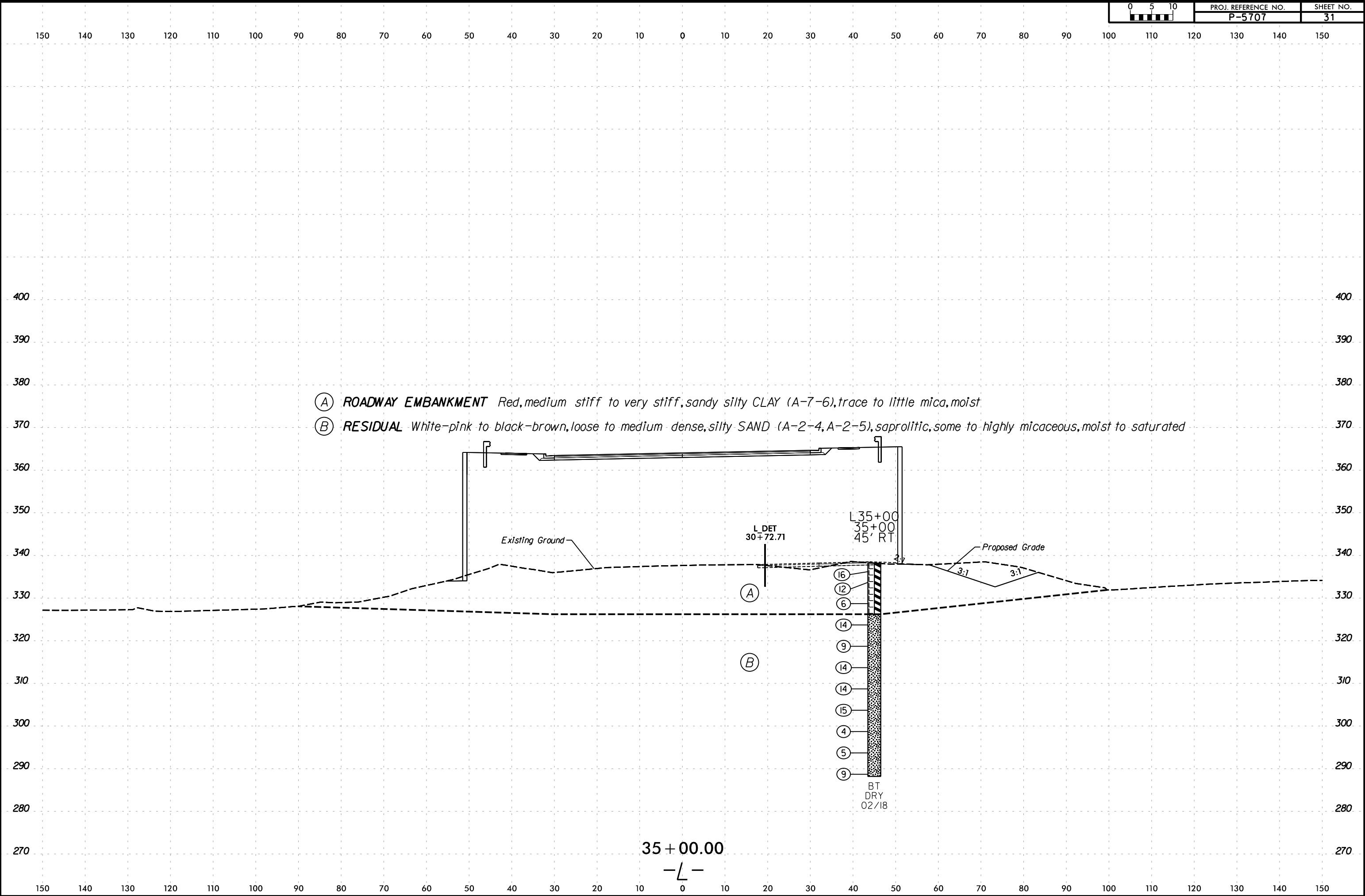
Red-orange to black-brown, medium stiff, clayey SILT (A-4, A-5), trace mica to highly micaceous
- (E)

RESIDUAL

Red to orange to black, soft to medium stiff, sandy silty moderately plastic CLAY (A-7-5), saprolitic, little to some mica, trace to little MnO

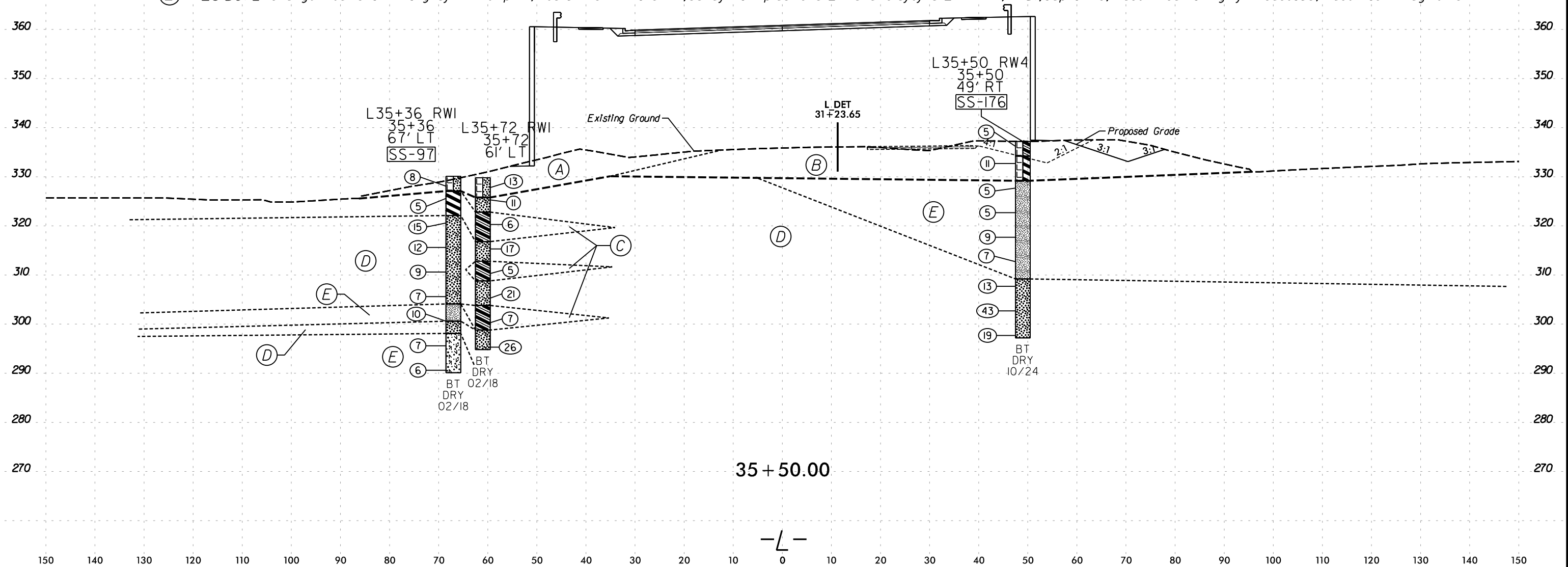
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SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-97	35+36	67 LT	3.5 - 5.0	A-7-5 (1)	45	11	28.9	35.2	12.5	23.4	94	79	40	21.9	--
SS-176	35+50	49 RT	13.5 - 15.0	A-4 (0)	NP	NP	29.3	39.9	21	9.8	100	92	37	24.2	--

- | | | |
|-----|--------------------|---|
| (A) | ROADWAY EMBANKMENT | Brown-black, loose to medium dense, silty SAND (A-2-4), trace gravel, trace organics |
| (B) | ROADWAY EMBANKMENT | Brown to red-brown, medium stiff to stiff, sandy and silty CLAY (A-6, A-7-5), trace mica, trace rootlets, trace gravel |
| (C) | RESIDUAL | Red-orange to brown-tan, medium stiff, sandy CLAY and silty slightly plastic CLAY (A-6, A-7-5), saprolitic, trace mica to highly micaceous |
| (D) | RESIDUAL | Pink-white-orange to brown-black-gray, loose to medium dense, silty fine to coarse SAND (A-2-4), saprolitic, trace to little mica |
| (E) | RESIDUAL | Orange-red-brown to gray-white-pink, medium stiff to stiff, sandy non-plastic SILT and clayey SILT (A-4, A-5), saprolitic, trace mica to highly micaceous, trace rock fragments |



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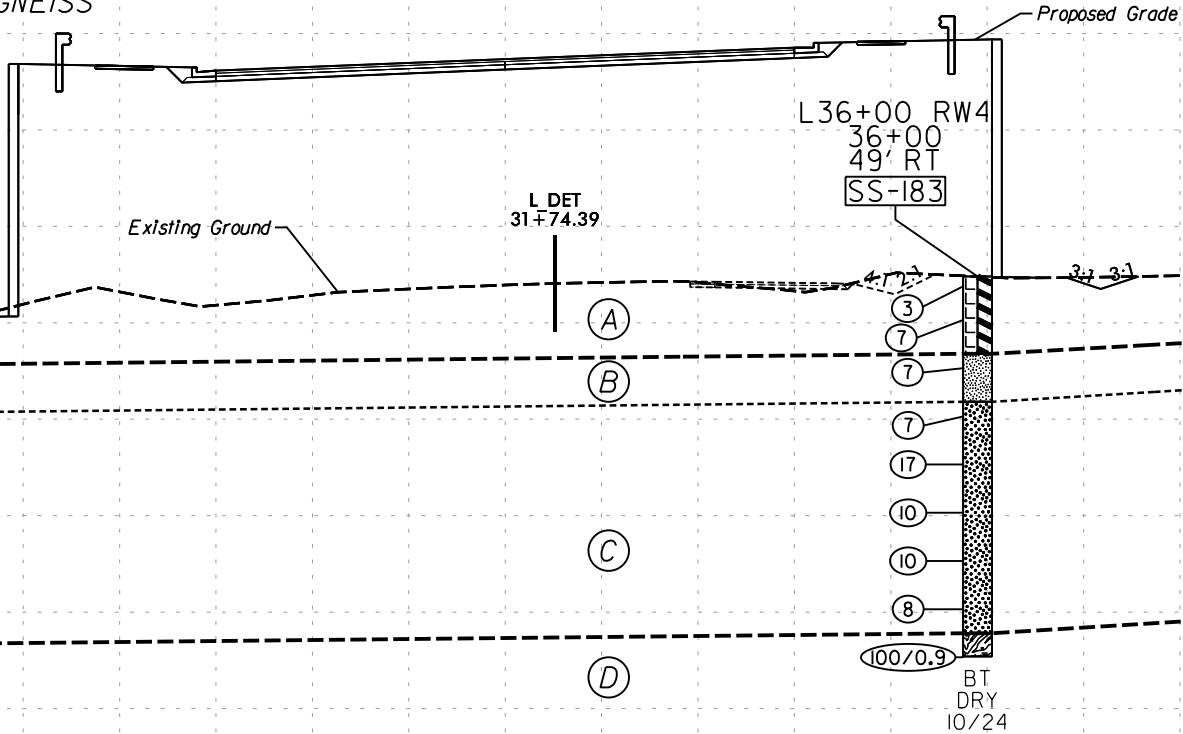
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SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-183	36+00	49 RT	3.5 - 5.0	A-7-5 (9)	57	26	35	15.8	18.6	30.6	91	65	48	26.8	--

- (A) ROADWAY EMBANKMENT Brown to red-brown, soft to medium stiff, silty highly plastic CLAY (A-7-5), trace rootlets, trace gravel, trace mica
- (B) RESIDUAL Orange-brown, medium stiff, sandy SILT (A-4), saprolitic, trace mica, trace rock fragments
- (C) RESIDUAL Orange-brown to gray, loose to medium dense, silty fine to coarse SAND (A-2-4), saprolitic, trace to some mica, trace rock fragments
- (D) WEATHERED ROCK BIOTITE GNEISS



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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-134	36+53	72 LT	3.5 - 5.0	A-7-6 (9)	51	27	31.4	23.9	13.5	31.2	100	79	49	24.1	--
SS-278	36+50	72 RT	3.5 - 5.0	A-7-6 (18)	63	38	28.3	17.8	9.6	44.3	96	80	55	24.1	--

- (A)

ROADWAY EMBANKMENT

Dark brown, loose, clayey SAND (A-2-6)
- (B)

ROADWAY EMBANKMENT

Red, medium stiff to stiff, silty highly plastic CLAY (A-7-6), trace gravel, trace mica
- (C)

RESIDUAL

Red, stiff, silty highly plastic CLAY (A-7-6), trace mica, saprolitic
- (D)

RESIDUAL

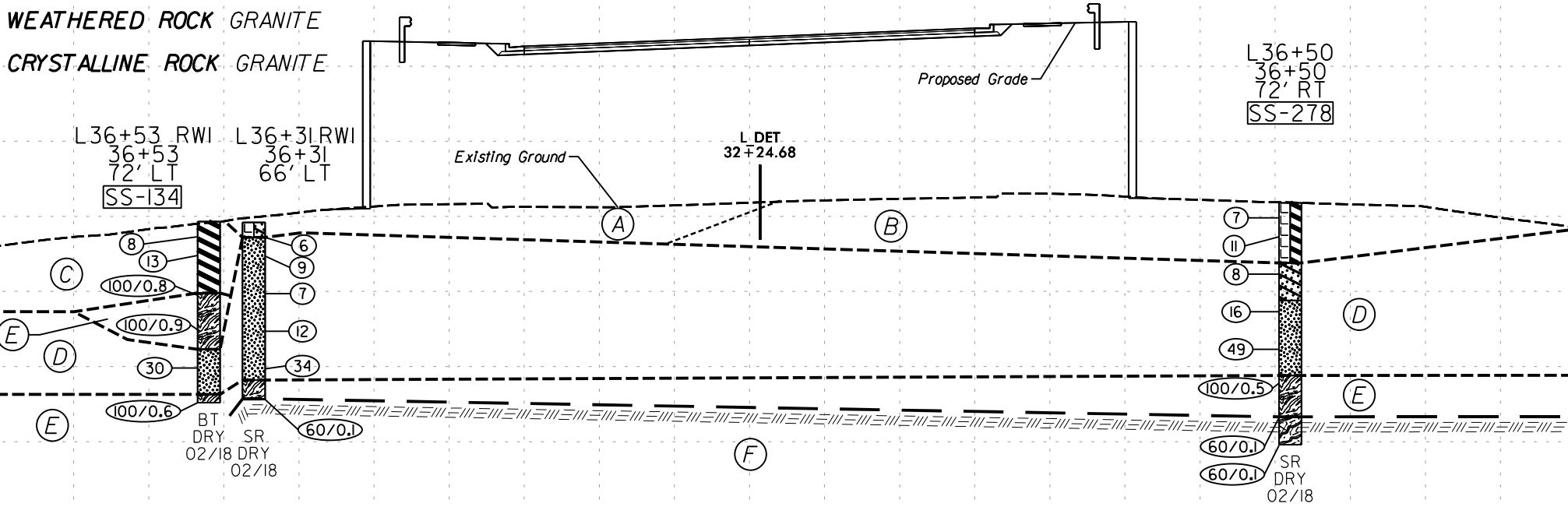
Pink-white to red-black-brown, loose to dense, silty and clayey fine to coarse SAND (A-2-4, A-2-6), saprolitic, little mica, lenses of coarse SAND
- (E)

WEATHERED ROCK

GRANITE
- (F)

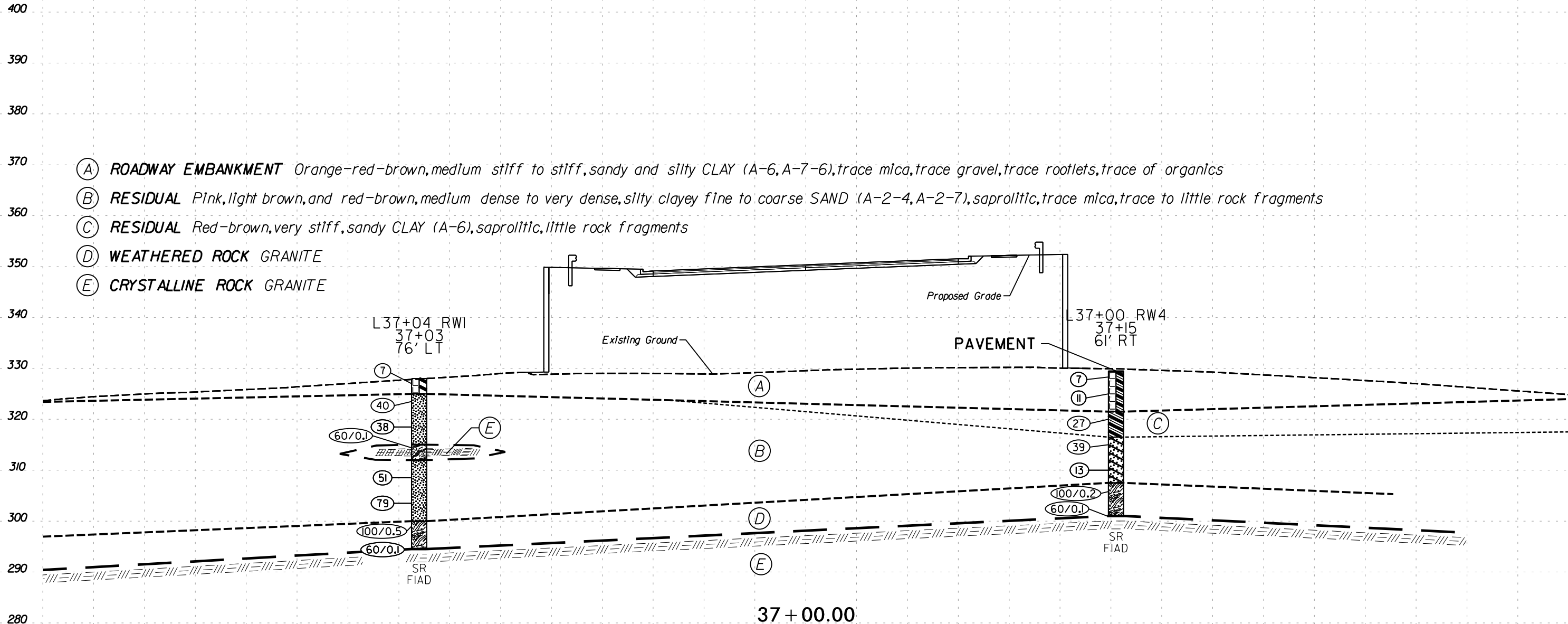
CRYSTALLINE ROCK

GRANITE

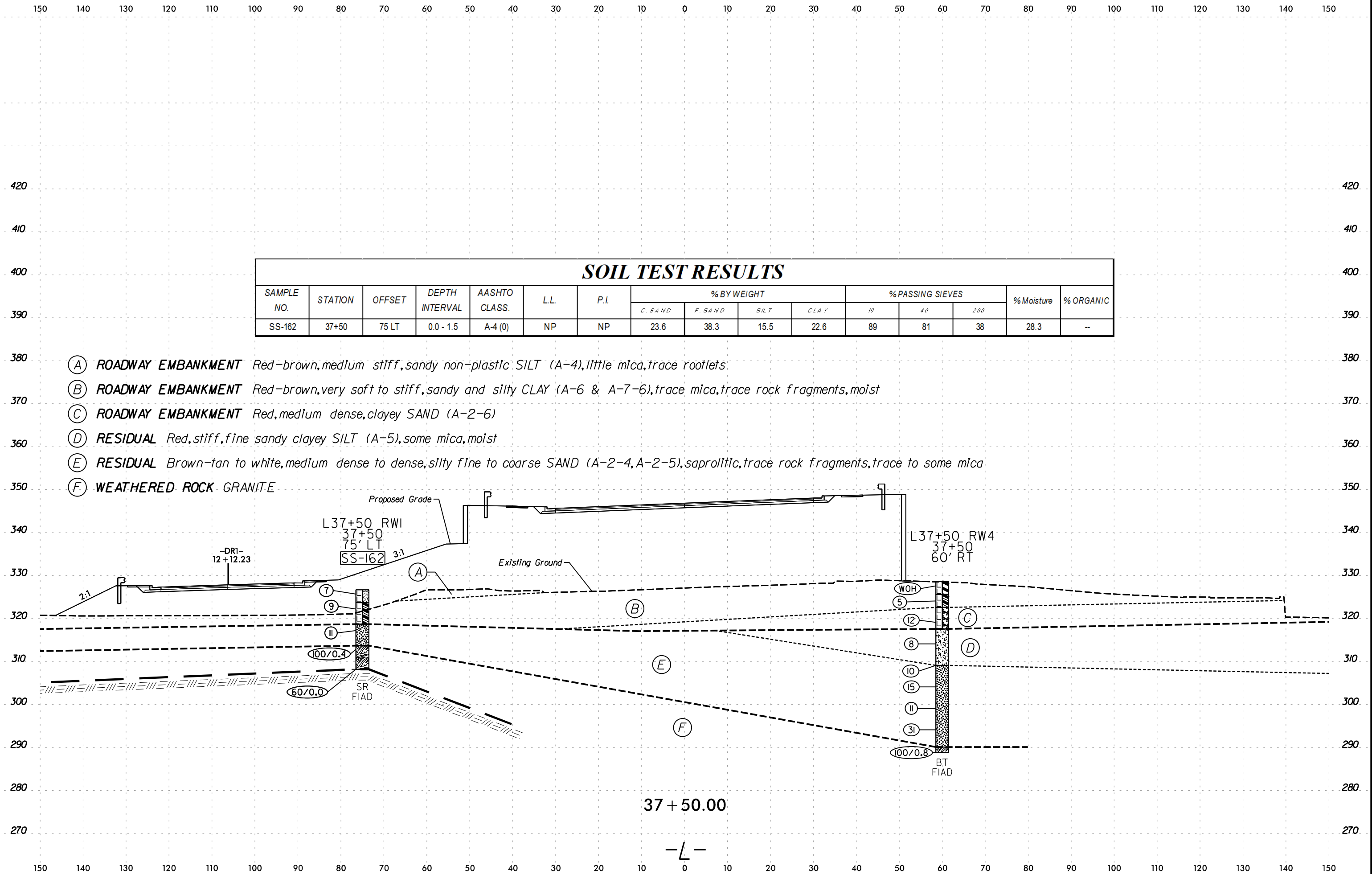


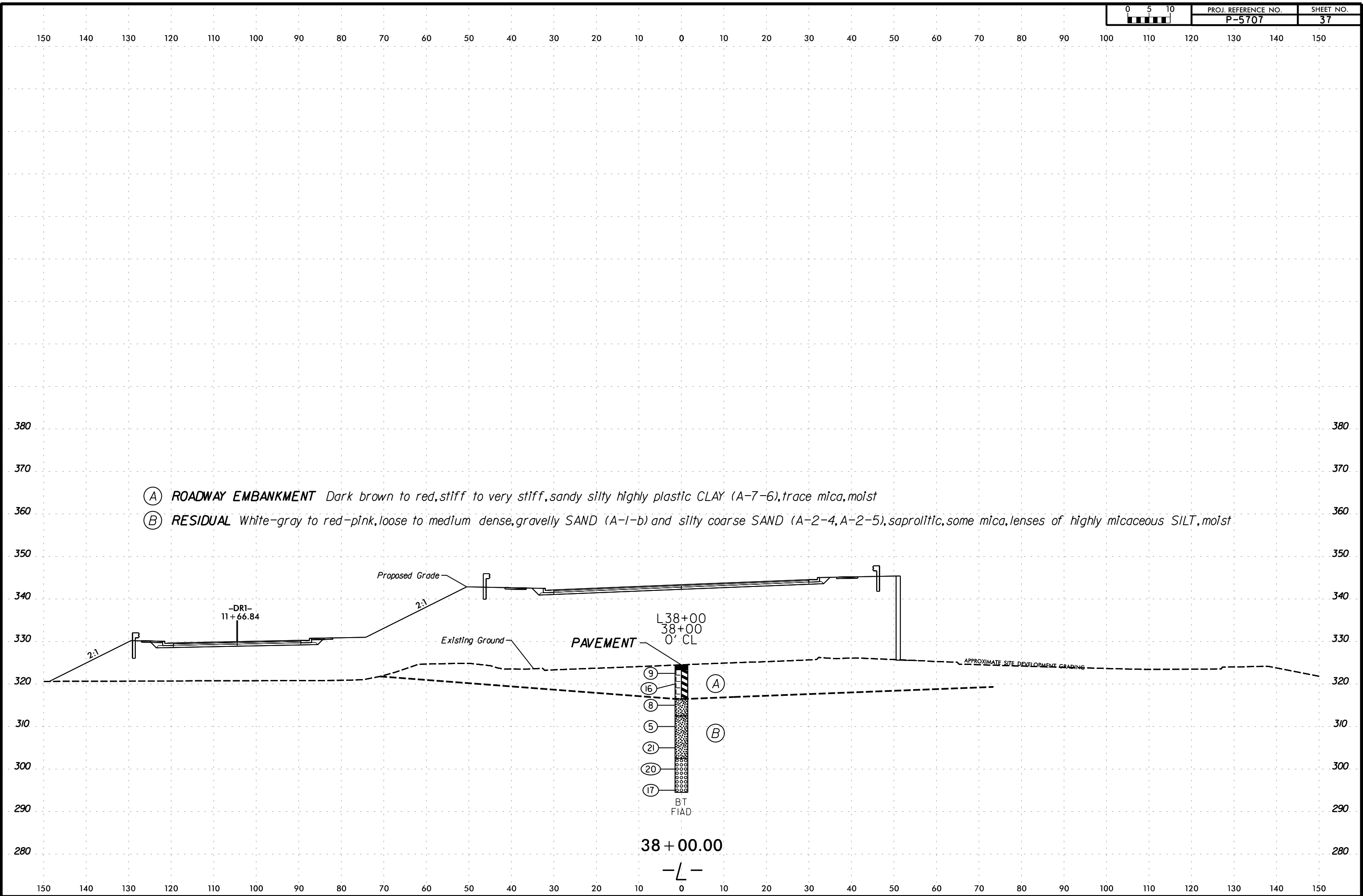
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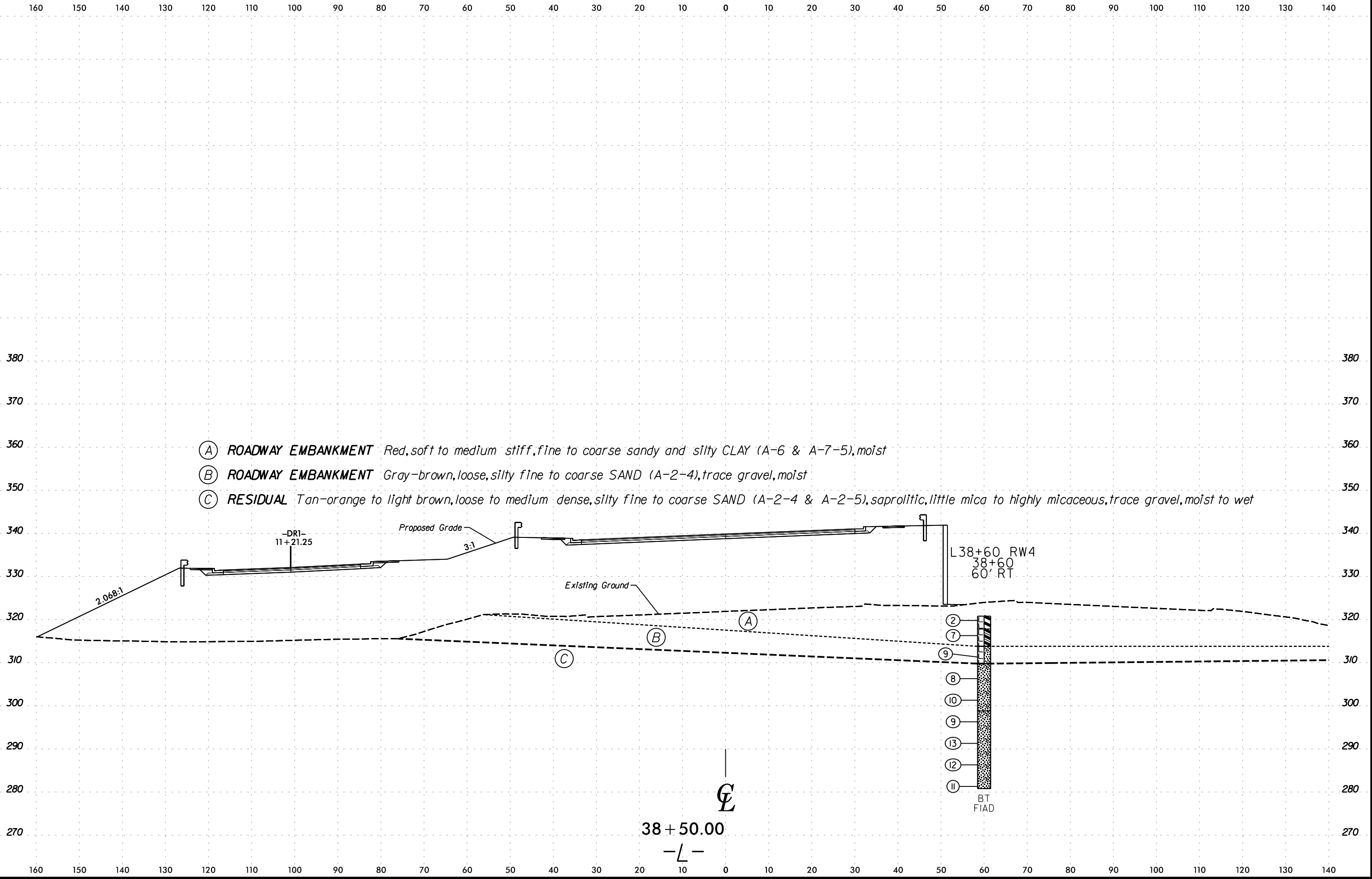


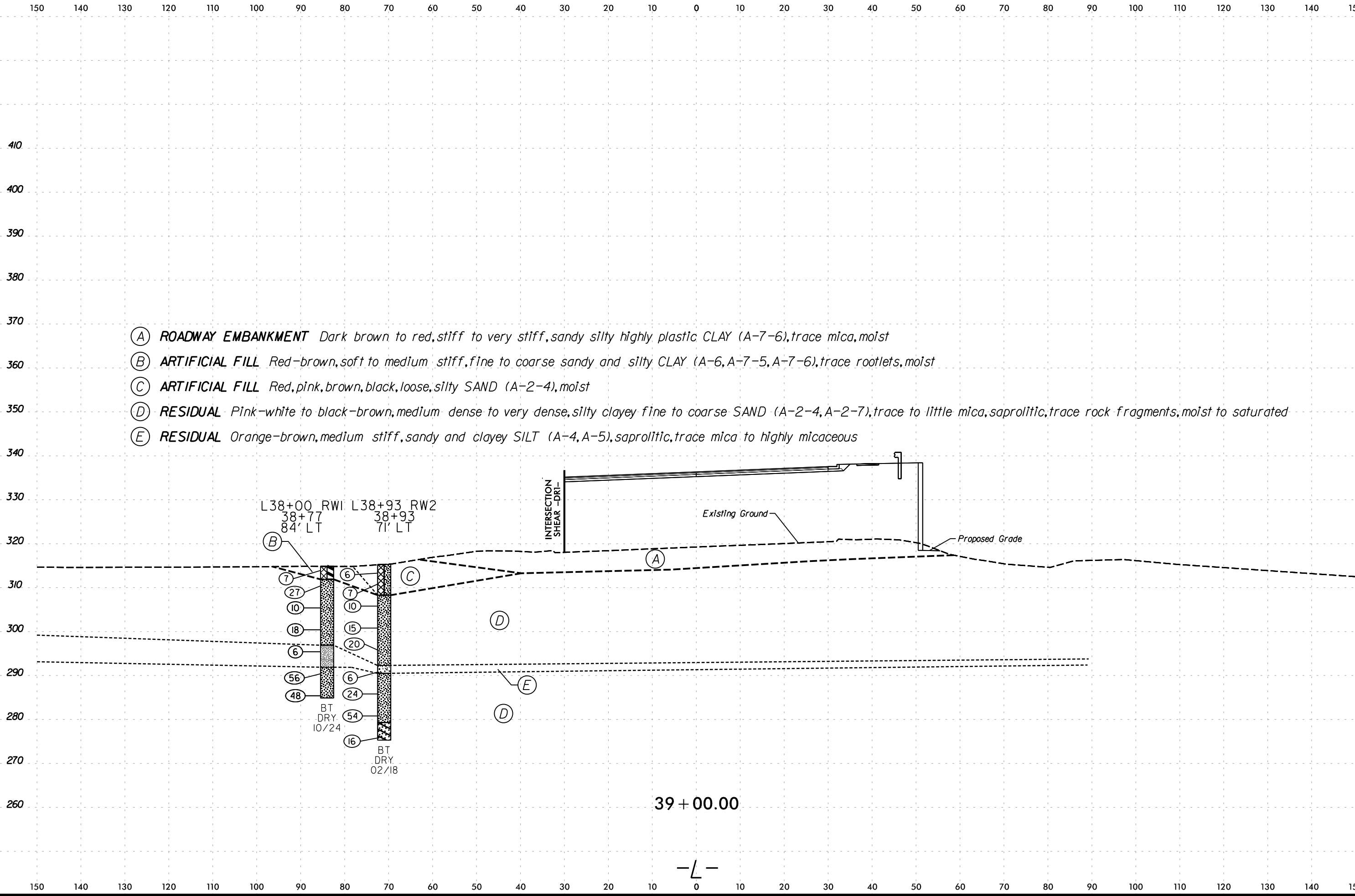
- (A) ROADWAY EMBANKMENT Orange-red-brown, medium stiff to stiff, sandy and silty CLAY (A-6, A-7-6), trace mica, trace gravel, trace rootlets, trace of organics
- (B) RESIDUAL Pink, light brown, and red-brown, medium dense to very dense, silty clayey fine to coarse SAND (A-2-4, A-2-7), saprolitic, trace mica, trace to little rock fragments
- (C) RESIDUAL Red-brown, very stiff, sandy CLAY (A-6), saprolitic, little rock fragments
- (D) WEATHERED ROCK GRANITE
- (E) CRYSTALLINE ROCK GRANITE



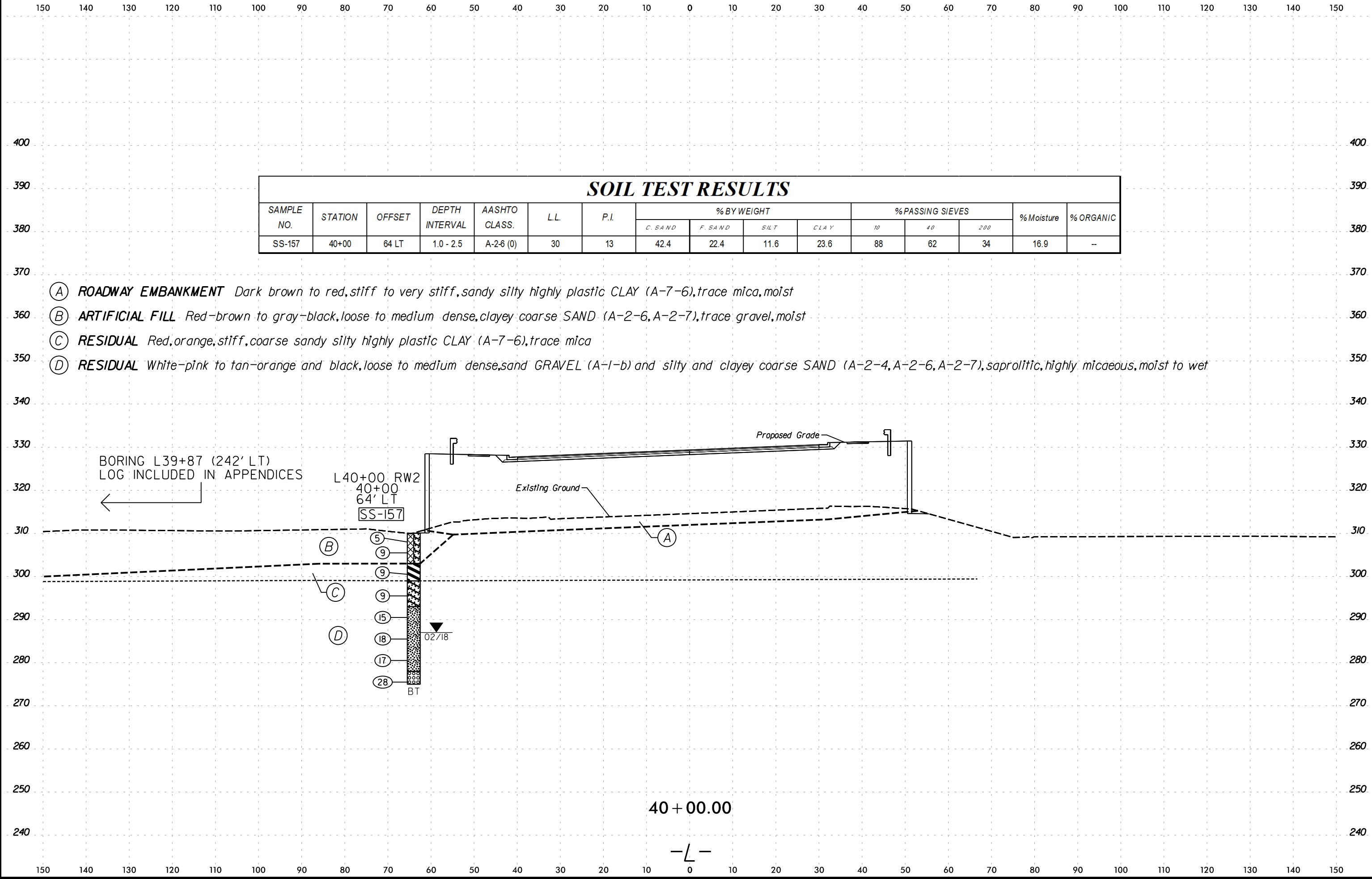


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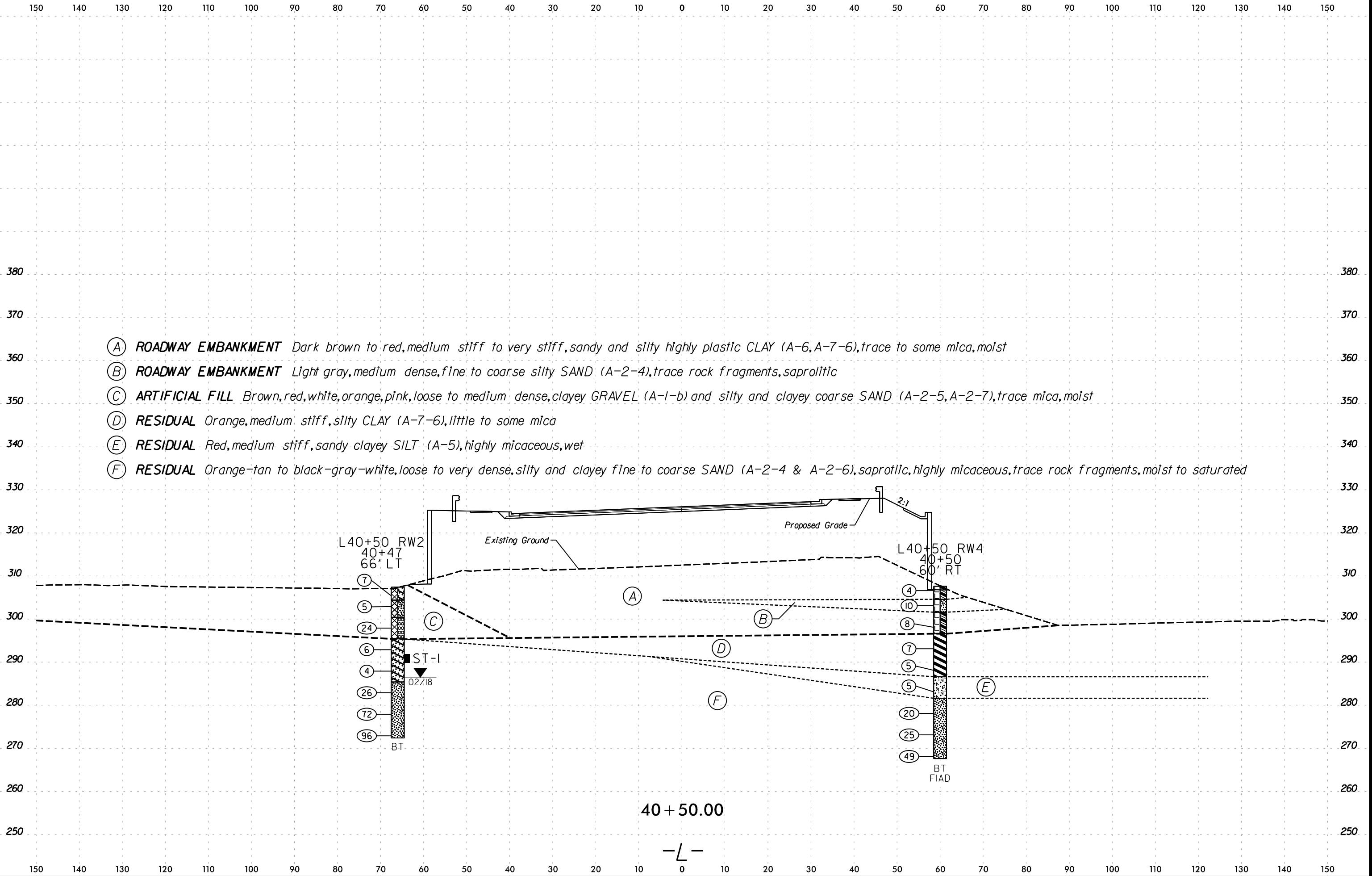






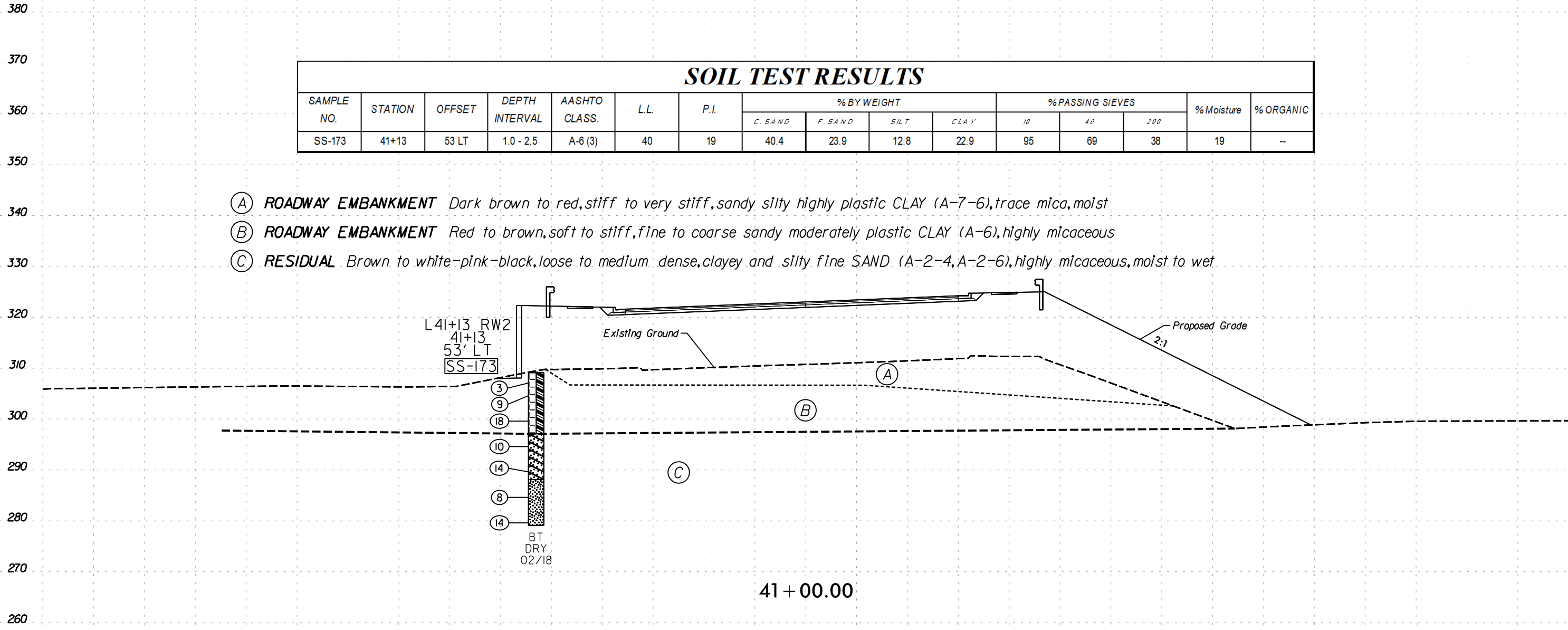


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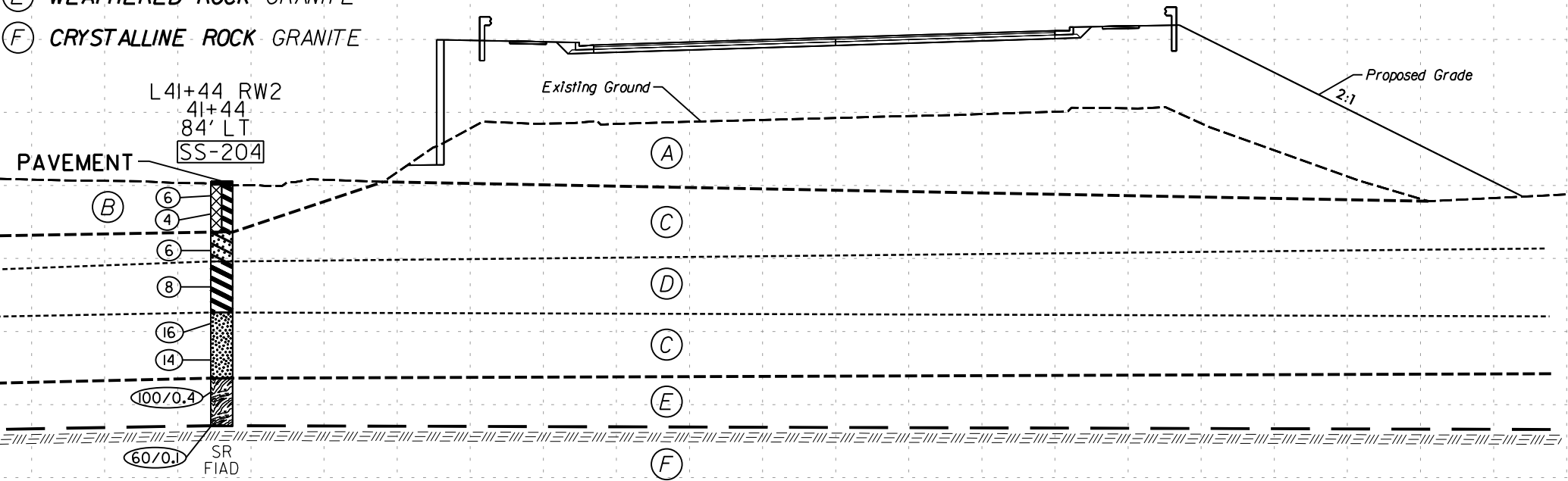
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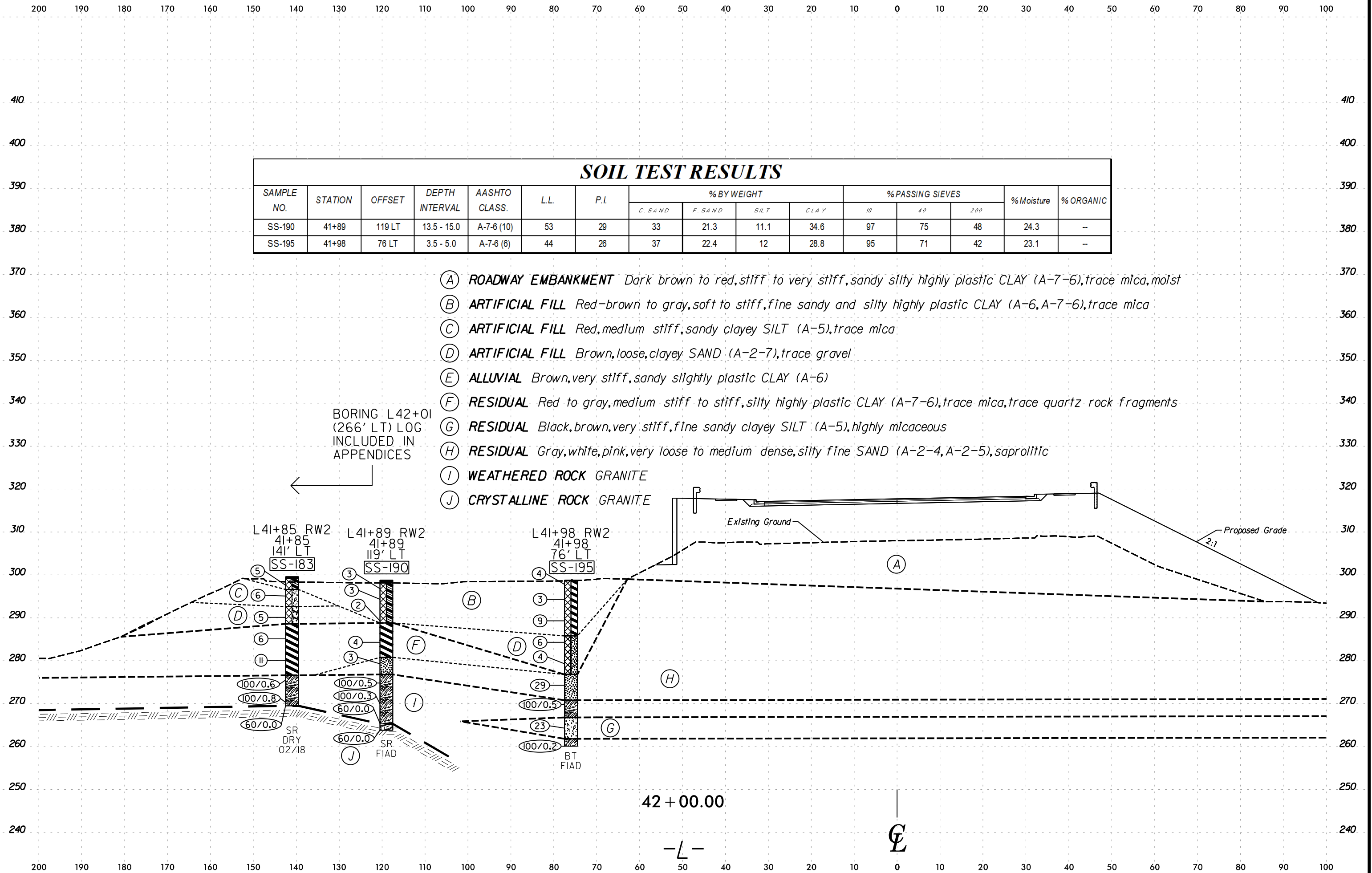
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SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-204	41+44	84 LT	3.5 - 5.0	A-7-6 (5)	49	25	37.6	24.8	10.9	26.7	94	69	40	22.1	--

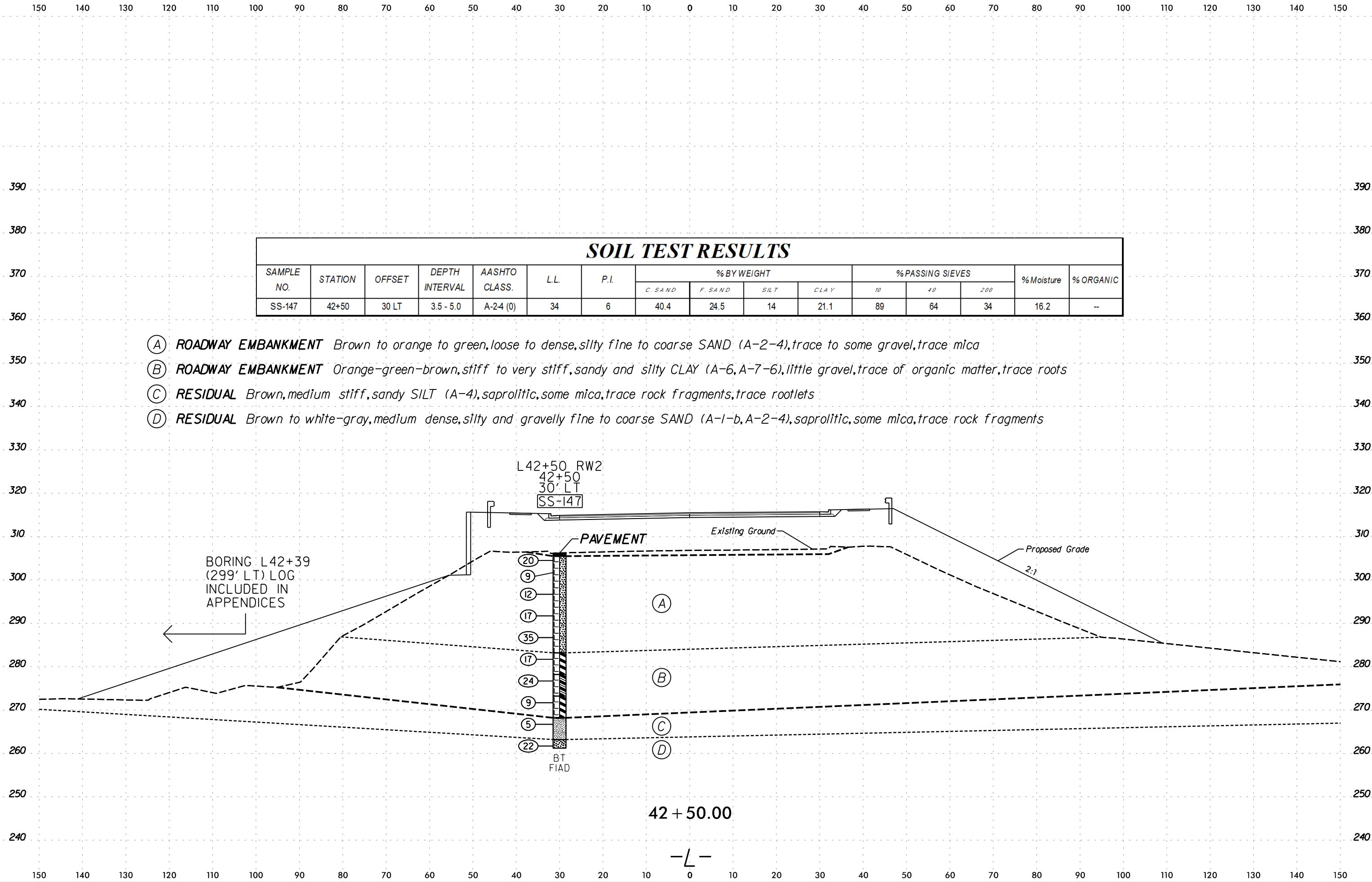
- (A) ROADWAY EMBANKMENT Dark brown to red, stiff to very stiff, sandy silty highly plastic CLAY (A-7-6), trace mica, moist
- (B) ARTIFICIAL FILL Gray-brown, red, medium stiff, sandy silty highly plastic CLAY (A-7-6), moist
- (C) RESIDUAL Pink-white to brown-orange, loose to medium dense, clayey and silty fine to coarse SAND (A-2-4, A-2-6), trace mica, moist
- (D) RESIDUAL Gray, red, stiff, gravelly sandy silty highly plastic CLAY (A-7-6), moist
- (E) WEATHERED ROCK GRANITE
- (F) CRYSTALLINE ROCK GRANITE

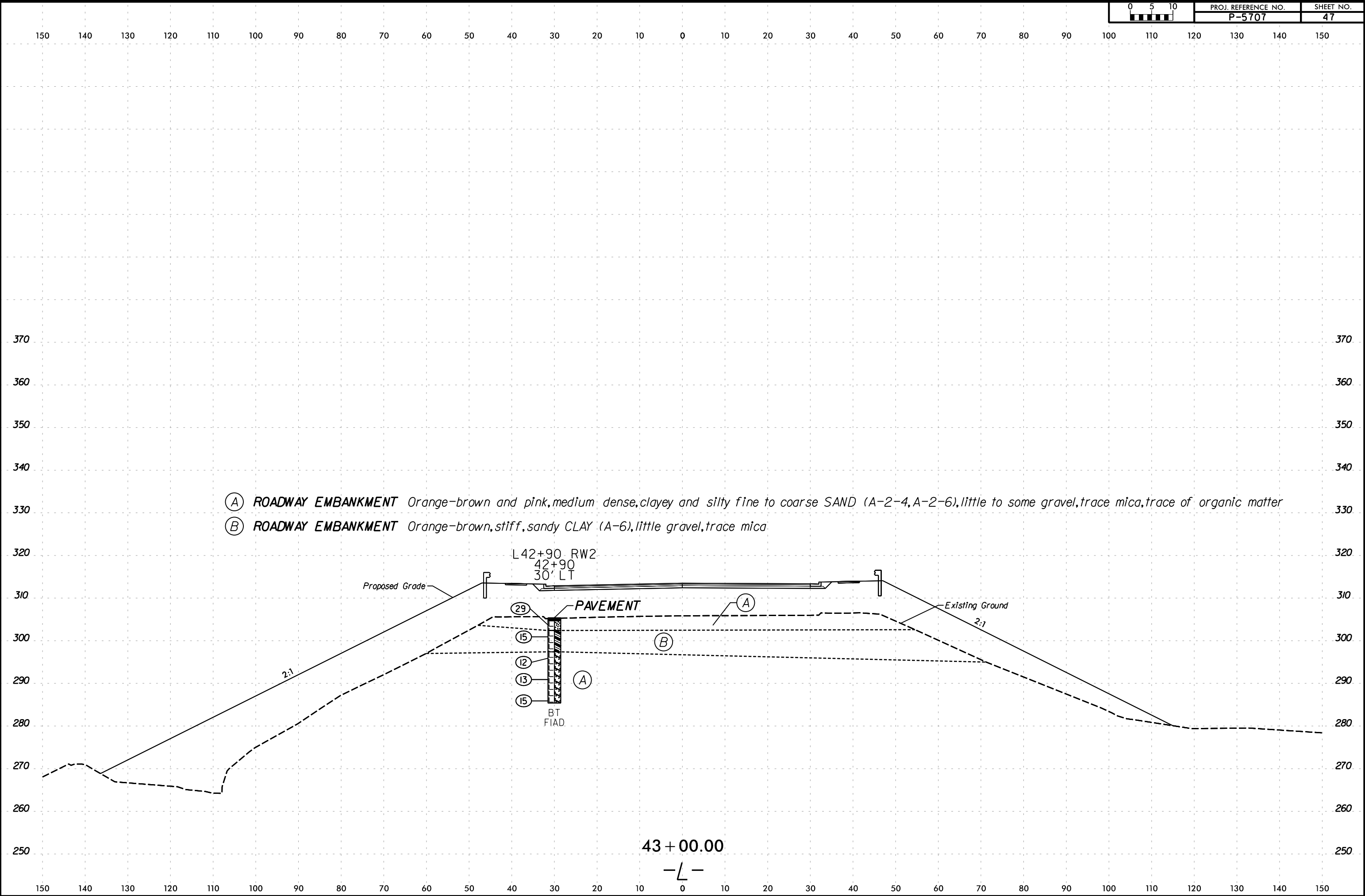




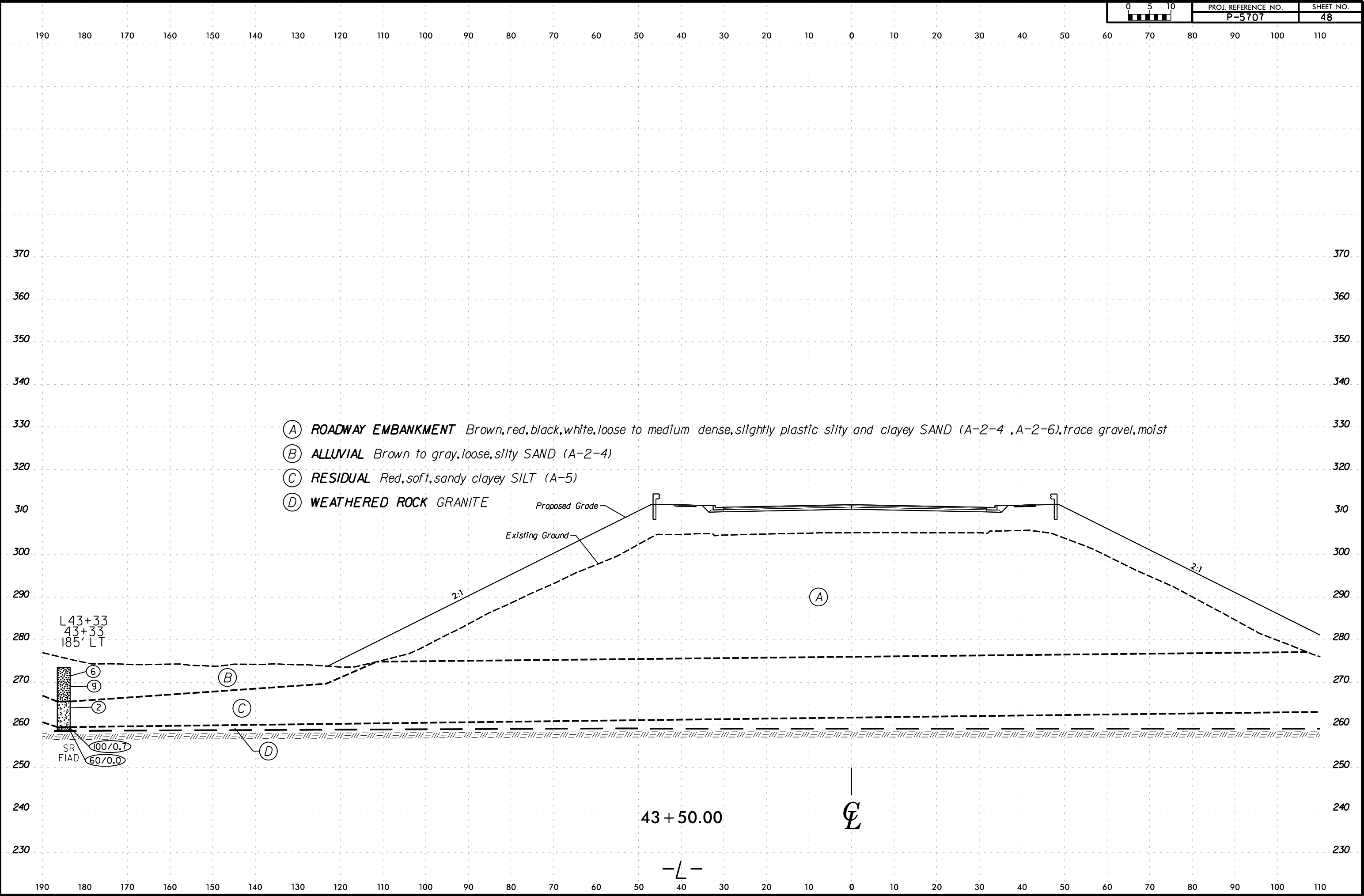
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6/23/16

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

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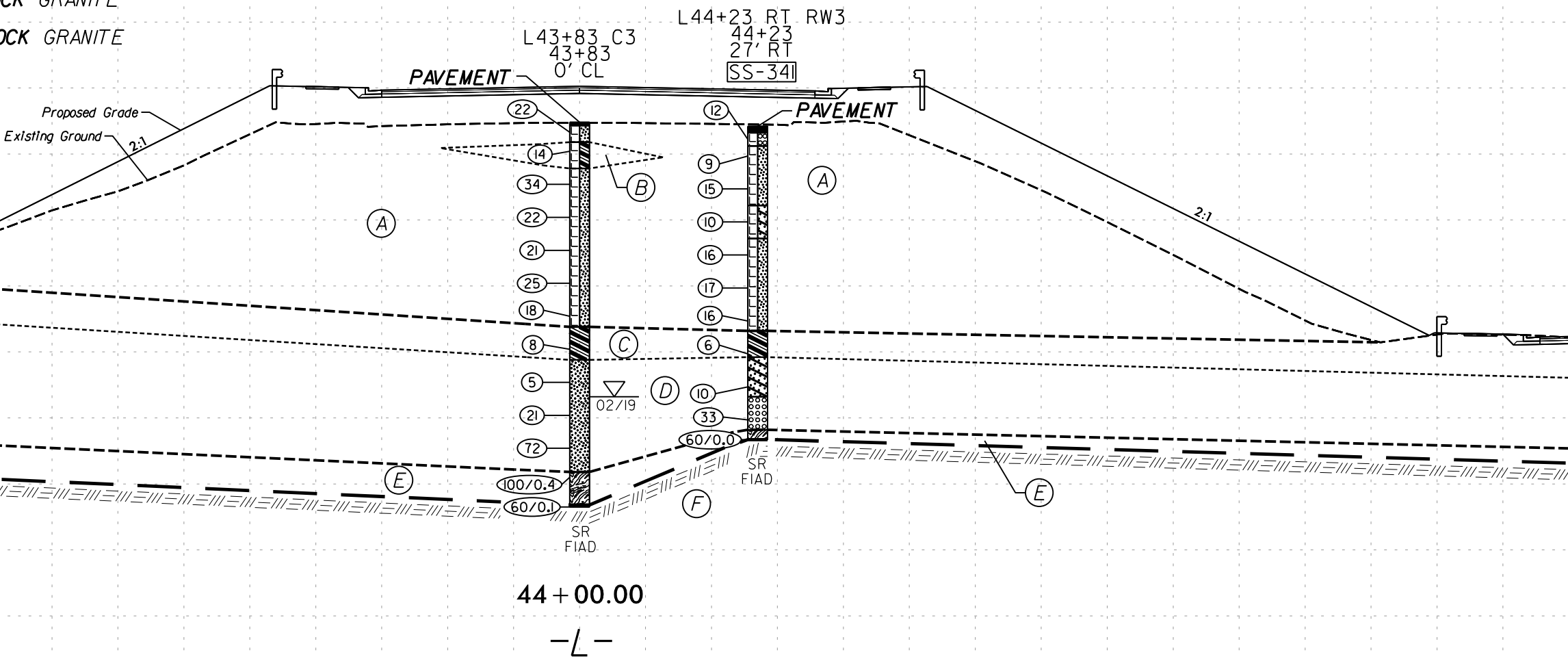
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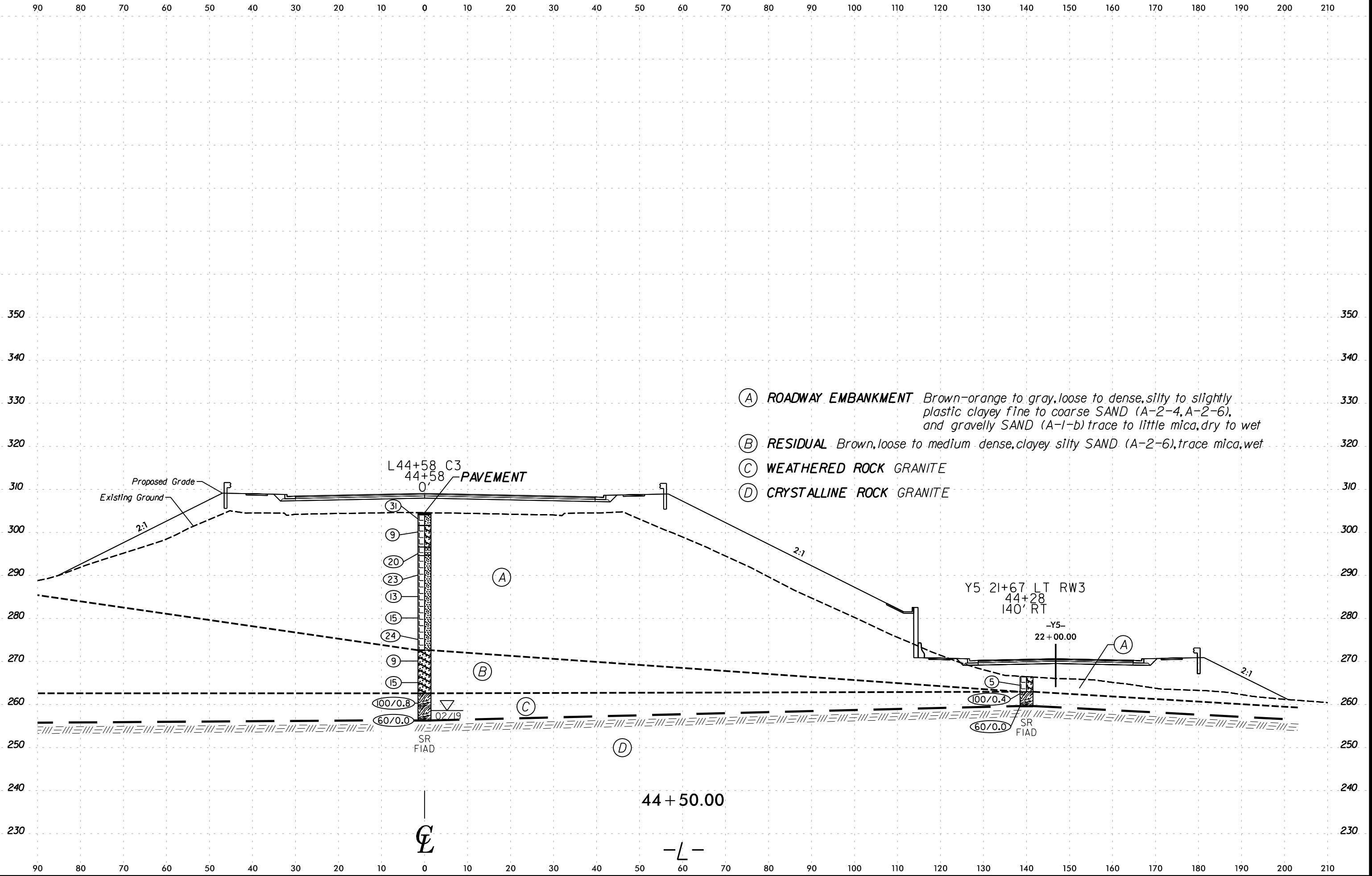
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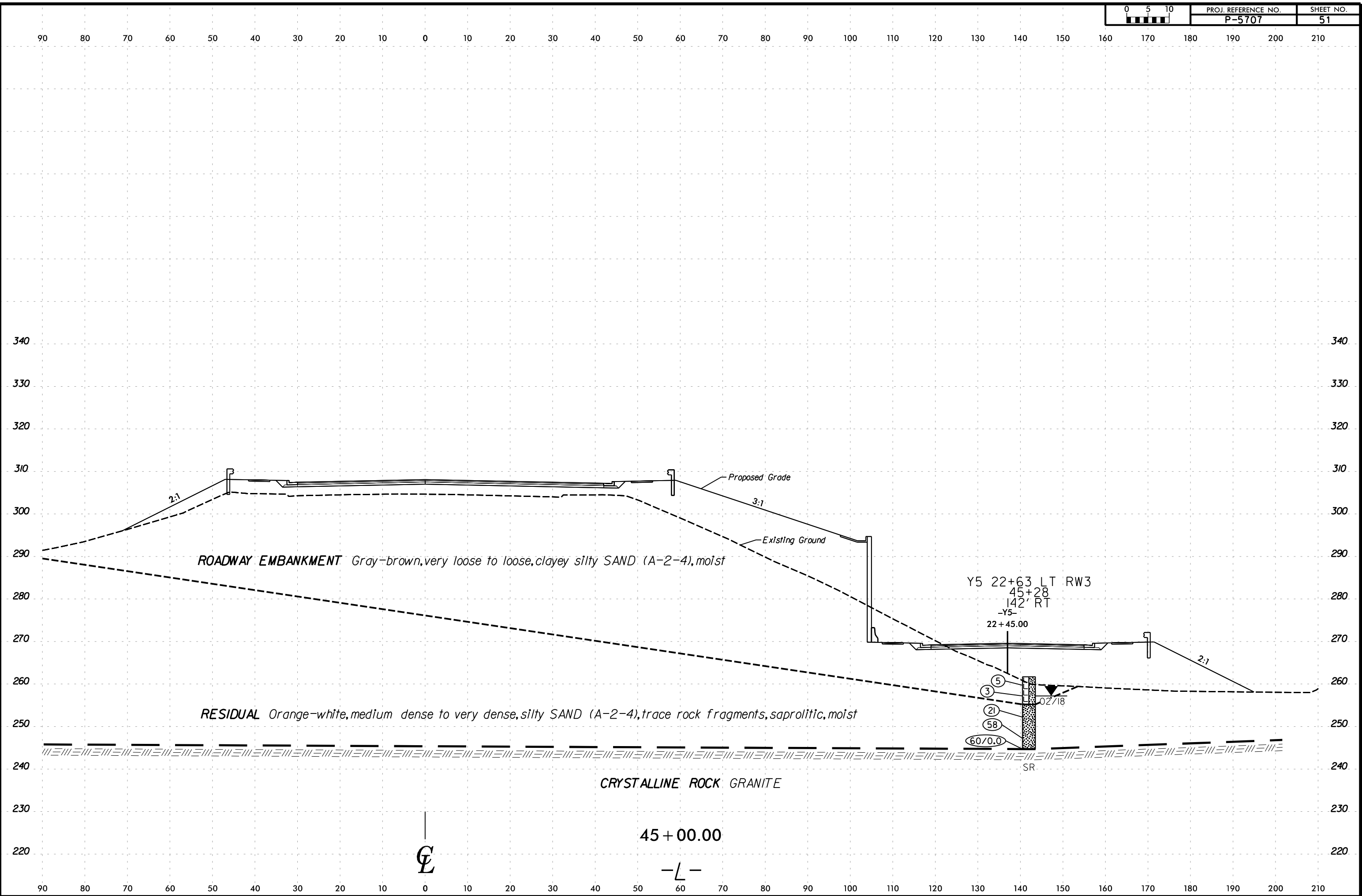
SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-341	44+23	27 RT	13.5 - 15.0	A-2-6 (0)	35	12	43.3	32.7	12.8	11.2	87	65	25	14.5	--

- (A) ROADWAY EMBANKMENT Brown-tan-orange to gray, loose to dense, silty, gravelly to silty to slightly plastic clayey fine to coarse SAND (A-1-b, A-2-4, A-2-5, A-2-6), trace mica
- (B) ROADWAY EMBANKMENT Brown-orange, stiff, sandy CLAY (A-6), trace gravel
- (C) RESIDUAL Gray-white to brown, medium stiff to stiff, sandy CLAY (A-6), trace mica
- (D) RESIDUAL White-gray to brown-red, loose to very dense, gravelly to silty to clayey coarse SAND (A-1-b, A-2-5, A-2-7), saprolitic, some mica, trace of organic matter
- (E) WEATHERED ROCK GRANITE
- (F) CRYSTALLINE ROCK GRANITE



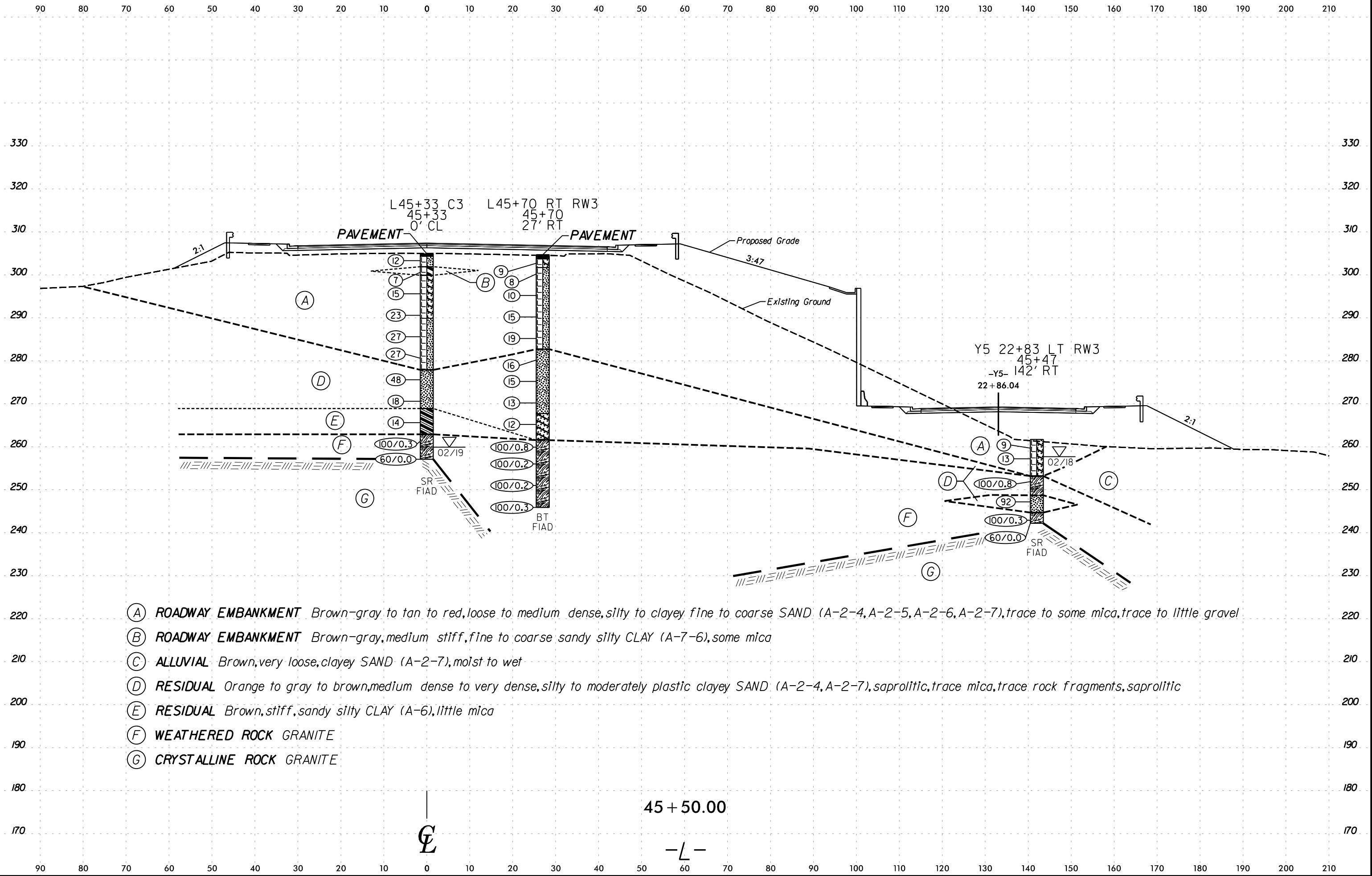
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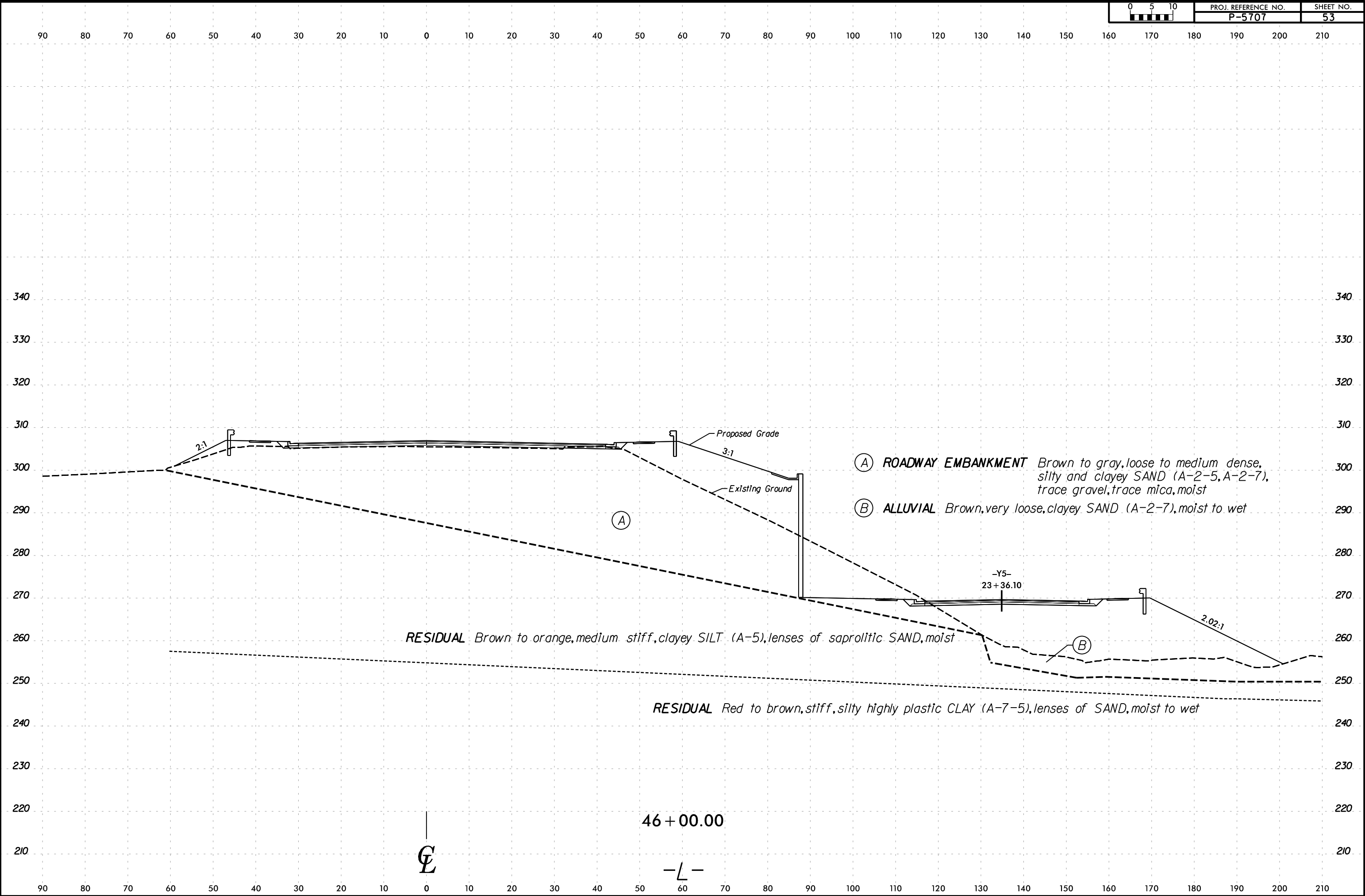




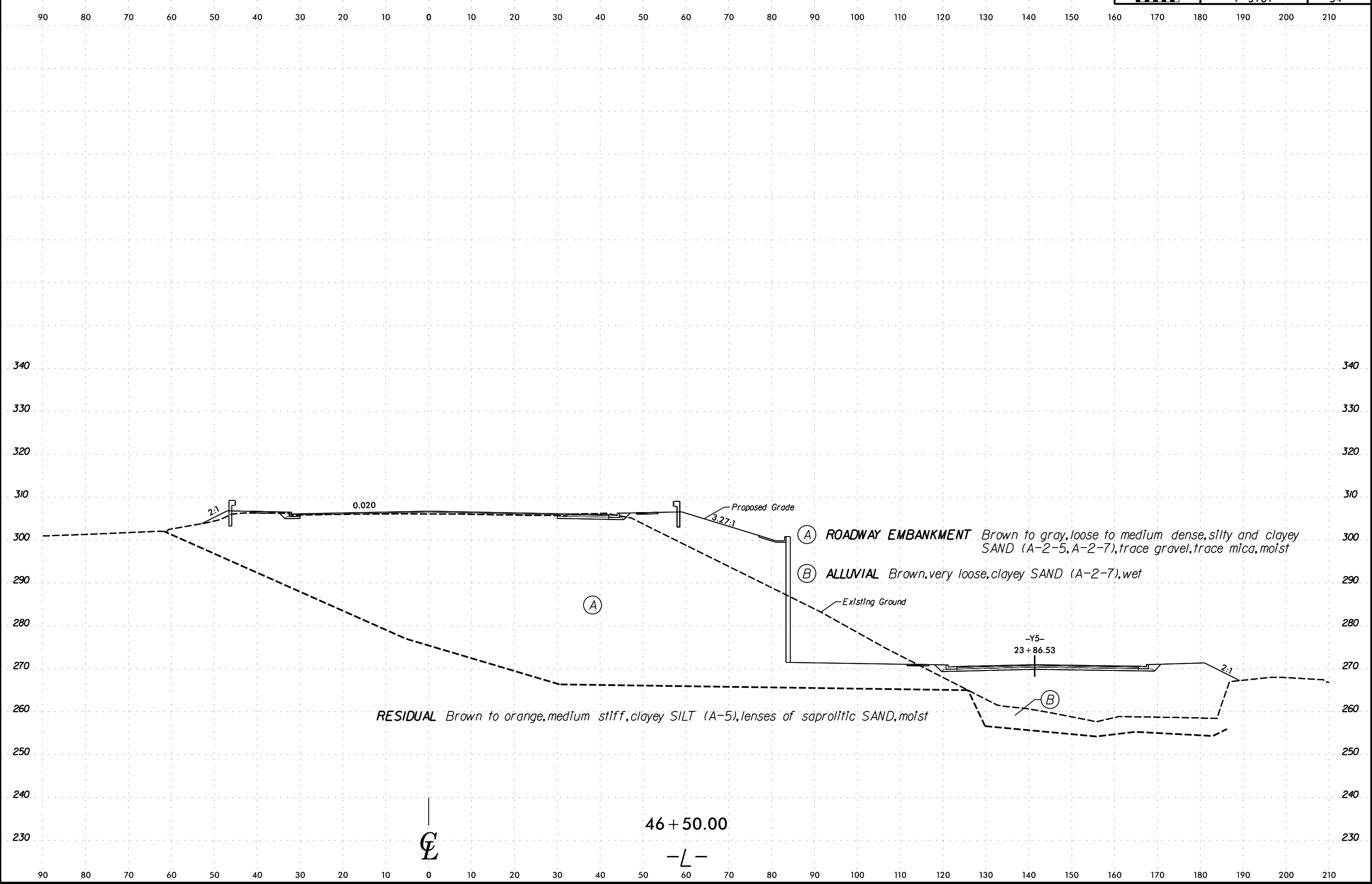
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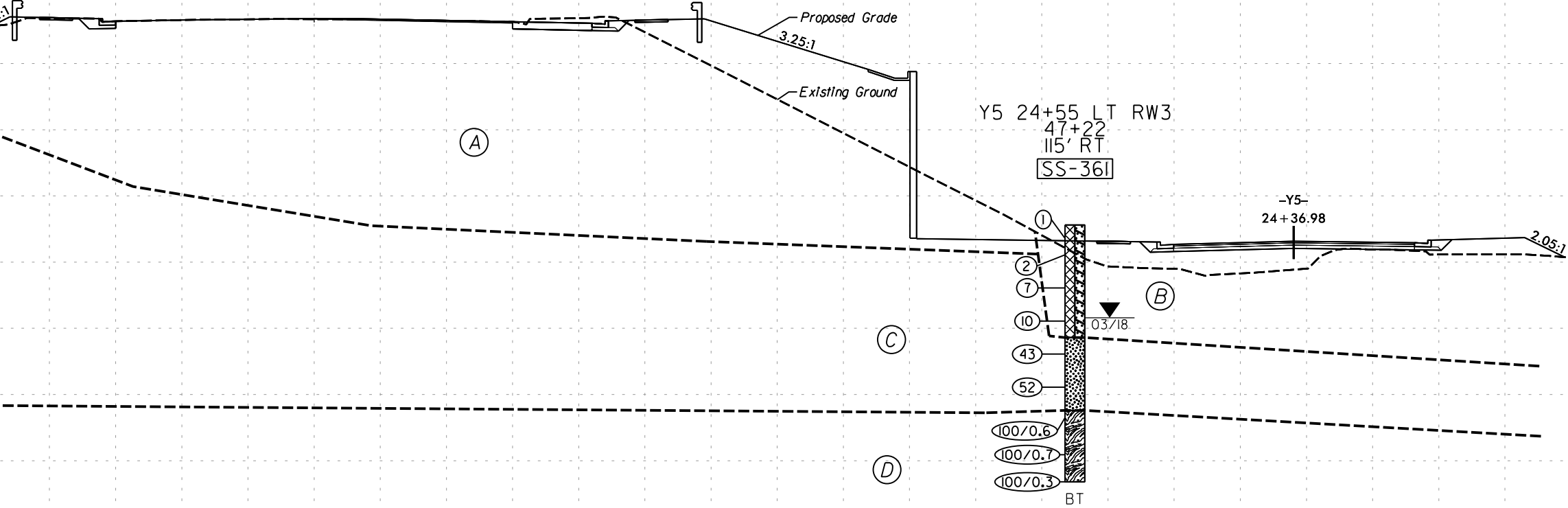
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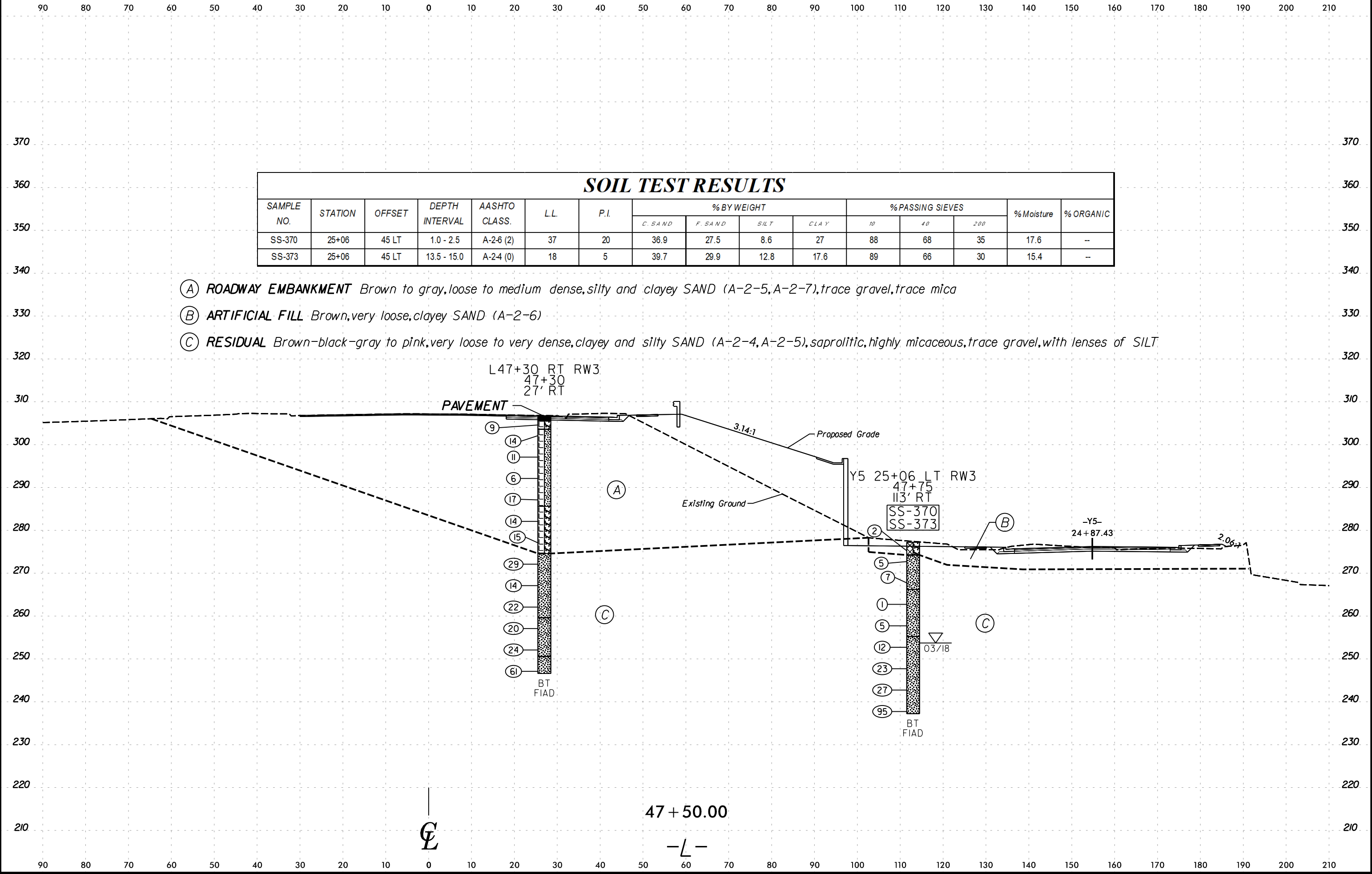
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SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-361	24+55	36 LT	1.0 - 2.5	A-2-6 (1)	38	20	40.1	26.2	10.1	23.6	88	66	33	22.9	--

- (A) ROADWAY EMBANKMENT Brown to gray, loose to medium dense, silty and clayey SAND (A-2-5, A-2-7), trace gravel, trace mica, moist
- (B) ARTIFICIAL FILL Gray-brown, very loose to medium dense, moderately plastic clayey SAND (A-2-6)
- (C) RESIDUAL Black-red, dense to very dense, silty SAND (A-2-4), saprolitic, trace mica
- (D) WEATHERED ROCK GRANITE

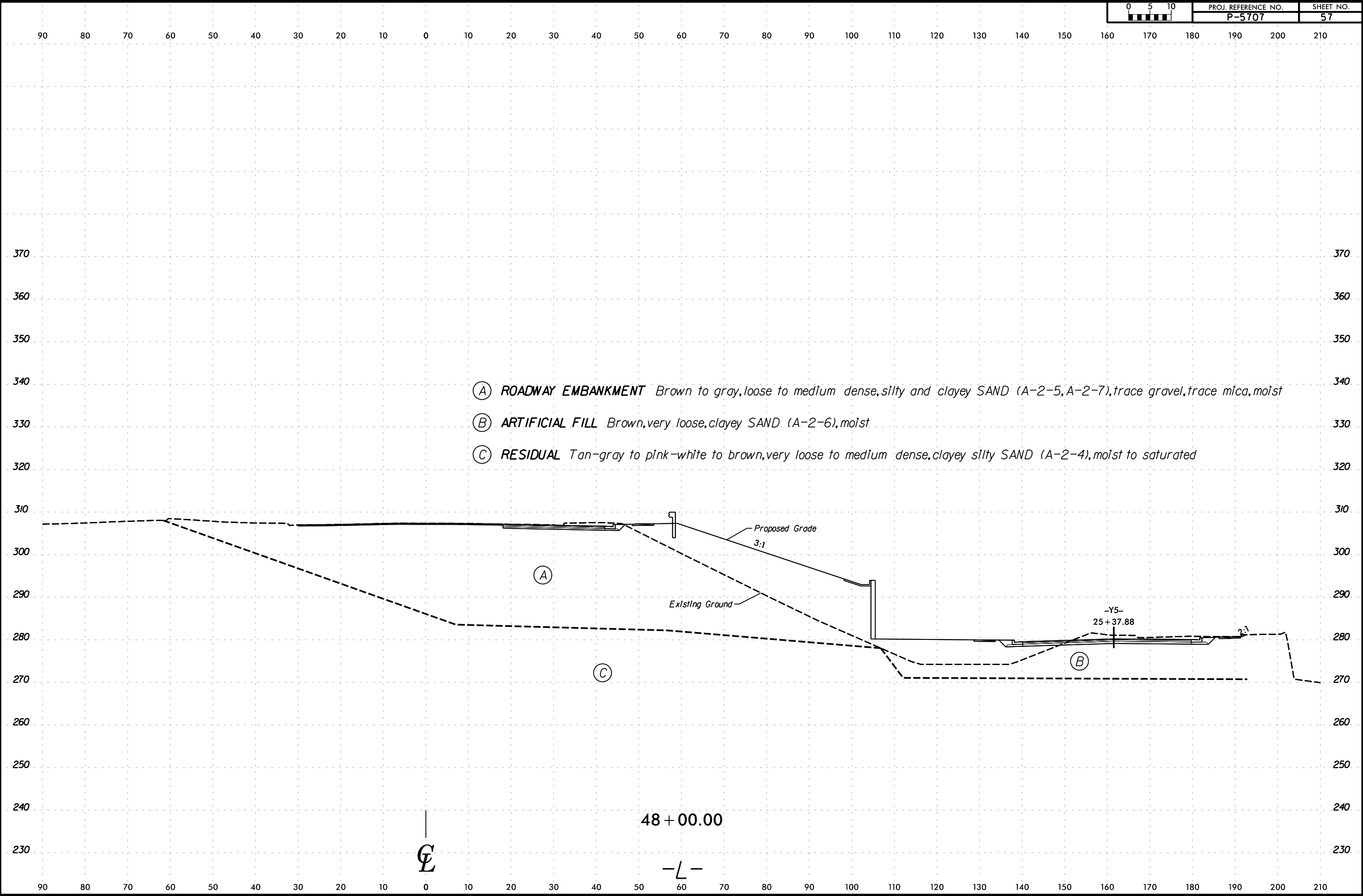


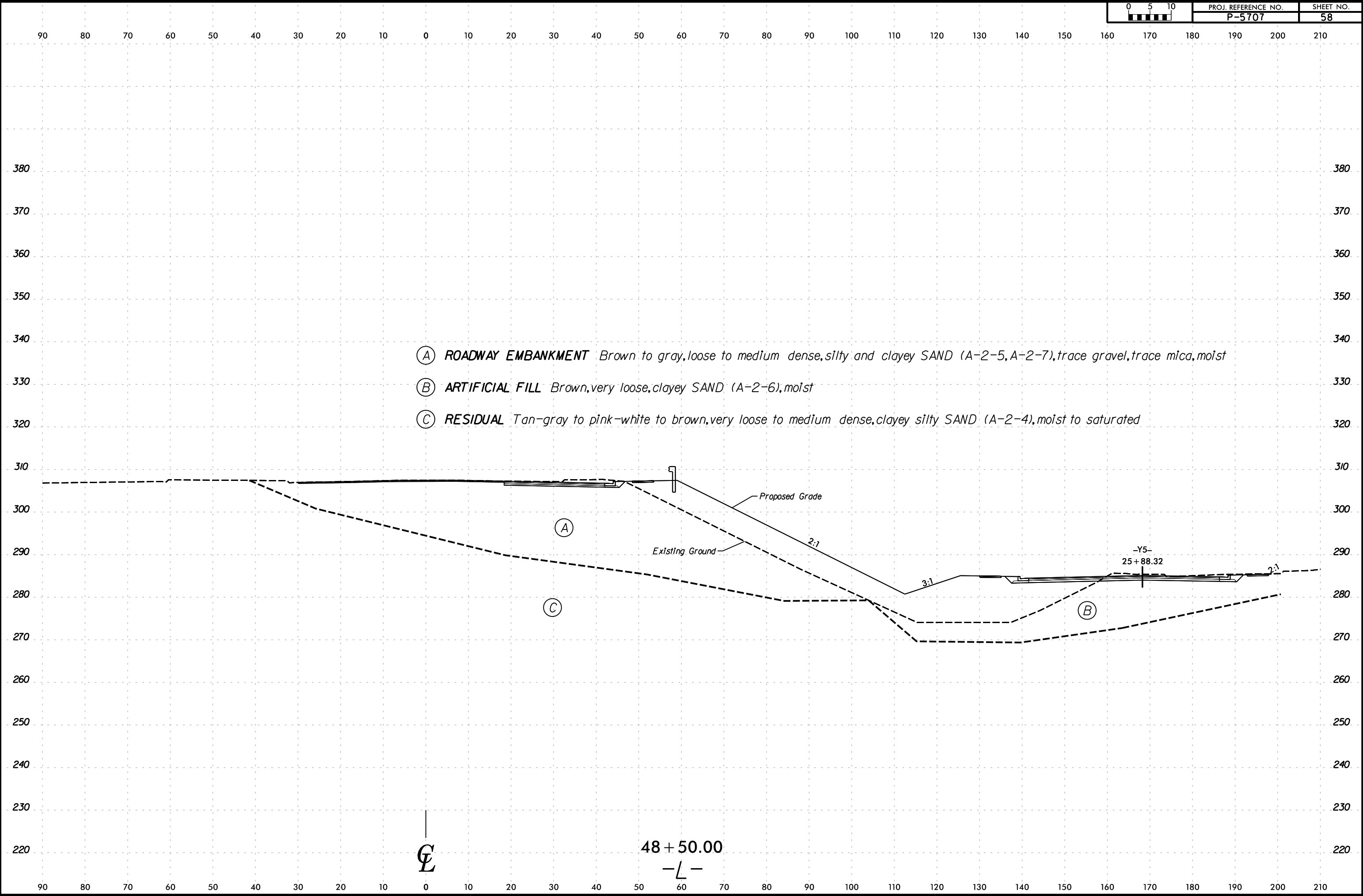
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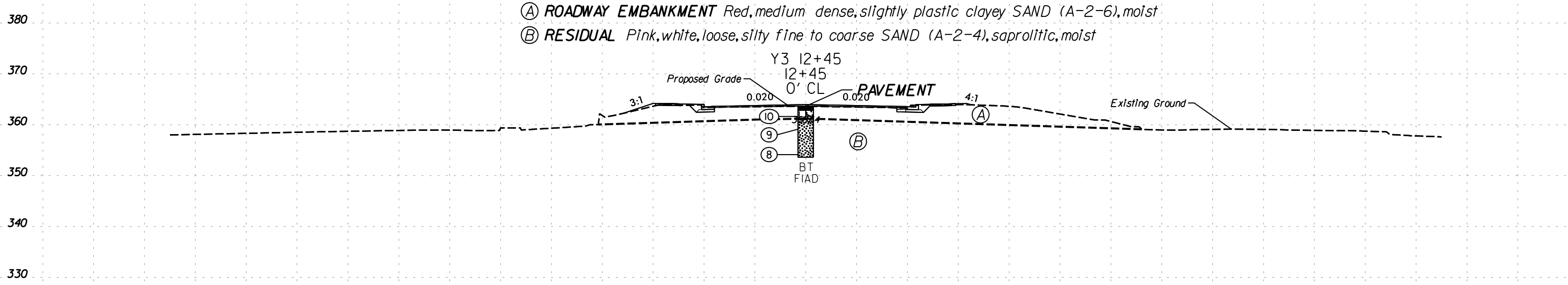
SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-370	25+06	45 LT	1.0 - 2.5	A-2-6 (2)	37	20	36.9	27.5	8.6	27	88	68	35	17.6	--
SS-373	25+06	45 LT	13.5 - 15.0	A-2-4 (0)	18	5	39.7	29.9	12.8	17.6	89	66	30	15.4	--

- (A) ROADWAY EMBANKMENT Brown to gray, loose to medium dense, silty and clayey SAND (A-2-5, A-2-7), trace gravel, trace mica
- (B) ARTIFICIAL FILL Brown, very loose, clayey SAND (A-2-6)
- (C) RESIDUAL Brown-black-gray to pink, very loose to very dense, clayey and silty SAND (A-2-4, A-2-5), saprolitic, highly micaceous, trace gravel, with lenses of SILT





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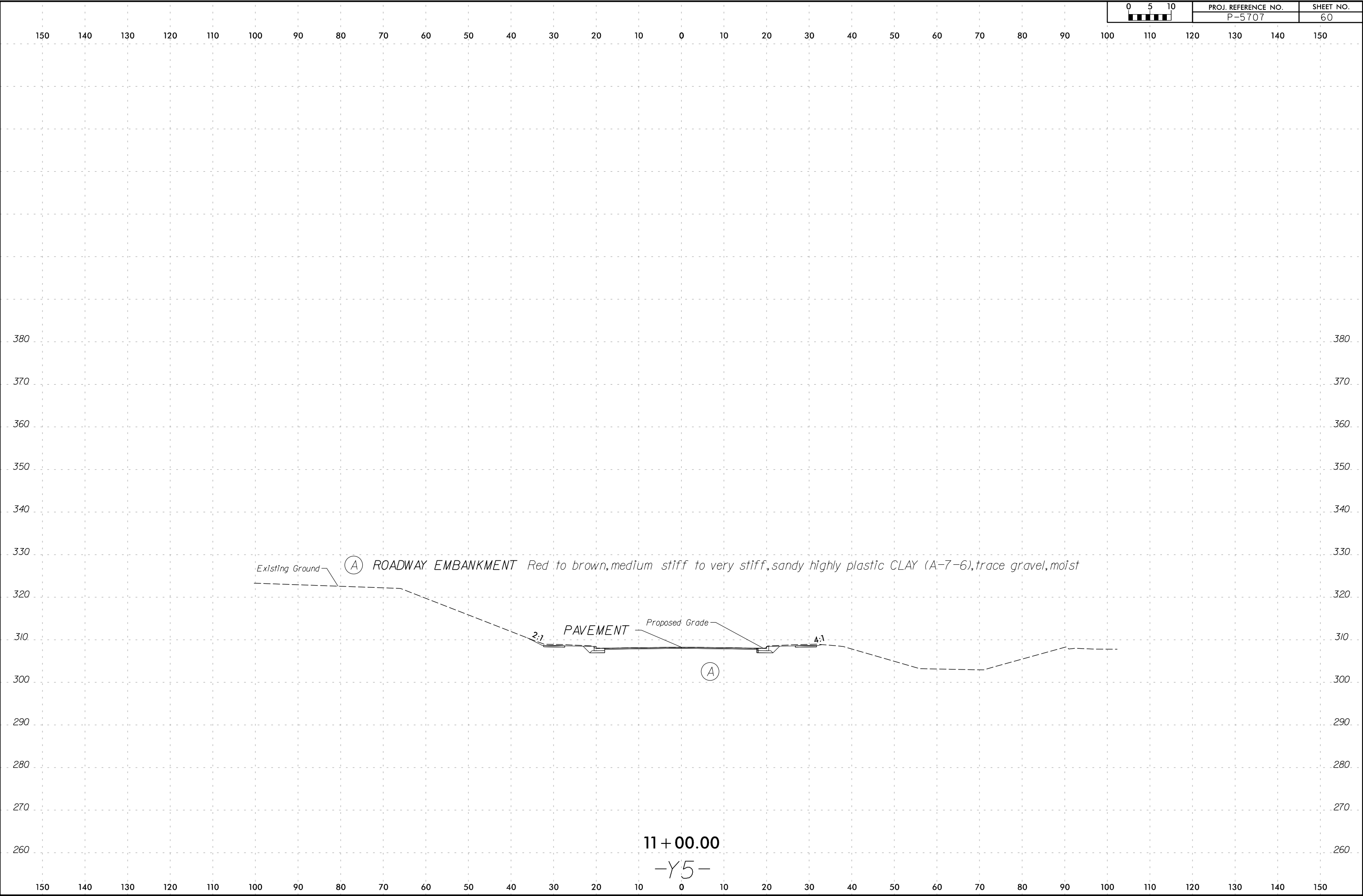
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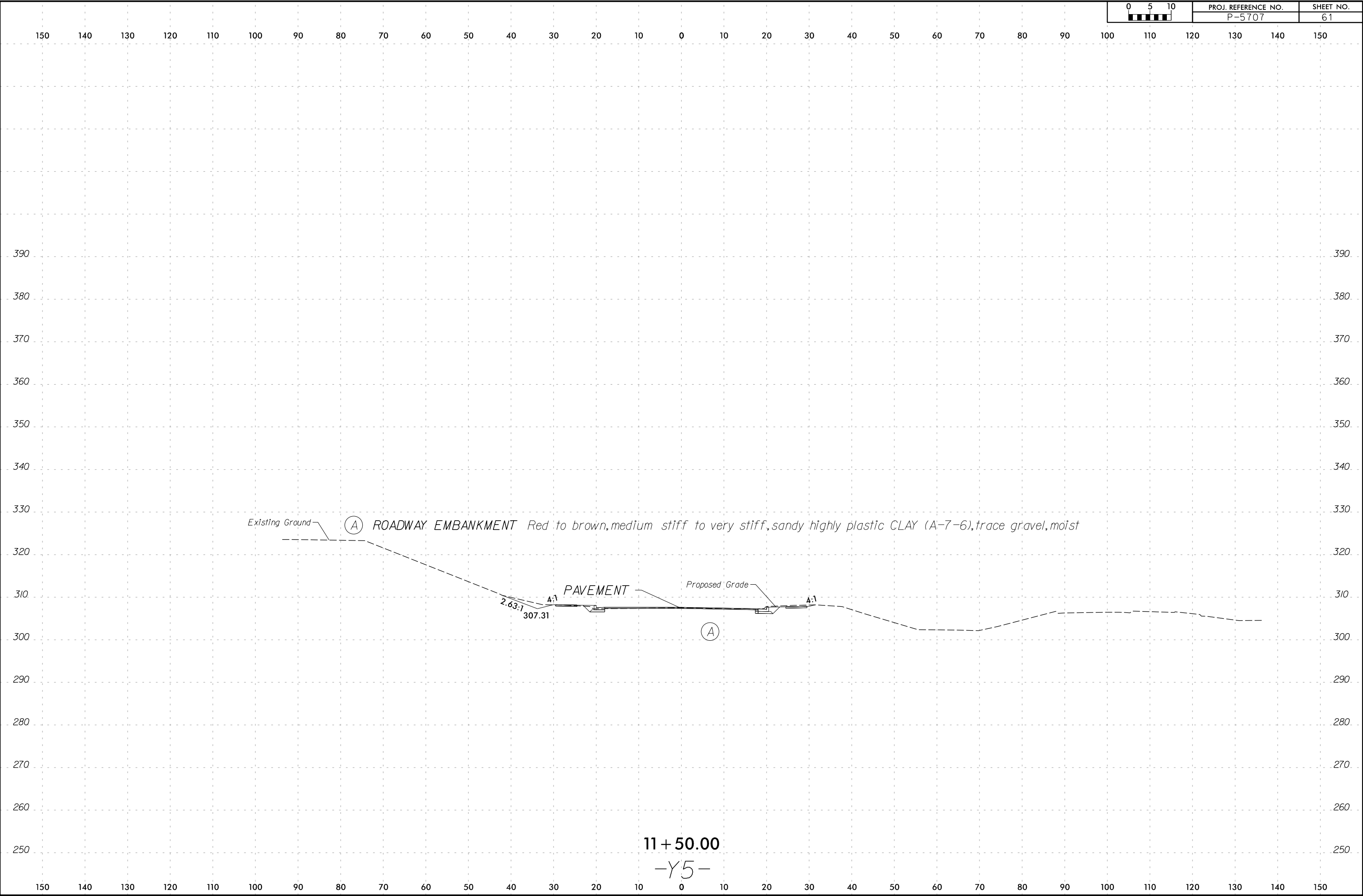
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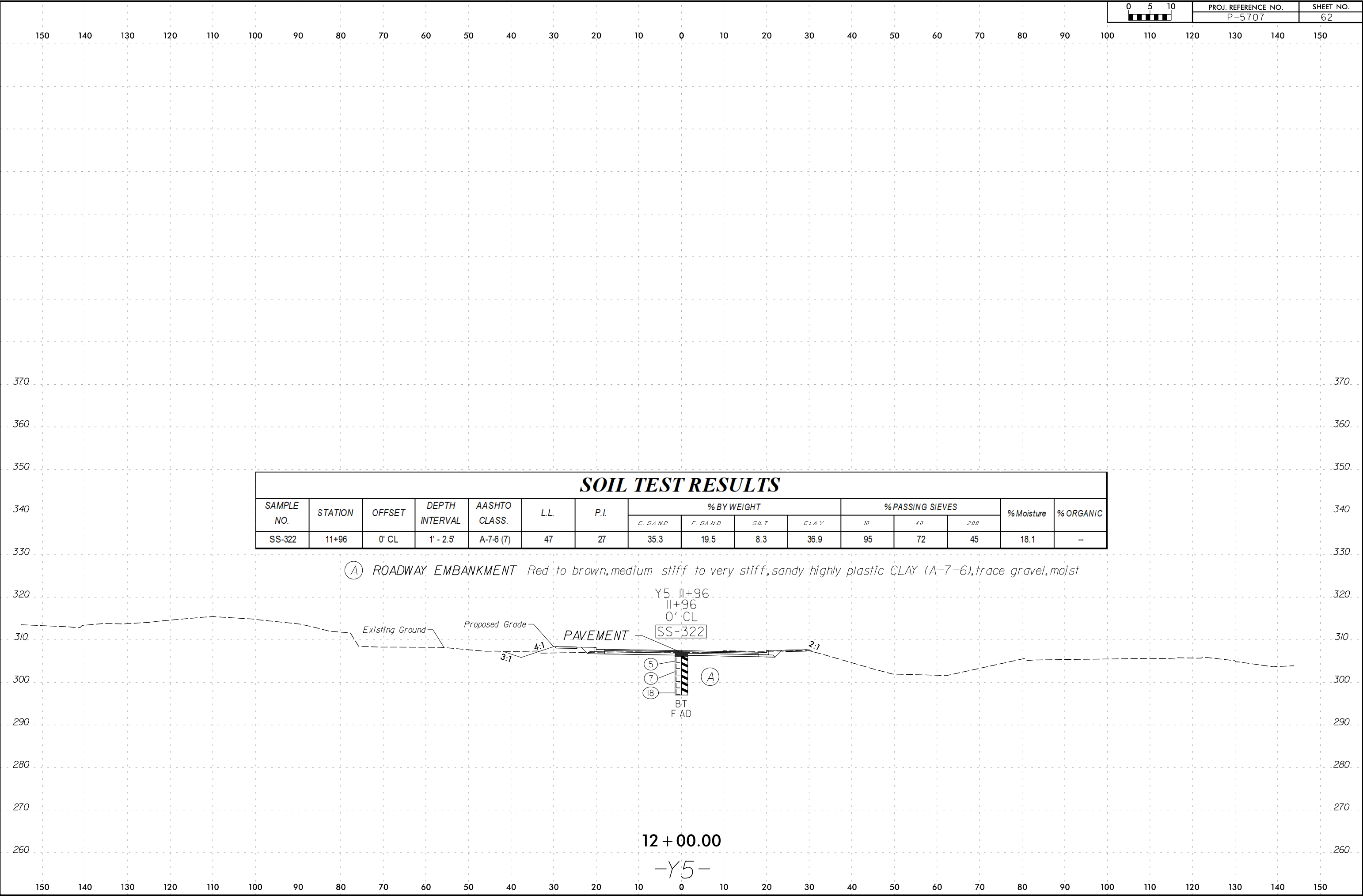
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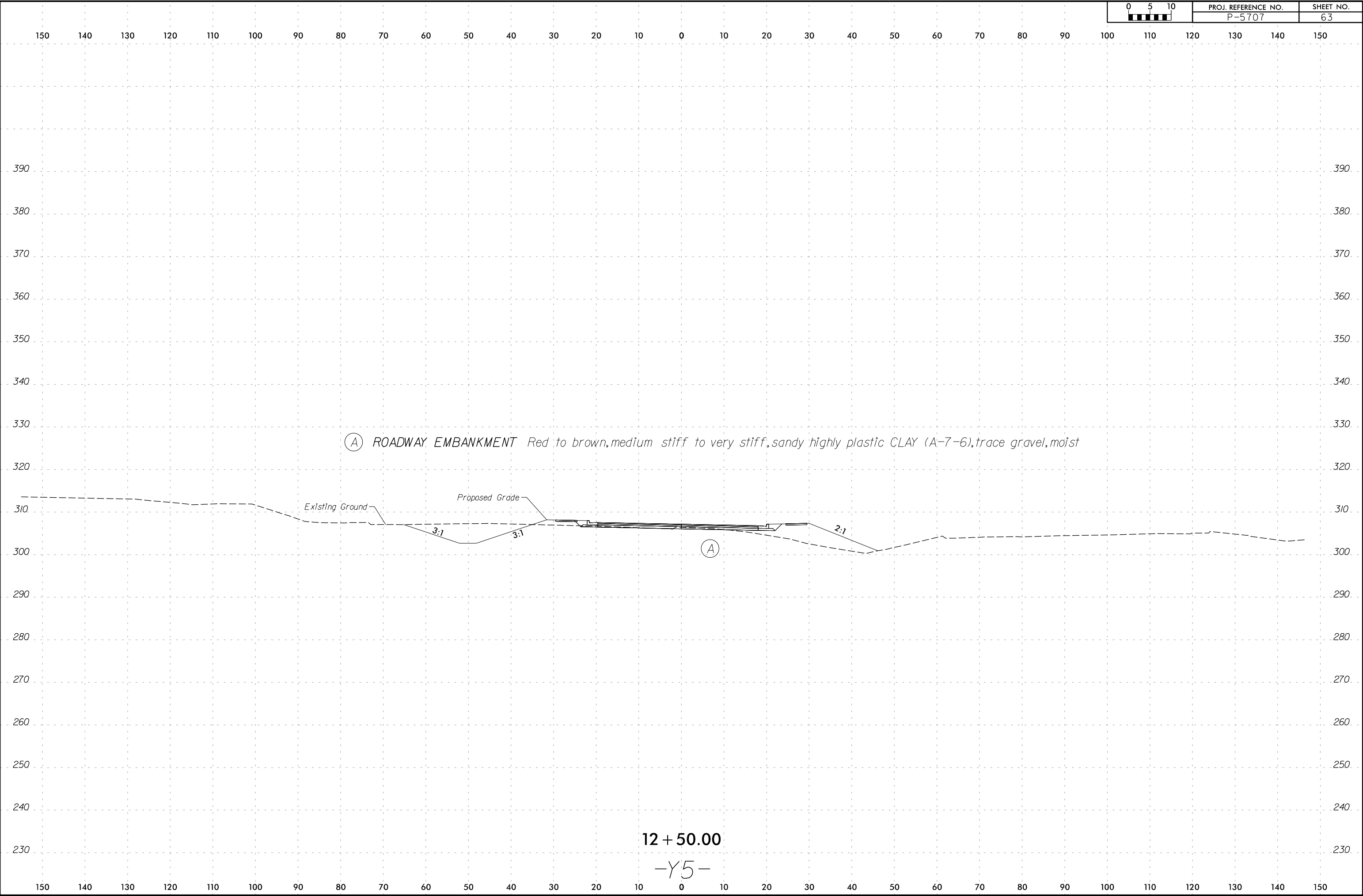
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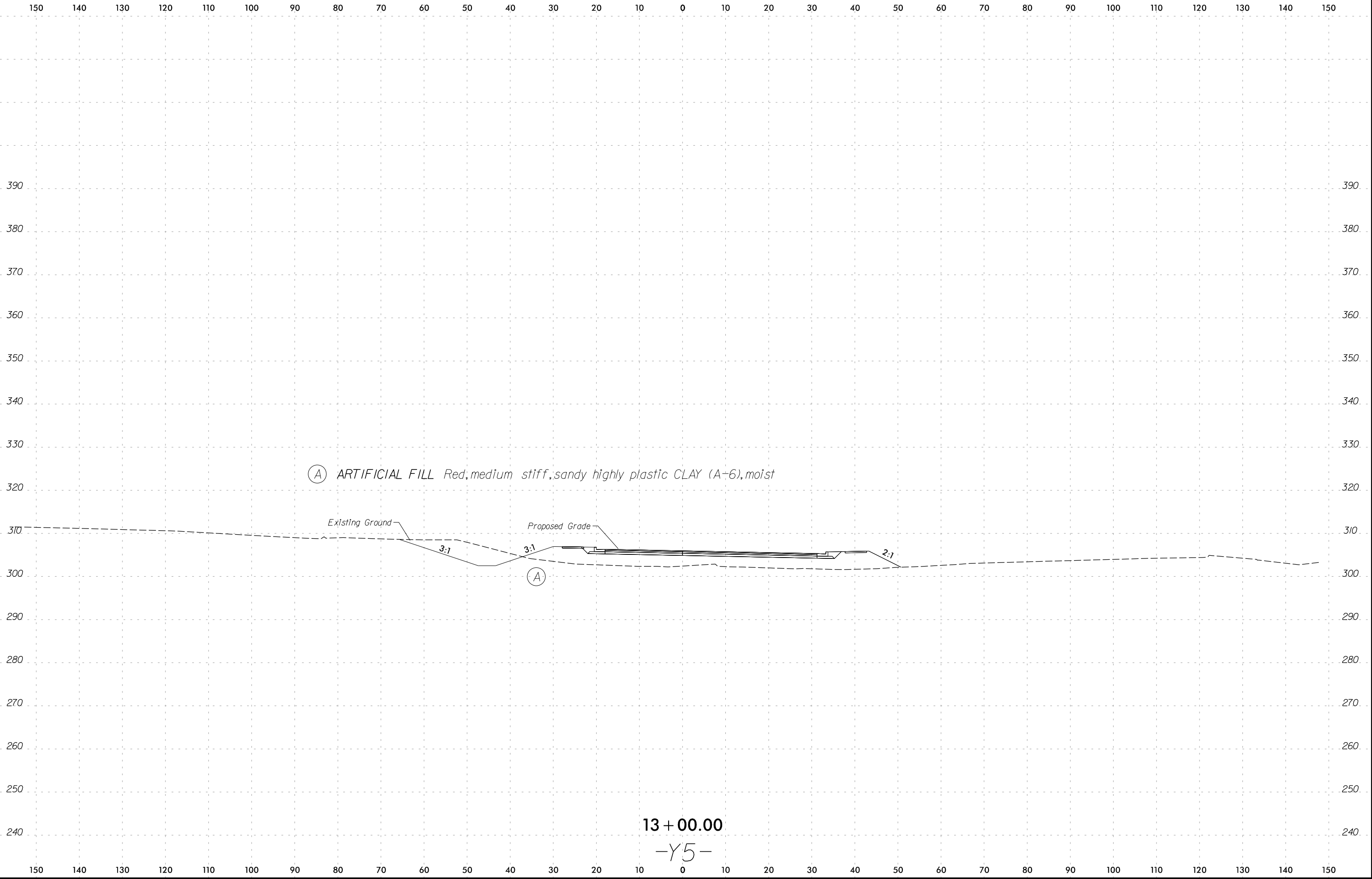
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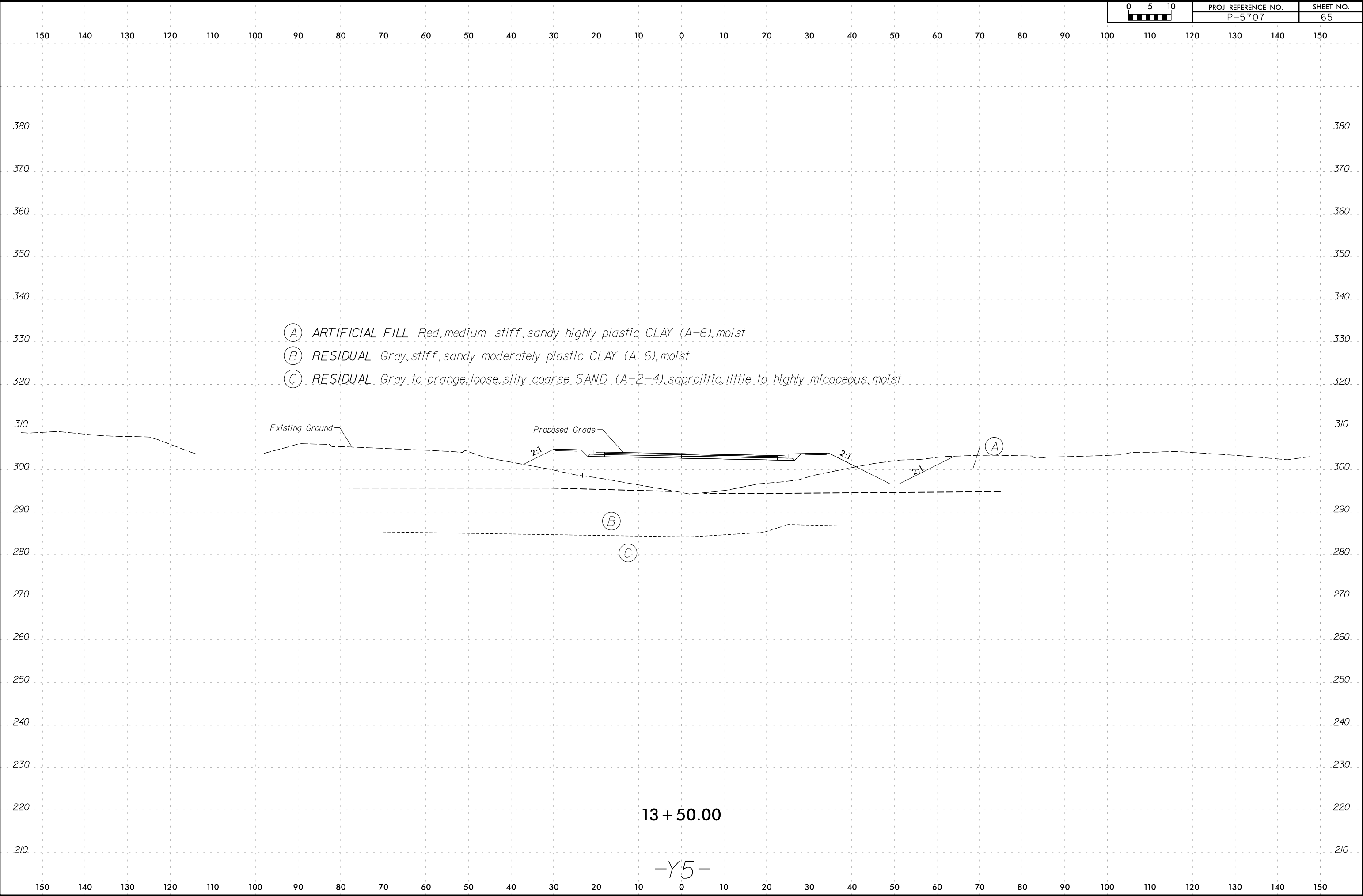
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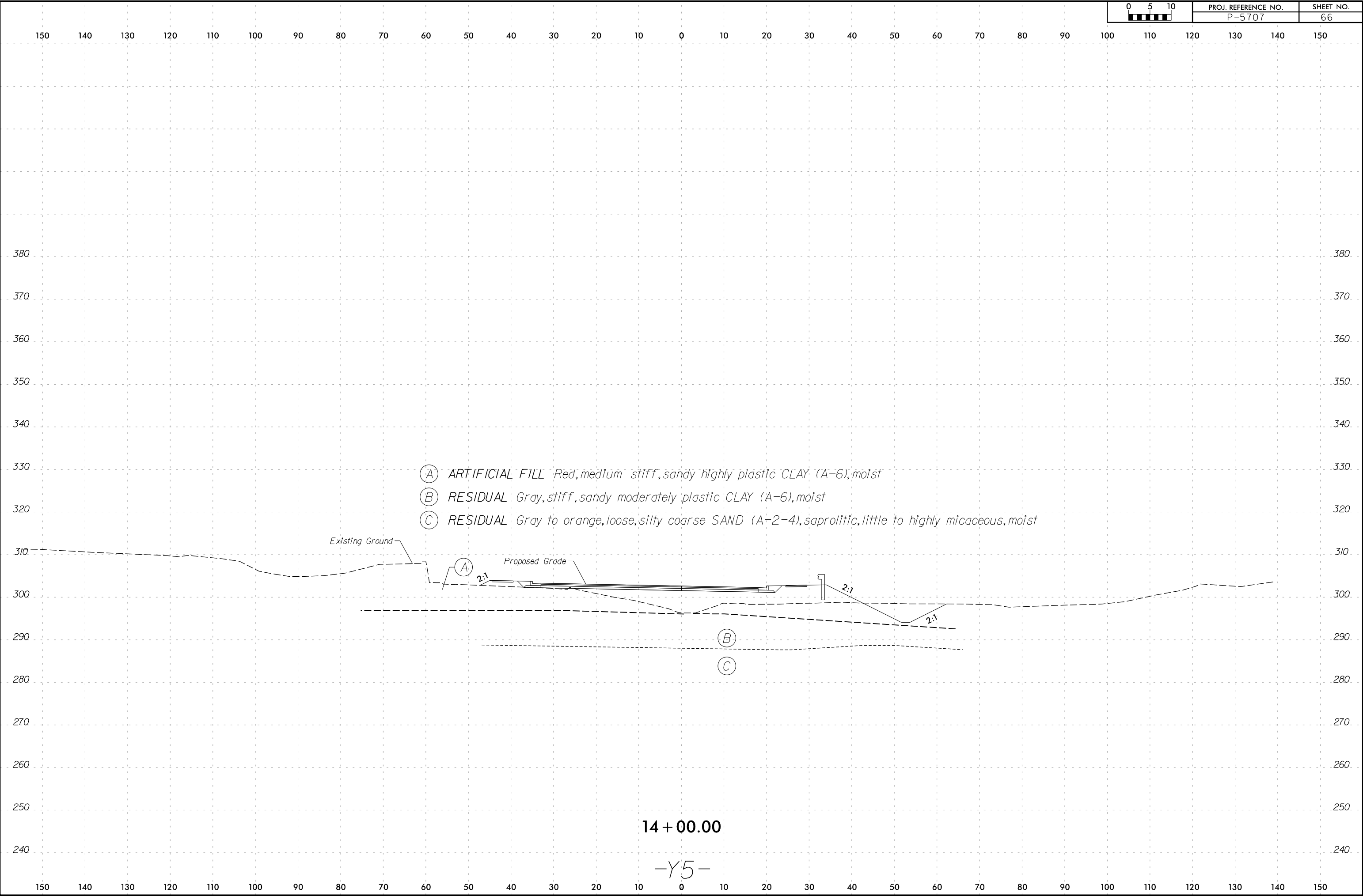
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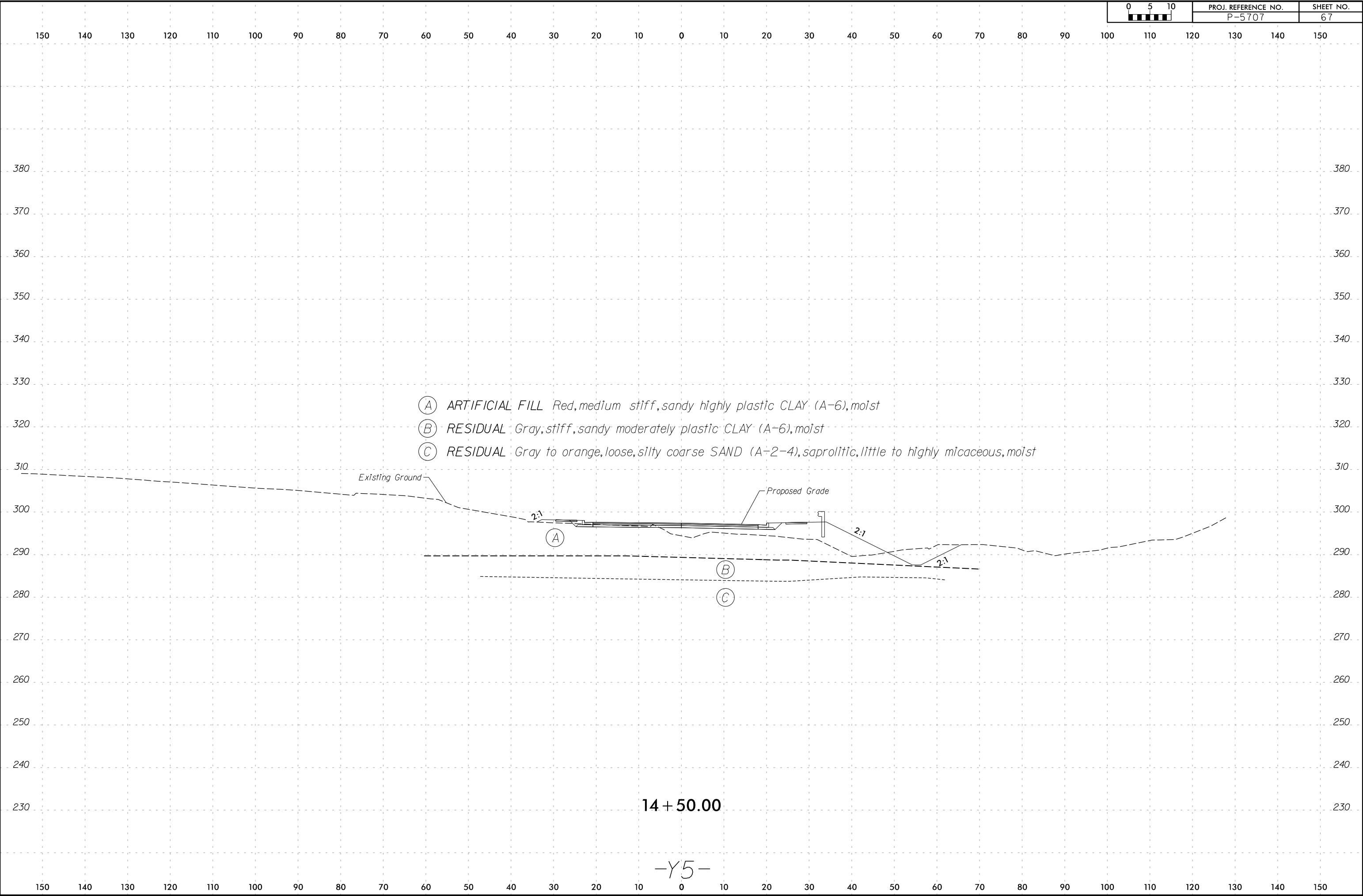
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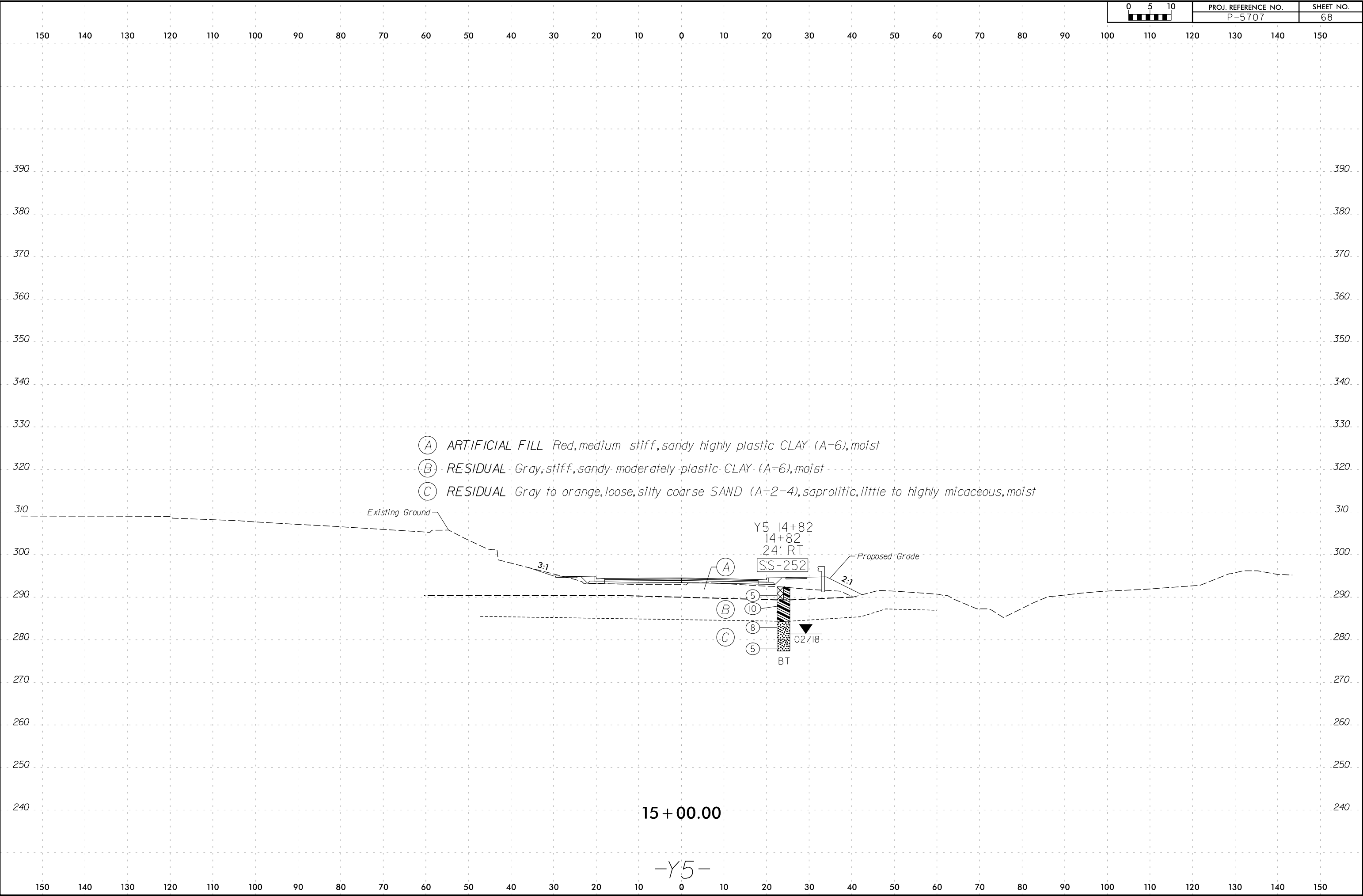
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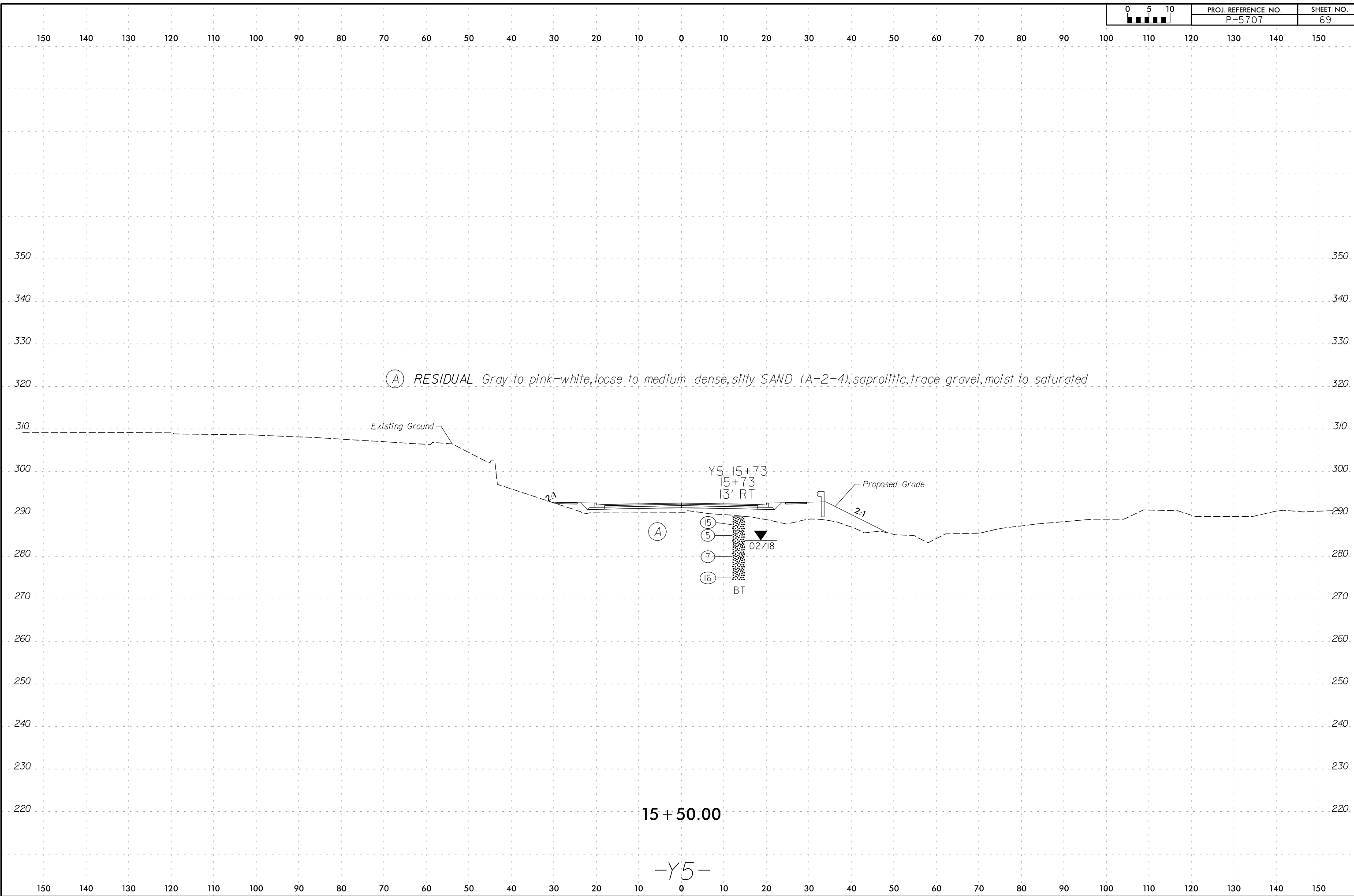
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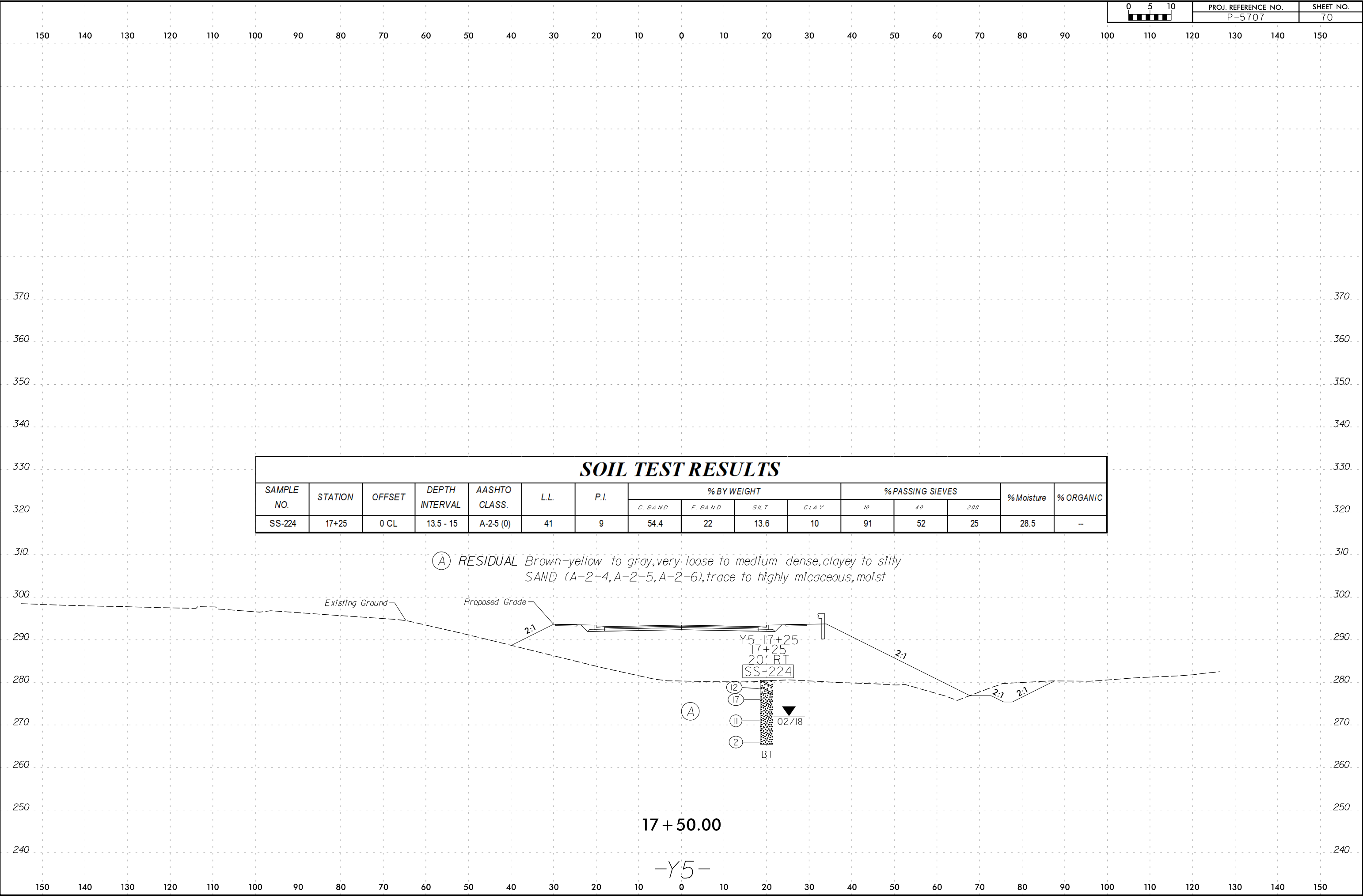


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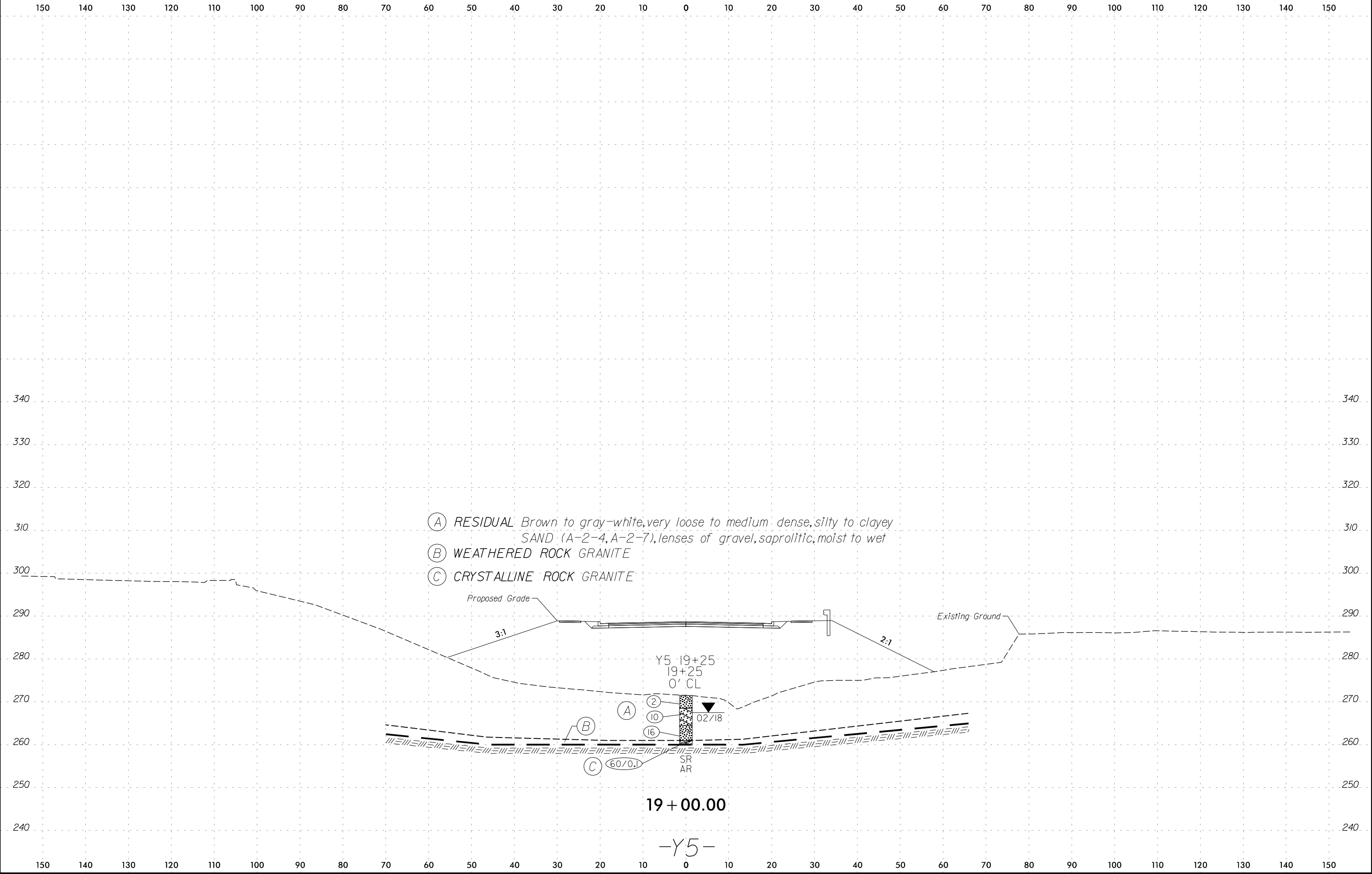
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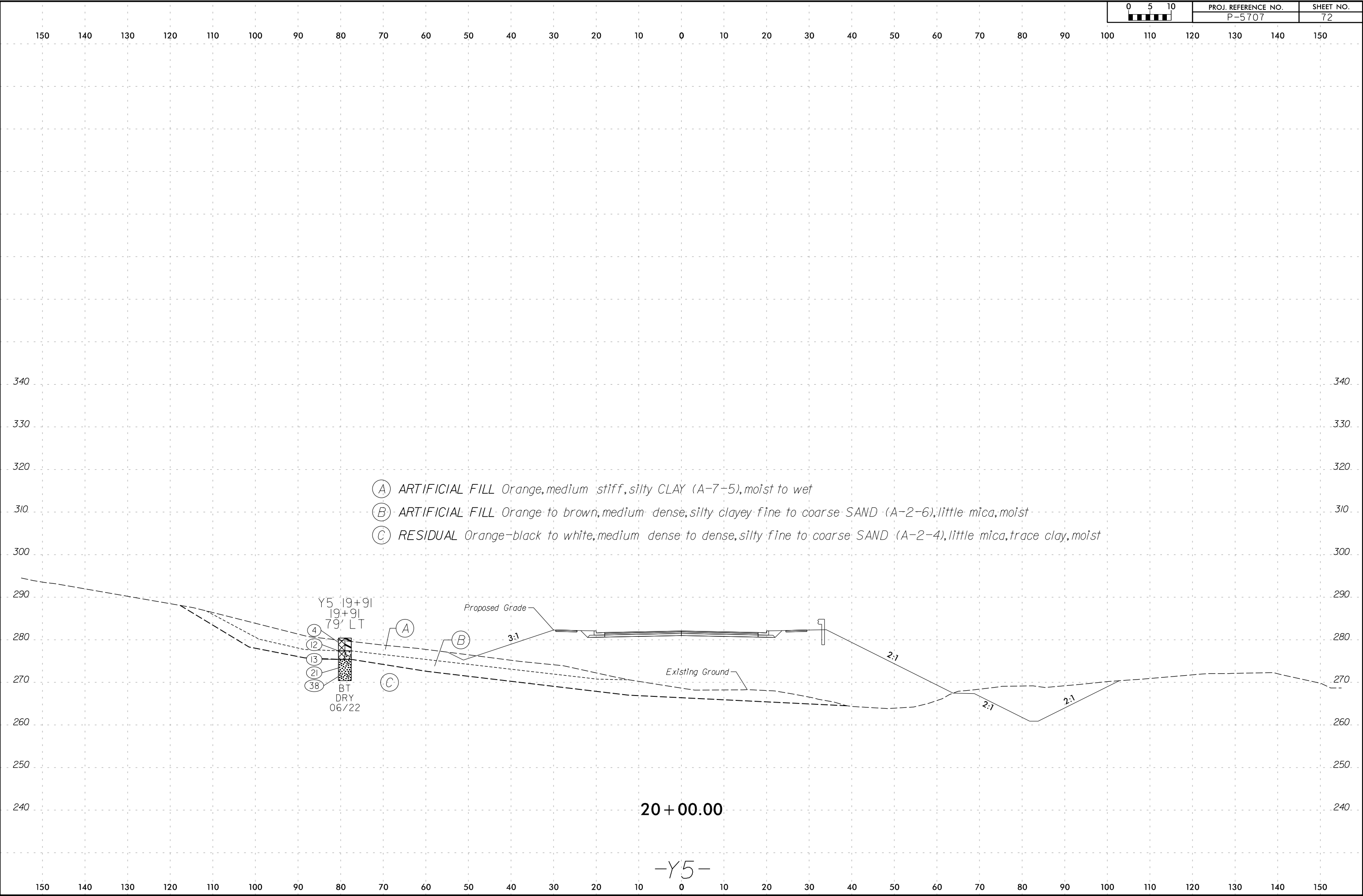
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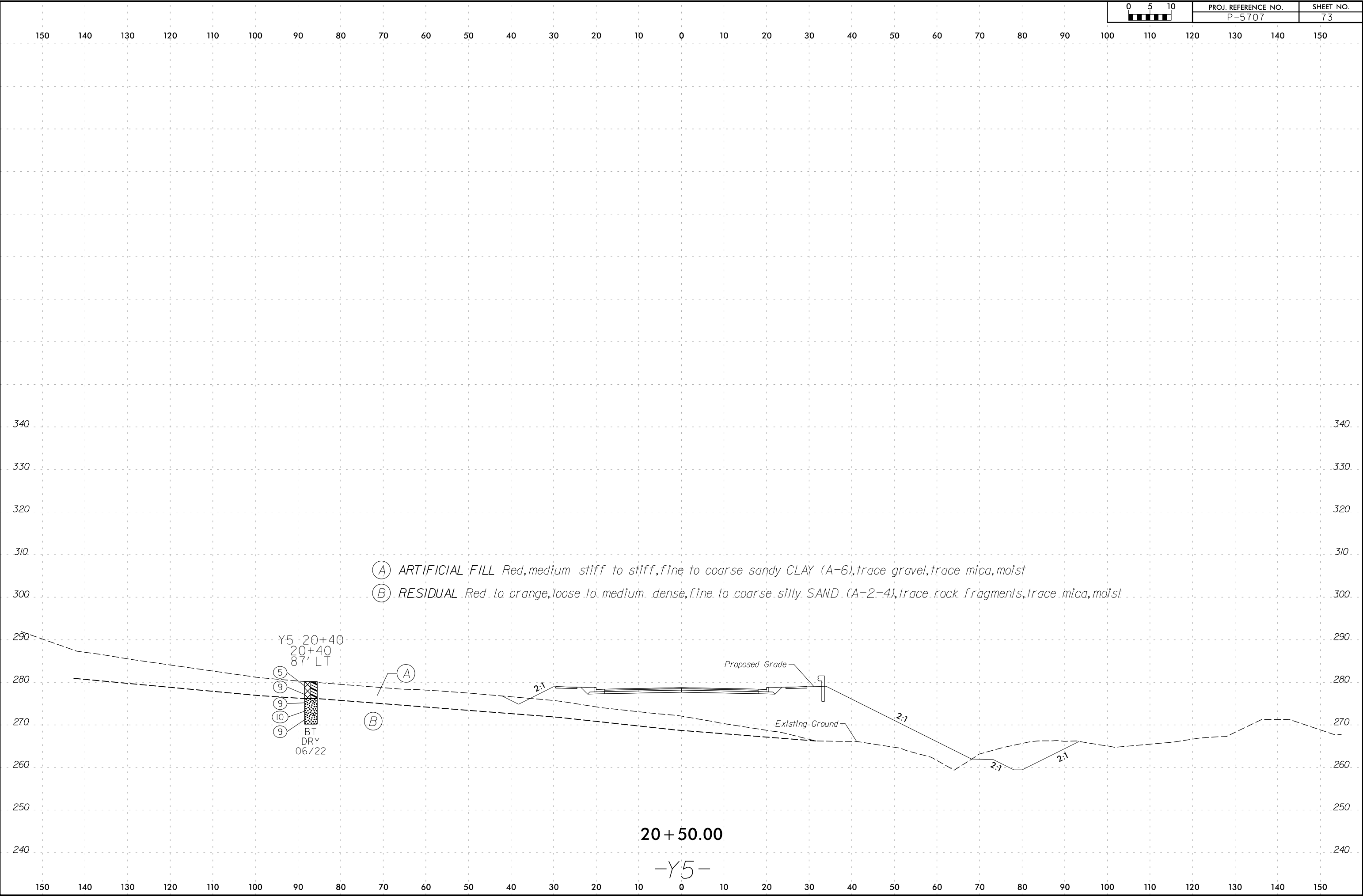


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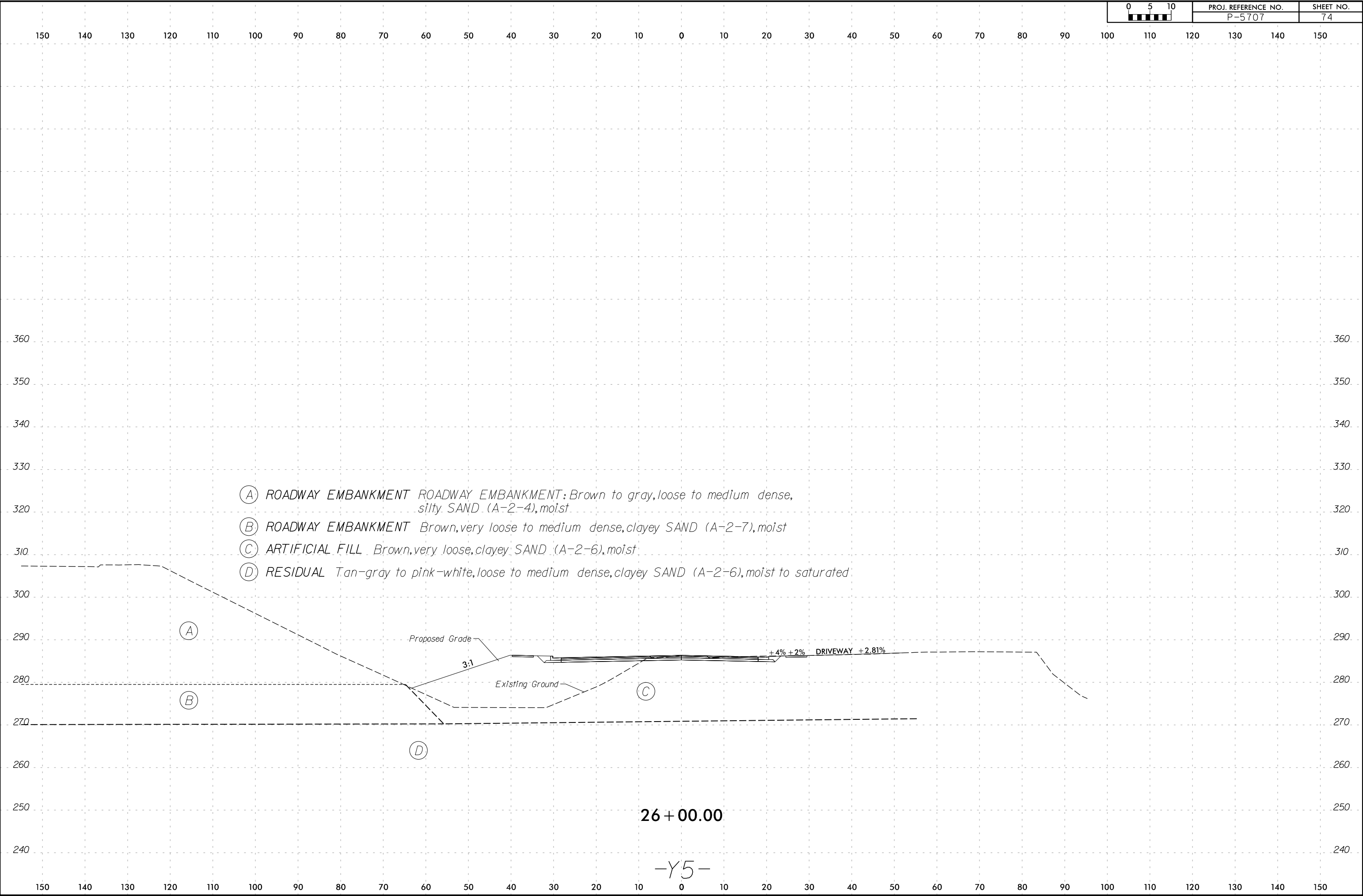




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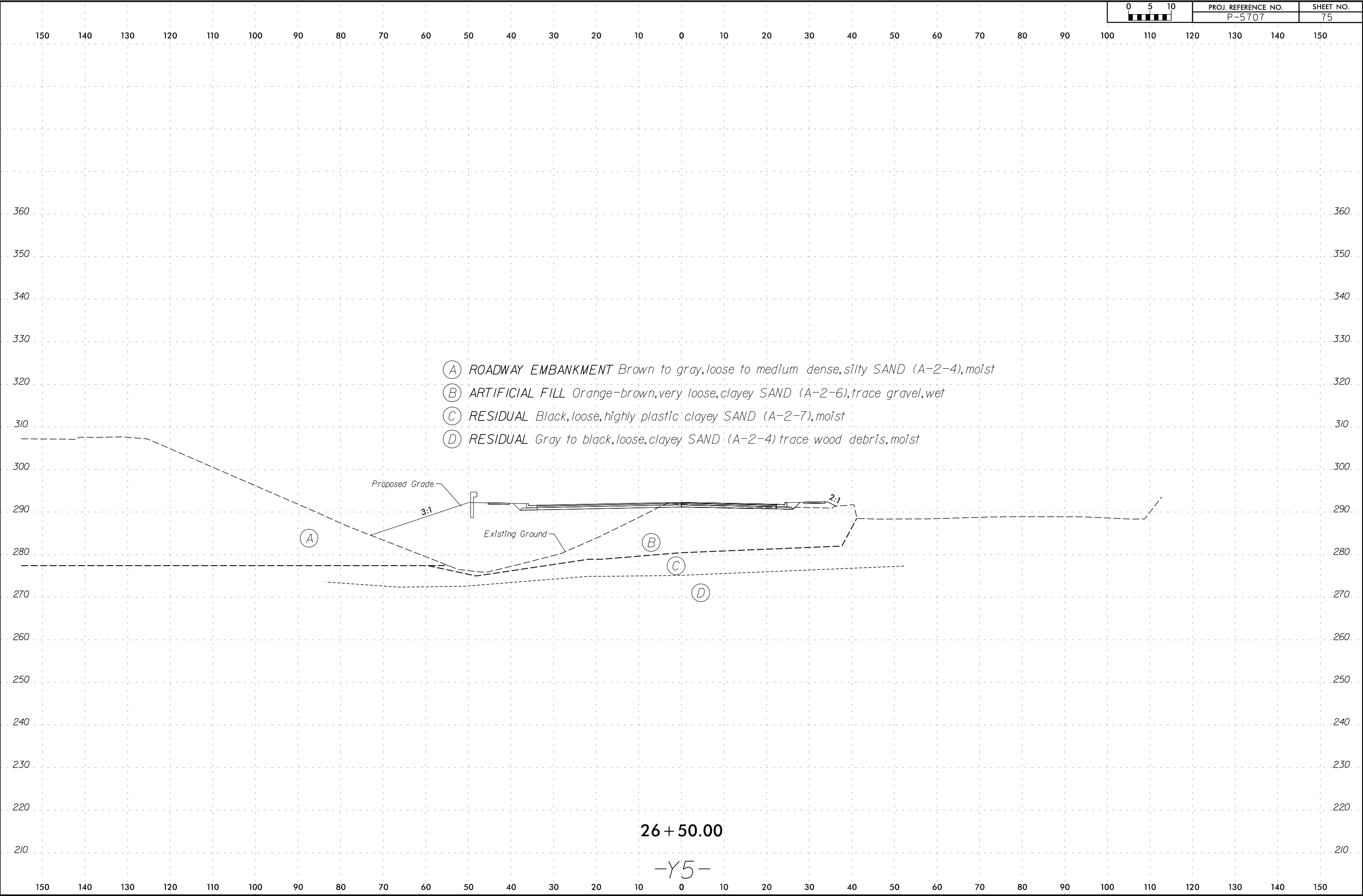
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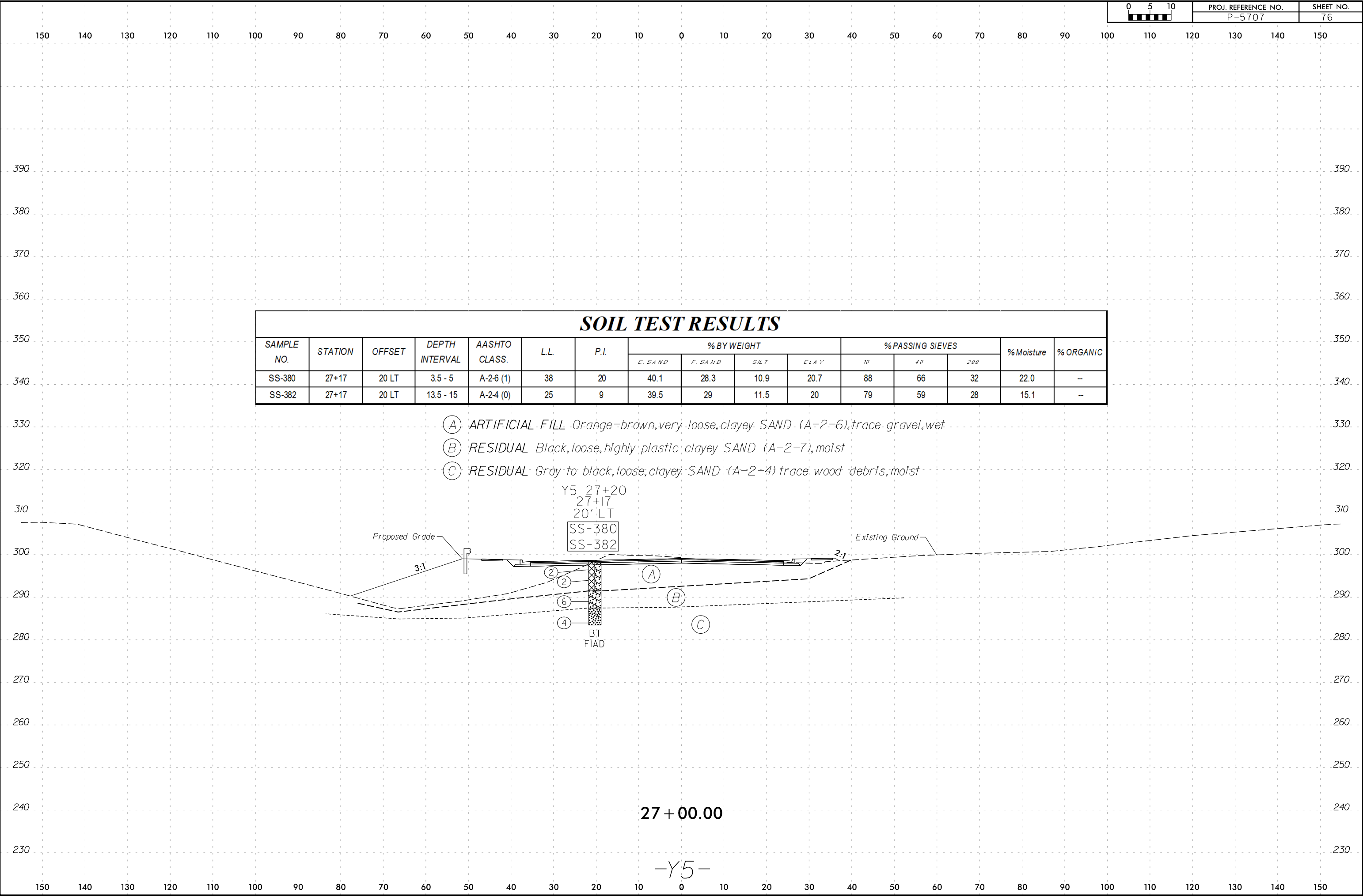
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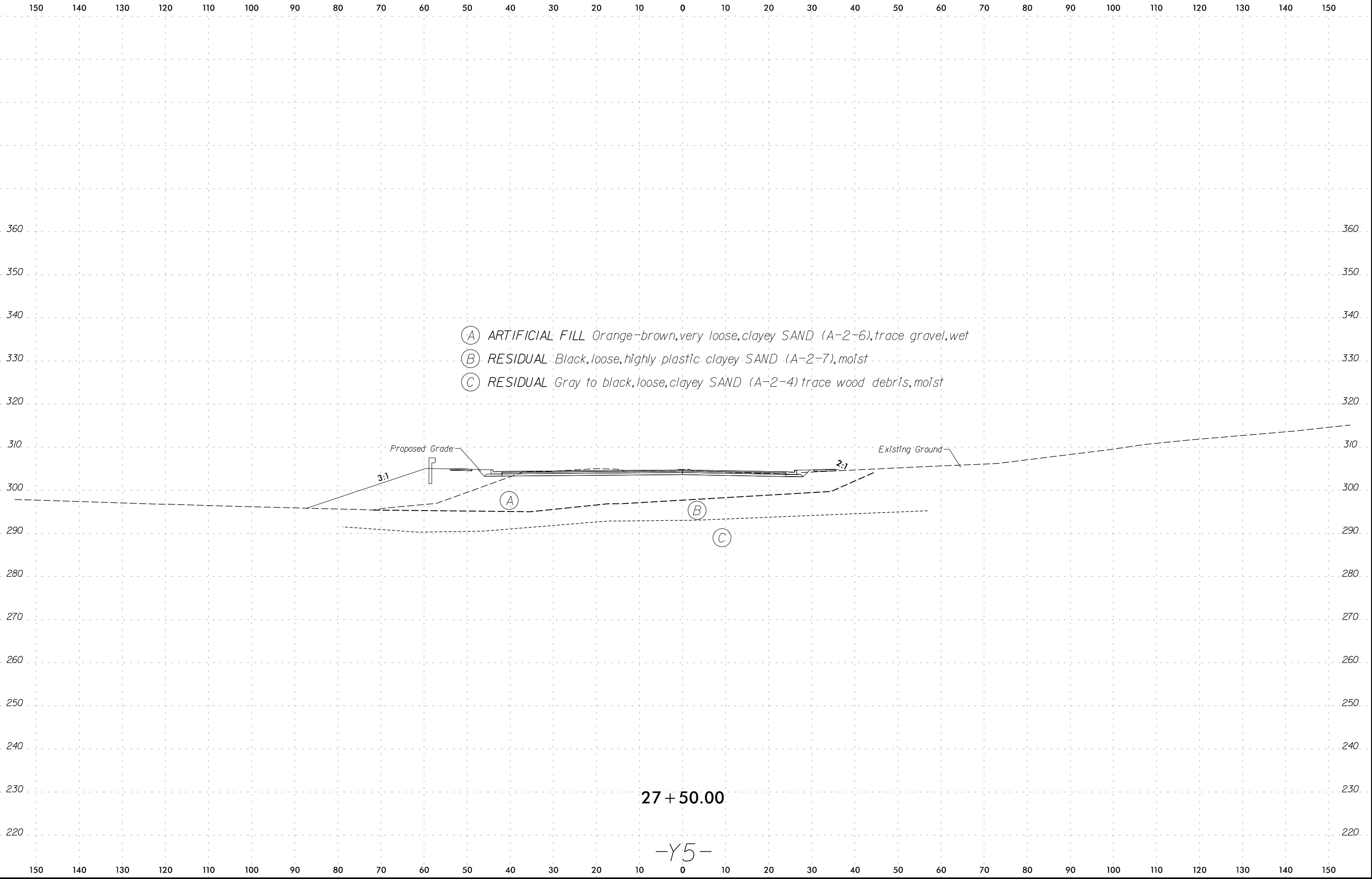
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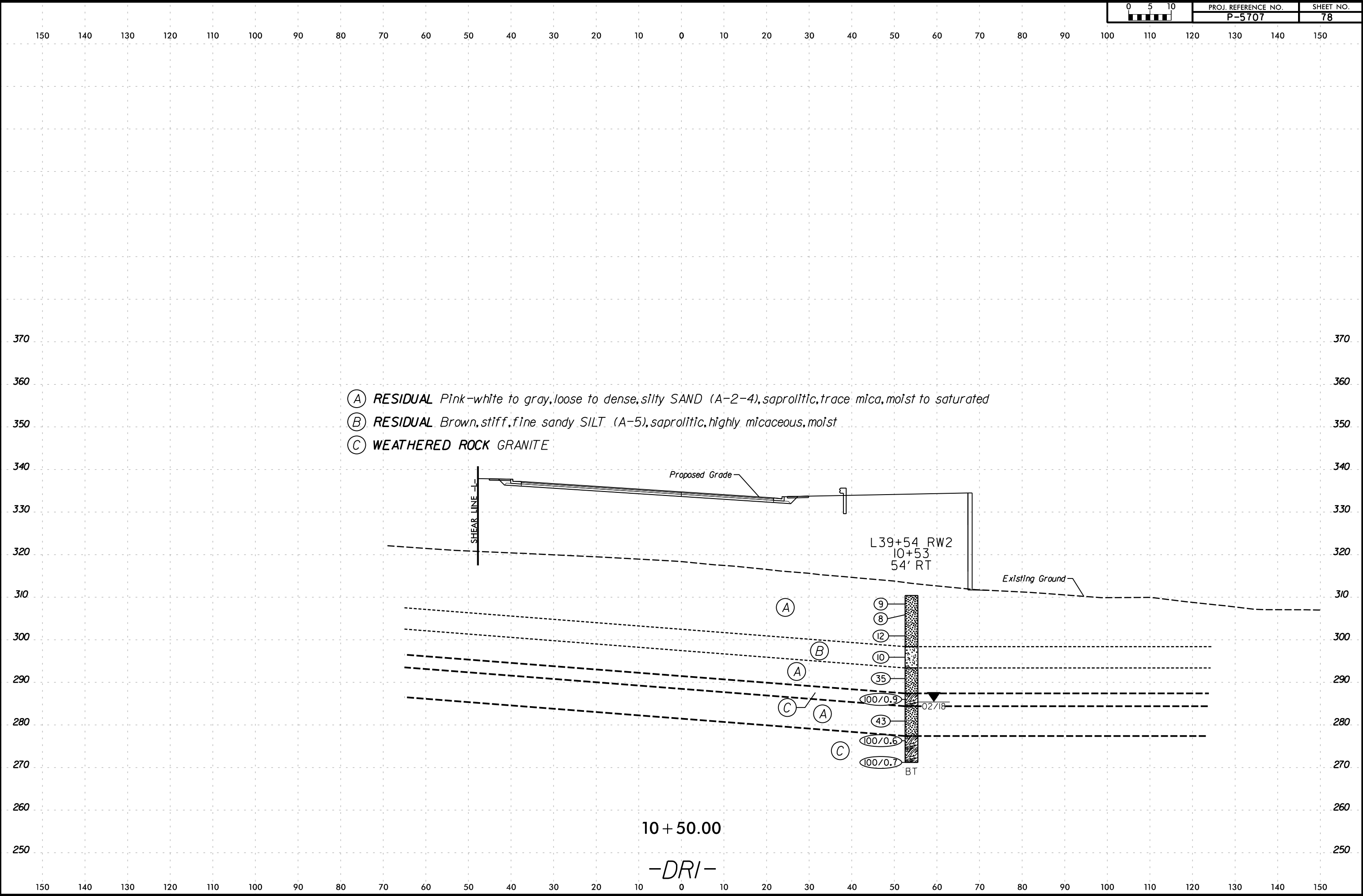
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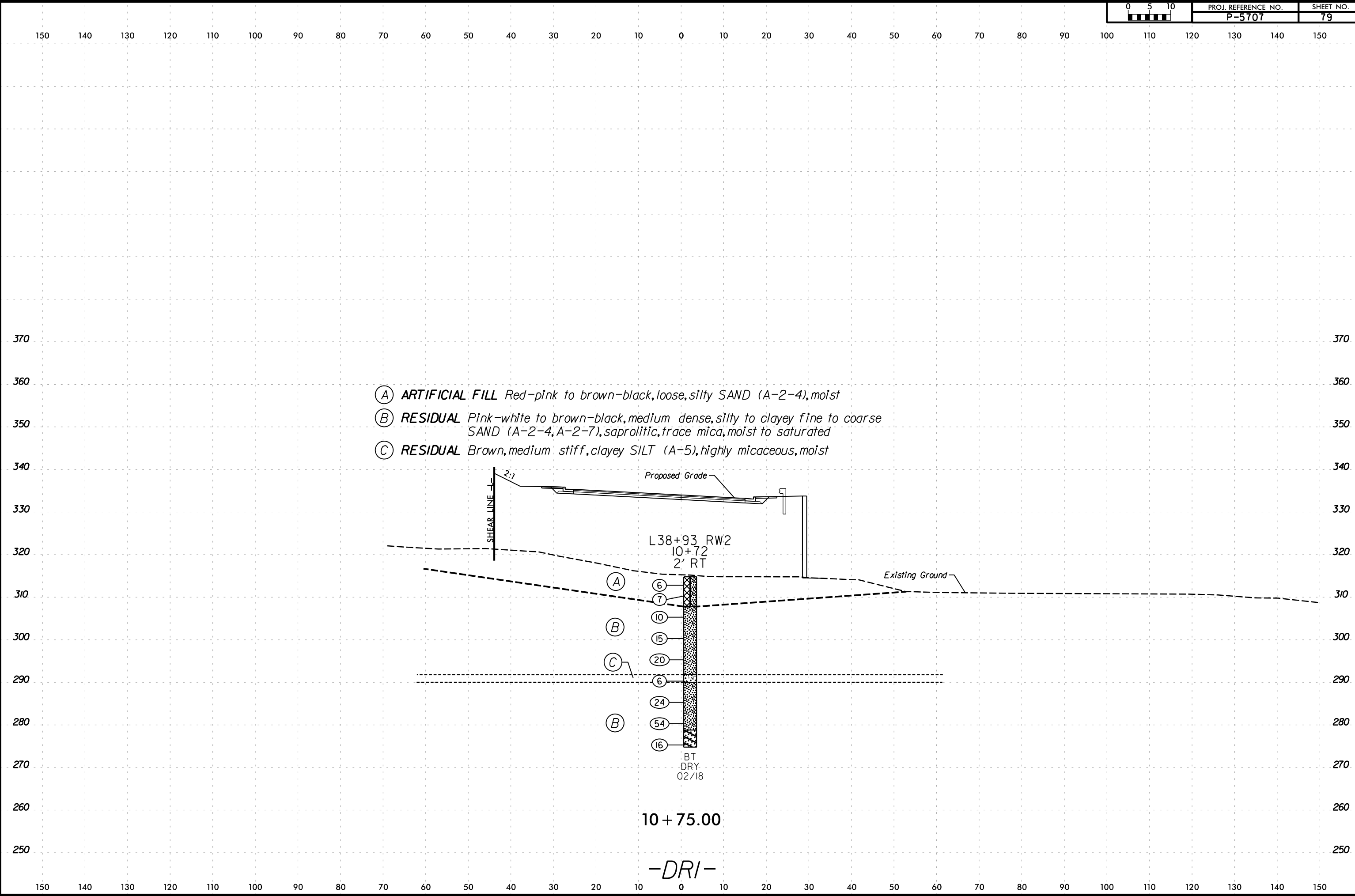
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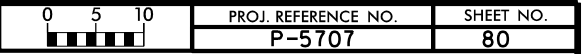


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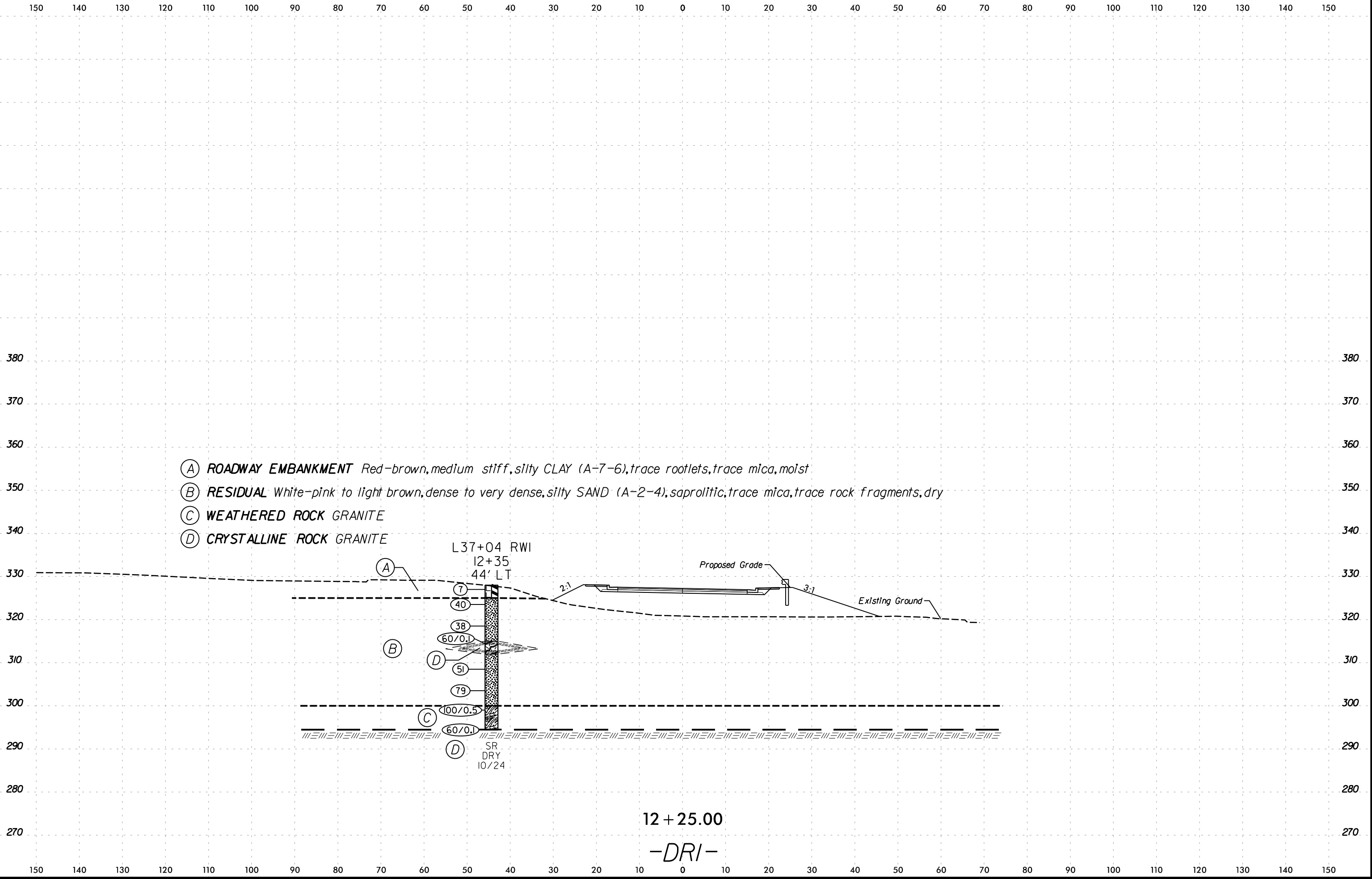


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REFERENCE: P-5707

PROJECT: 44643

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

ROADWAY
SUBSURFACE INVESTIGATION

APPENDIX A
BORING LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5707	83	



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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44643.1.1				TIP P-5707				COUNTY WAKE				GEOLOGIST J. Mize					
SITE DESCRIPTION Rogers Road Grade Separation Over CSX Railroad At Mile Post S 142.53												GROUND WTR (ft)					
BORING NO. L39+87				STATION 39+87				OFFSET 242 ft LT				ALIGNMENT -L-				0 HR. Dry	
COLLAR ELEV. 307.8 ft				TOTAL DEPTH 20.0 ft				NORTHING 801,267				EASTING 2,142,708				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 03/21/2016								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER W. Duggins				START DATE 02/09/18				COMP. DATE 02/09/18				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
310																	
305	306.8	1.0												GROUND SURFACE 0.0			
	304.3	3.5	2	4	6							M		ARTIFICIAL FILL Red to gray, loose to medium dense, clayey SAND (A-2-7), trace gravel			
300	304.3		3	6	5							M					
	299.3	8.5										M					
295	299.3		3	3	5							M					
	294.3	13.5										M		295.8 RESIDUAL 12.0 Orange, loose, clayey coarse SAND (A-2-7)			
290	294.3		4	4	5							M	290.8 17.0 Black, orange, medium stiff, clayey SILT (A-5), highly micaceous, saprolitic				
	289.3	18.5										M	287.8 20.0 Boring Terminated at Elevation 287.8 ft in Residual: clayey SILT (A-5)				
			3	2	4												

WBS 44643.1.1			TIP P-5707			COUNTY WAKE			GEOLOGIST J. Mize					
SITE DESCRIPTION Rogers Road (SR 2052) Grade Separation Over CSX Railroad (Crossing No. 633 905 Y) At Mile Post S 142.53										GROUND WTR (ft)				
BORING NO. L42+01 CI			STATION 42+02			OFFSET 266 ft LT			ALIGNMENT -L-			0 HR. 13.2		
COLLAR ELEV. 275.9 ft			TOTAL DEPTH 24.5 ft			NORTHING 801,297			EASTING 2,142,880			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 03/21/2016						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic				
DRILLER W. Duggins			START DATE 02/23/18			COMP. DATE 02/23/18			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
280														
275	274.9	1.0	1	20	7									275.9 GROUND SURFACE 0.0
270	272.4	3.5	3	55	45/0.1					100/0.6			W	273.9 ALLUVIAL Brown, very stiff, sandy slightly plastic CLAY (A-6) 2.0
														271.9 RESIDUAL White, pink, gray, loose to medium dense, silty SAND (A-2-4) 4.0
265	267.4	8.5	60/0.1							60/0.1				267.4 WEATHERED ROCK GRANITE 8.5
	262.4	13.5	49	25	35								M	264.9 CRYSTALLINE ROCK GRANITE 11.0
260														RESIDUAL Gray, silty fine SAND (A-2-5)
	257.4	18.5	100/0.4							100/0.4				257.4 18.5
255														WEATHERED ROCK GRANITE
	252.4	23.5	13	87/0.5						100/1.0				251.4 24.5
														Boring Terminated at Elevation 251.4 ft in Weathered Rock: GRANITE

NCDOT BORE DOUBLE P5707_GEO_RDWY_UPDATED - COPY.GPJ NC_DOT.GDT 2/26/25

NCDOT BORE DOUBLE P5707 GEO RDWY UPDATED - COPY.GPJ NC DOT.GDT 2/26/25

[illegible]

REFERENCE: P-5707

PROJECT: 44643

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

ROADWAY
SUBSURFACE INVESTIGATION

APPENDIX B
LAB RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5707	86	



P: (919) 878-9560
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LABORATORY TESTING SUMMARY

TIP: P-5707 COUNTY: WAKE

SOIL TEST RESULTS																		
SAMPLE NO.	BORING NO.	ALIGNMENT	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	NORTHING	EASTING
									C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-3	L 29+43	-L-	29+43	59 RT	1 - 2.5	A-7-6 (15)	57	32	26.1	19.0	12.3	42.6	95	78	55	26.3	801370	2141708.5
SS-14A	L 30+74	-L-	30+74	63 RT	3.5 - 5	A-7-6 (18)	58	33	25.9	14.3	9.3	50.5	98	80	60	18	801305.2	2141823
SS-18	L 30+74	-L-	30+74	63 RT	23.5 - 25	A-7-6 (15)	56	31	20.5	30.8	22.1	26.6	98	89	56	18.8	801305.2	2141823
SS-26	L 30+66	-L-	30+66	102 RT	18.5 - 20	A-6 (1)	32	11	37.1	28.8	17.8	16.3	100	77	40	8.7	801274	2141797
SS-31	L 30+64 EB2B	-L-	30+64	29 RT	1 - 2.5	A-7-6 (6)	46	25	39.3	20.7	9.9	30.1	95	67	42	20	801340	2141830
SS-47	L 29+05	-L-	29+05	87 LT	18.5 - 20	A-2-5 (0)	58	NP	45.1	42.4	6.9	5.6	94	78	15	14.8	801517	2141743
SS-51	L 29+27 EB1A	-L-	29+27	48 LT	1 - 2.5	A-7-6 (7)	48	25	32.3	21.8	12.3	33.6	93	72	46	22.2	801472	2141744
SS-78	L 32+70	-L-	32+70	85 LT	3.5 - 5	A-6 (2)	34	16	35.1	23.8	9.5	31.6	88	68	39	21.2	801261	2142134
SS-97	L 35+36 RW1	-L-	35+36	67 LT	3.5 - 5	A-7-5 (1)	45	11	28.9	35.2	12.5	23.4	94	79	40	21.9	801205	2142291
SS-106	L 30+27 EB2A	-L-	30+27	44 LT	1 - 2.5	A-7-6 (4)	43	19	38.6	22.1	12.4	26.9	96	68	41	20.9	801422	2141831
SS-134	L 36+53 RW1	-L-	36+53	72 LT	3.5 - 5	A-7-6 (9)	51	27	31.4	23.9	13.5	31.2	100	79	49	24.1	801164	2142393
SS-157	L 40+00 RW2	-L-	40+00	64 LT	1 - 2.5	A-2-6 (0)	30	13	42.4	22.4	11.6	23.6	88	62	34	16.9	801089	2142708
SS-173	L 41+13 RW2	-L-	41+13	53 LT	1 - 2.5	A-6 (3)	40	19	40.4	23.9	12.8	22.9	95	69	38	19	801077	2142815
SS-183	L 41+85 RW2	-DR1-	14+16	71 LT	13.5 - 15	A-7-6 (8)	50	27	36.5	22.1	12.6	28.8	99	74	45	22.7	801171	2142875
SS-190	L 41+89 RW2	-DR1-	13+96	89 LT	13.5 - 15	A-7-6 (10)	53	29	33	21.3	11.1	34.6	97	75	48	24.3	801149	2142882
SS-195	L 41+98 RW2	-DR1-	13+49	120 LT	3.5 - 5	A-7-6 (6)	44	26	37	22.4	12	28.6	95	71	42	23.1	801107	2142895
SS-204	L 41+44 RW2	-L-	41+44	84 LT	3.5 - 5	A-7-6 (5)	49	25	37.6	24.8	10.9	26.7	94	69	40	22.1	801110	2142842
SS-216	L 39+68 RW4	-L-	39+68	45 RT	1 - 2.5	A-7-6 (4)	42	20	35.3	21.8	15.1	27.8	92	70	43	24.1	800982	2142669
SS-224	Y5 17+25	-Y5-	17+25	0 CL	13.5 - 15	A-2-5 (0)	41	9	54.4	22	13.6	10	91	52	25	28.5	800633	2142804
SS-252	Y5 14+82	-Y5-	14+82	24 RT	1 - 2.5	A-6 (2)	33	17	40.8	21.8	11	26.4	90	64	36	15.4	800637	2142558
SS-278	L 36+50	-L-	36+50	72 RT	3.5 - 5	A-7-6 (18)	63	38	28.3	17.8	9.6	44.3	96	80	55	24.1	801031	2142338
SS-302	L 20+00	-L-	20+00	0 CL	1.3 - 2.8	A-7-6 (14)	58	31	23.7	22.9	13.6	39.8	95	82	55	23.2	801862	2140902
SS-322	Y5 11+96	-Y5-	11+96	0 CL	1 - 2.5	A-7-6 (7)	47	27	35.3	19.5	8.3	36.9	95	72	45	18.1	800573	2142310
SS-341	L 44+23 RT RW3	-L-	44+23	27 RT	13.5 - 15	A-2-6 (0)	35	12	43.3	32.7	12.8	11.2	87	65	25	14.5	801027.7	2143129.2
SS-361	Y5 24+55 LT RW3	-Y5-	24+55	36 LT	1 - 2.5	A-2-6 (1)	38	20	40.1	26.2	10.1	23.6	88	66	33	22.9	800970.6	2143435.7
SS-370	Y5 25+06 LT RW3	-Y5-	25+06	45 LT	1 - 2.5	A-2-6 (2)	37	20	36.9	27.5	8.6	27	88	68	35	17.6	800978.2	2143488
SS-373	Y5 25+06 LT RW3	-Y5-	25+06	45 LT	13.5 - 15	A-2-4 (0)	18	5	39.7	29.9	12.8	17.6	89	66	30	15.4	800978.2	2143488
SS-380	Y5 27+20	-Y5-	27+17	20 LT	3.5 - 5	A-2-6 (1)	38	20	40.1	28.3	10.9	20.7	88	66	32	22	801006.5	2143645.9
SS-382	Y5 27+20	-Y5-	27+17	20 LT	13.5 - 15	A-2-4 (0)	25	9	39.5	29	11.5	20	79	59	28	15.1	801006.5	2143645.9

LABORATORY TESTING SUMMARY

TIP: P-5707COUNTY: WAKE

SOIL TEST RESULTS																		
SAMPLE NO.	BORING NO.	ALIGNMENT	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	NORTHING	EASTING
									C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-2	L 31+00 RW1	-L-	31+00	43 LT	3.5 - 5.0	A-7-6 (10)	54	30	30	17	10.3	42.8	85	68	47	33.7	801387	2141895
SS-10	L 31+50 RW1	-L-	31+50	44 LT	3.5 - 5.0	A-7-6 (9)	54	31	33.2	17.6	11.9	37.3	86	65	45	17.7	801364	2141940
SS-14	L 31+50 RW1	-L-	31+50	44 LT	23.5 - 25.0	A-2-4 (0)	NP	NP	27.7	45.1	14.6	12.6	98	90	30	17.6	801364	2141940
SS-22	L 32+00 RW1	-L-	32+00	44 LT	3.5 - 5.0	A-7-6 (9)	55	31	35	13.8	11.5	39.7	82	60	44	23.7	801341	2141984
SS-36	L 33+20 RW1	-L-	33+20	44 LT	13.5 - 15.0	A-2-6 (0)	33	11	42.9	29.9	11.7	15.5	72	53	23	21.8	801285	2142090
SS-37	L 33+20 RW1	-L-	33+20	44 LT	18.5 - 20.0	A-7-6 (16)	64	36	28.2	17.6	8.3	45.9	93	75	53	18.3	801285	2142090
SS-46	L 33+70 RW1	-L-	33+70	44 LT	3.5 - 5.0	A-7-6 (4)	42	22	32.6	22	13.5	31.9	79	61	39	31.1	801261	2142134
SS-58	L 31+02 RW4	-L-	31+02	35 RT	3.5 - 5.0	A-7-6 (4)	46	26	32.6	22.4	14.7	30.3	79	62	38	17.3	801317	2141861
SS-67	L 31+50 RW4	-L-	31+50	35 RT	3.5 - 5.0	A-7-6 (6)	47	26	29.2	23.6	15.5	31.7	86	70	43	19.6	801294	2141903
SS-83	L 32+00 RW4	-L-	32+00	35 RT	18.5 - 20.0	A-7-5 (8)	47	15	10.3	35.4	24	30.3	99	97	60	31.2	801271	2141947
SS-92	L 32+50 RW4	-L-	32+50	35 RT	3.5 - 5.0	A-7-6 (7)	47	25	29.9	25	17.7	27.4	92	75	45	21.1	801248	2141991
SS-117	L 34+00 RW4	-L-	34+00	50 RT	13.5 - 15.0	A-2-4 (0)	NP	NP	41.3	30.4	17.1	11.2	99	74	33	16.0	801164	2142117
SS-132	L 34+50 RW4	-L-	34+50	49 RT	33.5 - 35.0	A-7-5 (7)	46	16	11.9	40.3	33	14.8	100	95	56	48.0	801142	2142162
SS-147	L 42+50 RW2	-L-	42+50	30 LT	3.5 - 5.0	A-2-4 (0)	34	6	40.4	24.5	14	21.1	89	64	34	16.2	801067	2142951
SS-162	L 37+50 RW1	-L-	37+50	75 LT	0.0 - 1.5	A-4 (0)	NP	NP	23.6	38.3	15.5	22.6	89	81	38	28.3	801124	2142476
SS-176	L 35+50 RW4	-L-	35+50	49 RT	13.5 - 15.0	A-4 (0)	NP	NP	29.3	39.9	21	9.8	100	92	37.0	24.2	801095	2142251
SS-183	L 36+00 RW4	-L-	36+00	49 RT	3.5 - 5.0	A-7-5 (9)	57	26	35	15.8	18.6	30.6	91	65	48	26.8	801073	2142298
SS-192	L 28+50 RW5	-L-	28+50	43 RT	3.5 - 5.0	A-2-4 (0)	37	6	36.8	29.7	16.6	16.9	76	60	28	23.2	801427	2141634
SS-203	L 28+00 RW5	-L-	28+00	44 RT	3.5 - 5.0	A-2-6 (0)	39	12	35.9	28.1	14.1	21.9	87	69	34	31.3	801450	2141589
SS-209	L 28+00 RW5	-L-	28+00	44 RT	33.5 - 35.0	A-2-4 (0)	NP	NP	30.7	51	13.4	4.9	99	91	23	34.1	801450	2141589
SS-215	L 27+50 RW5	-L-	27+50	45 RT	8.5 - 10.0	A-6 (3)	32	16	35.7	22.8	13.4	28.1	97	75	42	16.0	801472	2141544
SS-239	L 26+00 RW5	-L-	26+00	48 RT	0.0 - 1.5	A-4 (0)	NP	NP	23.3	40.7	16.2	19.8	97	88	39	28.2	801540	2141410



April 2, 2018

Project No. R-2018-074-001

Mr. Andrew Nash
Terracon
2401 Brentwood Rd., Suite 107
Raleigh, NC 27604
aanash@terracon.com

Transmittal
Laboratory Test Results
Rogers Road Grade Separation

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

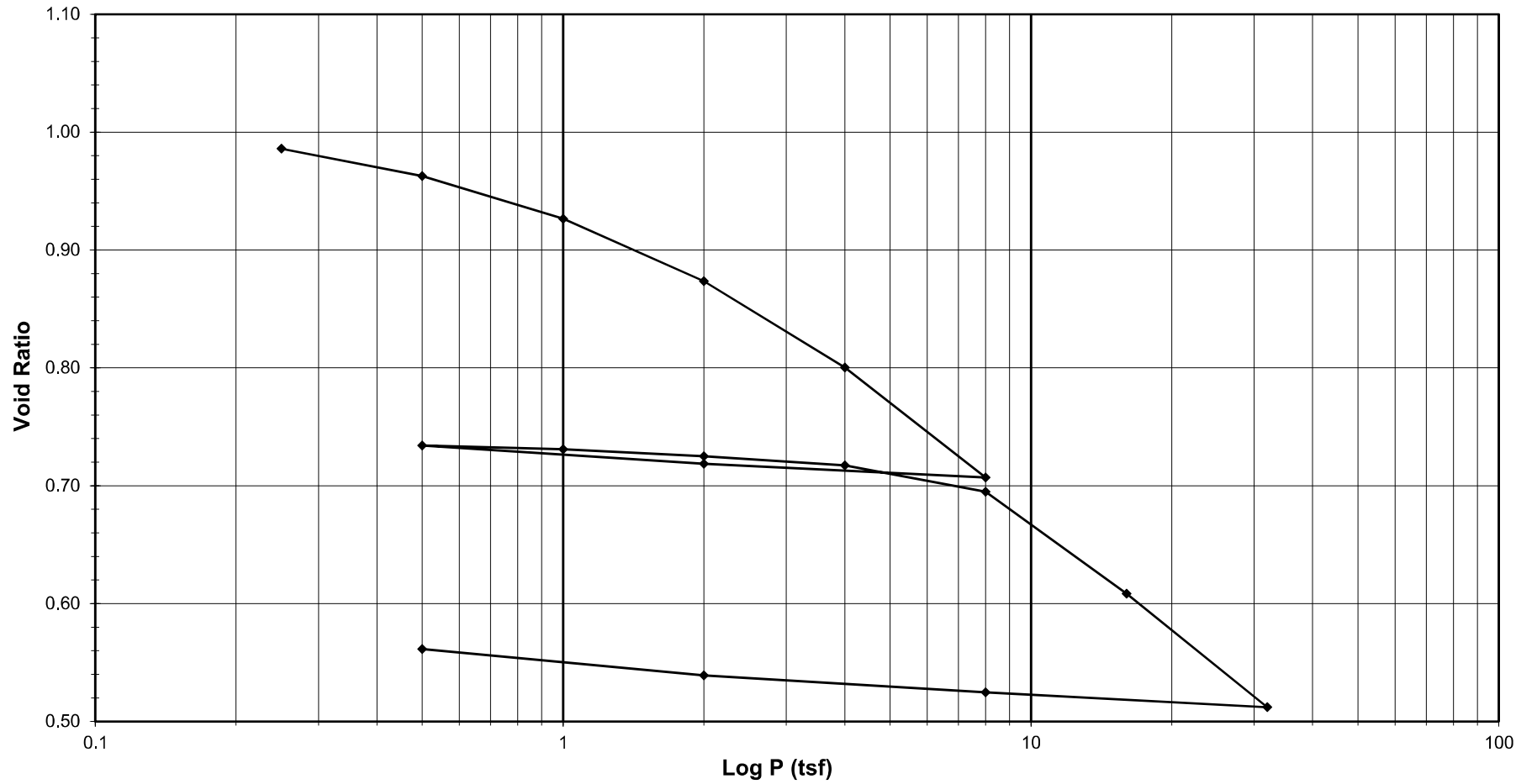
DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1



ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11

Client	Terracon	Boring No.	P-5707 L-40+50
Client Reference	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By SFS Date 3/24/18 Approved By MPS Date 4/2/18



ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11

Client	Terracon	Boring No.	P-5707 L-40+50
Client Reference	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R409
1 Division = 0.0001 (in.)

Sample Properties	Initial	Final	Test Data Summary							
Water Content			Applied Pressure	Final Dial Reading	Machine Deflection	Corrected Reading	Height of Sample	Volume (cc)	Dry Density	Void Ratio
Tare Number	810	826	(tsf)	(div)	(div)	(div)	(mm)		(g/cc)	
Wt. Tare & WS (g)	407.87	260.77								
Wt. Tare & DS (g)	358.13	238.50								
Wt. Water (g)	49.74	22.27	Seating	0	0	0	25.400	80.440	1.33409	1.02385
Wt. Tare (g)	112.33	134.01	0.25	201.9	14.6	187.3	24.924	78.933	1.35956	0.98594
Wt. DS (g)	245.80	104.49	0.5	329.1	26.6	302.5	24.632	78.007	1.37570	0.96264
Water Content (%)	20.24	21.31	1	527.4	46.6	480.7	24.179	76.573	1.40147	0.92655
			2	804.6	61.6	743.0	23.513	74.463	1.44117	0.87348
Sample Parameters			4	1197.9	93.5	1104.4	22.595	71.556	1.49971	0.80034
Sample Diameter (in)	2.5	2.5	8	1694.0	127.8	1566.1	21.422	67.842	1.58182	0.70689
Sample Height (in)	1.0000	0.7716	2	1595.4	87.3	1508.1	21.570	68.309	1.57101	0.71864
Sample Volume (cc)	80.44	62.06	0.5	1484.6	52.9	1431.7	21.764	68.923	1.55700	0.73410
Wt. Wet Sample + Ring (g)	343.27	344.43	1	1503.8	56.8	1447.0	21.725	68.800	1.55980	0.73100
Wt. of Ring (g)	214.24	214.24	2	1545.3	68.8	1476.5	21.650	68.563	1.56520	0.72502
Wt. of Wet Sample (g)	129.03	130.19	4	1612.1	97.8	1514.4	21.553	68.258	1.57218	0.71736
Wet Density (pcf)	100.09	130.89	8	1754.1	128.4	1625.7	21.271	67.362	1.59309	0.69482
Wet Density (g/cc)	1.60	2.10	16	2237.2	184.7	2052.5	20.187	63.930	1.67863	0.60846
Water Content (%)	20.24	21.31	32	2795.6	267.1	2528.5	18.978	60.101	1.78557	0.51212
Wt. of Dry Sample (g)	107.31	107.31	8	2621.2	155.0	2466.2	19.136	60.602	1.77080	0.52473
Dry Density (pcf)	83.25	107.89	2	2495.3	100.0	2395.3	19.316	61.172	1.75431	0.53907
Dry Density (g/cc)	1.33	1.73	0.5	2344.1	59.7	2284.4	19.598	62.064	1.72908	0.56153
Void Ratio	1.0239	0.5615								
Saturation (%)	53.36	102.48								
Specific Gravity	2.70	Assumed								

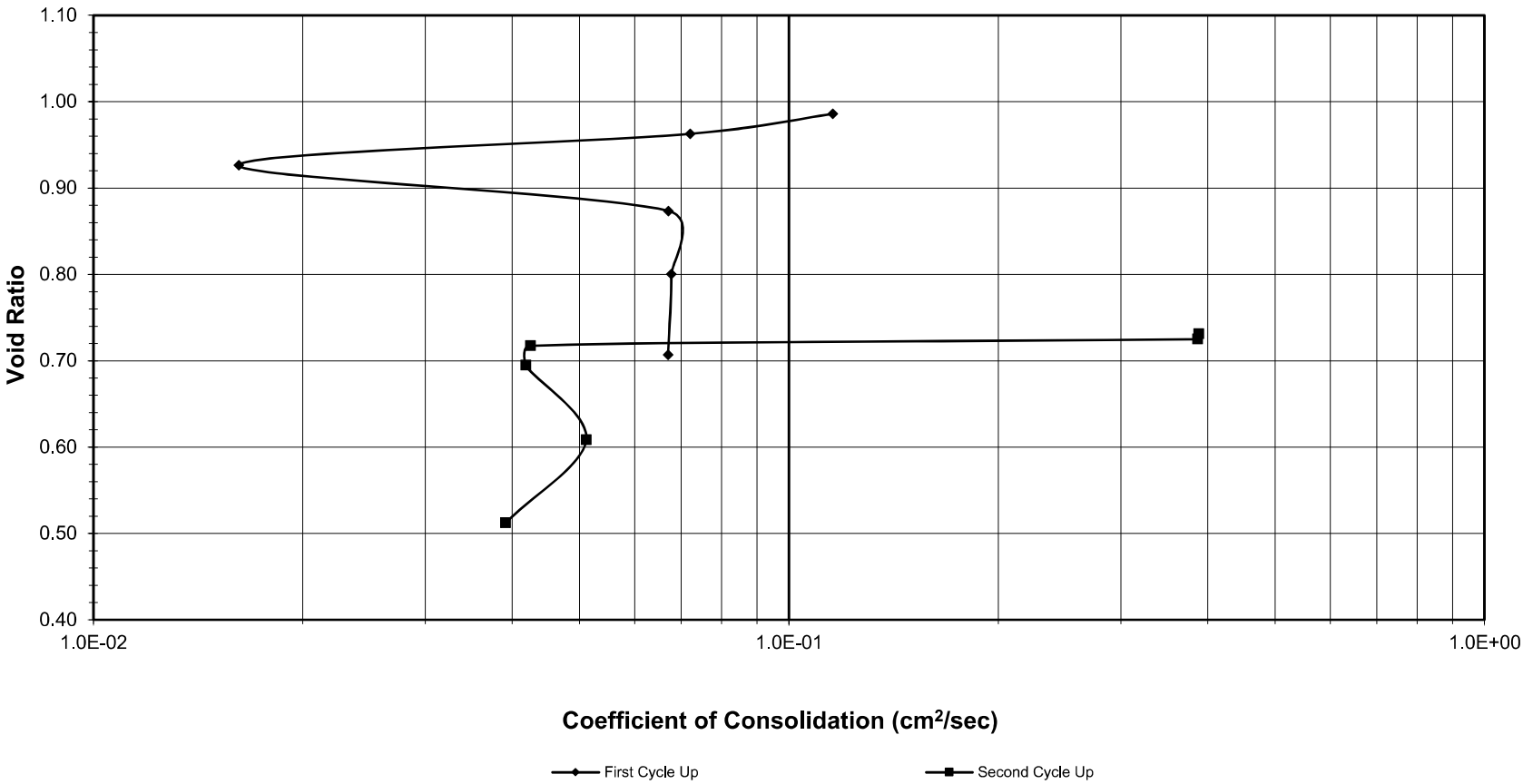
Tested By SFS Date 3/24/18 Input Checked By GEM Date 4/2/18



ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11

Client	Terracon	Boring No.	P-5707 L-40+50
Client Reference	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By SFS Date 3/24/18 Approved By MPS Date 4/2/18



ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11

Client	Terracon	Boring No.	P-5707 L-40+50
Client Reference	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R409
1 Division = 0.0001 (in.)

Sample Properties	Initial	Final	C _v Test Data Summary					Time <i>t</i> ₅₀ (min.)	C _v (cm ² /sec)
			Load Increment	Dial Reading @ <i>t</i> ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ <i>t</i> ₅₀ (div)	Sample Height @ <i>t</i> ₅₀ (cm)		
Water Content									
Tare Number	810	826							
Wt. Tare & WS (g)	407.87	260.77	(tsf)	(div)	(div)	(div)	(cm)		
Wt. Tare & DS (g)	358.13	238.50							
Wt. Water (g)	49.74	22.27	0 - 0.25	100.2	14.6	85.6	2.518	0.05	0.11568
Wt. Tare (g)	112.33	134.01	0.25 - 0.5	262.8	26.6	236.2	2.480	0.07	0.07212
Wt. DS (g)	245.80	104.49	0.5 - 1	470.0	46.6	423.4	2.432	0.30	0.01619
Water Content (%)	20.24	21.31	1 - 2	643.9	61.6	582.3	2.392	0.07	0.06710
			2 - 4	973.9	93.5	880.4	2.316	0.07	0.06776
			4 - 8	1413.8	127.8	1286.0	2.213	0.06	0.06702
Sample Parameters			8 - 2	NA	87.3	NA	NA	NA	NA
Sample Diameter (in)	2.5	2.5	2 - 0.5	NA	52.9	NA	NA	NA	NA
Sample Height (in)	1.000	0.772	0.5 - 1	1494.0	56.8	1437.2	2.175	0.01	0.38828
Sample Volume (cc)	80.44	62.06	1 - 2	1523.5	68.8	1454.7	2.171	0.01	0.38670
Wt. Wet Sample + Ring (g)	343.27	344.43	2 - 4	1598.3	97.8	1500.5	2.159	0.09	0.04251
Wt. of Ring (g)	214.24	214.24	4 - 8	1697.1	128.4	1568.7	2.142	0.09	0.04183
Wt. of Wet Sample (g)	129.03	130.19	8 - 16	1963.9	184.7	1779.2	2.088	0.07	0.05113
Wet Density (pcf)	100.09	130.89	16 - 32	2577.8	267.1	2310.7	1.953	0.08	0.03914
Wet Density (g/cc)	1.60	2.10	32 - 8	NA	155.0	NA	NA	NA	NA
Water Content (%)	20.24	21.31	8 - 2	NA	100.0	NA	NA	NA	NA
Wt. of Dry Sample (g)	107.31	107.31	2 - 0.5	NA	59.7	NA	NA	NA	NA
Dry Density (pcf)	83.25	107.89							
Dry Density (g/cc)	1.33	1.73							
Void Ratio	1.0239	0.5615							
Saturation (%)	53.36	102.48							
Specific Gravity	2.7	Assumed							

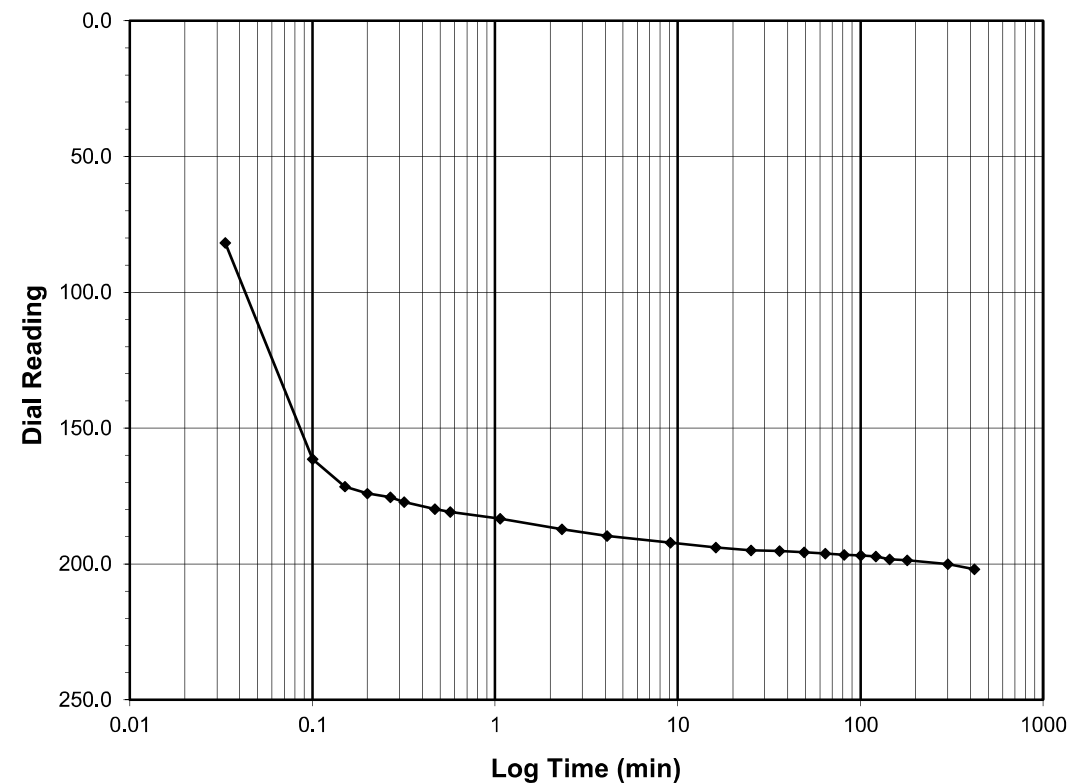
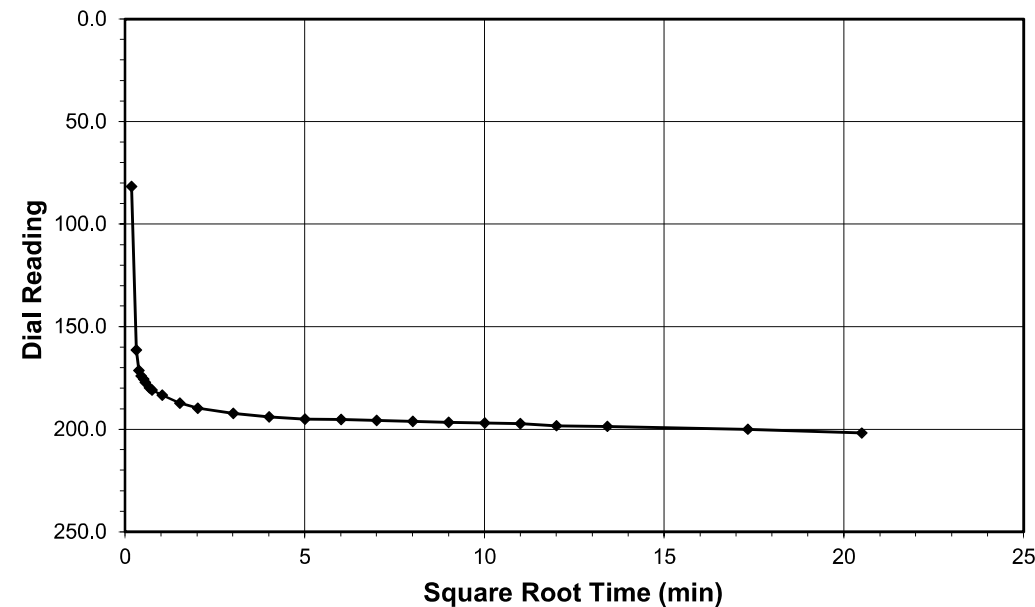
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	0.0-0.25
Final Reading (div)	201.9
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/24/18
Start Time	14:40:23

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.03	81.8
0.10	161.4
0.15	171.5
0.20	174.0
0.27	175.5
0.32	177.2
0.47	179.9
0.57	180.9
1.07	183.3
2.32	187.2
4.08	189.8
9.08	192.2
16.08	194.0
25.10	195.0
36.10	195.3
49.10	195.7
64.10	196.1
81.10	196.6
100.10	196.9
121.12	197.3
144.12	198.2
180.13	198.7
300.13	200.1
420.03	201.9

Tested By SFS Date 3/24/18 Checked By GEM Date 4/2/18

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DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\TERRACON\2018-074 TERRACON - ROGERS RD GRAD SEPARATION\2018-074-001-001 GEOJAC-32TSF1 Cv.xlsm]STEP 1

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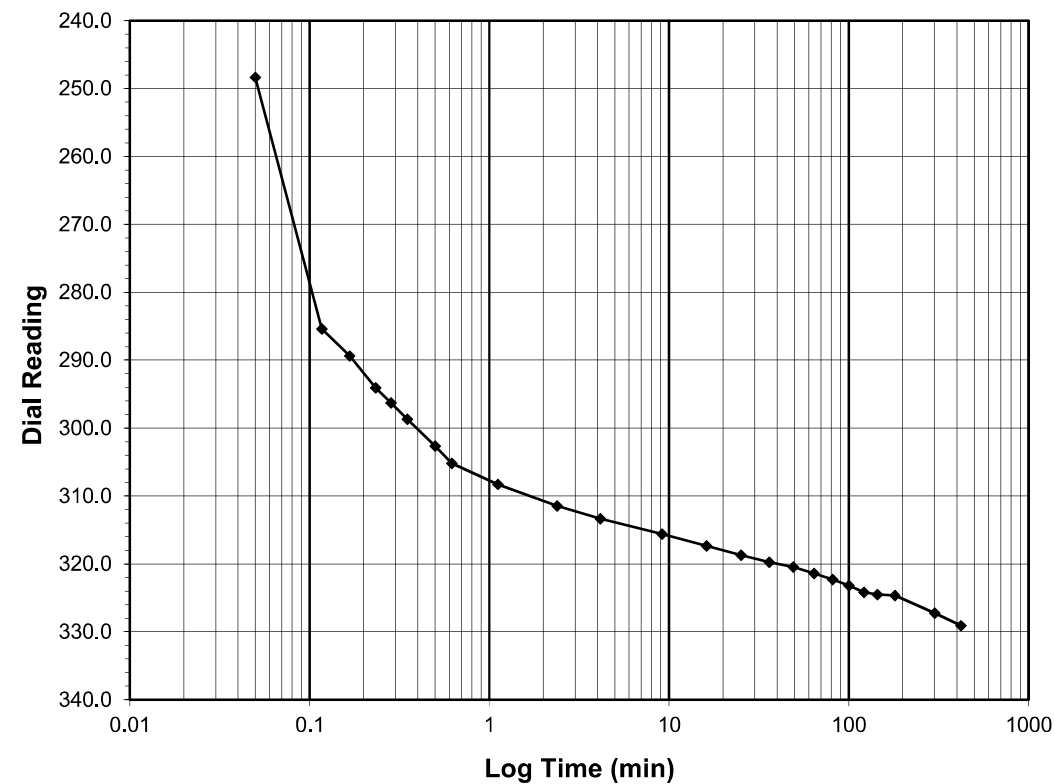
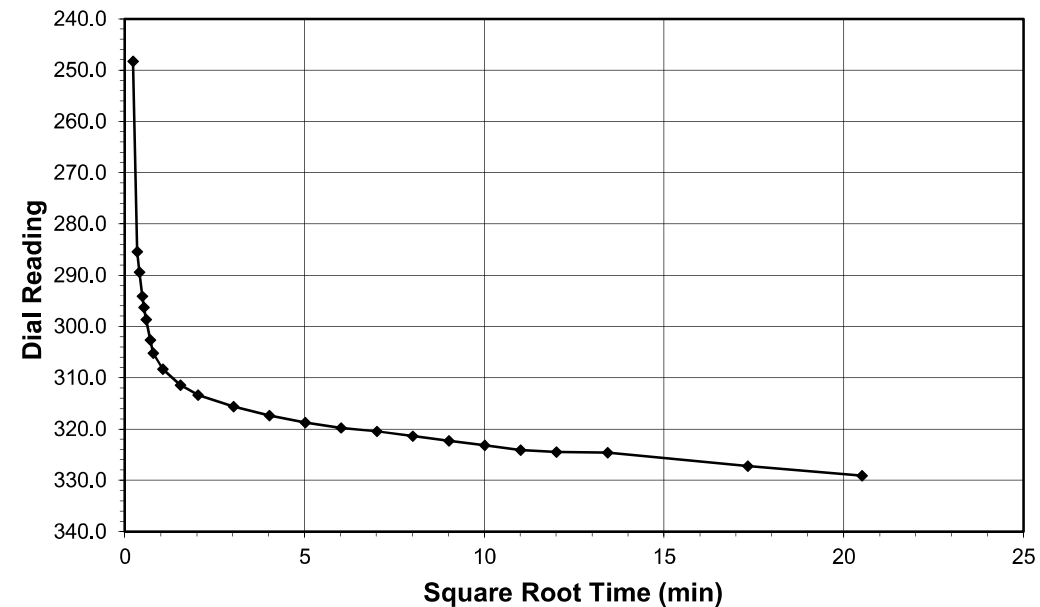
SHEET 94

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	0.25-0.5
Final Reading (div)	329.1
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/24/18
Start Time	21:40:26

Elapsed Time (min)	Dial Reading (div)
Initial	201.9
0.05	248.3
0.12	285.4
0.17	289.4
0.23	294.1
0.28	296.3
0.35	298.7
0.50	302.6
0.62	305.2
1.12	308.3
2.38	311.4
4.13	313.3
9.15	315.6
16.15	317.3
25.15	318.7
36.17	319.7
49.17	320.4
64.17	321.4
81.17	322.3
100.17	323.2
121.18	324.1
144.18	324.5
180.18	324.6
300.20	327.2
420.33	329.1

Tested By SFS Date 3/24/18 Checked By GEM Date 4/2/18

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DCN: CT-24E Date: 5/3/12 Revision: 3

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



ClientTerracon

Client ProjectRogers Rd. Grade Separation

Project No.R-2018-074-001

Lab IDR-2018-074-001-001

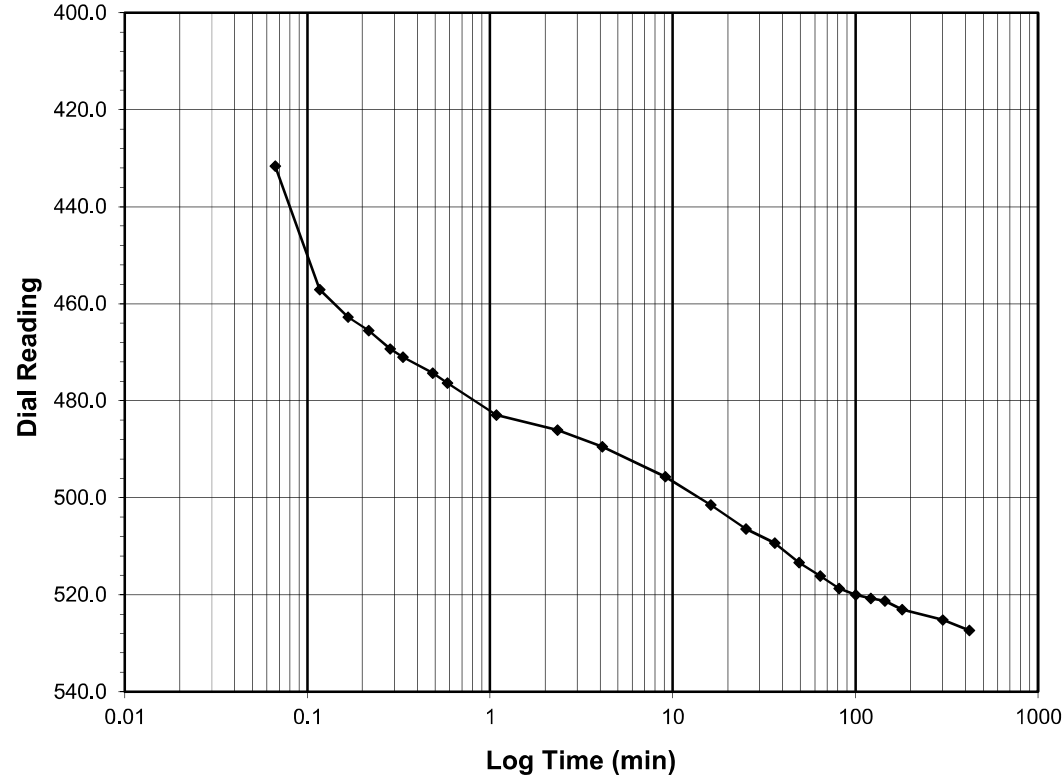
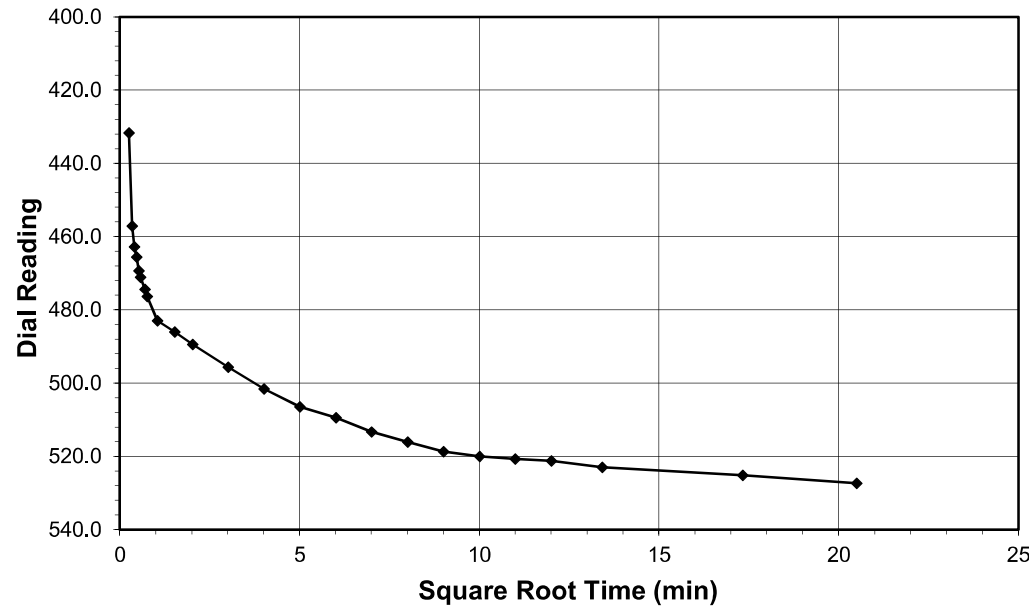
Boring No.P-5707 L-40+50

Depth (ft)15.5-17.5

Sample No.ST-1

Visual DescriptionORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)0.5-1.0

Final Reading (div)527.4

Consolidometer No.R409

1 Division (in)0.0001

Start Date3/25/18

Start Time4:40:47

Elapsed Time (min)	Dial Reading (div)
Initial	329.1
0.07	431.6
0.12	457.1
0.17	462.8
0.22	465.5
0.28	469.3
0.33	471.1
0.48	474.3
0.58	476.4
1.08	483.0
2.33	486.0
4.10	489.5
9.10	495.6
16.10	501.5
25.10	506.4
36.12	509.4
49.12	513.3
64.12	516.1
81.13	518.7
100.13	520.0
121.13	520.7
144.15	521.2
180.15	523.0
300.15	525.2
420.27	527.4

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



ClientTerracon

Client ProjectRogers Rd. Grade Separation

Project No.R-2018-074-001

Lab IDR-2018-074-001-001

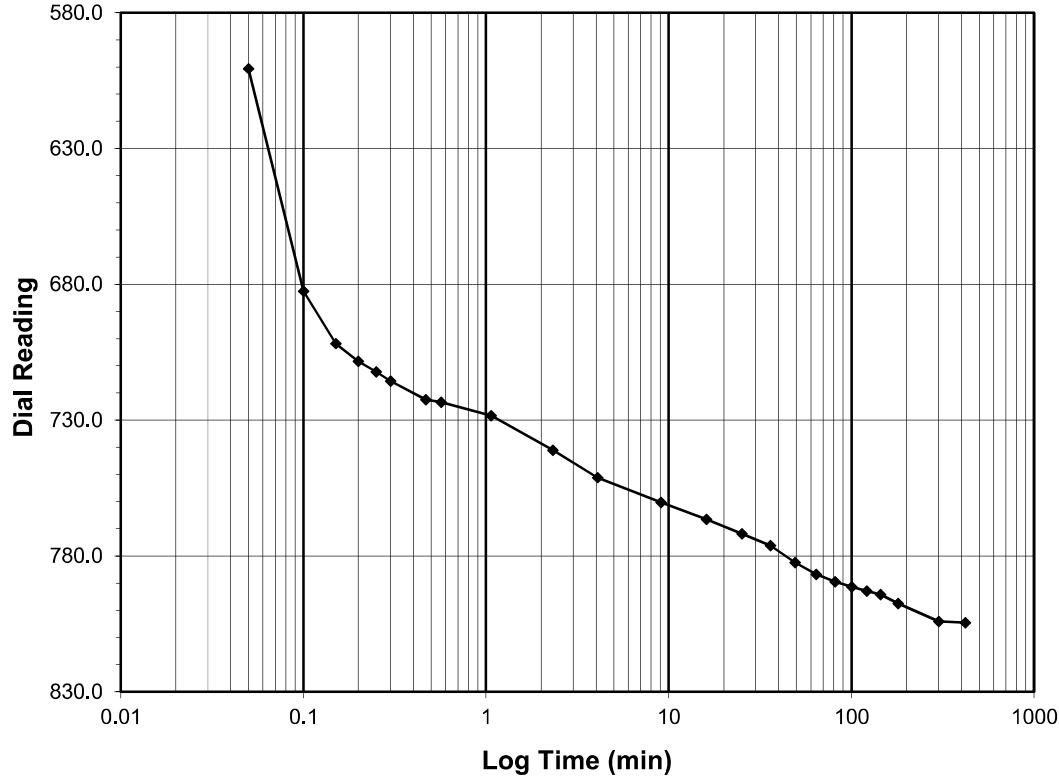
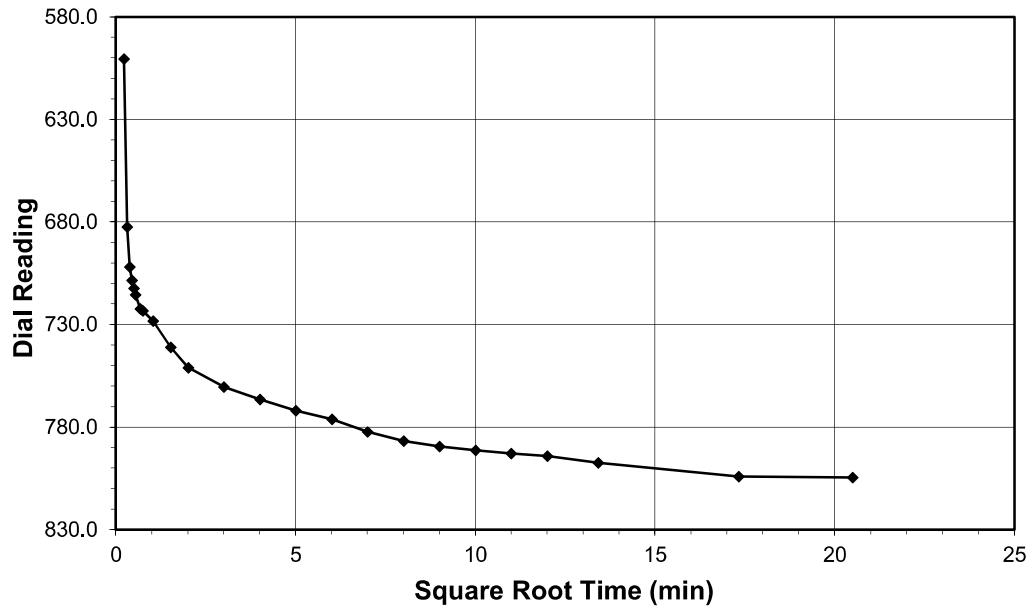
Boring No.P-5707 L-40+50

Depth (ft)15.5-17.5

Sample No.ST-1

Visual DescriptionORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)1.0-2.0

Final Reading (div)804.6

Consolidometer No.R409

1 Division (in)0.0001

Start Date3/25/18

Start Time11:41:02

Elapsed Time (min)	Dial Reading (div)
Initial	527.4
0.05	600.6
0.10	682.5
0.15	701.8
0.20	708.4
0.25	712.2
0.30	715.7
0.47	722.4
0.57	723.4
1.07	728.4
2.32	741.1
4.07	751.1
9.07	760.3
16.07	766.5
25.07	771.9
36.08	776.2
49.08	782.4
64.08	786.8
81.08	789.4
100.08	791.4
121.10	792.9
144.10	794.2
180.12	797.4
300.12	804.1
420.15	804.6

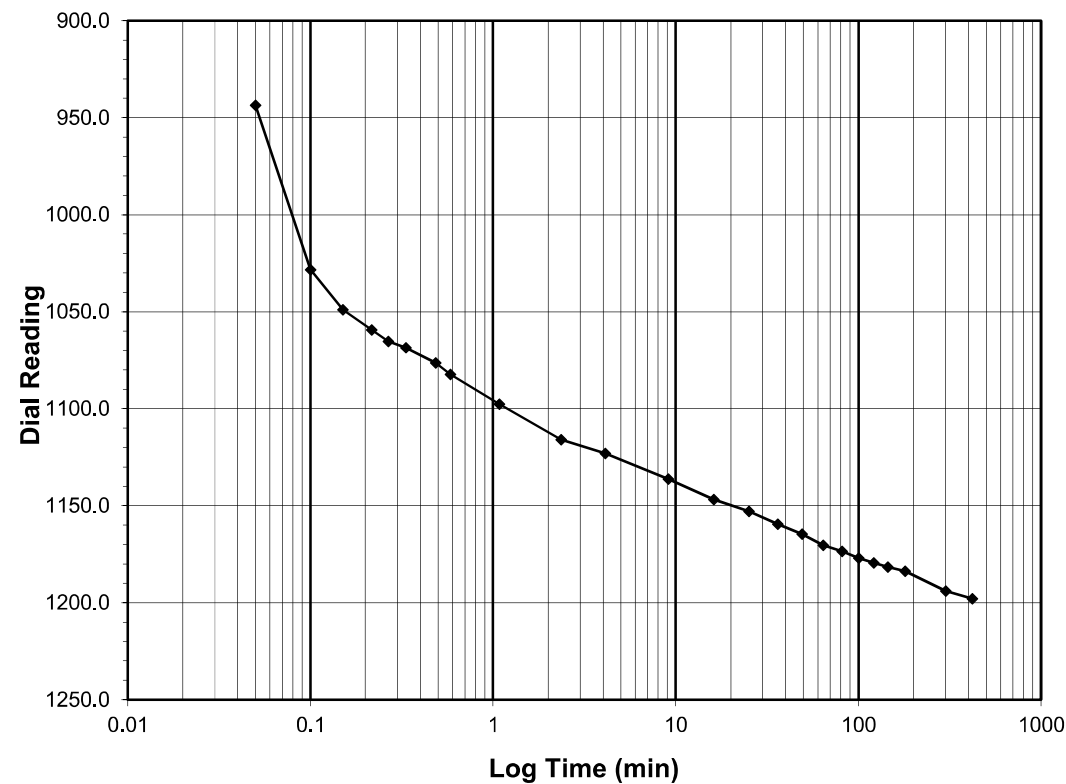
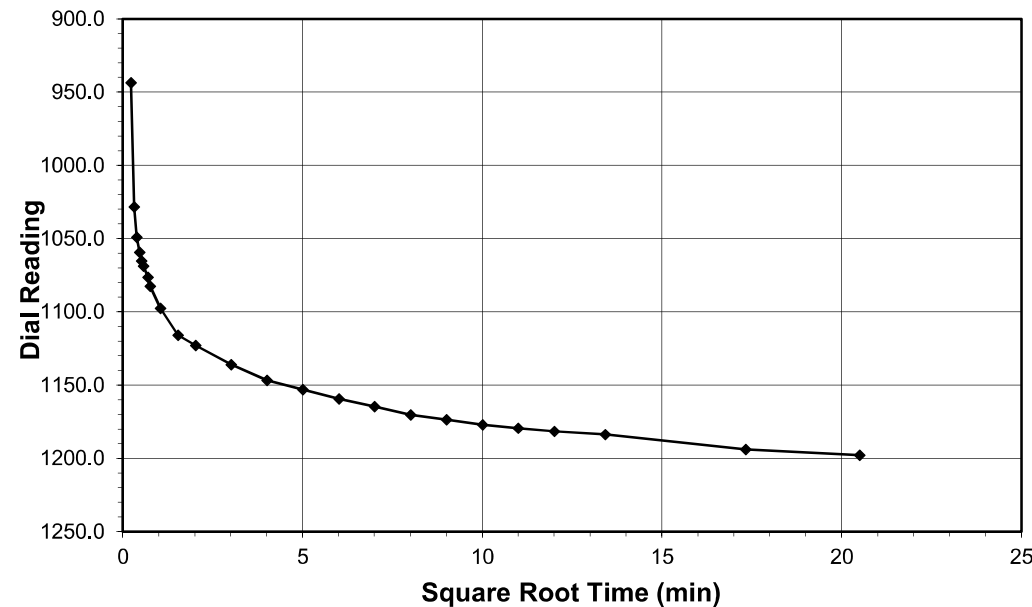
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	2.0-4.0
Final Reading (div)	1197.9
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/25/18
Start Time	18:41:11

Elapsed Time (min)	Dial Reading (div)
Initial	804.6
0.05	943.6
0.10	1028.4
0.15	1049.0
0.22	1059.4
0.27	1065.2
0.33	1068.6
0.48	1076.4
0.58	1082.3
1.08	1097.6
2.35	1116.0
4.10	1122.9
9.10	1136.1
16.10	1146.8
25.10	1153.0
36.12	1159.4
49.12	1164.6
64.12	1170.3
81.13	1173.6
100.13	1176.9
121.13	1179.4
144.13	1181.5
180.15	1183.7
300.15	1193.9
420.00	1197.9

Tested By	SFS	Date	3/25/18	Checked By	GEM	Date	4/2/18
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DCN: CT-24E Date: 5/3/12 Revision: 3

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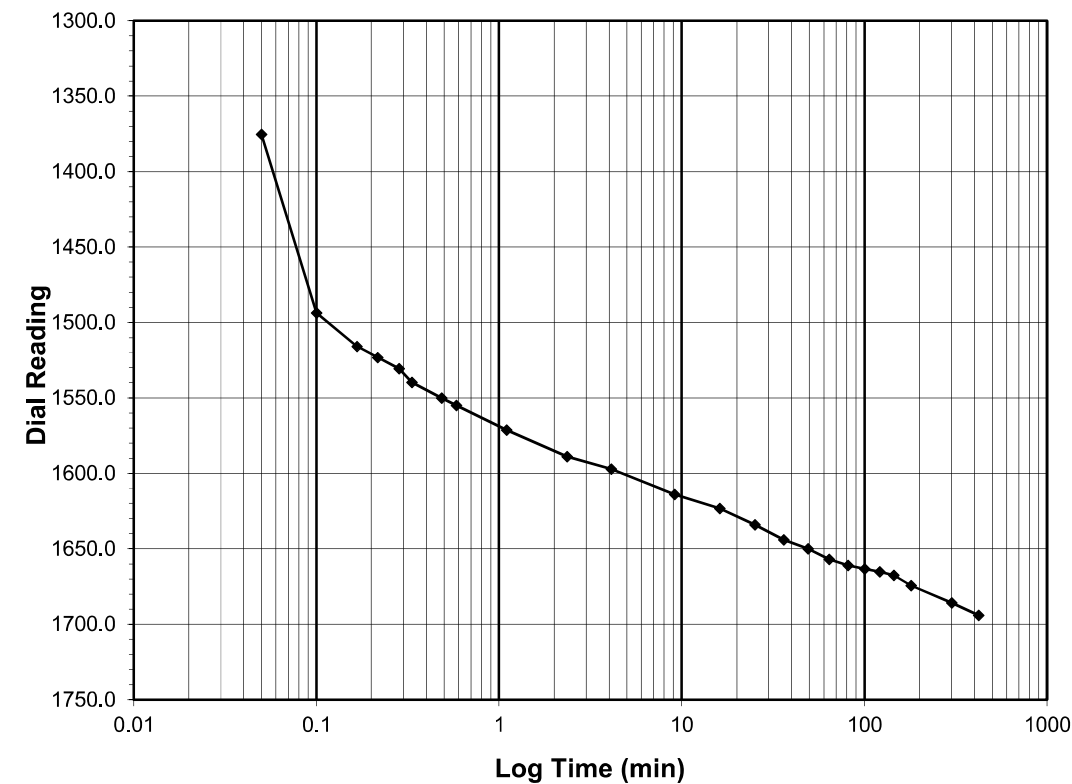
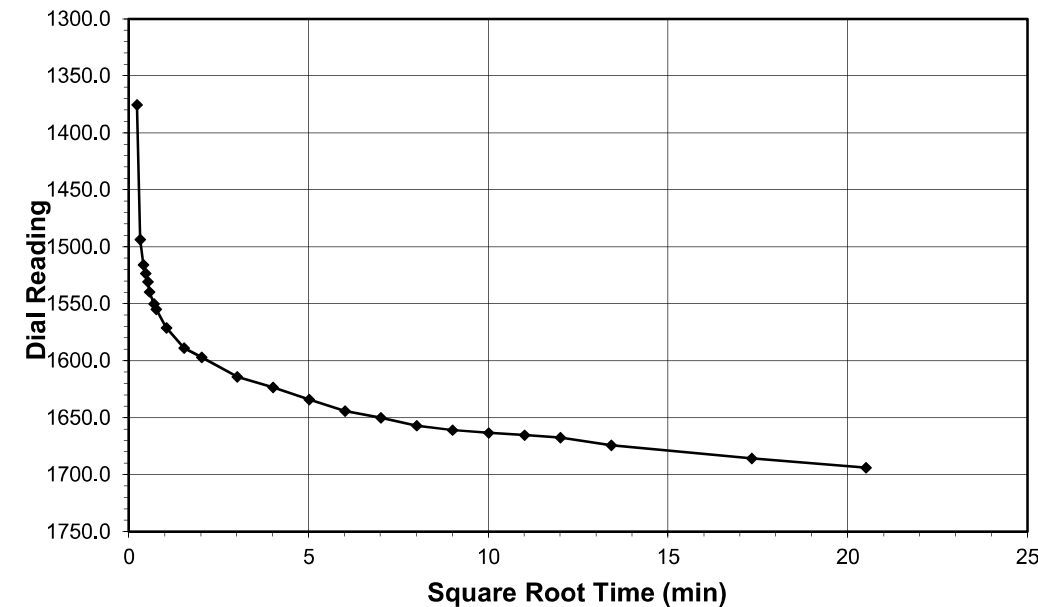
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	4.0-8.0
Final Reading (div)	1694.0
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/26/18
Start Time	1:41:11

Elapsed Time (min)	Dial Reading (div)
Initial	1197.9
0.05	1375.4
0.10	1493.6
0.17	1515.7
0.22	1523.2
0.28	1530.7
0.33	1539.7
0.48	1550.2
0.58	1555.0
1.10	1571.2
2.35	1588.8
4.10	1597.1
9.12	1614.1
16.12	1623.3
25.12	1634.0
36.13	1644.0
49.13	1650.0
64.13	1656.9
81.13	1660.9
100.13	1663.3
121.15	1665.3
144.15	1667.6
180.15	1674.3
300.15	1685.7
420.42	1694.0

Tested By	SFS	Date	3/26/18	Checked By	GEM	Date	4/2/18
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DCN: CT-24E Date: 5/3/12 Revision: 3

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ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

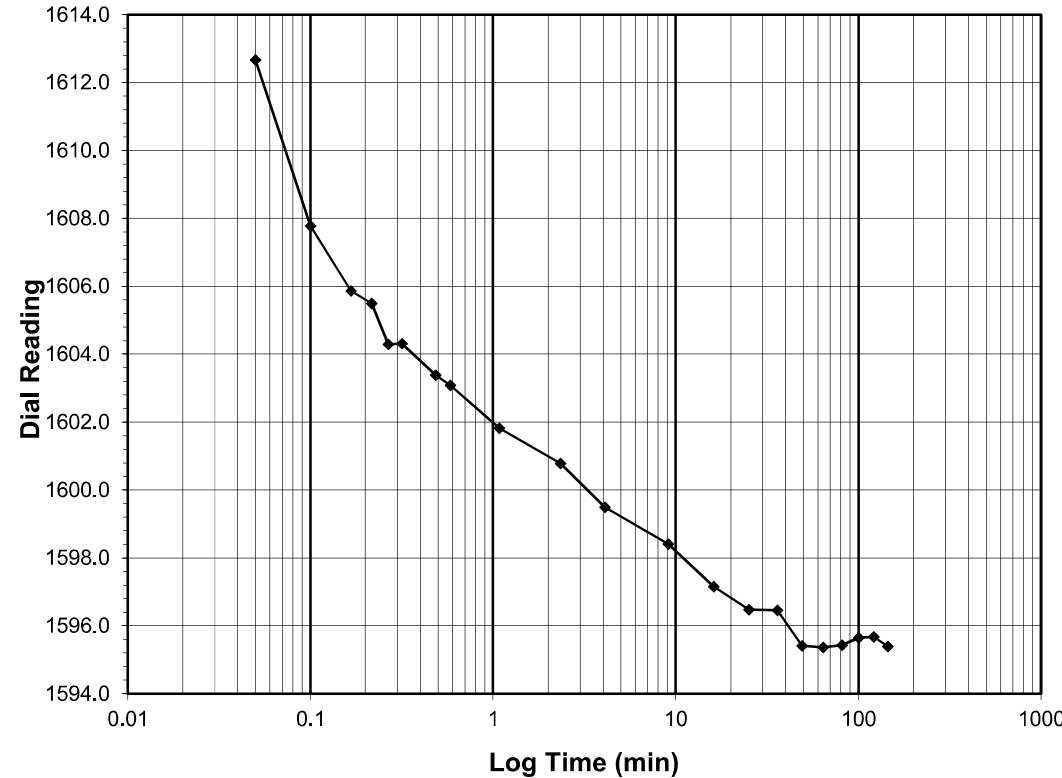
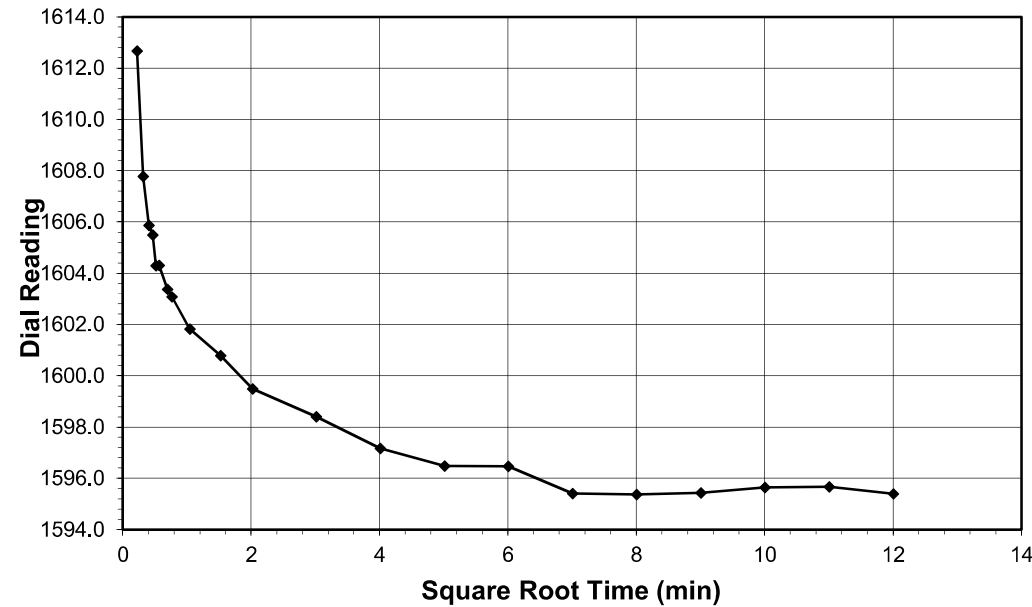
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-2.0
Final Reading (div) 1595.4
Consolidometer No. R409
1 Division (in) 0.0001

Start Date 3/26/18
Start Time 8:41:36

Elapsed Time (min)	Dial Reading (div)
Initial	1694.0
0.05	1612.7
0.10	1607.8
0.17	1605.9
0.22	1605.5
0.27	1604.3
0.32	1604.3
0.48	1603.4
0.58	1603.1
1.08	1601.8
2.33	1600.8
4.08	1599.5
9.08	1598.4
16.10	1597.2
25.10	1596.5
36.10	1596.5
49.10	1595.4
64.10	1595.4
81.12	1595.4
100.12	1595.6
121.12	1595.7
144.13	1595.4

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

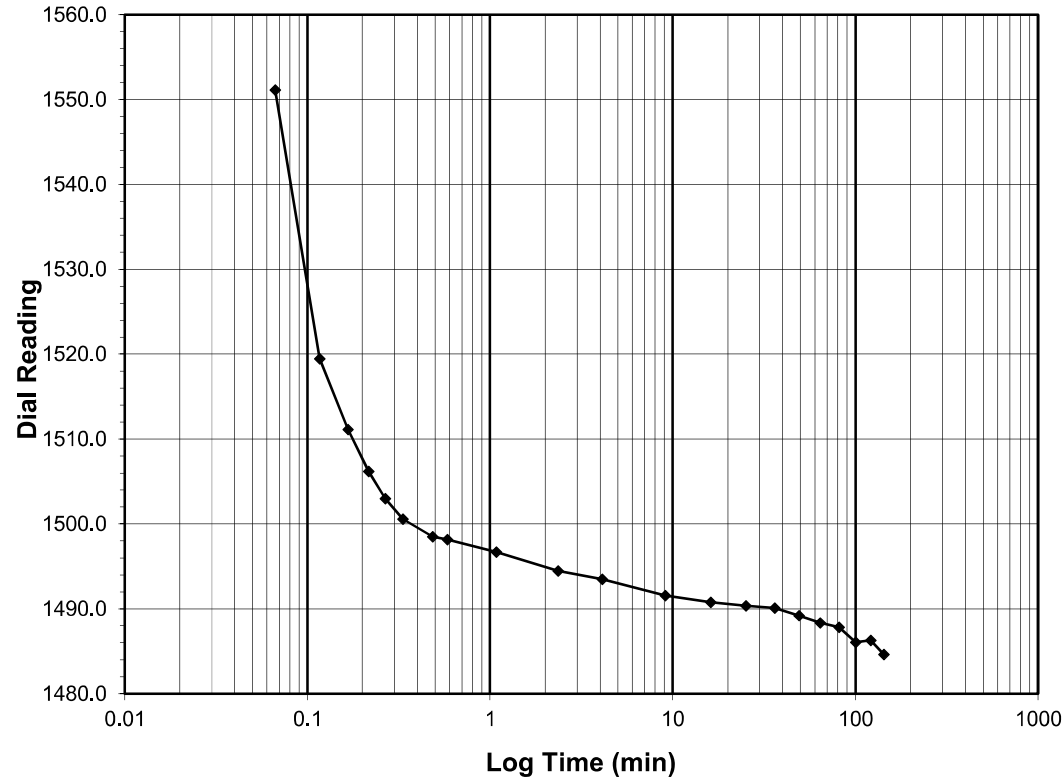
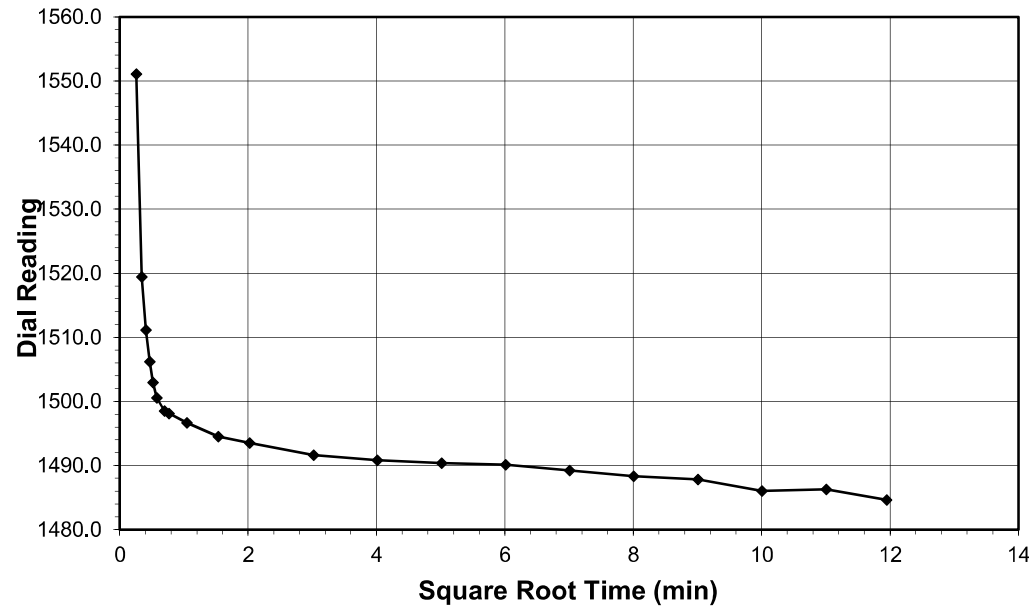
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-0.5
Final Reading (div) 1484.6
Consolidometer No. R409
1 Division (in) 0.0001

Start Date 3/26/18
Start Time 12:48:30

Elapsed Time (min)	Dial Reading (div)
Initial	1595.4
0.07	1551.1
0.12	1519.4
0.17	1511.1
0.22	1506.2
0.27	1503.0
0.33	1500.6
0.48	1498.5
0.58	1498.2
1.08	1496.7
2.35	1494.5
4.10	1493.5
9.10	1491.6
16.10	1490.8
25.10	1490.4
36.12	1490.1
49.12	1489.2
64.13	1488.3
81.13	1487.8
100.15	1486.0
121.15	1486.3
142.70	1484.6

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



ClientTerracon

Client ProjectRogers Rd. Grade Separation

Project No.R-2018-074-001

Lab IDR-2018-074-001-001

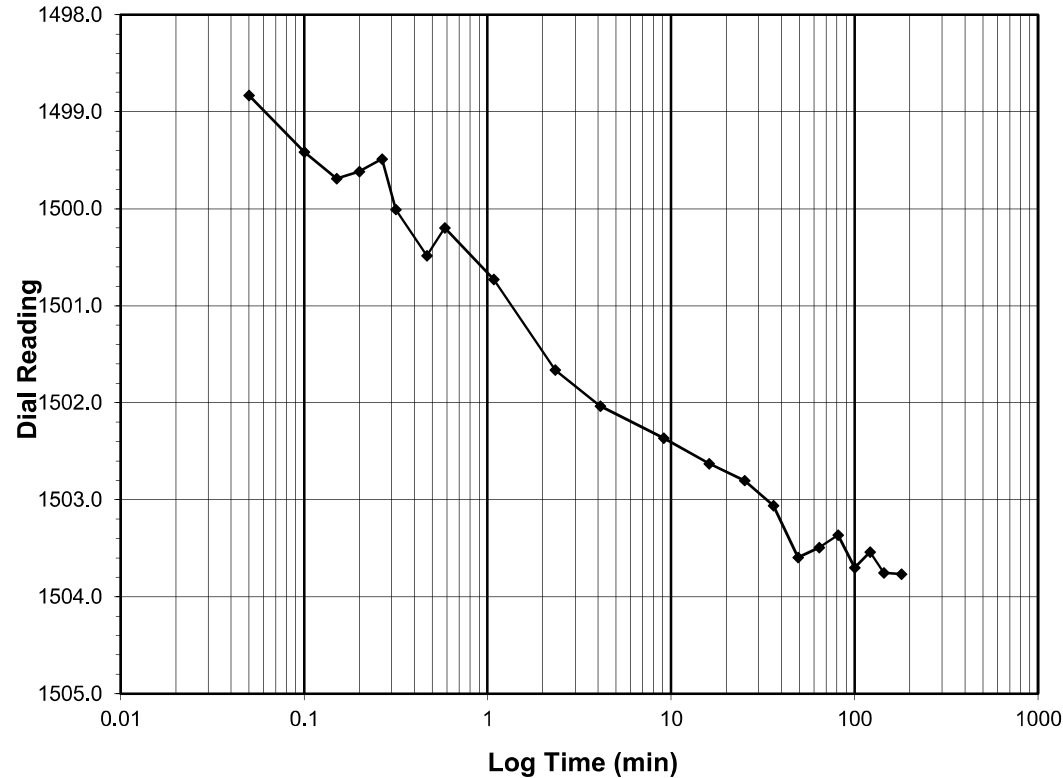
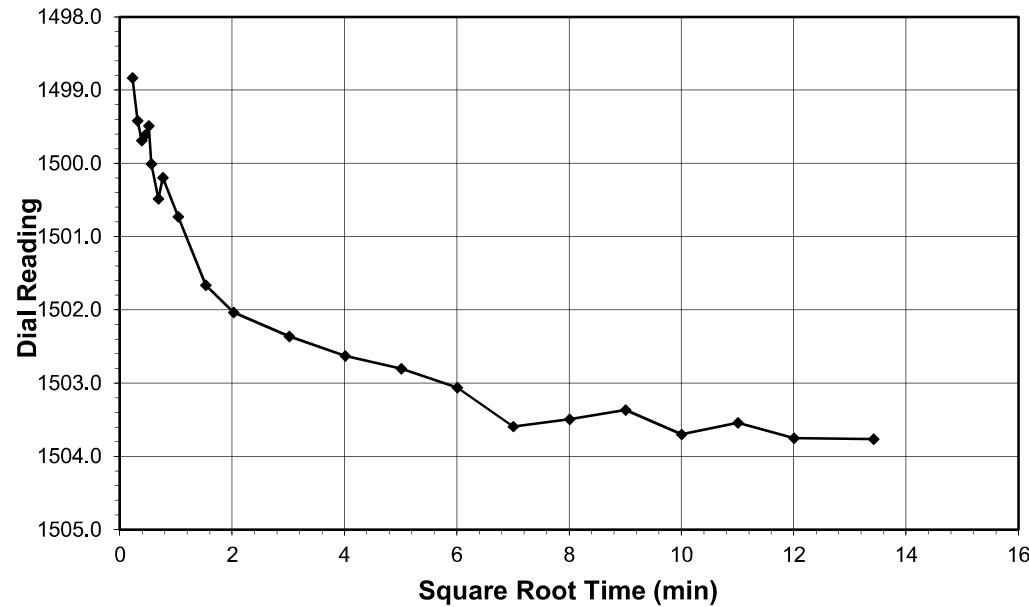
Boring No.P-5707 L-40+50

Depth (ft)15.5-17.5

Sample No.ST-1

Visual DescriptionORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)0.5-1.0

Final Reading (div)1503.8

Consolidometer No.R409

1 Division (in)0.0001

Start Date3/26/18

Start Time15:11:11

Elapsed Time (min)	Dial Reading (div)
Initial	1484.6
0.05	1498.8
0.10	1499.4
0.15	1499.7
0.20	1499.6
0.27	1499.5
0.32	1500.0
0.47	1500.5
0.58	1500.2
1.08	1500.7
2.33	1501.7
4.10	1502.0
9.10	1502.4
16.10	1502.6
25.10	1502.8
36.10	1503.1
49.12	1503.6
64.12	1503.5
81.12	1503.4
100.12	1503.7
121.12	1503.5
144.12	1503.8
180.12	1503.8

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



ClientTerracon

Client ProjectRogers Rd. Grade Separation

Project No.R-2018-074-001

Lab IDR-2018-074-001-001

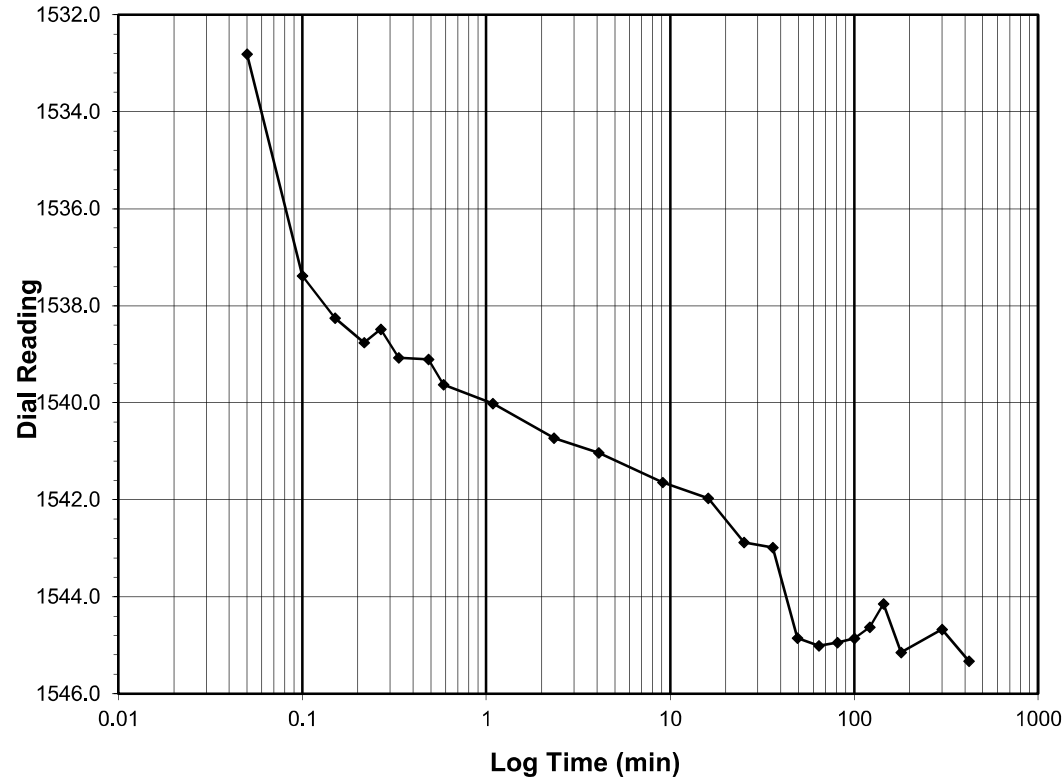
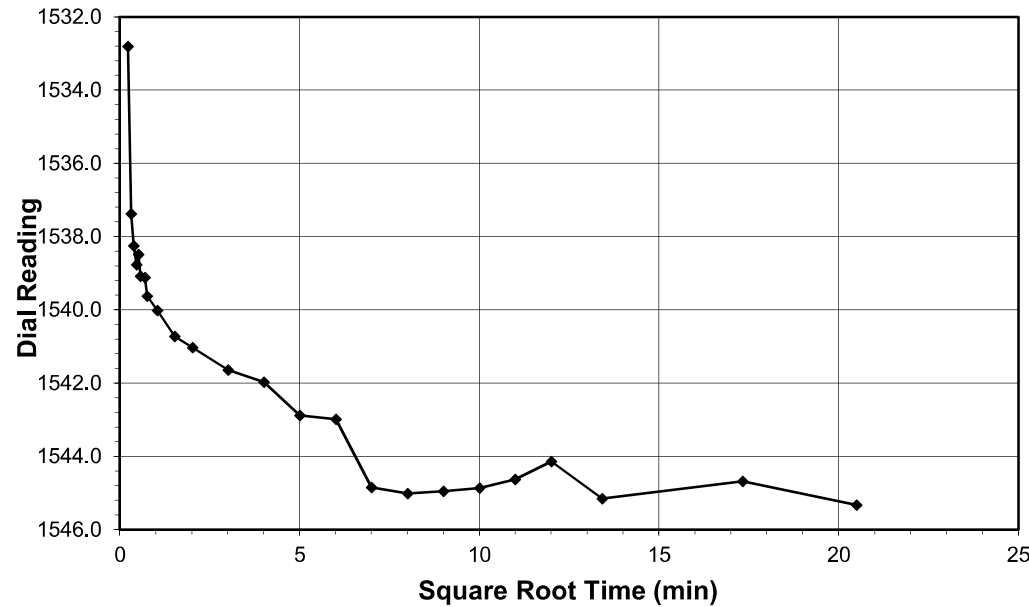
Boring No.P-5707 L-40+50

Depth (ft)15.5-17.5

Sample No.ST-1

Visual DescriptionORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)1.0-2.0

Final Reading (div)1545.3

Consolidometer No.R409

1 Division (in)0.0001

Start Date3/26/18

Start Time22:11:42

Elapsed Time (min)	Dial Reading (div)
Initial	1503.8
0.05	1532.8
0.10	1537.4
0.15	1538.3
0.22	1538.8
0.27	1538.5
0.33	1539.1
0.48	1539.1
0.58	1539.6
1.08	1540.0
2.33	1540.7
4.08	1541.0
9.08	1541.6
16.08	1542.0
25.08	1542.9
36.10	1543.0
49.10	1544.9
64.12	1545.0
81.12	1545.0
100.12	1544.9
121.12	1544.6
144.13	1544.1
180.13	1545.2
300.13	1544.7
420.25	1545.3

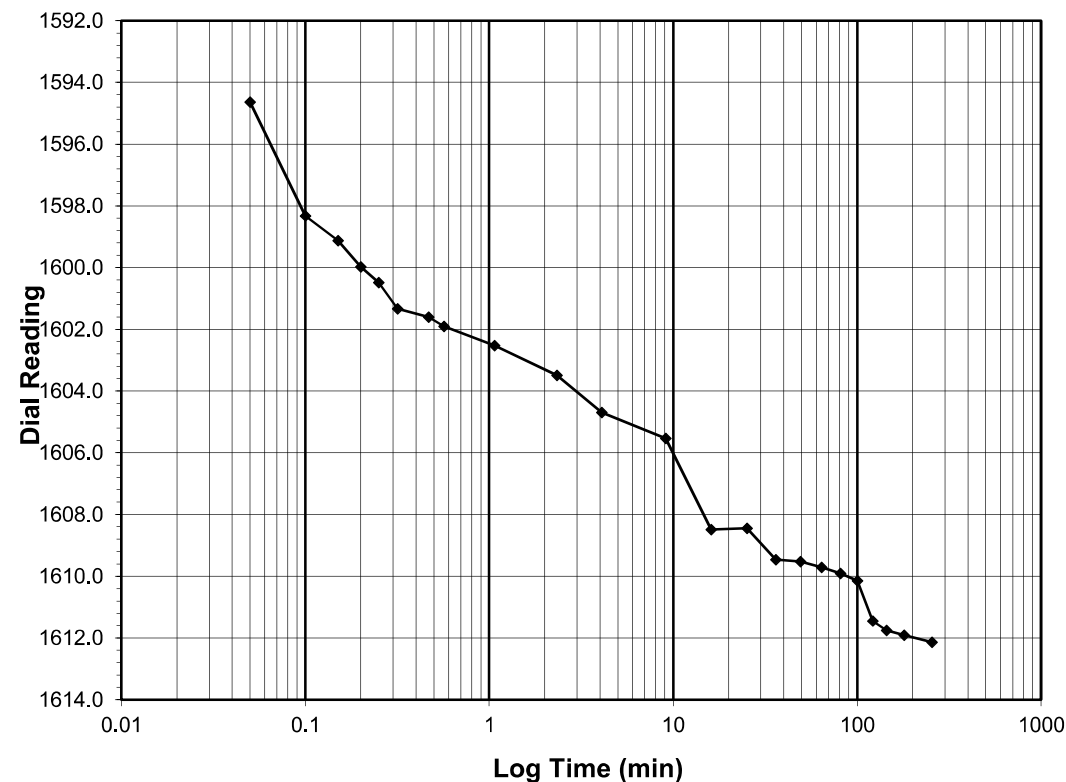
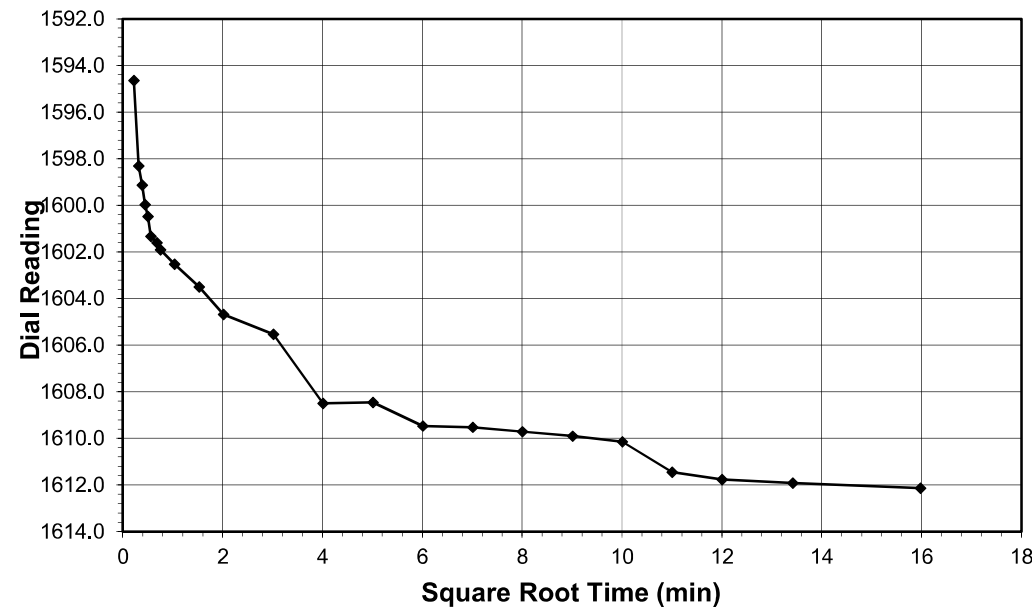
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	2.0-4.0
Final Reading (div)	1612.1
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/27/18
Start Time	5:11:58

Elapsed Time (min)	Dial Reading (div)
Initial	1545.3
0.05	1594.6
0.10	1598.3
0.15	1599.1
0.20	1600.0
0.25	1600.5
0.32	1601.3
0.47	1601.6
0.57	1601.9
1.07	1602.5
2.33	1603.5
4.08	1604.7
9.08	1605.5
16.08	1608.5
25.08	1608.4
36.10	1609.5
49.10	1609.5
64.10	1609.7
81.10	1609.9
100.10	1610.1
121.10	1611.4
144.10	1611.8
180.12	1611.9
255.38	1612.1

Tested By	SFS	Date	3/27/18	Checked By	GEM	Date	4/2/18
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DCN: CT-24E Date: 5/3/12 Revision: 3

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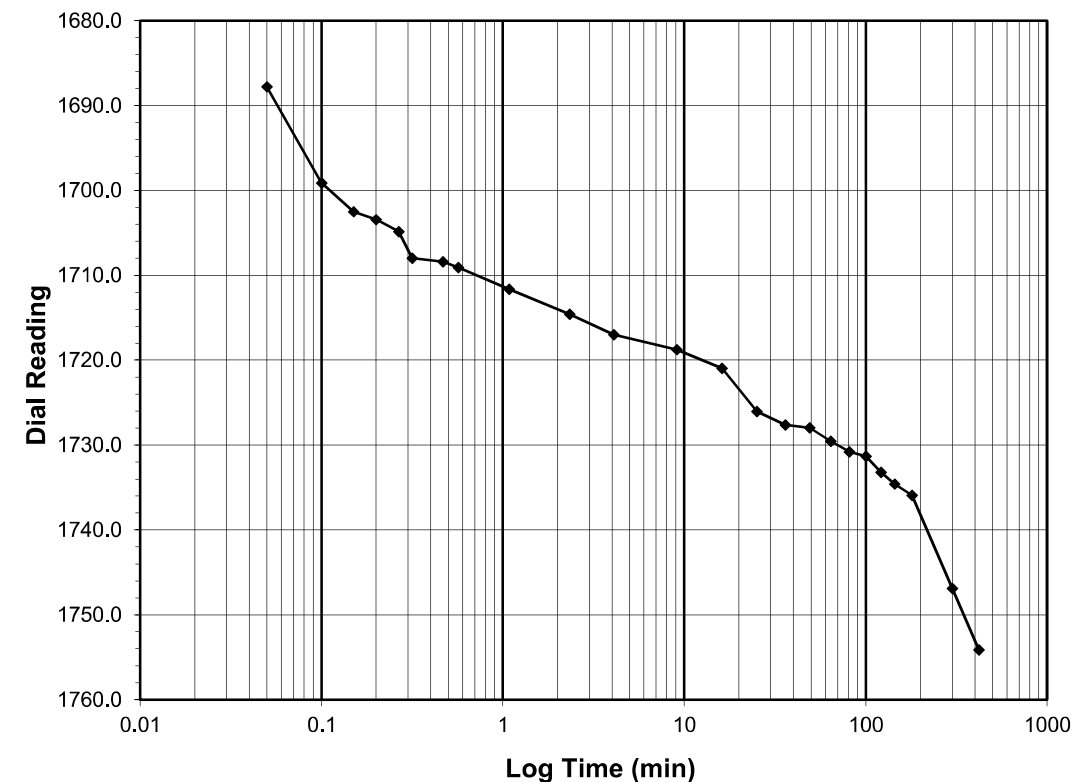
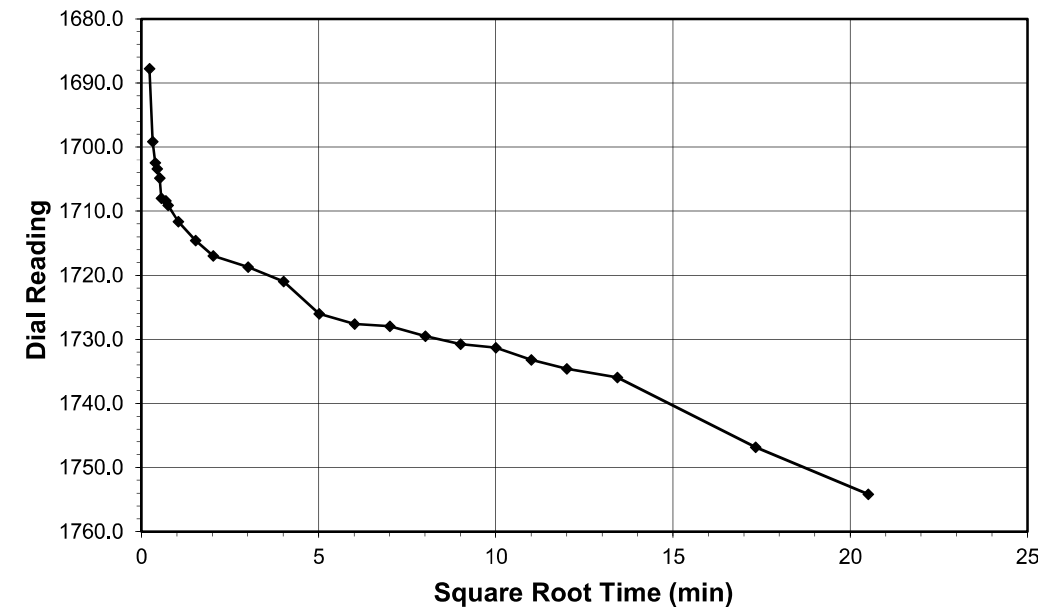
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	4.0-8.0
Final Reading (div)	1754.1
Consolidometer No.	R409
1 Division (in)	0.0001

Start Date	3/27/18
Start Time	9:27:21

Elapsed Time (min)	Dial Reading (div)
Initial	1612.1
0.05	1687.8
0.10	1699.1
0.15	1702.5
0.20	1703.4
0.27	1704.9
0.32	1708.0
0.47	1708.4
0.57	1709.1
1.08	1711.6
2.33	1714.6
4.08	1717.0
9.08	1718.7
16.08	1721.0
25.08	1726.0
36.10	1727.6
49.10	1728.0
64.10	1729.5
81.10	1730.8
100.10	1731.3
121.10	1733.2
144.10	1734.6
180.10	1735.9
300.12	1746.9
420.50	1754.1

Tested By	SFS	Date	3/27/18	Checked By	GEM	Date	4/2/18
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page 1 of 1

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\TERRACON\2018-074 TERRACON - ROGERS RD GRAD SEPARATION\2018-074-001-001 GEOJAC-32TSF1 Cv.xlsm\STEP 12

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

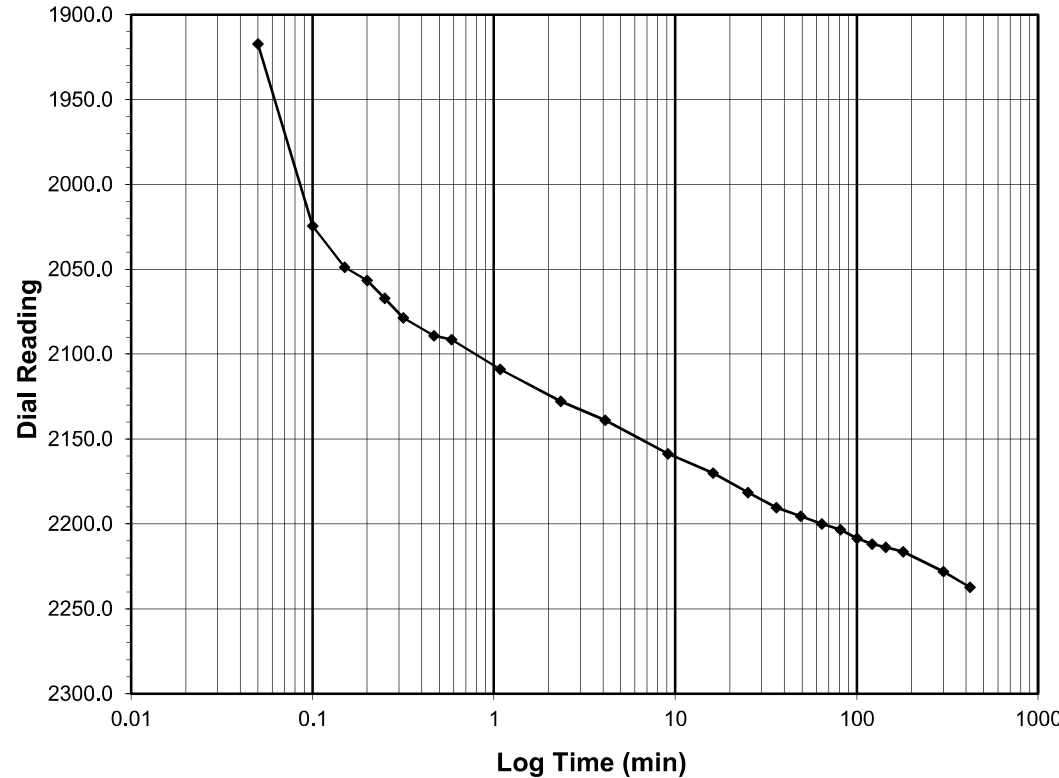
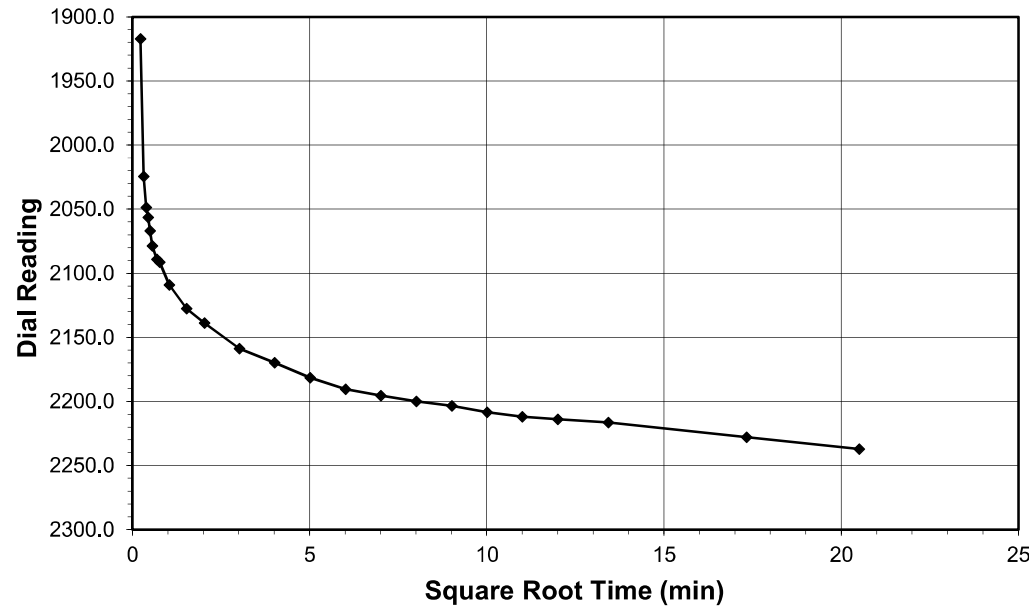
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-16.0
Final Reading (div) 2237.2
Consolidometer No. R409
1 Division (in) 0.0001

Start Date 3/27/18
Start Time 16:27:51

Elapsed Time (min)	Dial Reading (div)
Initial	1754.1
0.05	1917.1
0.10	2024.6
0.15	2048.7
0.20	2056.4
0.25	2066.9
0.32	2078.5
0.47	2089.1
0.58	2091.2
1.08	2109.0
2.33	2127.7
4.10	2138.8
9.10	2158.7
16.10	2169.8
25.10	2181.5
36.10	2190.4
49.10	2195.5
64.12	2200.0
81.12	2203.3
100.12	2208.4
121.12	2211.8
144.12	2213.7
180.12	2216.3
300.12	2228.0
420.50	2237.2

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

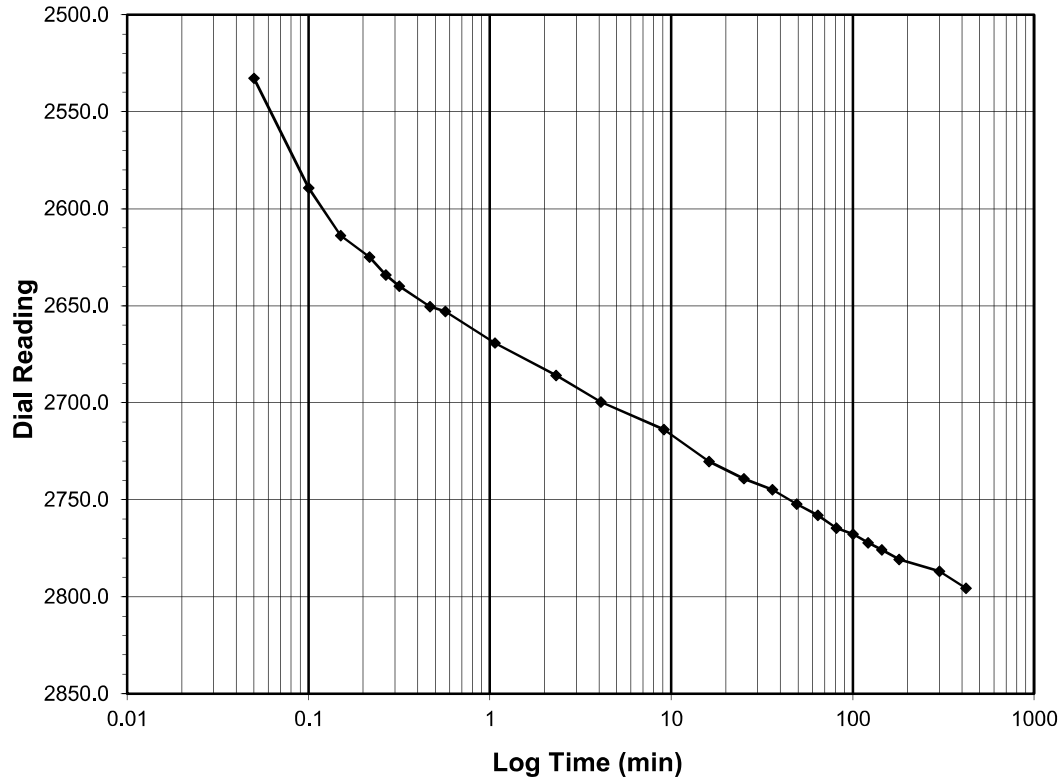
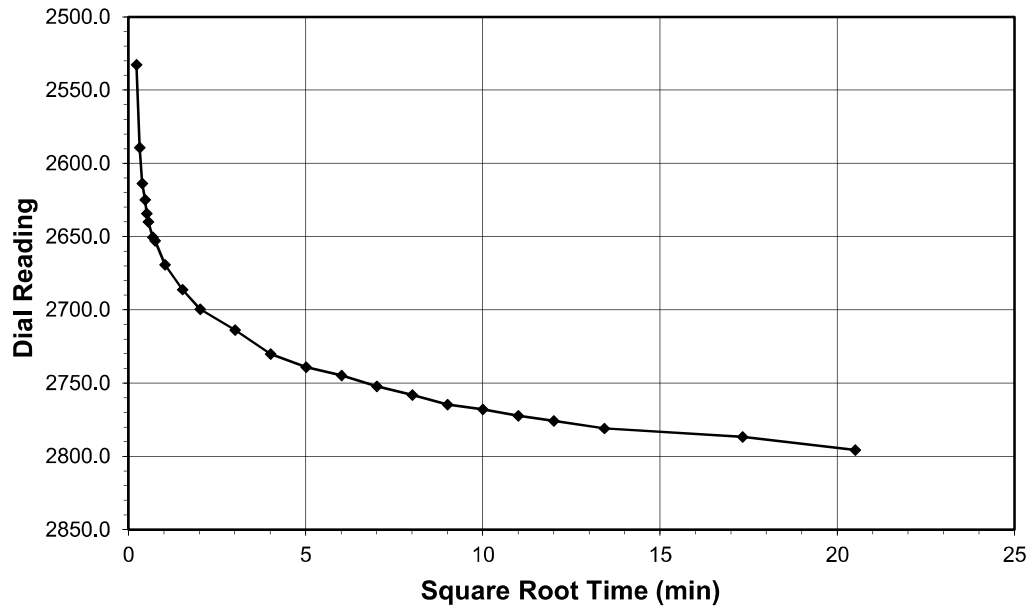
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 16.0-32.0
Final Reading (div) 2795.6
Consolidometer No. R409
1 Division (in) 0.0001

Start Date 3/27/18
Start Time 23:28:22

Elapsed Time (min)	Dial Reading (div)
Initial	2237.2
0.05	2532.8
0.10	2589.1
0.15	2613.8
0.22	2624.9
0.27	2634.2
0.32	2639.9
0.47	2650.3
0.57	2652.9
1.07	2669.1
2.32	2686.0
4.08	2699.7
9.08	2713.8
16.08	2730.2
25.10	2739.1
36.10	2744.8
49.10	2752.2
64.10	2758.1
81.10	2764.6
100.10	2767.8
121.12	2772.2
144.12	2775.8
180.12	2780.8
300.12	2786.7
420.42	2795.6

ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

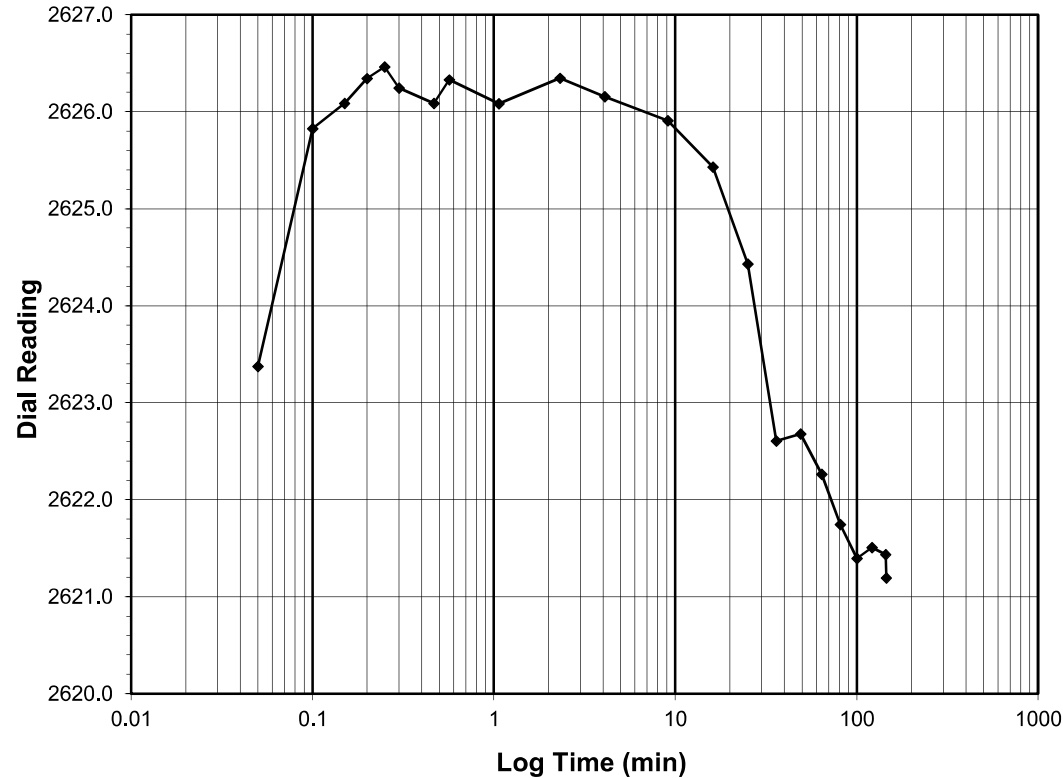
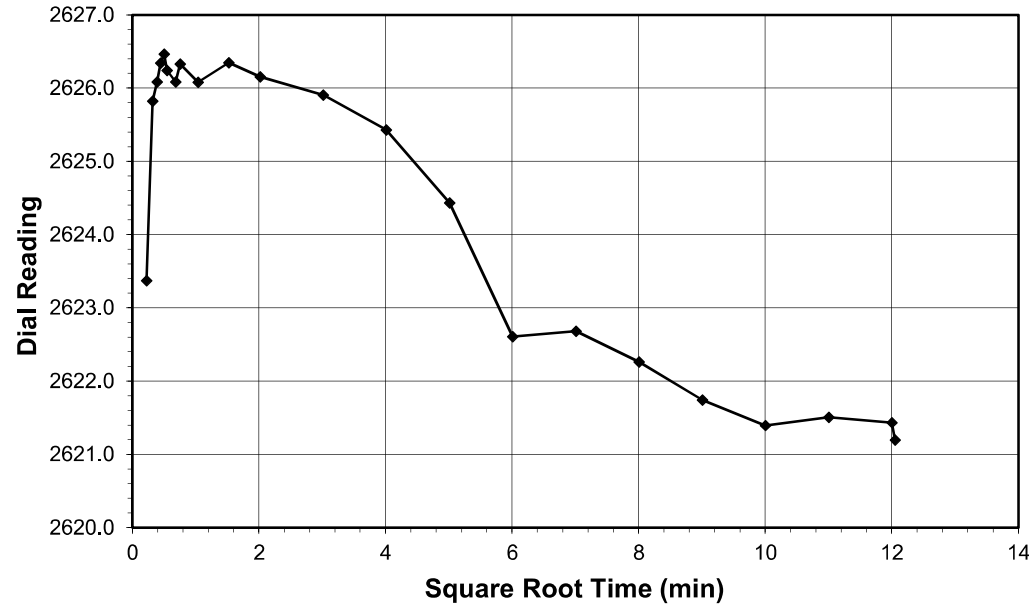
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)

Final Reading (div)

Consolidometer No.

1 Division (in)

32.0-8.0

2621.2

R409

0.0001

Start Date

Start Time

3/28/18

6:28:48

Elapsed Time (min)	Dial Reading (div)
Initial	2795.6
0.05	2623.4
0.10	2625.8
0.15	2626.1
0.20	2626.3
0.25	2626.5
0.30	2626.2
0.47	2626.1
0.57	2626.3
1.07	2626.1
2.32	2626.3
4.08	2626.2
9.08	2625.9
16.08	2625.4
25.08	2624.4
36.08	2622.6
49.08	2622.7
64.08	2622.3
81.08	2621.7
100.10	2621.4
121.10	2621.5
144.10	2621.4
145.23	2621.2

Tested By

SFS

Date

3/28/18

Checked By

GEM

Date

4/2/18

page 1 of 1

DCN: CT-24E Date: 5/3/12 Revision: 3

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client

Client Project

Project No.

Lab ID

Terracon

Rogers Rd. Grade Separation

R-2018-074-001

R-2018-074-001-001

Boring No.

Depth (ft)

Sample No.

Visual Description

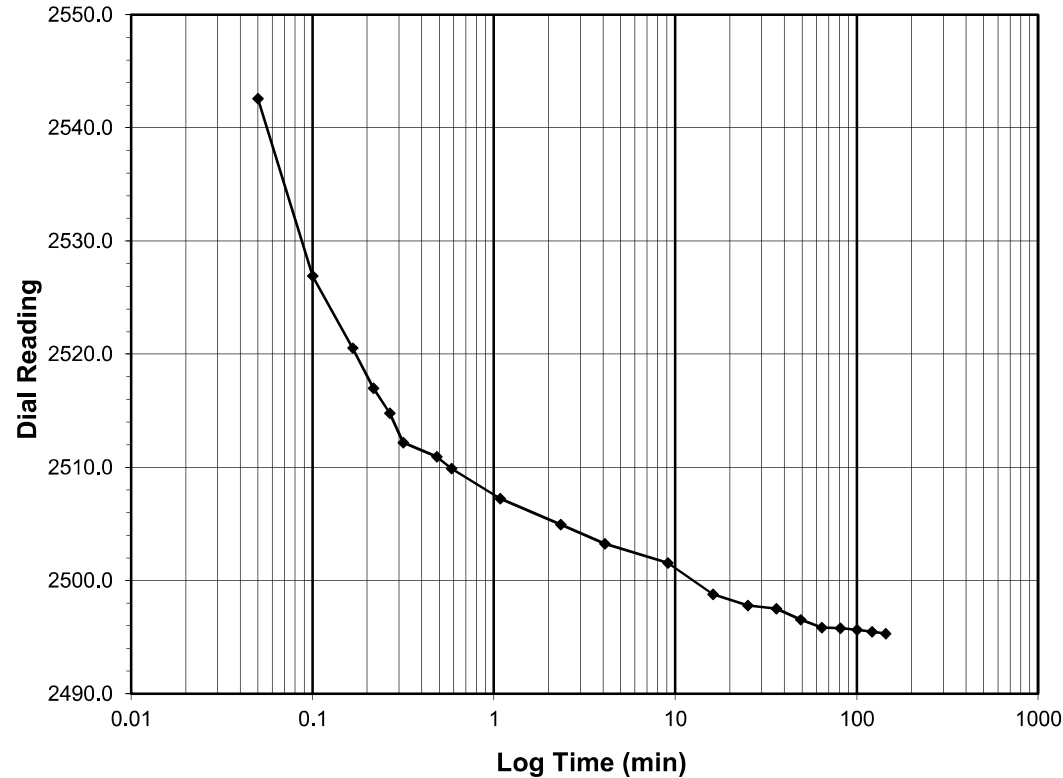
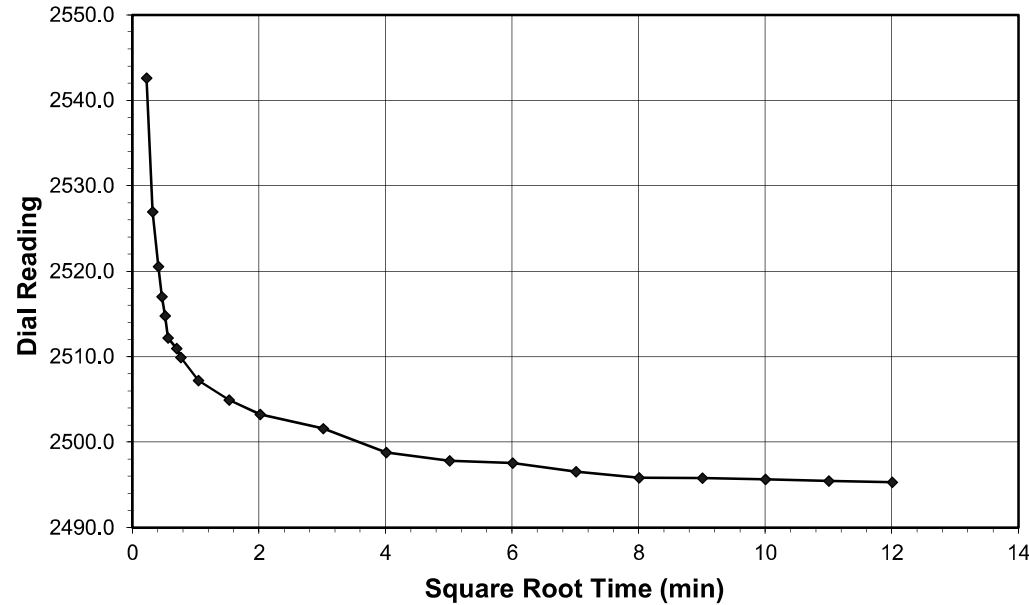
P-5707 L-40+50

15.5-17.5

ST-1

ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)

Final Reading (div)

Consolidometer No.

1 Division (in)

8.0-2.0

2495.3

R409

0.0001

Start Date

Start Time

3/28/18

8:54:02

Elapsed Time (min)	Dial Reading (div)
Initial	2621.2
0.05	2542.6
0.10	2526.9
0.17	2520.6
0.22	2517.0
0.27	2514.8
0.32	2512.2
0.48	2511.0
0.58	2509.9
1.08	2507.2
2.33	2504.9
4.08	2503.3
9.08	2501.6
16.10	2498.8
25.10	2497.8
36.10	2497.5
49.12	2496.5
64.12	2495.8
81.13	2495.8
100.13	2495.6
121.13	2495.5
144.13	2495.3

Tested By

SFS

Date

3/28/18

Checked By

GEM

Date

4/2/18

page 1 of 1

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\TERRACON\2018-074 TERRACON - ROGERS RD GRAD SEPARATION\2018-074-001-001 GEOJAC-32TSF1 Cv.xlsm\STEP 16

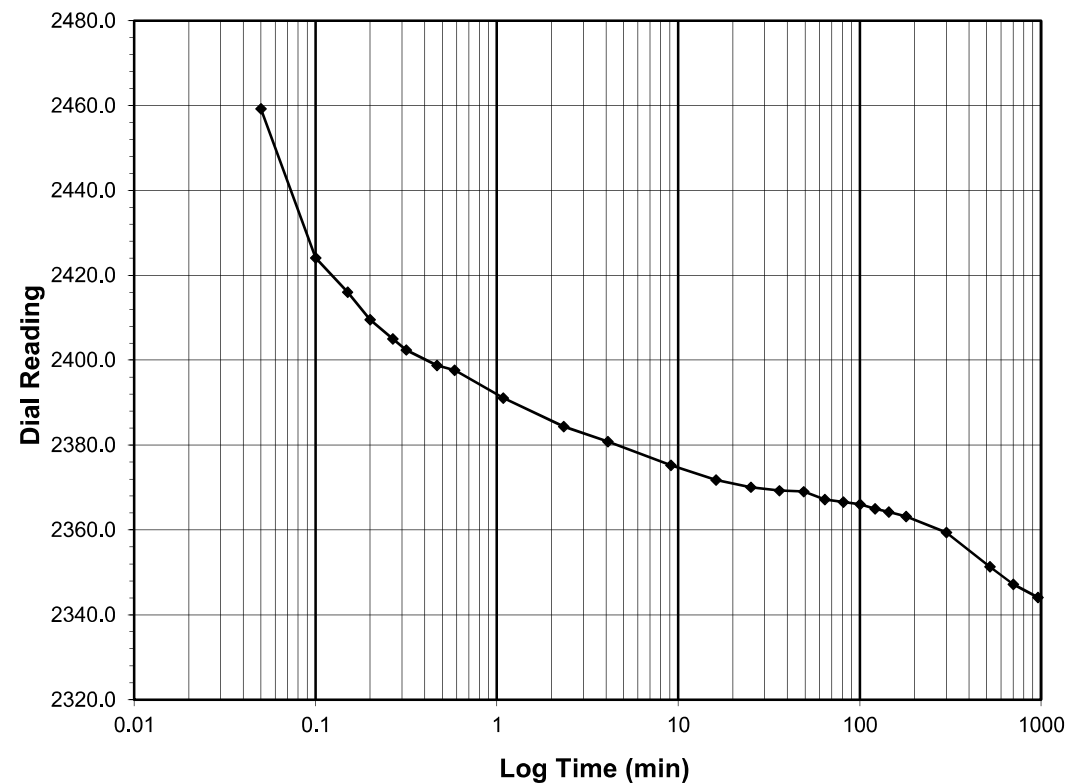
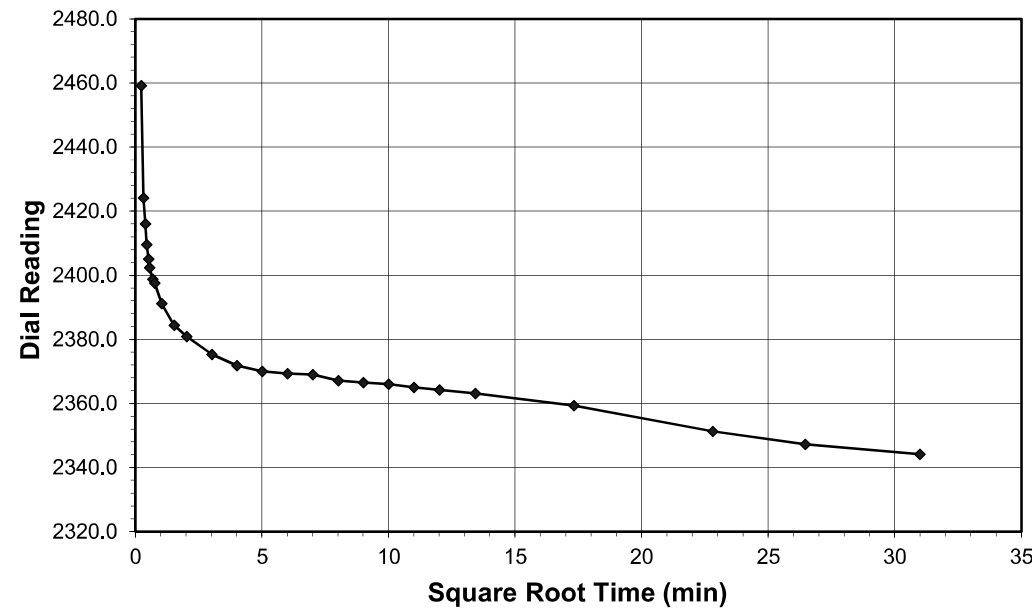
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client	Terracon	Boring No.	P-5707 L-40+50
Client Project	Rogers Rd. Grade Separation	Depth (ft)	15.5-17.5
Project No.	R-2018-074-001	Sample No.	ST-1
Lab ID	R-2018-074-001-001	Visual Description	ORANGE CLAYEY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-0.5
Final Reading (div) 2344.1
Consolidometer No. R409
1 Division (in) 0.0001

Start Date 3/28/18
Start Time 15:47:37

Elapsed Time (min)	Dial Reading (div)
Initial	2495.3
0.05	2459.2
0.10	2424.1
0.15	2416.1
0.20	2409.6
0.27	2405.0
0.32	2402.4
0.47	2398.8
0.58	2397.6
1.08	2391.1
2.33	2384.4
4.08	2380.9
9.08	2375.2
16.08	2371.8
25.08	2370.1
36.10	2369.3
49.10	2369.0
64.10	2367.2
81.10	2366.5
100.10	2366.0
121.12	2365.0
144.12	2364.2
180.12	2363.1
300.12	2359.4
520.13	2351.3
700.13	2347.2
960.13	2344.1



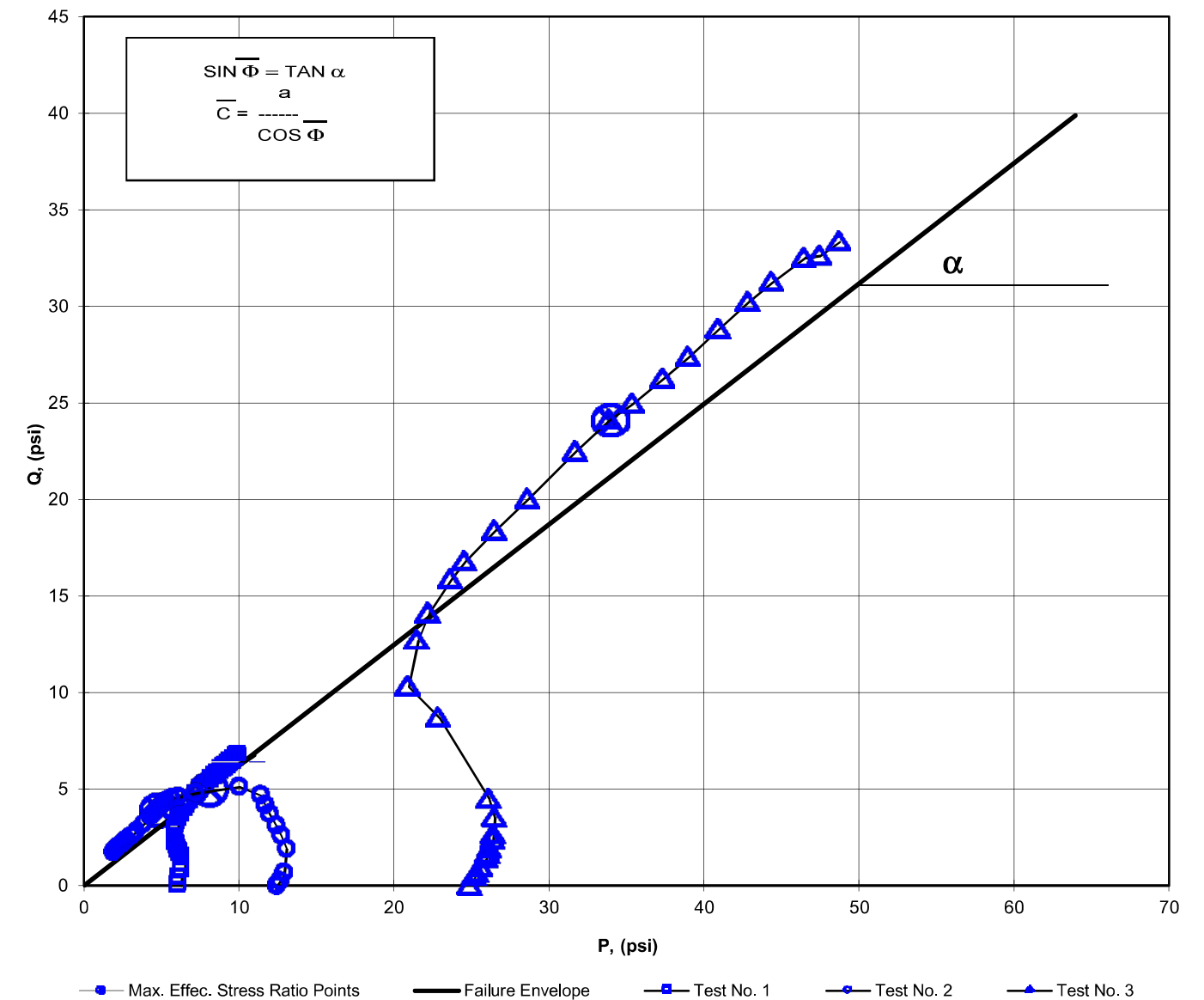
SHEET 102

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE READINGS

ASTM D4767-11

Client:	Terracon	Boring No.:	P-5707 L-40+50
Client Reference:	Rogers Rd. Grade Separation	Depth (ft):	15.5-17.5
Project No.:	R-2018-074-001	Sample No.:	ST-1
Lab ID:	R-2018-074-001-001		

Consolidated Undrained Triaxial Test with Pore Pressure



a	=	0.00	C	=	0.00
alpha	=	31.9	Phi	=	38.55

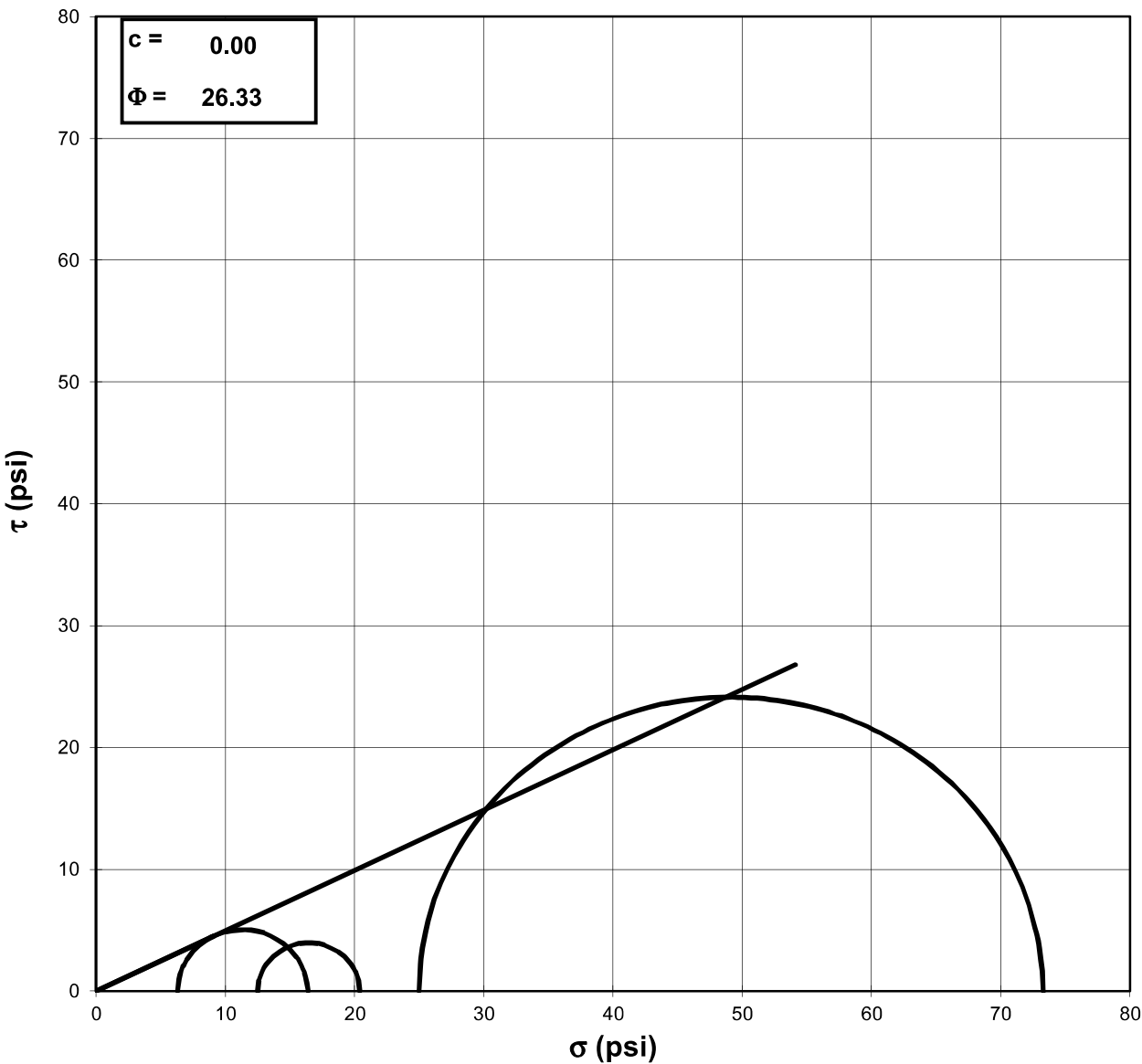
Tested By: MY Date: 3/27/18 Approved By: MPS Date: 4/2/18

Tested By: SFS Date: 3/28/18 Checked By: GEM Date: 4/2/18

MOHR TOTAL STRENGTH ENVELOPE
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001
Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)



Failure Based on Maximum Effective Principal Stress Ratio NOTE: GRAPH NOT TO SCALE

Tested By: MY Date: 3/27/18 Approved By: MPS Date: 4/2/18

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



SHEET 103

Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	1

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.083	Diameter 1:	2.842
Length 2:	6.011	Diameter 2:	2.844
Length 3:	6.012	Diameter 3:	2.836
Avg. Length:	6.035	Avg. Diam.:	2.841

PRESSURES (psi)

Cell Pressure (psi)	56.3
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	6.3
Pore Pressure Response (%)	96

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	14.4
Final Change (ml)	9.6

MAXIMUM OBLIQUITY POINTS

P	=	8.06
Q	=	5.02

Initial Dial Reading (mil)	189
Dial Reading After Saturation (mil)	189
Dial Reading After Consolidation (mil)	272

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
14.8	0.000	50.0
19.9	0.001	50.4
25.6	0.002	50.6
33.4	0.008	51.2
36.7	0.014	51.6
39.1	0.020	51.9
42.0	0.029	52.2
44.2	0.038	52.5
47.2	0.049	52.8
51.2	0.070	53.1
56.0	0.099	53.4
60.5	0.134	53.5
64.1	0.169	53.5
68.0	0.211	53.5
70.6	0.242	53.5
74.1	0.282	53.5
78.3	0.337	53.4
82.9	0.396	53.3
86.2	0.441	53.0
90.8	0.500	52.9
93.9	0.544	52.8
96.5	0.588	52.7
99.4	0.633	52.6
101.5	0.663	52.5
103.2	0.693	52.4
105.3	0.722	52.3
107.3	0.752	52.3
109.9	0.796	52.2
112.8	0.841	52.0
114.6	0.871	52.0
116.1	0.901	51.9

Tested By: MY Date: 3/27/18 Input Checked By: GEM Date: 4/2/18

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	6.3	Stage No.	1
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	6.04
Initial Sample Diameter (in)	2.84
Initial Sample Area (in ²)	6.34
Initial Sample Volume (in ³)	38.25

VOLUME CHANGE

Volume After Consolidation (in ³)	37.66
Length After Consolidation (in)	5.95
Area After Consolidation (in ²)	6.328

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	$\bar{A}$	$\bar{P}$	Q
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0.02	0.81	0.36	6.75	5.9	1.136	0.46	6.35	0.40
0.03	1.70	0.61	7.39	5.7	1.300	0.37	6.54	0.85
0.13	2.94	1.20	8.03	5.1	1.576	0.43	6.56	1.47
0.23	3.45	1.60	8.16	4.7	1.734	0.48	6.43	1.73
0.34	3.83	1.89	8.23	4.4	1.869	0.52	6.32	1.91
0.48	4.28	2.25	8.34	4.1	2.057	0.55	6.19	2.14
0.63	4.62	2.51	8.42	3.8	2.219	0.57	6.10	2.31
0.83	5.08	2.78	8.59	3.5	2.444	0.57	6.06	2.54
1.18	5.69	3.10	8.89	3.2	2.781	0.57	6.04	2.85
1.67	6.41	3.35	9.36	2.9	3.176	0.55	6.15	3.21
2.26	7.06	3.49	9.87	2.8	3.511	0.51	6.34	3.53
2.84	7.57	3.53	10.33	2.8	3.737	0.49	6.55	3.78
3.54	8.12	3.53	10.89	2.8	3.933	0.45	6.83	4.06
4.06	8.46	3.50	11.26	2.8	4.027	0.43	7.03	4.23
4.75	8.93	3.45	11.78	2.8	4.138	0.40	7.31	4.47
5.66	9.47	3.36	12.40	2.9	4.224	0.37	7.67	4.73
6.65	10.04	3.26	13.08	3.0	4.309	0.34	8.06	5.02
7.41	10.46	3.03	13.72	3.3	4.203	0.30	8.50	5.23
8.40	11.00	2.91	14.39	3.4	4.249	0.28	8.89	5.50
9.14	11.36	2.82	14.84	3.5	4.269	0.26	9.16	5.68
9.88	11.64	2.72	15.22	3.6	4.249	0.24	9.40	5.82
10.64	11.96	2.59	15.67	3.7	4.222	0.23	9.69	5.98
11.15	12.18	2.50	15.97	3.8	4.208	0.21	9.89	6.09
11.64	12.35	2.42	16.23	3.9	4.184	0.20	10.06	6.18
12.13	12.58	2.34	16.53	4.0	4.180	0.19	10.24	6.29
12.63	12.77	2.27	16.80	4.0	4.165	0.18	10.42	6.39
13.37	13.02	2.16	17.16	4.1	4.142	0.17	10.65	6.51
14.13	13.30	2.04	17.56	4.3	4.125	0.16	10.91	6.65
14.63	13.47	1.97	17.80	4.3	4.114	0.15	11.06	6.74
15.13	13.59	1.90	17.99	4.4	4.090	0.15	11.19	6.80

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	2

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.260	Diameter 1:	2.853
Length 2:	6.289	Diameter 2:	2.848
Length 3:	6.211	Diameter 3:	2.812
Avg. Length	6.253	Avg. Diam.:	2.838

PRESSURES (psi)

Cell Pressure (psi)	62.5
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	12.5
Pore Pressure Response (%)	100

VOLUME CHANGE

Initial Burette Reading (ml)	72.0
Final Burette Reading (ml)	20.4
Final Change (ml)	51.6

MAXIMUM OBLIQUITY POINTS

$\bar{P}$	=	4.83
Q	=	3.95

Initial Dial Reading (mil)	193
Dial Reading After Saturation (mil)	193
Dial Reading After Consolidation (mil)	335

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
11.0	0.000	50.0
13.7	0.001	50.0
18.8	0.003	50.2
33.8	0.009	51.3
42.1	0.015	52.3
48.2	0.021	53.2
55.3	0.030	54.2
60.9	0.039	55.0
67.0	0.051	55.7
72.5	0.073	57.5
68.7	0.104	60.0
66.9	0.142	60.9
66.0	0.180	61.3
64.7	0.224	61.4
64.1	0.254	61.5
62.7	0.297	61.6
61.0	0.357	61.6
59.1	0.420	61.7
57.2	0.466	61.7
52.1	0.528	61.8
48.2	0.575	61.9
44.9	0.622	62.0
42.4	0.668	62.1
41.2	0.700	62.1
40.4	0.731	62.2
39.9	0.763	62.2
39.0	0.794	62.2
37.5	0.841	62.3
36.2	0.888	62.3
35.5	0.918	62.3
34.8	0.918	62.4

Tested By: MY Date: 3/27/18 Input Checked By: GEM Date: 4/2/18

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	12.5	Stage No.	1
		Test No	2

INITIAL DIMENSIONS

Initial Sample Length (in)	6.25	Volume After Consolidation (in ³)	36.40
Initial Sample Diameter (in)	2.84	Length After Consolidation (in)	6.11
Initial Sample Area (in ²)	6.32	Area After Consolidation (in ²)	5.956
Initial Sample Volume (in ³)	39.55		

VOLUME CHANGE

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	$\bar{A}$	$\bar{P}$	Q
------------	------------------	------------	------------------	------------------	----------------------------------	-----------	-----------	---

0.01	0.44	0.03	12.92	12.5	1.035	0.07	12.70	0.22
0.05	1.31	0.19	13.62	12.3	1.106	0.15	12.97	0.65
0.15	3.82	1.32	15.01	11.2	1.341	0.35	13.10	1.91
0.25	5.19	2.34	15.36	10.2	1.511	0.45	12.76	2.60
0.35	6.22	3.19	15.54	9.3	1.667	0.51	12.43	3.11
0.50	7.39	4.19	15.71	8.3	1.888	0.57	12.01	3.69
0.65	8.31	4.96	15.86	7.5	2.101	0.60	11.71	4.16
0.84	9.31	5.74	16.08	6.8	2.376	0.62	11.42	4.66
1.20	10.19	7.55	15.15	5.0	3.055	0.74	10.05	5.09
1.70	9.52	9.99	12.04	2.5	4.781	1.05	7.28	4.76
2.33	9.16	10.93	10.75	1.6	6.788	1.19	6.16	4.58
2.94	8.96	11.27	10.20	1.2	8.227	1.26	5.72	4.48
3.66	8.68	11.45	9.75	1.1	9.188	1.32	5.40	4.34
4.16	8.53	11.51	9.53	1.0	9.527	1.35	5.27	4.27
4.85	8.26	11.57	9.20	0.9	9.775	1.40	5.07	4.13
5.85	7.89	11.63	8.78	0.9	9.929	1.47	4.83	3.95
6.88	7.51	11.67	8.35	0.8	9.897	1.55	4.60	3.75
7.62	7.15	11.69	7.97	0.8	9.729	1.63	4.40	3.58
8.64	6.29	11.78	7.03	0.7	9.581	1.87	3.88	3.15
9.41	5.64	11.88	6.27	0.6	9.995	2.11	3.45	2.82
10.17	5.10	11.99	5.62	0.5	10.775	2.35	3.07	2.55
10.94	4.69	12.09	5.12	0.4	12.036	2.57	2.77	2.35
11.45	4.49	12.12	4.88	0.4	12.568	2.70	2.63	2.25
11.96	4.34	12.17	4.68	0.3	13.541	2.81	2.51	2.17
12.48	4.24	12.19	4.56	0.3	14.263	2.88	2.44	2.12
12.99	4.08	12.22	4.37	0.3	15.121	3.00	2.33	2.04
13.76	3.83	12.28	4.06	0.2	17.424	3.21	2.15	1.91
14.53	3.61	12.31	3.81	0.2	18.943	3.41	2.01	1.81
15.02	3.49	12.34	3.67	0.2	21.528	3.53	1.92	1.75
15.02	3.39	12.36	3.54	0.1	24.190	3.65	1.84	1.70

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	3

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.187	Diameter 1:	2.868
Length 2:	6.199	Diameter 2:	2.840
Length 3:	6.194	Diameter 3:	2.812
Avg. Length:	6.193	Avg. Diam.:	2.840

PRESSURES (psi)

Cell Pressure (psi)	75.0
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	25.0
Pore Pressure Response (%)	95

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	17.9
Final Change (ml)	30.1

MAXIMUM OBLIQUITY POINTS

$\bar{P}$	=	33.98
Q	=	24.13

Initial Dial Reading (mil)	282
Dial Reading After Saturation (mil)	331
Dial Reading After Consolidation (mil)	353

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
12.2	0.000	50.0
18.0	0.001	50.2
19.9	0.003	50.2
23.6	0.009	50.3
29.0	0.015	50.4
32.1	0.021	50.6
35.1	0.030	50.7
40.5	0.039	50.9
44.1	0.051	51.2
54.5	0.073	52.0
66.4	0.104	53.3
117.8	0.142	60.7
138.3	0.180	64.3
169.3	0.224	66.1
187.5	0.254	66.8
211.0	0.297	67.1
224.4	0.357	67.2
247.3	0.420	66.8
270.5	0.466	66.3
305.3	0.528	65.7
329.4	0.575	65.1
342.9	0.622	64.5
363.0	0.668	63.8
380.2	0.700	63.3
401.6	0.731	62.8
423.0	0.763	62.3
439.4	0.794	61.8
460.9	0.841	61.0
466.4	0.888	60.1
479.2	0.918	59.5

Tested By: MY Date: 3/27/18 Input Checked By: GEM Date: 4/2/18

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	25.0	Stage No.	1
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in) 6.19
Initial Sample Diameter (in) 2.84
Initial Sample Area (in²) 6.33
Initial Sample Volume (in³) 39.23

VOLUME CHANGE

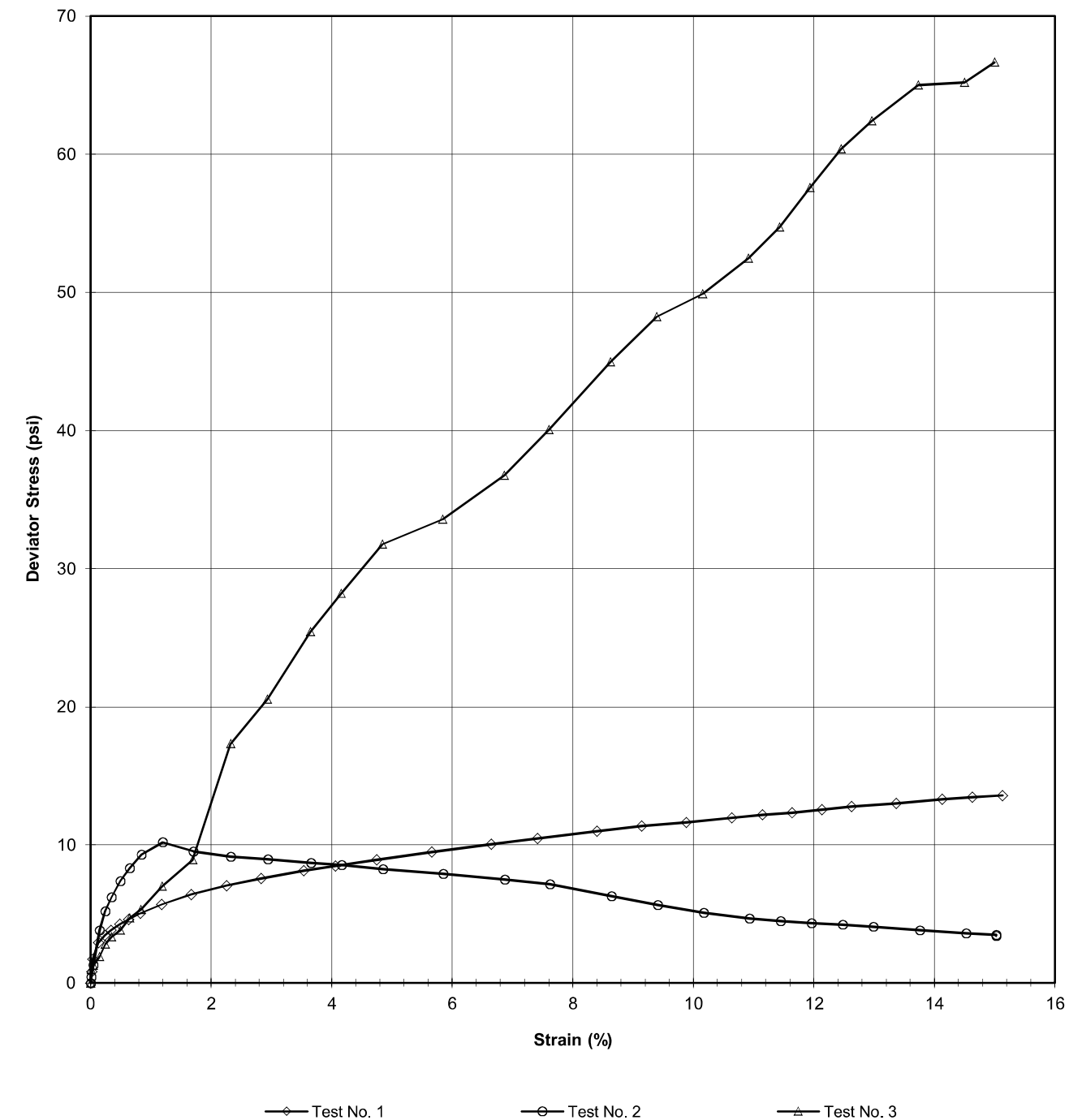
Volume After Consolidation (in³) 36.46
Length After Consolidation (in) 6.12
Area After Consolidation (in²) 5.956

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	$\bar{A}$	$\bar{P}$	Q
0.01	0.97	0.21	25.77	24.8	1.039	0.22	25.28	0.49
0.05	1.29	0.23	26.06	24.8	1.052	0.18	25.42	0.64
0.15	1.92	0.29	26.63	24.7	1.078	0.16	25.67	0.96
0.25	2.81	0.40	27.41	24.6	1.114	0.15	26.01	1.40
0.35	3.32	0.56	27.77	24.4	1.136	0.18	26.11	1.66
0.49	3.83	0.70	28.13	24.3	1.157	0.19	26.21	1.91
0.64	4.71	0.91	28.81	24.1	1.196	0.20	26.45	2.36
0.84	5.31	1.20	29.12	23.8	1.223	0.24	26.46	2.66
1.19	7.02	1.96	30.06	23.0	1.305	0.29	26.55	3.51
1.70	8.94	3.28	30.66	21.7	1.412	0.39	26.19	4.47
2.32	17.31	10.67	31.64	14.3	2.208	0.65	22.98	8.66
2.94	20.55	14.30	31.25	10.7	2.921	0.73	20.97	10.27
3.65	25.41	16.12	34.29	8.9	3.861	0.67	21.59	12.71
4.16	28.21	16.79	36.42	8.2	4.436	0.63	22.31	14.10
4.85	31.77	17.15	39.62	7.9	5.046	0.57	23.73	15.88
5.84	33.55	17.16	41.40	7.8	5.278	0.54	24.62	16.78
6.86	36.76	16.79	44.96	8.2	5.478	0.48	26.59	18.38
7.60	40.07	16.34	48.73	8.7	5.625	0.43	28.70	20.03
8.63	44.97	15.71	54.25	9.3	5.843	0.37	31.77	22.48
9.39	48.26	15.15	58.11	9.9	5.899	0.33	33.98	24.13
10.16	49.88	14.53	60.35	10.5	5.762	0.31	35.41	24.94
10.92	52.47	13.83	63.63	11.2	5.699	0.28	37.40	26.23
11.43	54.73	13.33	66.40	11.7	5.689	0.26	39.04	27.36
11.94	57.57	12.82	69.76	12.2	5.726	0.23	40.97	28.79
12.46	60.38	12.29	73.09	12.7	5.752	0.21	42.90	30.19
12.96	62.42	11.80	75.62	13.2	5.730	0.20	44.41	31.21
13.74	64.99	10.96	79.03	14.0	5.627	0.18	46.54	32.49
14.50	65.20	10.10	80.11	14.9	5.375	0.16	47.50	32.60
15.00	66.64	9.55	82.10	15.5	5.313	0.15	48.77	33.32

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11



Client: Terracon Boring No.: P-5707 L-40+50
Client Reference: Rogers Rd. Grade Separation Depth (ft): 15.5-17.5
Project No.: R-2018-074-001 Sample No.: ST-1
Lab ID: R-2018-074-001-001
Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)



Tested By: MY Date: 3/27/18 Approved By: MPS Date: 4/2/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
ASTM D4767-11

Client: Terracon
Client Reference: Rogers Rd. Grade Separation
Project No.: R-2018-074-001
Lab ID: R-2018-074-001-001 Specific Gravity (assumed) 2.7

Visual Description: ORANGE CLAYEY SAND (UNDISTURBED)

SAMPLE CONDITION SUMMARY

Boring No.:	P-5707 L-40+50	P-5707 L-40+50	P-5707 L-40+50
Depth (ft):	15.5-17.5	15.5-17.5	15.5-17.5
Sample No.:	ST-1	ST-1	ST-1
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.002	0.002	0.002
Back Pressure (psi)	50.0	50.0	50.0
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	20.2	20.2	20.2
Total Unit Weight (pcf)	108.0	110.4	114.1
Dry Unit Weight (pcf)	89.8	91.9	94.9
Moisture Content (%) (FINAL)	31.3	37.8	18.8
Initial State Void Ratio, e	0.877	0.835	0.776
Void Ratio at Shear, e	0.849	0.689	0.651

Tested By: MY Date: 3/27/18 Input Checked By: GEM Date: 4/2/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
ASTM D4767-11

Client: Terracon
Client Reference: Rogers Rd. Grade Separation
Project No.: R-2018-074-001
Lab ID: R-2018-074-001-001

Boring No.: P-5707 L-40+50
Depth (ft): 15.5-17.5
Sample No.: ST-1

TEST 1 INITIAL



TEST 1 FINAL



TEST 2 INITIAL



TEST 2 FINAL



TEST 3 INITIAL



TEST 3 FINAL



Tested By MY Date 3/27/18

Approved By MPS Date 4/2/18