

REFERENCE: B-5313

PROJECT: 46027

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY WILSON  
PROJECT DESCRIPTION BRIDGE NO. 109 OVER TOWN  
CREEK ON SR 1002 AT -L- STATION 15+45.5

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-8	CROSS SECTIONS
9-15	BORE LOGS
16	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5313	1	16

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

E. MAYR, PE

SDS

D. BLAKELY

K. GODFREY

INVESTIGATED BY D. BROWN, PE

DRAWN BY D. BROWN, PE

CHECKED BY E. MAYR, PE

SUBMITTED BY D. BROWN, PE

DATE JUNE 2015



DocuSigned by:

Donald W. Brown, Jr. 6/24/2015

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SIGNATURE

DATE

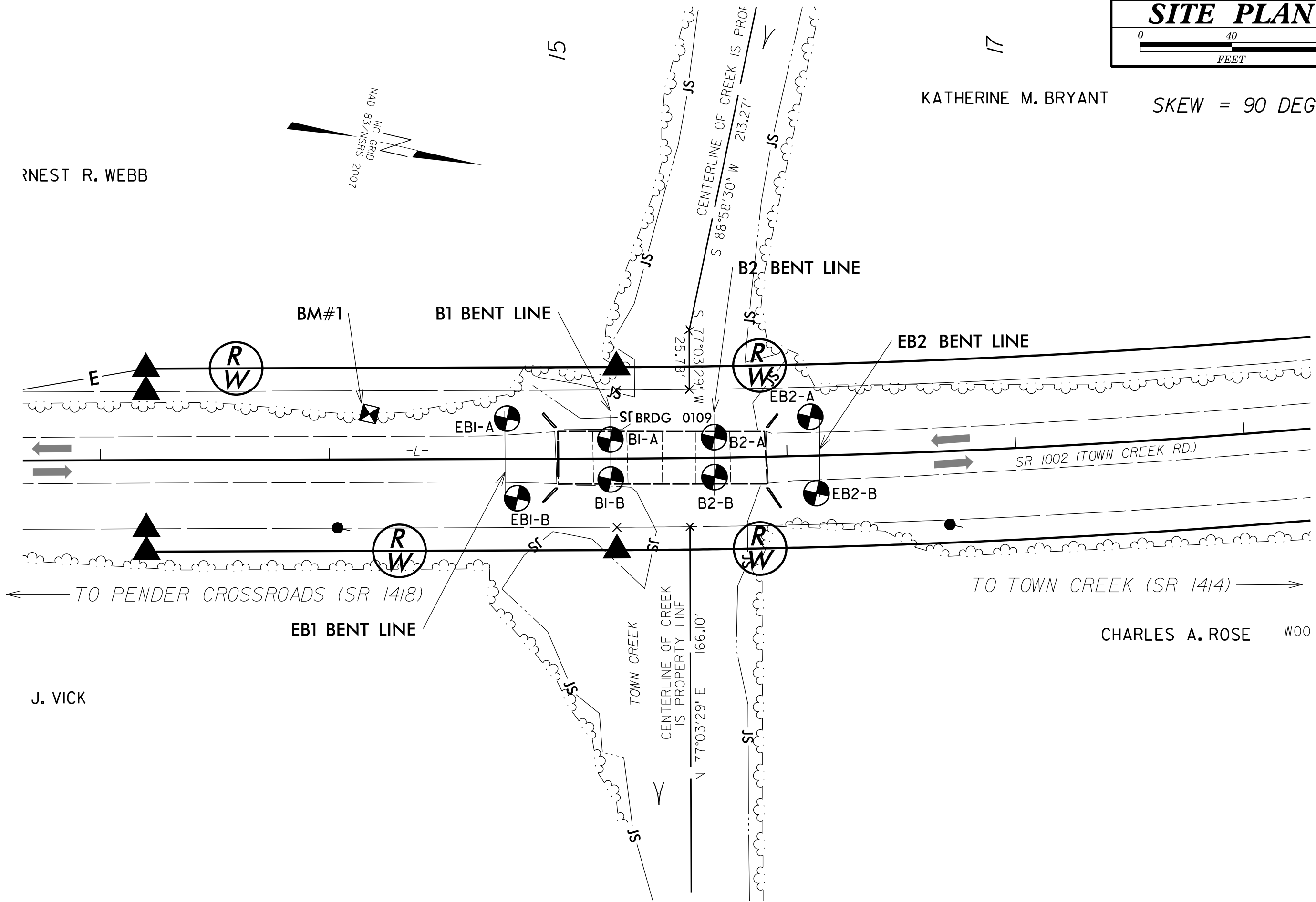
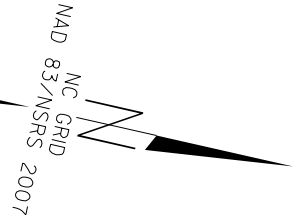
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
**SUBSURFACE INVESTIGATION**  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6.		<b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.		<b>HARD ROCK</b> IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.	
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>		<b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		<b>WEATHERED ROCK (WR)</b>		<b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.	
<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.		<b>CRYSTALLINE ROCK (CR)</b>		<b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.			
<b>COMPRESSION</b>		<b>NON-CRYSTALLINE ROCK (NCR)</b>		<b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
<b>PERCENTAGE OF MATERIAL</b>		<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>		<b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.			
<b>ORGANIC MATERIAL</b>		<b>WEATHERING</b>		<b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.			
<b>GROUND WATER</b>		<b>FRESH</b>		<b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.			
<b>MISCELLANEOUS SYMBOLS</b>		<b>VERY SLIGHT (V SL.)</b>		<b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.			
<b>RECOMMENDATION SYMBOLS</b>		<b>SLIGHT (SL.)</b>		<b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.			
<b>ABBREVIATIONS</b>		<b>MODERATE (MOD.)</b>		<b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.			
<b>EQUIPMENT USED ON SUBJECT PROJECT</b>		<b>SEVERE (SEV.)</b>		<b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.			
<b>PLASTICITY</b>		<b>VERY SEVERE (V SEV.)</b>		<b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.			
<b>COLOR</b>		<b>COMPLETE</b>		<b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.			
<b>TEXTURE OR GRAIN SIZE</b>		<b>INDURATION</b>		<b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.			
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>		<b>VERY HARD</b>		<b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.			
<b>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</b>		<b>HARD</b>		<b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.			
<b>FIELD MOISTURE DESCRIPTION</b>		<b>MODERATELY HARD</b>		<b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.			
<b>GUIDE FOR FIELD MOISTURE DESCRIPTION</b>		<b>MEDIUM HARD</b>		<b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.			
<b>PLASTICITY INDEX (PI)</b>		<b>SOFT</b>		<b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.			
<b>DRY STRENGTH</b>		<b>VERY SOFT</b>		<b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.			
<b>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</b>		<b>EXTREMELY INDURATED</b>		<b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.			

KATHERINE M. BRYANT

SKEW = 90 DEG.

RNEST R. WEBB



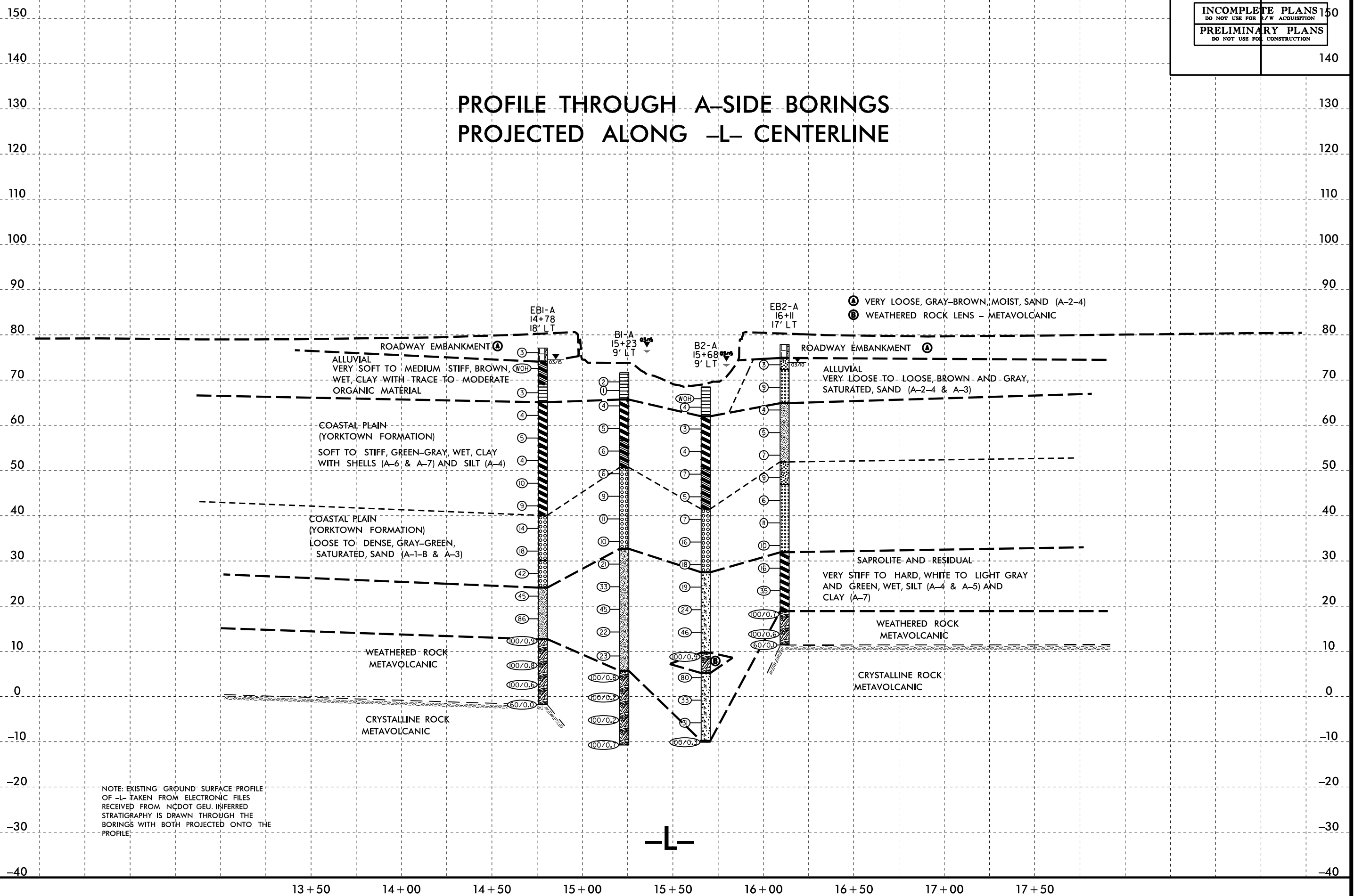
J. VICK

CHARLES A. ROSE W00

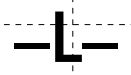
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PROJECT REFERENCE NO.	SHEET NO.
B-5313	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

## PROFILE THROUGH A-SIDE BORINGS PROJECTED ALONG -L- CENTERLINE



NOTE: EXISTING GROUND SURFACE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

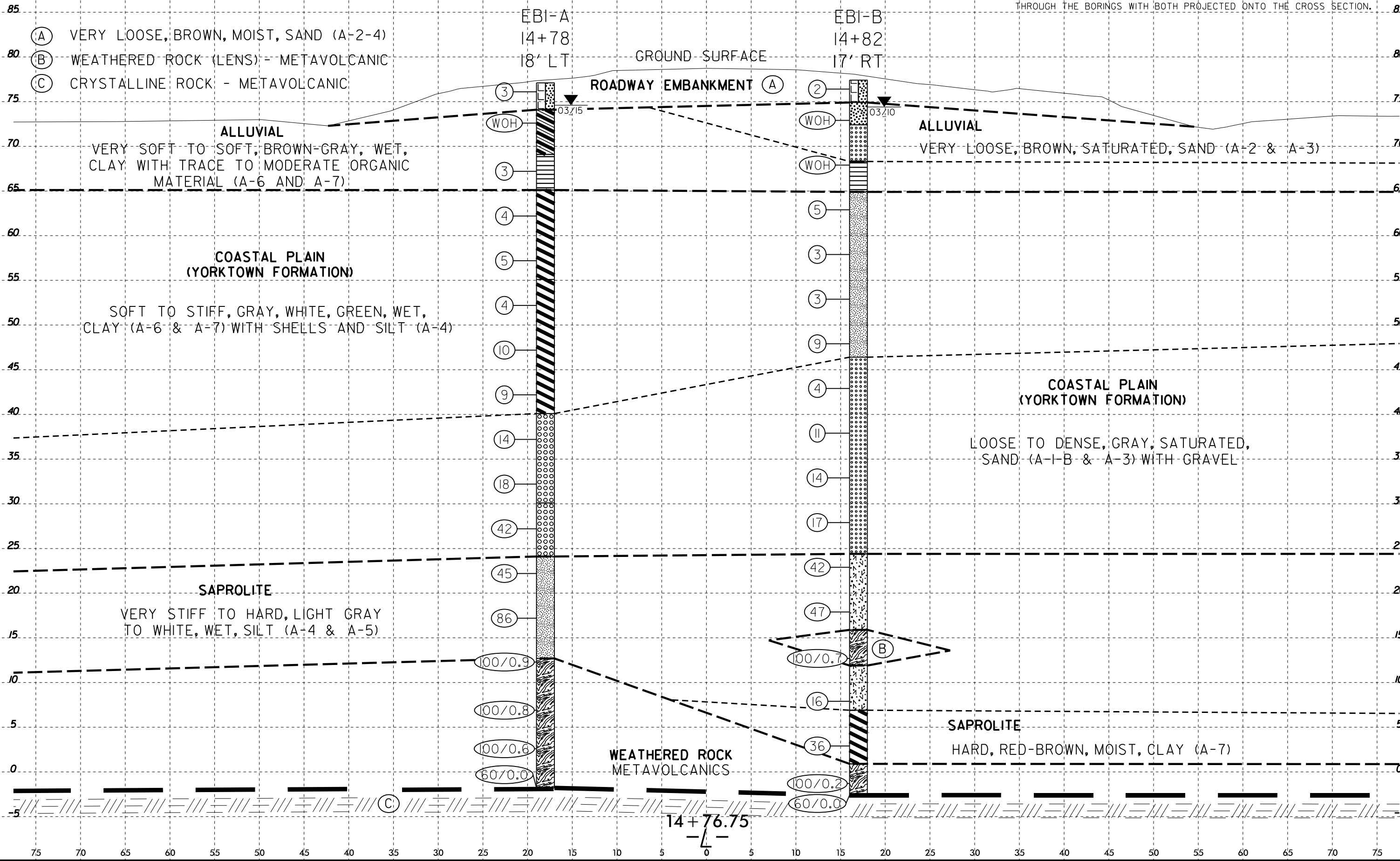


13+50      14+00      14+50      15+00      15+50      16+00      16+50      17+00      17+50

8/23/99

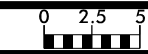
### CROSS SECTION ALONG END BENT I

NOTE: EXISTING GROUND SURFACE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

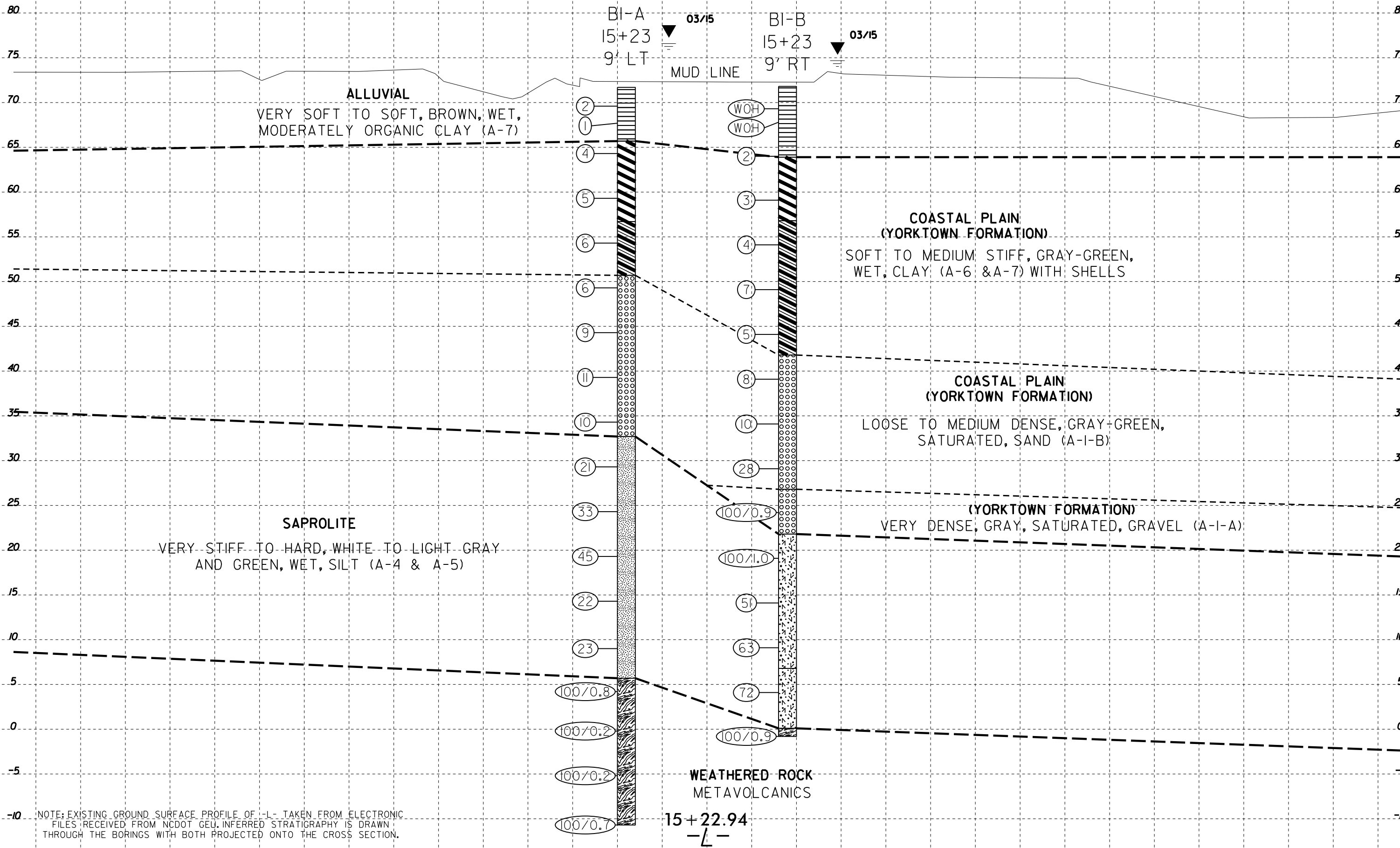


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8/23/99



CROSS SECTION ALONG BENT 1



ALLUVIAL  
VERY SOFT TO SOFT, BROWN, WET,  
MODERATELY ORGANIC CLAY (A-7)

COASTAL PLAIN  
(YORKTOWN FORMATION)  
SOFT TO MEDIUM STIFF, GRAY-GREEN,  
WET, CLAY (A-6 & A-7) WITH SHELLS

COASTAL PLAIN  
(YORKTOWN FORMATION)  
LOOSE TO MEDIUM DENSE, GRAY-GREEN,  
SATURATED, SAND (A-I-B)

(YORKTOWN FORMATION)  
VERY DENSE, GRAY, SATURATED, GRAVEL (A-I-A)

SAPROLITE  
VERY STIFF TO HARD, WHITE TO LIGHT GRAY  
AND GREEN, WET, SILT (A-4 & A-5)

WEATHERED ROCK  
METAVOLCANICS

BI-A 15+23 9' LT  
BI-B 15+23 9' RT  
MUD LINE  
03/15

- 2
- 1
- 4
- 5
- 6
- 6
- 9
- 11
- 10
- 21
- 33
- 45
- 22
- 23
- 100/0.8
- 100/0.2
- 100/0.2
- 100/0.7

- WOH
- WOH
- 2
- 3
- 4
- 7
- 5
- 8
- 10
- 28
- 100/0.9
- 100/1.0
- 51
- 63
- 72
- 100/0.9

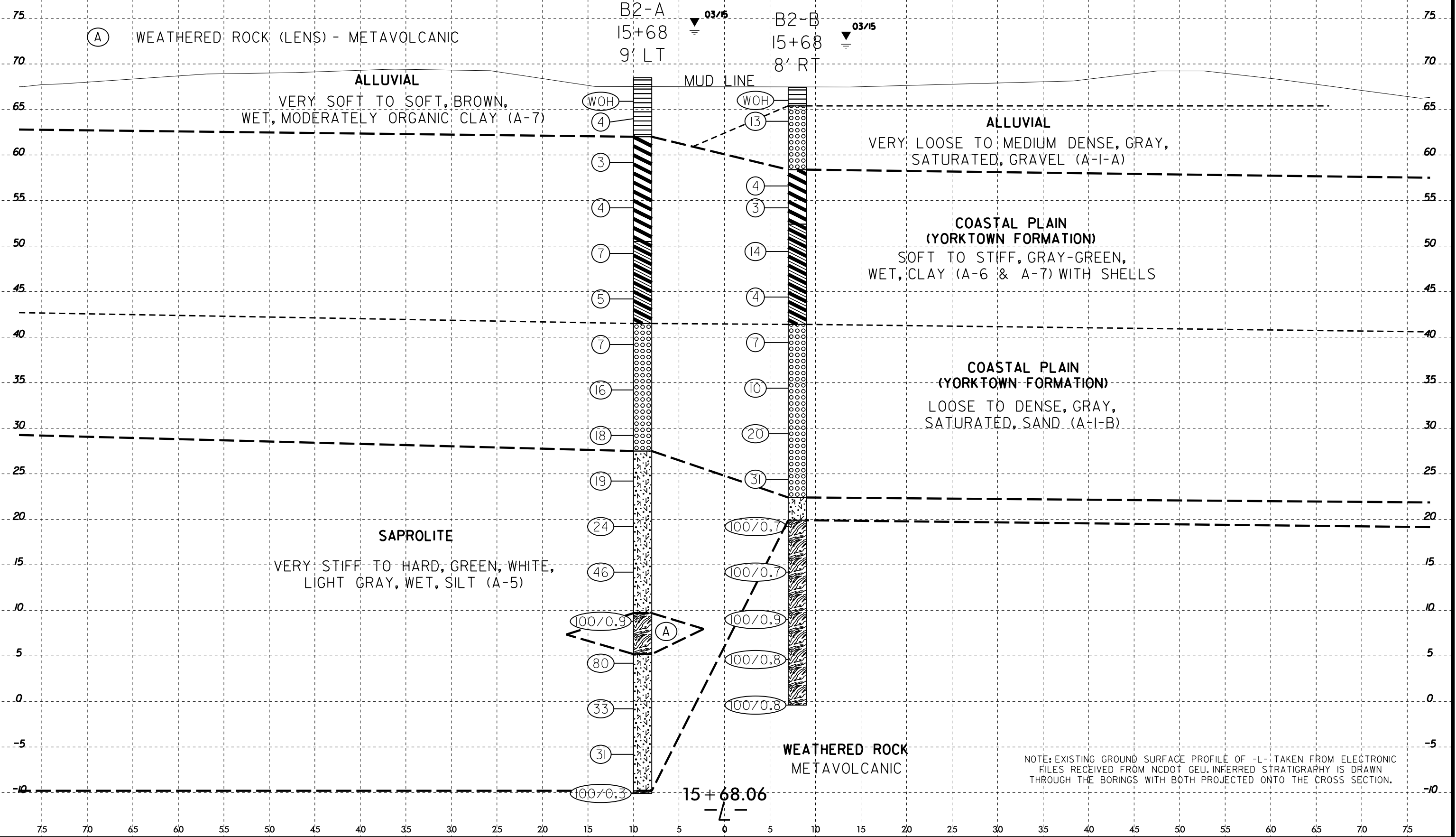
15+22.94  
-L-

NOTE: EXISTING GROUND SURFACE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

SYSTEM TIME: 8/23/99 10:00:00 AM

8/23/99  
SYTIME  
AUDITION  
SERIAL  
NAME

### CROSS SECTION ALONG BENT 2

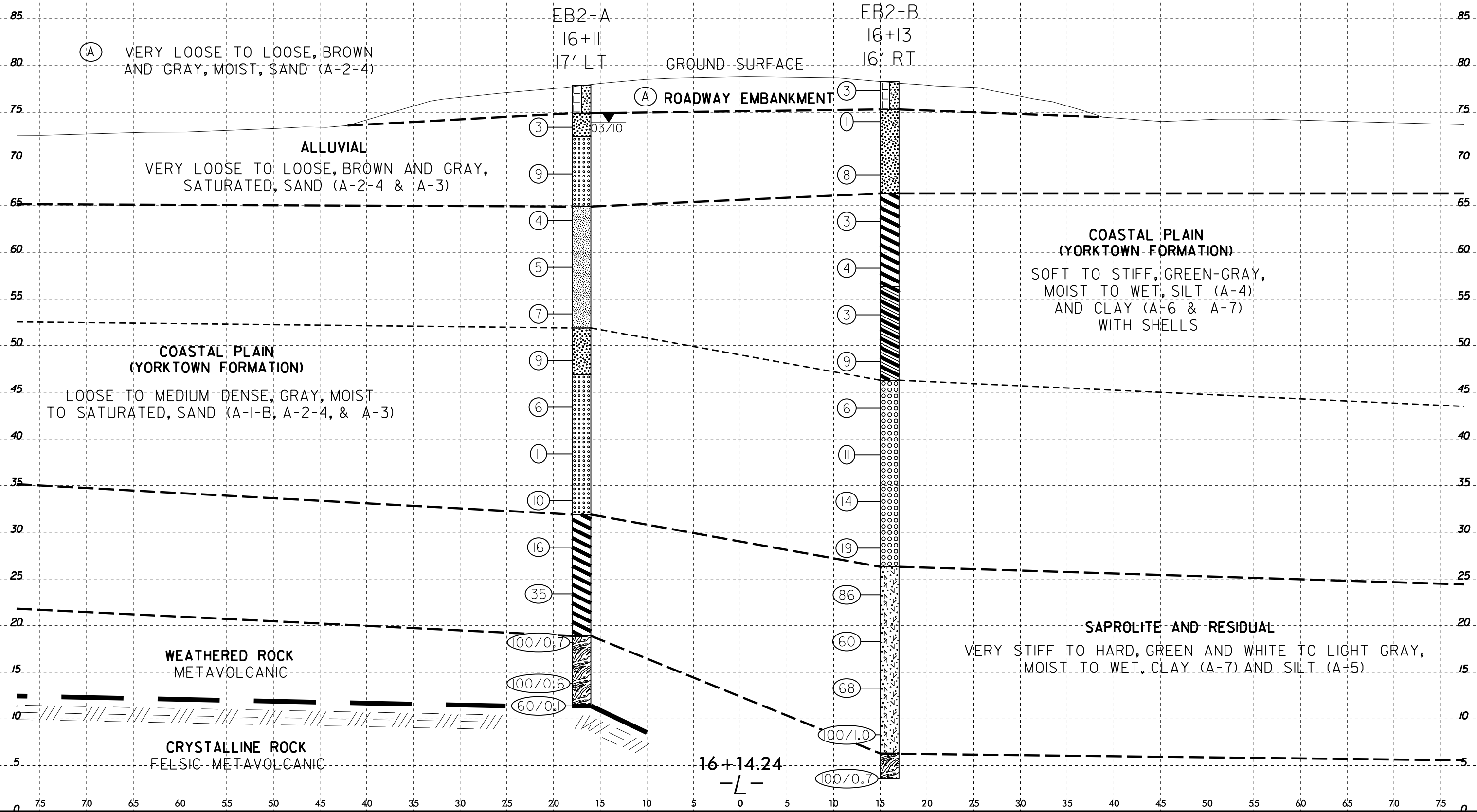


NOTE: EXISTING GROUND SURFACE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

8/23/99

### CROSS SECTION ALONG END BENT 2

NOTE: EXISTING GROUND SURFACE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



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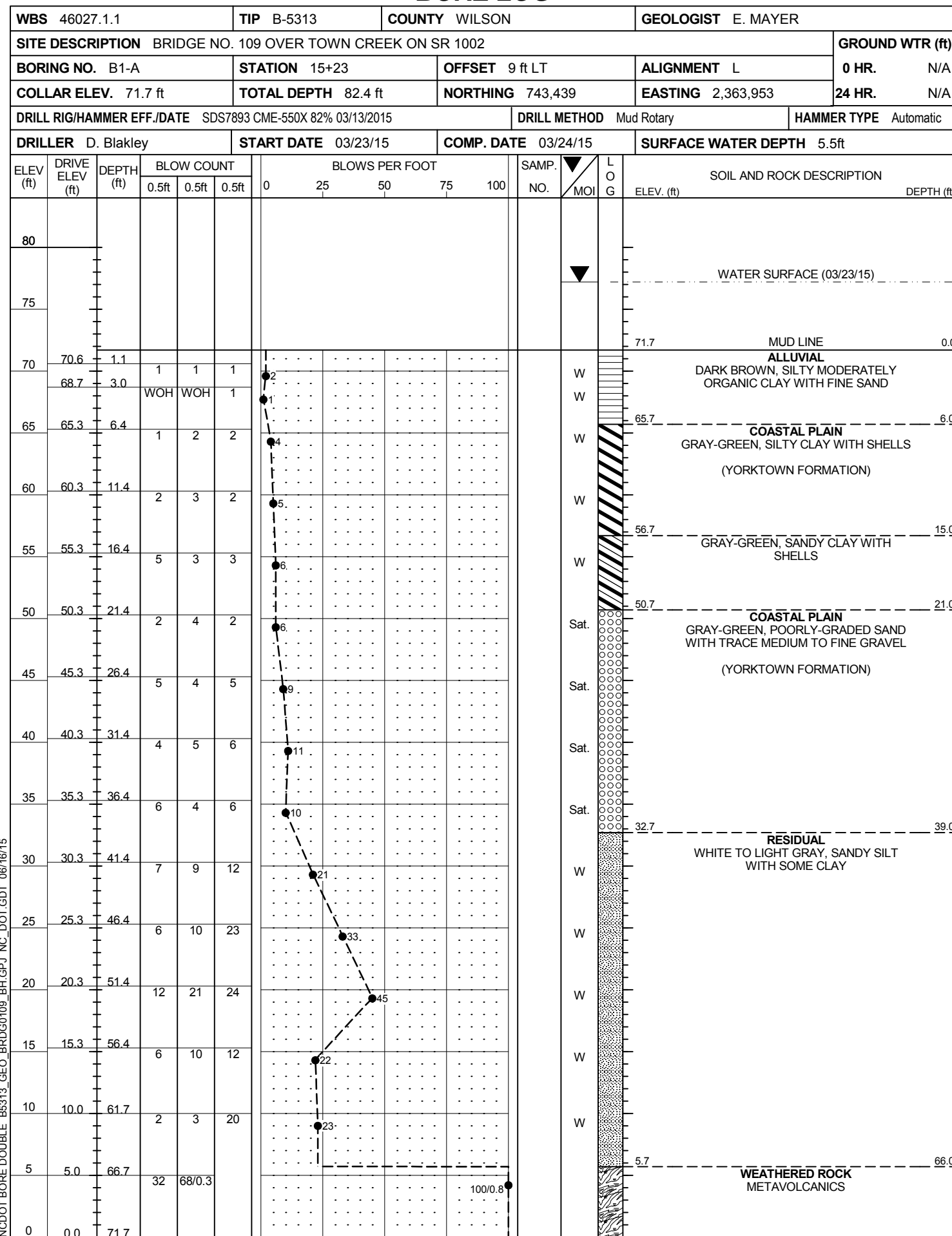




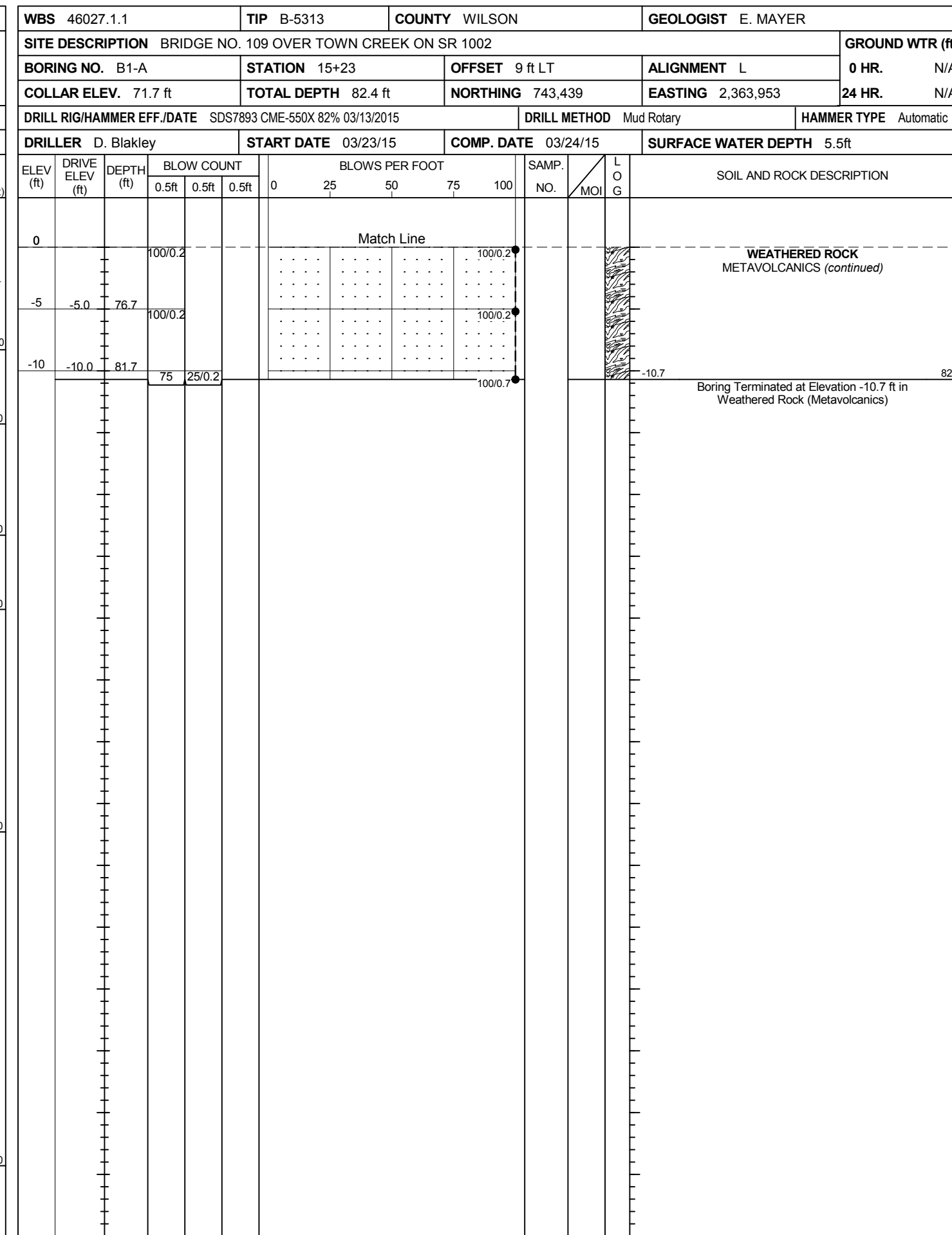


# GEOTECHNICAL BORING REPORT

## BORE LOG

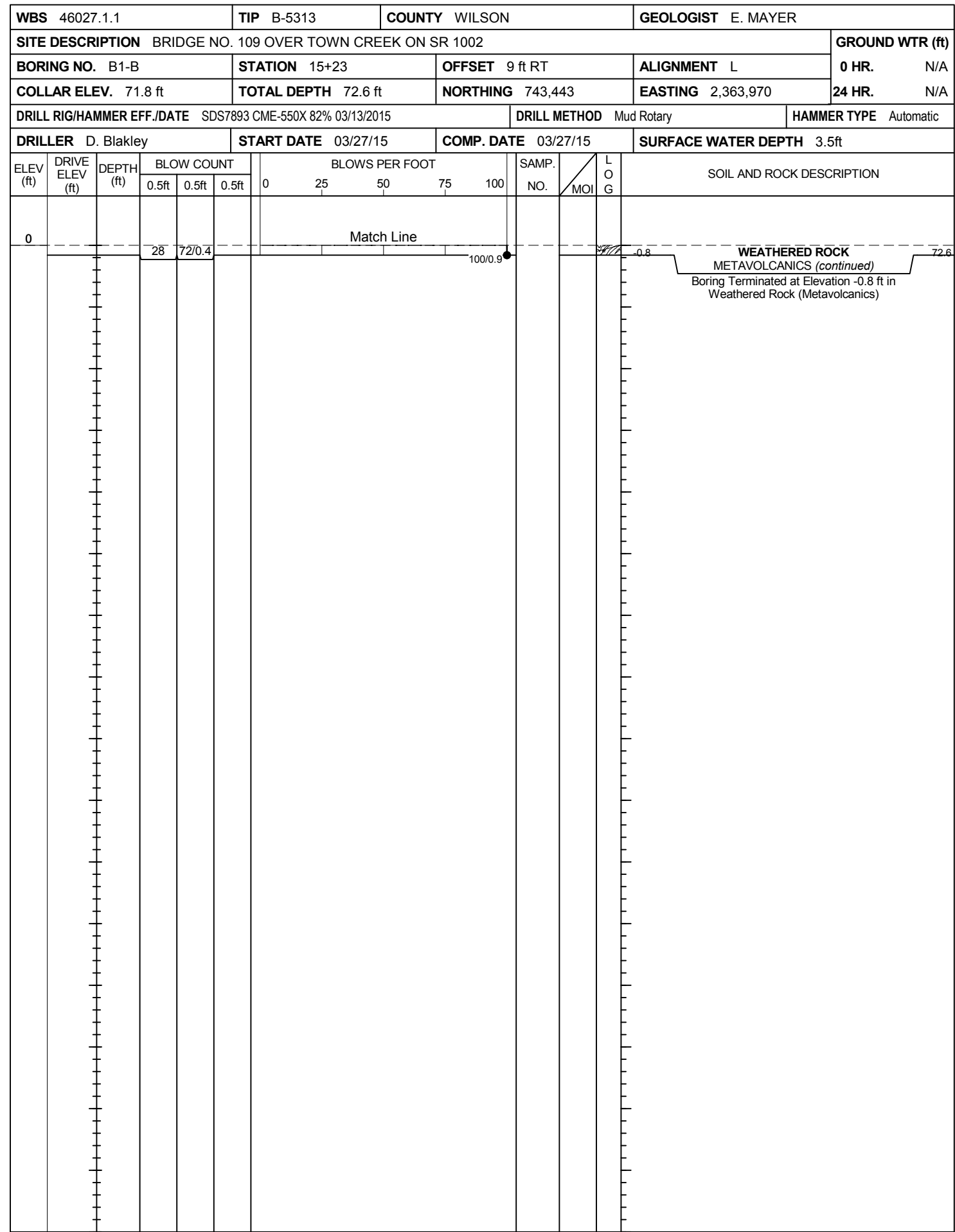
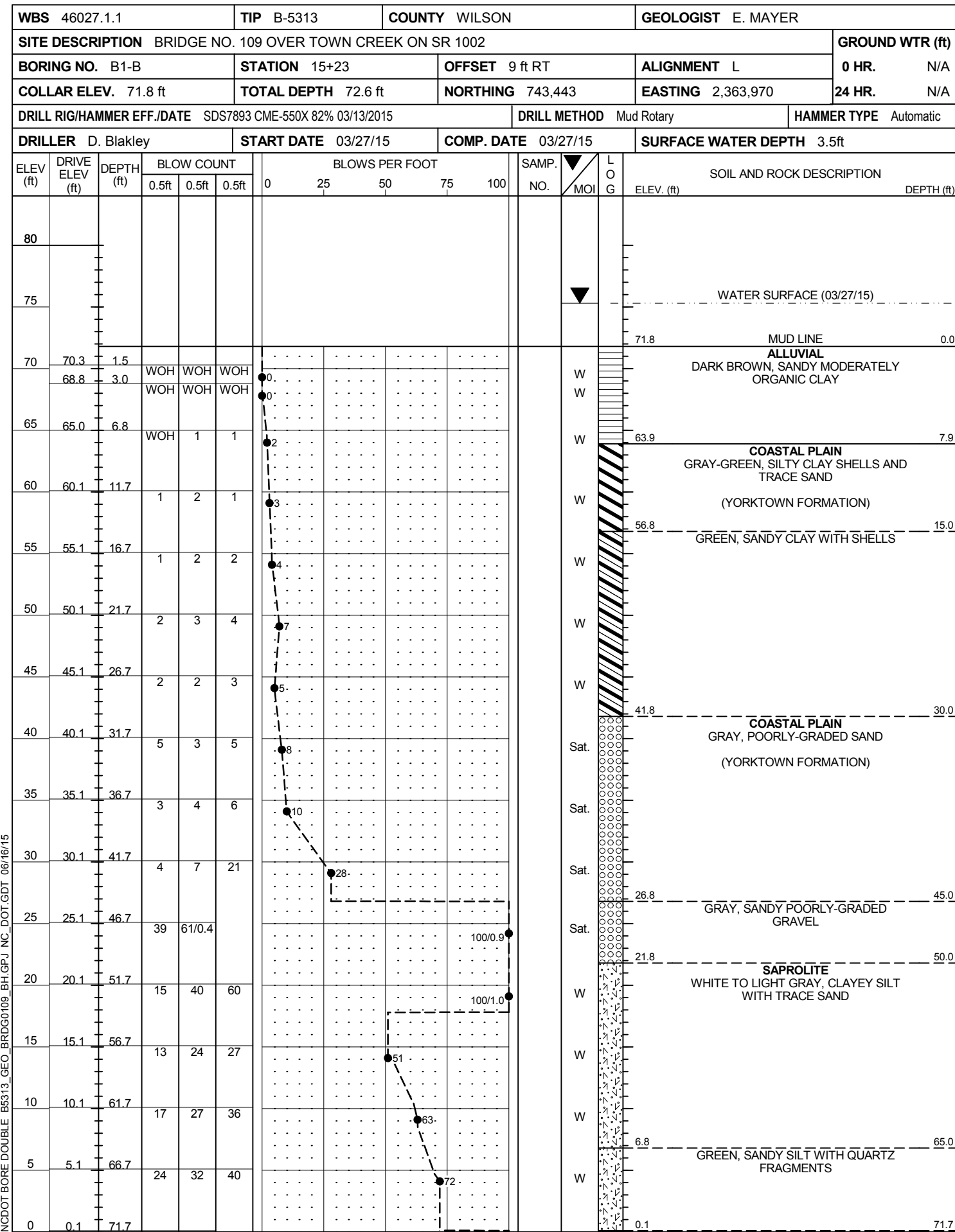


NCDOT BORE DOUBLE B5313\_GEO\_BRDG0109\_BH.GPJ\_NC\_DOT.GDT 06/16/15



# GEOTECHNICAL BORING REPORT

## BORE LOG



NCDOT BORE DOUBLE B5313\_GEO\_BRDG0109\_BH.GPJ\_NC\_DOT.GDT 06/16/15

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46027.1.1		TIP B-5313		COUNTY WILSON		GEOLOGIST E. MAYER								
SITE DESCRIPTION BRIDGE NO. 109 OVER TOWN CREEK ON SR 1002							GROUND WTR (ft)							
BORING NO. B2-A		STATION 15+68		OFFSET 9 ft LT		ALIGNMENT L								
COLLAR ELEV. 68.5 ft		TOTAL DEPTH 78.6 ft		NORTHING 743,483		EASTING 2,363,942								
DRILL RIG/HAMMER EFF./DATE SDS7893 CME-550X 82% 03/13/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Blakley		START DATE 03/25/15		COMP. DATE 03/25/15		SURFACE WATER DEPTH 5.6ft								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
80														
75														
70														
66.9	66.9	1.6												
65	65.0	3.5	3	2	2									
60	60.2	8.3	1	1	2									
55	55.2	13.3	2	2	2									
50	50.2	18.3	3	3	4									
45	45.2	23.3	2	2	3									
40	40.2	28.3	3	3	4									
35	35.2	33.3	5	6	10									
30	30.2	38.3	5	8	10									
25	25.2	43.3	5	7	12									
20	20.2	48.3	7	11	13									
15	15.2	53.3	11	20	26									
10	10.2	58.3	20	45	55/0.4									
5	5.2	63.3	22	33	47									
0	0.2	68.3												

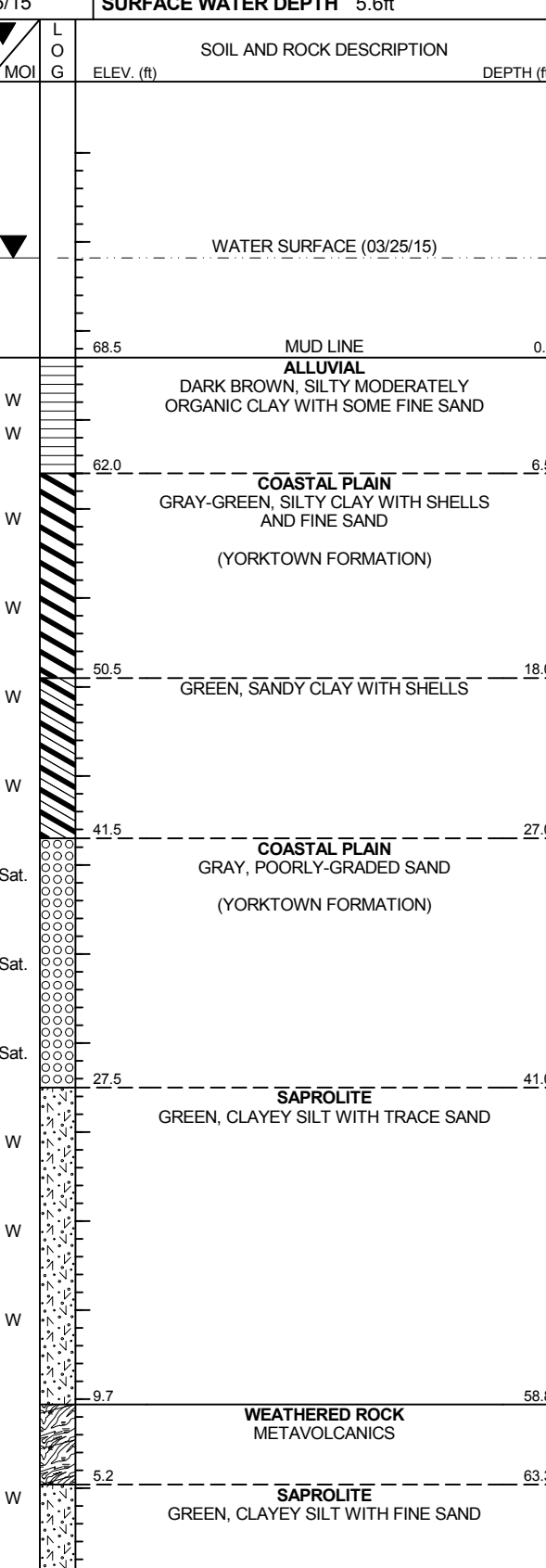
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ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
0														
-5	-4.8	73.3	17	15	16									
-10	-9.8	78.3	100/0.3											

NCDOT BORE DOUBLE B5313\_GEO\_BRDG0109\_BH.GPJ\_NC\_DOT.GDT 06/16/15

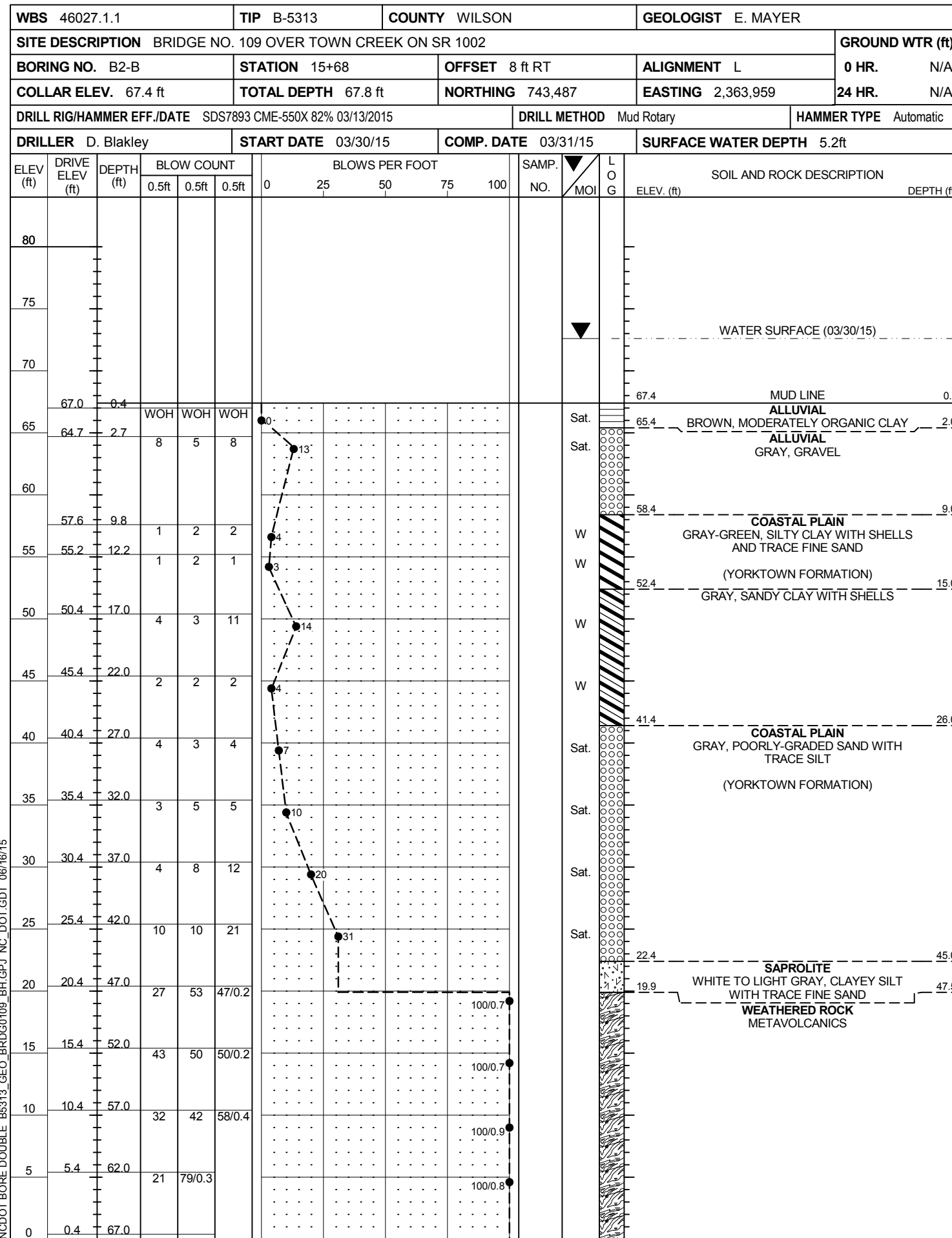
Match Line

SAPROLITE  
GREEN, CLAYEY SILT WITH FINE SAND  
*(continued)*

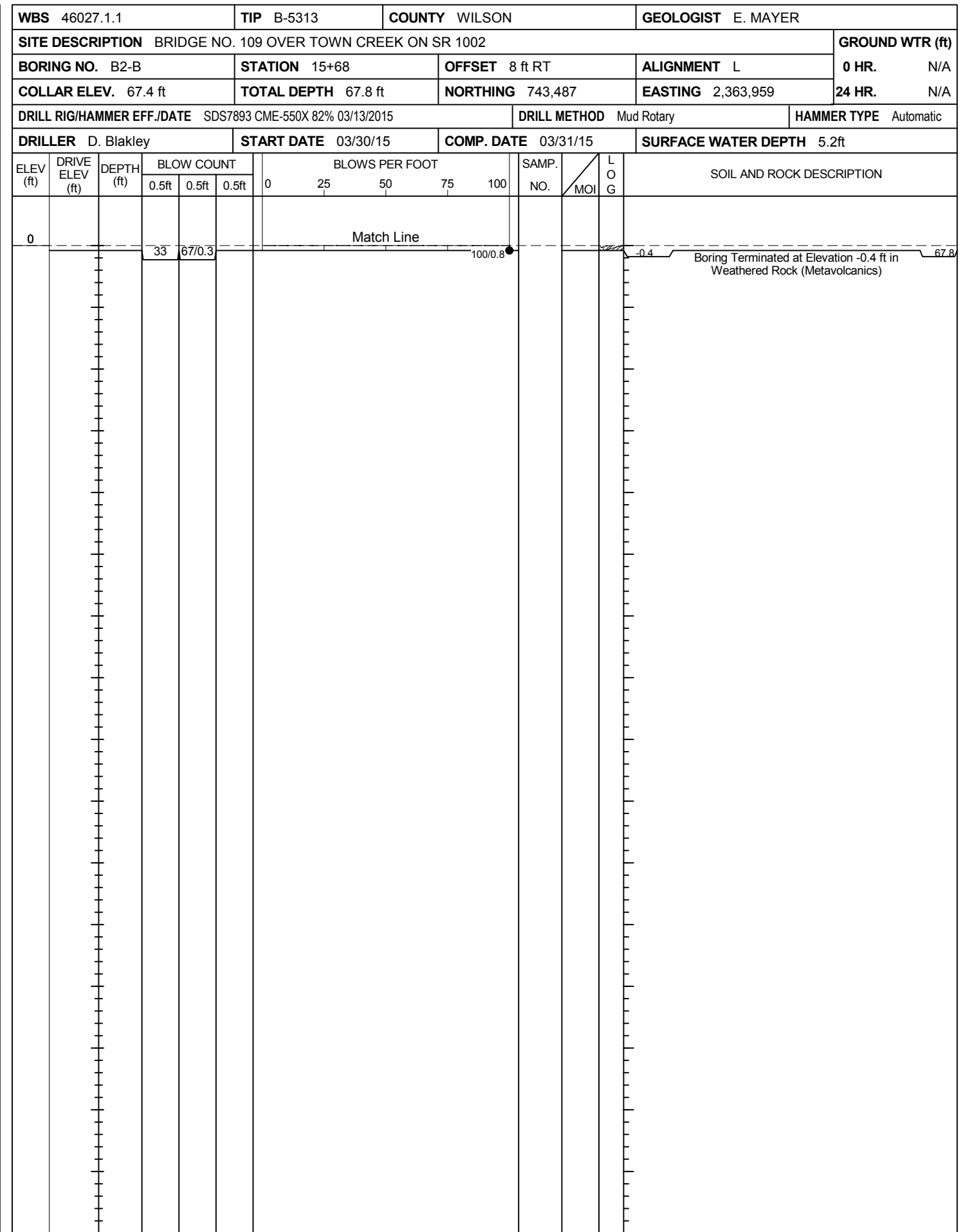
WEATHERED ROCK  
METAVOLCANICS  
Boring Terminated at Elevation -10.1 ft in  
Weathered Rock (Metavolcanics)



# GEOTECHNICAL BORING REPORT BORE LOG

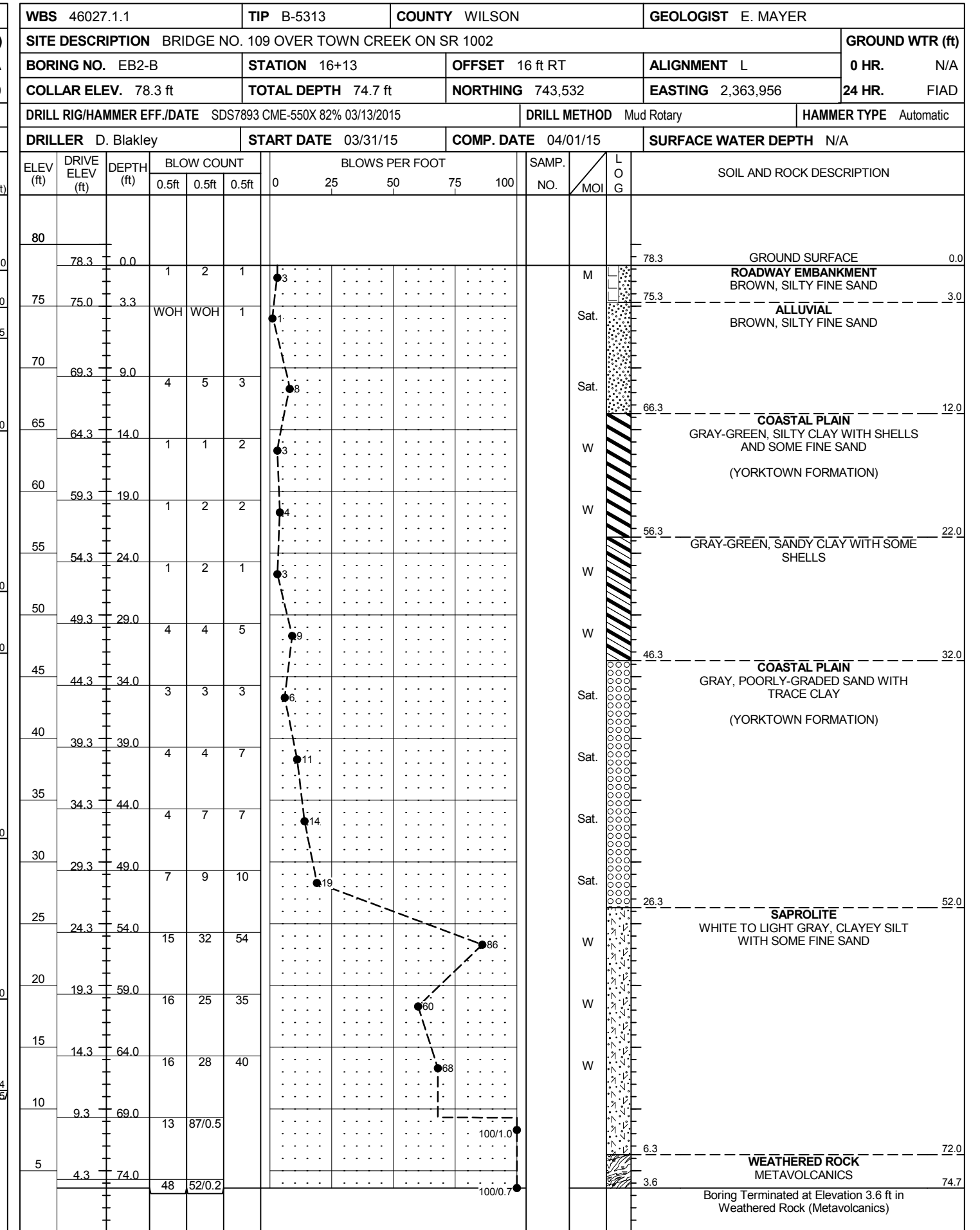
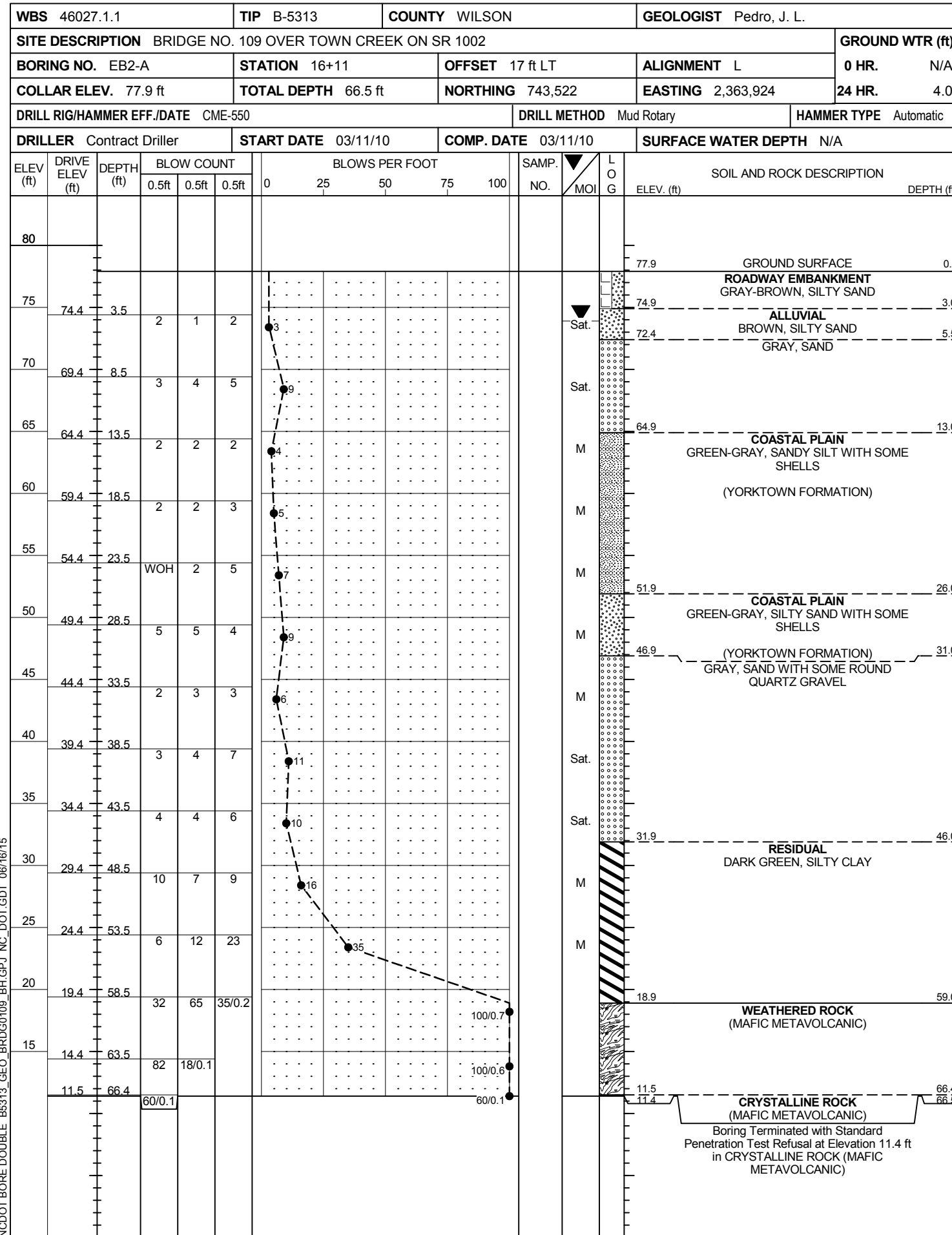


NCDOT BORE DOUBLE B5313\_GEO\_BRDG0109\_BH.GPJ NC\_DOT.GDT 06/16/15



# GEOTECHNICAL BORING REPORT

## BORE LOG



NCDOT BORE DOUBLE B5313\_GEO\_BRDG109\_BH.GPJ, NC\_DOT\_GDT\_06/16/15

SITE PHOTOGRAPHS



PHOTOGRAPH 1: VIEW LOOKING UPSTATION (NORTH) ALONG -L- FROM END BENT 1.



PHOTOGRAPH 2: VIEW LOOKING DOWNSTATION (SOUTH) ALONG -L- FROM END BENT 2.