STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 16, 2008

U. S. Army Corps of Engineers
Regulatory Field Office
Post Office Box 1890
Wilmington, NC 28402

Attention: Mr. Richard Spencer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permit 23 and Section 401 Water Quality Certification,** for the proposed replacement of Bridge Nos. 280 & 281 over Dan's Creek and Mill Creek on SR 1843 in Columbus County. State Project No. 8.2430801, WBS Element 33443.1.1, Federal Project No. BRZ-1843(1); Division 6, TIP No. B-4082.

Please find enclosed the permit drawings and half-size plans. A Categorical Exclusion (CE) was completed for this project in November 2005, and distributed shortly thereafter. Additional copies will be made available upon request. The North Carolina Department of Transportation (NCDOT) proposes to replace existing Bridge Nos. 280 & 281 over Dan's Creek and Mill Creek on SR 1843 in Columbus County. The project involves replacement of the existing Bridge No. 280 73-foot structure with a 89-foot single span bridge and Bridge No. 281 55-foot structure with a 82-foot single span bridge in approximately the same location and roadway elevation of the existing structures using top-down construction. Traffic will be detoured off-site along surrounding roads, during construction.

Impacts to Waters of the United States

General Description: The project is located within subbasin 030617 of the Cape Fear River Basin (Hydrologic Unit 03030005). Dan's Creek has been assigned Stream Index Number [DWQ Index # 18-64-7] and Mill Creek [DWQ Index No. 18-64-7-(2)] with a Best Usage Classification of "**C Sw**". Neither Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped watersheds), nor Outstanding Resource Waters (ORW) occur within one mile of project study area. Dan's Creek and Mill Creek are not designated as

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

North Carolina Natural or Scenic Rivers, or as a National Wild and Scenic Rivers. Additionally, these creeks are not listed on the Final 2006 303(d) list of impaired waters due to sedimentation for the Cape Fear River Basin, nor do they drain into any Section 303 (d) waters within 1.0 mile of the project study area.

Permanent Impacts: Dan's Creek, Mill Creek and adjacent wetlands will be impacted by the proposed project. Construction of the proposed project will result in a permanent impact of 0.07 acre from roadway fill in wetlands. In addition, there will be less than 0.01 acre of surface water impacted by the proposed construction. (see permit drawings).

Temporary Impacts: Temporary Impacts: Proposed temporary wetland impacts to 0.06 acre, from Temporary Fill in Wetlands in the Hand Clearing areas for the installation of erosion control measures, include some or all of the following: Temporary Silt Fence, Special Sediment Control fence, and Temporary Rock Silt Checks.

Hand Clearing: There will be 0.25 acre of hand clearing in wetlands.

Bridge Demolition: The existing bridges consist of a reinforced concrete deck on timber joists with concrete-wearing surfaces. The substructures are composed of timber end bents and interior bents consisting of timber caps on timber piles. The bridges can be removed without dropping components into Waters of the United States during construction. Best Management Practices for Bridge Demolition and Removal will be followed to avoid any temporary fill from entering Waters of the United States.

In-water Work Moratorium

A letter dated July 18, 2002 from the National Marine Fisheries Service (NMFS) stated that anadromous fish habitat is present at Dan's Creek and Mill Creek and requested an in-water work moratorium. However, in an email (attached) dated July 31, 2006, Ron Sechler with NMFS deferred the anadromous fish call to Fritz Rohde of North Carolina Division of Marine Fisheries (DMF). In the above referenced email correspondence, the DMF indicated there would be no anadromous fish present and with that information the NMFS said the NCDOT could remove the moratorium request.

Federally Protected Species

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 31, 2008 the U.S. Fish and Wildlife Service (FWS) lists seven federally protected species for Columbus County (Table 1). The wood stork has been added to the list since the completion of the CE. The biological conclusion for this species is "No Effect" due to lack of habitat.

Federally-protected species for Columbus County

Common Name	*Scientific Name*	Federal Status	Habitat or Survey Information	Biological Conclusion
American alligator	*Alligator mississippiensis*	T (S/A)	N/A	N/A
Red-cockaded woodpecker	*Picoides borealis*	E	No Habitat	No Effect
Shortnose sturgeon	*Acipenser brevirostrum*	E	No Habitat	No Effect
Waccamaw silverside	*Menidia extensa*	T	No Habitat	No Effect
Cooley's meadowrue	*Thalictrum cooleyi*	E	No Habitat	No Effect
Wood stork	*Mycteria americana*	E	No Habitat	No Effect
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	No Habitat	No Effect

Avoidance and Minimization

Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States." Due to the presence of surface waters and wetlands within the project study area, avoidance of all impacts is not possible. The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts. Minimization measures were incorporated as part of the project design these included:

- Use of an off-site detour during construction.
- NCDOT is utilizing longer spans with fewer bents than the existing bridge
- Slope stakes ranging from 1.5:1 to 3:1 in jurisdictional areas
- Best Management Practices will also be utilized during demolition of the existing bridge and construction of the new bridge.

Mitigation

Due to the limited amount of proposed impacts NCDOT is not proposing mitigation for this site.

Project Schedule

The review date for this project is July 29, 2008 and the Let Date is September 16, 2008.

Regulatory Approvals

Section 404 Permit: This project was processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). Therefore, we do not anticipate requesting an individual permit but propose to proceed under a Nationwide Permit 23 (72 CFR; 11092-11198, March 12, 2007).

Section 401 Permit: We anticipate 401 General Certification number 3701 will apply to this project. All general conditions of the Water Quality Certification will be met. Therefore, NCDOT is not requesting written concurrence. NCDOT is providing two copies of this application to the NCDWQ, for their review.

A copy of this application will be posted on the NCDOT website at: http://www.doh.dot.state.nc.us/preconstruct/pe/neu/permit.html

Thank you for your time and assistance with this project. Please contact John Merritt at jsmerritt@ncdot.gov or (919) 715-5536 if you have any questions or need additional information.

Sincerely,

for Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

CC: w/attachment
Mr. Brian Wrenn, NCDWQ (2 Copies)

W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Mark Staley, Roadside Environmental
Mr. Terry Gibson, P.E, Division 6 Engineer
Mr. Jim Rerko, Division 6 Environmental Officer
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Ms. Anne Deaton, NCDMF
Mr. Ron Sechler, NMFS
Ms. Stacy Oberhausen, PDEA Project Planning Engineer

Subject: Re: [Fwd: B-4082]
Date: Mon, 26 Feb 2007 14:14:38 -0500
From: Ron Sechler <ron.sechler@noaa.gov>
To: "John S. Merritt" <jsmerritt@dot.state.nc.us>

John,
Fritz has the most recent knowledge on these water bodies. So, if he believes that the moratorium is unnecessary, I will defer to his position and you may delete the moratorium at this site.
Ron

John S. Merritt wrote:

> Ron,
>
> Do you agree with Fritz's call for dropping the moratorium. If you do please send me a quick email back indicating so. If not please call me at your earliest convince, some unique construction problems have arisen with this project that I would need to discuss with you. Thanks for your help.
>
> John Merritt
> 919-715-5536

---

this is correct. At that point in the steams, there would be no anadromous fish present.

Fritz

John S. Merritt wrote:

> Fritz,
>
> We spoke February 23 concerning B-4082, Bridge No. 280 and 281 on SR 1843 over Dan's Creek and Mill Creek in Columbus Co. Per our conversation pertaining to an anadromous fish moratorium

requested by Ron Sechler with the National Marine Fisheries Service in a letter dated March 7, 2003, you concluded that a moratorium was not needed for the fishery resource in that area. As you requested, I will pass this information to Ron Sechler and consult with him on this recommendation. Please send me a brief email back to let me know if this is correct. Thanks for your help.

John Merritt

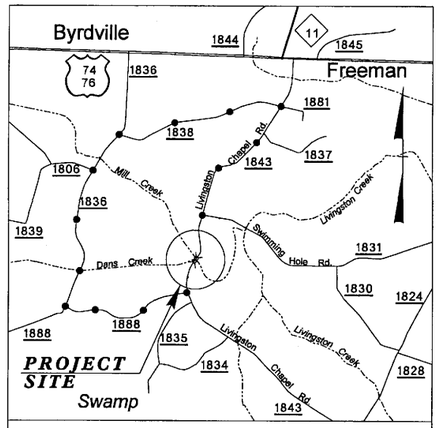
09/08/99

TIP PROJECT: B-4082

CONTRACT:

$$$$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$$$

See Sheet 1-A For Index of Sheets
See Sheet 1-B for Conventional Symbols
See Sheet 1-C for Survey Control Sheet



VICINITY MAP

DENOTES OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

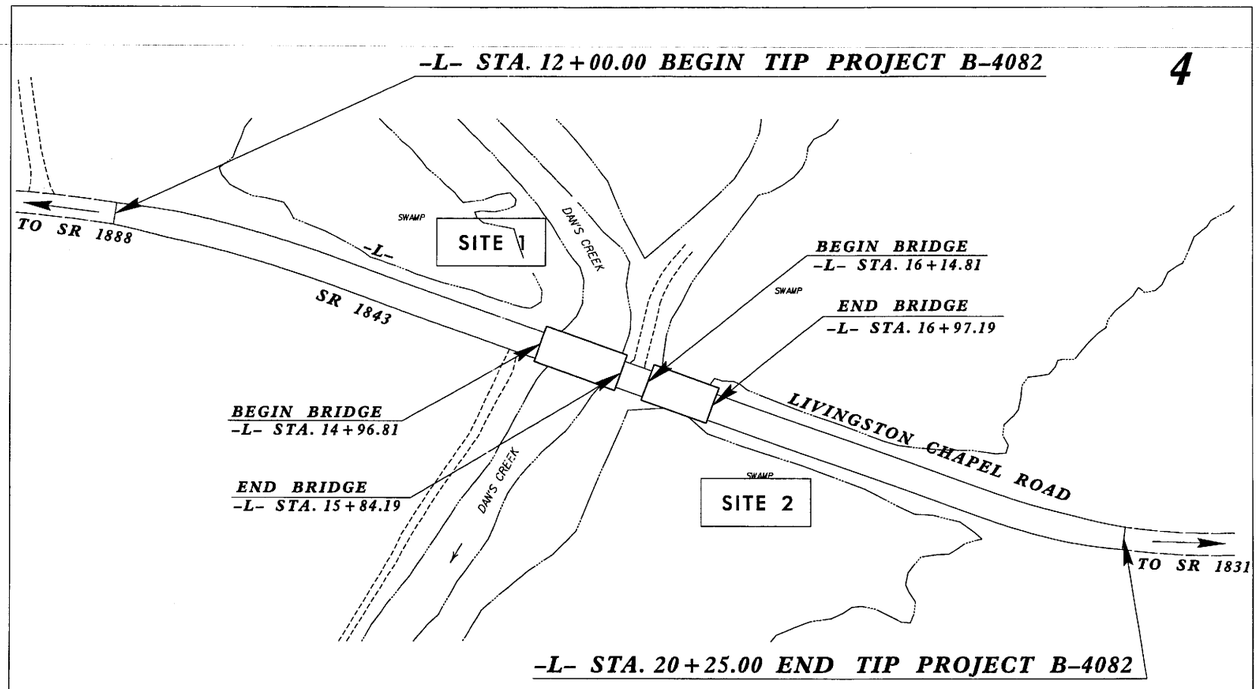
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4082	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33443.1.1	BRZ-1843(1)	PE
33443.2.1	BRZ-1843(1)	R/W & UTIL

LOCATION: BRIDGES 280 & 281 OVER DAN'S CREEK ON SR 1843 (LIVINGSTON CHAPEL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, AND STRUCTURES

NAD 83



Permit Drawing
Sheet 1 of 10

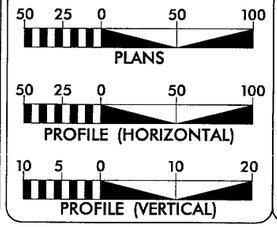
WETLAND/ STREAM IMPACTS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

NOTE: CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

GRAPHIC SCALES



DESIGN DATA

ADT 2008	=	971
ADT 2028	=	1475
DHV	=	14 %
D	=	65 %
T	=	3 % *
V	=	60 MPH

* TTST 1% + DUAL 2%

FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4082	=	.124 MILES
LENGTH OF STRUCTURE TIP PROJECT B-4082	=	.032 MILES
TOTAL LENGTH OF TIP PROJECT B-4082	=	.156 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 21, 2007

LETTING DATE: SEPTEMBER 16, 2008

BRENDA MOORE, P.E.
PROJECT ENGINEER

ROGER KLUCKMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

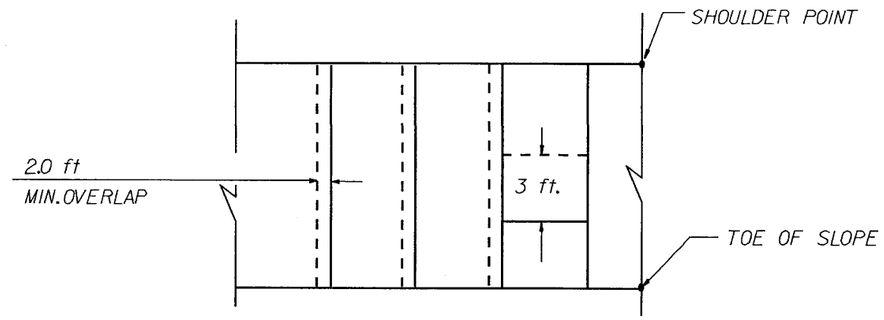
P.E.
STATE HIGHWAY DESIGN ENGINEER

PROJECT REFERENCE NO.	SHEET
B-4082	2-A

GEOTECHNICAL ENGINEER | ENGINEER

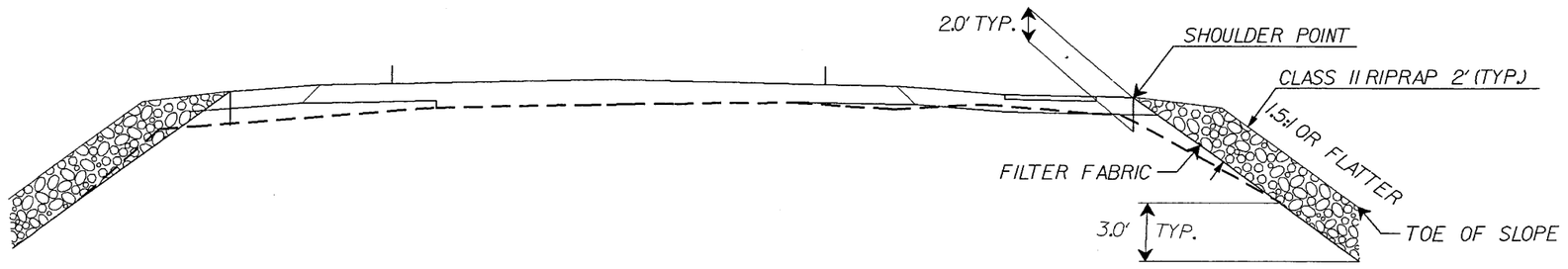
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE DATE | SIGNATURE DATE



FILTER FABRIC OVERLAP DETAIL

N.T.S.



Permit Drawing
Sheet 5 of 10

ESTIMATED QUANTITIES:

PLAIN RIP RAP, CLASS II: ..... 1150 TONS
FILTER FABRIC FOR DRAINAGE: ..... 1600 SQ.YD.

TYPICAL SECTION

-L- STA. 12+50 TO 14+92 LEFT

-L- STA. 17+00 TO 19+50 LEFT

-L- STA. 13+50 TO 14+92 RIGHT

-L- STA. 17+00 TO 19+50 RIGHT

PREPARED BY:	D.TEAGUE	DATE:	2/2007
REVIEWED BY:	J. BATTS	DATE:	2/2007

GEOTECHNICAL ENGINEERING UNIT
■ EASTERN REGIONAL OFFICE
□ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ROCK PLATING

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO.	SHEET NO.
B-4082	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

ENGLISH

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

HC HC DENOTES HAND CLEARING

-L-
PI Sta 11+60.57
Δ = 17° 15' 48.6" (RT)
D = 5° 25' 00.0"
L = 318.71'
T = 160.57'
R = 1,057.77'

-L-
PI Sta 20+96.14
Δ = 32° 31' 28.8" (LT)
D = 10° 08' 00.0"
L = 320.97'
T = 164.94'
R = 565.42'

SITE 1

SITE 2

CALVIN THURSTON MALPASS

ASHFORD MALPASS

GENE MALPASS

NELSON APPLEWHITE JR

SR 1843 LIVINGSTON CHAPEL RD

DAWS CREEK

SWAMP

WOODS

RETAIN

EXISTING R/W

18' BST

ROCK PLATING STA 13+80 TO STA 14+92 -L- RT SEE SHEET 2-A

ROCK PLATING STA 17+00 TO STA 19+50 -L- LT SEE SHEET 2-A

ROCK PLATING STA 17+00 TO STA 19+50 -L- RT SEE SHEET 2-A

SHOULDER BERM GUTTER -L- STA 14+65 TO BEGIN BRIDGE -L- RT AND LT

SHOULDER BERM GUTTER END BRIDGE TO STA 17+30 -L- RT AND LT

EXISTING BRIDGE TO BE REMOVED

EXCAVATE EXTG ROAD FILL FOR CL STRUCTURE (PAY ITEM) TO TOP OF BERM

CLASS B RIP-RAP EST. 1 TON 5 SY FF

CLASS II RIP RAP FOR 2:1 SLOPE PROTECTION EST 70 TONS EST 60 SY FF

CLASS B RIP-RAP EST. 1 TONS 5 SY FF

CLASS B RIP-RAP +/-3 TONS

CLASS B RIP-RAP EST. 3 TONS 10 SY FF

SPECIAL LAT 'V' DITCH STA 19+75 TO STA 20+25 -L- RT SEE DETAIL #1

SPECIAL LAT 'V' DITCH -L- STA 19+75 TO STA 20+25 RT SEE DETAIL #1

15" CSP W/ELBOWS

EXCAVATE EXTG ROAD FILL +/-50 CY

EXCAVATE EXTG ROAD FILL +/-4 CY

TBDI W/GRATE SLOT FLAT GRATE

TBDI W/GRATE SLOT FLAT GRATE

WINGWALLS

BRIDGE NO. 280

PC Sta. 10+00.00

PT Sta. 13+18.71

PC Sta. 19+31.20

PT Sta. 22+52.17

NOTE: USE 1.5:1 FILL SLOPES W/ROCK PLATING (SEE DETAIL SHEET 2-A)

FROM	-L- STA 12+50	TO STA 14+92	LEFT
FROM	-L- STA 17+00	TO STA 19+50	LEFT
FROM	-L- STA 13+50	TO STA 14+92	RIGHT
FROM	-L- STA 17+00	TO STA 19+50	RIGHT

REVISIONS

8/17/99

Permit Drawing
Sheet 6 of 10

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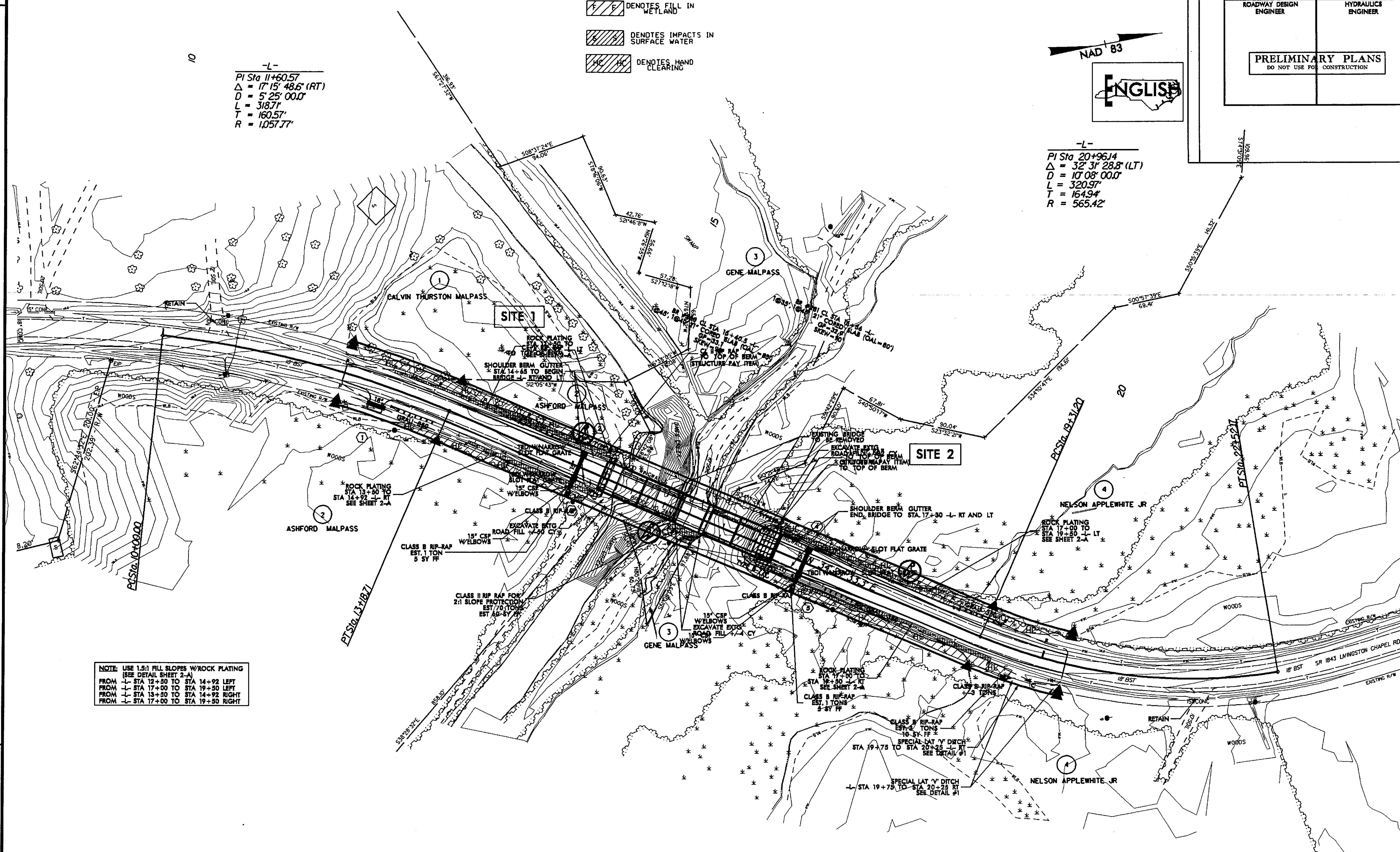
mcall

PROJECT REFERENCE NO.	SHEET NO.
B-4082	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

F DENOTES FILL IN WETLAND
S DENOTES IMPACTS IN SURFACE WATER
HC DENOTES HAND CLEARING



NOTE: USE 1.5:1 FILL SLOPES W/ROCK PLATING
(SEE DETAIL SHEET 2-A)
FROM -L- STA 12+50 TO STA 14+92 LEFT
FROM -L- STA 17+00 TO STA 19+50 LEFT
FROM -L- STA 13+50 TO STA 14+92 RIGHT
FROM -L- STA 17+00 TO STA 19+50 RIGHT

REVISIONS

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Permit Drawing
Sheet 7 of 10

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

RIGHT DITCH

BM # 80
RR SPIKE IN A 18" PINE TREE
52' RT OF BL STA.9+48 ELEV.29.86

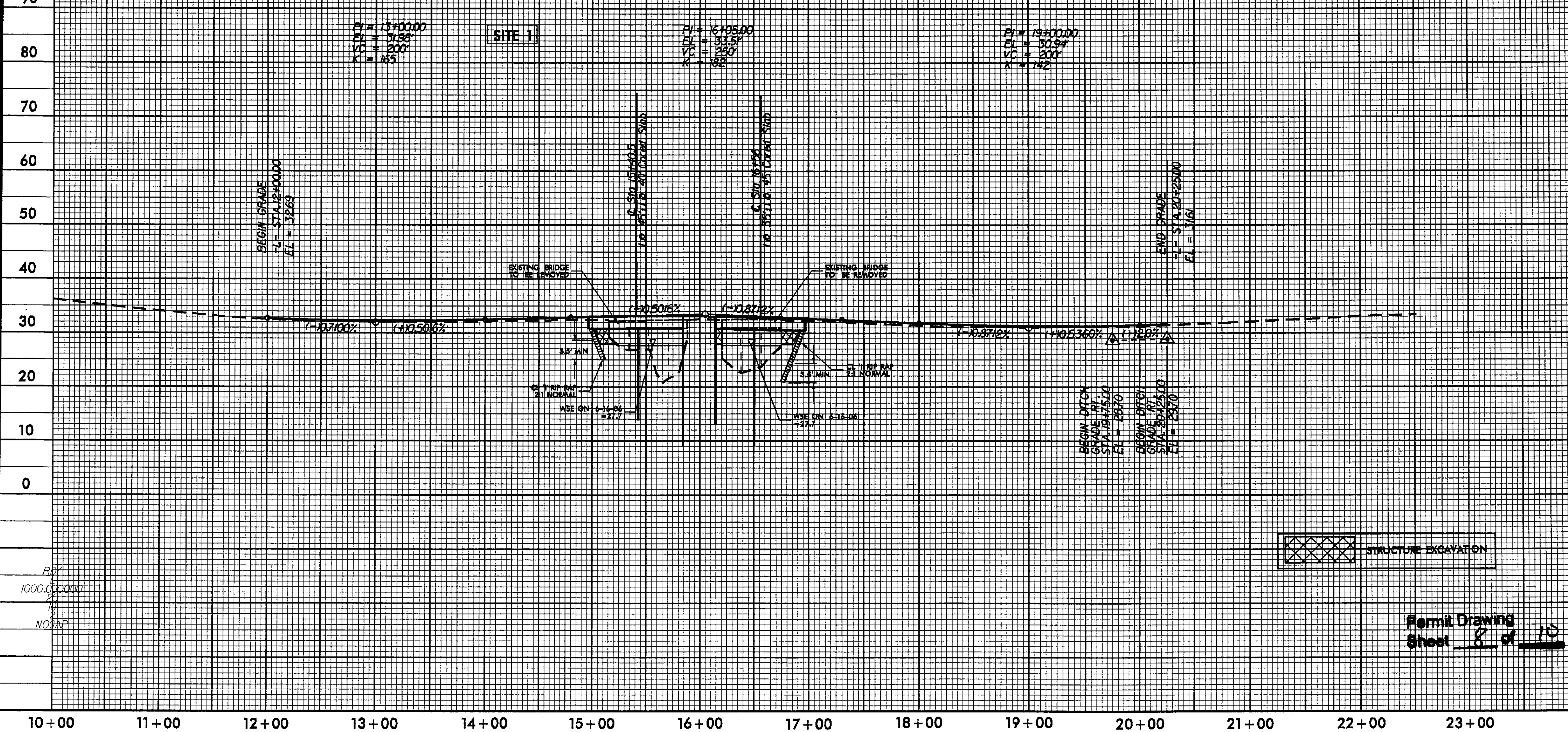
BM # 81
RR SPIKE IN A 15" PINE TREE
68.94' RT. OF BL STA.19+99 ELEV.34.03

STRUCTURE HYDRAULIC DATA

BRIDGE #280	
DESIGN DISCHARGE	= 1700 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 30.5 FT
BASE DISCHARGE	= 2272 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.8 FT
OVERTOPPING DISCHARGE	= 2300 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 31.3 FT

STRUCTURE HYDRAULIC DATA

BRIDGE #281	
DESIGN DISCHARGE	= 1700 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 30.5 FT
BASE DISCHARGE	= 2272 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.8 FT
OVERTOPPING DISCHARGE	= 2300 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 31.3 FT



Permit Drawing
Sheet 8 of 10

5/14/99
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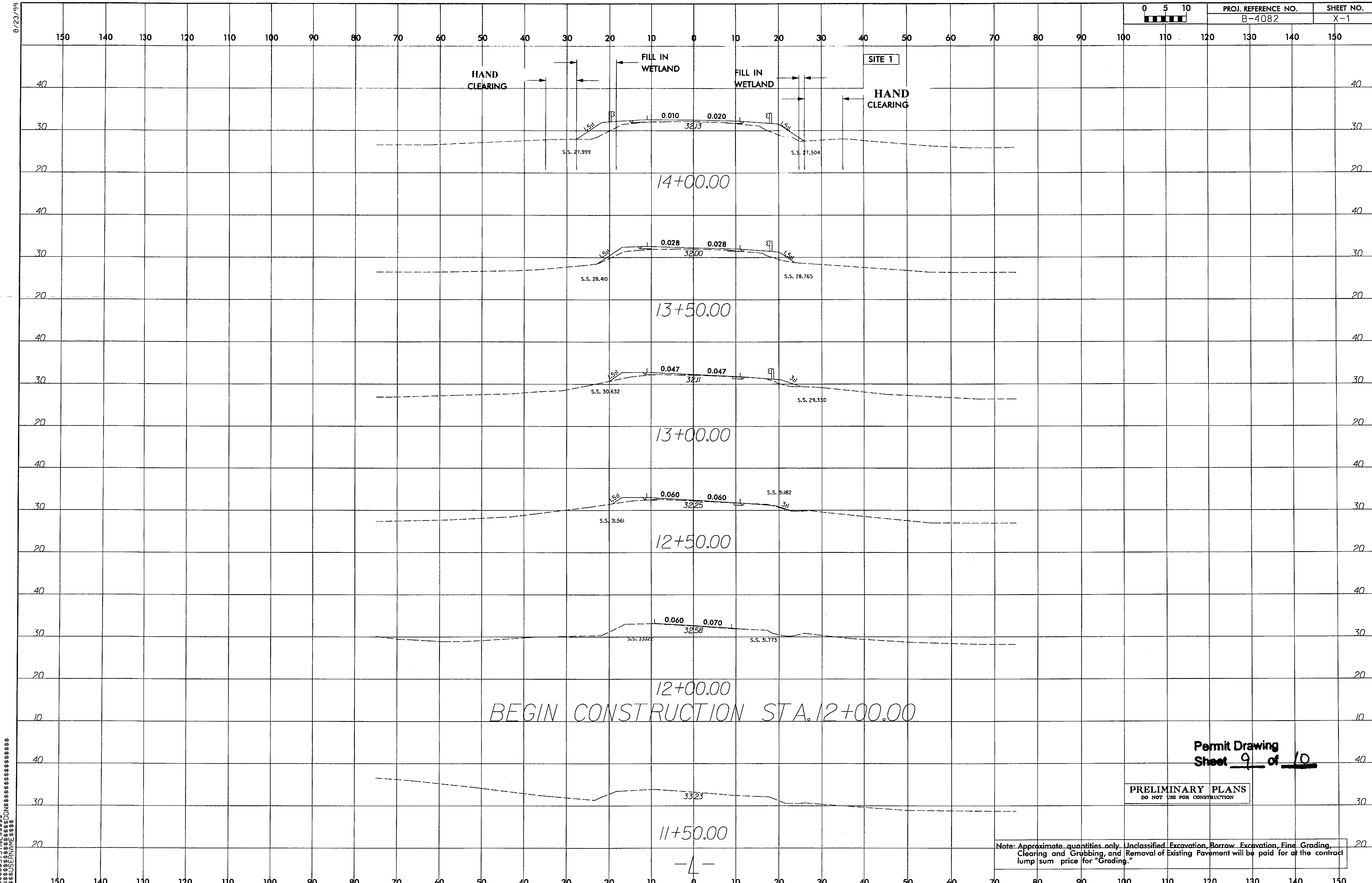
RDY
1000.000000
NOGAP

PROJ. REFERENCE NO.	SHEET NO.
B-4082	X-1



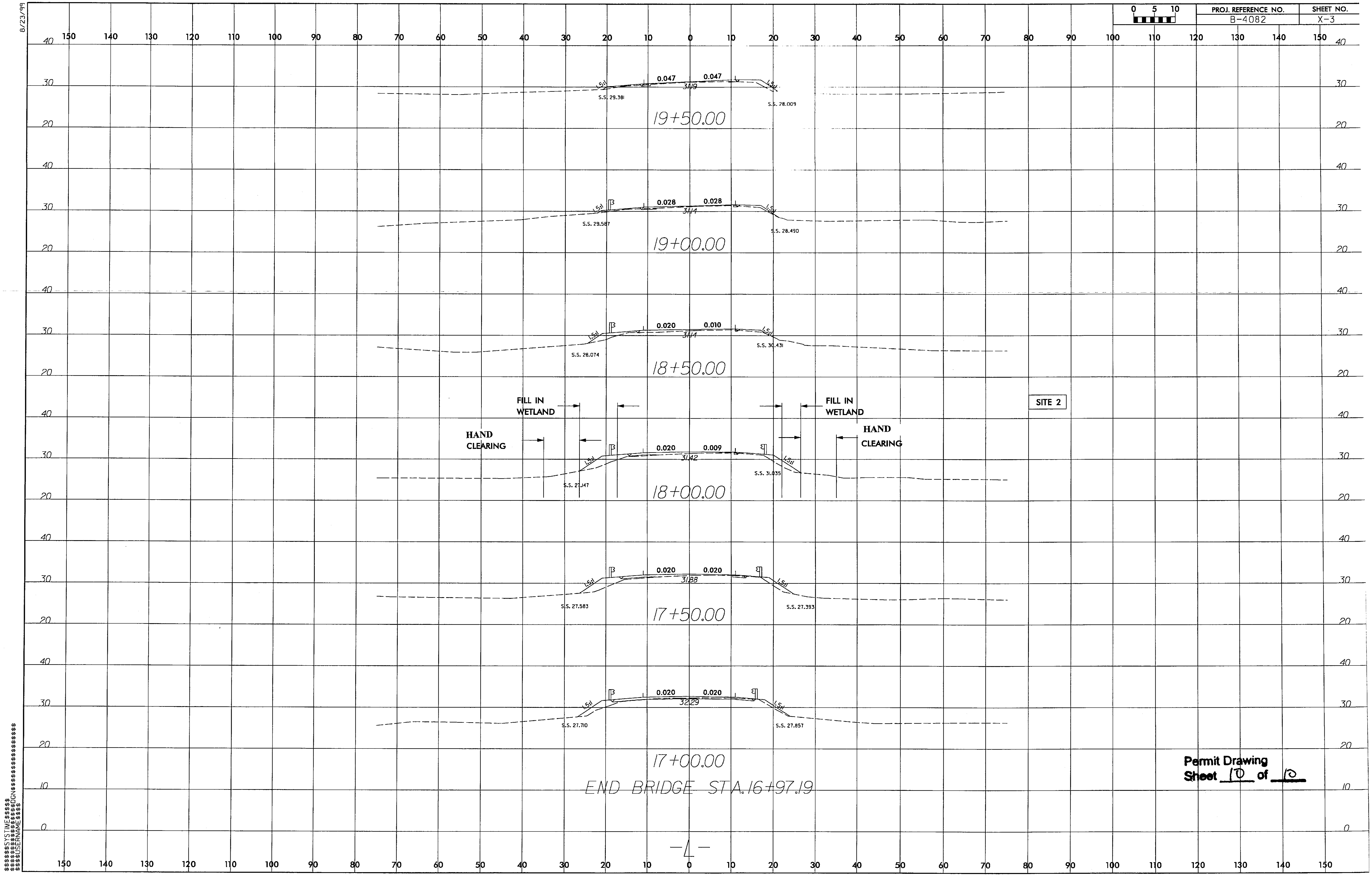
Permit Drawing
Sheet 9 of 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

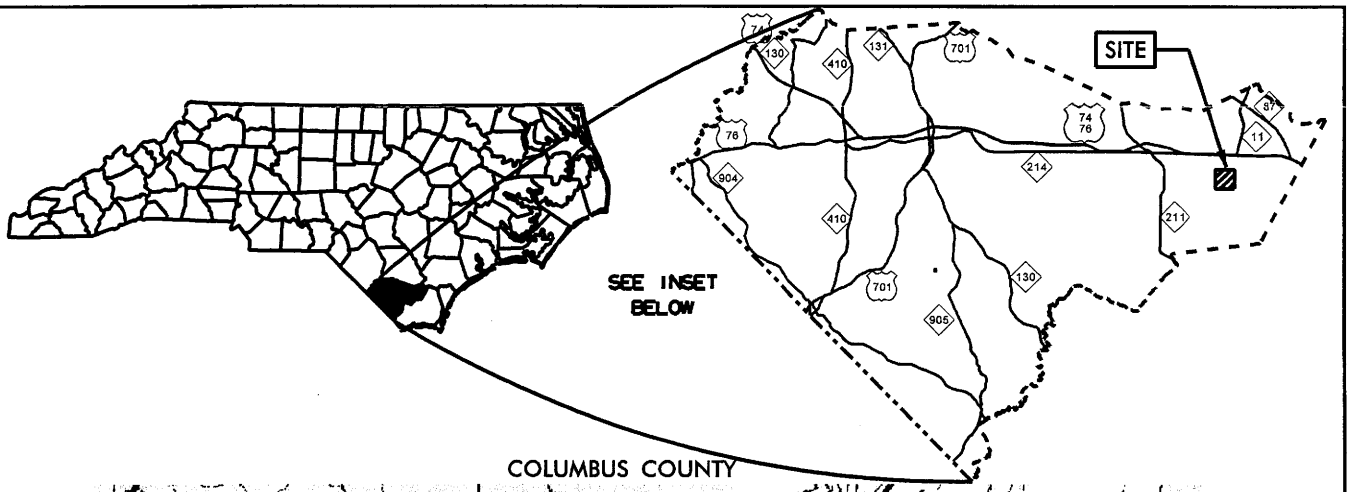
Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

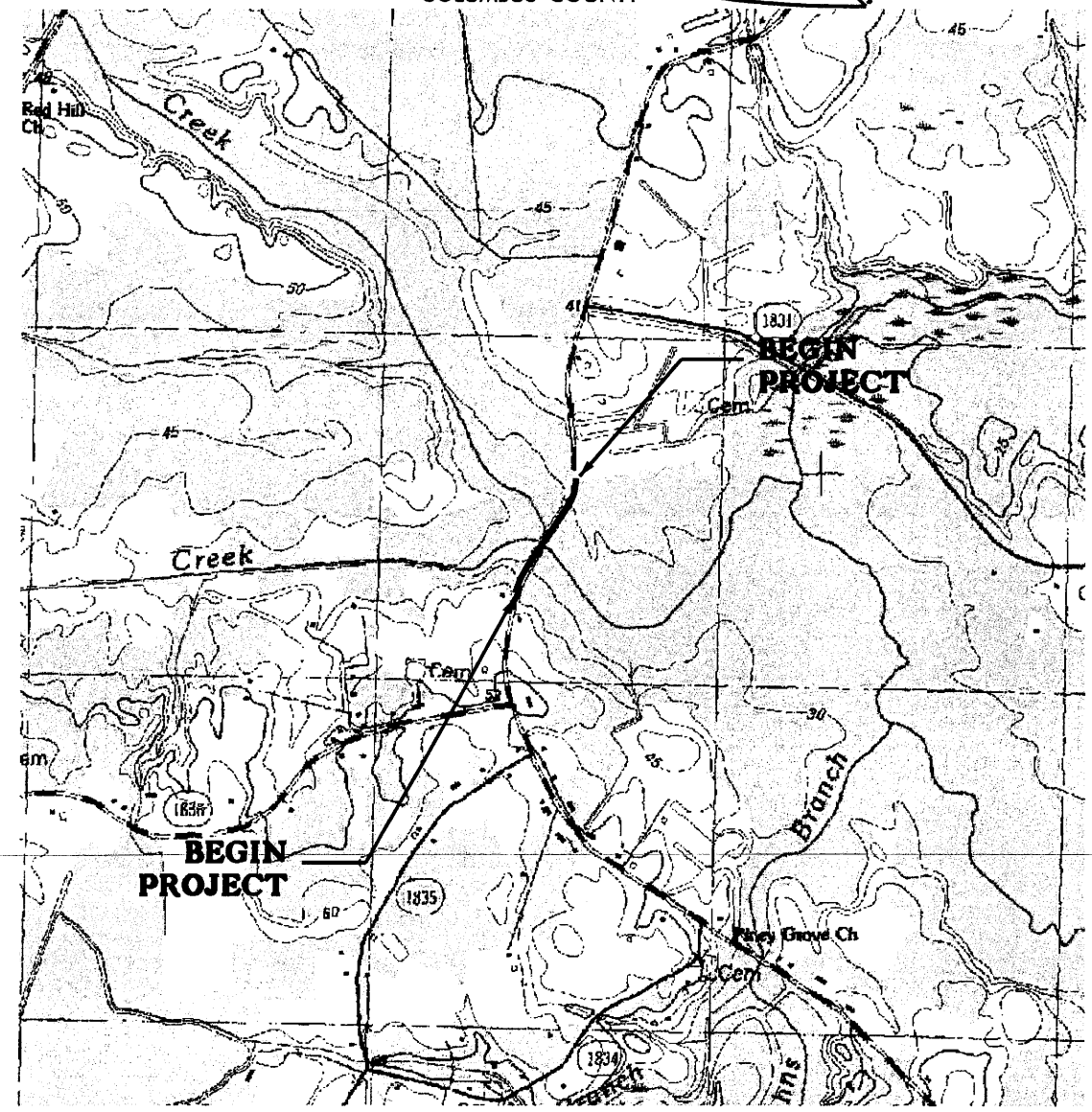
8/23/99

$$$$$$SYSTIME$$$$$ $$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$ $$$$$$USERNAME$$$$$



PROJ. REFERENCE NO.
B-4082
SHEET NO.
X-3
19+50.00
19+00.00
18+50.00
18+00.00
17+50.00
17+00.00
END BRIDGE STA. 16+97.19
FILL IN WETLAND
HAND CLEARING
SITE 2
Permit Drawing
Sheet 10 of 10





WETLAND IMPACTS

Permit Drawing
Sheet 2 of 10

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

COLUMBUS COUNTY
PROJECT:33443.1.1 (B-4082)
BRIDGES NO. 280 AND 281 OVER
DAN'S CREEK ON SR 1843
(LIVINGSTON CHAPEL ROAD)

SHEET ___ OF ___ 12 / 07

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	13+00/15+85 -L-	BRIDGE	0.02				0.10					
2	16+00/19+60 -L-	BRIDGE	0.05				0.15	<0.01		20		
TOTALS:			0.07	0.00	0.00	0.00	0.25	<0.01	0.00	20		

- Approx 6 Sq Ft of impacts to surface waters due to bridges (3 sq ft due to piers and 3 sq ft due to end bent sheeting)

- 0.06 acre of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures

Permit Drawing Sheet 3 of 10

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

COLUMBUS COUNTY
PROJECT: 33443.1.1 (B-4082)

SHEET December-07

ATN Revised 3/31/05

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
2	ASHFORD MALPASS	2357 LIVINGSTON CHAPEL RD DELCO, NC 28436
3	GENE MALPASS	2529 LIVINGSTON CHAPEL RD DELCO, NC 28436
4	NELSON APPLEWHITE JR	RT 1 BOX 50 DELCO, NC 28436

Permit Drawing
Sheet 4 of 10

NCDOT

DIVISION OF HIGHWAYS

COLUMBUS COUNTY

PROJECT: 33443.1.1 (B-4082)

BRIDGES NO. 281 AND 281 OVER DAN'S CREEK ON SR 1843 (LIVINGSTON CHAPEL ROAD)

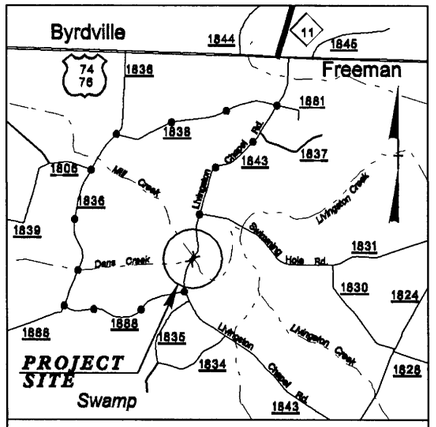
SHEET OF 107

09/08/99

TIP PROJECT: B-4082

CONTRACT: C201924

See Sheet 1-A For Index of Sheets
See Sheet 1-B for Conventional Symbols
See Sheet 1-C for Survey Control Sheet



VICINITY MAP

DENOTES OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

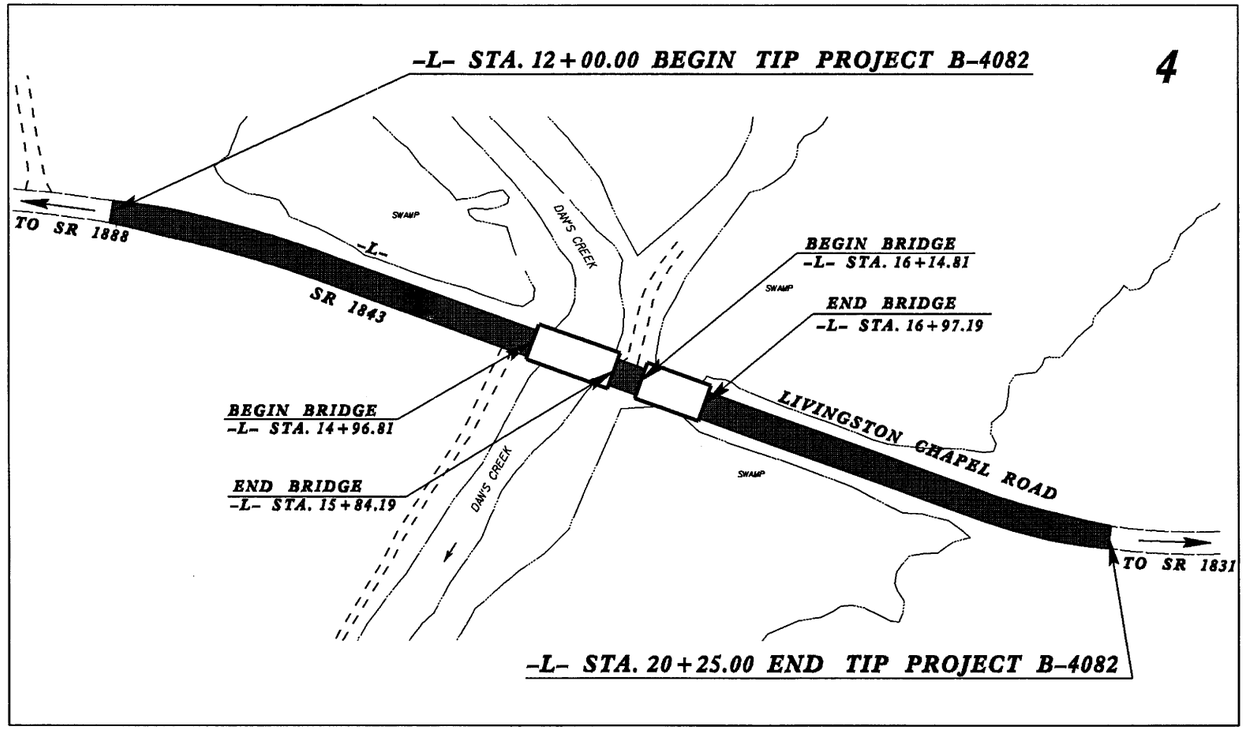
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4082	1	

STATE PROJ.NO.	F.A.PROJ.NO.	DESCRIPTION
33443.1.1	BRZ-1843(1)	PE
33443.2.1	BRZ-1843(1)	R/W & UTIL
33443.3.1	BRZ-1843(1)	CONST.

LOCATION: BRIDGES 280 & 281 OVER DAN'S CREEK ON SR 1843 (LIVINGSTON CHAPEL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

NAD 83



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 971
ADT 2028 = 1475
DHV = 14 %
D = 65 %
T = 3 % *
V = 60 MPH
* TTST 1% + DUAL 2%
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4082 = .124 MILES
LENGTH OF STRUCTURE TIP PROJECT B-4082 = .032 MILES
TOTAL LENGTH OF TIP PROJECT B-4082 = .156 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 21, 2007

LETTING DATE: SEPTEMBER 16, 2008

BRENDA MOORE, P.E.
PROJECT ENGINEER

ROGER KLUCKMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

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10/25/05

PROJECT REFERENCE NO.	SHEET NO.
B-4082	1B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — Fish
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth — $
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-4082	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4082

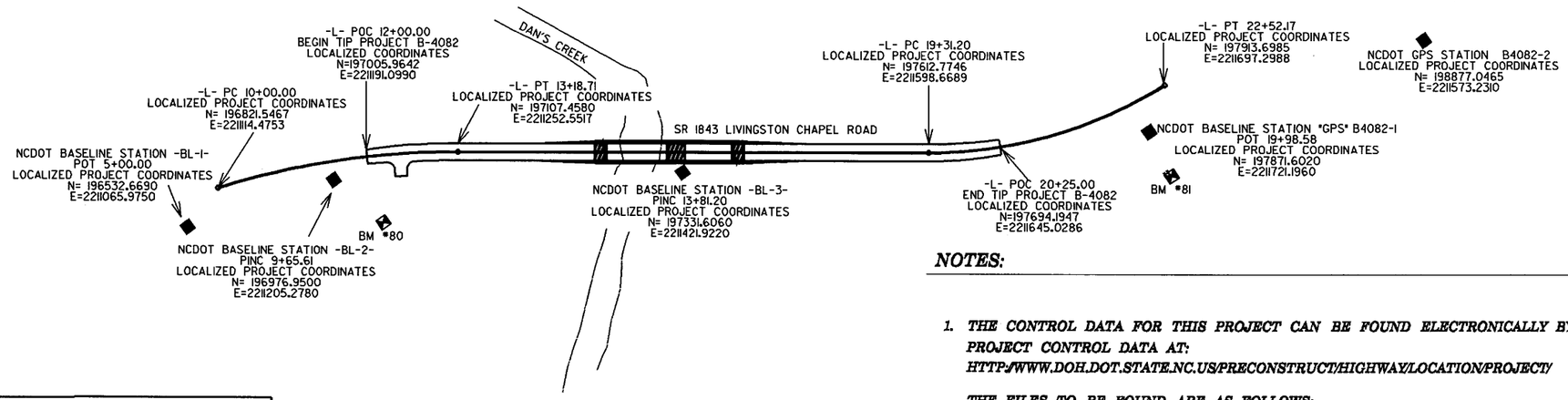
NC GRID NAD 83/95

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	B4082-BL1	196532.6690	2211065.9750	41.10	OUTSIDE PROJECT LIMITS	
2	B4082-BL2	196976.9500	2211205.2780	30.60	11+80.55	25.96 RT
3	B4082-BL3	197331.6060	2211421.9220	32.04	15+99.35	13.07 RT
101	B4082-1 (GPS)	197871.6020	2211721.1960	33.25	22+12.71	26.71 RT

BM80 ELEVATION = 29.86
N 196944 E 2211250
L STATION 11+71 80 RIGHT
RR SPIKE IN BASE OF 18" PINE TREE

BM81 ELEVATION = 34.03
N 197849 E 2211786
L STATION 21+99 94 RIGHT
RR SPIKE IN BASE OF 15" PINE TREE



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY FOR MONUMENT "B-4082-1" WITH STATE PLANE GRID COORDINATES OF NORTHING: 197871.6031(ft) EASTING: 2211721.1971(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.0000151801 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-4082-1" TO -L- STATION 12+00.00 IS S 31°28'56.5" W 1015.05 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS: B4082_LS_CONTROL_060721.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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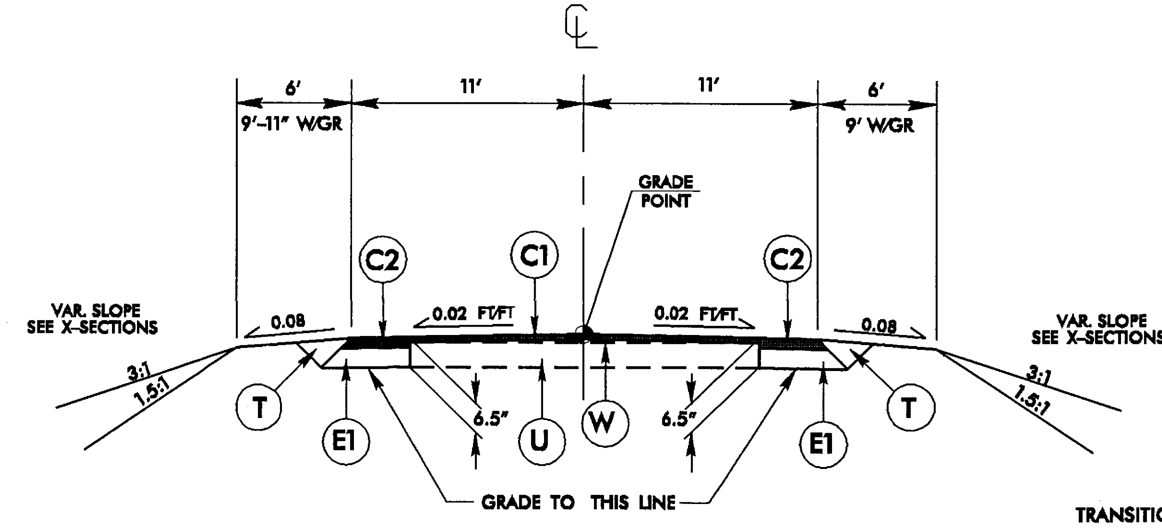
PROJECT REFERENCE NO.	SHEET NO.
B-4082	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE WEDGING DETAIL THIS SHEET).

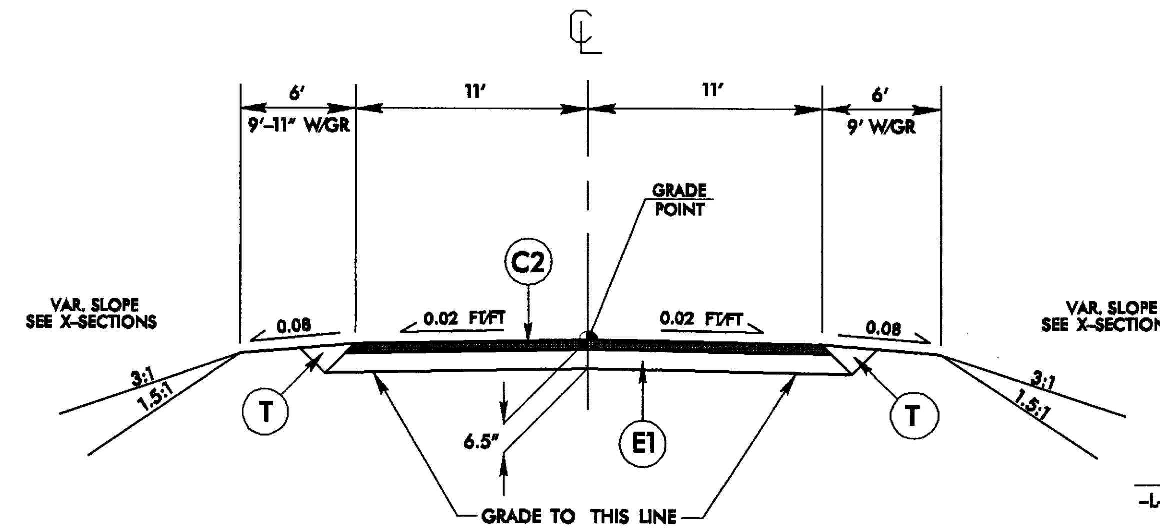
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING -L- STA. 12+00.00 TO STA. 12+50.00
-L- STA. 12+50.00 TO STA. 14+50.00
-L- STA. 17+50.00 TO STA. 19+75.00
TRANSITION TO EXISTING -L- STA. 19+75.00 TO STA. 20+25.00



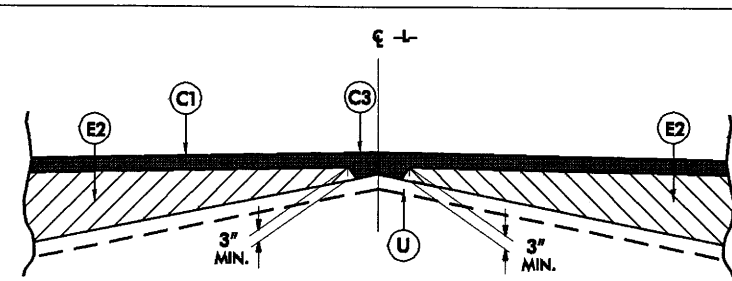
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

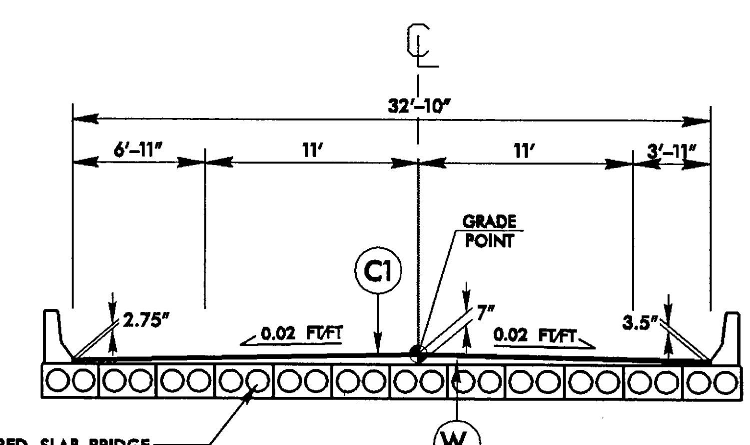
-L- STA. 14+50.00 TO STA. 14+96.81 (BEGIN BRIDGE)

* OVERLAY REINFORCED CONCRETE SLAB WITH ASPHALT PAVEMENT BETWEEN -L- STA. 15+84.19 (END BRIDGE) AND STA. 16+14.81 (BEGIN BRIDGE)

-L- STA. 16+97.19 (END BRIDGE) TO STA. 17+50.00

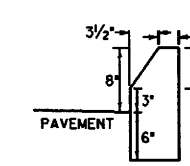


DETAIL SHOWING METHOD OF WEDGING



PROPOSED CORED SLAB BRIDGE (STRUCTURE PAY ITEM)

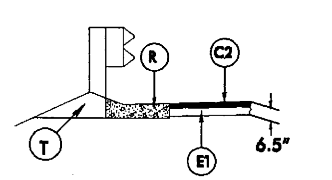
TYPICAL SECTION NO. 3



DETAIL OF 8"x6" CONCRETE CURB

USE TYPICAL SECTION NO. 3

-L- STA. 14+96.81 TO STA. 15+84.19
-L- STA. 16+14.81 TO STA. 16+97.19
*OVERLAY CORED SLAB BRIDGE AS DIRECTED BY THE ENGINEER



SHOULDER BERM GUTTER DETAIL

USE SHOULDER BERM GUTTER

-L- STA. 14+65.00 TO -L- STA. 14+82.81 (LT & RT)
-L- STA. 17+11.19 TO -L- STA. 17+30.00 (LT & RT)

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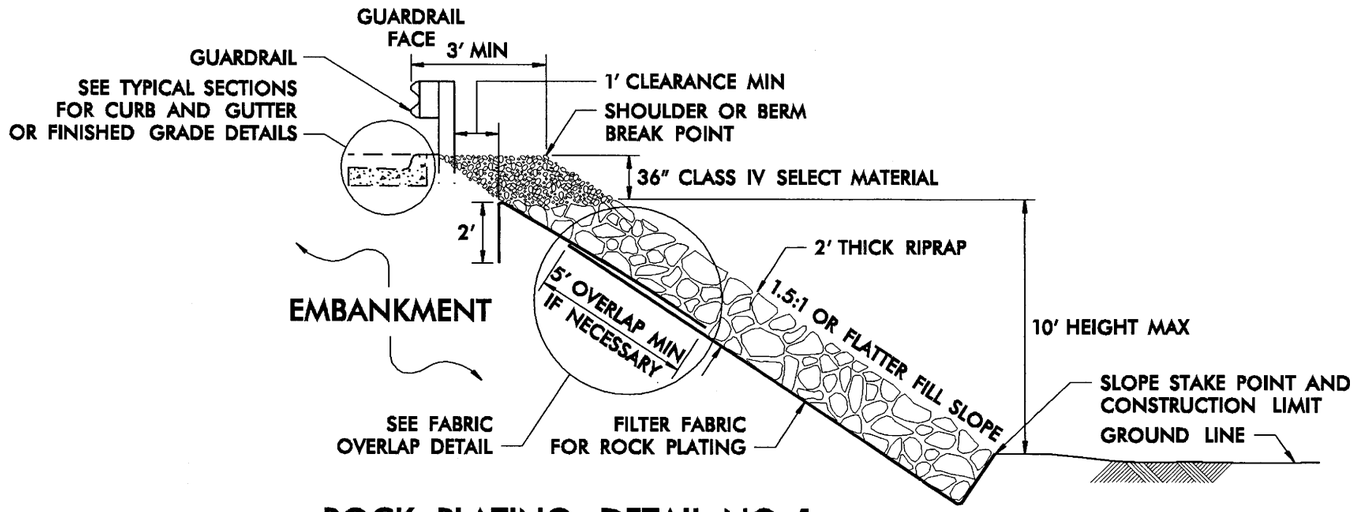
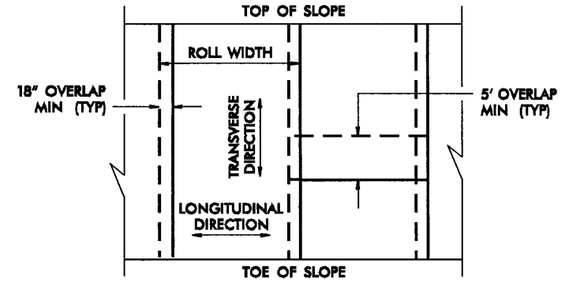
PROJECT REFERENCE NO.	SHEET NO.
B-4082	2-A
GEOTECHNICAL ENGINEER	ENGINEER



ROCK PLATING DETAIL NO. 1

USE ROCK PLATING DETAIL NO. 1 AT THE FOLLOWING LOCATIONS:

–L– STA 12+00 TO –L– STA 14+96 (LT.)
–L– STA 13+50 TO –L– STA 14+96 (RT.)
–L– STA 16+97 TO –L– STA 19+60 (LT. & RT.)
EXTEND ROCK PLATING LIMITS TO 3:1 SLOPES.



FABRIC OVERLAP DETAIL
(PLAN VIEW)

ESTIMATED QUANTITIES:

ROCK PLATING: 500 SQ.YD.

FOR ROCK PLATING,
SEE ROCK PLATING SPECIAL PROVISION.

ROCK PLATING DETAIL(S) AND LOCATION(S) WERE PROVIDED THROUGH A SEALED DOCUMENT FROM THE GEOTECHNICAL ENGINEERING UNIT. THE DOCUMENT WAS SUBMITTED TO THE ROADWAY DESIGN UNIT ON JANUARY 22, 2008 AND SEALED BY A PROFESSIONAL ENGINEER, THEIN TUN ZAN, LICENSE # 30943.

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COMPUTED BY: RCK
CHECKED BY: CFP

PROJECT REFERENCE NO.	SHEET NO.
B-4082	3-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS			IMPACT ATTENUATOR TYPE 350			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	B-77	AT-1	EA	G	NG	
-L-	13+84.31	14+96.81	LT	112.5				14+96.81 (BR)	6.917	9.917		50		1	1	1					
-L-	12+59.31	14+96.81	RT	237.5			14+96.81 (BR)		6	VAR.*	50		1		1	1					
-L-	16+97.19	19+47.19	LT	250.0			16+97.19 (BR)		6.917	9.917	50		1		1	1					
-L-	16+97.19	18+09.69	RT	112.5				16+97.19 (BR)	3.917	VAR.*		93.75		1.875	1	1					
		SUBTOTAL		712.5											4	4					
		LESS ANCHORS		275.0																	
			TOTAL	437.5							DEDUCTIONS OF ANCHORS										
			SAY	437.5							4 GRAU-350 @ 50' = 200										
											4 TYPE B-77 @ 18.75' = 75										
ADDITIONAL POSTS = 5 EACH											TOTAL = 275										

* THE DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT IS VARIABLE. SEE CROSS-SECTIONS.

SUMMARY OF EARTHWORK

(CUBIC YARDS)

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L- STA. 12+00.00 TO 14+96.81	9		250	241	
-L- STA. 15+84.19 TO 16+14.81	0		84	84	
-L- STA. 16+97.19 TO 20+25.00	23		226	203	
PROJECT SUBTOTALS	32		560	528	
UNCL. STRUCT. EXCAV. IN LIEU OF BORROW				-136	
EST. 5% TO REPLACE TOPSOIL ON BORROW PITS				20	
GRAND TOTAL	32			412	
SAY	40			420	

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the lump sum price for "Grading."

NOTE: 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.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 15"	CLASS III R.C. PIPE 18"	CLASS III R.C. PIPE 48"	BIT. COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 15" .064	18" .064	48" .064	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL 'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	T.B.D.I. STD. 840.35	D.I. (N.S.) FRAME WITH 2 GRATES STD. 840.29	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH TWO GRATES STD. 840.24	G.D.I. FRAME WITH TWO GRATES STD. 840.29	CORR. STEEL ELBOWS NO. & SIZE		4" CONCRETE PAVED DITCH (FOR B.D.O.) STD. 850.10 IN SQUARE YARDS	PIPE REMOVAL LIN.FT.	REMARKS
-L- 12+32	RT	1													24																							
-L- 14+70	LT	2																	1								1	1										
		2	3					28																														
-L- 14+70	RT	3																	1								1	1										
		3	OUT								12																							2@15"				
-L- 17+30	LT	4																	1								1	1										
		4	5					32																														
-L- 17+30	RT	5																	1								1	1										
		5	OUT					12																										2@15"				
TOTALS								72			12				24				4								4	4						4@15"				

ABBREVIATIONS

C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I. (N.S.) GRATED DROP INLET (NARROW SLOT)
J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUCTION BOX

SUMMARY OF ASPHALT PAVEMENT BREAK-UP / REMOVAL

(IN SQUARE YARDS)

LINE	BEGIN STATION	END STATION	LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP
-L-	14+50.00	15+14.74	EXISTING	131.4	
-L-	15+88.43	16+19.57	EXISTING	62.7	
-L-	16+74.86	17+50.00	EXISTING	152.9	
			TOTAL	347.0	
			SAY	350	

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4082	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

-L-
PI Sta 11+60.57
Δ = 17° 15' 48.6" (RT)
D = 5° 25' 00.0"
L = 318.71'
T = 160.57'
R = 1,057.77'

-L- STA. 12+00.00 BEGIN TIP PROJECT B-4082

-BL- 2
-L- POC STA. 11+80.55,
25.96' RT.

BEGIN BRIDGE
-L- STA. 14+96.81

BEGIN BRIDGE
-L- STA. 16+14.81

-L-
PI Sta 20+96.14
Δ = 32° 31' 28.8" (LT)
D = 10° 08' 00.0"
L = 320.97'
T = 164.94'
R = 565.42'

CALVIN THURSTON MALPASS
DB 415 PG 937

ASHFORD MALPASS
DB 761 PG 225

GENE MALPASS
DB 525 PG 555

NELSON APPLEWHITE JR
DB 484 PG 529

50' EP TAPER LT & RT

25:1 PAVT TAPER

ROCK PLATING
STA 12+00 TO
STA 14+96 — LT
SEE SHEET 2-A

CL II RIP RAP
TO TOP OF BERM
(STRUCTURE PAY ITEM)

8"x6" CONCRETE CURB
3' RADIUS

PAVE DRIVEWAY CONNECTION TO RIGHT OF WAY
AS DIRECTED BY THE ENGINEER

BEGIN SBG
LT & RT +11.19

END SBG
LT & RT +30

BEGIN SBG
LT & RT +43

END SBG
LT & RT +82.81

15" CSP
W/ELBOWS

CLASS B RIP-RAP
EST. 1 TON
5 SY FF

CLASS II RIP RAP FOR
2:1 SLOPE PROTECTION
EST 70 TONS
EST 50 SY FF

ROCK PLATING
STA 19+50 TO
STA 14+96 — RT
SEE SHEET 2-A

ROCK PLATING
STA 19+97 TO
STA 19+40 — LT
SEE SHEET 2-A

ROCK PLATING
STA 19+97 TO
STA 19+40 — RT
SEE SHEET 2-A

CLASS B RIP-RAP
EST. 1 TONS
8 SY FF

CLASS B RIP-RAP
EST. 8 TONS
10 SY FF

-BL- 3
-L- POT STA. 15+99.35
13.07' RT.

END BRIDGE
-L- STA. 15+84.19

END BRIDGE
-L- STA. 16+97.19

-BL- 101
-L- POC STA. 22+12.71
26.71' RT.

BM = 80
-BL- STA 9+48
52' RIGHT
ELEV. 29.86'

BM = 81
-BL- STA 19+99
68.94' RIGHT
ELEV. 34.03

SPECIAL LAT 'V' DITCH
-L- STA 19+75 TO STA 20+25 RT
SEE DETAIL #1

PCSta 19+11.20

PTSta 13+18.71

SCSta 10+00.00

CSSta 22+35.71

NOTE: USE 1.5:1 FILL SLOPES W/ROCK PLATING
(SEE DETAIL SHEET 2-A)
FROM -L- STA 12+00 TO STA 14+96 LT
FROM -L- STA 13+50 TO STA 14+96 RT
FROM -L- STA 16+97 TO STA 19+60 LT & RT

-L- STA. 20+25.00 END TIP PROJECT B-4082

APPROACH SLAB
-L- STA. 14+82.81

BEGIN BRIDGE
-L- STA. 14+96.81

BEGIN BRIDGE
-L- STA. 16+14.81

APPROACH SLAB
-L- STA. 17+11.19

25:1 PAVT TAPER

GRAU 350

TYPE B-77

SKETCH SHOWING BRIDGE/ PAVEMENT RELATIONSHIP

DETAIL I
SPECIAL LATERAL 'V' DITCH
(NOT to Scale)

Natural Ground — 3xD — 3xD or Flatter — Fill Slope — Min. D=1.5 Ft.

FROM STA. 19+75 TO STA. 20+25 -L- RT

BRIDGE APPROACH SLAB

PAVED SHOULDER

SBG SHOULDER BERM GUTTER

FOR -L- PROFILE SEE SHEET 5

FOR STRUCTURE PLANS SEE SHEETS S-___ THRU S-___

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PROJECT REFERENCE NO.	SHEET NO.
B-4082	5

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

RIGHT DITCH - - - - - - -

BM # 80
RR SPIKE IN A 18" PINE TREE
52' RT OF BL STA.9+48 ELEV.29.86

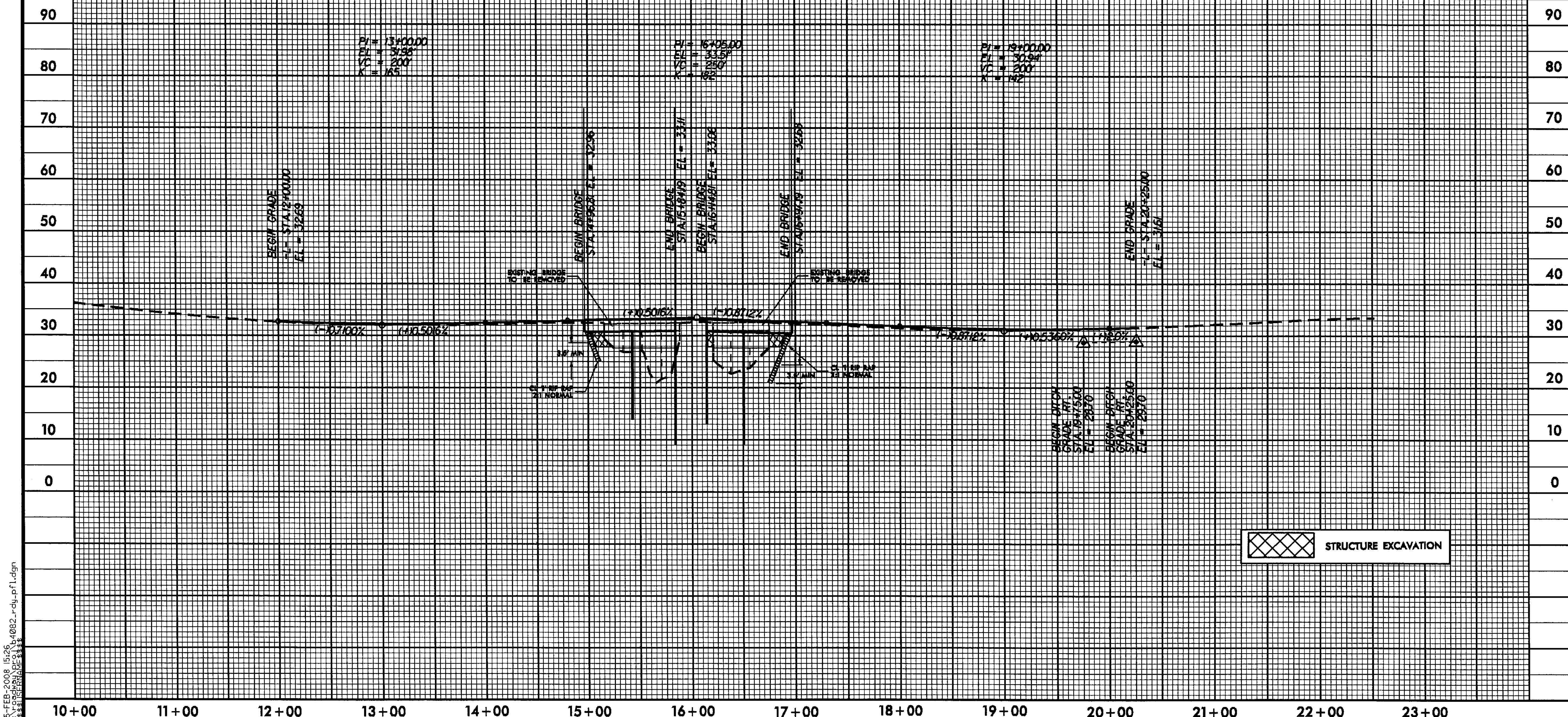
BM # 81
RR SPIKE IN A 15" PINE TREE
68.94' RT.OF BL STA.19+99 ELEV.34.03

STRUCTURE HYDRAULIC DATA

BRIDGE #280	
DESIGN DISCHARGE	= 1700 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 30.5 FT
BASE DISCHARGE	= 2272 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.8 FT
OVERTOPPING DISCHARGE	= 2300 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 31.3 FT

STRUCTURE HYDRAULIC DATA

BRIDGE #281	
DESIGN DISCHARGE	= 1700 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 30.5 FT
BASE DISCHARGE	= 2272 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 31.8 FT
OVERTOPPING DISCHARGE	= 2300 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 31.3 FT



PROJ. REFERENCE NO.	SHEET NO.
B-4082	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDES BACKFILL FOR UNDERCUT

CROSS-SECTION SUMMARY

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+00.00	0	0
12+25.23	0	2
12+50.00	1	5
12+61.20	1	4
13+06.10	3	19
13+18.71	0	7
13+50.00	1	21
13+83.88	0	34
14+00.00	0	22
14+50.00	0	57
14+82.87	2	22
14+96.81	1	7
Station L	**Uncl. Exc. (cu. yd.)**	**Embt (cu. yd.)**
15+84.19	0	0
16+00.00	0	54
16+14.81	0	13
Station L	**Uncl. Exc. (cu. yd.)**	**Embt (cu. yd.)**
16+97.19	0	0
17+10.72	2	10
17+50.00	3	35
18+00.00	1	47
18+10.72	0	9
18+50.00	0	25
18+85.72	1	13
19+00.00	0	4
19+31.20	1	8
19+50.00	1	6
19+75.00	4	10
20+00.00	7	10
20+25.00	3	4

Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the lump sum price for "Grading".

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4082	X-1

8.30'

1.5:1

0.060

0.060

3:1

32|25

12+50.00

1.5:1

0.060

0.061

32|38

12+25.23

0.060

0.070

32|58

12+00.00

33|23

11+50.00

-4-

8/23/99

0 2,5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4082	X-2

6.00'

8.50'

0.028 0.028

1.5:1

1.5:1

32.00

13+50.00

8.88'

0.040 0.040

1.5:1

3:1

32.07

13+18.71

9.00'

0.045 0.045

1.5:1

3:1

32.10

13+06.10

9.00'

0.060 0.060

1.5:1

3:1

32.21

12+61.20

—4—

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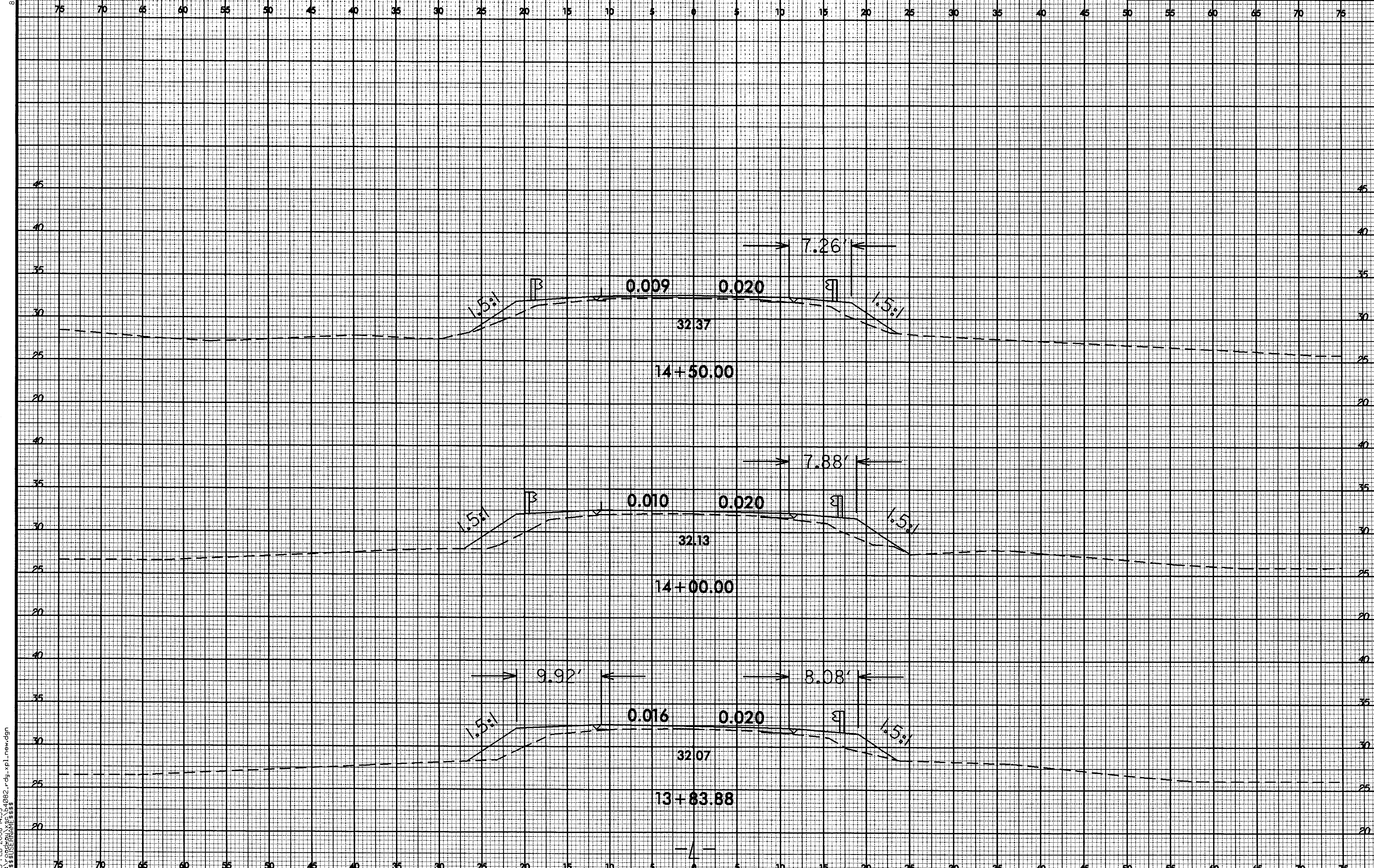
B-4082	X-3



8/23/99

0 2,5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4082	X-4

0.020 0.020

25.94

15+50.00

9.92' 6.92'

0.020 0.020 3:1

1.5:1

32.45

14+96.81

6.92'

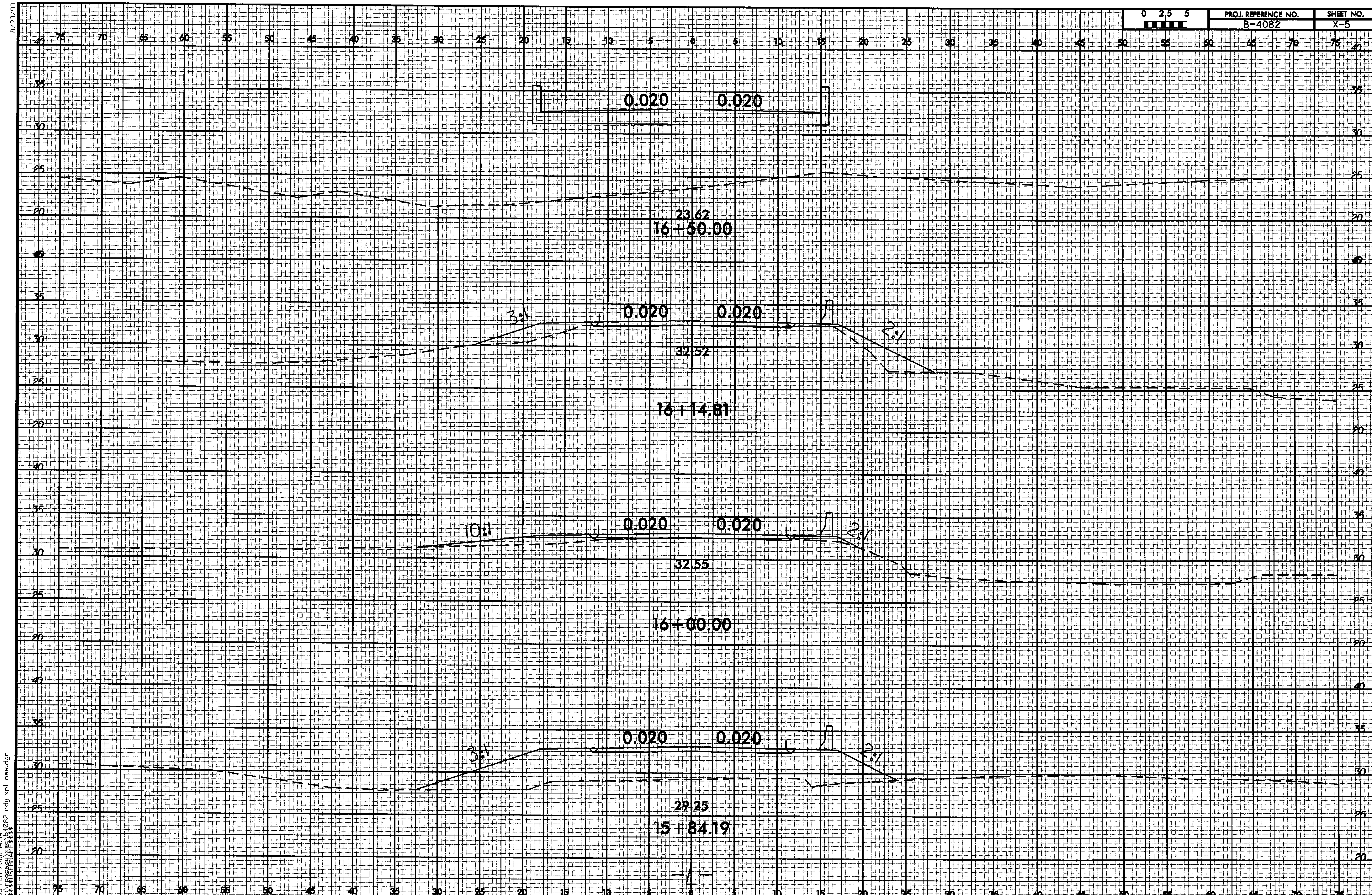
0.020 0.020 1.5:1

1.5:1

32.45

14+82.87

PROJ. REFERENCE NO.	SHEET NO.
B-4082	X-5



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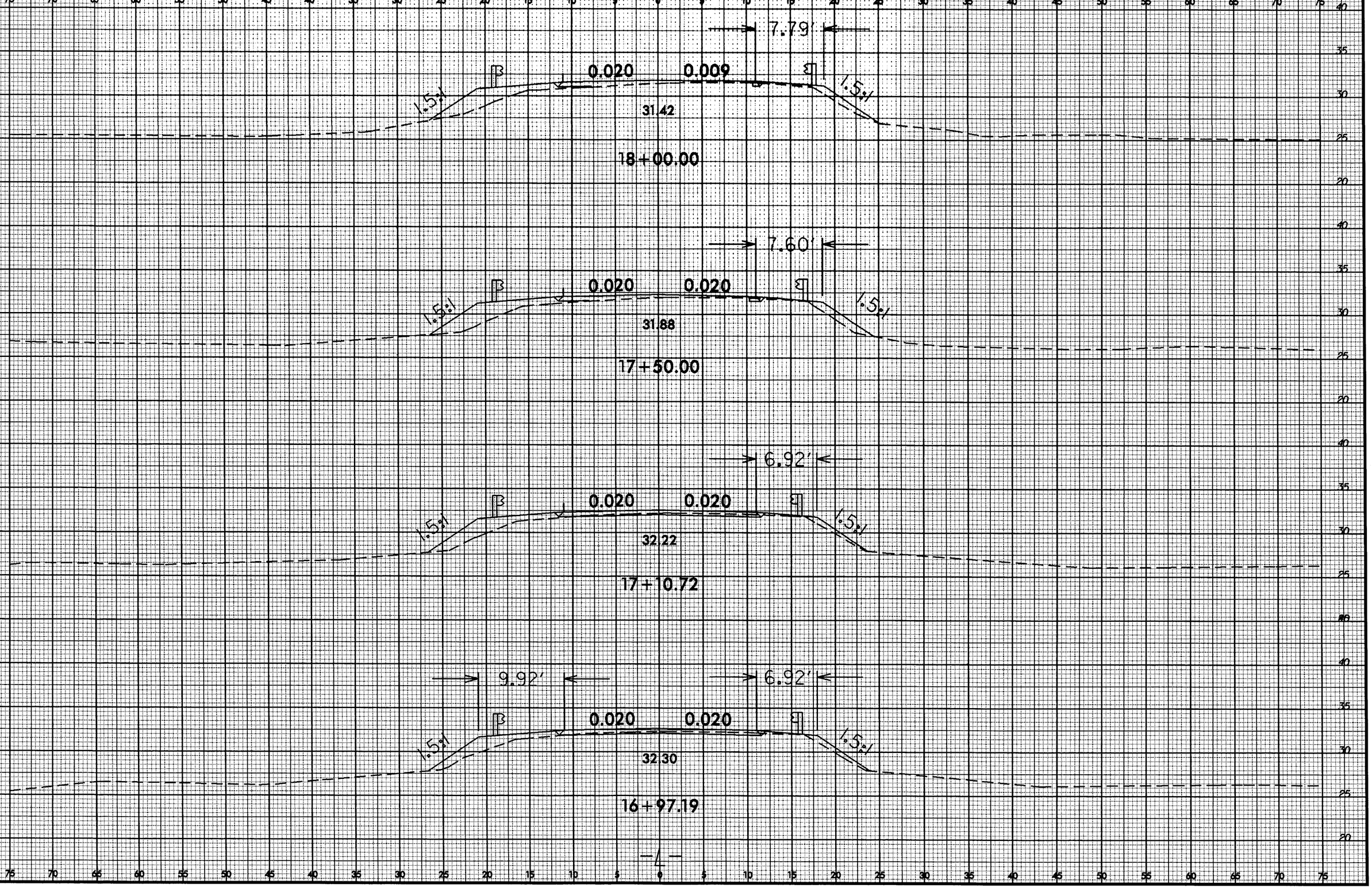
B-4082	X-6

0 2.5 5



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8/23/99

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	B-4082	X-7

1.5:1 | 0.028 | 0.028 | 1.5:1

31.14

19+00.00

1.5:1 | 0.023 | 0.023 | 1.5:1

31.15

18+85.72

6.00'

1.5:1 | 0.020 | 0.010 | 1.5:1

31.14

18+50.00

7.79'

1.5:1 | 0.020 | 0.005 | 1.5:1

31.33

18+10.72

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8/23/99

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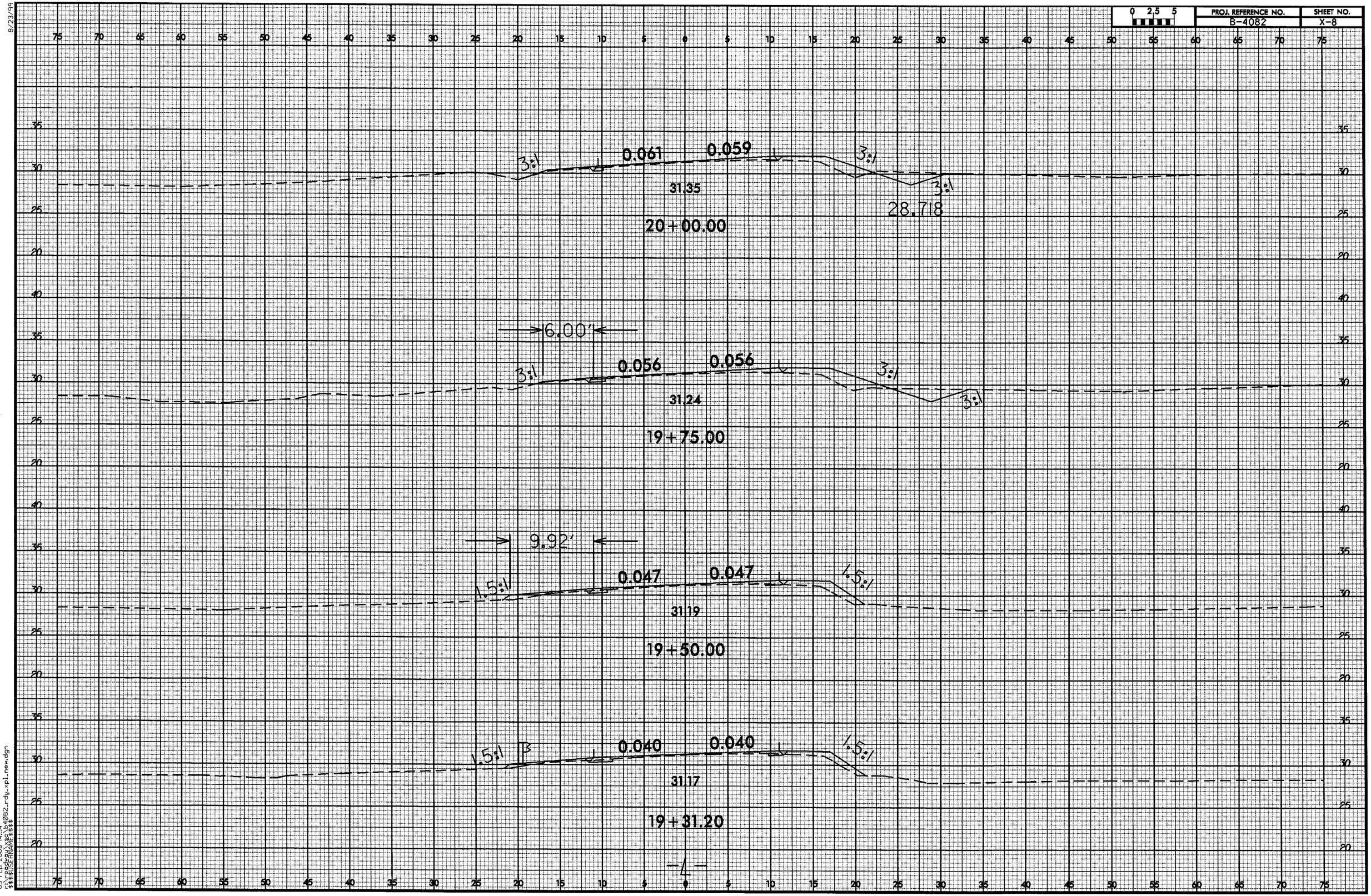
	B-4082	X-8



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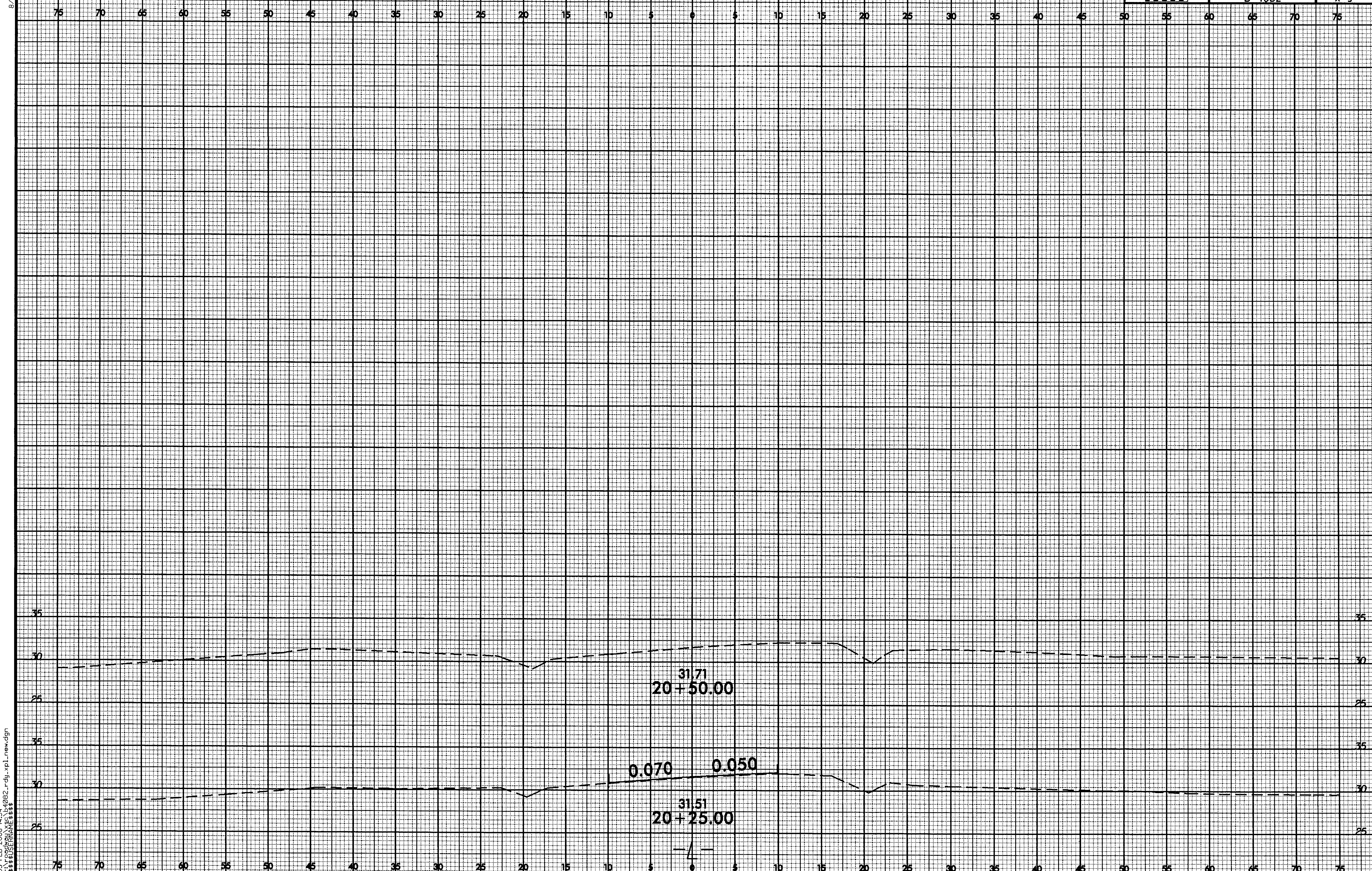
B-4082	X-9



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SR 1843 (LIVINGSTON CHAPEL ROAD)
BRIDGE NO. 280 OVER DAN'S CREEK AND
BRIDGE NO. 281 OVER MILL CREEK
COLUMBUS COUNTY

FEDERAL-AID PROJECT NO. BRZ-1843(1)
STATE PROJECT NO. 8.2430801
W.B.S. NO. 33443.1.1
T.I.P. NO. B-4082

CATEGORICAL EXCLUSION

U.S. DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION,
AND NORTH CAROLINA DEPARTMENT OF TRANSPORTATION,
DIVISION OF HIGHWAYS

APPROVED:

11/15/05
Date

for Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development & Environmental
Analysis Branch
North Carolina Department of
Transportation

11/16/05
Date

for John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration

SR 1843 (LIVINGSTON CHAPEL ROAD)
BRIDGE NO. 280 OVER DAN'S CREEK AND
BRIDGE NO. 281 OVER MILL CREEK
COLUMBUS COUNTY

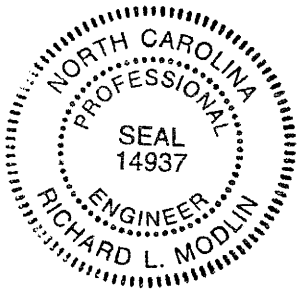
FEDERAL-AID PROJECT NO. BRZ-1843(1)
STATE PROJECT NO. 8.2430801
W.B.S. NO. 33443.1.1
T.I.P. NO. B-4082

CATEGORICAL EXCLUSION

NOVEMBER 2005

Document Prepared by:
Qk4, Inc.
7520 East Independence Blvd.
Suite 120
Charlotte, NC 28227

11-08-05
Richard L. Modlin, PE
Regional Manager



For the North Carolina Department of Transportation

Theresa Ellerby, Project Manager
Project Development and Environmental Analysis Branch

PROJECT COMMITMENTS
BRIDGE NO. 280 OVER DAN'S CREEK AND BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843 (LIVINGSTON CHAPEL ROAD)
COLUMBUS COUNTY

FEDERAL-AID PROJECT NO. BRZ-1843(1)
STATE PROJECT NO. 8.2430801
W.B.S. NO. 33443.1.1
T.I.P. NO. B-4082

In addition to the standard Nationwide Permit #23 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, Design Standards for Sensitive Watersheds, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

1. In order to protect anadromous fishery resources that may utilize the project area as spawning or nursery habitat, bottom-disturbing activities in the waters of Dan's Creek and Mill Creek shall be restricted to the period between October 1 and March 1 of any year unless prior approval is granted by the U.S. Army Corps of Engineers (USACE) following consultation with the National Marine Fisheries Service (NMFS).

BRIDGE REPLACEMENT

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK AND
BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843 (LIVINGSTON CHAPEL ROAD)
FEDERAL-AID PROJECT NO. BRZ-1843(1)
STATE PROJECT NO. 8.2430801
W.B.S. NO. 33443.1.1
TIP NO. B-4082

INTRODUCTION: The replacements of Bridge No. 280 over Dan's Creek and Bridge No. 281 over Mill Creek located on SR 1843 (Livingston Chapel Road) are included in the 2004-2010 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) as B-4082 and in the Federal-Aid Bridge Replacement Program (BRZ-1843[1]). The location of the proposed project is shown in **Figure 1**. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate that Bridge No. 280 had a sufficiency rating of 27.9 out of a possible 100 for a new structure. Bridge No. 281 had a sufficiency rating of 19.9. The bridges are considered functionally obsolete and structurally deficient. The replacement of these inadequate structures will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge Nos. 280 and 281 are located in a rural area of eastern Columbus County approximately 24 miles east of the town of Whiteville and 2 miles south of US 74. Refer to **Figures 2 and 2A** for photos of the existing project area.

Bridge No. 280 was constructed in 1950. Bridge No. 280 is a 4-span bridge consisting of a reinforced concrete deck on I-beams. The substructure consists of reinforced concrete end bents and interior bents with concrete caps on timber piles. The total length of Bridge No. 280 is 73'- 0". It has a clear roadway width of 24'- 0" that includes two travel lanes over the bridge. The existing structure has a crown-to-bed height of 11'- 0"and the normal depth of flow is 6'- 0". The bridge has a single vehicle (SV) weight limit of 15 tons and a truck-tractor semitrailer (TTST) posted weight limit of 22 tons.

Bridge No. 281 was constructed in 1950. Bridge No. 281 is a 3-span bridge consisting of a reinforced concrete deck on I-beams. The substructure consists of reinforced concrete end bents and interior bents with concrete caps on timber piles. The total length of Bridge No. 281 is 55'- 0". It has a clear roadway width of 24'- 0" that includes two travel lanes over the bridge.

The existing structure has a crown-to-bed height of 10'- 0"and the normal depth of flow is 2'- 0". The bridge has a single vehicle (SV) weight limit of 16 tons and a truck-tractor semitrailer (TTST) posted weight limit of 23 tons. The existing bridges are located on a horizontal tangent that extends approximately 400 feet north and 160 feet south from the southern end of Bridge No. 280. The south approach to the bridges has a 1,175-foot radius curve deflecting to the east. The north approach has a 600-foot radius curve deflecting to the west. The lengths of these curves are approximately 500 and 460 feet, respectively. Existing roadway grades are approximately 0.5%. The existing bridges are on a normal crown cross slope.

SR 1843 (Livingston Chapel Road) is classified as a rural local facility in the Statewide Functional Classification System. The estimated 2005 average daily traffic (ADT) volume for SR 1843 is approximately 895 vehicles per day (vpd). Traffic is expected to increase to 1,525 vpd by the design year 2030. The volumes include 2 percent dual trucks and 1 percent TTST's. The posted speed limit in the vicinity of the bridges is 55 miles-per-hour (mph).

SR 1843 (Livingston Chapel Road) measures approximately 18 feet in width, with 4-foot unpaved shoulders on each side of the roadway. The vertical grade is slight, with horizontal curves on both approaches. The existing right-of-way is approximately 60 feet in width. Overhead powerlines, underground telephone cables and underground fiber optic cables are located approximately 25 feet from the roadway on the east side of SR 1843. Utility impacts are anticipated to be low.

Land use immediately adjacent to the two bridges consists of rural residential and agriculture, with much of the surrounding area used for timber logging. The bridges are separated by a private driveway, Dan's Creek Trail, which provides access to a single-family residence located approximately 1,000 feet west of the bridges. The bridges are approximately 30 feet apart from each other.

There was 1 accident reported in the vicinity of the bridges during the period of August 1, 2000 to January 31, 2005.

Three (3) school buses cross Bridge Nos. 280 and 281 for a total of 8 bus trips per day.

This section of SR 1843 is not part of a designated bicycle route nor is it listed in the Transportation Improvement Program as needing incidental bicycle accommodations. There is no indication that an unusual amount of bicyclists use this roadway.

III. ALTERNATIVES

A. Project Description

The proposed approach roadway will consist of two 12-foot travel lanes with six-foot shoulders. The proposed structure(s) will provide a 30-foot travel way, consisting of two 12-foot travel lanes with 3-foot shoulders **(see Figure 3)**. The design speed is 60 mph.

The length and opening size of the proposed structures may increase or decrease as necessary to accommodate peak flows as determined by a more detailed hydraulic analysis to be performed during the final design phase of the bridge.

B. Build Alternatives

Three (3) Build Alternatives studied for replacing the bridges are described as follows:

Alternative A – Replace In-Place with Single Structure Using Offsite Detour

Alternative A consists of replacing the two bridges with a single, new structure **(see Figure 4).** Based upon a preliminary hydraulics analysis, the proposed replacement structure will be approximately 200 feet long. The length of the approach roadway will extend approximately 100 feet to the north of the replacement structure and approximately 100 feet to the south of the new structure. During construction, traffic will be maintained by an offsite detour along SR 1836 and SR 1838 that is approximately 4.5 miles in length. The driveway entrance would be relocated approximately 150 feet south of its present location and would require a culvert for it's crossing of Dan's Creek.

Alternative A was not selected as the preferred alternative because it has greater wetland impacts, stream impacts and costs associated with replacing the existing structures and relocating the existing driveway.

Alternative B – New Alignment To The East

Alternative B consists of replacing the two bridges with a single structure on a new alignment approximately 35 feet east of the existing bridges **(see Figure 5).** Based on a preliminary hydraulics analysis, the proposed structure will be approximately 180 feet long. The length of the approach roadway will extend approximately 1,000 feet from the north end of the replacement structure and approximately 900 feet from the south end. During construction, traffic will be maintained on the existing roadway. In order to maintain access to the driveway located between the existing bridges, one of the bridges will remain open after construction.

Alternative B was not selected as the preferred alternative because it has greater wetland impacts and costs more than either Alternative A or Alternative C.

Alternative C (Preferred) – Replace In-Place With Two Structures Using Offsite Detour

Alternative C consists of replacing the two bridges with two new structures **(see Figure 6).** The length of the approach roadway will extend approximately 400 feet to the north of the replacement structures and approximately 350 feet to the south of the replacement structures. During construction, traffic will be maintained by an offsite detour along SR 1836 and SR 1838 that is approximately 4.5 miles in length.

The driveway entrance will remain at its existing location, between the two bridges. The driveway grade will be raised to the maximum extent possible to minimize sight

distance concerns. The distance between the two bridges will remain at approximately 30 feet and the driveway will include a continuous approach slab.

The slab will encompass the driveway apron, shop-curved guardrail with anchor units, driveway embankment and bridge offsets. In addition, a six-foot shoulder on the left side of the two bridges (total width 33') is recommended to improve the sight distance for vehicles exiting the driveway.

C. Alternatives Eliminated from Further Study

The "Do-Nothing" Alternative will eventually necessitate closure of the bridges because of their poor condition. This is not desirable because of the traffic service provided by SR 1843. Investigation of the existing structures by the NCDOT Bridge Maintenance Unit indicates that rehabilitation of the existing bridges is not feasible because of their age and deteriorated condition.

D. Preferred Alternative

Alternative C consists of replacing the existing bridges at their existing locations with two new bridges while maintaining the existing driveway between them. During construction, traffic will be maintained by an offsite temporary detour along SR 1836 and SR 1838. Alternative C was selected as the "Preferred Alternative" because it has less wetland impacts than Alternative A and lower estimated costs than Alternative A or B.

The Division Engineer concurs with Alternative C as the Preferred Alternative.

IV. ESTIMATED COSTS

The estimated costs, based on current dollars, are shown in Table 1.

Table 1
Estimated Costs

	Alternative A	Alternative B	Alternative C (Preferred)
Structure Removal (existing)	$ 45,710	$ 19,710	$ 45,710
Structure (proposed)	502,350	461,550	373,070
Detour Structure and Approaches	-	-	-
Roadway Approaches	172,860	825,040	198,530
Driveway Relocation	80,120	-	-
User Costs (offsite detour)	158,280	-	158,280
Miscellaneous and Mobilization	114,000	371,400	89,400
Engineering and Contingencies	150,000	300,000	116,000
ROW/Const. Easements/Utilities	82,220	72,300	62,900
TOTAL	**$ 1,305,540**	**$ 2,050,000**	**$1,043,890**

The estimated cost of the project, as shown in the 2006-2012 NCDOT Transportation Improvement Program is $1,700,000, including $100,000 spent in prior years, $100,000 for right-of-way acquisition and $1,500,000 for construction.

V. NATURAL RESOURCES

Natural resources within the project study area were evaluated to provide: 1) an assessment of existing vegetation, wildlife, protected species, streams, wetlands and water quality; 2) an evaluation of probable impacts resulting from construction; and 3) a preliminary determination of permit needs. This section provides a description of the various natural resources within the study area and the anticipated impacts of the proposed project.

A. Methodology

Published information and resources were reviewed prior to conducting a field investigation. Sources include, but are not limited to, the following:

- United States Geological Survey topographic quadrangle map ([USGS], 1986)
- United States Fish and Wildlife Service Draft National Wetlands Inventory (NWI) Map for Freeman, N.C. ([USFWS], 1989)
- NCDOT aerial photograph of project area
- Natural Resources Conservation Service Soil Survey of Columbus County, ([USDA], 1990)
- North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality Basin-Wide Assessment ([DWQ], Assessment 1999)
- North Carolina Natural Heritage Program (NHP) files of rare species and unique habitats
- USFWS list of protected and candidate species for Columbus County (USFWS, 2003)

Water resource information was obtained from publications posted on the World Wide Web by the NCDENR Division of Water Quality (DWQ). Information concerning the occurrence of federally protected species in the project study area was obtained from the USFWS list (USFWS, Columbus County 2003) of protected and candidate species (last updated 5 February 2003), posted on the World Wide Web by the Ecological Services branch of the USFWS office in North Carolina. Information concerning species under state protection was obtained from the NHP database of rare species and unique habitats (NHP, 2004). NHP files were reviewed on 29 June 2001 and updated 3 June 2005 for locations of significant natural areas and documented sightings of species on state or federal lists.

A general field survey was conducted along the proposed project route on 14 July 2001. Biologists conducted an additional field survey on 7 January 2004 for an expanded project study area that includes the three alternatives. Water resources were identified and their physical characteristics were recorded. For the purposes of this study, a brief habitat assessment was performed within the project study area including Dan's Creek and Mill Creek.

Plant communities and their associated wildlife were identified using a variety of observation techniques, including active searching, visual observations and identifying characteristic signs of wildlife (sounds, tracks, scats and burrows). Terrestrial community classifications generally follow Schafale and Weakley (1990) where appropriate and plant taxonomy follows Radford, Ahles and Bell. (1968). Vertebrate taxonomy follows Rohde, Arndt, Lindquist and Parnell (1994), Conant, Roger and Collins (1998), the American Ornithologist's Union (2001), Thorpe and Covich (1991), and Webster, Parnell and Biggs (1985). Vegetative communities were mapped using aerial photography of the project study area. Predictions regarding wildlife community composition involved general qualitative habitat assessment based on existing vegetative communities.

Jurisdictional wetlands, if present, were identified using the three-parameter approach (hydrophytic vegetation, hydric soils and hydrology) outlined in *U.S. Army Corps of Engineers Wetlands Delineation Manual* ([DOA], 1987). Wetlands were classified based on Cowardin, Carter, Goblet and Laroe (1979).

The study limits used to evaluate the existing natural resources were approximately 3,000 feet in length and 250 feet in width, which equates to an area of approximately 17.2 acres.

B. Physiography and Soils

The project study area lies in the eastern portion of North Carolina within the Coastal Plain physiographic province. Elevation above mean sea level in the project study area is approximately 30 feet (National Geodetic Vertical Datum, 1929). The project vicinity is rural in nature with flat topography and wide bottomland hardwood swamps adjacent to streams. Almost all of the area surrounding the bridges is wooded swampland used for timber logging.

There are two hydric soil mapping units (Muckalee sandy loam and Grifton fine sandy loam), two non-hydric soil mapping units that may contain inclusions (Nahunta very fine sandy loam and Goldsboro fine sandy loam) and one non-hydric soil mapping unit (Norfolk loamy fine sand) mapped within the project study area (USDA, Hydric Soils 2004).

- **Goldsboro fine sandy loam (GoA)** occupies a small portion of the project study area north of the Mill Creek swamp. This moderately well drained soil is on smooth uplands. The seasonal high water table is 2 to 3 feet below the surface. Goldsboro may contain inclusions of hydric soils such as Rains and Coxville in depressions.
- **Grifton fine sandy loam (Gt)** is mapped in the northern end of the project study area within the pine woodland. This poorly drained soil is in broad interstream areas, on fringes of floodplains, and in shallow depressions around the head of drainageways. The seasonal high water table is 0.5 to1.5 feet below the surface during winter and spring. Grifton is listed as a hydric soil and is limited in its use by wetness and flooding.
- **Muckalee sandy loam, frequently flooded (Mk)** is mapped along most of the Dan's Creek floodplain within the project study area. This poorly drained soil occurs on floodplains of shallow meandering streams. Slopes are less than 2 percent.

The seasonal high water table is at 0.5 to 1.5 feet in winter and early spring. Muckalee is listed as a hydric soil and is limited in its use by wetness and flooding.

- **Nahunta very fine sandy loam (Na)** is mapped north of the Mill Creek swamp within the project area. This somewhat poorly drained soil is on broad, smooth flats and in slight depressions on uplands. The seasonal high water table is 1.0 to 2.5 feet in winter and spring. Included with Nahunta map units are small hydric areas of Grantham, Rains, and Bethera soils. Uses for Nahunta soils can be limited by wetness.
- **Norfolk loamy fine sand (NoB)** occupies the areas of the project study area that are mapped as agriculture land. This well drained soil is on convex ridges and smooth side slopes on uplands. The seasonal high water table is 4 to 6 feet below the surface from winter to early spring.

Site index is a measure of soil quality and productivity. The index is the average height, in feet, that dominant and co-dominant trees of a given species attain in a specified number of years (typically 50). The site index applies to fully stocked, even-aged, unmanaged stands. The soils in the project study area have the following site indices:

- The Muckalee soils have a site index of 90 for sweetgum (*Liquidambar styraciflua*), 90 for loblolly pine (*Pinus taeda*), 90 for slash pine (*Pinus elliottii*), 90 for water oak (*Quercus nigra*), 85 for green ash (*Fraxinus pennsylvanica*), and 100 for eastern cottonwood (*Populus deltoides*).
- The Grifton soils have a site index of 89 for loblolly pine.
- The Nahunta soils have a site index of 87 for loblolly pine, 90 for sweetgum, and 100 for tulip poplar (*Liriodendron tulipifera).*
- The Goldsboro soils have a site index of 90 for loblolly pine, 77 for longleaf pine (*Pinus plaustris),* and 90 for sweetgum.
- The Norfolk soils have a site index of 84 for loblolly pine and 68 for longleaf pine.

C. Water Resources

This section contains information concerning water resources potentially impacted by the proposed project. Water resources assessments include the physical characteristics potentially impacted by the proposed project (determined by field survey), best usage classifications, and water quality aspects of the water resources.

1. Waters Impacted

The project is located within sub-basin 030617 of the Cape Fear River Basin (DWQ, Assessment 2004; DWQ, BIMS 2005) and is part of the USGS hydrologic unit 03030005 (USGS, Hydrologic 1974). Dan's Creek originates from a canal approximately 2 miles west of the project study area. The canal from which Dan's Creek originates also flows west into Lake Waccamaw and the Lumber River basin. Dan's Creek is channelized along most of its length within the project study area. Mill Creek originates 2.7 miles northwest of the project study area.

In the project study area, Mill Creek is inundated with no defined bank and little noticeable channel development. Immediately downstream of Bridge No. 280, Mill Creek empties into Dan's Creek. The stream then continues in a southeasterly direction. The streams flow slowly or are stagnant in the project study area.

From the project study area, Dan's Creek meanders in an easterly direction about 0.75 miles to its confluence with Livingston Creek. Livingston Creek enters the Cape Fear River near Riegelwood, 7.5 miles northeast of the project study area. The drainage area at the two bridge crossings is approximately 494 acres (0.77 square mile).

Dan's Creek is approximately 25 feet wide with a substrate that consists of sand and silt. The water was an opaque brownish-green on the day of the site visit and approximately 2 feet deep. Dan's Creek has a well-defined channel with its banks approximately 2 to 3 feet high. Conversely, Mill Creek is a very unstable system that appears to have been affected by beaver activity. This system has no defined stream channel and is currently impounded. The substrate appears to have a high percentage of silt and mud. This area is now a swamp forest vegetated with aquatic species such as lizard tail (*Saururus cernuus*) and sensitive fern (*Onoclea sensibilis*) where it appears the channel may have been.

2. Water Resource Characteristics

Surface waters in North Carolina are assigned a classification by the DWQ as part of an effort to maintain, protect and enhance water quality within the state. Best Usage Classifications (BUC) and Stream Index Numbers (SIN) follow *Classifications and Water Quality Standards* published for each river basin (DEM, Cape Fear 1993), as updated through January 2004. Dan's Creek (SIN 18-64-7) has been assigned a BUC of **C Sw** from its source to Livingston Creek. Mill Creek (18-64-7-2) has been assigned a BUC of **C Sw** from its source to Dan's Creek (DEM, Cape Fear 1993; DWQ, BIMS 2005).

Class **C** waters are freshwaters protected for secondary recreation, fishing, aquatic life (including propagation and survival), and wildlife. Secondary recreation is any activity involving human body contact with water on an infrequent or incidental basis (DEM, Standards 1996). The **Sw** designation refers to the swampy low flow, low oxygen nature of the stream. There are no restrictions on watershed development activities (DEM, Standards 1996).

No waters classified as High Quality Water (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area (DWQ, BIMS 2005). Neither Dan's Creek nor Mill Creek within the project study area have been listed as impaired waters according to the 303(d) list (DWQ, List 2005).

The project study area watershed is cleared for both agriculture and forestry purposes. Residential uses are low-density single-family homes. Potential threats to stream quality in this area are forestry operations that would result in increased soil erosion, and runoff from agricultural and residential areas.

Basin-wide water quality assessments are conducted by the DWQ. The program has established monitoring stations for sampling selected benthic macroinvertebrates, which are known to have varying levels of tolerance to water pollution. An index of water quality can be derived from the number of taxa present and the ratio of tolerant to intolerant taxa. Streams can then be given a bioclassification ranging from Poor to Excellent.

There are no monitoring stations on Dan's Creek or Mill Creek. The nearest sampling station is located about 4 miles downstream of the project study area on Livingston Creek at US 74. It was classified as Fair in 1993 and Good-Fair in 1998 (DWQ, Assessment 2004).

Discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge are broadly referred to as "point sources." Wastewater point source discharges include municipal (city or county) Waste Water Treatment Plants (WWTP), industrial WWTP, small domestic wastewater treatment plants serving schools, commercial offices, residential subdivisions, and individual homes (DWQ, Permits 2005). Stormwater point source discharges include stormwater collection systems for municipalities and stormwater discharges associated with certain industrial activities. Point source discharges must apply for and obtain an NPDES permit to discharge. Point source discharges in North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) program administered by the DWQ. There are no permits issued to discharge within the project study area as of May 2005 (DWQ, Permits 2005).

3. Anticipated Impacts to Water Resources

Any action that affects water quality can adversely affect aquatic organisms. Temporary impacts during the construction phases may result in long-term impacts to the aquatic community. In general, replacing an existing structure in the same location with an off-site detour is the preferred approach to minimize environmental impacts. Bridge replacement on a new alignment results in more severe impacts, and physical impacts are incurred at the point of bridge replacement.

Project construction may result in the following impacts to surface water resources:

- Increased sediment loading and siltation as a consequence of watershed vegetation removal, erosion, and/or construction.
- Decreased light penetration/water clarity from increased sedimentation.
- Changes in water temperature with vegetation removal.
- Changes in the amount of available organic matter with vegetation removal.
- Increased concentration of toxic compounds from highway runoff, construction activities and construction equipment, and spills from construction equipment.
- Alteration of water levels and flows as a result of interruptions and/or additions to surface and groundwater flow from construction.

Construction impacts may not be restricted to the communities in which the construction activity occurs, but may also affect downstream communities. Efforts will be made to ensure that no sediment leaves the construction site. *NCDOT's Best Management Practices for the Protection of Surface Waters* will be implemented, as applicable, during the construction phase of the project to ensure that no sediment leaves the construction site.

4. Impacts Related to Bridge Demolition and Removal

In order to minimize potential impacts to water resources in the project area, *NCDOT's Best Management Practices for Bridge Demolition and Removal* will be implemented. The superstructures for both Bridge No. 280 and 281 consist of a reinforced concrete deck on I-beams. Their substructure consists of reinforced concrete end bents and interior bents, with concrete caps on timber piles. Bridge No. 280 has 4 spans and totals 73 feet in length. Bridge No. 281 has 3 spans and totals 55 feet in length.

There is the potential for the concrete deck and parts of the interior and end bents for both bridges to be dropped into waters of the United States during demolition and removal. The maximum resulting temporary fill associated with the removal of Bridge No. 280 is approximately 30.7 cubic yards. The maximum resulting temporary fill associated with the removal of Bridge No. 281 is approximately 40.3 cubic yards.

The segments of Dan's Creek and Mill Creek within the project study area are Class **C Sw** waters. Due to the size of Dan's Creek and Mill Creek, and their distance from the Cape Fear River, these creeks are unlikely to serve as habitat for the shortnose sturgeon (*Acipenser brevirostrum*).

The streambed in the project study area is sand, silt, and organic matter. Therefore, conditions in the stream raise sediment concerns and a turbidity curtain is recommended.

D. Biotic Resources

1. Plant Communities

Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow the NHP classification system (Schafale and Weakley, 1990) where possible and the descriptions written to reflect local variations within the project study area. Six terrestrial plant communities were identified within the project study area: mixed hardwood forest, pine woodland, swamp forest, agricultural land, successional (clear-cut) land and maintained/disturbed areas **(see Figure 7).**

Mixed Hardwood Forest - This community is characterized by the dominance of hardwoods in the canopy and is found on uplands. This community is located east of SR 1843 and south of Dan's Creek within the project study area. Typical overstory vegetation consists of southern red oak (*Quercus falcata*), willow oak (*Quercus phellos*), red maple (*Acer rubrum*), sweetgum and eastern red cedar (*Juniperus virginiana*).

A few pines (*Pinus* spp.) may be scattered throughout this community type. Understory vegetation generally consists of sapling-sized overstory species as well as flowering dogwood (*Cornus florida*) with an herbaceous layer consisting of Japanese honeysuckle (*Lonicera japonica*) and greenbrier (*Smilax* sp.).

Pine Woodland - The pine woodland community type is characterized by a predominance (greater than 80 percent cover) of pines in the canopy. Within the project study area pine woodland occupies the northwestern tip and the upland area north and adjacent the Mill Creek wetland. The canopy is dominated by loblolly pine. Vegetative composition varies depending upon hydrologic regimes. The wetter areas consist of a developing hardwood sub-canopy that includes laurel oak (*Quercus laurifolia*) and water oak, with shrubs consisting of horsesugar (*Symplocos tinctoria*), fetterbush (*Lyonia lucida*) and sweet gallberry (*Ilex coriacea*). The herbaceous layer in these wet areas is sparse consisting of giant cane (*Arundinaria gigantea*) and peatmoss (*Sphagnum* sp.). The dryer areas consist of a developing sub-canopy that includes water oak, sweetgum and southern red oak with shrubs that include wax myrtle (*Myrica cerifera*) and red bay (*Persea palustris*). The herbaceous layer is sparse with coral honeysuckle (*Lonicera sempervirens*) and Japanese honeysuckle.

Swamp Forest - This community occurs along the banks and on the floodplain of Dan's Creek and Mill Creek throughout the project study area. The canopy consists of green ash (*Fraxinus pennsylvanica*), bald cypress (*Taxodium distichum*), red maple, and water tupelo (*Nyssa aquatica*). Vines and herbaceous species present include poison ivy (*Toxicodendron radicans*), greenbrier, royal fern (*Osmunda regalis*) and cinnamon fern (*Osmunda cinnamomea*). This community represents a Coastal Plain Small Stream Swamp (Blackwater subtype) as described by Schafale and Weakley (1990).

Agricultural Land - Agricultural land within the project study area is used for row crops and pasture lands. Corn (*Zea mays*) and soybean (*Glycine max*) are the dominant row crops within the project study area. Cattle are the predominant livestock species within the project study area.

Successional (Clear-Cut) Land - This community type is different from various other forest communities by dominance of vegetation within the herbaceous or shrubby strata rather than dominance of vegetation in the tree strata. Vegetation within the regenerating areas consists of remnants of previous forest cover with varying amounts of early successional species. The northeast portion of swamp forest was clear-cut about three years ago and is now a natural regenerating community. Vegetation occurring within this wetland area includes shrub and tree species such as buttonbush (*Cephalanthus occidentalis*), sweetgum, bald cypress, black willow (*Salix nigra*) and loblolly pine (*Pinus taeda*). Vines and herbaceous species present include greenbrier, trumpet creeper (*Campsis radicans*), Bulrush (*Scirpus cyperinus*) and palmetto (*Sabal minor*). Additional upland clear-cut areas occur north of, and are contiguous with, the clear-cut swamp forest. Regenerated vegetation within this area includes shrub and tree species to include loblolly pine, sweetgum, red maple and American holly (*Ilex opaca*), with an herbaceous layer of broomsedge (*Andropogon virginicus*) and bracken fern (*Pteridium aquilinum*).

Maintained/Disturbed Areas - The maintained/disturbed areas include roadsides, driveways, maintained residential yards and other areas where human related activities dominate. Also within the general category of maintained/disturbed areas are areas characterized as maintained roadside and maintained powerline right-of-way.

- **Maintained Residential** - The residential areas that are routinely maintained have an herbaceous species composition including fescue (*Festuca obtusa*), clover (*Trifolium* sp.), common dandelion (*Taraxacum officinale*) and indian strawberry (*Duschesnea indica*).

- **Maintained Roadside** - This community covers the areas along the road shoulders and fill banks within the project study area and is mowed on a regular basis. The average width is 15 feet. The roadway is built on fill that drops steeply down from 3 to 6 feet to the adjacent communities. Species occurring in this area include vetch (*Vicia* sp.), Japanese honeysuckle and dayflower (*Commelina communis*).

- **Maintained Powerline Right-of-Way** - This community extends along the east side of SR 1843 through the project study area and is mowed or otherwise maintained on a semi-regular basis. The right-of-way width is approximately 25 feet. The central portion of the powerline right-of-way within the Dan's Creek and Mill Creek floodplain is jurisdictional wetlands, while the extreme north and south ends in the project study area are uplands. Shrub and small trees present include privet (*Ligustrum sinense*), elderberry, sweetgum, red maple and bald cypress. Vine species present include greenbrier (*Smilax bona-nox, Smilax rotundifolia*), poison ivy and trumpet creeper.

2. Wildlife

Wood thrush (*Hylocichala mustelina*), mourning dove (*Zenaida macroura*), Carolina wren (*Thryothorus ludovicianus),* northern cardinal (*Cardinalis cardinalis*), goldfinch (*Carduelis tristis*), white-eyed vireo (*Vireo griseus*), Acadian flycatcher (*Eripidonax virescens*) and red-bellied woodpecker (*Melanerpes carolinus*) are likely to occur within the **Mixed Hardwood Forest** community. Other inhabitants may include eastern box turtle (*Terrapene carolina carolina*), white-footed mouse (*Peromyscus leucopus*), Virginia opossum (*Didelphis virginiana)* and gray squirrel (*Sciurus carolinensis*).

Pine warbler (*Dendroica pinus*), eastern towhee (*Pipilo erythrophthalmus*), downy woodpecker (*Picoides pubescens*) and Carolina wren are likely to be observed in the **Pine Woodland** community. Other inhabitants may include brown creeper (*Certhia familiaris*), white breasted nuthatch (*Sitta carolinensis*), bobcat (*Felis rufus*), eastern cottontail (*Sylvilagus floridanus*), eastern mole (*Scalopus aquaticus*), ground skink (*Scincella lateralis*) and northern black racer (*Coluber constrictor*).

Bird species observed in the **Swamp Forest** community include barred owl (*Strix varia*) and great blue heron (*Ardea herodias*). Bird species expected to occupy the **Swamp Forest** include red-shouldered hawk (*Buteo lineatus*), prothonotary warbler (*Protonotaria citrea*), Louisiana waterthrush (*Seiurus motacilla*), Swainson's warbler (*Limnothlypis swainsonii*) and white-eyed vireo. Herpetofauna that may be encountered here include eastern cottonmouth (*Agkistrodon piscivorus piscivorus*), redbelly water snake

(*Nerodia erythrogaster erythrogaster*) snapping turtle (*Chelydra serpentina*), yellowbelly slider (*Trachemys scripta scripta*), Florida cooter (*Pseudemys floridana floridana*) and southern dusky salamander (*Desmognathus auriculatus*). Mammal species such as Virginia opossum, raccoon (*Procyon lotor*), bobcat, southern short-tailed shrew (*Blarina carolinensis*) and hispid cotton rat (*Sigmodon hispidus*) may be found in the swamp forest.

The animal species present in the **Agricultural Land** community are opportunistic and capable of surviving on a variety of resources ranging from vegetation to both living and dead faunal components. American crow (*Corvus brachyrhynchos*), northern mocking bird (*Mimus polyglottus*), northern cardinal, common grackle (*Quiscalus quiscula*), blue jay (*Cyanocitta cristata*), indigo bunting (*Passerina cyanea*), European starling (*Sturnus vulgaris*) and eastern kingbird (*Tyrannus tyrannus*) are expected to occur within this community. Other inhabitants may include southern five-lined skink (*Eumeces inexpectatus*), corn snake (*Elaphe guttata guttata*), eastern harvest mouse (*Reithrodontomys humulis*) and white-tailed deer (*Odocoileus virginianus*).

Successional (clear-cut) areas have limited cover and protection for many faunal species, but have increased habitat for others able to utilize these anthropogenic habitats. Common bird species expected to occur within this community include Carolina wren, northern cardinal and the American crow. Other inhabitants tolerant of disturbance likely to occur within this community include the black rat snake (*Elaphe obsoleta obsoleta*), gray squirrel and eastern cottontail.

The animal species present in the **Maintained Roadside** community are opportunistic and capable of surviving on a variety of resources ranging from vegetation to both living and dead faunal components. American crow, European starling and American robin (*Turdus migratorius*) are common birds that use these habitats. The area may also be used by the Virginia opossum, various species of mice (*Peromyscus* sp.), eastern garter snake (*Thamnophis sirtalis*) and southern toad (*Bufo terrestris*).

The animals that utilize the **Maintained Powerline Right-of-Way** community are similar to those found in the maintained roadside community. Other species may include common yellowthroat (*Geothlypis trichas*), Carolina wren, eastern cottontail and black rat snake.

3. Aquatic Communities

Within the project study area, Dan's Creek and Mill Creek are low-gradient, third-order streams. The bed material consists of mostly sand, silt and organic matter. On the day of the site visit, the water was opaque. Aquatic vegetation within Mill Creek included coontail (*Ceratophyllum demersum*) and spatterdock (*Nuphar luteum*).

Dan's Creek and Mill Creek are likely to support populations of largemouth bass (*Micropterus salmoides*), redbreast sunfish (*Lepomis auritis*), spotted sucker (*Minytrema melanops*), chain pickerel (*Esox niger*), American eel (*Anguilla rostrata*) and various other sunfish, suckers, minnows and catfish.

4. Anticipated Impacts to Biotic Communities

Terrestrial Communities – Potential impacts to plant communities are based on the approximate area of each plant community within the proposed right of way and temporary construction limits. Terrestrial communities in the project study area will be impacted permanently by project construction from clearing and paving. Table 2 describes the potential impacts to terrestrial communities by habitat type. Plant community mapping has been provided on an aerial photograph **(Figure 7)**.

Table 2
Potential Impact to Terrestrial Communities

Community Type	Potential Area of Impact Acres (Hectares)		
	Alternative A	*Alternative B*	*Alternative C (Preferred)*
Mixed Hardwood Forest	0.04 (0.02)	0.33 (0.14)	0.04 (0.02)
Pine Woodland	0.00 (0.00)	0.49 (0.20)	0.00 (0.00)
Swamp Forest	0.24 (0.98)	0.80 (0.33)	0.24 (0.98)
Agricultural/Pasture Land	0.00 (0.00)	1.08 (0.45)	0.00 (0.00)
Successional Land	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Maintained/Disturbed Areas			
• Residential	0.02 (0.01)	0.11 (0.05)	0.02 (0.01)
• Roadside	0.06 (0.03)	0.28 (0.11)	0.06 (0.03)
• Powerline	0.06 (0.03)	0.65 (0.26)	0.06 (0.03)
Total Impact	**0.42 (0.17)**	**3.74(1.52)**	**0.42 (0.17)**

Note: Due to changes in the design for Alternatives A and B and the addition of Alternative C since the publication of the Natural Resources Technical Report in January 2004, the area totals above have been updated to reflect the impacts of the current alternatives.

Destruction of natural communities along the project alignment will result in the loss of foraging and breeding habitats for the various animal species that utilize the area. Animal species will be displaced into surrounding communities. Adult birds, mammals, and some reptiles are mobile enough to avoid mortality during construction. Young animals and less mobile species, such as many amphibians, may suffer direct loss during construction. The plants and animals that are found in the upland communities are generally common throughout central North Carolina.

Impacts to terrestrial communities, particularly in locations having steep to moderate slopes, can result in the aquatic community receiving heavy sediment loads as a consequence of erosion. Construction impacts may not be restricted to the communities in which the construction activity occurs, but may also affect downstream communities. Efforts should be made to ensure that no sediment leaves the construction site.

Aquatic Communities - Impacts to aquatic communities include fluctuations in water temperatures as a result of the loss of riparian vegetation. Shelter and food resources, both in the aquatic and terrestrial portions of these organisms' life cycles, will be affected by losses in the terrestrial communities. The loss of aquatic plants and animals will affect terrestrial fauna, which rely on them as a food source.

Temporary and permanent impacts to aquatic organisms may result from increased sedimentation. Aquatic invertebrates may drift downstream after construction and recolonize the disturbed area once it has been stabilized.

Sediments have the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, affecting the habitat by scouring and filling of pools and riffles, altering water chemistry and smothering different life stages. Increased sedimentation may also cause decreased light penetration through an increase in turbidity.

Wet concrete should not come into contact with surface water during bridge construction. Potential adverse effects can be minimized through the implementation of *NCDOT's Best Management Practices for Protection of Surface Waters.*

E. Special Topics

1. "Waters of the United States": Jurisdictional Issues

Surface waters within the embankments of Dan's Creek and Mill Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "Waters of the United States" (33 CFR 328.3). The surface waters within Dan's Creek and Mill Creek are classified as lower perennial riverine systems (R2). R2 systems have no tidal influence with a low gradient and a well-developed floodplain (Cowardin *et al.,* 1979).

Wetlands subject to review under Section 404 of the Clean Water Act (33 U.S.C. 1344) are defined by the presence of three primary criteria; hydric soils, hydrophytic vegetation, and evidence of hydrology within 12 inches of the soil surface for a portion (12.5) percent of the growing season (DOA 1987).

Wetland Descriptions - Jurisdictional wetlands within the project study area are primarily palustrine in nature, as defined in Cowardin *et al.* (1979), and as identified on NWI mapping (USFWS, Freeman 1989). Palustrine systems include all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5% (Cowardin *et al.,* 1979). Some wetland systems are defined as palustrine but are hydrologically influenced by adjacent streams through periodic overbank flooding and are considered riparian wetlands.

The riparian wetlands are commonly referred to as riverine wetlands, not to be confused with the Riverine system of Cowardin *et al.* (1979). Non-riparian wetlands are not typically influenced by overbank flooding and are commonly referred to as non-riverine wetlands. The wetlands within the project study area cover a large area and function as riparian wetlands. These jurisdictional areas are associated with Dan's Creek and Mill Creek and contain evidence of beaver activity.

Wetland Classifications - Wetland systems vary in vegetative composition, depending in part on hydrological regime and site-specific disturbances.

Three wetland types were identified (palustrine forested, palustrine scrub-shrub, and palustrine emergent) and are discussed as follows:

Palustrine forested (PFO) - These areas are identified as forested jurisdictional wetlands, which are palustrine in nature. The PFO community within the project study area is located within the swamp forest community type. Forested broad-leaved deciduous forests located within the project study area are defined as palustrine by Cowardin *et al.* (1979). These wetlands can potentially act as major receptors of upland runoff and are expected to have high value for sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation purposes. These systems also act as buffers during times of flooding by reducing runoff rates, thereby increasing absorption and infiltration (high value for flood flow alteration). Wildlife habitat value in these deciduous systems is also expected to be high. Vegetation diversity and aquatic affiliation offer vital components (food, water, and cover) for high wildlife value.

Palustrine scrub-shrub (PSS) – These areas are identified as jurisdictional wetlands that are palustrine in nature and dominated by woody vegetation less than 20 feet in height. PSS areas occupy sections of the successional/clear-cut land within the project study area. In the project study area, these wetlands were dominated by loblolly pine, elderberry, American holly, sweetgum, and red maple. These areas receive and process upland runoff and stream floodwaters, which relates to high values for sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and flood flow alteration. However, wildlife values are generally considered low because of the density of the shrub vegetation and the lack of canopy and understory structure.

Palustrine emergent (PEM) – These areas are identified as palustrine emergent wetland systems. Within the project study area, these systems typically have persistent vegetation and are found in low landscape depressions or partially excavated areas where woody shrubs and trees cannot establish or are kept from establishing by routine maintenance or disturbance. Within the project study area, these emergent communities are limited to the maintained power line right-of-way. Wetland values such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and flood flow alteration have largely been negated by the nature of the community (*i.e.,* disturbed and small size). Although this wetland type may provide occasional habitat for passerine birds and breeding habitat for some amphibians, wildlife habitat value is considered minimal.

Characteristics of Wetlands and Surface Waters - Jurisdictional wetlands occur within the project study area and will be impacted by project construction. Wetlands are present on both sides of Dan's Creek and Mill Creek within the project study area (**Figure 8**). Dan's Creek and Mill Creek meet the definition of surface waters and are, therefore, classified as waters of the United States.

2. Potential Impacts to Waters of the United States

Temporary and permanent impacts to wetlands and surface waters are estimated based on the amount of each jurisdictional area within the project limits.

Permanent impacts are those areas that will be in the construction limits and/or the proposed right-of-way for the new structure and approaches. Temporary impacts include those impacts that will result from temporary construction activities outside of the proposed right-of-way and/or those activities associated with staging areas.

Any construction activities involving the potential use of borrow and waste sites must be located outside the 400-foot buffer areas established for jurisdictional areas. Temporary impacts will be restored to their original condition after the project has been completed. Table 3 provides a summary of jurisdictional areas within the project study area for each alternative. The locations of wetlands and surface waters are presented in **Figure 8**.

Table 3
Potential Impacts to Jurisdictional Areas

Wetlands			
	Area Potential Impact Acres (Hectares)		
Wetland	*Alternative A*	*Alternative B*	*Alternative C (Preferred)*
W1a	0.32 (0.13)	0.32 (0.13)	0.05 (0.02)
W1b	0.01 (0.00)	0.03 (0.01)	0.01 (0.00)
W2	0.10 (0.04)	0.47 (0.19)	0.10 (0.04)
Total Impact:	**0.43 (0.17)**	**0.82 (0.33)**	**0.16 (0.06)**
Streams			
	Length of Potential Impact Feet (Meters)		
	Alternative A	*Alternative B*	*Alternative C (Preferred)*
Dan's Creek	80 (24)	77 (23)	50 (16)

Notes: Mill Creek could not be delineated because of lack of channel and accessibility and therefore the length of potential impact is unquantifiable.
Due to changes in the design for Alternatives A and B and the addition of Alternative C since the publication of the Natural Resources Technical Report in January 2004, the area totals above have been updated to reflect the impacts of the current alternatives.

3. Permits

Section 401 Water Quality Certification - A 401 Water Quality Certification, administered through the DWQ, will be required. This certification is issued for any activity, which may result in a discharge into waters for which a federal permit is required.

Section 404 of the Clean Water Act - In accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344), a permit is also required from the USACE for projects of this type for the discharge of dredged or fill material into "Waters of the United States".

It is anticipated that this project will fall under Nationwide Permit 23, which is a type of general permit. Nationwide Permit 23 is relevant to approved Categorical Exclusions. This permit authorizes any activities, work and discharges undertaken, assisted, authorized, regulated, funded or financed, in whole or in part, by another federal agency and that the

activity is "categorically excluded" from environmental documentation because it is included with a category of actions which neither individually nor cumulatively have a substantial effect on the environment. Activities authorized under nationwide permits must satisfy all terms and conditions of the particular permit. Final determination of permit applicability lies with the USACE. NCDOT will coordinate with the USACE and the Division of Water Quality to obtain the necessary permits.

4. Mitigation Evaluation

Mitigation of wetland impacts has been defined by the Council on Environmental Quality to include avoidance, minimization, and compensation. These activities must be considered in sequential order. Final mitigation decisions will be determined by the USACE and the NCDWQ.

Avoidance - Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". According to a Memorandum of Agreement (MOA) between EPA and USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures will be appropriate to the slope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes. It is not feasible to completely avoid Dan's Creek and Mill Creek and still meet the purpose and need for this project.

Minimization - Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to "Waters of the U.S.". Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median width, right-of-way widths, fill slopes, and/or road shoulder widths.

Mitigation – Compensatory mitigation includes restoration, enhancement, creation, or preservation of wetland and stream function and values that are lost when these systems are converted to other uses. The USACE usually requires compensatory mitigation for activities authorized under Section 404 of the Clean Water Act when unavoidable impacts total more than 0.10 acre of wetlands or 150 linear feet of perennial or intermittent streams. The NCDWQ may require compensatory mitigation for activities authorized under Section 401 of the Clean Water Act for unavoidable impacts to more than 1.0 acre of wetlands or more than 150 linear feet of perennial or intermittent streams.

Compensatory wetland mitigation will likely be required by the USACE for all of the alternatives since more than 0.1 acre of wetland will be impacted.

Compensatory stream mitigation will not be required for any of the alternatives since less than 150 linear feet of stream will be impacted.

F. Rare and Protected Species

1. Federally Protected Species

Plant and animal species with a federal classification of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.)

The USFWS lists 6 species under federal protection for Columbus County as of 11 August 2005 (USFWS, Columbus County 2003). These species are listed in Table 4.

Table 4
Species Under Federal Protection in Columbus County

Common Name	Scientific Name	Federal Status	Biological Conclusion
Vertebrates			
Shortnose sturgeon	*Acipenser brevirostrum*	E	No Effect
American alligator	*Alligator mississippiensis*	T (S/A)	N/A
Waccamaw silverside	*Menidia extensa*	T	No Effect
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Vascular Plants			
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E*	No Effect
Cooley's meadowrue	*Thalictrum cooleyi*	E	No Effect

E - Endangered-A species that is threatened with extinction throughout all or a significant portion of its range.
T - Threatened-A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
T (S/A) Similarity of Appearance-A species that is listed as threatened because of similarity of appearance with other rare species.
* Historic Record – the species was last observed in the county more than 50 years ago.

Alligator mississippiensis **(American alligator)** **Threatened (Similar Appearance)**
Family: Alligatoridae
Federally Listed: 1967

Male alligators may reach lengths of 15 feet while females tend to only reach 6 feet. These animals have a large, slightly rounded body with thick limbs, a broad head, and a very powerful tail used for propulsion in the water as well as for defense.

These reptiles frequent wetland areas and are the top predator of the food chain. Alligators will eat just about anything but prefer fish, turtles, and snails. Small mammals that venture to the water's edge may also be eaten. Young alligators mostly feed on insects, crustaceans, snails and fish.

The alligator's greatest value to the wetland is the "gator holes" created by adults as a resting area. After removing vegetation with its mouth an adult gator will thrash about in the depression to create a hole that will trap and retain water during rain events. These holes serve as refugia and watering areas for fish, birds, turtles, snakes and many other animals.

Alligators may expand their holes by digging underneath an overhanging bank up to 20 feet away from the water body. These areas are then expanded and used by the animals to survive dry seasons and winters.

A search of the NHP database found no recorded occurrences of American alligator within the project vicinity. However, Dan's Creek and Mill Creek should be considered potential habitat. The mobile nature of this species should protect it from any direct impacts but some habitat may be lost.

Although habitat is present, the federal listing for the alligator is due to "Similarity of Appearance" and therefore does not afford it any special protection and warrants no biological conclusion.

Biological Conclusion: **N/A**

***Picoides borealis* (Red-cockaded woodpecker)** **Endangered**
Vertebrate Family: Picidae
Federally Listed: 1970

The red-cockaded woodpecker is federally listed as Endangered. It is a small to medium-sized bird about 8 inches long, with a wingspan of 13.8 to 14.96 inches. The back and top of the head are black. The cheek is white. Numerous small white spots arranged in horizontal rows give a ladder-back appearance. The chest is dull white with small black spots on the side. Males and females look alike except males have a small red streak above the cheek.

Among woodpeckers, the red-cockaded has an advanced social system. They live in a group termed a "clan". The clan may have from two to nine birds, but never more than one breeding pair. The other adults are usually males and are called helpers. The helpers are usually the sons of the breeding male and can be from 1 to 3 years old. The helpers assist in incubating eggs, feeding young, making new cavities and defending the clans' area from other red-cockaded woodpeckers.

Roosting cavities are excavated in living pines, and usually in those that are infected with a fungus producing red-heart disease. A clan nests and roosts in a group of cavity trees called a colony. The colony may have one or two cavity trees to more than 12, but only one clan uses a cavity. In most colonies, all the cavity trees are within a circle about 1,500 feet wide. Open stands of pines with a minimum age of 80 to 120 years provides suitable nesting habitat. Longleaf pines are the most commonly used, but other species of southern pine are also acceptable. Dense stands of pines, or stands that have a dense hardwood understory, are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years or older, with foraging preference for pine trees 10 inches or larger in diameter. The woodpeckers diet consists mainly of insects, which include ants, beetles, wood-boring insects and caterpillars.

Biological Conclusion: **No Effect**

A search of the NHP files found no occurrences of the red-cockaded woodpecker within 3.0 miles of the project study area. The pine woodland within the project study area contains loblolly pines that are approximately 25 years old. This does not provide nesting or foraging habitat for red-cockaded woodpecker. Because of a lack of potentially suitable nesting or foraging habitat, this project will not impact this endangered species.

***Acipenser brevirostrum* (Shortnose sturgeon)** **Endangered**
Vertebrate Family: Acipenseridae
Federally Listed: 1967

The shortnose sturgeon is a medium-sized (17 to 35 inches) fish, with a relatively short snout and a wide mouth. Its body is somewhat elongate and pentagonal in cross section and armored with five bony plates (scutes), with dorsal and anal fins far back on the body.

Shortnose sturgeon inhabit rivers, estuaries and the sea, but populations are confined mostly to natal rivers and estuaries (NMFS, 1998). They typically inhabit lower sections of larger rivers and coastal waters along the Atlantic Coast. They may spend most of their year in brackish or salt water and move into fresh water only to spawn in spring or fall (Gilbert, 1989). The ideal spawning habitat for the shortnose sturgeon is faster-moving freshwater systems (USFWS, Red Book 1992).

During the fall and winter, an unknown portion of the population appears to leave the estuaries and move short distances into the Atlantic Ocean, but different patterns of movement have been found for different populations. Adults are found in deep water (33 to 66 feet) in the winter and shallow water (6 to 33 feet) in summer. Juveniles are nonmigratory and typically inhabit deep channels of swiftly flowing rivers above the salt wedge. This species is anadromous, spawning in freshwater at a temperature of 48° to 54° F from February to mid-May. Shortnose sturgeons are benthic forgers and prefer areas with soft substrate and vegetated bottoms. Juveniles feed on small crustaceans and insect larvae. Adults in freshwater feed mostly on crustaceans, insect larvae and mollusks; in estuaries they mainly eat polychaete worms, crustaceans and mollusks.

According to Menhinik (1991), the closest "stream record" occurrence in proximity to the project study area is in the Cape Fear River approximately 20 miles downstream.

Biological Conclusion: **No Effect**

A search of the NHP files found no occurrence of shortnose sturgeon within 3.0 miles of the project study area. Because of the size of Dan's Creek and Mill Creek, and their distance from the Cape Fear River, these creeks are unlikely to serve as habitat for the shortnose sturgeon. These creeks are not swift moving streams and are unlikely to serve as spawning habitat. It can be concluded that the project will not impact this endangered species.

Menidia extensa **(Waccamaw silverside)** **Threatened**
Vertebrate Family: Cladoniaceae
Federally Listed: 1987

Waccamaw silversides are slender fish 1.2 to 2.6 inches long with a silvery stripe on the side. The species is endemic to Lake Waccamaw and has only been found outside of the lake after flooding. In the lake it is abundant and forms large schools near the surface.

Spawning peaks in spring during lake warming and females lay their eggs on the sandy bottom. Both sexes mature after the first winter and most individuals die after their first spawning season.

The Waccamaw silverside is listed as threatened because the population's restricted range and short lifespan make it susceptible to rapid extinction. If nutrient overloading in Lake Waccamaw disrupted one spawning season, the population would be jeopardized. As summarized by the USFWS (2003), Critical Habitat has been designated for Lake Waccamaw "...in its entirety to mean high water level, and Big Creek from its mouth at Lake Waccamaw upstream approximately 0.4 mile to where the creek is crossed by County Road 1947. Constituent elements include high quality clear open water, with a neutral pH and clean substrate."

Biological Conclusion: **No Effect**

A search of the NHP database found no occurrences of Waccamaw silverside within 3.0 miles of the project study area. Since Dan's Creek and Mill Creek generally flow east, except for the canal at the origin of Dan's Creek, the project study area is not in the Waccamaw River drainage basin, although tenuously connected. Since the Waccamaw silverside is endemic to the Waccamaw River basin, it will not be impacted by this project.

Thalictrum cooleyi **(Cooley's meadowrue)** **Endangered**
Plant Family: Ranunculaceae
Federally Listed:

Cooley's meadowrue is a perennial herb that grows from 3 to 6 feet tall. In full sun the stems are erect, while under shady conditions they are leaning or trailing on the ground. The small linear leaflets are in groups of three. The flowers are few, small and have no petals. The sepals may be yellow-white or green.

Flowering occurs in June and fruiting occurs in August and September. The fruits are hard, dry, and small and remain on the plant until October. Preferred habitat is moist to wet bogs and savannahs kept open by frequent fire or other disturbance. Roadside ditches and powerline rights-of way are also sometimes utilized when moisture and soil conditions are appropriate. The plant is often found in association with tulip poplar, cypress, and/or Atlantic white cedar (*Chamaecyparis thyoides*).

Biological Conclusion: **No Effect**

A search of the NHP files found no occurrences of Cooley's meadowrue within 3.0 miles of the project study area. No bogs or savannahs exist within the project study area that are suitable habitat for this species. Because of a lack of suitable habitat, this project will not impact any population of Cooley's meadowrue.

***Lysimachia asperulaefolia* (Rough-leaved loosestrife)** **Endangered**
Plant Family: Primulacae
Federally Listed: 1987

The rough-leaved loosestrife is a perennial rhizomatous herb, with erect stems 12 to 24 inches in height. Leaves are unusually sessile, occurring in whorls of 3 or 4. They are broadest at the base (0.3 to 0.8 inches wide), entire and have three prominent veins. The yellow, bisexual flowers are borne on a loose, terminal raceme. The inflorescence usually has five petals with ragged margins near the apex, with dots or streaks. Flowering occurs from late May to early June and seeds are formed by August.
Despite winter dormancy, the plant is easy to recognize in the fall because of the reddish color and distinctive leaf patterns.

The habitat for the rough-leaved loosestrife is generally the ecotone between longleaf pine or oak savannas and wetter, shrubby areas, where moist, sandy, or peaty soils occur and where low vegetation allows abundant sunlight into the herb layer. Fire is the main factor for the suppression of taller vegetation. The rough-leaved loosestrife is associated with six natural community types: low pocosin, high pocosin, wet pine flatwoods, pine savannah, streamhead pocosin, and sandhill seep.

Biological Conclusion: **No Effect**

A search of the NHP database found no occurrences of rough-leaved loosestrife within 3.0 miles of the project study area. The pine woodland within the project study area contains no longleaf pine nor does any community type. Because of a lack of potentially suitable habitat for this species, this project will not impact rough-leaved loosestrife.

2. Federal Species of Concern

The February 5, 2003 FWS list also includes a category of species designated as "Federal Species of Concern" (FSC).

Federal Species of Concern (FSC) are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Table 5 includes FSC species listed for Columbus County and their state classifications. Organisms, which are listed as Endangered (E), Threatened (T), or Special Concern (SC) on the North Carolina Natural Heritage Program list of Rare Plant and Animal Species, are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. However, the level of protection given to state-listed species does not apply to NCDOT activities.

Table 5
Federal Species of Concern in Columbus County

Common Name	Scientific Name	State Status	Habitat Present
Vertebrates			
Bachman's sparrow	*Aimophila aestivalis*	SC	No
Eastern Henslow's sparrow	*Ammodramus henslowii susurrans*	SR	Yes
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SC (PT)	No
Carolina pygmy sunfish	*Elassoma boehlkei*	T	Yes
Waccamaw darter	*Etheostoma perlongum*	T	No
Waccamaw killifish	*Fundulus waccamensis*	SC	No
"Broadtail" madtom	*Noturus sp. 1*	SC	Yes
Mimic glass lizard*	*Ophisaurus mimicus*	SC	No
Invertebrates			
"Waccamaw lance pearlymussel"	*Elliptio sp.5*	SR	No
Waccamaw spike	*Elliptio waccamawensis*	T	No
Waccamaw fatmucket	*Lampsilis fullerkati*	T	No
Pee Dee lotic crayfish	*Procambarus lepidactylus*	--	No
Savannah lilliput	*Toxolasma pullus*	T (PE)	Yes
Cape Fear threetooth	*Triodopsis soelneri*	T	Yes
Vascular Plants			
Savannah indigo-bush	*Amorpha georgiana var. confusa*	E	No
Chapman's three-awn	*Aristida simpliciflora*	SR-T	No
Venus flytrap	*Dionaea muscipula*	SR-L SC	No
Harper's fimbry	*Fimbristylis perpusilla*	T	No
Long beach seedbox	*Ludwigia brevipesi*	SR-T	Yes
Raven's seedbox	*Ludwigia ravenii*	SR-T	Yes
Carolina bogmint	*Macbridea caroliniana*	T	Yes
Pineland plantain	*Plantago sparsiflora*	E	No
Swamp forest beaksedge	*Rhynchospora decurrens*	SR-P	Yes
Spring-flowering goldenrod	*Solidago verna*	SR-L	No
Wireleaf dropseed	*Sporobolus teretifolius sensu stricto*	T	No
Carolina asphodel	*Tofieldia glabra*	W1	No
Carolina grass-of-parnassus	*Parnassia caroliniana*	E	
Chapman's sedge	*Carex chapmanii*	W1	
Savannah cowbane	*Oxypolis ternata*	W1	

Sources: Amoroso, ed., 1999; LeGrand and Hall, eds., 1999

Key: T = Threatened, E = Endangered, SC = Special Concern, C = Candidate, SR = Significantly Rare, PE-Proposed by a Scientific Council as a status Endangered, PT-Proposed by a Scientific Council as a status Threatened, -L-Limited to North Carolina and adjacent states, W-1=Rare but relatively secure.

* Historic Record – the species was last observed in the county more than 50 years ago.

No FSC species were observed during the site visit. A review at NHP revealed that the Carolina pigmy sunfish was documented to occur in Livingston Creek at Watertank Road, and was last observed in 1998. No other FSC were documented to occur within 2 miles of the project study area. A review of the NHP rare plant and rare animal files revealed no recorded occurrences of these species within 2 miles of the project study area and no federal species of concern were identified during the field survey.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires agencies to take into account the effect of their undertakings (federally funded, licensed, or permitted) on properties included or eligible for inclusion in the National Register of Historic Places, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. This project has been coordinated with the North Carolina State Historic Preservation Officer (SHPO) in accordance with the Advisory Council's regulations and FHWA procedures.

B. Historic Architecture

On September 3, 2002, representatives of NCDOT, FHWA and SHPO met to discuss historic architectural issues in accordance with Section 106 of the National Historic Preservation Act. The result of that meeting, as documented on the "Concurrence Form for Properties Not Eligible for the National Register of Historic Places", is agreement by the attending parties that the bridges are not eligible for listing on the National Register, and that there are no historic properties affected by the project. A copy of the Concurrence Form is included in the Appendix.

In a memorandum dated March 12, 2003, the SHPO stated, "We have conducted a review of the project area and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed." A copy of the SHPO memorandum is also included in the Appendix.

C. Archaeology

The State Historic Preservation Officer (SHPO), in a memorandum dated March 22, 2002, stated, "There are no known archaeological sites within the proposed project area. Based on our knowledge of the area, it is unlikely that any archaeological resources that may be eligible for conclusion in the National Register of Historic Places will be affected by the project. We therefore recommend that no archaeological investigation be conducted in connection with this project." A copy of the SHPO memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

The project is expected to have an overall positive impact. Replacement of an inadequate bridge will result in safer traffic operations.

The project is considered a Federal "Categorical Exclusion" because of its limited scope and lack of substantial environmental consequences.

The replacement of Bridge No. 280 and Bridge No. 281 will not have an adverse effect on the quality of the human or natural environment with the use of the current North Carolina Department of Transportation standards and specifications.

The project is not in conflict with any plan, existing land use or zoning regulation. No change in land use is expected to result from the construction of the project.

No adverse impact on families or communities is anticipated. Right-of-way acquisition will be limited. No relocatees are expected with implementation of the proposed alternative.

No adverse effect on public facilities or services is expected. The project is not expected to adversely affect social, economic or religious opportunities in the area.

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) a review was conducted to determine whether minority or low-income populations might experience disproportionately high adverse human health and environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

The studied route does not contain any bicycle accommodations, nor is it a designated bicycle route; therefore, no bicycle accommodations have been included as part of this project.

This project has been coordinated with the United States Department of Agriculture, Natural Resources Conservation Service. The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland for all land acquisition and construction projects. Since the proposed project involves replacement of the bridges in their existing locations, no impacts to prime or locally important farmland are anticipated.

No publicly owned parks or recreational facilities, wildlife and waterfowl refuges, or historic sites of national, state or local significance in the immediate vicinity of the project will be impacted.

The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

No adverse effects to air quality are expected to result from this project. This project is an air quality "neutral" project and therefore, is not required to be included in the regional emissions analysis (if applicable), nor is a project level CO analysis required. Since the project is located in an attainment area, 40 CFR Part 51 is not applicable.

If vegetation or wood debris is disposed of by open burning, it shall be done in accordance with applicable local laws and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520 and 1990 Clean Air Act Amendments and the National Environmental Policy Act.

This evaluation completes the assessment requirements for air quality, and no additional reports are required.

Ambient noise levels may increase during the construction of this project; however this increase will be only temporary and is usually confined to daylight hours. There should be no notable change in traffic volumes after this project is completed. Therefore, this project will have no adverse effect on existing noise levels. Noise receptors in the project area will not be impacted by this project. This evaluation completes the assessment requirements for highway noise set forth in 23 CFR Part 772. No additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Environmental Management, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no underground storage tanks (UST) or hazardous waste sites in the project area.

There will be some inconvenience to local travel because of the construction of an offsite temporary detour. Columbus County Emergency Services Department indicates that this project will not substantially impact their response time. No adverse effect on the overall public is expected.

Columbus County is a participant in the National Flood Insurance Program. As shown in the Flood Insurance Rate Map (FIRM) for Columbus County (panel 200 of 350), the proposed project is located in an area within the 100-year flood (Zone A), and where base flood elevations have not been determined (**see Figure 9**). There are no detailed flood studies in the project area on Dan's Creek or adjoining streams.

Geotechnical borings for the bridge foundation will be necessary.

Based on the above discussion, it is concluded that no substantial adverse environmental impacts will result from the replacement of Bridge Nos. 280 and 281.

VIII. PUBLIC INVOLVEMENT

Efforts were undertaken early in the planning process (January 31, 2003) to contact local officials to involve them in the project development with scoping letters and newsletters.

A Citizens Informational Workshop was held on April 27, 2004 at the Acme Delco Volunteer Fire Department to present the studied alternatives and to solicit public comments. Alternatives A, B and C were presented. Ten people attended the workshop. Three citizens indicated that Alternative A was the preferred alternative for replacing the bridges.

IX. AGENCY COMMENTS

Letters from the commenting agencies are included in the Appendix.

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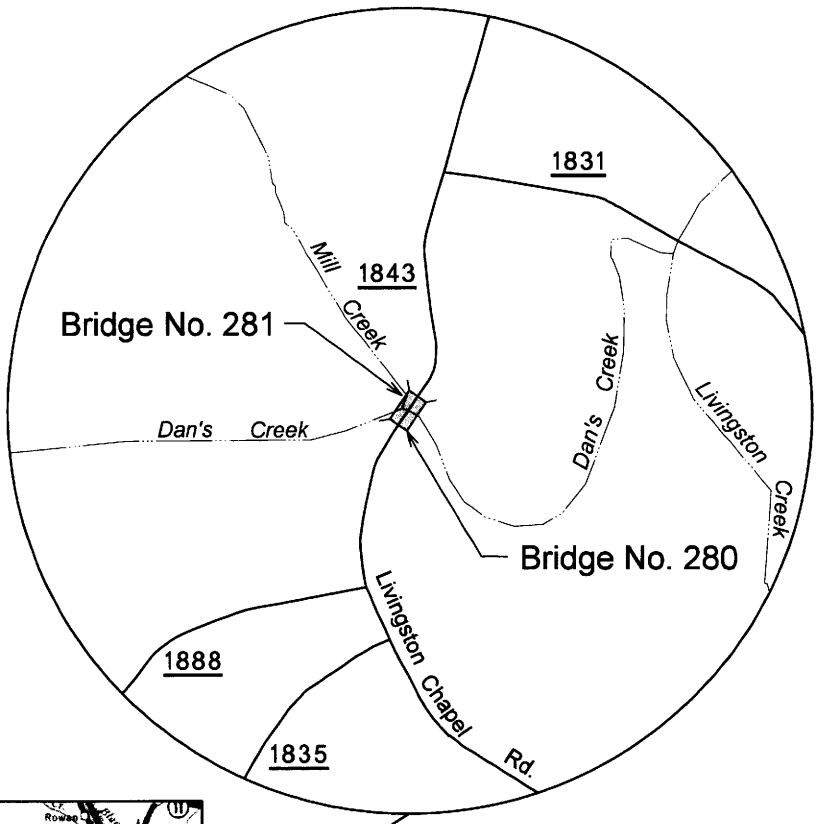
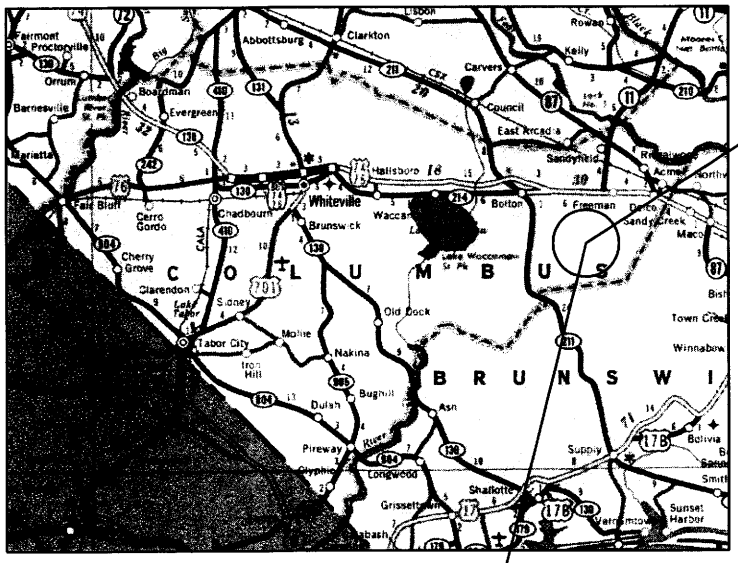
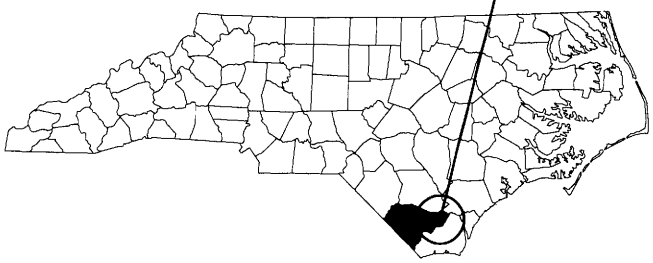
FIGURES

N.T.S.







NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843
TIP NO. B-4082

LOCATION MAP
FIGURE 1

EAST SIDE OF BRIDGE NO. 280
FROM SOUTHEAST QUADRANT

WEST SIDE OF BRIDGE NO. 281
FROM SOUTHWEST QUADRANT

NORTHBOUND TOWARD BRIDGES
FROM SOUTH APPROACH

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

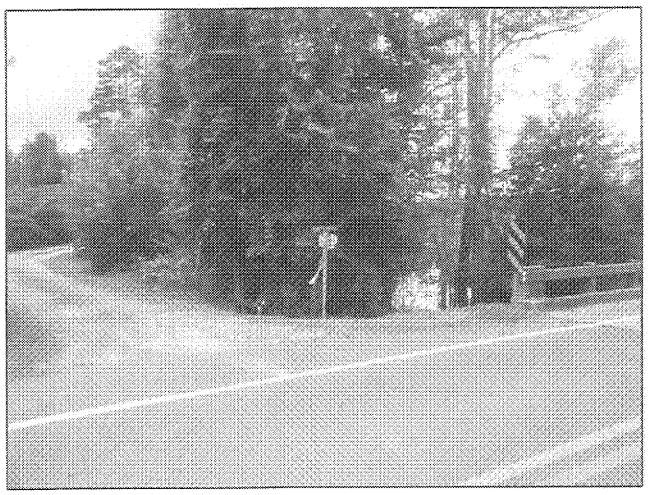
COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843
TIP NO. B-4082

NOT TO SCALE

PHOTOS
FIGURE 2

NORTHBOUND TOWARD BRIDGE NO. 281
FROM BRIDGE NO. 280

WETLANDS EAST OF
BRIDGE NO. 281



WESTBOUND TOWARD DRIVEWAY
BETWEEN BRIDGE NO. 280
AND BRIDGE NO. 281

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

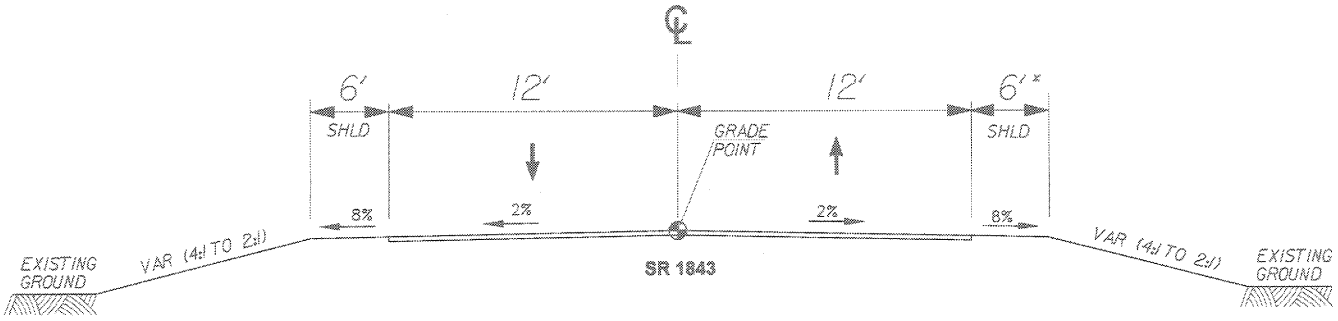
COLUMBUS COUNTY

BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843

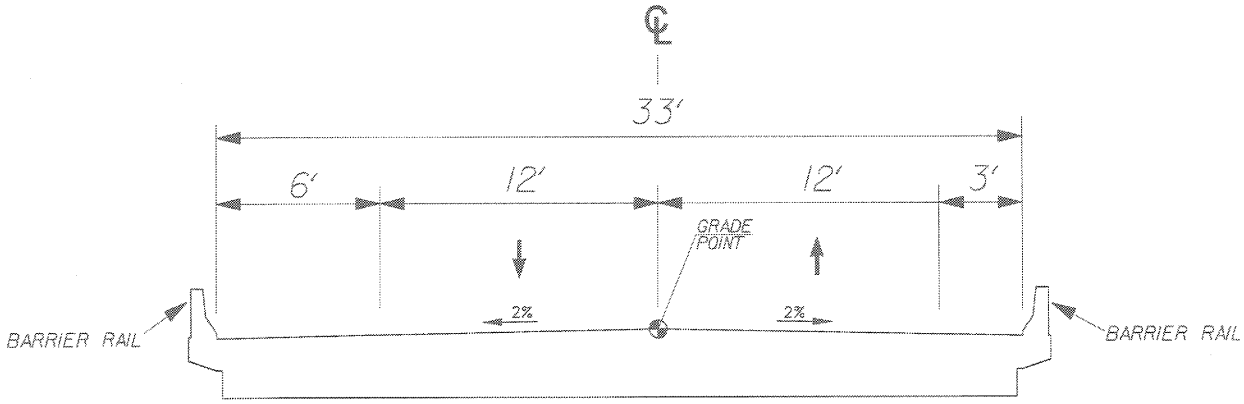
TIP NO. B-4082

NOT TO SCALE

PHOTOS
FIGURE 2A



ROADWAY APPROACH TYPICAL SECTION



PROPOSED BRIDGE TYPICAL SECTION

* ------- 8' WITH GUARDRAIL

DESIGN DATA

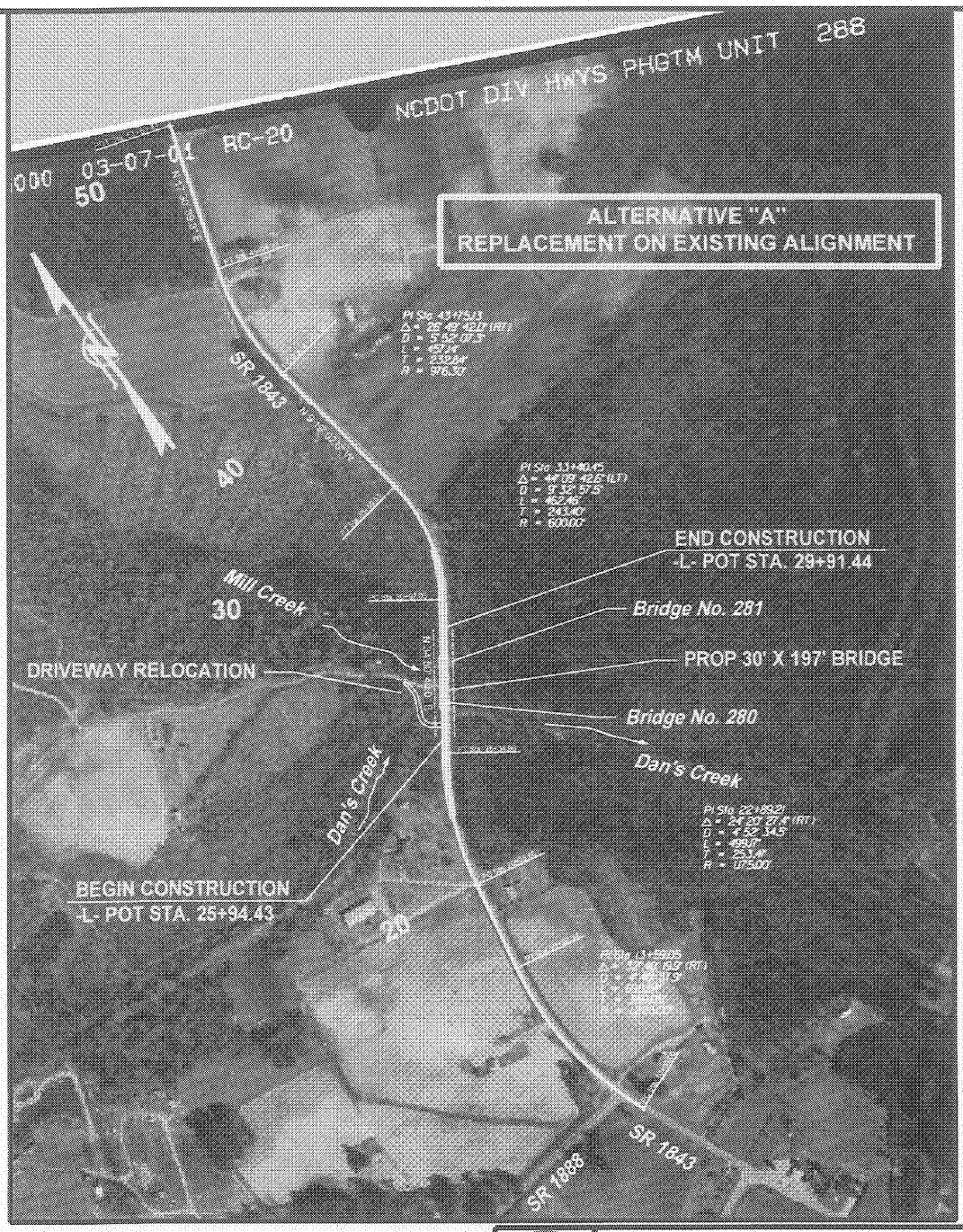
ADT 2007	930
ADT 2030	1,525
DUAL	2%
TTST	1%
DESIGN SPEED	60 mph
POSTED SPEED	55 mph
FUNCTIONAL CLASSIFICATION	Rural Local

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK &
BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843
TIP NO. B-4082

NOT TO SCALE

TYPICAL SECTIONS
FIGURE 3

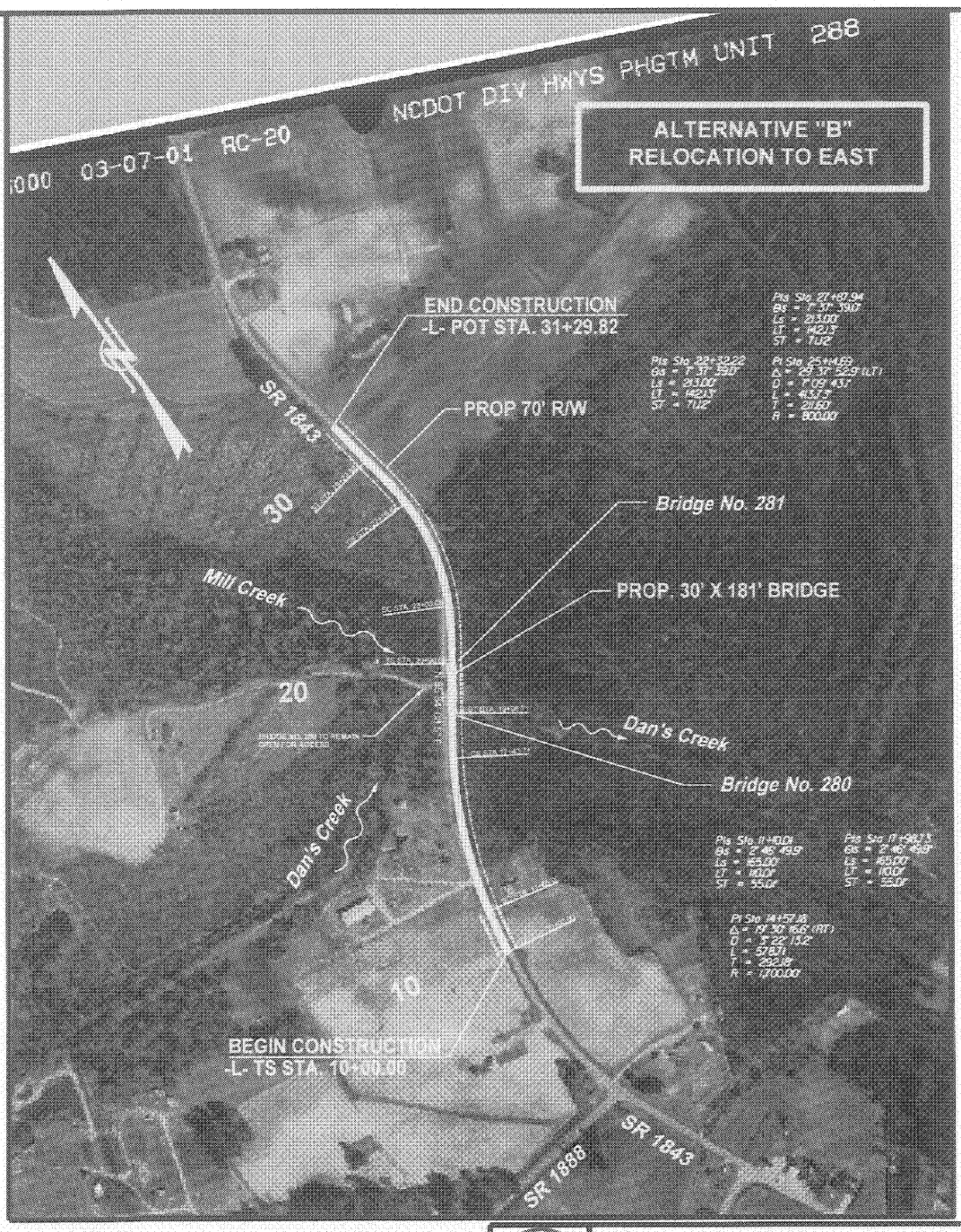


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843
TIP NO. B-4082

SCALE IN FEET
0 200 400

ALTERNATIVE A
FIGURE 4

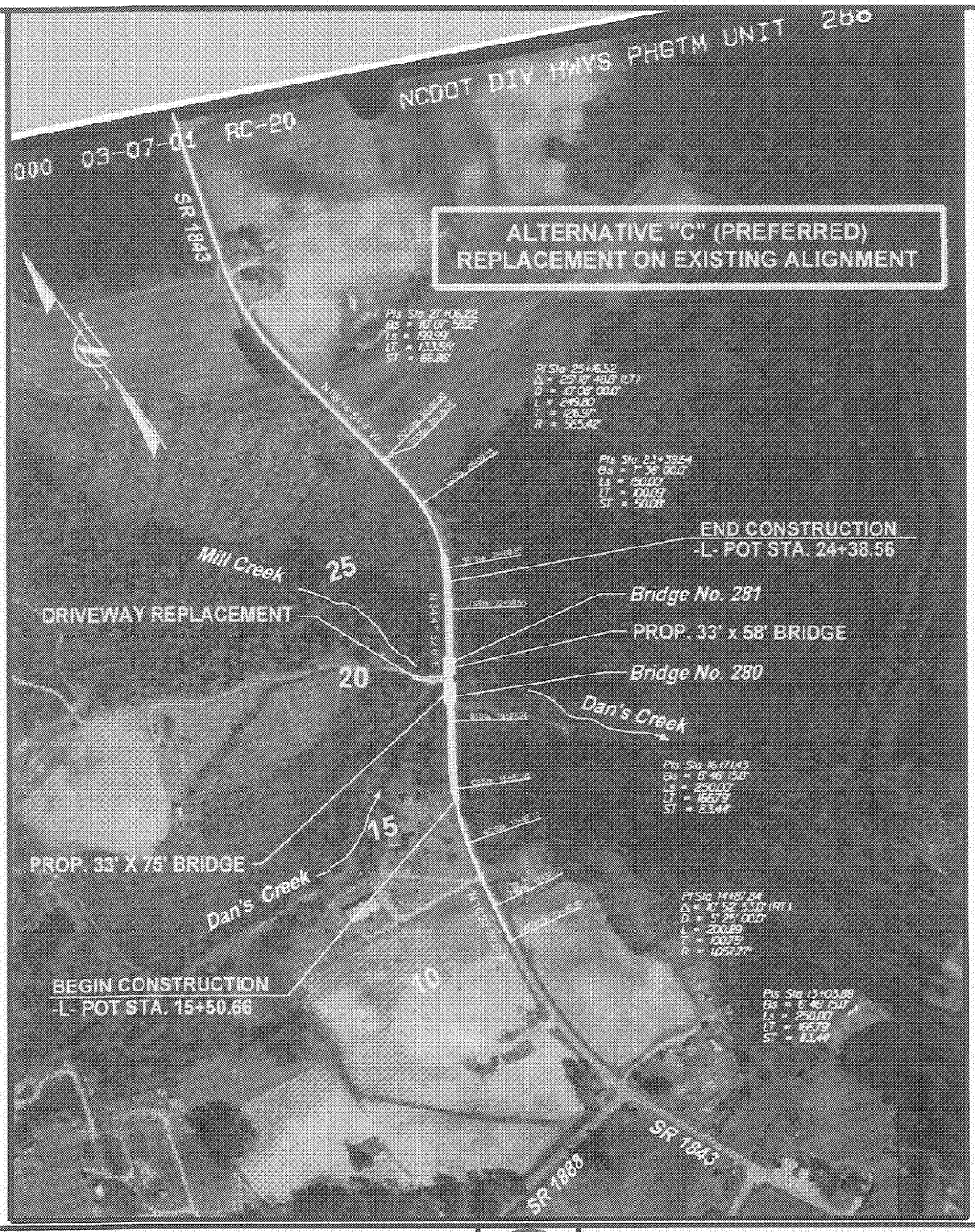


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843
TIP NO. B-4082

SCALE IN FEET
0 200 400

ALTERNATIVE B
FIGURE 5

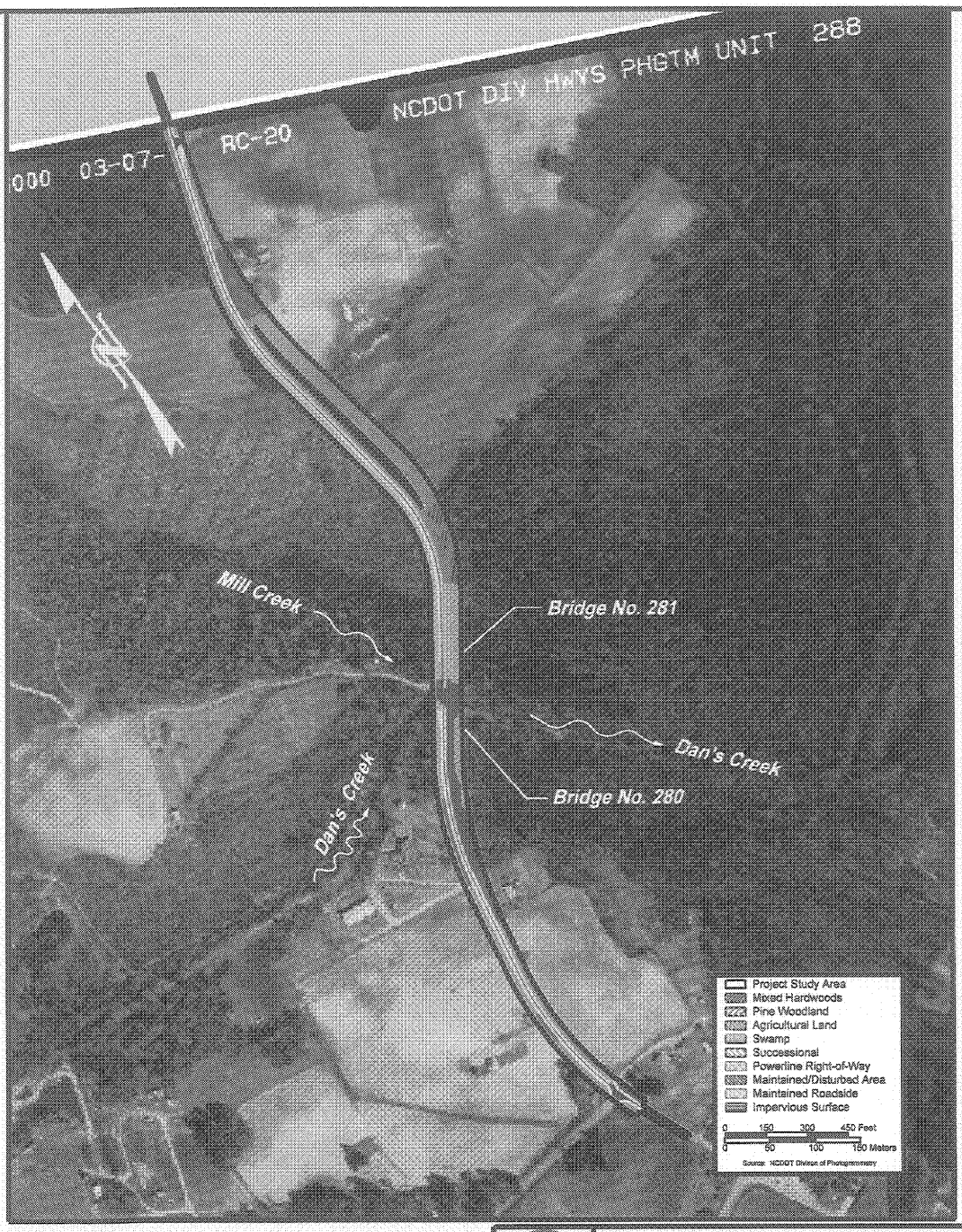


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK &
BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843
TIP NO. B-4082

SCALE IN FEET
0 800 1600

ALTERNATIVE C
FIGURE 6

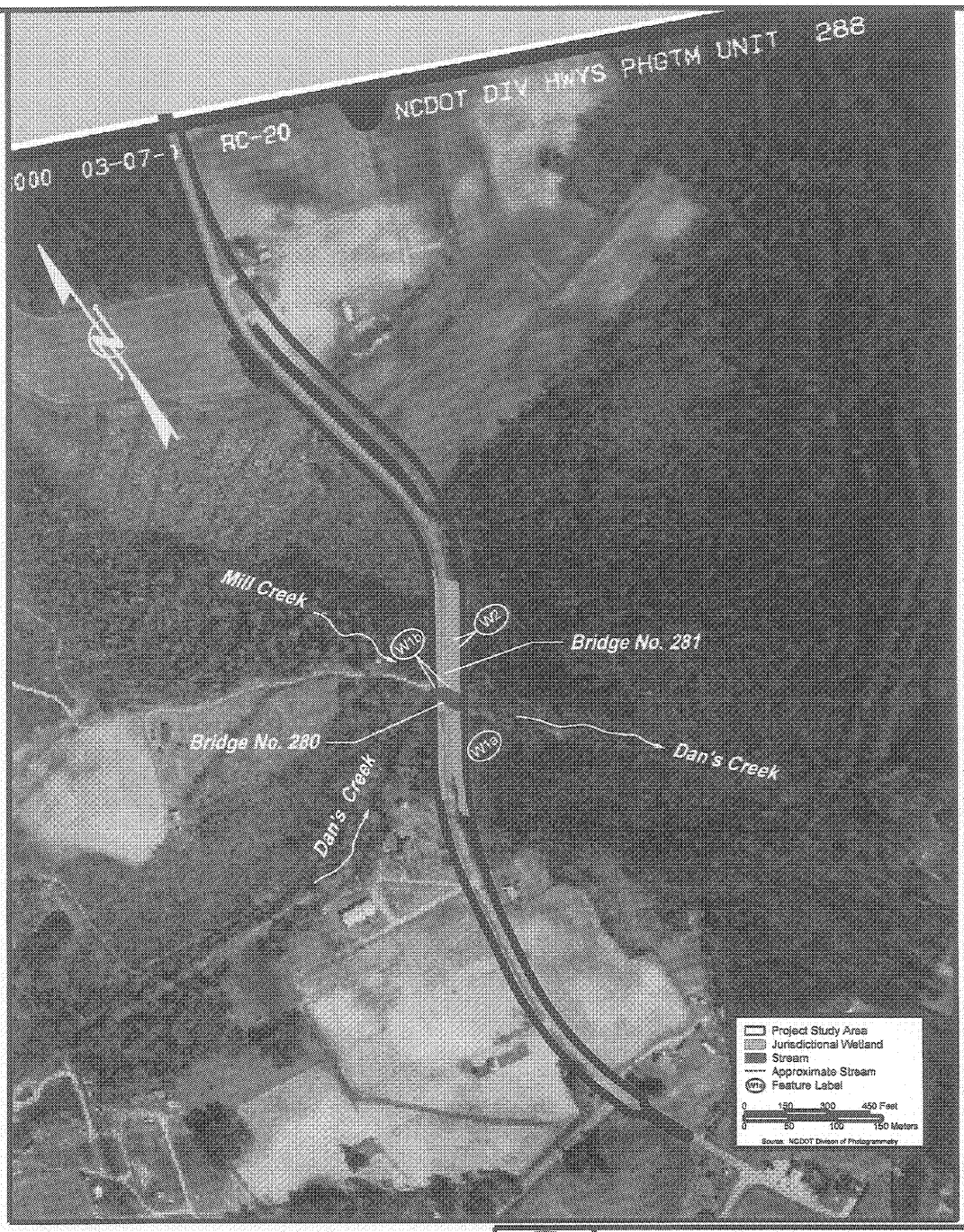


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK & BRIDGE NO. 281 OVER MILL CREEK ON SR 1843
TIP NO. B-4082

SCALE IN FEET
0 200 400

PLANT COMMUNITIES
FIGURE 7

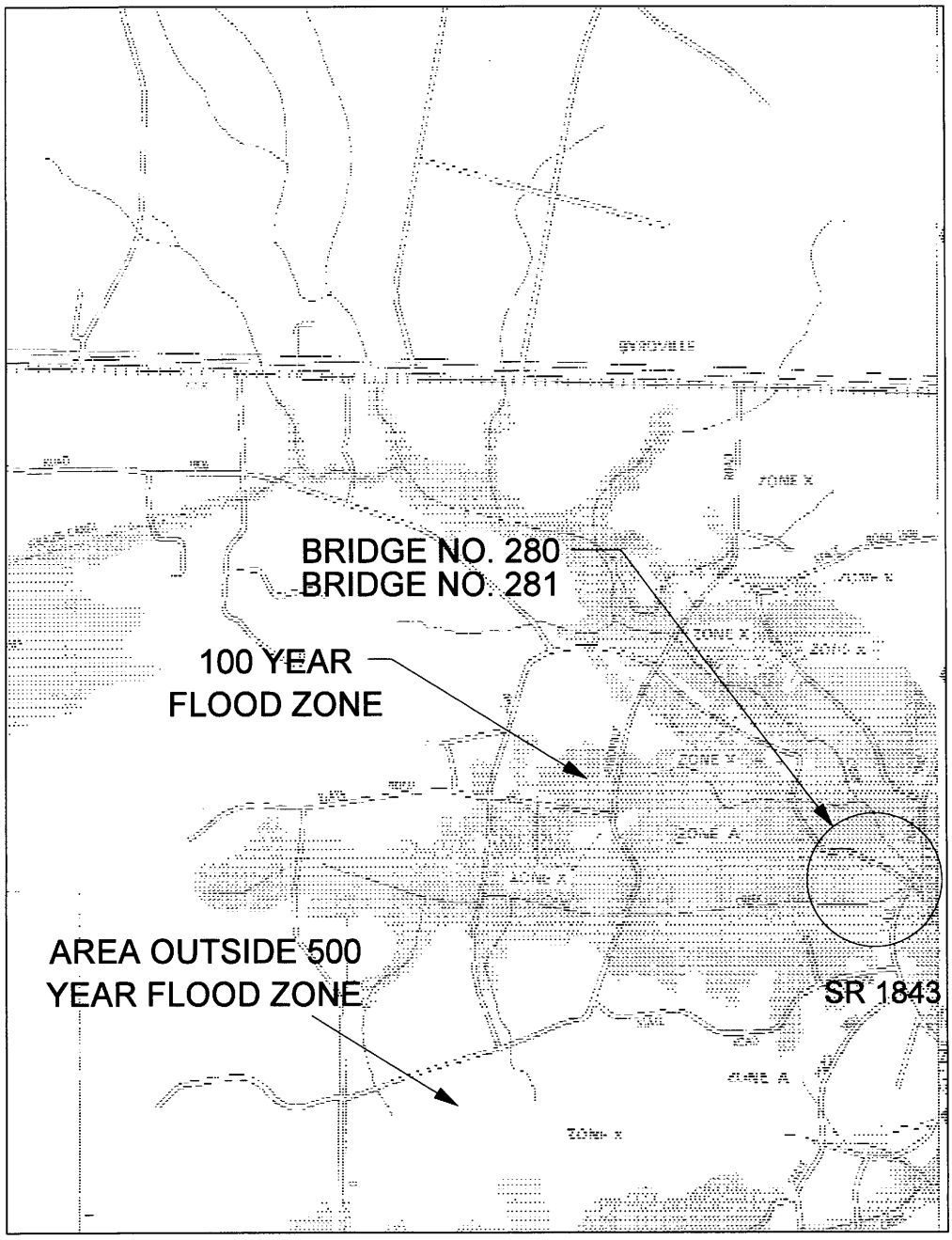


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK &
BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843
TIP NO. B-4082

SCALE IN FEET
0 200 400

JURISDICTIONAL WETLANDS
FIGURE 8



FEMA FLOOD INSURANCE RATE MAP
COMMUNITY - PANEL NUMBER
370305 0200 B
PANEL 200 OF 350

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY
BRIDGE NO. 280 OVER DAN'S CREEK &
BRIDGE NO. 281 OVER MILL CREEK
ON SR 1843
TIP NO. B-4082

NOT TO SCALE	FEMA RATE MAP FIGURE 9

APPENDIX

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

June 12, 2002

Mr. William T. Goodwin, Jr.
North Carolina Department of Transportation
Project Development and Environmental Analysis
Unit Head, Bridge Replacement Planning
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Goodwin:

This responds to your letters of March 1 and March 18, 2002, providing the U. S. Fish and Wildlife Service (Service) with Natural Resources Technical Reports (NRTR) on 26 bridges proposed for replacement in Construction Fiscal Year (CFY) 2005. Your letters requested the Service to review these reports and determine the level of concerns we might have for trust resources under our jurisdiction. This report provides scoping information in accordance with provisions of the Fish and Wildlife, Coordination Act (FWCA) (16 U.S.C. 661-667d) and Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543). This report also serves as initial scoping comments to federal and state resource agencies for use in their permitting and/or certification processes for this project.

The bridges scheduled for replacement are:

1. B-3611, Bridge No. 77 on NC 99 over Pantego Creek, Beaufort County;
2. B-4024, Bridge No. 136 on SR 1626 over Pantego Creek [Canal?], Beaufort County
3. B-4026, Bridge 45 on SR 1110 over Choowatic Creek, Bertie County;
4. B-4028, Bridges Nos. 12 and 18 over the Cape Fear River, Bladen County;
5. B-4031, Bridge No. 72 on NC 179 over Jinnys Branch, Brunswick County;
6. B-4077, Bridge No. 25 on NC 130 over Waccamaw River outflow, Columbus County
7. B-4082, Bridge 280 on SR 1843 over Dan's Creek, Columbus County;
8. B-4086, Bridge No. 10 on SR 1111 over Brices Creek, Craven County;
9. B-4090 - Bridge No. 125 on NC 24 over Cross Creek, Cumberland County;
10. B-4125, Bridge No. 46 on SR 1091 over Wheat Swamp Creek, Greene County;
11. B-4126, Bridge No. 49 on SR 1434 over Wheat Swamp Creek, Greene and Lenoir Counties;
12. B-4127, Bridge No. 43 on SR 1438 over Rainbow Creek, Green County;
13. B-4150, Bridge No. 67 on SR 1118 over Ahoskie Creek, Herford County;
14. B-4154, Bridge No. 108 on SR 1340 over Old State Canal, Hyde County;
15. B-4169, Bridge No. 7 on SR 1129 (Free Bridge Road) over Big Chinquapin Branch Jones County;

16. B-4187, Bridge No. 5 on SR 1417 over Conoho Creek, Martin County;
17. B-4214, Bridge No. 24 on US 17 over the New River, Onslow County;
18. B-4215, Bridge No. 19 on NC 210 over Stones Creek, Onslow County;
19. B-4219, Bridge No. 65 on SR 1304 over an unnamed tributary to the Neuse River, Pamlico County;
20. B- 4221 , Bridge No. 4 on SR 1344 over South Prong Bay River, Pamlico County;
21. B- 4223, Bridge No. 21 on NC 210 over the Northeast Cape Fear River, Pender County;
22. B-4227, Bridge No. 69 on SR 1222 over Unnamed tributary to Mill Creek, Perquimans County;
23. B-4234, Bridge No. 98 on SR 1407 over Conetoe Creek, Pitt County;
24. B-4235, Bridge No. 118 on SR 1538 over Grindel Creek, Pitt County;
25. B-4248, Bridge No. 170 on SR 1101 over Shoe Heel Creek (Gaddy Mill Road), Robeson County;
26. B-4272, Bridge No. 191 on SR 1845 over Great Coharie Creek, Sampson County; and,

General Scoping Comments

Some NRTRs contained only maps of the immediate project site and a verbal description of the project location. In reviewing our records of known locations for Federally listed species, it would be beneficial to the Service to have a map showing the location of the project. Each location map should include at least one municipality or sizable community to facilitate locating the project area.

The title page for B-4024 (Beaufort County) states that Bridge No. 136 on SR 1626 is over "Canal." The body of the report states that this bridge crosses Pantego Creek which appears to be the correct designation. Title pages should reflect the correct location of the project.

General Fish and Wildlife Habitat and Wetlands

For each project, we recommend the following conservation measures to avoid or minimize adverse environmental impacts to fish and wildlife resources:

1. Wetland impacts should be avoided and minimized to the maximum extent practical as outlined in Section 404 (b)(1) of the Clean Water Act Amendments of 1977. Areas exhibiting high biodiversity or ecological value important to the watershed and region should be avoided. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons.

2. Off-site detours should be used rather than construction of temporary, on-site bridges. For projects requiring an on-site detour in wetlands or open water, such detours should be aligned along or adjacent to existing, roadways, utility corridors, or previously developed areas in order to minimize habitat fragmentation and encroachment. At the completion of construction, the entire detour area, including any previous detour from past construction

activities, should be entirely removed and the impacted areas should be planted with appropriate, endemic vegetation, including trees if necessary;

3. If unavoidable wetland impacts are proposed, every effort should be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland impacts. Opportunities to protect mitigation areas in perpetuity, preferably via conservation easement, should be explored at the outset;

4. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning, and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 - June 15;

5. Best Management Practices (BMP) for Protection of Surface Waters should be implemented; and,

6. Activities within designated riparian buffers should be avoided or minimized.

Federal Species of Concern and State Listed Species

Federal Species of Concern (FSC) are those plant and animal species for which the Service remains concerned, but further biological research and field study are needed to resolve the conservation status of these taxa. Although FSCs receive no statutory protection under the ESA, we would encourage the NCDOT to be alert to their potential presence, and to make every reasonable effort to conserve them if found. The North Carolina Natural Heritage Program should be contacted for information on species under state protection.

Federally Protected Species

Several NRTRs make determinations that a project will not affect a particular species, primarily plants based on surveys in the recent past. The Service believes such determinations are premature and that additional surveys will be required prior to construction in approximately 2004-2005. It would be more appropriate to note that the species was not found during preliminary surveys and that results provide early indications that the project is not likely to adversely affect the species.

Effect determinations for plants based on surveys within the project area may require work at a particular time of year for accurate identification. The biological conclusions of the NCDOT for plants should include the time of year that a survey was conducted, the person hours of surveying, and the approximate size of the area surveyed. Surveys should be done within two or three years of actual construction for those species inhabiting stable and/or climax communities. Plant species that utilize disturbed communities, e.g., Michaux sumac (*Rhus michauxii*) and Cooley's meadowrue (*Thalictrum cooleyi*), should be done within two years of actual

construction if vegetation disturbing activities, e.g., regular mowing or timber harvesting, occur at the project site.

The NCDOT should carefully consider potential impacts to the West Indian manatee (*Trichechus manatus*) of bridge replacement projects in coastal counties. Several NRTRs, e.g., B-4235 (Pitt County), state that manatees require at least five feet of water. Manatees are able to use shallow channels that may not seem suited for such a large mammal. O'Shea and Ludlow (1992) wrote that the primary habitat requirements for the species are access to vascular aquatic plants, freshwater source, and proximity to channel 1-2 meters deep (3.3 -6.6 feet). Therefore, the NCDOT should only consider reaching a "no effect" determination for the manatee when water depths at the project site do not rise above one meter. Manatees may become entangled in erosion control and siltation fences placed in shallow water. Measures to prevent these devices from harming manatees are addressed in our 1996 guidelines to NCDOT (USFWS 1996). The biological conclusion of the NCDOT on impacts to manatees cannot be based on negative visual surveys of the project area. These mobile animals may not inhabit a given area for extended periods, and manatees may move into a given project site where the species has never been reported previously. The best procedure for ensuring the safety of these endangered mammals is to follow the Service's precautions if the area is suitable manatee habitat.

Surveys for mussels should extend 100 meters (328 feet) upstream and 300 meters (984 feet) downstream from the project site. Environmental documentation that includes survey methodologies, results, and NCDOT's recommendations based on those results, should be provided to this office for review and comment.

If surveys for a Federally protected species should determine that a given project would adversely affect the species, a biological assessment (BA) may be prepared to fulfill the section 7(a)(2) requirement and in determining whether formal consultation with the Service is necessary. Please notify this office with the results of the surveys for the listed species that may occur in the project area. Please include survey methodologies and an analysis of the effects of the action, including consideration of direct, indirect, and cumulative effects.

Project Specific Comments

In addition to the general comments applicable to all bridge replacement project, we offer the following project-specific comments:

B-3611, Bridge No. 77 on NC 99 over Pantego Creek, Beaufort County - The NRTR states (p. 16) that habitat for the manatee exists in the project area, but that no manatees were seen during natural resources investigations. The report concludes that the project would have "no effect" on the manatee. The Service does not concur with this determination. Manatees are seasonal transients in North Carolina from (primarily June through October). As noted, potential impacts on this species cannot be based on limited field inspections. The Service recommends that future project documentation include

commitments to follow procedures given in "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina" that the Service provided the NCDOT in 1996. A copy is provided with this letter.

Intertidal zones and marsh edges preferred by Federally threatened sensitive jointvetch (*Aeschynomene virginica*) are present in the project area, but the species was not observed during natural resources investigation. The NRTR provided a biological conclusion of "no effect." The Service will require additional surveys closer to the time of actual construction and greater details of survey methodology, including time of year and the intensity of the survey, before we can concur that the project will have no effect on the species.

The NRTR states that "marginal habitat exists for rough-leaved loosestrife [*Lysimachia asperulaefolia*] in the form of shallow organic soils adjacent to a forest community" in the project area. While the NRTR states that no plants were seen, the Service requires greater details of survey methodology before we can concur with the determination that the project will have no effect on rough-leaved loosestrife.

B-4024, Bridge No. 136 on SR 1626 over Pantego Creek, Beaufort County - The NRTR states (p. 3) that the average depth of Pantego Creek is 4.5 feet, but concludes (p. 14) that the necessary water depth for the manatee is not present. The Service disagrees and recommends that project plans should incorporates measures given in "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina" that the Service provided the NCDOT in 1996. Suitable habitat for sensitive jointvetch exists in the project area (p. 17), but the NRTR concludes that the project would have "no effect" on the species based, in part, on the fact that no plant were "found in the project area." The Service cannot concur with this determination. The Service will require additional surveys closer to the time of actual construction and greater details of survey methodology, including time of year and the intensity of the survey, before we can concur that the project will have no effect on the sensitive jointvetch.

B-4031, Bridge No. 72 on NC 179 over Jinnys Branch, Brunswick County - The NRTR states (p. 4) that water depths range from two to six feet, and concludes (p. 21) that "vagrant manatees visiting the lower Lumber river system would not be expected within the project area." The Service does concur with the biological conclusion of "no effect" on the manatee and requests that the project utilize the standard precautions for general construction in areas which may be used by manatees. The NRTR states that the biological conclusions for the bald eagle (*Haliaeetus leucocephalus*) and Federally endangered wood stork (*Mycteria americana*) are "unresolved." Wood storks may undertake post-breeding season dispersals from June through early autumn in search of food in swamps, marshes, and mudflats. The NCDOT should seek to determine whether the project area is used, if even on a temporary basis, by these species. If wood storks do feed in the project area during a limited portion of the year, the Service would recommend that this project be scheduled outside this particular period.

B-4086, Bridge No. 10 on SR 1111 over Brices Creek, Craven County - With an average depth of three feet, Brices Creek is not likely to used by manatees. The Service cannot concur with the determination that the project would have "no effect" on the sensitive jointvetch based the lack of observation during site survey in 2001 and an absence of historical occurrence in the project area. The NRTR notes that suitable habitat for this species is present in the project area. The Service will require additional surveys closer to the time of actual construction and greater details of survey methodology, including time of year and the intensity of the survey, before we can concur that the project will have no effect on the sensitive jointvetch..

B-4154, Bridge No. 108 on SR 1340 over Old State Canal, Hyde County - The NRTR notes that habitat for the sensitive jointvetch is present in the project area, but concludes that the project will have no impacts on the species, based in part, on a failure to find the species during surveys. The Service will require additional surveys closer to the time of actual construction and greater details of survey methodology, including time of year and the intensity of the survey, before we can concur that the project will have no effect on the sensitive jointvetch..

B-4219, Bridge No. 65 on SR 1304 over an unnamed tributary to the Neuse River, Pamlico County - The tributary to be crossed has an average depth of approximately four feet and the NRTR notes (p. 15) that "marginal" habitat for the manatee exists in the project area. The Service does not concur with the biological conclusion of "no effect" for the manatee and recommends that future project documentation include commitments to follow procedures given in "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina."

B- 4221 , Bridge No. 4 on SR 1344 over South Prong Bay River, Pamlico County - The NRTR (p. 3) notes that the average depth of the water to be bridged is approximately 3.5 feet and later concludes (p. 15) that the waterway is not deep enough or contain sufficient vegetation to provide habitat for the manatee. The Service cannot concur with the stated conclusion that "no impact to the West Indian manatee will result from project construction." We recommend that future project documentation include commitments to follow procedures given in "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina."

B- 4223, Bridge No. 21 on NC 210 over the Northeast Cape Fear River, Pender County - The NRTR notes (p. 20) that manatees could occur in the project area and states that impacts to the species are "unresolved." The NRTR also recommends that a "follow-up survey" be conducted. A one time survey will not determine the presence of this species at a particular construction site. The species moves through North Carolina coastal waters on a seasonal basis. If there is any chance that the species could occur at a construction site, the Service's guidelines (USFWS 1996) should be incorporated into project plans.

cc:
Ted Bisterfeld, U. S. Environmental Protection Agency, Atlanta, GA
Ron Sechler, NMFS, Beaufort, NC
Michael Bell. U. S. Army Corps of Engineers, Washington Regulatory Field Office, Washington, NC
Eric Alsmeyer, U. S. Army Corps of Engineers, Raleigh Regulatory Field Office, Raleigh NC
David Timpy, U. S. Army Corps of Engineers, Wilmington Regulatory Field Office, Wilmington NC
John Hennessy, NC Division of Water Quality, Raleigh, NC
David Cox, NC Wildlife Resources Commission, Northside, NC

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

March 4, 2003

Dr. Gregory J. Thorpe
Environmental Management Director
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of the proposed replacement of the following bridges:

Bridge No. 25 on NC 130 over Waccamaw River Overflow, Columbus County, TIP No. B-4077

Bridges No. 280 and 281 on SR 1843 over Dan's Creek, Columbus County, TIP No. B-4082

The Service previously provided scoping comments for these projects in a June 12, 2002 letter. We would like to emphasize our recommendation to conduct additional surveys for Cooley's meadowrue (*Thalictrum cooleyi*) and rough-leaved loosestrife (*Lysimachia asperulaefolia*). Surveys for these two species should be conducted within two years of actual project construction and should be conducted at the appropriate time of year for accurate identification.

The Service appreciates the opportunity to comment on this project. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Garland B. Pardue

Garland B. Pardue, Ph.D.
Ecological Services Supervisor

cc: Richard Spencer, USACE, Wilmington, NC
John Hennessy, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmore, NC
Chris Militscher, USEPA, Raleigh, NC

Ellerby

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Habitat Conservation Division
101 Pivers Island Road
Beaufort, North Carolina 28516-9722

July 18, 2002

William T. Goodwin, Jr., PE, Unit Head
Bridge Replacement Unit
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Goodwin

The National Marine Fisheries Service (NMFS) has reviewed the Natural Systems Technical Reports (NSTR) - Group 3, for 5 bridge replacement projects identified in your March 18, 2002, letter. These projects are scheduled for construction in fiscal year 2005. By letter dated May 9, 2002, the Wilmington District, U.S. Army Corps of Engineers identified the following issues and concerns as being relevant to the proposed bridge replacement projects:

- Replacing bridges with culverts
- Permanent and temporary wetland losses
- Offsite versus onsite detours
- Time of year restrictions on instream work
- Treatment of wetland restoration areas
- Existing bridge demolition and removal
- Lengthening existing bridges as a wetland restoration measure

The NMFS agrees that these issues should be fully addressed with regard to impacts and mitigation.

Section I - Yellow Light Projects (YLPs)

The bridge replacement projects listed below are located in areas that do not support NMFS trust fishery resources. Otherwise, they have normal environmental concerns and, therefore, are identified as YLPs.

Bridge Number	Project Number	Location
Bridge No. 170	B - 4248	Robeson County
Bridge No. 25	B - 4077	Columbus County

Section II - Red Light Projects (RLPs)

Red Light Projects are those that include extraordinary resources or concerns that will require close coordination to complete successfully. These projects involve high quality wetlands, extremely valuable or rare endangered species habitats, or other limited or unusual resources. The bridge replacement projects listed below are located in the Cape Fear River basin which is likely to support NMFS trust anadromous fishery resources including the threaten shortnose sturgeon and are, therefore, classified as RLPs.

Bridge Number	Project Number	Location
Bridge No. 125	B - 4090	Cumberland County
Bridge No. 280	B - 4082	Columbus County
Bridge Nos. 12 and 18	B-4028	Bladen County

Spawning and nursery habitat for anadromous fishes may be adversely impacted by these projects unless measures to avoid and minimize impacts to waters and wetlands are included in the project plans. Accordingly, the NMFS may recommend against Department of the Army authorization of these projects under Nationwide Permit 23 unless the following recommendations are incorporated:

1. Following impact avoidance and minimization, unavoidable wetland losses shall be offset through implementation of a compensatory mitigation plan that has been approved by the Corps of Engineers and in consultation with the NMFS.

2. All construction related activities in waters and associated wetlands shall utilize techniques that avoid and minimize adverse impacts to those systems and their associated flora and fauna.

3. In order to protect anadromous fishery resources that may utilize the project areas as spawning or nursery habitat, work in the waters of the creek shall be restricted to the period October 1 and March 1 of any year unless prior approval is granted by the Corps of Engineers following consultation with the NMFS.

If these projects are processed under Nationwide 23, they will be carefully reviewed for incorporation of the recommendations listed above and we may elect to provide additional comments and recommendations that are intended to avoid, minimize, and offset impacts to living marine resources. Our recommendations, if any, will be sent to the Wilmington District, U. S. Army Corps of Engineers, and a copy will be forwarded to you.

Finally, the shortnose sturgeon, a Federally protected species under the purview of the NMFS is found in the Cape Fear and Roanoke Rivers. These comments do not satisfy Federal agency consultation responsibilities under Section 7 of the Endangered Species Act of 1973, as amended. If any activity "may effect" listed species and habitats under NMFS purview, consultation should be initiated with our Protected Resources Division at 9721 Executive Center Drive North, St. Petersburg, Florida 33702.

We appreciate the opportunity for early participation in the review of these bridge replacement projects. If I can be of further assistance, please contact me at the letterhead address or at 252-728-5090.

Sincerely,

Ronald S. Sechler
Fishery Biologist

cc:
COE, Wilmington, NC
USFWS, Raleigh, NC
NCDMF, Raleigh

Habitat Conservation Division
101 Pivers Island Road
Beaufort, North Carolina 28516-9722

March 7, 2003

Gregory J. Thorpe, Ph. D.
Environmental Management Director
Project Development and
Environmental Analysis Branch
NC Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Attention: Theresa Ellerby

Dear Dr. Thorpe:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed your February 11, 2003 letter requesting comments on the alternative planning and environmental studies (Categorical Exclusions) for the following bridge replacement projects.

Bridge Number	Project Number	Location
Bridge No. 25	B - 4077	Columbus County
Bridge No. 280	B - 4028	Columbus County
Bridge No. 281	B - 4028	Columbus County

NOAA Fisheries supports the decision to replace the above listed bridges with new bridges of equal or longer lengths. By letters dated July18, 2002 (copy enclosed), we previously commented on the Natural Resources Technical Reports for these projects and provided recommendations for avoidance and minimization of adverse impacts to anadromous fishery resources. Since no additional information on these projects is included in your January 23rd letter, the recommendations provided in our July 18th letter remain valid.

Although avoidance of wetland impacts may not be possible in all cases, the environmental studies should identify highway and bridge design alternatives that would, to the extent practicable, avoid or minimize wetland losses. The environmental studies should also evaluate removal of the existing

causeways as a means of reducing and offsetting wetland losses. Also, since required traffic diversion may necessitate temporary filling or other wetland alteration, the environmental document should identify the least damaging alternative for maintaining traffic flow, including the use of existing roads as alternate routes. NOAA Fisheries is likely to recommend against the use of temporary onsite fill to establish construction bypass routes.

Adverse impacts to fishery resources in waters affected by these projects can be minimized through use of prudent and responsible construction techniques and use of seasonal work restrictions. Development of seasonal work restrictions within the project area should be coordinated with the North Carolina Wildlife Resources Commission, and the results of this effort should be presented in the environmental documents.

We appreciate the opportunity to provide these comments. If I may be of further assistance, please contact me at the letterhead address, or at 252-728-5090.

Sincerely,

Ron Sechler

Ronald S. Sechler
Fishery Biologist

Enclosure

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Division of Historical Resources
David J. Olson, Director

March 12, 2003

MEMORANDUM

TO: Greg Thorpe, Manager
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook DB for David Brook

SUBJECT: Replacement, Bridge Nos. 280 and 281 over Dan's Creek, on SR 1843, B-4082, Columbus County, ER02-8600

Thank you for your memorandum of February 11, 2003, concerning the above project.

this is as a result of our mtg w/ HPO to discuss eligibility 9-3-02 ↓ include concurrence form

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr

Federal Aid # BRZ-1843(1) *TIP #* B-4082 *County:* Columbus

CONCURRENCE FORM FOR PROPERTIES NOT ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Project Description: Replace Bridge # 280 & 281 on SR1843 over Dan's Creek

On 9-3-2002, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [x] Federal Highway Administration (FHWA)
- [x] North Carolina State Historic Preservation Office (HPO)
- [ ] Other

Reviewed the subject project at

- [ ] Scoping meeting
- [x] Historic architectural resources photograph review session/consultation
- [ ] Other

All parties present agreed

- [ ] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [x] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as _____ is considered not eligible for the National Register and no further evaluation of it is necessary. Bridge #'s 280 & 281
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [x] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Mary Pope Furr — 9-3-2002
Representative, NCDOT — Date

[signature] — 9/3/02
FHWA, for the Division Administrator, or other Federal Agency — Date

[signature] — 9/3/02
Representative, HPO — Date

[signature] — 9/3/02
State Historic Preservation Officer — Date

If a survey report is prepared, a final copy of this form and the attached list will be included

T. Hart PEF

North Carolina Department of Cultural Resources
State Historic Preservation Office
David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary
Office of Archives and History

Division of Historical Resources
David J. Olson, Director

March 22, 2002

MEMORANDUM

TO: William D. Gilmore, Manager
Project Development and Environmental Analysis Branch
Division of Highways
Department of Transportation

MAR 28 2002

FROM: David Brook RLG for David Brook

SUBJECT: Replace Bridge No. 280 and SR 1843 over Dans Creek, Replace Bridge No. 280 and SR 1843 over Dans Creek, B-4082, Columbus County, ER 02-8600

must explain what was done

Thank you for your memorandum of September 25, 2001, concerning the above project.

There are no known archaeological sites within the project area. Based on our knowledge of the area, it is unlikely that any archaeological resources that may be eligible for conclusion in the National Register of Historic Places will be affected by the project. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

Because the Department of Transportation is in the process of surveying and evaluating the National Register eligibility of all of its concrete bridges, we are unable to comment on the National Register eligibility of the subject bridge. Please contact Mary Pope Furr, in the Architectural History Section, to determine if further study of the bridge is needed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 296 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/72929-47629. In all future communication concerning this project, please cite the above-referenced tracking number.

DB:kgc

	Location	Mailing Address	Telephone/Fax
Administration	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh 27699-4617	(919) 733-4763 •733-8653
Restoration	515 N. Blount St, Raleigh , NC	4613 Mail Service Center, Raleigh 27699-4613	(919) 733-6547 •715-4801
Survey & Planning	515 N. Blount St. Raleigh. NC	4618 Mail Service Center. Raleigh 27699-4618	(919) 733-4763 •715-4801

State of North Carolina
Department of Environment
and Natural Resources
Division of Water Quality

Michael Easley, Governor
Bill Ross, Secretary
Gregory Thorpe, Director

NCDENR
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

June 18, 2002

Memorandum To: William T. Goodwin, Jr., PE, Unit Head
Bridge Replacement Planning Unit
Project Development and Environmental Analysis Branch

Through: John Dorney
NC Division of Water Quality

From: Robert Ridings
NC Division of Water Quality

Subject: Review of Natural Systems Technical Reports for bridge replacement projects scheduled for construction in CFY 2005: "Green Light" Projects: B-4077, B-4082, B-4090, B-4152, B-4248, B-4036, B-4059, B-4060, B-4155, B-4158, B-4177, B-4178, B-4198, B-4197, B-4194, & B-4192.

On all projects, use of proper sediment and erosion control will be needed. Sediment and erosion control measures should not be placed in wetlands. Sediment should be removed from any water pumped from behind a cofferdam before the water is returned to the stream.

This office would prefer bridges to be replaced with new bridges. However if the bridge must be replaced by a culvert and 150 linear feet or more of stream is impacted, a stream mitigation plan will be needed prior to the issuance of a 401 Water Quality Certification. While the NCDWQ realizes that this may not always be practical, it should be noted that for projects requiring mitigation, appropriate mitigation plans will be required prior to issuance of a 401 Water Quality Certification

For permitting, any project that falls under the Corps of Engineers' Nationwide Permits 23 or 33 do not require written concurrence by the NC Division of Water Quality. Notification and courtesy copies of materials sent to the Corps, including mitigation plans, are required. For projects that fall under the Corps of Engineers Nationwide Permit 14 or Regional General Bridge Permit 31, the formal 401 application process will be required including appropriate fees and mitigation plans.

Any proposed culverts shall be installed in such a manner that the original stream profile is not altered (i.e. the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions are to be maintained above and below locations of culvert extensions.

Wetlands/401 Unit 2321 Crabtree Blvd. Suite 250 Raleigh, North Carolina 27604
Telephone 919-733-1786 FAX # 733-6893

Do not use any machinery in the stream channels unless absolutely necessary. Additionally, vegetation should not be removed from the stream bank unless it is absolutely necessary. NCDOT should especially avoid removing large trees and undercut banks. If large, undercut trees must be removed, then the trunks should be cut and the stumps and root systems left in place to minimize damage to stream banks.

Special Note on projects B-4077 and B-4090: these waters are classified as 303(d) waters. Special measures for sediment control will be needed

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost.

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Ms. Theresa Ellerby, Project Development Engineer
Project Development and Environmental Analysis Branch, NCDOT

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program

DATE: March 10, 2003

SUBJECT: NCDOT Bridge Replacements Columbus, Harnett, and Cumberland counties. TIP Nos. B-4090, B-4091, B-4077, B-4082 and B-4137.

Biologists with the N. C. Wildlife Resources Commission (NCWRC) have reviewed the information provided and have the following preliminary comments on the subject project. Our comments are provided in accordance with provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

Our standard recommendations for bridge replacement projects of this scope are as follows:

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.

2. Bridge deck drains should not discharge directly into the stream.

3. Live concrete should not be allowed to contact the water in or entering into the stream.

4. If possible, bridge supports (bents) should not be placed in the stream.

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.

6. A clear bank (riprap free) area of at least 10 feet should remain on each side of the steam underneath the bridge.

7. In trout waters, the N.C. Wildlife Resources Commission reviews all U.S. Army Corps of Engineers nationwide and general '404' permits. We have the option of requesting additional measures to protect trout and trout habitat and we can recommend that the project require an individual '404' permit.

8. In streams that contain threatened or endangered species, NCDOT biologist Mr. Hal Bain should be notified. Special measures to protect these sensitive species may be required. NCDOT should also contact the U.S. Fish and Wildlife Service for information on requirements of the Endangered Species Act as it relates to the project.

9. In streams that are used by anadromous fish, the NCDOT official policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997)" should be followed.

10. In areas with significant fisheries for sunfish, seasonal exclusions may also be recommended.

11. Sedimentation and erosion control measures sufficient to protect aquatic resources must be implemented prior to any ground disturbing activities. Structures should be maintained regularly, especially following rainfall events.

12. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long-term erosion control.

13. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.

14. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams.

15. Only clean, sediment-free rock should be used as temporary fill (causeways), and should be removed without excessive disturbance of the natural stream bottom when construction is completed.

16. During subsurface investigations, equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used:

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream and downstream ends to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel(s) during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.

2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.

3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. If the area reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be utilized as mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-4090, Cumberland County, Replace Bridge No. 125 on NC 24 over Cross Creek. A significant fishery for sunfish exist at this site, we recommend an in-water work moratorium from April 1 to June 30 to minimize impacts to spawning sunfish. Other standard recommendations apply.

2. B-4091, Cumberland County, Replace bridge No. 85 on I-95 Business Loop and US 301 over SR 1738, SR 1741, and the Cape Fear River. We recommend replacing this bridge with a bridge. NCDOT should conduct a mussel survey at this site to determine any

presence of the state listed, endangered, Yellow lampmussel (*Lampsilis cariosa*). We recommend an in-water work moratorium from February 15 – June 30, for sunfish and anadromous fish. NCDOT should adhere to Stream Crossing Guidelines for Anadromous Fish Passage. Other standard recommendations apply.

3. B-4077, Columbus County, Replace bridge No. 25 on NC 130 over Waccamaw river Overflow. We recommend replacing this bridge with a bridge. A significant fishery for sunfish exists at this site, we recommend an in-water work moratorium from April 1 – June 30 to minimize impacts to spawning sunfish. A mussel survey should be conducted for the Waccamaw spike (*Elliptio waccamawensis*) if the project area is inundated.

4. B-4082, Columbus County, Replace Bridge Nos. 280 and 281 over Dan's Creek. We recommend replacing each bridge with a bridge. A significant fishery for sunfish exists at this site, we recommend an in-water work moratorium from April 1 – June 30 to minimize impacts to spawning sunfish. Other standard recommendations apply.

5. B-4137, Harnett County, Replace bridge No. 35 on NC 42 over the Norfolk and Southern Railroad. We have no concerns with this project.

NCDOT should routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. Restoring previously disturbed floodplain benches should narrow and deepen streams previously widened and shallowed during initial bridge installation. NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks and reduce habitat fragmentation.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (919) 528-9886. Thank you for the opportunity to review and comment on these projects.

Cc: Gary Jordan, U.S. Fish and Wildlife Service, Raleigh

Columbus County Emergency Services

9-1-1/ Columbus Central
Addressing
Emergency Management

June 4, 2001

NC Dept of Transportation
Attn: Davis Moore
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

REF: Letters May 24, 2001
Replacement of Bridge #280 on SR 1843
Replacement of Bridge # 25 on NC 130

Bridge #280 - road has enough access that with prior planning and notification fire, rescue and law enforcement can quickly reach both sections. B-4082

Bridge #25 - only one dwelling is located after the bridge. This is a cabin on the river. B-4077 PF

If you need further information, please give me a call.

Sincerely,

John H. Moore, Jr.
Director

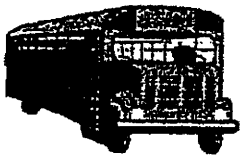
JHM/skw

Emergency Services
Telephone: (910) 640-6610
Fax: (910) 640-1241

9-1-1/Columbus Central
Telephone: (910) 640-1428
Fax: (910) 640-2295

Addressing
Telephone: (910) 640-1518 or
(910) 641-0016
Fax: (910) 914-4112

608 North Thompson Street, Whiteville, NC 28472



Columbus County/Whiteville City School Bus Garage
1231 Chadbourn Hwy, Whiteville, NC 28472
Phone: 910-642-2586; Fax: 910-641-0875

TO. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

FROM: James R. Hewett, Director of Transportation

DATE: February 21, 2003

RE: NCDOT Bridge Replacement Group #39

The following information was determined based on the 2002-2003 school year bus route information.

Bridge No. 25 on NC 130: There are no buses in Columbus County that travel over this bridge on a daily basis.

Bridge Nos. 280 & 281 over Dan's Creek: East Columbus High School has 1 bus that travels over these bridges twice daily. This bus can be rerouted to service the students in the area. Acme Delco Elementary School has 2 buses that travel over these bridges daily. One bus can be rerouted to service the students in the area. The other crosses the bridges, picks up a student then turns around and travels over the bridges again. The parents of this student will be responsible for providing transportation to the nearest intersection where the bus can then pick them up. These bridges are traveled a total of 8 times daily.

3 buses

8 times

If you have any questions please give me a call.

COPY