STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 24, 2005

US Army Corps of Engineers
PO Box 1890
Wilmington, NC 28402

ATTENTION: Mr. David Timpy
NCDOT Coordinator

Dear Sir:

Subject: **Nationwide 23 Permit Application** for the for the replacement of Bridge No. 63 over Doctors Creek on SR 1728, Duplin and Pender County. Federal Aid Project No. BRZ-1305(2), State Project No. 8.2271501, Division 3, TIP Project No. B-4224, WBS #33581.1.1.

Please find enclosed a copy of the Categorical Exclusion (CE), EEP Confirmation letter, Natural Resource Technical Report, permit drawings, and ½ size plans for the above referenced project. The document states that Bridge No. 63 over Doctor's Creek will be replaced with a new 145-foot long 28-foot wide structure on the same location. Permanent wetland impacts will total 0.32 acres. Top down construction methods will be used to build the bridge. No temporary impacts will occur. During construction, traffic will be detoured along existing area roads. There will be no in water construction between February 15 and June 30 to protect anadromous fish spawning.

IMPACTS TO WATERS OF THE UNITED STATES

General Description: The project is located in the Cape Fear River basin (HUC 03030007). The project will not impact Doctor's Creek. Doctors Creek has been assigned a best usage classification of **C Sw**, by the Division of Water Quality. There are no HQW, ORW WS-I, or WS-II waters within one mile of the project area. Approximately one mile down stream, Doctors Creek flows into Rock Fish Creek (DWQ # 18-74-29b). Rock Fish Creek is on the 303d list of biologically impaired streams potentially due to major industrial point source, habitat modification, and bank/shoreline destabilization. Permanent wetland impacts will total 0.32 acres and consist of 0.28 acres of fill and 0.04 acres of excavation in wetlands. No temporary impacts will occur and there will be no impacts to surface waters.

Bridge Demolition: The super structure of Bridge No. 63 is composed of pre-stressed concrete channels with an asphalt-wearing surface. The substructure is composed of pre-cast concrete caps on timber piles. Bridge components are slated to be removed without dropping any components into Doctor's Creek. In accordance with NCDOT's Best

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 CAPITOL BOULEVARD
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27699

Management Practices for Bridge Demolition and removal for projects that require a CAMA permit, no components of the bridge will be allowed to drop into the water.

All guidelines for bridge demolition and removal will be followed in addition to Best Management Practices for the Protection of Surface Waters and BMP's for Bridge Demolition and Removal.

MITIGATION

AVOIDANCE AND MINIMIZATION: 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 impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design and include:

- No Bents will be placed in the water
- No additional impacts will occur as a result of utility relocations
- Fill slopes will be 3:1 in jurisdictional wetlands
- No Mechanized clearing will be used in jurisdictional wetlands
- Top Down Construction will be used
- Best Management Practices for the Protection of Surface Waters and Bridge Demolition and Removal will be followed.

The Department has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The remaining, unavoidable impacts to 0.32 acres of jurisdictional wetlands will be offset by compensatory mitigation provided by the EEP program. See attached confirmation letter from EEP.

FEDERALLY-PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 2003 the Fish and Wildlife Service (FWS) lists eleven federally protected species for Duplin and Pender County (Table 4 from Attached NRTR below). The Biological Conclusion for all federally protected species is No Effect because no habitat occurs in the project area.

Table 4. Federally-Protected Species for Pender and Duplin Counties.

SCIENTIFIC NAME	COMMON NAME	STATUS	COUNTY
Acipenser brevirostrum	shortnose sturgeon	E	Pender
Alligator mississippiensis	American alligator	T (S/A)	Pender & Duplin
Amaranthus pumilus	seabeach amaranth	T	Pender
Caretta caretta	loggerhead sea turtle	T	Pender
Carex lutea	golden sedge	E	Pender
Charadrius melodus	piping plover	T	Pender
Lysimachia asperulaefolia	rough-leaved loosestrife	E	Pender
Picoides borealis	red-cockaded woodpecker	E	Pender & Duplin
Schwalbea americana	American chaffseed	E	Pender
Thalictrum cooleyi	Cooley's meadowrue	E	Pender
Trichechus manatus	West Indian manatee	E	Pender

REGULATORY APPROVALS

Section 404 Permit: This project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (FR number 10, pages 2020-2095; January 15, 2002).

Section 401 Permit: We anticipate 401 General Certification number 3403 will apply to this project. All general conditions of the Water Quality Certifications will be met. No written concurrence is required. Therefore, in accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing two copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their notification.

In a separate application, NCDOT is requesting a Coastal Area Management Act Major Development Permit for this project from the NC Division of Coastal Management. Copies of this application as well as the CAMA application will be posted on our website at the following address http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html.

If you have any questions or need additional information, please contact Brett Feulner at (919) 715-1488.

Sincerely,

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

w/attachment

Mr. John Hennessy, NCDWQ (2 copies)
Dr. David Chang, P.E., Hydraulics
Mr. Gary Jordan, USFWS
Mr. H. Allen Pope, P.E. Division 3 Engineer
Mr. Mason Herndon, Div 3 DEO
Mr. Ron Sechler, NMFS
Mr. Michael Street, NCDMF
Mr. Travis Wilson, NCWRC
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. Mark Staley, Roadside Environmental
Mr. Bill Arrington, NCDCM
Mr. Steve Sollod, NCDCM

w/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Todd Jones, NCDOT External Audit Branch
Ms. Beth Harmon, EEP
Mr. Bill Goodwin, PDEA
Mr. Scott McLendon, USACE, Wilmington

Ecosystem Enhancement PROGRAM

September 20, 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, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-4224, Bridge 63 over the Doctor's Creek**,** Duplin and Pender Counties

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory riverine wetland mitigation for the subject project. Based on the information supplied by you in a letter dated September 9, 2005, the impacts are located in CU 03030007 of the Cape Fear River Basin in the Southern Inner Coastal Plain (SICP) and Southern Outer Coastal Plain (SOCP) Eco-Regions, and are as follows:

Riverine Wetland Impacts: 0.32 acre

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. Mitigation for this project will be provided in accordance with the above referenced agreement. EEP will commit to implementing sufficient compensatory riverine wetland mitigation to offset the impacts associated with this project by the end of the MOA year in which this project is permitted, in accordance with Section X of the Tri-Party MOA.

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

Sincerely,

James B. Stanfill

William D. Gilmore, P.E.
EEP Director

cc: Mr. David Timpy, USACE-Wilmington
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-4224

Restoring, Enhancing, Protecting Our State

CATEGORICAL EXCLUSION ACTION CLASSIFICATION FORM

TIP Project No.	**B-4224**
State Project No.	**8.2271501**
Federal Project No.	**BRZ-1305(2)**

A. Project Description:

NCDOT will replace Bridge No. 63 on SR 1305 (Doctors Creek Road) over Doctors Creek in Pender County at the Duplin County line. The bridge will be replaced with a new bridge measuring 145 feet in length and 28 feet in width at approximately the same location as the existing bridge. This bridge will provide for a 22 foot travelway and 3 foot offsets on each side. The new approach roadway will be a 22 foot travelway with 4 foot grassed shoulders. The approach work will consist of 485 feet to the south and 470 feet to the north of the existing bridge. The roadway grade of the new structure will be approximately the same as the existing grade at this location. Traffic will be detoured on existing local roads during construction as shown in Figure 1. There will be 9 miles of additional travel.

B. Purpose and Need:

Bridge Maintenance records indicate the bridge has a sufficiency rating of 36.3 out of 100. The bridge's four span superstructure is composed of prestressed concrete channels with an asphalt wearing surface. The substructure is composed of precast concrete caps on timber piles. The bridge's low structural evaluation rating qualifies the bridge as structurally deficient according to Federal Highway Administration (FHWA) standards and therefore eligible for FHWA's Highway Bridge Replacement and Rehabilitation Program. The replacement of this inadequate structure will result in safer traffic operations.

C. Proposed Improvements:

The following Type II improvements which apply to the project are circled:

1. Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking, weaving, turning, climbing).

    a. Restoring, Resurfacing, Rehabilitating, and Reconstructing pavement (3R and 4R improvements)
    b. Widening roadway and shoulders without adding through lanes
    c. Modernizing gore treatments
    d. Constructing lane improvements (merge, auxiliary, and turn lanes)

e. Adding shoulder drains
f. Replacing and rehabilitating culverts, inlets, and drainage pipes, including safety treatments
g. Providing driveway pipes
h. Performing minor bridge widening (less than one through lane)
i. Slide Stabilization
j. Structural BMP's for water quality improvement

2. Highway safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.

a. Installing ramp metering devices
b. Installing lights
c. Adding or upgrading guardrail
d. Installing safety barriers including Jersey type barriers and pier protection
e. Installing or replacing impact attenuators
f. Upgrading medians including adding or upgrading median barriers
g. Improving intersections including relocation and/or realignment
h. Making minor roadway realignment
i. Channelizing traffic
j. Performing clear zone safety improvements including removing hazards and flattening slopes
k. Implementing traffic aid systems, signals, and motorist aid
l. Installing bridge safety hardware including bridge rail retrofit

3. Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings.

a. Rehabilitating, reconstructing, or replacing bridge approach slabs
b. Rehabilitating or replacing bridge decks
c. Rehabilitating bridges including painting (no red lead paint), scour repair, fender systems, and minor structural improvements
d. Replacing a bridge (structure and/or fill)

4. Transportation corridor fringe parking facilities.

5. Construction of new truck weigh stations or rest areas.

6. Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.

7. Approvals for changes in access control.

8. Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.

9. Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.

10. Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.

11. Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.

12. Acquisition of land for hardship or protective purposes, advance land acquisition loans under section 3(b) of the UMT Act. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.

13. Acquisition and construction of wetland, stream and endangered species mitigation sites.

14. Remedial activities involving the removal, treatment or monitoring of soil or groundwater contamination pursuant to state or federal remediation guidelines.

D. Special Project Information:

Estimated Cost:

Construction	$ 700,000
Right of Way	$ 31,600
Total	**$ 731,600**

Estimated Traffic:

Current	-	800 VPD
Year 2025	-	1400 VPD
TTST	-	1%
Dual	-	2%

Proposed Typical Roadway Section:

The approach roadway will be 22 feet wide with 4-foot shoulders. Shoulder width will be increased by three feet where guardrail is warranted.

Design Speed: 60 mph

Design exceptions: It is anticipated that no design exceptions will be required.

Functional Classification: Rural Local Route

Division Office Comments:

The Division 3 Construction Engineer concurs with the recommendation of replacing the bridge in place and detouring traffic on local roads during construction as shown in Figure 1. There will be 9 miles of additional travel.

Bridge Demolition:

Bridge No. 63 has 4 spans totaling 121 feet in length. The bridge superstructure is composed of prestressed concrete channels with an asphalt wearing surface. The substructure is composed of precast concrete caps on timber piles. All components of the bridge, except the precast concrete caps, will be removed without dropping any of their components into Waters of the United States. However, there is the potential for components of the precast concrete caps to drop into the Waters of the United States during construction. The resulting temporary fill associated with the precast concrete caps is approximately 3 cubic yards. This project can be classified as a Case 2, where no instream work can occure during the moritorium period from February 15 to June 30 due to anadromous fish migration.

Alternatives Studied and Rejected:

The "do-nothing" alternative will eventually necessitate closure of the bridge. This is not acceptable due to the traffic service provided by SR 1305.

One alternative, to replace in place with an on-site detour just east of the existing bridge, was rejected due to the increased cost and increased impacts to wetlands.

Environmental Commitments:

Please see attached Green Sheet for Project Commitments.

E. Threshold Criteria

The following evaluation of threshold criteria must be completed for Type II actions.

ECOLOGICAL		YES	NO
(1)	Will the project have a substantial impact on any unique or important natural resource?	☐	X
(2)	Does the project involve any habitat where federally listed endangered or threatened species may occur?	☐	X
(3)	Will the project affect anadromous fish?	X	___
(4)	If the project involves wetlands, is the amount of permanent and/or temporary wetland taking less than one-tenth (1/10) acre and have all practicable measures to avoid and minimize wetland takings been evaluated?	___	X
(5)	Will the project require use of U. S. Forest Service lands?	☐	X
(6)	Will the quality of adjacent water resources be adversely impacted by proposed construction activities?	☐	X
(7)	Does the project involve waters classified as Outstanding Water Resources (OWR) and/or High Quality Waters (HQW)?	☐	X
(8)	Will the project require fill in waters of the United States in any of the designated mountain trout counties?	☐	X

		YES	NO
(9)	Does the project involve any known underground storage tanks (UST's) or hazardous materials sites?	☐	X

PERMITS AND COORDINATION		YES	NO
(10)	If the project is located within a CAMA county, will the project significantly affect the coastal zone and/or any "Area of Environmental Concern" (AEC)?	☐	X
(11)	Does the project involve Coastal Barrier Resources Act resources?	☐	X
(12)	Will a U. S. Coast Guard permit be required?	☐	X
(13)	Will the project result in the modification of any existing regulatory floodway?	☐	X
(14)	Will the project require any stream relocations or channel changes?	☐	X

SOCIAL, ECONOMIC, AND CULTURAL RESOURCES		YES	NO
(15)	Will the project induce substantial impacts to planned growth or land use for the area?	☐	X
(16)	Will the project require the relocation of any family or business?	☐	X
(17)	Will the project have a disproportionately high and adverse human health and environmental effect on any minority or low-income population?	☐	X
(18)	If the project involves the acquisition of right of way, is the amount of right of way acquisition considered minor?	X	☐
(19)	Will the project involve any changes in access control?	☐	X
(20)	Will the project substantially alter the usefulness and/or land use of adjacent property?	☐	X

(21)	Will the project have an adverse effect on permanent local traffic patterns or community cohesiveness?	☐	X
(22)	Is the project included in an approved thoroughfare plan and/ or Transportation Improvement Program (and is, therefore, in conformance with the Clean Air Act of 1990)?	X	☐
(23)	Is the project anticipated to cause an increase in traffic volumes?	☐	X
(24)	Will traffic be maintained during construction using existing roads, staged construction, or on-site detours?	X	☐
(25)	If the project is a bridge replacement project, will the bridge be replaced at its existing location (along the existing facility) and will all construction proposed in association with the bridge replacement project be contained on the existing facility?	X	☐
(26)	Is there substantial controversy on social, economic and environmental grounds concerning aspects of the action?	☐	X
(27)	Is the project consistent with all Federal, State, and local laws relating to the environmental aspects of the project?	X	☐
(28)	Will the project have an "effect" on structures/properties eligible for or listed on the National Register of Historic Places?	☐	X
(29)	Will the project affect any archaeological remains which are important to history or pre-history?	☐	X
(30)	Will the project require the use of Section 4(f) resources (public parks, recreation lands, wildlife and waterfowl refuges, historic sites or historic bridges, as defined in Section 4(f) of the U. S. Department of Transportation Act of 1966)?	☐	X
(31)	Will the project result in any conversion of assisted public recreation sites or facilities to non-recreation uses, as defined by Section 6(f) of the Land and Water Conservation Act of 1965, as amended?	☐	X

(32) Will the project involve construction in, across, or adjacent to a river designated as a component of or proposed for inclusion in the natural Wild and Scenic Rivers? ☐ X

F. **Additional Documentation Required for Unfavorable Responses in Part E**
(Discussion regarding all unfavorable responses in Part E should be provided below. Additional supporting documentation may be attached, as necessary.)

Item (3) Anadromous fish
A moratorium for anadromous fish on in-water construction activities will be observed from February 15 to June 30.

Item (4) Wetlands
Impacts to wetlands will be minimized by closing the road and replacing Bridge No. 63 with a new bridge in the same location and at the same elevation as the existing bridge.

G. CE Approval

TIP Project No. **B-4224**
State Project No. **8.2271501**
Federal-Aid Project No. **BRZ-1305(2)**

Project Description:

NCDOT will replace Bridge No. 63 on SR 1305 (Doctors Creek Road) over Doctors Creek in Pender County at the Duplin County line. The bridge will be replaced with a new bridge measuring 145 feet in length and 28 feet in width at approximately the same location as the existing bridge. This bridge will provide for a 22 foot travelway and 3 foot offsets on each side. The new approach roadway will be a 22 foot travelway with 4 foot grassed shoulders. The approach work will consist of 485 feet to the south and 470 feet to the north of the existing bridge. The roadway grade of the new structure will be approximately the same as the existing grade at this location. Traffic will be detoured on existing local roads during construction. See Figure 1 for the detour route.

Categorical Exclusion Action Classification:

_____ TYPE II(A)
__X__ TYPE II(B)

Approved:

5-28-04 Teresa Hart
Date — Teresa Hart, PE, CPM, Assistant Manager
Project Development and Environmental Analysis Branch

5-28-04 William T. Goodwin Jr.
Date — William T. Goodwin Jr., P.E., Unit Head
Bridge Replacement Planning Unit

5-28-04 Joel A. Johnson
Date — Joel A. Johnson, Project Development Engineer
Bridge Replacement Planning Unit

For Type II(B) projects only:

5-28-04 for Ronald G. Fay
Date — John F. Sullivan, III, PE, Division Administrator
Federal Highway Administration

PROJECT COMMITMENTS

Replacement of Bridge No. 63
On SR 1305 over Doctors Creek
Pender County at the Duplin County line
Federal-Aid No. BRZ-1305(2)
State Project No. 8.2271501
T.I.P. No. B-4224

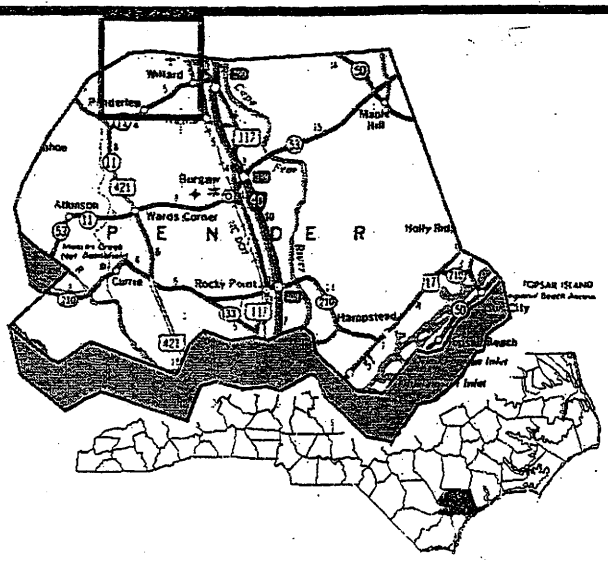
Commitments Developed Through Project Development and Design

Hydraulics Unit, Roadside Environmental Unit, Division Three Construction Office, Structure Design Unit

NCDOT will adhere to the Best Management Practices (BMPs) for "Bridge Demolition and Removal" during the removal of Bridge No. 63.

This reach of Doctors Creek has potential as a travel corridor for anadromous fish. Therefore, an in-stream moratorium will be in effect from February 15 to June 30. The Stream Crossing Guidelines for Anadromous Fish Passage will be implemented, as applicable.

The total time of **road closure** for this project should be held to a minimum due to the 9 mile detour. The contractor should be given incentives to minimize the road closure for the project. The **total project construction time** can be longer, as long as work can be done under traffic.



Detour Route

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS BRANCH

PENDER COUNTY
REPLACE BRIDGE NO. 63 ON SR 1305
OVER DOCTOR'S CREEK
B-4224

Figure 1

North Carolina Department of Cultural Resources
State Historic Preservation Office

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

Division of Historical Resources
David L. S. Brook, Director

April 7, 2004

TO: Clay Swindell
Office of Human Environment
Division of Highways
North Carolina Department of Transportation

FROM: David Brook for David Brook

SUBJECT: Archaeological Survey Report: Replacement of Bridge No. 63 over Doctor's Creek, Pender and Duplin Counties, ER03-0957

We have received the archaeological survey report for the above project from the Department of Transportation (NCDOT).

During the course of the survey no sites were discovered within the project area. NCDOT has recommended that no further archaeological investigation be conducted in connection with this project. We concur with this recommendation since the project will not involve significant archaeological resources.

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. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: ✓ Matt Wilkerson

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

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

Division of Historical Resources
David J. Olson, Director

May 29, 2003

MEMORANDUM

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

FROM: David Brook RBB for David Brook

SUBJECT: Replacement of Bridge No. 63 on SR 1305 over Doctor's Creek, B-4224, Pender County, ER03-0957

We have received notification of the bridge replacement referenced above and would like to comment.

There are no recorded archaeological sites within the proposed project area. If the replacement is to be located along the existing alignment, it is unlikely that significant archaeological resources would be affected and no investigations would be recommended. If, however, the replacement is to be in a new location, please forward a map to this office indicating the location of the new alignment so we may evaluate the potential effects of the replacement upon archaeological resources.

To avoid potential impacts to unknown archaeological resources, we recommend that the "replacement-in-place with traffic detoured off-site" alternative be adopted for this project.

We have conducted a search of our files and are aware of no structures of historical or architectural importance located within the planning area.

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

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

cc: Mary Pope Furr
Matt Wilkerson

REPLACE BRIDGE NO. 63 ON SR 1305
OVER DOCTOR'S CREEK
DUPLIN AND PENDER COUNTIES, NORTH CAROLINA

TIP NUMBER B-4224

STATE CONTRACT NO. A304259

STATE PROJECT NO. 8.2271501

FEDERAL AID PROJECT NO. BRZ-1305(2)

NATURAL RESOURCES TECHNICAL REPORT

PREPARED FOR:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

MARCH 2003

TABLE OF CONTENTS

1.0 INTRODUCTION

The following Natural Resources Technical Report (NRTR) is submitted to assist in the preparation of a Categorical Exclusion (CE) for the proposed project.

1.1 Project Description

The proposed project consists of the replacement of Bridge No. 63 on SR 1305 and SR 1155 (Pigford Road) over Doctor's Creek in Pender and Duplin Counties, North Carolina (Figure 1). The design of the proposed bridge has not been determined.

1.2 Purpose

The purpose of this technical report is to inventory, catalog and describe the various natural resources likely to be impacted by the proposed action. This report also attempts to identify and estimate the probable consequences of the anticipated impacts to these resources. Recommendations are made for measures which will minimize resource impacts. These descriptions and estimates are relevant only in the context of existing preliminary design concepts. If design parameters and criteria change, additional field investigations will need to be conducted.

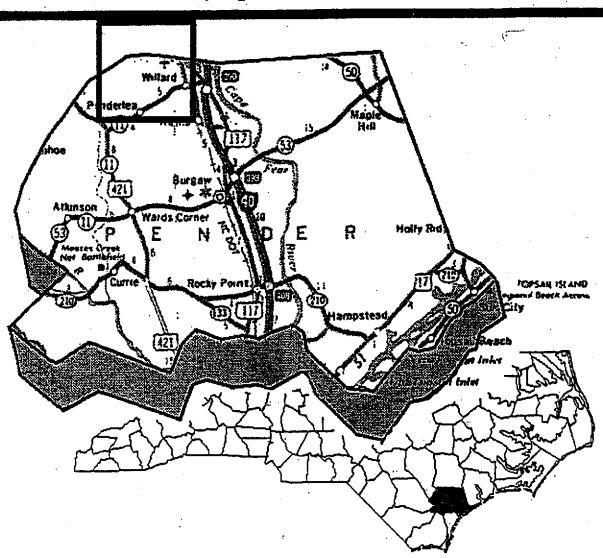
1.3 Methodology

Research was conducted prior to field investigations. Data sources utilized in the pre-field investigation of the study area include:

- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (Wallace West, 1984).
- USDA Natural Resource Conservation Service (NRCS) soil survey for Pender County, North Carolina (1990).
- USDA Natural Resource Conservation Service (NRCS) soil survey for Duplin County, North Carolina (1954).
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for 7.5-minute Wallace West quadrangle (1994).
- N.C. Department of Transportation (NCDOT) aerial photographs of the study area (1:200 scale).

Water resource information was obtained from publications of the North Carolina Department of Environment and Natural Resources, Division of Water Quality (NCDENR-DWQ 2000a and 2002).

Information concerning the occurrence of federal and state protected species in the study area was obtained from the USFWS list of protected species and candidate species (29 January 2003), the North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats, and the North Carolina Wildlife Resources Commission (NCWRC) Proposed Critical Habitats for aquatic species.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

PENDER COUNTY
REPLACE BRIDGE NO. 63 ON SR 1305
OVER DOCTOR'S CREEK
B-4224

Figure 1

General field surveys and wetlands investigations were conducted within the study area by biologists on the staff of Dr. J.H. Carter III & Associates, Inc. (JCA) on 13 January 2003. The corridor investigated extended 300 feet (90 meters (m)) upstream and downstream from the centerline of the existing bridge and 1500 feet north and south from the bridge along SR 1305 and SR 1155. Plant communities and their associated wildlife were identified and recorded. Wildlife identification involved using one or more of the following observation techniques: active searches and capture, visual observations (binoculars), and identification of characteristic signs of wildlife (sounds, scat, tracks, nests and burrows).

All wetlands subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and harbors Act of 1899 were identified and delineated according to methods prescribed in the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the USACE's 6 March 1992 Clarification and Interpretation of the 1987 Manual.

1.4 Qualification of Field Investigators

Investigator:	Tracy E. Rush
Education:	B.S. Biology (Botany Option), The Pennsylvania State University M.S. Forest Resources, The Pennsylvania State University
Experience:	Senior Biologist/Botanist, JCA, July 2000-Present Botanist, Washington State Natural Heritage Program, April 1997-June 2000. Biologist/Botanist, JCA, January 1993-January 1996.
Expertise:	Protected species surveys for flora and fauna, native plant identification, biotic community identification, wetland delineation, restoration and monitoring, forest management, vegetation monitoring and GPS/GIS.

Investigator:	Katie Barch
Education:	B.S. Environmental Science, Virginia Polytechnic Institute and State University M.S. Soil and Water Science, University of Florida
Experience:	Wetland Biologist, JCA, October 2002-Present. Environmental Technician, St. Johns River Water Management District, FL.
Expertise:	Wetland delineation and restoration, hydric soils, wetland hydrology, vegetation and groundwater monitoring, protected species surveys for flora and fauna and use of ArcView software.

1.5 Terminology

The definitions used for area descriptions contained in this report are as follows:

- Study Area (Study Corridor) – denotes the bubble area for the proposed project (area indicated on the aerial photograph by DOT).
- Project Vicinity – denotes an area extending 0.5 mile (mi) (0.8 kilometers (km)) on all sides of the study area.

- Project Region – is equivalent to an area represented by a 7.5 minute USGS quadrangle map with the project occupying the central position.

2.0 PHYSICAL RESOURCES

Soil and water resources located within the study area are discussed below.

2.1 Regional Characteristics

Pender and Duplin Counties lie in the Coastal Plain physiographic province of North Carolina. The counties range in elevation from approximately sea level (Pender County) to 167 feet (50 m) (Duplin County) above mean sea level (msl). Elevations within the study area range from approximately 35 to 55 feet (10 to 16 m) above msl.

2.2 Soils

Nine soil types occur within the study area (USDA 1990 and 1954): Fallingston fine sandy loam, Goldsboro fine sandy loam, Kenansville fine sandy loam, Marvyn and Craven soils, Mixed alluvial land, Muckalee loam, Norfolk loamy fine sand, Pactolus fine sand and Woodstown loamy fine sand. All study area soils, their drainage characteristics and hydric classifications are presented in Table 1.

Table 1. Study Area Soils and Characteristics.

Map Unit Symbol	Specific Map Unit	Percent Slope	Drainage Class	Hydric Class	Hydric Inclusions
Fa	Fallsington fine sandy loam	0 to 2	poor	hydric	No
GoA	Goldsboro fine sandy loam	0 to 2	moderate	non hydric	Yes
Kb	Kenansville fine sandy loam	0 to 2	well drained	non hydric	No
McC	Marvyn and Craven soils	6 to 12	well/moderate	non hydric	Yes
Mh	Mixed alluvial land	0 to 2	poor	hydric	No
Mk	Muckalee loam	0 to 2	poor	hydric	No
NoB	Norfolk loamy fine sand	2 to 6	well drained	non hydric	Yes
PaA	Pactolus fine sand	0 to 2	moderate/poor	non hydric	Yes
Wc	Woodstown loamy fine sand	0 to 2	moderate	non hydric	Yes

Fallsington fine sandy loam: Fallsington fine sandy loam is a poorly drained soil on slightly depressed baylike areas on broad upland flats. The seasonal high water table occurs at depths 0.5 to 1 feet from the surface and runoff potential is high. The flooding frequency for Fallsington fine sandy loam is never.

Goldsboro fine sandy loam: Goldsboro fine sandy loam is a moderately well drained soil on smooth uplands. The seasonal high water table occurs at depths 2 to 3 feet below the surface and runoff potential is medium. The flooding frequency for Goldsboro fine sandy loam is never.

Kenansville fine sandy loam: Kenansville fine sandy loam is a well drained soil on smooth uplands. The seasonal high water table occurs at depths 6 to 10 feet from the surface and runoff potential is slow to medium. The flooding frequency for Kenansville fine sandy loam is never.

Marvyn and Craven soils: Marvyn and Craven soils are well to moderately well drained soils on side slopes on uplands. The seasonal high water table occurs at depths greater than 6 feet for Marvyn soils and 2 to 3 feet from the surface for Craven soils and runoff potential is medium. The flooding frequency for Marvyn and Craven soils is never.

Mixed alluvial land: Mixed alluvial land is a poorly drained soil on flood plains along major streams. The seasonal high water table occurs at or near the surface and runoff potential is slow to medium. The flooding frequency for Mixed alluvial land is frequent.

Muckalee loam: Muckalee loam is a poorly drained soil on flood plains. The seasonal high water table occurs at depths 0.5 to 1.5 feet from the surface and runoff potential is very slow. The flooding frequency for Muckalee loam is frequent.

Norfolk loamy fine sand: Norfolk loamy fine sand is a well drained soil on convex interstream divides near major drainageways. The seasonal high water table occurs at depths 4 to 6 feet from the surface and runoff potential is medium. The flooding frequency for Norfolk loamy fine sand is never.

Pactolus fine sand: Pactolus fine sand is a moderately well drained or somewhat poorly drained soil on slight depressions on the uplands near the coast and on low ridges on terraces. The seasonal high water table occurs at depths 1.5 to 2.5 feet from the surface and runoff potential is slow. The flooding frequency for Pactolus fine sand is never.

Woodstown loamy fine sand: Woodstown loamy fine sand is a moderately drained soil in broad interstream upland areas. The seasonal high water table occurs at depths 1.5 feet from the surface and runoff potential is slow to medium. The flooding frequency for Woodstown loamy fine sand is never.

2.3 Water Resources

This section contains information concerning surface water resources likely to be impacted by the proposed project. Water resource information encompasses physical aspects of the resource, its relationship to major water systems, Division of Water Quality (DWQ) Best Usage Classifications, and the "quality" of the water resources. Probable impacts to these water bodies are also discussed, as are a means to minimize those impacts.

2.3.1 Waters Impacted and Characteristics

Doctor's Creek will be the only surface water directly impacted by the proposed project. Waters in the project vicinity are part of the Cape Fear River Basin, Hydrologic Unit 03030007. The Cape Fear River Basin contains 24 subbasins. The study area is found in the Northeast Cape Fear River and Rockfish Creek subbasin 03-06-22. Study area waters drain to the east into Rockfish Creek and eventually south into the Northeast Cape Fear River (NCDENR-DWQ 2000).

2.3.2 Best Usage Classification

Doctor's Creek has been assigned a best usage classification of Class "C SW" (index #18-74-29-3, 7/1/73) by the Division of Water Quality (NCDENR-DWQ 2002). A "C" classification designates waters that are for aquatic life propagation/protection and secondary recreation. The Swamp Waters "SW" supplemental classification designates this region as having waters naturally more acidic and with lower levels of dissolved oxygen. **Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominantly undeveloped watersheds), nor Outstanding Resource Waters (ORW) occur within 1.0 mi (1.6 km) of the study area.**

2.3.3 Water Quality

This section describes the water quality of the water resources within the study area. Potential impacts to water quality from point and nonpoint sources are evaluated. Water quality assessments are based upon published resource information and field study observations.

2.3.3.1 Nonpoint Source Discharge

Nonpoint source runoff from agricultural land are likely to be the primary source of water quality degradation to the water resources located within the project vicinity. The surrounding vicinity appears to be mainly used for agriculture with surrounding forested land. Nutrient loading and increased sedimentation from agricultural runoff and forestry affects water quality. Inputs of nonpoint source pollution from a few private residences within the study area also are likely to contribute to water quality degradation.

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. A review of the 303(d) list for North Carolina indicates that Doctor's Creek in the Cape Fear River Basin is not listed as an impaired waterway (NCDENR-DWQ 2000b).

2.3.3.2 Benthic Macroinvertebrate Ambient Network

The DWQ has initiated a whole basin approach to water quality management for the 17 river basins within the state. To accomplish this goal the DWQ collects biological, chemical and physical data that can be used in basinwide assessment and planning. All basins are reassessed every five years. Prior to the implementation of the basinwide approach to water quality management, the Benthic Macroinvertebrate Ambient Network (managed by the DWQ) assessed

water quality by sampling for benthic macroinvertebrate organisms at fixed monitoring sites throughout the state.

Many benthic macroinvertebrates have stages in their life cycle that can last from six months to a year, therefore, the adverse effects of a toxic spill will not be overcome until the next generation. Different taxa of macroinertebrates have different tolerances to pollution, thereby, long term changes in water quality conditions can be identified by population shifts from pollution sensitive to pollution tolerant organisms (and vice versa). Overall, the species present, the population diversity and the biomass are reflections of long term water quality conditions. There are no biological stations within 1.0 mi (1.6 km) of the study area (NCDENR-DWQ 2000a).

2.3.3.3 Point Source Dischargers

Point source dischargers located throughout North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) Program. Any discharger is required to register a permit. There are no point source dischargers located within 1 mi (1.6 km) of the study area.

2.3.4 Summary of Anticipated Impacts to Water Resources

Construction of the proposed project bridge will impact water resources. The estimated linear impact is the width of the study area since the project is still in the design phase. Project construction may result in the following impacts to surface waters:

- Increased sedimentation and siltation from construction and/or erosion.
- Changes in incident light levels and turbidity due to increased sedimentation rates and vegetation removal.
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction.
- Increases in nutrient loading during construction through runoff from temporarily exposed land surfaces.
- Increased concentration of toxic compounds from highway runoff, construction, toxic spills and increased vehicular use.
- Changes in water temperature due to removal of streamside vegetation.

Precautions should be taken to minimize impacts to water resources in the study area. NCDOT's Best Management Practices for the protection of surface water and water supplies must be strictly enforced during the construction stage of the project. Provisions to preclude contamination by toxic substances during the construction interval must also be strictly enforced.

3.0 BIOTIC RESOURCES

Biotic resources include aquatic and terrestrial communities. This section describes those communities encountered in the study area as well as the relationships between fauna and flora within these communities. Composition and distribution of biotic communities throughout the

project are reflective of topography, hydrologic influences and past and present land uses in the study area. Descriptions of the terrestrial systems are presented in the context of plant community classifications and follow descriptions presented by Schafale and Weakley (1990) where possible. Dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

Scientific nomenclature and the common names (when applicable) are included for each described plant and animal species. Plant taxonomy follows Radford, et al. (1968) and Weakley (2000). Animal Taxonomy follows Martof et al. (1980), Webster et al. (1985), National Geographic (1987) and Rohde et al. (1994). Subsequent references to the same organism will include the common name only. Fauna observed during the site visit are denoted with an asterisk (*). Spoor evidence or tracks equate to observation of the species. Published range distributions and habitat analysis are used in estimating fauna expected to be present within the study area.

3.1 Terrestrial Communities

3.1.1 Coastal Plain Small Stream Swamp (Blackwater Subtype)

The Coastal Plain Small Stream Swamp is located on floodplains of small blackwater streams (Schafale and Weakley 1990). This community type is most common comprising approximately 75% of the study corridor. Canopy vegetation includes bald cypress (*Taxodium distichum*), swamp black gum (*Nyssa biflora*), tulip poplar (*Liriodendron tulipifera*) and red maple (*Acer rubrum*). Understory species include red maple, red bay (*Persea borbonia*), titi (*Cyrilla racemiflora*), sweet bay (*Magnolia virginiana*) and ironwood (*Carpinus caroliniana*). Shrub species include sweet gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), leucothoe (*Leucothoe axillaris*) and inkberry (*Ilex glabra*). The herb layer includes cane (*Arundinaria tecta*) and wool-grass (*Scirpus cyperinus*). Vines are also common including catbrier (*Smilax* spp.), poison ivy (*Toxicodendron radicans*) and yellow jessamine (*Gelsemium sempervirens*).

A portion of the Coastal Plain Small Stream Swamp (northwest quadrant) has been recently clearcut and consists of shrubs and saplings including swamp black gum, red maple, titi and leucothoe. The herbaceous layer includes cane and cat-tails (*Typha latifolia*).

3.1.2 Mesic Pine Flatwoods

Mesic Pine Flatwoods are located on mesic (non-wetland sites) on rolling Coastal Plain sediments (Schafale and Weakley 1990). This community type is located on forested uplands adjacent to the Coastal Plain Small Stream Swamp community type and comprises approximately 10% of the study corridor. Canopy vegetation is dominated loblolly pine (*Pinus taeda*). Understory species include red maple, sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*) and southern red oak (*Quercus falcata*). The shrub layer includes inkberry, dwarf huckleberry (*Gaylussacia dumosa*) and sweet leaf (*Symplocos tinctoria*). The herb layer is dominated by bracken fern (*Pteridium aquilinum*). Vines are also common including Japanese honeysuckle (*Lonicera japonica*), catbrier, poison ivy and yellow jessamine.

3.1.3 Maintained/Disturbed Community

The maintained/disturbed communities consist of the road shoulder and residential landscapes. Road shoulders are irregularly maintained, receiving only periodic mowing and herbicide applications. Residential landscapes receive more frequent mowing, general maintenance, and disturbance.

Road shoulders act as buffers between the roadway and surrounding communities by filtering stormwater run-off and reducing runoff velocities. Herbaceous vegetation located in the road shoulder consisted of mowed fescue (*Festuca* spp.), broomsedge (*Andropogon* spp.), Japanese honeysuckle, dog fennel (*Eupatorium capillifoilium*) and blackberry (*Rubus* spp.).

Vegetation associated with the residential landscapes included mainly unvegetated areas and grasses such as fescue, Bermuda grass (*Cynodon dactylon*) and crabgrass (*Digitaria* sp.). A few trees and shrubs were also located in the residential landscapes including loblolly pine and various ornamental species.

3.1.4 Agricultural Fields

The agricultural field community includes land currently being used for the growth of various crops.

3.1.5 Old Field Community

There is one old field community within the study area. This area was dominated by young loblolly pine and early successional species including blackberry, Japanese honeysuckle, dog fennel, goldenrod and sweetgum.

3.2 Aquatic Communities

One aquatic community, Doctor's Creek, will be potentially impacted by the proposed project. Physical characteristics of a water body and the condition of the water resource influence faunal composition of aquatic communities. The streambed width (bank to bank) is 40 feet (12 m) at the bridge, the main channel is approximately 8 feet (2.4 m) wide and the channel depth is approximately 1 foot (0.3 m). The channel substrate is composed primarily of sand. The flow of the creek within the study area was moderate.

3.3 Wildlife

Many faunal species are highly adaptive and may populate or exploit the entire range of biotic communities located within the study area. Each species present fills its own ecological niche and there are often complex interactions between all species present. Examples of these relationships include symbiotic, competitive and predator/prey relationships.

3.3.1 Terrestrial Fauna

Mammals that commonly exploit habitats found within the study area include: raccoon* (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*) and white-tailed deer* (*Odocoileus virginianus*). Other mammal species that may exploit the forest edge and open habitats within the project are include Virginia opossum (*Didelphis virginiana*), red fox (*Vulpes vulpes*), eastern cottontail rabbit (*Sylvilagus floridanus*) and eastern mole (*Scalopus aquaticus*) (Webster et al. 1985).

The forest and forest edge habitats located in the study area provide shelter and forage for a variety of avian species. Birds that may be found in these habitats include the American crow* (*Corvus brachyrhynchos*), Carolina chickadee* (*Poecile carolinensis*), turkey vulture* (*Cathartes aura*), mourning dove* (*Zenaida macroura*), downy woodpecker* (Picoides pubescens), rufous sided towhee* (*Pipilo erythrophthalmus*), American robin* (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*) and Carolina wren* (*Thryothorus ludovicianus*) (National Geographic 1987).

The reptiles that can be expected to utilize the terrestrial communities within the study area include Carolina anole (*Anolis carolinensis*), five-lined skink (*Eumeces fasciatus*), eastern hognose snake (*Heterodon platyrhinos*) and the eastern garter snake (*Thamnophis siralis*) (Martof et al. 1980).

Terrestrial and ecotonal areas provide habitat for amphibians such as southern dusky salamander (*Desmognathus auriculatus*), slimy salamander (*Plethodon glutinosus*), eastern spadefoot toad (*Scaphiopus holbrooki*), southern road (*Bufo terrestris*), spring peeper (*Hyla crucifer*) and bullfrog (*Rana catesbeiana*) (Martof et al. 1980).

3.3.2 Aquatic Fauna

Aquatic fauna present within the study area are dependent upon physical characteristics of the water body and overall condition of the water resource. Terrestrial communities adjacent to a water resource also greatly influence aquatic communities. Fauna associated with the aquatic communities include various vertebrate and invertebrate species.

Representative species of fish that may be found in the study area include American eel (*Anguilla rostrata*), rosyside dace (*Clinostomus funduloides*), brown bullhead (*Ameiurus nebulosus*), redfin pickerel (*Esox americanus*), pirate perch (*Aphredoderus sayanus*), redbreast sunfish (*Lepomis auritus*) and eastern mosquitofish (*Gambusia holbrooki*) (Rohde et al. 1994).

Doctor's Creek provides habitat for a variety of reptiles. Species which may be present in or near the creek include yellowbelly slider (*Chrysemys scripta*), redbelly water snake (*Nerodia erythrogaster*), rough green snake (*Opheodrys aestivus*), brown water snake (*Nerodia taxispilota*) and cottonmouth (*Agkistrodon piscivorus*) (Martof et al. 1980).

Invertebrates that would be expected within the study area include: crayfish (Camaridae); nymphal and larval stages of dragonflies (Odonata), caddisflies (Trichoptera); and snails (Gastopoda).

3.4 Summary of Anticipated Terrestrial Impacts

Construction of the subject project will have various impacts on the biotic resources described. Any construction related activities in or near these resources have the potential to impact biological functions. These impacts cannot be quantified at this time since the specifications of the project are not yet known.

Plant communities found along the proposed study area serve as nesting and sheltering habitat for various wildlife. Project construction may reduce habitat for faunal species, thereby diminishing faunal numbers. Habitat reduction concentrates wildlife into smaller areas of refuge, thus causing some species to become more susceptible to disease, predation and starvation.

Areas modified by construction (but not paved) will become road shoulders and early successional habitat. Increased traffic noise and reduced habitat will displace some wildlife further from the roadway while attracting other wildlife by the creation of more early successional habitat. Animals temporarily displaced by construction activities will repopulate areas suitable for the species. This temporary displacement of animals may result in an increase of competition for the remaining resources.

3.5 Summary of Anticipated Aquatic Impacts

Aquatic communities are sensitive to small changes in their environment. Stream channelization, scouring, siltation, sedimentation and erosion from construction- related work would affect water quality and biological constituents. Although direct impacts may be temporary, environmental impacts from these construction processes may result in long term or irreversible effects.

Alterations in the aquatic community will result from the installation of bridges or temporary arched culverts. Impacts often associated with in-stream construction include increased channelization of water and scouring of stream channels. Water movement through these structures becomes concentrated and direct, thereby increasing the flow velocity.

In-stream construction alters the stream substrate and may remove streamside vegetation at the site. Disturbances to the substrate will destroy aquatic vegetation and produce siltation, which clogs the gills and/or feeding mechanisms of benthic organisms (sessile filter-feeders and deposit- feeders), fish and amphibian species. Benthic organisms can also be covered by excessive amounts of sediment. These organisms are slow to recover or repopulate a stream. Turbidity reduces light penetration thus decreasing the growth of aquatic vegetation.

The removal of streamside vegetation and placement of fill material at the construction site alters the terrain. Alterations of the stream bank enhances the likelihood of erosion and sedimentation. Revegetation stabilizes and holds the soil thus mitigating these processes.

Erosion and sedimentation carry soils, toxic compounds and other materials into aquatic communities at the construction site. These processes magnify turbidity and can cause the formation of sandbars at the site and downstream, thereby altering water flow and the growth of vegetation. Streamside alterations also lead to more direct sunlight penetration and to elevations of water temperatures, which may impact many species.

4.0 JURISDICTIONAL TOPICS

This section provides descriptions, inventories and impact analysis pertinent to two important issues--waters of the United States, and rare and protected species.

4.1 Waters of the United States

The U.S. Army Corps of Engineers (USACE) promulgated the definition of "Waters of the United States" under 33 CFR §328.3(a). Waters of the United States include most interstate and intrastate surface waters, tributaries, and wetlands. Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions are considered "wetlands" under 33 CFR §328.3(b). Wetlands generally include swamps, marshes, bogs, and similar areas. Any action that proposes to place dredged or fill materials into waters of the United states falls under the jurisdiction of the USACE, and must follow the statutory provisions under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344).

4.1.1 Characteristics of Wetlands and Surface Waters

Potential wetland communities were investigated pursuant to the 1987 "Corps of Engineers Wetland Delineation Manual". The three parameter approach is used where hydric soils, hydrophytic vegetation and prescribed hydrologic characteristics must **all** be present for an area to be considered a wetland.

One large wetland occurs within the study area, the floodplain swamp of Doctor's Creek. Hydrophytic vegetation in this area includes bald cypress, swamp black gum, sweet bay, bayberry (*Myrica heterophylla*), titi, red bay, leucothoe and cane. The soil is a sandy loam, generally saturated to the surface and has a Munsell color notation of 10YR 2/1 or 3/1 (Appendix I). This wetland has a wetland value score of 65 (NCDENR 1995) (Appendix II).

Juridictional surface waters present within the study area include Doctor's Creek. A detailed description of Doctor's Creek is presented in Section 3.2.

4.1.2 Summary of Anticipated Impacts

Estimated impacts to surface waters were derived from aerial photographs of the study area, onto which surface water locations were mapped in the field. The study area width and length were used in the calculations. Usually, project construction does not require the use of the entire study area, therefore, actual impacts may be considerably less.

Table 2. Anticipated impacts to surface waters based on study area:

Site	Impacts within Study Area
Doctor's Creek	600 linear ft (182 linear m)

Wetlands were delineated in the field and mapped using a Global Positioning System (GPS). Estimated impacts to wetlands were calculated using GPS and the study area width and length. Usually, project construction does not require the use of the entire study area, therefore, actual impacts may be considerably less.

Table 3. Anticipated impacts to wetlands based on the study area:

Site	Impacts within Study Area	DWQ Rating
Wetland A	29.4 ac (11.6 ha)	65

4.1.3 Permits

In accordance with provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344), a Section 404 Nationwide Permit 23 from the USACE is likely to be applicable for all impacts to Waters of the United States resulting from the proposed project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded or financed in whole, or part, by another Federal agency or department where that agency or department has determined that pursuant to the council on environmental quality regulation for implementing the procedural provisions of the National Environmental Policy Act. A Section 404 Nationwide Permit 33 may be required if temporary construction including cofferdams, access and dewatering are required for this project. The USACE will determine the final permit requirements.

A Coastal Area Management Act (CAMA) Permit may be required for this project since Pender County is a coastal county.

A North Carolina Division of Water Quality (DWQ) Section 401 Water Quality General Certification (#3361) is required prior to the issuance of the Section 404 Nationwide 23. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulations.

4.1.4 Mitigation

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy which embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological and physical integrity of Waters of the United States, specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts (to wetlands), minimizing impacts, rectifying impacts, reducing impacts over time and compensating for impacts (40 CFR 1508.20). Each of these three aspects (avoidance, minimization and compensatory mitigation) must be considered sequentially.

4.1.4.1 Avoidance

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology and logistics in light of overall project purposes. Impacts to Waters of the United States will likely not be avoided due to their close proximity to the existing bridge.

4.1.4.2 Minimization

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to Waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way (ROW) widths, fill slopes and/or road shoulder widths. Other practical mechanisms to minimize impacts to Waters of the United States crossed by the proposed project include: strict enforcement of sedimentation control BMP's for the protection of surface waters during the entire life of the project; reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams; reduction of runoff velocity; re-establishment of vegetation on exposed areas, judicious pesticide and herbicide usage; minimization of "in-stream" activity; and litter/debris control. Impacts to Waters of the United States can be minimized by replacing the bridge on the existing location with an off-site detour on SR 1307/1165 to the east or SR 1304/1157 to the west.

4.1.4.3 Compensatory Mitigation

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the United States have been avoided **and** minimized to the maximum extent possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation and enhancement of Waters of the United States. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site. It is anticipated that no compensatory mitigation will be required for this project although final determination rests with the USACE.

4.2 Rare and Protected Species

Some populations of fauna and flora have been in, or are in, the process of decline either due to natural forces or their inability to coexist with human activities. Federal law (under the provisions of the Endangered Species Act of 1973, as amended) requires that any action, likely to adversely affect a species classified as federally-protected, be subject to review by the USFWS. Other species may receive additional protection under separate state laws.

4.2.1 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 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the USFWS lists the following federally-protected species for Pender and Duplin Counties (Table 4). A brief description of each species' characteristics and habitat follows.

Table 4. Federally-Protected Species for Pender and Duplin Counties.

SCIENTIFIC NAME	COMMON NAME	STATUS	COUNTY
Acipenser brevirostrum	shortnose sturgeon	E	Pender
Alligator mississippiensis	American alligator	T (S/A)	Pender & Duplin
Amaranthus pumilus	seabeach amaranth	T	Pender
Caretta caretta	loggerhead sea turtle	T	Pender
Carex lutea	golden sedge	E	Pender
Charadrius melodus	piping plover	T	Pender
Lysimachia asperulaefolia	rough-leaved loosestrife	E	Pender
Picoides borealis	red-cockaded woodpecker	E	Pender & Duplin
Schwalbea americana	American chaffseed	E	Pender
Thalictrum cooleyi	Cooley's meadowrue	E	Pender
Trichechus manatus	West Indian manatee	E	Pender

"E" denotes Endangered (a species in danger of extinction throughout all or a significant portion of its range).

"T" denotes Threatened (a species that is likely to become an endangered species within the foreseeable future thought all or a significant portion of its range).

"T(S/A)" denotes Threatened due to Similarity of Appearance.

***Acipenser brevirostrum* (shortnose sturgeon) Endangered**
Family: Acipenseridae
Federally listed: March 11, 1967

The shortnose sturgeon lives in Atlantic Seaboard rivers from southern Canada to northeastern Florida. This fish is usually less than 3 feet (1 m) long. It is dark above and light

below. It has a wide mouth pointed downward beneath a short snout. Along the sides of it body are five rows of sharp, pointed plates which provide protection from predators.

The shortnose sturgeon inhabits the lower sections of larger rivers and coastal waters along the Atlantic coast. It may spend most of the year in brackish or salt water and move into fresh water only to spawn.

BIOLOGICAL CONCLUSION **UNRESOLVED**

Habitats in the form of large rivers and coastal waters do not occur within the study area. Additionally, a 14 January 2003 review of the Natural heritage Program database of threatened and endangered species revealed no known populations of shortnose sturgeon within 1 mile (1.6 km) of the study area. However, the biological conclusion for the shortnose sturgeon will be determined by an NCDOT biologist.

***Alligator mississippiensis* (American alligator) Threatened**
Family: Alligatoridae
Federally listed: March 11, 1967

The American alligator lives throughout the Southeastern United States, including Alabama, Arkansas, North and South Carolina, Florida, Georgia, Louisiana, Mississippi, Oklahoma, and Texas. The American alligator primarily lives in freshwater swamps and marshes, but can also be found in rivers and lakes.

Adult males can reach to 13 to 14.5 feet (4 to 4.5 m) in length with females reaching lengths of 10 feet (3 m). The snout is characteristically broad and when the mouth is closed, the edge of the upper jaw overlaps teeth in the lower jaw. Juveniles are essentially smaller versions of their parents, although they do have bright yellow cross-bands. Older alligators gradually lose the yellow banding and turn olive brown and black.

The study area does contain habitat for the American alligator, however, no nests were found during the field investigations and no surveys are required since the species is threatened due to similarity of appearance. It is likely that American alligators occur in the swamp but will move out of the area during construction activities and repopulate the area once the construction is complete. Biological conclusions are not required for species listed as threatened due to similarity of appearance.

***Amaranthus pumilus* (seabeach amaranth) Threatened**
Family: Amaranthaceae
Federally listed: April 7, 1993

Historically, the seabeach amaranth was found in 31 counties in nine states from Massachusetts to South Carolina. Now there are only 55 populations within three states, New

York and the Carolinas. Of these, 34 were found in Currituck, Dare, Hyde, Carteret, Onslow, Pender, New Hanover and Brunswick Counties, North Carolina.

The seabeach amaranth is an annual plant with fleshy, pink-red or reddish stems and small rounded leaves, 0.5 to 1 inch (1.3 to 2.5 centimeters (cm)) in diameter. This plant initially forms a small unbranched sprig, but soon begins to branch into a clump reaching up to a foot in diameter with 5 to 20 branches. The shiny, spinach-green colored leaves are clustered towards the tip of the stem and have a small notch at the rounded tip. The flowers and fruits are not easily seen and borne on clusters along the stems. Flowering begins as early as June in the Carolinas and extends until late fall or early winter. Seed production beings in July or August and continues until winter. The flowering and fruiting period, however, may vary as a result of weather events.

Seabeach amaranth is endemic to the Atlantic Coast barrier beaches, where its primary habitat is overwashed flats at accreting ends of islands, lower foredunes, and upper strands of noneroding beaches. Occasionally, this plant can be found in other places, including sound-side beaches, blowouts in foredunes, interdunal areas, and on sand and shell material used for beach replenishment or dredge spoil. Seabeach amaranth does not occur on well-vegetated sites because of its intolerance of competition. The species requires areas functioning in a relatively natural and dynamic nature.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of barrier beaches and dunes do not occur within the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of seabeach amaranth within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on seabeach amaranth.

***Caretta caretta* (loggerhead sea turtle) Threatened**
Family: Chelonidae
Federally listed: July 28, 1978

In the United States, loggerhead sea turtles can be found along the southeastern coast with significant nesting sites in Florida, Georgia, South Carolina, and North Carolina. Loggerheads are capable of living in diverse environments, such as in brackish waters or coastal lagoons and river mouths. It has been observed that they favor steeply sloped beaches with gradually sloping offshore approaches. Loggerhead hatchlings and juveniles are often associated with sea fronts (areas where ocean currents converge), downwellings, and eddies, where floating open ocean animals gather. During the winter, the loggerhead sea turtles remain dormant, buried in the mud at the bottom of sounds, bays and estuaries.

Adult loggerhead sea turtles have a reddish-brown carapace measuring about 36 inches (92 cm). The dorsal and lateral head scales and dorsal scales on the extremities are also reddish-brown, but with varying light yellow margins. The neck, shoulders and limb bases, which are

not scaled, are dull brown above and medium yellow laterally and ventrally. The plastron is also medium yellow. Loggerhead sea turtle hatchlings lack the reddish tinge varying from light to dark brown. Both pairs of appendages are dark brown above with distinct white margins. The plastron and other ventral surfaces are dull yellowish tan.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of coastal lagoons, brackish water or river mouths do not occur within the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of loggerhead sea turtle within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on the loggerhead sea turtle.

***Carex lutea* (golden sedge) Endangered**
Family: Cyperaceae
Federally listed: January 23, 2002

Golden sedge has been found in only 2 counties in North Carolina, Onslow and Pender counties. The species has only been found in coastal savannas that are underlain by calcareous, or chalk, deposits.

Golden sedge grows in small to large clumps. The 3 to 7 grass-like leaves range from 2 to 11 inches (5 to 27 cm) long and 0.7 to 1.5 inches (1.7 to 3.8 cm) wide and are found mostly at the base of the plant. Flower spikes develop in early and mid-April and fruits mature by mid-May, with most or all fruits fallen by late June. Leaves and naked flowering stems persist through the summer.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of savannas did not occur within the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of golden sedge within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on the golden sedge.

***Charadrius melodus* (piping plover) Threatened**
Family: Charadriidae
Federally listed: January 10, 1986

Piping plovers breed only in North America in three geographic regions: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. In North Carolina, around 50 pairs of nesting populations were counted (1995). Four pairs of piping plovers were found nesting at Holden Beach in southern North Carolina in 1993. These birds have been observed as early as the end of February in Virginia. There are several North Carolina sites where plovers have been

observed during migration, including Oregon Inlet, Ocracoke Inlet/Portsmouth Flats, and New Drum Inlet. Sightings of the piping plover away from the outer beaches are rare.

Piping plovers are small shorebirds approximately 7 inches (18 cm) long with a 15 inch (38 cm) wingspand. They have a sand-colored plumage on their backs and crown, white underparts, and a black upper tail with a white edge. Breeding birds have a single black breastband (which is often incomplete), a black bar across the forehead, bright orange legs and bill, and a black tip on the bill. During winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black.

Piping plover nests are found above the high tide line on coastal beaches, sandflats at the ends of sand spits and barrier islands, gently sloped foredunes, sparsely vegetated dunes, blowout areas behind primary dunes and washover areas cut into or between dunes. They may also nest where dredge material has been dumped. The nesting sites are shallow scraped depressions residing in fine grained sand to mixtures of sand, pebbles, shells or cobble. Piping plovers will primarily nest in areas with little or no vegetation.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of coastal beaches, sandflats and dunes do not occur within the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of piping plovers within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on piping plovers.

***Lysimachia asperulaefolia* (rough-leaved loosestrife) Endangered**
Family: Primulaceae
Federally listed: June 12, 1987

The rough-leaved loosestrife is endemic to the coastal plain and sandhills of the Carolinas. There are currently 35 populations in North Carolina and one in South Carolina. The populations in North Carolina are in the following counties: Burnswick (8 populations); Pender (1 population); Bladen (1 population); Carteret (8 populations); Scotland (3 populations); Cumberland (5 populations); Onslow (3 populations); Hoke (5 populations); and Pamlico (1 population). Most of the populations are small, both in area covered and in the number of stems.

Rough-leaved loosestrife is a perennial rhizomatous herb with erect stem 11 to 23 inches (30 to 60 cm) tall. The leaves are sessile in whorls of 3 to 4 and are broadest at the base. The leaves encircle the stem at intervals beneath the showy yellow flowers. The upper surface of the leaves is deep yellow-green or blue-green and lustrous. The leaf margins are entire. Flowering occurs from mid-May through June, with fruits present from July through October. This species is easily distinguished from the one other similar southeastern species of *Lysimachia*, *Lysimachia loomisii* Torrey, by its broader, glandular leaves and much larger flowers.

This plant generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins (areas of dense shrub and vine growth usually on wet, peaty, poorly drained soil). This species has also been found on deep peat in the low shrub community of large Carolina bays (shallow, elliptical, poorly drained depressions of unknown origin). Rough-leaved loosestrife is associated with six natural community types: low pocosin, high pocosin, wet pine flatwoods, pine savanna, streamhead pocosin, and sandhill seep. Plants have also been found in disturbed sites such as roadside depressions, power line rights-of-way and firebreaks.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitats in the form of ecotones between longleaf pine uplands and pond pine pocosins or Carolina bays with abundant sunlight are not found within the study area. The study area has been severely degraded by agricultural development and fire suppression. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of rough-leaf loosestrife within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on rough-leaf loosestrife.

***Picoides borealis* (Red-cockaded woodpecker) Endangered**
Family: Picidae
Federally listed: October 13, 1970

The red-cockaded woodpecker historically occurred from East Texas and Oklahoma, to Florida, and North to New Jersey. The present distribution is similar except the species is not found in Missouri, Maryland and New Jersey. The red-cockaded woodpecker is found in open stands of pine with a minimum age of 80 to 120 years. Longleaf pine (*Pinus palustris*) are the most commonly used, but other species of southern pine are also acceptable. Dense stands that are primarily hardwoods or that have dense hardwood understories are avoided.

The red-cockaded woodpecker is 7 to 8 inches (18 to 20 cm) long with a wing span of 13 to 15 inches (35 to 38 cm). Black and white horizontal stripes are on its back, and its checks and underparts are white. Its flanks are black streaked. The cap and stripe on the side of the neck and throat are black. The male has a small red spot on each side of the black cap. After the first post fledgling molt, fledgling males have a red crown patch. Most often these birds are found in groups ranging from three up to as many as seven other birds.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of old growth stands of southern pine lacking a thick understory are not present within the study area. No RCW trees were found and no active clusters are located within 0.5 mile (0.8 km) from the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of red-cockaded woodpeckers within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on the red-cockaded woodpecker.

***Schwalbea americana* (American chaffseed) Endangered**
Family: Scrophulariaceae
Federally listed: September 29, 1992

The American chaffseed is primarily a coastal plain species of the Atlantic and Gulf coasts. Fifty-one populations are known, including one in New Jersey, one in North Carolina (Fort Bragg, Cumberland and Hoke Counties), 43 in South Carolina, four in Georgia, and two in Florida. American chaffseed is found in sandy (sandy peat, sandy loam), acidic, seasonally moist to dry soils. It is found in habitats described as pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems. This plant appears to be shade intolerant and therefore occurs in areas maintained in an open to partially open condition. American chaffseed is dependent on fire, mowing, or fluctuating water tables to maintain the partially open forest conditions it requires.

The American chaffseed is an erect perennial herb with unbranched stems (or stems branched only at the base) growing to a height of 12 to 24 inches (30 to 60 cm). The leaves are alternate, lance-shaped to elliptic and the upper leaves are narrow bracts. They have large, purplish-yellow tubular flowers borne singly on short stalks in the axils of the uppermost, bracts and form a many-flowered, spike-like raceme. The fruit is a narrow capsule enclosed in a sac-like structure. Flowering occurs from April to June. The fruits mature from early summer. This species is distinguished by its unbranched stem alternate leaves, largest at the base; the two-lipped flowers, long and pale yellow with purple near the open end; hairy stems and leaves; and posterior sepal and two braclets subtending each flower. The dark brown senescing stems are quite distinctive for identification after flowering.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitats in the form of fire-maintained pine flatwoods, savannas, ecotonal areas between peaty wetlands and xeric sandy soils do not occur within the study area. The study area has been heavily impacted by fire suppression, agricultural development and timber harvesting. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of American chaffseed within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on American chaffseed.

***Thalictrum cooleyi* (Cooley's meadowrue) Endangered**
Family: Ranunculaceae
Federally listed: February 7, 1989

Only eleven populations of Cooley's meadowrue remain in Pender, Onslow, Brunswick and Columbus Counties in North Carolina. In Onslow and Pender Counties, the six sites of Cooley's meadowrue are all within a 6.5 km radius. The three sites in Columbus County are within a 2.5 mi (4 km) radius, and the two sites of Cooley's meadowrue in Brunswick County are within a 1 mi (1.6 km) radius.

Cooley's meadowrue is a tall perennial herb, 39 to 78 inches (1 to 2 m), which grows from an underground rhizome. The slender stems stand erect in sunny locations; in the shade, they are lax and may trail along the ground or lean on other plants. The leaflets are 1 inch (2 cm) long, narrow and with entire margins. Both basal and stem leaves are present and usually grouped in threes. All parts of the plant are glabrous (smooth). Male and female flowers are on separate plants. The flowers lack petals, and the sepals are small and drop off early. The sepals on the male plants are pale yellow to white. There are numerous stamen, and the filaments are light lavender. The female plants have green sepals, and their small, spindle-shaped carpels develop into narrowly ellipsoid, one-seeded fruits (achenes). Flowering occurs in mid-to late June with fruits maturing in August or September and remaining on the plant into October.

The Cooley's meadowrue is found in moist wet bogs and savannahs often at the border of intermittent drainages or swamp forests. It grows along fireplow lines, roadside ditches, woodland clearings, and powerline rights-of-way. This species needs some type of disturbance to sustain its open habitat. Tulip poplar growing with cypress and/or Atlantic white cedar has been the best indicator of Cooley's meadowrue sites.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of moist wet bogs and savannahs on the border of intermittent drainages and swamp forests does not exist in the study area. The study area has been severely degraded by agricultural development and fire suppression. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of Cooley's meadowrue within one-half mile of the study area. Consequently, the proposed project will have "No Effect" on Cooley's meadowrue.

***Trichechus manatus* (West Indian manatee) Endangered**
Family: Trichechidae
Federally listed: March 11, 1967

The United States' West Indian manatee is confined during the winter to the coastal waters of Florida and to springs and warm water outfalls reaching up to southeast Georgia. They have been known to migrate as far north as coastal Virginia and west to Louisiana during the summer months. Manatees are found in both salt and fresh water with depths ranging from 5 feet (1.5 m) to less than 20 feet (6 m). They have been observed in canals, rivers, estuarine habitats and saltwater bays. When water temperatures fall below 21 to 22 degrees Centigrade, the manatees migrate south to Florida or other cluster together in warm springs or industrial outfalls. In warmer months, manatees are found in areas with an adequate food supply, water depth and near fresh water.

The West Indian manatee is a large, 10 to 15 feet (3 to 4.5 m), long fusiform-shaped mammal that is gray or brown, wrinkled, sparsely haired, and rubber-like. They have modified paddle-like forelimbs, no hindlimbs and a horizontally flattened tail. They have stiff whiskers on their muzzles. Manatees, which are primarily herbivorous, spend about five hours a day feeding on aquatic vegetation.

BIOLOGICAL CONCLUSION **NO EFFECT**

Habitat in the form of canals, rivers, estuarine habitats and saltwater bays do no exisit within the study area. Additionally, a 14 January 2003 review of the Natural Heritage Program database of threatened and endangered species revealed no known populations of West Indian manatees within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on the West Indian Manatee.

4.2.2 Federal Species of Concern and State Listed Species

There are 26 Federal Species of Concern (FSC) listed for Pender and Duplin Counties as of 29 January 2003. Federal Species of Concern are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Federal Species of Concern are defined as those species which may or may not be listed in the future. These species were formally candidate species, or species under consideration for listing for which there was insufficient information to support a listing of Endangered, Threatened, Proposed Endangered and Proposed Threatened. Organisms which are listed as Endangered, Threatened, Significantly Rare, or Special Concern by the NCNHP list of rare plant and animal species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979.

Table 5 lists Federal Species of Concern, species state status, and the existence of suitable habitat for each species in the study area. This species list is provided for information purposes as the status of these species may be upgraded in the future.

Surveys for these species were not conducted during the site visit, nor were any of these species observed. As of 14 January 2003, review of the NCNHP database of the rare species and unique habitats revealed no records of North Carolina rare and/or protected species in or near the study area.

Table 5. Federal Species of Concern for Pender and Duplin Counties.

Scientific Name	Common name	NC Status	Habitat
Acrotis buchholzi	Buchholz's dart moth	SR	No
Aimophila aestivalis	Bachman's sparrow	SC	No
Ammodramus henslowii susurrans	Henslow's sparrow	SR	No
Amorpha georgiana var. *georgiana*	Georgia indigo-bush	E	No
Aristida simpliciflora	Chapman's three-awn	SR-T	No
Astragalus michauxii	Sandhills milkvetch	T	No
*Corynorhinus rafinesquii***	Rafinesque's big-eared bat	T	Yes
Dionaea muscipula	Venus' flytrap	SR-L, SC	No
Fusconaia masoni	Atlantic pigtoe	E	Yes
Hemipachnobia s. subporphyrea	Venus flytrap cutworm moth	SR	No
*Heterodon simus**	southern hognose snake	SC	Yes
Lampsilis cariosa	yellow lampmussel	E	Yes
Macbridea caroliniana	Carolina bogmint	T	Yes
Myotis austroriparius	southeastern myotis	SC	Yes
Noturus sp. 1	"broadtail" madtom	SC	Yes
Plantago sparsiflora	pineland plantain	E	No
Procambarus plumimanus	Croatan crayfish	W3	Yes
Rana capito captio	Carolina gopher frog	T	No
Rhynchospora thornei	Thorne's beaksedge	E	No
Sagittaria graminea var. weatherbiana	grassleaf arrowhead	SR-T	Yes
Solidago pulchra	Carolina goldenrod	E	No
Solidago verna	spring-flowering goldenrod	SR-L	No
Solidago villosicarpa	coastal goldenrod	SR-L	No
Spartiniphaga carterae	Carter's spartiniphaga	SR	No
Tofieldia glabra	Carolina asphodel	W1	No
Trillium pusillum var. pusillum	Carolina least trillium	E	No

"E"--An Endangered species is one whose continued existence as a viable component of the State's flora is determined to be in jeopardy.

"T"--A Threatened species is one which is likely to become endangered species within the foreseeable future throughout all or a significant portion of its range.

"SC"--A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.

"SR"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.

"-L"—Range of the species is limited to North Carolina and adjacent states.

"-T"—Rare throughout their ranges (fewer than 100 populations total).

"W1"--A watch Category 1 species is a species rare but relatively secure.

"W3"--A Watch Category 3 species is a species that is poorly known; perhaps needs listing in upcoming years.

"*"--Historic record (last observed in the county more than 50 years ago).

"**"--Obscure record (the date and/or location of observation is uncertain).

(Amoroso and Finnegan, 2002; LeGrand, Hall and Finnegan, 2001)

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APPENDIX I:

WETLAND DATA SHEETS

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

Project/Site: TIP Project No B-4224 | Date: 1-13-03
Applicant/Owner: NCDOT | County: PENDER
Investigator: Dr. J.H. Carter III | State: NORTH CAROLINA
JCA,Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site?	(Yes)	No	Community ID:
Is the site significantly disturbed (Atypical Situation)	Yes	(No)	Transect ID:
Is the area a potential Problem Area?	Yes	(No)	Plot ID: A-6
(if needed, explain on reverse)			WETLAND A

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pinus taeda	1	FAC	9.		
2. Acer rubrum	2	FAC	10.		
3. Liquidambar styraciflua	1	FAC+	11.		
4. Carpinus caroliniana	2	FAC	12.		
5. Liriodendron tulipifera	1	FAC	13.		
6. Magnolia virginiana	2	FACW+	14.		
7. Sambucus canadensis	3	FACW-	15.		
8. Aralia spinosa	3	FAC	16.		

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

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

Remarks: HYDROPHYTIC VEGETATION PRESENT

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
__X__ No Recorded Data Available

Wetland Hydrology Indicators:
Primary Indicator:
___ Inundated
__X__ Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil: 4 (in.)

Secondary Indicators (2 or more required):
__X__ Oxidized Root Channels in Upper 12 inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: WETLAND HYDROLOGY PRESENT

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

Project/Site: TIP Project No. B-4224 | Date: 1-13-03
Applicant/Owner: NCDOT | County: PENDER
Investigator: Dr. J.H. Carter III | State: NORTH CAROLINA
JCA,Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site? (Yes) No | Community ID: _____
Is the site significantly disturbed (Atypical Situation) (Yes) No | Transect ID: _____
Is the area a potential Problem Area? Yes (No) | Plot ID: A-6
(if needed, explain on reverse) UPLAND A

↑ edge of a yard / mowed area

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pinus taeda	1	FAC	9.		
2. Quercus nigra	1	FAC	10.		
3. Liquidambar styraciflua	1	FAC+	11.		
4. Ligustrum sinense	3	FAC	12.		
5. Lonicera japonica	5	FAC-	13.		
6. Andropogon virginicus	4	FAC-	14.		
7.			15.		
8.			16.		

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 66%

Remarks:
HYDROPHYTIC VEGETATION PRESENT

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_X_ No Recorded Data Available

Wetland Hydrology Indicators:
Primary Indicator:
____ Inundated
____ Saturated in Upper 12 inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil: 0 (in.)

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:
WETLAND HYDROLOGY ABSENT

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

Project/Site: TIP Project No B-4224 | Date: 1-13-03
Applicant/Owner: NCDOT | County: DUPLIN
Investigator: Dr. J.H. Carter III | State: NORTH CAROLINA
JCA,Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site? (Yes) No | Community ID: _____
Is the site significantly disturbed (Atypical Situation) Yes (No) | Transect ID: _____
Is the area a potential Problem Area? Yes (No) | Plot ID: Northeast Quadrant WETLAND A
(if needed, explain on reverse)

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pinus taeda	1	FAC	9. Arundinaria tecta	4	FACW
2. Liriodendron tulipifera	1	FAC	10.		
3. Quercus nigra	1	FAC	11.		
4. Persea borbonia	2	FACW	12.		
5. Myrica heterophylla	3	FACW	13.		
6. Ilex opaca	3	FAC-	14.		
7. Ilex coriacea	3	FACW	15.		
8. Magnolia virginiana	2	FACW+	16.		

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 88%

Remarks: HYDROPHYTIC VEGETATION PRESENT

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
X No Recorded Data Available

Wetland Hydrology Indicators:
Primary Indicator:
_____ Inundated
X Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil: 1 (in.)

Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
X FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: WETLAND HYDROLOGY PRESENT

APPENDIX II:

WETLANDS RATING WORKSHEETS

WETLAND A

WETLANDS RATING WORKSHEET

Fourth Version

Project name TIP Project No. B-4224 Nearest road SR 1305
County PENDER / DUPLIN Wetland area 29.4 acres Wetland width _____ feet
Name of evaluator TRACY RUSH / KATIE BARCH Date 1-13-03

Wetland location

- ☐ on pond or lake
- ☒ on perennial stream
- ☐ on intermittant stream
- ☐ within interstream divide
- ☐ other _____

Adjacent land use
(within 1/2 mile upstream, upslope, or radius)

- ☑ forested/natural vegetation 60 %
- ☑ agriculture, urban/suburban 35 %
- ☑ impervious surface <5 %

Soil series Mervyn & Craven Soils
Fallingston fine sandy loam

- ☐ predominantly organic – humus, muck, or peat
- ☐ predominantly mineral – non-sandy
- ☒ predominantly sandy

Dominant vegetation

(1) Liriodendron tulipifera
(2) Nyssa biflora
(3) Cyrilla racemiflora

Hydraulic factors

- ☐ steep topography
- ☐ ditched or channelized
- ☒ total riparian wetland width ≥ 100 feet

Flooding and wetness

- ☐ Semipermanently to permanently flooded or inundated
- ☒ seasonally flooded or inundated
- ☒ intermittantly flooded or temporary surface water
- ☐ no evidence of flooding or surface water

Wetland type (select one)*

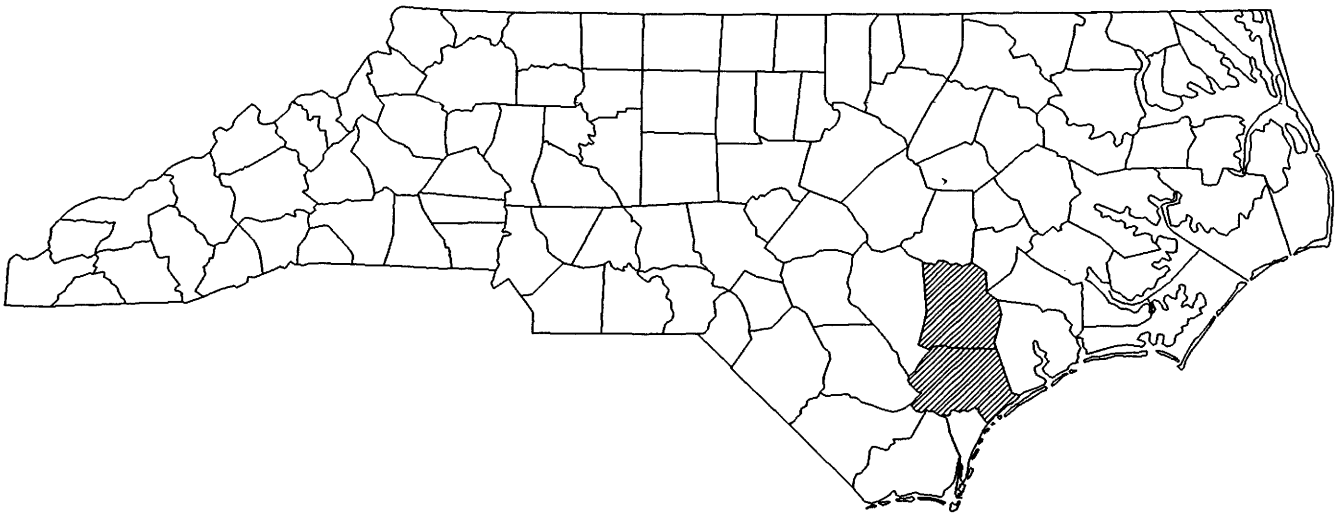
- ☒ Bottomland hardwood forest
- ☐ Headwater forest
- ☒ Swamp forest creek edge
- ☐ Wet flat
- ☐ Pocosin
- ☐ Pine savanna
- ☐ Freshwater marsh
- ☐ Estuarine fringe forest
- ☐ Ephemeral wetland
- ☐ Carolina Bay
- ☐ Bog forest
- ☐ Bog/fen
- ☐ Seep
- ☐ Other _____

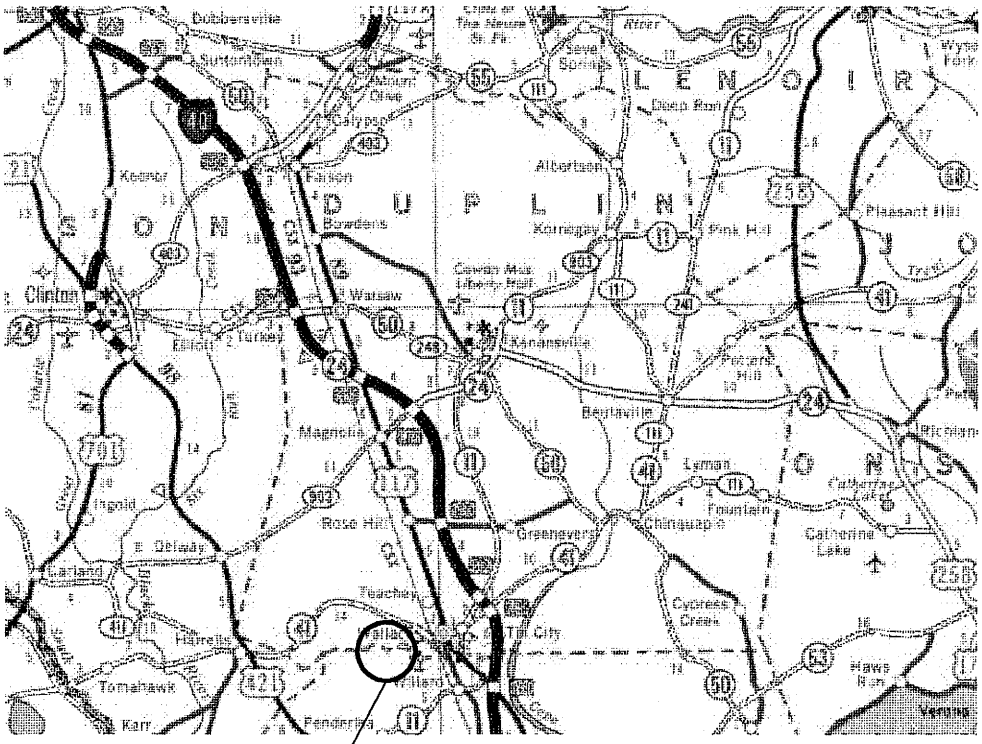
*The rating system cannot be applied to salt or brackish marshes or stream channels.

			weight			
R	Water storage	3	x 4.00 =	12		
A	Bank/Shoreline stabilization	2	x 4.00 =	8	*Wetland Score*	
T	Pollutant removals	4	x 5.00 =	20		65
I	Wildlife habitat	5	x 2.00 =	7		
N	Aquatic life value	4	x 4.00 =	16		
G	Recreation/Education	2	x 1.00 =	2		

*Add 1 point if in sensitive watershed and > 10% nonpoint disturbance within ½ mile upstream, upslope, or radius.

NORTH CAROLINA





NAD 83

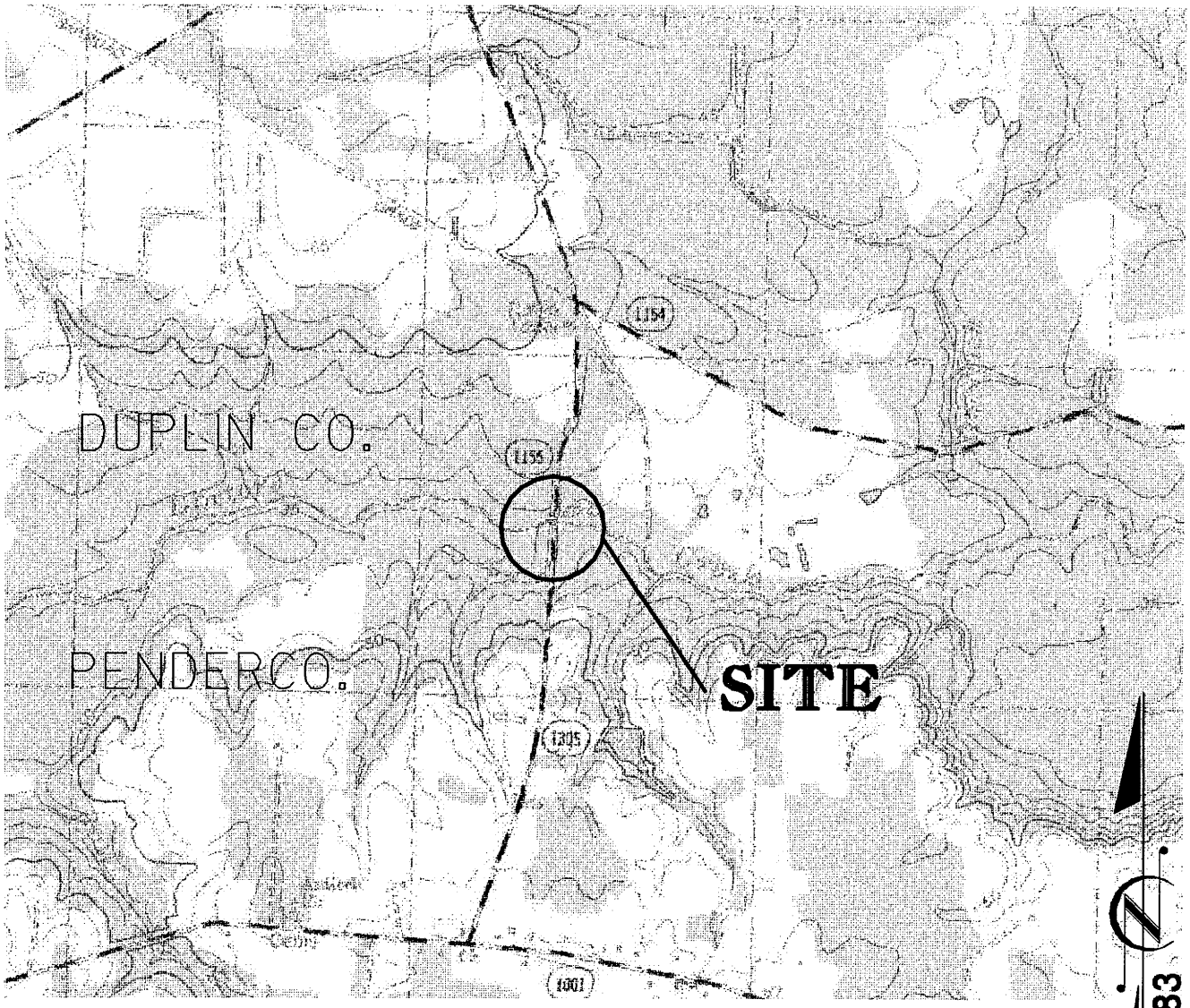
PROJECT

VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
DUPLIN / PENDER COUNTY
PROJECT: 33568.1.1 (B-4224)
REPLACE BRIDGE # 63 OVER DOCTORS CREEK ALONG SR1155 AND SR 1305

SHEET 1 **OF** 9 **04/10/05**



NOT TO SCALE

TOPOGRAPHIC MAPS

NCDOT

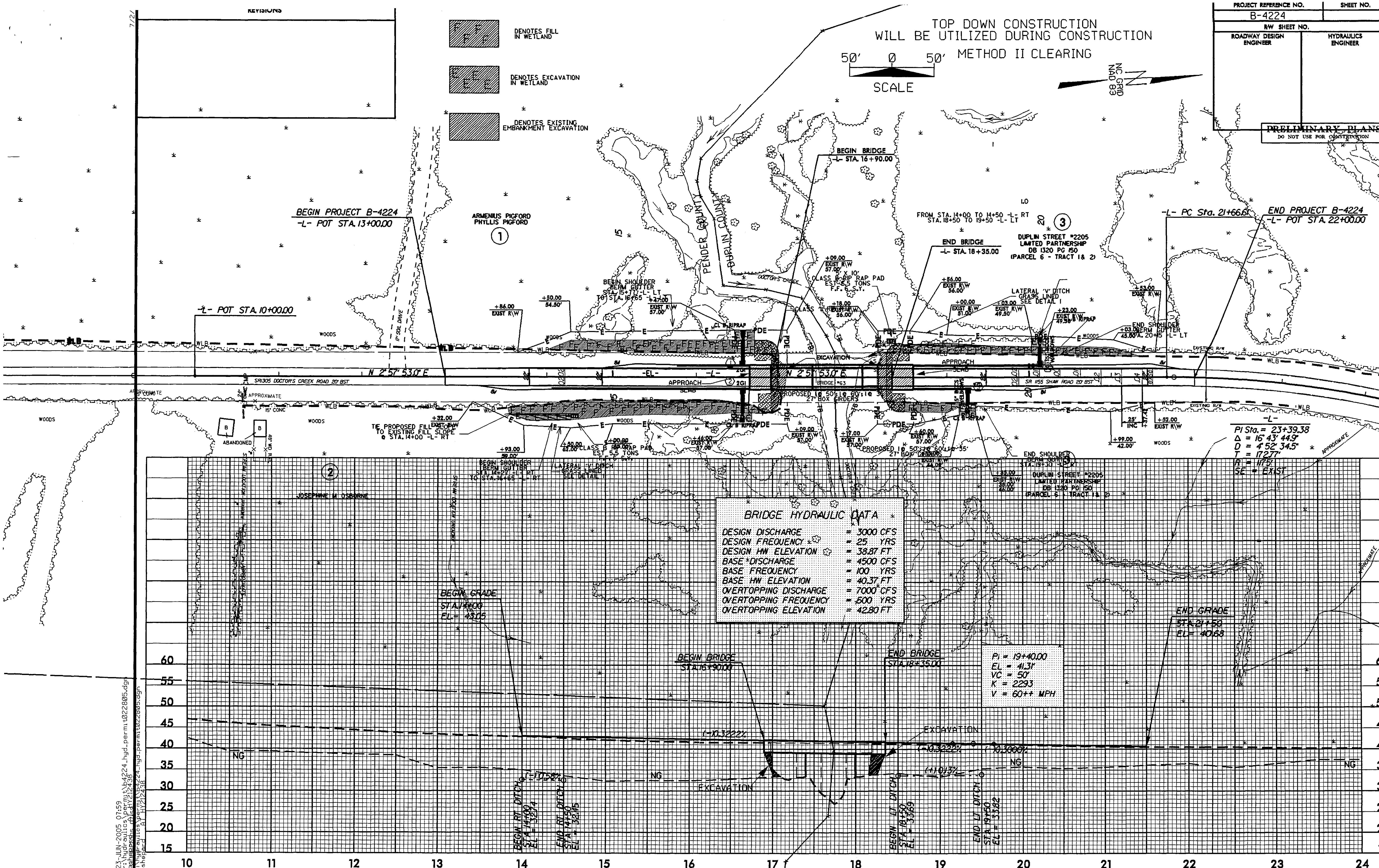
DIVISION OF HIGHWAYS

DUPLIN / PENDER COUNTY

PROJECT: 33568.1.1 (B-4224)

REPLACE BRIDGE # 63 OVER DOCTORS CREEK ALONG SR1155 AND SR 1305

SHEET 2 OF 9 04 / 10 / 05


PROJECT REFERENCE NO.
SHEET NO.
B-4224
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES EXISTING EMBANKMENT EXCAVATION
TOP DOWN CONSTRUCTION WILL BE UTILIZED DURING CONSTRUCTION
METHOD II CLEARING
50' 0 50'
SCALE
NC GRID NAD 83
BEGIN PROJECT B-4224
-L- POT STA. 13+00.00
-L- POT STA. 10+00.00
ARMENIUS PIGFORD
PHYLLIS PIGFORD
PENDER COUNTY
DUPLIN COUNTY
DOCTOR'S CREEK
BEGIN BRIDGE
-L- STA. 16+90.00
END BRIDGE
-L- STA. 18+35.00
FROM STA. 14+00 TO 14+50 -L- RT
STA. 18+50 TO 19+50 -L- LT
DUPLIN STREET #2205 LIMITED PARTNERSHIP
DB 1320 PG 150
(PARCEL 6 - TRACT 1& 2)
-L- PC Sta. 21+66.61
END PROJECT B-4224
-L- POT STA. 22+00.00
N 2°57'53.0" E
SR 1305 DOCTOR'S CREEK ROAD 20' BST
SR 1155 SHAW ROAD 20' BST
APPROACH SLAB
BRIDGE #63
PROPOSED 1@ 50'; 1@ 60'; 1@ 35' 27" BOX GIRDERS
EXCAVATION
WOODS
TIE PROPOSED FILL SLOPE TO EXISTING FILL SLOPE @ STA. 14+00 -L- RT
LATERAL 'V' DITCH GRASS LINED SEE DETAIL 1
CLASS B RIP RAP PAD EST 5.5 TONS
END SHOULDER BERM GUTTER
ABANDONED
JOSEPHINE M OSBORNE
-L-
PI Sta. = 23+39.38
Δ = 16° 43' 44.9"
D = 4° 52' 34.5"
T = 172.77'
R = 1175'
SE = EXIST
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 3000 CFS
DESIGN FREQUENCY = 25 YRS
DESIGN HW ELEVATION = 38.87 FT
BASE DISCHARGE = 4500 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 40.37 FT
OVERTOPPING DISCHARGE = 7000 CFS
OVERTOPPING FREQUENCY = 500 YRS
OVERTOPPING ELEVATION = 42.80 FT
BEGIN GRADE
STA 14+00
EL= 43.05
END GRADE
STA 21+59
EL= 40.68
BEGIN BRIDGE
STA 16+90.00
END BRIDGE
STA 18+35.00
PI = 19+40.00
EL = 41.31'
VC = 50'
K = 2293
V = 60++ MPH
(-)0.3222%
(-)0.3000%
NG
EXCAVATION
BEGIN RT DITCH
END RT DITCH
BEGIN LT DITCH
END LT DITCH
60 55 50 45 40 35 30 25 20 15
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
23-JUN-2005 07:59

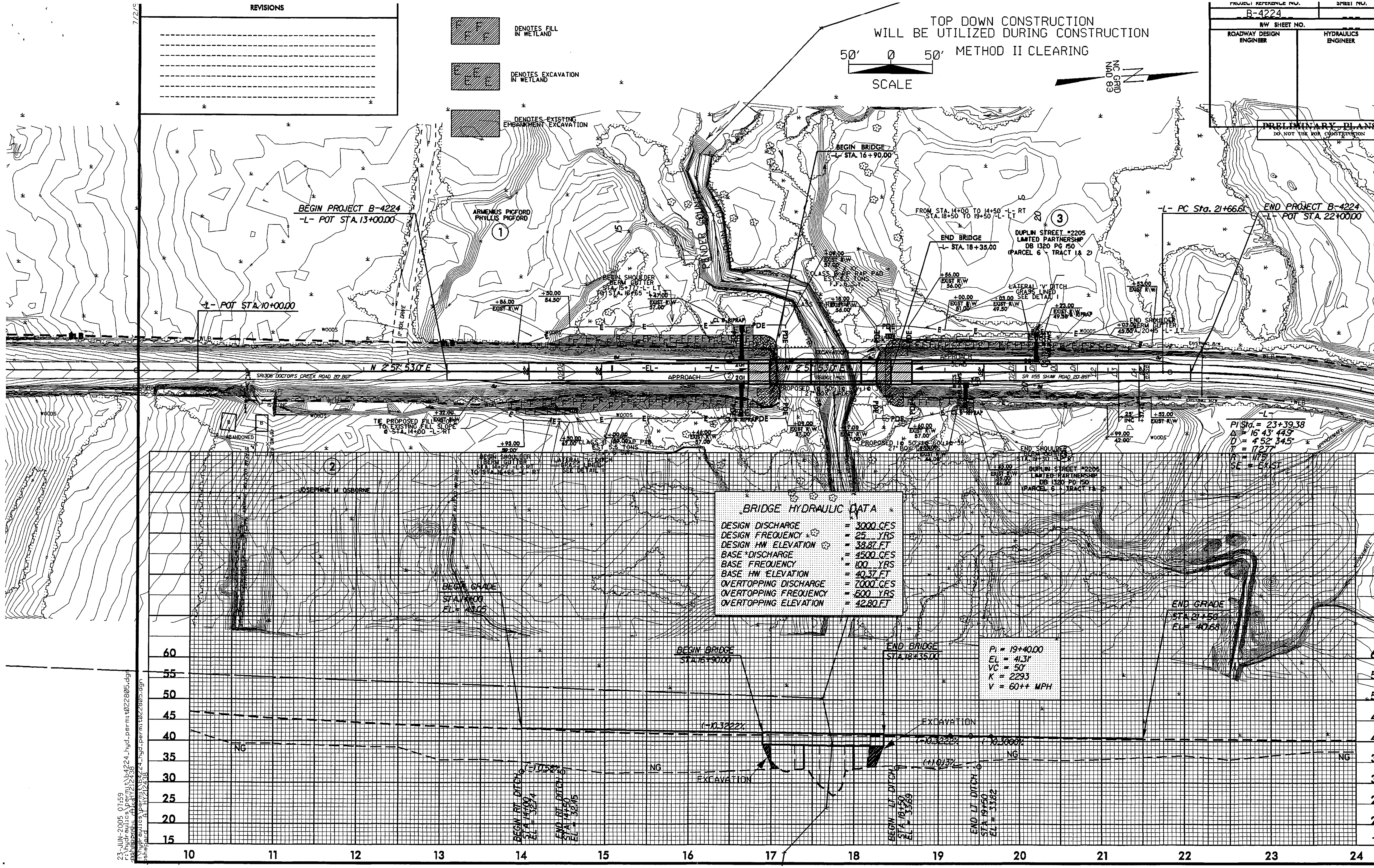
Sheet 3 of 9

PROJECT REFERENCE NO.	SHEET NO.
B-4224	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

TOP DOWN CONSTRUCTION WILL BE UTILIZED DURING CONSTRUCTION

METHOD II CLEARING



REVISIONS
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES EXISTING EMBANKMENT EXCAVATION
50' 0 50'
SCALE
NC GRID NAD 83
BEGIN PROJECT B-4224
-L- POT STA. 13+00.00
END PROJECT B-4224
-L- POT STA. 22+00.00
-L- POT STA. 10+00.00
-L- PC Sta. 21+66.61
ARMENIUS PIGFORD
PHYLLIS PIGFORD
BEGIN BRIDGE
-L- STA. 16+90.00
END BRIDGE
-L- STA. 18+35.00
FROM STA. 14+00 TO 14+50 -L- RT
STA. 18+50 TO 19+50 -L- LT
DUPLIN STREET #2205
LIMITED PARTNERSHIP
DB 1320 PG 150
(PARCEL 6 - TRACT 1& 2)
LATERAL 'V' DITCH
GRASS LINED
SEE DETAIL 1
N 2°57'53.0" E
SR1306 DOCTOR'S CREEK ROAD 20' BST
SR 1155 SHAW ROAD 20' BST
APPROACH SLAB
JOSEPHINE M OSBORNE
TIE PROPOSED FILL SLOPE TO EXISTING FILL SLOPE
@ STA. 14+00 -L- RT
WOODS
PDE
PI Sta. = 23+39.38
Δ = 16° 43' 44.9"
D = 4° 52' 34.5"
T = 172.77'
R = 1175'
SE = EXIST
BEGIN GRADE
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EL = 43.05
END GRADE
STA 21+59
EL = 40.68
BEGIN BRIDGE
STA 16+90.00
END BRIDGE
STA 18+35.00
PI = 19+40.00
EL = 41.31'
VC = 50'
K = 2293
V = 60++ MPH
EXCAVATION
NG
(-)0.3222%
(+)0.3000%
BEGIN RT DITCH
END RT DITCH
BEGIN LT DITCH
END LT DITCH
60
55
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45
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24
23-JUN-2005 07:59
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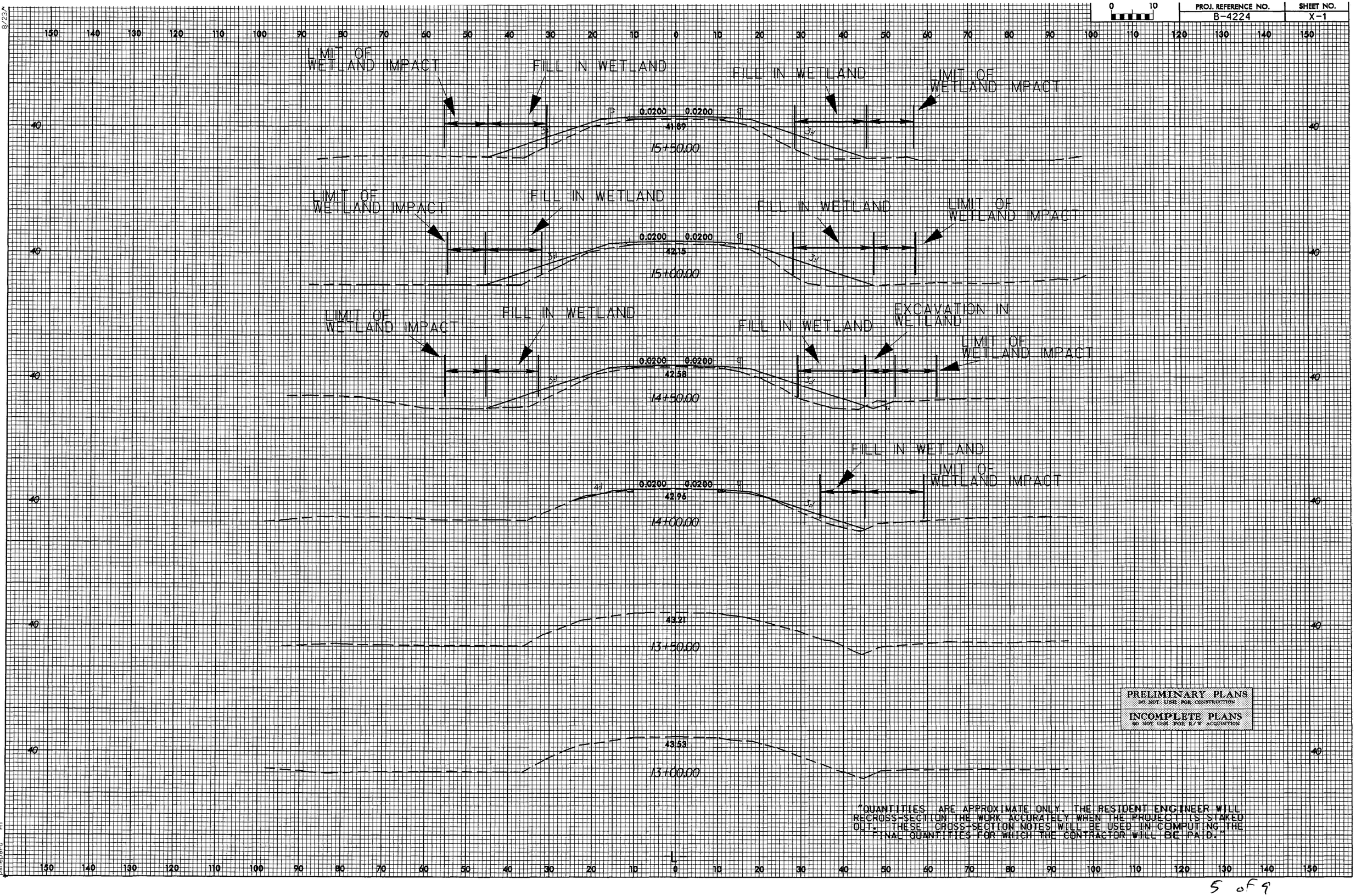
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	3000 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	38.81 FT
BASE DISCHARGE	=	4500 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	40.37 FT
OVERTOPPING DISCHARGE	=	7000 CFS
OVERTOPPING FREQUENCY	=	500 YRS
OVERTOPPING ELEVATION	=	42.80 FT

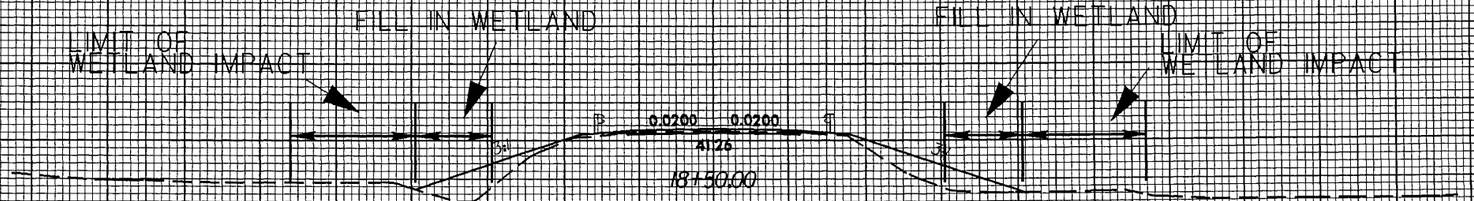


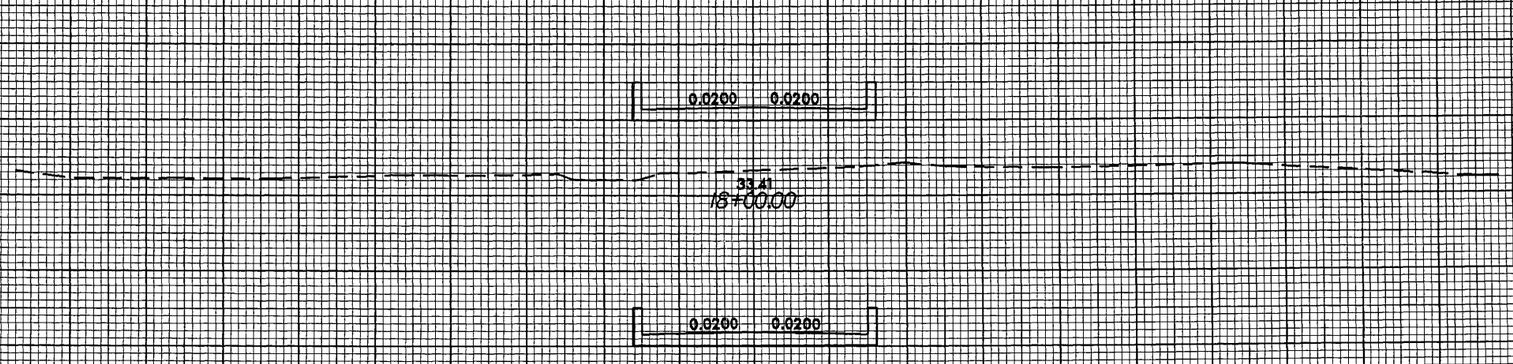
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

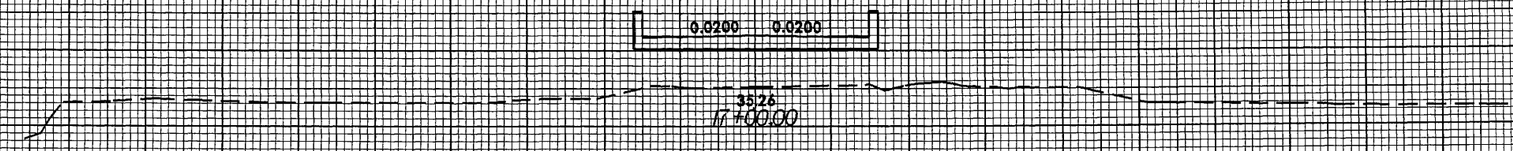
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

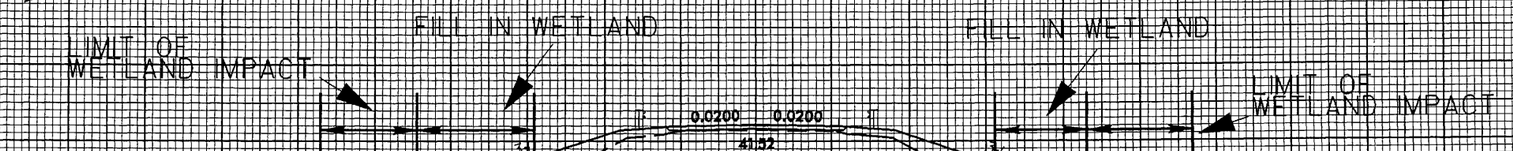
"QUANTITIES ARE APPROXIMATE ONLY. THE RESIDENT ENGINEER WILL RECROSS-SECTION THE WORK ACCURATELY WHEN THE PROJECT IS STAKED OUT. THESE CROSS-SECTION NOTES WILL BE USED IN COMPUTING THE FINAL QUANTITIES FOR WHICH THE CONTRACTOR WILL BE PAID."

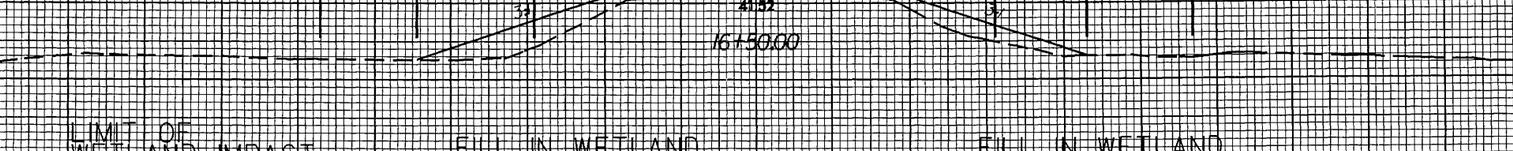
PROJ. REFERENCE NO.	SHEET NO.
B-4224	X-2

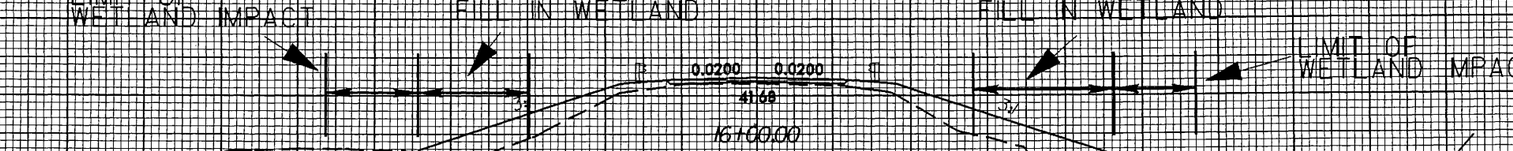


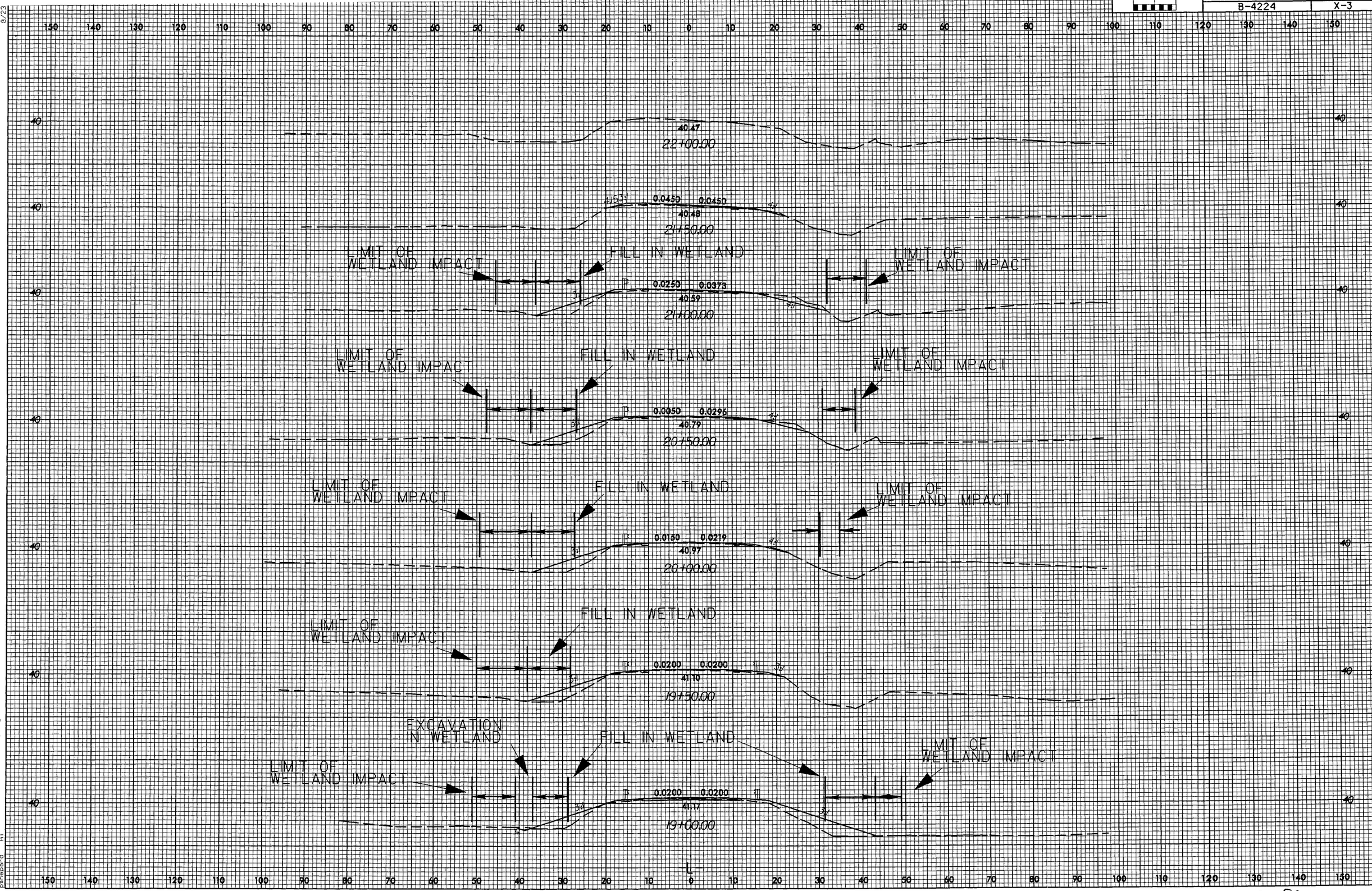












WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	13+74 to	Bridge	0.109	0.000	0.017	0.000	0.000	0.000	0.000	0	0	0
	17+00 -L- RT	& Ditch										
	14+21 to		0.087	0.000	0.007	0.000	0.000	0.000	0.000	0	0	0
	17+00 -L- LT											
	18+27 to	Bridge	0.021	0.000	0.006	0.000	0.000	0.000	0.000	0	0	0
	19+35 -L- RT											
	18+27 to	Ditch	0.066	0.000	0.010	0.000	0.000	0.000	0.000	0	0	0
	21+35 -L- LT											
TOTALS:			0.283		0.040							

METHOD II CLEARING

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DUPLIN-PENDER COUNTY
WBS - 33568.1.1 (B-4224)

SHEET 8 of 9 4/11/2005

ATN Revised 3/31/05

Property Owner Contact Report

TIP # B-4224

Owner Last Name/ Business	Owner First Name	Address	City/Town	State	Zip Code	Contact/ Relationship	Home Phone	Contacted By	Contact Date	How Contacted	Comments
								Nick Miguez	04/05/04	Letter	
(2) Osborne	Josephine M	2514 Beachwood Drive	Tarboro	NC	27886			Nick Miguez	04/05/04	Letter	
(1) Pigford	Armenius	4355 Willard Rd	Willard	NC	28478			Nick Miguez	04/05/04	Letter	
(3) Smith	W.W.	220 S Duplin Street	Wallace	NC	24492						

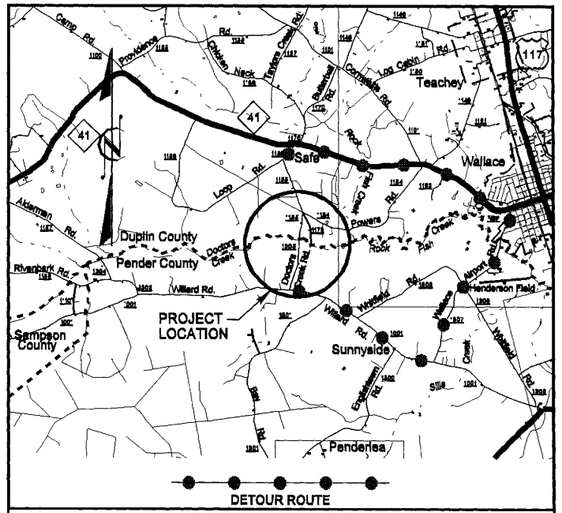
Sheet 9 of 9

05/08/99

TIP PROJECT: B-4224

CONTRACT: C201484

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

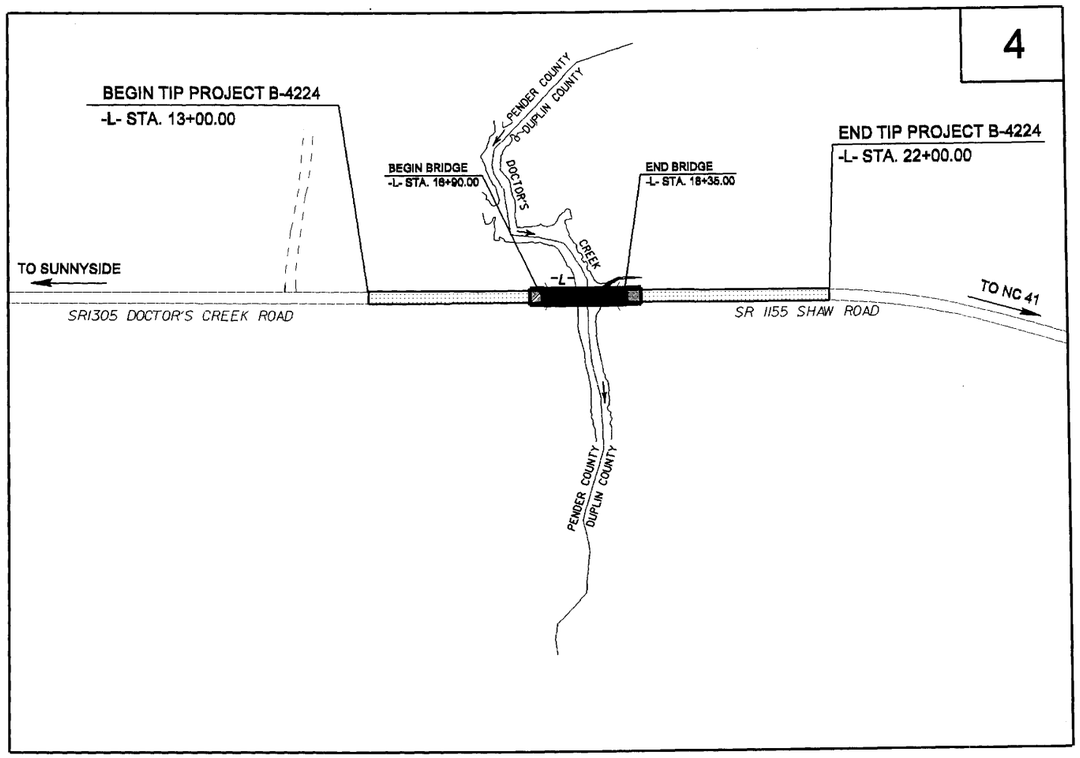
PENDER/DUPLIN COUNTIES

LOCATION: BRIDGE 63 OVER DOCTOR'S CREEK ON SR 1305 & SR 1155

TYPE OF WORK: GRADING, DRAINAGE, STRUCTURE, PAVING, GUARDRAIL, AND PAVEMENT MARKINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4224	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33568.1.1	BRZ-1305(2)	P.E.
33568.2.1	BRZ-1305(2)	R\W, UTILITIES



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

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2003 = 800
ADT 2025 = 1400
DHV = 10 %
D = 60 %
T = 3 % *
V = 60 MPH
* TTST 1 % DUAL 2 %
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4224 = 0.143 MILES

LENGTH STRUCTURE TIP PROJECT B-4224 = 0.027 MILES

TOTAL LENGTH OF TIP PROJECT B-4224 = 0.170 MILES

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 21, 2005

LETTING DATE: APRIL 18, 2006

JASON MOORE, PE
PROJECT ENGINEER

BRYAN KEY, PE
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*

22-JUN-2005 15:16
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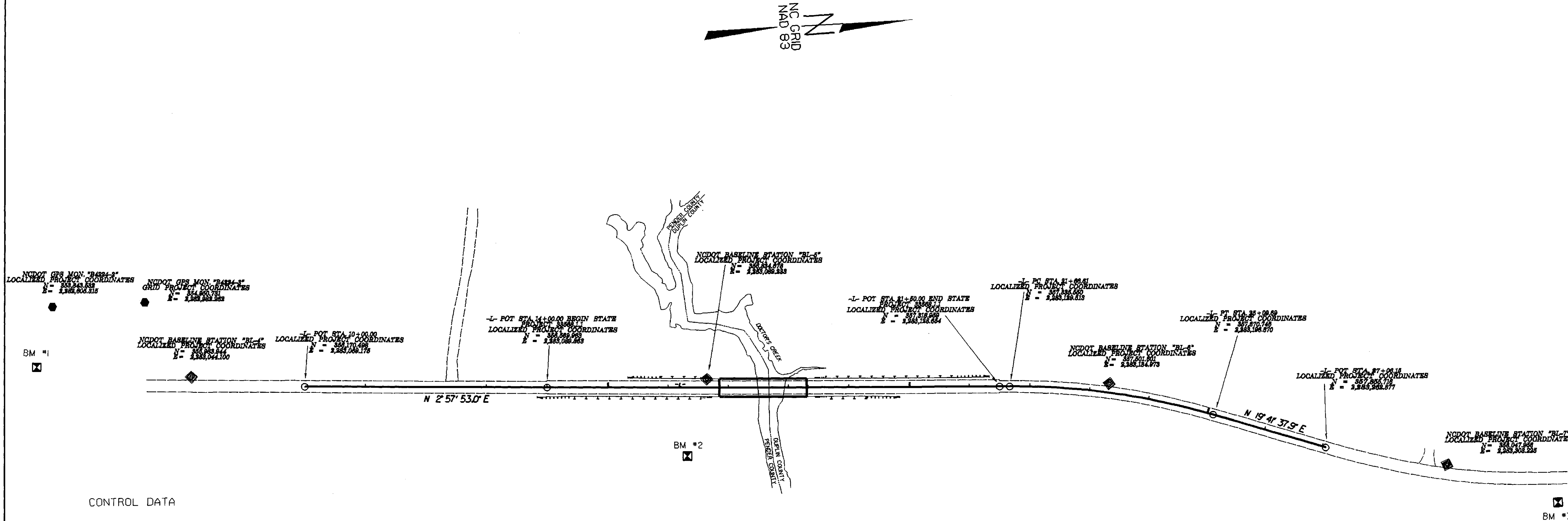
bckey AT R0223183

PROJECT REFERENCE NO.	SHEET NO.
B-4224	1-C
Location and Surveys	

SURVEY CONTROL SHEET



CONTROL DATA

-BL-

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
3	NCDOT GPS MON.'B4224-3'	354950.7310	2282982.2620	62.14	OUTSIDE PROJECT LIMITS	
4	BL-4	355983.9440	2283044.1000	49.09	OUTSIDE PROJECT LIMITS	
5	BL-5	356834.6780	2283089.2330	40.62	16+64.33	14.32 LT
6	BL-6	357501.6010	2283134.9730	40.54	23+31.20	14.79 LT
7	BL-7	358047.9560	2283303.2250	40.67	OUTSIDE PROJECT LIMITS	

BENCHMARK DATA

BM1 ELEVATION - 59.16
N 355652 E 2282993
L STATION 10+00
S 8° 23' 47.8" W DIST 523.71
RR SPIKE SET IN POWER POLE

BM2 ELEVATION - 34.00
N 356795 E 2283216
L STATION 16+32 114 RIGHT
RR SPIKE SET IN 17" MAPLE

BM3 ELEVATION - 44.18
N 358291 E 2283381
L STATION 27+06
N 15° 08' 16.9" E DIST 450.41
RR SPIKE SET IN 20" PINE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-4224-3" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 354950.731(ft) EASTING: 2282982.262(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99991 7 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-4224-3" TO -L- STATION 14+00.00 IS N 03°48'07" E 1622.80' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

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
FILE NAME: b4224_ls_control_050110.txt

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

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

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTS NAD 83/95

NOTE: DRAWING NOT TO SCALE

6/2/99

22-JUN-2005 15:16
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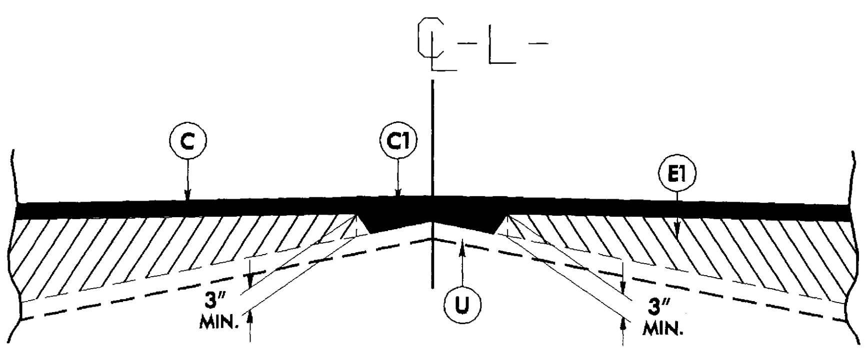
PROJECT REFERENCE NO.	SHEET NO.
B-4224	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

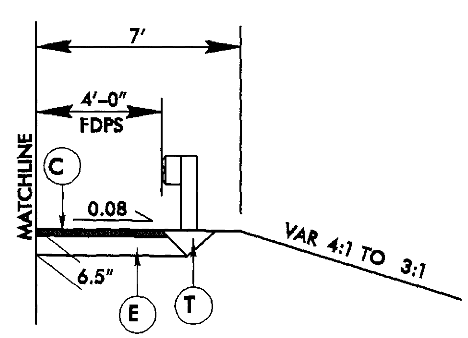
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE	
C	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C1	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.
E	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL BELOW)

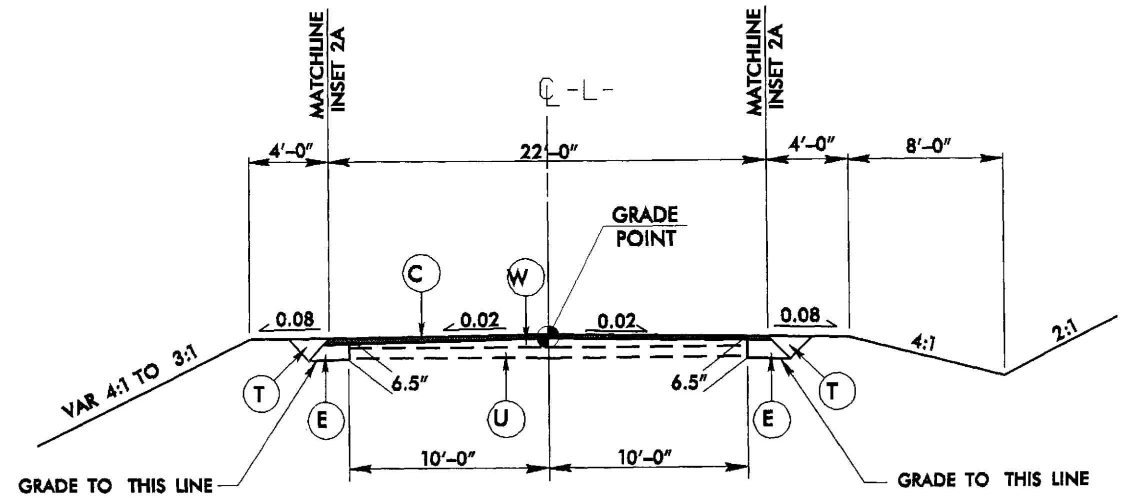
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging



INSET 2A



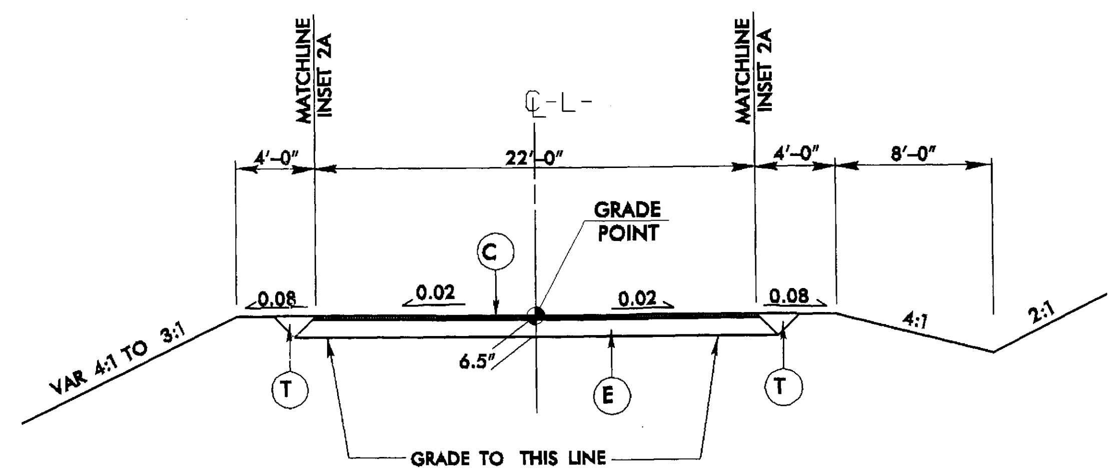
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO.1

-L- STA. 14+00.00 TO STA. 15+90.00
-L- STA. 19+35.00 TO STA. 21+50.00

USE INSET 2A IN GUARDRAIL LOCATIONS

TRANSITION TO EXISTING
-L- STA. 13+00.00 TO -L- STA. 14+00.00
-L- STA. 21+50.00 TO -L- STA. 22+00.00

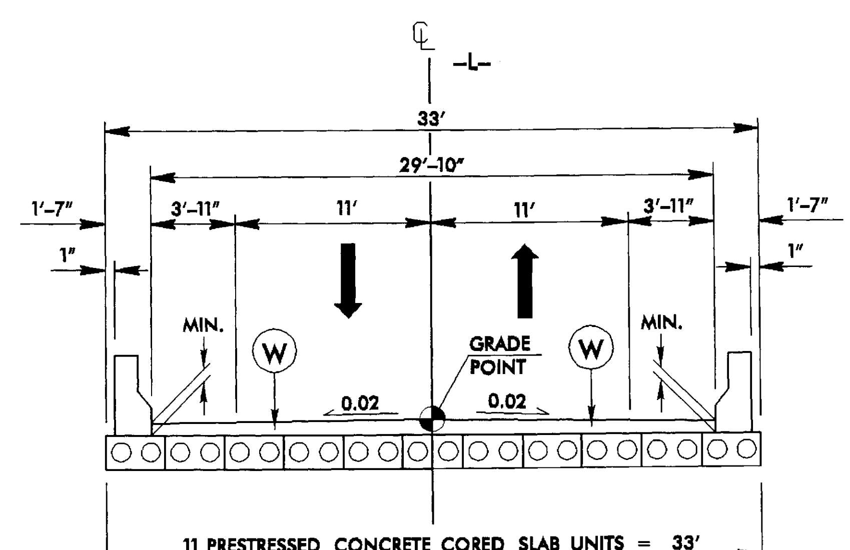


TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO.2

-L- STA. 15+90.00 TO STA. 16+90.00
-L- STA. 18+35.00 TO STA. 19+35.00

USE INSET 2A IN GUARDRAIL LOCATIONS



TYPICAL SECTION ON STRUCTURE

USE TYPICAL SECTION NO.3

STA 16+90.00 TO 18+35.00

22-JUN-2005 15:16
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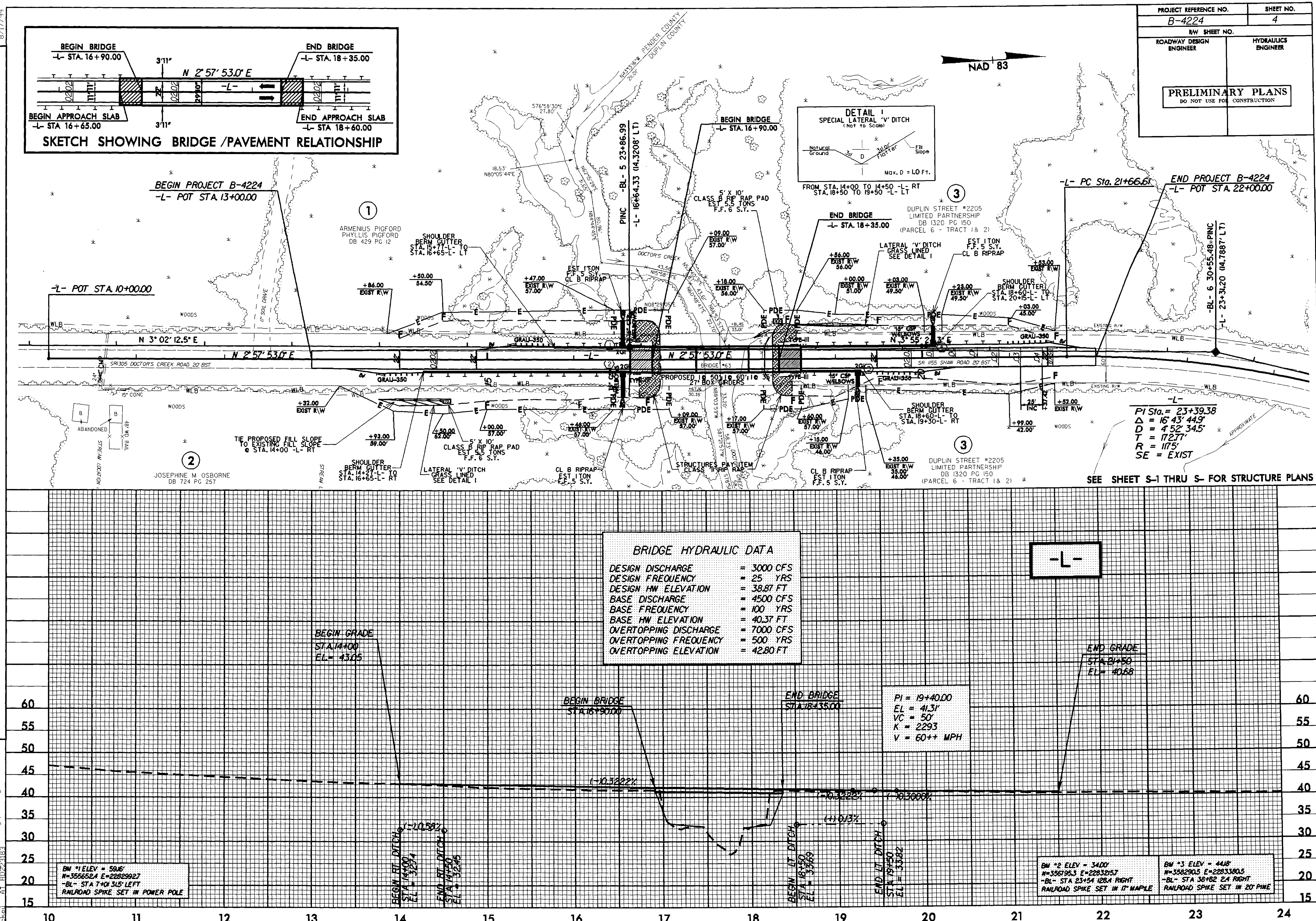
PROJECT REFERENCE NO.	SHEET NO.
B-4224	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BEGIN BRIDGE -L- STA. 16+90.00
END BRIDGE -L- STA. 18+35.00
N 2° 57' 53.0" E
BEGIN APPROACH SLAB -L- STA 16+65.00
END APPROACH SLAB -L- STA 18+60.00
SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP
NAD 83
DETAIL I
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Max. D = 1.0 Ft.
FROM STA. 14+00 TO 14+50 -L- RT
STA. 18+50 TO 19+50 -L- LT
BEGIN PROJECT B-4224
-L- POT STA. 13+00.00
-L- POT STA. 10+00.00
END PROJECT B-4224
-L- POT STA. 22+00.00
-L- PC Sta. 21+66.61
PINC -BL- 5 23+86.99
-L- 16+64.33 (14.3208' LT)
-BL- 6 30+55.48 PINC
-L- 23+31.20 (14.7887' LT)
ARMENIUS PIGFORD
PHYLLIS PIGFORD
DB 429 PG 12
JOSEPHINE M OSBORNE
DB 724 PG 257
DUPLIN STREET #2205
LIMITED PARTNERSHIP
DB 1320 PG 150
(PARCEL 6 - TRACT 1 & 2)
N 3° 02' 12.5" E
SR1305 DOCTOR'S CREEK ROAD 20' BST
SR 1155 SHAW ROAD 20' BST
PROPOSED 1 @ 50', 1 @ 60', 1 @ 35' 27" BOX GIRDERS
5' X 10' CLASS B RIP RAP PAD EST 5.5 TONS F.F. 6 S.Y.
LATERAL 'V' DITCH GRASS LINED SEE DETAIL I
TIE PROPOSED FILL SLOPE TO EXISTING FILL SLOPE @ STA. 14+00 -L- RT
SHOULDER BERM GUTTER STA. 14+27-L- TO STA. 16+65-L- RT
SHOULDER BERM GUTTER STA. 15+77-L- TO STA. 16+65-L- LT
SHOULDER BERM GUTTER STA. 18+60-L- TO STA. 19+30-L- RT
SHOULDER BERM GUTTER STA. 18+60-L- TO STA. 20+15-L- LT
STRUCTURES PAY ITEM CLASS II RIP RAP
PI Sta.= 23+39.38
Δ = 16° 43' 44.9"
D = 4° 52' 34.5"
T = 172.77'
R = 1175'
SE = EXIST
SEE SHEET S-1 THRU S- FOR STRUCTURE PLANS
-L-
BEGIN GRADE
STA.14+00
EL= 43.05
END GRADE
STA.21+50
EL= 40.68
BEGIN BRIDGE
STA.16+90.00
END BRIDGE
STA.18+35.00
PI = 19+40.00
EL = 41.31'
VC = 50'
K = 2293
V = 60++ MPH
(-)0.3222%
(+)0.3222%
(-)0.3000%
(-)0.58%
(+)0.13%
BM #1 ELEV = 59.16'
N=355652.4 E=2282992.7
-BL- STA 7+01 31.5' LEFT
RAILROAD SPIKE SET IN POWER POLE
BM #2 ELEV = 34.00'
N=356795.3 E=2283215.7
-BL- STA 23+54 128.4 RIGHT
RAILROAD SPIKE SET IN 17" MAPLE
BM #3 ELEV = 44.18'
N=358290.5 E=2283380.5
-BL- STA 38+82 2.4 RIGHT
RAILROAD SPIKE SET IN 20" PINE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3000 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 38.87 FT
BASE DISCHARGE	= 4500 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 40.37 FT
OVERTOPPING DISCHARGE	= 7000 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 42.80 FT

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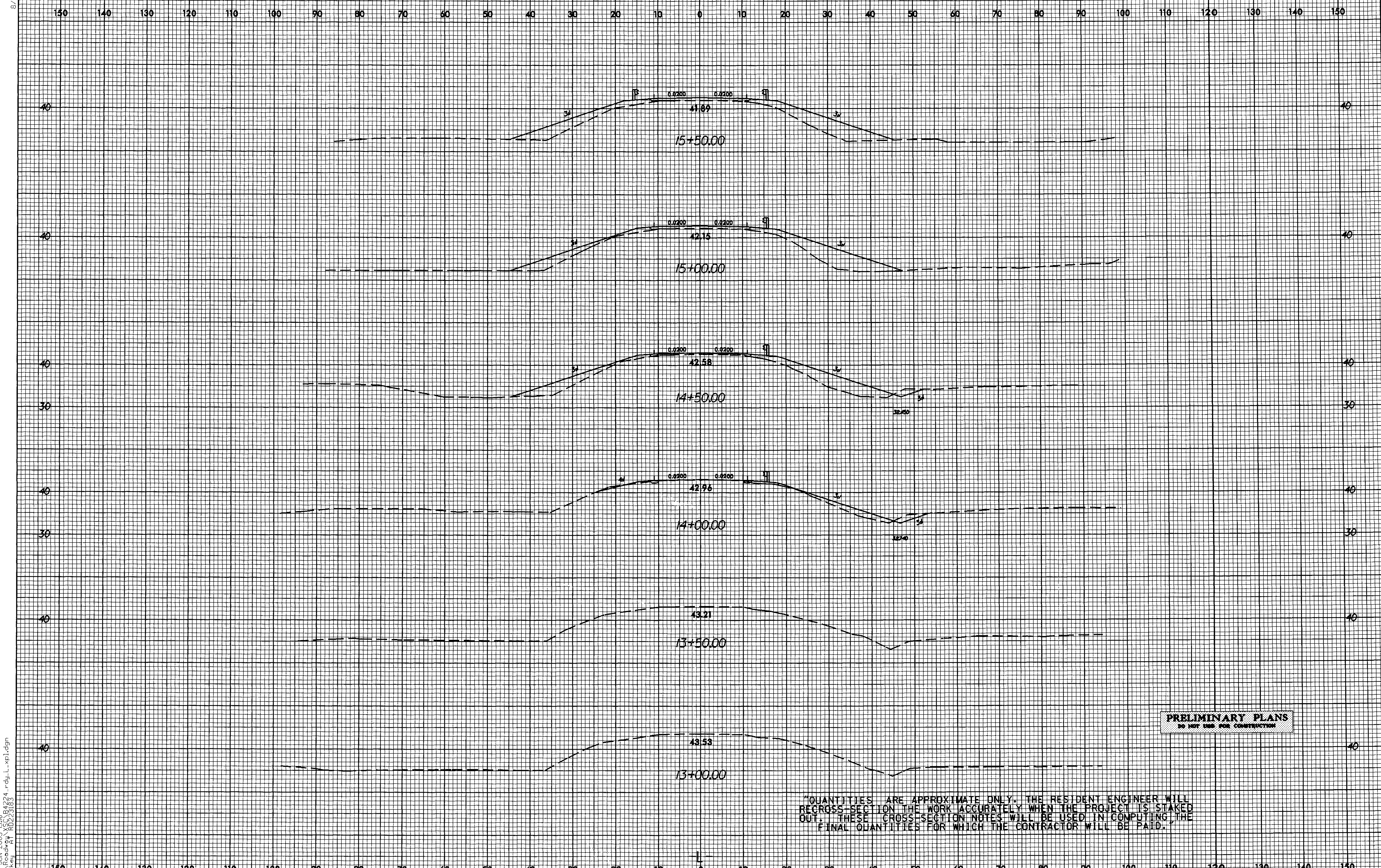
22-JUN-2005 15:16

PROJ. REFERENCE NO.	SHEET NO.
B-4224	X-1



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

"QUANTITIES ARE APPROXIMATE ONLY. THE RESIDENT ENGINEER WILL RECROSS-SECTION THE WORK ACCURATELY WHEN THE PROJECT IS STAKED OUT. THESE CROSS-SECTION NOTES WILL BE USED IN COMPUTING THE FINAL QUANTITIES FOR WHICH THE CONTRACTOR WILL BE PAID."

8/23/99

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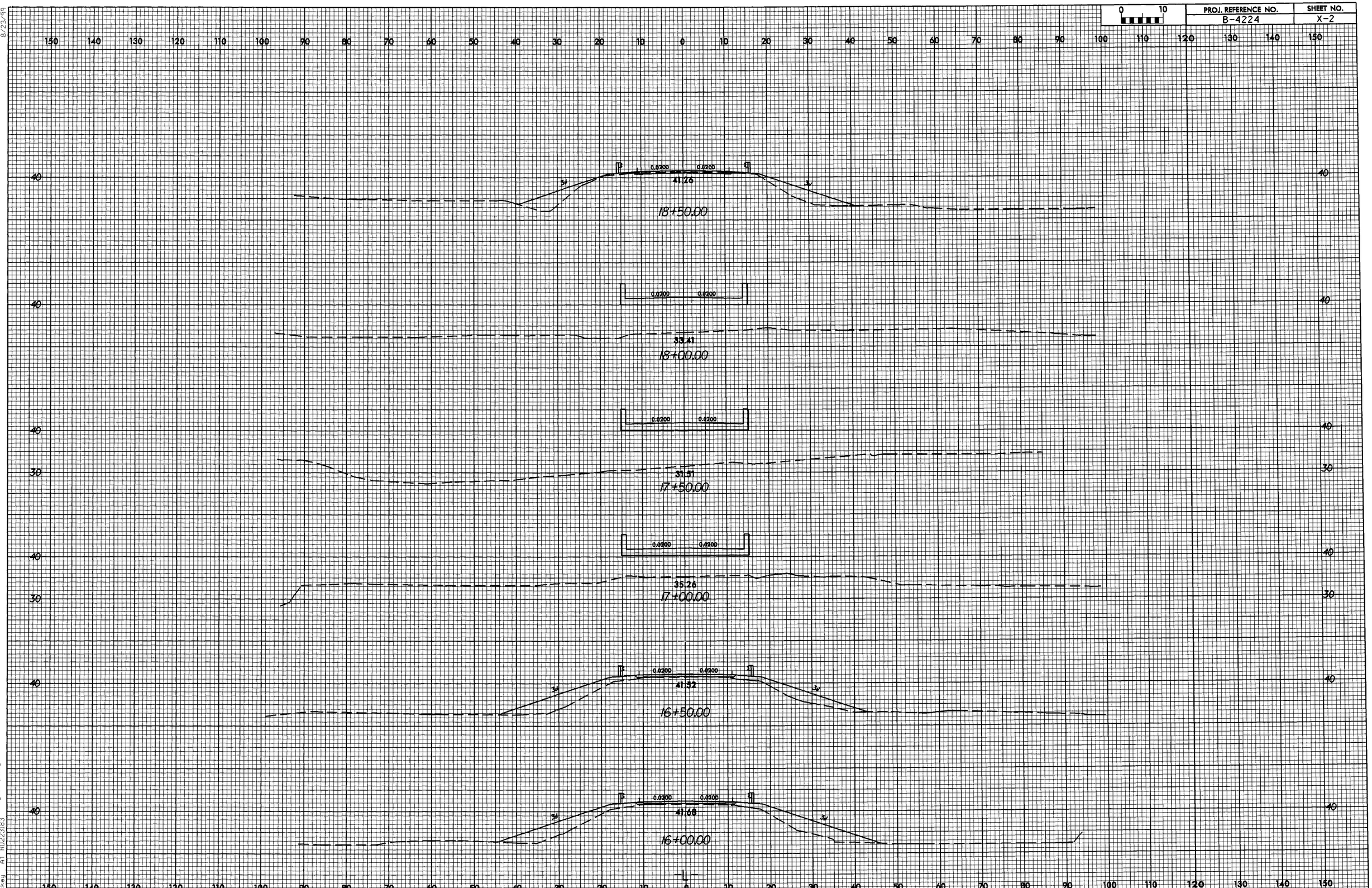
0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4224	X-2



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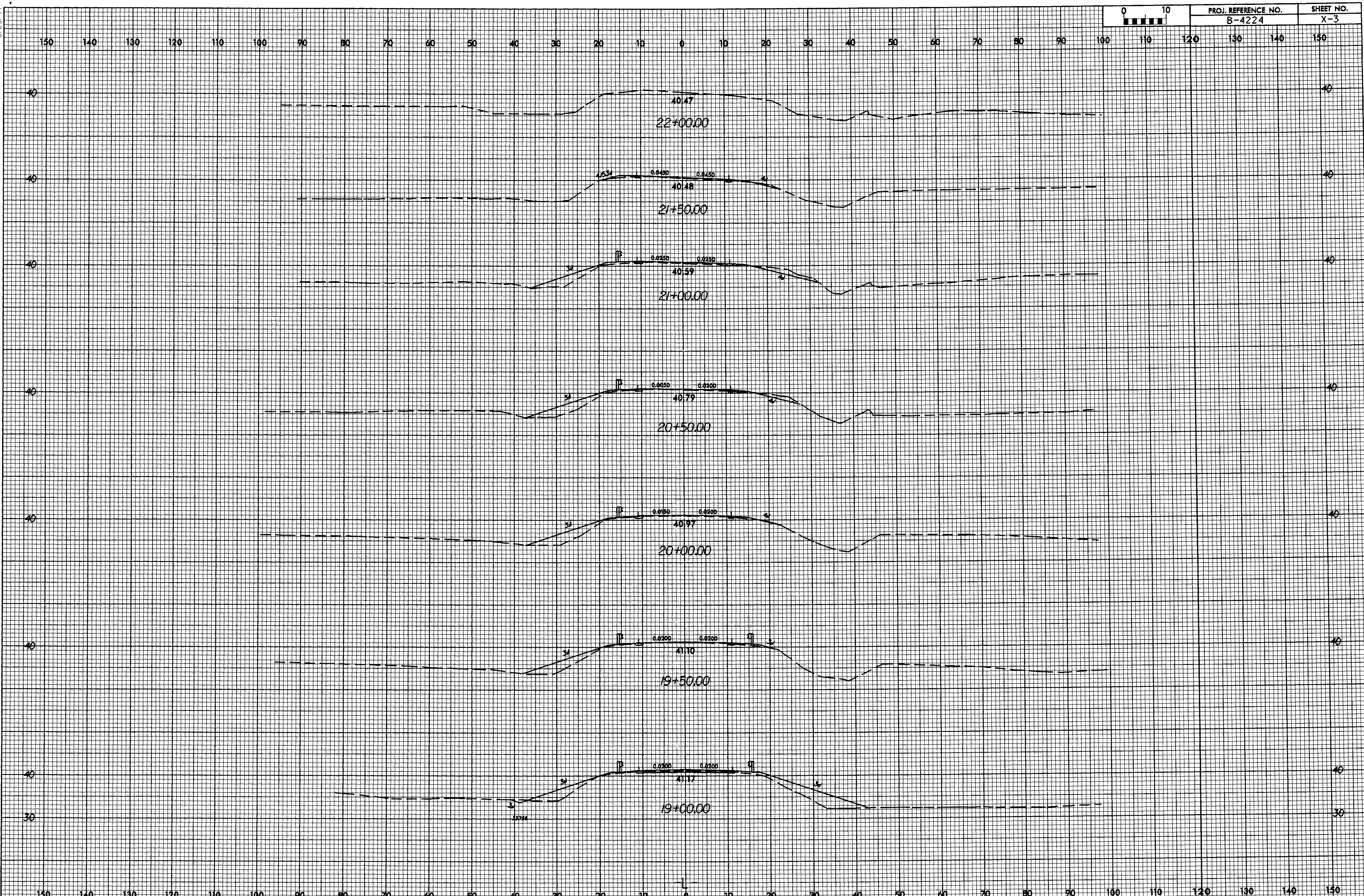
PROJ. REFERENCE NO.	SHEET NO.
B-4224	X-3



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