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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	42330.1.1 (B-5173)	1	10

**STATE OF NORTH CAROLINA**

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

**STRUCTURE  
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 42330.1.1 (B-5173) F.A. PROJ. BRZ-1328(6)

COUNTY SURRY

PROJECT DESCRIPTION BRIDGE #39 OVER MITCHELL RIVER  
BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD.

SITE DESCRIPTION BRIDGE #39 ON SR 1328 (HAYSTACK RD.)  
OVER MITCHELL RIVER

**CONTENTS**

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**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 ZENO-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

C. C. MURRAY

J. E. ESTEP

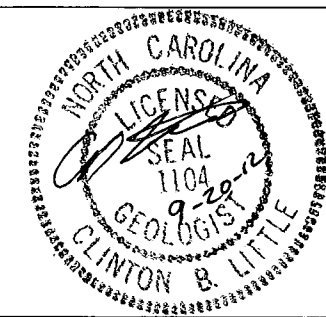
M. R. MOORE

INVESTIGATED BY R. Q. CALLAWAY

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE SEPTEMBER 2012



**PROJECT: 42330.1.1 ID: B-5173**

DRAWN BY: C. E. BURRIS /R. Q. CALLAWAY

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

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

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

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
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 (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: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		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.		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:		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. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED 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. SILL - 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 IN 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 (SCRC) - 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 STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.			
GROUP CLASS. A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		COMPRESSIBILITY		VERY SLIGHT (V SL.)			
SYMBOL		SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE		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.			
% PASSING #10, #40, #200		LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50		SLIGHT (SL.)			
LIQUID LIMIT PLASTIC INDEX		PERCENTAGE OF MATERIAL		MODERATE (MOD.)			
GROUP INDEX		ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL		MODERATELY SEVERE (MOD. SEV.)			
USUAL TYPES OF MAJOR MATERIALS		TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10%		SEVERE (SEV.)			
GEN. RATING AS A SUBGRADE		GROUND WATER		VERY SEVERE (V SEV.)			
EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSUITABLE		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		COMPLETE			
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MISCELLANEOUS SYMBOLS		ROCK HARDNESS			
CONSISTENCY OR DENSENESS		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES		VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.			
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		FRACTURE SPACING		BEDDING	
U.S. STD. SIEVE SIZE OPENING (MM) 4, 10, 40, 60, 200, 270 4.76, 2.00, 0.42, 0.25, 0.075, 0.053		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST V - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL M - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT UNIT WEIGHT		VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE		TERM SPACING THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
BOULDER (BLDR.) COBBLE (COBB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)		SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO		FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
GRAIN SIZE MM 305, 75, 2.0, 0.25, 0.05, 0.005 IN. 12, 3		EQUIPMENT USED ON SUBJECT PROJECT					
SOIL MOISTURE - CORRELATION OF TERMS		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST		ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE 2 1/8" TUNG-CARB. CORE BIT		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B- -N- -H- HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION							
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE							
PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE							
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE							
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE							
PLASTICITY							
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY							
COLOR							
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.							

ARCADIA LLC.  
 DB 0511 PG 1434

.....  
 BMI ELEVATION = 1355.13'  
 N 982359. E 1436167.  
 BL STATION 11+93.00 7.00' LEFT  
 DISK IN HEADWALL 145 HLZ 1969  
 .....

ARCADIA LLC.  
 DB 0511 PG 1434

KATHRYN  
 TAYLOR  
 REYNOLDS  
 DB 1101 PG 364

REMOVE EXIST. BRIDGE

-L- PT Sta. 15+26.41

-L- PC Sta. 17+87.66

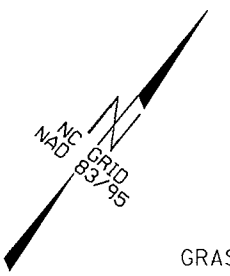
-BL- 5 PINC  
 -BYI- 7 POT

-BYI- 8 POT

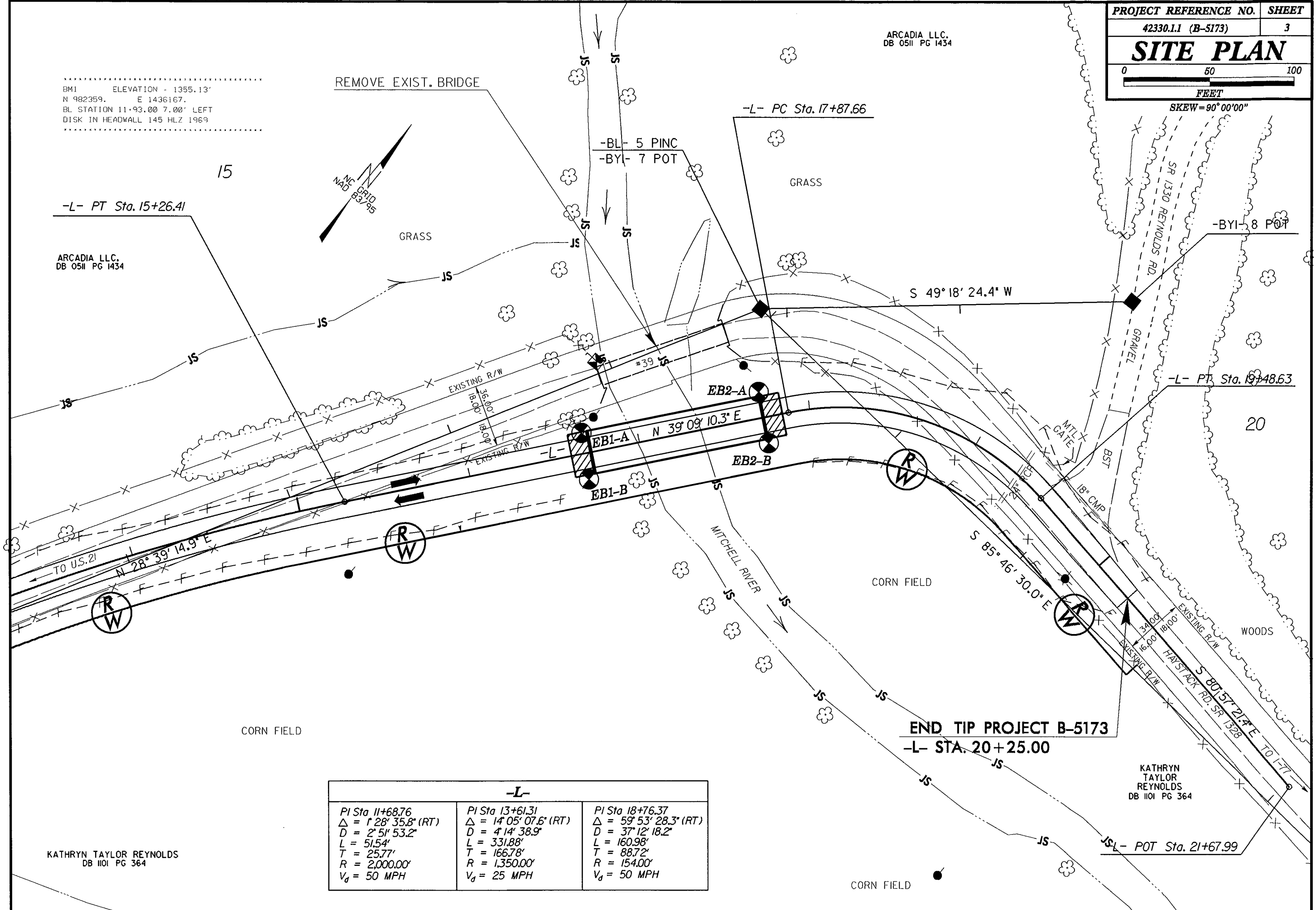
-L- PT Sta. 19+48.63

END TIP PROJECT B-5173  
 -L- STA. 20+25.00

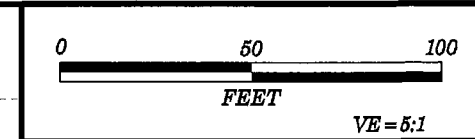
-L- POT Sta. 21+67.99



-L-		
PI Sta 11+68.76	PI Sta 13+61.31	PI Sta 18+76.37
$\Delta = 1^{\circ} 28' 35.8"$ (RT)	$\Delta = 14^{\circ} 05' 07.6"$ (RT)	$\Delta = 59^{\circ} 53' 28.3"$ (RT)
D = 2' 51' 53.2"	D = 4' 14' 38.9"	D = 37' 12' 18.2"
L = 51.54'	L = 331.88'	L = 160.98'
T = 25.77'	T = 166.78'	T = 88.72'
R = 2,000.00'	R = 1,350.00'	R = 154.00'
V <sub>d</sub> = 50 MPH	V <sub>d</sub> = 25 MPH	V <sub>d</sub> = 50 MPH



# -L- SR 1328 HAYSTACK RD.



<b>PROJECT REFERENCE NO.</b> 42330.1.1 (B-5173)	<b>SHEET</b> 4
<b>BRIDGE #39 SURRY CO.</b> PROFILE ALONG -L- SKEW = 90° 00' 00"	

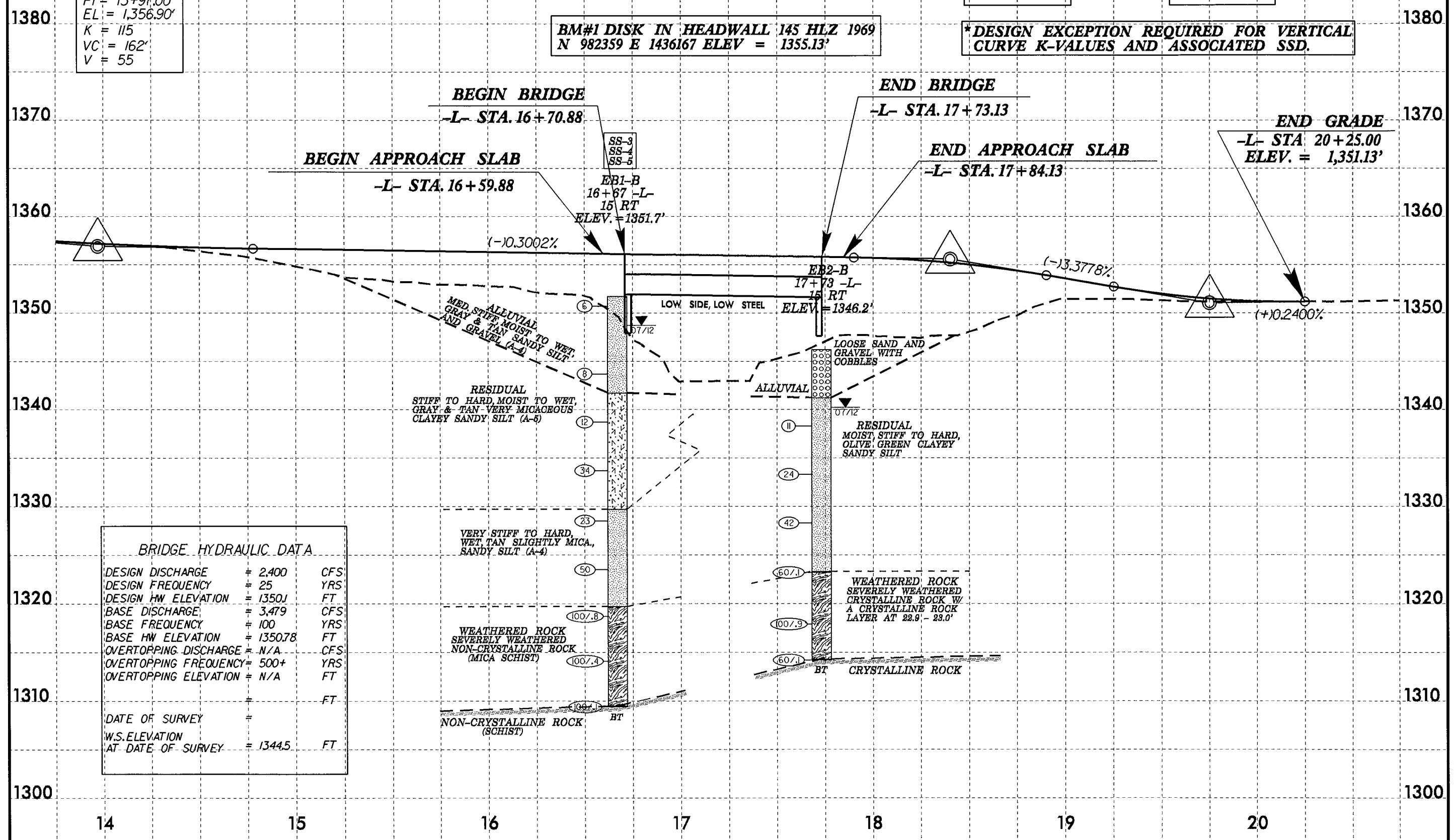
PI = 13+97.00  
EL = 1,356.90'  
K = 115  
VC = 162'  
V = 55

PI = 18+40.00  
EL = 1,355.57'  
K = 32\*  
VC = 100'  
V = 35

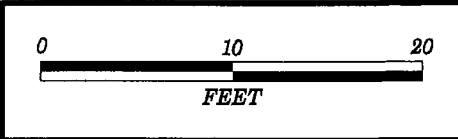
PI = 19+75.00  
EL = 1,351.01'  
K = 28\*  
VC = 100'  
V = 25

**BM#1 DISK IN HEADWALL 145 HLZ 1969**  
N 982359 E 1436167 ELEV. = 1355.13'

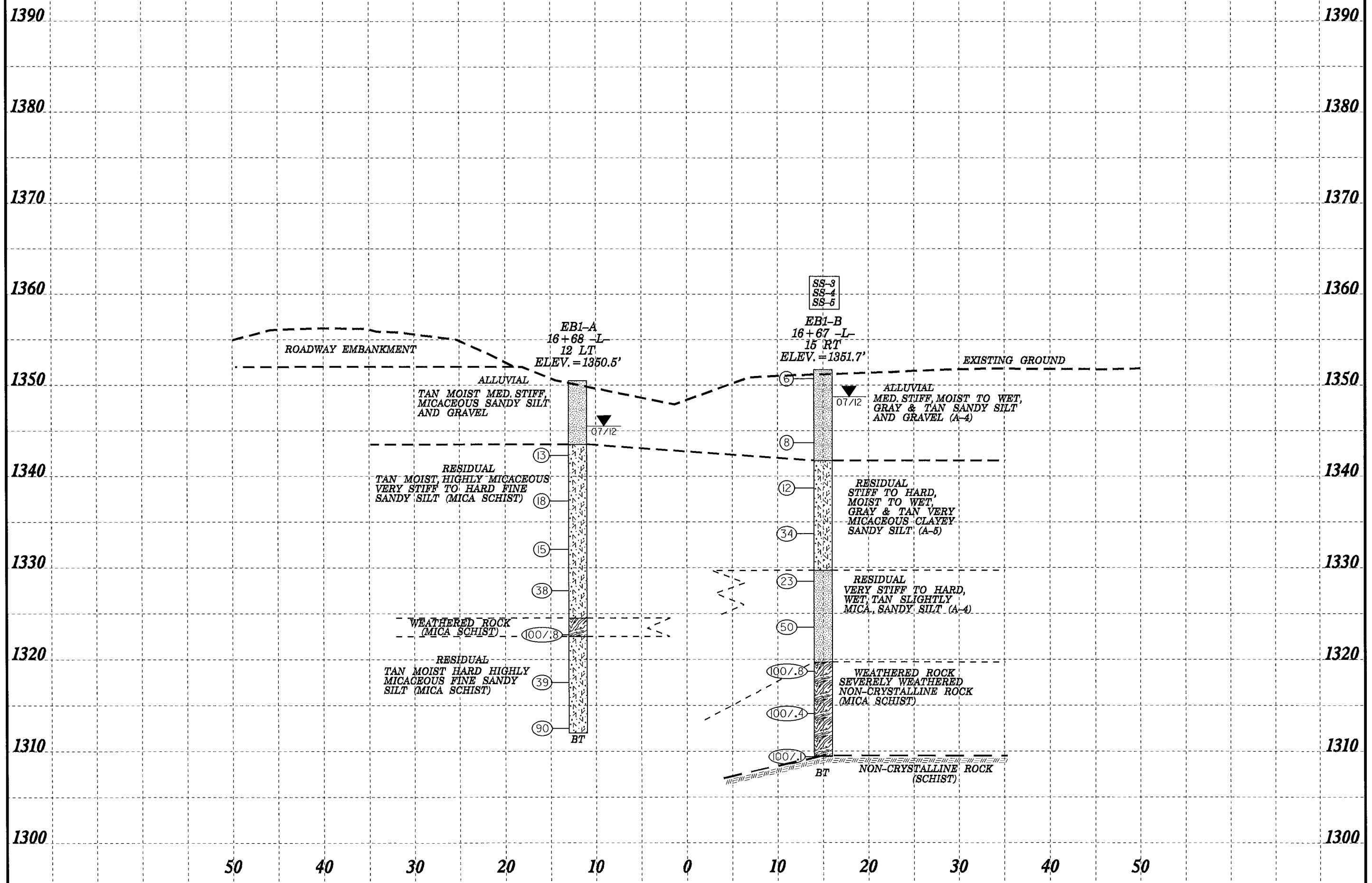
**\*DESIGN EXCEPTION REQUIRED FOR VERTICAL CURVE K-VALUES AND ASSOCIATED SSD.**

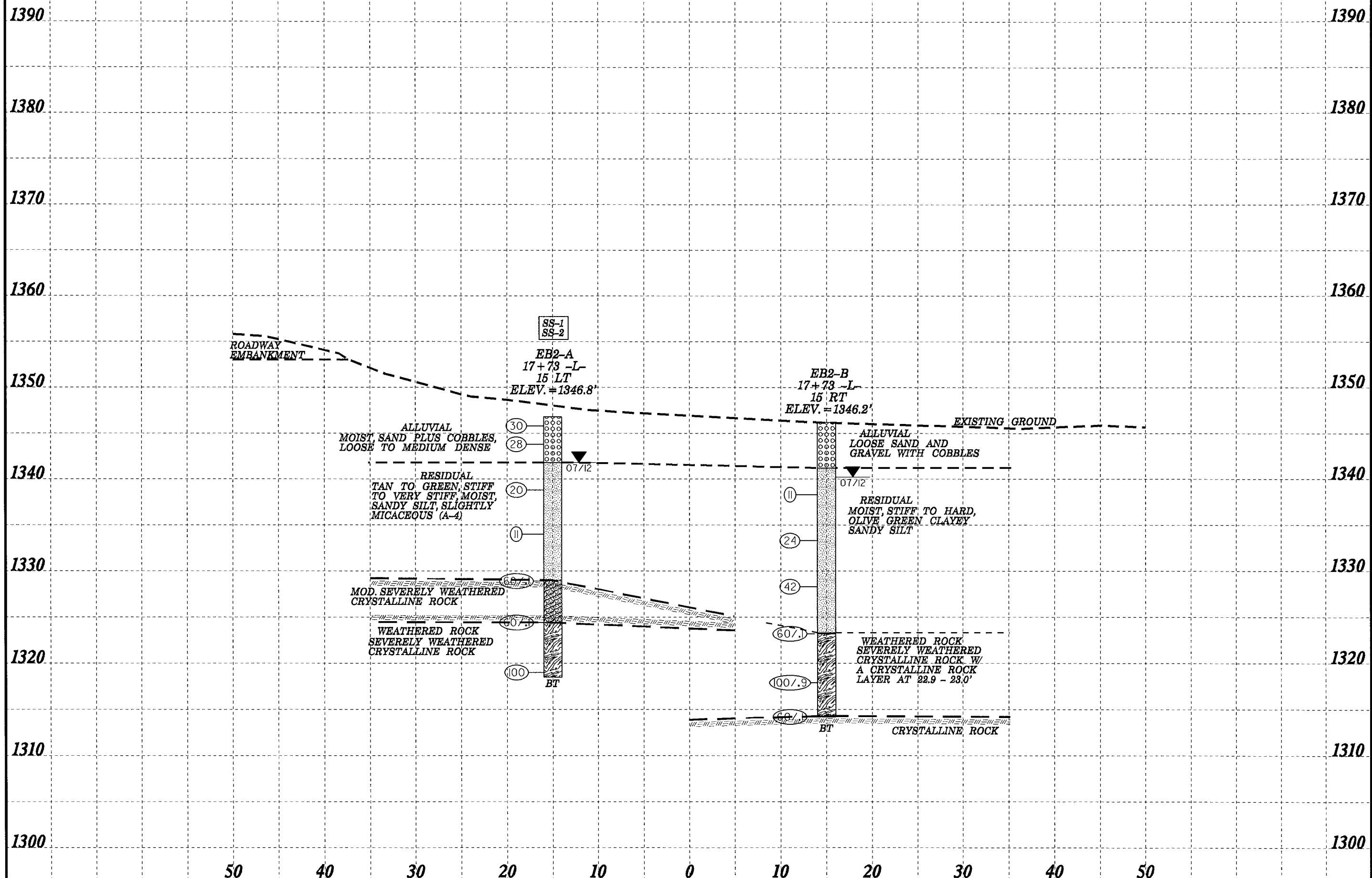
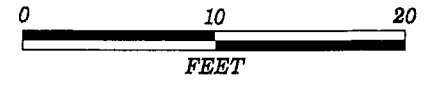


BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 2,400	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1350.1	FT
BASE DISCHARGE	= 3,479	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1350.78	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= N/A	FT
DATE OF SURVEY	=	FT
W.S. ELEVATION AT DATE OF SURVEY	= 1344.5	FT



PROJECT REFERENCE NO.	SHEET
42330.1.1 (B-5173)	5
SECTION THROUGH EB-1 STA. 16+70.88 -L- SKEW=90°00'00"	







WBS 42330.1.1		TIP B5173		COUNTY SURRY		GEOLOGIST Murray, C. C.							
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD							GROUND WTR (ft)						
BORING NO. EB1-A		STATION 16+68		OFFSET 12 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 1,350.5 ft		TOTAL DEPTH 38.5 ft		NORTHING 982,321		EASTING 1,436,186							
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 07/26/12		COMP. DATE 07/26/12		SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
1355													
1350												1,350.5	0.0
1345													
1340	1,343.3	7.2	9	8	5						M	1,343.5	7.0
1335	1,338.3	12.2	5	7	11						M		
1330	1,333.0	17.5	8	5	10						M		
1325	1,328.5	22.0	14	19	19						M		
1320	1,323.5	27.0	44	56/3							M	1,324.5	26.0
1315	1,318.5	32.0	6	8	31						M	1,322.5	28.0
	1,313.5	37.0	15	39	51						M	1,312.0	38.5
Boring Terminated at Elevation 1,312.0 ft in highly micaceous fine sandy silt													

NCDOT BORE SINGLE B5173\_GEO\_BH\_BRD0039\_SURRY.GPJ\_NC\_DOT.GDT 9/5/12

WBS 42330.1.1		TIP B5173		COUNTY SURRY		GEOLOGIST Murray, C. C.							
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD							GROUND WTR (ft)						
BORING NO. EB1-B		STATION 16+67		OFFSET 15 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 1,351.7 ft		TOTAL DEPTH 42.3 ft		NORTHING 982,304		EASTING 1,436,207							
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 07/26/12		COMP. DATE 07/26/12		SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
1355													
1350	1,351.7	0.0	3	3	3						SS-3	M	1,351.7
1345	1,344.7	7.0	11	4	4							M	
1340	1,339.7	12.0	5	4	8							W	1,341.7
1335	1,334.7	17.0	12	16	18						SS-4	W	
1330	1,329.5	22.2	3	6	17						SS-5	W	1,329.7
1325	1,324.5	27.2	9	16	34							W	
1320	1,319.5	32.2	48	52/3									1,319.7
1315	1,314.5	37.2	100/4										1,319.7
1310	1,309.5	42.2	100/1										1,309.5
Boring Terminated with Standard Penetration Test Refusal at Elevation 1,309.4 ft in non-crystalline rock (schist)													

NCDOT BORE SINGLE B5173\_GEO\_BH\_BRD0039\_SURRY.GPJ\_NC\_DOT.GDT 9/5/12





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 42330.1.1		TIP B5173		COUNTY SURRY		GEOLOGIST Murray, C. C.										
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 17+73		OFFSET 15 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 1,346.8 ft		TOTAL DEPTH 28.3 ft		NORTHING 982,405		EASTING 1,436,250										
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic										
DRILLER Estep, J. E.		START DATE 07/25/12		COMP. DATE 07/25/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1350																
	1,346.8	0.0												1,346.8	0.0	
1345	1,344.8	2.0	5	20	10								SS-1	M	0 - 5 ALLUVIAL, MOIST, SAND PLUS COBBLES, LOOSE TO MEDIUM DENSE	5.0
1340	1,339.8	7.0	15	25	3								SS-2	M	5 - 17.8 RESIDUAL, TAN TO GREEN, STIFF TO VERY STIFF, MOIST, SANDY SILT, SLIGHTLY MICACEOUS (A-4)	17.8
1335	1,335.0	11.8	10	8	12								M	M		
1330	1,330.0	16.8	2	3	8								M	M		
1325	1,325.0	21.8	13	65	60/1								M	M	CRYSTALLINE ROCK 17.8 - 22.4 MOD. SEVERELY WEATHERED CRYSTALLINE ROCK	22.4
1320	1,320.0	26.8	50	60/1									M	M	WEATHERED ROCK 22.4 - 28.3 SEVERELY WEATHERED CRYSTALLINE ROCK	28.3
			13	37	63								M	M	Boring Terminated at Elevation 1,318.5 ft in severely weathered crystalline rock	

WBS 42330.1.1		TIP B5173		COUNTY SURRY		GEOLOGIST Murray, C. C.										
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 17+73		OFFSET 15 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 1,346.2 ft		TOTAL DEPTH 32.0 ft		NORTHING 982,386		EASTING 1,436,274										
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic										
DRILLER Estep, J. E.		START DATE 07/25/12		COMP. DATE 07/25/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1350																
	1,346.2	0.0												1,346.2	0.0	
1345																
	1,341.2	5.0												1,341.2	5.0	
1340	1,339.3	6.9	3	2	9								M	M	0 - 5 ALLUVIAL, LOOSE SAND AND GRAVEL WITH COBBLES	
1335	1,334.3	11.9	8	11	13								M	M	5 - 22.9 RESIDUAL, MOIST, STIFF TO HARD, OLIVE GREEN CLAYEY SANDY SILT	
1330	1,329.3	16.9											M	M		
1325	1,324.3	21.9	13	19	23								M	M	CRYSTALLINE ROCK 22.9 - 23 SPT REFUSAL, PRESUMED ROCK	23.0
1320	1,319.3	26.9	22	45	60/1								M	M	WEATHERED ROCK 23 - 31.9 SEVERELY WEATHERED CRYSTALLINE ROCK	31.9
1315	1,314.3	31.9	20	28	72/4								M	M	CRYSTALLINE ROCK 31.9 - 32, SPT REFUSAL, CRYSTALLINE ROCK	32.0
			60/1										M	M	Boring Terminated with Standard Penetration Test Refusal at Elevation 1,314.2 ft in crystalline rock	

NCDOT BORE DOUBLE B5173\_GEO\_BH\_BRD00099\_SURRY.GPJ\_NC\_DOT.GDT\_9/18/12

TEST RESULTS

PROJECT: 42330.1.1 (B-5173)

COUNTY: SURRY

SITE DESCRIPTION: BRIDGE NO. 39 OVER MITCHELL RIVER BETWEEN SR 1301 / 1325 AND SR 1330 REYNOLDS RD.

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				
<b>EB1-B</b>																		
SS-3	15.0 RT	16+67	0.00-1.50	A-4(2)	6	36	5	7.5	46.5	29.9	16.2	95	91	56				
SS-4	15.0 RT	16+67	17.00-18.50	A-5(0)	34	43	NP	1.4	80.4	16.2	2.0	100	100	38				
SS-5	15.0 RT	16+67	22.20-23.70	A-4(0)	23	37	NP	3.4	67.3	25.3	4.0	100	100	47				
<b>EB2-A</b>																		
SS-1	15.0 LT	17+73	0.00-1.50	Not enough material	30			44.2	39.0	16.8	0.0	60	44	13				
SS-2	15.0 LT	17+73	7.00-9.50	A-4(0)	20	35	NP	37.4	34.9	27.7	0.0	96	68	36				



.....  
 BM1 ELEVATION = 1355.13'  
 N 482359, E 1438167,  
 BL STATION 11+93.00 7.00' LEFT  
 DISK IN HEADWALL 145 MLZ 1969  
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