

NOTE: SEE SHEET 1A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4281	1	6
WBS PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33621.1.1	BRSTP-008(4)	P.E.	
33621.2.1	BRSTP-008(4)	RW/UTL	
33621.3.1	BRSTP-008(4)	CONST	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	13+50 - 28+00	4,5	6	
-Y-	14+00 - 14+93.28	4	6	

ROADWAY  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33621.1.1 (B-4281) F.A. PROJ. BRSTP-008(4)  
COUNTY STOKES  
PROJECT DESCRIPTION BRIDGE NO. 60 OVER DAN RIVER  
ON NC 889

INVENTORY

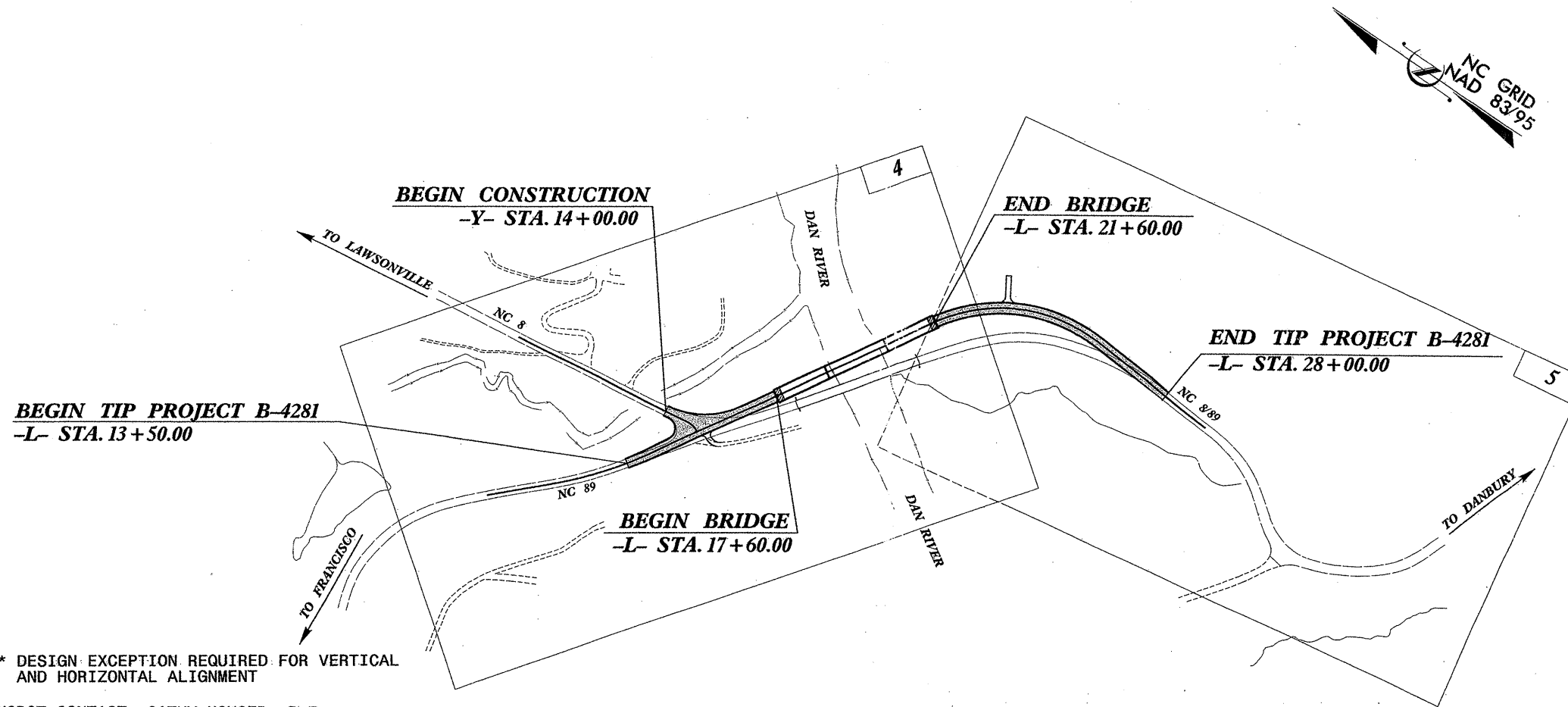
**CAUTION NOTICE**

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.

CONTRACT: C201815 ID: B-4281

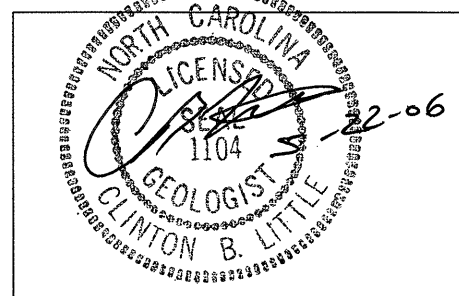


\*\* DESIGN EXCEPTION REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT

NCDOT CONTACT: CATHY HOUSER, P.E.  
ROADWAY DESIGN - ENGINEERING COORDINATION

PERSONNEL  
C C MURRAY  
J E ESTEP  
L N HARPER

INVESTIGATED BY C C MURRAY  
CHECKED BY C B LITTLE  
SUBMITTED BY C B LITTLE  
DATE 5-19-06



DRAWN BY: C E BURRIS

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

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

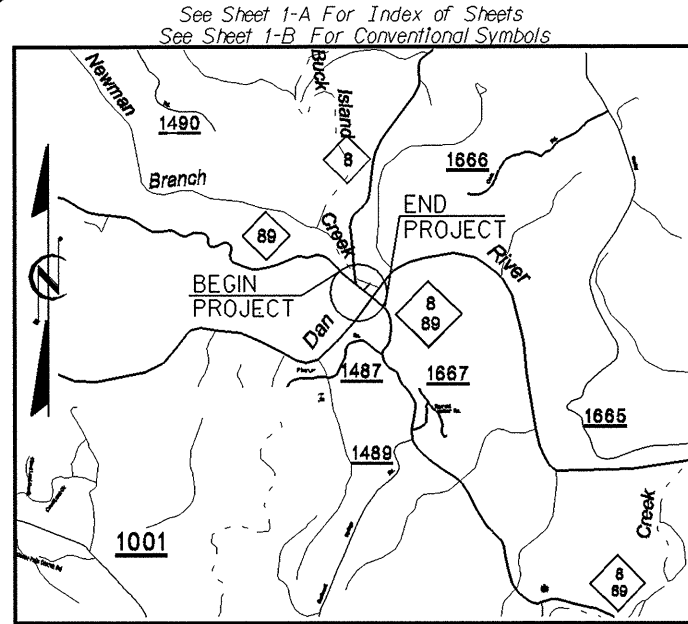
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4281	1A	
WAS PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
33621.1.1	BRSTP-008(4)	P.E.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**STOKES COUNTY**

LOCATION: BRIDGE NO. 60 OVER DAN RIVER ON NC 8/89

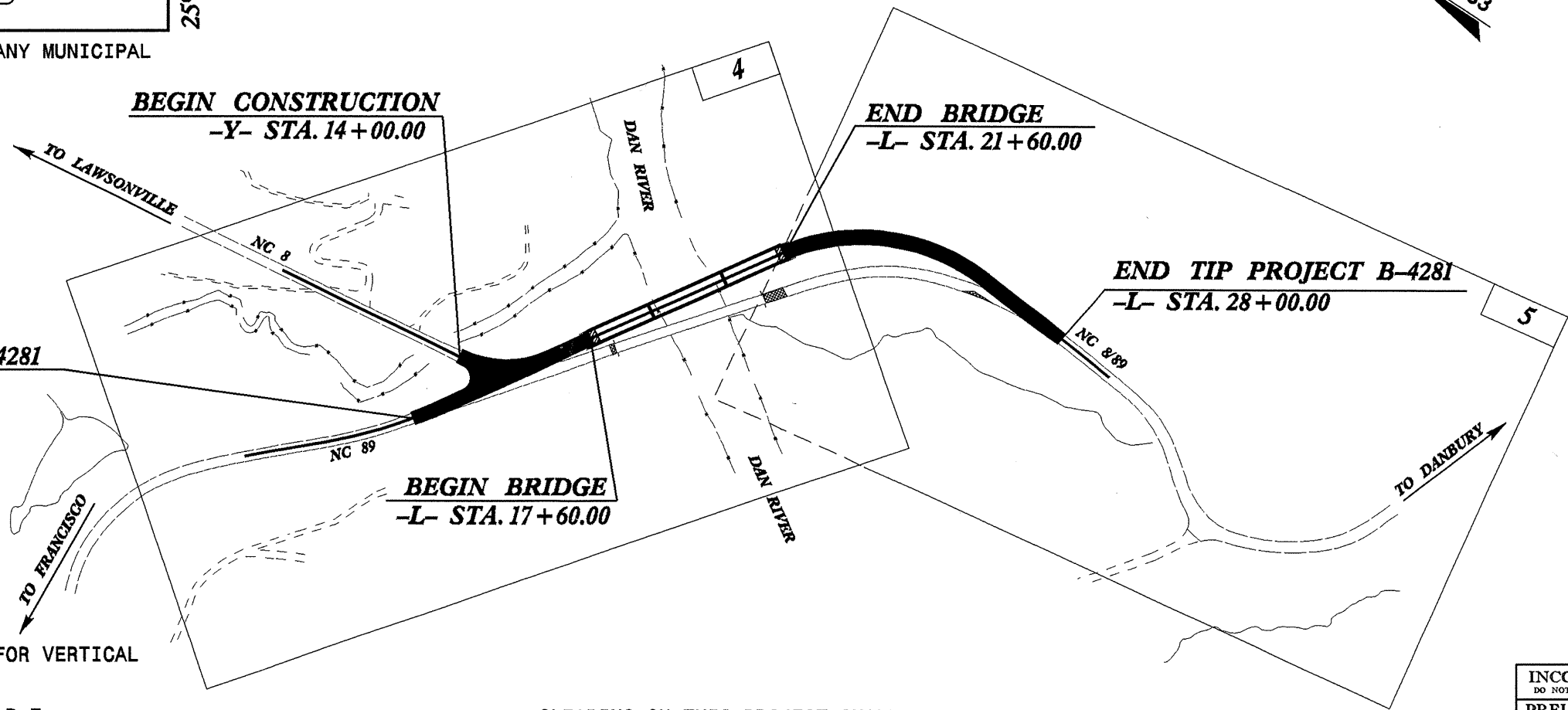
TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE



VICINITY MAP

25% PLANS

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARY



\*\* DESIGN EXCEPTION REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT

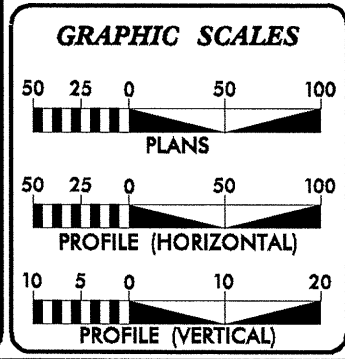
NCDOT CONTACT: CATHY HOUSER, P.E.  
ROADWAY DESIGN - ENGINEERING COORDINATION

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_\_\_\_

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

TIP PROJECT: B-4281

CONTRACT:



**DESIGN DATA**

ADT 2007 =	3180
ADT 2027 =	4980
DHV =	10 %
D =	65 %
T =	3 % *
** V =	60 MPH
* TTST 1%	DUAL 2%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4281	=	0.199 MI.
LENGTH STRUCTURE TIP PROJECT B-4281	=	0.076 MI.
TOTAL LENGTH OF TIP PROJECT B-4281	=	0.275 MI.

Prepared In the Office of:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 Schaub Dr. Suite 202 Raleigh NC 27606  
(919) 851-6066

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 17, 2006

LETTING DATE: NOVEMBER 20, 2007

STEPHEN R. WHITLEY, PE  
PROJECT ENGINEER

DAVID C. WALLER, PE  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED DIVISION ADMINISTRATOR

DATE

19-MAY-2006 10:48 c:\projects\stokes\stokes\cadd\geotech\planproj\b4281\geo\_rdy\_tsh.dgn



## EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT TIP # B-4281

COUNTY Stokes

DATE 1/4/2008

SHEET 3 OF 6 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 20%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
SUMMARY NO.1																
-L-	13+50	18+50	55				55	3135			3135	3762	3707			
-Y-	14+00	14+50						173			173	208	208			
TOTAL SUMMARY NO.1			55				55	3308			3308	3970	3915			
SUMMARY NO. 2																
-L-	20+50	28+00	455				455	10202			10202	12242	11787			
TOTAL SUMMARY NO.2			455				455	10202			10202	12242	11787			
SUMMARY NO. 3 (Rem. Exist. Roadbed)																
-L-	15+50	18+50	3225				3225							3225		
TOTAL SUMMARY NO. 3			3225				3225							3225		
SUMMARY NO. 4 (Rem. Exist. Roadbed)																
-L-	20+50	26+00	5484				5484							5484		
TOTAL SUMMARY NO.4			5484				5484							5484		
<b>PROJECT SUBTOTAL</b>			9219				9219	13510	0	0	13510	16212	15702	8709		
ADDITIONAL UNDERCUT																
SHOULDER MATERIAL																
WASTE IN LIEU OF BORROW																
LOSS DUE TO CLEARING & GRUBBING			-25				-25						25			
<b>PROJECT TOTAL</b>			9194				9194	13510			13510	16212	15727	8709		
EST 5% TO REPLACE TOP SOIL ON BORROW PIT													786			
<b>GRAND TOTAL</b>			9194				9194	13510			13510	16212	16513	8709		
<b>SAY</b>			<b>9200</b>										<b>16550</b>			

**\* EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.**



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

May 19, 2006

STATE PROJECT: 33621.1.1 (B-4281)  
FEDERAL PROJECT: BRSTP-008(4)  
COUNTY: Stokes  
DESCRIPTION: Bridge 60 over Dan River on NC 8/89

SUBJECT: Geotechnical Report - Inventory

**PROJECT DESCRIPTION**

The project is located in central Stokes County near Hanging Rock State Park. The closest town is Danbury. NC 8 and NC 89 converge near the beginning of the project to run coincident toward the south-east. The project calls for relocation of NC 8/89 toward the north (upstream along the Dan River). The maximum relocation is about 80'. Most of the roadway will be on embankment with fill heights on the order of 20'.

The Geotechnical investigation consisted of six Standard Penetration Test (SPT) borings performed with a CME-550 drill rig using 8" hollow stem augers. The borings were conducted in March 2006.

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

There are no areas of particular concern.

**PHYSIOGRAPHY AND GEOLOGY**

The site is in the Sauratown Mountains Geologic group, mapped as CZmg meta-graywacke and muscovite-biotite schist. Rock core samples were not obtained. A large portion of the project is within the Dan River floodplain. There are some small deposits of terrace gravels above the floodplain level.

Project elevations range from a low in the stream channel of about 702' to a high at the end of the project of about 755'. The floodplain elevation is near 720'. The floodplain along the centerline – L- runs from approximate Station 15+50 to 22+75.

**SOIL PROPERTIES**

*Residual Soils*

Residual soils occur below the alluvium and outside of the floodplain area. They were described as white and tan micaceous silty sand with classifications of A-4 and A-2-4. Near the end of the project, one boring encountered red to tan silty clay (A-7). The sandy silts and silty sands were typically hard or very dense and rapidly graded to weathered and/or hard rock. The clay soils at the end of the project were medium to very stiff.

*Artificial/Roadway Fill Soils*

Artificial fills were not encountered. The existing roadway embankment is about 15' high. It was not tested or sampled.

*Alluvial Soils*

The overall thickness of the floodplain sediments is 15 to 20 feet. A fairly consistent surface layer is present to depth of 5 – 10 feet. It consists of brown, soft to medium stiff, slightly micaceous, sandy silt (A-4). Below the surface silt, we encountered either loose, wet, micaceous silty sand (A-2-4) or soft to medium stiff, wet, sandy clay (A-6, A-7).

**GROUNDWATER**

Groundwater was encountered only in the floodplain borings, at depths of 11 – 12 feet (Elevation 707-708').

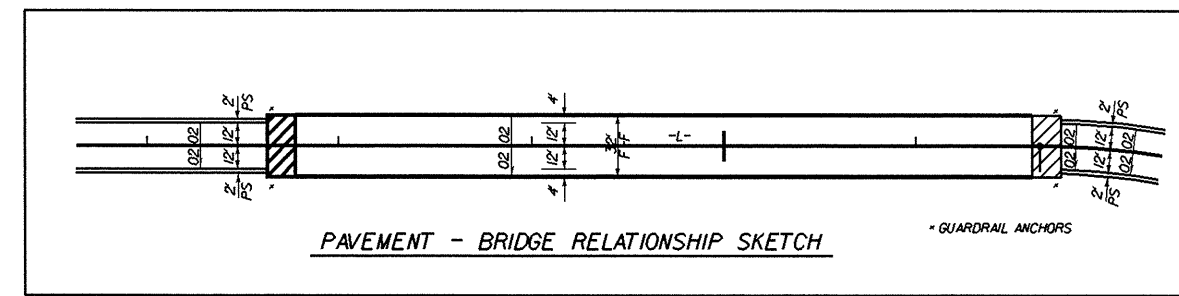
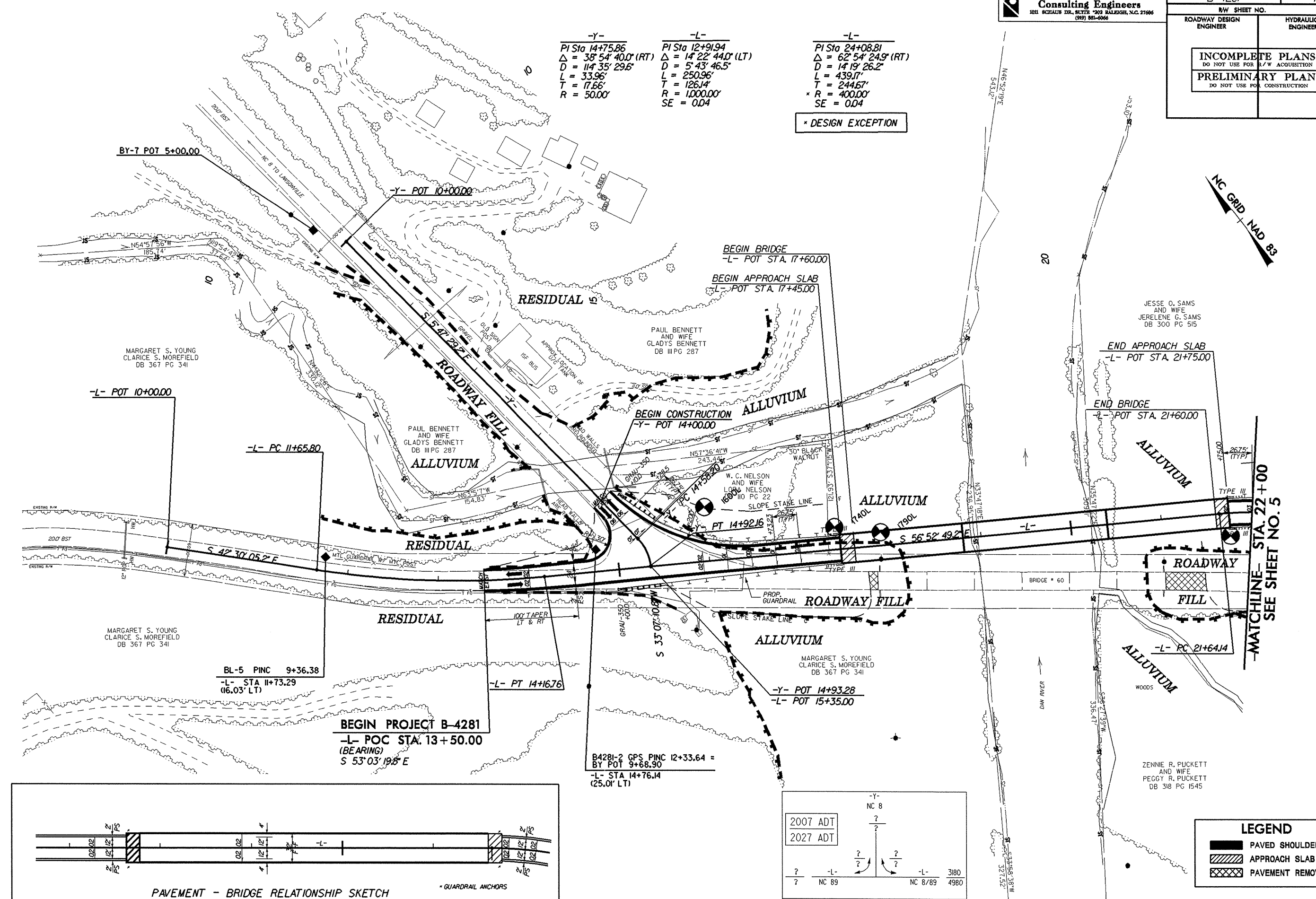
Respectfully submitted,

Clint Little  
Regional Geologist

PROJECT REFERENCE NO. B-4281	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-Y-	-L-	-L-
PI Sta 14+75.86	PI Sta 12+91.94	PI Sta 24+08.81
$\Delta = 38^\circ 54' 40.0''$ (RT)	$\Delta = 14^\circ 22' 44.0''$ (LT)	$\Delta = 62^\circ 54' 24.9''$ (RT)
D = 114' 35' 29.6"	D = 5' 43' 46.5"	D = 14' 19' 26.2"
L = 33.96'	L = 250.96'	L = 439.17'
T = 17.66'	T = 126.14'	T = 244.67'
R = 50.00'	R = 1,000.00'	* R = 400.00'
	SE = 0.04	SE = 0.04

\* DESIGN EXCEPTION



2007 ADT	NC 8	?	?
2027 ADT	?	?	?
?	-L-	?	-L-
?	NC 89	?	NC 8/89
			3180
			4980

PROJECTED TRAFFIC VOLUMES

LEGEND	
	PAVED SHOULDER
	APPROACH SLAB
	PAVEMENT REMOVAL

FOR -L- PROFILE, SEE SHEET NO. 6  
 FOR -Y- PROFILE, SEE SHEET NO. 6

5/14/99  
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 11:21:57



5/14/99

**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 HAZEL DR., SUITE 202 RALEIGH, N.C. 27605  
(919) 883-0066

PROJECT REFERENCE NO. B-4281	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NC GRID | NAD 83

-L-  
PI Sta 24+08.81  
 $\Delta = 62^{\circ} 54' 24.9" (RT)$   
 $D = 1419' 26.2"$   
 $L = 439.17'$   
 $T = 244.67'$   
 $R = 400.00'$   
 $SE = 0.04$

DESIGN EXCEPTION

JESSE O. SAMS AND WIFE  
JERELINE G. SAMS  
DB 300 PG 515

-L- PT 26+03.31

BL-3 PINC 27+13.88

JESSE O. SAMS AND WIFE  
JERELINE G. SAMS  
DB 300 PG 515

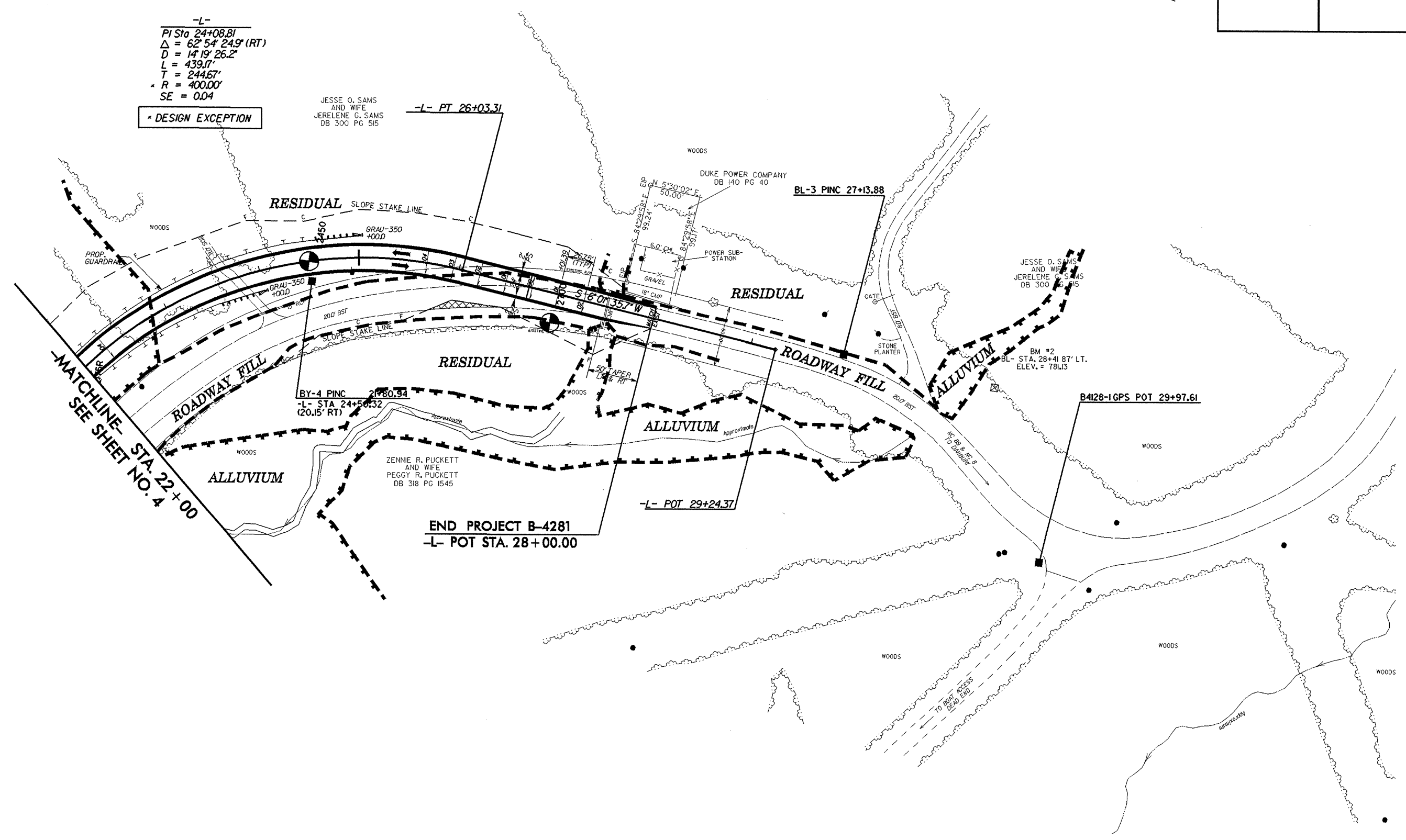
BM #2  
BL STA. 28+41.87' LT.  
ELEV. = 781.13

B4128-1G/PS POT 29+97.61

-L- POT 29+24.37

END PROJECT B-4281  
-L- POT STA. 28+00.00

MATCHLINE STA. 22+00  
SEE SHEET NO. 4



**LEGEND**

	PAVED SHOULDER
	PAVEMENT REMOVAL

FOR -L- PROFILE, SEE SHEET NO. 6

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5/28/99

B.M. #2 EL = 781.3'  
RR SPIKE IN 18' OAK  
87' RT OF -BL- STA 28+41

**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE 203 WALKER, N.C. 27606  
(919) 881-0000

PROJECT REFERENCE NO. **B-4281** SHEET NO. **6**  
ROADWAY DESIGN ENGINEER  
HYDRAULICS ENGINEER  
**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT			% PASSING (SIEVES)			MOISTURE	ORGANIC	γ <sub>d</sub>	VOID RATIO
							C. SAND	F. SAND	SILT	10	40	200				
SS-1	16 LT	17+90	4.10 - 6.80	A-4(3)	31	6	0.8	47.3	27.7	24.2	100	100	66			
SS-2	16 LT	17+90	9.10 - 10.80	A-6(7)	40	11	0.8	44.3	22.8	22.2	100	100	68			
SS-3	60 LT	16+00	3.30 - 4.80	A-7-8(10)	41	18	3.6	33.1	35.0	28.3	99	97	74			
SS-4	60 LT	16+00	8.30 - 9.80	A-2-4(0)	30	NP	26.4	51.1	22.5	0.0	96	92	33			
SS-5	24 RT	21+75	3.80 - 6.30	A-4(3)	31	7	1.6	51.5	26.7	20.2	100	100	61			
SS-6	24 RT	21+75	8.80 - 10.30	A-4(6)	38	9	2.8	47.0	30.0	20.2	100	99	64			
SS-7	24 RT	21+75	13.80 - 15.30	A-2-4(0)	28	NP	18.0	61.2	16.9	4.0	100	97	31			
SS-8	24 RT	21+75	18.80 - 20.30	A-4(0)	29	NP	18.3	62.2	33.8	0.0	98	92	50			
SS-9	CL	24+60	3.80 - 6.30	A-4(0)	40	NP	14.3	62.7	31.0	2.0	86	89	50			
SS-10	30 RT	27+00	4.00 - 6.50	A-7-8(20)	58	35	7.1	22.6	28.0	42.4	98	94	76			
SS-11	30 RT	27+00	9.00 - 10.50	A-7-8(9)	45	15	8.1	35.1	30.6	26.2	97	93	66			
ST-1	25 LT	17+40	4.10 - 6.80	A-4(0)	27	NP	9.7	63.1	17.1	10.1	100	98	38	18.84	87.11	0.9880
ST-2	25 LT	17+40	6.30 - 8.40	A-2-4(0)	30	NP	17.2	63.5	19.2	6.1	100	94	29	19.0	85.63	0.9905

-L-  
FOR PLAN, SEE SHEETS NO. 4 & 5

PI = 15+60.00  
EL = 731.39'  
VC = 272'  
K = 40  
DS = 32 MPH

\* DESIGN EXCEPTION REQUIRED

**BORING DESCRIPTION**

- (A) BROWN MED STIFF MOIST SLIGHTLY MICA SILTY SANDY CLAY (A-7-6) (ALLUVIUM)
- (B) TAN SOFT TO MED STIFF MOIST CLAYEY SANDY SILT (A-4) (ALLUVIUM)
- (C) TAN LOOSE MOIST CLAYEY SILTY SAND (A-2-4) (ALLUVIUM)
- (D) BROWN SOFT TO MED STIFF MOIST CLAYEY SANDY SILT (A-4) (ALLUVIUM)
- (E) BROWN MED STIFF WET SILTY SANDY CLAY (A-6) (ALLUVIUM)

**BORING DESCRIPTION**

- (F) BROWN SOFT TO STIFF MOIST SLIGHTLY MICA CLAYEY SANDY SILT (A-4) (ALLUVIUM)
- (G) BROWN MED STIFF WET MICA SILTY SAND W/ GRAVEL LAYER AT 10.4 (A-2-4) (ALLUVIUM)
- (H) TAN VERY STIFF TO HARD WET MICA SANDY SILT (A-4) (RESIDUAL)

(RESIDUAL) WHITE-TAN VERY DENSE DRY MICA CLAYEY SILTY SAND (A-2-4)

BT DRY 38006

BT NM 32906

BT DRY 33706

13 14 15 16 17 18 19 20 21 22 23 24 25 26

-L-  
FOR PLAN, SEE SHEET NO. 5

-Y-  
FOR PLAN, SEE SHEET NO. 4

**BORING DESCRIPTION**

- (I) TAN MED STIFF MOIST CLAYEY SANDY SILT W/ TERRACE GRAVEL (A-4) (ALLUVIUM)
- (J) WHITE-TAN HARD MOIST SANDY SILT (A-4) (RESIDUAL)
- (K) RED-TAN STIFF TO VERY STIFF MOIST SILTY SANDY CLAY (A-7-6) (RESIDUAL)

PI = 14+20.00  
EL = 730.77'  
VC = 40'  
K = 19  
DS = 20 MPH

26 27 28 29 30 10 11 12 13 14 15

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