

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	42310.1.1 (B-5149)	1	

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 42310.1.1 (B-5149) F.A. PROJ. BRZ-1574(3)  
COUNTY HENDERSON  
PROJECT DESCRIPTION BRIDGE No. 38 ON SR-1574  
OVER CLEAR CREEK

SITE DESCRIPTION \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**CAUTION NOTICE**

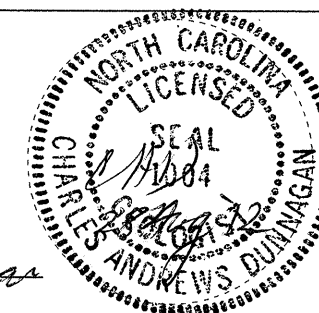
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PERSONNEL  
P Q LOCKAMY  
D O CHEEK  
C J COFFEY

INVESTIGATED BY C A DUNNAGAN  
CHECKED BY W D FRYE, Jr  
SUBMITTED BY W D FRYE, Jr  
DATE AUGUST 2012



*[Handwritten Signature]*

**PROJECT: 42310.1.1 ID: B-5149**

DRAWN BY: C A DUNNAGAN

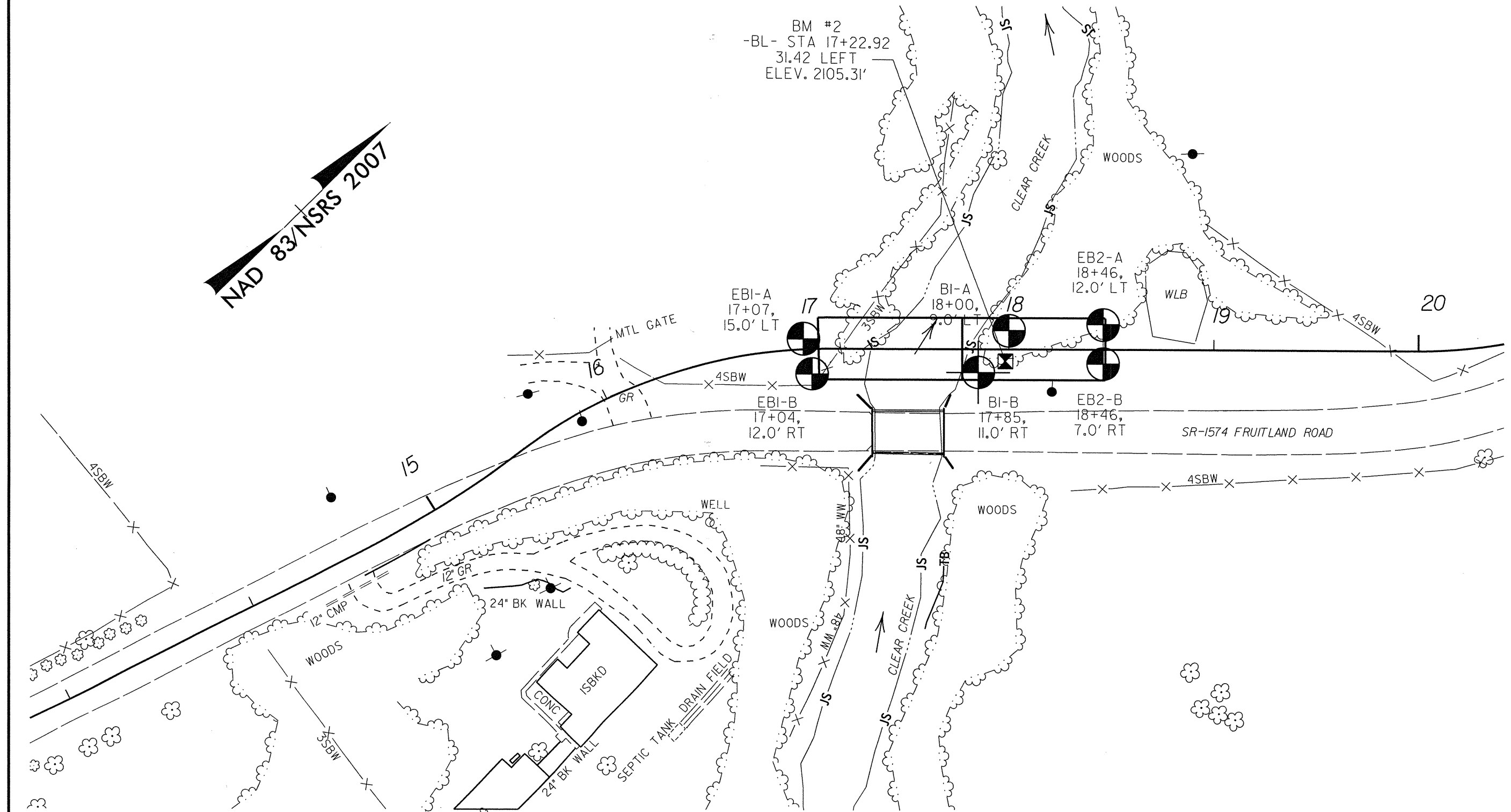
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NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



# BRIDGE No. 38 ON SR-1574 OVER CLEAR CREEK

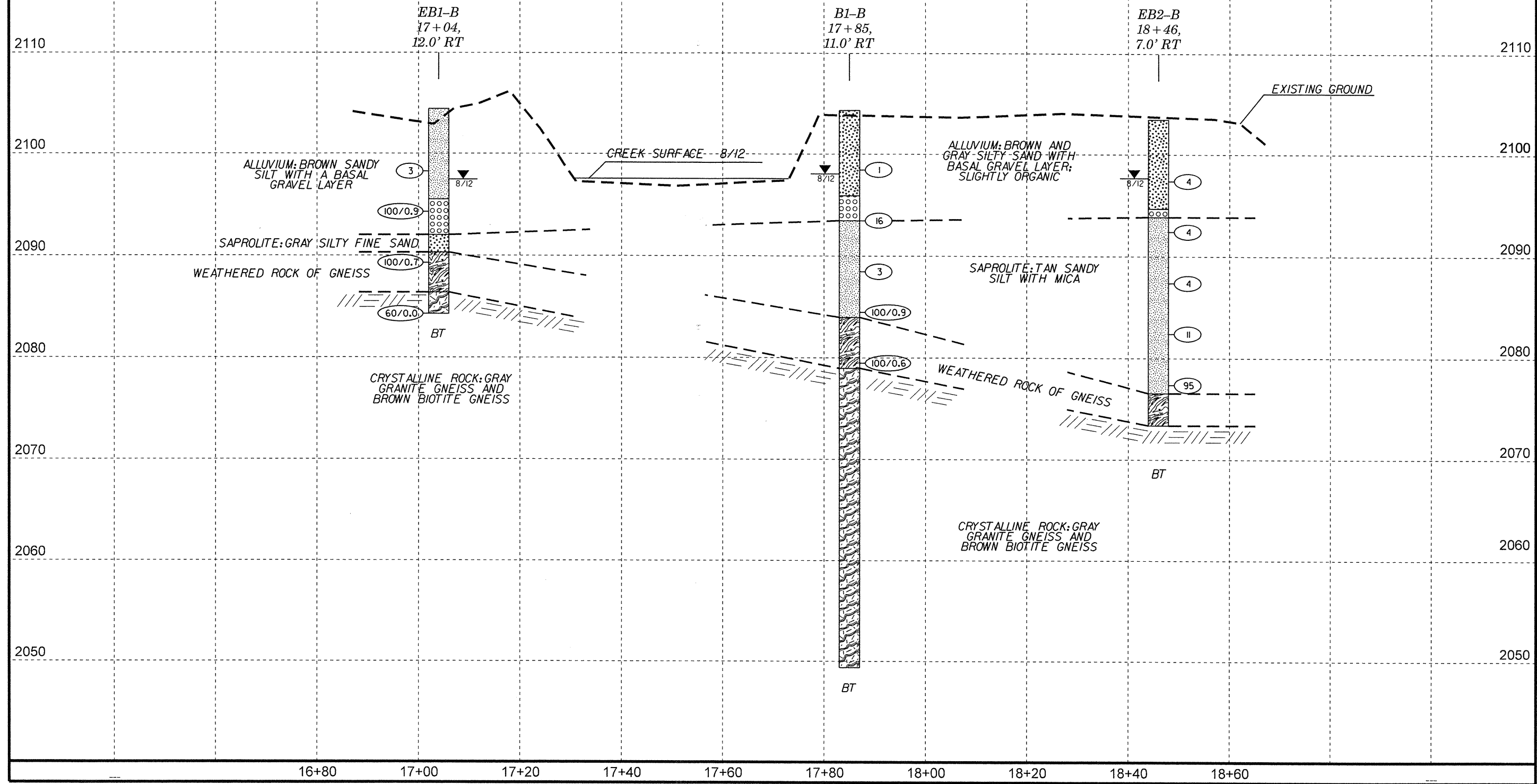
PROJECT REFERENCE NO.	SHEET
42310.1.1 (B-5149)	3 / 14
<b>SITE PLAN</b>	
FEET	

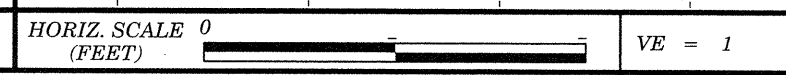
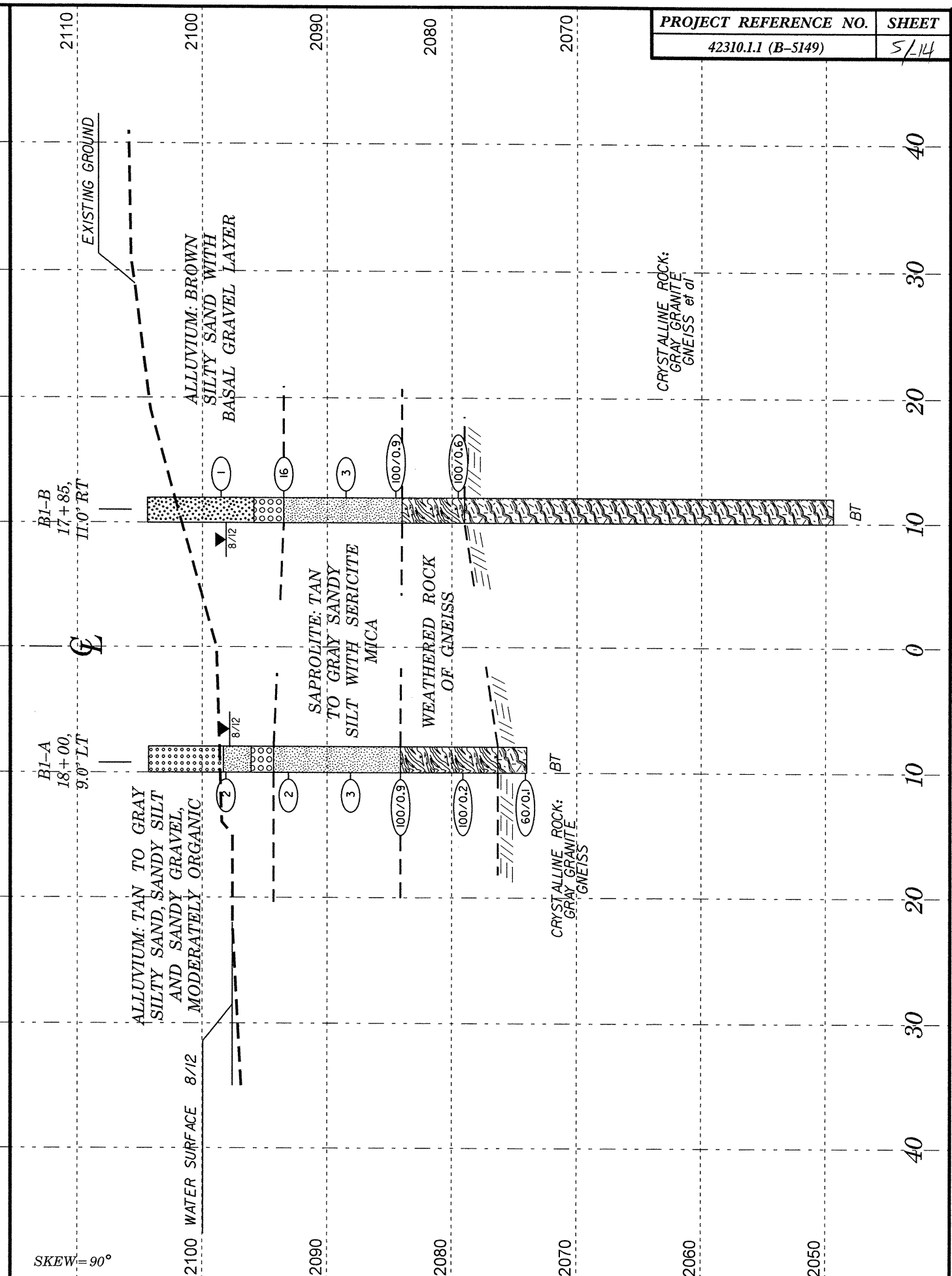
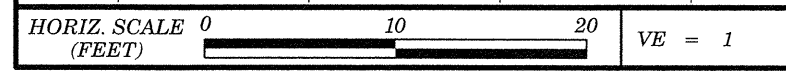
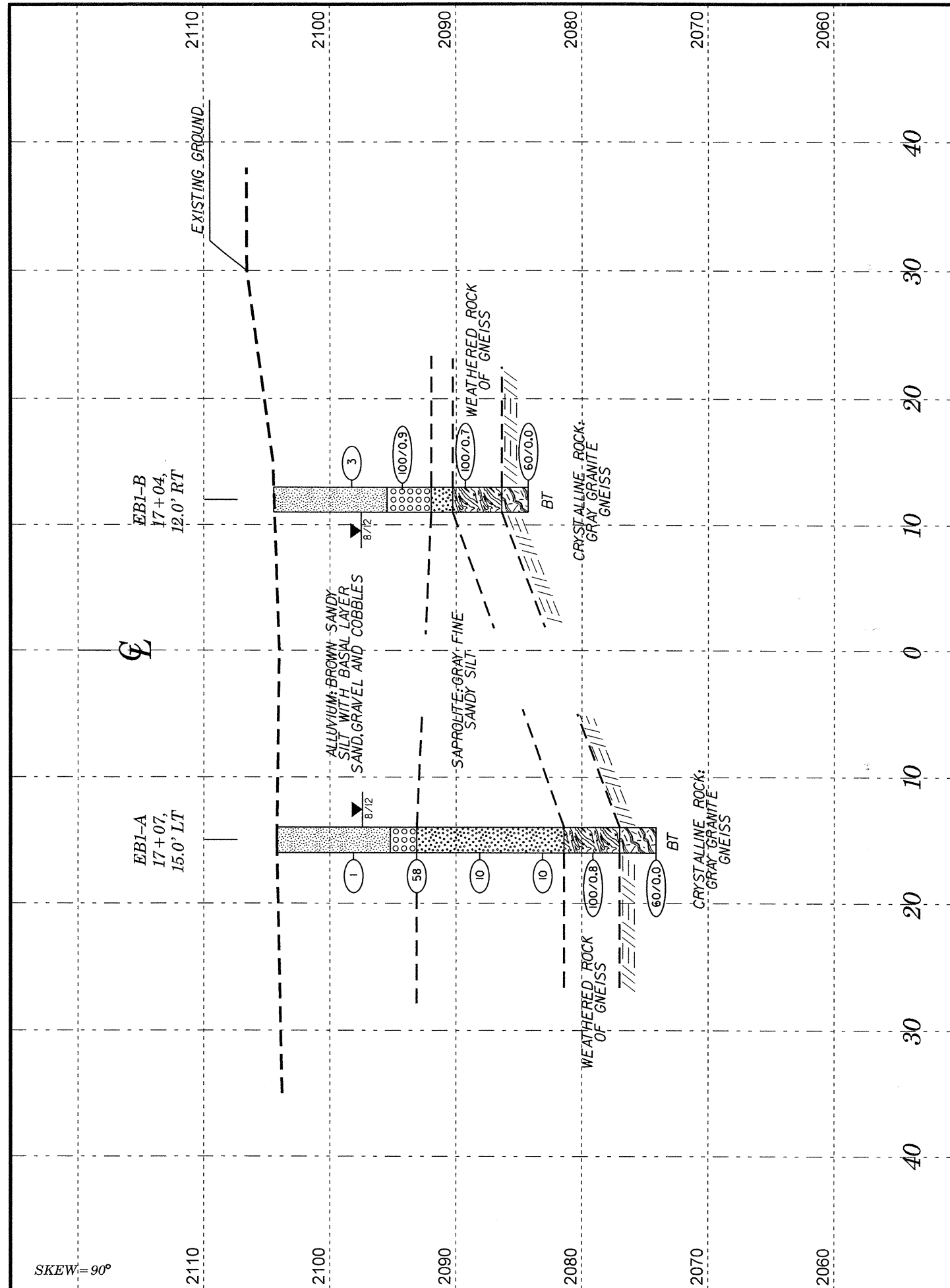


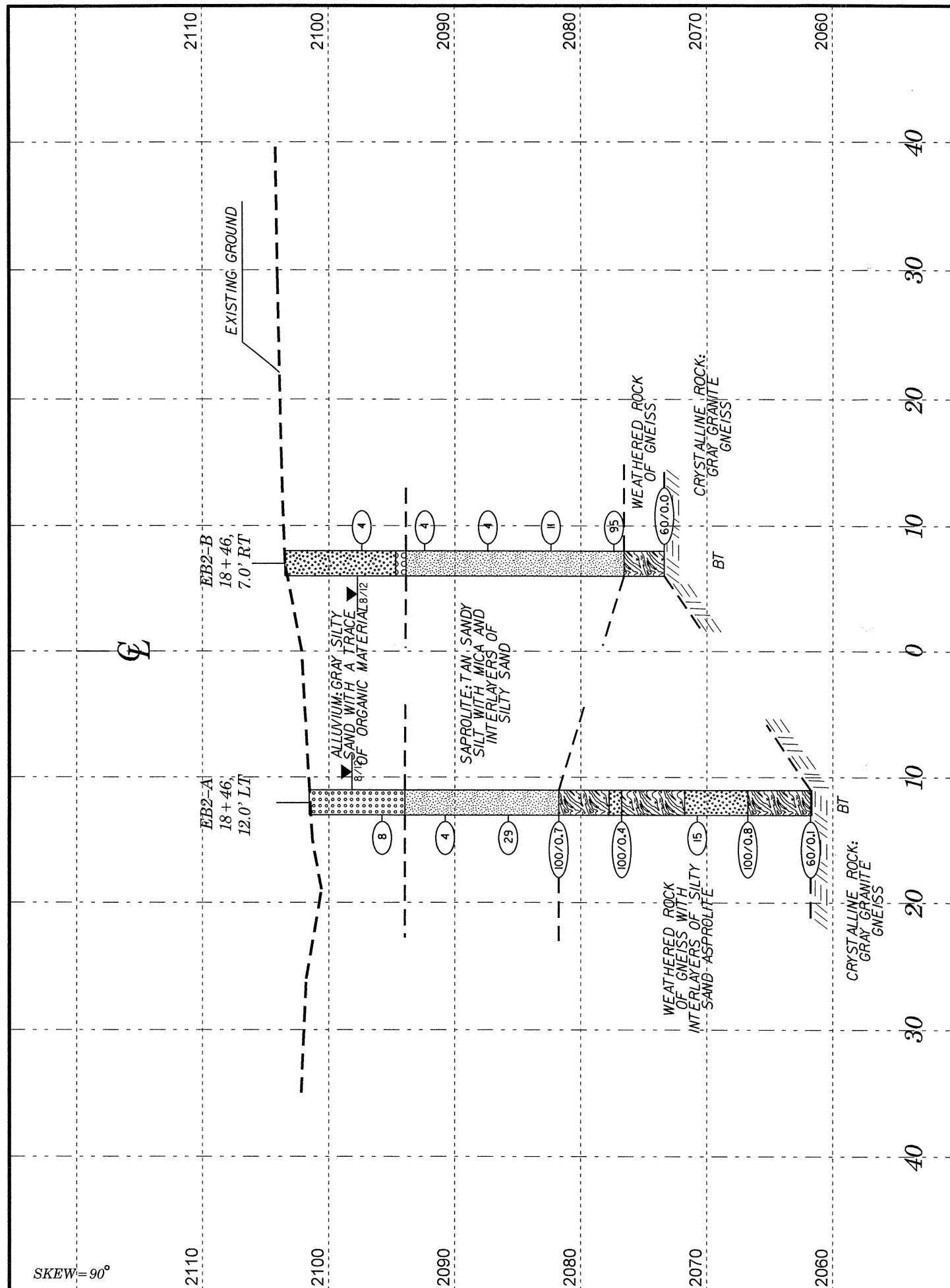
NAD 83/NSRS 2007

# BRIDGE No. 38 ON SR-1574 OVER CLEAR CREEK

<p>0 10 20 FEET VE = 2</p>	PROJECT REFERENCE NO.	SHEET
	42310.1.1 (B-5149)	4/14
PROFILE 15.0' RIGHT OF CENTERLINE		







HORIZ. SCALE 0 10 20 (FEET)

VE = 1

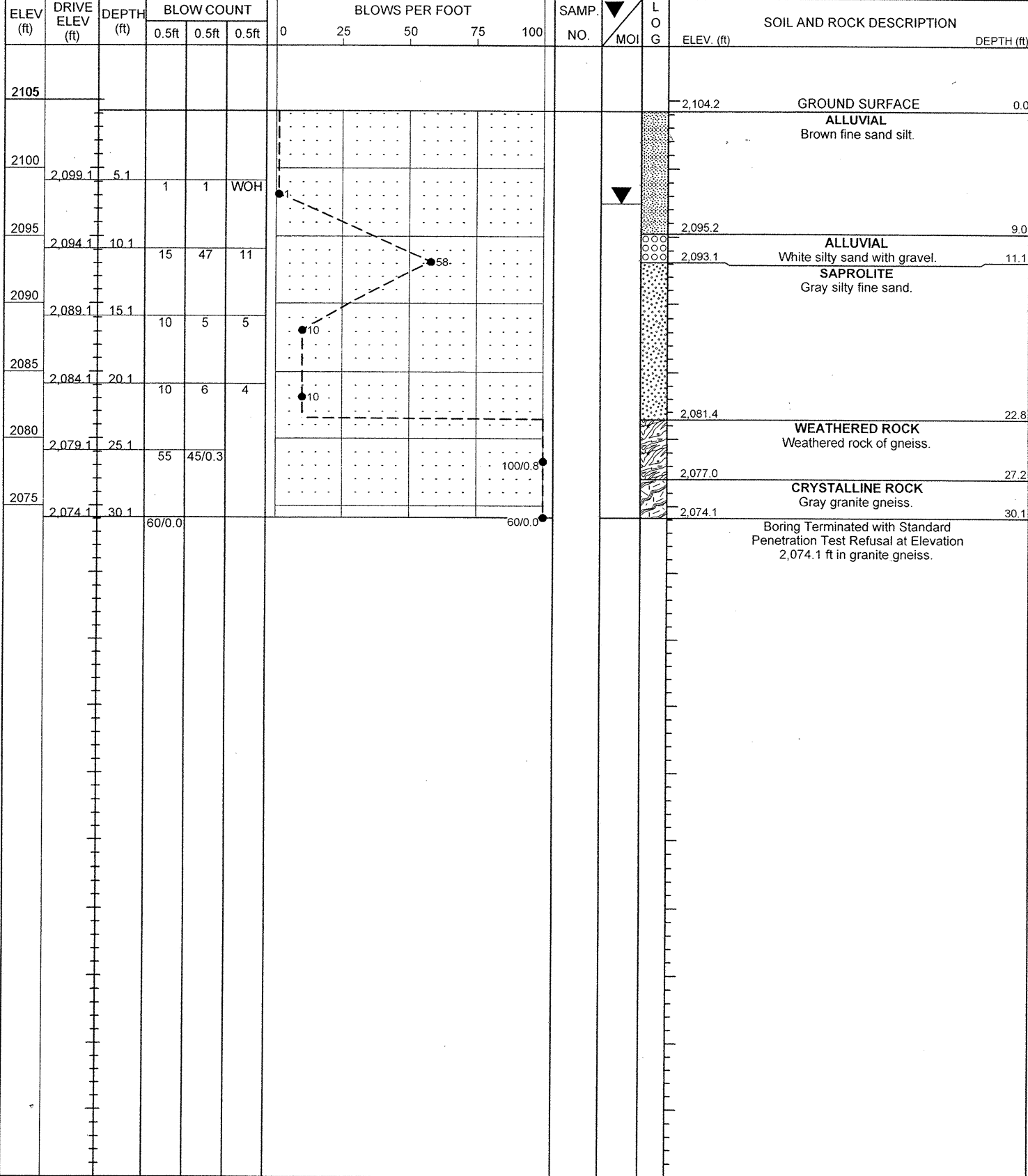
**CROSS SECTION:  
END BENT TWO**

SKEW=90°

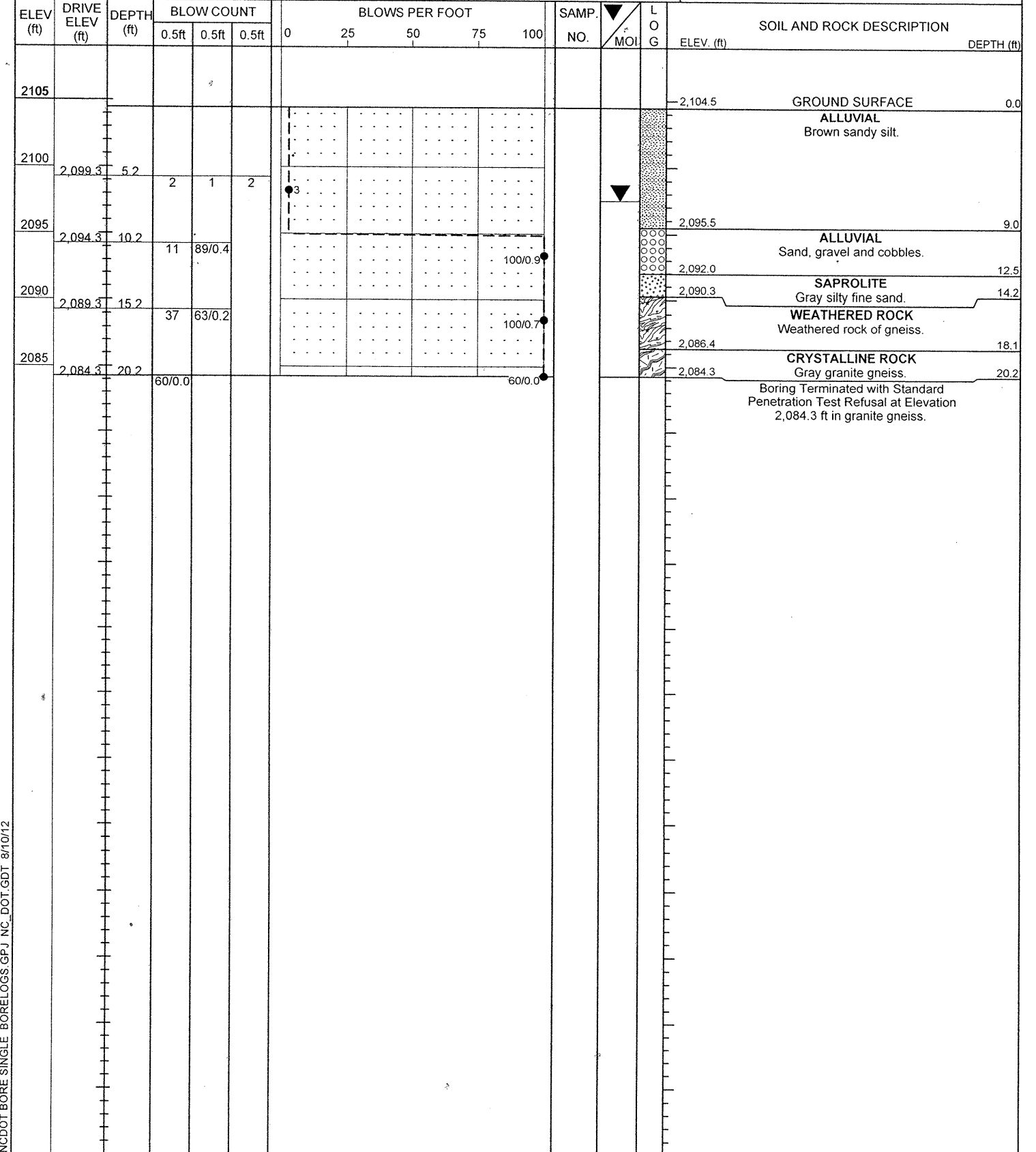
2110 2100 2090 2080 2070 2060

40 30 20 10 0 10 20 30 40

WBS 42310.1.1	TIP B-5149	COUNTY Henderson	GEOLOGIST Lockamy, P. Q.
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.			GROUND WTR (ft)
BORING NO. EB1-A	STATION 17+07	OFFSET 15 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,104.2 ft	TOTAL DEPTH 30.1 ft	NORTHING 609,113	EASTING 982,620
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 08/01/12	COMP. DATE 08/01/12	SURFACE WATER DEPTH N/A



WBS 42310.1.1	TIP B-5149	COUNTY Henderson	GEOLOGIST Lockamy, P. Q.
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.			GROUND WTR (ft)
BORING NO. EB1-B	STATION 17+04	OFFSET 12 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,104.5 ft	TOTAL DEPTH 20.2 ft	NORTHING 609,104	EASTING 982,635
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Coffey, Jr., C.	START DATE 08/01/12	COMP. DATE 08/01/12	SURFACE WATER DEPTH N/A







# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET

8/14

WBS 42310.1.1		TIP B-5149		COUNTY Henderson		GEOLOGIST Lockamy, P. Q.										
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.							GROUND WTR (ft)									
BORING NO. B1-A		STATION 18+00		OFFSET 9 ft LT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 2,104.3 ft		TOTAL DEPTH 30.3 ft		NORTHING 609,188		EASTING 982,688	24 HR. 6.5									
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 08/09/12		COMP. DATE 08/09/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2105														2,104.3	0.0	GROUND SURFACE
2100	2,099.1	5.2												2,098.3	6.0	ALLUVIAL Alluvium: Tan silty fine sand.
2095	2,094.1	10.2	1	1	1									2,096.1	8.2	ALLUVIAL Alluvium: Gray fine sandy silt, moderately organic with a log from 7.1' to 8.2'.
2090	2,089.1	15.2	2	1	1									2,094.3	10.0	ALLUVIAL Alluvium: Tan silty sand and gravel.
2085	2,084.1	20.2												2,084.1	20.2	SAPROLITE Light gray to tan fine sandy silt with trace of sericite mica.
2080	2,079.1	25.2	32	68/0.4										2,084.1	20.2	WEATHERED ROCK Weathered rock of gneiss.
2075	2,074.1	30.2												2,076.3	28.0	CRYSTALLINE ROCK Gray granite gneiss.
			60/0.1											2,074.0	30.3	CRYSTALLINE ROCK Gray granite gneiss.
																Boring Terminated with Standard Penetration Test Refusal at Elevation 2,074.0 ft in granite gneiss.

NCDOT BORE SINGLE BORELOGS.GPJ NC\_DOT.GDT 8/10/12



WBS 42310.1.1		TIP B-5149		COUNTY Henderson		GEOLOGIST Lockamy, P. Q.										
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.																
BORING NO. B1-B		STATION 17+85		OFFSET 11 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,104.4 ft		TOTAL DEPTH 55.0 ft		NORTHING 609,162		EASTING 982,692										
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 08/09/12		COMP. DATE 08/09/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2105														2,104.4	GROUND SURFACE	0.0
2100	2,099.5	4.9	1	WOH	1									2,095.9	ALLUVIAL Brown silty sand.	
2095	2,094.5	9.9	2		7	9								2,093.5	ALLUVIAL Brown silty sand and gravel.	10.9
2090	2,089.5	14.9	1		1	2								2,084.0	SAPROLITE Tan sandy silt with sericite mica.	20.4
2085	2,084.5	19.9	15		85/4									2,079.0	WEATHERED ROCK Weathered rock of gneiss.	25.4
2080	2,079.5	24.9	11		60	40/1								2,068.5	CRYSTALLINE ROCK White granite gneiss.	35.9
2075														2,062.3	CRYSTALLINE ROCK Dark gray-brown augen gneiss, biotite gneiss and gray granite gneiss.	42.1
2070														2,049.4	CRYSTALLINE ROCK Gray granite gneiss and dark brown biotite gneiss.	55.0
2065																
2060																
2055																
2050																

NCDOT BORE SINGLE BORELOGS.GPJ NC\_DOT\_GDT\_8/10/12

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WBS 42310.1.1		TIP B-5149		COUNTY Henderson		GEOLOGIST Lockamy, P. Q.						
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.												
BORING NO. B1-B		STATION 17+85		OFFSET 11 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 2,104.4 ft		TOTAL DEPTH 55.0 ft		NORTHING 609,162		EASTING 982,692						
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic						
DRILLER Cheek, D. O.		START DATE 08/09/12		COMP. DATE 08/09/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN 28.2 ft		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	ROD (ft) %		REC. (ft) %	ROD (ft) %			
2077.56	2,077.6	26.8	3.2	N/A/28.3	(1.5) 47%	(0.9) 28%					Begin Coring @ 26.8 ft	
2075	2,074.4	30.0	5.0		(2.2) 44%	(1.3) 26%					CRYSTALLINE ROCK White granite gneiss interlayered with dark gray- brown biotite gneiss and augen gneiss. Medium hard; moderately severely to moderately weathered. a) Parts along foliation @ 10°. b) Joint @ 65°. c) Joint @ 35°. (continued)	
2070	2,069.4	35.0	5.0		(2.9) 58%	(0.0) 0%					CRYSTALLINE ROCK Interlayers of augen gneiss, biotite gneiss and granite gneiss. Dark gray-brown to gray. Severely to moderately weathered. Very soft to moderately hard. a) Abundant parts along foliation @ 10°.	35.9
2065	2,064.4	40.0	5.0		(4.3) 86%	(3.2) 64%	RS-1				CRYSTALLINE ROCK Light gray granite gneiss ( fresh, very hard) interlayered with dark brown biotite gneiss (severely to moderately severely weathered, soft to medium hard). a) Parts along foliation @ 10°. b) Joints @ 70°.	42.1
2060	2,059.4	45.0	5.0		(5.0) 100%	(4.9) 98%	RS-2					
2055	2,054.4	50.0	5.0		(4.9) 98%	(1.4) 28%						
2050	2,049.4	55.0									Boring Terminated at Elevation 2,049.4 ft in granite gneiss.	55.0

NCDOT CORE SINGLE BORELOGS.GPJ NC\_DOT\_GDT\_8/10/12

WBS 42310.1.1		TIP B-5149		COUNTY Henderson		GEOLOGIST Lockamy, P. Q.										
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 18+46		OFFSET 12 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,101.6 ft		TOTAL DEPTH 39.9 ft		NORTHING 609,222		EASTING 982,718										
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 08/02/12		COMP. DATE 08/02/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2105														2,101.6	GROUND SURFACE	0.0
2100														2,101.6	ALLUVIAL White sand with a trace of organic material.	
2095	2,096.8	4.8	1	1	7									2,094.0	SAPROLITE Tan sandy silt with mica.	7.6
2090	2,091.8	9.8	1	1	3									2,081.8	WEATHERED ROCK Weathered rock of gneiss.	19.8
2085	2,086.8	14.8	14	17	12									2,077.8	SAPROLITE Brown silty sand.	23.8
2080	2,081.8	19.8	3	50	50/0.2									2,076.8	WEATHERED ROCK Weathered rock of gneiss.	24.8
2075	2,076.8	24.8	100/0.4											2,071.8	SAPROLITE Brown silty sand.	29.8
2070	2,071.8	29.8	12	8	7									2,066.8	WEATHERED ROCK Weathered rock of gneiss.	34.8
2065	2,066.8	34.8	55	45/0.3										2,061.8	CRYSTALLINE ROCK Gray granite gneiss.	39.8
	2,061.8	39.8	60/0.1											2,061.7	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,061.7 ft in granite gneiss.	39.9

NCDOT BORE SINGLE BORELOGS.GPJ NC\_DOT.GDT 8/10/12

10/14

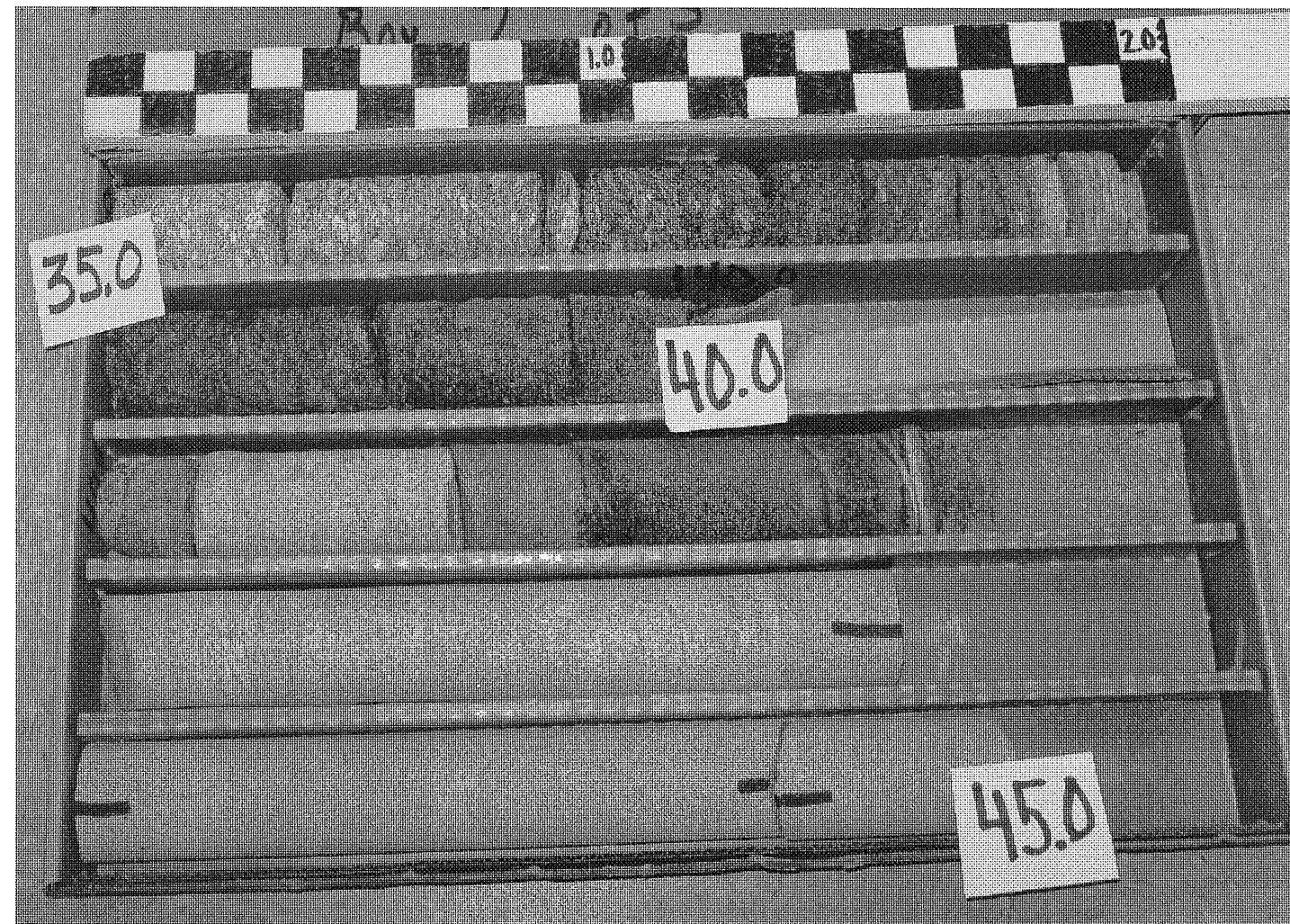
WBS 42310.1.1		TIP B-5149		COUNTY Henderson		GEOLOGIST Lockamy, P. Q.										
SITE DESCRIPTION Bridge No. 38 on SR-1574 over Clear Creek.							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 18+46		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,103.5 ft		TOTAL DEPTH 30.1 ft		NORTHING 609,209		EASTING 982,732										
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 08/02/12		COMP. DATE 08/02/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2105														2,103.5	GROUND SURFACE	0.0
2100														2,103.5	ALLUVIAL Gray silty fine sand with a trace of organic material.	
2095	2,098.4	5.1	2	2	2									2,094.7	ALLUVIAL Gray sand and gravel.	8.8
2090	2,093.4	10.1	1	1	3									2,093.9	SAPROLITE Tan sandy silt with interlayers of silty sand.	9.6
2085	2,088.4	15.1	4	2	2									2,083.4	WEATHERED ROCK Weathered rock of gneiss.	20.1
2080	2,083.4	20.1	3	4	7									2,078.4	WEATHERED ROCK Weathered rock of gneiss.	25.1
2075	2,078.4	25.1	18	25	70									2,073.4	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,073.4 ft on granite gneiss.	30.1

NCDOT BORE SINGLE BORELOGS.GPJ NC\_DOT.GDT 8/10/12





42310.1.1 (B-5149)  
 Henderson Co.  
 Bridge No 38 on SR-1574  
 Over Clear Creek  
 B1-B  
 Box 1 of 3



42310.1.1 (B-5149)  
 Henderson Co.  
 Bridge No. 38 on SR-1574  
 Over Clear Creek  
 B1-B  
 Box 2 of 3



12/14



42310.1.1 (B-5149)  
Henderson Co.  
Bridge No 38 on SR-1574  
Over Clear Creek  
B1-B  
Box 3 of 3

13/14

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAY  
MATERIALS & TESTS UNIT  
PHYSICAL TESTING LABORATORY**

T. I. P. No. B-5149

**REPORT ON SAMPLES OF ROCK COMPRESSION**

Project 42310.1.1 County Henderson Owner C A Dunnagan  
 Date: Sampled 8/10/2012 Received 8/14/2012 Reported 8/20/12  
 Sampled from \_\_\_\_\_ By \_\_\_\_\_  
 Submitted by C A Dunnagan \_\_\_\_\_ 2006 Standard Specifications  
 Tested By Dan Miller \_\_\_\_\_ Date Tested 8/20/2012

**TEST RESULTS**

Proj. Sample No.		RS-1	RS-2				
Lab. Sample No.		P380570	P380570				
Diameter	in	1.86	1.86				
Specimen Height	in	4.04	3.87				
Area	in <sup>2</sup>	2.717	2.717				
H/D Ratio		2.17	2.08				
Weight	lbf	1.08	1.04				
Unit Weight	lbf/ft <sup>3</sup>	170.0	170.9				
Ultimate	lbf	27200	20400.0				
Ultimate	ksi	10.010	7.508				
Ultimate Corrected	ksi	10.1	7.54				
Sec Mod @ 40%	Mpsi	5.2	4.24				
Station		17+85	17+85				
Offset		11.0' RT	11.0' RT				
Alignment							
Depth (ft)		42.10	47.40				
	to	42.60	48.10				

cc:

V. O. Cordeiro  
Physical Testing Engineer

14/14

**Rock Mass Rating (AASHTO)**

Project: **42310.1.1 (B-5149)**  
 Boring Location: **B1-B, RS-1**  
 Stratigraphic Depth Range: **42.1'-42.6'**

Parameter		Range of Values				Strength Value	
1	Strength of Intact Rock Material	>1215psi	590 - 1215 psi	312 - 590 psi	139-312 psi	For this low range - Uniaxial Comp. Strength test is preferred 0.5 - 1.5 ksi 0.1 - 0.5 ksi	
	Uniaxial Comp. Strength	>30 ksi	15 - 30 ksi	7.5 - 15 ksi	3.6 - 7.5 ksi		
2	Drill Core Quality - ROD	15	12	7	4	2	
	Rating	15	12	7	4		
3	Spacing of Discontinuities	90 - 100%	75 - 90%	50 - 75%	25 - 50%	<25%	
	Rating	20	17	13	8		
4	Condition of Discontinuities	>10 ft	3 - 10 ft	1 - 3 ft	2in - 1ft	Soft Gouge >0.2 in thick or Separation > 0.2 in Continuous Joints	
	Rating	30	25	20	10		
5	Inflow per 30 ft tunnel length	None	< 400 gal/hr	400 - 2000 gal/hr	>2000 gal/hr	>0.5	
	(Joint Water Pressure) (Major Principle σ)	0	0.0 - 0.2	0.2 - 0.5			
6	General Conditions	Completely Dry	Moist only	Under Moderate Water Pressure	Severe Water Problems	0	
	Rating	10	7	4	0		
B. RATING ADJUSTMENT FOR DISCONTINUITY ORIENTATIONS							
6	Strike and Dip Orientations	Very Favorable	Favorable	Fair	Unfavorable	Very Unfavorable	
	Foundations	0	-2	-7	-15	-25	
6	Slopes	0	-5	-25	-50	-60	
	Adjust to Rating					-7	
<b>ROCK MASS CLASSIFICATION</b>		<b>Class III: Fair Rock</b>				<b>ROCK MASS RATING</b>	<b>53</b>

**ROCK MASS CLASSIFICATION** **Class III: Fair Rock** **ROCK MASS RATING** **53**

**Rock Mass Rating (AASHTO)**

Project: **42310.1.1 (B-5149)**  
 Boring Location: **B1-B, RS-2**  
 Stratigraphic Depth Range: **47.4'-48.1'**

Parameter		Range of Values				Strength Value	
1	Strength of Intact Rock Material	>1215psi	590 - 1215 psi	312 - 590 psi	139-312 psi	For this low range - Uniaxial Comp. Strength test is preferred 0.5 - 1.5 ksi 0.1 - 0.5 ksi	
	Uniaxial Comp. Strength	>30 ksi	15 - 30 ksi	7.5 - 15 ksi	3.6 - 7.5 ksi		
2	Drill Core Quality - ROD	15	12	7	4	2	
	Rating	15	12	7	4		
3	Spacing of Discontinuities	90 - 100%	75 - 90%	50 - 75%	25 - 50%	<25%	
	Rating	20	17	13	8		
4	Condition of Discontinuities	>10 ft	3 - 10 ft	1 - 3 ft	2in - 1ft	Soft Gouge >0.2 in thick or Separation > 0.2 in Continuous Joints	
	Rating	30	25	20	10		
5	Inflow per 30 ft tunnel length	None	< 400 gal/hr	400 - 2000 gal/hr	>2000 gal/hr	>0.5	
	(Joint Water Pressure) (Major Principle σ)	0	0.0 - 0.2	0.2 - 0.5			
6	General Conditions	Completely Dry	Moist only	Under Moderate Water Pressure	Severe Water Problems	0	
	Rating	10	7	4	0		
B. RATING ADJUSTMENT FOR DISCONTINUITY ORIENTATIONS							
6	Strike and Dip Orientations	Very Favorable	Favorable	Fair	Unfavorable	Very Unfavorable	
	Foundations	0	-2	-7	-15	-25	
6	Slopes	0	-5	-25	-50	-60	
	Adjust to Rating					-7	
<b>ROCK MASS CLASSIFICATION</b>		<b>Class III: Fair Rock</b>				<b>ROCK MASS RATING</b>	<b>53</b>

**ROCK MASS CLASSIFICATION** **Class III: Fair Rock** **ROCK MASS RATING** **53**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	38537.1.2 B-4765	1	7

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 38537.1.2 B-4765 F.A. PROJ. \_\_\_\_\_  
 COUNTY HENDERSON  
 PROJECT DESCRIPTION BRIDGE NO. 113 ON SR 1574 OVER KYLES CREEK

SITE DESCRIPTION \_\_\_\_\_  
 \_\_\_\_\_

**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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PERSONNEL  
 MM HAGER

DO CHEEK

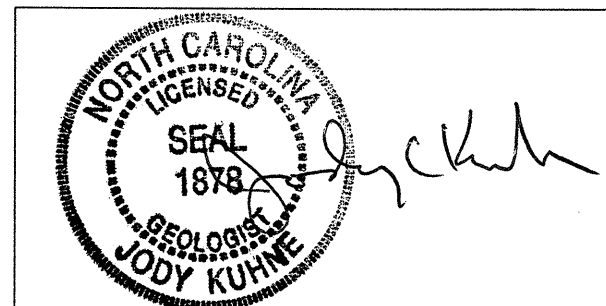
C COFFEY

INVESTIGATED BY JC KUHNE

CHECKED BY WD FRYE

SUBMITTED BY JC KUHNE

DATE 4/13/2012



**CONTENTS**

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	CROSS SECTIONS
5-7	BORE LOG REPORTS (DETOUR LOGS INCLUDED)

**PROJECT: 38537.1.2 ID: B-4765**

DRAWN BY: JC KUHNE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.



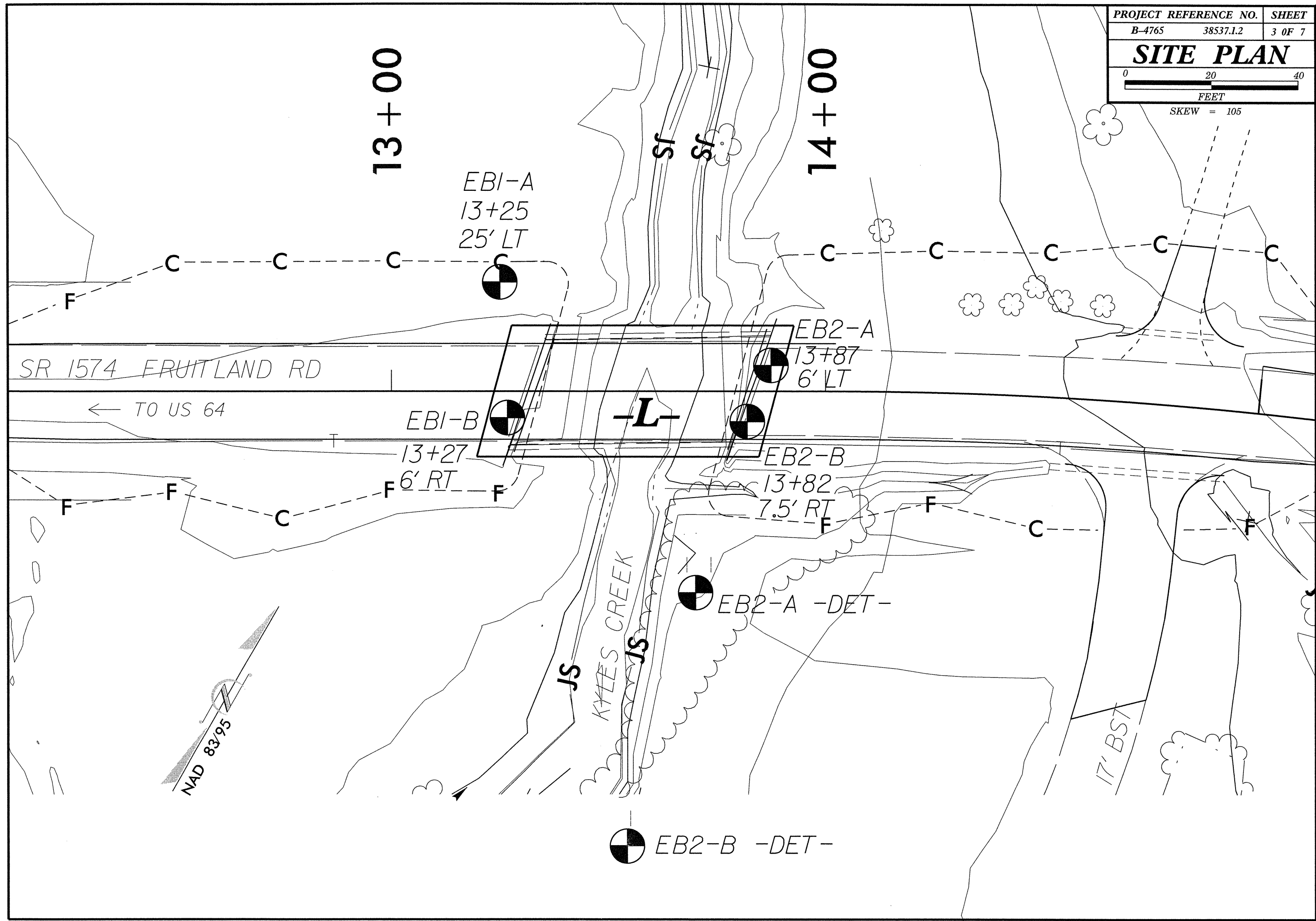
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

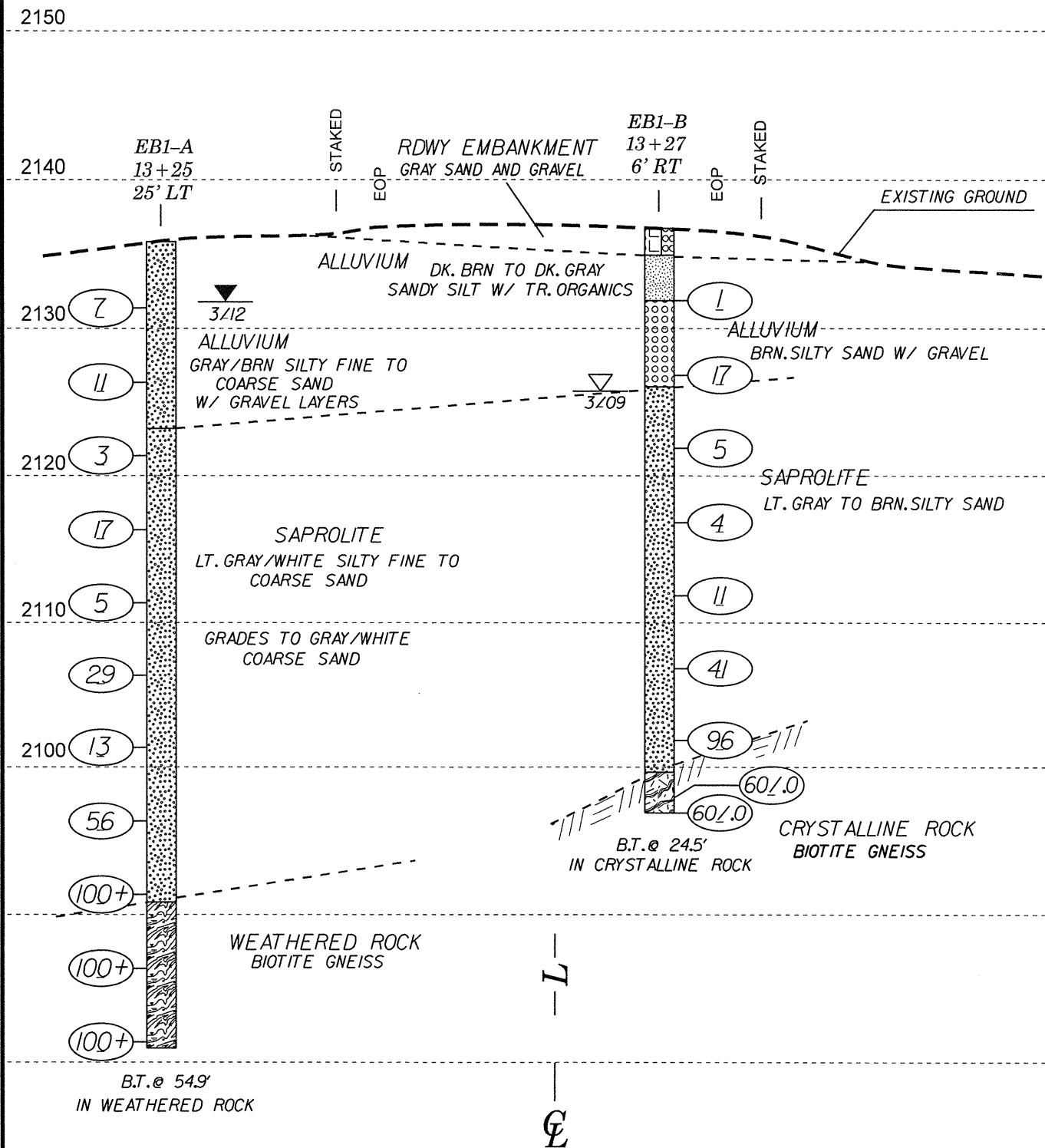
PROJECT REFERENCE NO. 38537.1.2 B-4765 SHEET NO. 2 OF 7

SUBSURFACE INVESTIGATION

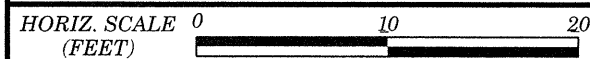
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, PLASTICITY, COLOR.



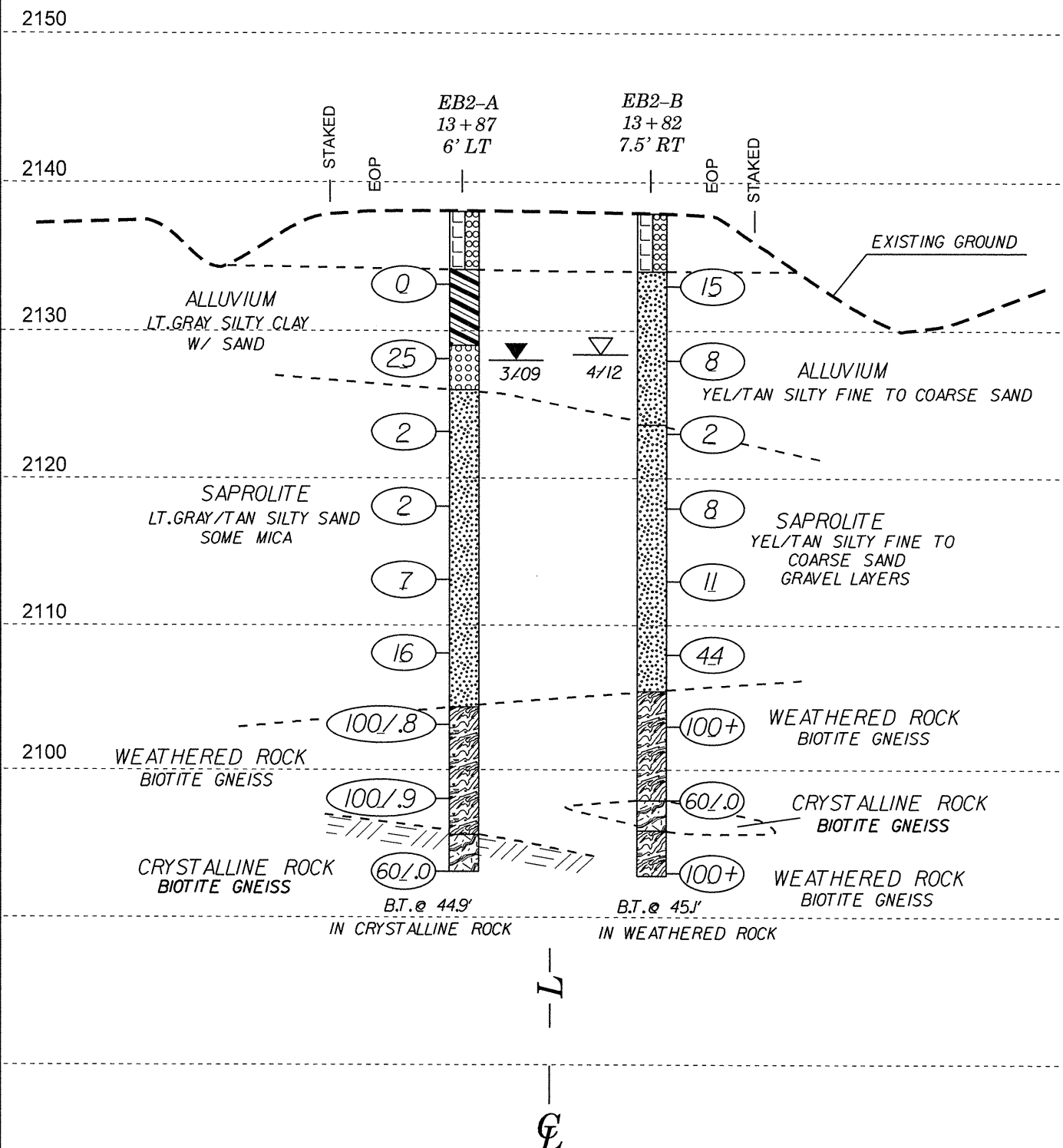


SKEW = 105

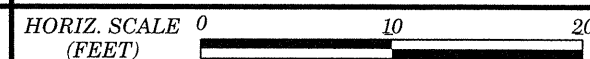


VE = 1:1

SECTION THROUGH EBI



SKEW = 105



VE = 1:1

SECTION THROUGH EB2



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.											
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)										
BORING NO. EB1-A		STATION 13+25		OFFSET 25 ft LT		ALIGNMENT -L-											
						0 HR.	N/A										
COLLAR ELEV. 2,135.6 ft		TOTAL DEPTH 54.9 ft		NORTHING 615,508		EASTING 988,155											
						24 HR.	4.1										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 03/29/12		COMP. DATE 03/29/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2140																	
2135															2,135.6	GROUND SURFACE	0.0
2130	2,131.1	4.5	2	3	4											ALLUVIAL GRAY/BRN SILTY FINE TO COARSE SAND WITH COARSE SAND AND GRAVEL LAYERS	
2125	2,126.1	9.5	8	6	5												
2120	2,121.1	14.5	1	1	2										2,122.9	SAPROLITE LT. GRAY/WHITE, SILTY FINE TO COARSE SAND. GRADES TO GRAY/WHITE COARSE SAND.	12.7
2115	2,116.1	19.5	5	6	11												
2110	2,111.1	24.5	1	2	3												
2105	2,106.1	29.5	8	17	12												
2100	2,101.1	34.5	3	6	7												
2095	2,096.1	39.5	4	7	49												
2090	2,091.1	44.5	60	54	46/2										2,090.6	WEATHERED ROCK GRAY/WHITE AUGEN GNEISS. THINLY FOLIATED.	45.0
2085	2,086.1	49.5	100/3														
	2,081.1	54.5	100/4												2,080.7	Boring Terminated at Elevation 2,080.7 ft IN WEATHERED ROCK, BIOTITE GNEISS	54.9

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.											
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)										
BORING NO. EB1-B		STATION 13+27		OFFSET 6 ft RT		ALIGNMENT -L-											
						0 HR.	N/A										
COLLAR ELEV. 2,136.8 ft		TOTAL DEPTH 40.8 ft		NORTHING 615,482		EASTING 988,172											
						24 HR.	11.0										
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Rose, G. K.		START DATE 03/11/09		COMP. DATE 03/11/09		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2140																	
2135															2,136.8	GROUND SURFACE	0.0
2130	2,131.9	4.9	1	WOH	1										2,135.0	ROADWAY EMBANKMENT Brown sand and gravel.	1.8
2125	2,126.9	9.9	2	7	10										2,130.9	ALLUVIAL Dark brown to dark gray silty with trace of organic material.	5.9
2120	2,121.9	14.9	2	2	3										2,125.1	ALLUVIAL Brown silty sand with gravel.	11.7
2115	2,116.9	19.9	2	3	1											SAPROLITE Light gray to brown silty sand.	
2110	2,111.9	24.9	4	5	6												
2105	2,106.9	29.9	11	17	24												
2100	2,101.9	34.9	17	32	64												
	2,096.9	39.9	60/0.0														
	2,096.0	40.8	60/0.0														
															2,098.7	CRYSTALLINE ROCK Granite gneiss.	38.1
															2,096.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,096.0 ft in granite gneiss.	40.8

NCDOT BORE DOUBLE B4765\_BORELOGS.GPJ NC\_DOT\_GDT\_4/13/12



**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.										
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 13+87		OFFSET 6 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,138.1 ft		TOTAL DEPTH 44.9 ft		NORTHING 615,523		EASTING 988,219										
DRILL RIG/HAMMER EFF/DATE AFO0070 CME-550X 81% 09/03/2009			DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Rose, G. K.		START DATE 03/11/09		COMP. DATE 03/11/09		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2140														2,138.1	GROUND SURFACE	0.0
2135														2,134.2	ROADWAY EMBANKMENT Brown sand and gravel.	3.9
2130	2,133.2	4.9	WOH	WOH	WOH										ALLUVIAL Light gray silty clay with sand.	
2125	2,128.2	9.9	8	14	11									2,129.1	ALLUVIAL Brown silty sand and gravel.	9.0
2120	2,123.2	14.9	WOH	1	1									2,126.1	SAPROLITE Light gray to tan silty sand with trace of mica.	12.0
2115	2,118.2	19.9	WOH	1	1											
2110	2,113.2	24.9	1	3	4											
2105	2,108.2	29.9	4	6	10											
2100	2,103.2	34.9	56	44/0.3										2,104.4	WEATHERED ROCK Weathered rock of gneiss.	33.7
2095	2,098.2	39.9	10	90/0.4										2,095.7	CRYSTALLINE ROCK Granite gneiss.	42.4
	2,093.2	44.9	60/0.0											2,093.2	CRYSTALLINE ROCK Granite gneiss.	44.9
															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,093.2 ft in granite gneiss.	

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.										
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 13+82		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,137.9 ft		TOTAL DEPTH 45.1 ft		NORTHING 615,511		EASTING 988,220										
DRILL RIG/HAMMER EFF/DATE AFO0071 CME-550X 72% 09/03/2009			DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 04/02/12		COMP. DATE 04/02/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2140														2,137.9	GROUND SURFACE	0.0
2135														2,134.0	ROADWAY EMBANKMENT COARSE SAND AND GRAVEL	3.9
2130	2,133.0	4.9				6	10	5							ALLUVIAL YEL/TAN SILTY FINE TO COARSE SAND	
2125	2,128.0	9.9				4	6	2								
2120	2,123.0	14.9				1	1	1							SAPROLITE YEL/TAN SILTY FINE TO COARSE SAND. GRAVEL LAYERS	14.3
2115	2,118.0	19.9				2	3	5								
2110	2,113.0	24.9				4	6	5								
2105	2,108.0	29.9				13	19	25								
2100	2,103.0	34.9				100/0.3								2,105.4	WEATHERED ROCK WEATHERED BIOTITE GNEISS	32.5
2095	2,098.0	39.9				60/0.0								2,098.0	CRYSTALLINE ROCK BIOTITE GNEISS	39.9
	2,093.0	44.9				.2								2,095.9	CRYSTALLINE ROCK BIOTITE GNEISS	42.0
														2,092.8	WEATHERED ROCK WEATHERED BIOTITE GNEISS	45.1
															Boring Terminated at Elevation 2,092.8 ft IN WEATHERED ROCK, BIOTITE GNEISS	



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.									
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)								
BORING NO. EB2-ADET		STATION N/A		OFFSET N/A		ALIGNMENT -DET-									
COLLAR ELEV. 2,126.4 ft		TOTAL DEPTH 24.1 ft		NORTHING 615,469		EASTING 988,230									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 03/29/12		COMP. DATE 03/29/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2130														2,126.4	0.0
2125	2,122.3	4.1	1	1	6									2,119.3	7.1
2120	2,117.3	9.1	1	1	1										
2115	2,112.3	14.1	4	5	6										
2110	2,107.3	19.1	12	22	26										
2105	2,102.3	24.1	60/0.0											2,102.3	24.1

WBS 38537.1.2		TIP B-4765		COUNTY Henderson		GEOLOGIST Hager, M. M.									
SITE DESCRIPTION Bridge No. 113 on SR-1547 over Kyles Creek.							GROUND WTR (ft)								
BORING NO. EB2-BDET		STATION N/A		OFFSET N/A		ALIGNMENT -DET-									
COLLAR ELEV. 2,128.6 ft		TOTAL DEPTH 19.3 ft		NORTHING 615,411		EASTING 988,246									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 03/28/12		COMP. DATE 03/28/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2130														2,128.6	0.0
2125	2,123.7	4.9	4	5	4									2,120.1	8.5
2120	2,118.7	9.9	3	6	14										
2115	2,113.7	14.9	9	9	23										
2110	2,108.7	19.9	60/0.0											2,109.3	19.3