

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33766.1.1 (B-4553)	1	21

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-8	CROSS SECTIONS
9-14	BORE LOGS & CORE REPORTS
15	SOIL TEST RESULTS
16	SCOUR REPORT
17-20	CORE PHOTOGRAPHS
21	SITE PHOTOGRAPHS

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33766.1.1 F.A. PROJ. BRSTP-2308(2)
 COUNTY IREDELL
 PROJECT DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH 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

R. W. TODD

M. L. SMITH

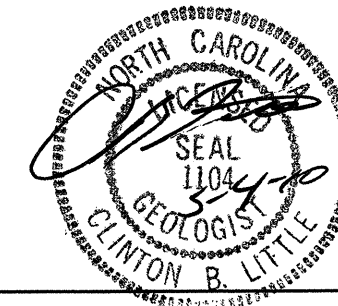
A. C. SMITH

INVESTIGATED BY J. P. ROGERS

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE FEBRUARY 2010



DRAWN BY: C. E. BURRIS

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.

ID: B-4553

PROJECT: 33766.1.1

BM #1
 -BL- STA. 12+93.18
 213.66' LEFT
 ELEV. 731.45'

RUSSELL JAYNES BROWN
 DB III4 PG 1369

JON H. PEPPER
 DB 818 PG 782

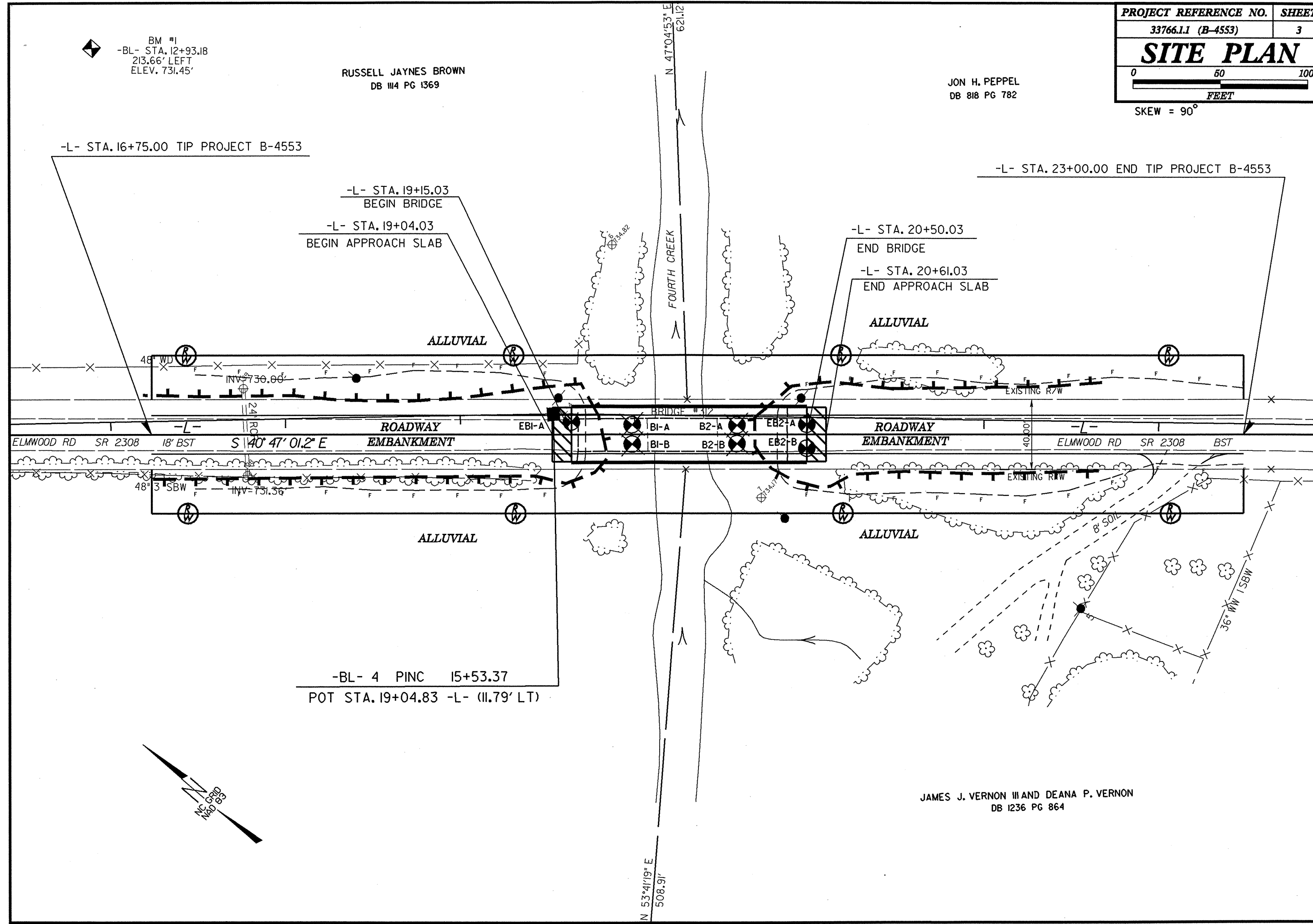
SKREW = 90°

-L- STA. 16+75.00 TIP PROJECT B-4553

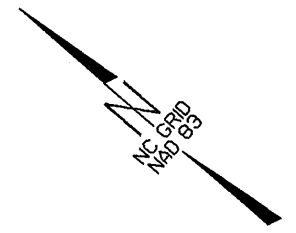
-L- STA. 23+00.00 END TIP PROJECT B-4553

-L- STA. 19+15.03
 BEGIN BRIDGE
 -L- STA. 19+04.03
 BEGIN APPROACH SLAB

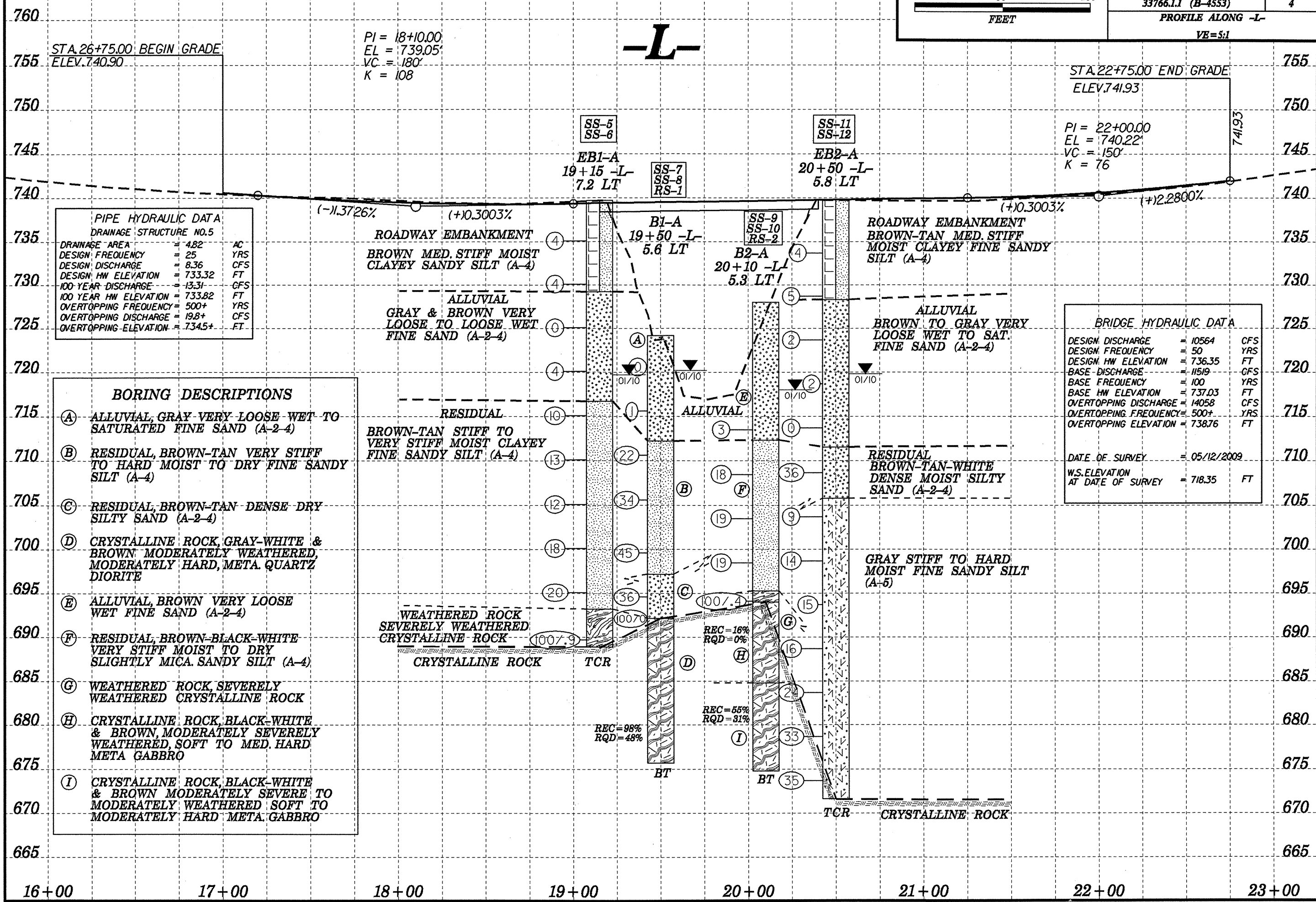
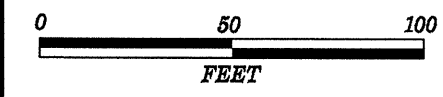
-L- STA. 20+50.03
 END BRIDGE
 -L- STA. 20+61.03
 END APPROACH SLAB



-BL- 4 PINC 15+53.37
 POT STA. 19+04.83 -L- (11.79' LT)



JAMES J. VERNON III AND DEANA P. VERNON
 DB 1236 PG 864



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.5

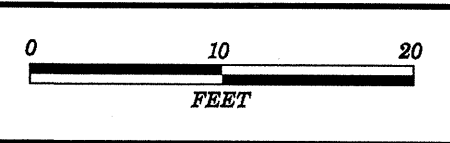
DRAINAGE AREA	= 4.82	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8.36	CFS
DESIGN HW ELEVATION	= 733.32	FT
100-YEAR DISCHARGE	= 13.31	CFS
100 YEAR HW ELEVATION	= 733.82	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 19.8+	CFS
OVERTOPPING ELEVATION	= 734.5+	FT

BORING DESCRIPTIONS

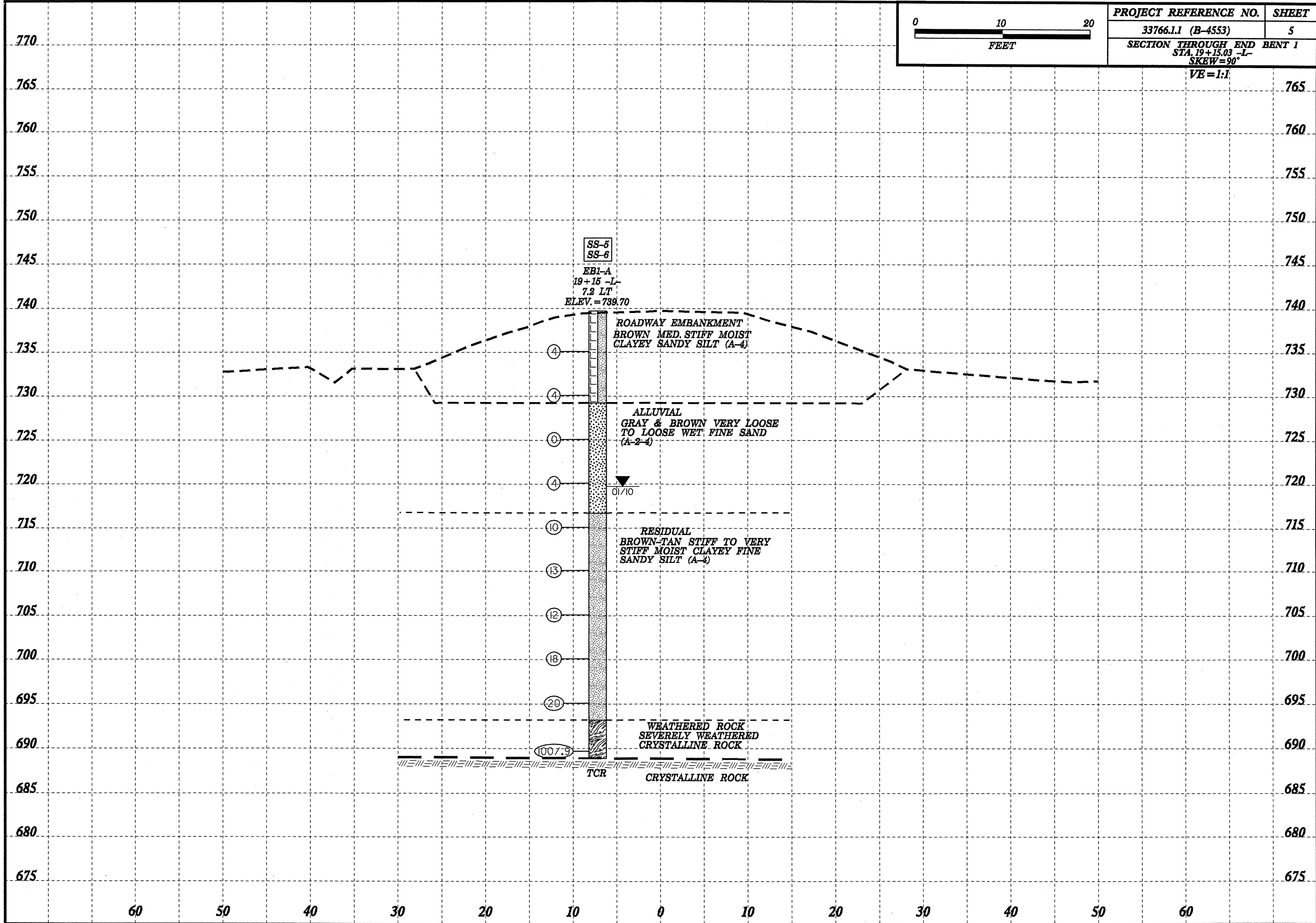
(A)	ALLUVIAL, GRAY VERY LOOSE WET TO SATURATED FINE SAND (A-2-4)
(B)	RESIDUAL, BROWN-TAN VERY STIFF TO HARD MOIST TO DRY FINE SANDY SILT (A-4)
(C)	RESIDUAL, BROWN-TAN DENSE DRY SILTY SAND (A-2-4)
(D)	CRYSTALLINE ROCK, GRAY-WHITE & BROWN, MODERATELY WEATHERED, MODERATELY HARD, META. QUARTZ DIORITE
(E)	ALLUVIAL, BROWN VERY LOOSE WET FINE SAND (A-2-4)
(F)	RESIDUAL, BROWN-BLACK-WHITE VERY STIFF MOIST TO DRY SLIGHTLY MICA. SANDY SILT (A-4)
(G)	WEATHERED ROCK, SEVERELY WEATHERED CRYSTALLINE ROCK
(H)	CRYSTALLINE ROCK, BLACK-WHITE & BROWN, MODERATELY SEVERELY WEATHERED, SOFT TO MED. HARD META GABBRO
(I)	CRYSTALLINE ROCK, BLACK-WHITE & BROWN MODERATELY SEVERELY WEATHERED, SOFT TO MODERATELY HARD META GABBRO

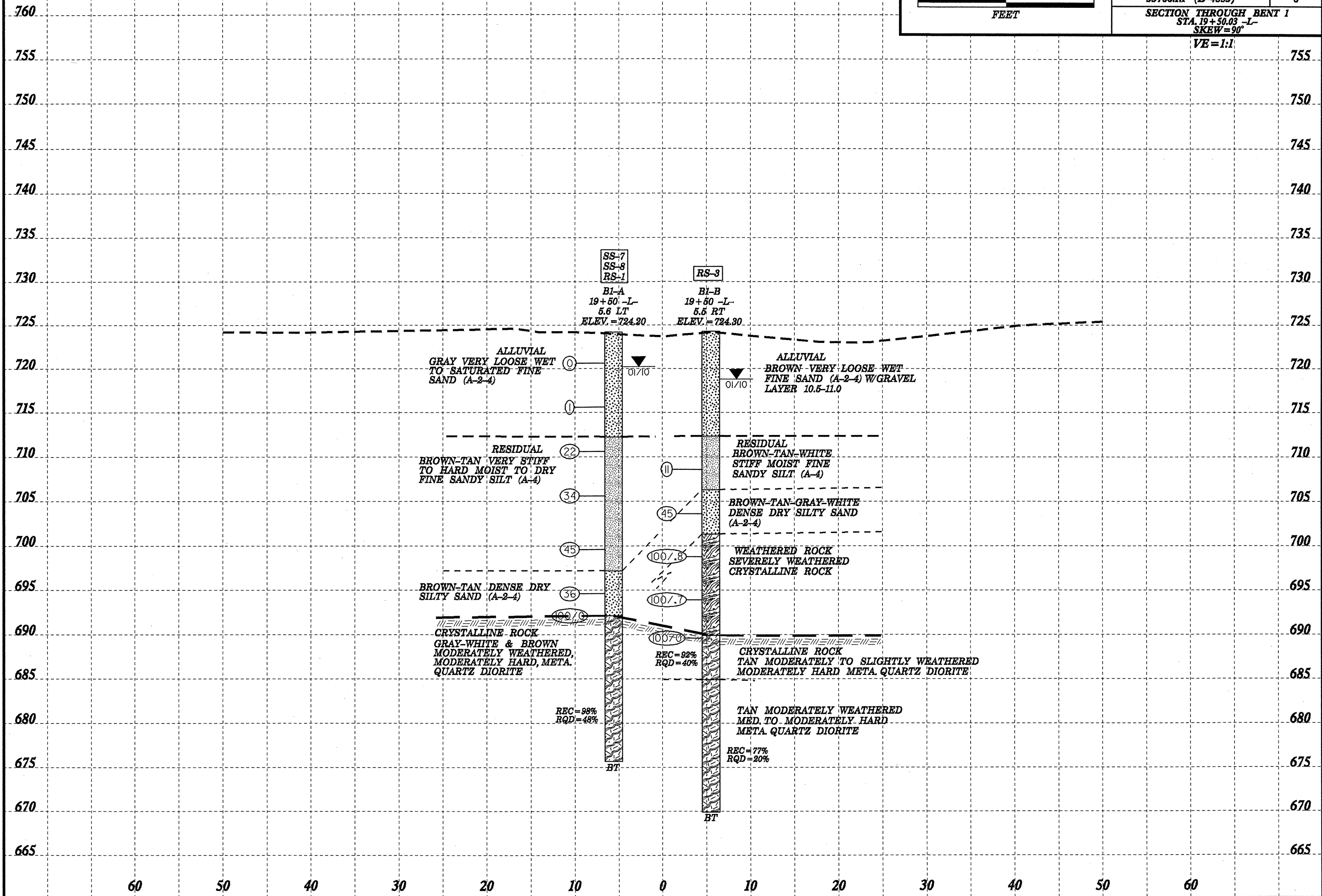
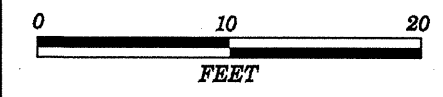
BRIDGE HYDRAULIC DATA

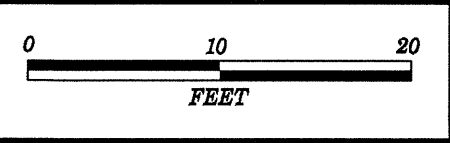
DESIGN DISCHARGE	= 10564	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 736.35	FT
BASE DISCHARGE	= 1519	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 737.03	FT
OVERTOPPING DISCHARGE	= 14058	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 738.76	FT
DATE OF SURVEY	= 05/12/2009	
W.S. ELEVATION AT DATE OF SURVEY	= 718.35	FT



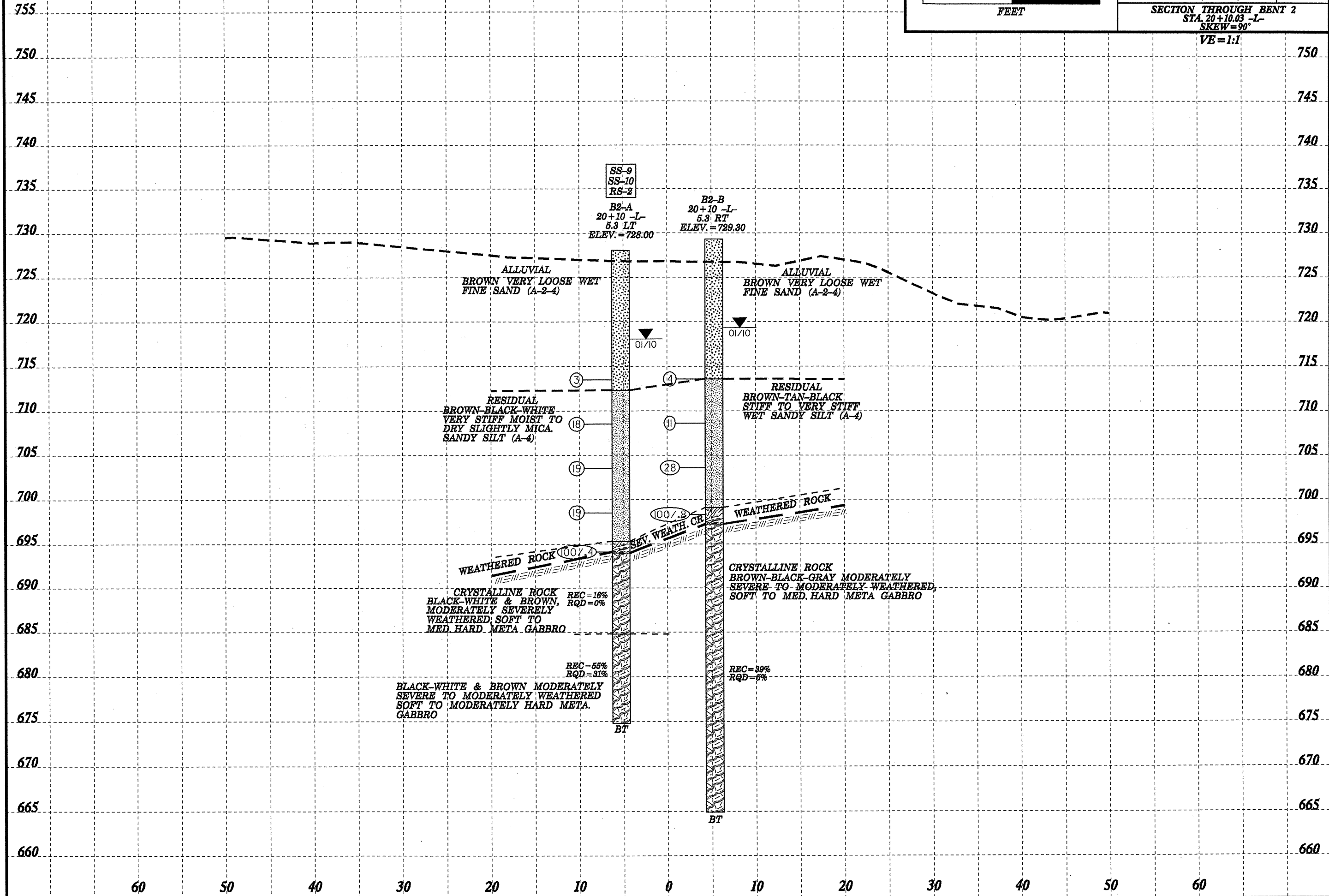
PROJECT REFERENCE NO.	SHEET
33766.1.1 (B-4553)	5
SECTION THROUGH END BENT 1	
STA. 19+15.03 -L-	
SKEW=90°	
VE=1:1	

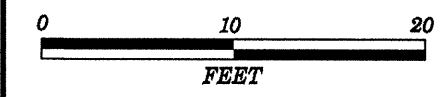




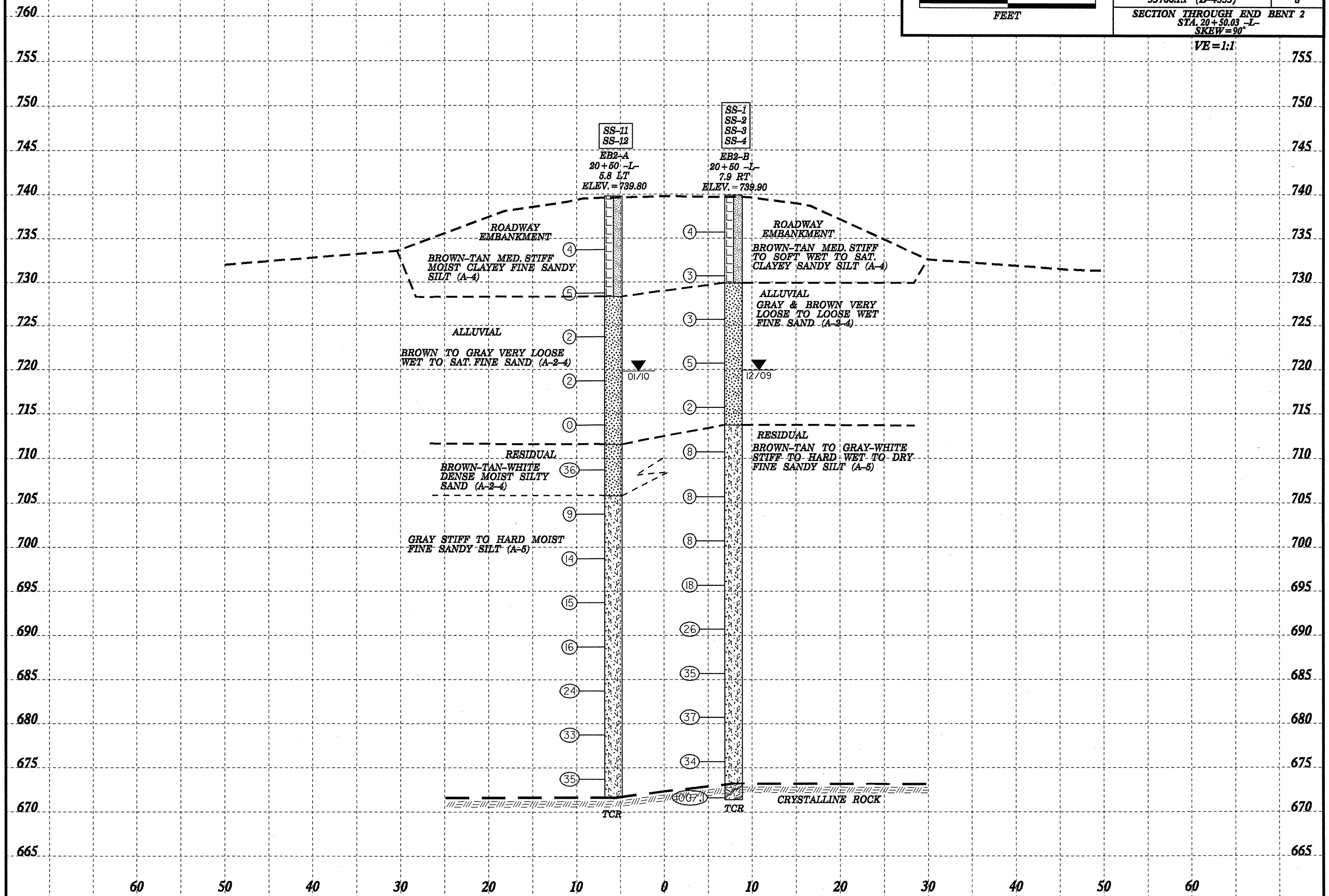


PROJECT REFERENCE NO.	SHEET
33766.1.1 (B-4553)	7
SECTION THROUGH BENT 2	
STA. 20+10.03 -L-	
SKEW = 90°	
VE = 1:1	





VE = 1:1





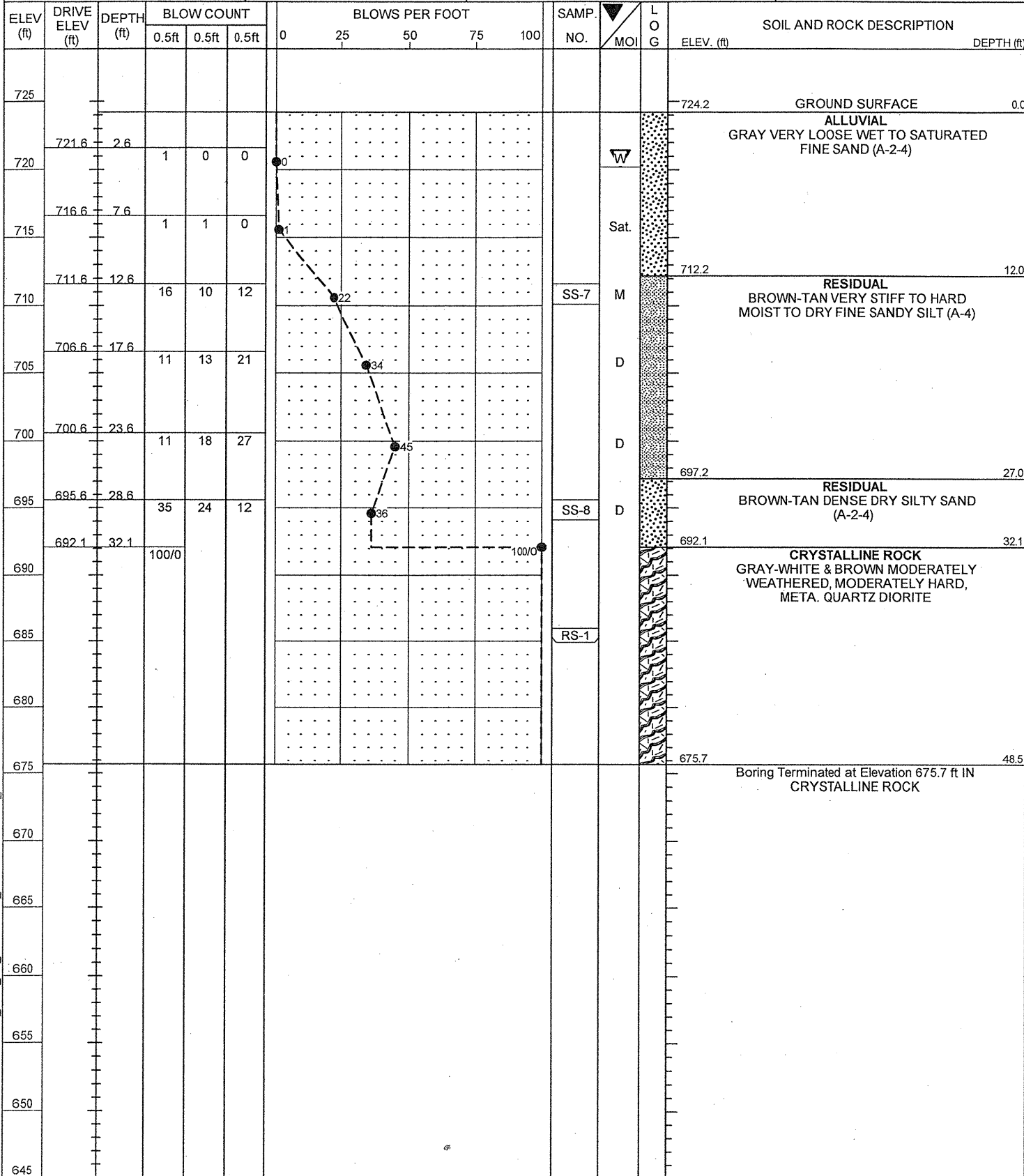
NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 19+15	OFFSET 7ft LT	ALIGNMENT -L-
COLLAR ELEV. 739.7 ft	TOTAL DEPTH 50.8 ft	NORTHING 739,267	EASTING 1,480,883
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/SPT		HAMMER TYPE Automatic
START DATE 01/06/10	COMP. DATE 01/06/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 50.8 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							
740														739.7	GROUND SURFACE	0.0	
735	736.1	3.6	2	2	2								M		ROADWAY EMBANKMENT BROWN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)		
730	731.1	8.6	1	2	2								M				
725	726.1	13.6	1	0	0								W		ALLUVIAL GRAY & BROWN VERY LOOSE TO LOOSE WET FINE SAND (A-2-4)	10.5	
720	721.1	18.6	1	2	2								W				
715	716.1	23.6	4	5	5								SS-5	M	RESIDUAL BROWN-TAN STIFF TO VERY STIFF MOIST CLAYEY FINE SANDY SILT (A-4)	23.0	
710	711.1	28.6	6	6	7								M				
705	706.1	33.6	5	5	7								M				
700	701.1	38.6	8	8	10								M				
695	696.1	43.6	7	9	11								M				
690	691.1	48.6	23	62	38/4								SS-6	D	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	46.5	
																Boring Terminated BY TRI-CONE ROLLER BIT REFUSAL at Elevation 688.9 ft ON CRYSTALLINE ROCK	50.8
685																	
680																	
675																	
670																	
665																	
660																	

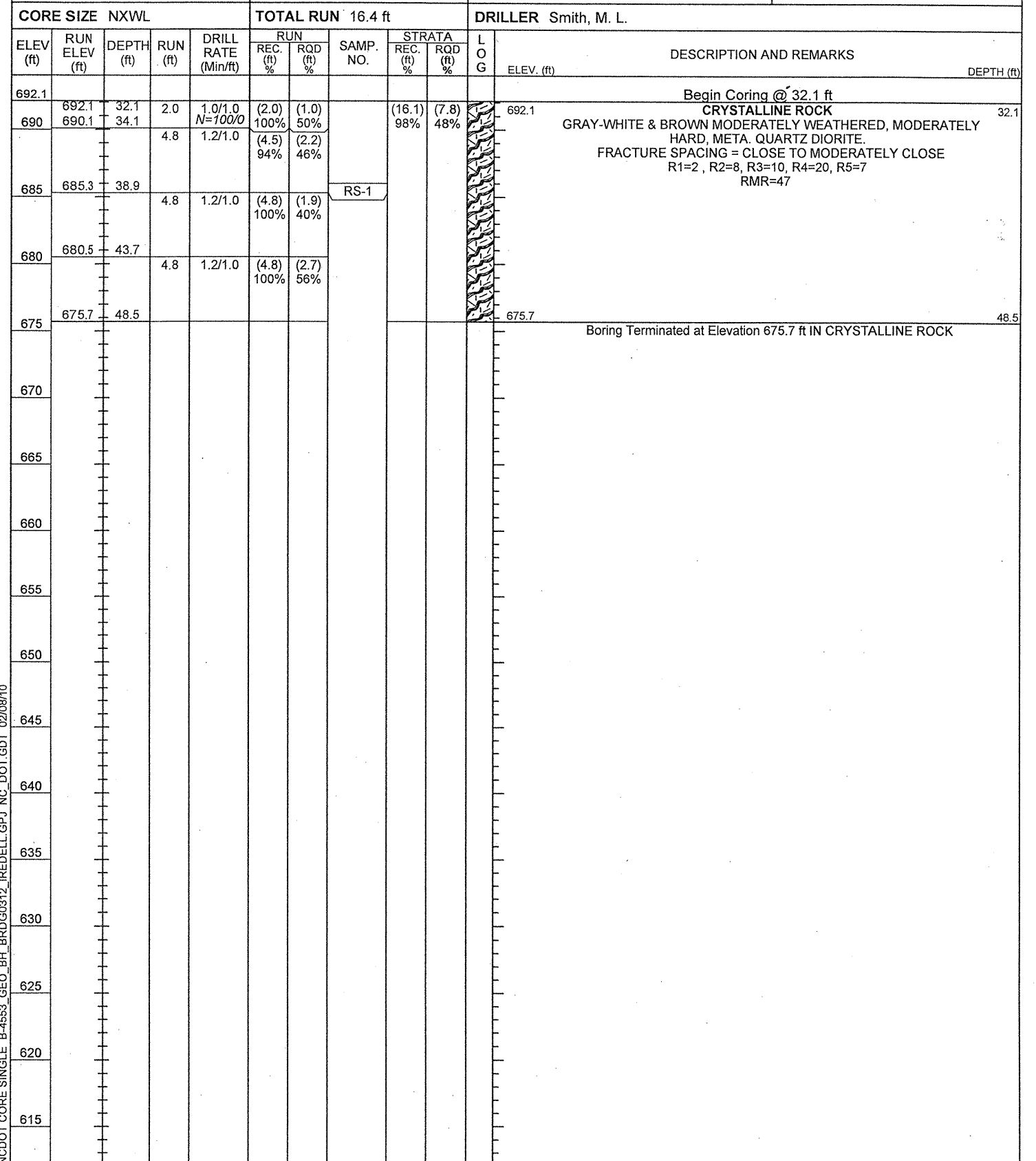
NCDOT BORE SINGLE B-4553 GEO. BH. DRDG0012 IREDELL.GPJ NC_DOT.GDT 02/06/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 19+50	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 724.2 ft	TOTAL DEPTH 48.5 ft	NORTHING 739,240	EASTING 1,480,905
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/07/10	COMP. DATE 01/08/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.1 ft



NCDOT BORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ NC_DOT_GDT 02/08/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 19+50	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 724.2 ft	TOTAL DEPTH 48.5 ft	NORTHING 739,240	EASTING 1,480,905
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/07/10	COMP. DATE 01/08/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.1 ft



NCDOT CORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ NC_DOT_GDT 02/08/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 19+50	OFFSET 6ft RT	ALIGNMENT -L-
COLLAR ELEV. 724.3 ft	TOTAL DEPTH 54.4 ft	NORTHING 739,232	EASTING 1,480,896
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/14/10	COMP. DATE 01/14/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 34.4 ft

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				
725													GROUND SURFACE	0.0
720													ALLUVIAL BROWN VERY LOOSE WET FINE SAND (A-2-4) W/ GRAVEL LAYER 10.5-11.0	
715														
710	709.6	14.7	4	5	6								RESIDUAL BROWN-TAN-WHITE STIFF MOIST FINE SANDY SILT (A-4)	12.0
705	704.6	19.7	12	21	24								RESIDUAL BROWN-TAN-GRAY-WHITE DENSE DRY SILTY SAND (A-2-4)	18.0
700	699.6	24.7	55	45/3									WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	23.0
695	694.6	29.7	47	53/2										
690	689.6	34.7	100/0										CRYSTALLINE ROCK TAN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD, META. QUARTZ DIORITE	34.4
685													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	39.4
680													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
675													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
670													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
665													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
660													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
655													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
650													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
645													CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	

NCDOT BORE SINGLE B-4553 GEO_BH_BRD0312_IREDELL.GPJ NC_DOT.GDT 02/08/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 19+50	OFFSET 6ft RT	ALIGNMENT -L-
COLLAR ELEV. 724.3 ft	TOTAL DEPTH 54.4 ft	NORTHING 739,232	EASTING 1,480,896
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/14/10	COMP. DATE 01/14/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 34.4 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (%)	RQD (%)		REC (%)	RQD (%)			
689.9	689.9	34.4	5.0	1.0/1.0 N=100/0	(4.6)	(2.0)		(4.6)	(2.0)		Begin Coring @ 34.4 ft	34.4
685	684.9	39.4	5.0	1.0/1.0	(4.7)	(0.4)		(11.6)	(3.0)		CRYSTALLINE ROCK TAN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD, META. QUARTZ DIORITE	39.4
680	679.9	44.4	5.0	1.0/1.0	(4.0)	(1.3)		77%	20%		FRACTURE SPACING = CLOSE TO VERY CLOSE R1=4, R2=8, R3=7, R4=6, R5=7 RMR=32	
675	674.9	49.4	5.0	1.1/1.0	(2.9)	(1.3)				RS-3	CRYSTALLINE ROCK TAN, MODERATELY WEATHERED, MED. TO MODERATELY HARD, META QUARTZ DIORITE	
670	669.9	54.4	5.0	1.1/1.0	(2.9)	(1.3)					FRACTURE SPACING = VERY CLOSE TO CLOSE R1=4, R2=3, R3=7, R4=0, R5=7 RMR=21	
665											Boring Terminated at Elevation 669.9 ft IN CRYSTALLINE ROCK	54.4
660												
655												
650												
645												
640												
635												
630												
625												
620												
615												
610												

NCDOT CORE SINGLE B-4553 GEO_BH_BRD0312_IREDELL.GPJ NC_DOT.GDT 02/08/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 20+10	OFFSET 5ft LT	ALIGNMENT -L-
COLLAR ELEV. 728.0 ft	TOTAL DEPTH 53.2 ft	NORTHING 739,194	EASTING 1,480,944
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/12/10	COMP. DATE 01/12/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 34.0 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				
730													GROUND SURFACE	0.0
725													ALLUVIAL BROWN VERY LOOSE WET FINE SAND (A-2-4)	
720														
715	714.5	13.5	1	2	1						SS-9	W		
710	709.5	18.5	2	8	10						SS-10	M	RESIDUAL BROWN-BLACK-WHITE VERY STIFF MOIST TO DRY SLIGHTLY MICA. SANDY SILT (A-4)	15.7
705	704.5	23.5	5	7	12							D		
700	699.5	28.5	13	9	10							D		
695	694.5	33.5	100/4							100/4		D	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	32.7
690													CRYSTALLINE ROCK BLACK-WHITE & BROWN, MODERATELY SEVERELY WEATHERED, SOFT TO MED. HARD META GABBRO	34.0
685														
680											RS-2		CRYSTALLINE ROCK BLACK-WHITE & BROWN, MODERATELY SEVERE TO MODERATELY WEATHERED, SOFT TO MODERATELY HARD META. GABBRO	43.2
675														
670														
665														
660														
655														
650														

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 20+10	OFFSET 5ft LT	ALIGNMENT -L-
COLLAR ELEV. 728.0 ft	TOTAL DEPTH 53.2 ft	NORTHING 739,194	EASTING 1,480,944
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/12/10	COMP. DATE 01/12/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 34.0 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 (%)			
694	694.0	34.0	4.2	1.4/1.0	(0.3)	(0.0)		(1.5)	(0.0)		Begin Coring @ 34.0 ft	34.0
690	689.8	38.2	5.0	1.1/1.0	(1.2)	(0.0)					CRYSTALLINE ROCK BLACK-WHITE & BROWN, MODERATELY SEVERELY WEATHERED, SOFT TO MED. HARD META GABBRO FRACTURE SPACING = VERY CLOSE R1=0, R2=3, R3=5, R4=0, R5=7 RMR=15	
685	684.8	43.2	5.0	1.0/1.0	(3.1)	(2.1)		(5.5)	(3.1)		CRYSTALLINE ROCK BLACK-WHITE & BROWN, MODERATELY SEVERE TO MODERATELY WEATHERED, SOFT TO MODERATELY HARD META. GABBRO. FRACTURE SPACING = VERY CLOSE TO MODERATELY CLOSE R1=7, R2=7, R3=8, R4=6, R5=7 RMR=35	43.2
680	679.8	48.2	5.0	1.0/1.0	(2.4)	(1.0)	RS-2					
675	674.8	53.2									Boring Terminated at Elevation 674.8 ft IN CRYSTALLINE ROCK	53.2
670												
665												
660												
655												
650												
645												
640												
635												
630												
625												
620												
615												

NCDOT BORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ_NC_DOT_GDT_02/08/10

NCDOT CORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ_NC_DOT_GDT_02/08/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 20+10	OFFSET 5ft RT	ALIGNMENT -L-
COLLAR ELEV. 729.3 ft	TOTAL DEPTH 64.4 ft	NORTHING 739,187	EASTING 1,480,936
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/13/10	COMP. DATE 01/13/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.1 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				
730													GROUND SURFACE	0.0
725													ALLUVIAL BROWN VERY LOOSE WET FINE SAND (A-2-4)	
720														
715	714.6	14.7	1	1	3								RESIDUAL BROWN-TAN-BLACK STIFF TO VERY STIFF WET SANDY SILT (A-4)	15.7
710	709.6	19.7	3	5	6									
705	704.6	24.7	7	11	17									
700	699.6	29.7	24	52	48/3								WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	30.2
695													CRYSTALLINE ROCK BROWN-BLACK-GRAY MODERATELY SEVERE TO MODERATELY WEATHERED, SOFT TO MED. HARD META GABBRO	32.1
690														
685														
680														
675														
670														
665														
660														
655														
650														

NCDOT BORE SINGLE B-4553_GEO_BH_BRDG0312_IREDLL.GPJ NC_DOT.GDT 02/09/10

PROJECT NO. 33766.1.1	ID. B-4553	COUNTY IREDELL	GEOLOGIST Todd, R. W.
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 20+10	OFFSET 5ft RT	ALIGNMENT -L-
COLLAR ELEV. 729.3 ft	TOTAL DEPTH 64.4 ft	NORTHING 739,187	EASTING 1,480,936
DRILL MACHINE CME-550X	DRILL METHOD NW Casing / Tri-Cone Roller Bit w/ SPT & Core	HAMMER TYPE Automatic	
START DATE 01/13/10	COMP. DATE 01/13/10	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.1 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 (%)			
697.2	697.2	32.1	7.3	1.5/1.0	(1.3)	(0.0)		(12.7)	(1.6)		Begin Coring @ 32.1 ft	
695					18%	0%		39%	5%		CRYSTALLINE ROCK BROWN-BLACK-GRAY MODERATELY SEVERE TO MODERATELY WEATHERED, SOFT TO MED. HARD META GABBRO FRACTURE SPACING = VERY CLOSE TO CLOSE R1=0, R2=3, R3=7, R4=0, R5=7 RMR=17	32.1
690	689.9	39.4	5.0	1.0/1.0	(2.7)	(0.8)						
685	684.9	44.4	5.0	1.0/1.0	(0.9)	(0.0)						
680	679.9	49.4	5.0	1.1/1.0	(0.8)	(0.0)						
675	674.9	54.4	5.0	1.0/1.0	(3.4)	(0.0)						
670	669.9	59.4	5.0	1.0/1.0	(3.6)	(0.8)						
665	664.9	64.4			72%	16%					Boring Terminated at Elevation 664.9 ft IN CRYSTALLINE ROCK	64.4
660												
655												
650												
645												
640												
635												
630												
625												
620												

NCDOT CORE SINGLE B-4553_GEO_BH_BRDG0312_IREDLL.GPJ NC_DOT.GDT 02/09/10

PROJECT NO. 33766.1.1		ID. B-4553		COUNTY IREDELL		GEOLOGIST Todd, R. W.									
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 20+50		OFFSET 6ft LT		ALIGNMENT -L-									
COLLAR ELEV. 739.8 ft		TOTAL DEPTH 68.2 ft		NORTHING 739,164		EASTING 1,480,970									
DRILL MACHINE CME-550X		DRILL METHOD NW Casing / Tri-Cone Roller Bit w/SPT			HAMMER TYPE Automatic										
START DATE 01/15/10		COMP. DATE 01/15/10		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 68.2 ft									
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					
740														739.8	0.0
ROADWAY EMBANKMENT															
BROWN-TAN MED. STIFF MOIST CLAYEY FINE SANDY SILT (A-4)															
735	734.7	5.1	1	2	2										
730	729.7	10.1	1	2	3										
725	724.7	15.1	1	1	1										
720	719.7	20.1	1	1	1										
715	714.7	25.1	1	0	0										
710	709.7	30.1	9	13	23									711.5	28.3
RESIDUAL BROWN-TAN-WHITE DENSE MOIST SILTY SAND (A-2-4)															
705	704.7	35.1	3	4	5									705.8	34.0
RESIDUAL GRAY STIFF TO HARD MOIST FINE SANDY SILT (A-5)															
700	699.7	40.1	3	5	9										
695	694.7	45.1	4	7	8										
690	689.7	50.1	7	8	8										
685	684.7	55.1	10	11	13										
680	679.7	60.1	9	11	22										
675	674.7	65.1	12	15	20										
670														671.6	68.2
Boring Terminated BY TRI-CONE ROLLER BIT REFUSAL at Elevation 671.6 ft ON CRYSTALLINE ROCK															

PROJECT NO. 33766.1.1		ID. B-4553		COUNTY IREDELL		GEOLOGIST Todd, R. W.									
SITE DESCRIPTION BRIDGE 312 ON SR 2308 OVER FOURTH CREEK							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 20+50		OFFSET 8ft RT		ALIGNMENT -L-									
COLLAR ELEV. 739.9 ft		TOTAL DEPTH 68.5 ft		NORTHING 739,155		EASTING 1,480,960									
DRILL MACHINE CME-550X		DRILL METHOD NW Casing / Tri-Cone Roller Bit w/SPT			HAMMER TYPE Automatic										
START DATE 12/11/09		COMP. DATE 12/15/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 66.7 ft									
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					
740														739.9	0.0
ROADWAY EMBANKMENT															
BROWN-TAN MED. STIFF TO SOFT WET TO SAT. CLAYEY SANDY SILT (A-4)															
735	736.7	3.2	2	2	2										
730	731.7	8.2	1	1	2										
725	726.7	13.2	1	2	1										
720	721.7	18.2	2	2	3										
715	716.7	23.2	2	1	1										
710	711.7	28.2	4	4	4									713.7	26.2
RESIDUAL BROWN-TAN TO GRAY-WHITE STIFF TO HARD WET TO DRY FINE SANDY SILT (A-5)															
705	706.7	33.2	4	4	4										
700	701.7	38.2	3	4	4										
695	696.7	43.2	5	7	11										
690	691.7	48.2	6	8	18										
685	686.7	53.2	15	16	19										
680	681.7	58.2	15	15	22										
675	676.7	63.2	15	17	17										
670	671.7	68.2	100/1											673.2	66.7
CRYSTALLINE ROCK															
Boring Terminated BY TRI-CONE ROLLER BIT REFUSAL at Elevation 671.4 ft IN CRYSTALLINE ROCK															

NCDOT BORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ_NC_DOT.GDT_02/09/10

NCDOT BORE SINGLE B-4553_GEO_BH_BRD0312_IREDELL.GPJ_NC_DOT.GDT_02/09/10

TEST RESULTS

PROJECT: 337661.1 (B-4553)

COUNTY: IREDELL

SITE DESCRIPTION: BRIDGE NO. 312 ON SR 2308 OVER FOURTH CREEK

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC	UNIT WT. (d)	VOID RATIO
								C. SAND	F. SAND	SILT	CLAY	10	40	200				
EB1-A																		
SS-5	7.2 LT	19+15	23.60-25.10	A-4(1)	10	36	4	9.9	40.5	39.5	10.1	86	82	52				
SS-6	7.2 LT	19+15	48.60-50.00	A-4(0)	100	26	NP	21.8	43.6	29.5	5.0	94	80	44				
B1-A																		
SS-7	5.6 LT	19+50	12.60-14.10	A-4(1)	22	36	4	11.9	43.3	36.7	8.1	100	94	55				
SS-8	5.6 LT	19+50	28.60-30.10	A-2-4(0)	36	23	NP	38.5	38.9	16.5	6.0	93	69	26				
B2-A																		
SS-9	5.3 LT	20+10	13.50-15.00	A-2-4(0)	3	32	NP	7.8	83.4	4.8	4.0	100	100	13				
SS-10	5.3 LT	20+10	18.50-20.00	A-4(0)	18	30	3	26.1	37.1	30.7	6.0	96	78	45				
EB2-A																		
SS-11	5.8 LT	20+50	30.10-31.60	A-2-4(0)	36	29	2	33.9	36.9	21.2	8.1	81	64	30				
SS-12	5.8 LT	20+50	35.10-36.60	A-5(2)	9	41	1	6.5	40.7	44.8	8.1	97	95	64				
EB2-B																		
SS-1	7.9 RT	20+50	8.20-9.70	A-4(6)	3	34	10	4.7	36.5	30.5	28.4	100	99	68				
SS-2	7.9 RT	20+50	18.20-19.70	A-2-4(0)	5	24	NP	20.3	64.8	7.8	7.1	100	97	20				
SS-3	7.9 RT	20+50	28.20-29.70	A-5(2)	8	48	3	15.2	40.7	38.0	6.1	100	96	53				
SS-4	7.9 RT	20+50	33.20-34.70	A-5(0)	8	43	NP	9.9	46.4	39.6	4.1	100	97	56				

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT (lb/ft3)	Q(ksf)	E(MPsi)
B1-A							
RS-1	5.6 LT	19+50 -L-	38.2-38.9	48%	126.9	318	0.1551
B1-B							
RS-3	5.5 RT	19+50 -L-	46.8-47.3	20%	158.1	595	0.1293
B2-A							
RS-2	5.3 LT	20+10 -L-	45.7-46.2	31%	183.5	1840	4.58



**FIELD
SCOUR REPORT**

WBS: 33766.1.1 TIP: B-4553 COUNTY: IREDELL

DESCRIPTION(1): BRIDGE NO. 312 OVER FOURTH CREEK ON SR 2308

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
Other (explain) _____

Bridge No.: 312 Length: 120' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 4
Foundation Type: TIMBER AND STEEL PILES.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: MODERATE SCOUR AT BOTH END BENTS.

Interior Bents: MODERATE TO SEVERE SCOUR AT BOTH CHANNEL BENTS.

Channel Bed: N/A

Channel Bank: VERY SEVERE BANK FAILURE OBSERVED DURING THIS GEOTECHNICAL INVESTIGATION. BOTH UPSTREAM AND DOWNSTREAM.

EXISTING SCOUR PROTECTION

Type(3): NONE

Extent(4): NONE

Effectiveness(5): NONE

Obstructions(6): SMALL TO V. LARGE DEBRIS AT SITE DUE TO HEAVY RAIN (1/10)

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): SANDY SILT AS SS-7.

Channel Bank Material(8): SILTY SAND AS SS-2.

Channel Bank Cover(9): TREE LINED CHANNEL W/ MOST LEANING TOWARDS CENTER OF CHANNEL

Floodplain Width(10): APP. 400'

Floodplain Cover(11): CULTIVATED FIELD AND WELL MAINTAINED YARDS.

Stream is(12): Aggrading _____ Degrading _____ Static

Channel Migration Tendency(13): NO OBSERVABLE TENDENCY.

Observations and Other Comments: CREEK ROSE APP. 8' IN MID. JAN. 2010 DUE TO HEAVY RAINS. SEVERE CHANNEL BANK EROSION OCCURRED DURING THIS TIME.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

	BENTS											
	EB1	B1	B2	EB2								
100 YR. SCOUR	732	707	707	736								
		PLS.	SEE	DSE	LETTER							

Comparison of DSE to Hydraulics Unit theoretical scour:

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

Reported by: RW TODD

Date: JAN. 2010

33766.1.1 (B-4553)
IREDELL COUNTY
BRIDGE 312 ON SR 2308 OVER FOURTH CREEK

B1-A CORE PHOTOS



33766.1.1 (B-4553)
IREDELL COUNTY
BRIDGE 312 ON SR 2308 OVER FOURTH CREEK

B1-B CORE PHOTOS



33766.1.1 (B-4553)
IREDELL COUNTY
BRIDGE 312 ON SR 2308 OVER FOURTH CREEK

B2-A CORE PHOTOS



33766.1.1 (B-4553)
IREDELL COUNTY
BRIDGE 312 ON SR 2308 OVER FOURTH CREEK

B2-B CORE PHOTOS



**PROJECT NUMBER: 33766.1.1 (B-4553)
IREDELL COUNTY
BRIDGE 312 ON SR 2308 OVER FOURTH CREEK**

PHOTOS

PHOTO COURTESY OF ROADWAY DESIGN



PHOTO COURTESY OF ROADWAY DESIGN

