

REFERENCE: B-4844

PROJECT: 38614

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4844	1	18

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY DUPLIN/WAYNE  
PROJECT DESCRIPTION BRIDGE NO. 117 ON -L- (SR 1958/  
SR 1502) OVER NORTHEAST CAPE FEAR RIVER

**INVENTORY**

**CONTENTS**

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
-L-	15+00 TO 37+20	4-5	4-5

**CROSS SECTIONS**

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	18+50 TO 32+50	6-17

**SAMPLE RESULTS**

18

**CAUTION NOTICE**

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

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

**PERSONNEL**

S.N. ZIMARINO

R.E. SMITH

D.N. ARGENBRIGHT

INVESTIGATED BY T.C. BOTTOMS

DRAWN BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2019



DocuSigned by:  
Tyler Bottoms 7/29/2019

48A2D3BD08CF4A6  
SIGNATURE DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

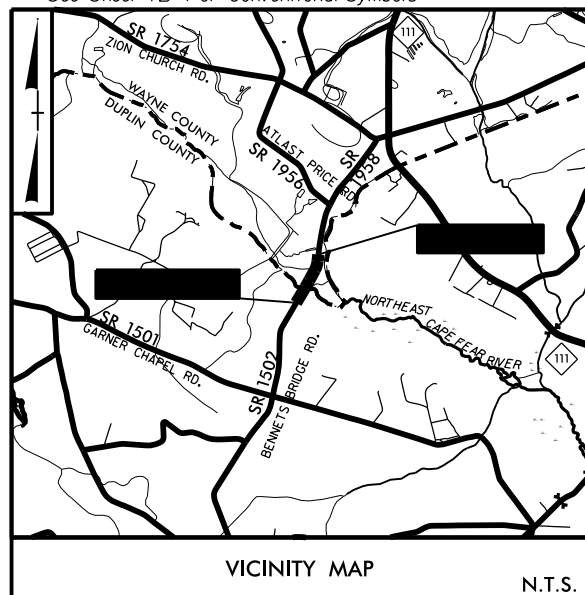
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It includes detailed classification charts, legends for soil types, gradation symbols, rock hardness, and various engineering terms and symbols.

09/08/99

**TIP PROJECT: B-4844**

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



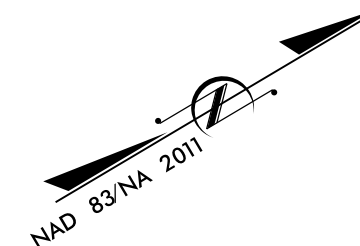
65% PLANS

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## DUPLIN/WAYNE COUNTIES

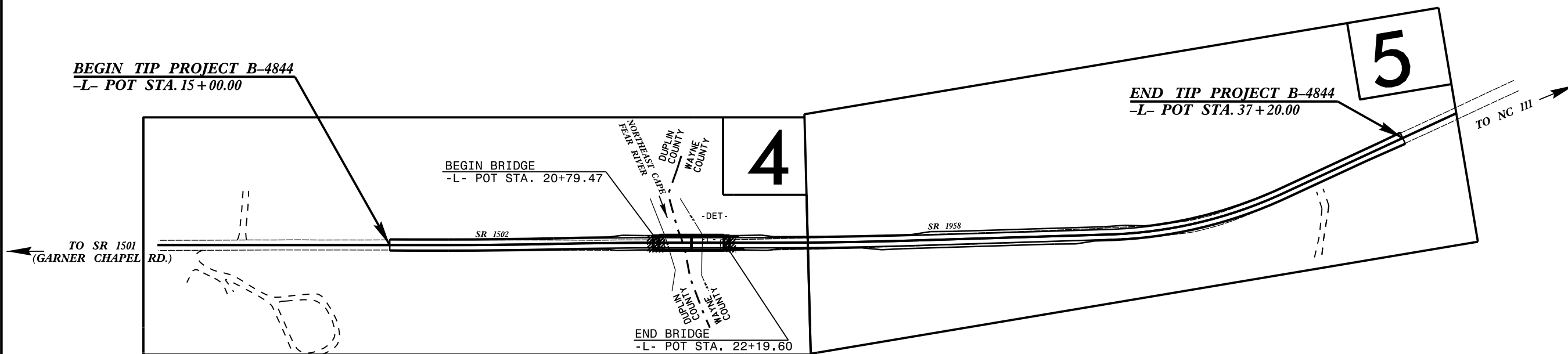
**LOCATION: REPLACE BRIDGE NO. 950117 OVER NORTHEAST CAPE FEAR RIVER ON SR 1958/1502 (BENNETTS BRIDGE RD.)**

**TYPE OF WORK: DETOUR, TEMPORARY STRUCTURE, GRADING, PAVING, DRAINAGE, AND STRUCTURE**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4844	3	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38614.1.3		PE	
		RW	
		CONST.	

**BEGIN TIP PROJECT B-4844**  
-L- POT STA. 15+00.00



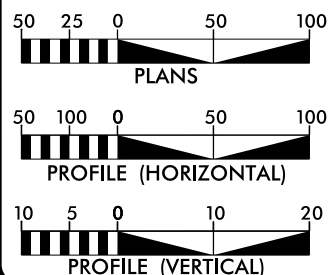
DESIGN EXCEPTION REQUESTED FOR  
MIN. HORIZONTAL CURVE RADIUS &  
SAG VERTICAL CURVE K VALUE.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO  
THE LIMITS ESTABLISHED BY METHOD II.

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

**CONTRACT:**

### GRAPHIC SCALES



### DESIGN DATA

ADT 2019 = 2,150  
 ADT 2039 = 3,150  
 K = N/A  
 D = 3.0 %  
 T = N/A  
 V = 60 MPH  
 \* TTST = 3.0 DUAL 3%  
 FUNC CLASS =  
 LOCAL, RURAL  
 SUBREGIONAL TIER

### PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4844 = 0.393 MILES  
 LENGTH OF STRUCTURE TIP PROJECT B-4844 = 0.027 MILES  
 TOTAL LENGTH OF TIP PROJECT B-4844 = 0.420 MILES

NCDOT CONTACT: --- RACHEL EVANS, PE  
DIVISION 4 PROJECT MANAGER

PLANS PREPARED FOR THE NCDOT BY:

**STV ENGINEERS, INC.**

1600 Perimeter Park Dr., Ste. 225, Morrisville NC, 27560  
NC License Number F-0991

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
MARCH 1, 2019

LETTING DATE:  
TBD

PATRICK A. LIVINGSTON, PE  
PROJECT ENGINEER

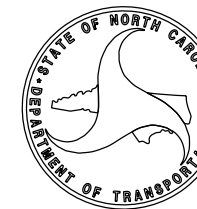
STARKE W. HIPPI, EI  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

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

ROADWAY DESIGN  
ENGINEER

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



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

JAMES H. TROGDON, III  
SECRETARY

March 5, 2019

State Project: 38614.1.3 (B-4844)  
F.A. Project: BRZ-1958(005)  
County: Duplin/ Wayne  
Description: Bridge No. 117 on -L- (SR 1958/ SR 1502) over Northeast Cape Fear River  
Subject: Geotechnical Inventory Report

**Project Description**

This project begins approximately 0.7 miles north of the intersection of SR 1502 and Garner Chapel Road in Duplin County, and extends north along SR 1502 and SR 1958 for approximately 0.4 miles. Proposed construction consists of widening and raising the grade of SR 1958/ SR 1502 as well as construction of a temporary detour. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in February of 2019. SPT and hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignment was investigated. Subsurface profiles and selected cross sections of this alignment are included in this report.

<u>Line</u>	<u>Station(±)</u>
-L-	15+00 to 37+20

**Areas of Special Geotechnical Interest**

- 1) The entire project was found to exhibit seasonal high ground water.
- 2) The following section contains organic soils which have the potential to cause embankment/subgrade and or slope stability problems during construction:

<u>Line</u>	<u>Station(±)</u>
-L-	18+84 to 32+25

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Natural ground elevations ranged from 78± to 111± feet above sea level.

Surficial soils in this area are generally classified as alluvial sediments and are underlain by formational soils belonging to the Black Creek Formation.

**Ground Water**

Ground water data was collected in February of 2019. Ground water elevations ranged from 84± to 101± feet above sea level.

**Soils**

Soils encountered within this project area have been divided into three categories: Roadway Embankment, alluvial and formational

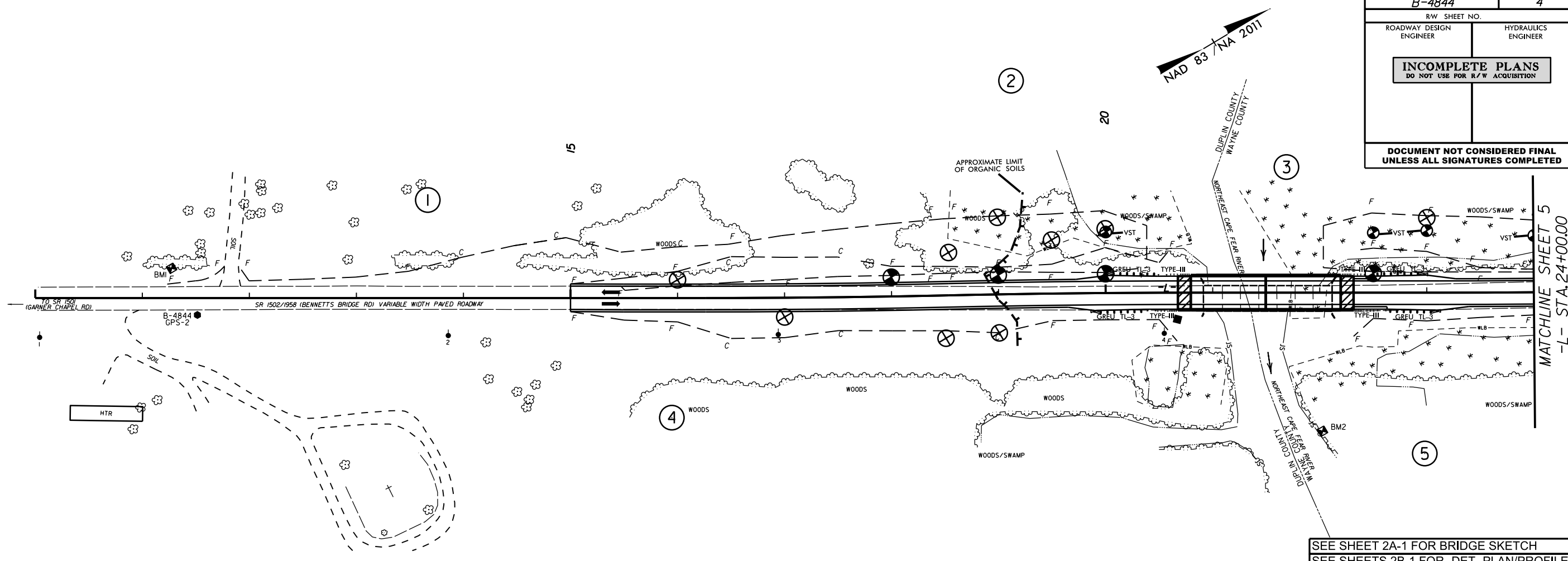
Roadway embankment soils were found along the existing SR 1958/ SR 1502 corridor. Where encountered it was composed of 1± to 7± feet of very loose to loose sand (A-2-4).

Soils identified as alluvial are composed of 1± to 10± feet of very loose to medium dense sand and gravel (A-2-4, A-3, A-1-b), 3± feet of very loose moderately organic sand, 6± feet of very soft little to moderately organic sandy silt (A-4), and 1 to 6± feet of very soft muck. Moisture samples taken within the organic units returned a natural moisture content ranging from 55% to 154%. Organic percentages ranged from 10% to 32%. Vane shear tests in the organic soils range from 84 to 2004 psf.

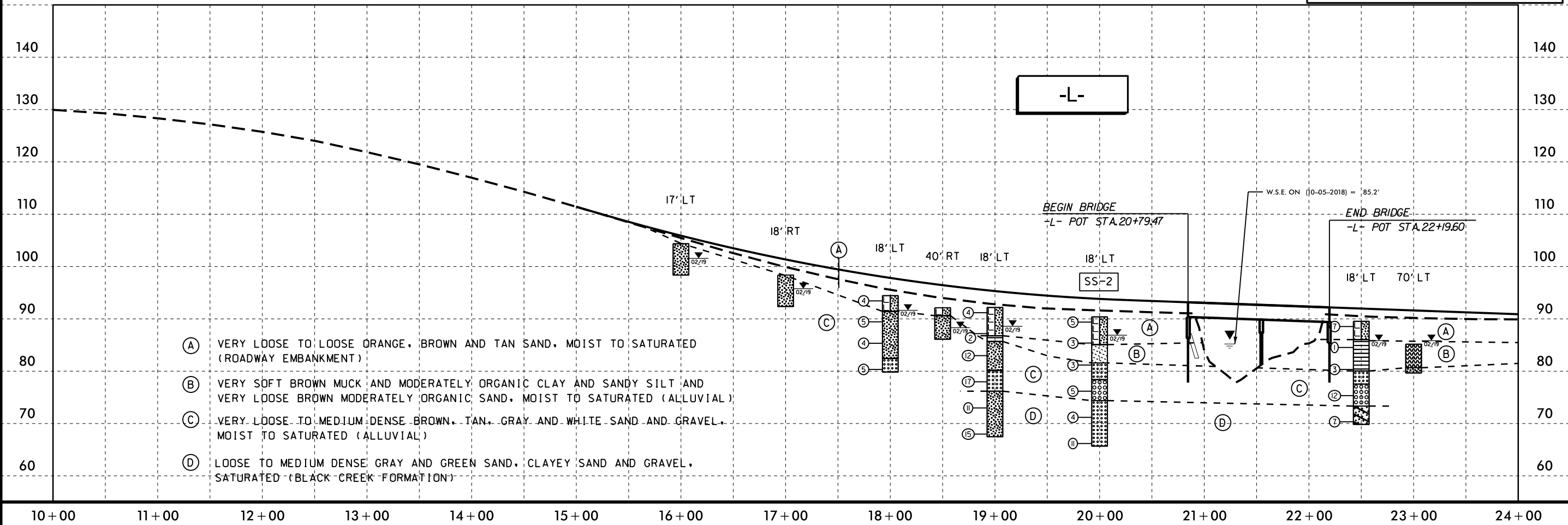
Formational soils belonging to the Black Creek Formation were encountered beneath the alluvial soils. Where encountered, these soils consisted of loose to medium dense sand, clayey sand and gravel (A-2-6, A-2-4, A-3).

8/17/99

PROJECT REFERENCE NO. <b>B-4844</b>	SHEET NO. <b>4</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



SEE SHEET 2A-1 FOR BRIDGE SKETCH  
SEE SHEETS 2B-1 FOR -DET- PLAN/PROFILE

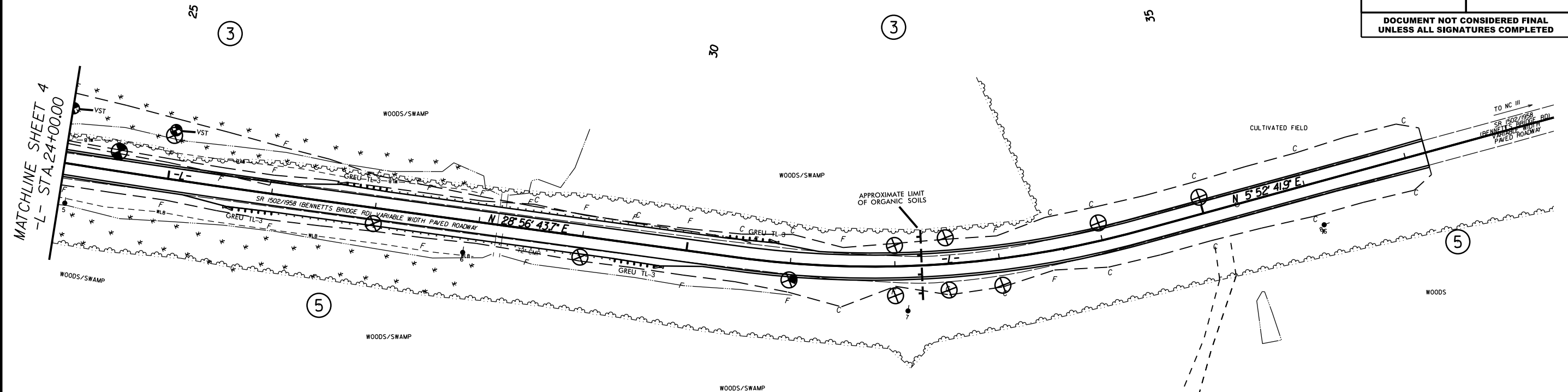
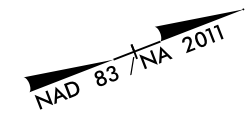


- (A) VERY LOOSE TO LOOSE ORANGE, BROWN AND TAN SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)
- (B) VERY SOFT BROWN MUCK AND MODERATELY ORGANIC CLAY AND SANDY SILT AND VERY LOOSE BROWN MODERATELY ORGANIC SAND, MOIST TO SATURATED (ALLUVIAL)
- (C) VERY LOOSE TO MEDIUM DENSE BROWN, TAN, GRAY AND WHITE SAND AND GRAVEL, MOIST TO SATURATED (ALLUVIAL)
- (D) LOOSE TO MEDIUM DENSE GRAY AND GREEN SAND, CLAYEY SAND AND GRAVEL, SATURATED (BLACK CREEK FORMATION)

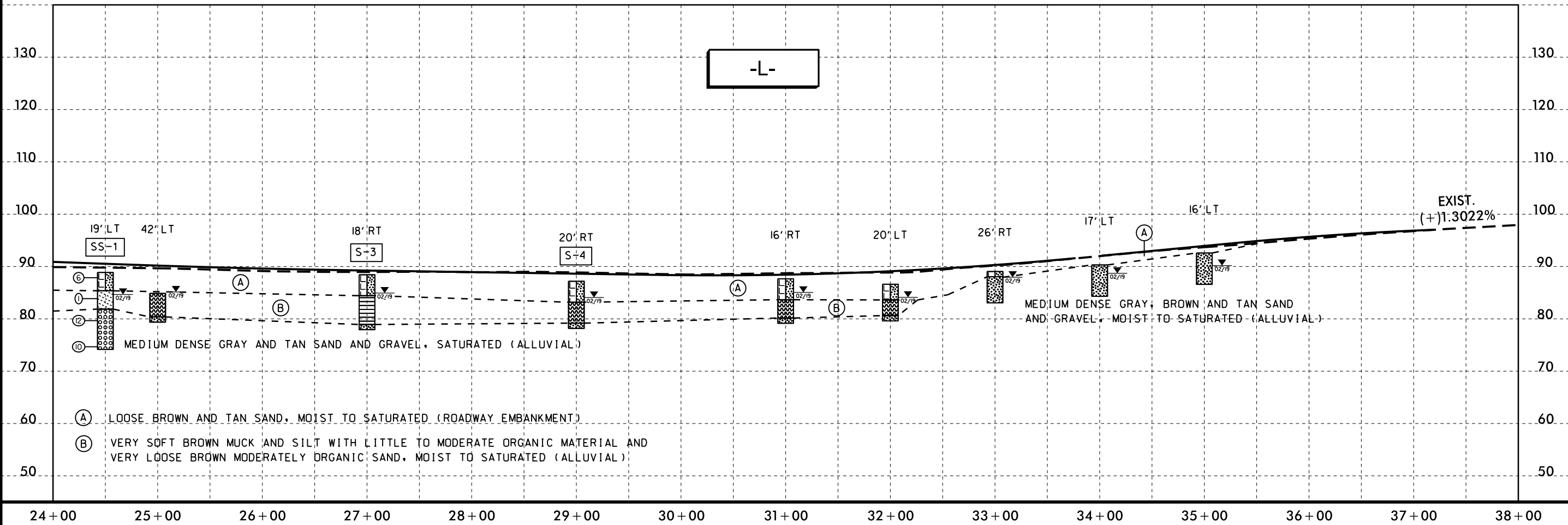
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8/17/99

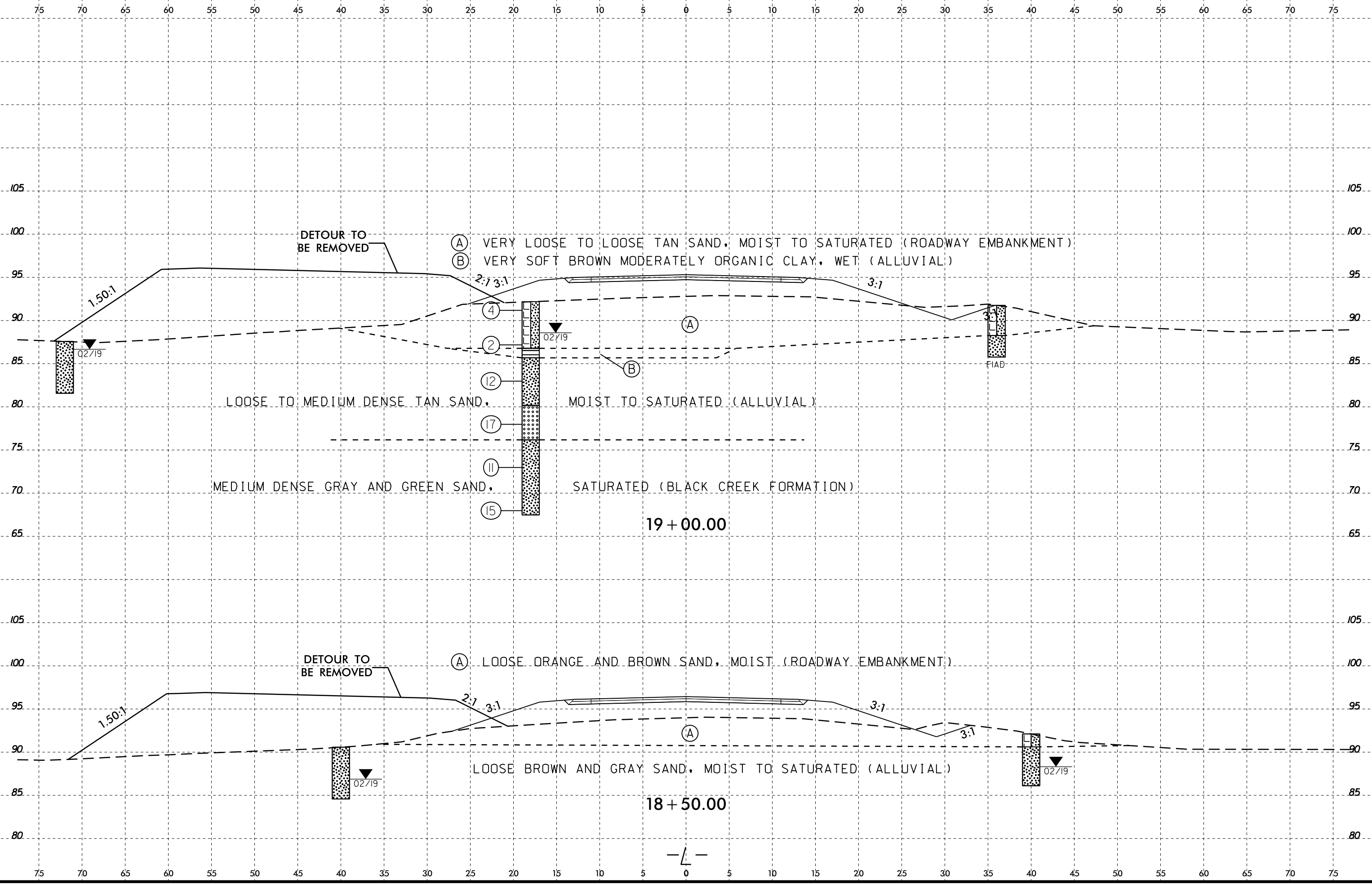
PROJECT REFERENCE NO. <b>B-4844</b>	SHEET NO. <b>5</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



SEE SHEETS 2B-1 FOR -DET- PLAN/PROFILE



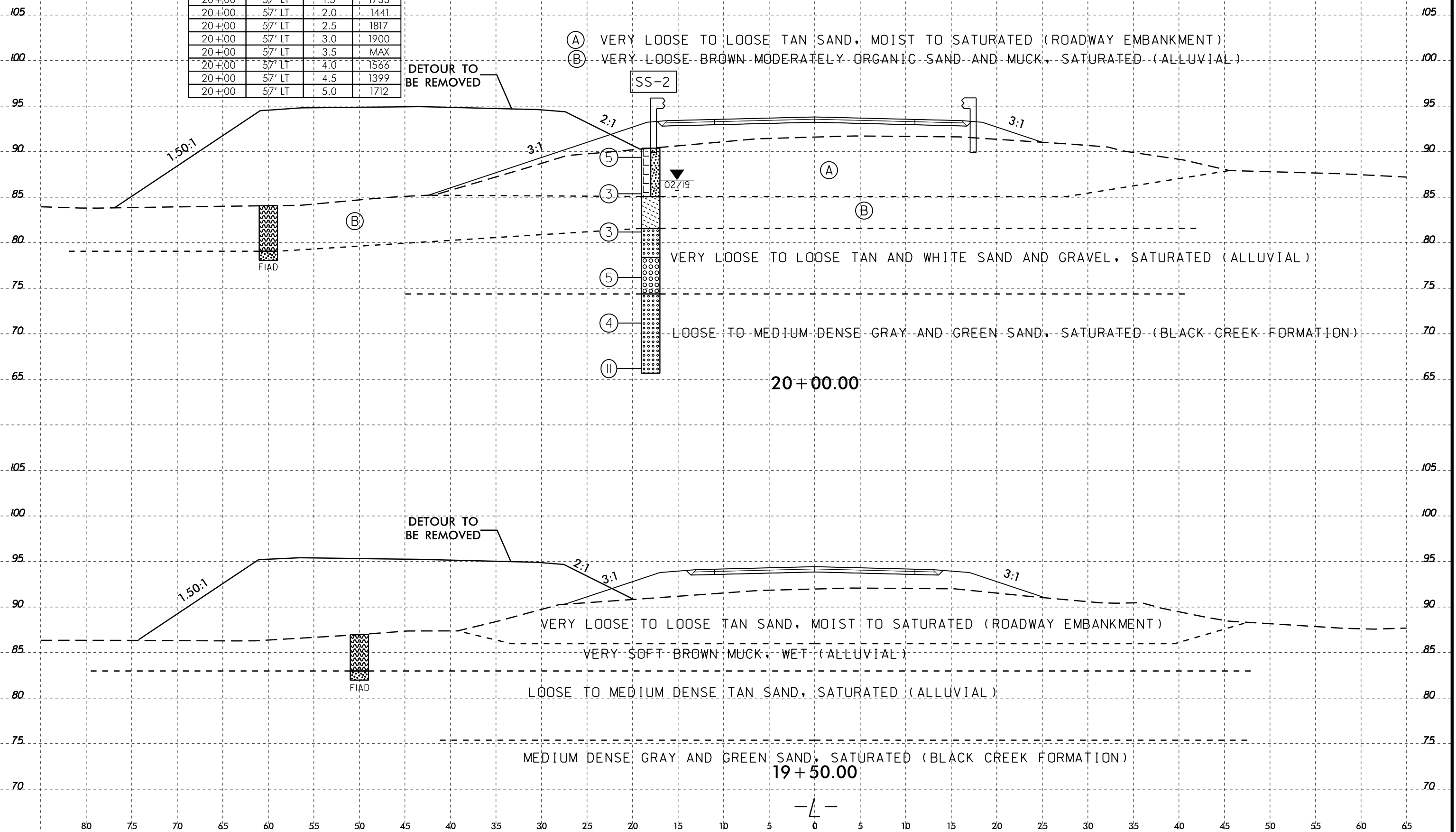
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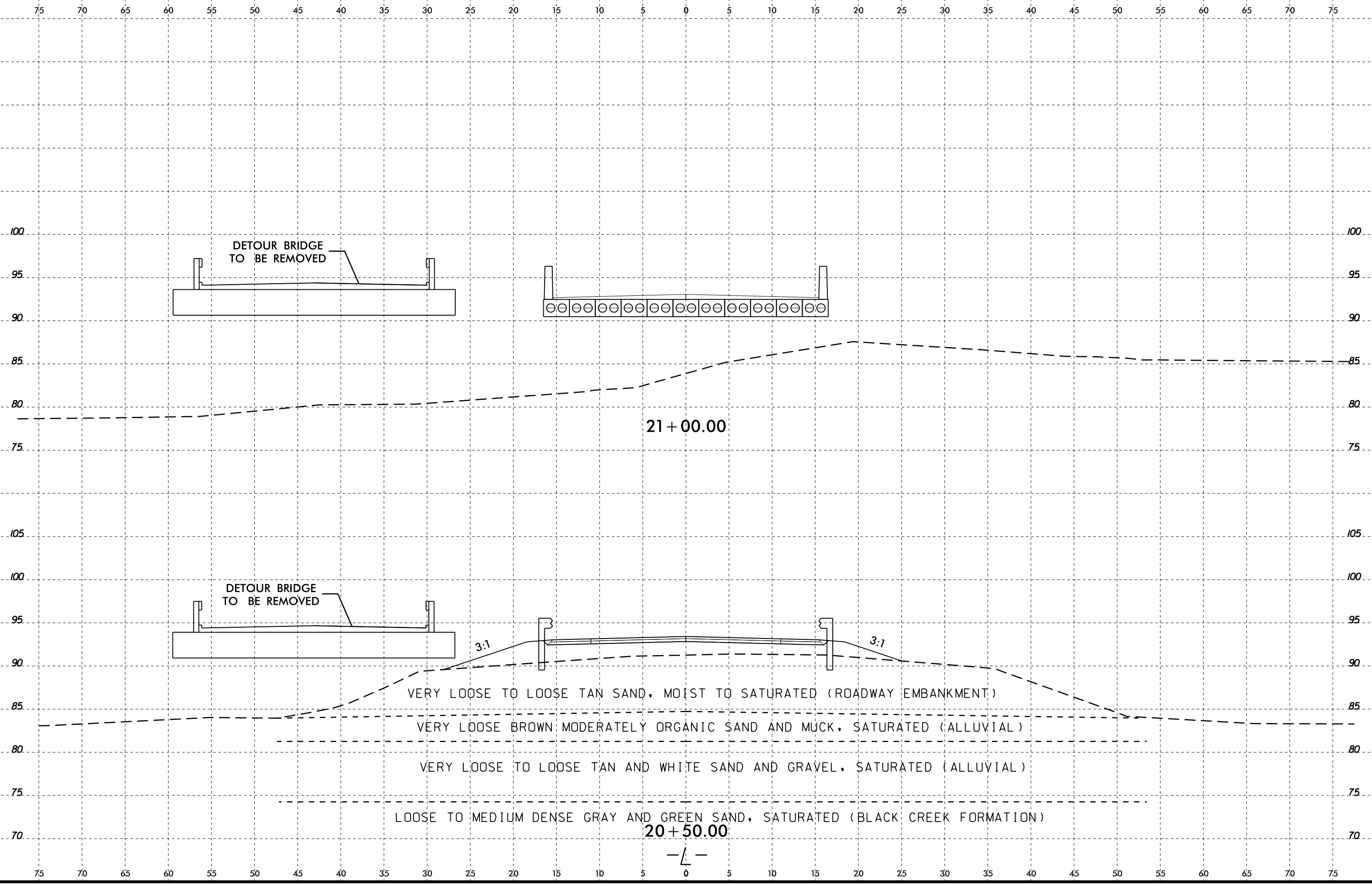
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### VANE SHEAR TESTS

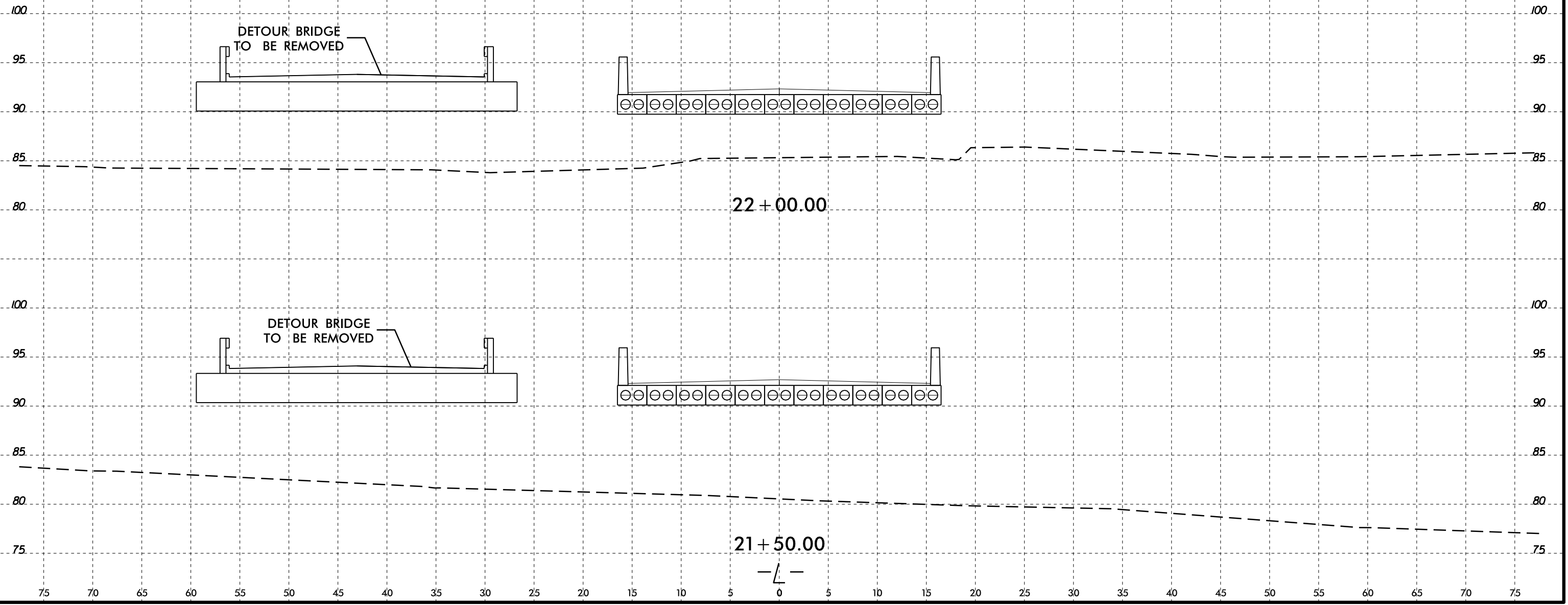
STATION	OFFSET	DEPTH	(psf)
20+00	57' LT	0.5	459
20+00	57' LT	1.0	1587
20+00	57' LT	1.5	1733
20+00	57' LT	2.0	1441
20+00	57' LT	2.5	1817
20+00	57' LT	3.0	1900
20+00	57' LT	3.5	MAX
20+00	57' LT	4.0	1566
20+00	57' LT	4.5	1399
20+00	57' LT	5.0	1712







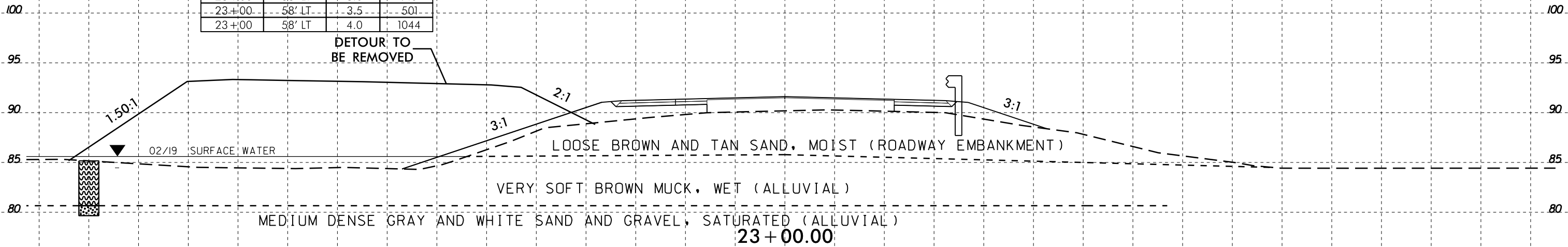
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

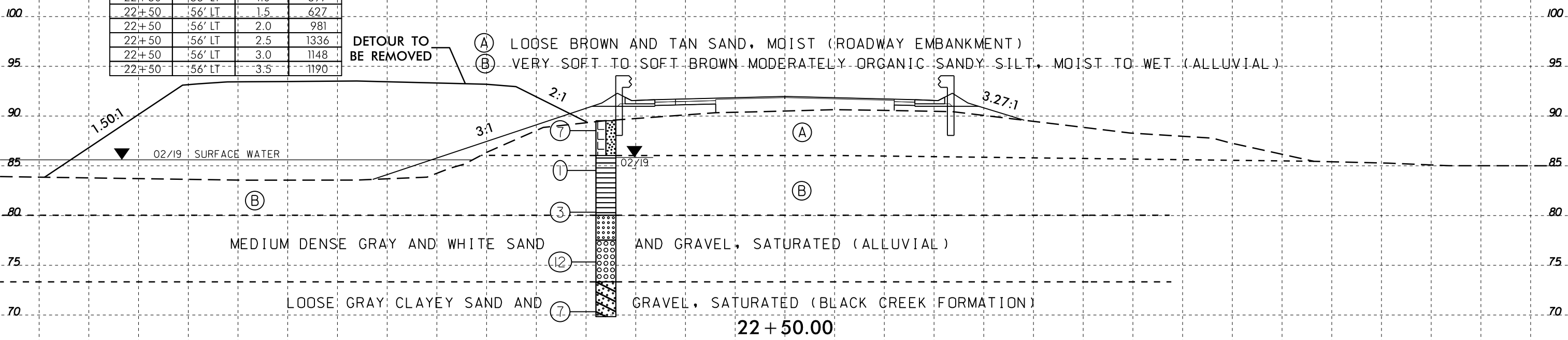
**VANE SHEAR TESTS**

STATION	OFFSET	DEPTH	(psf)
23+00	58' LT	0.5	125
23+00	58' LT	1.0	564
23+00	58' LT	1.5	835
23+00	58' LT	2.0	84
23+00	58' LT	2.5	731
23+00	58' LT	3.0	710
23+00	58' LT	3.5	501
23+00	58' LT	4.0	1044



**VANE SHEAR TESTS**

STATION	OFFSET	DEPTH	(psf)
22+50	56' LT	0.5	209
22+50	56' LT	1.0	397
22+50	56' LT	1.5	627
22+50	56' LT	2.0	981
22+50	56' LT	2.5	1336
22+50	56' LT	3.0	1148
22+50	56' LT	3.5	1190

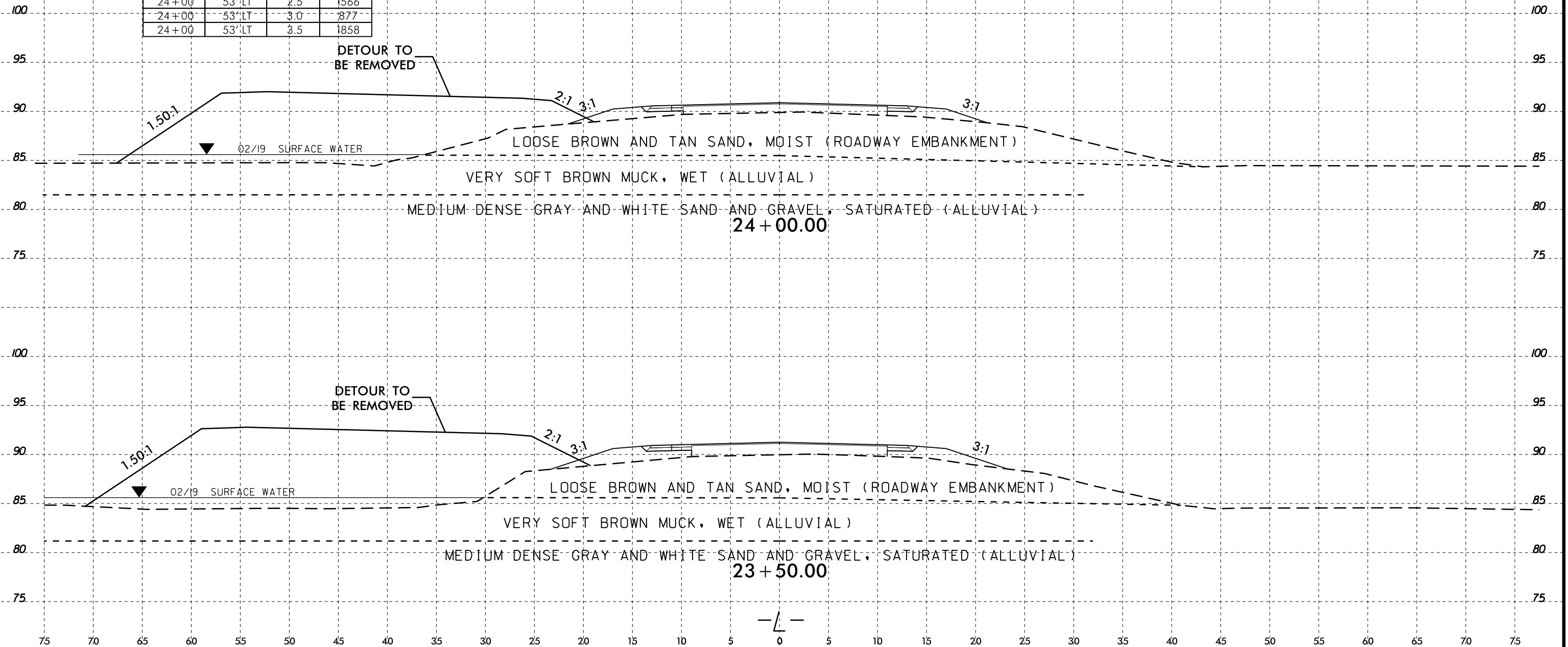


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75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

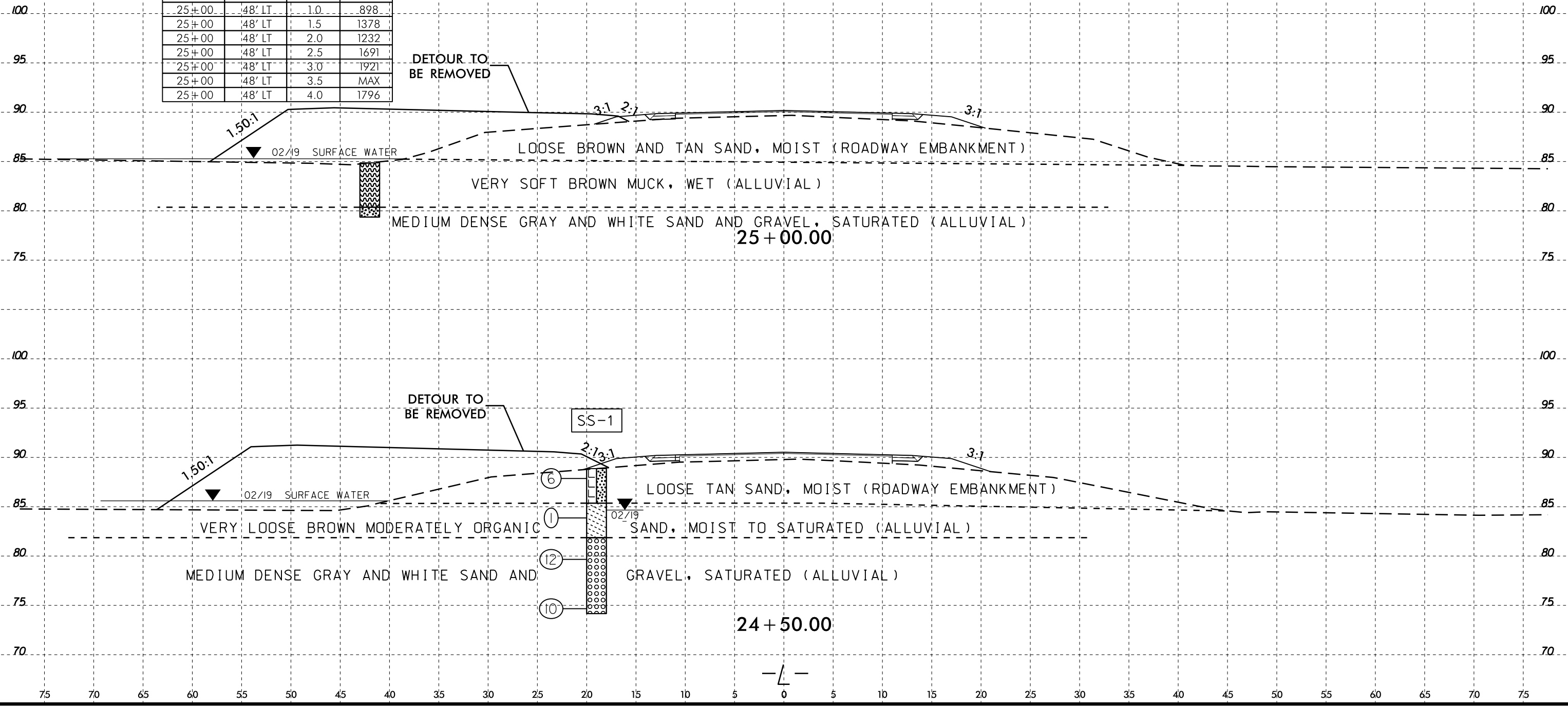
### VANE SHEAR TESTS

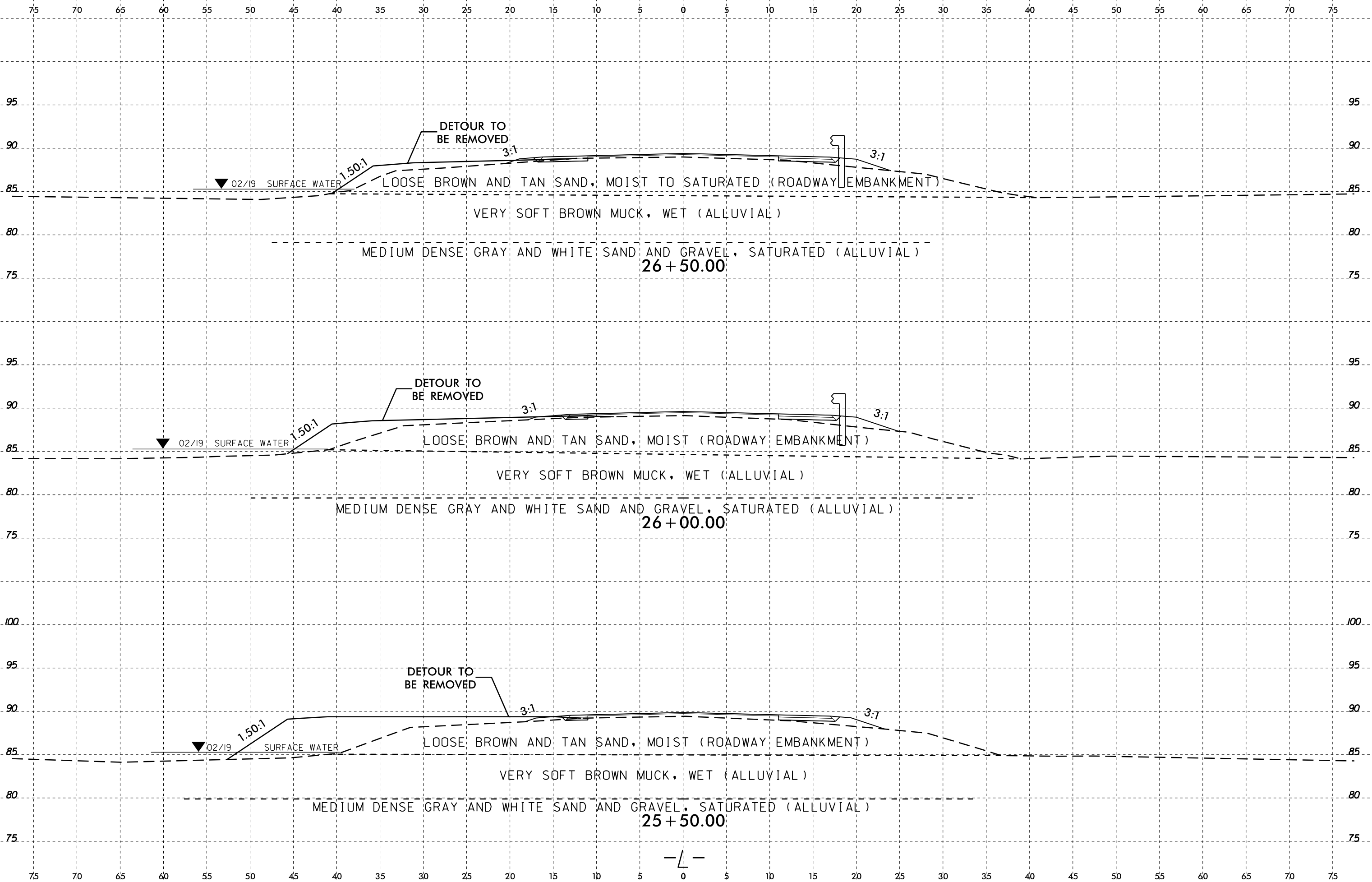
STATION	OFFSET	DEPTH	(psf)
24+00	53'LT	0.5	376
24+00	53'LT	1.0	835
24+00	53'LT	1.5	2004
24+00	53'LT	2.0	877
24+00	53'LT	2.5	1566
24+00	53'LT	3.0	877
24+00	53'LT	3.5	1858

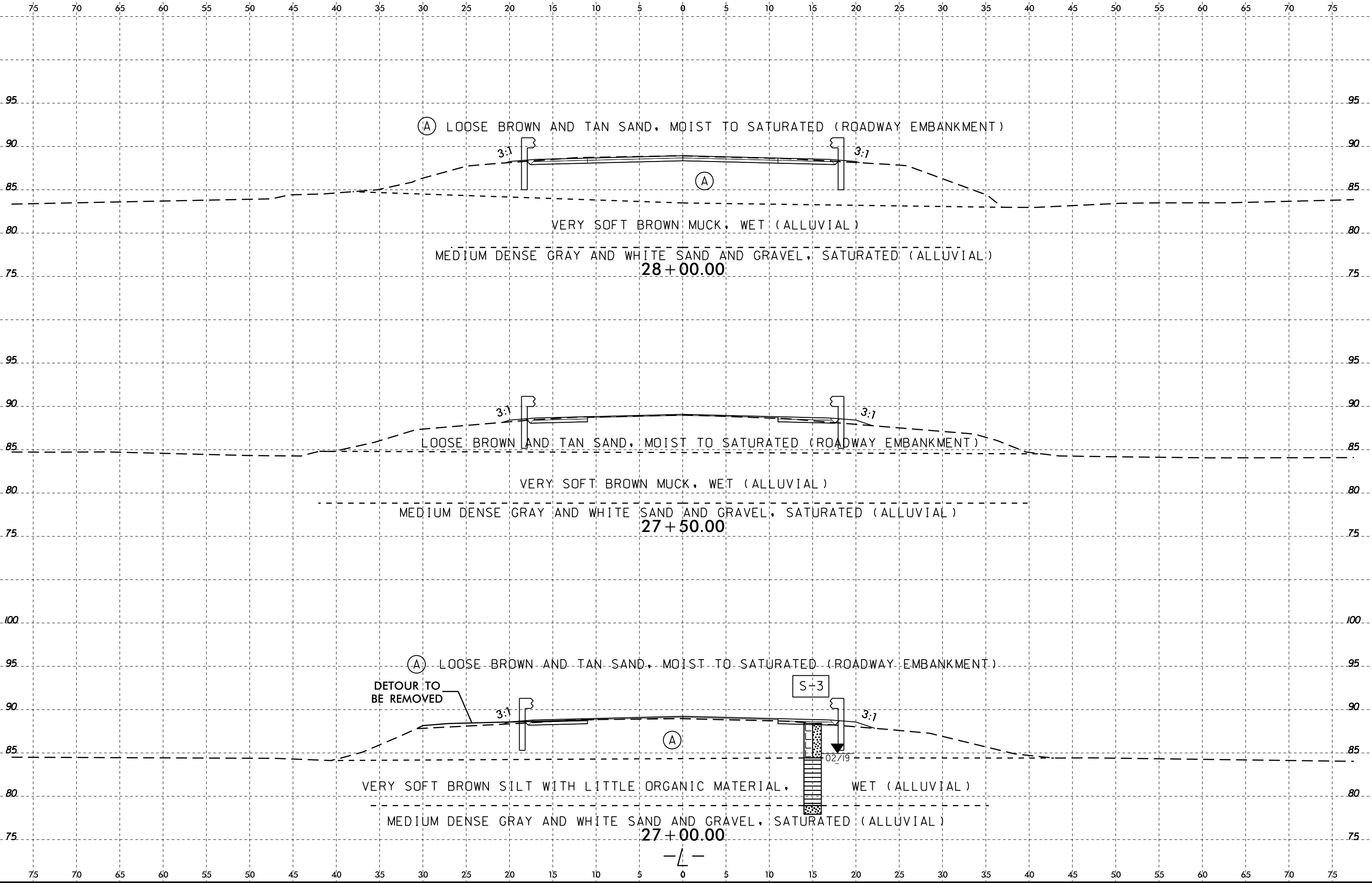


### VANE SHEAR TESTS

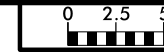
STATION	OFFSET	DEPTH	(psf)
25+00	48' LT	0.5	292
25+00	48' LT	1.0	898
25+00	48' LT	1.5	1378
25+00	48' LT	2.0	1232
25+00	48' LT	2.5	1691
25+00	48' LT	3.0	1921
25+00	48' LT	3.5	MAX
25+00	48' LT	4.0	1796



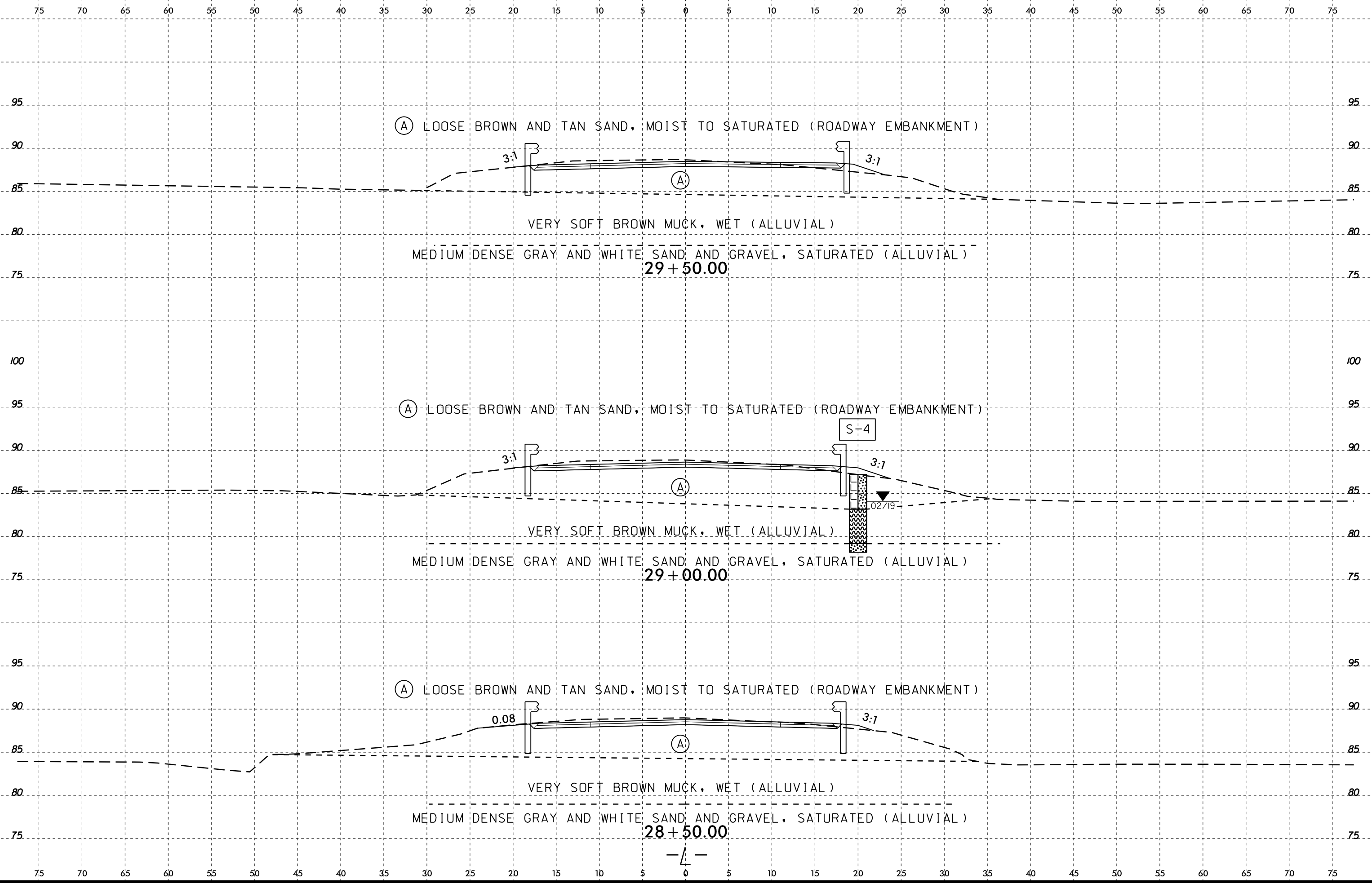




6/23/16

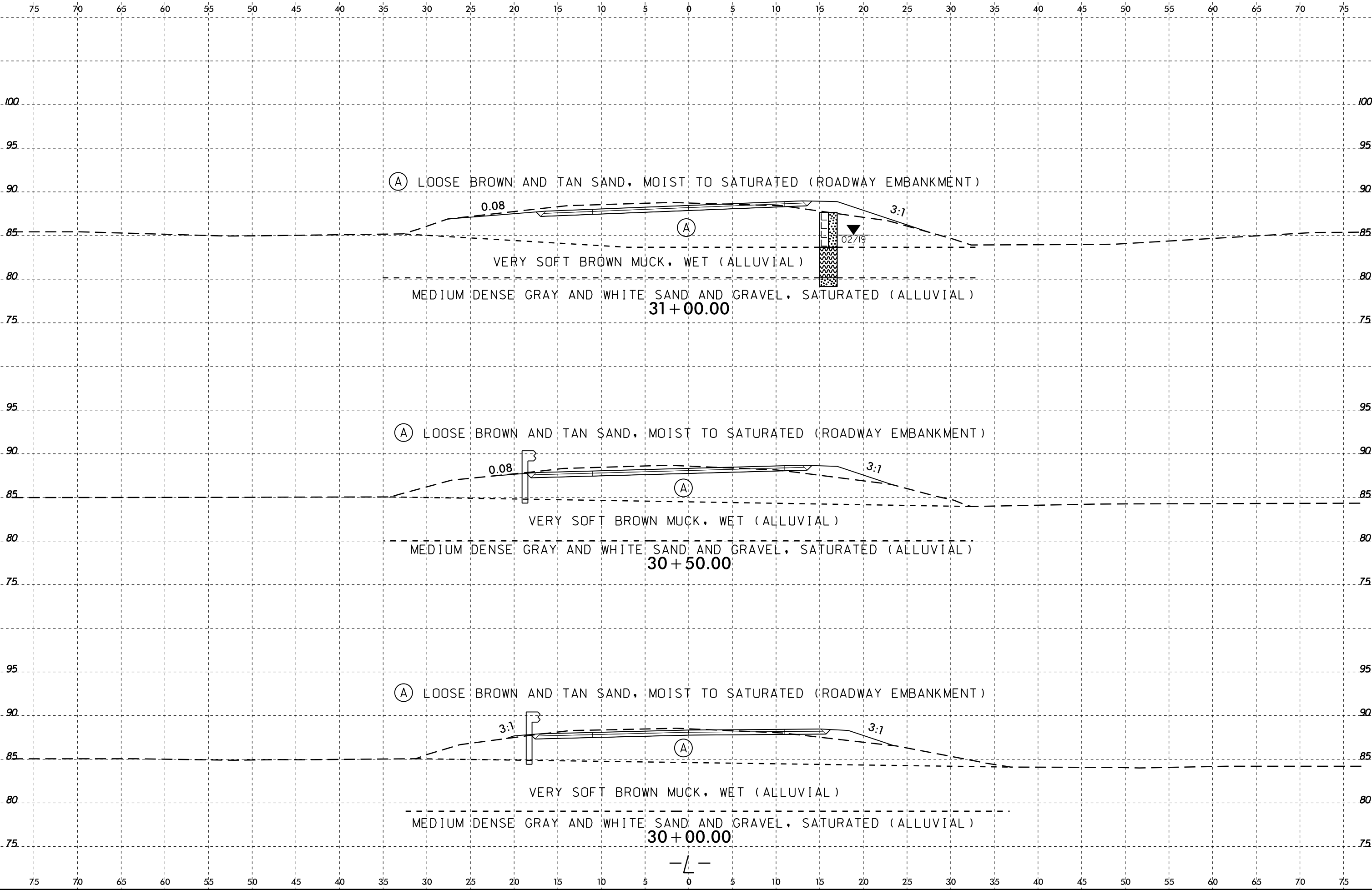


PROJ. REFERENCE NO.	SHEET NO.
B-4844	15

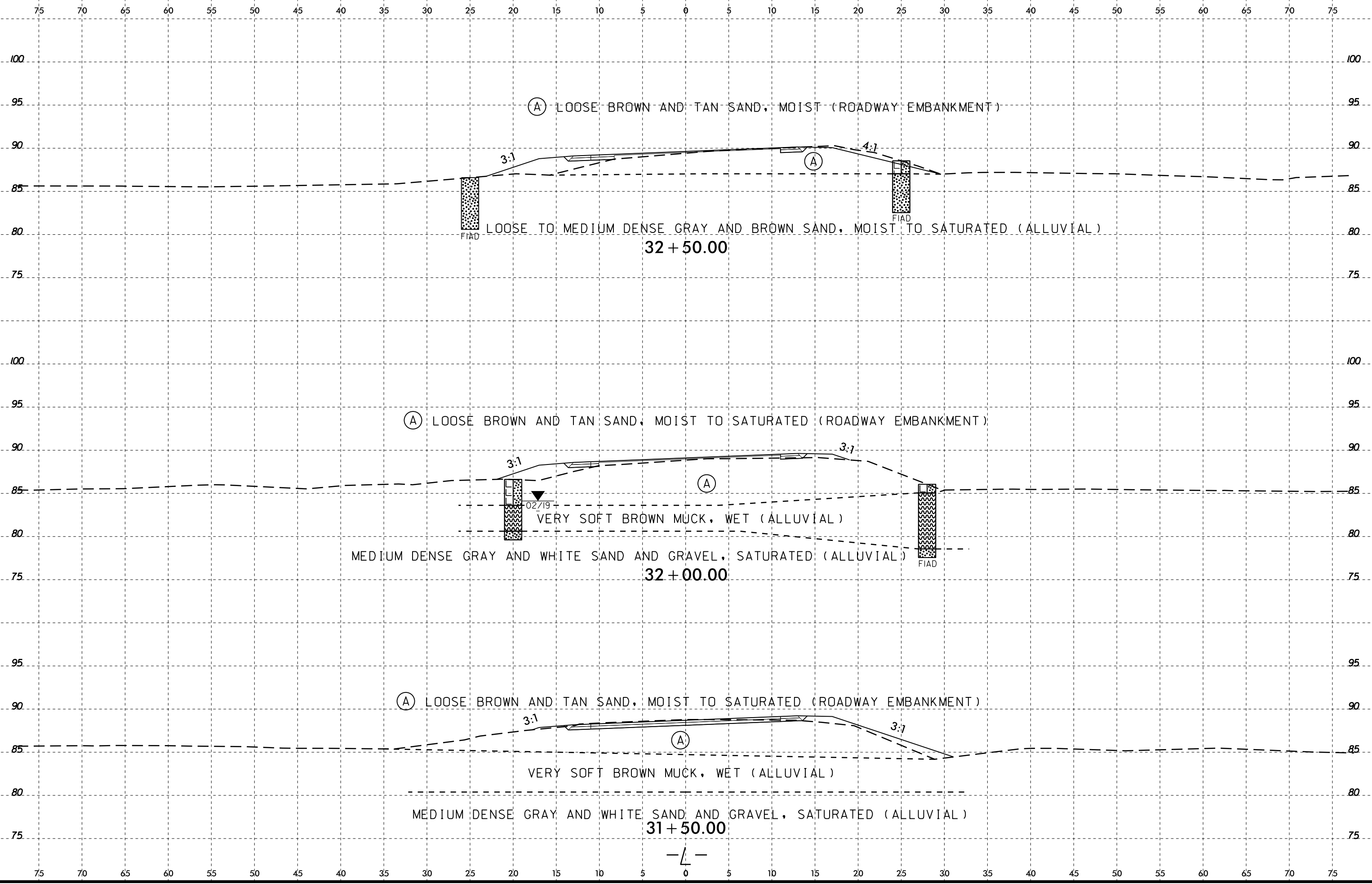


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6/23/16



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### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS- 1	19' LT	24+50	4.0- 5.5	A- 2- 4( 0)	-	NP	10.3	77.2	4.4	8.1	100	99	16	-	-
SS- 2	18' LT	20+00	4.0- 5.5	A- 2- 4( 0)	-	NP	6.7	72.0	9.3	12.1	100	99	29	-	-
S- 3	18' RT	27+00	4.0- 9.5	A- 4( 0)	-	NP	3.8	61.1	25.0	10.1	100	99	47	55.7	10.1
S- 4	20' RT	29+00	4.5- 8.0	A- 4( 0)	-	NP	31.0	35.1	23.8	10.1	100	82	36	154.5	32.5