

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. B-4406 F.A. PROJ. BRSTP-221(16)  
 COUNTY ALLEGHANY  
 PROJECT DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON  
U.S. 221

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

**CONTENTS**

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-13	BORE LOGS AND CORE REPORTS
14	SCOUR REPORT
15-17	CORE PHOTOGRAPHS

**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

D. C. ELLIOT

G. J. COFFEY

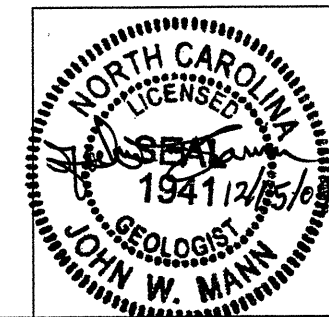
L. A. RIDDLE

INVESTIGATED BY J.W. MANN

CHECKED BY W. D. FRYE

SUBMITTED BY W. D. FRYE

DATE 12.11.09



**PROJECT: 33685.1.1 ID: B-4406**

DRAWN BY: J.T. WILLIAMS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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

SUBSURFACE INVESTIGATION

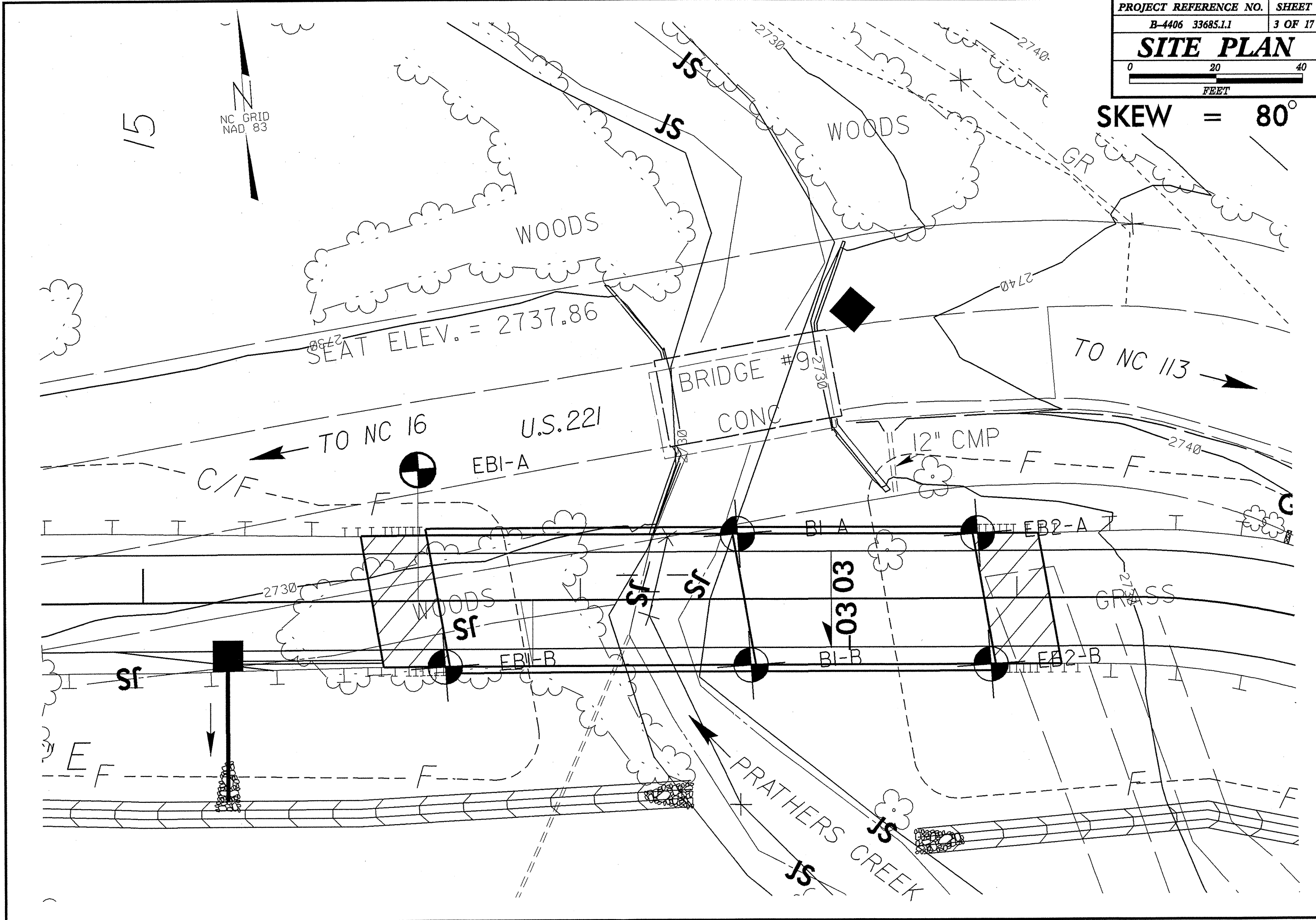
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO.
33685.1.I B-4406

SHEET NO.
2 OF 17

Main table containing sections: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, and BENCH MARK.

**SKEW = 80°**



15

NC GRID  
NAD 83

WOODS

WOODS

GR

SEAT ELEV. = 2737.86

BRIDGE #9  
CONC

TO NC 113

TO NC 16

U.S. 221

EBI-A

12" CMP

2730

WOODS

GRASS

Sf

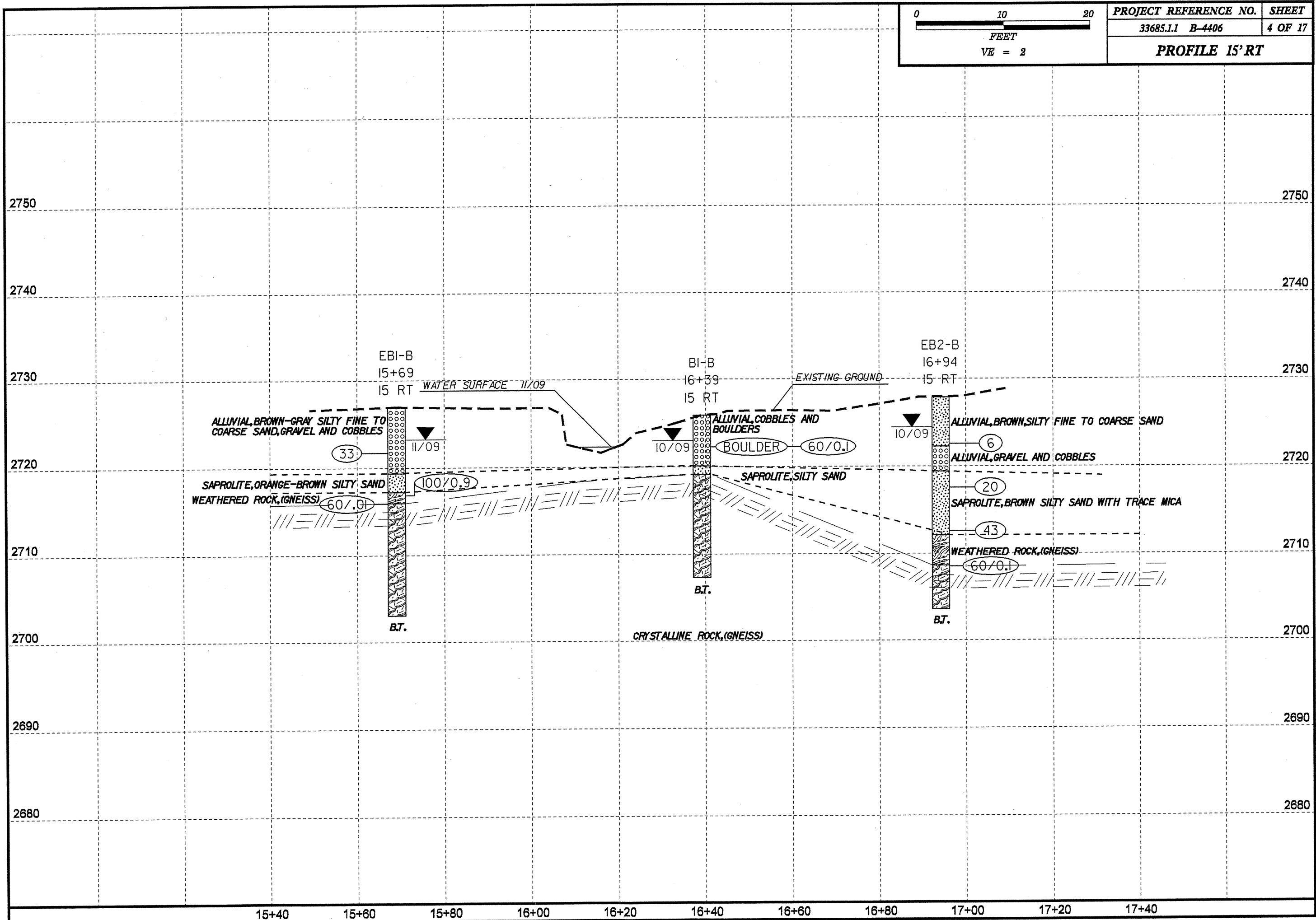
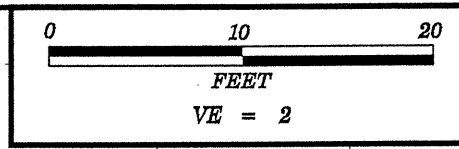
EBI-B

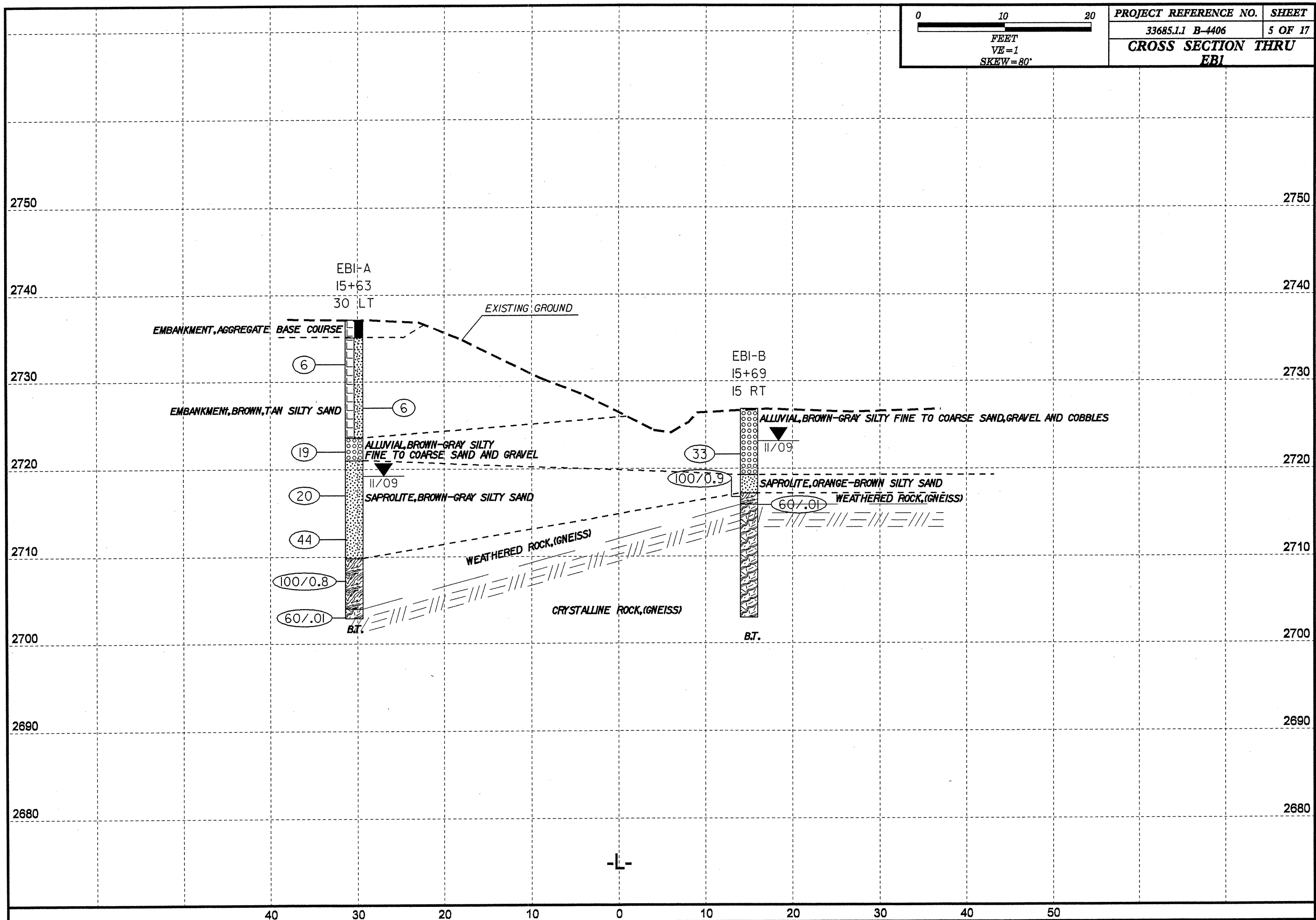
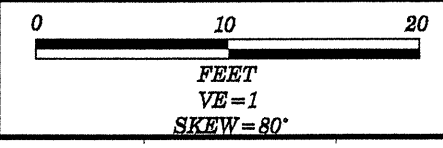
BI-B

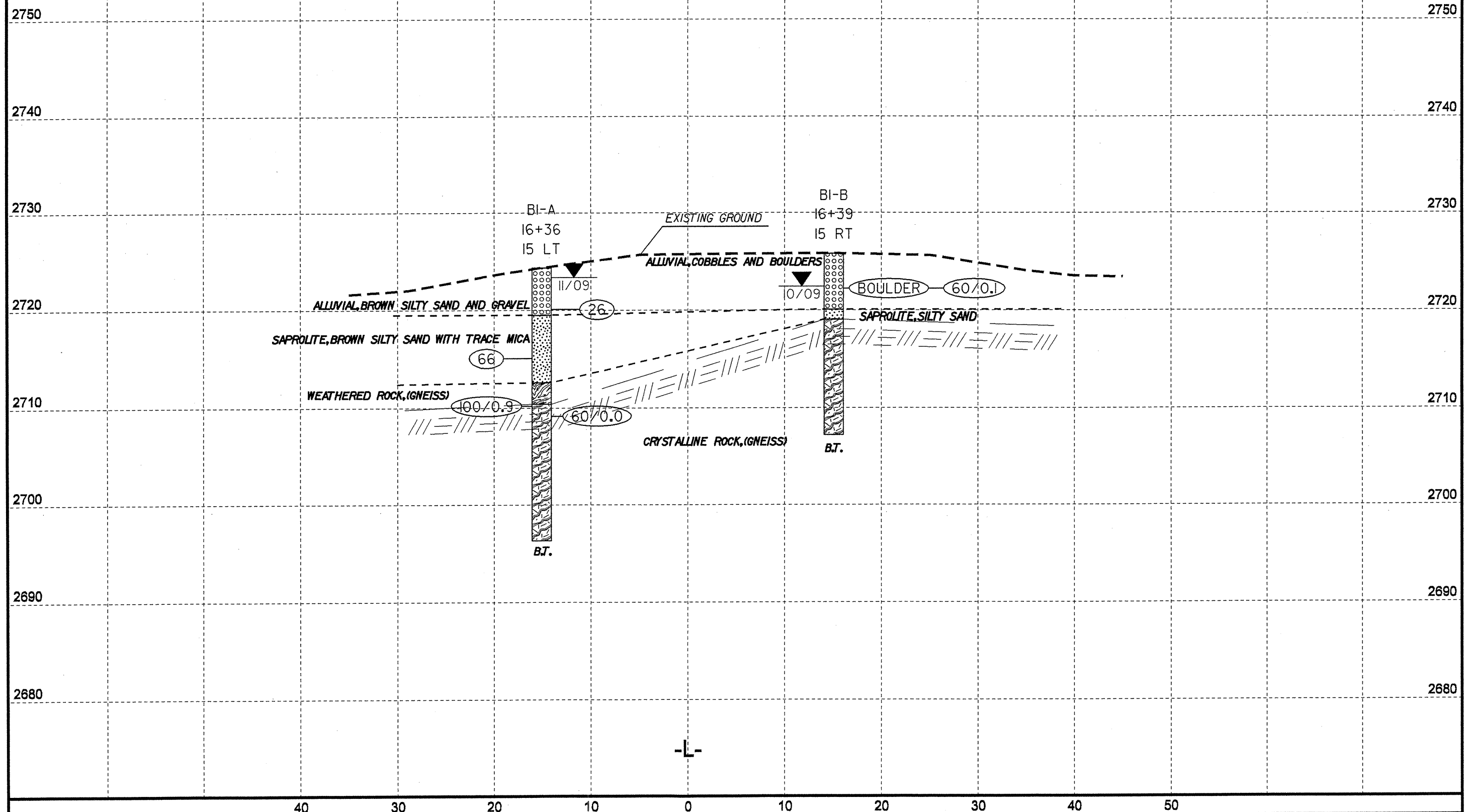
EB2-B

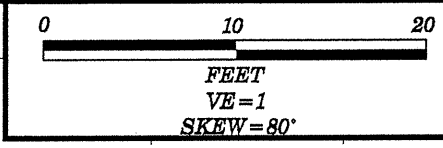
PRATHERS CREEK

E F

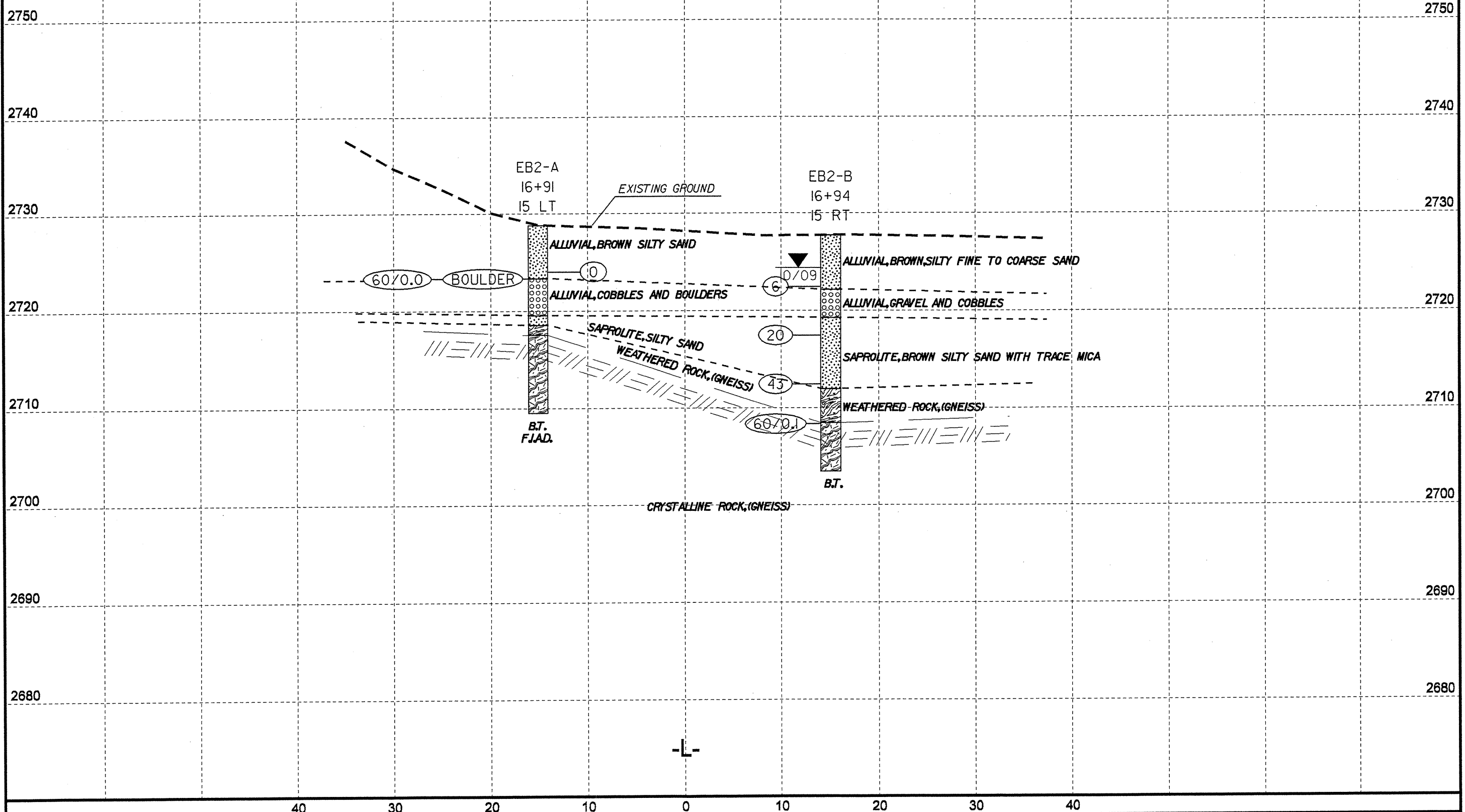








PROJECT REFERENCE NO.	SHEET
33685.1.1 B-4406	7 OF 17
CROSS SECTION THRU EB-2	



-L-





PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. EB1-A	STATION 15+63	OFFSET 30ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,737.1 ft	TOTAL DEPTH 34.2 ft	NORTHING 1,003,085	EASTING 1,327,811
DRILL MACHINE CME-550	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 11/04/09	COMP. DATE 11/04/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 33.1 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2740														2,737.1	GROUND SURFACE	0.0
2735														2,735.0	ROADWAY EMBANKMENT AGGREGATE BASE COURSE	2.1
2730	2,733.0	4.1	1	3	3								M	2,733.0	ROADWAY EMBANKMENT BROWN, TAN SILTY SAND	
2725	2,728.0	9.1	1	3	3								M	2,728.0		
2720	2,723.0	14.1	5	9	10								M	2,723.6	ALLUVIAL BROWN-GRAY SILTY FINE TO COARSE SAND AND GRAVEL	13.5
2715	2,718.0	19.1	2	6	14									2,721.0	SAPROLITE BROWN-GRAY SILTY SAND	16.1
2710	2,713.0	24.1	14	18	26									2,709.8	WEATHERED ROCK (GNEISS)	27.3
2705	2,708.0	29.1	18	50	50/0.3									2,704.0	CRYSTALLINE ROCK	33.1
2700	2,703.0	34.1	60/0.1											2,702.9	CRYSTALLINE ROCK	34.2
2695															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,702.9 ft IN CRYSTALLINE ROCK(GNEISS)	
2690																
2685																
2680																
2675																
2670																
2665																
2660																

NCDOT BORE SINGLE B4406 GEO. BH.GPJ NC.DOT.GDT 12/1/09



PROJECT NO. 33685.1.1		ID. B-4406		COUNTY ALLEGHANY		GEOLOGIST Elliott, D. C.									
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221						GROUND WTR (ft)									
BORING NO. EB1-B		STATION 15+69		OFFSET 15ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,726.9 ft		TOTAL DEPTH 23.9 ft		NORTHING 1,003,040		EASTING 1,327,814									
DRILL MACHINE CME-550		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
START DATE 11/05/09		COMP. DATE 11/05/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 11.0 ft									
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					
2730															
2725															
2720	2,722.7	4.2	8	15	18										
2715	2,717.7	9.2	4	37	63/0.4										
2710	2,715.9	11.0	60/0.1												
2705															
2700															
2695															
2690															
2685															
2680															
2675															
2670															
2665															
2660															
2655															
2650															

NCDOT BORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/1/09

PROJECT NO. 33685.1.1		ID. B-4406		COUNTY ALLEGHANY		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221						GROUND WTR (ft)						
BORING NO. EB1-B		STATION 15+69		OFFSET 15ft RT		ALIGNMENT -L-						
COLLAR ELEV. 2,726.9 ft		TOTAL DEPTH 23.9 ft		NORTHING 1,003,040		EASTING 1,327,814						
DRILL MACHINE CME-550		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic							
START DATE 11/05/09		COMP. DATE 11/05/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 11.0 ft						
CORE SIZE NXWL			TOTAL RUN 12.9 ft			DRILLER Coffey, Jr., C.						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2715.85												
2715	2,715.9	11.0	2.9	N=60/01	(2.7)	(2.4)						
	2,713.0	13.9	5.0		93%	83%						
2710					(3.1)	(2.3)						
	2,708.0	18.9	5.0		62%	46%						
2705					(3.6)	(3.0)						
	2,703.0	23.9			72%	60%						
2700												
2695												
2690												
2685												
2680												
2675												
2670												
2665												
2660												
2655												
2650												
2645												
2640												

NCDOT CORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/1/09



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

SHEET

PROJECT NO. 33685.1.1		ID. B-4406		COUNTY ALLEGHANY		GEOLOGIST Elliott, D. C.									
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221						GROUND WTR (ft)									
BORING NO. B1-A		STATION 16+36		OFFSET 15ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2,724.4 ft		TOTAL DEPTH 28.0 ft		NORTHING 1,003,065		EASTING 1,327,883									
DRILL MACHINE CME-550		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
START DATE 11/02/09		COMP. DATE 11/02/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 14.0 ft									
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					
2725														GROUND SURFACE	0.0
														ALLUVIAL BROWN SILTY SAND AND GRAVEL	
2720	2,721.1	3.3	9	15	11								M		4.9
														SAPROLITE BROWN SILTY SAND WITH TRACE MICA	
2715	2,716.1	8.3	14	40	26								M		
														WEATHERED ROCK (GNEISS)	11.8
2710	2,711.1	13.3	27	55	45/0.4									CRYSTALLINE ROCK (GNEISS)	14.0
	2,709.2	15.2												CRYSTALLINE ROCK (GNEISS)	
2705														RUN 1 : 15.2' - 18.0' REC=96% RQD=96%	
														RUN 2 : 18.0' - 23.0' REC=100% RQD=100%	
2700														RUN 3 : 23.0' - 28.0' REC=100% RQD=100%	
2695														Boring Terminated at Elevation 2,696.4 ft IN CRYSTALLINE ROCK(GNEISS)	28.0
2690															
2685															
2680															
2675															
2670															
2665															
2660															
2655															
2650															
2645															

NCDOT BORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/1/09



**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**CORE BORING REPORT**

SHEET  
10 OF 17

PROJECT NO. 33685.1.1		ID. B-4406		COUNTY ALLEGHANY		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221						GROUND WTR (ft)						
BORING NO. B1-A		STATION 16+36		OFFSET 15ft LT		ALIGNMENT -L-						
COLLAR ELEV. 2,724.4 ft		TOTAL DEPTH 28.0 ft		NORTHING 1,003,065		EASTING 1,327,883						
DRILL MACHINE CME-550		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic							
START DATE 11/02/09		COMP. DATE 11/02/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 14.0 ft						
CORE SIZE NXWL			TOTAL RUN 12.8 ft			DRILLER Coffey, Jr., C.						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2709.19											Begin Coring @ 15.2 ft	
	2,709.2	15.2	2.8	N=60/0.0	(2.7)	(2.7)					CRYSTALLINE ROCK GRAY, FRESH, HARD GNEISS. NO OBSERVABLE JOINTS. FOLIATION MODERATELY DEVELOPED @ 65 DEGREES (continued)	
2705	2,706.4	18.0	5.0	1:39	(5.0)	(5.0)						
				1:35	100%	100%						
2700	2,701.4	23.0	5.0	1:46								
				1:27								
2695	2,696.4	28.0	5.0	1:33	(5.0)	(5.0)						
				1:48	100%	100%						
				1:31								
				1:35								
				1:40								
				1:43								
2690											Boring Terminated at Elevation 2,696.4 ft IN CRYSTALLINE ROCK(GNEISS)	28.0
2685												
2680												
2675												
2670												
2665												
2660												
2655												
2650												
2645												
2640												
2635												
2630												

NCDOT CORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/2/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. B1-B	STATION 16+39	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,725.9 ft	TOTAL DEPTH 18.6 ft	NORTHING 1,003,035	EASTING 1,327,883
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/29/09	COMP. DATE 10/29/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 6.8 ft

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				
2730														
2725													GROUND SURFACE 0.0	
2720	2,722.3	3.6											ALLUVIAL COBBLES AND BOULDERS	
2715													SAPROLITE SILTY SAND	5.8
2710													CRYSTALLINE ROCK (GNEISS)	6.8
2705													RUN 1 : 6.8' - 8.6' REC=72% RQD=61%	
2700													RUN 2 : 8.6' - 13.6' REC=94% RQD=64%	
2695													RUN 3 : 13.6' - 18.6' REC=76% RQD=40%	
2690													Boring Terminated at Elevation 2,707.3 ft IN CRYSTALLINE ROCK(GNEISS)	18.6

NCDOT BORE SINGLE B4406\_GEO\_BH.GPJ NC\_DOT.GDT 12/1/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. B1-B	STATION 16+39	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,725.9 ft	TOTAL DEPTH 18.6 ft	NORTHING 1,003,035	EASTING 1,327,883
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/29/09	COMP. DATE 10/29/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 6.8 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2719.06											Begin Coring @ 6.8 ft	
2715	2,719.1	6.8	1.8		(1.3)	(1.1)					CRYSTALLINE ROCK	6.8
	2,717.3	8.6	5.0	2:10	72%	61%					GRAY, SLIGHTLY WEATHERED, MODERATELY HARD TO HARD GNEISS. FRACTURE SPACING VARIABLE BUT TYPICALLY CLOSE FRACTURES ARE NEAR HORIZONTAL (0-10 DEGREES) OR @ ~70 DEGREES ALONG FOLIATION.	
2710	2,712.3	13.6	5.0	2:05	94%	64%						
				2:15								
				2:01								
				2:16								
2705	2,707.3	18.6			(3.8)	(2.0)					Boring Terminated at Elevation 2,707.3 ft IN CRYSTALLINE ROCK(GNEISS)	18.6
2700												
2695												
2690												
2685												
2680												
2675												
2670												
2665												
2660												
2655												
2650												
2645												
2640												

NCDOT CORE SINGLE B4406\_GEO\_BH.GPJ NC\_DOT.GDT 12/2/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+91	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,728.8 ft	TOTAL DEPTH 19.3 ft	NORTHING 1,003,061	EASTING 1,327,938
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/29/09	COMP. DATE 10/29/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.3 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2730														GROUND SURFACE	0.0
2725	2,725.0	3.8												ALLUVIAL BROWN SILTY SAND	
	2,723.3	5.5	0	0	0									ALLUVIAL COBBLES AND BOULDERS	5.5
2720														SAPROLITE SILTY SAND	10.3
														WEATHERED ROCK (GNEISS)	11.3
2715														CRYSTALLINE ROCK (GNEISS)	
2710														CRYSTALLINE ROCK (GNEISS)	19.3
RUN 1: 11.3' - 14.3' REC=83% RQD=70% RUN 2: 14.3' - 19.3' REC=96% RQD=84% Boring Terminated at Elevation 2,709.5 ft IN CRYSTALLINE ROCK(GNEISS)															
2705															
2700															
2695															
2690															
2685															
2680															
2675															
2670															
2665															
2660															
2655															
2650															

NCDOT BORE SINGLE B4406 GEO BH.GPJ NC.DOT.GDT 12/1/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+91	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,728.8 ft	TOTAL DEPTH 19.3 ft	NORTHING 1,003,061	EASTING 1,327,938
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/29/09	COMP. DATE 10/29/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.3 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2723.32				N=60/0.0							Begin Coring @ 5.5 ft	
2720											ALLUVIAL	5.5
	2,717.5	11.3	3.0		(2.5)	(2.1)					SAPROLITE	9.3
	2,714.5	14.3	5.0	2:31	83%	70%					WEATHERED ROCK	10.3
2715				2:19	96%	84%					CRYSTALLINE ROCK	11.3
2710				2:36							RECOVERED ROCK IS GRAY, HARD VERY SLIGHTLY WEATHERED GNEISS. FRACTURE SPACING TYPICALLY CLOSE TO MODERATELY CLOSE. JOINTS ARE LOW ANGLE (<10 DEGREES) OR @ ~70 DEGREES ALONG FOLIATION. WEATHERED ZONE FROM APPROXIMATELY 11.6' - 12.1'.	
	2,709.5	19.3		2:41							Boring Terminated at Elevation 2,709.5 ft IN CRYSTALLINE ROCK(GNEISS)	19.3
2705												
2700												
2695												
2690												
2685												
2680												
2675												
2670												
2665												
2660												
2655												
2650												
2645												

NCDOT CORE SINGLE B4406 GEO BH.GPJ NC.DOT.GDT 12/2/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. EB2-B	STATION 16+94	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,727.7 ft	TOTAL DEPTH 24.3 ft	NORTHING 1,003,031	EASTING 1,327,938
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/28/09	COMP. DATE 10/28/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 19.3 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2730														GROUND SURFACE	0.0
2725	2,723.4	4.3	1	1	5									ALLUVIAL BROWN, SILTY FINE TO COARSE SAND	
2720	2,718.4	9.3												ALLUVIAL GRAVEL AND COBBLES	8.5
2715	2,713.4	14.3												SAPROLITE BROWN SILTY SAND WITH TRACE MICA	
2710	2,708.4	19.3												WEATHERED ROCK (GNEISS)	15.8
2705														CRYSTALLINE ROCK (GNEISS)	19.3
2700														RUN 1: 19.4' - 24.4' REC=96% RQD=88%	24.3
2695														Boring Terminated at Elevation 2,703.4 ft IN CRYSTALLINE ROCK(GNEISS)	
2690															
2685															
2680															
2675															
2670															
2665															
2660															
2655															
2650															

NC DOT BORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/7/09

PROJECT NO. 33685.1.1	ID. B-4406	COUNTY ALLEGHANY	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 9 OVER PRATHERS CREEK ON U.S. 221			GROUND WTR (ft)
BORING NO. EB2-B	STATION 16+94	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,727.7 ft	TOTAL DEPTH 24.3 ft	NORTHING 1,003,031	EASTING 1,327,938
DRILL MACHINE CME-550	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
START DATE 10/28/09	COMP. DATE 10/28/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 19.3 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2708.34											Begin Coring @ 19.4 ft	
2705	2,708.3	19.4	4.9	3:06 3:15 2:58 3:17 3:09/0.9	(4.7) 96%	(4.3) 88%					CRYSTALLINE ROCK GRAY, FRESH, HARD GNEISS. FRACTURE SPACING CLOSE TO WIDE WITH HORIZONTAL JOINTS NEAR TOP OF RUN. (continued)	
2700	2,703.4	24.3									Boring Terminated at Elevation 2,703.4 ft IN CRYSTALLINE ROCK(GNEISS)	24.3
2695												
2690												
2685												
2680												
2675												
2670												
2665												
2660												
2655												
2650												
2645												
2640												
2635												
2630												

NC DOT CORE SINGLE B4406 GEO BH.GPJ NC DOT.GDT 12/2/09



**FIELD  
 SCOUR REPORT**

WBS: 33685.1.1 TIP: B-4406 COUNTY: Alleghany

DESCRIPTION(1): Bridge No. 9 on US 221 over Prathers Creek

**EXISTING BRIDGE**

Information from: Field Inspection  Microfilm \_\_\_\_\_ (reel \_\_\_\_\_ pos: \_\_\_\_\_)  
 Other (explain) BSR dated 10/26/09

Bridge No.: 9 Length: ~37 Total Bents: 2 Bents in Channel: 0 Bents in Floodplain: 2  
 Foundation Type: Abutments

**EVIDENCE OF SCOUR(2)**

Abutments or End Bent Slopes: Creek is eroding beneath EB1-B side of abutment.

Interior Bents: n/a

Channel Bed: Probable scour pocket at EB1-B side of abutment.

Channel Bank: None noted.

**EXISTING SCOUR PROTECTION**

Type(3): Rip Rap

Extent(4): Placed behind EB1-B wing wall.

Effectiveness(5): Fair to poor.

Obstructions(6): None.

**INSTRUCTIONS**

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

**DESIGN INFORMATION**

Channel Bed Material(7): Sand, gravel, & cobbles.

Channel Bank Material(8): Sand, gravel, & cobbles.

Channel Bank Cover(9): Trees & bramble.

Floodplain Width(10): ~200'

Floodplain Cover(11): Grass, bramble

Stream is(12): Aggrading \_\_\_\_\_ Degrading  Static \_\_\_\_\_

Channel Migration Tendency(13): Thalweg flows into EB1-B side upstream; shifts toward EB2-A beneath the bridge.

Observations and Other Comments: Stream is sinuous at the site. The confluence of a drainage ditch from a field is located ~5-6' upstream of the End Bent One abutment.

**DESIGN SCOUR ELEVATIONS(14)**

Feet  Meters \_\_\_\_\_

**BENTS**

B1

2718																			

Comparison of DSE to Hydraulics Unit theoretical scour:

DSE is in agreement with the Hydraulics Unit theoretical scour reported on the BSR dated 10/26/09.

**SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL**

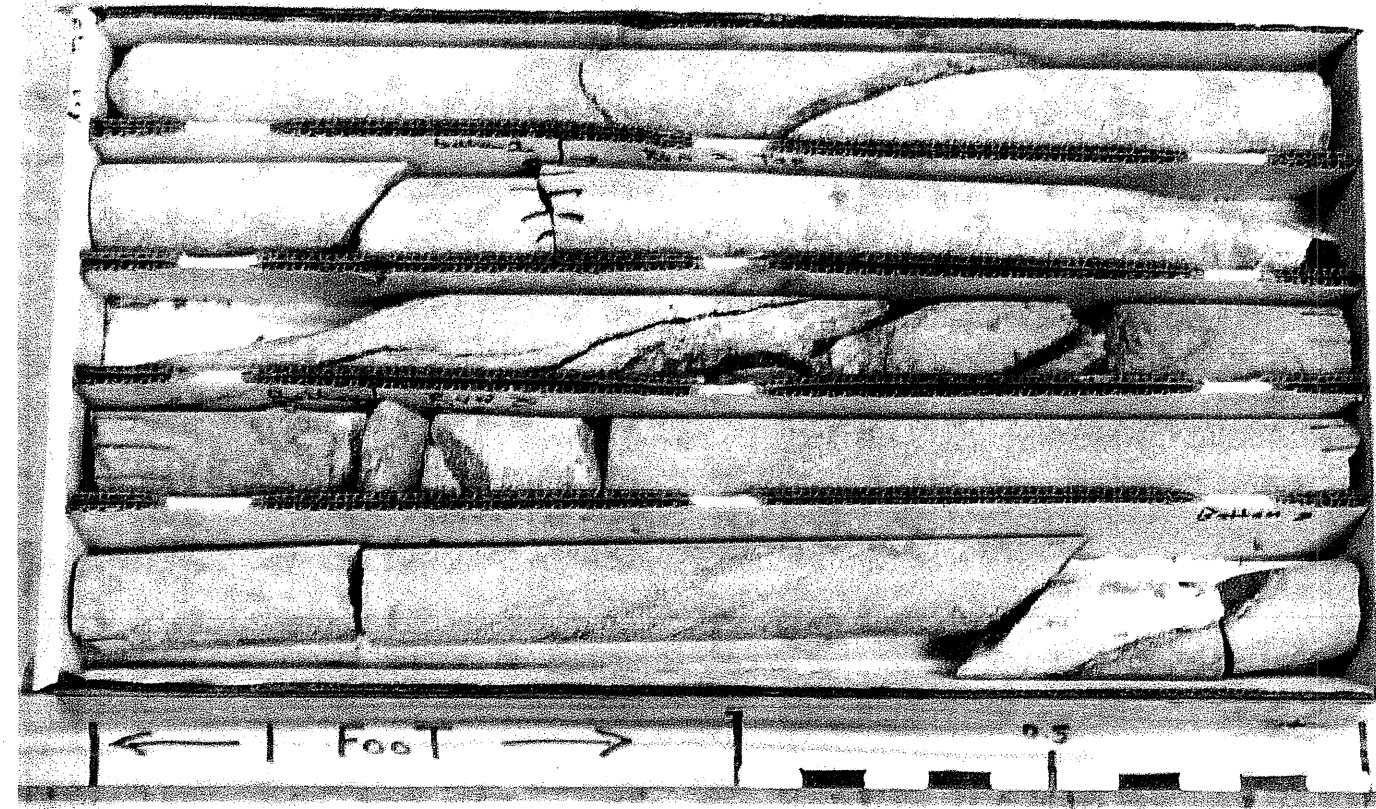
Bed or Bank																				
Sample No.																				
Retained #4																				
Passed #10																				
Passed #40																				
Passed #200																				
Coarse Sand																				
Fine Sand																				
Silt																				
Clay																				
LL																				
PI																				
AASHTO																				
Station																				
Offset																				
Depth																				



33685.1.1 (B-4406)  
ALLEGHANY COUNTY  
BRIDGE # 9 ON US 221 OVER PRATHERS CREEK

CORE PHOTOS

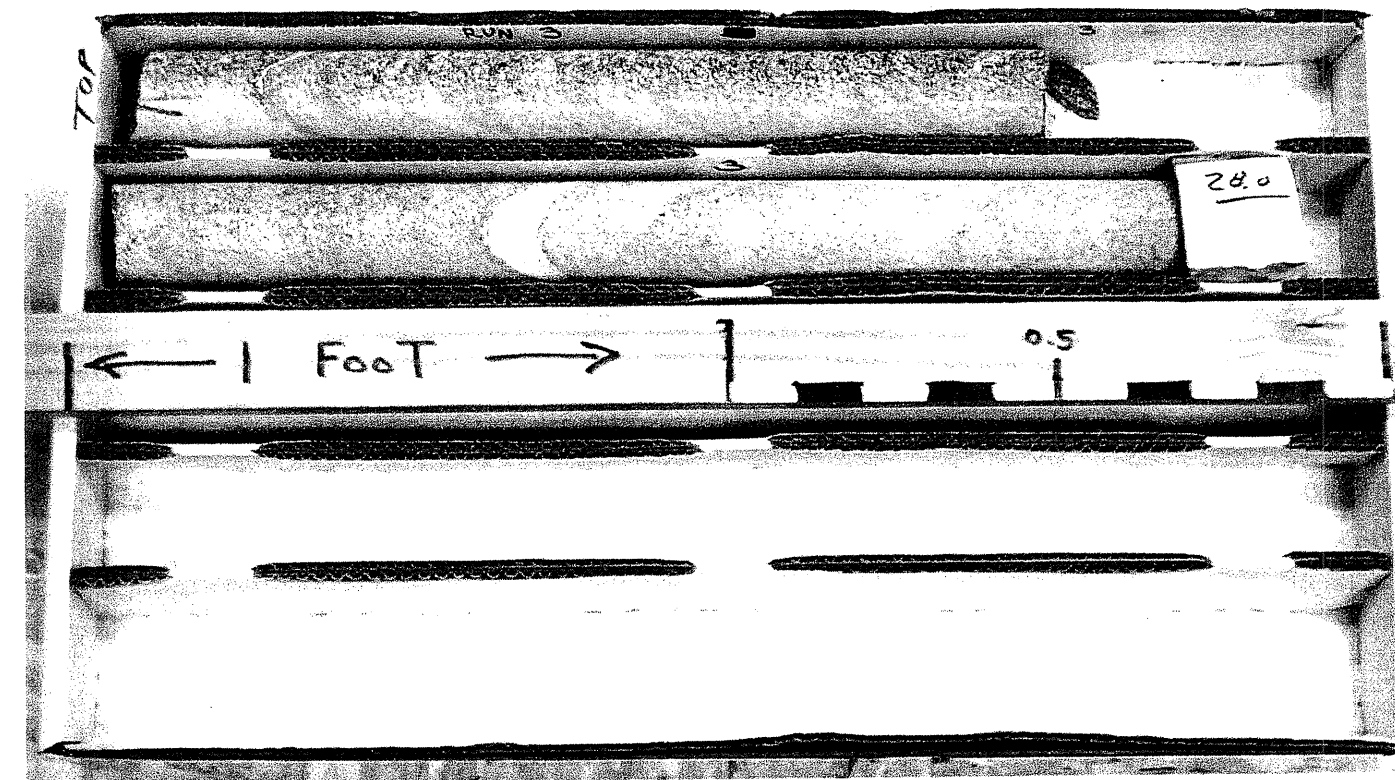
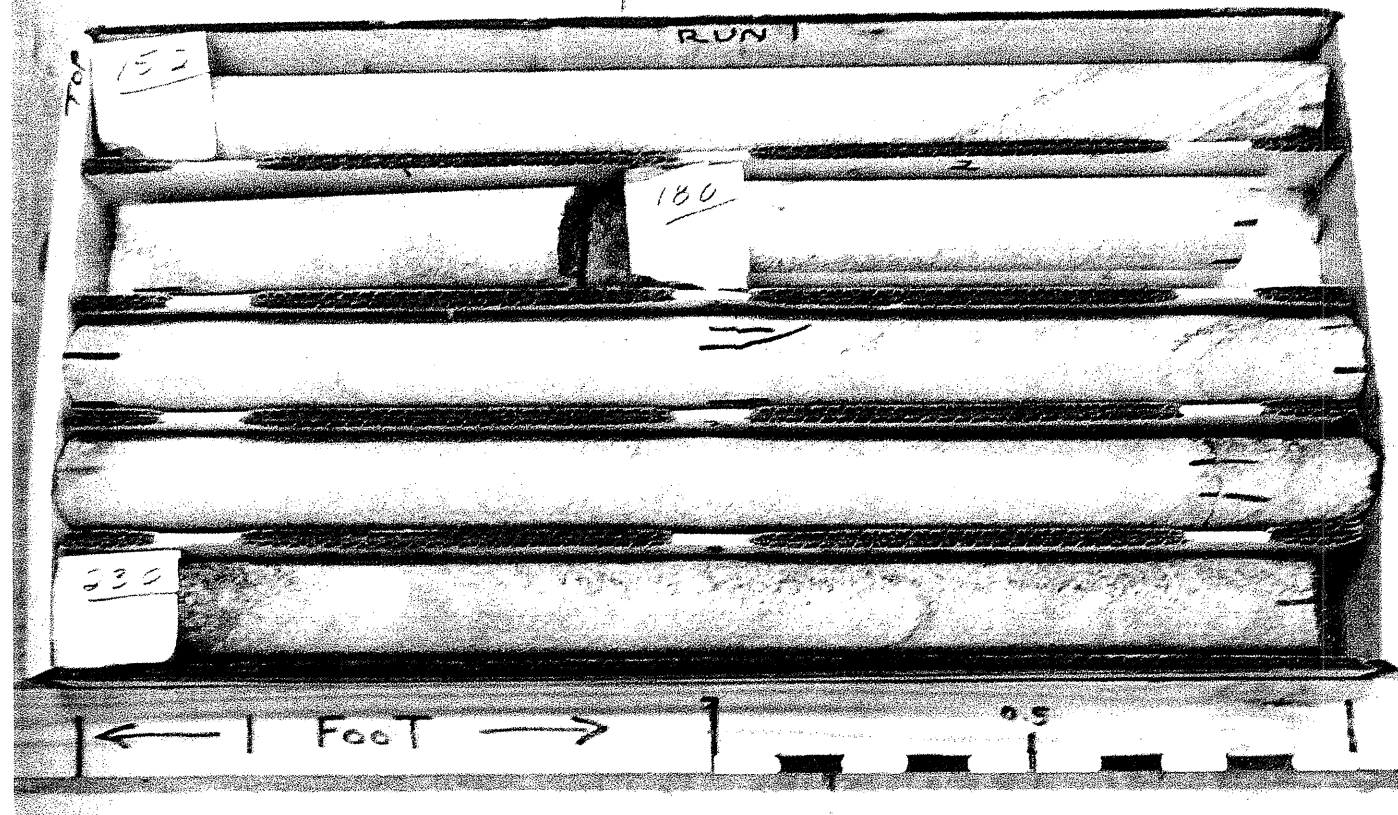
EB1-B





CORE PHOTOS

B1-A



B1-B



33685.1.1 (B-4406)  
ALLEGHANY COUNTY  
BRIDGE # 9 ON US 221 OVER PRATHERS CREEK

CORE PHOTOS

EB2-A



EB2-B

