STATE OF NORTH CAROLINA
# DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

January 7, 2005

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

ATTN: Mr. Dave Timpy
NCDOT Coordinator

Dear Sir:

Subject: **Application for Nationwide Permit 23** for the proposed replacement of Bridge No. 116 on SR 1520 over Shaken Creek, Pender County, Division 3. Federal-Aid Project No. BRZ-1520 (3), State Project No. 8.2271401, WBS Element 33326.1.1; TIP No. B-3887.

Please find enclosed copies of the Categorical Exclusion (CE), permit drawings, half size plans, North Carolina Division of Water Quality Stormwater Exemption, and EEP acceptance letter.

The NCDOT proposes to replace Bridge No. 116 on SR 1520 over Shaken Creek. Bridge No. 116 is currently 87 feet in length, consisting of five spans with the maximum span at approximately 18 feet. The clear roadway width for the structure is 19.2 feet, providing two nine foot travel lanes with 0.6 foot shoulders. The proposed bridge will replace Bridge No. 116 with a new cored slab bridge approximately 115 feet in length. The new bridge will have three spans, one at 35 feet, one at 50 feet and one at 30 feet with two steel pile interior bents and spill through end bents. The new structure will provide a 28-foot clear roadway width providing two 11-foot travel lanes, including three-foot shoulders. The proposed approach roadway will consist of two 11-foot travel lanes with four-foot grass shoulders. The bridge is designed for top down construction and no bents will be placed in the water.

Bridge Maintenance Unit records indicated the Bridge No. 116 has a sufficiency rating of 14.7 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient. The replacement of an inadequate structure will result in safer and more efficient traffic operations.

**MAILING ADDRESS:**
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1500
FAX: 919-715-1501
WEBSITE: WWW.DOH.DOT.STATE.NC.US

**LOCATION:**
2728 CAPITAL BLVD
PLB SUITE 168
RALEIGH, NC 27604

Areas of Environmental Concern (AEC's) potentially impacted by this project include Public Trust Areas of Shaken Creek. Wetlands associated with the floodplain of Shaken Creek exhibit characteristics of a palustrine, broad leaved, deciduous forest.

## PROPOSED IMPACTS TO WATERS OF THE UNITED STATES

**General Description:** Shaken Creek is located in the Cape Fear River Basin (Hydrological Cataloging Unit 03030001) and classified by the Division of Water Quality as **C Sw. Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project area.**

The structure targeted for replacement spans the open water stream associated with Shaken Creek. There is no direct involvement of additional streams or tributaries. This section of Shaken Creek has been assigned Stream Index Number 18-74-33-4 by the NCDWQ. Shaken Creek is a tributary of and joins with Holly Shelter Creek approximately 200 feet downstream (west) of Bridge No. 116. National Wetland Index (NWI) mapping indicates that floodplains of Shaken Creek exhibit characteristics of a palustrine, broad-leaved, deciduous forest system that is seasonally flooded [PFO1C; (Cowardin *et al.* 1979)]. Field investigations indicate that floodplain wetlands occur along both sides of Shaken Creek east of SR 1520 and on the north side of Shaken Creek west of SR 1520.

**Wetland Impacts:** Permanent impacts to wetlands associated with this project total 0.017 acre, including 0.009 acre of permanent fill and 0.008 acre due to mechanized clearing. The permanent fill is due to the widening of the road. The mechanized clearing is due to fill slope construction and maintenance (see Wetland Impact Summary Sheet 7 of 7). Mechanized Clearing is necessary for road stabilization when wetlands occur inside the fill slopes.

**Utility Impacts:** There will be no permanent utility impacts associated with this site. Any necessary clearing of wetlands for the Permanent Utility Easement [(PUE) aerial utility relocation] will utilize hand clearing techniques. Hand Clearing will result in a temporary impact of 0.06 acres in jurisdictional wetlands (see permit drawing sheet 4 of 7). Bell South will be directional boring the wetlands and creek approximately 75 feet right of –L- from approximate station 14+77 to 16+65.

**Stream Impacts:** Permanent impacts to the stream are limited to bridge shading; bridging will not result in fill or dredging of wetlands/waters of the United States, and encroachment into the stream will be avoided.

**Bridge Demolition**: Bridge No. 116 is 87 feet long, consisting of five spans with the maximum span at approximately 18-feet. The superstructure consists of a timber floor on timber joists with an asphalt-wearing surface. The substructure is a timber abutment design. The interior bents consist of timber caps on timber piles. In order to protect the water quality and aquatic life in the area affected by this project, the NCDOT and all potential contractors will follow appropriate guidelines for bridge demolition and removal. These guidelines are presented in three NCDOT documents entitled "Pre-Construction Guidelines for Bridge Demolition and Removal", "Policy: Bridge Demolition and Removal in Waters of the United States", and "Best Management Practices for Bridge Demolition and Removal" (all documents dated 9/20/99).

Dropping any portion of the structure into waters of the United States will be avoided unless there is no other practical method of removal. In the event that no other practical method is feasible, a worst-case scenario is assumed for calculations of fill entering waters of the US. Since Bridge No. 116 is composed completely of steel and timber, there is little potential for components of the bridge to be dropped in the water. Therefore, no temporary fill is expected to result from bridge removal. NCDOT will coordinate with the various resource agencies during project planning to ensure that any concerns regarding bridge demolition are resolved. Within Pender County, both inland and estuarine surface waters and wetlands are considered to be high quality habitat and have been designated as Areas of Environmental Concern (AECs) by the NC Department of Coastal Management (DCM). Consideration will be given to avoid disturbances within these areas whenever practicable.

Anadromous fish use this section of Shaken Creek including river herring, striped bass, American and hickory shad. The in water moratorium for these anadromous fish is February 15 to June 15. Sunfish also occupy these waters and require a moratorium from April 1 to June 30. There is no in water work planned due to the top down construction of the bridge, therefore, the anadromous fish moratorium on in water construction should not be an issue.

**Schedule for Construction**: It is assumed that the Contractor will begin construction of the proposed bridge shortly after the date of availability for the project. The let date is April 19, 2005 with a date of availability of May 31, 2005.

## AVOIDANCE, MINIMIZATION AND MITIGATION

Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional stages; minimization measures were incorporated as part of the project design.

The impacts to Shaken Creek are minimized by using a maximum slope of 3:1 in the wetlands, replacing the existing bridge in its current location, and top down construction of the bridge, which eliminates the need for a temporary work bridge or causeway. The impacts to Shaken Creek are also minimized by replacing Bridge No. 116 with a new bridge that will span the creek with no bents in the water. The impacts to the wetlands were avoided by using hand clearing techniques for the utility relocation rather than mechanized clearing. However, not all impacts were avoided so compensatory mitigation will be required for 0.017 acre of wetland impact. The Ecosystem Enhancement Program has confirmed that they will provide mitigation for all impacts (see attached letter).

## FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 of the Endangered Species Act of 1973, as amended.

As of January 29, 2003 the U.S. Fish and Wildlife Service (USFWS) lists eleven federally protected species for Pender County (Table 1). No species have been added to or deleted from this list since the completion of the referenced document. A survey for these

species and habitat was conducted on January 4, 2001 and June 19, 2001. Habitat was found for two of the eleven species, however no specimens of these species were found during the survey. Therefore, biological conclusions of "No Effect" were given for those species requiring biological conclusions. Since biological conclusions for species that have habitat expire after two years, a re-survey of the project area was conducted July 10, 2003, for the two species with suitable habitat. These surveys were conducted during the flowering period for rough leaved loosestrife and Cooley's meadowrue. A plant by plant survey revealed neither species, therefore a biological conclusion of "No Effect" was given.

**Table 1. Federally-Protected Species for Pender County**

| Scientific Name | Common Name | Status | Habitat Determination | Biological Conclusion* |
|---|---|---|---|---|
| *Trichechus manatus* | Manatee | E | No | No Effect |
| ***Picoides borealis*** | Red-cockaded woodpecker | E | No | No Effect |
| ***Charardrius melodus*** | Piping plover | T | No | No Effect |
| ***Alligator mississippiensis*** | American Alligator | T(S/A) | No | Not Required |
| ***Caretta caretta*** | Loggerhead Sea Turtle | T | No | No Effect |
| ***Acipenser brevirostrum*** | Shortnose sturgeon | E | No | No Effect |
| ***Amaranthus pumilus*** | Seabeach amaranth | T | No | No Effect |
| ***Carex lutea*** | Golden sedge | E(P) | No | No Effect |
| ***Lysimachia asperulaefolia*** | Rough leaved loosestrife | E | Yes | No Effect |
| ***Schwalbea americana*** | American chaffseed | E | No | No Effect |
| ***Thalictrum cooleyi*** | Cooley's meadowrue | E | Yes | No Effect |

* Based on latest survey of July 10, 2003.

**Essential Fish Habitat**: The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (MSFCMA) set forth a new mandate for the National Marine Fisheries Service (NMFS), regional fishery management councils (FMC) and other Federal agencies to identify and protect important marine and anadromous fish habitat. The FMCs, with the assistance from NMFS, have delineated "essential fish habitat" (EFH) for managed species. In the South Atlantic region, waterbodies in Currituck County are listed in which EFHs are found. Shaken Creek is not a listed waterbody for EFHs. Therefore, the rules of the MSFCMA will not apply for this project. Fritz Rhode of the Division of Marine Fisheries Service was contacted on April 19, 2004, and recommended that an EFH assessment not be done for this project.

## REGULATORY APPROVALS

**Section 404 Permit**: This project is being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). Therefore, we do not anticipate

this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their review.

A copy of this permit application will be posted on the DOT website at: http://www.ncdot.org/planning/pe/naturalunit/Permit.html.

If you have any questions or need additional information, please contact Ms. Cheryl Knepp at cknepp@dot.state.nc.us or (919) 715-1489.

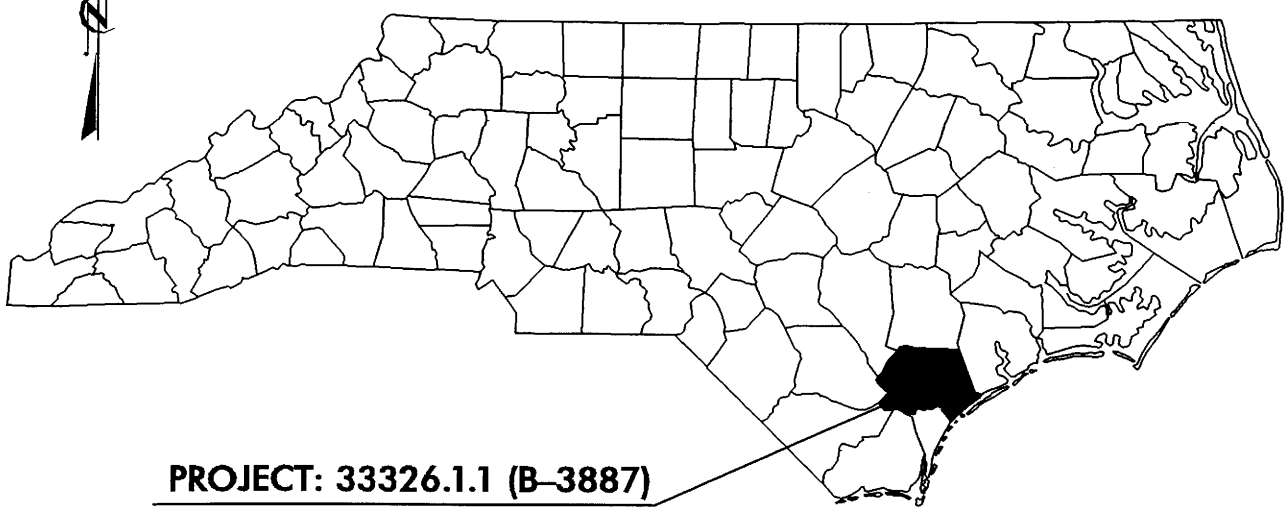
Sincerely,

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

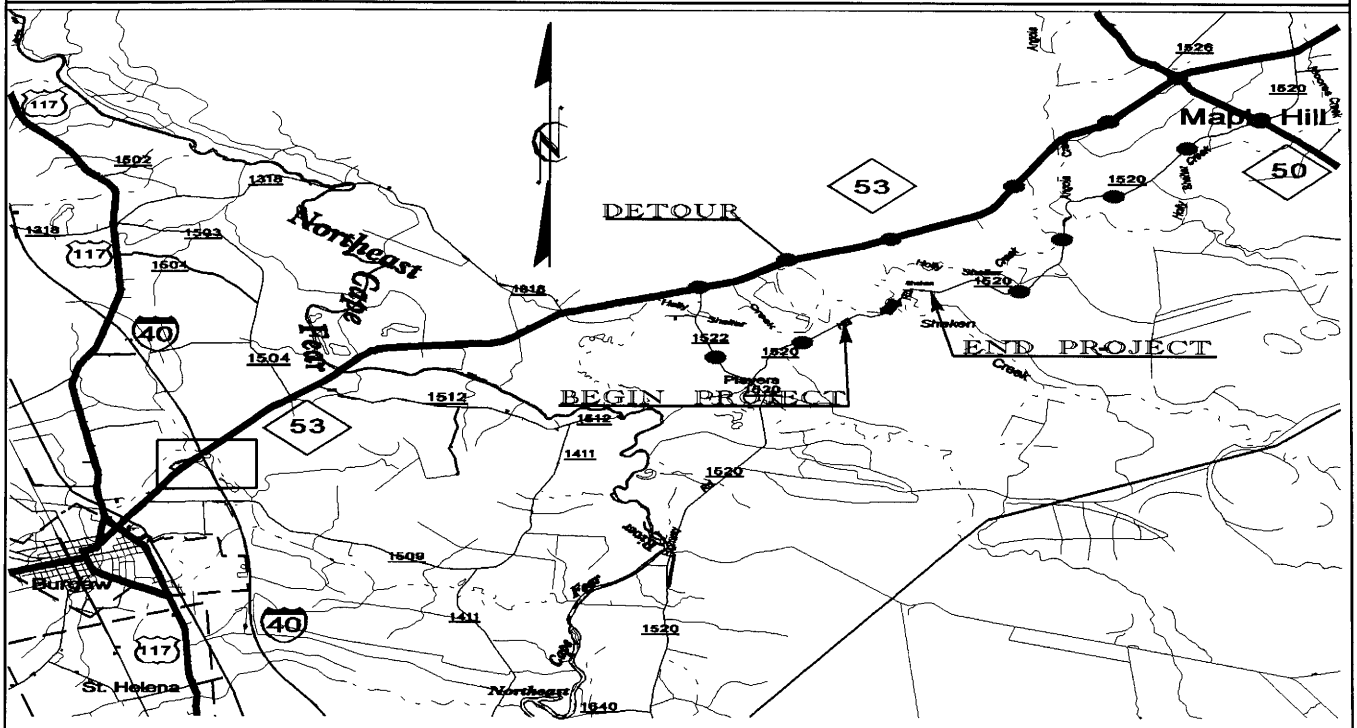
cc:
w/attachment
Mr. John Hennessy, Division of Water Quality
Mr. Travis Wilson, NCWRC
Ms. Cathy Brittingham, NCDCM
Mr. Bill Arrington, NCDCM
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. H. Allen Pope, P.E., Division Engineer
Mr. Mason Herndon, Division Environmental Officer
Mr. Mark Staley, Roadside Environmental

w/o attachment
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. David Franklin, USACE, Wilmington
Ms. Stacy Baldwin, P.E., PDEA Project Planning Engineer
Ms. Beth Harmon, EEP
Mr. Carl Goode, PE

# NORTH CAROLINA



PROJECT: 33326.1.1 (B-3887)




# VICINITY MAPS

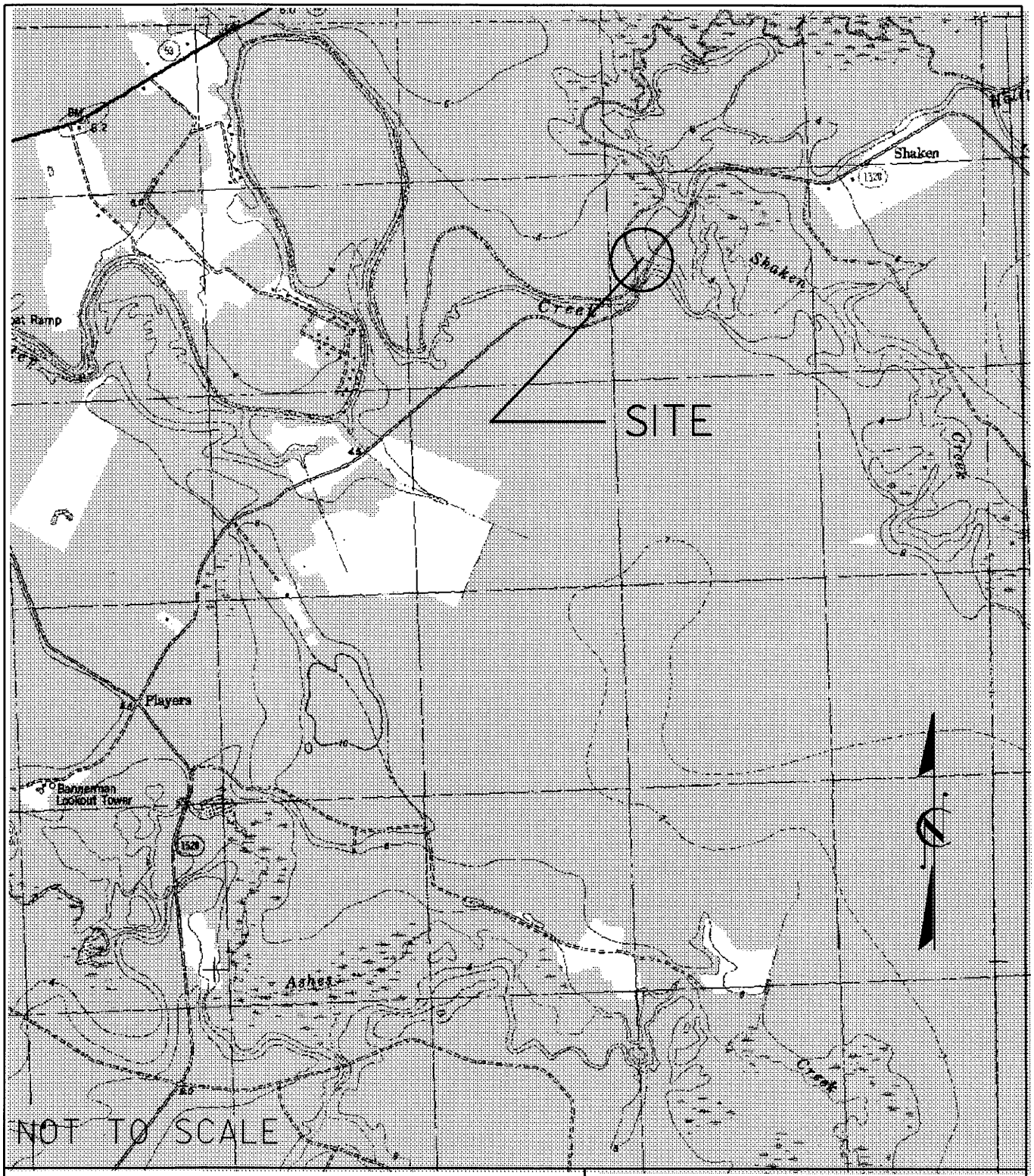
## NCDOT

**DIVISION OF HIGHWAYS**
**PENDER COUNTY**

**PROJECT: 33326.1.1 (B-3887)**

**REPLACE BRIDGE #116 OVER SHAKEN CREEK ON SR 1520**

**SHEET** 1 **OF** 7 **4/2/04**




# LOCATION MAP

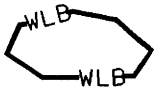
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
PENDER COUNTY

PROJECT: 33326.1.1 (B-3887)
REPLACE BRIDGE #116 OVER
SHAKEN CREEK ON SR 1520

SHEET 2 OF 7 4/2/04

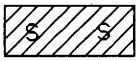
# WETLAND LEGEND

WLB WETLAND BOUNDARY

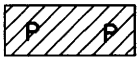


WETLAND

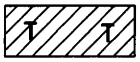
DENOTES FILL IN WETLAND



DENOTES FILL IN SURFACE WATER



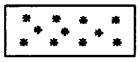
DENOTES FILL IN SURFACE WATER (POND)

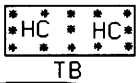


DENOTES TEMPORARY FILL IN WETLAND

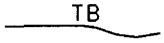
DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY FILL IN SURFACE WATER

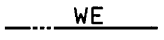

DENOTES MECHANIZED CLEARING



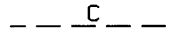
DENOTES HAND CLEARING



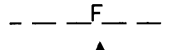
TOP OF BANK



EDGE OF WATER



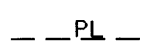
PROP. LIMIT OF CUT



PROP. LIMIT OF FILL


PROP. RIGHT OF WAY

NG NATURAL GROUND



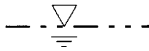
PROPERTY LINE

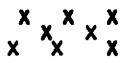
TDE TEMP. DRAINAGE EASEMENT

PDE PERMANENT DRAINAGE EASEMENT

EAB EXIST. ENDANGERED ANIMAL BOUNDARY

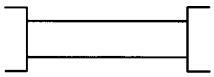
EPB EXIST. ENDANGERED PLANT BOUNDARY

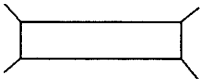

WATER SURFACE


LIVE STAKES


BOULDER


COIR FIBER ROLLS


PROPOSED BRIDGE


PROPOSED BOX CULVERT

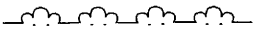

PROPOSED PIPE CULVERT

12"-48" PIPES

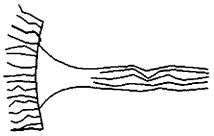
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)


SINGLE TREE


WOODS LINE

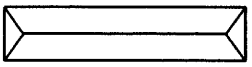

DRAINAGE INLET

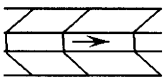

ROOTWAD


RIP RAP

ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE


PREFORMED SCOUR HOLE


LEVEL SPREADER (LS)


DITCH / GRASS SWALE

**NCDOT**

**DIVISION OF HIGHWAYS**

**PENDER COUNTY**

**PROJECT: 33326.1.1 (B-3887)**

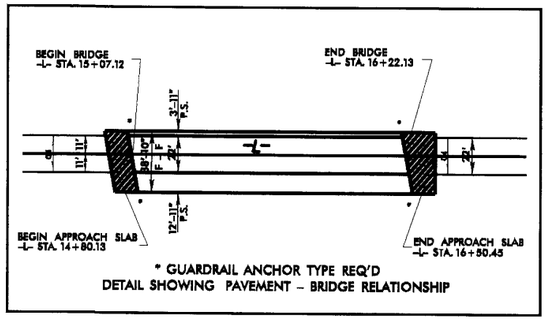
**REPLACE BRIDGE #116 OVER SHAKEN CREEK ON SR 1520**

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 4 |
| R/W SHEET NO. | OF 7 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

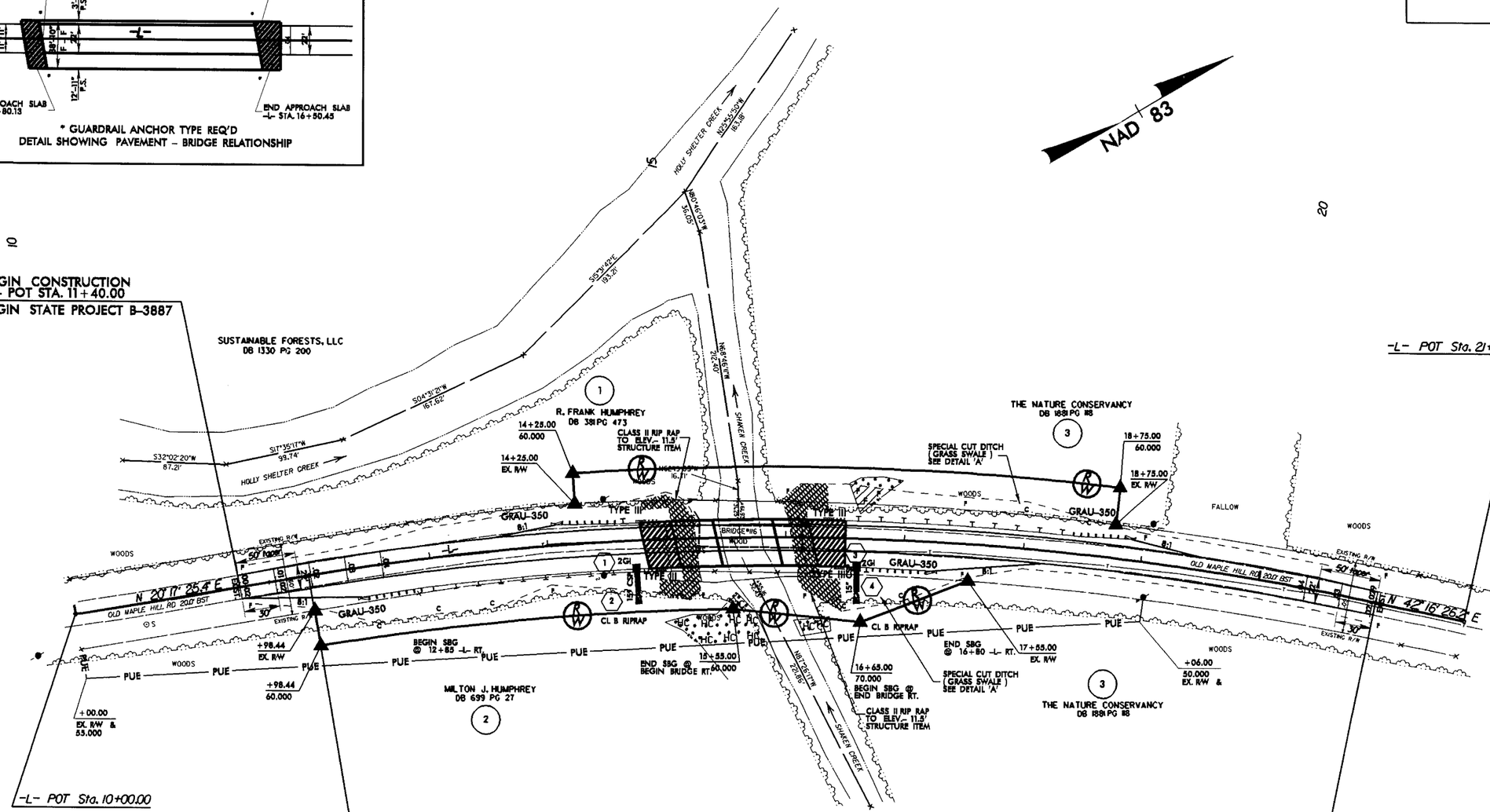
8/17/99

REVISIONS

8-26-03 Adding permanent utility easement from -L- Sta.10+00.00 to 19+06.00 Rt.
3-22-04 Revised property owner names on Parcels 2 and 3.

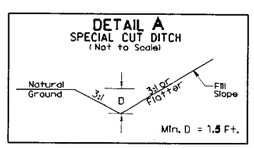



* GUARDRAIL ANCHOR TYPE REQ'D
DETAIL SHOWING PAVEMENT – BRIDGE RELATIONSHIP




-L-
PI Sta 16+54.89
Δ = 21° 59' 00.7" (RT)
D = 2° 26' 17.2"
L = 901.66'
T = 456.44'
R = 2,350.00'

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)




FROM STA. 16+80-L- TO STA. 17+00-L- RT.
FROM STA. 18+00-L- TO STA. 18+50-L- LT.

DENOTES HAND CLEARING

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

50 0 25 50
SCALE: 1" = 100' HORIZ.

REVISED 12/17/04

REVISED 12/15/04

FOR -L- PROFILE SEE SHEET 5
FOR STRUCTURE PLANS SEE S1 THRU S-

I:\DEC-2004\08\7
R:\DEC-2004\08\add\B3887_HYD_DRN.DGN
Plotted: 08:17

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 4 |
| R/W SHEET NO. | 5 OF 7 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

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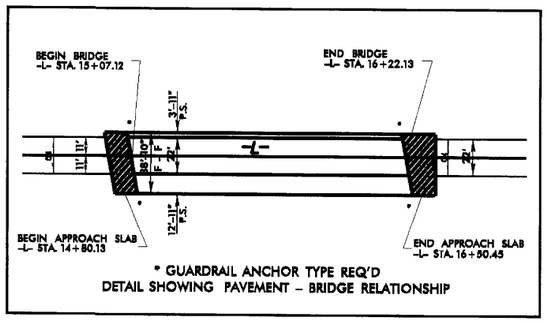



* GUARDRAIL ANCHOR TYPE REQ'D
DETAIL SHOWING PAVEMENT – BRIDGE RELATIONSHIP

NAD 83

BEGIN CONSTRUCTION
-L- POT STA. 11+40.00
BEGIN STATE PROJECT B-3887

-L- POT Sta. 10+00.00

-L- PC Sta. 11+98.44

-L- POT Sta. 21+71.76

END CONSTRUCTION
-L- PT STA. 21+00.00
END STATE PROJECT B-3887

SUSTAINABLE FORESTS, LLC
DB 1330 PG 200

R. FRANK HUMPHREY
DB 381 PG 473

MILTON J. HUMPHREY
DB 699 PG 27

THE NATURE CONSERVANCY
DB 1881 PG 113

HOLLY SHELTER CREEK

SHARPE CREEK

OLD MAPLE HILL RD 20.0' BST

GRAU-350

CL B RIPRAP

CLASS II RIP RAP TO ELEV= 11.5' STRUCTURE ITEM

SPECIAL CUT DITCH (GRASS SWALE) SEE DETAIL 'A'

BEGIN SBG @ 12+85 -L- RT.

END SBG @ BEGIN BRIDGE RT.

END SBG @ 16+80 -L- RT.

BEGIN SBG @ END BRIDGE RT.

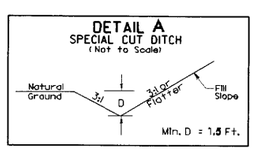
WOODS

FALLOW

EXISTING R/W

PUE

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)




FROM STA. 16+50-L- TO STA. 17+00-L- RT.
FROM STA. 18+00-L- TO STA. 18+50-L- LT.

-L-
PI Sta 16+54.89
Δ = 21° 59' 00.7" (RT)
D = 2° 26' 17.2"
L = 901.66'
T = 456.44'
R = 2,350.00'

DENOTES HAND CLEARING

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

50 0 25 50
SCALE: 1" = 100' HORIZ.

REVISED 12/17/04

REVISED 12/15/04

FOR -L- PROFILE SEE SHEET 5
FOR STRUCTURE PLANS SEE S1 THRU S-

17-DEC-2004 08:47
R:\TIP\B-3887\Hyd\B3887_HYD_DRN.DGN
jlassiter

# PROPERTY OWNERS

NAMES AND ADDRESSES

| PARCEL NO. | NAMES | ADDRESSES |
|---|---|---|
| 1 | FRANK R. HUMPHREY, II | 705 EAST SATCHWELL ST.<br>BURGAW, N.C. 28425 |
| 2 | MILTON J. HUMPHREY, JR. | 6265 NC HWY. 53 W.<br>BURGAW, N.C. 28425 |
| 3 | SP FORESTS, LLC | 15 GUM AVENUE<br>BOLTON, N.C. 28423 |

NCDOT

DIVISION OF HIGHWAYS
PENDER COUNTY
PROJECT: 33326.1.1 (B-3887)

REPLACE BRIDGE #116 OVER
SHAKEN CREEK ON SR 1520

SHEET 6 OF 7 4/2/04

# WETLAND PERMIT IMPACT SUMMARY

| Site No. | Station (From/To) (-L-) | Structure Size / Type | WETLAND IMPACTS | | | | SURFACE WATER IMPACTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Fill In Wetlands (ac) | Temp. Fill In Wetlands (ac) | Excavation In Wetlands (ac) | Mechanized Clearing (Method III) (ac) | Fill In SW (Natural) (ac) | Fill In SW (Pond) (ac) | Temp. Fill In SW (ac) | Existing Channel Impacted (ft) | Natural Stream Design (ft) |
| 1 | 15+65 -L- LT | 21" Cored Slab | 0.009 | 0 | 0 | 0.008 | 0 | 0 | 0 | 0 | 0 |
| | | O.A.L- 115' | | | | | | | | | |
| TOTALS: | | | 0.009 | 0 | 0 | 0.008 | 0 | 0 | 0 | 0 | 0 |

NOTE:AN ADDITIONAL 0.06AC. HAND CLEARING WILL BE USED FOR P.U.E.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

PENDER COUNTY

PROJECT: 33326.1.1 ( B-3887 )

SHEET 7 OF 7 REVISED 5/19/04

9/09/99

**TIP PROJECT: B-3887**

**CONTRACT:**

25 FEB 2004 12:11
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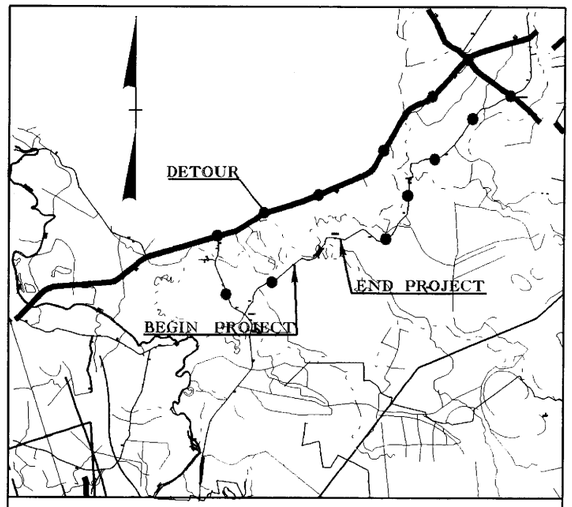
See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols




VICINITY MAP

# STATE OF NORTH CAROLINA
## DIVISION OF HIGHWAYS
# PENDER COUNTY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | B-3887 | 1 | |

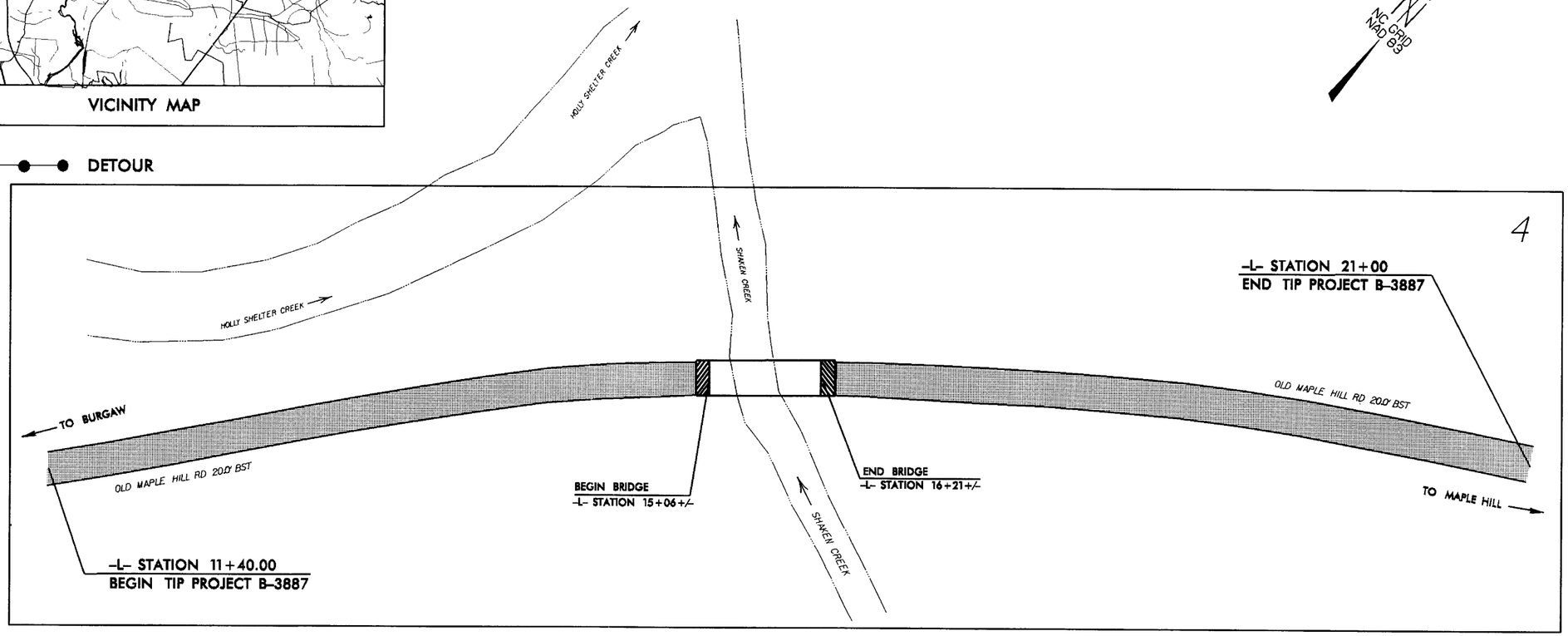
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 33326.1.1 | BRZ-1520(3) | P.E. |
| 33326.2.1 | BRZ-1520(3) | R/W, UTL |

***LOCATION: BRIDGE # 116 OVER SHAKEN CREEK ON SR 1520***

***TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE***

N
N.C. GRID
NAD 83

DETOUR




THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

***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 2004 = 182
ADT 2024 = 390
DHV = 12 %
D = 60 %
T = 3 %
V = 60 MPH

TTST 1% DUAL 2%

***PROJECT LENGTH***

LENGTH ROADWAY TIP PROJECT B-3887 = 0.1600 Mile

LENGTH STRUCTURE TIP PROJECT B-3887 = 0.0218 Mile

TOTAL LENGTH OF TIP PROJECT B-3887 = 0.1818 Mile

*Prepared In the Office of:*
***DIVISION OF HIGHWAYS***
*1020 Birch Ridge Dr., Raleigh, NC 27610*

*2002 STANDARD SPECIFICATIONS*

*RIGHT OF WAY DATE:* AUGUST 22, 2003

*LETTING DATE:* AUGUST 17, 2004

CATHY S. HOUSER, PE
*PROJECT ENGINEER*

VIRGINIA G. MABRY
*PROJECT DESIGN ENGINEER*

***HYDRAULICS ENGINEER***

SIGNATURE: P.E.

***ROADWAY DESIGN ENGINEER***

SIGNATURE: P.E.

***DIVISION OF HIGHWAYS***
***STATE OF NORTH CAROLINA***

STATE DESIGN ENGINEER P.E.

***DEPARTMENT OF TRANSPORTATION***
***FEDERAL HIGHWAY ADMINISTRATION***

APPROVED
DIVISION ADMINISTRATOR DATE

5/28/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 1A |

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

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revised 02/25/97

040397

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 1B |

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# CONVENTIONAL SYMBOLS

## ROADS & RELATED ITEMS

Edge of Pavement
Curb
Prop. Slope Stakes Cut — C
Prop. Slope Stakes Fill — F
Prop. Woven Wire Fence
Prop. Chain Link Fence
Prop. Barbed Wire Fence
Prop. Wheelchair Ramp — WCR
Exist. Guardrail
Prop. Guardrail
Exist. Cable Guiderail
Prop. Cable Guiderail
Equality Symbol
Pavement Removal

## RIGHT OF WAY

Baseline Control Point
Existing Right of Way Marker
Exist. Right of Way Line w/Marker
Prop. Right of Way Line with Proposed
R/W Marker (Iron Pin & Cap)
Prop. Right of Way Line with Proposed
(Concrete or Granite) R/W Marker
Exist. Control of Access Line — CA
Prop. Control of Access Line — CA
Exist. Easement Line — E
Prop. Temp. Construction Easement Line — E
Prop. Temp. Drainage Easement Line — TDE
Prop. Perm. Drainage Easement Line — PDE

## HYDROLOGY

Stream or Body of Water
River Basin Buffer — BZ
Flow Arrow
Disappearing Stream
Spring
Swamp Marsh
Shoreline
Falls, Rapids
Prop Lateral, Tail, Head Ditches — FLOW

## STRUCTURES

MAJOR
Bridge Wing Wall, Head Wall and End Wall — CONC — CONC WW

MINOR
Head & End Wall — CONC HW
Pipe Culvert
Footbridge
Drainage Boxes — CB
Paved Ditch Gutter

## UTILITIES

Exist. Pole
Exist. Power Pole
Prop. Power Pole
Exist. Telephone Pole
Prop. Telephone Pole
Exist. Joint Use Pole
Prop. Joint Use Pole
Telephone Pedestal — T
Cable TV Pedestal — C
Hydrant
Satellite Dish
Exist. Water Valve
Sewer Clean Out
Power Manhole — P
Telephone Booth
Water Manhole — W
Light Pole
H-Frame Pole
Power Line Tower
Pole with Base
Gas Valve
Gas Meter
Telephone Manhole
Power Transformer
Sanitary Sewer Manhole
Storm Sewer Manhole — S
Tank; Water, Gas, Oil
Water Tank With Legs
Traffic Signal Junction Box — S
Fiber Optic Splice Box — F
Television or Radio Tower
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS — TS

Recorded Water Line — W — W
Designated Water Line (S.U.E.*) — W — W
Sanitary Sewer — SS — SS
Recorded Sanitary Sewer Force Main — FSS — FSS
Designated Sanitary Sewer Force Main(S.U.E.*) — FSS — FSS
Recorded Gas Line — G — G
Designated Gas Line (S.U.E.*) — G — G
Storm Sewer — S — S
Recorded Power Line — P — P
Designated Power Line (S.U.E.*) — P — P
Recorded Telephone Cable — T — T
Designated Telephone Cable (S.U.E.*) — T — T
Recorded U/G Telephone Conduit — TC — TC
Designated U/G Telephone Conduit (S.U.E.*) — TC — TC
Unknown Utility (S.U.E.*) — ?UTL — ?UTL
Recorded Television Cable — TV — TV
Designated Television Cable (S.U.E.*) — TV — TV
Recorded Fiber Optics Cable — FO — FO
Designated Fiber Optics Cable (S.U.E.*) — FO — FO
Exist. Water Meter
U/G Test Hole (S.U.E.*)
Abandoned According to U/G Record — ATTUR
End of Information — E.O.I.

## BOUNDARIES & PROPERTIES

State Line
County Line
Township Line
City Line
Reservation Line
Property Line
Property Line Symbol — PL
Exist. Iron Pin — EIP
Property Corner
Property Monument — ECM
Property Number — 123
Parcel Number — 6
Fence Line — WW & ISBW
Existing Wetland Boundaries — WLB
Proposed Wetland Boundaries — WLB
Existing Endangered Animal Boundaries — EAB
Existing Endangered Plant Boundaries — EPB

## BUILDINGS & OTHER CULTURE

Buildings
Foundations
Area Outline
Gate
Gas Pump Vent or U/G Tank Cap
Church
School
Park
Cemetery
Dam
Sign — S
Well — W
Small Mine
Swimming Pool

## TOPOGRAPHY

Loose Surface
Hard Surface
Change in Road Surface
Curb
Right of Way Symbol — R/W
Guard Post — GP
Paved Walk
Bridge
Box Culvert or Tunnel
Ferry
Culvert
Footbridge
Trail, Footpath
Light House

## VEGETATION

Single Tree
Single Shrub
Hedge
Woods Line
Orchard
Vineyard — VINEYARD

## RAILROADS

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

revised 03/26/97

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TEFarr AT

07/15/03

# SURVEY CONTROL SHEET B-3887

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 8.2271401 | 1C |
| ID # B-3887 | WBS# 33326.1.1 |
| Location and Surveys | |

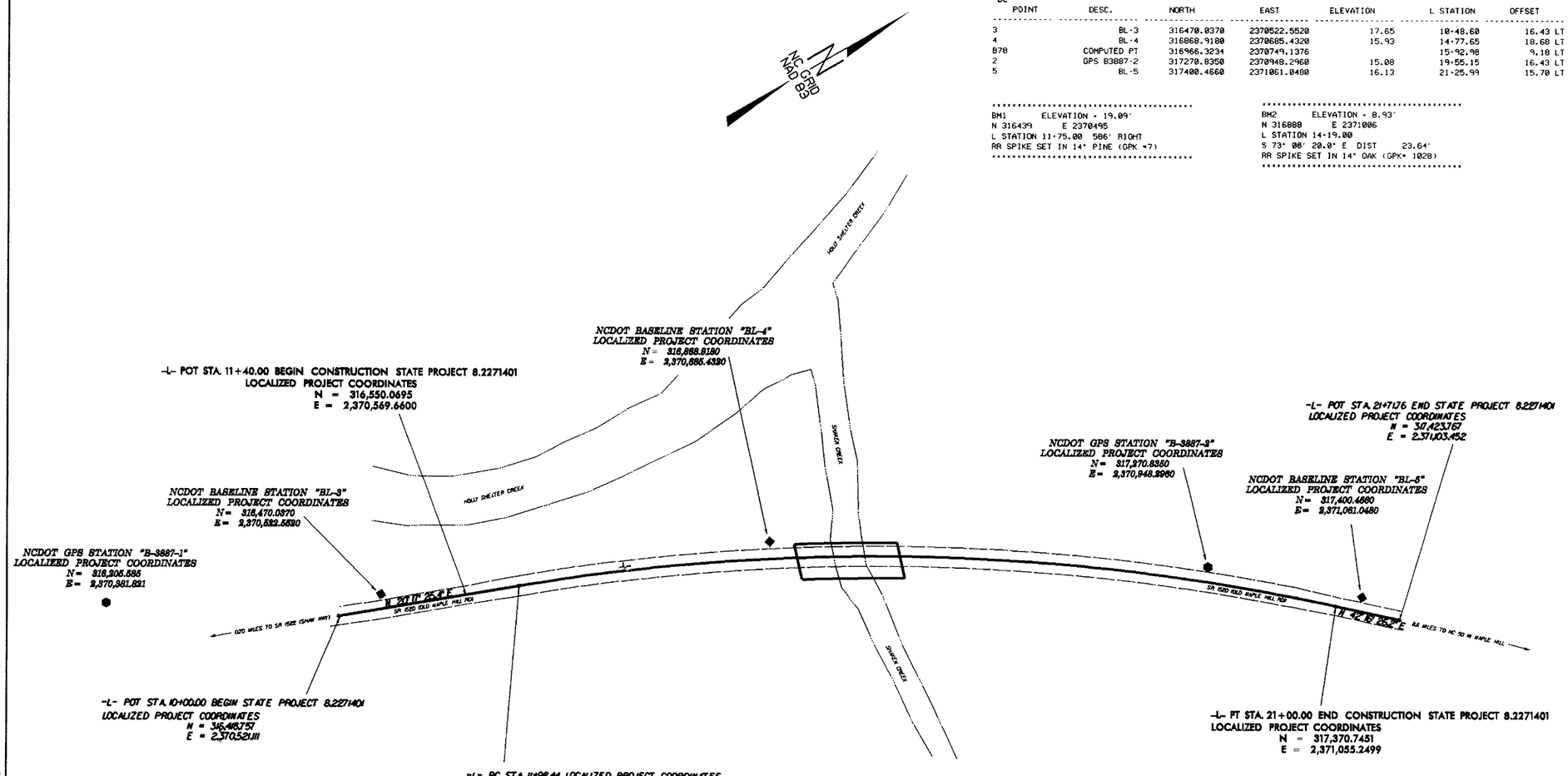
## CONTROL DATA

-BL-

| POINT | DESC. | NORTH | EAST | ELEVATION | L STATION | OFFSET |
|---|---|---|---|---|---|---|
| 3 | BL-3 | 316470.0370 | 2370522.5520 | 17.65 | 10+48.60 | 16.43 LT |
| 4 | BL-4 | 316868.9180 | 2370685.4320 | 15.93 | 14+77.65 | 18.68 LT |
| B78 | COMPUTED PT | 316966.3234 | 2370749.1376 | | 15+92.98 | 9.18 LT |
| 2 | GPS B3887-2 | 317270.8350 | 2370948.2960 | 15.08 | 19+55.15 | 16.43 LT |
| 5 | BL-5 | 317400.4660 | 2371061.0480 | 16.13 | 21+25.99 | 15.70 LT |

BM1 ELEVATION = 19.09'
N 316439 E 2370495
L STATION 11+75.00 566' RIGHT
RR SPIKE SET IN 14" PINE (GPK #7)

BM2 ELEVATION = 8.93'
N 316888 E 2371006
L STATION 14+19.00
S 73° 08' 20.0" E DIST 23.64'
RR SPIKE SET IN 14" OAK (GPK# 1028)




## DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3887-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 316,205.5848(ft) EASTING: 2,370,381.8209(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99994278 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3887-1" TO -L- STATION 11+40.00 IS 392.368' N 28° 36' 09.15" E

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

## NOTES:

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

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

● INDICATES GPS 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 MONUMENTS NAD 83/95

25-FEB-2004 12:12
File: C:\Location&Surveys\b3887_ls_control_030716.dgn
Level: 61

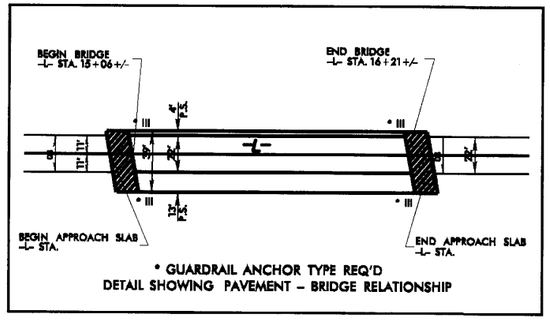
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

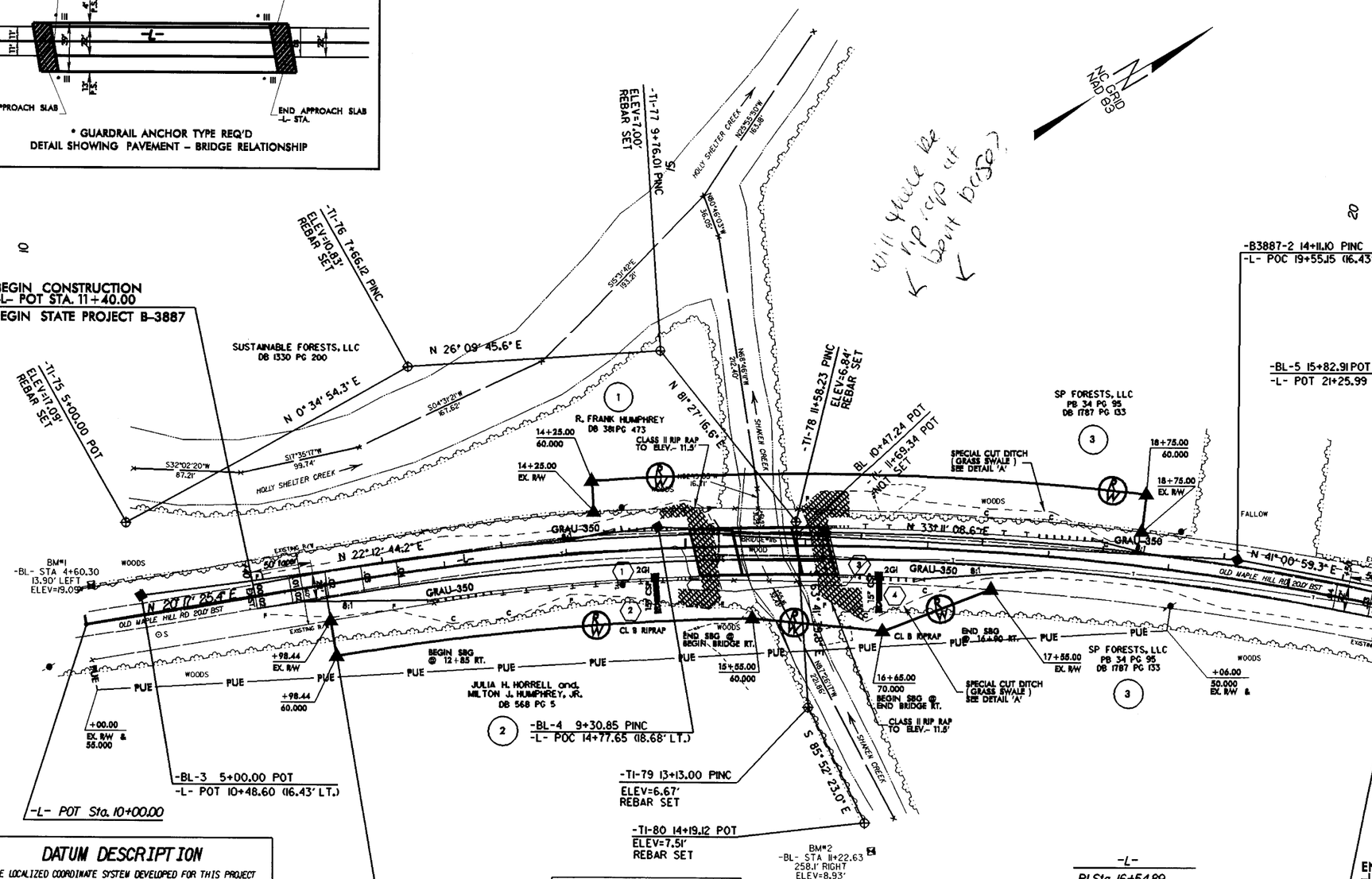
8/17/05

REVISIONS

8-26-03 Adding permanent utility easement from -L- Sta.10+00.00 to 19+06.00 Rt.




* GUARDRAIL ANCHOR TYPE REQ'D
DETAIL SHOWING PAVEMENT – BRIDGE RELATIONSHIP

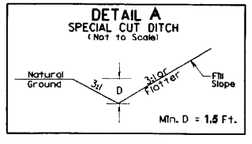



## DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3887-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 316205.58481(1) EASTING: 2370381.82091(1)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99994278
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3887-1" TO -L- STATION 11+40.00 IS 392.3687' N 28° 36' 09.15" E

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)




FROM STA. 16+50-L- TO STA. 17+00-L- RT.
FROM STA. 18+00-L- TO STA. 18+50-L- LT.

-L-
PI Sta 16+54.89
Δ = 21° 59' 00.7" (RT)
D = 2° 26' 17.2"
L = 901.66'
T = 456.44'
R = 2,350.00'

FOR -L- PROFILE SEE SHEET 5
FOR STRUCTURE PLANS SEE S1 THRU S-

25-FEB-2004 12:19
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TELear RT

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | 5 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM. #1 ELEV. = 19.09'
N316436.5 E 2370494.7
-BL- STA. 4+60.30 13.90' LT.
RR SPIKE SET IN 14" PINE

BM. #2 ELEV. = 8.93'
N316888.2 E 2371006.4
-BL- STA. 11+22.63 258.1' RT.
RR SPIKE SET IN 14" OAK

BEGIN GRADE
-L- STA. 11+40.00
EL. 18.84'

PI = 18+50.00
EL = 16.00'
VC = 80'

BEGIN GRADE
-L- STA. 21+80.00
EL. 16.30'

-6.400%

+1.867%

BEG. DITCH STA. 16+50.00 RT.
ELEV. 8.70'

END DITCH STA. 17+40.00 RT.
ELEV. 11.10'

BEG. DITCH STA. 18+60.00 LT.
ELEV. 11.60'

BEG. DITCH STA. 18+50.00 LT.
ELEV. 13.00'

STRUCTURE HYDRAULIC DATA

| | |
|---|---|
| DESIGN DISCHARGE | = 3900 CFS |
| DESIGN FREQUENCY | = 25 YRS |
| DESIGN HW ELEVATION | = 15.45 FT. |
| BASE DISCHARGE | = 5800 CFS |
| BASE FREQUENCY | = 100 YRS |
| BASE HW ELEVATION | = 16.28 FT. |
| OVERTOPPING DISCHARGE | = 8600 CFS |
| OVERTOPPING FREQUENCY | = 500+ YRS |
| OVERTOPPING ELEVATION | = 16.71 FT. |

20
10
0
-10

10 11 12 13 14 15 16 17 18 19 20 21

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LEVEL

8/23/99

| PROJ. REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | X-2 |

0 10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

20
10

12+00.00
18.65

11+50.00
18.65

11+00.00
18.7

10+50.00

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the contract lump sum price for "Grading".

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| 0 10 | PROJ. REFERENCE NO. | SHEET NO. |
|---|---|---|
| | B-3887 | X-3 |

14+50.00

14+00.00

13+50.00

13+00.00

12+50.00

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| 0 10 | PROJ. REFERENCE NO. | SHEET NO. |
|---|---|---|
| | B-3887 | X-4 |

17+00.00

16+50.00

16+00.00

15+50.00

15+00.00

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TEFORT

8/23/99

| 0 10 | PROJ. REFERENCE NO. | SHEET NO. |
|---|---|---|
| | B-3887 | X-5 |

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

20

16.80

5%

15.15

13%

20+00.00

20

16.20

5%

15.54

4.3%

19+50.00

20

16.05

5%

15.50

4%

19+00.00

20

16.02

5%

15.82

4%

18+50.00

20

16.20

5%

5%

15.14

4%

18+00.00

20

16.40

5%

15.69

4%

17+50.00

10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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| PROJ. REFERENCE NO. | SHEET NO. |
|---|---|
| B-3887 | X-6 |

0 10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

20

20

16.30

16.12

21+00.00

16.24

16.16

3.1

20+50.00

L

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FEDOR
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Ecosystem Enhancement PROGRAM

January 4, 2005

Mr. David Timpy
U. S. Army Corps of Engineers
Wilmington Regulatory Field Office
Post Office Box 1890
Wilmington, North Carolina 28403-1890

Dear Mr. Timpy:

Subject: EEP Mitigation Acceptance Letter:

**B-3887,** Replace Bridge 116 over Shaken Creek on SR 1520, Pender County; Cape Fear River Basin (Cataloging Unit 03030007); Southern Outer Coastal Plain Eco-Region

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide mitigation for the 0.017 acre of unavoidable riverine wetland impact associated with the above referenced project.

The subject project is not listed in Exhibit 2 of the Memorandum of Agreement among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, Wilmington District dated July 22, 2003; therefore, the EEP intends to provide compensatory riverine wetland mitigation up to a 2:1 ratio in Cataloging Unit 03030007 of the Cape Fear River Basin.

If you have any questions or need additional information, please contact Ms. Beth Harmon at (919) 715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Phil Harris, Office of Natural Environment, NCDOT
John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3887

Ecosystem Enhancement PROGRAM

January 4, 2005

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

**B-3887,** Bridge 116 over Shaken Creek, Pender County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide wetland mitigation for the subject project. Based on the information supplied by you in a letter dated December 6, 2004, the impacts are located in CU 03030007 of the Cape Fear River Basin in the Southern Outer Coastal Plain Eco-Region, and are as follows:

Riverine Wetland Impacts: 0.017 acre

The subject project is not listed in Exhibit 2 of the Memorandum of Agreement (MOA) among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, Wilmington District dated July 22, 2003. The EEP is only committed to provide the mitigation needs for projects listed on Exhibit 2 during the first two years of the program; however, the EEP currently has sufficient riverine wetland mitigation assets within this CU and will provide the proper riverine wetland mitigation amount. The EEP intends to provide compensatory riverine wetland mitigation up to a 2:1 ratio in Cataloging Unit 03030007 of the Cape Fear River Basin.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

James B. Stanfill for

William D. Gilmore, P.E.
Director

cc: Mr. Dave Timpy, USACE-Wilmington
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3887

Michael F. Easley, Governor
William G. Ross, Jr., Secretary
North Carolina Department of Environment and Natural Resources
Alan W. Klimek, P.E., Director
Division of Water Quality
Coleen H. Sullins, Deputy Director
Division of Water Quality
Wilmington Regional Office

RCH

LBF

RECEIVED

JUL 24 2003

DIVISION OF HIGHWAYS
HYDRAULICS UNIT

July 22, 2003

Mr. D. R. Henderson
NC Department of Transportation
1590 Mail Service Center
Raleigh, NC 27699-1590

Subject: **EXEMPTION** from Stormwater Management Permit Regulations
Stormwater Project No. SW8 030713
B-3887 8.2271401 Bridge Replacement
Pender County

Dear Mr. Henderson:

The Wilmington Regional Office received a copy of your application for the project known as B-3887 8.2271401 Bridge Replacement. Staff of the Wilmington Regional Office have reviewed the application for the applicability of the Stormwater Management rules to the proposed activity at this project. Based on our review, you do not appear to be proposing a development activity on this site at this point in time that would be subject to the stormwater requirements as provided for in 15A NCAC 2H.1000. Please be advised that other regulations will potentially apply to your proposed activities.

If your project disturbs one acre or more and has a point source discharge of stormwater runoff, then it is subject to the National Pollutant Discharge Elimination System (NPDES) stormwater discharge requirements. You are required to have an NPDES permit for stormwater discharge from projects meeting these criteria.

This exemption applies only to the Coastal Stormwater Management Permit for the currently proposed activity. If at any time in the future, development of any part of this site is planned, as defined in NCAC 2H.1000, or if the proposed activities differ in any manner from what is shown on the plans on file with the Division, you must submit the project for review of the applicability of the stormwater management rules. If you have any questions concerning this matter, please do not hesitate to call me at (910) 395-3900.

Sincerely,

Edward Beck

for Rick Shiver
Water Quality Regional Supervisor

RSS/arl: S:\WQS\STORMWAT\EXEMPT\030713.Jul
cc:
Jimmy Canady, Pender County Building Inspections
Joanne Steenhuis
Linda Lewis
Wilmington Regional Office
Central Files

Pender County

SR 1520

Replace Bridge No. 116 Over Shaken Creek

Federal-Aid Project No. BRZ-1520(3)

State Project No. 8.2271401

T.I.P. No. B-3887

CATEGORICAL EXCLUSION

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

10-18-01
DATE

for _____
William D. Gilmore, P.E., Manager
Project Development and Environmental
Analysis Branch, NCDOT

10-18-01
DATE

for _____
Nicholas L. Graf, P.E.
Division Administrator, FHWA

Pender County

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# CATEGORICAL EXCLUSION

October 2001

Document Prepared by:
Wang Engineering Company, Inc.

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Project Manager

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10/10/01

James Wang, Ph.D., P.E.
Principal

For the North Carolina Department of Transportation

Stacy B. Harris, P.E.
Project Manager
Consultant Engineering Unit

## PROJECT COMMITMENTS

**Pender County**
**SR 1520**
**Replace Bridge No. 116 Over Shaken Creek**
**Federal-Aid Project No. BRZ-1520(3)**
**State Project No. 8.2271401**
**T.I.P. No. B-3887**

In addition to the standard Nationwide Permit No. 23 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for Bridge Demolition and Removal, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

***Division Engineer***

The Stream Crossing Guidelines for Anadromous Fish Passage will be implemented, as applicable.

A moratorium for no in-stream work or discharges into the river will be in effect from February 15 to June 15, to protect anadromous fish during spawning.

**Pender County**
**SR 1520**
**Replace Bridge No. 116 Over Shaken Creek**
**Federal-Aid Project No. BRZ-1520(3)**
**State Project No. 8.2271401**
**T.I.P. No. B-3887**

**INTRODUCTION:** The replacement of Bridge No. 116 is included in the 2002-2008 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

## I. PURPOSE AND NEED

Bridge Maintenance Unit records indicated the bridge has a sufficiency rating of 14.7 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient. The replacement of an inadequate structure will result in safer and more efficient traffic operations.

## II. EXISTING CONDITIONS

SR 1520 (Old Maple Hill Road) is classified as a rural local collector. Land use in the project area is predominantly undeveloped woodlands. Undeveloped woodlands are adjacent on the east and west sides of the study area.

Bridge No. 116 was constructed in 1956. The existing structure is 87-feet (26.1 meters) in length, consisting of five spans with the maximum span at approximately 18-feet (5.4 meters). The clear roadway width for the structure is 19.2-feet (5.76 meters), providing two nine foot (2.7 meters) travel lanes with 0.6-foot (0.2-meter) shoulders. The superstructure consists of a timber floor on timber joists with an asphalt-wearing surface. The substructure is a timber abutment design. The interior bents consist of timber caps on timber piles. The bed to crown height is 18 feet (5.4 meters). The posted weight limit is nine tons (8.16 megagrams [Mg]) for single vehicles (SV) and 15 tons (13.6 Mg) for truck-tractors semi-trailers (TTST).

A five degree (350 meter radius) approach curve exists on the south end and a 2.5-degree (730 meter radius) approach curve exists on the north end of the existing structure and the structure is tangent. SR 1520 consists of two ten foot (three meter) lanes with ten foot (three meter) grass shoulders.

The estimated 2001 average daily traffic volume is 150 vehicles per day (vpd). The projected traffic volume is expected to increase to 400 vpd by the design year 2025. The volumes include one percent TTST and two percent dual-tired vehicles.

The posted speed limit is 55 miles per hour (mph) [90 kilometers per hour (km/h)].

SR 1520 is not part of a designated bicycle route and there are no indications that an unusual number of bicyclists are using this route.

There are aerial power lines running on the southeast side of SR 1520 that cross the creek. There is no evidence of underground utilities. Utility impacts are anticipated to be low.

There were zero accidents reported in the vicinity of the bridge during the period from January 1, 1995 to December 31, 1997.

One school bus crosses this bridge twice daily.

## III. ALTERNATIVES

### A. Project Description

The proposed structure will provide a 28-foot (8.4 meter) clear roadway width providing two 11-foot (3.3-meter) travel lanes, including three foot (one meter) shoulders (Figure 4). The proposed approach roadway will consist of two 11-foot (3.3 meter) travel lanes with four foot (1.2 meter) grass shoulders. The design speed will be 60 mph (100 km/h).

Based on a preliminary hydraulic analysis, Bridge No. 116 will be replaced with a cored slab bridge approximately 110 feet (33 meters) in length, with a spill through design. The elevation of the new structure will be approximately the same as the existing structure. The opening size of the proposed structure may increase or decrease as necessary to accommodate peak flows as determined from a more detailed hydraulic analysis to be performed during the final design phase of the project.

### B. Reasonable and Feasible Alternatives

One (1) reasonable and feasible alternative studied for replacing the existing bridge is described below.

**Alternate A (Preferred)** replaces the bridge at the existing location with a new structure. During construction, traffic will be maintained on an off-site detour (Figure 1) along SR 1523 (Old Blakes Bridge Rd.), NC 53, and NC 50 that is approximately 18 miles (29.0 kilometers) in length. The length of approach work will be approximately 380 feet (114 meters) on the west side of the bridge and approximately 375 feet (112.5 meters) on the east side of the bridge. The right-of-way width varies from 100 to 210 feet (30 to 63 meters), including temporary easements.

A road user analysis was performed based on 200 vpd for construction year 2003 and an average of 18 miles (29.0 kilometers) of indirect travel. The cost of additional travel will be approximately 427 thousand dollars during a twelve-month construction period.

#### Alternatives Eliminated From Further Study

**Alternate B** replaces the bridge at the existing location. During construction, traffic will be maintained by an on-site detour east of the existing structure with a temporary detour structure approximately 110 feet (33 meters) in length. Alternate B was eliminated because of the greater impacts, costs, and construction duration of its detour.

**Alternate C** replaces the bridge on a new alignment east of the existing structure. During construction, traffic will be maintained on the existing structure. Alternate C was eliminated because of its greater cost and additional environmental impacts.

**The "Do-Nothing" Alternative** will eventually necessitate removal of the bridge. This is not desirable due to the traffic service provided by SR 1520.

Investigation of the existing structure by the Bridge Maintenance Unit indicates the rehabilitation of the old bridge is not feasible due to its age and deteriorated condition.

### C. Preferred Alternative

**Alternate A** replaces the bridge at the existing location with a new structure while maintaining traffic during construction with an off-site detour route approximately 18 miles (29.0 kilometers) in length. Alternate A was selected as the preferred alternate because of its low user cost and environmental impacts.

The Division Engineer concurs with Alternate A as the preferred alternate.

## IV. ESTIMATED COST

The estimated costs, based on current 2001 prices, are as follows:

| | **Alternate A (Preferred)** |
|---|---|
| Structure Removal (existing) | **$ 15,300** |
| Structure (proposed) | **196,600** |
| Detour Structure and Approaches | **0** |
| Roadway Approaches | **106,400** |
| Miscellaneous and Mobilization | **143,700** |
| Engineering and Contingencies | **88,000** |
| ROW/Const. Easements/Utilities | **36,400** |
| TOTAL | **$ 586,400** |

The estimated cost of the project, as shown in the 2002-2008 Transportation Improvement Program, is $660,000 including $60,000 for right-of-way and $600,000 for construction.

## V. NATURAL RESOURCES

### A. Methodology

Materials and literature supporting this investigation have been derived from a number of sources including U.S. Geological Survey (USGS) topographic mapping (Stag Park, NC 7.5 minute quadrangle), U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory mapping (NWI) (Stag Park, NC 7.5 minute quadrangle), Natural Resources Conservation Service (NRCS; formerly the Soils Conservation Service) soils mapping (SCS 1990), and recent aerial photography.

Plant community descriptions are based on a classification system utilized by North Carolina Natural Heritage Program (NHP) (Schafale and Weakley 1990). When appropriate, community classifications were modified to better reflect field observations. Vascular plant

names follow nomenclature found in Radford *et al.* (1968) with exceptions for updated nomenclature. Jurisdictional areas were evaluated using the three-parameter approach following U.S. Army Corps of Engineers (COE) delineation guidelines (DOA 1987). Jurisdictional areas were characterized according to a classification scheme established by Cowardin *et al.* (1979). Habitat requirements and distributions of aquatic and terrestrial wildlife were determined by supportive literature (Martof et al. 1980; Potter et al. 1980; Webster et al. 1985; Menhinick 1991; Hamel 1992; Palmer and Braswell 1995; Rohde et al. 1994). Water quality information for area streams and tributaries was derived from the NC Division of Water Quality (DWQ). Quantitative sampling was not undertaken to support existing data.

The FWS listing of federally protected species with ranges extending into Pender County (February 26, 2001) was reviewed prior to initiation of the field investigation. In addition, NHP records documenting presence of federally or state listed species were consulted before commencing field investigations. The most current list (March 22, 2001) of federally protected species has been reviewed since the field investigations and no new species have been added.

The site was visited on January 4, 2001 and June 19, 2001. The study corridor was walked and visually surveyed for significant features. For purposes of this evaluation, the study corridor was assumed to be the same as right-of-way and temporary easement boundaries (varies from 100 to 210 feet [30 to 63 meters]). Actual impacts will be limited to cut-fill boundaries and are expected to be less than those shown for the right-of-way. Special concerns evaluated in the field include 1) potential protected species habitat and 2) wetlands and water quality protection in Shaken Creek.

**B. Physiography and Soils**

The study corridor is underlain by the Cretaceous Pee Dee geologic formation within the inner Coastal Plain physiographic province of North Carolina. Topography is characterized as gently undulating with wide floodplains and broad, flat interstream divides. The study corridor is located on uplands and across the floodplain of Shaken Creek. Elevations in the study corridor are relatively level and average approximately five feet (1.5 meters) National Geodetic Vertical Datum (NGVD) (USGS Stag Park, NC quadrangle).

Soil mapping units underlying the study corridor are Baymeade fine sand (*Arenic Hapludults*), Pactolus fine sand (*Aquic Quartzipsamments*), and Marvyn (*Typic Hapludults*) and Craven (*Aquic Hapludults*) soils (not mapped separately).

The Baymeade series occurs on low ridges and convex divides on uplands near main drainageways. This series occurs in the study corridor on upland areas south of Bridge No. 116. The Baymeade series is well drained and permeability is moderately rapid. Baymeade soils are non-hydric in Pender County but in low lying areas may have inclusions of the hydric Leon (*Aeric Haplaquods*) series (NRCS 1997).

The Pactolus series occurs in slight depressions in uplands near the coast and on low ridges on terraces. This series occurs in the study corridor on upland areas north of Bridge No. 116. Pactolus soil is moderately well drained and permeability is rapid. Pactolus soils are non-hydric in Pender County, but small depressions may have inclusions of the hydric Leon, Lumbee (*Typic Ochraquults*), and Murville (*Typic Haplaquods*) soils.

Marvyn and Craven soils occur on side slopes in uplands. Within the study corridor, this series occurs on the Shaken Creek floodplain. Marvyn and Craven soils are well drained and moderately well drained, respectively. These soils are considered non-hydric in Pender County, but in narrow drainageways may have inclusions of the hydric Muckalee (*Typic Haplaquods*) series (SCS 1990; NRCS 1997).

## C. Water Resources

### 1. Surface Waters

The study corridor is located within sub-basin 03-06-23 of the Cape Fear River Basin (DWQ 2000a). This area is part of USGS Hydrologic Unit 03030001 of the Mid-Atlantic/Gulf Region. The drainage area at the project site is approximately 85 square miles (220 square kilometers). The structure targeted for replacement spans the open water stream associated with Shaken Creek. There is no direct involvement of additional streams or tributaries. This section of Shaken Creek has been assigned Stream Index Number 18-74-33-4 by the DWQ. Shaken Creek is a tributary of and joins with Holly Shelter Creek approximately 200 feet (60.0 meters) downstream (west) of Bridge
No. 116.

### 2. Stream Characteristics

Shaken Creek is a well-defined, Coastal Plain, black-water river with moderate flow over sandy substrate. At Bridge No. 116, Shaken Creek is approximately 40-feet (12 meters) wide. The banks are steep and average three feet (one meter) high. During field investigations of Shaken Creek, water clarity was good, flow velocity was moderate, and water depth was approximately three feet (one meter). The streambed is composed of sand and some silt. A narrow floodplain, approximately 30-feet (9 meters) wide, occurs upstream (east) of the bridge along the south side of Shaken Creek. A narrow slough, approximately 12-feet (3.6 meters) wide, occurs 60-feet (18.0 meters) east of the bridge on the north side of Shaken Creek.

Classifications are assigned to waters of the State of North Carolina based on the existing or contemplated best usage of various streams or segments of streams in the basin. A best usage classification of **C Sw** has been assigned to Shaken Creek. The designation **C** denotes that appropriate uses include aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation refers to human body contact with waters on an infrequent or incidental basis. The **Sw** designation refers to swamp waters that are naturally more acidic and lower in dissolved oxygen levels. No designated High Quality Waters (**HQW**), Outstanding Resource Waters (**ORW**), Water Supply I (**WS-I**), or Water Supply II (**WS-II**) waters occur within one mile (1.6 kilometers) of the study corridor (DWQ 2000b).

DWQ has initiated a whole-basin approach to water quality management for the 17 river basins within the state. Water quality for the proposed study corridor is summarized in the Cape Fear River basinwide water quality plan (DWQ 2000a). Shaken Creek is rated as **Fully Supporting** of designated uses. Shaken Creek is not rated for ambient water quality; however, Juniper Swamp, approximately 11.5 miles (18.5 kilometers) west of the study corridor, has a bioclassification rating of **Good-Excellent** based on macroinvertebrate community sampling (DWQ 2000a).

This sub-basin (03-06-23) supports one major point-source discharger and five minor point-source dischargers. Total permitted flow for two major dischargers is 1.1 million gallons per day (MGD) (4.2 million liters per day [MLD]). Total permitted flow for the five minor dischargers is 1.4 MGD (5.3 MLD). There are no point-source discharges directly associated with Shaken Creek. Major non-point sources of pollution for the entire Cape Fear River Basin are agriculture, urban development, construction, forestry, mining, onsite wastewater disposal, solid waste disposal, and atmospheric deposition. Sedimentation and nutrient inputs are major problems associated with non-point source discharges and often result in fecal coliform, heavy metals, oil from roads and parking lots, and increased nutrient levels in surface waters (DWQ 2000a).

## 3. Anticipated Impacts

### a) Impacts Related to Water Resources

Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of a standard erosion control schedule and the use of best management practices. The contractor will follow contract specifications pertaining to erosion control measures as outlined in 23 CFR 650 Subpart B and Article 107-13 entitled "Control of Erosion, Siltation, and Pollution" (NCDOT, Specifications for Roads and Structures). These measures include the use of dikes, berms, silt basins, and other containment measures to control runoff; elimination of construction staging areas in floodplains and adjacent to waterways; re-seeding of herbaceous cover on disturbed sites; management of chemicals (herbicides, pesticides, de-icing compounds) with potential negative impacts on water quality; and avoidance of direct discharges into steams by catch basins and roadside vegetation.

The proposed bridge replacement will allow for continuation of pre-project stream flows in Shaken Creek, thereby protecting the integrity of these waterways. Long-term impacts to adjacent reaches resulting from construction are expected to be negligible. In order to minimize impacts to water resources, NCDOT Best Management Practices (BMPs) for the Protection of Surface Waters will be strictly enforced during the entire life of the project.

### b) Impacts Related to Bridge Demolition and Removal

In order to protect the water quality and aquatic life in the area affected by this project, the NCDOT and all potential contractors will follow appropriate guidelines for bridge demolition and removal. These guidelines are presented in three NCDOT documents entitled "Pre-Construction Guidelines for Bridge Demolition and Removal", "Policy: Bridge Demolition and Removal in Waters of the United States", and "Best Management Practices for Bridge Demolition and Removal" (all documents dated 9/20/99). Guidelines followed for bridge demolition and removal are in addition to those implemented for Best Management Practices for the Protection of Surface Waters.

Dropping any portion of the structure into waters of the United States will be avoided unless there is no other practical method of removal. In the event that no other practical method is feasible, a worst-case scenario is assumed for calculations of fill entering waters of the United States. Since Bridge No. 116 is composed completely

of steel and timber, there is little potential for components of the bridge to be dropped into waters of the United States. Therefore, no temporary fill is expected to result from removal of the existing bridge. NCDOT's Best Management Practices for Bridge Demolition and Removal (BMP-BDR) will be applied for the removal of this bridge.

Under the guidelines presented in the documents noted in the first paragraph of this section, work done in the water for this project will fall under Case 2, which states that no work will be performed in the water during moratorium periods (February 15 to June 15) associated with fish migration, spawning, and larval recruitment into nursery areas. This conclusion is based upon the classification of the waters within the project area and vicinity, the Stream Crossing Guidelines for Anadromous Fish Passage, and comments received from the North Carolina Wildlife Resources Commission (NCWRC).

## D. Biotic Resources

### 1. Plant Communities

Four distinct plant communities were identified within the study corridor: Coastal Plain Bottomland Hardwoods, Upland pine/mixed deciduous forest, pine plantation, and roadside/disturbed land. These plant communities are described below.

#### a) Coastal Plain Bottomland Hardwoods (Blackwater Subtype)

Coastal Plain Bottomland Hardwoods is a natural plant community described by Schafale and Weakley (1990), and occurs along the Shaken Creek floodplain east of Bridge No. 116. This community represents approximately five percent of the total vegetated study corridor area. The canopy is closed and includes bald cypress (*Taxodium distichum*), sweetgum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), and laurel oak (*Quercus laurifolia*). The sub-canopy/shrub layer is moderately dense and consists of laurel oak, American holly (*Ilex opaca*), sweet bay (*Magnolia virginiana*), titi (*Cyrilla racemiflora*), dahoon (*Ilex cassine*), and cane (*Arundinaria gigantea*). Herbaceous vegetation is sparse and includes blueberry (*Vaccinium* sp.), cane, a sedge (*Carex* sp.), laurel-leaved greenbriar (*Smilax laurifolia*), common greenbriar, (*Smilax rotundifolia*), royal fern (*Osmunda regalis*), and peatmoss (*Sphagnum* sp.).

#### b) Upland Pine/Mixed Deciduous Forest

Upland pine/mixed deciduous forest occurs in upland areas of the study corridor and represents approximately 20 percent of the total vegetated study corridor. Canopy species are loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), sweetgum (*liquidambar styraciflua*), river birch (*Betula nigra*), and red maple (*Acer rubrum*). The sub-canopy/shrub community consists of water oak, red maple, green ash (*Fraxinus pennsylvanica*), wax myrtle (*Morella cerifera*), American holly, cane, blueberry, and sweet bay. Herbaceous vegetation includes blueberry, bullbriar (*Smilax bona-nox*), common greenbrier, and St. Johns-wort (*Hypericum* sp.). East of SR 1520, this community has been timbered within the last 20 years and is characterized by an open canopy and a dense sub-canopy/shrub layer. West of SR 1520, this community is represented by a mature stand with a

moderately dense shrub layer and contains mesic hardwood canopy species associated with the Holly Shelter Creek floodplain.

**c) Pine Plantation**

Pine plantation occurs along the east side of SR 1520 north of Bridge No. 116. This is a monoculture stand of loblolly pine approximately 15 years of age. The canopy is closed and the shrub and herbaceous layers are absent. This community represents less than one percent of the total vegetated study corridor area.

**d) Roadside/disturbed Land**

Roadside/disturbed land is defined as the present maintained roadside margins and powerline corridor within the study corridor. This plant community represents approximately 75 percent of the total vegetated study corridor area. Plant species include loblolly pine, water oak, sweetgum, pearly everlasting (*Anaphalis margaritacea*), bitterweed (*Helenium amarum*), crabgrass (*Digitaria* sp.), panic grass (*Panicum* sp.) broomsedge (*Andropogon virginicus*), dog fennel (*Eupatorium capillifolium*), and cane.

**e) Anticipated Impacts to Terrestrial Plant Communities**

Plant community areas are estimated based on the amount of each plant community present within the projected right-of-ways and temporary easements (varies from 100 to 210 feet [30.0 to 63.0 meters]). Permanent impacts are considered to be those impacts that occur within the proposed right-of-way, and temporary impacts are those impacts that occur outside the right-of way boundary but within the proposed temporary easement. A summary of potential plant community impacts is presented in Table 1.

**Table 1**
**Area (Acres [Hectares]) of Anticipated Impacts to Terrestrial Plant Communities**

| Alternate | Impact Type | Plant community | | | | **Total** |
|---|---|---|---|---|---|---|
| | | Coastal Plain Bottomland Hardwoods | Upland Pine/Mixed Deciduous Forest | Pine Plantation | Roadside/ Disturbed Land | |
| **A** | Temporary | – | 0.09 (0.04) | – | 0.08 (0.03) | 0.17 (0.07) |
| | Permanent | – | 0.08 (0.03) | – | 0.65 (0.26) | 0.73 (0.29) |
| | Total | – | 0.17 (0.07) | – | 0.73 (0.29) | 0.90 (0.36) |

Alternate A impacts to natural plant communities are 0.17 acres (0.07 hectares). Alternate A does not require construction of a new alignment or temporary bridge structure and therefore minimizes impacts.

Permanent impacts to plant communities resulting from bridge replacements are generally restricted to narrow strips adjacent to the existing bridge and roadway approach segments. Very little area of natural plant community is expected to be impacted by the proposed project. From an ecological perspective, impacts of upgrading existing road facilities are minimal. No additional fragmentation of plant communities will be created, as the project will result only in alteration of community boundaries. Much of the alignment is currently bounded by a maintained right-of-way. Therefore, the proposed project may only claim narrow strips of adjacent natural communities.

Roadside-forest edges typically serve as vectors for movement of invasive species into adjacent natural communities. An example of an undesirable invasive species utilizing roadsides is kudzu (*Pueraria lobata*). The establishment of a hardy groundcover on road shoulders as soon as practicable will limit the availability of construction areas to invasive and undesirable plants.

## 2. Wildlife

### a) Terrestrial

Signs of two mammal species, white-tailed deer (*Odocoileus virginianus*) and raccoon (*Procyon lotor),* were observed during the site visit. Other mammal species that are expected to occur within the study corridor are black bear (*Ursus americanus*), gray fox *(Urocyon cinereoargenteus*), eastern cottontail (*Sylvilagus floridanus*), marsh rabbit (*Sylvilagus palustris*), fox squirrel (*Sciurus niger*), Virginia opossum (*Didelphis virginiana*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), southeastern shrew (*Sorex longirostris*), and cotton mouse (*Peromyscus gossypinus*).

Birds observed within or adjacent to the corridor were turkey vulture (*Cathartes aura*), downy woodpecker (*Picoides pubescens*), red-bellied woodpecker (*Melanerpes carolinus*), tufted titmouse (*Baeolophus bicolor*), Carolina chickadee (*Poecile carolinensis*), American robin (*Turdus migratorius*), hermit thrush (*Catharus guttatus*), and wood duck (*Aix sponsa*). Other avian species expected to occur in the study corridor are prothonotory warbler (*Protonotaria citrea*), yellow-billed cuckoo (*Coccyzus americanus*), blue-gray gnatcatcher (*Polioptila caerulea*), Acadian flycatcher (*Empidonax virescens*), American redstart (*Setophaga ruticilla*), pileated woodpecker (*Dryocopus pileatus*), barred owl (*Strix varia*), and red-shouldered hawk (*Buteo lineatus*).

No terrestrial reptile or amphibian species were observed during the site visit. Some terrestrial reptiles which may occur within the study corridor include eastern box turtle (*Terrapene carolina*), Carolina anole (*Anolis carolinensis*), eastern fence lizard (*Sceloporus undulatus*), five-lined skink (*Eumeces fasciatus*), rough green snake (*Opheodrys aestivus*), worm snake (*Carphophis amoenus*), rat snake (*Elaphe obsoleta*), eastern kingsnake (*Lampropeltis getula*), eastern garter snake (*Thamnophis sirtalis*), copperhead (*Agkistrodon contortrix*), green treefrog (*Hyla cineria*), gray treefrog (*Hyla versicolor*), southern toad (*Bufo terrestris*), and slimy salamander (*Plethodon cylindraceus*).

### b) Aquatic

Limited surveys resulted in no observations of aquatic reptile or amphibian species within the study corridor. Aquatic or semi-aquatic reptiles and amphibians which are expected to occur within the study corridor include snapping turtle (*Chelydra serpentina*), mud turtle (*Kinosternon subrubrum*), yellowbelly slider (*Trachemys scripta*), river cooter (*Pseudemys concinna*), brown water snake (*Nerodia taxispilota*), redbelly water snake (*Nerodia erythrogaster*), cottonmouth (*Agkistrodon piscivorus*), eastern newt (*Notophthalmus viridescens*), marbled salamander (*Ambystoma opacum*), and southern dusky salamander (*Desmognathus auriculatus*).

No sampling was undertaken in Shaken Creek to determine fishery potential. Visual surveys of Shaken Creek did not reveal the presence of fish, molluscan fauna, or other aquatic life; however, fish species that may be present in Shaken Creek include American shad (*Alosa sappidissima*), bluehead chub (*Nocomis leptocephalus*), margined madtom (*Noturus insignis*), spottail shiner (*Notropis hudsonius*), tessellated darter (*Etheostoma olmstedi*), and yellow bullhead (*Ameiurus natalis*). Potential game fish that may be present within the study corridor include redbreast sunfish (*Lepomis auritus*), bowfin (*Amia calva*), yellow perch (*Perca flavescens*), and largemouth bass (*Micropterus salmoides*).

### c) Anticipated Impacts

Shaken Creek is a Coastal Plain system, and anadromous fish passage should be considered in the timing of any proposed in-stream activities associated with bridge replacement. Nine anadromous fish species have been documented to occur in the Cape Fear River basin and have distributions that include Pender County (Rohde *et al.* 1994; Menhinick 1991). Design and scheduling of bridge replacement will avoid the necessity of in-stream activities during the spring migration period for anadromous fish species (February 15 to June 15) within the Cape Fear River and its tributaries, including Shaken Creek.

Due to the limited extent of infringement on natural communities, the proposed bridge replacement will not result in significant loss or displacement of known terrestrial animal populations. No significant habitat fragmentation is expected since most improvements will be restricted to existing roadside margins. Construction noise and associated disturbances will have short-term impacts on avifauna and migratory wildlife movement patterns. Long-term impacts are expected to be negligible. Potential down-stream impacts to aquatic habitat will be avoided by bridging the systems to maintain regular flow and stream integrity. Short-term impacts associated with turbidity and suspended sediments will affect benthic populations. Temporary impacts to downstream habitat from increased sediment during construction will be minimized by the implementation of standard erosion control measures.

## E. Special Topics

### 1. Waters of the United States

Surface waters within the embankments of Shaken Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as waters of the United States

(33 CFR section 328.3). NWI mapping indicates that Shaken Creek exhibits characteristics of a riverine system with an unconsolidated bottom that is permanently flooded (R2UBH; Cowardin *et al.* 1979). Field investigations indicate that within the study corridor, Shaken Creek is a black water Coastal Plain stream with adjacent wetlands.

Wetlands adjacent to Shaken Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as waters of the United States (33 CFR section 328.3). These areas are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology at or near the surface for a portion (12.5 percent) of the growing season (DOA 1987). NWI mapping indicates that floodplains of Shaken Creek exhibit characteristics of a palustrine, broad-leaved, deciduous forest system that is seasonally flooded (PFO1C; (Cowardin *et al.* 1979). Field investigations indicate that floodplain wetlands occur along the both sides of Shaken Creek east of SR 1520 and on the north side of Shaken Creek west of SR 1520. These wetlands satisfy the three-parameter approach outlined by the COE (DOA 1987; see attached Routine Wetland Determination data forms). Wetland vegetation species are bald cypress, sweet bay, titi, laurel oak, laurel-leaved greenbriar, and royal fern. These plants are growing on Marvyn and Craven soils that exhibit values, chromas, and mottles characteristic of hydric soils. Evidence of wetland hydrology includes saturated soil at surface, surface drainage patterns, pooling, stained leaves, and oxidized root channels.

Permanent impacts to the stream are limited to bridge shading; bridging will not result in fill or dredging of wetlands/waters of the United States, and encroachment into the stream will be avoided. Upon completion of construction, temporary impacts associated with construction activities and temporary alignments will be restored to pre-project conditions. The areas of wetland within the alternative right-of-ways and the areas and linear distances of stream shaded by proposed bridging are shown in Table 2.

**Table 2**
**Potential Wetland and Open Water Impacts**

| Alternate | Impact Type | Jurisdictional Area | | |
|---|---|---|---|---|
| | | Wetland | Stream | Stream Linear Distance |
| **A** | Temporary | 0.007 (0.003) | 0.03(0.01) | 29(8.7) |
| | Permanent | .001 (<0.001) | – | – |
| | Total | 0.008 (0.003) | 0.03(0.01) | 29(8.7) |

Notes: Area estimations are expressed in acres (hectares) and linear distance is expressed in feet (meters). Stream area and stream linear distance impacts are from bridge shading.

Alternate A entails reconstruction of Bridge No. 116 in place (approximately 0.007 acre [0.003 hectare] of vegetated wetlands temporarily impacted). Alternate A includes 0.001 acre (<0.001 hectare) of vegetated wetland within the existing right-of-way that constitutes permanent impacts.

There is little potential that components of the existing bridge may be dropped into waters of the United States during construction. Therefore, no temporary fill is expected to result from bridge removal. This project can be classified as Case 2, where no in-stream work may occur during moratorium periods due to anadromous fish migration. NCDOT will coordinate with the various resource agencies during project planning to ensure that any concerns regarding bridge demolition are resolved. Within Pender County, both inland and estuarine surface waters and wetlands are considered to be high quality habitat and have been designated as Areas of Environmental Concern (AECs) by the N.C. Department of Coastal Management (DCM). Consideration will be given to avoid disturbances within these areas whenever practicable.

**2. Permits**

This project is being processed as a Categorical Exclusion (CE) under Federal Highway Administration (FHWA) guidelines. The COE has made available Nationwide Permit (NWP) No.23 (61 FR 65874, 65916; December 13, 1996) for CEs due to minimal impacts expected with bridge construction. DWQ has made available a General 401 Water Quality Certification for NWP No.23. However, authorization for jurisdictional area impacts through use of this permit will require written notice to DWQ. In the event that NWP No.23 will not suffice, minor impacts attributed to bridging and associated approach improvements are expected to qualify under General Bridge Permit 031 issued by the Wilmington COE District. Notification to the Wilmington COE office is required if this general permit is utilized. The proposed project will also require a Coastal Area Management Act (CAMA) permit from the DCM because of probable impacts to AECs. AECs potentially impacted by this project include Public Trust Areas.

**3. Mitigation**

Compensatory mitigation is recommended for this project due to the scope and nature of potential project impacts. Fill or alteration of streams will require compensatory mitigation in accordance with 15 NCAC 2H .0506(h). Required permits must be obtained from the Division of Water Quality prior to project initiation. Utilization of BMPs is recommended in an effort to minimize impacts.

Mitigation has been defined in National Environmental Policy Act (NEPA) regulations to include efforts which: a) avoid, b) minimize, or c) compensate for adverse impacts to the environment (40 CFR 1598.22 (a-e)).

*Avoidance.* Jurisdictional areas exist on both sides of the existing SR 1520 and Bridge No. 116, so complete avoidance is not possible. The elimination of staging areas in lowland sites, careful containment of hazardous materials near Shaken Creek, and employment of strict erosion and sedimentation control procedures are practices which can be used to avoid impacts to jurisdictional areas. Existing stream crossings cannot be avoided by facility improvements.

*Minimization.* Reduction of fill slopes and canopy removal in or near floodplain systems will reduce unnecessary wetland losses. Minor shifts in the roadway footprint will also reduce the amount of additional cut and fill areas necessary for improvements.

*Compensation.* Compensatory mitigation is recommended for all unavoidable losses. Few on-site opportunities are available however, restoration opportunities in or near the

project corridor should be investigated for mitigation potential. Mitigation opportunities may be available through restoration of existing road surfaces to be obliterated after the new bridge is completed. A final determination regarding mitigation rests with the COE and DWQ.

## F. Protected Species

### 1. Federally Protected Species

Species with the federal classification of Endangered (E), Threatened (T), Threatened due to Similarity of Appearance (T [S/A]), or officially Proposed (P) for such listing are protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The term "Endangered Species" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range", and the term "Threatened Species" is defined as "any species that is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. 1532). The term "Threatened due to Similarity of Appearance" is defined as a species that is not "Endangered" or "Threatened", but "closely resembles an Endangered or Threatened species" (16 U.S.C. 1532). Federally protected species listed for Pender County (March 22, 2001 FWS list) are presented in Table 3.

**Table 3**
**Federally Protected Species Listed for Pender County**
(March 22, 2001 FWS list)

| Common Name | Scientific Name | Status |
|---|---|---|
| Manatee | *Trichechus Manatus* | E |
| Red-Cockaded Woodpecker | *Picoides Borealis* | E |
| Piping Plover | *Charardrius Melodus* | T |
| American Alligator | *Alligator Mississippiensis* | T (S/A) |
| Loggerhead Sea Turtle | *Caretta Caretta* | T |
| Shortnose Sturgeon | *Acipenser Brevirostrum* | E |
| Seabeach Amaranth | *Amaranthus Pumilus* | T |
| Golden Sedge | *Carex Lutea* | E (P) |
| Rough-Leaved Loosestrife | *Lysimachia Asperulaefolia* | E |
| American Chaffseed | *Schwalbea Americana* | E |
| Cooley's Meadowrue | *Thalictrum Cooleyi* | E |

State Status Codes (Amoroso 1999; LeGrand and Hall1999):

C - Candidate
E - Endangered
PE - Proposed Endangered
PT - Proposed Threatened
S/A - Threatened due to similarity of appearance
SC - Special Concern
SR - Significantly Rare
T - Threatened
W3 - Watch List: rare, but with uncertain documentation
W1: rare, but relatively secure

**West Indian Manatee** - The West Indian Manatee is a large, gray or brown aquatic mammal that averages ten to 13-feet (three to four meters) in length and weighs up to 1,000 pounds (455 kilograms). During summer months manatees migrate from their Florida wintering areas to as far north as coastal Virginia. These mammals inhabit warm waters, both fresh and salt, where their diet consists mostly of aquatic vegetation (Webster *et al.* 1985).

Shaken Creek, within the study corridor, is a small, shallow, Coastal Plain river lacking submerged aquatic vegetation. Therefore, this tributary does not provide passage or suitable forage habitat for the manatee. Manatees have not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that manatees have not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and the aquatic habitat type within the study corridor, this project will not affect manatee. **NO EFFECT**

**Red-Cockaded Woodpecker** - This small woodpecker (seven to 8.5 inches [17.8 to 21.6 centimeters] long) has a black head, prominent white cheek patch, and black-and-white barred back. Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (Potter *et al.* 1980). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf (*P. palustris*), slash (*P. elliotii*), and pond (*P. serotina*) pines (Thompson and Baker 1971). Nest cavities are constructed in the heartwood of living pines generally older than 70 years, and that have been infected with red-heart disease. Nest cavity trees tend to occur in clusters, which are referred to as colonies (FWS 1985). The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees. Pine flatwoods or pine-dominated savannas that have been maintained by frequent natural fires serve as ideal nesting and foraging.

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. Forested, upland areas within the study corridor have a moderately dense to dense shrub layer and lack the open shrub layer of the pine savannah habitat required by this species for foraging and nesting. Red cockaded woodpecker has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that the red-cockaded woodpecker has not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect red-cockaded woodpecker. **NO EFFECT**

**Piping Plover** - Piping plovers are the smallest of the plovers found in the Carolinas, measuring only 15 to 20 centimeter (six to eight inches) in length (Golder and Parnell 1987). This species is characterized by a white head and back and white breast and belly, yellow legs, narrow black neck band and a narrow band above the eyes, and a black bill in the winter and yellow and black bill in the summer (Potter *et al.* 1980).

These small Nearctic birds occur along beaches above the high tide line, sand flats at the ends of sand spits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover areas cut into or between dunes (Dyer *et al.* 1987). Nests are most often on open, wide, sandy stretches of beach similar to those associated with inlets and capes.

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. The study corridor region is not oceanic in nature and the beach habitat required by this species does not occur within 15 miles (24.1 kilometers) of the study corridor. Piping plover has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that piping plover has not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect piping plover. **NO EFFECT**

**American Alligator -** American alligator is listed as Threatened based on Similarity in Appearance to other federal-listed crocodilians; however, there are no other crocodilians within North Carolina. American alligators can be found in a variety of freshwater to estuarine aquatic habitats including swamp forests, marshes, large streams and canals, and ponds and lakes. NHP records indicate that American alligators have been documented within one mile (1.6 kilometers) of the study corridor, and areas within the study corridor do provide suitable habitat for this species. The nearest NHP documented occurrence of this species is approximately 0.9 mile (1.5 kilometers) west of the study corridor.

> **BIOLOGICAL CONCLUSION:** T S/A species are not subject to Section 7 consultation and a biological conclusion is not required.

**Loggerhead Sea Turtle -** The loggerhead sea turtle is the most common sea turtle on the coast of the Carolinas. This species averages 31 to 47 inches (79 to 120 centimeters) in length and weighs from 170 to 500 pounds (77 to 227 kilograms) (Martof *et al.* 1980). The loggerhead is temperate or subtropical in nature, and is primarily oceanic, but may also be found in estuarine bays, sounds, and large coastal rivers. This species occurs along the coast of North Carolina from late April to October. Preferred nesting habitat is ocean beaches, generally south of Cape Lookout. Traditionally, the largest concentration of loggerhead nests each year is on Smith Island at the mouth of the Cape Fear River (Palmer and Braswell 1995). The loggerhead sea turtle occurs primarily in oceanic habitat and requires oceanic beaches for nesting; however, Shaken Creek is a small, Coastal Plain river and does not provide suitable migratory passage or nesting habitat for loggerhead sea turtles. This species has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that loggerhead sea turtles have not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect loggerhead sea turtle. **NO EFFECT**

**Shortnose Sturgeon** - The shortnose sturgeon is a bottom-feeding fish that rarely exceeds three feet (0.9 meter) in length. Adults have a short, blunt snout; the body is brown to blackish dorsally, yellowish on the sides, and white ventrally (FWS 1993b). This species occurs in Atlantic seaboard rivers from the St. Johns River, Florida to eastern Canada. The usual habitat is estuaries and lower sections of large rivers. The sturgeon is anadromous, spending most of the year in brackish estuarine environments and moving into fresh water only when spawning during late summer to early winter (Gilbert 1989). This species prefers deep water with a soft substrate, and for spawning prefers fast moving water with a rough bottom (Rhode *et al.* 1994).

Shaken Creek, within the study corridor, is a shallow, freshwater, Coastal Plain river and does not provide the deep-water habitat preferred by the shortnose sturgeon. Shaken Creek does not provide suitable breeding habitat preferred by this species. The shortnose sturgeon has not been documented to occur one mile (1.6 kilometers) of the study corridor. Furthermore, the Shaken Creek River Basin is not listed by the National Marine Fisheries Service (NMFS) as supporting of short-nosed sturgeon (based on letter from NMFS to NCDOT dated July 25, 2000).

> **BIOLOGICAL CONCLUSION:** Shaken Creek does not provide habitat preferred by this species, and NHP records indicate that shortnose sturgeon has not been documented to occur within one mile (1.6 kilometers) the study corridor. Shaken Creek is not listed by the National Marine Fisheries Service (NMFS) as supporting of short-nosed sturgeon. This project will not affect short-nosed sturgeon. **NO EFFECT**

**Seabeach Amaranth** - Seabeach amaranth is a low-growing, fleshy, annual herb. The spatula-shaped leaves are pink and range from 0.5 to one inch (1.3 to 2.5 centimeters) in diameter. The leaves are clustered near the end of the stem and are notched apically. Flowers and fruits are inconspicuous, and occur along the stem. This plant is primarily found on foredunes and sand spits of Atlantic coast barrier beaches and inlets in areas where periodic over-wash eliminates vegetative competition. Some of the largest remaining populations of this species occur in North Carolina (FWS 1993a).

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. None of these plant communities provide suitable beach habitat for seabeach amaranth, and the species has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that seabeach amaranth has not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect seabeach amaranth. **NO EFFECT**

**Golden Sedge** - Golden sedge is a tall, slender, yellowish green perennial of the sedge family. Fertile stems may reach three feet (0.9 meter) or more in height, with two to four terminal flowering spikes. Male and female flowers are borne on separate spikes, with the female spikes being much wider and bright yellow in color. The individual female florets have long pointed tips, with tips on the lowermost flowers pointing downward.

Flowering and fruiting occurs from mid April to mid June. The grasslike leaves are ten to 25 inches (25.4 to 63.5 centimeters) long. Golden sedge grows in sandy soils overlying coquina limestone deposits where the soil pH is high, typically between 5.5 and 7.2. Soils are very wet to periodically shallowly inundated. The species prefers the ecotone between pine savannah and adjacent wet hardwood or hardwood/conifer forest, where occasional to frequent fires favor an herbaceous ground layer and suppress shrub dominance. Associated plants are tulip poplar (*Liriodendron tulipifera*), pond cypress (*Taxodium ascendens*), red maple, wax myrtle, colic root (*Aletris farinosa*), beakrushes (*Rhynchospora* spp.), and Cooley's meadowrue (*Thalictrum cooleyi*). Continued survival of golden sedge is threatened by ditching and draining, fire suppression, development, and herbicide use (FWS 1999).

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. Upland, pine dominated areas of the study corridor have a moderately dense to dense shrub layer that is not characteristic of the open shrub layer habitat required by this species. Furthermore, transitional areas from pine flatwoods to wet hardwoods do not occur within the study corridor. Golden sedge has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that golden sedge has not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect golden sedge. **NO EFFECT**

**Rough-Leaved Loosestrife -** The rough-leaved loosestrife is a rhizomatous perennial herb that grows to two feet (0.6 meter) in height. Plants are dormant in the winter, with the first leaves appearing in late March or early April. The triangular leaves typically occur in whorls of three or four. Leaves are typically sessile, entire, 0.3 to 0.4 inch (eight to ten millimeters) wide, broadest at the base, and have three prominent principal veins. Five-lobed yellow flowers, approximately 0.6 inch (1.5 centimeters) across, are produced on a loose terminal raceme one to four inches (three to ten centimeters) long (Godfrey and Wooten 1981). Rough-leaved loosestrife is reported to flower from late May to June (FWS 1995). Seeds are formed by August, but the small, rounded capsules do not dehisce until October. Habitat typical of rough-leaved loosestrife consists of the wet ecotone between longleaf pine savannas and wet, shrubby areas, where lack of canopy vegetation allows abundant sunlight into the herb layer. Kral (1983) indicates that rough-leaved loosestrife is typically found growing in black sandy peats or sands with a high organic content. This species is fire maintained; suppression of naturally occurring fires has contributed to the loss of habitat in our state. In the absence of fire, rough-leaved loosestrife may persist for several years in an area with dense shrub encroachment; however, reproduction is reported to be suppressed under these conditions, leading to eventual local extirpation (FWS 1995a). Because rough-leaved loosestrife is an obligate wetland species (Reed 1988), drainage of habitat also has an adverse effect on the plant. Based on NHP records, this species has not been documented to occur within one mile (1.6 kilometers) of the proposed alternatives.

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. Within the study corridor, a roadside ditch traversing the eastern side of SR

1520 does provide suitable habitat for this species. The ditch occurs within the maintained right-of-way of SR 1520 and parallels a maintained power line corridor. Rough-leaved loosestrife has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that rough-leaved loosestrife has not been documented to occur within one mile (1.6 kilometers) of the study corridor; however, the study corridor does contain suitable habitat for this species. Based on a NHP record search and a systematic search conducted within areas of suitable habitat and during the flowering period, this project will not affect rough-leaved loosestrife. **NO EFFECT**

**American Chaffseed -** Chaffseed is a perennial pubescent herb growing 12 to 24 inches (30.5 to 61 centimeters) tall. It is semi-parasitic, without host specificity. The alternately-leaved plant is erect and simple, or branched only at the base. The fleshy leaves are lanceolate, sessile, yellow-green or dull green with red undertones, and become smaller and narrower from the base of the plant to the top (Kral 1983). Flowers are purplish-yellow, tubular, bilaterally symmetrical, and showy. They are arranged on a spike-like terminal raceme and bloom from April to June. The fruit is a narrow capsule approximately 0.5 inch (1.3 centimeters) long that matures in early summer. Seeds are enclosed in a sac-like structure that provides the common name. American chaffseed occurs in open grass/sedge assemblages with seasonally moist to dry acidic sandy loams or sandy peat loams. These assemblages typically exist in moist pine flatwoods, savannas, bog borders, and open oak woods. In North Carolina, most documented occurrences are at Fort Bragg, in frequently burned impact zones. These areas consist of pine/scrub oak sandhills, pine savannas, and ecotones of streamhead pocosins. Frequent fires maintain a strong dominance and high diversity of herbs in what were historically fire-dominated communities (FWS 1995b).

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. Forested areas within the study corridor have a moderately dense to dense shrub layer and a closed canopy, and transitions from pine/ scrub oak or pine savannah to a wet, open land do not occur within the study corridor. American chaffseed has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that American chaffseed has not been documented to occur within one mile (1.6 kilometers) of the study corridor, and the study corridor contains no suitable habitat for this species. Based on a NHP record search and habitat types within the study corridor, this project will not affect American chaffseed. **NO EFFECT**

**Cooley's Meadowrue -** Cooley's meadowrue is a rhizomatous, perennial herb with a smooth stem; the three foot (0.9-meter) high plant is normally erect in full sun but lax in the shade. Leaves are ternately divided; the leaflets, less than one inch (2.5 centimeters) long, are narrow, with untoothed margins. The small, unisexual flowers lack petals and appear on an open panicle in June. The fruits are small ellipsoidal achenes and mature in August and September. This species is endemic to the southeastern Coastal Plain of North Carolina (11 locations) and one location in Florida. Moist bogs and savannas are the preferred habitat, and some form of disturbance is usually needed to sustain the open quality of meadowrue habitat. Consequently,

Cooley's meadowrue is sometimes found along utility corridors, roadside margins and ditches, or other maintained areas. Cooley's meadowrue is threatened by fire suppression and land disturbing practices such as silvicultrue or agriculture (FWS 1994).

Plant communities within the study corridor are 1) roadside/disturbed land, 2) upland pine/mixed deciduous forest, 3) pine plantation, and 4) Coastal Plain Bottomland Hardwoods. Within the study corridor, a roadside ditch traversing the eastern side of SR 1520 does provide suitable habitat for this species. The ditch occurs within the maintained right-of-way of SR 1520 and parallels a maintained power line corridor. Cooley's meadowrue has not been documented to occur within one mile (1.6 kilometers) of the study corridor.

> **BIOLOGICAL CONCLUSION:** NHP records indicate that Cooley's meadowrue has not been documented to occur within one mile (1.6 kilometers) of the study corridor; however, the study corridor contains suitable habitat for this species. Based on a NHP record search and a systematic search conducted within areas of suitable habitat and during the flowering period, this project will not affect Cooley's meadowrue. **NO EFFECT**

**2. Federal Species of Concern**

The March 22, 2001 FWS list also includes a category of species designated as "Federal species of concern" (FSC). A species with this designation is one that may or may not be listed in the future (formerly C2 candidate species or species under consideration for listing for which there is insufficient information to support listing). The FSC designation provides no federal protection under the ESA for the species listed. FSC species listed for Pender County are presented in Table 4. NHP files have no documentation of FSC listed species within the study corridor or within one mile (1.6 kilometers) of the study corridor.

**3. State Protected Species**

Plant and animal species which are on the North Carolina state list as Endangered (E), Threatened (T), Special Concern (SC), Candidate (C), Significantly Rare (SR), or Proposed (P) (Amoroso 1999; LeGrand and Hall 1999) receive limited protection under the North Carolina Endangered Species Act (G.S. 113-331 *et seq.*) and the North Carolina Plant Protection Act of 1979 (G.S. 106-202 *et seq.*). NHP records indicate that no state listed species have been document.

**Table 4**
**Federal Species of Concern Listed for Pender County**
(March 22, 2001 FWS List)

| Common Name | Scientific Name | Potential Habitat | State Status* |
|---|---|---|---|
| Southeastern Bat | *Myotis Austroriparius* | yes | SC |
| Bachman's Sparrow | *Aimophila Aestivalis* | no | SC |
| Henslow's Sparrow | *Ammodramus Henslowii* | no | SR |
| Rafinesque's Big-Eared Bat | *Corynorhinus Rafinesquii* | yes | SC (PT) |
| Southern Hognose Snake | *Heterodon Simus* | no | SR (PSC) |
| Carolina Gopher Frog | *Rana Capito Capito* | no | SC |
| Atlantic Pigtoe | *Fusconaia Masoni* | yes | T (PE) |
| Yellow Lampmussel | *Lampsilis Cariosa* | yes | T (PE) |
| Croatan Crayfish♦ | *Procambarus Plumimanus* | yes | NL |
| Buchholz's Dart Moth♦ | *Agrotis Buchholzi* | no | NL |
| Venus Flytrap Cutworm Moth | *Hemipachnobia S. Subporphyrea* | no | SR |
| Carter's Noctuid Moth | *Spartiniphaga Carterae* | no | SR |
| Chapman's Sedge | *Carex Chapmanii* | yes | W1 |
| Venus Flytrap | *Dioneae Muscipula* | no | C-SC |
| White Wicky | *Kalmia Cuneata* | no | E-SC |
| Georgia Indigo Bush | *Amorpha Georgiana* Var. *Georgiana* | no | E |
| Sandhills Milkvetch | *Astragalus Michauxii* | no | T |
| Savanna Cowbane | *Oxypolis Ternata* | no | W1 |
| Carolina Grass-Of-Parnassas | *Parnassia Caroliniana* | no | E |
| Pineland Plantain | *Plantago Sparsiflora* | no | E |
| Thorne's Beaksedge | *Rhynchospora Thornei* | no | E |
| Carolina Goldenrod | *Solidago Pulchra* | no | E |
| Spring-Flowering Goldenrod | *Solidago Verna* | no | T |
| Carolina Asphodel | *Tofieldia Glabra* | no | C |
| Carolina Bogmint | *Macbridea Verna* | yes | T |
| Carolina Least Trillium | *Trillium Pusillum* Var. *Pusillum* | no | E |
| Savanna Cowbane | *Oxypolis Ternata* | no | W1 |

*State Status Codes (Amoroso 1999; LeGrand and Hall1999):

C - Candidate
E - Endangered
PE - Proposed Endangered
PT - Proposed Threatened
SC - Special Concern
SR - Significantly Rare
T - Threatened
W1: Watch List: rare, but relatively secure
W3 - Watch List: rare, but with uncertain documentation

## VI. CULTURAL RESOURCES

### A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historical 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 that for federally funded, licensed, or permitted projects having an effect on properties listed in or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation be given the opportunity to comment.

### B. Historic Architecture

A field survey of the Area of Potential Effects (APE) was conducted on July 2, 1999. All structures within the APE were photographed, and later reviewed by the North Carolina State Historic Preservation Office (HPO). In a concurrence form dated October 27, 2000, the HPO concurred that there are no historic architectural resources either listed in or eligible for listing on the National Register of Historic Places within the APE. A copy of the concurrence form is included in the Appendix.

### C. Archaeology

The State Historic Preservation Officer (SHPO), in a memorandum dated August 14, 2000, had no comment on the project as was currently proposed. There is little likelihood of any National Register archaeological sites occurring in the project area because of the disturbed landforms, therefore the SHPO recommends no further action. 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 a Federal "Categorical Exclusion" due to its limited scope and lack of significant environmental consequences.

The bridge replacement will not have an adverse effect on the quality of the human or natural environment with the use of current NCDOT standards and specifications.

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

There are no publicly owned recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project.

No North Carolina Geodetic Survey control monuments will be impacted during construction of this project.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). Since there are no prime or important farmlands in the immediate vicinity of the proposed bridge the Farmland Protection Policy does not apply.

This project is located in Pender County, which has been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR Part 51 is not applicable, because the proposed project is located in an attainment area. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

The traffic volumes will not increase or decrease because of this project. There are no receptors located in the immediate project area. The project's impact on noise and air quality will not be significant.

Noise levels could increase during construction but will be temporary. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAA and NEPA) and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no hazardous waste sites, no regulated or unregulated landfills or dumpsites with in the project area. No facility with underground storage tanks (UST) was identified in the project vicinity.

Pender County is a participant in the National Flood Insurance Regular Program. This site on the Shaken Creek is located in a 100-year flood hazard zone where no detailed F.E.M.A. flood study has been performed. Attached is a copy of the Flood Insurance Rate Map, on which are shown the approximate limits of the 100-year flood plain in the vicinity of the project (Figure 5). There are no buildings in the existing floodplain near the bridge. The proposed replacement will not adversely affect the floodplain. The proposed alternatives will not modify flow characteristics and will have minimal impact on floodplains due to roadway encroachment. The existing drainage patterns and groundwater will not be affected.

On the basis of the above discussion, it is concluded that no significant adverse environmental effects will result from implementation of the project.

## VIII. PUBLIC INVOLVEMENT

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters and newsletters. A Citizens Informational Workshop was held at Chinquapin Elementary School on August 13, 2001, where preliminary alternatives were reviewed and discussed with concerned citizens and local officials.

## IX. AGENCY COMMENTS

The following are comments received during the scoping process:

1. North Carolina Wildlife Resource Commission (NCWRC)

   **Comment:** *"Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadramous Fish Passage". This includes an in-water work moratorium from February 15 to June 15."*

   **Response:** Construction work will be restricted as noted in the Project Commitments.

   **Comment:** *"Bridge deck drains should not discharge directly into the stream."*

   **Response:** Deck drains will not be allowed to discharge directly into the water.

2. Corps of Engineers (COE)

   **Comment:** *"Off-site detours are always preferable to on-site (temporary) detours in wetlands."*

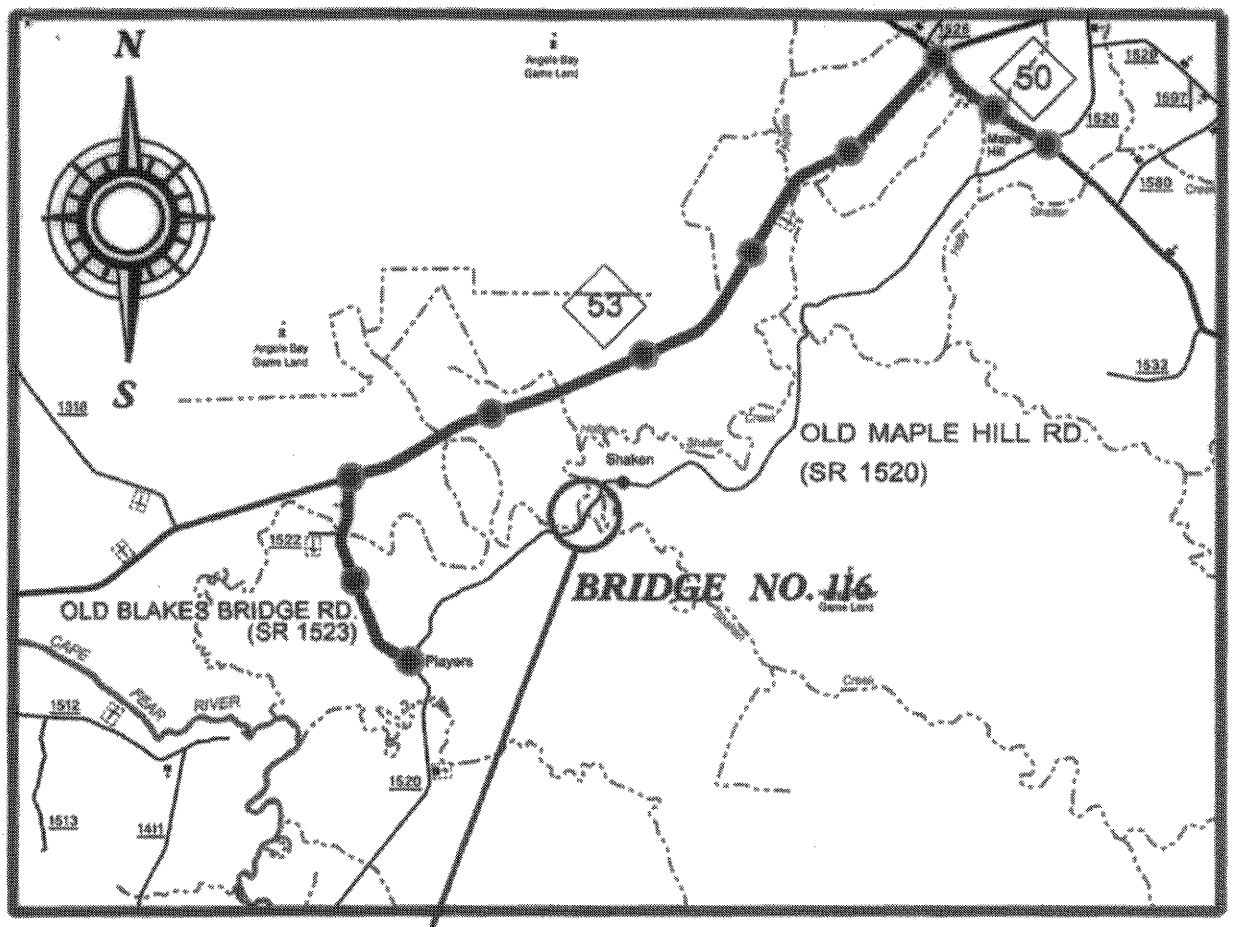
   **Response:** Traffic will be maintained off-site during replacement of the bridge.

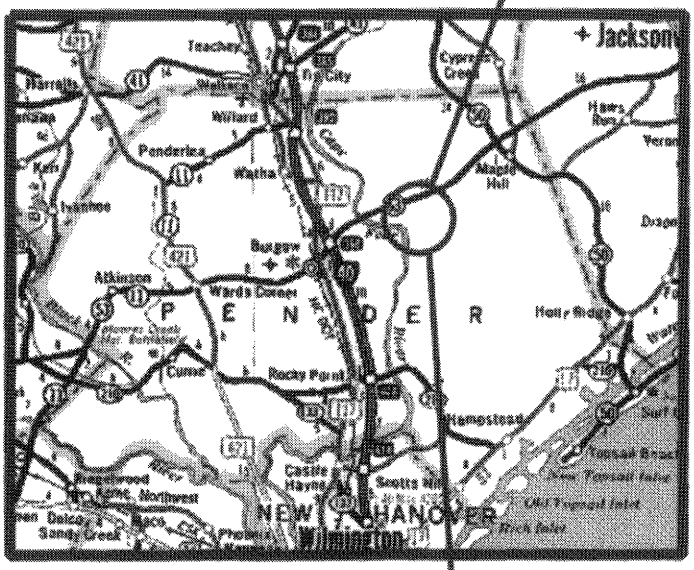
3. Pender County Schools

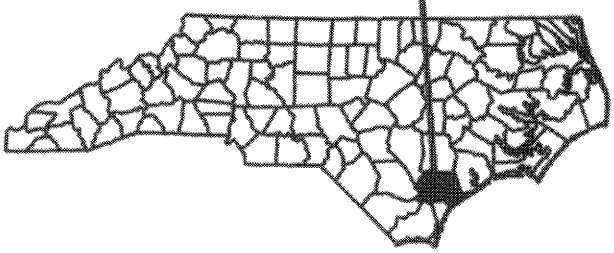
   **Comment:** If the road is closed, this will add approximately 30 to 40 minutes to the bus route, add an additional 20 miles per day, and require students to be picked up before 6:00 a.m.

   **Response:** An off-site detour was selected as the preferred alternate for this project because of comparatively lower construction costs and environmental impacts. There is an in-water construction moratorium from February 15 to June 15, otherwise construction will be scheduled during the summer months to mitigate impacts on the schools.

# FIGURES



**LEGEND**

*Studied Detour Route*

*NORTH CAROLINA*
*DEPARTMENT OF TRANSPORTATION*
*HYDRAULICS UNIT*

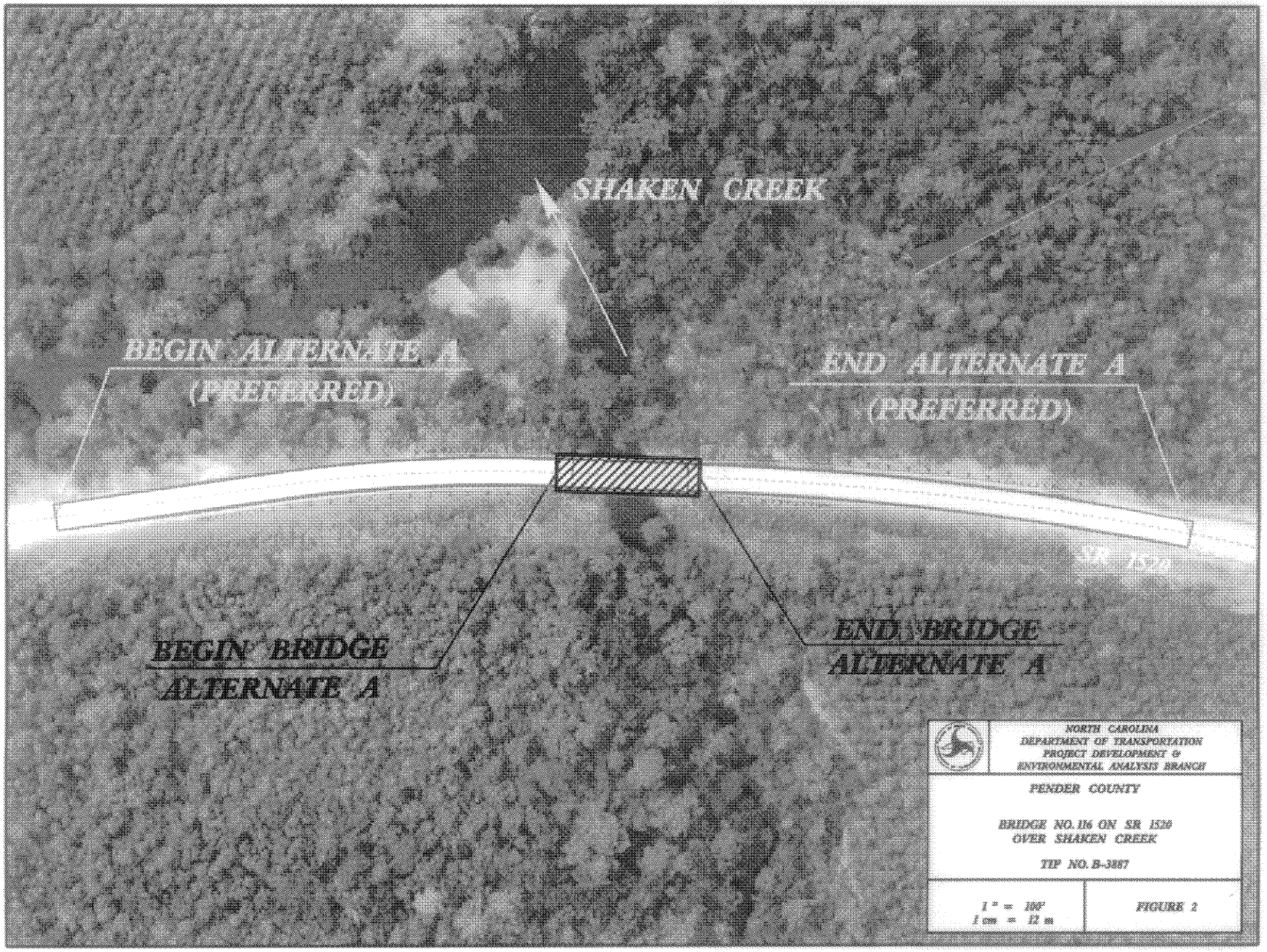
*PENDER COUNTY*

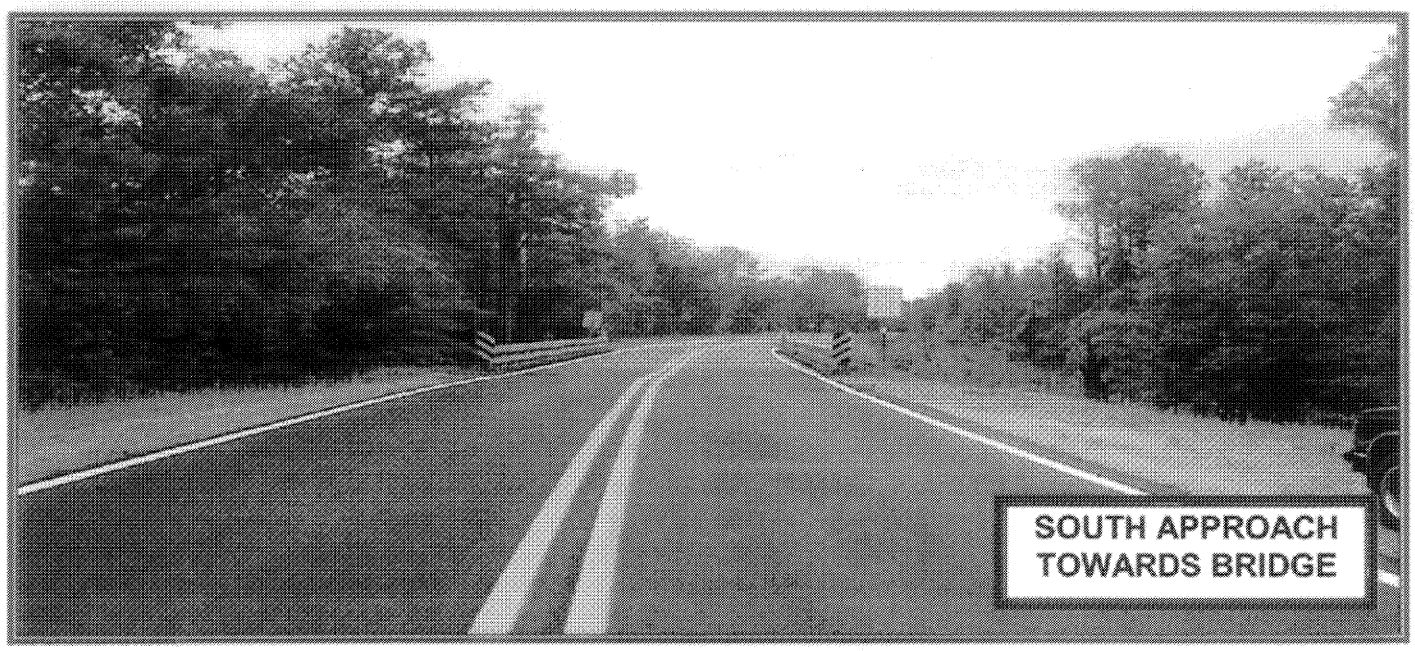
*BRIDGE NO. 116 ON SR 1520*
*OVER SHAKEN CREEK*

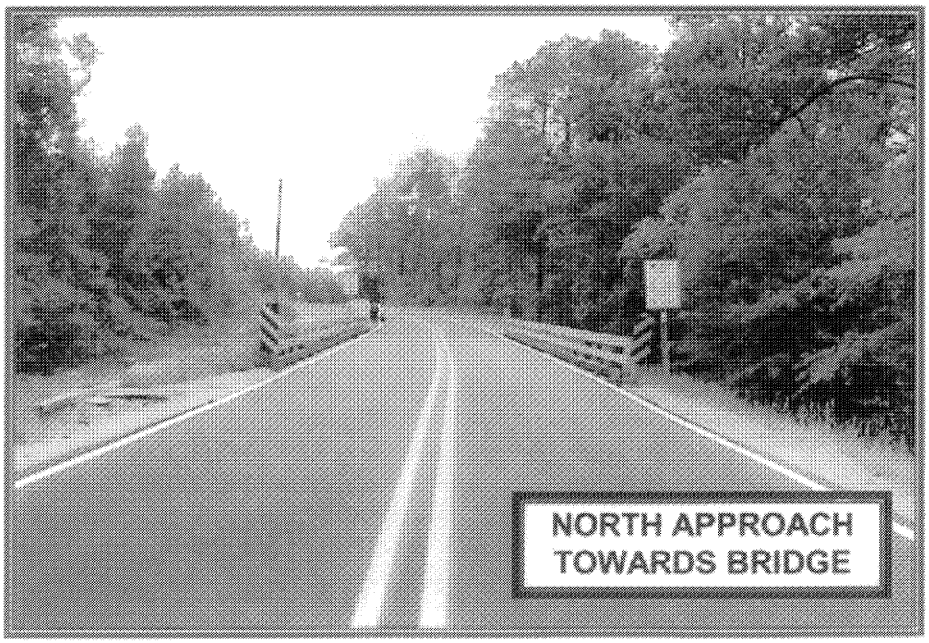
*TIP NO. B-3887*

*VICINITY MAP*

*FIGURE 1*


SHAKEN CREEK
BEGIN ALTERNATE A
(PREFERRED)
END ALTERNATE A
(PREFERRED)
BEGIN BRIDGE
ALTERNATE A
END BRIDGE
ALTERNATE A
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH
PENDER COUNTY
BRIDGE NO. 116 ON SR 1520
OVER SHAKEN CREEK
TIP NO. B-3887
1 " = 100'
1 cm = 12 m
FIGURE 2

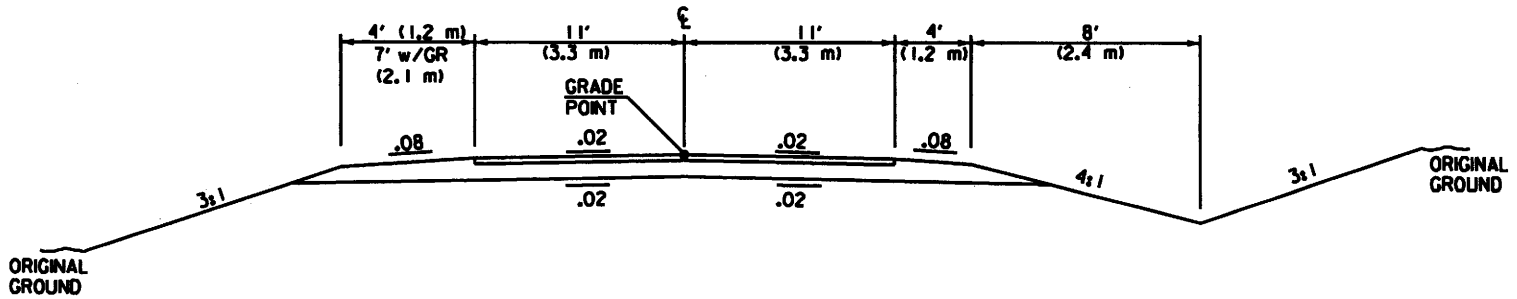




**B-3887**
**Replacement of Bridge No. 116 on SR 1520 Over Shaken Creek**
**Pender County**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

**FIGURE 3**

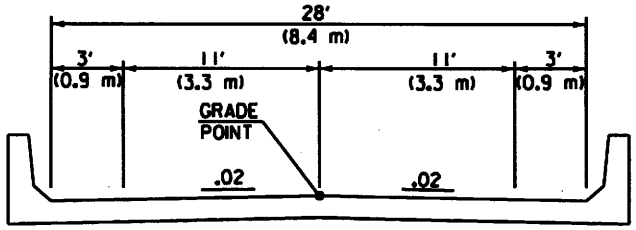



## TYPICAL ROADWAY SECTION

## TRAFFIC DATA

| | |
|---|---|
| ADT 2001 | 150 |
| ADT 2003 | 200 |
| ADT 2025 | 400 |
| DUAL | 2% |
| TTST | 1% |

FUNCTIONAL CLASSIFICATION:
RURAL LOCAL




## TYPICAL BRIDGE SECTION

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPEMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

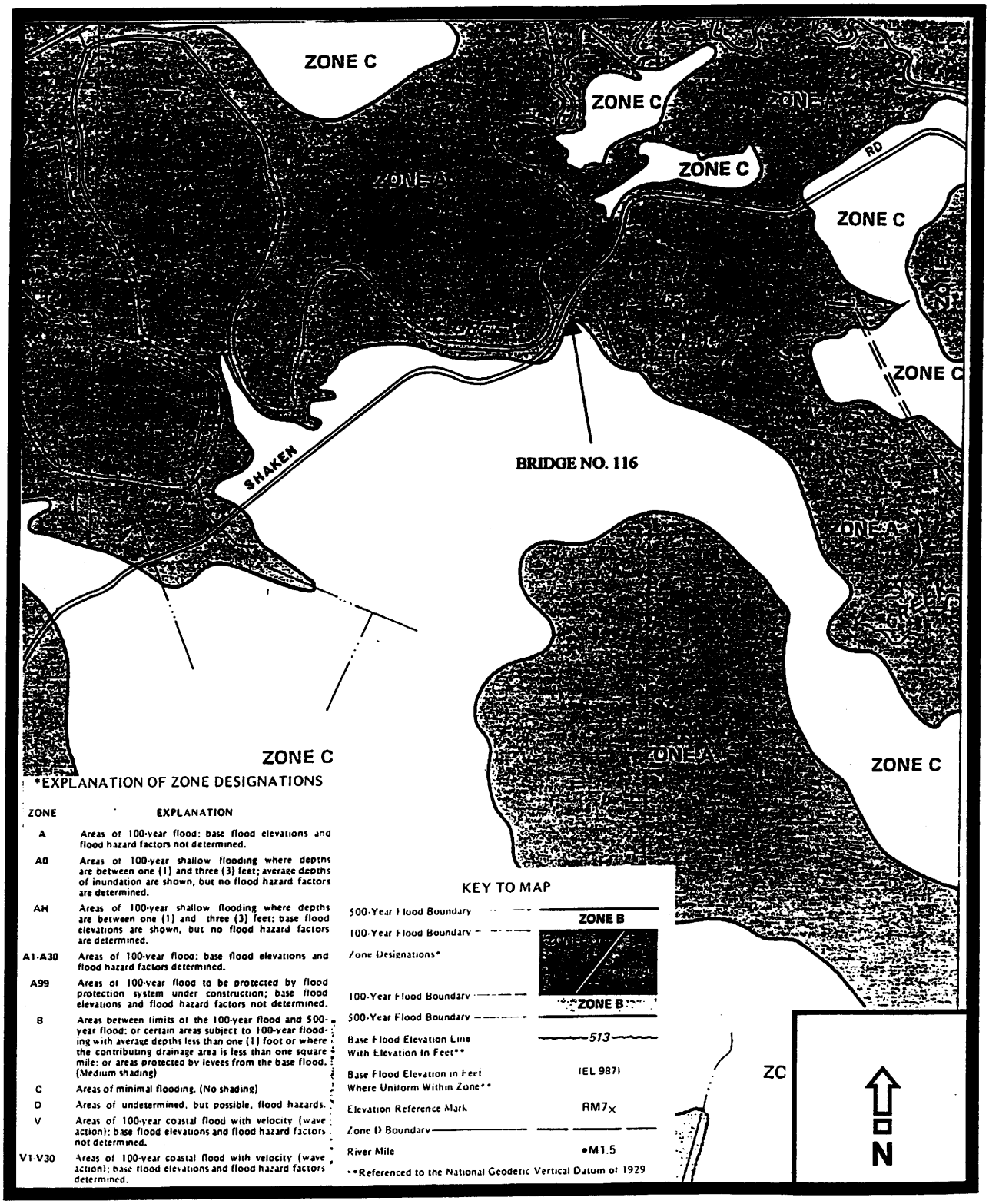
PENDER COUNTY

BRIDGE NO. 116 ON SR 1520
OVER SHAKEN CREEK

B-3887

FIGURE 4

B-3887
BRIDGE N0. 116
PENDER COUNTY




*EXPLANATION OF ZONE DESIGNATIONS

| ZONE | EXPLANATION |
|---|---|
| A | Areas of 100-year flood; base flood elevations and flood hazard factors not determined. |
| A0 | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined. |
| AH | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined. |
| A1-A30 | Areas of 100-year flood; base flood elevations and flood hazard factors determined. |
| A99 | Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined. |
| B | Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading) |
| C | Areas of minimal flooding. (No shading) |
| D | Areas of undetermined, but possible, flood hazards. |
| V | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined. |
| V1-V30 | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined. |

KEY TO MAP

| | |
|---|---|
| 500-Year Flood Boundary | |
| 100-Year Flood Boundary | ZONE B |
| Zone Designations* | |
| 100-Year Flood Boundary | ZONE B |
| 500-Year Flood Boundary | |
| Base Flood Elevation Line With Elevation In Feet** | 513 |
| Base Flood Elevation in Feet Where Uniform Within Zone** | (EL 987) |
| Elevation Reference Mark | RM7x |
| Zone D Boundary | |
| River Mile | •M1.5 |

**Referenced to the National Geodetic Vertical Datum of 1929

# FEMA FLOOD STUDY 100 YEAR FLOOD PLAIN

Panel No. 370344 0225 B
Date: February 15, 1985
Street Name: SR 1520
Pender County, North Carolina

1000 ft. 0 1000 ft
305 m Approximate Scale 305 m

FIGURE

# APPENDIX

U.S. Department of Transportation
United States Coast Guard

Commander
United States Coast Guard
Atlantic Area

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (Aowb)
Phone: (757)398-6422

16590
15 FEB 01

Mr. William D. Gilmore, P.E.
Manager, Project Development and Environmental
Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Gilmore:

Our Bridge Staff has reviewed your plans and specifications dated July 3, 2000, for the replacement of 14 bridges in 10 different counties of North Carolina.

All of the waterways involved in this project are considered navigable waterways of the United States for Bridge Administration purposes. Must also meet the criteria for advance approval waterway set forth in Title 33, Code of Federal Regulations, Section 115.70, at all of the bridge sites. Advance approval waterways are those that are navigable in law, but not actually navigated by other than small boats. In such cases, the Commandant of the Coast Guard has given his advance approval to the construction of bridges across such waterways. The North Carolina State projects include bridge #143 over Northeast Cape Fear River, bridge #26 over a branch of the Newport River, bridge #16 over Merchants Mill Pond, bridge #30 over Green Mill Run, bridge 42 over Neuse River, bridge #88 over Falling Creek, bridge #64 over Pungo Creek, bridge #272 over Big Swamp, bridge #64 over Dog Branch, bridge #40 over Squires Run and bridge #116 over Shaken Creek which all qualify for the Advance Approval category. Accordingly, individual Coast Guard bridge permits will not be required for the new bridges across these waterways.

The fact that a Coast Guard permit will not be required for these advance approval bridges, does not relieve you of the responsibility for compliance with the requirements of any other Federal, State, or local agency who may have jurisdiction over any aspect of these projects.

Sincerely,

ANN B. DEATON
Chief, Bridge Administration Office
By direction of the Commander
Fifth Coast Guard District

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890



IN REPLY REFER TO

August 2, 2000

Regulatory Division

Action ID No. 200001525, 200001526, 200001527, 200001528, 200001529, 200001530, 200001531.

Mr. William D. Gilmore, P.E., Manager
Project Development & Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, N.C. 27699-1548

Dear Mr. Gilmore:

Reference your letters dated June 7, 2000, June 28, 2000, and July 3, 2000 regarding the following proposed bridge replacement projects, including those of Group XXVII:

1. TIP Project B-3449, Duplin County, Bridge No. 204 on SR 1827 over Northeast Cape Fear River, Action ID 200001525.
2. TIP Project B-3626, Carteret County, Bridge No. 26 on SR 1154 over a branch of the Newport River, Action ID 200001526.
3. TIP Project B-3884, Onslow County, Bridge No. 40 on SR 1308 over Squires Run, Action ID 200001527.
4. TIP Project B-3887, Pender County, Bridge No. 116 on SR 1520 over Shaken Creek, Action ID 200001528.
5. TIP Project B-3516, Scotland County, Bridge No. 59 on SR 1614 over Gum Swamp Creek, Action ID 200001529.
6. TIP Project B-3515, Scotland County, Bridge No. 46 on SR 1612 over Big Shoe Heel Creek, Action ID 200001530.
7. TIP Project B-3613, Bladen/Sampson County, Bridge No. 44 on NC 41 over South River, Action ID 200001531.

Based on the information provided in the referenced letters, it appears that each proposed bridge replacement project may impact jurisdictional wetlands. Department of the Army (DA) permit authorization, pursuant to Section 404 of the Clean Water Act of 1977, as amended, will be required for the discharge of excavated or fill material in waters of the United States or any adjacent wetlands in conjunction with these projects, including

disposal of construction debris. Specific permit requirements will depend on design of the projects, extent of fill work within the waters of the United States, including wetlands, construction methods, and other factors.

Although these projects may qualify as a Categorical Exclusion, to qualify for nationwide permit authorization under Nationwide Permit #23, the project planning report should contain sufficient information to document that the proposed activity does not have more than a minimal individual or cumulative impact on the aquatic environment. Our experience has shown that replacing bridges with culverts often results in sufficient adverse impacts to consider the work as having more than minimal impacts on the aquatic environment. Accordingly, the following items need to be addressed in the project planning report:

a. The report should contain the amount of permanent and temporary impacts to waters and wetlands as well as a description of the type of habitat that will be affected.

b. Off-site detours are always preferable to on-site (temporary) detours in wetlands. If an on-site detour is the recommended action, justification should be provided. On-site detours can cause permanent wetland impacts due to sediment consolidation resulting from the on-site detour itself and associated heavy equipment. Substantial sediment consolidation in wetland systems may in turn cause fragmentation of the wetland and impair the ecological and hydrologic functions of the wetland. Thus, on-site detours constructed in wetlands can result in more than minimal wetland impacts. These types of wetland impacts will be considered as permanent wetland impacts.

For proposed projects and associated on-site detours that cause minimal losses of wetlands, an approved wetland restoration plan will be required prior to issuance of a DA nationwide or general permit. For proposed projects and associated on-site detours that cause significant wetland losses, an individual DA permit and a mitigation proposal for the unavoidable wetland impacts may be required.

In view of our concerns related to onsite detours constructed in wetlands, recent field inspections were conducted at each of the proposed project sites and a cursory determination was made on the potential for sediment consolidation due to an onsite detour. Based on these inspections, potential for sediment consolidation in wetlands exists at several of the proposed projects. Therefore, it is recommended that geotechnical evaluations be conducted at <u>each</u> project site to estimate the magnitude of sediment consolidation that can occur due to an on-site detour and the results be provided in the project planning report.

Based on our field inspections, we strongly recommend that geotechnical evaluations be conducted at the following proposed project sites:

1) TIP Project B-3626, Carteret County, Bridge No. 226 on SR 1154 over a branch of the Newport River, Action ID 200001526.
2) TIP Project B-3884, Onslow County, Bridge No. 40 on SR 1308 over Squires Run, Action ID 200001527.
3) TIP Project B-3887, Pender County, Bridge No. 116 on SR 1520 over Shaken Creek, Action ID 200001528.
4) TIP Project B-3516, Scotland County, Bridge No. 59 on SR 1614 over Gum Swamp Creek, Action ID 200001529.
5) TIP Project B-3515, Scotland County, Bridge No. 46 on SR 1612 over Big Shoe Heel Creek, Action ID 200001530.

c. Project commitments should include the removal of all temporary fills from waters and wetlands and "time-of-year" restrictions on in-stream work if recommended by the NC Wildlife Resources Commission. In addition, if undercutting is necessary for temporary detours, the undercut material should be stockpiled to be used to restore the site.

d. All restored areas should be planted with endemic vegetation including trees, if appropriate.

e. The report should provide an estimate of the linear feet of new impacts to streams resulting from construction of the project.

f. If a bridge is proposed to be replaced with a culvert, NCDOT must demonstrate that the work will not result in more than minimal impacts on the aquatic environment, specifically addressing the passage of aquatic life including anadromous fish. In addition, the report should address the impacts that the culvert would have on recreational navigation.

g. The report should discuss and recommend bridge demolition methods and shall include the impacts of bridge demolition and debris removal in addition to the impacts of constructing the bridge. The report should also incorporate the bridge demolition policy recommendations pursuant to the NCDOT policy entitled "Bridge Demolition and Removal in Waters of the United States" dated September 20, 1999.

Should you have any questions, please call Mr. David L. Timpy at the Wilmington Field office at 910-251-4634.

Sincerely,

E. David Franklin

E. David Franklin
NCDOT Team Leader

# United States Department of the Interior

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


July 25, 2000

Mr. William D. Gilmore, P.E., Manager
NCDOT
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Gilmore:

Thank you for your July 3, 2000 request for information from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of fourteen proposed bridge replacements in various counties in eastern North Carolina. This report provides scoping information and is provided 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 North Carolina Department of Transportation (NCDOT) proposes to replace the following bridge structures:

1. B-3449, Bridge No. 204 on SR 1827 over the Northeast Cape Fear River, Duplin County;

2. B-3612, Bridge No. 143 on SR 1123 over Branch of Indian Creek, Bertie County;

3. B-3626, Bridge No. 26 on SR 1154 over Branch of Newport River, Carteret County;

4. B-3640, Bridge No. 16 on SR 1400 over Merchants Mill Pond, Gates County;

5. B-3684, Bridge No. 129 on SR 1565 over the Tar River, Pitt County;

6. B-3685, Bridge No. 30 on SR 1703 over Green Mill Run, Greenville, Pitt County;

7. B-3708, Bridge No. 66 on SR 1325/SR 1583 over Welch Creek, Washington/Martin Counties;

8. B-3711, Bridge No. 42 on NC 111 over the Neuse River Outflow, Wayne County;

9. B-3712, Bridge No. 88 over SR 1006, Falling Creek, Wayne County;

10. B-3809, Bridge No. 64 on NC 99 over Pungo Creek, Beaufort County;

11. B-3810, Bridge No. 272 on SR 1514 over Big Swamp, Beaufort County;

12. B-3871, Bridge No. 64 on SR 1001 over Dog Branch, Martin County;

13. B-3884, Bridge No. 40 on SR 1308 over Squires Run, Onslow County; and,

14. B-3887, Bridge No. 116 on SR 1520 over Shaken Creek, Pender County.

The following recommendations are provided to assist you in your planning process and to facilitate a thorough and timely review of the project.

Generally, the Service recommends that wetland impacts be avoided and minimized to the maximum extent practical as outlined in Section 404 (b)(1) of the Clean Water Act Amendments of 1977. In regard to avoidance and minimization of impacts, we recommend that proposed highway projects be aligned along or adjacent to existing roadways, utility corridors, or previously developed areas in order to minimize habitat fragmentation and encroachment. Areas exhibiting high biodiversity or ecological value important to the watershed and region should be avoided. Crossings of streams and associated wetland systems should use existing crossings and/or occur on a structure wherever feasible. Where bridging is not feasible, culvert structures that maintain natural water flows and hydraulic regimes without scouring, or impeding fish and wildlife passage, should be employed. Highway shoulder and median widths should be reduced through wetland areas. Roadway embankments and fill areas should be stabilized by using appropriate erosion control devices and techniques. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons.

The National Wetlands Inventory (NWI) maps of the Chinquapin, Grantham,Greenville SW, Grimesland, Merchants Mill Pond, Newport, Old Ford, Ransomville, Richlands, SE Goldsboro, Stag Park, Washington, Williamston, and Woodville 7.5 Minute Quadrangles show wetland resources in the specific work areas. However, while the NWI maps are useful for providing an overview of a given area, they should not be relied upon in lieu of a detailed wetland delineation by trained personnel using an acceptable wetland classification methodology. Therefore, in addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action.

1. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory. Wetland boundaries should be determined by using the 1987 Corps of Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers (Corps).

2. If unavoidable wetland impacts are proposed, we recommend that every effort 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.

The enclosed lists identify the federally-listed endangered and threatened species, and Federal Species of Concern (FSC) that are known to occur in Beaufort, Bertie, Carteret, Duplin, Gates, Martin, Onslow, Pender, Pitt, Washington, and Wayne Counties. The Service recommends that habitat requirements for the listed species be compared with the available habitats at the respective project sites. If suitable habitat is present within the action area of the project, biological surveys for the listed species should be performed. 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.

FSC's 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 FSC's 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.

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 these comments, please contact Tom McCartney at 919-856-4520, ext. 32.

Sincerely,

Dr. Garland B. Pardue
Ecological Services Supervisor

Enclosures

cc:
COE, Washington, NC (Michael Bell)
COE, Wilmington, NC (David Timpy)
NCDWQ, Raleigh, NC (John Hennessey)
NCDNR, Northside, NC (David Cox)
FHWA, Raleigh, NC (Nicholas Graf)
EPA, Atlanta, GA (Ted Bisterfield)

FWS/R4:TMcCartney:TM:07/24/00:919/856-4520 extension 32:\14brdgs.var

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

Southeast Regional Office
9721 Executive Center Drive N
St. Petersburg, Florida 33702

July 25, 2000

Colonel James W. DeLony,
District Engineer, Wilmington District
Department of the Army, Corps of Engineers
P. O. Box 1890
Wilmington, North Carolina 28402-1890

Attention Dave Timpy/Mike Bell

Dear Colonel DeLony:

Please reference the July 3, 2000, letter (copy enclosed) from the North Carolina Department of Transportation requesting National Marine Fisheries Service's (NMFS) comments on the proposed replacement of eleven highway bridges in eastern North Carolina under the Federal Categorical Exclusion (CE). The letter specifically addresses the potential impacts of demolition and removal of the existing structure and other environmental concerns in the project areas. We have reviewed the information provided with the letter and offer the following comments for consideration.

A. Anadromous Fishery Resources/Wetlands

| | |
|---|---|
| Project No. 1 | B-3449, Duplin County, Replace Bridge No. 204 on SR 1827 over the Northeast Cape Fear River |
| Project No. 2 | B-3612, Bertie County, Replace Bridge No. 143 on SR 1123 over Branch of Indian Creek |
| Project No. 4 | B-3684, Pitt County, Replace Bridge No. 129 on SR 1565 over the Tar River |
| Project No. 5 | B-3708, Washington/Martin Counties, Replace Bridge No. 66 on SR 1325/SR1583 over Welch Creek |
| Project No. 7 | B-3712, Wayne County, Replace Bridge No. 88 on SR 1006 over Falling Creek |
| Project No. 8 | B-3809, Beaufort County, Replace Bridge No. 64 on NC 99 over Pungo Creek |
| Project No. 11 | B-3887, Pender County, Replace Bridge No. 116 on SR 1520 over Shaken Creek |

The projects listed above span waters that support anadromous fishery resources for which the NMFS is responsible. Anadromous fish species commonly found through the project area include American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), blueback herring (*Alosa*

*aestivalis*), alewife (*Alosa pseudoharengus*), striped bass (*Morone saxatilis*), and Atlantic sturgeon (*Acipenser oxyrhynchus*). Each of the above project areas provide spawning and nursery habitat for some subset of these anadromous species. Bridge demolition and construction can result in sediment disturbing activities and discharges of highway construction materials and pollutants that are detrimental to early life history stages of these species. In addition to habitat, wooded wetlands within the project area provide water quality maintenance functions that are important for the production of fishery resources in downstream waters. Any wetland losses associated with these seven projects will add to the cumulative loss of wetlands that are detrimental to the continued production of NMFS trust resources.

Therefore, in order to minimize adverse impacts to fisheries, we recommend that these projects not be processed under the Federal CE unless the following conditions are incorporated:

"No construction or demolition activities shall be allowed in the water between February 15 and June 1 of any year."

"Mitigation shall be provided for any unavoidable wetland losses."

In addition to the above, Project Nos. 1, 2, and 5 are located in river basins that support the endangered shortnose sturgeon (*Acipenser brevirostrum*). Accordingly, we recommend coordination with our Protected Resources Division at the letterhead address or at 727/570-5312.

B. Wetlands

| | |
|---|---|
| Project No. 6 | B-3711, Wayne County, Replace Bridge No. 42 on NC 111 over Neuse River Overflow |
| Project No. 9 | B-3810, Beaufort County, Replace Bridge No. 272 on SR 1514 over Big Swamp |
| Project No. 10 | B-3884, Onslow County, Replace Bridge No. 40 on SR 1308 over Squires Run |

Wooded wetlands within these project areas provide water quality maintenance functions that are important for the continued production of fishery resources in downstream waters. Therefore, in order to minimize adverse impacts to fishery resources, we recommend that this work not be processed under the Federal CE unless the following condition is incorporated:

"Mitigation shall be provided for any unavoidable wetland losses."

C. Estuarine Fishery Resources/Wetlands

| | |
|---|---|
| Project No. 3 | B-3626 Carteret County, Replace Bridge No.26 on SR 1154 over Branch of Newport River |

Wooded wetlands within the project area provide water quality maintenance functions that are important for the continued production of estuarine dependent fishery resources. Therefore, in order to minimize adverse impacts to estuarine resources, we recommend that this work not be processed under the Federal CE unless the following condition is incorporated:

"Mitigation shall be provided for any unavoidable wetland losses."

Thank you for the opportunity to provide these comments. If we can be of further assistance, please advise.

Sincerely,

Ronald L. Seckler

for Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

cc: FWS, ATLA, GA
FWS, Raleigh, NC
EPA, ATLA, GA
NCDENR, Raleigh, NC
NCDENR, Morehead City, NC
NCDOT, Raleigh, NC
F/SER4

# North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: Stacy Harris, PE
Project Engineer, NCDOT

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: June 8, 2001

SUBJECT: NCDOT Bridge Replacements in Duplin, Bertie, Carteret, Gates, Pitt, Wayne, Beaufort, Martin, Onslow, and Pender counties of North Carolina. TIP Nos. B-3449, B-3612, B-3626, B-3640, B-3684, B-3685, B-3711, B-3712, B-3809, B-3810, B-3871, B-3884, and B-3887.

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).

On bridge replacement projects of this scope our standard recommendations 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

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 733-3633 ext. 281 • Fax: (919) 715-7643

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. Tim Savidge 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 fish passage. Generally, this means that the culvert or pipe invert is buried at least 1 foot below the natural stream bed. If multiple cells are required the second and/or third cells should be placed so that their

bottoms are at stream bankful stage (similar to Lyonsfield design). This could be accomplished by constructing a low sill on the upstream end of the other cells that will divert low flows to another cell. This will allow sufficient water depth in the culvert or pipe during normal flows to accommodate fish movements. If culverts are long, notched baffles should be placed in reinforced concrete box culverts at 15 foot intervals to allow for the collection of sediments in the culvert, to reduce flow velocities, and to provide resting places for fish and other aquatic organisms moving through the structure.

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 so that no channel realignment or widening is required. Widening of the stream channel at the inlet or outlet of structures usually causes a decrease in water velocity causing sediment deposition that will require future maintenance.

4. Riprap should not be placed on the stream bed.

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 that is reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be used as wetland mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-3449 – Duplin County – Bridge No. 204 over Northeast Cape Fear River. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 1 to June 15 for areas where there is the potential for Shortnose sturgeon, an endangered species. We request that High Quality Sedimentation and Erosion Control Measures be used due to the presence of HQW waters.

2. B-3612 – Bertie County – Bridge No. 143 over a branch of Indian Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. NCDOT should be aware that NCWRC has designated NCWRC gamelands in the vicinity of this bridge. Impacts to gameland properties should be avoided.

3. B-3626 – Carteret County – Bridge No. 26 over a branch of the New Port River. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

4. B-3640 – Gates County – Bridge No. 16 over Merchant's Mill Pond. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

5. B-3684 Pitt County – Bridge No. 129 over Tar River. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

6. B-3685 – Pitt County – Bridge No. 30 over Green Mill Run. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

7. B-3711 – Wayne County – Bridge No. 42 over the Neuse River Overflow. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

8. B-3712 · Wayne County – Bridge No 88 over Falling Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

9. B-3809 - Beaufort County – Bridge No. 64 over Pungo Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

10. B-3810 – Beaufort County – Bridge No. 272 over Big Swamp. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

11. B-3871 – Martin County – Bridge No. 64 over Dog Branch. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

12. B-3884 Onslow County – Bridge No. 40 over Squires Run. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

13. B-3887 Pender County – Bridge No. 116 over Shaken Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The 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, reducing habitat fragmentation and vehicle related mortality at highway crossings.

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.

*Federal Aid* #BRZ-1520(3) *TIP* #B-3887 *County*: Pender

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

*Project Description*: Replace Bridge No. 116 on SR 1520 over Shaken Creek

On September 21, 2000, representatives of the

- [X] North Carolina Department of Transportation (NCDOT)
- [ ] Federal Highway Administration (FHWA)
- [X] North Carolina State Historic Preservation Office (SHPO)

Reviewed the subject project at

- [ ] a scoping meeting
- [X] photograph review session/consultation
- [ ] other

All parties present agreed

- [X] there are no properties over fifty years old within the project's area of potential effect.
- [X] there are no properties less than fifty years old which are considered to meet Criterion Consideration G within the project's area of potential effect.
- [ ] there are properties over fifty years old (list attached) within the project's area of potential effect, but based on the historical information available and the photographs of each property, properties identified as _____ are considered not eligible for the National Register and no further evaluation of them is necessary.
- [X] there are no National Register-listed properties located within the project's area of potential effect.

Signed:

Mary Pope Furr — 9·21·2000
Representative, NCDOT — Date

Michael C Dorn — 10/24/00
FHWA, for the Division Administrator, or other Federal Agency — Date

April Montgomery — 9/21/2000
Representative, SHPO — Date

David Brook — 10/27/00
State Historic Preservation Officer — Date

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

Harris

# North Carolina Department of Cultural Resources

**State Historic Preservation Office**

David L. S. Brook, Administrator

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

August 14, 2000

**MEMORANDUM**

To: William D. Gilmore, P.E., Manager
Project Development & Environmental Analysis Branch

From: David Brook DLB for David Brook
Deputy State Historic Preservation Officer

Re: B-3887, Pender County, Replace Bridge 116, SR 1520 over Shaken Creek, ER 01-7097

Thank you for your memorandum of July 3, 2000, concerning the above project.

We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance which would be affected by the project. Therefore, we have no comment on the project as currently 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, please contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc


| | Location | Mailing Address | Telephone/Fax |
|---|---|---|---|
| ADMINISTRATION | 507 N. Blount St., Raleigh NC | 4617 Mail Service Center, Raleigh NC 27699-4617 | (919) 733-4763 • 733-8653 |
| ARCHAEOLOGY | 421 N. Blount St., Raleigh NC | 4619 Mail Service Center, Raleigh NC 27699-4619 | (919) 733-7342 • 715-2671 |
| RESTORATION | 515 N. Blount St., Raleigh NC | 4613 Mail Service Center, Raleigh NC 27699-4613 | (919) 733-6547 • 715-4801 |
| SURVEY & PLANNING | 515 N. Blount St., Raleigh NC | 4618 Mail Service Center, Raleigh NC 27699-4618 | (919) 733-6545 • 715-4801 |

**PENDER COUNTY BUS GARAGE** Stacy Harris

995 PENDERLEA HWY
BURGAW, N.C. 28425

Phone 910-259-0141
Fax 910-259-0142
email- pobuses@intrstar.net

DATE: JULY 19, 2000

TO: WILLIAM D. GILMORE, P.E., MANAGER
PROJECT DEVELOPMENT AND ENVIRONMENTAL
ANALYSIS BRANCH
1548 MAIL SERVICE CENTER
RALEIGH, N.C.

FROM: THURMAN CASEY Thurman Casey
TRANSPORTATION COORDINATOR

RE: B-3887, PENDER COUNTY, REPLACEMENT OF BRIDGE NO.116
OVER SHAKEN CREEK

AT THE PRESENT TIME, PENDER COUNTY SCHOOLS HAS ONE BUS THAT CROSSES BRIDGE NO. 116. THIS BUS NOW COMES FROM SHAW HWY. (SR 1532) AND PICKS UP STUDENTS AT THE INTERSECTION OF GLADE RIDGE ROAD/OLD MAPLE HILL ROAD(SR 1520) AND CONTINUES ON OLD MAPLE HILL ROAD(SR 1520) TO 5425 WHERE WE PICK UP TWO STUDENTS AND TURNS AROUND. IF THE ROAD IS CLOSED, OUR BUS WILL HAVE TO COME FROM NC 50 IN MAPLE HILL TO 5425 OLD MAPLE HILL ROAD THEN RETURN 5.425 MILES BACK TO NC 50, THEN TRAVEL NC 50 TO NC 53, NC 53 TO SHAW HWY.(SR 1523), SHAW HWY. TO OLD MAPLE HILL ROAD, THEN TO THE GLADE RIDGE /OLD MAPLE HILL ROAD STOP, THEN RETURN TO NC 53. THIS WILL ADD APPROXIMATELY 30 TO 40 MINUTES TO THIS BUS ROUTE AND AN ADDITIONAL 20 MILES PER DAY. THIS BUS IS NOW STARTING AT APPROXIMATELY 6:15 AM. AT THE PRESENT TIME, NO STUDENTS ARE PICKED UP BEFORE 6:00 A.M. IN PENDER COUNTY AND WE WOULD LIKE TO KEEP THIS POLICY IN EFFECT.

I WOULD LIKE TO THANK YOU FOR THE OPPORTUNITY TO SHARE OUR CONCERNS IN RELATION TO THE BRIDGE CLOSURE AND IF I CAN BE OF FURTHER ASSISTANCE, PLEASE CONTACT ME.

# Wetland Rating Worksheet

Project name B-3887 Bridge No. 16 over Shaken Ck. Nearest road SR 1520
County Pender Name of Evaluator Shay Garrick Date 01/04/01

**Wetland location**

- _ on pond or lake
- ✓ on perennial stream
- _ on intermittent stream
- _ within interstream divide
- _ other

**Adjacent land use (within 1/2 mile upstream)**

forested/natural vegetation 100 %
agriculture, urban/suburban _____ %
impervious surface _____ %

**Soil Series** Marvyn & Torhunta

- _ predominantly organic-humus, muck, or peat
- _ predominantly mineral- non-sandy
- ✓ predominantly sandy

**Dominant Vegetation**

(1) Bald cypress
(2) Titi
(3) Black gum

**Hydraulic Factors**

- _ steep topography
- _ ditched or channelized
- ✓ wetland width >/= 50 feet

**Flooding and Wetness**

- _ semipermanently to permanently flooded or inundated
- ✓ seasonally flooded or inundated
- _ intermittently flooded or temporary surface water
- _ no evidence of flooding or surface water

---

**Wetland Type (select one)**

- ✓ Bottomland hardwood forest
- _ Headwater forest
- _ Swamp forest
- _ Wet flat
- _ Pocosin
- _ Pine savanna
- _ Freshwater marsh
- _ Bog/fen
- _ Ephemeral wetland
- _ Other

*The rating system cannot be applied to salt or brackish marshes

| | | | | | |
|---|---|---|---|---|---|
| Water storage | 5 | * | 4 | = | 20 |
| Bank/Shoreline stabilization | 4 | * | 4 | = | 16 |
| Pollutant removal | 1 | * | 5 | = | 5 |
| Wildlife habitat | 4 | * | 2 | = | 8 |
| Aquatic life value | 4 | * | 4 | = | 16 |
| Recreation/Education | 5 | * | 1 | = | 5 |

Total score 70

Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream

Upland CH02

# DATA FORM
## ROUTINE WETLAND DETERMINATION
## (1987 COE Wetlands Delineation Manual)

| | |
|---|---|
| Project/Site: B-3887; SR1520 over Shaken Creek<br>Applicant/Owner: _____<br>Investigator: Eco Science Corp / Shay Garrock | Date: 1/4/01<br>County: Pender<br>State: NC |
| Do Normal Circumstances exist on the site? (Yes) No<br>Is the site significantly disturbed (Atypical Situation)? Yes (No)<br>Is the area a potential Problem Area? Yes (No)<br>(If needed, explain on reverse) | Community ID: PINE, MIXED Deciduous<br>Transect ID: UPLAND<br>Plot ID: CH02 |

## VEGETATION

| Dominant Plant Species | Stratum | Indicator |
|---|---|---|
| 1. Ilex opaca | S | FAC- |
| 2. Pinus Taeda | C | FAC |
| 3. Arundinaria gigantea | H | FACW |
| 4. Smilax rotundifolia | VINE | FAC |
| 5. Liquidambar styraciflua | C/S | FAC+ |
| 6. | | |
| 7. | | |
| 8. | | |

| Dominant Plant Species | Stratum | Indicator |
|---|---|---|
| 9. | | |
| 10. | | |
| 11. | | |
| 12. | | |
| 13. | | |
| 14. | | |
| 15. | | |
| 16. | | |

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 80%

Remarks:

## HYDROLOGY

___Recorded Data (Describe in Remarks):
- ___Stream, Lake or Tide Gauge
- ___Aerial Photographs
- ___Other

✓No Recorded Data Available

Field Observations:

Depth of Surface Water: NONE (in.)
Depth to Free Water in Pit: – (in.)
Depth to Saturated Soil: NONE (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- ___Inundated
- ___Saturated in Upper 12 Inches
- ___Water Marks
- ___Drift Lines
- ___Sediment Deposits
- ___Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___Oxidized Root Channels in Upper 12 Inches
- ___Water-Stained Leaves
- ___Local Soil Survey Data
- ___FAC-Neutral Test
- ___Other (Explain in Remarks)

Remarks: No hydrology present

## SOILS

Map Unit Name (Series and Phase): Bayamonte Fine Sand

Drainage Class: well-drained

Taxonomy (Subgroup): Arenic Haplaquults

Field Observations
Confirm Mapped Type: Yes (No)

| Profile Description: Depth (inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Colors (Munsell Moist) | Mottle Abundance/Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|---|
| 0+ | | 10YR 4/2 | | | 70% Organic coated sand grain - no muck or mineral |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soils non-hydric

## WETLAND DETERMINATION

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | (Yes) No (Circle) | (Circle) |
| Wetland Hydrology Present? | Yes (No) | |
| Hydric Soils Present? | Yes (No) | Is this Sampling Point Within a Wetland? Yes (No) |

Remarks:

Approved by HQUSACE 2/92

HJL
8/93

WETLAND CA 02

# DATA FORM
## ROUTINE WETLAND DETERMINATION
## (1987 COE Wetlands Delineation Manual)

| | |
|---|---|
| Project/Site: B-3887; SR1520 over Shaken Creek<br>Applicant/Owner:<br>Investigator: EcoScience Corp / Shay Garriock | Date: 1/4/01<br>County: Pender<br>State: NC |
| Do Normal Circumstances exist on the site? (Yes) No<br>Is the site significantly disturbed (Atypical Situation)? Yes (No)<br>Is the area a potential Problem Area? Yes (No)<br>(If needed, explain on reverse) | Community ID: Bottom land hardwoods<br>Transect ID: WETLAND<br>Plot ID: CA02 |

## VEGETATION

| Dominant Plant Species | Stratum | Indicator | Dominant Plant Species | Stratum | Indicator |
|---|---|---|---|---|---|
| 1. Taxodium distichum | C | OBL | 9. | | |
| 2. Cyrilla racemiflora | S | FACW | 10. | | |
| 3. Nyssa sylvatica | C | FAC | 11. | | |
| 4. Osmunda regalis | H | OBL | 12. | | |
| 5. Quercus laurifolia | C/S | FACW | 13. | | |
| 6. Smilax laurifolia | Vine | FACW+ | 14. | | |
| 7. | | | 15. | | |
| 8. | | | 16. | | |

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100 %

Remarks:

## HYDROLOGY

___Recorded Data (Describe in Remarks):
- ___Stream, Lake or Tide Gauge
- ___Aerial Photographs
- ___Other

✓No Recorded Data Available

Field Observations:

| | | |
|---|---|---|
| Depth of Surface Water: | — | (in.) |
| Depth to Free Water in Pit: | — | (in.) |
| Depth to Saturated Soil: | 1-2 | (in.) |

Wetland Hydrology Indicators:

Primary Indicators:
- ✓Inundated
- ✓Saturated in Upper 12 Inches
- ___Water Marks
- ___Drift Lines
- ✓Sediment Deposits
- ✓Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___Oxidized Root Channels in Upper 12 Inches
- ✓Water-Stained Leaves
- ✓Local Soil Survey Data
- ___FAC-Neutral Test
- ___Other (Explain in Remarks)

Remarks:

## SOILS

Map Unit Name (Series and Phase): Marvyn & Craven — Drainage Class: well- mod. well drained

Taxonomy (Subgroup): Typic Hapludults, Aquic Hapludults — Field Observations Confirm Mapped Type: Yes (No)

Profile Description:

| Depth (inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Colors (Munsell Moist) | Mottle Abundance/Contrast | Texture, Structure, etc. |
|---|---|---|---|---|---|
| 0-1 | organic layer | | | | mucky |
| 1-3 | | 10YR 6/2 | | | |
| 3+ | | 10YR 3/1 | 10YR 3/4 | 25% | sandy loam |
| | | | | | |
| | | | | | |

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ✓ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

## WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Approved by HQUSACE 2/92

HJL
8/93

5-10-02
workday est. request

~~Rachelle~~
Tim

# WANG ENGINEERING

BG 27 w/ Wang

Surveys to be completed by Ecoscience

August 2, 2001

Ms. Gail Grimes, P.E., Assistant Manager
North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

**ATTENTION:** Ms. Stacy Harris, P.E.

**SUBJECT:** Group XXVII Bridge Replacement Projects

Dear Ms. Grimes:

We are requesting a supplement to the Engineering Contract for the Group XXVII Bridge Replacement Projects. Ecoscience Corporation conducted detailed natural resource investigations at these bridge sites in January and February 2001 at which time we identified potential habitat areas for federally protected species listed by the U. S. Fish and Wildlife Service for the respective counties in which the projects are located.

During the investigations, potential habitat for the following species was identified at the associated bridge replacement sites:

- B-3685 (Pitt County) Tar River Spinymussel Rachelle
- B-3809 (Beaufort County) Sensitive Jointvetch Rachelle
- B-3810 (Beaufort County) Rough-leaved loosestrife Rachelle
- B-3887 (Pender County) Rough-leaved loosestrife and Cooley's meadowrue Rachelle

Heather Montague completed cost estimates for Carex lutea on July 17, 2002

NCDOT will conduct the survey for the Tar River Spinymussel on B-3685. In order to resolve the habitat assessment for the remaining projects Ecoscience Corporation is conducting an additional field visit to complete this endeavour. We would like to request a supplement to our existing contract in order to complete these assessments.

If you need any additional information or have any questions, please call Mr. Greg S. Purvis, P. E. at (919) 677-9544.

Respectfully,

James Wang, Ph.D., P.E.

15200 WESTON PARKWAY, SUITE 101 • CARY, NC • 27513
PHONE: 919-677-9544 • FAX: 919-677-9744