

CONTRACT: 34422.1.1 ID: R-2320G

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2320G	1	1/2
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34422.1.1	NHF-52(23)	P.E.	
		CONST.	

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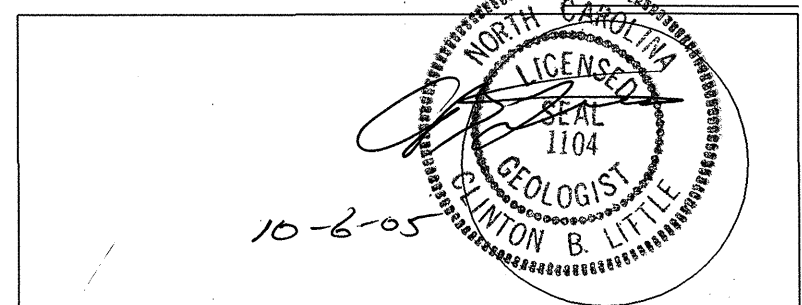
STATE PROJECT 34422.1.1 I.D. NO. R-2320G
 F.A. PROJECT NHF-52(23)
 COUNTY STANLY
 PROJECT DESCRIPTION Albemarle - US 52 Extension
from the Intersection of US 52, NC 73, NC 24-27
& NC 138 to Intersect of US 52 and SR 1785 (Johns Road)
 SITE DESCRIPTION US 52 Extension (-L-) Left Lane Bridge
over Winston-Salem Southbound Railway (-Y2-)
between US 52 and SR 1907

INVESTIGATED BY R.Q. CALLAWAY PERSONNEL C.C. MURRAY
 CHECKED BY C.B. LITTLE J.E. ESTEP
 SUBMITTED BY C.B. LITTLE J.W. VANDERBURG
 DATE SEPTEMBER 2005

DRAWN BY: J.K. McCLURE

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 UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2320G	34422.1.1	2	12

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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, GRN SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH 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 WHEN 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 WHICH 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 IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 IMPERVIORUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (REC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION			
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.			
GROUP CLASS.		SYMBOL		COMPRESSIBILITY		PERCENTAGE OF MATERIAL	
SLIGHTLY COMPRESSIBLE		MODERATELY COMPRESSIBLE		HIGHLY COMPRESSIBLE		ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL	
TRACE OF ORGANIC MATTER		LITTLE ORGANIC MATTER		MODERATELY ORGANIC		HIGHLY ORGANIC	
GROUND WATER				MISCELLANEOUS SYMBOLS			
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION			
STATIC WATER LEVEL AFTER 24 HOURS.				SOIL SYMBOL			
PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA				ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS			
SPRING OR SEEPAGE				INFERRED SOIL BOUNDARIES			
				INFERRED ROCK LINE			
				ALLUVIAL SOIL BOUNDARY			
				SLOPE INDICATOR INSTALLATION			
				SPT N-VALUE			
				SPT REFUSAL			
TEXTURE OR GRAIN SIZE							
U.S. STD. SIEVE SIZE							
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)							
GRAIN SIZE MM IN.							
SOIL MOISTURE - CORRELATION OF TERMS							
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		PLASTICITY INDEX (PI)		DRY STRENGTH			
LOW PLASTICITY		0-5		VERY LOW			
MED. PLASTICITY		6-15		SLIGHT			
HIGH PLASTICITY		16-25		MEDIUM			
		26 OR MORE		HIGH			
COLOR							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.							
EQUIPMENT USED ON SUBJECT PROJECT				FRACTURE SPACING		BEDDING	
DRILL UNITS:				TERM		THICKNESS	
ADVANCING TOOLS:				VERY WIDE		> 4 FEET	
HAMMER TYPE:				WIDE		1.5 - 4 FEET	
CORE SIZE:				MODERATELY CLOSE		0.16 - 1.5 FEET	
HAND TOOLS:				CLOSE		0.03 - 0.16 FEET	
INDURATION				VERY CLOSE		< 0.03 FEET	
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.	
FRAGILE				MODERATELY INDURATED		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
INDURATED				EXTREMELY INDURATED		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
ABBREVIATIONS							
AR - AUGER REFUSAL							
BT - BORING TERMINATED							
CL - CLAY							
CPT - CONE PENETRATION TEST							
CSE - COARSE							
DMT - DILATOMETER TEST							
DPT - DYNAMIC PENETRATION TEST							
e - VOID RATIO							
F - FINE							
FOSS. - FOSSILIFEROUS							
FRAC. - FRACTURED							
FRAGS. - FRAGMENTS							
MED. - MEDIUM							
PMT - PRESSUREMETER TEST							
SD - SAND, SANDY							
SL - SILT, SILTY							
SLI - SLIGHTLY							
TCR - TRICONE REFUSAL							
γ - UNIT WEIGHT							
γ _d - DRY UNIT WEIGHT							
W - MOISTURE CONTENT							
V - VERY							
VST - VANE SHEAR TEST							
BENCH MARK: BL-18							
-BL- PINC 100+76.02 = -BY2- PINC 8+28.27							
-L- STA. 77+39.50 (3.67' RT.) = -Y2- STA. 13+27.70 (44.60' RT.)							
ELEVATION: 523.18							
NOTES:							



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 26, 2005

NCDOT
Geotechnical Unit
5253 Z-Max Blvd
Harrisburg, NC 28075
STATE PROJECT 34422.1.1
I.D. NUMBER R-2320G
COUNTY Stanley
DESCRIPTION U.S. 52 Extension: Bridge Over Winston Salem Southbound
Railroad between U.S. 52 and SR 1907
SUBJECT: Geotechnical Report – Bridge Foundation Investigation

PROJECT DESCRIPTION

This is a report in English units, of a preliminary Bridge Foundation Investigation for a structure that will carry U.S. 52 over the Winston Salem Southbound Railroad within a project that relocates US 52 to a new alignment.

Location:

The site is about two miles south of Albemarle, and about a half-mile west of U.S. 52, just south of the intersection of Quail Ridge and Southside roads. This investigation was based on the location and structure that were portrayed on Preliminary Plans.

Proposed Structure (s):

The planned roadway elevation is 10 feet higher than the existing ground surface. With the planned top of slope elevation at about 535' and the track elevation at about 508', slightly more than a minimum clearance of 26',10" is available. The bents for the planned structure are parallel to the railroad. At the point the railroad and the roadway cross they are at an angle of 56°, 24',04" to each other.

Drilling:

On this project we used a CME 550 drill rig with automatic hammer to complete three hollow stem auger borings to refusal at each endbent location.

Bearing and Fixity:

All borings achieved required bearing capacity. Fixity was not an issue.

PHYSIOGRAPHY and GEOLOGY

Physiography

The project is in the Piedmont Physiographic Province just northwest of the Uwharrie Mountains. The railroad grade is at about 805' elevation, ground level at the bent is 825' and the top of the nearest ridge is at about 850' elevation.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

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FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Geology

Bedrock Geology

The 1985 Geologic Map of North Carolina shows the project area is located in the Carolina Slate Belt litho-tectonic province on the south limb of the New London Syncline at the contact of the Csm� unit, (slate) and the Czfv2 unit (metavolcanic). On the ground, the contact is actually farther to the southeast and the bridge is within the Czmd slate unit. The geologic units are dipping to the north and exhibit a near vertical axial plane cleavage to the northeast. In a geologic report of the Albemarle quad it is mentioned that two dominant fracture sets are expressed as well: 1.) N60°W and 2.) N45°E. The railroad is in a northwest trending valley that is parallel to Triassic age diabase dykes, shown on the geology map. An outcrop of medium-grained mafic intrusive rock was noticed in the railroad cut, while small blocky pieces of slate were seen in the nearby fields.

Variation and Predictability of the Subsurface

All of the borings encountered auger refusal within 20 feet of the surface and all of the borings had at least 7 feet of residual soil over weathered rock. Rock appears to be slightly closer to the surface at the "B" side of the bents.

FOUNDATION MATERIALS

Soil Section:

The soil was either residual or fill of local origin.

Bent	Boring	Collar Elevation	Fill Thickness	Interval of Residual Soil Drilled	Interval of Residual Soil	Elevation of Top of Weathered Rock	Depth to Auger Refusal	Elevation at Top of Rock
EB1	A	525.7	1.5	1.5-13.9	12.4	511.8	18.2	507.5
EB1	B	525.16	1	3.0-9.0	6	516.16	11.6	513.56
EB1	C	525.01	3	1.0-7.0	6	518.01	16.4	508.61
EB2	A	529.33	0	0-12.6	12.6	516.73	15.4	513.93
EB2	B	529.45	0	0-10.3	10.3	519.15	11	518.45
EB2	C	529.28	0	0-13	13	516.28	16	513.28

Artificial Fill:

The endbent 1 boring logs show a relatively thin layer of artificial fill. These borings were sited on a drill road possibly situated on an old erosion feature, draining the nearby field. The endbent 2 borings were also located on a drill road cut into residual soil with no fill noted.

Residual Soil:

The residual soil layer in the preliminary bridge borings is shown in the table above and was from 12'6" to 6.0' thick. The soil in 5 of the 6 borings is stiff to very stiff A-6 or A-7 clay, with the remaining boring, EB1-A, traversing an interval of very stiff to hard silt.

Weathered Rock:

Weathered rock was found in all borings at an irregular elevation.

Rock:

Rock was found in all borings but was not cored.

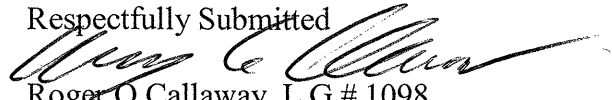
Hydrology:

The water level was measured at the time of boring, and at 24 hours. Water was found in two endbent 1 borings and one endbent 2 borings at an irregular elevation. Where water was found it was above the railroad grade, which was excavated into rock and probably drains the immediate area.

CLOSING STATEMENT

The geotechnical foundation investigation, analysis and recommendations are based on the Preliminary General Drawing plans dated February 15, 2005. If any significant changes are made in the design or location of the proposed structure, the subsurface information and recommendations will have to be reviewed and modified as necessary.

Respectfully Submitted



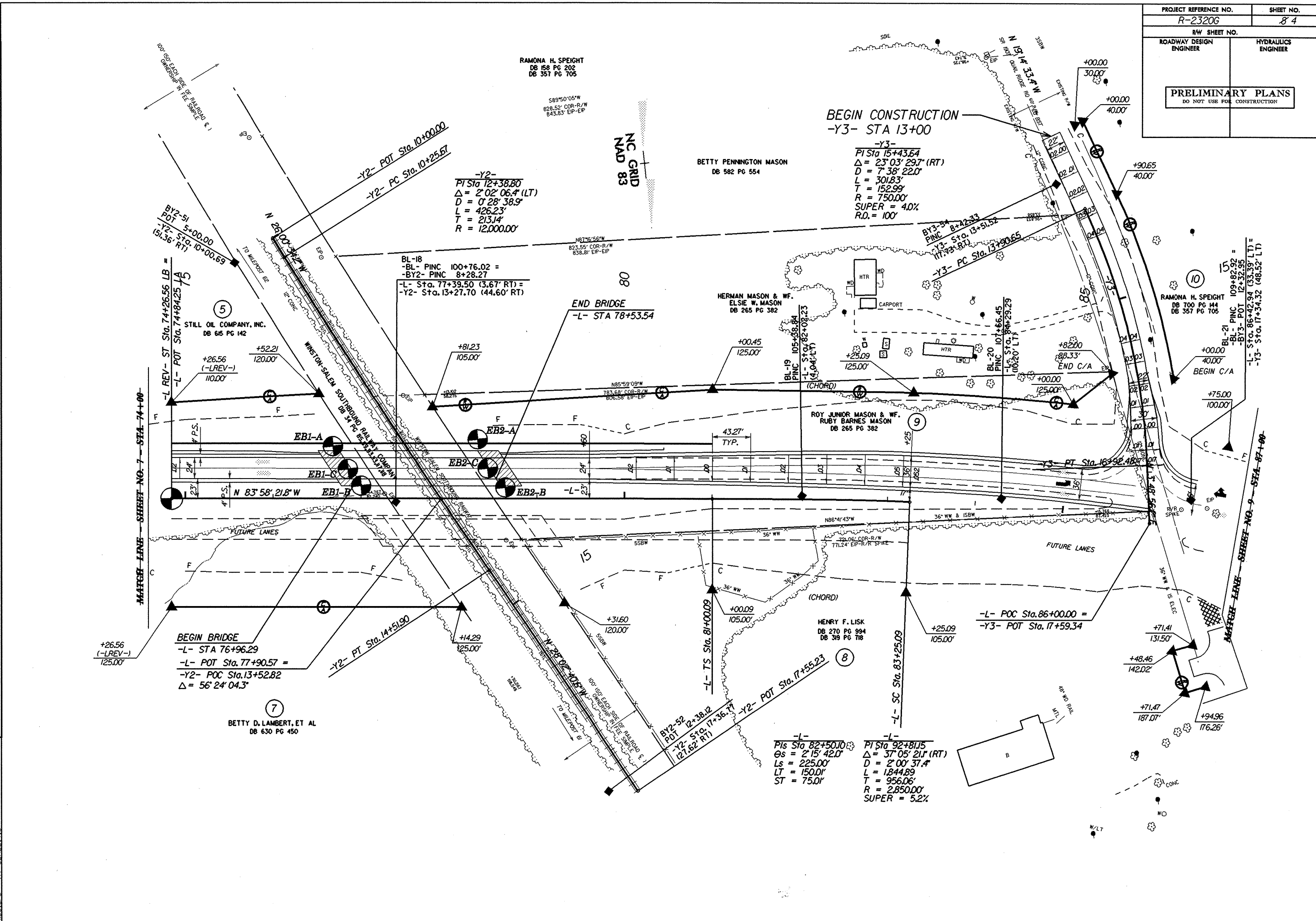
Roger Q Callaway, L.G.# 1098

Project Geologist

Geotechnical Unit, Matthews Field Office

PROJECT REFERENCE NO.	SHEET NO.
R-2320G	84
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

REVISIONS
 11/04/04 R/W Revision Alignment Revision from Sta 36+65.28 -LREV- to Sta 74+26.65 -LREV-
 23-SEP-2005 15:18
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 8/17/99



RAMONA H. SPEIGHT
DB 158 PG 202
DB 357 PG 705

S89°50'05"W
828.52' COR-R/W
843.83' EIP-EP

BETTY PENNINGTON MASON
DB 582 PG 554

HERMAN MASON & WF.
ELSIE W. MASON
DB 265 PG 382

BEGIN CONSTRUCTION
-Y3- STA 13+00
-Y3-
PI Sta 15+43.64
Δ = 23° 03' 29.7" (RT)
D = 7° 38' 22.0"
L = 301.83'
T = 152.99'
R = 750.00'
SUPER = 4.0%
R.O. = 100'

-Y2-
PI Sta 12+38.80
Δ = 2° 02' 06.4" (LT)
D = 0° 28' 38.9"
L = 426.23'
T = 213.14'
R = 12,000.00'

BL-18
-BL- PINC 100+76.02 =
-BY2- PINC 8+28.27
-L- Sta. 77+39.50 (3.67' RT) =
-Y2- Sta. 13+27.70 (44.60' RT)

BY2-51
POT
-Y2- Sta. 10+00.69
151.36' RT)

5
STILL OIL COMPANY, INC.
DB 615 PG 142

-L REV- ST Sta. 74+26.56 LB =
-L- POT Sta. 74+84.25 LA
+26.56 (-LREV-) 110.00'
+52.21 120.00'

BEGIN BRIDGE
-L- STA 76+96.29
-L- POT Sta. 77+90.57 =
-Y2- POC Sta. 13+52.82
Δ = 56° 24' 04.3"

7
BETTY D. LAMBERT, ET AL
DB 630 PG 450

-L-
PI Sta 82+50.10
Os = 2° 15' 42.0"
Ls = 225.00'
LT = 150.01'
ST = 75.01'

-L-
PI Sta 92+81.15
Δ = 37° 05' 21.1" (RT)
D = 2° 00' 37.4"
L = 1844.89'
T = 956.06'
R = 2,850.00'
SUPER = 5.2%

-L- POC Sta. 86+00.00 =
-Y3- POT Sta. 17+59.34

RAMONA H. SPEIGHT
DB 109 PG 144
DB 357 PG 705

BL-21
-BL- PINC 109+82.92 =
-BY3- POT 12+32.95
-L- STA. 86+42.94 (33.39' LT) =
-Y3- Sta. 17+54.32 (48.52' LT)

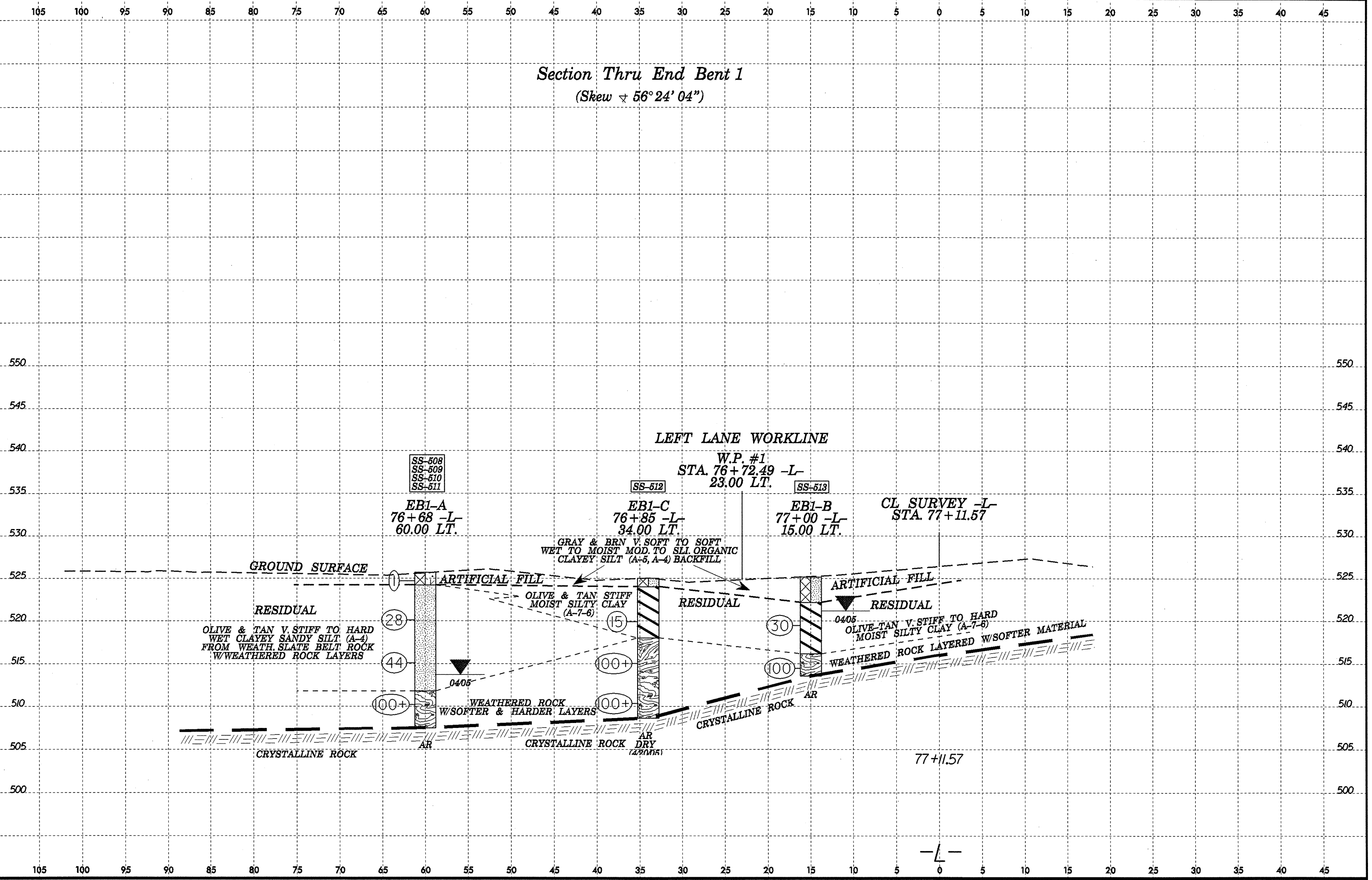
+00.00
40.00'
+75.00
100.00'

MARCH LINE - SHEET NO. 9 - STA 87+00

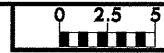
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21-SEP-2005 15:20
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12320g_CED.dwg
12320g_CED.dwg

0 2.5 5	PROJ. REFERENCE NO. R-2320G	SHEET NO. 5
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Section Thru End Bent 1
(Skew ∇ 56° 24' 04")



8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2320G	6

105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45

Section Thru End Bent 2
(Skew ∇ 56° 24' 04")

LEFT LANE WORKLINE

W.P. #2
STA. 78+53.54 -L-
23.00 LT.

CL SURVEY -L-
STA. 78+68.82

SS-514
SS-515
EB2-A
78+32.50 -L-
68.00 LT.

SS-516
EB2-C
78+44 -L-
35.00 LT.

EB2-B
78+64 -L-
13.00 LT.

GROUND SURFACE

RESIDUAL

OLIVE TO TAN STIFF TO HARD
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6, A-6)

RESIDUAL

TAN & OLIVE MED. STIFF TO V. STIFF
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6, A-6)

WEATHERED ROCK
LAYERED W/ SOFTER LAYERS
CRYSTALLINE ROCK

WEATHERED ROCK
CRYSTALLINE ROCK

(20)
(PI=27)

(31)
(PI=11)

(100)

AR
DRY
(42005)
(CAVED @ 14.0)

(7)
(PI=28)

(23)

(100)

AR

(14)

(14)

(42105)

78+68.82

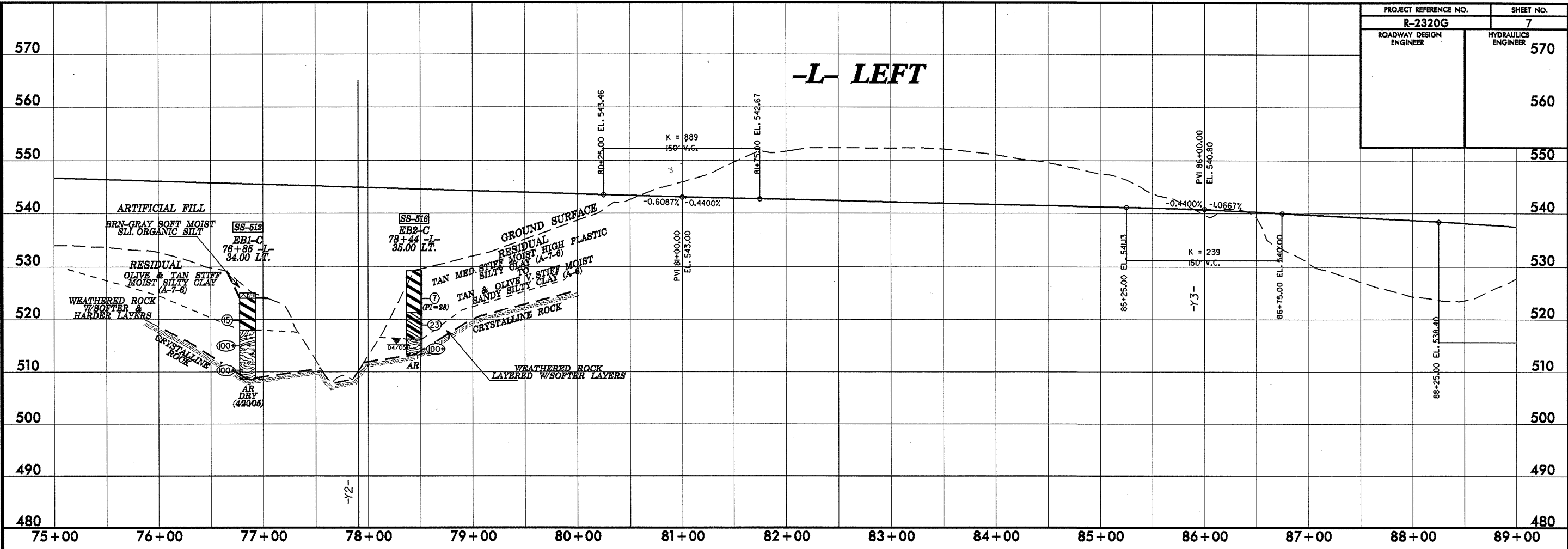
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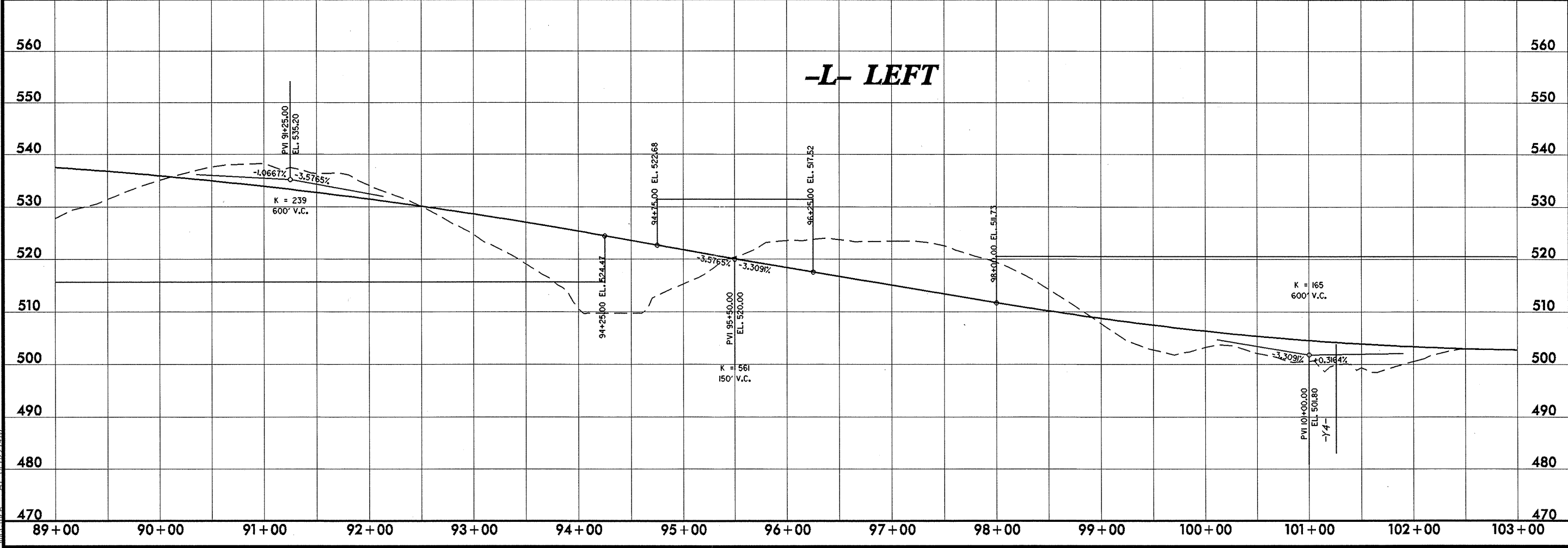
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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2320G	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	570
	560
	550



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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER						
BORING NO EB1A		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 76+68.000		OFFSET 60.00ft LT		24 HR 12.00ft							
COLLAR ELEV 525.70ft		TOTAL DEPTH 18.20ft		START DATE 4/20/05		COMPLETION DATE 04/20/05							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 18.20ft			Log EB1A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
525.70	0.00	0	0	1	1.0								Ground Surface
520.00	4.60	6	12	16	1.0				28	SS-508	SAT		(ARTIFICIAL FILL) 0-1.5 GRAY V. SOFT WET MOD. ORGANIC (14%) CLAYEY SILT (A-5) BACKFILL
	9.60	24	22	22	1.0				44	SS-509	W		(RESIDUAL) 1.5-13.9 OLIVE & TAN V. STIFF TO HARD CLAYEY SANDY SILT (A-4) FROM WEATH. SLATE BELT ROCK W/ WR LAYERS
510.00	14.60	14	58	42	0.9				100	SS-510	W		(RESIDUAL) 1.5-13.9 OLIVE & TAN V. STIFF TO HARD CLAYEY SANDY SILT (A-4) FROM WEATH. SLATE BELT ROCK W/ WR LAYERS
507.50										SS-511	W		13.9-18.2 WEATHERED ROCK WITH SOME LAYERS OF SOFTER MATERIAL
													AUGER REFUSAL AT ELEV. 507.50 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER						
BORING NO EB1C		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 76+85.000		OFFSET 34.00ft LT		24 HR N/A							
COLLAR ELEV 525.01ft		TOTAL DEPTH 16.40ft		START DATE 4/20/05		COMPLETION DATE 04/20/05							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 16.40ft			Log EB1C, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
525.01													Ground Surface
520.00	4.10	3	5	10	1.0				15	SS-512	M		(ARTIFICIAL FILL) 0 - 1 BRN-GRAY SOFT SLI. ORGANIC SILT (A-4)
	9.10	26	74		0.9								(RESIDUAL) 1-7 OLIVE & TAN STIFF SILTY CLAY (A-7-6)
510.00	14.10	22	42	58	0.6				100				7-16.4 WEATHERED ROCK WITH SOFTER AND HARDER LAYERS
508.61													AUGER REFUSAL AT ELEV. 508.61 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY								
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER							
BORING NO EB1B		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT L		BORING LOCATION 77+00.000		OFFSET 15.00ft LT		24 HR 4.00ft								
COLLAR ELEV 525.16ft		TOTAL DEPTH 11.60ft		START DATE 4/20/05		COMPLETION DATE 04/20/05								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 11.60ft			Log EB1B, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
525.16														Ground Surface
520.00	4.70	3	11	19	1.0						30	SS-513	M	(ARTIFICIAL FILL) 0 - 3 BLACK V. SOFT MOD. ORGANIC (15.4%) CLAYEY SANDY SILT (A-4) BACKFILL INTO BORROW PIT
513.56	9.70	8	38	62	1.0						100		D	(RESIDUAL) 3.0-9.0 OLIVE-TAN V. STIFF TO HARD SILTY CLAY (A-7-6)
														9 - 11.6 WEATHERED ROCK LAYERED WITH SOFTER MATERIAL
														AUGER REFUSAL AT ELEV. 513.56 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY								
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER							
BORING NO EB2A		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT L		BORING LOCATION 78+32.500		OFFSET 68.00ft LT		24 HR N/A								
COLLAR ELEV 529.33ft		TOTAL DEPTH 15.40ft		START DATE 4/20/05		COMPLETION DATE 04/20/05								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 15.40ft			Log EB2A, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
529.33														Ground Surface
	4.10	3	6	14	1.0						20	SS-514	M	(RESIDUAL) 0 - 8 OLIVE TO TAN STIFF TO V. STIFF HIGH PLASTIC (PI=27) SANDY SILTY CLAY (A-7-6)
	9.10	14	13	18	1.0						31	SS-515	M	8-12.6 TAN HARD LOW PLASTIC (PI=11) SANDY SILTY CLAY (A-6)
	14.10	22	60	40	0.6						100		W	12.6-15.4 WEATHERED ROCK
														AUGER REFUSAL AT ELEV. 513.93 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY								
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER							
BORING NO EB2C		NORTHING 0.00		EASTING 0.00		0 HR N/A	24 HR N/A							
ALIGNMENT L		BORING LOCATION 78+44.000		OFFSET 35.00ft LT		24 HR N/A	24 HR N/A							
COLLAR ELEV 529.28ft		TOTAL DEPTH 16.00ft		START DATE 4/20/05		COMPLETION DATE 04/20/05								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 16.00ft			Log EB2C, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
529.28														Ground Surface
	4.30	2	3	4	1.0	7						SS-516	M	(RESIDUAL) 0-8 TAN MED. STIFF HIGH PLASTIC (PI=28) SILTY CLAY (A-7-6)
520.00	9.30	5	8	15	1.0	23								8-13 TAN & OLIVE V. STIFF SANDY SILTY CLAY (A-6)
	14.30	47	53	0.6					100					13-16 WEATHERED ROCK LAYERED WITH SOFTER LAYERS
513.28														AUGER REFUSAL AT ELEV. 513.28 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34422.1.1		ID R-2320G		COUNTY STANLY		GEOLOGIST C.C. MURRAY								
SITE DESCRIPTION US 52 EXTENSION OVER WINSTON SALEM SOUTHBOUND RAILWAY							GND WATER							
BORING NO EB2B		NORTHING 0.00		EASTING 0.00		0 HR N/A	24 HR N/A							
ALIGNMENT L		BORING LOCATION 78+64.000		OFFSET 13.00ft LT		24 HR N/A	24 HR N/A							
COLLAR ELEV 529.45ft		TOTAL DEPTH 11.00ft		START DATE 4/21/05		COMPLETION DATE 04/21/05								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 11.00ft			Log EB2B, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
529.45														Ground Surface
	3.80	5	5	9	1.0	14							M	(RESIDUAL) 0-7 TAN STIFF SANDY SILTY CLAY (A-7-6)
520.00	8.80	4	7	7	1.0	14								8-10.3 TAN & OLIVE STIFF SANDY SILTY CLAY (A-6)
518.45														10.3-11.0 WEATHERED ROCK
														AUGER REFUSAL AT ELEV. 518.45 ON HARD NON-CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. R-2320G

T. I. P. No. R-2320G

REPORT ON SAMPLES OF SOILS FOR QUALITY

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 3442211 County STANLEY Owner _____
 Date: Sampled 4/20/05 Received 4/25/05 Reported 4/27/2005
 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA 1995 Standard Specifications

Project 3442211 County STANLEY Owner _____
 Date: Sampled 4/20/05 Received 4/25/05 Reported 4/27/2005
 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA 1995 Standard Specifications

722129 TO 722137
 9/22/05

722129 TO 722137
 9/22/05

TEST RESULTS

Proj. Sample No.	SS-508	SS-509	SS-510	SS-511	SS-512	SS-513
Lab. Sample No.	722129	722130	722131	722132	722133	722134
Retained #4 Sieve %	-	-	-	-	-	10
Passing #10 Sieve %	92	100	96	100	100	67
Passing #40 Sieve %	85	92	74	50	100	52
Passing #200 Sieve %	81	72	58	34	99	40

TEST RESULTS

Proj. Sample No.	SS-514	SS-515	SS-516			
Lab. Sample No.	722135	722136	722137			
Retained #4 Sieve %	11	-	-			
Passing #10 Sieve %	76	88	90			
Passing #40 Sieve %	66	80	88			
Passing #200 Sieve %	59	66	87			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	9.3	14.1	29.4	57.2	0.6	28.2
Fine Sand Ret - #270 %	3.4	17.7	13.9	10.9	1.8	13.7
Silt 0.05 - 0.005 mm %	51.1	40.0	30.5	19.8	41.2	27.9
Clay < 0.005 mm %	36.3	28.2	26.2	12.1	56.4	30.2
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	16.9	12.7	2.2			
Fine Sand Ret - #270 %	7.7	16.5	1.8			
Silt 0.05 - 0.005 mm %	31.1	46.6	41.6			
Clay < 0.005 mm %	44.3	24.2	54.4			
Passing #40 Sieve %	-	-	-			
Passing #200 Sieve %	-	-	-			

L. L.	50	40	36	30	49	38
P. I.	9	6	8	5	23	9
AASHTO Classification	A-5(11)	A-4(5)	A-4(3)	A-2-4(0)	A-7-6(27)	A-4(1)
Station						
ALIGNMENT	L	L	L	L	L	L
LOCATION	EB1-A	EB1-A	EB1-A	EB1-A	EB1-A	EB1-A
Depth (Ft)	0.00	4.60	9.60	14.60	4.10	0.00
to	1.50	5.10	11.10	16.10	5.60	3.00
% ORGANIC	14					15.4

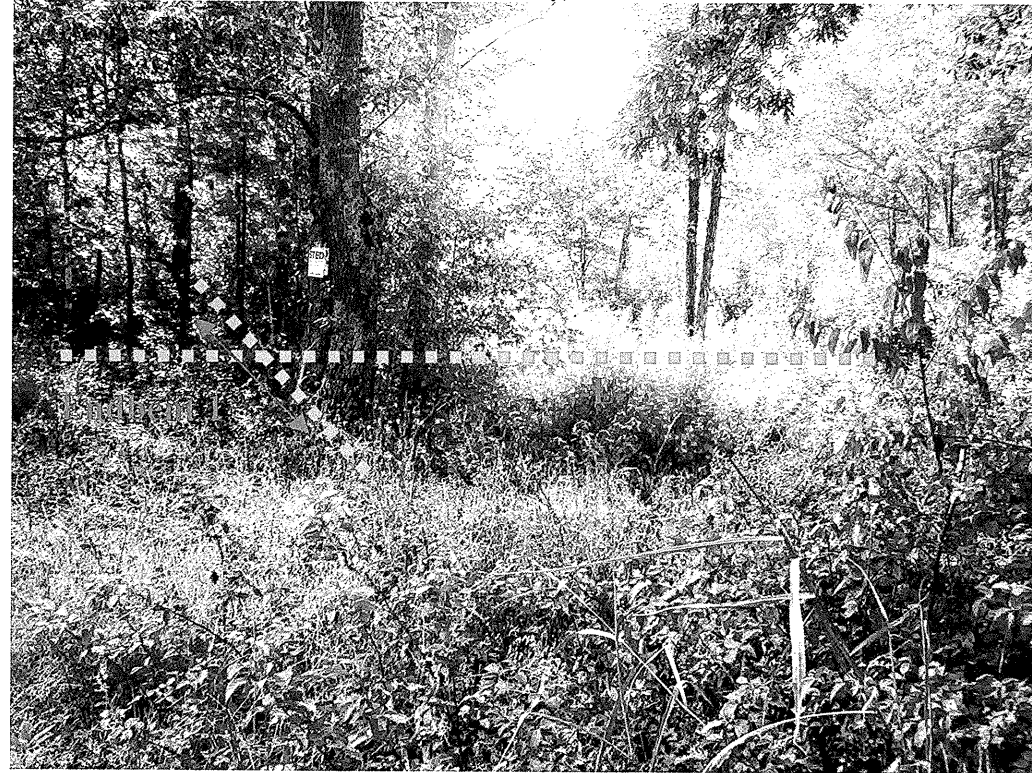
L. L.	53	39	52			
P. I.	27	11	28			
AASHTO Classification	A-7-6(14)	A-6(7)	A-7-6(26)			
Station						
ALIGNMENT	L	L	L			
LOCATION	EB2A	B2A	EB2C			
Depth (Ft)	4.10	9.10	4.30			
to	5.60	10.60	5.80			

cc: C C MURRAY
 Soils File

Soils Engineer

Soils Engineer

End Bent 1, Looking from B towards A, (Southerly)



Endbent 2, Looking From B to A, (Northerly)



Railroad Cut Showing Rock above Grade



Endbent 2 Looking from A to B, (Southerly)

