STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 24, 2004

D.E.N.R. Division of Water Quality
1621 Mail Service Center
Raleigh, NC 27699-1621

ATTENTION: Mr. John Hennessy
NCDOT Coordinator

SUBJECT: **Buffer Certification Application** for the proposed replacement of Bridge No. 246 over Little Arm Branch on SR 2564 (Creech Road) in Wake County, Division 5. Federal Aid Project No. BRSTP-2564(1), State Project No. 8.2406901, T.I.P. B-3376.

Dear Sir:

Please find the enclosed 3 copies of the Categorical Exclusion, project site map, EEP compensatory mitigation request, permit drawings, and roadway design plan sheets. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 246 over Little Arm Branch with a new bridge at approximately the same location and roadway elevation. The proposed bridge would be approximately 80 feet in length and 40 feet in width, with a 24 foot travel way and with 8 foot offsets. Traffic would be detoured onsite, using a temporary bridge located upstream of the existing bridge during construction. The detour bridge will be approximately 50 feet in length and 40 feet in width. The temporary bridge may be placed as much as one meter lower than the existing bridge.

Project History

A Section 404 Regional General Permit (GP) 31 was issued 12-31-02 by Mr. Eric Alsmeyer of the USACE. The previous design involved replacing existing Bridge No. 246 with a culvert on a new alignment to the west of the existing structure. This project was later redesigned from a culvert to a bridge. Soil structural stability issues have been identified at the site, which would make constructing a culvert in that location unfeasible. In addition, changing to a bridge minimized impacts to natural resources

IMPACTS TO WATERS OF THE UNITED STATES

Little Arm Branch is a perennial stream that comprises the single water resource within the project area. The stream is located within the Neuse River Drainage Basin and is designated as Subbasin 03-04-03 according to the NC Department of Water Quality

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.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

(NCDWQ) system for cataloging drainage basins, and USGS Hydrologic Unit 03020201 according to the federal system for cataloging drainage basins.

No jurisdictional streams or wetlands will be affected by the proposed project. NCDOT's Best Management Practices (BMP) or the Protection of Surface Waters and Sedimentation Control guidelines in Sensitive Watersheds will be strictly enforced during the construction stage of the project. Provisions to preclude contamination by toxic substances during the construction interval will also be strictly enforced. The construction of the bridge will not require the use of impervious dikes (sand bags), work pads, causeways or workbridges.

Bridge Demolition: Bridge No. 246 is located on SR 2564 (Creech Road) over Little Arm Branch in Wake County. The existing bridge is composed of a combination of various timber, steel, and reinforced concrete components, with an overlaid asphalt wearing surface. The asphalt wearing surface will be removed prior to demolition, without dropping it into the water. The timber and steel components will also be removed in their sequence without dropping them into the water. The reinforced concrete components of the bridge will not enter the Waters of the United States during demolition. During construction, Best Management Practices for Bridge Demolition and Removal will be followed.

Restoration Plan: Upon completion of the new bridge, the temporary bridge will be removed. The temporary approach fill will be removed to natural grade and the area will be planted with native grasses and or tree species as appropriate.

Utility Impacts: Utility impacts associated with this project include installation of a sewer line causing a parallel impact in the Neuse river buffer at L Sta. 12+77-12+93. Allowable impacts in Zone 2 include 566 ft^2 and mitigable impacts occur in Zone 1 totaling 674 ft^2 (See Table 1).

Schedule: All steps will be taken to minimize stream impacts to Little Arm Branch. The project schedule calls for a production letting of 12/21/04 with a date of availability of 02/01/05.

AVOIDANCE, MINIMIZATION AND MITIGATION

Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional stages; minimization measures were incorporated as part of the project design. Redesigning the project from a culvert to a bridge avoided impacts associated with culvert design including construction of impervious dikes and causeways likely to be in place for 12 or more months.

Neuse River Basin Rules

This project is located in the Neuse River Basin; therefore the regulations pertaining to the Neuse River Rules will apply. The buffer impacts to Zone 1 and Zone 2 are broken out in Table 1. According to the buffer rules, temporary roads for bridge construction are ALLOWABLE. Uses designated as allowable may proceed within the riparian buffer provided that there are no practical alternatives to the requested use pursuant to Item (8) of

this Rule. These uses require written authorization from the Division or the delegated local authority. Therefore, NCDOT requests written authorization for a Buffer Certification from the Division of Water Quality (DWQ).

Non-electric (sewer) utility lines with impacts other than perpendicular crossings in Zone 1 are ALLOWABLE WITH MITIGATION. Uses designated as allowable with mitigation may proceed within the riparian buffer provided that there are no practical alternatives to the requested use pursuant to Item (8) of this Rule and an appropriate mitigation strategy has been approved pursuant to Item (10) of this Rule. These uses require written authorization from DWQ. Mitigation is required from the North Carolina Ecological enhancement Program (EEP) to provide compensatory mitigation. Therefore, a request has been made to EEP to provide confirmation that they are willing to provide mitigation (see attached letter).

Table 1. Neuse River Buffer Impacts (Square Feet)

	Sewer Line Parallel Impact	Bridge Construction
Zone 1 Impact (sq ft)	674	3,647
Zone 2 Impact (sq ft)	566	9,030
TOTAL IMPACTS	**1,240**	**12,677**
Mitigation requirements (exempt, allowable or allowable with mitigation)	Zone 1: Allowable with Mitigation Zone 2: Allowable	Allowable
Mitigable Impacts (using 3:1 ratio) for Zone 1	2,022	N/A
TOTAL MITIGATION REQUIRED	**2,022**	**N/A**

Total mitigation required for buffer impacts is for 2,022 sq. ft., 0.05 ac.

Federally Protected Species

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the Fish and Wildlife (FWS) lists four federally protected species for Wake County (Table 2). The CE (dated March 14, 2001) rendered Biological Conclusions of "No Effect" for each of these due to lack of suitable habitat, except in the case of Michaux's sumac. A most recent plant by plant survey was conducted on May 11, 2004 of the suitable habitat for Michaux's sumac. No plants were discovered within the project area. To date, habitat conditions have not changed within the survey area. Additionally, a review of the NC Natural Heritage Program database of Rare and Unique Habitats of May 14, 2004, revealed that no known occurrences of any federally protected species occur within one mile of the project area. As Michaux's sumac habitat exists in the project area, the biological conclusion is May Affect, Not Likely to Adversely Affect. Concurrence with this conclusion was requested from the USFWS on June 4, 2004 (See attached letter).

Table 2. Federally-Protected Species for Wake County

Common Name	Scientific Name	Federal Status	Biological Conclusion
Dwarf wedge mussel	*Alasmidonia heterodon*	E	No Effect
Bald Eagle	*Haliaeetus leucopephalus*	T	No Effect
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Michaux's sumac	*Rhus michauxii*	E	May Affect Not Likely to Adversely Affect

Summary

According to the buffer rules, temporary roads for bridge construction are ALLOWABLE. Non-electric (sewer) utility lines with impacts other than perpendicular crossings in Zone 1 are ALLOWABLE WITH MITIGATION. These uses require written authorization from the Division or the delegated local authority. Therefore, NCDOT requests written authorization for a Buffer Certification from the Division of Water Quality.

This project has been reviewed for jurisdiction under the Federal Clean Water Act (CWA). There are no impacts to Waters of the US, therefore none of the actions of this project fall under jurisdiction of the CWA. Therefore, no permits pursuant to the CWA are required.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Ms. Cheryl Knepp at (919) 715-1489.

Sincerely,

Gregory Thorpe, P.E., Manager
Project Development and Environmental Analysis Branch

cc:
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
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. Greg Perfetti, P.E., Structure Design
Mr. Ron Hancock, P.E., Bridge Construction
Mr. Mark Staley, Roadside Environmental
Mr. Jon Nance, P.E., Division Engineer
Mr. Chris Murray, DEO
Mr. David Franklin, USACE, Wilmington
Mr. Bill Gilmore, Interim Manager, EEP

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 3, 2004

MEMORANDUM TO: Cindy Sharer, P.E., Unit Head
Project Development Unit

FROM: Cheryl Knepp, Environmental Specialist
Office of Natural Environment

SUBJECT: Water resources and protected species review for a Federal Highway Administration (FHWA) Construction Consultation for the proposed replacement of Bridge No. 246 over Little Arm Branch in Wake County. State Project No. 8.2406301, Federal Aid Project No. BRSTP-2564 (1), Division 5, TIP No. B-3376.

ATTENTION: Stephanie Caudill, Project Planning Engineer
Project Development Unit

REFERENCES: 1) Categorical Exclusion (NCDOT, dated March 26, 2001).

The following memorandum provides information to assist in the preparation of an FHWA Construction Consultation for the proposed project. It addresses water resources and federally protected species potentially impacted by the project and serves to update the previously submitted Categorical Exclusion (CE) with respect to these two issues.

WATER RESOURCES

Water resource classifications have not changed since the CE was prepared. The Division of Water Quality (DWQ) best usage classification remains **C NSW** for Little Arm Branch, which is DWQ Index No. 27-34-11-2. **Class C** refers to waters suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, agriculture and other uses requiring waters of low quality. The supplemental classification of **NSW** denotes Nutrient Sensitive Waters, which requires limitations on nutrient, inputs.

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

Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW), occur within 1.6 km (1.0 mi.) of the project area.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), Proposed Threatened (PT), are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended.

As of January 29, 2003, the U.S. Fish and Wildlife Service (FWS) lists four protected species, which includes bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*), dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michauxii*) for Wake County. The status of these species, red-cockaded woodpecker (E), dwarf wedgemussel (E) and Michaux's sumac (E), has not changed since the completion of the referenced CE. However, the bald eagle has been proposed for delisting.

A description and biological conclusion of "No Effect" was given for the bald eagle, red-cockaded woodpecker, dwarf wedgemussel and Michaux's sumac in the referenced CE document. This biological conclusion of "No Effect" remains valid for the Bald eagle and red-cockaded woodpecker due to lack of suitable habitat.

A plant by plant survey for Michaux's sumac was conducted in the project study area on May 11, 2004 by NCDOT biologists Cheryl Knepp and Rachelle Beauregard, in the areas of suitable habitat. Habitat was found and surveyed on foot by the above mentioned biologists. Although habitat was located, no Michaux's sumac was found anywhere within the project study area in 2 man-hours of survey time. The NCNHP database of rare species and unique habitat does not list any populations of Michaux's sumac within the project vicinity. As Michaux's sumac habitat exists in the project area, the biological conclusion is "May Affect, Not Likely to Adversely Affect".

A mussel survey was conducted on March 25, 2004 by NCDOT biologists, Neil Medlin, Anne Burroughs, and Jared Gray. The Little Arm Branch crossing at SR 2564 contains run, riffles and slack areas. The compactness of the streambed was unconsolidated. The substrate above and below the bridge on SR 2564 consists of sand, silt, clay, and gravel with slow to medium current. The portion of Little Arm Branch that was surveyed had moderate buffer upstream and downstream except for two residential areas downstream. The stream banks were unstable. Sand and gravel bars were abundant in the stream. The land use was urban at the SR 2564 crossing of Little Arm Branch. The host fish that carry the glochidia for dwarf wedgemussel was observed during the survey. Surveys were conducted by wading using a batiscope from approximately 400 meters downstream to 100 meters upstream of the project crossing. No freshwater mussels were found in 2.25 man-hours of survey time.

Given the survey results, that no freshwater mussels were found, it is apparent that the dwarf wedgemussel does not occur in the project footprint. The North Carolina Natural Heritage Program (NCNHP) does not list a known population up or downstream in Little Arm Branch or Big Branch Creek, which Little Arm flows into. The proposed bridge replacement will have "No Effect" on the dwarf wedgemussel.

QUALIFICATIONS OF PRINCIPAL INVESTIGATORS

Investigator: Jared Gray
Education: B.S. Environmental Science, Morehead State University
Experience: Environmental Biologist, Enviro-Pro, October 1994 – May 1997
Environmental Technician, Appian Consulting Engineers, P.A., October 1997 – May 1998
Environmental Specialist, NCDOT, October 1998-present
Expertise: Endangered species (terrestrial/aquatic) surveys; benthic macroinvertebrate collection, wetland delineation; soils, water quality analysis, and 404/401 permitting.

Investigator: Anne Burroughs, Environmental Specialist
Education: B.S. Biological Science, minor Environmental Science,
North Carolina State University / Raleigh 1992.
Experience: Biological Control technician – NC Dept of Agriculture May 2001-April 2003.
Environmental Specialist – NC Dept. of Transportation, May 2003-August 2003, January 2004-present.
Expertise: Endangered species (terrestrial/aquatic) surveys; benthic macroinvertebrate collection.

Investigator: Neil Medlin, Environmental Specialist
Education: M.A. Biology, Appalachian State University
B.S. Biology, Appalachian State University
Experience: Environmental Specialist, NCDOT, January 2002 - present
Environmental Biologist, NC Division of Water Quality
June 1990 - January 2002
Environmental Biologist, FL Department of Environmental Protection (formerly Department of Environmental Regulation), August 1986 – June 1990
Expertise: Freshwater fish and benthic macroinvertebrate collection and identification; aquatic habitat evaluations and function; biocriteria and biotic indices evaluations; Endangered species (terrestrial/aquatic) surveys.

Investigator: Cheryl Knepp
Education: B.S. Natural Resource Management & Ecology, Colorado State University
Experience: Environmental Specialist, NCDOT, Raleigh, NC, December 2003 to present
Field Tech, GeoSonics, Inc., Raleigh, NC September to December 2003
Expertise: Biotic community mapping and assessment, species identification, wetland delineation, and technical report writing.

Investigator: Rachelle Beauregard
Education: B.S. Fisheries and Wildlife Science, North Carolina State University
Experience: Environmental Biologist, NCDOT, March 2001-present
Biologist, Dr. J.H. Carter III and Associates, Inc., March 1997-Jan. 2001
Expertise: Natural resource investigations; Section 7 field investigations; protected species (terrestrial/aquatic) surveys; Section 404/401 permitting; wetland delineation.

B-3376

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 3, 2004

Mr. William D. Gilmore, P.E.
EEP Transition Manager
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Sir:

Subject: Wake County, Replacement of Bridge No. 246 over Little Arm Branch on SR 2564, Division 5, Wake County. Federal Aid Project No. BRSTP-2564(1), State Project No. 8.2406301, T.I.P. No. B-3376.

The purpose of this letter is to request that the North Carolina Ecosystem Enhancement Program (EEP) provide confirmation that you are willing to provide compensatory mitigation for the project in accordance with the Memorandum of Agreement (MOA) signed July 22, 2003 by the USACE, the NCDENR and the NCDOT.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 246 in Wake County.

We have avoided and minimized the impacts to jurisdictional resources and riparian buffers to the greatest extent possible as described in the permit application. We do not anticipate impacts to jurisdictional streams or wetlands for the construction of this project. The project is located in the Piedmont Physiographic Province in Wake County in the Neuse River basin in Hydrological Cataloguing Unit 03020201.

The following table shows the buffer impacts and needed mitigation.

Table 1. Neuse River Buffer Impacts (Square Feet)

	Sewer Line Parallel Impact	Bridge Construction
Zone 1 Impact (sq ft)	674	3,647
Zone 2 Impact (sq ft)	566	9,030
TOTAL IMPACTS	**1,240**	**12,677**
Mitigation requirements (exempt, allowable or allowable with mitigation)	Zone 1: Allowable with Mitigation Zone 2: Allowable	Allowable
Mitigable Impacts (using 3:1 ratio) for Zone 1	2,022	
TOTAL MITIGATION REQUIRED	**2,022**	

Total mitigation required for buffer impacts is for 2,022 sq. ft., 0.05 ac.

Please send the letter of confirmation to Eric Alsmeyer (USACE Coordinator) at U. S. Army Corps of Engineers Raleigh Regulatory Field Office, 6508 Falls of Neuse Rd,. Suite 120, Raleigh, NC 27615-6814. Mr. Alsmeyer's FAX number is 919-876-5823.

In order to satisfy regulatory assurances that mitigation will be performed; the NCDWQ requires a formal letter from EEP indicating their willingness and ability to provide the mitigation work requested by NCDOT. The NCDOT requests such a letter of confirmation be addressed to Mr. John Hennessy of NCDWQ, with copies submitted to NCDOT.

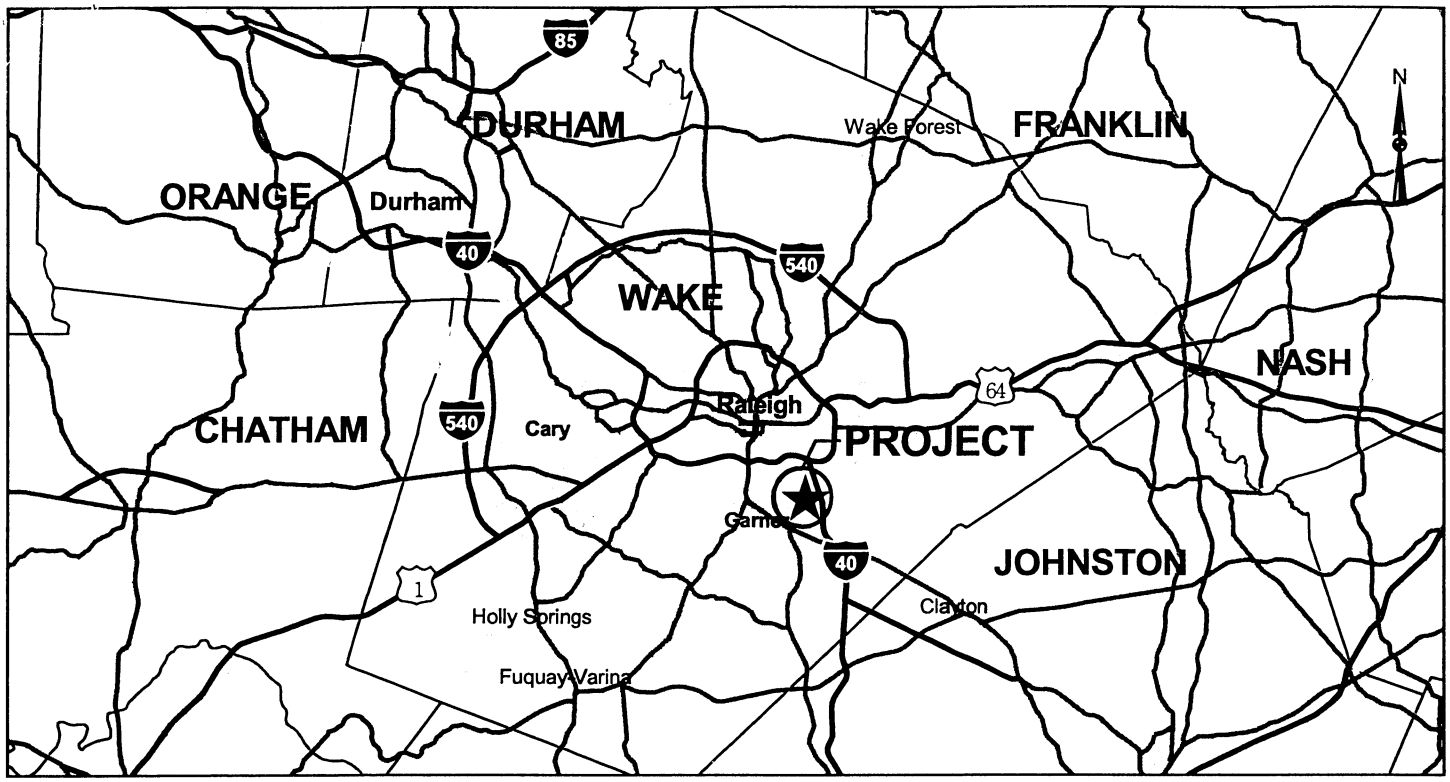
If you have any questions or need additional information please call Cheryl Knepp at 715-1489.

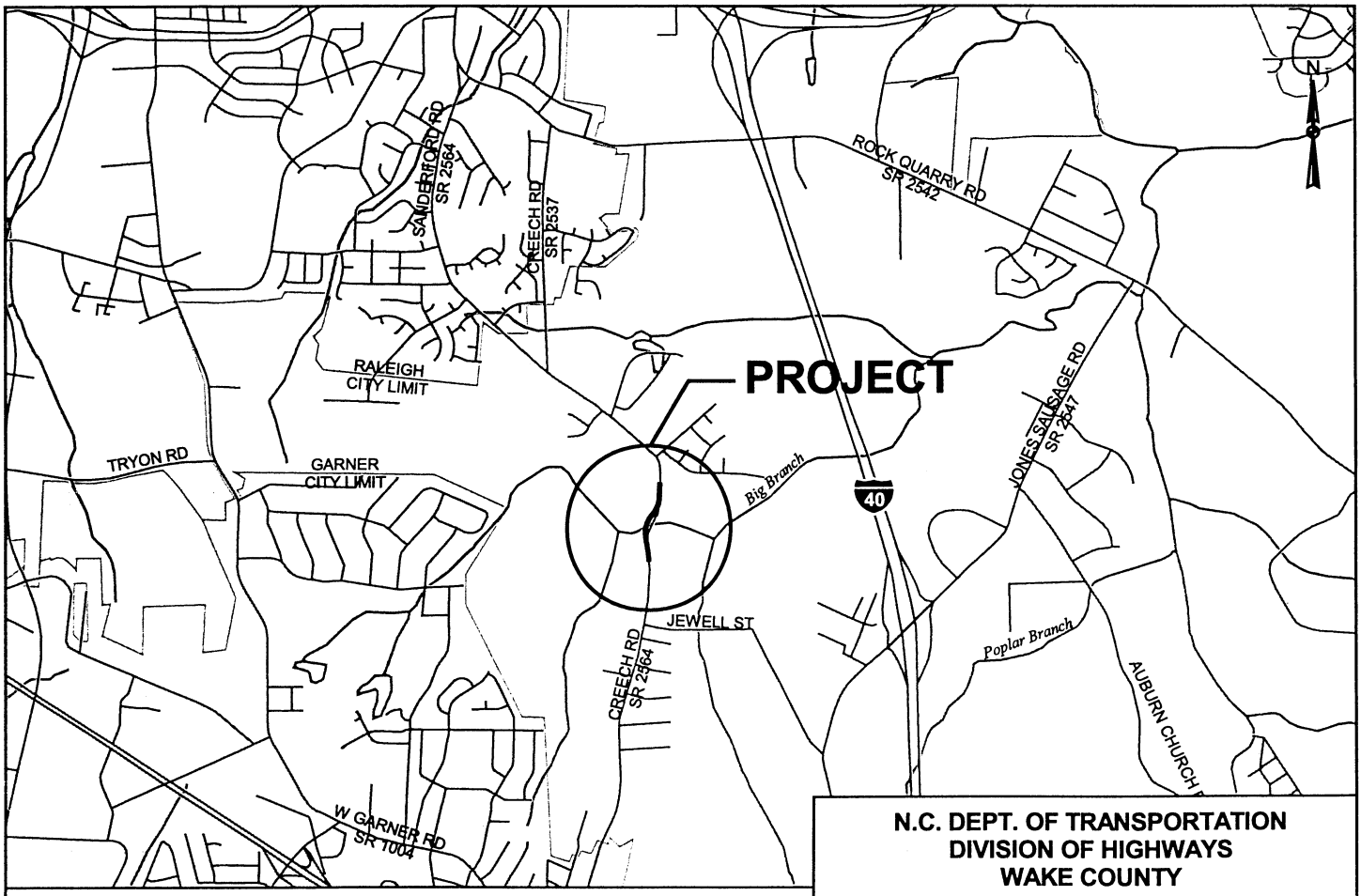
Sincerely,

for

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

cc: Mr. John Hennessy, Division of Water Quality (2 copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Greg Perfetti, P.E., Structure Design
Mr. David Franklin, USACE, Wilmington
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. John F. Sullivan, III, FHWA
Ms. Stefanie Caudill, Planning Engineer
Mr. Jon Nance, P.E., Division 5 Engineer
Mr. Chris Murray, DEO





NEUSE RIVER BUFFER
VICINITY MAPS

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

PROJECT 8.2406301 (B-3376)

BRIDGE NO. 246 AND APPROACHES
ON SR 2564 OVER BIG BRANCH CREEK
SHEET 1 OF 5 **03/11/02**

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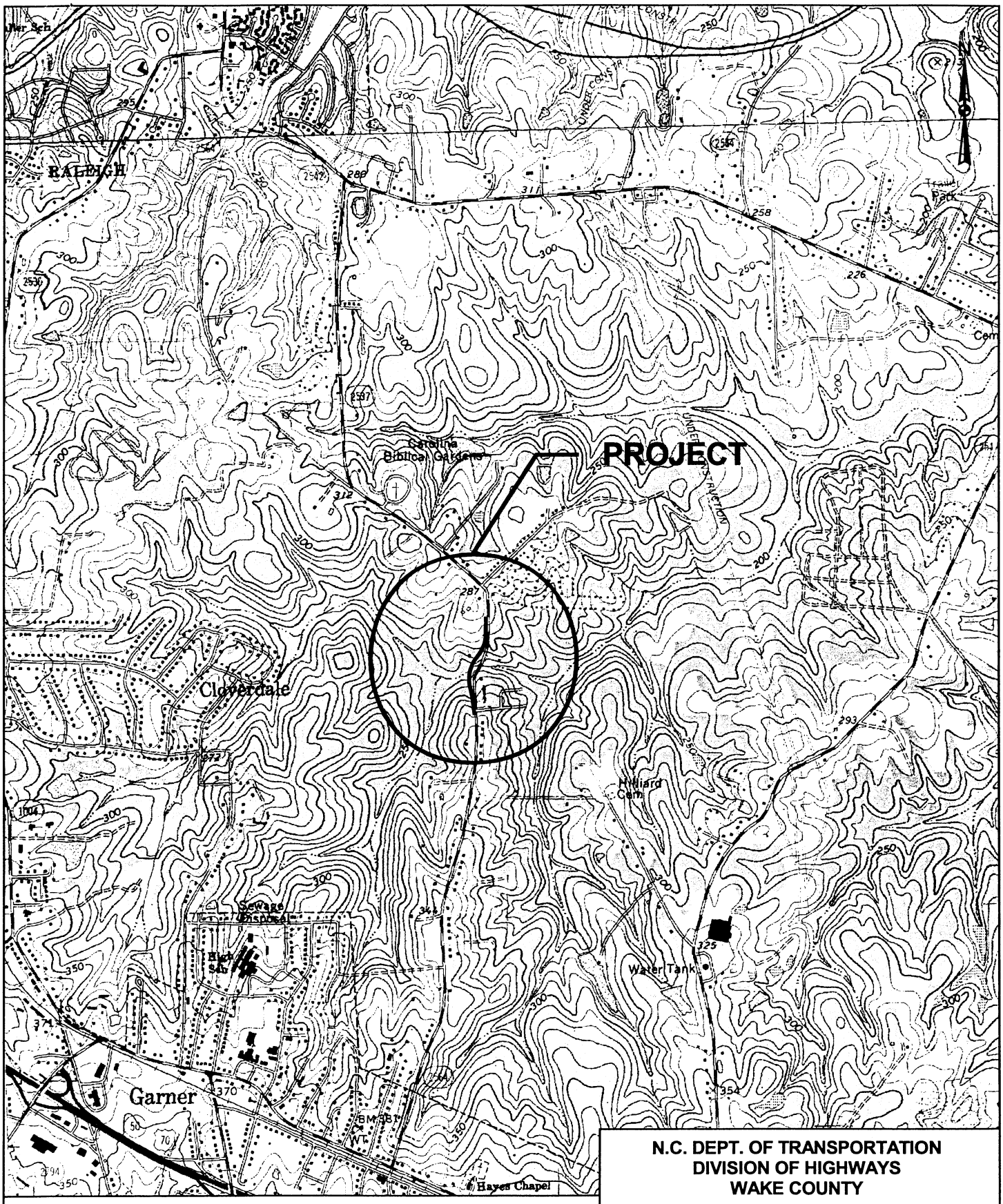

NEUSE RIVER BUFFER LOCATION

Scale: 1" = 2000'

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

PROJECT 8.2406301 (B-3376)

BRIDGE NO. 246 AND APPROACHES ON SR 2564 OVER BIG BRANCH CREEK

SHEET 2 OF 5 **03/11/02**

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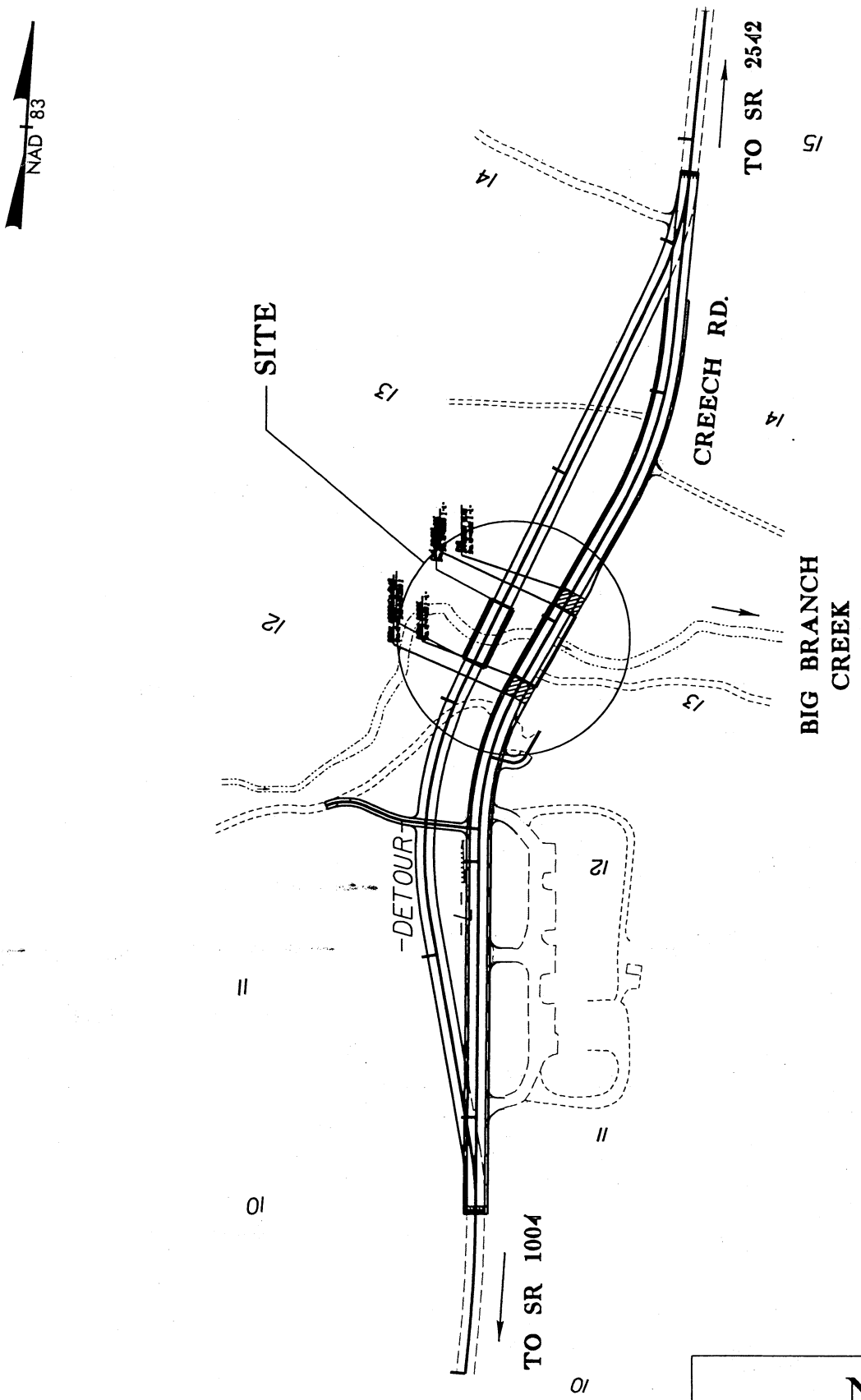


SITE MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 8.2406301 (B-3376)
BRIDGE NO. 246 ON SR 2564
OVER BIG BRANCH CREEK

4/06/04

PROJECT REFERENCE NO.	SHEET NO.
B-3376	4 OF 5
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R /W REV.

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

NAD 83

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

3.529

-L- PC Sta. 12+08.951

-DET- PT Sta. 12+08.

PT Sta. 10+16.533 -DRIVE1-

S 68°32'37.5" E

PC Sta. 10+23.159 -DRIVE1-

PC Sta. 10+23.469

PT Sta. 10+35.889 -DRIVE1-

PT Sta. 10+35.889 -DRIVE1-

POC Sta. 12+41.210=

POT Sta. 10+00.210=

POC Sta. 10+00.00 -DRIVE1-

POT Sta. 10+00.00 -DRIVE2-

POT Sta. 10+62.396 -DRIVE1-

POC Sta. 12+12.638

POT Sta. 10+62.396 -DRIVE1-

POC Sta. 12+12.638 -L-

PC Sta. 10+08.012

PT Sta. 10+15.168

N 82°22'14.9" E

POT Sta. 10+26.350

POT Sta. 10+26.350 -DRIVE2-

S 79°14'29.6" E

INV OUT= 75.384

INV IN= 72.062

INV OUT= 70.455

INV IN= 77.350

-L- Sta 11+45.691
13.818m RT EXIST.R/W
(45.33')

BEGIN APPROACH SLAB
Sta. 12+66.38 ± -L-

BEGIN BRIDGE
Sta. 12+17.500 ±

BEGIN BRIDGE
Sta. 12+74.00 ± -L-

END BRIDGE
Sta. 12+43.000 ±

END BRIDGE
Sta. 13+06.00 ± -L-

END
APPROACH SLAB
Sta. 13+13.62 ± -L-

PLUG

PLUG

AB

TYPE D

TYPE D

450mm CLAY

300mm DIP

375mm CONC

200mm CONC

350mm DI W

Cla 50

450mm CLA

300mm DIP

6.4 CONC BK

1.5 S FD

2S BK APT

IS BK D

GR.

BST

2.3 GR

3.4 GR

SS CLEAN OUT

GREECH RD. SR. 2564

-DET-

-L- STA. 13+20.00 SEE SHEET 5

BZ 1

BZ 2

3Z

13

BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT TYPE: ROAD CROSSING	IMPACT TYPE: PARALLEL IMPACT	ALLOWABLE: ZONE 1 (ft^2)	ALLOWABLE: ZONE 2 (ft^2)	ALLOWABLE: TOTAL (ft^2)	MITIGABLE: ZONE 1 (ft^2)	MITIGABLE: ZONE 2 (ft^2)	MITIGABLE: TOTAL (ft^2)	BUFFER REPLACEMENT: ZONE 1 (ft^2)	BUFFER REPLACEMENT: ZONE 2 (ft^2)
	Bridge	L Sta. 12+66-12+85	X		695.3	1578.7	2274.0					
	Bridge	L Sta. 12+99-13+10	X		710.4	1494.0	2204.4					
	Bridge	DET Sta. 11+68-12+24	X		1534.9	4281.0	5816.0					
	Bridge	DET Sta. 12+39-12+5	X		706.1	1676.0	2382.1					
	Sewer Line	L Sta 12+77-12+93		X		566.2	566.2	673.8		673.8		
TOTAL:					3646.7	9595.9	13242.7	673.8	0.0	673.8		

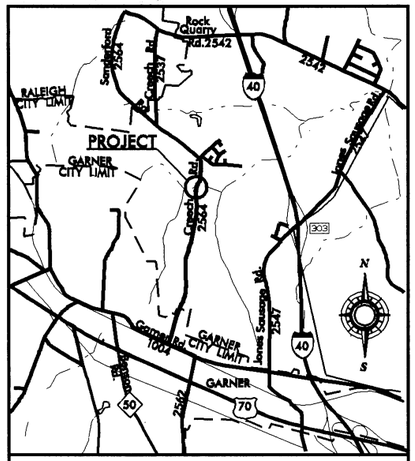
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 8.2406301 B-3376

6/3/2004
SHEET 5 OF 5

CONTRACT: C00000 TIP PROJECT: B-3376

See Sheet 1-A For Index of Sheets



VICINITY MAP

THIS PROJECT IS NOT WITHIN THE MUNICIPAL BOUNDRIES OF GARNER OR RALEIGH.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

LOCATION: BRIDGE NO. 246 AND APPROACHES ON SR 2564 OVER BIG BRANCH CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

METRIC

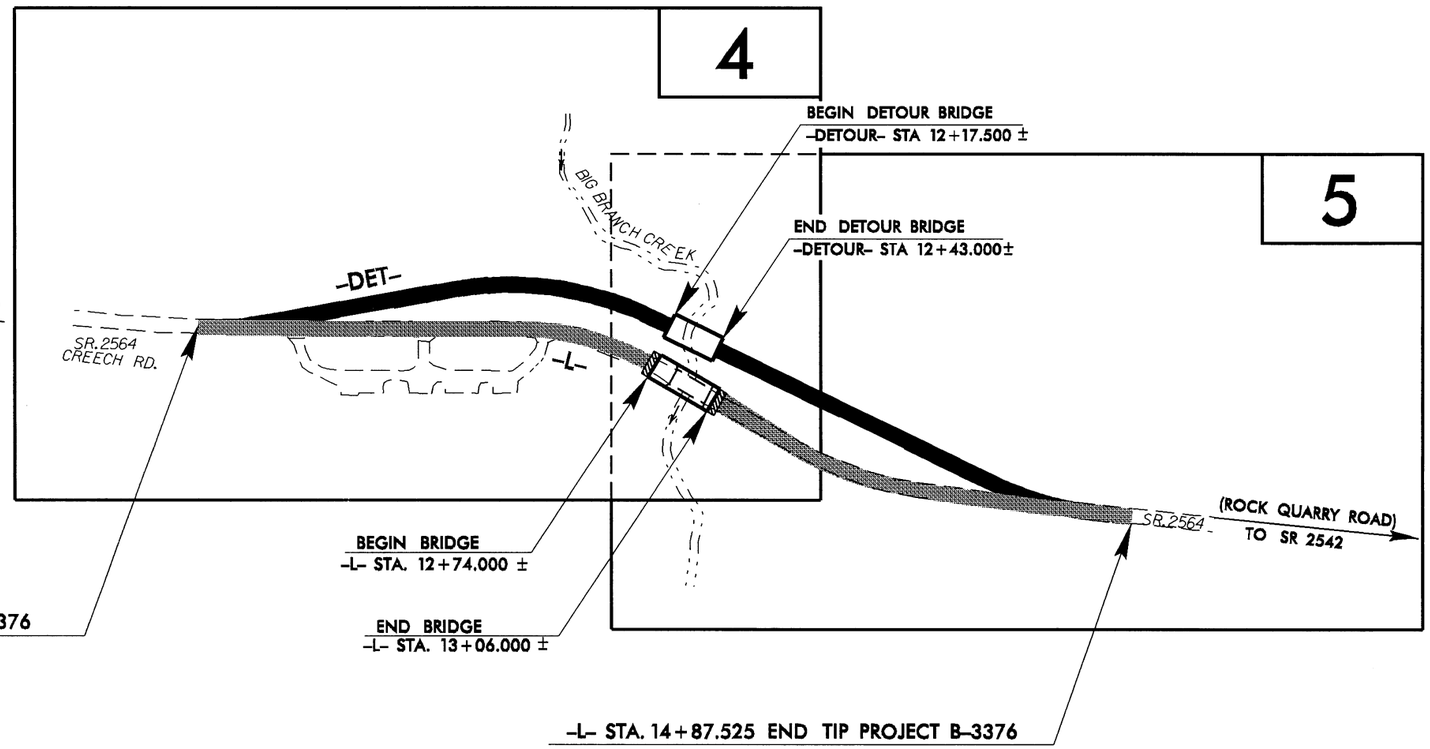
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3376	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33024.1.1	BRSTP-2564(1)	P.E.
33024.2.1	BRSTP-2564(2)	R/W, UTL.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 90 km\h TO 50 km\h AND VERTICAL ALIGNMENT

GRAPHIC SCALES

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2003 = 6,600
ADT 2025 = 11,000
DHV = 10 %
D = 65 %
T = 5 %*
V = 50 km/h**
* TTST 1 % DUAL 4 %
FUNC CLASS = URBAN COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3376 = 0.393 Km

LENGTH STRUCTURE TIP PROJECT B-3376 = 0.032 Km

TOTAL LENGTH OF TIP PROJECT B-3376 = 0.425 Km

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: DECEMBER 31, 2003

LETTING DATE: DECEMBER 21, 2004

G.E. BREW, P.E.
PROJECT ENGINEER

D. WILLIAMS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

9/9/04

19-APR-2004 12:13
File:PROJ.TCL
By:Lawson

Design- Nov 03\B3376.tsh
Nov 03\B3376.71

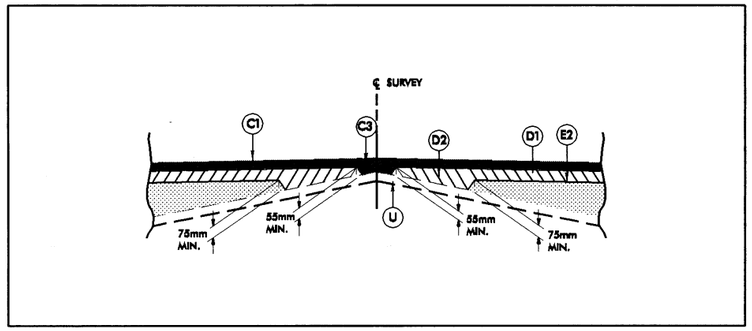
PROJECT REFERENCE NO.	SHEET NO.
B-3376	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

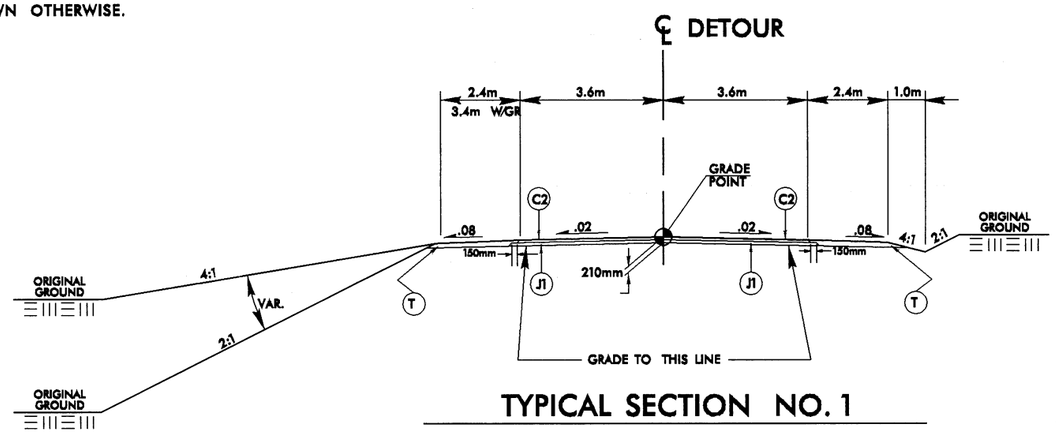
PRELIMINARY PAVEMENT SCHEDULE

C1	PROP. APPROX. 30 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 72 kg PER SQ. METER.
C2	PROP. APPROX. 60 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 72 kg PER SQ. METER IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 2.40 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 40 mm IN DEPTH.
D1	PROP. APPROX. 100 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 245 kg PER SQ. METER
D2	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 55 mm IN DEPTH OR GREATER THAN 110 mm IN DEPTH.
E1	PROP. APPROX. 90mm ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 221 kg. PER SQ. METER.
E2	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 2.45 Kg. PER SQ. METER PER 1mm DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 140mm IN DEPTH OR LESS THAN 75mm IN DEPTH
J1	PROP. 200 mm AGGREGATE BASE COURSE.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT. SEE STANDARD WEDGING DETAIL

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



Detail Showing Method of Wedging
(Use with Typical Section No. 2)



TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO T.S. NO. 1.
DETOUR STA. 10+00.000 TO 10+30.000
USE TYPICAL SECTION NO. 1

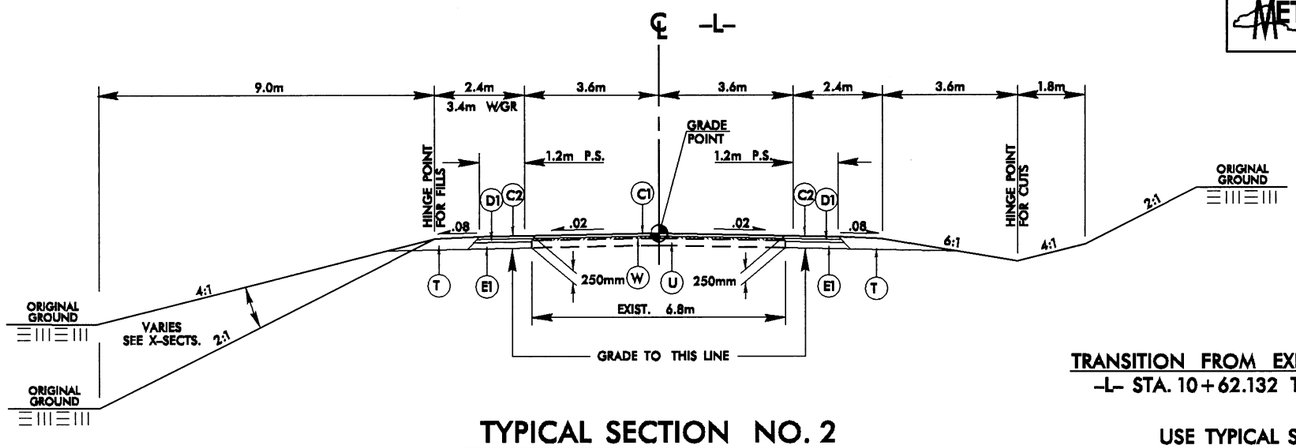
–DETOUR– STA. 10+30.000 TO 12+17.500 ± (BEGIN BRIDGE)
–DETOUR– STA. 12+43.000 ± (END BRIDGE) TO 14+00.000

TRANSITION FROM T.S. NO. 1 TO EXISTING
DETOUR STA. 14+00.000 TO 14+28.889

C1	30 mm S9.5B
C2	60 mm S9.5B
D1	100 mm I19.
E1	90 mm B25.0B
J1	200 mm ABC
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH ASPHALT PVMT.

PROJECT REFERENCE NO.	SHEET NO.
B-3376	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

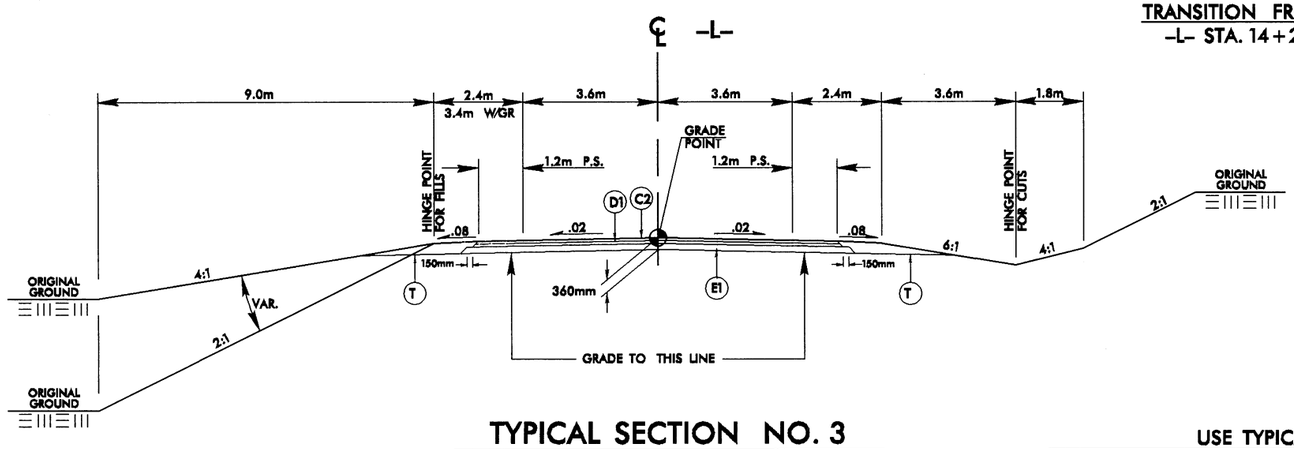


TYPICAL SECTION NO. 2

TRANSITION FROM EXISTING TO T.S. NO. 2
–L– STA. 10+62.132 TO STA. 10+80.000

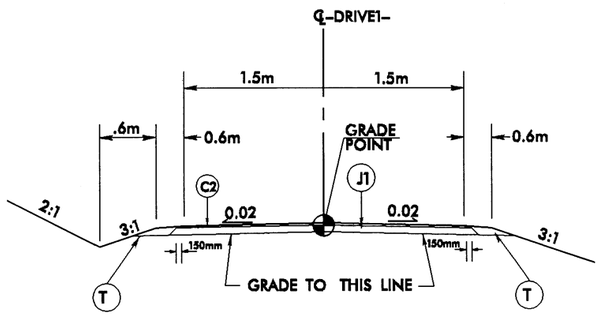
USE TYPICAL SECTION NO. 2
–L– STA. 10+80.000 TO 12+60.000
–L– STA. 13+20.000 TO 14+20.000

TRANSITION FROM T.S. NO. 2 TO EXISTING
–L– STA. 14+20.000 TO 14+87.525



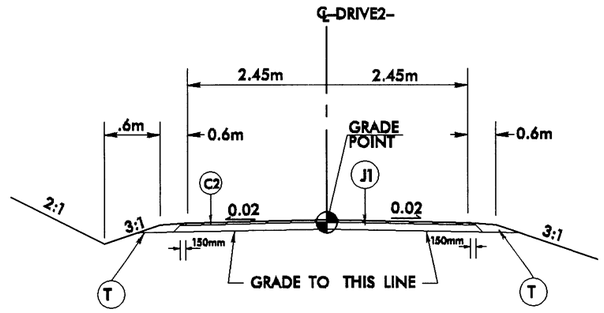
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
–L– STA. 12+60.000 TO 12+74.000 ± (BEGIN BRIDGE)
–L– STA. 13+06.000 ± (END BRIDGE) TO 13+20.000



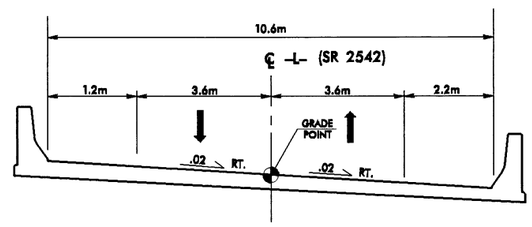
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
–DRIVE1– STA. 10+03.250 TO 10+60.004



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
–DRIVE2– STA. 10+04.800 TO 10+17.000



TYPICAL SECTION ON BRIDGE

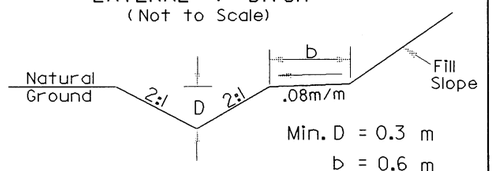
–L– STA. 12+74.000 ± (BEGIN BRIDGE) TO
–L– STA. 13+06.000 ± (END BRIDGE)

6/16/23

PROJECT REFERENCE NO.	SHEET NO.
B-3376	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

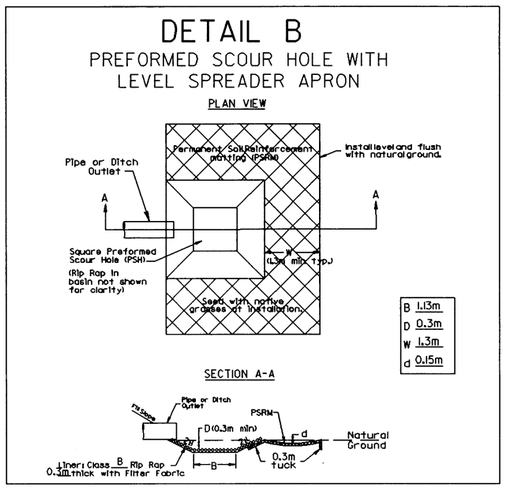
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL A
LATERAL 'V' DITCH
(Not to Scale)



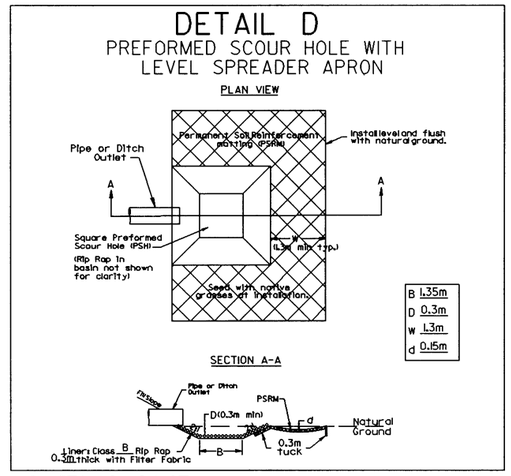
-L- STA. 13+17.473 - 13+47.473 RT

DETAIL B
PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON



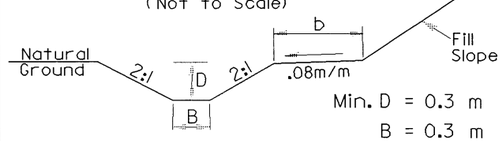
-L- STA. 13+15 RT

DETAIL D
PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON



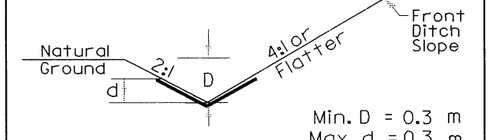
-L- STA. 12+24 LT
-L- STA. 13+09 LT
-DET- STA. 12+52 LT (TEMP)
-DRIVE 1 STA. 10+24 LT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



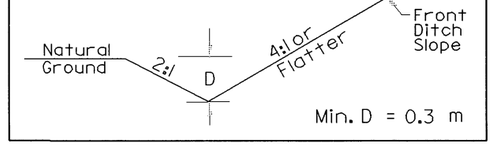
-L- STA. 13+07.473 - 13+27.473 LT
-DET- STA. 12+48 - 12+55 LT

DETAIL E
SPECIAL CUT DITCH W/ LINER
(Not to Scale)



-DET- STA. 10+96.371 - 11+42.940 RT

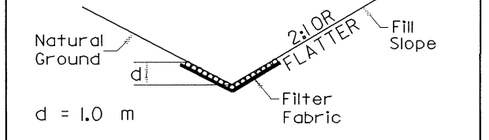
DETAIL F
SPECIAL CUT DITCH
(Not to Scale)



-L- STA. 10+60 - 10+80 LT & RT
-L- STA. 14+20 - 14+40 LT & RT
-DET- STA. 14+07 - 14+47 LT (TEMP)
-DRIVE 2- STA. 10+08 - 10+14 RT

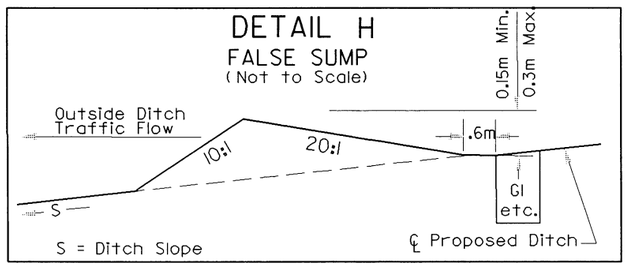
NOTE: -L- STA. 10+60 - 10+80 RT. USE 3:1 FRONT DITCH SLOPE

DETAIL G
TOE PROTECTION
(Not to Scale)



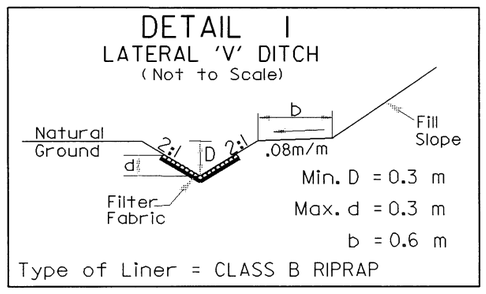
-DET- STA. 12+08 - 12+21 RT (TEMP)
-DET- STA. 12+40 - 12+67 RT (TEMP)

DETAIL H
FALSE SUMP
(Not to Scale)



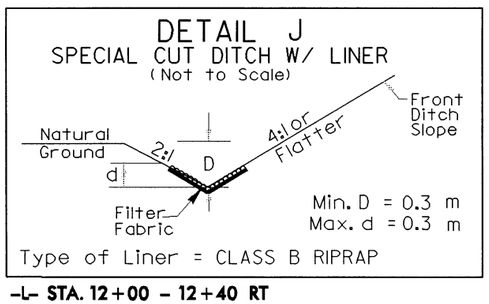
-DRIVE1- STA. 10+04 RT

DETAIL I
LATERAL 'V' DITCH
(Not to Scale)



-L- STA. 13+47.473 - 13+67.473 RT

DETAIL J
SPECIAL CUT DITCH W/ LINER
(Not to Scale)



-L- STA. 12+00 - 12+40 RT
-L- STA. 13+27.473 - 13+47.473 LT
-DET- STA. 12+55 - 12+75 LT (TEMP)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3376-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 218812.248 EASTING: 645690.466
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988708
THE NC LAMBERT GRID BEARING
LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3376-1" TO -L- STATION 10+62.132 IS N 6° 58' 03.32" E DISTANCE 582.673m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
B-3376	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

-DET-

PI Sta 10+11.615
Δ = 10° 37' 01.6" (LT)
L = 23.163
T = 11.615
R = 125.000

PI Sta 11+62.483
Δ = 36° 08' 59.6" (RT)
L = 94.640
T = 48.955
R = 150.000

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

FOR DETOUR PLANS SEE SHEET NO. 6 & 7
FOR PROFILES SEE SHEET NO. 8 & 9

NOTE:
SHOULDER BERM GUTTER REQUIRED AT THE FOLLOWING APPR. STATIONS
-L- STA. 12+54 - 12+66.38 +- RT
-L- STA. 13+13.62 +- - 13+26 RT

BEGIN STATE PROJECT B-3376
-L- PT Sta.10+62.132

-L- POT Sta. 10+00.000

-L- PC Sta.10+19.471

-DET- PC Sta.10+00.000 = -L- POT Sta.10+65.015

-DET- PT Sta.10+23.163

-L- PT Sta.10+62.132

-DET- PC Sta.11+13.529

-L- PC Sta.12+08.951

POC Sta.10+00.000 -DRIVE1-

PT Sta.10+16.533 -DRIVE1-

PT Sta.10+35.889 -DRIVE1-

POC Sta.10+23.159 -DRIVE1-

POT Sta.10+62.396 -DRIVE1-

POC Sta.12+12.638 -L-

PC Sta.10+08.042

PT Sta.10+15.168

POT Sta.10+26.350 -DRIVE2-

POT Sta.10+06.00 -DRIVE2-

POC Sta.12+41.210 -DRIVE2-

-L- PT Sta.12+72.760

-DET- PT Sta.12+08.169

BEGIN APPROACH SLAB
Sta. 12+66.38 ± -L-

BEGIN BRIDGE
Sta. 12+74.00 ± -L-

END BRIDGE
Sta. 13+06.00 ± -L-

END APPROACH SLAB
Sta. 13+13.62 ± -L-

MATCHLINE -L- STA. 13+27.47
SEE SHEET 5

FRANCES W. UNDERHILL GRANDCHILDREN TRUST
DB 5491 PG 804

BETTY C. & BILLY T. WILDER
DB 1804 PG 267
(12)

(4Z)
MARC C. YOUNG
20011-E-2497

CHARLIE C. & JESSIE M. WATSON
DB 1786 PG 141
(3Z)

KENNETH V. & REBECCA W. HOLMES
DB 3645 PG 182
(2)

JOHN W. WINTERS
DB 3126 PG 502

MARGARET B. COLEMAN
DB 3126 PG 502
(7)

UNNAMED STREET

CREECH RD. SR.2564

-L-
PI Sta 10+40.814
Δ = 4° 53' 19.2" (LT)
L = 42.662
T = 21.344
R = 500.000

-DRIVE1-
PI Sta 10+08.772
Δ = 47° 21' 45.1" (RT)
L = 16.533
T = 8.772
R = 20.000

-DRIVE1-
PI Sta 10+29.578
Δ = 18° 14' 04.5" (LT)
L = 12.730
T = 6.419
R = 40.000

-DRIVE2-
PI Sta 10+12.198
Δ = 74° 33' 04.2" (LT)
L = 7.156
T = 4.186
R = 5.500

-L-
PI Sta 12+41.567
Δ = 29° 14' 51.1" (RT)
L = 63.809
T = 32.616
** R = 125.000
V = 50 Km/h

** DESIGN SPEED EXCEPTION REQUIRED

8/17/93

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METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	B-3376	5
	R/W SHEET NO.	
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

FOR DETOUR PLANS SEE SHEET NO. 6 & 7
FOR PROFILES SEE SHEET NO. 8 & 9

NAD 83

SEE SHEET 4

MATCHLINE -L- STA. 13+27.47

-DET-
PI Sta 14+06.915
Δ = 20° 21' 43.5" (LT)
L = 44.423
T = 22.448
R = 125.000

-DET- N 22° 11' 32.2" E

-L- PC Sta.13+51.357

-L- PT Sta.14+21.975

-DET- PC Sta.13+84.466

-DET- PT Sta.14+28.889 =
-L- POT Sta.14+87.525

-L- POT Sta.15+50.974

END STATE PROJECT B-3376
-L- POT Sta. 14+87.525

-L-
PI Sta 13+87.195
Δ = 24° 05' 02.4" (LT)
L = 70.618
T = 35.838
R = 168.000

-L- Sta 13+70.000
42.632m LT.(139.87')

-L- Sta 13+80.000
43.000m LT.(141.08')

-L- Sta 14+02.866
32.286m LT
105.93'
(PROPOSED EASEMENT)

-L- Sta 14+40.000
24.500m LT.(80.38')

-L- Sta 14+52.441
17.025m LT.(55.86')

-L- Sta 14+52.441
17.025m LT
55.86'

-L- Sta 15+35.845
14.866m LT
48.77'

-L- Sta 15+35.845
EXIST.R/W

-L- Sta 13+50.000
18.500m RT.(60.70')

-L- Sta 13+75.493
14.500 RT (47.57')

-L- Sta 13+75.860
EXIST.R/W

-L- Sta 14+00.000
14.800 RT (48.56')

-L- Sta 14+20.000
14.800 RT (48.56')

-L- Sta 14+29.000
11.332 RT. (37.18')

-L- Sta 14+62.434
20.09m RT 65.92'

-L- Sta 15+35.843
13.64m RT
44.76'

-L- Sta 15+35.843
EXIST.R/W

G.T.D.

SPECIAL CUT DITCH SEE DETAIL J

LATERAL V DITCH SEE DETAIL A

LATERAL V DITCH SEE DETAIL I

SPECIAL CUT DITCH SEE DETAIL F

SPECIAL CUT DITCH SEE DETAIL F (EXISTING)

REMOVE

EXISTING R/W

N 1° 49' 23.5" E -L- CREECH RD. SR.2564 BST

18.288m (60')

300mm DIP

450mm CONC

900mm RW FENCE

1500 WD

7.62m INC

GRADE 3.50

IS BK D

IS BK D W/BASEMENT

HD 1200 OH

100.680
S 87° 50' 51" E

56.236
S 21° 39' 07" W

69.885
S 55° 52' 29" E

30.932
N 35° 38' 44" E

EIP

4Z MARC C. YOUNG
2001-E-2497

6 NADINE WARD
DB 6801 PG 1785

5Z PAUL & MARILYN WOO TRUSTEES
DB 6520 PG 109
BOM 1985 PG 2046

8 JOAN E. BUOL
DB 1850 PG 16334
DB 8076 PG 615

8/17/99

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3376-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 218812.248 EASTING: 645690.466
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THE NC LAMBERT GRID BEARING
LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3376-1" TO -L- STATION 10+62.132 IS N 6° 58' 03.32" E DISTANCE 582.673m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

PROJECT REFERENCE NO.	SHEET NO.
B-3376	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR DETOUR PLANS SEE SHEET NO. 6 & 7
FOR PROFILES SEE SHEET NO. 8 & 9

NAD 83

-DET-
PI Sta 10+11.615
Δ = 10° 37' 01.6" (LT)
L = 23.163
T = 11.615
R = 125.000

PI Sta 11+62.483
Δ = 36° 08' 59.6" (RT)
L = 94.640
T = 48.955
R = 150.000

-L- PC Sta.10+19.471
-L- POT Sta.10+00.000
-L- POT Sta.10+65.015
-L- PT Sta.10+62.132
-DET- PC Sta.10+00.000
-DET- PT Sta.10+23.163
-DET- PC Sta.11+13.529
-L- PC Sta.12+08.951
-DET- PT Sta.12+08.169
POC Sta.10+00.000 -DRIVE1-
PT Sta.10+16.533 -DRIVE1-
PC Sta.10+23.159 -DRIVE1-
PT Sta.10+35.889 -DRIVE1-
POC Sta.12+41.210 -DRIVE2-
POT Sta.10+00.000 -DRIVE2-
POT Sta.10+62.396 -DRIVE1-
POC Sta.12+12.838 -L-
PC Sta.10+08.012 -DRIVE2-
PI Sta.10+15.168 -DRIVE2-
POT Sta.10+26.350 -DRIVE2-
-L- PT Sta.12+72.760

-DETOUR- STA. 12+05.310 -L-

BEGIN STATE PROJECT B-3376
-L- POT Sta.10+62.132

MATCHLINE -L- STA. 13+27.47 SEE SHEET 7

FRANCES W. UNDERHILL GRANDCHILDREN TRUST DB 5491 PG 804

BETTY C. & BILLY T. WILDER DB 1804 PG 267 (12)

MARC C. YOUNG 2001-E-2497 (4Z)

KENNETH V. & REBECCA W. HOLMES DB 3645 PG 182 (2)

JOHN W. WINTERS DB 3126 PG 502

CHARLIE C. & JESSIE M. WATSON DB 1786 PG 141 (3Z)

MARGARET B. COLEMAN DB 3126 PG 502 (7)

CREECH RD. SR.2564

N 13° 57' 27.7" W
N 1° 32' 52.8" E
N 3° 20' 26.4" W
S 69° 32' 37.5" E
S 19° 14' 29.6" E
N 26° 12' 14.9" E
N 25° 54' 26.4" E

BEGIN BRIDGE Sta.12+17.500 ±
END BRIDGE Sta.12+43.000 ±

-L- Sta 12+33.152 81.477m LT 267.12'
-L- Sta 12+57.377 85.766m LT 281.38'
-L- Sta 12+14.238 59.774m LT 196.11'
-L- Sta 12+14.875 45.747m LT 150.09'
-L- Sta 12+24.713 32.542m LT 106.77'
-L- Sta 12+53.028 43.836 LT (144.15')
-L- Sta 12+71.535 77.583m LT 254.54'
-L- Sta 11+60.000 36.615m LT (123.41')
-L- Sta 12+83.509 67.835m LT 222.55'
-L- Sta 12+92.919 52.418m LT 171.98'
-L- Sta 13+24.736 50.55m LT 165.86'
-L- Sta 11+77.194 EX.R/W
-L- Sta 11+50.000 27.50m LT, 90.22'
-L- Sta 11+15.000 20.000 LT 65.62'
-L- Sta 10+48.069 18.578m LT 62.27'
-L- Sta 11+83.714 34.292m LT 112.48'
-L- Sta 10+80.000 18.250 LT 59.88'
-L- Sta 11+00.000 18.250 LT 59.88'
-L- Sta 10+84.348 15.043m LT 49.34'
-L- Sta 10+84.409 EXIST.R/W
-L- Sta 10+66.492 EXIST.R/W
-L- Sta 10+84.561 EXIST.R/W
-L- Sta 10+84.602 EXIST.R/W
-L- Sta 10+84.602 13.456m RT 44.15'
-L- Sta 11+45.691 13.818m RT EXIST.R/W (45.33')
-L- Sta 11+80.000 18.000 RT (59.06')
-L- Sta 12+49.232 EXIST.R/W 15.800 (51.84')
-L- Sta 13+00.000 EXIST.R/W 21.000m RT (68.90')
-L- STA.12+47.647 34.421m RT, 112.93'
-L- Sta 12+42.000 14.800 RT (48.56')
-L- STA.12+36.358 8.404m RT, 27.57'
-L- STA.12+30.000 16.980m RT (55.71')
-L- STA.12+35.000 23.000m RT (75.46')
-L- STA.12+68.724 1.5 S FD EXIST.R/W
-L- STA.12+80.000 EXIST.R/W 15.800 (51.84')
-L- STA.12+50.000 16.100m RT (52.82')

INV OUT 69.678
0.9 TONS CL B RIPRAP W/4.2 SM PIL FAB
INV IN 72.062
2.7 TONS CL B RIPRAP W/8.4 SM PIL FAB
INV OUT 75.384
EXTEND 450mm W/2.4m RCP TO DITCH
450mm RCP STUB OUT W/COVER FOR CONNECTION W/PROPOSED PERMANENT DRAINAGE
RCP 450 TYP. B
300mm RCP TYP. B
375mm CONC
300mm CONC
600mm CONC
SPECIAL CUT DITCH SEE DETAIL E
SPECIAL CUT DITCH SEE DETAIL J
LATERAL BASE DITCH SEE DETAIL C
PSH SEE DETAIL D
RSH SEE DETAIL D RETAIN AFTER CONSTRUCTION
TOE PROTECTION SEE DETAIL G
TEMP GRAD 350
TEMP TYPE III
TEMP SLT
EXISTING R/W
PROPOSED EASEMENT
PROP. EASE.
EXISTING
IS BK APT
2S BK APT
IS BK D
GR.
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-L-
PI Sta 10+40.814
Δ = 4° 53' 19.2" (LT)
L = 42.662
T = 21.344
R = 500.000

-DRIVE1-
PI Sta 10+08.772
Δ = 47° 21' 45.1" (RT)
L = 16.533
T = 8.772
R = 20.000

PI Sta 10+29.578
Δ = 18° 14' 04.5" (LT)
L = 12.730
T = 6.419
R = 40.000

-DRIVE2-
PI Sta 10+12.198
Δ = 74° 33' 04.2" (LT)
L = 7.156
T = 4.186
R = 5.500

-L-
PI Sta 12+41.567
Δ = 29° 14' 51.9" (RT)
L = 63.809
T = 32.616
** R = 125.000
V = 50 Km/h

** DESIGN SPEED EXCEPTION REQUIRED

P:\PROJECT\Nov 03\plotsc-1 Nov 03\detour-B3376.dgn
Bentley Systems, Inc. (08.05.01.07)

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	B-3376	7
	R /W SHEET NO.	
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

FOR DETOUR PLANS SEE SHEET NO. 6 & 7
FOR PROFILES SEE SHEET NO. 8 & 9

NAD 83

SEE SHEET 6

MATCHLINE -L- STA. 13+27.47

-DET-
PI Sta 14+06.915
Δ = 20° 21' 43.5" (LT)
L = 44.423
T = 22.448
R = 125.000

-L- PC Sta.13+51.357

-L- PT Sta.14+21.975

-DET- PC Sta.13+84.466

-DET- PT Sta.14+28.889

-DET- PT Sta.14+92.338
-L- POT Sta.15+50.974

END STATE PROJECT B-3376
-L- POT Sta. 14+87.525

-L-
PI Sta 13+87.195
Δ = 24° 05' 02.4" (LT)
L = 70.618
T = 35.838
R = 168.000

MARC C. YOUNG
2001-E-2497

NADINE WARD
DB 8801 PG 1785

JOAN E. BUOL
DB 1850 PG 16334
DB 8076 PG 615

PAUL & MARILYN WOO TRUSTEES
DB 6520 PG 109
BOM 1985 PG 2046

CREECH RD.
SR.2564

PROJECT REFERENCE NO.	SHEET NO.
B-3376	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

0

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BRIDGE DATA

BRIDGE #246
OVER BIG BRANCH CREEK

DESIGN Q =	45.3 cms
DESIGN FREQ =	50 yr
DESIGN EL =	68.69 m
BASE FLOOD Q =	507 cms
BASE FLOOD FREQ =	100 yr
BASE FLOOD EL =	68.84 m
OT Q =	256 cms
OT FREQ =	500+ yr
OT EL =	72.57 m

FOR PLANS SEE SHEET 4 AND 5

BEGIN GRADE
-L- STA. 10+82.152
EL. = 88.858

PI = 10+77.262
EL = 84.550 m
VC = 10 m
* K = 18

PK = 11+45.650
EL = 77.320 m
VC = 60 m
** K = 93

BEGIN BRIDGE
-L- STA. 12+74.000

PI = 12+47.654
EL = 75.689 m
VC = 60 m
*** K = 7

END BRIDGE
-L- STA. 13+06.000

PI = 13+37.864
EL = 72.300 m
VC = 45 m
**** K = 8

NOTE: OVERLAY EXISTING PAVEMENT
-L- STA. 14+07.166 TO -L- STA. 14+87.525

PI = 14+07.166
EL = 78.487 m
VC = 60 m
***** K = 10

END GRADE
-L- STA. 14+37.1880
EL. = 79.319

DESIGN SPEED EXCEPTIONS REQUIRED

* DESIGN EXCEPTION REQUIRED FOR CREST VERTICAL CURVE MEETS 71 Km/h DESIGN

** DESIGN EXCEPTION REQUIRED FOR SAG VERTICAL CURVE MEETS 82 Km/h DESIGN

*** DESIGN EXCEPTION REQUIRED FOR SAG VERTICAL CURVE MEETS 45 Km/h DESIGN

**** DESIGN EXCEPTION REQUIRED FOR SAG VERTICAL CURVE MEETS 27 Km/h DESIGN

***** DESIGN EXCEPTION REQUIRED FOR CREST VERTICAL CURVE MEETS 53 Km/h DESIGN

19-APR-2004 12:16
B:\PROJ\CL New Design - Nov 03\B3376rev.pf1
BWJohnson
AT RD203671

6/03/98

METRIC

PROJECT REFERENCE NO.	SHEET NO.
B-3376	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DETOUR-

BRIDGE DATA
TEMP. DET. BRIDGE
OVER BIG BRANCH CREEK

DESIGN Q =	210 cfs
DESIGN FREQ =	5 yr
DESIGN EL =	6778 ft
BASE FLOOD Q =	NA cfs
BASE FLOOD FREQ =	NA yr
BASE FLOOD EL =	NA ft
OF Q =	NA cfs
OF FREQ =	NA yr
OF EL =	NA ft

FOR PLANS SEE SHEET 8 AND 7

BEGIN GRADE
-DETOUR- STA. 10+31.386
EL. 83.005

PI = 10+82.663
EL = 80.581 ft
VC = 40 ft
K = 12

-4.030%

PI = 11+18.648
EL = 74.781 ft
VC = 40 ft
K = 8

-3.000%

-2.000%

-1.500%

BEGIN BRIDGE
-DETOUR- STA. 11+17.50?

PI = 11+72.653
EL = 70.780 ft
VC = 80 ft
K = 16

+1.500%

+6.000%

PI = 12+72.653
EL = 72.280 ft
VC = 60 ft
K = 12

+6.400%

END GRADE
-DETOUR- STA. 12+45.000 ?

-DETOUR-

-DRIVE1-

-DRIVE2-

PI = 13+72.663
EL = 78.880 ft
VC = 40 ft
K = 28

+6.400%

END GRADE
-DETOUR- STA. 13+60.00?
EL.= 79.271ft

+2.875%

+2.175%

BEGIN GRADE
-DRIVE1- STA. 10+50.000
EL.= 66.928 ft

PI = 10+40.000
EL = 72.602 ft
VC = 14 ft
K = 2

PI = 10+52.306
EL = 74.039 ft
K = 1

PI = 10+10.160
EL = 70.140 ft
VC = 20 ft
K = 3

+2.200%

+3.940%

+4.800%

-0.034%

END GRADE
-DRIVE1- STA. 10+66.306
EL.= 74.030 ft

BEGIN GRADE
-DRIVE2- STA. 10+08.000
EL.= 72.7884 ft

-0.240%

-0.300%

-0.400%

END GRADE
-DRIVE2- STA. 10+17.600
EL.= 72.272 ft

PI = 10+07.000
EL = 72.788 ft
K=2

PI = 10+13.000
EL = 72.281 ft
K=7

9-APR-2004 12:15 New Design - Nov 03\B3376r-ev.pf1
R:\PROJCL AT RD20367
BWJohnson

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-1

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

85

DET
10+35.326

82.77

82.73

85

11+00.000

DET
10+14.914

90

85

84.49

84.40

SS. 84.997

SS. 85.321

SS. 83.935

SPECIAL CUT DITCH
-L- STA.10+80 TO STA.10+80
DETAIL F

SS. 83.108

83.398

PROP. SP. DITCH ELEV.

SPECIAL CUT DITCH
-L- STA.10+80 TO STA.10+80
DETAIL F

10+80.000

90

85

SS. 85.540

85.420

85.99

SS. 86.248

86.238

SPECIAL CUT DITCH
-L- STA.10+60 TO STA.10+60
DETAIL F

SPECIAL CUT DITCH
-L- STA.10+60 TO STA.10+60
DETAIL F

10+60.000

87.23

10+40.000

50 40 30 20 10 0 10 20 30 40 50

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

10/26/23

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-2

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

80 75

DET
11+16.713
74.646
76.609
76.55
SS. 74.85
SS. 74.879
SS. 75.007
SS. 77.196
74.040
73.982
78.720
SPECIAL CUT DITCH
-DET- 10+96.371 TO 11+23.40
DET ML E

11+80.000

85 80 75

DET
10+96.371
76.655
77.983
77.92
SS. 77.876
SS. 77.803
SS. 77.668
SS. 76.66
75.830
76.544
77.401
SPECIAL CUT DITCH (TEMP)
-DET- 10+96.371 TO 11+23.40
DET ML E

11+60.000

85 80 75

DET
10+76.023
78.984
79.478
79.43
SS. 79.09
SS. 79.64
SS. 79.834
78.450
78.606
78.800
78.685

11+40.000

85 80

DET
10+55.674
81.044
81.095
81.06
SS. 81.09
SS. 81.055
SS. 81.07
80.965
80.303
80.363

11+20.000

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-3

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

80 75 70

DET
11+82.001
71.380
73.301
73.01
S.S. 73.209
S.S. 71.481
S.S. 68.386
73.334
SPECIAL CUT DITCH
-L- ST.11+90.00 TO ST.12+40
DETAIL J

12+40.000

DET
11+58.695
72.037
74.215
74.15
S.S. 72.010
S.S. 71.032
74.575
S.S. 75.350
72.586
SPECIAL CUT DITCH
-L- ST.11+90.00 TO ST.12+40
DETAIL J

12+20.000

DET
11+36.823
73.158
75.358
75.28
S.S. 72.282
S.S. 72.881
72.400
S.S. 73.880
S.S. 74.809
74.506
SPECIAL CUT DITCH
-DET - 10+85.32 TO 11+82.940
DETAIL E
SPECIAL CUT DITCH
-L- ST.11+90.00 TO ST.12+40
DETAIL J

12+00.000

50 40 30 20 10 0 10 20 30 40 50

80 75 70

2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-4

℄ BRIDGE
DET
12+27.271

71.579

℄ BRIDGE

72.524

71.24

SS. 68.596

12+80.000

BEGIN BRIDGE -DET- STA.12+17.500

DET
12+05.221

71.277

BEGIN BRIDGE -L- STA.12+74.000

72.739

71.88

SS. 68.454

SS. 71.200

SS. 72.388

12+60.000

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-5

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

80 75 70 80 75 70 80 75 70 65

DET
12+87.398

73.298

72.928

72.70

SS 76873
SS 72235
SS 74180
72790
72773
13371
SPECIAL CUT DITCH
-L- STA.13+87 TO 13+40
DETAIL J
SS 70491
70536
LAT -Y- DITCH
-L- STA.13+7 TO STA.13+47
DETAIL A

13+40.000

DET
12+67.355

72.429

72.393

71.52

SS 73568
SS 71487
SS 71548
71259
TEMP SPECIAL CUT DITCH
-DET- STA.12+75 TO STA.12+75
DETAIL J
69004
LATERAL BASE DITCH
-L- STA.13+47 TO STA.13+67
DETAIL C
70364
SS 69304
69048
LAT -Y- DITCH
-L- STA.13+47 TO STA.13+67
DETAIL A

13+20.000
℄ BRIDGE

DET
12+47.313

71.689

72.446

69.32

SS 69004
69000
PROP. TEMP LAT BASE DITCH ELEV
69393
TEMP LAT BASE DITCH
-DET- STA.12+48 TO STA.12+98
DETAIL C
SS 68856

13+00.000
-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-6

2.5 0 2.5 5 METRIC

DET
13+59.040
77.781
78.692
78.56
14+20.000
DET
13+40.600
76.808
77.583
77.40
14+00.000
DET
13+23.143
75.491
76.065
75.90
13+80.000
DET
13+06.122
74.401
74.289
74.28
13+60.000

10/26/98

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-7

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

80 80

81.64

15+20.000

81.11

15+00.000

85 85

DET
14+21.359

80 80

80.62

SPECIAL CUT DITCH ITEM PA
"DET" STA.NN+00 TO STA.NN+40
DETAIL F

14+80.000

DET
14+01.137

85 85

80 80

80.07

14+60.000

DET
13+80.165

85 85

80 80

79.004

79.40

14+40.000

50 40 30 20 10 0 10 20 30 40 50

10/26/98

2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-8

50 40 30 20 10 0 10 20 30 40 50

85

82.23

15+40.000

85

50 40 30 20 10 0 10 20 30 40 50

2.5	0	2.5	5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-9

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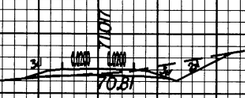
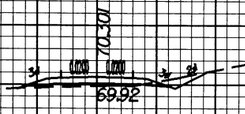
75

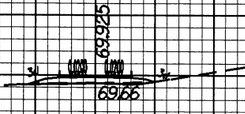
70



10+20.000



10+10.000



10+00.000

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75

70

10/26/38

2.5	0	2.5	5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-10

50 40 30 20 10 0 10 20 30 40 50

75
74.86

10+60.000

74.90
75
72.85
70

10+50.000

75
72.35
71.73
70

10+40.000

75
71.909
71.34
71.01
70

10+30.000
-DRIVE 1-

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PROJECT REFERENCE NO.	SHEET NO.
B-3376	X-11

2.5 0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

75
70

72.27

10+18.000

72.334

S.S. 72.29

Ø-36"

71.858

73.31

72.050

S.S. 74.383

2%

75
70

10+14.000

72.567

Ditch Depth

S.S. 72.538

73.43

72.070

72.140

S.S. 73.885

2%

75
70

10+10.000

72.888

4.5%

72.73

S.S. 72.46

72.665

S.S. 73.085

2%

75
70

10+06.000

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10/26/98

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Wake County
Bridge No. 246
Over Little Arm Branch
Federal-Aid Project No. BRSTP-2564(1)
State Project No. 8.2406301
T.I.P. No. B-3376

ADDENDUM TO

CATEGORICAL EXCLUSION

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

N.C. DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

June 2, 2003
DATE

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

June 2, 2003
DATE

John F. Sullivan, III
for Division Administrator, FHWA

Wake County
Bridge No. 246
Over Little Arm Branch
Federal-Aid Project No. BRSTP-2564(1)
State Project No. 8.2406301
T.I.P. No. B-3376

ADDENDUM TO
CATEGORICAL EXCLUSION

June, 2003

Documentation Prepared in
Project Development and Environmental Analysis Branch by:

June 2, 2003
DATE

Stephanie Ledbetter Caudill
Project Planning Engineer

6/2/03
DATE

Cynthia D. Sharer, P.E., Unit Head
Project Planning Unit

Project Commitments

Wake County
Bridge No. 246
Over Little Arm Branch on SR 2564
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

Highway Division 5, Hydraulics Unit, Roadside Environmental Unit

NCDOT's Best Management Practices (BMP) for the Protection of Surface Waters and Sedimentation Control guidelines in Sensitive Watersheds will be strictly enforced during the construction stage of the project. Provisions to preclude contamination by toxic substances during the construction interval will also be strictly enforced.

Roadway Design Unit, Project Development and Environmental Analysis Branch, Roadside Environmental Unit, Highway Division 5

Upon completion of the new bridge, the temporary bridge will be removed. The temporary approach fill will be removed to natural grade and the area will be planted with native grasses and/or tree species as appropriate.

Roadway Design Unit, Structure Design Unit, Project Development and Environmental Analysis Branch, Highway Division 5

Both the bridge rail, deck and substructure will be removed without dropping them into Waters of the United States. During and after bridge demolition no bridge debris will be allowed to enter Waters of the United States.

Roadside Environmental Unit, Hydraulics, PD&EA, Roadway Design Unit

All Neuse River Buffer rules will apply.

Roadside Environmental Unit, Hydraulics, PD&EA

There will be *no* on site Stream Mitigation due to relocation of stream surface waters.

WakeCounty
Bridge No246
Over Little Arm Branch
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

I. BACKGROUND

A Categorical Exclusion (CE) for the subject project was approved March 14, 2001. The document recommended, Alternative 1, replacement of the existing bridge with a double barrel box culvert on new location approximately 98 feet (30 meters) west of the existing bridge with each barrel measuring 12 feet by 9 feet (approximately 3.6 meters by 2.7 meters). Traffic would be maintained using the existing bridge during construction.

Since the completion of the CE document, soil structural stability issues have been identified at the site of the proposed culvert alternative which would make constructing a culvert in that location unfeasible. In addition, the permitting agencies strongly encourage replacing existing structures with bridges rather than culverts.

It is not possible to replace this bridge on existing location without using a temporary bridge since there is not a reasonable offsite detour route available; SR 2564 is a school bus route and the total detour length would be over 9.5 miles.

Therefore, the US Army Corps of Engineers, and NC Department of Transportation determined that another alternate needed to be evaluated. This alternative appears below:

Alternate 2: (Discussed as non-preferred in the CE document signed March, 2001) Replace Bridge No. 246 with a new bridge at approximately the same location and roadway elevation. The proposed bridge would be approximately 24.4 meters (80 feet) in length and 12.2 meters (40 feet) in width, with a 7.2 meter (24 foot) travel way and with 2.4 meter (8 feet) offsets. Traffic would be detoured onsite, using a temporary bridge located upstream of the existing bridge during construction.

II. DISCUSSION

The Hydraulics Unit made design revisions to minimize stream impacts and as a result alternative 2 will require no stream or buffer mitigation. Alternative 2 also avoids the unstable streambed.

Bridge No. 246 will be replaced as recommended in Alternate 2, above, with a new bridge at approximately the same location and roadway elevation of the existing structure (see Figure two). Due to the location of the bridge and the existing terrain, the proposed profile meets a 30 mph design speed only. A design exception will be required for both vertical and horizontal alignments for the permanent improvement and for the detour alike.

The approach roadway will consist of 7.2 meter (24 foot) travel way and offsets of at least 2.4 meters (8 feet). The shoulder widths will be 4 meters (13.12 feet) wide where guardrail is warranted. There will be approximately 150 meters (492 feet) of approach work on the south side and 120 meters (394 feet) on the north side of the bridge.

During construction, traffic will be shifted onto a temporary alignment over a detour bridge up stream of the existing bridge. The detour bridge will be approximately 15.2 meters (50 feet) in length and 12.2 meters (40 feet) in width. The temporary bridge may be placed as much as 1 meter (3 feet) lower than the existing bridge.

III. COST ESTIMATES

The estimated cost of Alternative 2 is $1,093,000 including $1,050,000 in construction costs and $43,000 in right of way costs (in 2003 dollars).

IV. RECOMMENDATIONS

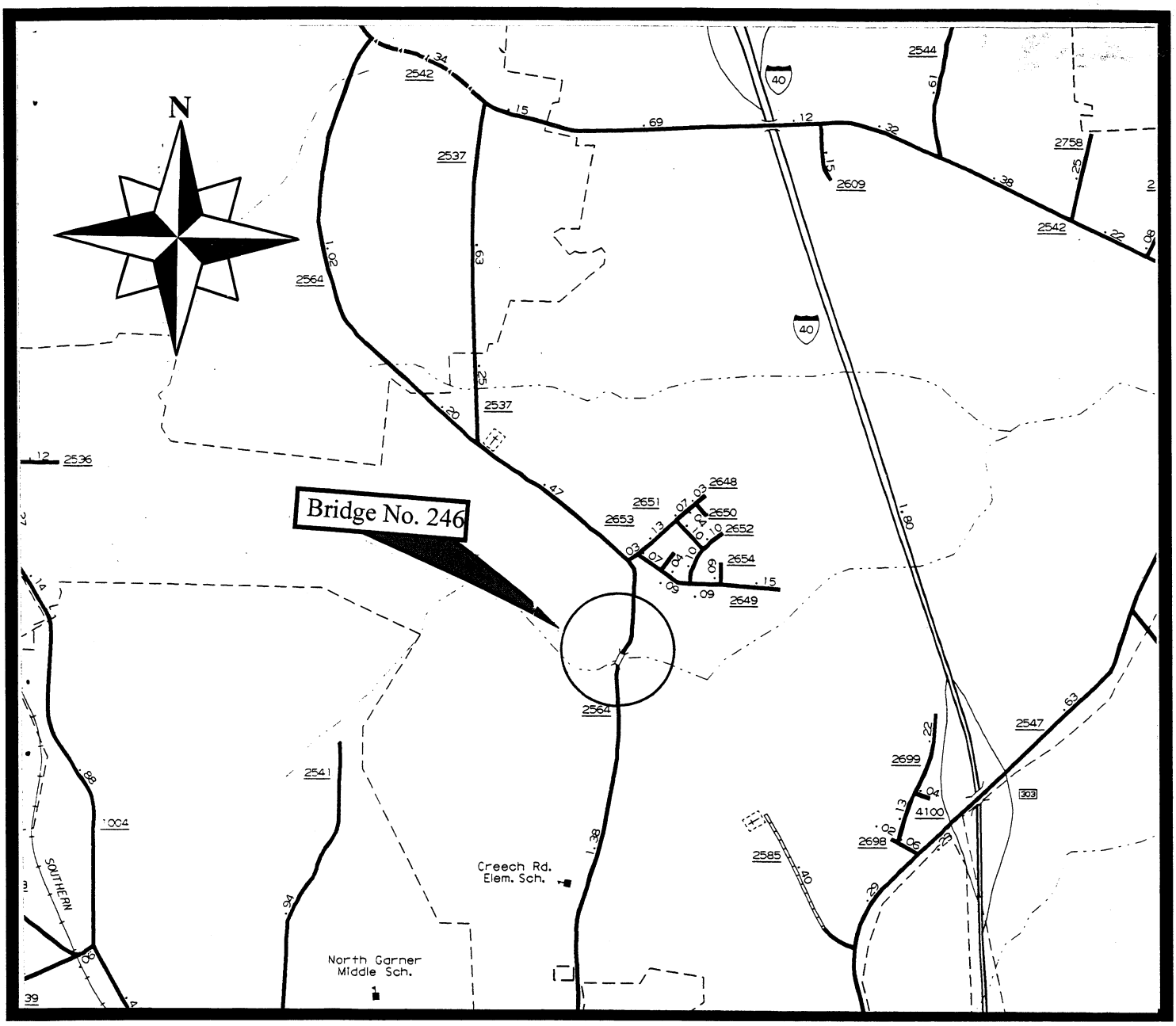
Bridge No. 246 will be replaced as discussed above. Traffic will be detoured on site during construction. Total project length will be approximately 305 meters (1000 feet). Due to the location of the bridge and the existing terrain, the proposed profile meets a design speed of 30 mph (miles per hour) instead of the previously recommended 40 mph. A design exception will be required for both horizontal and vertical alignments.

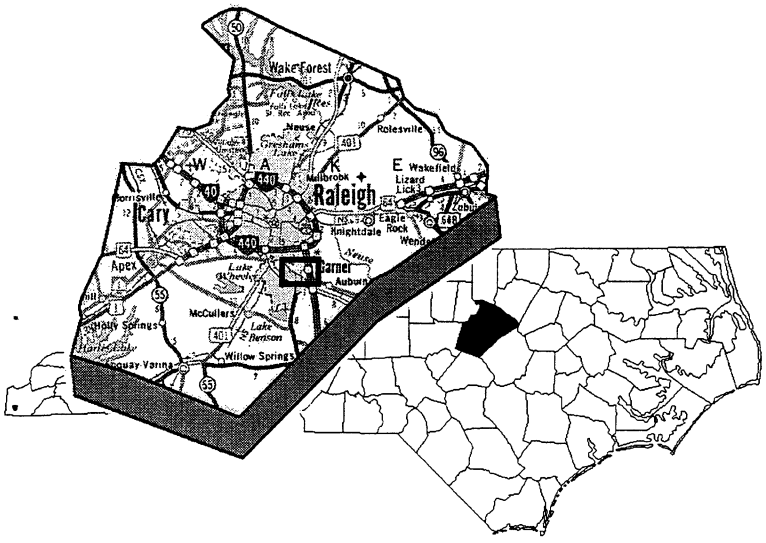
The construction of the recommended alternate does not have the potential to cause substantial impacts to the local environment. The preferred alternate (2) replaces the bridge in place and the proposed on site detour places the temporary bridge in approximately the same location as the original alternate (1) selected in the CE signed March 14, 2001. The NCDOT Division 5 Construction Engineer concurs with the selection of Alternate 2.

V. CONCLUSIONS

Alternate 2 is the preferred alternate for replacing Bridge No. 246 on SR 2564 over Little Arm Branch in Wake County. This is the most constructable option and has minimal impacts to natural resources. Also, this Alternate combines both the department and agency requirements to satisfy the public needs in a safe manner.

FIGURES

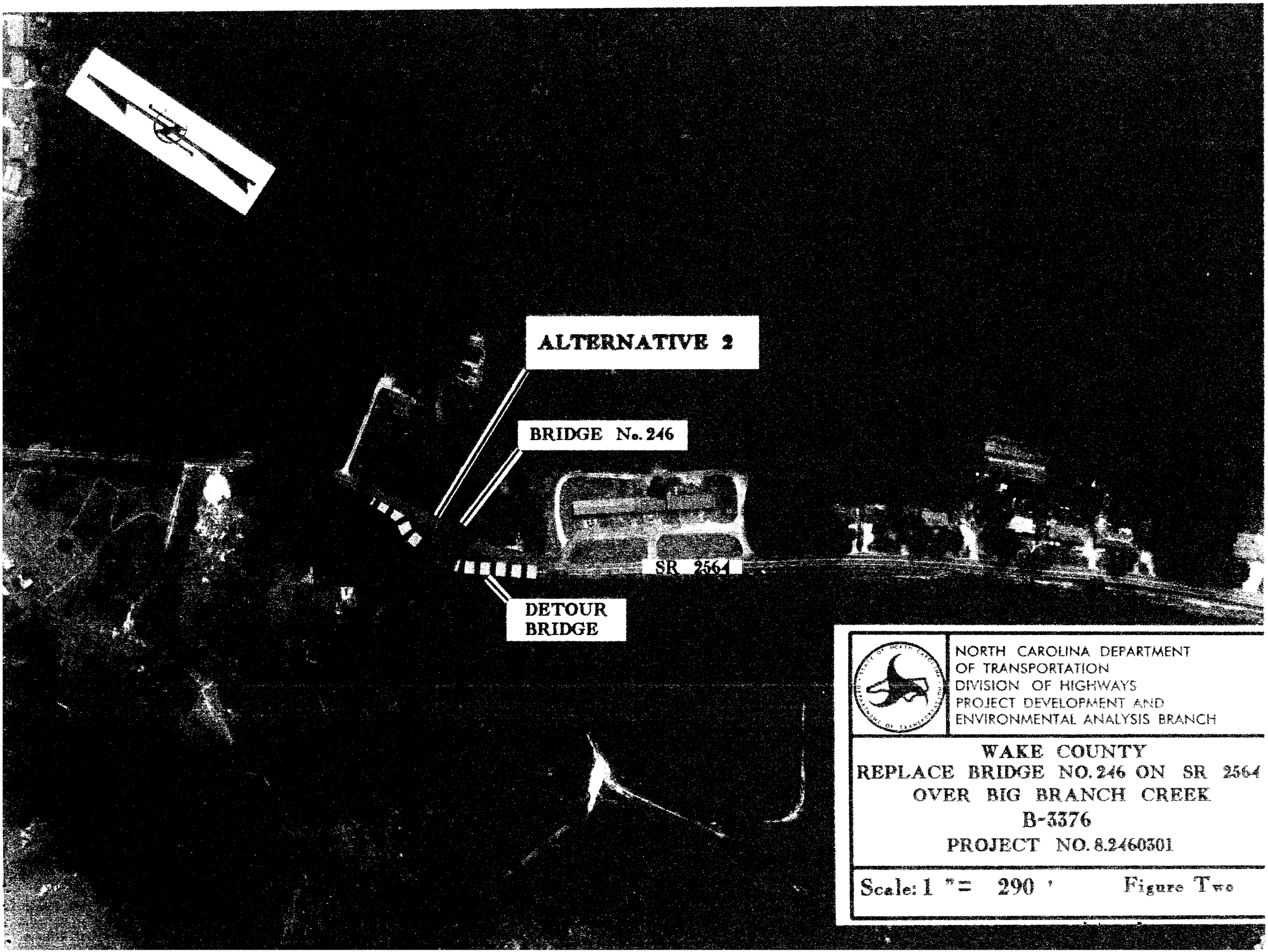




North Carolina
Department of Transportation
Division of Highways
Planning & Environmental Branch

Wake County
Replace Bridge No. 246 on SR 2564
Over Creek
B-3376

Figure One



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

WAKE COUNTY
REPLACE BRIDGE NO. 246 ON SR 2564
OVER BIG BRANCH CREEK
B-3376
PROJECT NO. 8.2460301

Scale: 1 "= 290 ' Figure Two

Wake County
Bridge No. 246
Over a Creek on SR 2564
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

CATEGORICAL EXCLUSION

U. S. Department Of Transportation

Federal Highway Administration

And

N. C. Department Of Transportation

Division Of Highways

3-14-01
Date

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

3/26/2001
Date

Nicholas Graf, P. E.
Division Administrator, FHWA

Wake County
Bridge No. 246
Over a Creek on SR 2564
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

CATEGORICAL EXCLUSION

March 2001

Documentation Prepared in
Project Development and Environmental Analysis Branch By:

3/14/01 — Stephanie Ledbetter, Project Development Engineer
Date — Project Development and Environmental Analysis Branch

3/14/01 — Cynthia D. Sharer, P. E., Project Development Unit Head
Date — Project Development and Environmental Analysis Branch

3-14-01 — Lubin V. Prevatt, P. E., Assistant Manager
Date — Project Development and Environmental Analysis Branch

Project Commitments

Wake County
Bridge No. 246
Over a Creek on SR 2564
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

Highway Division 5, Hydraulics Unit, Roadside Environmental Unit

NCDOT's Best Management Practices (BMP) for the Protection of Surface Waters and Sedimentation Control guidelines in Sensitive Watersheds will be strictly enforced during the construction stage of the project. Provisions to preclude contamination by toxic substances during the construction interval will also be strictly enforced.

Roadway Design Unit, Project Development and Environmental Analysis Branch, Roadside Environmental Unit, Highway Division 5

Upon completion of the new ~~bridge~~ culvert, the existing bridge will be removed. The existing approach fill will be removed to natural grade and the area will be planted with native grasses and/or tree species as appropriate.

Roadway Design Unit, Structure Design Unit, Project Development and Environmental Analysis Branch, Highway Division 5

Both the bridge rail, deck and substructure will be removed without dropping them into Waters of the United States. During and after bridge demolition no bridge debris will be allowed to enter Waters of the United States.

Roadside Environmental Unit, Hydraulics, PD&EA, Roadway Design Unit

All Neuse River Buffer rules will apply.

Roadside Environmental Unit, Hydraulics, PD&EA

There will be no on site Stream Mitigation due to relocation of stream surface waters.

Wake County
Bridge No. 246
Over a Creek on SR 2564
Federal Project BRSTP-2564(1)
State Project 8.2406301
TIP No. B-3376

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 246 in Wake County (see Figure 1). This bridge carries SR 2564 (Creech Road) over Little Arm Branch Creek. This project is included in NCDOT's 2000-2006 Transportation Improvement Program (TIP) as a bridge replacement project. NCDOT and the Federal Highway Administration (FHWA) classify this project as a Categorical Exclusion. No substantial environmental impacts are expected.

I. SUMMARY OF RECOMMENDATIONS

Bridge No. 246 will be replaced as recommended in Alternate 1 with a culvert on new alignment approximately 30 meters (98 feet) west of the existing structure (see Figure 2). The new structure will consist of a two barrel box culvert each barrel 3.6 meters (11.8 ft) by 2.7 meters (8.9 ft) and 31.2 meters (102 ft) in length. The roadway over the culvert will consist of two 3.6-meter (12-ft) lanes and two 2.4 meter (7.9 ft) shoulders. The roadway approaching the culvert will consist of two 3.6-meter (12-ft) lanes with 1.4-meter (4.6-ft) paved shoulders. The new culvert plus cover will be at approximately the same elevation as the existing structure. The desirable design speed for this project is 97 km/hr (60 mph). However, the horizontal and vertical design speed, of 64 km/hr (40 mph) on the sag curve at the culvert, does not meet the 97 km/hr (60 mph) design criteria due to the tie in points at either end of the project. Therefore, a design exception will be required. Traffic will be maintained on the existing alignment during construction.

The estimated cost of the project is $1,593,000 including $1,550,000 in construction costs and $43,000 in right of way costs. The estimated cost shown in the 2000-2006 TIP is $572,000. The current estimated cost of the proposed improvements exceeds the TIP funding by $1,021,000. Right of way acquisition for the project is scheduled to begin in fiscal year 2001 and construction is scheduled to begin in fiscal year 2002.

II. ANTICIPATED DESIGN EXCEPTIONS

There is one design exception currently associated with this project. It entails readjusting the design speed to accommodate the new vertical alignment. The design speed will change to 64 km/hr (40 mph) and a design speed exception will be required. A final determination of design exceptions will be made during the design phase for the project.

III. EXISTING CONDITIONS

SR 2564 is classified as an Urban Minor Arterial in the Statewide Functional Classification System. Bridge number 246 is located approximately one mile north of Creech Road Elementary School in Garner, N. C. The statutory speed limit in the vicinity of the bridge is 89 km/h (55 mph). There were six reported accidents in the vicinity of the bridge during the three-year period from May 1, 1994, to April 30, 1997.

The existing bridge was built in 1961(see attached photos). The bridge has spans totaling 18.0 meters (60 feet) in length and is 7.6 meters (25 feet) wide. It has a prestressed concrete channel deck and the substructure has concrete caps on timber piles. The structure carries two lanes of traffic and has a 7.2-meter (24-foot) roadway width. The approach roadway is 5.8 meter (19 feet) wide with acceptable grass shoulders. It is approximately 5.5 meters (18 feet) above the streambed. Both the bridge rail and substructure will be removed without dropping them into Waters of the United States. There is potential for components of the deck to be dropped into Waters of the United States during construction. The resulting temporary fill associated with the concrete deck is approximately 16.8 m^3 (22.2 yd^3).

According to Bridge Maintenance Unit records, the sufficiency rating of the bridge is 14.1 out of a possible 100. Presently the bridge is posted with weight restrictions of 23 tons for single vehicles and 26 tons for truck-tractor semi-trailers.

The Traffic Forecasting Unit has indicated that near Bridge No. 246, SR 2564 carries 5,600 vehicles per day in the year 2000. This figure is expected to increase to 10,000 vehicles per day by the year 2020. These traffic figures include 4% dual tired vehicles [DUAL], and 1% truck-tractor semi-trailers [TTST]. The design hourly volume [DHV] is 10%.

The Wake County School Bus Transportation Coordinator indicated that 14 school buses each cross this bridge as many as two times per day during the school year.

IV. STUDIED ALTERNATES

A. Alternative 1 (Recommended)

Replace Bridge No. 246 with a two barrel box culvert each barrel 3.6 meters (11.8 ft) by 2.7 meters (8.9 ft) on new location west of existing bridge. The proposed box culvert will have a buried base, which the stream will fill in over time. This will lessen the impact that the structure has on the environment Traffic will be maintained using the existing bridge during construction. No residences will be relocated as a result of construction of this alternate.

D. Other Alternatives

The "do-nothing" alternative is not practical; requiring the eventual closing of the road as the existing bridge completely deteriorates. Rehabilitation of the existing deteriorating bridge is neither practical nor economical.

All alternatives with an off-site detour are not reasonable or feasible. The shortest detour route is more than 15 kilometers (9 miles) in length (see Figure 3). This detour would generate a much greater cost to the average road user during the course of construction than an on-site detour. The off site detour would result in a $1,500,000 user cost for a ninety-day road closure. An off-site detour is also undesirable due to the resulting community impacts. Two schools have recently been constructed in the area. As mentioned above, 14 school buses each cross the bridge as many as two times per day during the school year. Closing the bridge during construction would cause substantial delays for these buses and would be an obstacle to school bus operations.

A bridge on existing location with an on- site detour was considered. However, due to length of the bridge that would be necessary, and the cost of the detour, this alternative would be neither reasonable nor feasible.

An alternative to the east of the existing bridge was also considered. This alternate was rejected because it would relocate one multi family dwelling which would result in far greater community impacts.

An alternative on new location west of the existing bridge using a bridge instead of a culvert was considered as well. This alternate was not recommended due to the design constraints associated with the creek alignment and also

because of the high cost of the bridge. Construction of any bridge alternative would require a channel change for the creek, which would have a greater impact on the creek than the proposed culvert. The total construction cost of the bridge would be $1,750,000 not including annual maintenance costs. A culvert would cost $1,593,000 without any annual maintenance or road user costs associated with it.

V. ESTIMATED COSTS

Estimated costs of the recommended alternative studied are as follows:

Table 1. Estimated Costs

	Alternate 1
Culvert	$221,200.00
Roadway Approaches	$1,096,000.00
Structure Removal	$12,800.00
Contract Cost	$1,330,000.00
Right of Way	$43,000.00
Plus Engineering & Contingencies	$220,000.00
TOTAL PROJECT COST	$1,593,000.00

VI. RECOMMENDED IMPROVEMENTS

Bridge No. 246 will be replaced as recommended in Alternate 1 with a culvert on new alignment approximately 30 meters (98 feet) west of the existing structure (see Figure 2). The new structure will consist of a double barrel box culvert each barrel approximately 3.6 meters (11.8 feet) by 2.7 meters (8.9 feet). The clear roadway width of the culvert will be 24 meters (79 feet) to accommodate two 3.6-meter (12-foot) lanes. The roadway approaching the structure will consist of two 3.6-meter (12-foot) lanes with 2.4-meter (8-foot) grassed shoulders. The new culvert will be at approximately the same elevation as the existing bridge. Based on preliminary design, the design speed will be 64 km/h (40 mph). Traffic will be maintained on the existing alignment during construction.

Upon completion of the new culvert, the existing bridge will be removed.

The existing approach fill will be removed to natural grade and the area will be planted with native grasses and/or tree species as appropriate. This action will provide on-site mitigation to offset impacts to the Neuse River Buffer.

VII. ENVIRONMENTAL EFFECTS

A. General

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

This project is considered to be a "Categorical Exclusion" due to its limited scope and insignificant environmental consequences.

This bridge replacement will not have a substantial adverse effect on the quality of the human or natural environment by implementing the project commitments listed in the front of this document, and by using current NCDOT standards and specifications.

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

There is potential for components of the deck to be dropped into Waters of the United States during construction. The resulting temporary fill associated with the concrete deck is approximately 16.8 m^3 (22.2 yd^3).

There are no hazardous waste impacts.

No adverse effect on families or communities is anticipated. Right-of-way acquisition will be limited. No residences will be relocated as a result of construction of the project.

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 of national, state, or local significance in the vicinity of the project.

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

Utility conflicts will be medium for the project. There is a water line along the west side of SR 2564 and sanitary sewer crossing SR 2564 8.9 meters (29 ft.) south of the existing bridge. There are aerial telephone lines and underground cables along the west side of SR 2564. There is a fiber-optic cable on the west side of SR 2564, which is above ground across the creek.

B. Air And Noise

This project is an air quality "neutral" project, so it is not required to be included in the regional emissions analysis and a project level CO analysis is not required.

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.

The project will not substantially increase traffic volumes. Therefore, it will not have substantial impact on noise levels. Temporary noise increases may occur during construction.

C. Land Use & Farmland Effects

In the vicinity of this project, Wake County has no zoning. This project will impact no soils considered to be prime or important farmland.

D. Historical Effects & Archaeological Effects

The State Historic Preservation Office (SHPO) has indicated that there are no known historic architectural resources in the project area. Therefore, SHPO has recommended that no historic architectural survey be conducted for the project (see letter dated April 9, 1999, in the appendix).

The State Historic Preservation Office (SHPO) has indicated that there are no known archaeological sites in the project area and no unknown sites are likely

to be found. Therefore, SHPO has recommended that no archaeological investigation be conducted for the project (see letter dated April 9, 1999, in the appendix).

E. Natural Resources

1. Methodology

Published information regarding the project area was consulted prior to a field visit. Information sources used in this pre-field investigation of the study area include U.S. Geological Survey (USGS) quadrangle map (Garner), U.S. Fish and Wildlife Service (FWS) National Wetland Inventory Map (Garner), and NCDOT aerial photographs of project area (1:1200).

Water resource information was obtained from publications of the Department of Environment, Health and Natural Resources (DEHNR, 1996) and from the NC Center for Geographic Information and Analysis (Environmental Sensitivity Base Map of Wake County, 1995). Information concerning the occurrence of federal and state protected species in the study area was gathered from the Fish and Wildlife Service (FWS) list of protected species and species of concern, and the N.C. Natural Heritage Program (NCNHP) database of rare species and unique habitats.

General field surveys were conducted along the proposed alignment by NCDOT biologists Tim Bassette, Jared Gray, and Chris Murray on June 15, 1999. Plant communities and their associated wildlife were identified and recorded. Wildlife identification involved using one or more of the following observation techniques: active searching and capture, visual observations (binoculars), and identifying characteristic signs of wildlife (sounds, scat, tracks and burrows). Jurisdictional wetland determinations were performed utilizing delineation criteria prescribed in the "Corps of Engineers Wetland Delineation Manual" (Environmental Laboratory, 1987).

2. Physical Resources

Soil and water resources, which occur in the study area, are discussed below. Soils and availability of water directly influence composition and distribution of flora and fauna in any biotic community. The project study area lies within the Piedmont Physiographic Province. Broad, smooth ridgetops, long side slopes, and long narrow drainageways characterize the topography in this section of Wake

County. Topography in the project area is long side slopes that flatten out into a narrow floodplain area associated with Little Arm Branch. Project elevation is approximately 73-85 m (240-280 ft.) above mean sea level (msl).

a. Soils

Three soil phases occur within project boundaries: Wake loamy sand, 10-25 percent slopes, Appling sandy loam, 6-10 percent slopes, and Wehadkee and Bibb loam-sandy loam 0-4 percent slopes.

Wake loamy sand is an excessively drained soil that is very shallow over hard rock that occurs on side slopes bordering drainageways in the uplands. Permeability is moderately rapid, runoff is very rapid, and the water table remains below the solum. Infiltration is good and the soils are not suitable for cultivation.

Appling sandy loam is a well-drained soil that occurs on fairly narrow upper side slopes on uplands. Permeability is moderate, runoff is rapid, and the available water capacity is medium. Infiltration is fair and the hazard of further erosion is severe.

Wehadkee and Bibb loam-sandy loam consists of poorly drained soils that are similar in use and management that they were mapped together as an undifferentiated unit. These soils are on floodplains, in narrow upland draws, and in depressions throughout the county. Permeability is moderate to moderately rapid, runoff is slow to ponded, and the seasonal high water table is located at the surface for periods as long as 6 months. Infiltration for the Wehadkee soil is fair and good for the Bibb soil. Flooding and ponding are the most important limitations. Wehadkee and Bibb soil unit is listed as a hydric soil for Wake County.

Soil core samples taken throughout the project area revealed soils with a loam to sandy loam to clay loam texture. The soils did not exhibit hydric conditions, such as low chroma colors, in low areas near the stream. Therefore, hydric soil indicators, as defined in the "Corps of Engineers Wetland Delineation Manual", 1987, were not observed within the project study area.

b. Water Resources

This section contains information concerning those water resources likely to be impacted by the project. Water resource information encompasses physical aspects of the resource, its relationship to major water systems, Best Usage Standards and water quality of the resources.

Probable impacts to these water bodies are also discussed, as are means to minimize impacts.

Waters Impacted and Characteristics

Little Arm Branch will be the only surface water resource directly impacted by the proposed project (Figure 2). Little Arm Branch is located in sub-basin NEU2, 03020201 of the Neuse River Basin. Little Arm Branch is a tributary to Big Branch Creek, and has its confluence with Big Branch Creek approximately 3.2 km (2.0 mi.) stream channel distance downstream of Bridge No. 246.

Little Arm Branch, at Bridge No. 246, is a perennial stream approximately 4.6 m (15.0 ft) wide and has a 1.8 m (6.0 ft) bank at this location. The substrate is composed of sand, and cobble. The waters of Little Arm Branch were very clear at the time of the natural resource investigation, and the stream was approximately 10.2 cm (4 in.) in depth.

Best Usage Classification

Streams have been assigned a best usage classification by the DWQ (DENR 1999). The classification of Little Arm Branch [Index No. 27-34-11-2] is Class C NSW. Class C waters is suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation and agriculture. The supplemental classification of NSW denotes Nutrient Sensitive Waters, which requires limitations on nutrient, inputs. Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped watersheds) nor Outstanding Resource Waters (ORW) occur within 1.6 km (1.0 mi.) of project study area.

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. Likewise, benthic macroinvertebrates are intensively sampled for specific river basins. Benthic macroinvertebrates have proven to be a good indicator of water quality because they are sensitive to subtle changes in water quality, have extremely long life cycle, are non-mobile (compared to fish) and are extremely diverse. The overall species richness and presence of indicator organisms help to assess the health of streams and rivers. River basins are

reassessed every five years to detect changes in water quality and to facilitate (NPDES) permit review.

The Benthic Macroinvertebrate Ambient Network (BMAN) monitors ambient water quality by sampling at fixed sites for selected benthic macroinvertebrate organisms that are sensitive to water quality conditions. Criteria have been developed to assign bioclassifications based on the number of taxa present in the intolerant groups Ephemeroptera, Pleoptera, and Trichoptera (EPT's). There were no BMAN monitoring sites in the project vicinity.

Point sources refer to discharge that enter surface water through a pipe, ditch, or other associated 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. Any discharger is required to register for a permit. There are no NPDES sites located within 1.6 km (1.0 mi.) 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 non-point 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 non-point 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. Excluding road runoff and a parking lot, there were no identifiable non-point sources that could be observed during the site visit.

Summary of Anticipated Impacts

Construction of the proposed project will impact water resources by the following processes: tearing down of the existing bridge, and the construction of a new culvert. Construction activities are likely to alter and/or interrupt stream flows and water levels at each aquatic site. This disruption of the stream can reduce flows downstream of the project. Temporary diversions of water flow may raise the water level upstream

from the project and lower the water level downstream of the project. Anticipated impacts to the project areas aquatic environment are contained in Section 4.1.2 of this report. Project construction may result in the following impacts to surface waters:

1. Increased sedimentation and siltation from construction and/or erosion.

2. Changes in light incidence and water clarity due to increased sedimentation and vegetation removal.

3. Alteration of water levels and flows due to interruption and/additions to surface and ground water flow from construction.

4. Changes in water temperature due to streamside vegetation removal.

5. Increased nutrient loading during construction via runoff from exposed areas.

6. Potential concentration of toxic compounds from highway runoff, construction and toxic spills.

Precautions should be taken to minimize impacts to water resources in the study area; NCDOT's Best Management Practices (BMP) must be strictly enforced during the construction stage of the project. Guidelines for these BMP's include, but are not limited to: minimizing built upon area and diversion of stormwater away from surface water supply waters as much as possible. Provisions to preclude contamination by toxic substances during the construction interval should also be strictly enforced.

As the project is located in the Neuse River Basin, Riparian Area Rules for Nutrient Sensitive Waters apply. The rules state that roads, bridges, stormwater management facilities, ponds, and utilities may be allowed where no practical alternative exists. They also state that these structures shall be located, designed, constructed, and maintained to have minimal disturbance, to provide maximum nutrient removal and erosion protection, to have the least adverse effects on aquatic life and habitat, and to protect water quality to the maximum extent practical through the use of best management practices. Every reasonable effort will be made to avoid and minimize stream impacts. Once the new alignment and the stream relocation has been completed, the buffer areas will be revegetated.

Table 1. Summary of Impacts to Neuse Riparian Buffer Zones

Water Resource	Biotic Community(s)	Zone 1 Impacts ha (ac)	Zone 2 impacts ha (ac)	Total Impacts ha (ac)	On-site Mitigation ha (ac)	Total Mitigation Required ha (ac)
LITTLE ARM BRANCH	MHF, MR	0.12 (0.3)	0.08 (0.2)	0.2 (0.5)	0.13 (0.3)	0.37 (0.91)

Note: MHF- Mixed Hardwood Forest
MR- Maintained roadside/ residential

There is potential for components of Bridge No. 246 to be dropped into Waters of the United States during construction. The resulting temporary fill associated with the bridge removal is identified in Section 1.1. NCDOT's Best Management Practices for Bridge Demolition and Removal (BMP-BDR) must be applied for the removal of this bridge.

3. Biotic Resources

Biotic resources include aquatic and terrestrial communities. This section describes those communities encountered in the study area, as well as, the relationships between fauna and flora within these communities. Composition and distribution of biotic communities throughout the project area are reflective of topography, hydrologic influences and past and present land uses in the study area. Descriptions of the terrestrial systems are presented in the context of plant community classifications and follow descriptions presented by Schafale and Weakley (1990) where possible. Dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

Scientific nomenclature and common names (when applicable) are provided for each animal and plant species described. Plant taxonomy generally follows Radford, et al. (1968). Animal taxonomy follows Martof, et al. (1980), Menhinick (1991), Potter, et al. (1980), and Webster, et al. (1985). Subsequent references to the same organism will include the common name only. Fauna that was observed during the site visit is denoted with an asterisk (*). Published range distributions and habitat

analysis are used in estimating fauna expected to be present within the project area.

a. Terrestrial Communities

Two distinct terrestrial communities are identified in the project study area: mixed hardwood forest community, and maintained/disturbed community. Community boundaries within the study area are well defined without a significant transition zone between them. Faunal species likely to occur within the study area will exploit all of these communities for shelter and foraging opportunities or as movement corridors.

Mixed Hardwood Forest Community

The Mixed Hardwood Forest community is the major community impacted by the project. This upland tract is dominated by species common throughout the piedmont of North Carolina. The herbs and vines in the mixed hardwood flora include sedge (Carex sp.), Japanese honeysuckle (Lonicera japonica), poison ivy (Toxicodendron radicans), violet (Viola sp.), Christmas fern (Polystichum acrostichoides), ebony spleenwort (Asplenium platyneuron), Virginia creeper (Parthenocissus quinquefolia), greenbrier (Smilax rotundifolia), false nettle (Boehmeria cylindrica), jewel-weed (Impatiens capensis), rush (Juncus effusus), grape (Vitis sp.), giant cane (Arundinaria gigantea), and pokeweed (Phytolacca americana).

The canopy was comprised of red mulberry (Morus rubra), sycamore (Plantus occidentalis), red maple (Acer rubrum), white oak (Quercus alba), tulip poplar (Liriodendron tulipifera), southern red oak (Quercus falcata), American elm (Ulmus americana), loblolly pine (Pinus taeda), blackjack oak (Quercus marilandica), northern red oak (Quercus rubra), and American beech (Fagus grandifolia). The shrub layers consisted of green ash (Fraxinus laevigata), elderberry (Sambucus canadensis), redbud (Cercis canadensis), blackhaw (Viburnum prunifolium), Chinese privet (Ligustrum sinense), flowering dogwood (Cornus florida), persimmon (Diospyros virginiana), tree of heaven (Ailanthus altissima), and sweet gum (Liquidambar styraciflua).

Maintained/Disturbed

The maintained/ disturbed community is made of several sub-communities, which include roadside shoulder, maintained yard, and maintained road, which runs perpendicular SR 2564 west across where the new location is proposed. The flora which can be found in the maintained areas include fescue (Festuca sp.), English plantain (Plantago lanceolata), bush clover (Lespedeza intermedia), ragweed (Ambrosia artemisiifolia), black nightshade (Solanum americanum), aster (Aster sp.), Japanese grass (Microstegium vimineum), violet (Viola sp.), curly dock (Rumex crispus), smooth sumac (Rhus glabra), poison ivy, and dandelion (Taraxacum officinale).

Faunal Component

Wildlife that may frequently use the mixed hardwood community and maintained/disturbed communities include: two-lined salamander (Eurycea bislineata), spring peeper (Hyla crucifer), Eastern ribbon snake (Thamnophis sauritus), woodchuck (Marmota monax), beaver (Castor canadesis), white-tailed deer (Odocoileus virginianus), pine vole (Microtus pinetorum), mink (Mustela vison), striped skunk (Mephitis mephitis), raccoon (Procyon lotor), gray squirrel* (Sciurus carolinensis), and white footed mouse (Peromyscus leucopus).

Avian species utilizing these communities include the northern mockingbird (Mimus polyglottas), Carolina wren* (Thryothorus ludovicianus), Carolina chickadee* (Parus carolinensis), blue jay* (Cyanocitta cristata) American crow (Corvus brachyrhynchos), belted kingfisher* (Megaceryle alcyon), field sparrow* (Spizella pusilla), and the downy woodpecker (Picoides pubescens). The mourning dove (Zenaida macroura) is a permanent resident in this community type.

Aquatic Communites

One aquatic community, Little Arm Branch, a piedmont perennial stream, will be impacted by the proposed project. Perennial streams support an assemblage of fauna that require a constant source of flowing water, as compared to a intermittent stream or standing water. Physical characteristics of the water body and condition of the water resource influence flora and faunal composition of aquatic communities. Terrestrial communities adjacent to a water resource also greatly influence aquatic communities.

Amphibians and reptiles commonly observed in and adjacent to

moderately sized perennial streams in rural areas may include northern dusky salamander (Desmognathus fuscus), three lined salamander (Eurycea guttolineata), green frog (Rana clamitans), pickerel frog (Rana palustris), and northern water snake (Nerodia sipedon). According to Fish (1968), Little Arm Branch is of no fishing significance due to stream size. Fish species that maybe located here include bluehead chub (Nocomis leptocephalus), silver shiner (Notropis photogenis), Johnny darter (Etheostoma olmstedi), redbreast sunfish (Lepomis auritus), margined madtom (Noturus insignis), Eastern mosquitofish (Gambusia holbrooki), pirate perch (Aphredoderus sayanus) and creek chub (Semotilus astromaculatus).

Summary of Anticipated Impacts

Construction of the subject project will have various impacts on the biotic resources described. Any construction related activities in or near these resources have the potential to impact biological functions. This section quantifies and qualifies impacts to the natural resources in terms of area impacted and ecosystems affected. Permanent impacts to biotic communities are represented in Table 1.

Calculated impacts to terrestrial resources reflect the relative abundance of each community present within the study area. Project construction will result in clearing and degradation of portions of these communities. Table 2 summarizes potential quantitative losses to these biotic communities, resulting from project construction. Estimated impacts are derived using the entire proposed right of way width of 18.3-m (60.0-ft). Usually, project construction does not require the entire right of way; therefore, actual impacts may be considerably less.

TABLE 2. Anticipated Impacts to Biotic Communities

Community	Alternate 1
Mixed Hardwood Forest	0.02 (0.06)
Maintained/Disturbed	0.04 (0.09)
Totals	0.07 (0.18)

Values cited are in hectares (acres)

Plant communities found within the proposed project area serve as nesting and sheltering habitat for a variety of wildlife. Replacing Bridge

No. 246 and its associated improvements will reduce habitat for faunal species, thereby diminishing faunal numbers. However, due to the limited size and scope of this project, it is anticipated that impacts to fauna will be minimal. Areas modified by construction (but not paved) will become road shoulders and early successional habitat. Reduced habitat will displace some wildlife further from the roadway while attracting other wildlife by the creation of earlier successional habitat. Animals temporarily displaced by construction activities will repopulate areas suitable for the species.

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

Impacts often associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the stream substrate and may remove streamside vegetation at the site. Disturbances to the substrate will produce siltation, which clogs the gills and/or feeding mechanisms of benthic organisms (sessile filter-feeders and deposit-feeders), fish and amphibian species. Benthic organisms can also be covered by excessive amounts of sediment. These organisms are slow to recover or repopulate a stream.

The removal of streamside vegetation and placement of fill material at the construction site alters the terrain. Alteration of the stream bank enhances the likelihood of erosion and sedimentation. Revegetation stabilizes and holds the soil, thus mitigating these processes. Erosion and sedimentation carry soils, toxic compounds and other materials into aquatic communities at the construction site. These processes magnify turbidity and can cause the formation of sandbars at the site and downstream, thereby altering water flow and the growth of vegetation. Streamside alterations also lead to more direct sunlight penetration and to elevations of water temperatures, which may impact many species

4. Jurisdictional Topics

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

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. Any action that proposes to place dredge 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 Wetlands and Surface Waters

Potential wetland communities were investigated pursuant to the 1987 "Corps of Engineers Wetland Delineation Manual". The three-parameter approach is used where hydric soils, hydrophytic vegetation and prescribed hydrologic characteristics must all be present for an area to be considered a wetland. There are no wetland areas located within the project study area.

Little Arm Branch is jurisdictional surface water under Section 404 of the Clean Water Act (33 U.S.C. 1344). Discussion of the biological, physical and water quality aspects of Little Arm Branch are presented in previous sections of this report.

Summary of Anticipated Impacts

Anticipated permanent impacts to surface waters are determined by the length of the culvert which is 31.2 m (102 ft.). NCDOT is also going to relocate Little Arm Branch using natural stream design for approximately 80 m (262 ft.). The existing channel loss for Little Arm Branch is approximately 120 m (393 ft.). Surface water loss pertaining to Alternate 1 have been determined to be 131 linear feet. The amount of surface water impacts may be modified by any changes in roadway design.

There is the potential that components of the deck associated with Bridge No. 246 will be dropped into waters of the U.S. during construction. The resulting temporary fill associated with Bridge No. 246

is 16.8 m^3 (22.2 yd^3). This project can be classified as Case 3, where there are no special restrictions other than those outlined in BMP's.

Permits

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 CWA (Strand, 1997).

Nationwide Permit No. 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 No. 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. Also, 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 (61 FR 65874, 65916; December 13, 1996). The project's impacts on the waters of the United States will likely require a NWP 23.

Clean Water Act §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. North Carolina developed General Certifications (GCs) that satisfy CWA §401 and correspond to the Corps of Engineers' NWPs (NCDENR, DWQ, Water Quality Section, Wetlands Water Quality Certification; undated Internet site). Water Quality Certification No. 3107, which corresponds to NWP 23, will likely be required for the project's impacts to wetlands and waters.

Mitigation

USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy which embraces the concept of "no net loss of wetlands and surface waters" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological and physical integrity of Waters of the United States, specifically wetlands. Mitigation of Waters of the U.S. has been defined by the CEQ to include: avoiding impacts (to surface waters), 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 USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology and logistics in light of overall project purposes. Avoidance cannot be reached because of the replacement of the existing bridge with a culvert, which will affect Waters of the United States.

Minimization

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to Waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, ROW widths, fill slopes and/or road shoulder widths. Other practical mechanisms to minimize impacts to Waters of the United States crossed by the proposed project include: strict enforcement of sedimentation control BMP's for the protection of surface waters during the entire life of the project, reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams, reduction of runoff velocity; re-establishment of vegetation on exposed areas, minimization of "in-stream" activity, covering of exposed fill material and litter/debris control

Compensatory Mitigation

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the United States have been avoided and minimized to the maximum extent possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts, which remain after all; appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation and enhancement of Waters of the United States. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site. Compensatory mitigation will not be require according to DENR (15A NCAC 2II .0506(h)), because more than 150 linear feet (45.7 meters) of streams must be filled or altered, and the project area less than that.

NCDOT is proposing to relocate Little Arm Branch using natural stream design techniques for approximately 80 m (262 ft.). A 15.24 m (50 ft.) wooded buffer will be established by planting native grasses to stabilize the banks and then coming back and planting native tree species. The existing channel impacts to Little Arm Branch are approximately 120 m (393 ft.). Total surface water impacts pertaining to Alternate 1 have been determined to be 131 linear feet. This is below the level of stream loss at which mitigation is required.

The existing buffer impacted in Zone 1 is 0.12 ha (0.3 ac). Buffers in Zone 2 that are impacted are 0.08 ha (0.2 ac). The on-site mitigation for buffers is 0.08 ha (0.2 ac) in Zone 1 and .05 ha (0.12 ac). The ratio at which buffers are mitigated for Zone 1 are 3:1. The ratio buffers are mitigated for Zone 2 are 1.5:1. The total mitigation required by the construction of this project will be 0.37 ha (0.91 ac).

b. Rare and Protected Species

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

Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE) and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of June 16, 2000 the FWS lists four federally protected species for Wake County.

Table 3. Federally-Protected Species for Wake County

COMMON NAME	SCIENTIFIC NAME	STATUS
dwarf wedge mussel	Alasmidonta heterodon	E
bald eagle	Haliaeetus leucocephalus	T
red-cockaded woodpecker	Picoides borealis	E
Michaux's sumac	Rhus michauxii	E

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

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

Alasmidonta heterodon (dwarf wedge mussel) **E**
Animal Family: Unionidae
Date Listed: 3/14/90

The dwarf wedge mussel is a small mussel having a distinguishable shell noted by two lateral teeth on the right half and one on the left half. The periostracum (outer shell) is olive green to dark brown in color and the nacre (inner shell) is bluish to silvery white.

Known populations of the dwarf wedge mussel in North Carolina are found in the Neuse River Basin and in the Tar River system. This mussel is sensitive to agricultural, domestic, and industrial pollutants and requires a stable silt free streambed with well-oxygenated water to survive.

BIOLOGICAL CONCLUSION.....NO EFFECT

There is a stream on the project site, which is Little Arm Branch. NCDOT biologist Sue Brady and Jared Gray surveyed for the dwarf wedge mussel on August 19, 1999. There were no dwarf wedge mussels found in Little Arm Branch. Little Arm Branch was low flowing, and was full of sediment, which does not provide suitable habitat for the dwarf wedge mussel. A review of NCNHP database of rare species and unique habitats revealed no known populations of dwarf wedge mussel within1.6 km (1.0 mi.) of the project study area. The biological conclusion of no effect will be used for dwarf wedge mussel for lack of suitable habitat. This project will not effect the dwarf wedge mussel.

Haliaeetus leucocephalus (bald eagle) **T**
Animal Family: Accipitridae
Date Listed: 3/11/67

Their large white head and short white tail can identify adult bald eagles. The body plumage is dark-brown to chocolate-brown in color. In flight bald eagles can be identified by their flat wing soar.

Eagle nests are found in close proximity to water (within a half mile) with a clear flight path to the water, in the largest living tree in an area, and having an open view of the surrounding land. Human disturbance can cause an eagle to abandon otherwise suitable habitat. The breeding season for the bald eagle begins in December or January. Fish are the major food source for bald eagles. Other sources include coots, herons, and wounded ducks. Food may be live or carrion.

BIOLOGICAL CONCLUSION.....NO EFFECT

There is a stream located within the project area; however, this water body is too small to offer suitable habitat for the bald eagle. A review of the Natural Heritage Program (NCNHP) database of rare species and unique habitats did not indicate that the presence of any bald eagle activity occurs near the project area. Impacts to this species will not occur from project construction.

Picoides borealis (red-cockaded woodpecker) **E**
Animal Family: Picidae
Date Listed: 10/13/70

The adult red-cockaded woodpecker (RCW) 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 RCW is black and white with horizontal stripes. The breast and underside of this woodpecker are white with

streaked flanks. The RCW has a large white cheek patch surrounded by the black cap, nape, and throat.

The RCW 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 RCW. These birds nest exclusively in trees that are $\geq$ 60 years old and are contiguous with pine stands at least 30 years of age. The foraging range of the RCW is up to 200.0 hectares (500.0 acres). 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 3.6-30.3 m (12-100 ft) above the ground and average 9.1- 15.7 m (30-50 ft) high. They can be identified by a large incrustation of running sap that surrounds the tree. The RCW lays its eggs in April, May, and June; the eggs hatch approximately 38 days later.

BIOLOGICAL CONCLUSION.....NO EFFECT

Suitable nesting and foraging habitat for the RCW, in the form of old growth pine forest, is not located in the project study area. There were no pines of sufficient size and density located in the project study area or nearby vicinity. A review of NCNHP database of rare species and unique habitats revealed no known populations of RCW within1.6 km (1.0 mi.) of the project study area. This project will not effect the red-cockaded woodpecker.

Rhus michauxii (Michaux's sumac) **E**
Plant Family: Anacardiaceae
Federally Listed: September 28, 1989
Flowers Present: June

Michaux's sumac is a densely pubescent rhizomatous shrub. The bases of the leaves are rounded and their edges are simply or doubly serrate. The flowers of Michaux's sumac are greenish to white in color. Fruits, which develop from August to September on female plants, are a red densely short-pubescent drupe.

This plant occurs in rocky or sandy open woods. Michaux's sumac is dependent on some sort of disturbance to maintain the openness of its habitat. It usually grows in association with basic soils and occurs on sand

or sandy loams. Michaux's sumac grows only in open habitat where it can get full sunlight. Michaux's sumac does not compete well with other species, such as Japanese honeysuckle, with which it is often associated.

BIOLOGICAL CONCLUSION.....NO EFFECT

A plant by plant survey for Michaux's sumac was conducted in the project study area on June 15, 1999 by NCDOT biologists Tim Bassette, Chris Murray, and Jared Gray, in the areas of suitable habitat such as irregularly maintained shoulder and forested maintained ecotones. Prior to conducting this survey, a known Michaux's sumac population was visited to familiarize us with the species. Survey methodology involved was driving the length of the project looking for areas with suitable habitat. Once the survey area was determined, habitat was found and surveyed on foot by the above mentioned biologists. Although habitat was located, no Michaux's sumac was found anywhere within the project study area. The NCNHP database of rare species and unique habitat does not list any populations of Michaux's sumac within the project vicinity. Therefore, this project will not impact Michaux's sumac.

Federal Species of Concern and State Listed Species

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

Table 4 lists Federal Species of Concern, the species state status (if afforded state protection) and the existence of suitable habitat for each species in the study area. This species list is provided for information purposes as the status of these species may be upgraded in the future.

Table 4. Federal Species of Concern for Wake County.

Common Name	Scientific Name	NC Status	Habitat
Bachman's sparrow	Aimophila aestivalis	SC	No
Carolina darter	Etheostoma collis lepidinion	SC	Yes
Southern hognose snake	Heterodon simus	SR/(PSC)	No
Pinewoods shiner	Lythrurus matutinus	SR	Yes
Southeastern myotis	Myotis austroriparius	SC	Yes
yellow lance	Elliptio lanceolata	T/(PE)	No
Atlantic pigtoe	Fusconaia masoni	T/(PE)	No
green floater	Lasmigona subvirdus	E	No
Diana fritillary butterfly	Speyeria diana	SR	No
sweet pinesap	Monotropis odorata	C	Yes
Carolina least trillium	Trillium pusillum pusillum	E	No

"E"--An Endangered species is one whose continued existence as a viable component of the State's flora is determined to be in jeopardy.
"T"--A Threatened species is one which is likely to become endangered species within the foreseeable future throughout all or a significant portion of its range.
"SC"--A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.
"C"--A Candidate species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is 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"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.
"PSC"-A species that has been proposed by a Scientific Council as a status (Special Concern), that is different from the current status, but the status has not yet been adopted by the WRC and by the General Assembly as law.
"PE"- A species that has been proposed by a Scientific Council as a status (Endangered), that is different from the current status, but the status has not yet been adopted by the WRC and by the General Assembly as law

"*"--Historic record (last observed in the county more than 20 years ago). (NCNHP, 1999)

Surveys for the above-mentioned species were not conducted during the site visit, nor were these species observed during the site visit. A search of the NC Natural Heritage database of rare and unique habitats revealed no records of FSC or State listed species in the project area. Please contact me if you have any further questions regarding the project.

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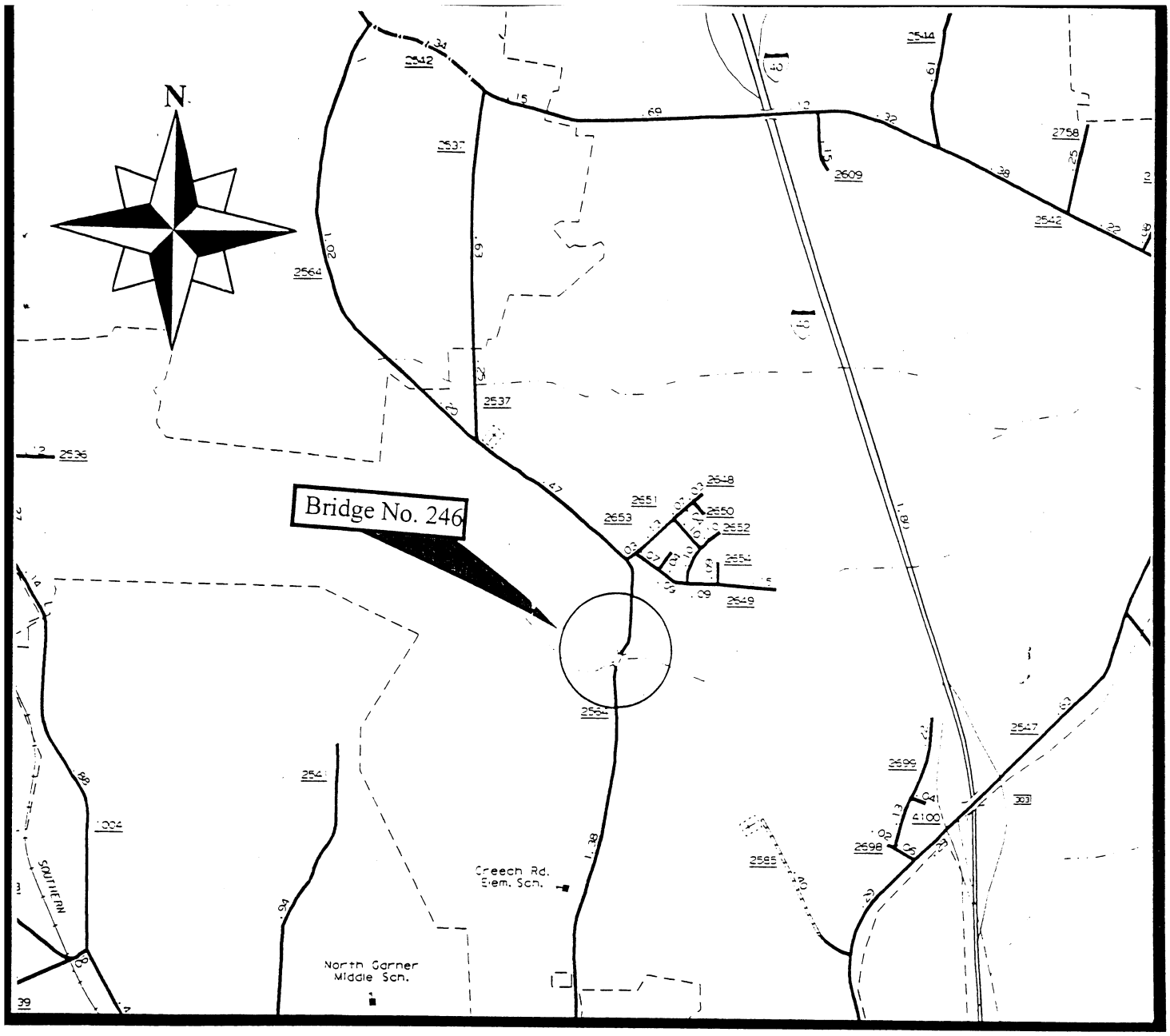
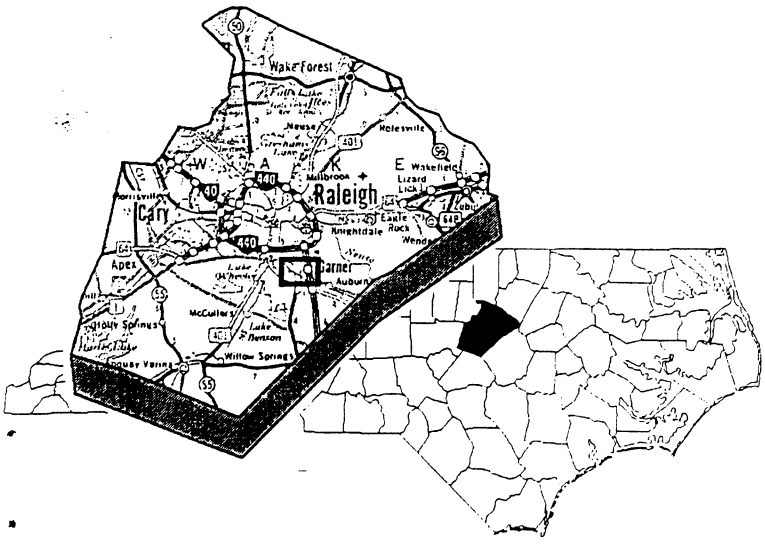
VIII. CONCLUSION

On the basis of the above discussion, it is concluded that no substantial adverse environmental effects will result from the implementation of the project. The proposed project is considered to be a "categorical exclusion" as defined by the Federal Highway Administration's environmental guidelines (23 CFR 771.117).

FIGURES

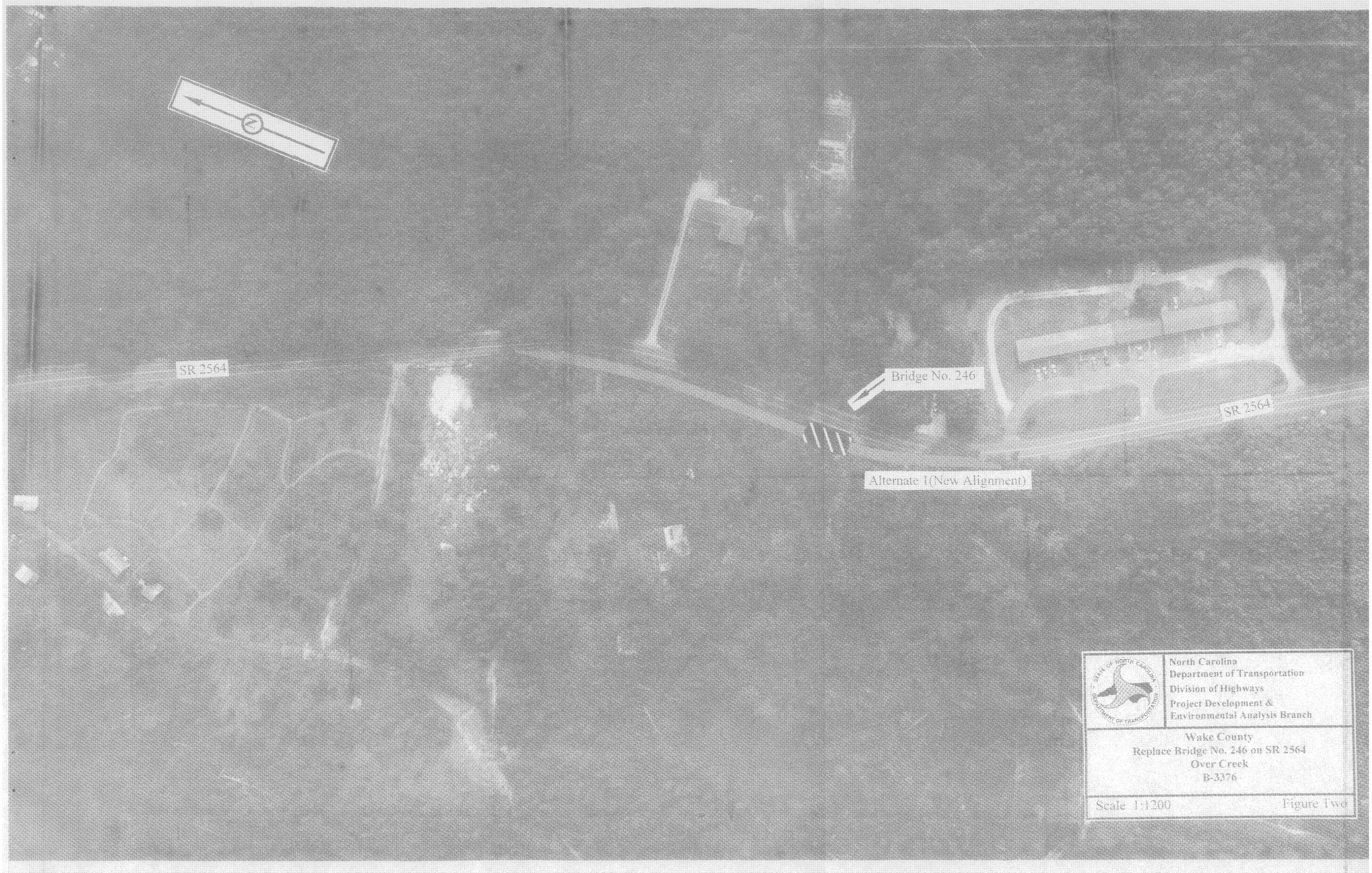




North Carolina
Department of Transportation
Division of Highways
Planning & Environmental Branch

Wake County
Replace Bridge No. 246 on SR 2564
Over Creek
B-3376

Figure One



North Carolina
Department of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Wake County
Replace Bridge No. 246 on SR 2564
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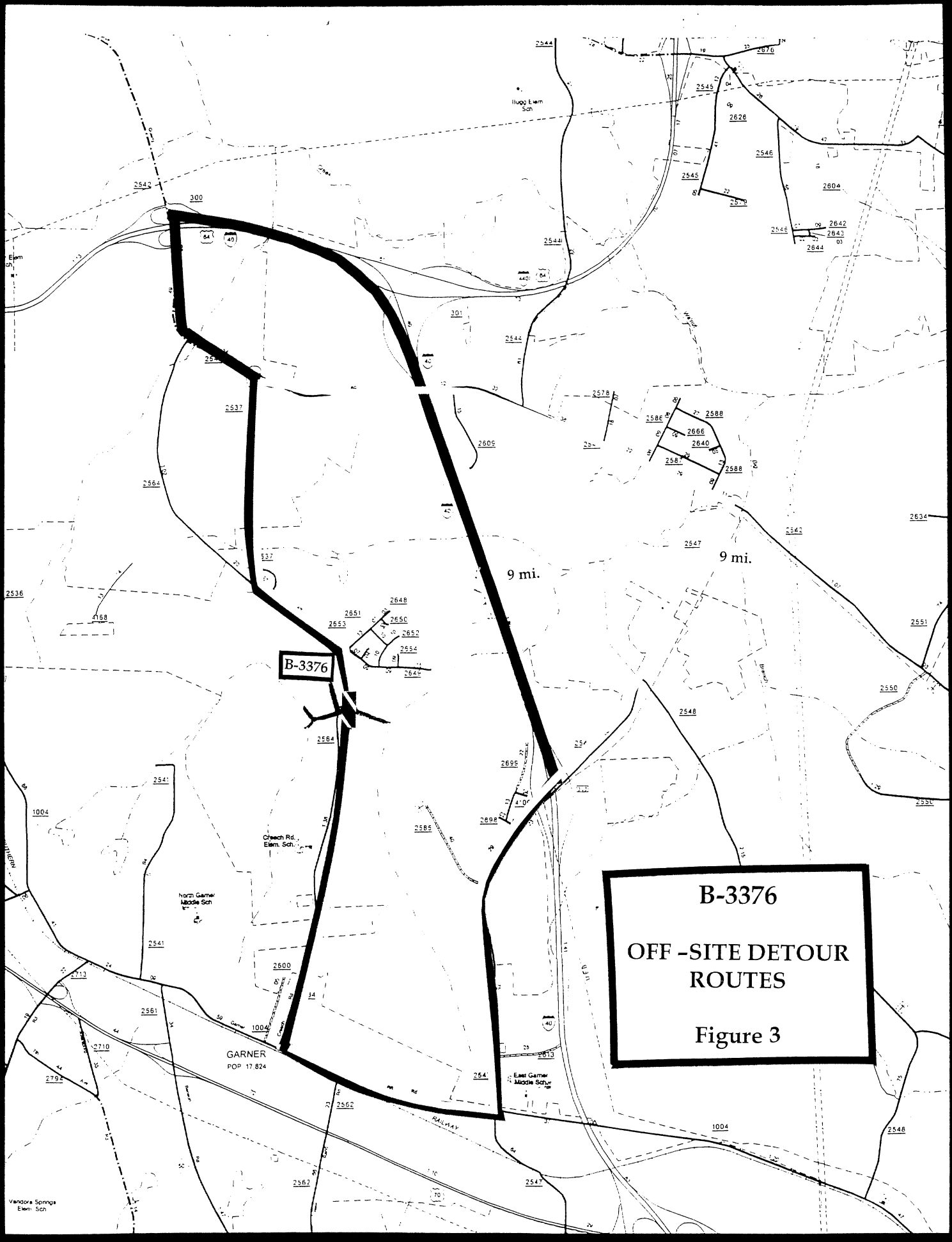
B-3376

Scale 1:1200 Figure Two



B-3376

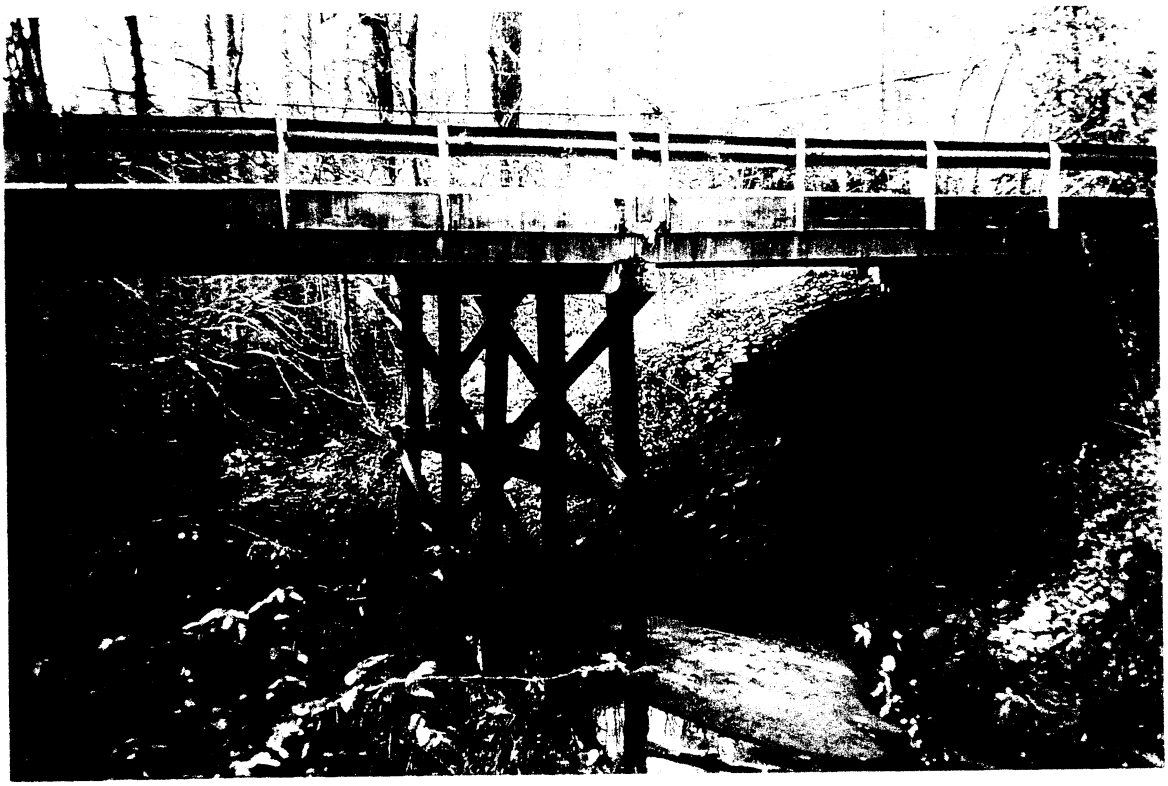
OFF -SITE DETOUR ROUTES

Figure 3

APPENDIX

Looking North on SR 2564

Looking South on SR 2564



Looking West along Little Arm Branch

Looking South- East along Little Arm Branch

North Carolina Department of Cultural Resources

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

Division of Archives and History
Jeffrey J. Crow, Director

April 6, 1998

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

Re: Bridge 246 on SR 2564 over creek, Wake County, B-3376, Federal Aid Project BRSTP-2564(1), State Project 8.2406301, ER 98-8623

Dear Mr. Graf:

On April 2, 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.

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

David Brook
Deputy State Historic Preservation Officer

DB:slw

cc: H. F. Vick
B. Church
T. Padgett
Wake County Historic Preservation Commission