

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33523.1.1 (B-4176) F.A. PROJ. BRSTP-1008(12)
 COUNTY LINCOLN

PROJECT DESCRIPTION BRIDGE OVER CLARK CREEK ON SR 1008
BETWEEN SR 1005 AND NC 27 AND TEMPORARY BRIDGE
OVER CLARK CREEK ON SR 1008 DETOUR

SITE DESCRIPTION BRIDGE #118 OVER CLARK CREEK ON SR 1008
AND TEMPORARY BRIDGE OVER CLARK CREEK
ON SR 1008 DETOUR

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-11	CROSS SECTIONS
12-18	BORE LOG & CORE REPORTS
19	SOIL TEST REPORTS
20	SCOUR REPORT
21-24	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.

PROJECT: 33523.1.1 ID: B-4176

PERSONNEL

J. K. STICKNEY

R. W. TODD

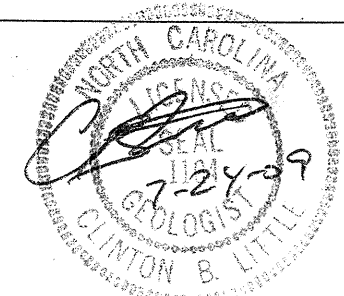
C. L. SMITH

INVESTIGATED BY **J. E. BEVERLY**

CHECKED BY **C. B. LITTLE**

SUBMITTED BY **C. B. LITTLE**

DATE **JULY, 2009**



DRAWN BY: **J. E. ROLFSMEYER**

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

PROJECT REFERENCE NO.
83523.1.1 (B-4176)
SHEET NO.
2

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																																								
<p>SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, DARK SAT. CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED). GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - 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. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOOD - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - 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. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. STILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																								
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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>		<p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>	
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<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>																																																																																																																																														

BRIDGE #118 SKEW=60
TEMPORARY BRIDGE SKEW=90

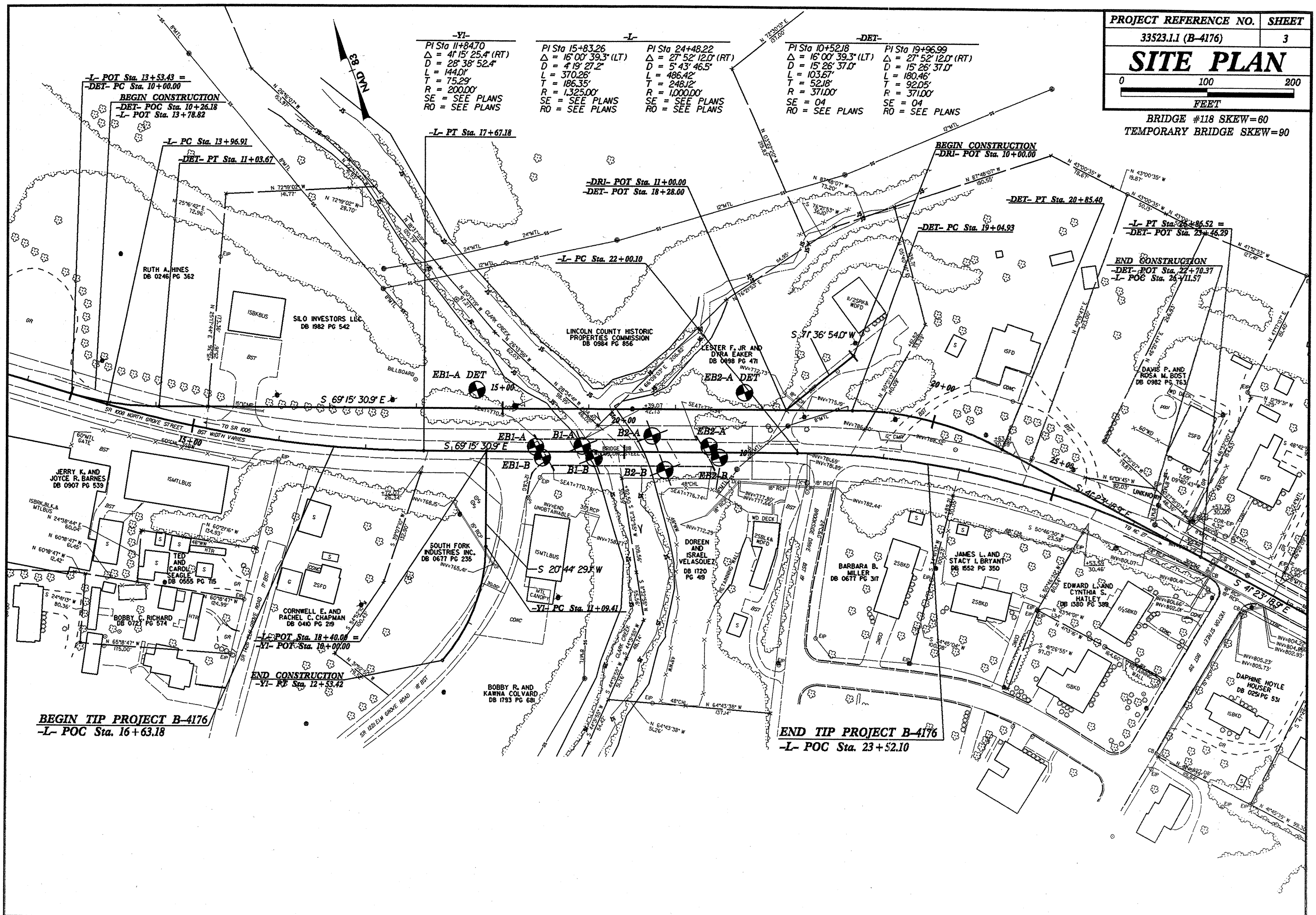
-YI-
 PI Sta 11+84.70
 $\Delta = 41' 15" 25.4" (RT)$
 $D = 28' 38" 52.4"$
 $L = 144.01'$
 $T = 75.29'$
 $R = 200.00'$
 SE = SEE PLANS
 RO = SEE PLANS

-L-
 PI Sta 15+83.26
 $\Delta = 16' 00" 39.3" (LT)$
 $D = 4' 19" 27.2"$
 $L = 370.26'$
 $T = 186.35'$
 $R = 1,325.00'$
 SE = SEE PLANS
 RO = SEE PLANS

-L-
 PI Sta 24+48.22
 $\Delta = 27' 52" 12.0" (RT)$
 $D = 5' 43" 46.5"$
 $L = 486.42'$
 $T = 246.12'$
 $R = 1,000.00'$
 SE = SEE PLANS
 RO = SEE PLANS

-DET-
 PI Sta 10+52.18
 $\Delta = 16' 00" 39.3" (LT)$
 $D = 15' 26" 37.0"$
 $L = 103.67'$
 $T = 52.18'$
 $R = 371.00'$
 SE = 04
 RO = SEE PLANS

-DET-
 PI Sta 19+96.99
 $\Delta = 27' 52" 12.0" (RT)$
 $D = 15' 26" 37.0"$
 $L = 180.46'$
 $T = 92.05'$
 $R = 371.00'$
 SE = 04
 RO = SEE PLANS

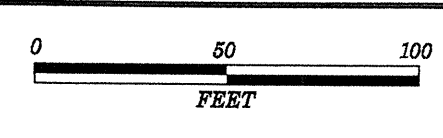


BEGIN TIP PROJECT B-4176
-L- POC Sta. 16+63.18

END TIP PROJECT B-4176
-L- POC Sta. 23+52.10

PI = 18+13.18
 EL = 771.31'
 VC = 150'
 K = 98

PI = 21+02.10
 K = 142
 VC = 400'
 EL = 778.61'

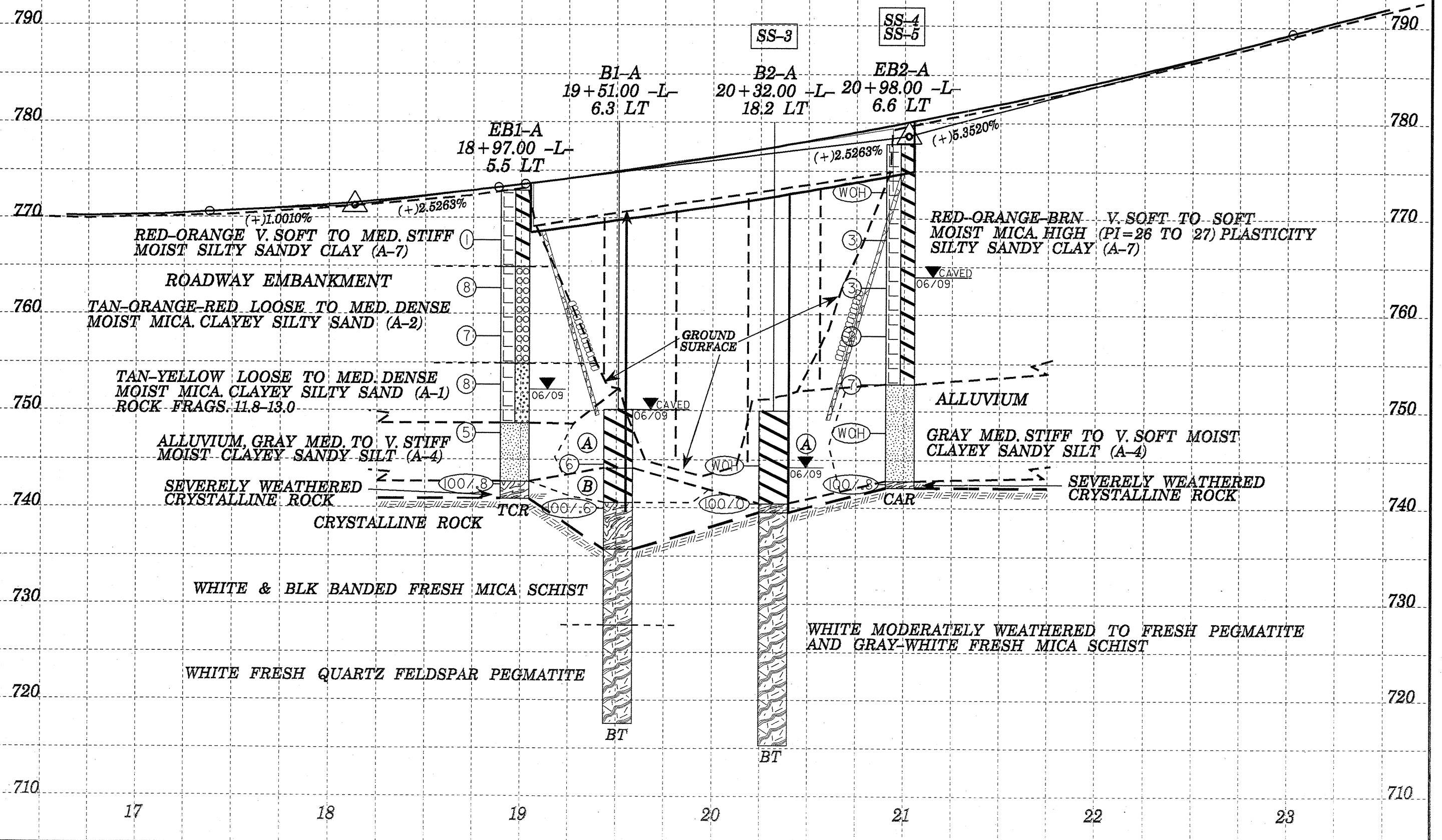


PROJECT REFERENCE NO.	SHEET
33523.1.1 (B-4176)	4
BRIDGE #118 ON SR 1008 OVER CLARK CREEK SKEW=60	

BORING DESCRIPTIONS

- (A) ALLUVIUM, BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7)
- (B) RESIDUAL, BRN STIFF MOIST SANDY SILTY CLAY (A-7)

-L- PROFILE



17

18

19

20

21

22

23

710

720

730

740

750

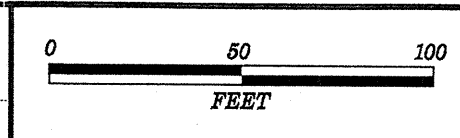
760

770

780

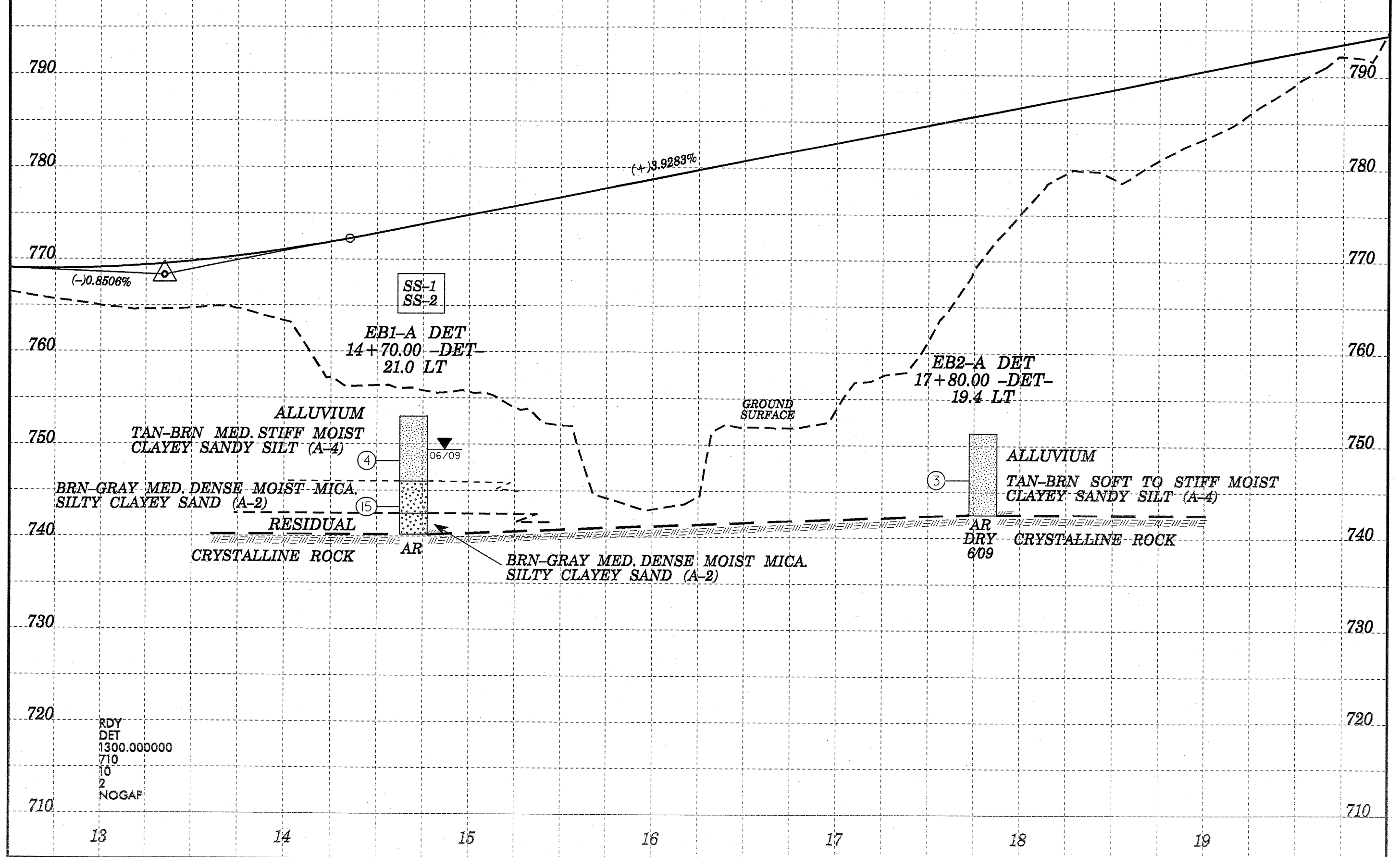
790

PI = 13+35.00
 EL = 768.32'
 VC = 200'
 K = 42



PROJECT REFERENCE NO. 33523.1.1 (B-4176)
 SHEET 5
 TEMPORARY BRIDGE ON SR 1008
 DETOUR OVER CLARK CREEK
 SKEW=90

-DET- PROFILE



SS-1
SS-2

EB1-A DET
14+70.00 -DET-
21.0 LT

EB2-A DET
17+80.00 -DET-
19.4 LT

ALLUVIUM
TAN-BRN MED. STIFF MOIST
CLAYEY SANDY SILT (A-4)

BRN-GRAY MED. DENSE MOIST MICA
SILTY CLAYEY SAND (A-2)

RESIDUAL
CRYSTALLINE ROCK

ALLUVIUM
TAN-BRN SOFT TO STIFF MOIST
CLAYEY SANDY SILT (A-4)

AR
DRY
609
CRYSTALLINE ROCK

BRN-GRAY MED. DENSE MOIST MICA
SILTY CLAYEY SAND (A-2)

RDY
DET
1300.000000
710
10
2
NOGAP

13

14

15

16

17

18

19

790

780

770

760

750

740

730

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710

790

780

770

760

750

740

730

720

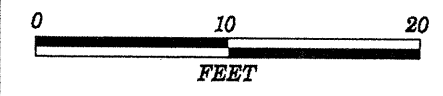
710

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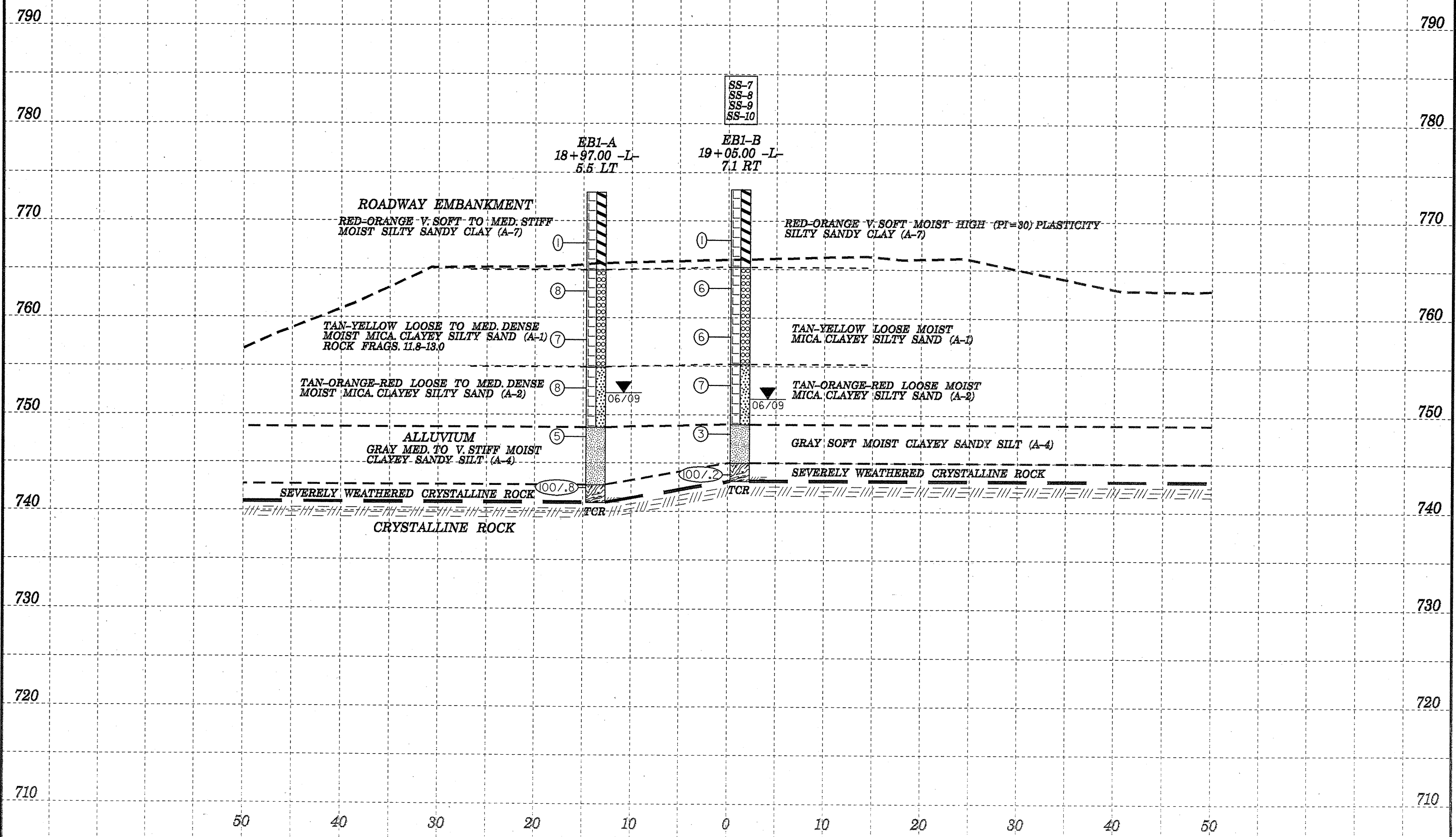
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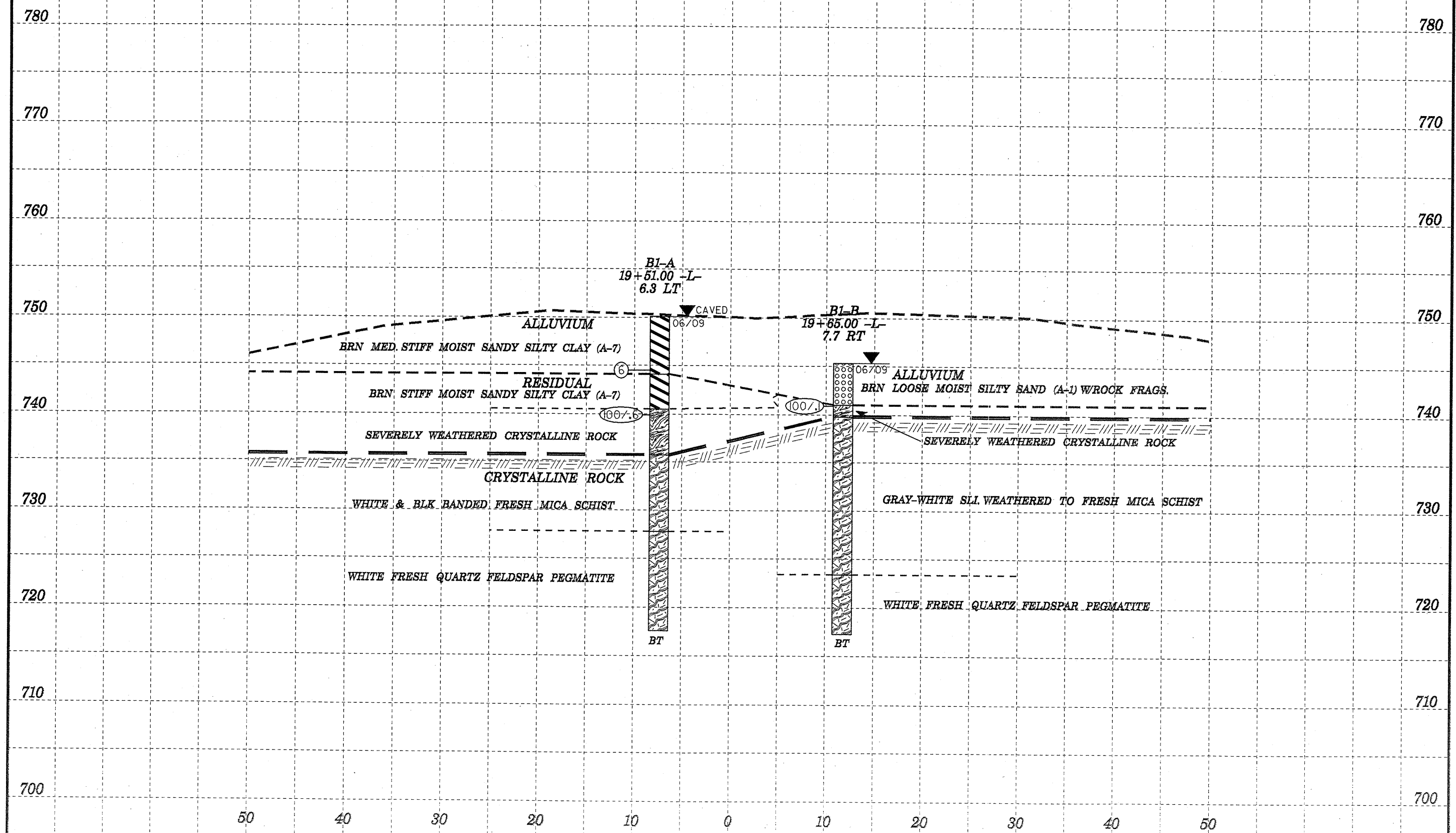
06/09

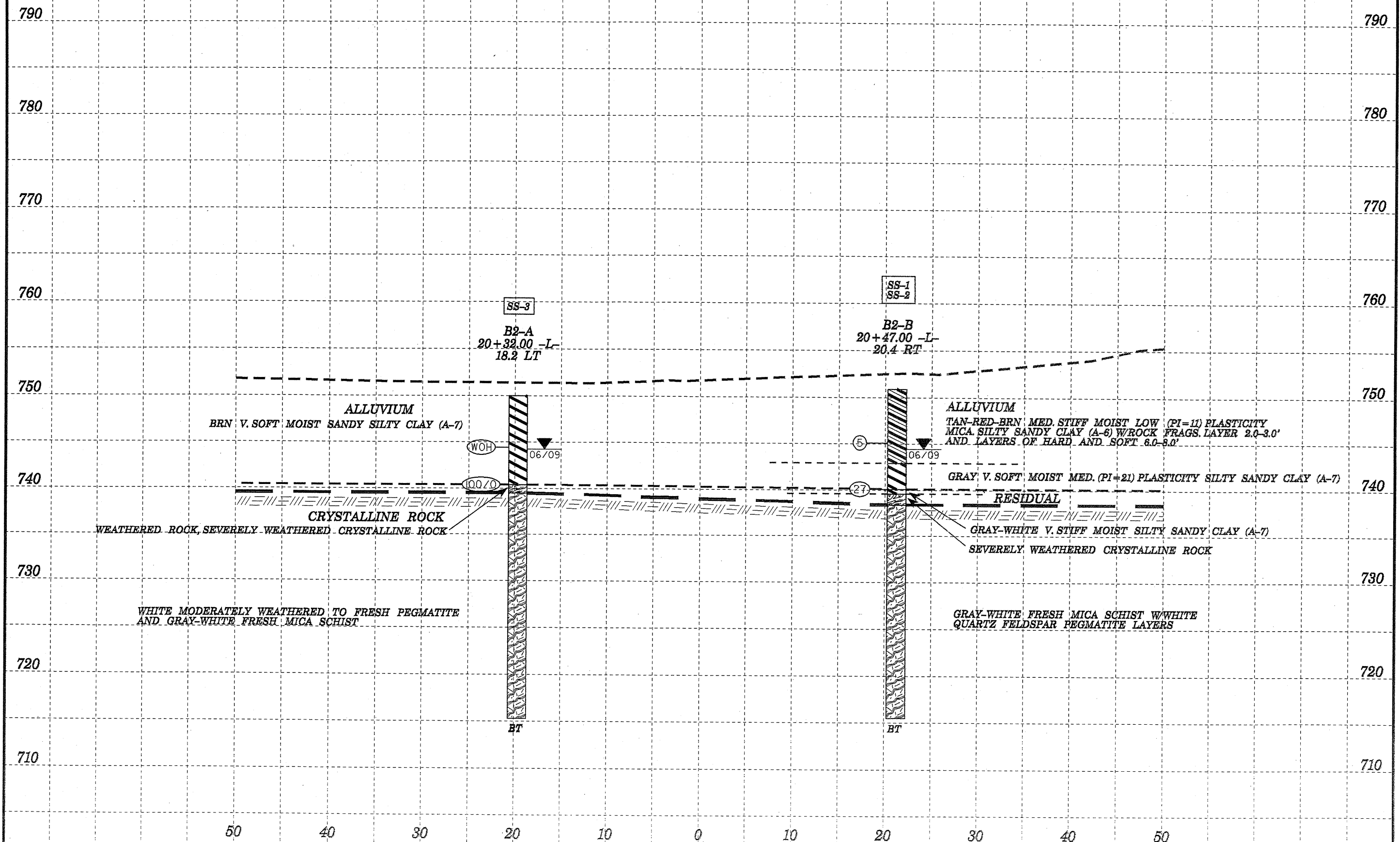
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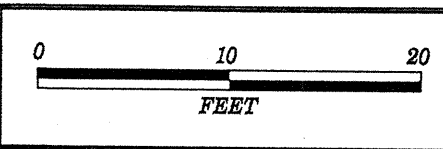


PROJECT REFERENCE NO.	SHEET
33523.1.1 (B-4176)	6
SECTION THRU END BENT ONE	
STA. 19+14.80 -L-	
BRIDGE #118 SKEW=60	

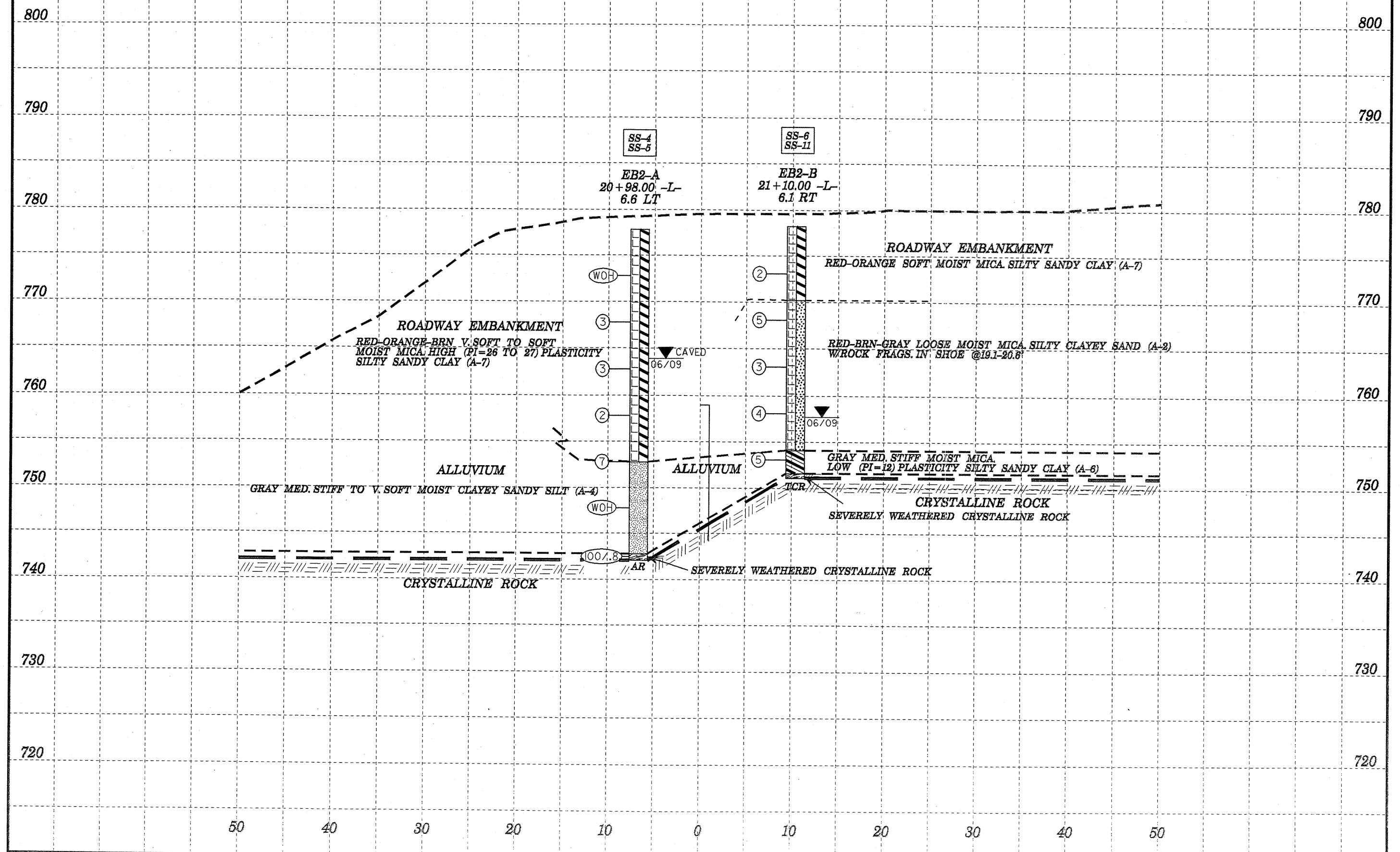


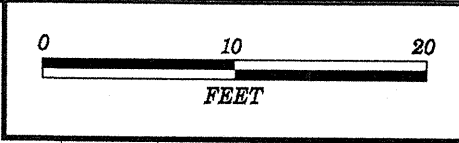




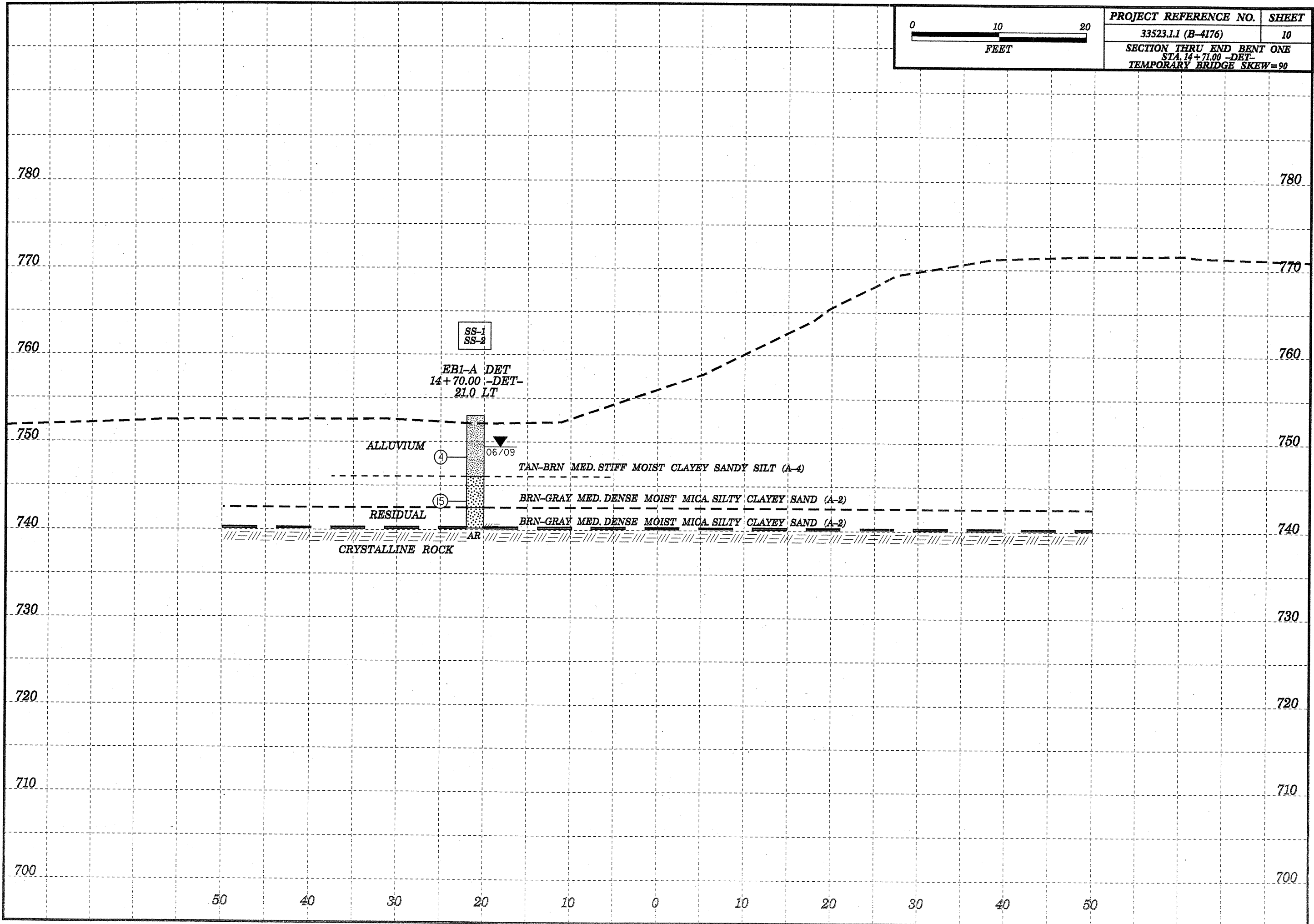


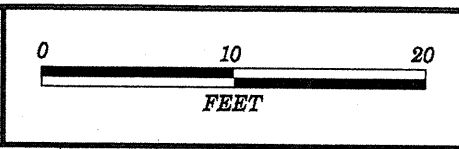
PROJECT REFERENCE NO.	SHEET
33523.1.1 (B-4176)	9
SECTION THRU END BENT TWO	
STA. 20+99.80 -L-	
BRIDGE #118 SKEW=60	



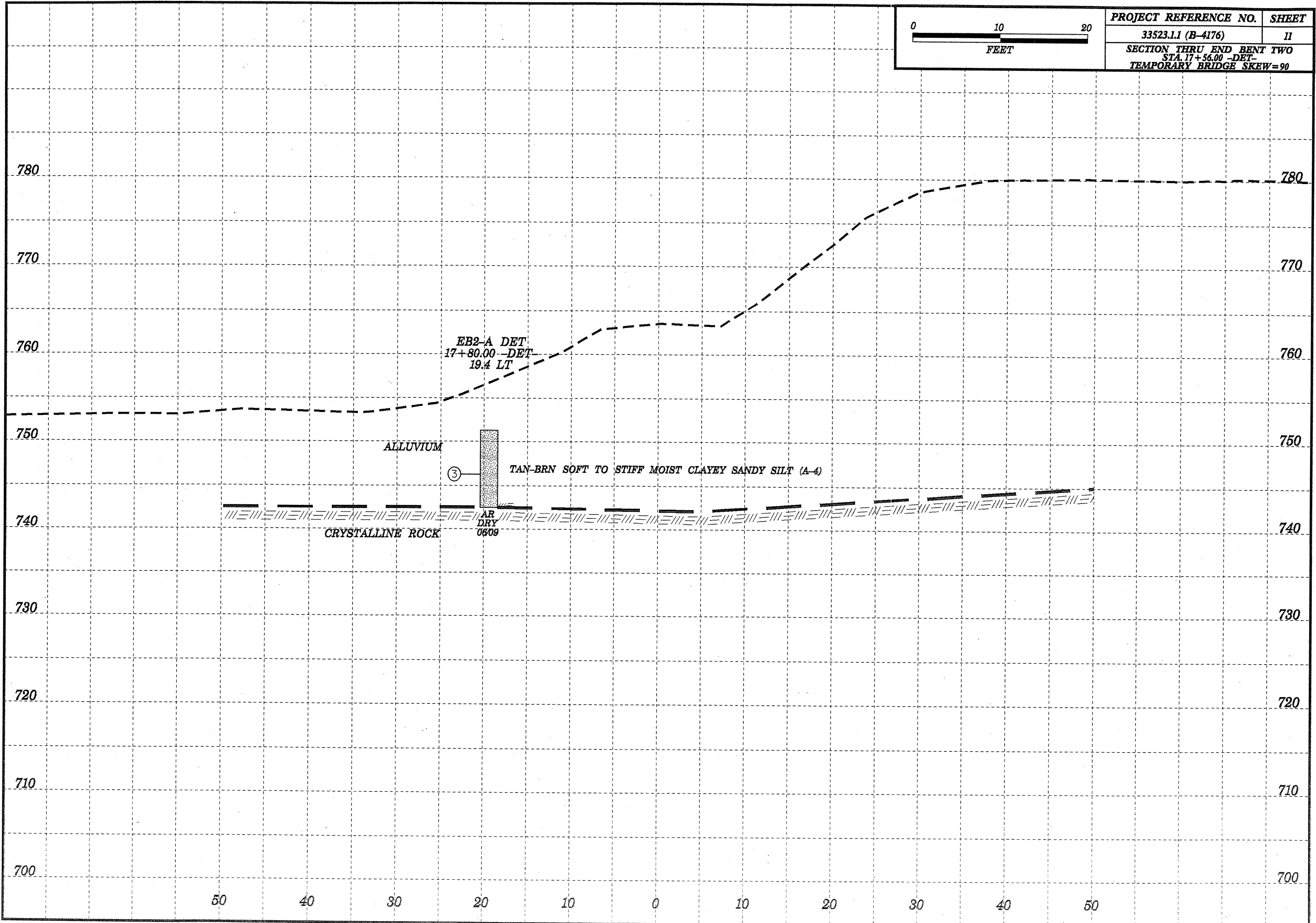


PROJECT REFERENCE NO.	SHEET
33523.1.1 (B-4176)	10
SECTION THRU END BENT ONE	
STA. 14+71.00 -DET-	
TEMPORARY BRIDGE SKEW=90	





PROJECT REFERENCE NO.	SHEET
33523.1.1 (B-4176)	11
SECTION THRU END BENT TWO	
STA. 17+56.00 -DET-	
TEMPORARY BRIDGE SKEW=90	



780

770

760

750

740

730

720

710

700

780

770

760

750

740

730

720

710

700

50

40

30

20

10

0

10

20

30

40

50

ALLUVIUM

CRYSTALLINE ROCK

EB2-A DET
17+80.00 -DET-
19.4 LT

TAN-BRN SOFT TO STIFF MOIST CLAYEY SANDY SILT (A-4)

AR
DRY
0609

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION TEMPORARY BRIDGE ON SR 1008 DETOUR OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB1-A DET	STATION 14+70	OFFSET 21ft LT	ALIGNMENT -DET-
COLLAR ELEV. 753.0 ft	TOTAL DEPTH 12.8 ft	NORTHING 635,731	EASTING 1,324,975
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 06/10/09	COMP. DATE 06/10/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.8 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					
755														GROUND SURFACE	0.0
750	749.2	3.8									SS-1	M		ALLUVIAL TAN-BRN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)	7.0
745	744.2	8.8	1	2	2						SS-2	M		ALLUVIAL BRN-GRAY MED. DENSE MOIST MICA. SILTY CLAYEY SAND (A-2)	10.5
740			4	7	8									RESIDUAL BRN-GRAY MED. DENSE MOIST MICA. SILTY CLAYEY SAND (A-2)	12.8
														Boring Terminated BY AUGER REFUSAL at Elevation 740.2 ft ON CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4176_GEO_BH_BRD00118&DETOUR_LINCOLN.GPJ_NC_DOT.GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION TEMPORARY BRIDGE ON SR 1008 DETOUR OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB2-A DET	STATION 17+80	OFFSET 19ft LT	ALIGNMENT -DET-
COLLAR ELEV. 751.3 ft	TOTAL DEPTH 8.8 ft	NORTHING 635,619	EASTING 1,325,264
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 06/10/09	COMP. DATE 06/10/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 8.8 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					
755														GROUND SURFACE	0.0
750														ALLUVIAL TAN-BRN SOFT TO STIFF MOIST CLAYEY SANDY SILT (A-4)	8.8
745	747.3	4.0	0	1	2							M		Boring Terminated BY AUGER REFUSAL at Elevation 742.5 ft ON CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4176_GEO_BH_BRD00118&DETOUR_LINCOLN.GPJ_NC_DOT.GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 18+97	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 772.9 ft	TOTAL DEPTH 32.0 ft	NORTHING 635,646	EASTING 1,325,016
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT/ TRICONE	HAMMER TYPE Automatic	
START DATE 06/09/09	COMP. DATE 06/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.0 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				
775													GROUND SURFACE	0.0
770	768.7	4.2	0	1	0							M	ROADWAY EMBANKMENT RED-ORANGE V. SOFT TO MED. STIFF MOIST SILTY SANDY CLAY (A-7)	
765	763.7	9.2	2	3	5							M	ROADWAY EMBANKMENT TAN-YELLOW LOOSE TO MED. DENSE MOIST MICA. CLAYEY SILTY SAND (A-1) ROCK FRAGS. 11.8-13.0	8.0
760	758.7	14.2	2	3	4							M		
755	753.7	19.2	2	4	4							M	ROADWAY EMBANKMENT TAN-ORANGE-RED LOOSE TO MED. DENSE MOIST MICA. CLAYEY SILTY SAND (A-2)	18.0
750	748.7	24.2	1	3	2							M	ALLUVIAL GRAY MED. TO V. STIFF MOIST CLAYEY SANDY SILT (A-4)	24.2
745	743.7	29.2	1	17	83/3								WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	30.2
740													Boring Terminated BY TRICONE REFUSAL at Elevation 740.9 ft ON CRYSTALLINE ROCK	32.0

NCDOT BORE SINGLE B4176_GEO_BH_BRD0118&DETOUR_LINCOLN.GPJ_NC_DOT_GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 19+05	OFFSET 7ft RT	ALIGNMENT -L-
COLLAR ELEV. 773.2 ft	TOTAL DEPTH 30.1 ft	NORTHING 635,631	EASTING 1,325,019
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT/ TRICONE	HAMMER TYPE Automatic	
START DATE 06/09/09	COMP. DATE 06/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 30.1 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				
775													GROUND SURFACE	0.0
770	769.0	4.2	0	0	1						SS-7	M	ROADWAY EMBANKMENT RED-ORANGE V. SOFT MOIST HIGH (PI=30) PLASTICITY SILTY SANDY CLAY (A-7)	
765	764.0	9.2	2	3	3						SS-8	M	ROADWAY EMBANKMENT TAN-YELLOW LOOSE MOIST MICA. CLAYEY SILTY SAND (A-1)	8.0
760	759.0	14.2	2	3	3							M		
755	754.0	19.2	2	3	4						SS-9	M	ROADWAY EMBANKMENT TAN-ORANGE-RED LOOSE MOIST MICA. CLAYEY SILTY SAND (A-2)	18.0
750	749.0	24.2	2	2	1						SS-10	M	ALLUVIAL GRAY SOFT MOIST CLAYEY SANDY SILT (A-4)	24.2
745	744.0	29.2											WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	28.2
740													Boring Terminated BY TRICONE REFUSAL at Elevation 743.1 ft ON CRYSTALLINE ROCK	30.1

NCDOT BORE SINGLE B4176_GEO_BH_BRD0118&DETOUR_LINCOLN.GPJ_NC_DOT_GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 19+51	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 750.1 ft	TOTAL DEPTH 32.5 ft	NORTHING 635,628	EASTING 1,325,067
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/08/09	COMP. DATE 06/08/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 14.4 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				
755													
750												GROUND SURFACE	0.0
745	745.5	4.6	1	2	4						M	ALLUVIAL BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7)	
740	740.5	9.6	74	26/1.1								RESIDUAL BRN STIFF MOIST SANDY SILTY CLAY (A-7)	6.0
735												WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	9.6
730												CRYSTALLINE ROCK WHITE & BLK BANDED FRESH MICA SCHIST	14.4
725												CRYSTALLINE ROCK WHITE FRESH QUARTZ FELDSPAR PEGMATITE	22.3
720													
715													
710													
705													
700													
695													
690													
685													
680													
675													

NCDOT BORE SINGLE B4176_GEO_BH_BRD0118&DETOUR LINCOLN.GPJ_NC_DOT_GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 19+51	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 750.1 ft	TOTAL DEPTH 32.5 ft	NORTHING 635,628	EASTING 1,325,067
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/08/09	COMP. DATE 06/08/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 14.4 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 (%)			
735	735.7	14.4	0.9	06:30/5.0	(0.9)	(0.0)		(7.7)	(3.4)		Begin Coring @ 14.4 ft	
	734.8	15.3	5.0		100%	0%		97%	43%		CRYSTALLINE ROCK WHITE & BLK BANDED FRESH MODERATELY HARD MICA SCHIST AVG. JOINT SPACING 0.25' JOINTS SEMI ROUGH	14.4
730	729.8	20.3	5.0	07:24/5.0	(4.8)	(3.8)					AVG. Is(50)=42.23 KSF DIAMETRIAL R1=4, R2=8, R3=10, R4=12, R5=4, RMR=38 ROCK TYPE E	22.3
725	724.8	25.3	5.0	08:22/5.0	(5.0)	(4.9)		98%	97%		CRYSTALLINE ROCK WHITE FRESH HARD QUARTZ FELDSPAR PEGMATITE AVG. JOINT SPACING 1.8' JOINTS ROUGH	
											AVG Is(50)=184.37 KSF RMR=N/A ROCK TYPE E	
720	719.8	30.3	2.2	04:33/2.2	(2.2)	(2.2)						
	717.6	32.5			100%	100%						
715											Boring Terminated at Elevation 717.6 ft IN CRYSTALLINE ROCK	32.5
710												
705												
700												
695												
690												
685												
680												
675												

NCDOT CORE SINGLE B4176_GEO_BH_BRD0118&DETOUR LINCOLN.GPJ_NC_DOT_GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 19+65	OFFSET 8ft RT	ALIGNMENT -L-
COLLAR ELEV. 745.3 ft	TOTAL DEPTH 28.0 ft	NORTHING 635,610	EASTING 1,325,075
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/04/09	COMP. DATE 06/04/09	SURFACE WATER DEPTH 0.0ft	DEPTH TO ROCK 5.5 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					
750															
745													745.3	WATER SURFACE (06/04/09)	0.0
740	741.0	4.3											741.0	ALLUVIAL BRN LOOSE MOIST SILTY SAND (A-1) W/ ROCK FRAGS.	4.3
735													739.8	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	5.5
730														CRYSTALLINE ROCK GRAY-WHITE SLI. WEATHERED TO FRESH MICA SCHIST	
725															
720													723.4	CRYSTALLINE ROCK WHITE FRESH QUARTZ FELDSPAR PEGMATITE	21.9
715													717.3	Boring Terminated at Elevation 717.3 ft IN CRYSTALLINE ROCK	28.0

NCDOT BORE SINGLE B4176_GEO_BH_BRD60118&DETOUR_LINCOLN.GPJ_NC_DOT.GDT_07/13/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 19+15	OFFSET 8ft RT	ALIGNMENT -L-
COLLAR ELEV. 745.3 ft	TOTAL DEPTH 28.0 ft	NORTHING 635,627	EASTING 1,325,028
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/04/09	COMP. DATE 06/04/09	SURFACE WATER DEPTH 0.0ft	DEPTH TO ROCK 5.5 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. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
739.8	739.8	5.5	4.4	05:59/4.4	(4.4)	(0.9)		(16.4)	(6.7)		Begin Coring @ 5.5 ft	
735	735.4	9.9	5.0	09:42/5.0	(5.0)	(2.0)		100%	40%		GRAY-WHITE SLI. WEATHERED TO FRESH MED. TO MODERATELY HARD MICA SCHIST AVG. JOINT SPACING 0.2' JOINTS SMOOTH AND SEMI-ROUGH	5.5
730	730.4	14.9	5.0		(5.0)	(3.6)		100%	72%		AVG. Is(50)=46.75 KSF R1=7, R2=6, R3=6, R4=12, R5=7, RMR=38 ROCK TYPE E	
725	725.4	19.9	5.0		(4.8)	(3.4)		96%	68%			
720	720.4	24.9	3.1		(3.0)	(2.1)		(5.7)	(5.0)		CRYSTALLINE ROCK WHITE FRESH HARD QUARTZ FELDSPAR PEGMATITE AVG. JOINT SPACING 0.75' JOINTS ROUGH	21.9
715	717.3	28.0			(3.0)	(2.1)		97%	68%		AVG. Is(50)=203.14 KSF R1=15, R2=25, R3=6, R4=25, R5=7, RMR=78 ROCK TYPE E	28.0
710											Boring Terminated at Elevation 717.3 ft IN CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4176_GEO_BH_BRD60118&DETOUR_LINCOLN.GPJ_NC_DOT.GDT_07/13/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 20+32	OFFSET 18ft LT	ALIGNMENT -L-
COLLAR ELEV. 750.0 ft	TOTAL DEPTH 34.7 ft	NORTHING 635,610	EASTING 1,325,147
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core/ TRICONE	HAMMER TYPE Automatic	
START DATE 06/02/09	COMP. DATE 06/02/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 10.5 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				
750													GROUND SURFACE	0.0
745	745.4	4.6											ALLUVIAL BRN V. SOFT MOIST SANDY SILTY CLAY (A-7)	
740	740.4	9.6											WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	9.6
735													CRYSTALLINE ROCK WHITE MODERATELY WEATHERED TO FRESH PEGMATITE AND GRAY-WHITE FRESH MICA SCHIST	
730														
725														
720														
715														
710														
705														
700														
695														
690														
685														
680														
675														
670														

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 20+32	OFFSET 18ft LT	ALIGNMENT -L-
COLLAR ELEV. 750.0 ft	TOTAL DEPTH 34.7 ft	NORTHING 635,610	EASTING 1,325,147
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core/ TRICONE	HAMMER TYPE Automatic	
START DATE 06/02/09	COMP. DATE 06/02/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 10.5 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 (%)			
739.5	739.5	10.5	4.2		(4.2)	(0.3)		(24.1)	(9.2)		Begin Coring @ 10.5 ft	
735	735.3	14.7	5.0		(5.0)	(3.0)		100%	60%		CRYSTALLINE ROCK (10.5-14.1) WHITE MODERATELY WEATHERED SOFT PEGMATITE, (14.1-16.7) GRAY-WHITE MED. HARD MICA SCHIST, (16.7-18.1) FRESH MODERATELY HARD PEGMATITE, (18.1-34.7) FRESH MODERATELY HARD MICA SCHIST AVG. JOINT SPACING 0.15'	10.5
730	730.3	19.7	5.0		(5.0)	(4.3)		100%	86%		AVG. Is(50)=43.51 KSF R1=4, R2=6, R3=0, R4=8, R5=7, RMR=23 ROCK TYPE E	
725	725.3	24.7	5.0		(5.0)	(3.7)		100%	74%			
720	720.3	29.7	5.0		(4.9)	(3.3)		98%	66%			
715	715.3	34.7									Boring Terminated at Elevation 715.3 ft IN CRYSTALLINE ROCK	34.7
710												
705												
700												
695												
690												
685												
680												
675												
670												
665												
660												

NCDOT CORE SINGLE B4176_GEO_BH_BRDG0118&DETOUT_LINCOLN.GPJ NC_DOT_GDT_07/01/09

NCDOT CORE SINGLE B4176_GEO_BH_BRDG0118&DETOUT_LINCOLN.GPJ NC_DOT_GDT_07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 20+47	OFFSET 20ft RT	ALIGNMENT -L-
COLLAR ELEV. 750.9 ft	TOTAL DEPTH 35.4 ft	NORTHING 635,569	EASTING 1,325,147
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/01/09	COMP. DATE 06/01/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.5 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					
755															
750														750.9	0.0
745	746.1	4.8	1	2	3						SS-1	W	TAN-RED-BRN MED. STIFF MOIST LOW (PI=11) PLASTICITY MICA, SILTY SANDY CLAY (A-6) ROCK FRAGS. LAYER 2.0-3.0' AND LAYERS OF HARD AND SOFT 6.0-8.0'		
740	741.1	9.8	1	1	26						SS-2	M	ALLUVIAL GRAY V. SOFT MOIST MED. (PI=21) PLASTICITY SILTY SANDY CLAY (A-7)	10.8	
735													RESIDUAL GRAY-WHITE V. STIFF MOIST SILTY SANDY CLAY (A-7)	11.3	
730													WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	12.5	
725													CRYSTALLINE ROCK GRAY-WHITE FRESH MICA SCHIST W/ WHITE QUARTZ FELDSPAR PEGMATITE LAYERS		
720															
715														715.5	35.4
710															
705															
700															
695															
690															
685															
680															
675															

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 20+47	OFFSET 20ft RT	ALIGNMENT -L-
COLLAR ELEV. 750.9 ft	TOTAL DEPTH 35.4 ft	NORTHING 635,569	EASTING 1,325,147
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 06/01/09	COMP. DATE 06/01/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.5 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 (%)			
	738.4											
	738.4	12.5	2.9	04:30/2.9	(2.9)	(2.2)					Begin Coring @ 12.5 ft	
735	735.5	15.4	5.0	05:30/5.0	(4.8)	(2.5)					CRYSTALLINE ROCK	12.5
											GRAY-WHITE FRESH MODERATELY HARD MICA SCHIST W/ WHITE HARD QUARTZ FELDSPAR PEGMATITE LAYERS. AVG. JOINT SPACING 0.4' JOINTS SMOOTH TO SEMI-ROUGH	
											AVG. Is(50)=136.66 KSF R1=12, R2=12, R3=6, R4=6, R5=7, RMR=43 ROCK TYPE E	
730	730.5	20.4	5.0	08:33/5.0	(5.0)	(2.6)						
725	725.5	25.4	5.0	09:18/5.0	(4.8)	(3.1)						
720	720.5	30.4	5.0	08:51/5.0	(4.9)	(4.2)						
715	715.5	35.4										
											Boring Terminated at Elevation 715.5 ft IN CRYSTALLINE ROCK	35.4
710												
705												
700												
695												
690												
685												
680												
675												

NCDOT BORE SINGLE B4176 GEO. BH. BRDG0118&DETOUR LINCOLN.GPJ NC_DOT.GDT 07/01/09

NCDOT CORE SINGLE B4176 GEO. BH. BRDG0118&DETOUR LINCOLN.GPJ NC_DOT.GDT 07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 20+98	OFFSET 7ft LT	ALIGNMENT -L- 0 HR. NM
COLLAR ELEV. 777.8 ft	TOTAL DEPTH 35.7 ft	NORTHING 635,576	EASTING 1,325,204 24 HRCV@ 13.9
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 06/08/09	COMP. DATE 06/08/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 35.7 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							
780															777.8	GROUND SURFACE	0.0
775	773.8	4.0	0	0	0							SS-4	M			ROADWAY EMBANKMENT RED-ORANGE-BRN V. SOFT TO SOFT MOIST MICA. HIGH (PI=26 TO 27) PLASTICITY SILTY SANDY CLAY (A-7)	
770	768.8	9.0	0	1	2							SS-5	M				
765	763.8	14.0	0	1	2								M				
760	758.8	19.0	0	0	2								M				
755	753.8	24.0	1	3	4								M				
750	748.8	29.0	0	0	0								M		752.8	ALLUVIAL GRAY MED. STIFF TO V. SOFT MOIST CLAYEY SANDY SILT (A-4)	25.0
745	743.8	34.0	2	15	85/3										742.8	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	35.0
740															742.1	Boring Terminated WITH CASING ADVANCER REFUSAL at Elevation 742.1 ft ON CRYSTALLINE ROCK	35.7

NCDOT BORE SINGLE B4176 GEO_BH_BRD00118&DETOUR_LINCOLN.GPJ NC_DOT.GDT 07/01/09

PROJECT NO. 33523.1.1	ID. B-4176	COUNTY LINCOLN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #118 ON SR 1008 OVER CLARK CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 21+10	OFFSET 6ft RT	ALIGNMENT -L- 0 HR. NM
COLLAR ELEV. 778.2 ft	TOTAL DEPTH 27.1 ft	NORTHING 635,560	EASTING 1,325,211 24 HR. 20.5
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT/ TRICONE	HAMMER TYPE Automatic	
START DATE 06/09/09	COMP. DATE 06/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 27.1 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							
780															778.2	GROUND SURFACE	0.0
775	774.1	4.1	0	1	1								M			ROADWAY EMBANKMENT RED-ORANGE SOFT MOIST MICA. SILTY SANDY CLAY (A-7)	
770	769.1	9.1	1	2	3								SS-6	M		ROADWAY EMBANKMENT RED-BRN-GRAY LOOSE MOIST MICA. SILTY CLAYEY SAND (A-2) ROCK FRAGS. IN SHOE @19.1-20.6	8.0
765	764.1	14.1	0	2	1								M				
760	759.1	19.1	2	1	3												
755	754.1	24.1	3	2	3								SS-11	M			
750															751.6	ALLUVIAL GRAY MED. STIFF MOIST MICA. LOW (PI=12) PLASTICITY SILTY SANDY CLAY (A-6)	26.6
745															751.1	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	27.1
740																Boring Terminated BY TRICONE REFUSAL at Elevation 751.1 ft ON CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4176 GEO_BH_BRD00118&DETOUR_LINCOLN.GPJ NC_DOT.GDT 07/01/09

TEST RESULTS

PROJECT: 33523.1.1 (B-4176)

COUNTY: LINCOLN

SITE DESCRIPTION: BRIDGE NO. 118 OVER CLARK CREEK ON SR 1008 AND TEMPORARY BRIDGE OVER CLARK CREEK ON SR 1008 DETOUR

SHEET NO. 19

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	LL	P.I.	% BY WEIGHT				% PASSING SIEVES			UNIT WT. (d)	VOID RATIO
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A DET																
SS-1	21.0 LT	14+70 -DET-	4.30-5.30	A-4(1)	4	26	8	8.1	51.6	16.1	24.3	99	97	47		
SS-2	21.0 LT	14+70 -DET-	9.30-10.30	A-2-4(0)	15	25	1	20.8	51.0	14.1	14.2	99	93	34		
EB1-B																
SS-7	7.1 RT	19+05 -L-	4.70-5.70	A-7-6(24)	1	56	30	10.9	13.3	17.1	58.6	99	93	77		
SS-8	7.1 RT	19+05 -L-	9.70-10.70	A-1-b(0)	6	37	NP	46.3	28.9	12.6	12.1	72	50	21		
SS-9	7.1 RT	19+05 -L-	19.70-20.70	A-2-4(0)	7	37	5	45.1	30.5	14.3	10.1	76	54	22		
SS-10	7.1 RT	19+05 -L-	24.70-25.70	A-4(0)	3	34	10	37.8	24.1	13.9	24.3	89	65	37		
B2-A																
SS-3	18.2 LT	20+32 -L-	5.10-6.10	A-7-6(20)	0	47	21	2.2	14.2	25.0	58.6	100	100	87		
B2-B																
SS-1	20.4 RT	20+47 -L-	5.30-6.30	A-6(2)	5	39	11	29.7	26.1	15.9	28.3	91	73	45		
SS-2	20.4 RT	20+47 -L-	9.80-10.80	A-7-6(12)	27	48	20	14.4	16.6	26.6	42.5	88	79	63		
EB2-A																
SS-4	6.6 LT	20+98 -L-	4.50-5.50	A-7-6(19)	0	53	26	12.5	17.8	21.1	48.5	99	92	72		
SS-5	6.6 LT	20+98 -L-	9.50-10.50	A-7-6(18)	3	51	27	16.0	17.6	24.0	42.5	99	90	69		
EB2-B																
SS-6	6.1 RT	21+10 -L-	9.60-10.60	A-2-4(0)	5	33	5	45.3	30.5	12.0	12.1	75	53	21		
SS-11	6.1 RT	21+10 -L-	24.50-25.50	A-6(3)	5	35	12	25.3	25.5	20.9	28.3	91	77	48		

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT	Q(MPa) (MPsi)	E(MPa) (MPsi)
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FIELD SCOUR REPORT

WBS: 33523.1.1 TIP: B-4176 COUNTY: Lincoln

DESCRIPTION(1): Bridge #118 over Clark Creek on SR 1008

EXISTING BRIDGE

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

Bridge No.: 118 Length: 188' Total Bents: 6 Bents in Channel: 2 Bents in Floodplain: 6
 Foundation Type: Timber Pile, concrete piers

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None observed

Interior Bents: None

Channel Bed: None

Channel Bank: None- steep protected slope

EXISTING SCOUR PROTECTION

Type(3): Abutment slopes are covered with concrete

Extent(4): 40 feet back from EB1 and EB2

Effectiveness(5): Slope protection works good - 10' back of protection slope is eroding

Obstructions(6): Debris accumulated 5 - 6 feet high at B-2 and B-3 in channel.

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 and gravel

Channel Bank Material(8): Clay, silt, sand

Channel Bank Cover(9): Mature trees, shrubs, grass

Floodplain Width(10): appx. 300'

Floodplain Cover(11): Grass, trees, shrubs

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): Slight

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

	BENTS												
	B1	B2	B3	B4									
100 Year Scour	742.5	742.5											
500 Year Scour	739.5	739.5											

Comparison of DSE to Hydraulics Unit theoretical scour:
No change. Agree with NCDOT Theoretical Scour.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

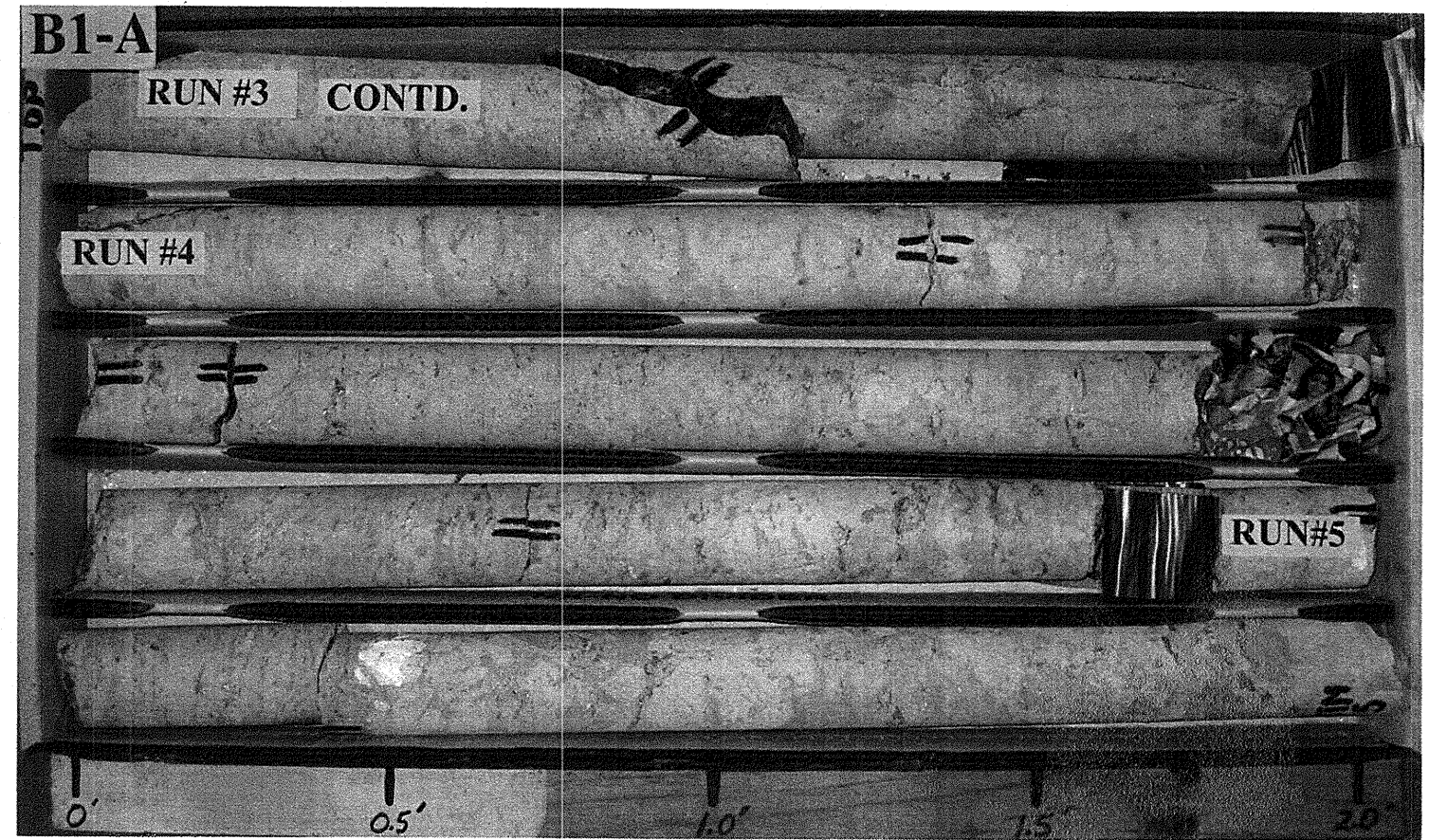
Bed or Bank													
Sample No.													
Retained #4													
Passed #10													
Passed #40													
Passed #200													
Coarse Sand													
Fine Sand													
Silt													
Clay													
LL													
PI													
AASHTO													
Station										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

See Sheet #19 for
"Soil Test Results"

Reported by: JKS/JEB Date: 6/10/2009

33523.1.1 (B-4176)
LINCOLN COUNTY
BRIDGE #118 OVER CLARK CREEK ON SR 1008 AND TEMPORARY BRIDGE OVER CLARK CREEK ON SR 1008 DETOUR

CORE PHOTOS



33523.1.1 (B-4176)
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