STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 19, 2004

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

ATTENTION: Mr. David Timpy
NCDOT Coordinator

Dear Sir:

Subject: **Nationwide 23 and 33 Permit Application** for the Replacement of Bridge No. 10 over Bradley Creek on SR 1411, New Hanover County. Federal Aid Project No. BRZ-1141(5), State Project No. 8.2251101, TIP Project No. B-3496.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 10 over Bradley Creek on SR 1411 in New Hanover County. The existing bridge will be replaced with a longer bridge along the existing alignment. The proposed bridge replacement will be a spanning structure, thereby eliminating the piles in the stream channel. The proposed bridge is approximately 200 feet in length and will facilitate the removal of a total of 160 feet of the old causeway, resulting in the removal of fill in 0.19 acres of wetland. During construction, traffic will be detoured along existing area roads. Please find enclosed three copies of the Categorical Exclusion (CE) document, permit drawings, and half size plan sheets.

Bradley Creek (DWQ Index No. 18-87-24-4(1)) Class SC HQW, and associated wetlands will be impacted by the proposed project. Construction of the proposed project will result in 0.04 acre of fill in wetlands, 0.12 acre mechanized clearing in wetlands, 0.025 ac of fill in surface water and 0.008 ac of temporary fill in 48 feet of the stream. Bridge No. 10 will be replaced using top down construction. This project is on the Ecosystem Enhancement Program (EEP) list for mitigation. However due to minimization of impacts during the design phase and the use of onsite mitigation will, no offsite mitigation will be needed.

BRIDGE DEMOLITION

The existing deck and bridge railings are composed of concrete. The substructure is composed of timber bents and caps. The bridge rail, bents, and substructure will be removed without dropping components into Waters of the United States. There is potential for components of the deck and interior bents to be dropped into waters of the United States, resulting in a temporary fill of approximately 13 cubic yards. NCDOT's

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

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

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

Best Management Practices for Bridge Demolition and Removal will be followed. According to these guidelines this project is classified under the "Case 2" category which allows no work at all in the water between February 15 to June 30 to protect anadromous fish spawning.

Temporary Causeways

There will be 0.008 acres of temporary impacts from the construction of a temporary rock causeway in 48 linear feet of Bradley Creek (see permit drawing Sheets 2 and 4 of 5). A temporary rock causeway will be required to provide access to the site by the construction equipment on the southern side of the creek. The causeways will consist of plain Class I rip rap.

Restoration Plan: No permanent fill will result from the causeway. The materials used as temporary fill in the construction of the causeways will be removed. The temporary fill areas will be graded back to the original contours. Elevations and contours in the vicinity of the proposed causeways are available from the field survey notes.

Schedule for Restoration of Temporary Fill Areas: It is assumed that the Contractor will begin construction of the proposed causeway shortly after the date of availability for the project. The Let date is July 20, 2004 with a date of availability of August 31, 2004.

Removal and Disposal: The causeways will be removed within 90 days after it is no longer needed. The temporary rock causeways will be removed by the Contractor using excavating equipment. All materials placed in the stream by the Contractor will be removed. All other materials removed by the Contractor will be disposed of at an off site upland location.

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 February 25, 2003, the United States Fish and Wildlife Service lists ten federally protected species for New Hanover County. Of these species, the American alligator (*Alligator mississippiensis*) is listed threatened due to similarity in appearance and is not subject to Section 7 consultation. There is potential habitat for the manatee and the shortnose sturgeon at this project location, but it is unlikely that either will be encountered. However, NCDOT will commit to adhering to the Fish and Wildlife Service Guidelines for Avoiding Impacts to the West Indian Manatee (see attached Guidelines). A biological conclusion of "May Affect, but Not Likely to Adversely Affect" has been rendered for the West Indian manatee. A copy of the concurrence letter dated February 4, 2004 to the Fish and Wildlife Service is attached. NCDOT also commits to the above mentioned construction moratorium and adherence to best management practices to avoid impacts to the shortnose sturgeon. The Biological Conclusion of No Effect for the shortnose sturgeon remains valid. Biological conclusions of "No Effect" documented in the CE for the remaining species given based on the absence of habitat within the project area remain valid.

Regulatory Approvals

Section 404 Permit: It is anticipated that the construction of the causeways will be authorized under Section 404 Nationwide Permit 33 (Temporary Construction Access and Dewatering). We are, therefore, requesting the issuance of a Nationwide Permit 33 authorizing construction of the causeway. All other aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). Therefore, we do not anticipate requesting an individual permit, but propose to proceed under a Nationwide 23 as authorized by a Nationwide Permit 23 (FR number 10, pages 2020-2095; January 15, 2002).

Section 401 Permit: We anticipate 401 General Certifications numbers 3403 and 3366 will apply to this project. In accordance with 15A NCAC 2H .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 records.

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/planning/pe/naturalunit/Permit.html).

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

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

Sincerely,

Gregory J. Thorpe, Ph.D. Environmental Management Director,
Project Development and Environmental Analysis Branch

w/ attachment Mr. John Hennessy, Division of Water Quality (2 copies)
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Ms. Cathy Brittingham, NCDCM
Mr. Bill Arrington, NCDCM
Mr. Greg Perfetti, P.E., Structure Design
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Allen Pope, Division 3 Engineer
Mr. Mason Herndon, Division Environmental Officer
Ms. Karen Taylor, P.E., PDEA Project Engineer
Mr. David Franklin, USACE, Wilmington (Cover Letter Only)

Office Use Only: Form Version May 2002

USACE Action ID No. _____ **DWQ No.** _____

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☐ 401 Water Quality Certification
   - ☐ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ

2. Nationwide, Regional or General Permit Number(s) Requested: NW 23 & 33

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☒

4. If payment into the North Carolina Wetlands Restoration Program (NCWRP) is proposed for mitigation of impacts (verify availability with NCWRP prior to submittal of PCN), complete section VIII and check here: ☐

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here: ☒

II. Applicant Information

1. Owner/Applicant Information
   Name: NCDOT
   Mailing Address: Project Development and Environmental Analysis
   1548 Mail Service Center
   Raleigh, NC 27966-1548

   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: gthorpe@dot.state.nc.us

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name: _____
   Company Affiliation: _____
   Mailing Address: _____

   Telephone Number: _____ Fax Number: _____
   E-mail Address: _____

III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: Replacement of Bridge 10 over Bradley Creek

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3496

3. Property Identification Number (Tax PIN): _____

4. Location
   County: New Hanover Nearest Town: Wilmington
   Subdivision name (include phase/lot number): _____
   Directions to site (include road numbers, landmarks, etc.): The site is located on SR 1411 over Bradley Creek.

5. Site coordinates, if available (UTM or Lat/Long): 18 237976E 37090387N
   (Note – If project is linear, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)

5. Property size (acres): _____

6. Nearest body of water (stream/river/sound/ocean/lake): Bradley Creek

7. River Basin: Cape Fear River
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

8. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The area surronding the bridge marshland, residential and forestland

9. Describe the overall project in detail, including the type of equipment to be used: Plans for replacing the bridge include replacing the current bridge in the same location with a longer

spanning structure. Equipment used will include regular equipment utilized on bridge replacement projects.

10. Explain the purpose of the proposed work: The purpose is to replace the old bridge that is functionally obsolete.

IV. Prior Project History

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules.

N/A

V. Future Project Plans

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.

N/A

VI. Proposed Impacts to Waters of the United States/Waters of the State

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. The applicant must also provide justification for these impacts in Section VII below. All proposed impacts, permanent and temporary, must be listed herein, and must be clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) must be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: The proposed project will temporary fill .008 acres of Bradley Creek and .025 acres permanent fill. The temporary fill is composed of Class II Riprap and is necessary to facilitate the removal of the interior bent from the existing bridge. The project will also impact 0.16 acres of wetlands

2. Individually list wetland impacts below:

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Located within 100-year Floodplain** (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland***
1	Fill	.04	Yes	Adjacent	Marsh
1	Mechanized Clearing	.12	Yes	Adjacent	Marsh

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

** 100-Year floodplains are identified through the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM), or FEMA-approved local floodplain maps. Maps are available through the FEMA Map Service Center at 1-800-358-9616, or online at http://www.fema.gov.

*** List a wetland type that best describes wetland to be impacted (e.g., freshwater/saltwater marsh, forested wetland, beaver pond, Carolina Bay, bog, etc.) Indicate if wetland is isolated (determination of isolation to be made by USACE only).

List the total acreage (estimated) of all existing wetlands on the property: > 1 acre
Total area of wetland impact proposed: 0.16

3. Individually list all intermittent and perennial stream impacts below:

Stream Impact Site Number (indicate on map)	Type of Impact*	Length of Impact (linear feet)	Stream Name**	Average Width of Stream Before Impact	Perennial or Intermittent? (please specify)
1	Fill in surface waters	48ft	Bradley Creek	25 ft	Perennial

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: culverts and associated rip-rap, dams (separately list impacts due to both structure and flooding), relocation (include linear feet before and after, and net loss/gain), stabilization activities (cement wall, rip-rap, crib wall, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included.

** Stream names can be found on USGS topographic maps. If a stream has no name, list as UT (unnamed tributary) to the nearest downstream named stream into which it flows. USGS maps are available through the USGS at 1-800-358-9616, or online at www.usgs.gov. Several internet sites also allow direct download and printing of USGS maps (e.g., www.topozone.com, www.mapquest.com, etc.).

Cumulative impacts (linear distance in feet) to all streams on site: 60 ft (temporary)

4. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.) below:

Open Water Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Name of Waterbody (if applicable)	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: fill, excavation, dredging, flooding, drainage, bulkheads, etc.

5. Pond Creation

If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.

Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands

Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____

_____

Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):_____

_____

Size of watershed draining to pond:_____ Expected pond surface area:_____

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.

The No-Build or "do nothing" alternative was considered but would eventually necessitate closure of the bridge. 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. Minimization was incorporated into the design by the use of a longer bridge

VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on March 9, 2000, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted

aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCWRP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at http://h2o.enr.state.nc.us/ncwetlands/strmgide.html.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   Onsite mitigation will be used. The replacement bridge will be longer then the current bridge. The longer bridge will allow the removal of the causeway in 0.19 acres of wetland.

2. Mitigation may also be made by payment into the North Carolina Wetlands Restoration Program (NCWRP). Please note it is the applicant's responsibility to contact the NCWRP at (919) 733-5208 to determine availability and to request written approval of mitigation prior to submittal of a PCN. For additional information regarding the application process for the NCWRP, check the NCWRP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCWRP is proposed, please check the appropriate box on page three and provide the following information:

   Amount of stream mitigation requested (linear feet):_____
   Amount of buffer mitigation requested (square feet):_____
   Amount of Riparian wetland mitigation requested (acres):_____
   Amount of Non-riparian wetland mitigation requested (acres):_____
   Amount of Coastal wetland mitigation requested (acres):_____

IX. Environmental Documentation (required by DWQ)

Does the project involve an expenditure of public (federal/state) funds or the use of public (federal/state) land?

Yes ☒ No ☐

If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation.

Yes ☒ No ☐

If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter.

Yes ☒ No ☐

X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)?

Yes ☐ No ☒ If you answered "yes", provide the following information:

Identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1		3	
2		1.5	
Total			

* Zone 1 extends out 30 feet perpendicular from near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Conservation Easement, Riparian Buffer Restoration / Enhancement, Preservation or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0260.

XI. Stormwater (required by DWQ)

Describe impervious acreage (both existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property.

XII. Sewage Disposal (required by DWQ)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.

XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application?
Yes ☐ No ☒

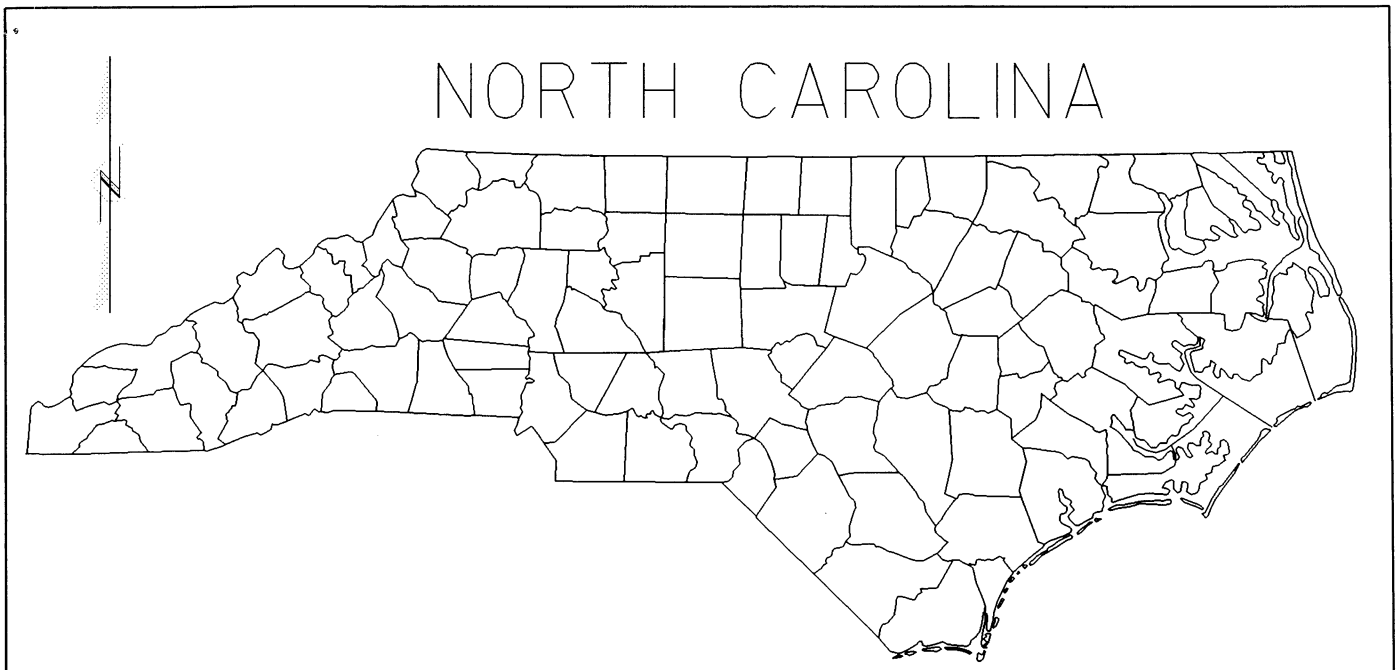
XIV. Other Circumstances (Optional):

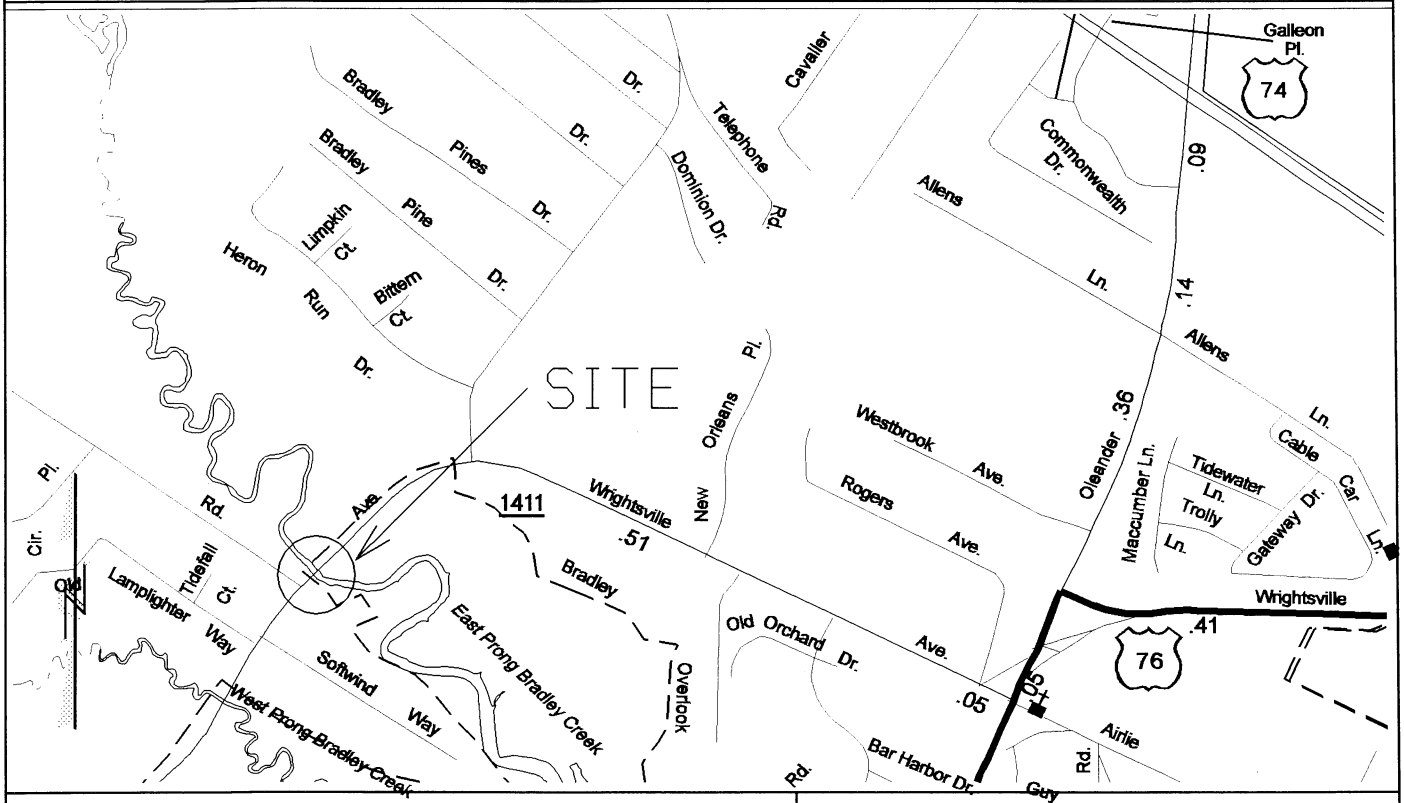
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).

Rupert Smith 3/15/04

Applicant/Agent's Signature **Date**

(Agent's signature is valid only if an authorization letter from the applicant is provided.)





VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 8.2251101 (B-3496)

BRIDGE NO. 10 OVER BRADLEY CREEK ON SR 1411 IN WILMINGTON

SHEET 1 OF 5 **07 / 01 / 03**

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS				SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Removal Of Fill In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	16+00 to 22+00-L-	200' Cored Slab Bridge	0.04		0.19	0.12	0.025		0.008	48	
TOTALS:			0.04	0	0.19	0.12	0.025	0	0.008	48	0

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY
PROJECT 8.2551101 (B-3496)

SHEET 2 OF 5 7/1/03

Form Revised 3/22/01

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
3	Carol Ann Russell	110 Hooker Rd. Wilmington, NC 28403
4	James A and Holly A Hug	1601 Southwind Way Wilmington, NC 28403

NCDOT

DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 8.2251101 (B-3496)

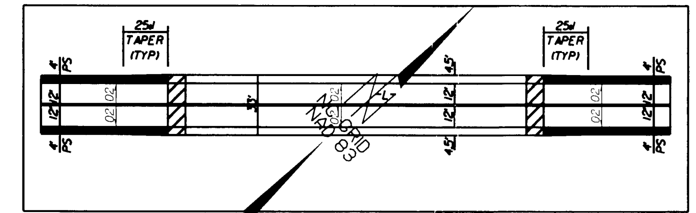
BRIDGE NO. 10 OVER BRADLEY CREEK ON SR 1411 IN WILMINGTON

PROJECT REFERENCE NO.	SHEET NO.
B-3496	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

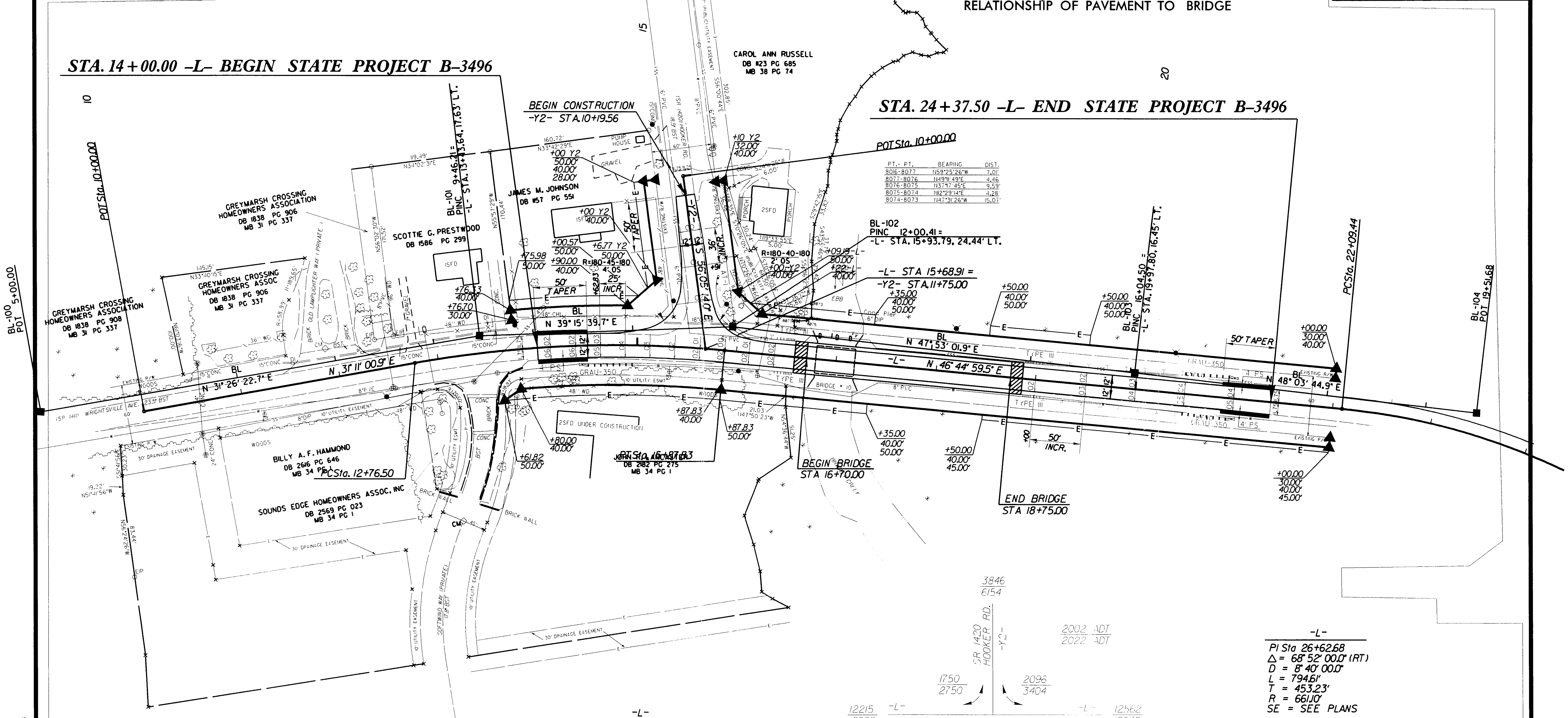
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



RELATIONSHIP OF PAVEMENT TO BRIDGE



PT.- PT.	BEARING	DIST.
8016-8077	N59°25'26"W	7.01'
8077-8076	N49°11'49"E	4.46
8076-8075	N37°17'45"E	9.59'
8075-8074	N12°29'14"E	4.28'
8074-8073	N47°31'26"W	15.07'

-L-
PI Sta 14+33.13
Δ = 15° 33' 58.6" (RT)
D = 5° 00' 00.0"
L = 311.33'
T = 156.63'
R = 1145.92'
SE = SEE PLANS

-L-
PI Sta 26+62.68
Δ = 68° 52' 00.0" (RT)
D = 8° 40' 00.0"
L = 794.61'
T = 453.23'
R = 661.10'
SE = SEE PLANS

PAVED SHOULDER

APPROACH SLAB

FOR -L- & -Y2- PROFILE SEE SHEET 5

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3496-2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 173841.808(ft) EASTING: 2348781.146(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000038649
THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3496-2" TO -L- STATION 14+00.00 IS S 42 07 24.17 E DISTANCE 640.1181 FT.
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

7/2/99

REVISIONS
R/W REVISION 8-20-03
1) Parcel 2, Revised Offset at -Y2- STA 10+35 Rt.
2) Parcel 3, Added Northern Property Line
3) Parcel 4, Revised Property Owner Name
4) Removed Parcel 1 And Parcel 5

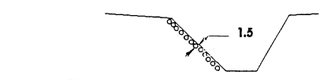
PROJECT REFERENCE NO.	SHEET NO.
B-3496	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

7/2/99

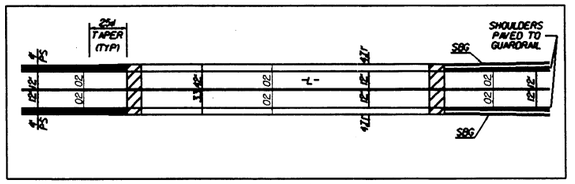
-L-
PI Sta 14+33.13
Δ = 15° 33' 58.6" (RT)
D = 5° 00' 00.0"
L = 311.33'
T = 156.63'
R = 1145.92'
SE = SEE PLANS

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)



Est. 20 Tons

Type of Liner = CL. I RIP RAP



RELATIONSHIP OF PAVEMENT TO BRIDGE

-L-
PI Sta 26+62.68
Δ = 68° 52' 00.0" (RT)
D = 8° 40' 00.0"
L = 794.61'
T = 453.23'
R = 661.10'
SE = SEE PLANS

STA. 14+00.00 -L-
BEGIN STATE PROJECT B-3496

STA. 22+00.00 -L- END STATE PROJECT B-3496

NC GRID NAD 83

NAD 83

POT Sta. 10+00.00

BEGIN CONSTRUCTION -Y2- STA. 10+19.56

POT Sta. 10+00.00

BL-100 POT 5+00.00

DB 1838 PG 906 MB 31 PG 337

DB 1838 PG 908 MB 31 PG 337

DB 1586 PG 299

DB 1823 PG 685 MB 38 PG 74

CAROL ANN RUSSELL

JAMES M. JOHNSON DB 1157 PG 551

BL-101 PINC 9+46.21= -L- Sta 13+43.64, 17.63' Rt.

BL-102 PINC 12+00.41= -L- Sta 15+93.79, 24.44' Rt.

-L- STA 15+68.91 = -Y2- STA. 11+75.00

BL-103 PINC 16+04.50= -L- Sta 19+97.80, 16.45' Rt.

PCSta. 22+09.44

BL-104 POT 19+51.68 -L- Sta 23+41.40, 22.06' Rt.

PCSta. 12+76.50

PTSta. 15+87.83

BEGIN BRIDGE STA 16+65.94

END BRIDGE STA 18+68.06

DB 2616 PG 646 MB 34 PG 1

DB 2569 PG 023 MB 34 PG 1

JAMES A. HUG DB 3258 PG 172 MB 34 PG 1

DB 1304 PG 4 NEW HANOVER CO.

DANIEL K. ALDEN DB 1449 PG 727

BM #2 ELEVATION = 6.27'
BL- STATION 20+74.05 49.9' RIGHT
R/R SPIKE SET IN 13" GUM

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

R R DENOTES REMOVAL OF FILL IN WETLAND

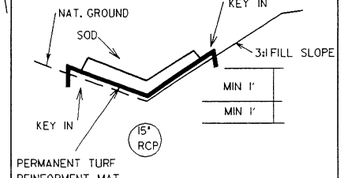
TS TS DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DATUM DESCRIPTION

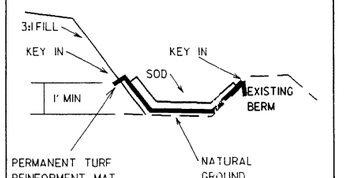
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3496-2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 173841.808111 EASTING: 2348781.146111 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000038649 THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3496-2" TO -L- STATION 14+00.00 IS S 42° 07' 24.26" E DISTANCE 640.185 FT. ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

DETAIL A



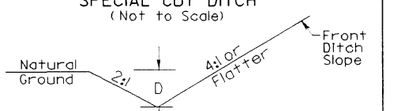
STATION 16+50 TO 16+70 -L- Lt

DETAIL E



STATION 16+00 TO 16+50 -L- Rt

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

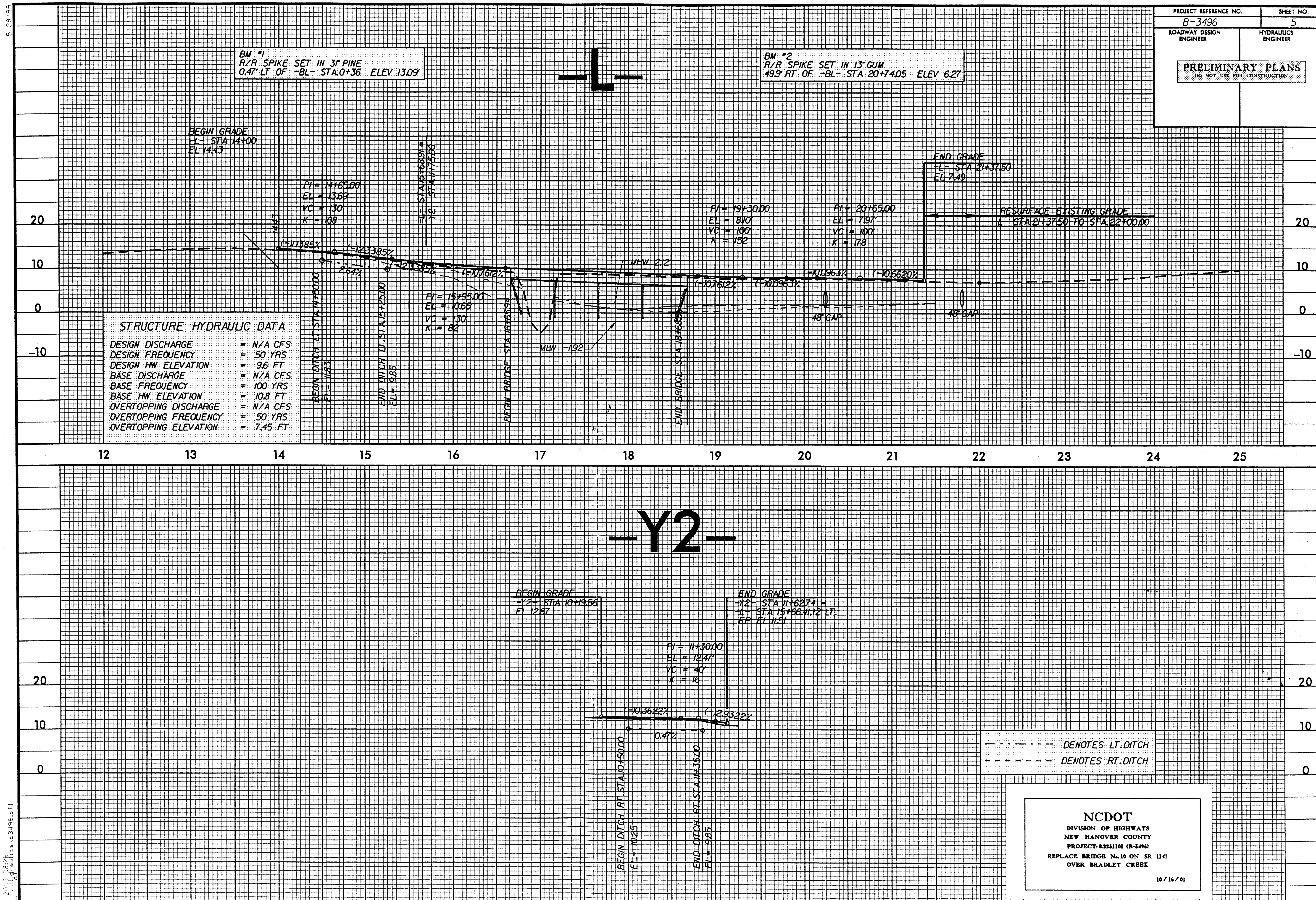


STA 14+50 TO 15+25 -L- Lt
STA 10+50 TO 11+35 -Y2- Rt

NCDOT
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 8.2561101 (B-3496)
REPLACE BRIDGE No. 10 ON SR 1141
OVER BRADLEY CREEK
10/16/01

FOR -L- & -Y2- PROFILE SEE SHEET 5

10-SEP-2003 08:27
R:\Structures\B3496.dgn
belam


PROJECT REFERENCE NO.
B-3496
SHEET NO.
5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-L-
BM #1
R/R SPIKE SET IN 3' PINE
0.47' LT OF -BL- STA.0+36 ELEV 13.09'
BM #2
R/R SPIKE SET IN 13" GUM
49.9' RT OF -BL- STA 20+74.05 ELEV 6.27
BEGIN GRADE
-L- STA 14+00
EL 14.43
PI = 14+65.00
EL = 13.69
VC = 130'
K = 108
-L- STA.15+66.91 =
-Y2- STA.11+75.00
PI = 15+95.00
EL = 10.65
VC = 130'
K = 82
PI = 19+30.00
EL = 8.10'
VC = 100'
K = 152
PI = 20+65.00
EL = 7.97'
VC = 100'
K = 178
END GRADE
-L- STA 21+37.50
EL 7.49
RESURFACE EXISTING GRADE
-L- STA 21+37.50 TO STA 22+00.00
(+1.1385%)
(-1.23385%)
2.64%
(-0.7612%)
(-0.0963%)
(-0.6620%)
MHW 2.12
MLW -1.92
48" CAP
48" CAP
BEGIN DITCH LT.STA.14+50.00
EL= 11.83
END DITCH LT.STA.15+25.00
EL= 9.85
BEGIN BRIDGE STA 16+65.94
END BRIDGE STA 18+65.94
STRUCTURE HYDRAULIC DATA
DESIGN DISCHARGE = N/A CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 9.6 FT
BASE DISCHARGE = N/A CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 10.8 FT
OVERTOPPING DISCHARGE = N/A CFS
OVERTOPPING FREQUENCY = 50 YRS
OVERTOPPING ELEVATION = 7.45 FT
12 13 14 15 16 17 18 19 20 21 22 23 24 25
-Y2-
BEGIN GRADE
-Y2- STA 10+19.56
EL 12.87
END GRADE
-Y2- STA 11+62.74 =
-L- STA 15+66.91,12' LT.
EP EL 11.51
PI = 11+30.00
EL = 12.47'
VC = 40'
K = 16
(-0.3622%)
(-2.9322%)
0.47%
BEGIN DITCH RT.STA.10+50.00
EL= 10.25
END DITCH RT.STA.11+35.00
EL= 9.85
DENOTES LT.DITCH
DENOTES RT.DITCH
NCDOT
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 8.2251101 (B-3496)
REPLACE BRIDGE No.10 ON SR 1141
OVER BRADLEY CREEK
10/16/01

New Hanover County
Bridge No. 10 Over Bradley Creek
on SR 1411 (Wrightsville Avenue)
in Wilmington
Federal Aid Project No. BRSTP-1411(5)
State Project No. 8.2251101
TIP Project No. B-3496

CATEGORICAL EXCLUSION

U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

N. C. DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

7-1-02
Date

Project Development and Environmental Analysis Branch,
NCDOT

7-1-02
Date

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

New Hanover County
Bridge No. 10 Over Bradley Creek
on SR 1411 (Wrightsville Avenue)
in Wilmington
Federal Aid Project No. BRSTP-1411(5)
State Project No. 8.2251101
TIP Project No. B-3496

CATEGORICAL EXCLUSION

July 2002

Documentation Prepared in the
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Project Development Engineer

S. Eric Midkiff, P. E.
Project Development Unit Head

Lubin V. Prevatt, P. E.
Assistant Manager

PROJECT COMMITMENTS

New Hanover County
Bridge No. 10 Over Bradley Creek
on SR 1411 (Wrightsville Avenue)
in Wilmington
Federal Aid Project No. BRSTP-1411(5)
State Project No. 8.2251101
TIP Project No. B-3496

Division 3 Construction

An in-water construction moratorium is required from February 15 to June 30. Bradley Creek is located within a Primary Fish Nursery Area and may potentially provide habitat for anadromous fish spawning. The North Carolina Wildlife Resources Commission and the North Carolina Division of Marine Fisheries require the moratorium.

Division 3 Construction/Structure Design Unit

The existing bridge over Bradley Creek (Bridge No. 10) and the adjacent concrete utility structure will be removed in accordance with NCDOT's Best Management Practices for Bridge Demolition and Removal (Case 2 action). No temporary fill will be placed in Bradley Creek as a result of removing the existing bridge and utility structure. Based on preliminary information, top down construction will be used to construct the new bridge.

Division 3 Construction

Suitable habitat for the West Indian manatee is present in the project area. NCDOT will implement the US Fish and Wildlife Service (USFWS) "Precautions for General Construction in Areas Which May Be Used by West Indian Manatee" (see Appendix B). If these precautions are considered in all aspects of project construction, this project will not affect the West Indian manatee.

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Bridge No. 10 Over Bradley Creek
on SR 1411 (Wrightsville Avenue)
in Wilmington
Federal Aid Project No. BRSTP-1411(5)
State Project No. 8.2251101
TIP Project No. B-3496

The replacement of Bridge No. 10 is included in the Draft 2004-2010 Transportation Improvement Program (TIP) as a bridge replacement project due to the deteriorated structural integrity. The project is part of the Federal Highway Bridge Replacement and Rehabilitation Program (HBRRP) and has been classified as a "Categorical Exclusion". The project's location is shown in Figure 1. No substantial environmental impacts are anticipated. Right of way acquisition is scheduled to begin in Federal Fiscal Year (FFY) 2003 and construction is scheduled to begin in FFY 2004.

I. SUMMARY OF RECOMMENDATIONS

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 10 on existing location as shown in Figure 2. The existing structure carries Wrightsville Avenue (SR 1411) over Bradley Creek in a north-south direction. Bradley Creek is flowing from west to east in the vicinity of the project. The existing bridge and a portion of the existing causeway will be removed and a new bridge 200 feet (61 meters) in length will be constructed. The clear roadway width of the new bridge is 33 feet (10 meters).

Approximately 160 feet (48.8 meters) of the existing causeway will be removed. The grade of the new structure will be approximately the same as the grade of the existing bridge. Approximately 270 feet (82.3 meters) of new approach work is needed to the south and 260 feet (79.3 meters) of new approach word is needed to the north of the new bridge. The approach roadway will have a pavement width of 24 feet (7.2 meters) with 8-foot (2.4-meter) shoulders, of which 4-feet (1.2 meters) will be paved. The proposed right of way width is approximately 80 feet (24.4 meters) wide with additional construction easements. Traffic will be detoured on existing secondary roads during construction to allow for on-site replacement with road closure (see Figure 3).

II. COST ESTIMATE

The current estimated costs for the replacement of Bridge No. 10 are as follows:

Construction Cost	$ 1,150,000
Rigth of Way Cost	$ 110,500
Total Cost	$ 1,260,500

The estimated total cost of the project, as shown in the Draft 2004-2010 Transportation Improvement Program (TIP), is $ 1,013,000, which includes $ 28,000 for right of way acquisition, $850,000 for construction, and $ 135,000 for prior years cost.

III. ANTICIPATED DESIGN EXCEPTIONS

NCDOT does not anticipate any design exceptions.

IV. DESCRIPTION OF EXISTING CONDITIONS

A. Structure

Bridge No. 10 is located 0.8 miles (1.3 km) west of the US 76 junction and carries Wrightsville Avenue (SR 1411) over Bradley Creek. The bridge consists of a two-span reinforced concrete rail and deck on timber beams supported by timber caps and timber piles with timber bulkhead-type abutments. The existing structure is 39 feet (11.9 meters) long and is 29.3 feet (8.9 meters) wide. The bridge has a 28-foot (8.4-meter) clear roadway width with two 11-foot (3.4-meter) travel lanes. The vertical clearance between the floorbeams of the bridge deck and the streambed is approximately 13 feet (4 meters).

The bridge was originally constructed in 1961. According to Bridge Maintenance Unit records, the sufficiency rating of the existing bridge is 28.1 out of a possible 100. The existing bridge is found to be functionally obsolete. The posted weight restrictions for the bridge are 28 tons for single vehicles and 34 tons for truck-tractor semi-trailers.

B. Roadway

Wrightsville Avenue (SR 1411) is currently a two-lane facility in the vicinity of Bridge No. 10 consisting of a 24-foot (7.2-meter) wide travelway with 6-foot (1.8-meter) wide grass shoulders.

The vertical alignment is flat in the project area. Horizontally, Bridge No. 10 is located on a tangent section; however, there is a notable curve on SR 1411 north of the existing bridge.

The posted speed limit on Wrightsville Avenue in the project area is 45 mph.

C. Functional Classification

According to the North Carolina Functional Classification System, Wrightsville Avenue (SR 1411) functions as an urban collector within the study limits of the project. Wrightsville Avenue is designated as a major thoroughfare in the Wilmington Urban Area Thoroughfare Plan.

D. Intersections

Hooker Road (SR 1420) intersects Wrightsville Avenue (SR 1411) approximately 125 feet (38.1 meters) south of Bridge No. 10. Rogersville Road (SR 1419) intersects Wrightsville Avenue approximately 950 feet (289.6 meters) north of the existing bridge. Both intersections are stop-sign controlled.

E. Right of Way and Access Control

The existing right of way on Wrightsville Avenue (SR 1411) in the vicinity of the project is 60 feet (18.3 meters). No control of access currently exists in the project area.

F. Bicycle and Pedestrian Accommodations

No exclusive bicycle lanes, other bicycle facilities, or sidewalks currently exist along Wrightsville Avenue (SR 1411) in the vicinity of the project. Bridge No. 10 currently has 2 feet (0.6 meters) of lateral clearance on each side of the bridge for passage of pedestrians and bicyclists.

G. Utilities

A forced sewer line is located above ground on a separate concrete structure west of the existing bridge and continues underground parallel to and west of the causeway. An underground waterline runs parallel and east of the existing bridge and causeway and crosses underneath Wrightsville Avenue perpendicularly just south of the bridge.

An overhead shared utility line (telephone, power, and cable) parallels the existing bridge and causeway to the west and crosses to the east just south of the bridge. An underground telephone line parallels the bridge and causeway to the west.

H. School Bus Data

Sixteen (16) school buses travel on Wrightville Avenue (SR 1411) for a total of 29 trips a day, year round, in the vicinity of the project. These school buses serve J.C. Roe Pre-kindergarten School; Bradley Creek, College Park, Gregory, and Wrightsville Beach Elementary Schools; Roland-Grise, Virgo, and Williston Middle Schools; and Lakeside and New Hanover High Schools.

I. Traffic Volumes

The current traffic volume (base year 2000) on Wrightsville Avenue (SR 1411) between Hooker Road (SR 1420) and Rogersville Road (SR 1419) is 11,800 vehicles per day (vpd). The projected traffic volume on Wrightsville Avenue in the year 2025 is 20,700 vpd in the project area (see Figure 4).

J. Accident Record

There have been nineteen (19) accidents reported in the vicinity of Bridge No. 10 during the period between November, 1997, and October, 2000. No fatal accidents occurred during the studied years.

V. ALTERNATIVES

A. Build Alternatives

Three "build" alternatives were studied for the proposed project. Alternative 1 proposed the replacement of Bridge No. 10 with a bridge of adequate length to satisfy hydraulic needs of the surrounding area. Alternative 2 proposed the removal of Bridge No. 10 and a section of the existing causeway (approximately 480 feet [146.3 meters] west of the existing bridge) and constructing a bridge approximately 550 feet (167.4 meters) in length. Alternative 3 proposed the removal of Bridge No. 10 and a section of the causeway that would equal the area of wetlands to be impacted by the proposed project. The three alternatives are summarized below:

Alternative 1

Alternative 1 considered replacement of the existing bridge with a new structure approximately 100 feet long. Three different side slope scenarios; 2:1, 3:1, and 4:1 were considered for the roadway approaches to the bridge. Two-to-one (2:1) side slopes will need rip-rap for slope protection. Cross pipes will be installed under the causeway to improve sheet flow.

Alternative 2:

Alternative 2 considered removal of a large section of the existing causeway and constructing a bridge approximately 550 feet in length. Three different side slope scenarios; 2:1, 3:1, and 4:1 were considered for the roadway approaches to the bridge.

Alternative 3 (Recommended):

Alternative 3 considered removal of a section of the existing causeway that will result in restoring an area equal to the area of wetlands to be impacted by the proposed project. Three side slope scenarios; 2:1, 3:1, and 4:1 were considered for the roadway approaches to the bridge. The length of the new bridge would range from 138 feet to 234 feet (42.1 meters to 71.3 meters) depending on the side slopes. Alternative 3 with 3:1 side slopes is the recommended alternative. The length of the recommended structure was increased to 200 feet (61 meters) after preliminary planning studies were completed.

Table 1 summarizes impacts associated with all three bridge replacement alternatives.

Table 1: Summary of Bridge Replacement Alternatives

	Alternative 1	Alternative 2	Alternative 3 (Recommended)
Length	100 ft	550 ft	2:1 slopes = 138 feet 3:1 slopes = 188 feet* 4:1 slopes = 234 feet
Width	40 ft	32 ft	32 feet
Total Construction Cost	$850,000	$2,625,000	138-ft bridge = $1,100,000 188-ft bridge = $1,195,000 234-ft bridge = $1,375,000
Approximate Wetland Impacts	2:1 slopes = 0.109 ac 3:1 slopes = 0.191 ac 4:1 slopes = 0.264 ac	0.2 ac	138-ft bridge = 0.109 ac 188-ft bridge = 0.191 ac 234-ft bridge = 0.264 ac
Approximate Area of Causeway to be Removed	0.048 ac	0.771 ac	138-ft bridge = 0.109 ac 188-ft bridge = 0.191 ac 234-ft bridge = 0.264 ac

Note: The length of the recommended structure has been increased to 200 feet (61 meters) with 3:1 side slopes after preliminary planning studies were completed.

B. Alternatives Dropped from Further Study

1. Do Nothing Alternative

The "Do Nothing" alternative is not practical, since it will require the eventual closing of the road as the existing bridge completely deteriorates. Rehabilitation of the existing bridge is neither practical nor economical.

2. On-site Detour

An on-site detour was dropped from consideration because of the pristine salt marsh located on both sides of the existing bridge and the impacts associated with constructing a temporary bridge.

VI. RECOMMENDED IMPROVEMENTS

A. Structure/Roadway

Alternative 3 is the recommended alternative. Bridge No. 10 will be replaced with a new 200-foot (61-meter) long cored slab bridge on existing location (see Figure 2). A section of the causeway, approximately 160 feet (48.8 meters) in length, will be removed as part of the proposed improvements. The cross section of the new bridge will include two 12-foot (3.6-meter) wide travel lanes with 4.5-foot (1.4-meter) wide offsets

(shoulders) for pedestrian and bicycle passage. Based on preliminary information, top down construction will be used to construct the new bridge.

Approximately 270 feet (82.3 meters) of new approach work is needed to the south and 260 feet (79.3 meters) of new approach word is needed to the north of the new bridge. The new approaches include two 12-foot (3.6-meter) travel lanes and 8-foot (2.4-meter) wide shoulders, of which 4-feet (1.2-meters) will be paved.

Three-to-one (3:1) side slopes will be constructed at the roadway approaches to the new bridge. In this area, side slopes steeper than 3:1 present maintenance and slope stability problems. In dry conditions where it never rains, a 2:1 side slope would always be on the verge of failure and will fail by mass erosion when it rains. The safety factor against slope failure increases to a more acceptable level with the use of 3:1 side slopes. A 3:1 slope will also fail in some rain events; however, it will fail less frequently than a 2:1 slope. Vegetation takes longer to establish on poor sand material found in the coastal areas. Vegetation tends to grow better on 3:1 side slopes and erosion is less likely to occur. Refer to Section VII.A on Pages 30 and 31 and Appendix A, Page A-4 and A-5 for coordination with resource and permitting agencies regarding the side slopes.

B. Drainage

Based on preliminary information, stormwater on the new structure may need to be drained through openings on the deck. Due to the length of the proposed bridge, deck drains may be required to drain excess water off the bridge. If deck drains are required, they will not be placed over open water. Based on NCDOT's guidelines for the location and design of hazardous spill basins, no hazardous spill basins will be required for this project.

C. Right of Way and Access Control

The proposed right of way width is approximately 80 feet (24.4 meters) wide with additional construction easements. No control of access is proposed for this project.

D. Bicycle Accommodations and Sidewalks

The new bridge will have a 4.5-foot (1.4-meter) lateral clearance on both sides of the bridge for pedestrian and bicycle passage. The approaches to the bridge will have 4-foot (1.2-meter) paved shoulders to accommodate pedestrians and bicycles.

E. Utility Conflicts

A forced sewer line is currently located above ground on a separate structure west of the existing bridge. The sewer line will need to be relocated. A waterline is currently located underneath the creek east of the existing bridge and will need to be moved. It is anticipated that directional boring will be used to relocate the existing forced sewer line and waterline underneath the creek.

An overhead shared utility line (telephone, power, and cable) that currently parallels the existing bridge and causeway to the west and crosses to the east just south of the bridge will need to be relocated. An underground telephone line paralleling the bridge and causeway to the west will also need to be relocated. The method of relocating the overhead shared utility line and underground telephone line is not known at this time.

F. Maintenance of Traffic

Traffic will be detoured on existing area roads during the construction period (see Figure 3). The detour route will follow SR 1421 (Greenville Avenue) and US 76 (Oleander Drive) for alternative routes and will increase travel by 2.47 miles (4.0 km).

VII. ENVIRONMENTAL IMPACTS

A. General

The project is expected to have an overall positive impact. Replacement of an inadequate bridge will result in safer traffic operations. The project is considered to be a federal "categorical exclusion" due to its limited scope and insignificant environmental consequences. This bridge replacement will not have a substantial effect on the quality of the human or natural environment by implementing the environmental commitments of this document in addition to use of current NCDOT standards and specifications.

The project is not in conflict with any plans, existing land use, or zoning regulation. No change in land use is expected to result from construction of this project. No adverse effect on families or communities is anticipated. Right of way acquisition will be limited. No adverse effect on public facilities or services is expected. The project is not expected to adversely affect social, economic, or religious opportunities in the area.

There are no publicly owned parks, recreational facilities, or wildlife and waterfowl refuges on national, state, or local significance in the vicinity of the project. This project will not impact any resource protected by Section 4(f) of the DOT Act.

The proposed bridge replacement project will not raise the existing flood levels or have any significant adverse effect on the existing floodplain.

B. Air and Noise

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

Noise transmission loss provided by the proposed structure should be sufficient to moderate any intrusive traffic noise. Since the existing two-lane bridge will be replaced

with a two-lane bridge, the proposed project will not increase traffic volumes; therefore, the project's impact on noise and air quality will not be significant. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520.

This evaluation completes the assessment requirements for highway traffic noise of Title 23 of the Code of Federal Regulations, Part 772, and for air quality of the 1990 Clean Air Act Amendments and the NEPA process.

C. Community Impacts

This project does not propose relocations or negatively effect property access or access to public facilities and services; therefore, no negative community impacts are anticipated to result from this project.

D. Farmland Effects

This bridge replacement project will not result in the loss of any federally or state designated prime, unique or important farmland soils, nor will this project disrupt an active farming operation.

E. Historical Effects and Archaeological Effects

The proposed project will not affect any potential historic architectural or archaeological resources within the proposed project area. The State Historic Preservation Office (SHPO) reviewed the subject project and recommended that no further historic architectural or archaeological surveys would be required (see letter in Appendix A, Page A-2 and A-3).

F. Natural Resources

1. Physical Resources

Topography, soil and water resources, which occur in the study area, are discussed below. In addition, a general description of the project vicinity and project region is also described.

a. Topography

The proposed project is located in eastern New Hanover County near the Intercoastal Waterway. The project is located in the Coastal Plain Physiographic Province of North Carolina. Topography in the vicinity of the study area is characterized as nearly level to gently sloping along streams. Project elevations range from 5 to 10 feet (1.5 to 3 meters) above mean sea level.

b. Soils

Soils located in the project area are of the Kenansville-Craven-Lakeland and Tidal Marsh-Newhan associations. The Kenansville-Craven-Lakeland association consists of nearly level to gently sloping soils on uplands. Soils of the Tidal Marsh-Newhan association consist of nearly level soils in flat or slightly depressional areas on rims of depressions and on broad smooth flats. Tidal marsh is the dominant soil in the study area. Information concerning specific soil types occurring in the study area is provided below.

Craven fine sandy loam is nearly level, moderately well drained soil found on broad, smooth flats on uplands. Areas are generally irregular in shape and highly variable in size. This soil has a low organic content, low permeability, low shrink-swell potential, and medium available water capacity. The seasonal high water table is from 2 to 3 feet (0.6 to 0.9 meters) below the surface.

Tidal marsh is on the nearly level flats between the coastal dunes and the interior uplands. Organic-matter content of the surface layer is high. The water table is at or above the surface most of the time and many areas are flooded daily.

c. Water Resources

This section contains information concerning surface water resources likely to be impacted by the proposed project. Water resource assessments include the physical characteristics, best usage standards, and water quality aspects of the water resources, along with their relationship to major regional drainage systems. Probable impacts to surface water resources are also discussed, as are means to minimize impacts.

Best Usage Classification

The Division of Water Quality (DWQ) has assigned index numbers for streams and tributaries in North Carolina. One perennial stream in the Cape Fear River Basin, Bradley Creek [DWQ Index No. 18-87-24-4(1), (8/1/90)] is crossed by SR 1411 (Wrightsville Avenue). This stream carries a Best Usage Classification of SC HQW. Class SC refers to saltwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All saltwaters shall be classified to protect these uses at a minimum. High Quality Waters (HQW), refers to waters which are rated as excellent based on biological and physical/chemical characteristics through Division of Water Quality monitoring or special studies.

No waters classified as Outstanding Resource Waters (ORW), or Water Supplies (WS-I or WS-II) occur within 1.0 mile (1.6 km) of project study area.

Physical Characteristics

The salt marsh community is bisected by a coastal plain perennial stream. At the time of the field visit, Bradley Creek had an approximate depth of 4.0 feet (1.2 meters). The flow was slow and the water had dark brown color. The average channel width was approximately 25 feet (7.6 meters). The substrate consisted primarily of silt.

National Pollutant Discharge Elimination System

Point sources refer to discharges that enter surface water through a pipe, ditch, or other defined points of discharge. The term most commonly refers to discharges associated with wastewater treatment plants. Point source dischargers located throughout North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) program. Dischargers are required to register for a permit. There are no permitted dischargers located within 1.0 mile (1.6 km) upstream of the project study area.

Non-point source refers to runoff that enters surface waters through stormwater flow or no defined point of discharge. There are many types of land use activities that can serve as sources of nonpoint source pollution including land development, construction, crop production, animal feeding lots, failing septic systems, landfills, roads, and parking lots. Sediment and nutrients are major pollution-causing substances associated with nonpoint source pollution. Others include fecal coliform bacteria, heavy metals, oil and grease, and any other substance that may be washed off the ground or removed from the atmosphere and carried into surface waters.

Water Quality

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 assessed water quality by sampling for benthic macroinvertebrate organisms at fixed monitoring sites throughout the state. There are no biological monitoring sites located within the project vicinity.

2. Biotic Resources

This section describes the ecosystems encountered and the relationships between vegetative and faunal components within terrestrial, and aquatic ecosystems. Descriptions of the terrestrial systems are presented where applicable in the context of plant community classifications (Schafale and Weakley, 1990).

Representative animal species which are likely to occur in these habitats are cited. Animals observed during the site visit are denoted by an asterisk (*) in the text. Sightings of spoor evidence are equated with sightings of individuals. Scientific nomenclature and common names (when applicable) are used for plant and animal species described. Subsequent references to the same organism will include the common name only.

a. Biotic Communities

Three biotic communities, maintained roadside, salt marsh, and coastal plain perennial stream exist within the project study area and will be impacted by the subject project. Each of these communities is described below.

Maintained Roadside

The maintained roadside community consists of the highly maintained shoulders and some less intensively managed areas that grade into the surrounding natural communities as well as residential communities. Significant soil disturbance and compaction, along with frequent mowing or herbicide application, keep this community in an early successional state.

Dominant plants in the heavily maintained portions of the maintained roadside community include fescue (*Festuca sp.*), and plantain (*Plantago sp.*). In the areas which receive lower levels of maintenance, more diverse communities can develop. This community was populated by bead grass (*Paspalum sp.*) and ragweed (*Ambrosia artemisiifolia*). This community grades into residential yards with vegetation comprised of grasses and species such as flowering dogwood (*Cornus florida*) and pecan (*Carya illinoensis*). Also included in this community are roadside shoulders along the causeway with herb and vine species such as morning glory (*Ipomoea sagittata*), poison ivy (*Toxicodendron radicans*), greenbrier (*Smilax bonanox*), silverling (*Boccharis halimifolia*), trumpet creeper (*Campis radicans*), foxtail grass (*Setaria geniculata*), peppergrass (*Lepidium campestre*), soft needle rush (*Juncus effusus*), and giant cane (*Arundinaria gigantea*). Trees and shrubs found in this area include sea ox-eye (*Barrichia frutescens*), sweet gum saplings (*Liquidambar*

styraciflua), yaupon (*Ilex vomitoria*), black cherry (*Prunis serotina*), red cedar saplings (*Juniperus virginiana*), black willow (*Salix nigra*), marsh elder (*Iva frutescens*), red maple saplings (*Acer rubrum*), lobolly pine saplings (*Pinus taeda*), water hickory (*Carya aquatica*), Chinese wisteria (*Wisteria sinensis*), and pecan.

Salt Marsh

Dominant plants in the salt marsh community consisted of two species which covered the entire community. Salt marsh cordgrass (*Spartina alterniflora*) covered areas of elevation adjacent to Bradley creek while black needle rush (*Juncus roemerianus*) was present in areas that were slightly higher in elevation.

Coastal Plain Perennial stream

Bradley Creek is a brackish stream that bisects the salt marsh community. This stream has a tidal influence that results in over-bank flooding. One species, salt marsh cordgrass was the dominant vegetation present along the banks of Bradley Creek. The ribbed mussel * (*Geukensia demissa*) was observed in the stream near the banks by the bridge and the Eastern oyster (*Crassitrea virginica*) may also be present in these stream. Fishes likely to be found in creeks such as Bradley Creek may include striped bass (*Roccus lineatus*), striped mullet (*Mugil cephalus*), golden shiner (*Notemigonus crysoleucas*), and mosquitofish (*Gambusia affinis*).

Wildlife

Wildlife found in these communities is limited and consists primarily of wide-ranging, adaptable species which are well suited to coexistence with human development. Mammals common to salt marshes such as raccoon (*Procyon lotor*), river otter (*Lutra canadensis*), and marsh rice rat (*Oryzomys palustris*) may be observed occasionally. The most common reptiles found in such habitats are eastern box turtle (*Terrapene carolina*), predators such as black racer (*Coluber constrictor*), and eastern garter snake (*Thamnophis sirtalis*). Amphibians present in this community may include bullfrog (*Rana catesbeiana*), and pickerel frog (*R. palustris*). Marsh fiddler crab* (*Uca pugnax*) and marsh periwinkle* (*Littorina irrorata*) were observed during the field visit.

Birds likely to frequent such habitats include great blue heron (*Ardea* herodias), redwing blackbird* (Agelaius phoeniceus), kingfisher* (Megaceryle alcyon), marsh wren (*Telmatodytes palustris*), clapper rail (*Rallus longirostris*), black duck (*Anas rubripes*), and meadowlark (*Sturnella magna*).

b. Summary of Anticipated Impacts

Construction of the proposed project will have various impacts on the biotic resources described. This section quantifies and qualifies potential impacts to the natural communities within the project study area in terms of the area impacted and the organisms affected.

Anticipated Impacts to Terrestrial Communities

Impacts to terrestrial communities will result from project construction due to the clearing and paving of portions of the project study area, and thus the loss of community area. Calculated quantitative impacts to terrestrial communities reflect the relative abundance of each community present in the study area (Table 2). Estimated impacts are derived based on approximately 740 feet (225.6 meters) of total approach work required on both sides of the proposed bridge. The entire right of way [80.0 feet (24.4 meters)] was used for this calculation. The entire right of way will probably not be impacted, therefore actual impacts to the communities may be considerably less.

Table 2. Estimated Impacts to Terrestrial Communities.

Community type	Estimated impacts in acres (hectares)
Maintained roadside	1.24 (0.51)
Salt marsh	0.20 (0.08)
Total	**1.44 (0.59)**

Flora and fauna occurring in these communities are generally common throughout North Carolina because of their adaptability to wide ranging environmental factors. Moreover, a similar roadside shoulder community will be re-established after construction. Animals temporarily displaced by construction activities should repopulate areas suitable for the species following project completion. As a result, it is unlikely that existing species will be displaced significantly from the project study area following construction. However, to minimize the temporary effects of project construction, all cleared areas along the roadways should be revegetated promptly after project completion to minimize erosion and the loss of wildlife habitat.

Anticipated Impacts to Water Resources

Estimated impacts to Bradley Creek will be minimal. Approximately 160 feet (48.8 meters) of the existing causeway adjacent to Bradley Creek will be removed which should improve tidal flushing and movement of aquatic organisms.

Aquatic communities are sensitive to any changes in the environment. Any action that affects water quality can have an adverse impact on aquatic organisms. Although most of the disturbance caused by project construction will be temporary, some environmental impacts caused by the proposed project will be long term or irreversible. Installation or modification of instream structures, such as replacement of bridges, can permanently affect many physical stream parameters. Project construction may result in the following impacts to surface waters:

- Increased silt loading and sedimentation from erosion of disturbed soils.
- Changes in light incidence, water clarity and water temperature due to increased sediment load and riparian vegetation removal.
- Alteration of stream discharge due to silt loading and changes in surface or ground water drainage patterns.
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles.

Precautions will be taken to minimize these and other impacts to water resources in the study area. NCDOT's Best Management Practices (BMP) for the Protection of Surface Waters will be strictly enforced throughout the construction stage of the project.

Bradley Creek is located within a Primary Fish Nursery Area, and may potentially provide habitat for anadromous fish spawning. For this reason, an in-water construction moratorium will be required from the N.C. Wildlife Resources Commission from February 15 to June 30. The N.C. Division of Marine Fisheries agreed that this moratorium would be sufficient.

Essential Fish Habitat Designations

The 1996 Congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (PL 94-265) set forth new requirements for the National Marine Fisheries Service (NMFS), regional fishery management councils (FMC), and other Federal agencies to identify and protect important marine and anadromous fish habitat. These amendments established procedures for the identification of Essential Fish Habitat (EFH) and a requirement for interagency coordination to further the conservation of federally managed fisheries.

The replacement of Bridge No. 10 will result in impacts to salt marsh adjacent to Bradley Creek that might provide habitat or contribute to estuarine food chains. The proposed project involves replacing the existing bridge which is 39.0 ft (11.9 m) in length in the same location with a new bridge that will be 200.0 ft (61.0 m) in length. Impacts will

occur as a result of additional fill necessary due to the lengthening of the bridge, while removing a portion of the existing causeway.

The replacement of Bridge No. 10 will impact approximately 0.2 acres (0.08 hectare) of salt marsh adjacent to Bradley Creek. However, removal of the existing causeway will expose 0.2 acres (0.08 hectare) of marsh substrate that was previously filled. Therefore, the net effect of the new bridge construction and existing causeway removal will result in no net loss of Essential Fish Habitat (EFH) with the 200-foot (61.0 meter) bridge length.

Table 3 lists the fish species that may occur in the study area that are managed under MSFCMA (species listed by NMFS for Bradley Creek), including the life stages which are known to occur.

Table 3. Fish Species Listed by NMFS Likely to Occur in Bradley Creek.

Species	Life Stages
Brown shrimp	P/J, S
White shrimp	P/J, S
Red drum	P/J, S
Spanish mackerel	J
Cobia	L, P/J, A
Bluefish	J, A
Summer flounder	L, J, A

Note: E – Eggs, P/J – Postlarvae/ Juvenile, L – Larvae, S – Subadult,
J – Juvenile,
A – Adult

Bridge Demolition and Removal

The existing deck and bridge railings are composed of concrete. The substructure is composed of timber bents and caps. The bridge rail, bents, and substructure will be removed without dropping components into Waters of the United States. However, if components of the deck were dropped into Waters of the United States during bridge demolition, the resulting temporary fill associated with the concrete deck would be approximately 13 cubic yards (9.9 cubic meters). The existing bridge will be removed according to the NCDOT's best management practices for bridge demolition and removal guidelines. According to these guidelines, the subject project falls under the "Case 2" category which allows no work at all in the water during moratorium periods associated with fish migration, spawning, and larval recruitment into nursery areas. An in-water construction moratorium will be required for this project from the N.C. Wildlife Resources Commission from February 15 to June 30.

An existing sewer line is located on a separate concrete structure next to Bridge No. 10. The structure is composed of concrete caps on top of concrete piers. During construction of the new bridge, the sewer line will be moved and the concrete structure will be removed according to the NCDOT's best management practices for bridge demolition and removal guidelines. The structure will be removed without dropping components into Waters of the United States.

3. Jurisdictional Topics

This section provides inventories and impact analyses pertinent to two significant regulatory issues: Waters of the United States and rare and protected species. These issues retain particular significance because of federal and state mandates which regulate their protection. This section deals specifically with the impact analyses required to satisfy regulatory authority prior to project construction.

a. 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. Wetlands are identified based on the presence of hydric soils, hydrophytic vegetation, and saturated or flooded conditions during all or part of the growing season. 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).

Characteristics of Surface Waters

One surface water, Bradley Creek, exists within the project study area and is considered a jurisdictional surface water under Section 404 of the Clean Water Act (33 U.S.C. 1344). Discussions of the biological and water quality aspects of this water resource are presented in previous sections of this report.

Summary of Anticipated Impacts

Estimated impacts to Bradley Creek will be minimal. Approximately 160 feet (48.8 meters) of the existing causeway through

Bradley Creek will be removed. Approximately 0.2 acres (0.8 hectare) of salt marsh may be impacted as a result of project construction. Estimated impacts are derived based on the project length of 760 feet (225 meters). The entire right of way width of 80 feet (24.4 meters) was used for this calculation. The entire right of way will probably not be impacted; therefore, actual impacts to the stream may be considerably less.

b. Permits

Clean Water Act (CWA) §401 authorizes states to determine whether activities permitted by the federal government comply with state water quality standards. The DWQ may require a Section 401 Water Quality Certification if a project fills or substantially modifies waters or wetlands. The Section 401 Water Quality Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulation. North Carolina developed General Certifications (GCs) that satisfy CWA §401 and correspond to the Corps of Engineers' Nationwide Permits (NWPs) [NCDENR, DWQ, Water Quality Section, Wetlands Water Quality Certification; undated Internet site]. The issuance of a 401 permit from the DWQ is a prerequisite to issuance of a Section 404 permit. Water Quality Certification No. 3107, which corresponds to NWP 23, will likely be required for the project.

Clean Water Act §404 establishes a permit program to regulate the discharge of dredged or fill materials into waters of the United States. The USACE, which administers the permit program under CWA §404, established nationwide permits for minor activities, specialized activities, and activities regulated by other authorities. A nationwide permit (NWP) is a permit by rule. In other words, compliance with the NWP rules satisfies the statutory provisions under Section 404 of the Clean Water Act. Forty NWPs referenced by a number currently exist (Strand, 1997). Nationwide 23, entitled Approved Categorical Exclusions, covers certain activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department. Nationwide Permit 23 applies when another Federal agency or department determines that their activity, work, or discharge is categorically excluded from an environmental impact statement (EIS) under the National Environmental Policy Act (NEPA). The activity, work, or discharge becomes categorically excluded when its actions neither individually nor cumulatively have a significant effect on the human environment. The Office of the Chief of Engineers must receive notice of the agency's or department's application for the categorical exclusion and concur with the categorical exclusion determination [January 15, 2002 (Volume 67, Number 10, Pages 2019-2095)].

A Nationwide Permit 23 CFR 330 Appendix A (B) (23) is likely to be applicable for the crossing of Bradley Creek. This permit authorizes construction provided the following conditions are met:

- the width of the fill is limited to the minimum necessary for the actual crossing;
- the fill place in Waters of the United States is limited to a filled area of no more than 1.0 acre (0.45 hectare);
- no more than a total of 150 linear feet (45.7 meters) of the fill for the roadway can occur in special aquatic sites, including wetlands;
- the crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows and movement of aquatic organisms, and;
- the crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of Waters of the United States.

The subject project is located within a county that is under the jurisdiction of the Coastal Area Management Act (CAMA), which is administered by the Division of Coastal Management (DCM). DCM is the lead permitting agency for projects located within its jurisdiction. A CAMA Major Development Permit will likely be required for this project.

Representatives from NCDOT's Hydraulics Unit held a pre-application meeting with the DWQ Wilmington Regional Office on November 14, 2000. At this meeting it was determined that a Stormwater Management Permit will not be required for this project.

NCDOT coordinated with the U.S. Coast Guard to determine if a permit is needed from that agency. At the site crossing, Bradley Creek meets the criteria for advanced approval and an individual permit will not be required from the Coast Guard. See letter on Page A-1 of Appendix A.

c. Avoidance, Minimization, and Mitigation

The Corps of Engineers (COE) 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 he 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.

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 COE, 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. In order to avoid impacts to U.S. Waters, the existing 39-foot (11.9-meter) bridge will be replaced by a 200-foot (61 meter) bridge, thereby avoiding impacts and further opening up the existing causeway. Removing approximately 160 feet (48.8 meters) of the existing causeway should improve tidal flushing and movement of aquatic organisms.

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 to median widths, right of way widths, fill slopes and/or road shoulder widths. To minimize impacts to U.S. Waters, the existing approaches will be widened symmetrically, thereby maximizing use of the existing facility pavement. Additionally, the minimum standard shoulder and lane widths for this type facility are recommended, as well as the steepest slopes possible for this area.

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 Water of the United States, specifically wetlands. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site.

Estimated impacts to jurisdictional wetlands total 0.2 acres (0.08 hectare). Though compensatory mitigation is not required for impacts for projects authorized under Nationwide Permits that result in the fill or

alteration of less 1.0 acre (than 0.45 hectare) of palustrine wetlands, it is likely that mitigation will be required for impacts in estuarine wetlands (salt marsh) associated with this project. Written approval of the final mitigation plan is required from the DWQ prior to the issuance of a 401 Certification. Final permit/mitigation decisions rest with the COE and DWQ.

Current designs call for the removal of approximately 160 feet (48.8 meters) of the existing causeway. This area (0.2 acres [0.08 hectare]) will be graded to the elevation of the adjacent salt marsh and replanted with vegetation of the same species as that in the salt marsh; therefore, offsetting impacts from construction of the bridge.

Minimal impacts to jurisdictional surface waters may occur as result of the proposed project. If fill or dredging in surface waters occurs as a result of construction activities, permits and certifications will be required from various regulatory agencies in charge of protecting the water quality of public waters resources.

4. Federally 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 U.S. Fish and Wildlife Service (FWS).

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. An endangered species is considered to be a species that is in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is considered to be a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

As of March 7, 2002, the U.S. Fish and Wildlife Service (FWS) lists ten federally protected species for New Hanover County (see Table 4). A brief description and biological conclusion is provided for each of these species below.

Table 4. Federally Protected Species for New Hanover County.

Common Name	Scientific Name	Status
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
American alligator	*Alligator mississippiensis*	Threatened (S/A)
Loggerhead sea turtle	*Caretta caretta*	Threatened
Piping plover	*Charadrius melodus*	Threatened
green sea turtle	*Chelonia mydas*	Threatened
red-cockaded woodpecker	*Picoides borealis*	Endangered
west Indian manatee	*Trichechus manatus*	Endangered
Seabeach amaranth	*Amaranthus pumilus*	Threatened
rough-leaved loosestrife	*Lysimachia asperulaefolia*	Endangered
Cooley's meadowrue	*Thalictrum cooleyi*	Endangered**

Note: "Endangered" a species in danger of extinction throughout all or a significant portion of its range.
"Threatened S/A" This listing is defined as a species which are threatened due to similarity of appearance with other rare species and are listed to protect these species. These species are not biologically endangered or threatened and are not subject to Section 7 consultation.
"Threatened" a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
"**" obscure record, the date and/or location of the observation is uncertain.

Short-nosed sturgeon *(Acipenser brevirostrum)* **Endangered**

Family: Acipenseridae
Date Listed: 11 March 1967

The short-nosed sturgeon is a small (3.3 feet [1 meter] in length) species of fish which occurs in the lower sections of large rivers and in coastal marine habitats from the St. John River, Canada to the Indian River, Florida. It can be differentiated from the Atlantic sturgeon because of its shorter snout, wider mouth, and the pattern of its preanal shields (the short-nose having one row and the Atlantic having two).

The short-nosed sturgeon prefers deep channels with a salinity less than sea water. It feeds on benthic invertebrates and plant material and is most active at night. It is an anadromous species that spawns upstream in the spring and spends most of its life within close proximity of the rivers mouth. At least two entirely freshwater populations have been recorded, in South Carolina and Massachusetts.

The short-nosed sturgeon requires large fresh water rivers that are unobstructed by dams or pollutants to reproduce successfully.

Biological Conclusion: **No Effect**

Bradley Creek may provide suitable habitat for the shortnose sturgeon. A review of the North Carolina Natural Heritage Program (NCNHP) database on July 18, 1999 indicated that there is no known occurrence of the short-nosed

sturgeon within 1 mile (1.6 km) of the project area. Through verbal communication on August 12, 1999 with the N.C. Division of Marine Fisheries, it was determined that it is unlikely that the short-nosed sturgeon would be present in this section of Bradley Creek. However, best management practices and use of the construction moratorium will insure this project will not affect this species.

American alligator *(Alligator mississippiensis)* **Threatened**
Family: Alligatoridae **(Due to Similarity of Appearance)**
Date Listed: June 4, 1987

The alligator is a large aquatic reptile, measuring 1.8-5.8 meters in length, with a broadly rounded snout, heavy body, laterally compressed tail, and a dark gray or blackish color. Young are black with conspicuous yellow crossbands; the banding may occasionally persist on adults, although very faintly. Unlike the American crocodile, the fourth tooth on the lower jaw of the alligator fits in a notch in the upper jaw and is not exposed when the jaws are closed.

The alligator can be found on the east coast of the United States from Tyrrell County, North Carolina to Corpus Christi, Texas, and north in the Mississippi River drainage basin to Arkansas and southeastern Oklahoma. Home ranges may vary considerably, with 3,162 acres for males and 21 acres for females being average. Individuals can travel great distances, both overland and in the water, but males tend to travel more than females.

The alligator is found rivers, streams, canals, lakes, swamps, bayous, and coastal marshes. Adult animals are highly tolerant of salt water, but the young are apparently more sensitive, with salinities greater than 5 parts per thousand considered harmful. The diet consists of anything of suitable size, including mammals, reptiles, amphibians, birds, fish, and crustaceans.

Nesting takes place in late spring and early summer, with the female building a mound of grass and other vegetation that may be two feet high and six feet across. The nest is usually constructed near the water, in a shaded location. The clutch of 30-60 (average 35) eggs is laid in a cavity near the top of the mound, and is incubated by the heat from the decaying vegetation. The female usually remains near the nest until the eggs hatch. Hatching takes place in about nine weeks, when the young begin calling to alert the female to excavate the nest.

The primary threats to the alligator in the past have been loss of habitat and overhunting. The legal protections in recent years have allowed this species to increase significantly, and it is now considered biologically secure. The alligator is distinguished from the American crocodile by its broad, rounded snout and the way its fourth tooth of its lower jaw fits into a notch in the upper jaw when the jaws are closed, and is therefore not exposed when the jaws are closed.

Biological Conclusion **Not Required**

This species is listed as Threatened Due to Similarity of Appearance, and is therefore not protected under Section 7 of the Endangered Species Act. However, in order to control the illegal trade of other protected crocodilians such as the American crocodile, federal regulations (such as hide tagging) are maintained on the commercial trade of alligators. The NHP database shows one element of occurrence for this species approximately 0.8 miles (1.3 km) southeast of the project area. No survey is required for this species.

loggerhead sea turtle *(Caretta caretta)* **Threatened**

Family: Cheloniidae
Date Listed: 28 July 1978

The loggerhead nests on suitable beaches from Ocracoke inlet, North Carolina through Florida and on a small scale off of the Gulf States. There are also major nesting grounds on the eastern coast of Australia. It lives worldwide in temperate to subtropical waters.

Adult loggerheads weigh between 170 to 500 pounds (77 and 227 kilograms) and are 2.6 to 3.9 feet (0.8 to 1.2 meters) in length. The loggerhead can be distinguished from other sea turtles by its unique reddish-brown color. The loggerhead is characterized by a large head and blunt jaws. Otherwise they have 5 or more costal plates with the first touching the nuchal and 3 to 4 bridge scutes.

Loggerheads nest nocturnally between May and September on isolated beaches that are characterized by fine grained sediments. It is mainly carnivorous feeding on small marine animals.

Biological Conclusion: **No Effect**

Suitable habitat in the form of beaches was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of a loggerhead sea turtle within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

piping plover (*Charadrius melodus*) **Threatened**

Family: Charadriidae
Date Listed: 11 December 1985

The piping plover is a small migratory shorebird that resembles a sandpiper. An average bird grows to about 6.9 inches (17.5 cm) in length and has a wing span of 14.8 inches (37.5 cm). It can be identified by the orange legs and black band around the base of its neck. During the winter the plover loses its black band, its legs fade to pale yellow, and the bill fades to black. Breeding

birds are characterized by white underparts, a single black breastband, and a black bar across the forehead.

The piping plover breeds along the east coast from New Foundland to North Carolina. It winters from North Carolina southward into the Florida Keys and along the Gulf of Mexico. Plovers return to their breeding grounds in March or early April.

Piping plovers nest in flat areas with fine sand and mixtures of shells and pebbles. They nest most commonly where there is little or no vegetation, but some may nest in stands of beachgrass. The nest is a shallow depression in the sand that is usually lined with shells and pebbles and food consists of invertebrates such as insects and marine worms.

The piping plover is very sensitive to human disturbances. The presence of people can cause the plover to abandon its nest and quit feeding.

Biological Conclusion: **No Effect**

Suitable habitat for the piping plover in the form of fine sand and mixtures of shells and pebbles was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of piping plover within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

green sea turtle *(Chelonia mydas)* **Threatened**
Family: Cheloniidae
Date Listed: 28 July 1978

The green sea turtle is found in temperate and tropical oceans and seas. It ranges as far north as Massachusetts on the east coast and British Columbia in the west. Nesting in North America is limited to small communities on the east coast of Florida.

The distinguishing factors found in the green turtle are the single clawed flippers and a single pair of elongated scales between the eyes. This turtle has a small head and grows to a size of 2.5 to 5 feet (0.76 to 1.53 meters) and a weight of 220.5 to 650.4 pounds (100 to 295 kilograms). It has a strongly serrate lower jaw and only four pairs of pleural scutes.

The green sea turtle can be found in shallow waters. They are attracted to lagoons, reefs, bays, mangrove swamps and inlets where an abundance of marine grasses, the principle food source for the green turtle, can be found. These turtles require beaches with minimal disturbances and a sloping platform for nesting.

Biological Conclusion: **No Effect**

Suitable habitat for the green sea turtle in the form of lagoons, reefs, bays, mangrove swamps and inlets was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of the green sea turtle within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

red-cockaded woodpecker (*Picoides borealis*) **Endangered**

Family: Picidae
Date Listed: 13 October 1970

The red-cockaded woodpecker once occurred from New Jersey to southern Florida and west to eastern Texas. It occurred inland in Kentucky, Tennessee, Arkansas, Oklahoma, and Missouri. The red-cockaded woodpecker is now found only in coastal states of its historic range and inland in southeastern Oklahoma and southern Arkansas. In North Carolina moderate populations occur in the sandhills and southern coastal plain. The few populations found in the piedmont and northern coastal plain are believed to be relics of former populations.

The adult red-cockaded woodpecker has a plumage that is entirely black and white except for small red streaks on the sides of the nape in the male. The back of the red- woodpecker is black and white with horizontal stripes. The breast and underside of this woodpecker are white with streaked flanks. The red-cockaded woodpecker has a large white cheek patch surrounded by the black cap, nape, and throat.

The red-cockaded woodpecker uses open old growth stands of southern pines, particularly longleaf pine (*Pinus palustris*), for foraging and nesting habitat. A forested stand must contain at least 50% pine, lack a thick understory, and be contiguous with other stands to be appropriate habitat for the red-cockaded woodpecker. These birds nest exclusively in trees that are more than 60 years old and are contiguous with pine stands at least 30 years of age. The foraging range of the red-cockaded woodpecker is up to 500 acres (200 hectares). This acreage must be contiguous with suitable nesting sites.

These woodpeckers nest exclusively in living pine trees and usually in trees that are infected with the fungus that causes red-heart disease. Cavities are located in colonies from 12 to 100 feet (3.6 to 30.3 meters) above the ground and average 30 to 50 feet (9.1 to 15.7 meters) high. They can be identified by a large incrustation of running sap that surrounds the tree. The large incrustation of sap is believed to be used as a defense by the red-cockaded woodpecker against possible predators. A clan of woodpeckers usually consists of one breeding pair and the offspring from previous years. The red-cockaded woodpecker lays its eggs in April, May, and June and hatch 38 days later. Clutch size ranges in number from 3-5 eggs. All members of the clan share in raising the young. Red-

cockaded woodpeckers feed mainly on insects but may also feed on seasonal wild fruits.

Biological Conclusion: **No Effect**

Suitable habitat for the red-cockaded woodpecker in the form of trees that are more than 60 years old and are contiguous with pine stands at least 30 years of age was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of red-cockaded woodpeckers within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

West Indian manatee (*Trichechus manatus*) **Endangered**
Family: Trichechidae
Date Listed: 11 March 1967

The manatee's historic range included the Gulf Coast as far west as Texas and the Atlantic Coast as far north as New Jersey. Winter populations are now limited to the southern half of the Florida peninsula. In summer sightings have occurred as far north as Virginia and west as far as the Florida panhandle. Although manatees found in North Carolina are considered to be migratory, there is evidence of overwintering by manatees in warm-water discharges from powerplants.

The manatee is a large, gray or brown, barrel shaped, aquatic mammal. Adults average 9.8 to 13.1 feet (3 to 4 meters) long and weigh around 1,100 pounds (500 kilograms). The vestigual hindlimbs are not visible and the tail is horizontally flattened. The specialized forelimbs are adapted to swimming. The wrinkled body is nearly hairless except for stiff "whiskers" on the muzzle. In turbid water common to North Carolina's waterways only a small part of the head and nose are visible above the surface.

Manatees are found in freshwater and marine habitats with a depth of 4.9 feet (1.5 meters) or more. These habitats include: canals, sluggish rivers, estuaries, salt water bays, and as far off shore as 3.7 miles (6.0 km). Overwintering occurs in areas with warm water, during the rest of the year habitats with sufficient water depth, an adequate food supply, and proximity to freshwater. It is believed that manatees require a source of freshwater to drink.

Manatees are herbivorous, feeding on aquatic vegetation and occasionally fish. They may consume up to 11% of their body weight and spend up to eight hours a day feeding.

The main threats to the manatees existence are from flood control structures, destruction of habitat, and injury by boat/barge collisions.

Biological Conclusion: **No Effect**

Bradley Creek may allow access to the West Indian manatee, therefore suitable habitat is present for this species. The North Carolina Natural Heritage Program's database of rare species and unique habitats was checked on May 6, 2002. No populations of the West Indian Manatee have been reported from the project vicinity. This species typically inhabits more southern areas but has been observed on occasion in North Carolina's coastal waters. The U.S. Fish and Wildlife Service has developed a list of "Precautions for the general construction in areas which may be used by the West Indian manatee in North Carolina," (July 2, 1996). If these precautions are considered in all aspects of project construction, this project will not affect the West Indian manatee. See Appendix B for the "Precautions for general construction in areas which may be used by the West Indian manatee in North Carolina."

sea-beach amaranth (*Amaranthus pumilus*) **Threatened**

Family: Amaranthaceae
Federally Listed: 11 March 1992
Flowers Present: June to frost

Seabeach amaranth is endemic to the Atlantic Coastal Plain beaches. It was historically known from Massachusetts to Florida and is presently confined to 55 populations in North Carolina, New York, and South Carolina.

Seabeach amaranth is an annual legume that grows in clumps containing 5 to 20 branches and are often over a foot across. The trailing stems are fleshy and reddish-pink or reddish in color and 3.9 to 23.6 inches (10 to 60 centimeters) long. The thick, fleshy leaves are small, ovate- spatulate, emarginate, rounded and 0.4 to 0.6 inches (1 to 1.5 centimeter) long. The leaves are usually spinach green in color, cluster towards the end of a stem, and have winged petioles. Flowers grow in axillary fascicles and the smooth, indehsicent fruits are 0.16 to 0.2 inches (4 to 5 millimeter) long. Seeds are glossy black. Both fruits and flowers are relatively inconspicuous and born along the stem.

Habitat for seabeach amaranth is found on barrier island beaches functioning in a relatively dynamic and natural manner. It grows well in overwash flats at the accreting ends of islands and the lower foredunes and upper strands of noneroding beaches. Temporary populations often form in blowouts, sound-side beaches, dredge spoil, and beach replenishment. This species is very intolerant to competition and is not usually found in association with other species. Threats to seabeach amaranth include beach stabilization projects, all terrain vehicles (ATV's), herbivory by insects and animals, beach grooming, and beach erosion.

Biological Conclusion: **No Effect**

Suitable habitat for seabeach amaranth in the form of barrier island beaches was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of seabeach amaranth within 1mile (1.6 km) of the project area. Therefore, this project will not affect this species.

rough-leaved loosestrife (*Lysimachia asperulaefolia*) **Endangered**

Plant Family: Primulaceae
Federally Listed: 12 June 1987
Flowers Present: June

This plant is endemic to the coastal plain and sandhills of North and South Carolina. It is currently found in nine locations in North Carolina and is believed to be extirpated from South Carolina.

This perennial herb has slender stems that grow to a height of three to six dm from a rhizome. The whorled leaves encircle the stem at intervals below the showy yellow flowers, and usually occur in threes or fours. Flowers are borne in terminal racemes of five-petalled flowers. Fruits are present from July through October.

This species occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins (areas of dense shrub and vine growth usually on a wet, peat, poorly drained soil), on moist to seasonally saturated sands and on shallow organic soils overlaying sand. It has also been found to occur on deep peat in the low shrub community of large Carolina bays (shallow, elliptical, poorly drained depressions of unknown origins). The areas it occurs in are fire maintained. It is rarely associated with hardwood stands and prefers acidic soils.

Biological Conclusion: **No Effect**

Suitable habitat for rough-leaved loosestrife in the form of ecotones or edges between longleaf pine uplands and pond pine pocosins was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of rough-leaved loosestrife within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

Cooley's meadowrue (*Thalictrum cooleyi*) **Endangered**

Family: Ranunculaceae
Federally Listed: 7 February 1989
Flowers Present: late June-July (best mid July)

Historical records show populations of Cooley's meadowrue in the southeastern coastal plain in North Carolina, Georgia, and Florida. Present populations are limited to nine locations in North Carolina and one in Florida.

Known North Carolina populations are found in Columbus, Pender, and Onslow counties.

Cooley's meadowrue is a rhizomatous perennial plant with stems that grow to one meter in length. Stems are usually erect in direct sunlight but are lax and may lean on other plants or trail along the ground in shady areas. Leaves are usually narrowly lanceolate and unlobed, some two or three lobed leaves can be seen. The flowers lack petals, but staminate ones have yellowish to white sepals and lavender filaments about 0.2 to 0.28 inches (5 to 7 millimeters) long. Pistillate flowers are smaller and have greenish sepals. Fruits are narrowly ellipsoidal achenes, 0.2 to 0.24 inches (5 to 6 millimeters) long. Fruits mature from August to September.

This plant is found in moist to wet bogs, savannas and savanna-like openings, sandy roadsides, rights-of-ways, and old clearcuts. It is dependent on some form of disturbance to maintain its habitat. All known populations are on circumneutral, poorly drained, moderately permeable soils of the Grifton series. It only grows well in areas with full sunlight.

Biological Conclusion: **No Effect**

Suitable habitat for Cooley's meadowrue in the form of moist to wet bogs, savannas and savanna-like openings, sandy roadsides, right of ways, and old clearcuts was not observed during the site visit. In addition, a review of the North Carolina Natural Heritage Program (NCNHP) database on May 6, 2002 indicated that there is no known occurrence of Cooley's meadowrue within 1 mile (1.6 km) of the project area. Therefore, this project will not affect this species.

5. Federal Species of Concern and State Listed Species

There are twenty-two Federal Species of Concern (FSC) listed by the FWS for New Hanover County (Table 5). Federal Species Of Concern are not afforded federal protection under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. However, the status of these species is subject to change, and so should be included for consideration. Federal Species of Concern are defined as a species which is under consideration for listing for which there is insufficient information to support listing. In addition, organisms which are listed as Endangered, Threatened, or Special Concern by the North Carolina Natural Heritage Program list of Rare Plant and Animal Species are afforded state protection under the NC State Endangered Species Act and the N.C. Plant Protection and Conservation Act of 1979.

Table 5. Federal Species of Concern and State Status for New Hanover County.

Common Name	Scientific Name	Status	Habitat
Southern hognose snake	*Heterodon simus*	SR	No
Southeastern myotis	*Myotis austroriparius*	SC	Yes
Mimic glass lizard	*Ophisaurus mimicus*	SC	No
Eastern painted bunting	*Passerina ciris ciris*	R	No
Northern pine snake	*Pituophis melanoleucus melanoleucus*	SC	No
Carolina gopher frog	*Rana capito capito*	SC	No
arogos skipper	*Atrytone arogos arogos*	SR	No
magnificent rams-horn	*Planorbella magnifica*	E	No
rare skipper	*Problema bulenta*	SR	Yes
Croatan crayfish	*Procambarus plumimanus*	SR	Yes
Cape Fear threetooth	*Triodopsis soelneri*	T	Yes
savanna indigo-bush	*Amorpha geogiana* var. *confusa*	E	No
sandhills milkvetch	*Astragalus michauxii*	C/PT	No
Chapman's sedge	*Carex chapmanii*	W1	No
Venus flytrap	*Dionaea muscipula*	C-SC	No
bog St. John's wort	*Hypericum adpressum*	C	No
Pondspice	*Litsea aestivalis*	C	No
spiked medusa	*Pteroglossaspis ecristata*	E	No
spring-flowering goldenrod	*Solidago verna*	E/PT	No
Pickering's dawnflower	*Stylisma pickeringii* var. *pickeringii*	E	No
Carolina asphodal	*Tofieldia glabra*	C	No
Dune bluecurls	*Trichostima sp. 1*	C	No

Note:

- "C" (Candidate) a species 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 also either rare throughout its range or disjunct in North Carolina from a main range in a different part of the country or the world.
- "SR" (Significantly Rare) a species which exists in small numbers in the state and has been determined by the N.C. NHP to need monitoring.
- "SC" (Special Concern) any native or once-native species which is determined by the WRC to require monitoring but which may be taken under regulations adopted under the provisions of this article.
- "E" (Endangered) any native or once native species whose continued existence as a viable component of the State's flora or fauna is determined by the WRC to be in jeopardy or any species determined to be an endangered species pursuant to the Endangered Species Act.
- "T" (Threatened) any native or once native species which is likely to become as endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as threatened pursuant to the Endangered Species Act.
- "P" (Proposed)a species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the legally mandated listing process.
- "W1" (Watch List 1) a species that is considered rare, but relatively secure.

Surveys for these species were not conducted during the site visit. A review of the N.C. Natural Heritage Program database of the rare species and unique habitats on May 6, 2002 revealed one record of North Carolina rare and/or protected species in or near the project study area. An element of occurrence of Venus flytrap (*Dionea muscipula*) exists 0.8 miles (1.3 km) northeast of the project area.

6. Summary

The proposed project is expected to have only minor effects on natural resources and environmental quality in the vicinity of the project area. The primary issue of concern is protecting water quality from excessive sedimentation as a result of stream bank and substrate disturbance. Minimizing the impacted area along the stream channel and protecting exposed soils from erosion will greatly aid in reducing water quality degradation. Effects on populations of other native plants and animals should be minor. Permits will be required from the U. S. Army Corps of Engineers, the N. C. Department of Environment and Natural Resources – Division of Water Quality, and from the N. C. Division of Coastal Management prior to construction initiation for impacts to surface water resources.

G. Flood Hazard Evaluation and Stream Modification

New Hanover County is a current participant in the National Flood Insurance Regular Program. This particular crossing of Bradley Creek is in a designated flood hazard zone; however, it is not included in a detailed flood study. Bradley Creek is included in the detailed flood study for New Hanover County; however, the project site is downstream of the detailed flood study limits. Figure 5 shows the approximate 100-year floodplain limits in the vicinity of the project as shown on the Flood Insurance Rate Map. There is one home northwest of the bridge which has a floor elevation approximately at the same elevation as the existing bridge deck, which is below the approximate 100-year flood level shown in the FEMA floodplain mapping. The existing floodplain is rural and primarily comprised of marsh wetlands. The proposed bridge replacement will not have any significant adverse impact on the existing floodplain or on the associated flood hazard. Existing drainage patterns will be maintained to the extent practicable, and groundwater resources should not be affected by the project.

VII. COMMENTS AND COORDINATION

A. Agency Coordination

An on-site meeting was held on May 5, 2000, to discuss the impacts associated with the proposed project and to discuss possible design alternatives to minimize impacts to the coastal wetlands next to the existing bridge. Representative from the U.S. Army Corps of Engineers (USACE), the N.C. Division of Coastal Management (NCDCM) and

the N.C. Department of Transportation were present at this meeting. A request was made to study an alternative that would bridge the causeway.

On December 7, 2000, an interagency meeting was held to discuss three build alternatives (see Section V.B pages 4 and 5) for the proposed project. Representatives from the following agencies were present at this meeting:

U.S. Army Corps of Engineers (USACE)
U.S. Fish and Wildlife Service (USFWS)
National Marine Fisheries (NMF)
Federal Highway Administration (FHWA)
N.C. Division of Water Quality (DWQ)
N.C. Wildlife Resources Commission (WRC)
N.C. Division of Coastal Management (DCM)

A representative from the N.C. Division of Marine Fisheries (NCDMF) was not present, but meeting minutes were sent to this agency following the meeting.

Representatives from the above mentioned resource agencies requested that NCDOT investigate the possibility of removing a large section of the existing causeway and thereby construct a much longer bridge than what is hydraulically sufficient. NCDOT agreed to construct a 550-foot long bridge in exchange for wetland mitigation credits to help off-set a portion of the additional costs associated with constructing the longer bridge. Additional meetings were held to further discuss this possibility; however, resource agencies were not able to commit to providing additional mitigation credits for this project and the longer bridge concept (Alternative 2) was dropped from further consideration.

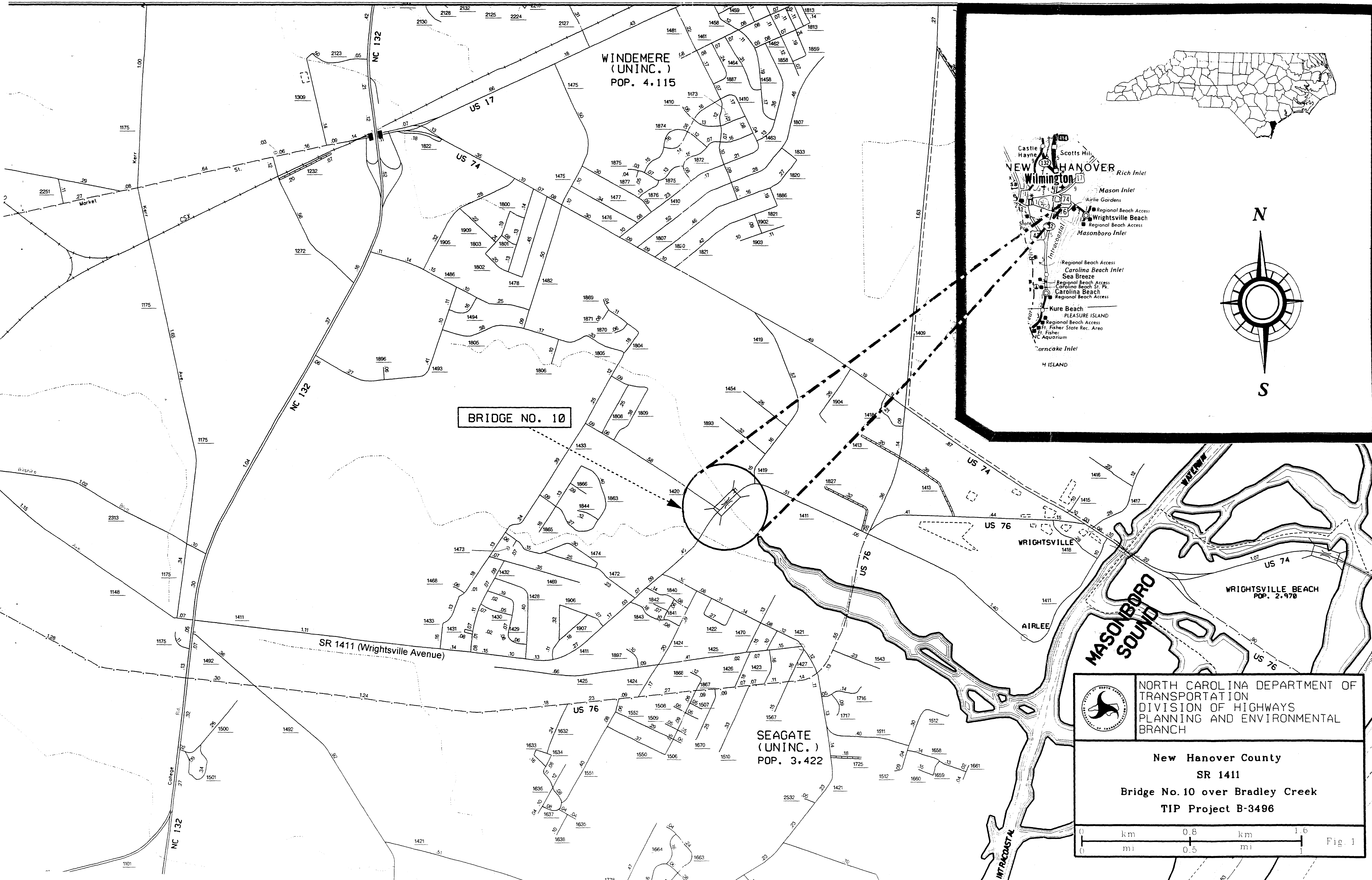
NCDOT coordinated with the Division of Coastal Management (DCM) regarding the construction of 3:1 side slopes instead of 2:1. DCM has agreed to the use of 3:1 side slopes for the approaches to the new bridge, provided that NCDOT can supply adequate documentation to demonstrate that the maintenance and construction of 2:1 side slopes is not feasible (see Appendix A, pages A-4 and A-5). NCDOT provided DCM with the requested information (see Section VI.A on pages 5 and 6).

IX. BASIS FOR CATEGORICAL EXCLUSION

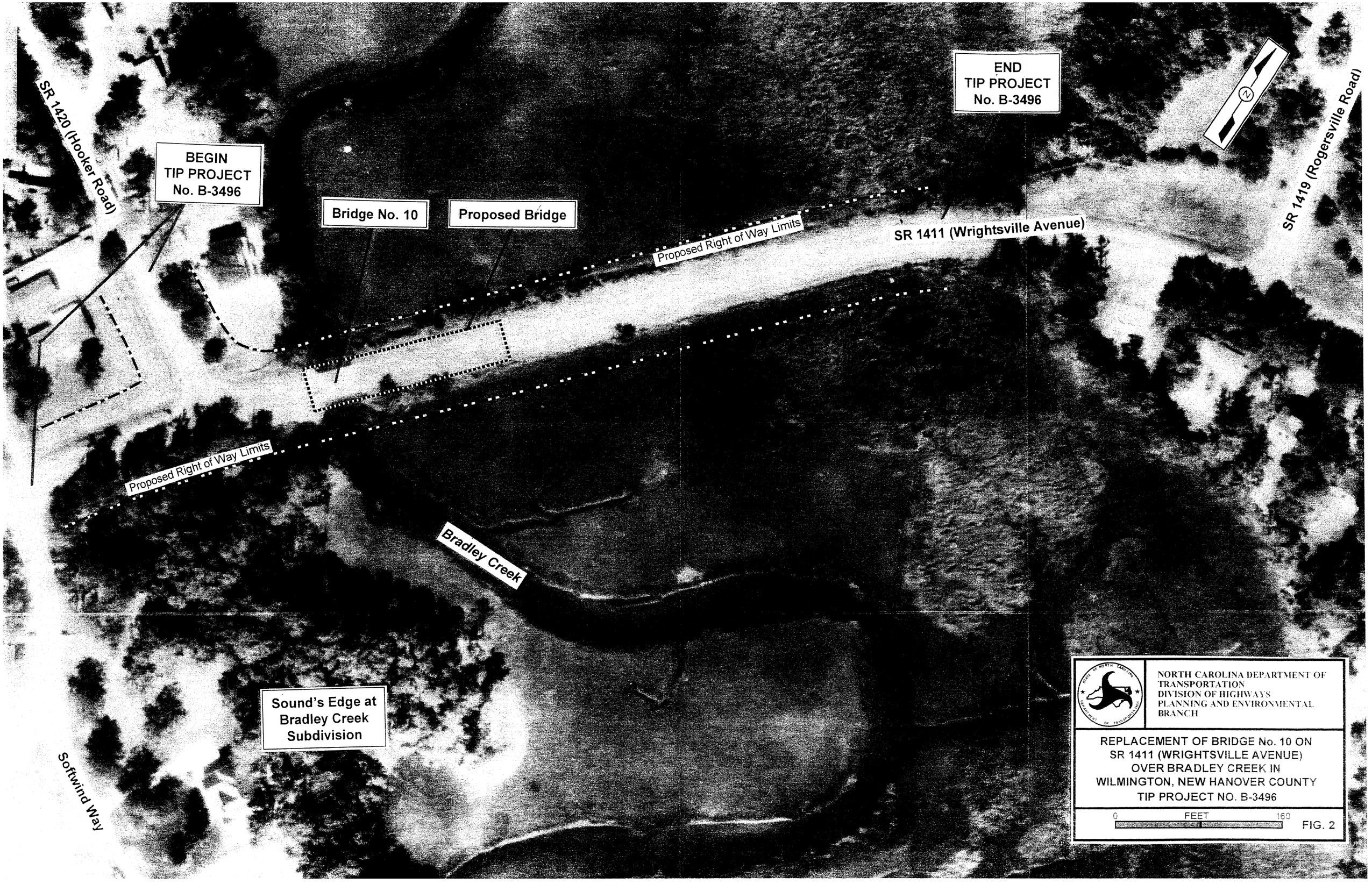
On the basis of the above discussion, it is concluded that no serious adverse environmental effects will result from implementation of the proposed project.

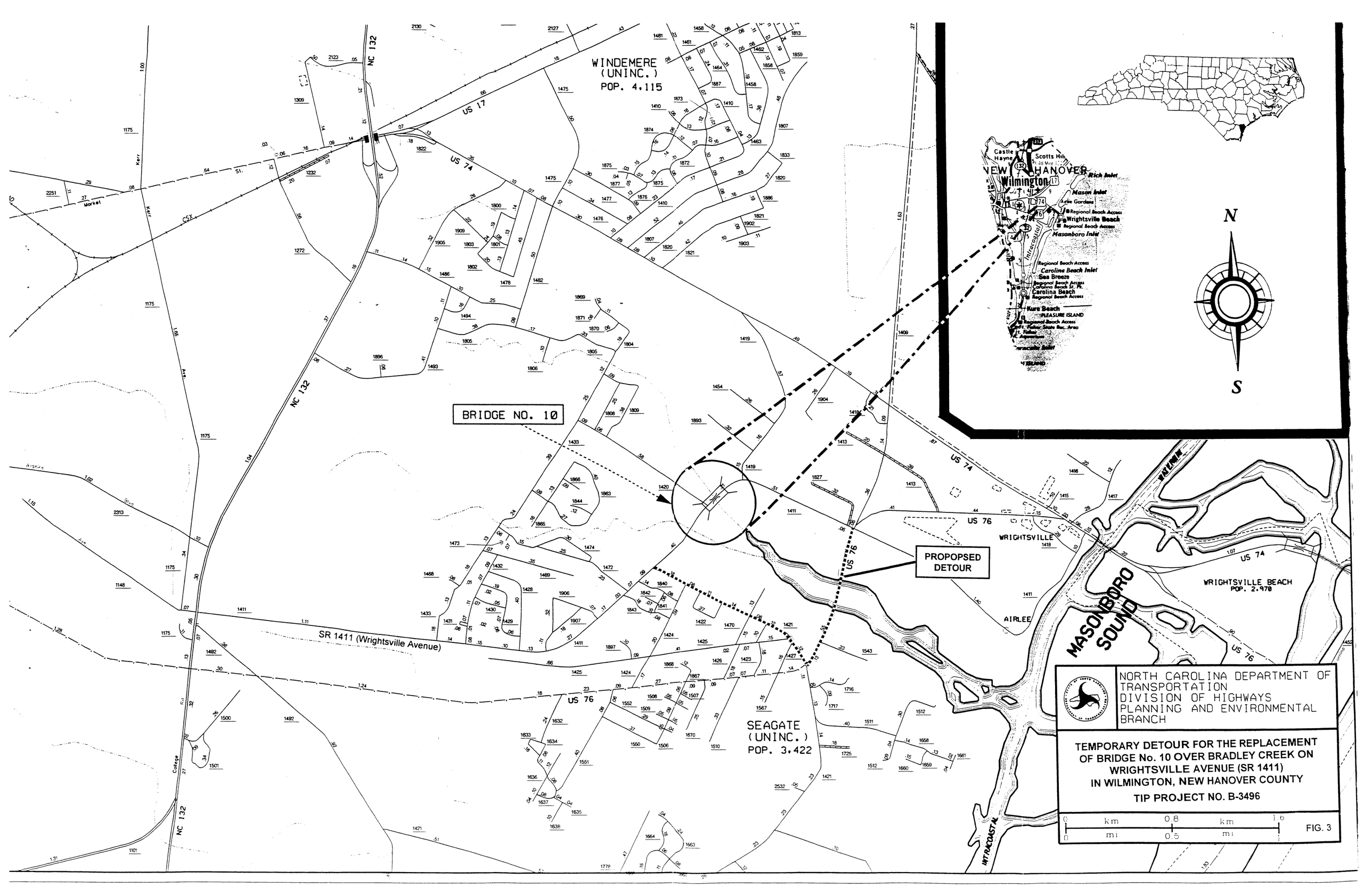
TIP Project No. B-3496

FIGURES



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND ENVIRONMENTAL BRANCH
New Hanover County
SR 1411
Bridge No. 10 over Bradley Creek
TIP Project B-3496
Fig. 1
BRIDGE NO. 10
SR 1411 (Wrightsville Avenue)
WINDEMERE (UNINC.) POP. 4,115
SEAGATE (UNINC.) POP. 3,422
WRIGHTSVILLE BEACH POP. 2,970
MASONBORO SOUND
WRIGHTSVILLE
AIRLEE
INTRACOASTAL
US 74
US 76
US 17
NC 132
CSX
N
S


SR 1420 (Hooker Road)
BEGIN
TIP PROJECT
No. B-3496
Bridge No. 10
Proposed Bridge
END
TIP PROJECT
No. B-3496
SR 1419 (Rogersville Road)
SR 1411 (Wrightsville Avenue)
Proposed Right of Way Limits
Proposed Right of Way Limits
Bradley Creek
Sound's Edge at
Bradley Creek
Subdivision
Softwind Way
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND ENVIRONMENTAL
BRANCH
REPLACEMENT OF BRIDGE No. 10 ON
SR 1411 (WRIGHTSVILLE AVENUE)
OVER BRADLEY CREEK IN
WILMINGTON, NEW HANOVER COUNTY
TIP PROJECT NO. B-3496
0
FEET
160
FIG. 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND ENVIRONMENTAL BRANCH

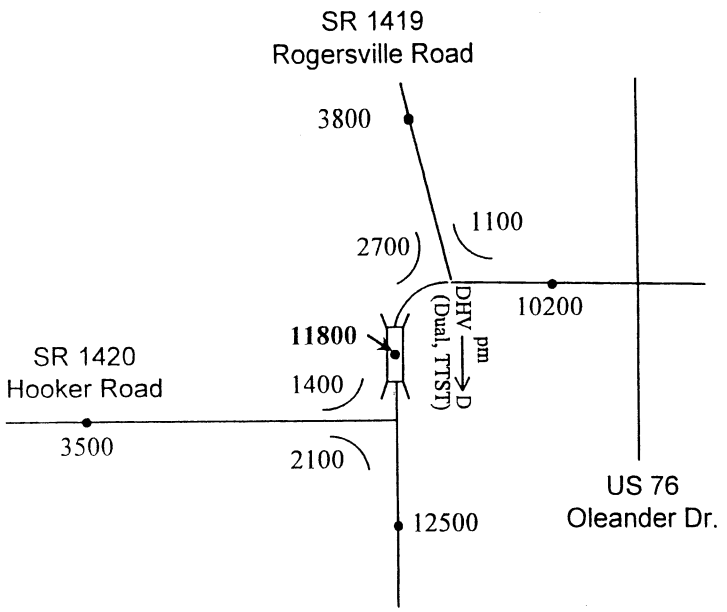
TEMPORARY DETOUR FOR THE REPLACEMENT OF BRIDGE No. 10 OVER BRADLEY CREEK ON WRIGHTSVILLE AVENUE (SR 1411) IN WILMINGTON, NEW HANOVER COUNTY

TIP PROJECT NO. B-3496

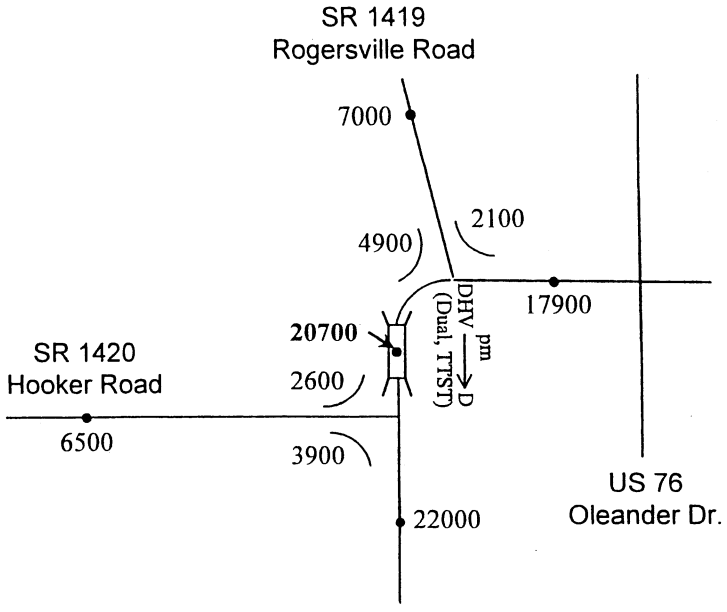
0 km 0.8 km 1.6
0 mi 0.5 mi

FIG. 3

Current Year 2000



Future Year 2025



B-3496 Design Data

Route	Wrightsville @ Bridge	Hooker	Rogersville
Year	2000/2025	2000/2025	2000/2025
DHV	10/9	10/10	10/10
D	55/50	55/50	50/50
Direction	SB	EB	NB
Peak	pm	pm	pm
Dual, TTST	(2,2)/(3,2)	(2,1)/(3,1)	(1,1)/(2,1)

NCDOT STATEWIDE PLANNING

Statewide Planning Branch
Division of Highways
NC Department of Transportation

Traffic Forecast for B-3496
Estimated **2000/2025** ADT Volumes
Bridge #10 over Bradley Creek on SR 1411

Wilmington	New Hanover County		Division 3
02/09/0:	k. d. Hinton	NTS	Page 1 of 1

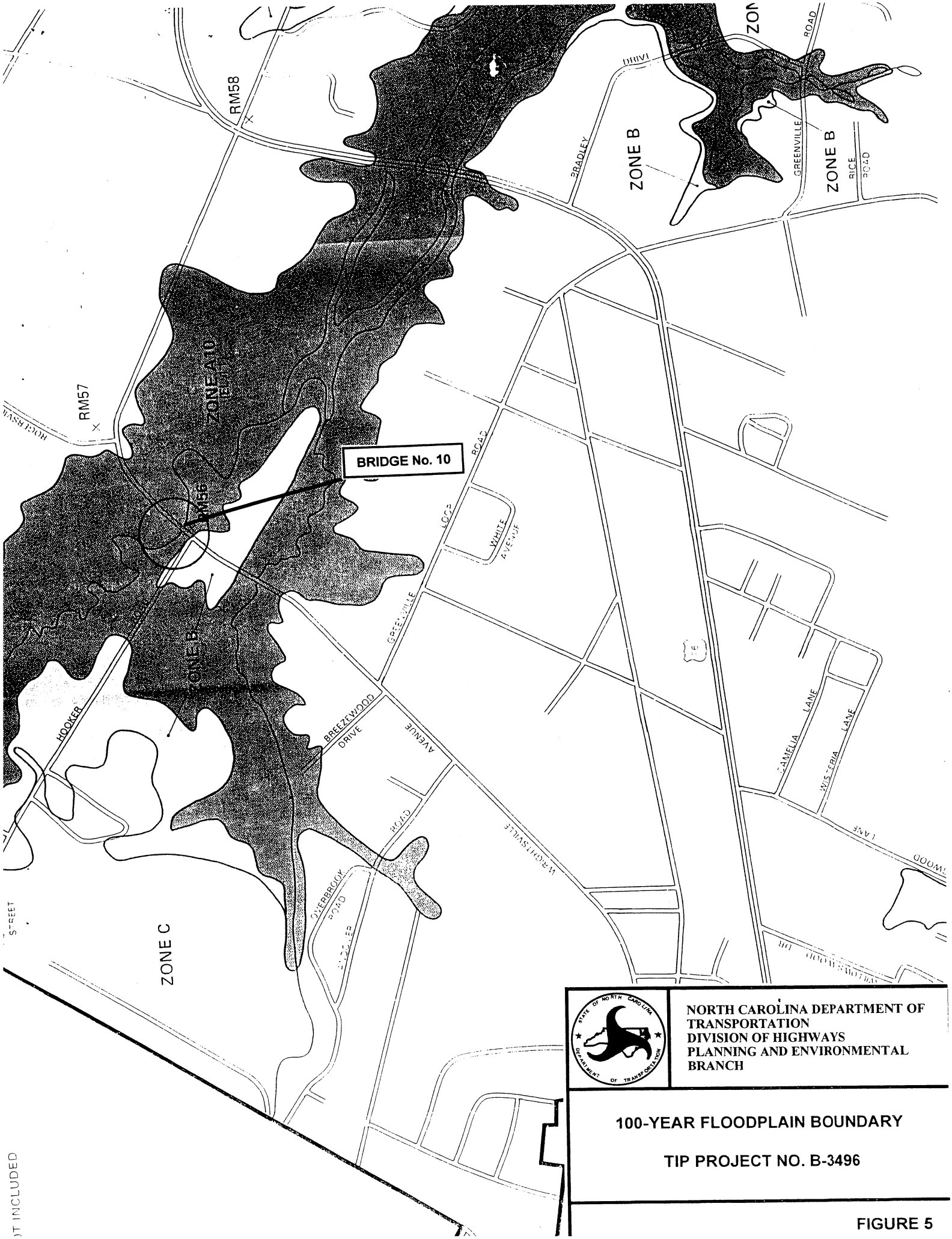
LEGEND

DHV $\xrightarrow{\text{pm}}$ D
Fac. (DUAL,TTST)

0000 = vpd
DHV Fac. = DESIGN HOURLY VOLUME (%) = K30
K30 = 30th highest hourly volume as % of ADT
D = DIRECTIONAL FLOW (%)
AM/PM = AM or PM Peak
$\longrightarrow$ = Direction of D
(DUAL,TTST) = Truck Percentages

Notes: DHV & D, if not shown are the same for the opposing leg.

FIGURE 4



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND ENVIRONMENTAL BRANCH

100-YEAR FLOODPLAIN BOUNDARY

TIP PROJECT NO. B-3496

FIGURE 5

TIP Project No. B-3496

APPENDIX A

Comments Received from Agencies

U.S. Department of Transportation
United States Coast Guard

Commander
United States Coast Guard
Atlantic Area

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (Aowb)
Phone: (757)398-6587

16590
09 Aug 00

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

Dear Mr. Gilmore:

This is in response to your July 20, 2000 letter requesting if a Coast Guard permit will be required to replace the bridge across Bradley Creek in New Hanover County, North Carolina.

Since this stream is subject to tidal influence, it is considered legally navigable for Bridge Administration purposes. This stream at the crossing site also meets the criteria for advance approval waterways outlined in Title 33, Code of Federal Regulations, Section 115.70. Advance approval waterways are those that are navigable in law, but not actually navigated by other than small boats. The Commandant of the Coast Guard has given his advance approval to the construction of bridges across such waterways. Ms. Karen Boshoff of your office confirmed such conditions. Therefore, an individual permit will not be required for this project.

If you have any questions regarding this matter, please contact Mr. Terrance Knowles at the phone number or address shown above.

Sincerely,

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

Copy: Mr. Ken Forster

North Carolina Department of Cultural Resources

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

Division of Archives and History
Jeffrey J. Crow, Director

September 17, 1998

Nicholas L. Graf
Division Administrator
Federal Highway Administration
Department of Transportation
310 New Bern Avenue
Raleigh, N.C. 27601-1442

Re: Bridge #10 on SR 1411 over Bradley Creek,
New Hanover County, B-3496, ER 99-7303

Dear Mr. Graf:

On September 14, 1998, Debbie Bevin of our staff met with North Carolina Department of Transportation (NCDOT) staff for a meeting of the minds concerning the above project. We reported our available information on historic architectural and archaeological surveys and resources along with our recommendations. NCDOT provided project area photographs and aerial photographs at the meeting.

Based upon our review of the photographs and the information discussed at the meeting, we offer our preliminary comments regarding this project.

In terms of historic architectural resources, we are aware of no historic structures located within the area of potential effect. We recommend that no historic architectural survey be conducted for this project.

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

Having provided this information, we look forward to receipt of either a Categorical Exclusion or Environmental Assessment which indicates how NCDOT addressed our comments.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966 and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800.

109 East Jones Street • Raleigh, North Carolina 27601-2807

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.

Sincerely,

David Brook/w

David Brook
Deputy State Historic Preservation Officer

DB:slw

cc: W. D. Gilmore
B. Church
T. Padgett

NCDENR

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF COASTAL MANAGEMENT

JAMES B. HUNT JR.
GOVERNOR

BILL HOLMAN
SECRETARY

DONNA D. MOFFITT
DIRECTOR

January 3, 2001

Karen Boshoff, Project Development Engineer
NC Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

RE: Replacement of Bridge No. 10 on SR 1411 (Wrightsville Avenue) over Bradley Creek, New Hanover County, TIP Project No. B-3496.

Dear Ms. Boshoff:

On December 7, 2000 I attended an interagency meeting about the above referenced project. The purpose of the meeting was for the NC Department of Transportation (DOT) to review the proposed project with environmental agencies to address any potential problems that might be encountered in the permitting process.

As you summarized in the meeting minutes, most of the meeting attendees agreed that 3:1 side slopes are acceptable for approaches to the new bridge. However, I stated that the NC Division of Coastal Management (DCM) prefers the use of 2:1 side slopes because of the reduced impact to the adjacent coastal wetlands. DOT then explained that the construction and maintenance of 2:1 side slopes creates a major problem in coastal areas due to the steepness of the slopes and the instability of the sandy soils. Based on this information, I agreed to speak with Ed Brooks, DCM Field Representative and Doug Huggett, DCM Major Permits and Consistency Coordinator, to reconsider whether DCM would agree to the use of 3:1 side slopes for the approaches to the new bridge.

Based on information received at the meeting, and subsequent conversations with Doug Huggett and Ed Brooks, DCM has agreed that the use of 3:1 side slopes for the approaches to the new bridge would be acceptable, provided that DOT can supply adequate documentation to demonstrate that the maintenance and construction of 2:1 side slopes is not feasible. Documentation may include a description of the type of fill material to be used, and the stability of the ground surface where the fill material will be placed. Documentation may also include a description of DOT's experience constructing and maintaining 2:1 side slopes under similar circumstances.

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Though DCM has agreed to the use of 3:1 side slopes for the approaches to the new bridge provided that adequate documentation is received, we remain concerned about the additional coastal wetland impacts that would result from the use of 3:1 side slopes. We would not agree to the construction of 4:1 side slopes for the approaches to the new bridge. During the permit review process for any project, DCM will require that DOT use the steepest possible slopes that can be adequately stabilized and maintained.

Another question that came up at the meeting was in regard to DOT's consideration under proposed alternatives 2 or 3 of replacing portions of the existing causeway with a bridge. The question was whether DCM would consider the area underneath the replacement bridge in areas where the causeway has been removed as mitigation of coastal wetland impacts even if shading from the replacement bridge prevented coastal wetland vegetation from recolonizing the area. The answer to this question is yes. Even if coastal wetland vegetation does not recolonize within the areas where the causeway has been removed due to shading from the replacement bridge, DCM would consider removal of the causeway as marsh mitigation. At a minimum, the marsh surrounding the causeway would qualify for enhancement credits due to benefits from improved tidal flushing and movement of aquatic organisms.

At the 12/7/00 meeting, there was also discussion about removing more of the causeway than is needed for mitigation of wetland impacts from this project. The additional wetlands that would be restored by removing a longer section of the causeway could potentially be used as up-front mitigation for future DOT projects in the area. Removing all or most of the existing causeway would have significant benefits to the Bradley Creek ecosystem, and is strongly supported by DCM.

Please contact me at (919) 733-2293 x238 or via e-mail at Cathy.Brittingham@ncmail.net if you have any questions or concerns, or require additional information.

Sincerely,

Cathy Brittingham

Cathy Brittingham
Transportation Project Coordinator

CC: Ed Brooks, DCM
Doug Huggett, DCM
David Cox, WRC
John Hennessy, DWQ
Tom McCartney, USFWS
Dave Timpy, COE
John Wadsworth, FHWA
Randy Turner, DOT
Kelly Williams, DCM

TIP Project No. B-3496

APPENDIX B

U.S. Fish and Wildlife Service (USFWS) Guidelines (July 2, 1996) "Precautions for the General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina"

Appendix B. PRECAUTIONS FOR GENERAL CONSTRUCTION IN AREAS WHICH MAY BE USED BY THE WEST INDIAN MANATEE IN NORTH CAROLINA

The North Carolina Field Office of the U.S. Fish and Wildlife Service (Service) has developed recommendations for general construction activities in aquatic areas which may be used by the manatee. Since the manatee is considered a seasonal inhabitant of North Carolina with reported occurrences being greatest during the months of June through October. The Service prefers that in-water construction which can be completed in several months be scheduled during the seven month period of November through May. However, the Service believes that the implementation of the following recommendations will allow major, in-water construction projects which do not require blasting to proceed without adverse impacts to manatees. While most conditions must be implemented throughout the year, other requirements may be implemented only during the period when manatees are most likely to be in North Carolina waters, currently considered to be the months of June through October. The conditions which should be implemented throughout the year are:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, primarily during the months of June through October, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.

2. The project manager and/or the contractor will advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the ESA.

3. If a manatee is seen within 100 yards of the active construction/dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition.

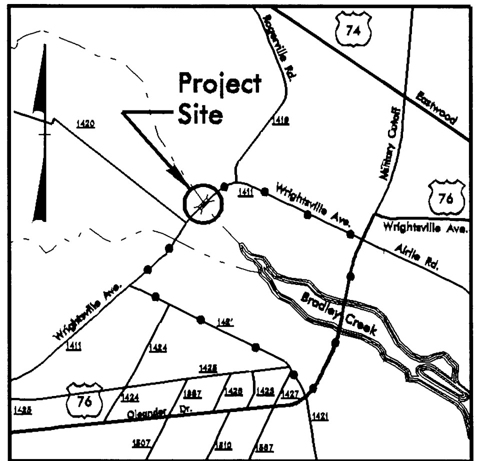
4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the Service's manatee coordinator in Jacksonville, FL (ph. 904-232-2580), the Raleigh Field Office (ph. 919-856-4520), and the North Carolina Wildlife Resources Commission (ph. 919-224-1288). The project manager should coordinate with the Service immediately prior to the start of construction for the name and current telephone number of the individuals to be contacted.

5. A sign should be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

CONTRACT:

TIP PROJECT: B-3496

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

DETOUR ROUTE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3496	1	

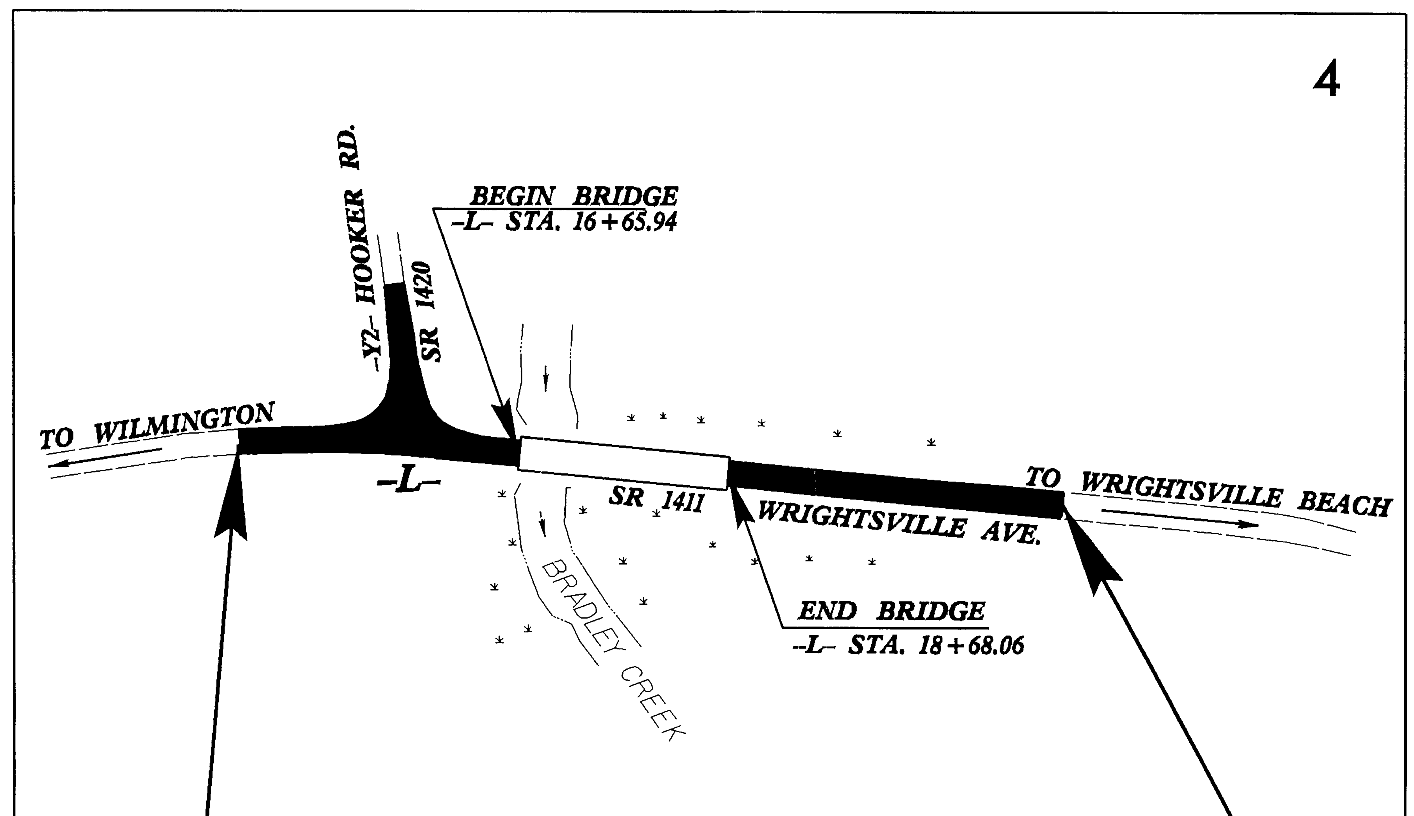
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33111.1.1	BRSTP-1411(5)	PE
33111.2.1	BRSTP-1411(5)	R/W, UTIL.
33111.3.1	BRSTP-1411(5)	CONSTR.

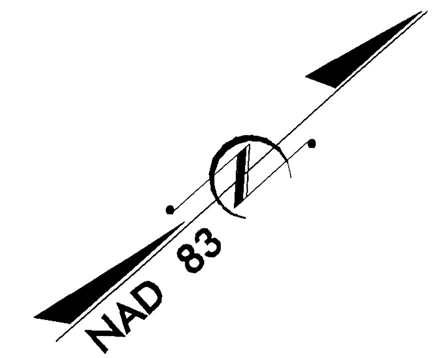
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

LOCATION: BRIDGE No. 10 OVER BRADLEY CREEK ON SR 1411 IN WILMINGTON

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





STA. 22+00.00 -L- END TIP PROJECT B-3496

STA. 14+00.00 -L- BEGIN TIP PROJECT B-3496

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 13,224
ADT 2024 = 20,344
DHV = 9 %
D = 50 %
T = 5 % *
V = 50 MPH

* TTST 2% DUAL 3%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3496 = 0.114 MI
LENGTH OF STRUCTURE TIP PROJECT B-3496 = 0.038 MI
TOTAL LENGTH OF TIP PROJECT B-3496 = 0.152 MI

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 17, 2003

LETTING DATE:
APRIL 20, 2004

BRENDA MOORE, PE
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

9/09/99

04-FEB-2004 11:51
R:\project\b3496.tsh

PROJECT REFERENCE NO.	SHEET NO.
B-3496	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

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

RIGHT OF WAY

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

HYDROLOGY

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

STRUCTURES

MAJOR

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

MINOR

- Head & End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Boxes (CB)
- Paved Ditch Gutter

UTILITIES

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

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

BOUNDARIES & PROPERTIES

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

BUILDINGS & OTHER CULTURE

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

TOPOGRAPHY

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

VEGETATION

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard (VINEYARD)

RAILROADS

- Standard Gauge (CSX TRANSPORTATION)
- RR Signal Milepost (MILEPOST 35)
- Switch (SWITCH)

revised 11/09/00

5/28/99

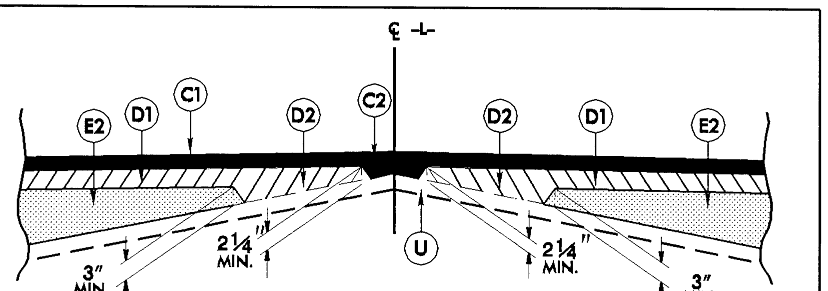
04-FEB-2004 11:27

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

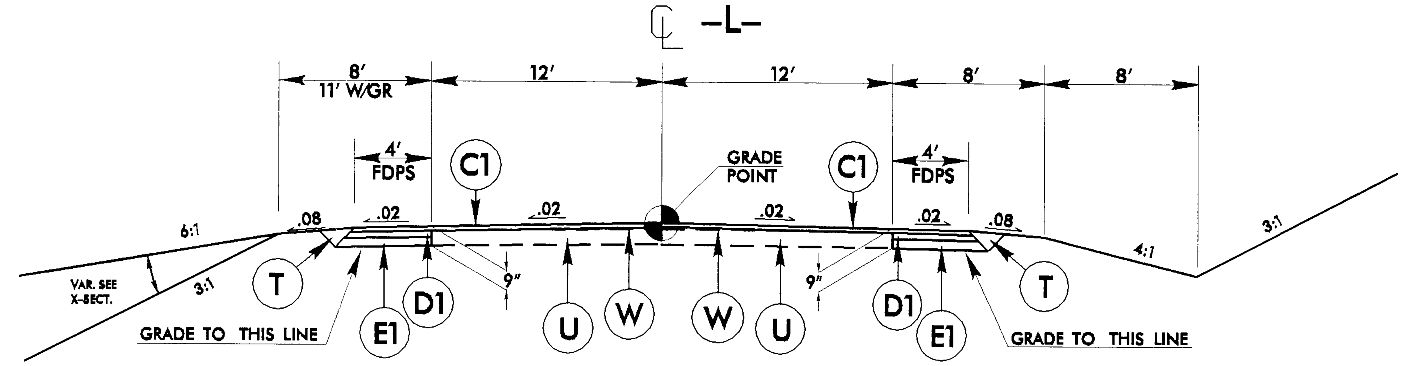
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½"ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET).

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



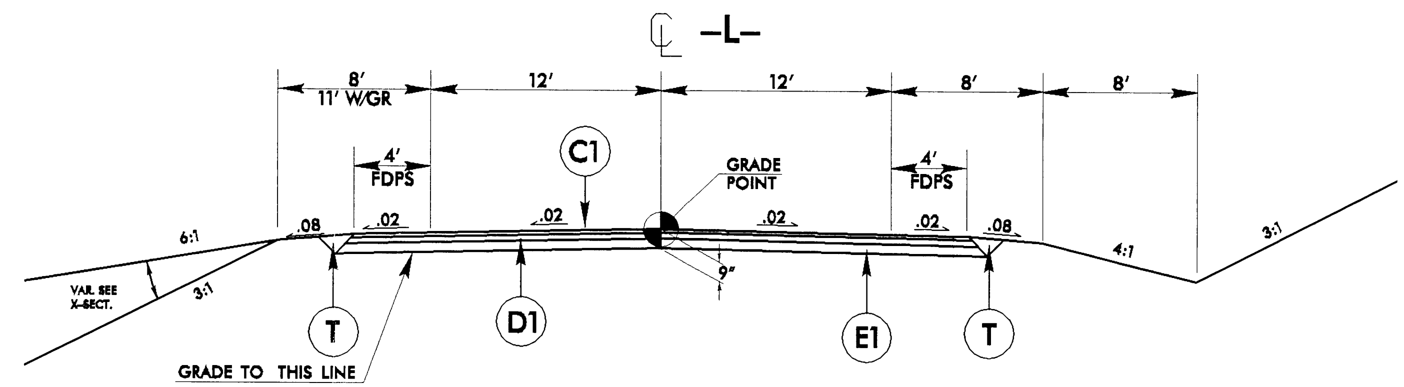
STANDARD WEDGING DETAIL



TYPICAL SECTION No. 1

USE TYPICAL SECTION NO. 1

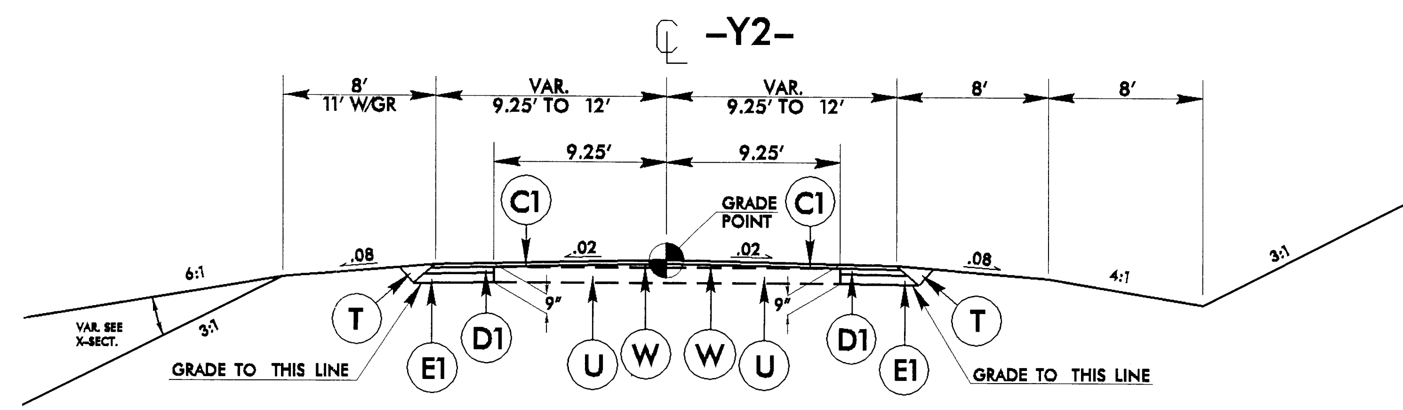
-L- STA. 14+00.00 TO 16+20.00
-L- STA. 19+00.00 TO 21+37.50



TYPICAL SECTION No. 2

USE TYPICAL SECTION NO. 2

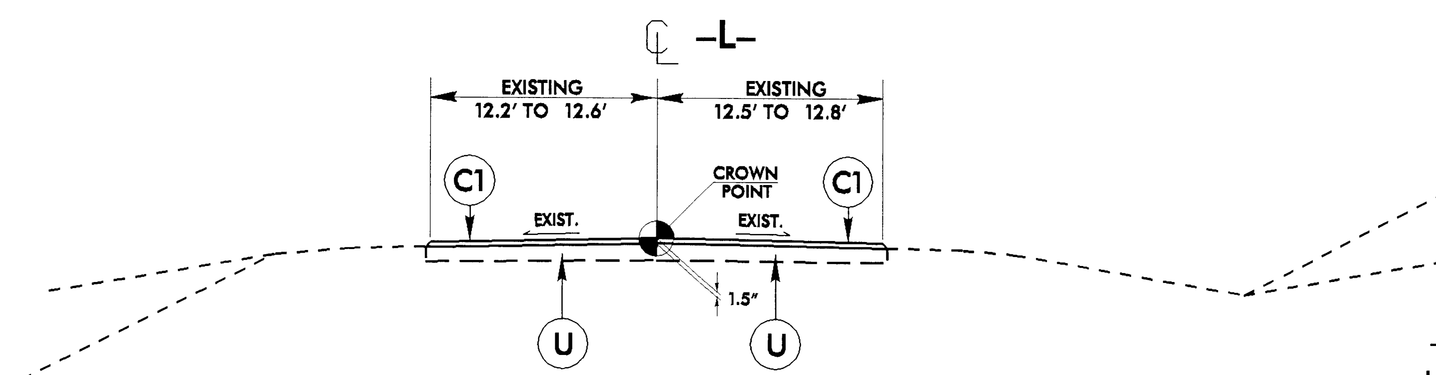
-L- STA. 16+20.00 TO 16+65.94 (BEGIN BRIDGE)
-L- STA. 18+68.06 (END BRIDGE) TO 19+00.00



TYPICAL SECTION No. 3

USE TYPICAL SECTION NO. 3

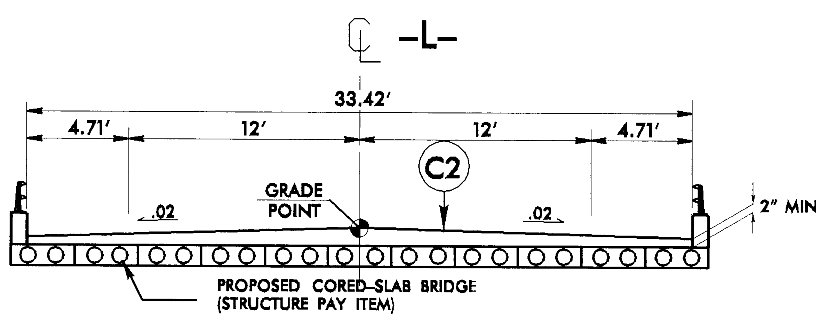
-Y2- STA. 10+19.56 TO 11+62.74



TYPICAL SECTION No. 4

USE TYPICAL SECTION NO. 4

-L- STA. 21+37.50 TO 22+00.00



TYPICAL SECTION No. 5

USE TYPICAL SECTION NO.5

-L- STA. 16+65.94 (BEGIN BRIDGE) TO 18+68.06 (END BRIDGE)

6/2/99

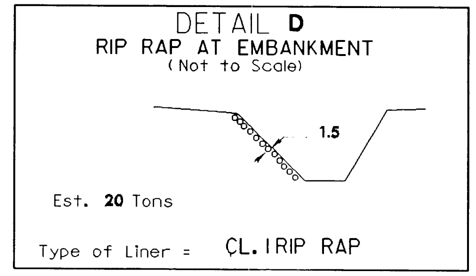
04-FEB-2004 11:27

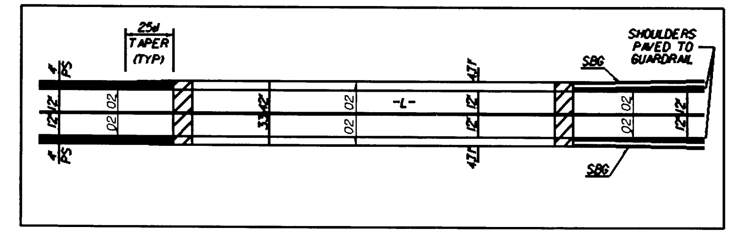
PROJECT REFERENCE NO.	SHEET NO.
B-3496	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

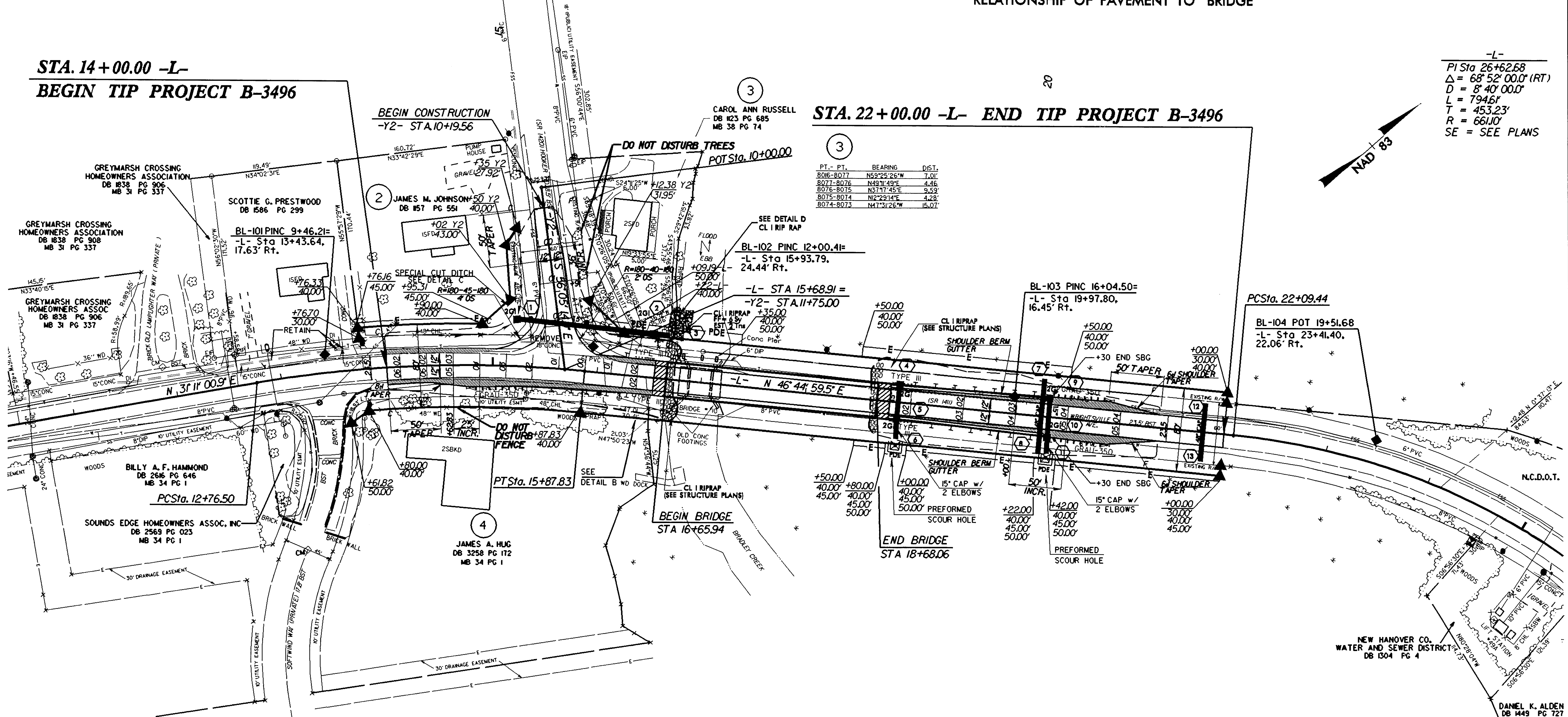
-L-
PI Sta 14+33.13
△ = 15° 33' 58.6" (RT)
D = 5° 00' 00.0"
L = 311.33'
T = 156.63'
R = 1,145.92'
SE = SEE PLANS





RELATIONSHIP OF PAVEMENT TO BRIDGE

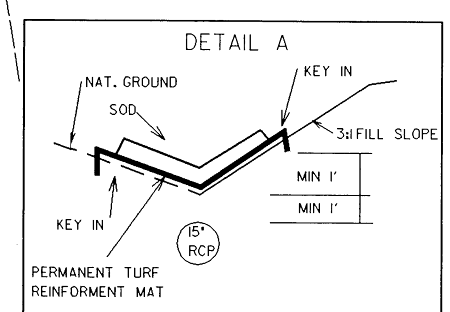
-L-
PI Sta 26+62.68
△ = 68° 52' 00.0" (RT)
D = 8° 40' 00.0"
L = 794.61'
T = 453.23'
R = 661.10'
SE = SEE PLANS



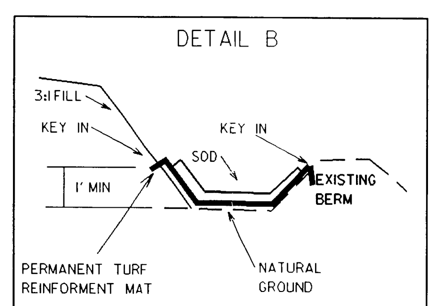
PT.- PT.	BEARING	DIST.
8016-8077	N59°25'26"W	7.01'
8077-8076	N49°11'49"E	4.46'
8076-8075	N37°17'45"E	9.59'
8075-8074	N12°29'14"E	4.28'
8074-8073	N47°31'26"W	15.07'

DATUM DESCRIPTION

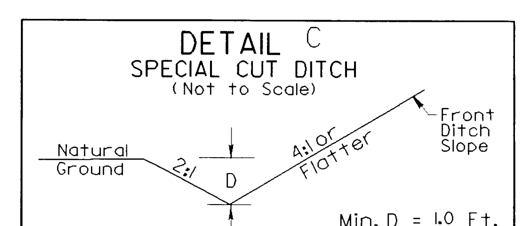
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3496-2"
WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 173841.808(ft) EASTING: 2348781.145(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000038649
THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3496-2" TO -L- STATION 14+00.00 IS S 42 07 24.26 E DISTANCE 640.1185 FT.
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29



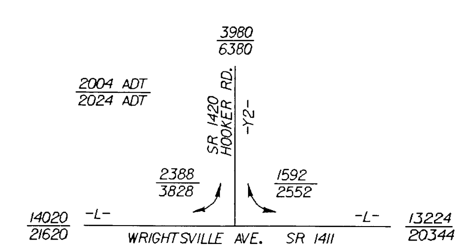
STATION 16+50 TO 16+70 -L- Lt



STATION 16+00 TO 16+50 -L- Rt



STA 14+50 TO 15+25 -L- Lt
STA 10+50 TO 11+35 -Y2- Rt



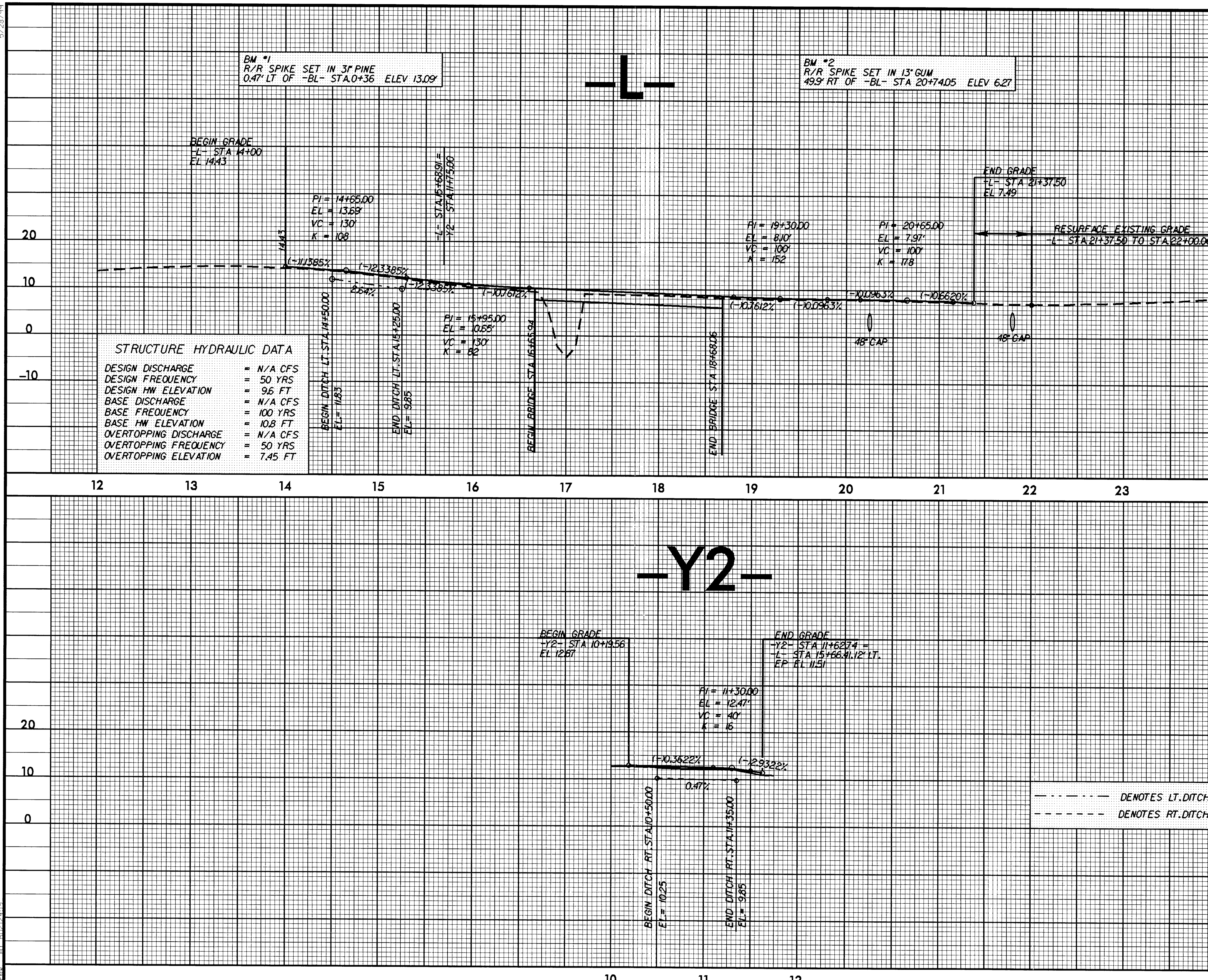
PAVED SHOULDER
APPROACH SLAB

FOR -L- & -Y2- PROFILE SEE SHEET 5

7/2/99
04-FEB-2004 11:43

PROJECT REFERENCE NO.	SHEET NO.
B-3496	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



5/28/99
04-FEB-2004 11:28