STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 20, 2004

US Army Corps of Engineers
Raleigh Field Office
6508 Falls of Neuse Road, Suite 120
Raleigh, NC 27615-6814

ATTENTION: Eric Alsmeyer
NCDOT Coordinator, Division 5

Dear Sir:

Subject: **Application for Nationwide Permit 23 and 33 and Riparian Buffer Certification** for the replacement of Bridge No. 108 over Lower Barton's Creek on SR 1834, Wake County. Federal Aid Project No. BRZ-1834(2), State Project No. 8.2407901, T.I.P. No. B-3704: NCDOT Division 5

Please find enclosed three copies of the project planning report for the above referenced project, as well as half size plan sheets, permit drawings, PCN form and Neuse Buffer Addendum. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 108 over Lower Barton's Creek [DWQ Index # 27-16(1) and #27-16(2)], a Division of Water Quality Class "WS IV NSW" and "WS IV NSW CA" Waters of the State. Classification and index numbers change where it flows under SR 1834. The project involves replacing the current 102-foot bridge in its existing location, while using an off-site detour to maintain traffic during construction. The proposed bridge will be a 3-span, 150 foot cored slab bridge with a width of 36 feet. The approaches will be two, 12 ft lanes with 8-foot shoulders.

IMPACTS TO WATERS OF THE UNITED STATES

Bridge No. 108 over Lower Barton's Creek (Site 1) will be a 3-span, 150-foot cored slab bridge. This new bridge is 46 feet longer and 11 feet wider than the existing bridge. The construction of the bridge will require the use of a temporary work pad consisting of Class II and Class B riprap to provide access to the site for the construction equipment. The resulting temporary surface water fill will be 0.02 ac. Construction of

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

the proposed temporary work pad is depicted in the attached drawings (Plan Sheets 3 and 4).

At Site 2, a 36-inch reinforced concrete pipe (RCP) will be replaced with a new 36-inch RCP to accommodate the end bents and approaches being widened and will impact 108 ft of jurisdictional stream (UT to Lower Barton's Creek). The old pipe will be dug out and a new, but longer pipe, will be replaced in same location. We do not anticipate any mitigation for any of these impacts. No jurisdictional wetlands are impacted due to this project.

Utilities: A fiber optic cable will be relocated within the right-of-way of the project due to the construction of the new bridge by directional boring under the streams. No impacts will result from the relocation of this cable.

BRIDGE DEMOLITION

Existing Bridge No. 108 is approximately 102 ft long with six spans. The bridge superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps and piles. There is the potential for 51.9 cubic yards to be temporarily placed into Waters of the United States, although all guidelines for bridge demolition and removal will be followed in addition to Best Management Practices for the Protection of Surface Waters. This project is classified as Case 3 in there are no special restrictions other than those outlined in Best Management Practices for the Protection of Surface Waters and Bridge Demolition and Removal.

RESTORATION PLAN

The project schedule calls for a December 2004 let date. It is expected that the contractor will chose to start construction of the temporary work pad shortly after that date.

The materials used as temporary fill in the construction of the temporary work pad will be completely removed. The entire temporary work pad footprint shall be returned to the original contours and elevations after the purpose of the temporary work pad has been served.

After the temporary work pad is no longer needed, the contractor will use excavating equipment to remove all materials. The rip rap used in the temporary work pad may be placed as riprap slope protection. All temporary work pad material will become the property of the contractor. The contractor will be required to submit a reclamation plan for removal of and disposal of all materials off-site.

AVOIDANCE, MINIMIZATION, MITIGATION

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

The following measure were taken to avoid and minimize impacts to jurisdictional areas:

- The bridge will be replaced on existing location
- No bents will be located within the stream channel
- The placement of pre-formed scour holes treat stormwater
- Minimum amount of rip rap in buffer areas

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 United States Fish and Wildlife Service (USFWS) lists four federally protected species for Wake County. Table 1 lists the species, their status and biological conclusion.

Table 1. Federally-Protected Species for Wake County

Common Name	Scientific Name	Federal Status	Biological Conclusion
dwarf wedgemussel	*Alasmidonta heteradon*	E	No Effect
bald eagle	*Haleaeetus leucephalus*	T	No Effect
red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Michaux's sumac	*Rhus michauxii*	E	No Effect

"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 significant portion of its range).

Biological conclusions of "No Effect" were given in the CE for the bald eagle, red-cockaded woodpecker, Michauxi's sumac and dwarf wedgemussel. No habitat was present for all species except dwarf wedgemussel.

Surveys for the dwarf wedgemussel were conducted by NCDOT biologists on September 21, 2000 and by Alderman Environmental Services, Inc. on June 6, 2003. Habitat is present in the vicinity of the bridge but is somewhat degraded due to sediment loads, mostly due to development in the area. No dwarf wedge mussels were found and very few mussels overall were found during both surveys, mostly eastern elliptio mussels (*Elliptio* sp.). Given the survey results it is apparent that dwarf wedgemussel does not occur in the project footprint and therefore a Biological Conclusion of "No Effect" is given.

SUMMARY

It is anticipated that the construction of the temporary work pad will be authorized under Section 404 Nationwide Permit 33 (Temporary Construction Access and Dewatering). We are, therefore, requesting the issuance of a Nationwide Permit 33 authorizing construction of the temporary work pad. All other aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR § 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (FR number 10, pages 2020-2095; January 15, 2002). We anticipate 401 General Water Quality Certifications (WQC) numbers 3361 and 3366 will apply to this project. All general conditions of these WQCs will be met, therefore, in accordance with 15A NCAC 2H .0501(a) we are providing two copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their records.

If you have any questions or need additional information, please call Rachelle Beauregard at 715-1383.

Sincerely,

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

cc: w/attachment
Mr. John Hennessy, Division of Water Quality (2 copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Greg Perfetti, P.E., Structure Design

w/o attachment
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, P.E., FHWA
Mr. Jon Nance, P.E., Division Engineer
Mr. Chris Murray , DEO
Mr. John Conforti, PDEA Planning Engineer
Mr. Bill Gilmore, EEP

NEUSE BUFFER ADDENDUM

The purpose of this addendum is to provide the NCDWQ with the information needed to evaluate the impacts of the project on the Neuse Buffer areas. In addition, we are presenting material in this addendum to illustrate that the project has been designed to comply with the Riparian Buffer Mitigation Program (15A NCAC 2B .0242) and the Neuse River Basin Riparian Buffer Rules (15A NCAC 2B .0233). Therefore, we request that the DWQ issue an Authorization Certificate pursuant to 15A NCAC 2B .0233 for the proposed use.

The North Carolina Department of Transportation proposes to replace Bridge No. 108 over Lower Barton's Creek on SR 1834 at its existing location.

Neuse Buffer Impacts. Impacts to buffers include that of construction of the new bridge, including the temporary work pad (See plan sheets 4 and 5) and the installation of a reinforced concrete pipe. Impacts to buffers are shown in Table 2 below. Under the Neuse Buffer Rules, impacts to buffers from the construction of bridge and temporary work pad are allowable and impacts are allowable with mitigation for road crossings with impacts to riparian buffers greater than one-third of an acre.

Table 2. Neuse River Buffer Impacts (Square Feet)

	Road Crossing of Stream	Bridge Construction	Temporary Work Pad
Zone 1 Impact (sq ft)	10,307	3113	382
Zone 2 Impact (sq ft)	12,396	7117	50
TOTAL IMPACTS	**22,703**	**10,230**	**432**
Mitigation requirements (exempt, allowable or allowable with mitigation)	allowable with mitigation	allowable	allowable
Mitigable Impacts (using 3:1 ratio) for Zone 1	30,921		
Mitigable Impacts (using 1.5:1 ratio) for Zone 2	18,594		
TOTAL MITIGATION REQUIRED	**49,515**		

This bridge has been determined to be structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations. Because this bridge needs to be replaced and the pipe replaced, impacts to the riparian buffers at Lower Barton's Creek are unavoidable. Replacing the existing bridge at its existing location provides the least amount of impacts to riparian buffers. The road crossing over the stream is perpendicular and only extends an existing pipe.

NCDOT has developed measures in the design of the bridge to minimize impacts to buffers and water quality. The new bridge is 46 feet longer than the existing bridge and has three less spans. Performed scour holes have been placed, outside the buffer zones, to treat stormwater. A minimum amount of rip rap will be used in buffer areas.

Total mitigation required for mitigable impacts to buffers from the construction of this project are 49, 515 sq. ft. We will provide buffer mitigation from the North Carolina Ecosystem Enhancement Program. The request letter is attached to this application. A concurrence letter will be sent to the USACE on their approval.

Office Use Only: Form Version May 2002

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

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

I. Processing

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

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

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

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

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

II. Applicant Information

1. Owner/Applicant Information
   Name: **NCDOT/Project Development and Environmental Analysis**
   Mailing Address: **1548 Mail Service Center,**
   Raleigh, NC 27699-1548

   Telephone Number: **919-733-3141** Fax Number: **919-733-9794**
   E-mail Address: _____

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

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

III. Project Information

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

1. Name of project: **Replacement of Bridge No. 108 over Lower Barton's Creek on SR 1834**

2. T.I.P. Project Number or State Project Number (NCDOT Only): **B-3704**

3. Property Identification Number (Tax PIN): **N/A**

4. Location
   County: **Wake** Nearest Town: **Raleigh**
   Subdivision name (include phase/lot number): **N/A**
   Directions to site (include road numbers, landmarks, etc.): **See map in permit drawings**

Site coordinates, if available (UTM or Lat/Long): **35.649°N, 78.792°W**
(Note – If project is linear, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)

5. Property size (acres): **N/A**

6. Nearest body of water (stream/river/sound/ocean/lake): **Lower Barton's Creek**

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

Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: **residential and forested**

8. Describe the overall project in detail, including the type of equipment to be used:
   Bridge No. 108 will be replaced on existing location with a temporary work pad to provide access for construction equipment to the site. Heavy duty excavation

equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

9. Explain the purpose of the proposed work: **To replace a deteriorating bridge**

IV. Prior Project History

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

N/A

V. Future Project Plans

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

N/A

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

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

1. Provide a written description of the proposed impacts: **Jurisdictional impacts include temporary impacts to Lower Barton's Creek due to the temporary work pad and permanent stream impacts to an unnamed tributary due to the extension of a reinforced concrete pipe.**

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

Open Water Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Name of Waterbody (if applicable)	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)
No impacts				

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

5. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): **N/A**

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

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

VII. Impact Justification (Avoidance and Minimization)

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

The new bridge is 46 feet longer than the existing bridge and has three less spans than the existing bridge. The new bridge is being replaced on existing location.

VIII. Mitigation

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

freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on March 9, 2000, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

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

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   Buffer mitigation required for impacts caused by the extension of a 36 inch RCP

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

   Amount of stream mitigation requested (linear feet): **N/A**
   Amount of buffer mitigation requested (square feet): **22,703 sq.ft**
   Amount of Riparian wetland mitigation requested (acres): **N/A**
   Amount of Non-riparian wetland mitigation requested (acres): **N/A**
   Amount of Coastal wetland mitigation requested (acres): **N/A**

2. Individually list wetland impacts below:

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Located within 100-year Floodplain** (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland***

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

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

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

List the total acreage (estimated) of all existing wetlands on the property: **0 ac**
Total area of wetland impact proposed: **0 ac**

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

Stream Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Stream Name**	Average Width of Stream Before Impact	Perennial or Intermittent? (please specify)
2	permanent	0.03	UT to Lower Barton's Creek	1-2 ft	perennial
3	temporary	0.02	Lower Barton's Creek	30 ft	perennial

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

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

Cumulative impacts (linear distance in feet) to all streams on site: **76 ft**

IX. Environmental Documentation (required by DWQ)

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

Yes ☒ No ☐

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

Yes ☒ No ☐

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

Yes ☒ No ☐

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

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

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

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

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

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1	10,307	3	30,921
2	12,396	1.5	18,594
Total	22,703,		49,515

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

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

Mitigation will be performed through payment to the North Carolina Ecosystem Enhancement Program.

XI. Stormwater (required by DWQ)

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

N/A

XII. Sewage Disposal (required by DWQ)

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

N/A

XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?

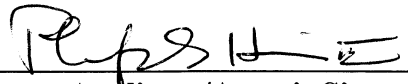
Yes ☐ No ☒

Is this an after-the-fact permit application?

Yes ☐ No ☒

XIV. Other Circumstances (Optional):

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



5/20/04

Applicant/Agent's Signature **Date**

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 20, 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, Reeplacement of Bridge No. 108 over Lower Barton's Creek on SR 1834, Wake County. Federal Aid Project No. BRZ-1834(2), State Project No. 8.2407901, T.I.P. No. B-3704:

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. 108 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)

	Road Crossing of Stream	Bridge Construction	Temporary Work Pad
Zone 1 Impact (sq ft)	10,307	3113	382
Zone 2 Impact (sq ft)	12,396	7117	50
TOTAL> IMPACTS	**22,703**	**10,230**	**432**
Mitigation requirements (exempt, allowable or allowable with mitigation)	allowable with mitigation	allowable	allowable
Mitigable Impacts (using 3:1 ratio) for Zone 1	30,921		
Mitigable Impacts (using 1.5:1 ratio) for Zone 2	18,594		
TOTAL MITIGATION REQUIRED	**49,515**		

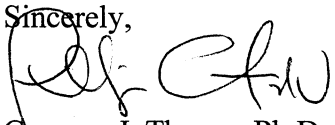
Total mitigation required required for buffer impacts is for 49, 515 sq. ft.

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,. Suite120, 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.

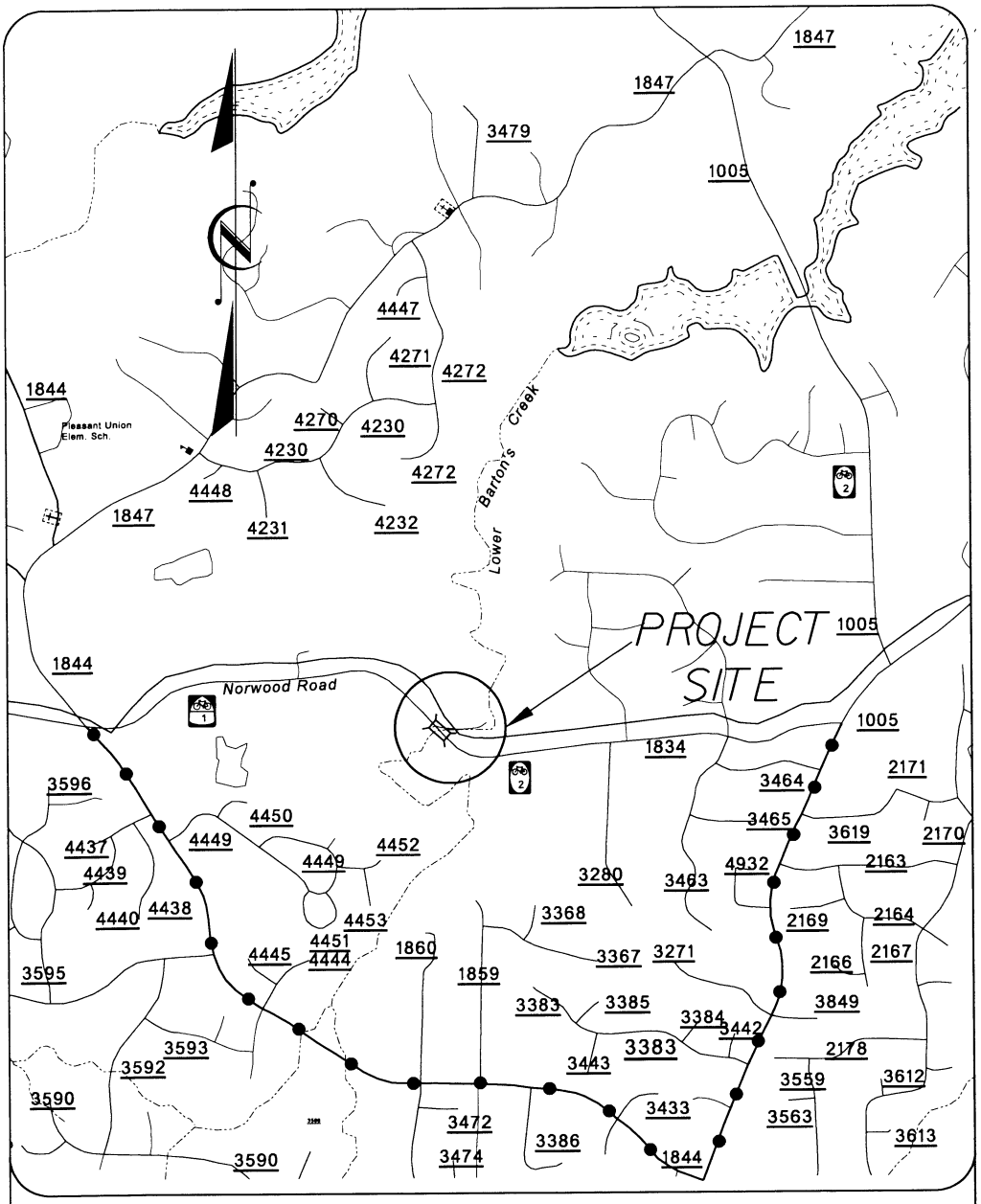
If you have any questions or need additional information please call Rachelle Beauregard at 715-1383.

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
Mr. John Conforti, PDEA Project Planning Engineer
Mr. Jon Nance, P.E., Division 5 Engineer
Mr. Chris Murray, DEO



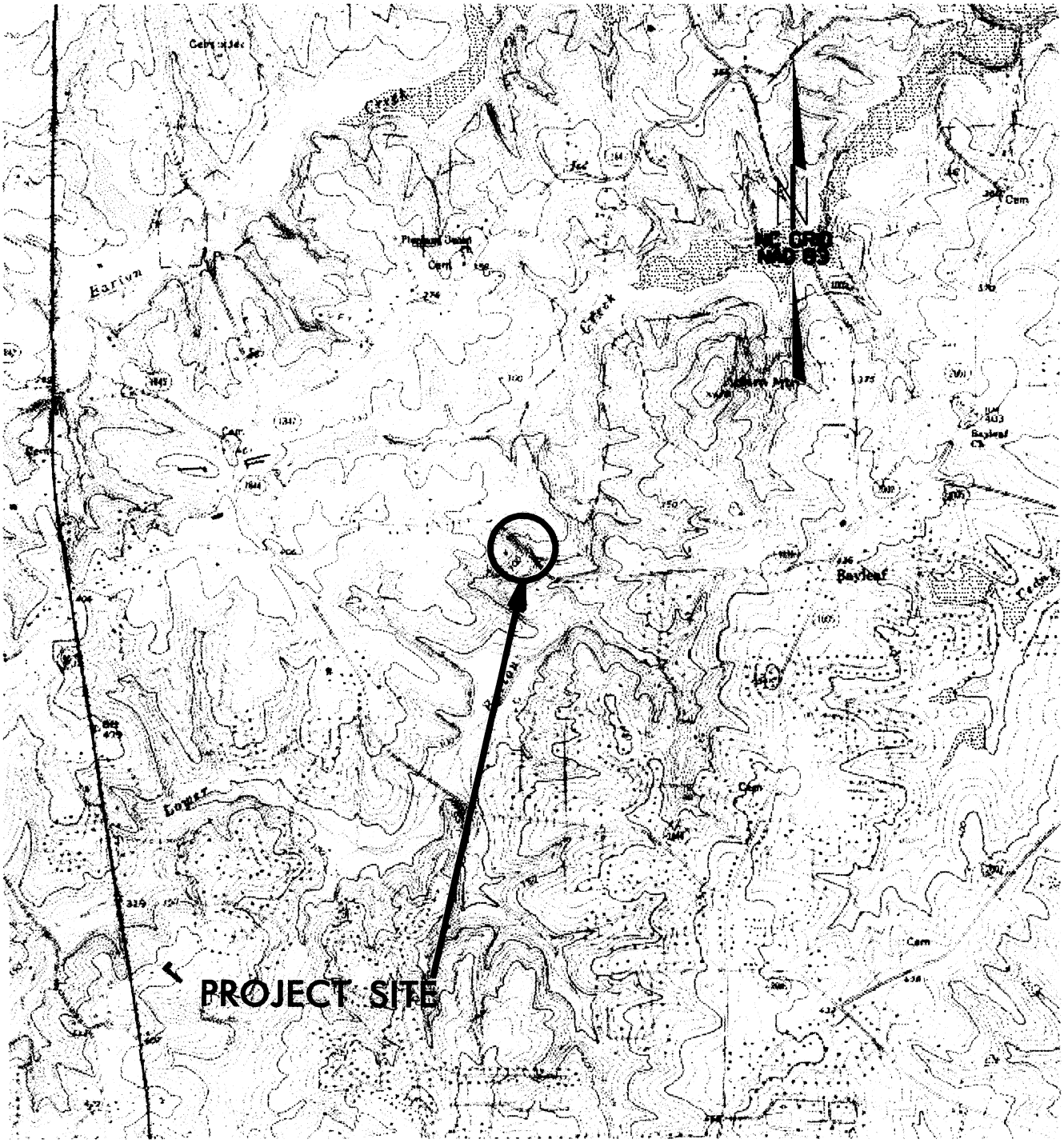
VICINITY MAP

OFFSITE DETOUR ROUTE

VICINITY MAP

N.C.D.O.T.
DIVISION OF HIGHWAYS
WAKE COUNTY
BRIDGE NO. 108 ON SR 1834 OVER LOWER BARTON'S CREEK

STATE PROJECT B-3704
SHEET 1 OF 9



SITE MAP

N.C.D.O.T.
DIVISION OF HIGHWAYS
WAKE COUNTY
BRIDGE NO. 108 ON SR 1834 OVER LOWER BARTON'S CREEK

STATE PROJECT B-3704
SHEET 2 OF 9

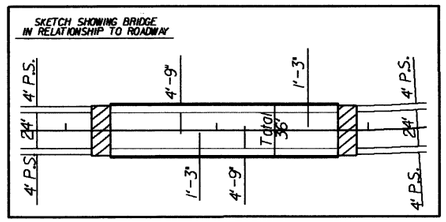
...\PermitDrawings\quad.dgn 07/17/2003 03:51:00 PM

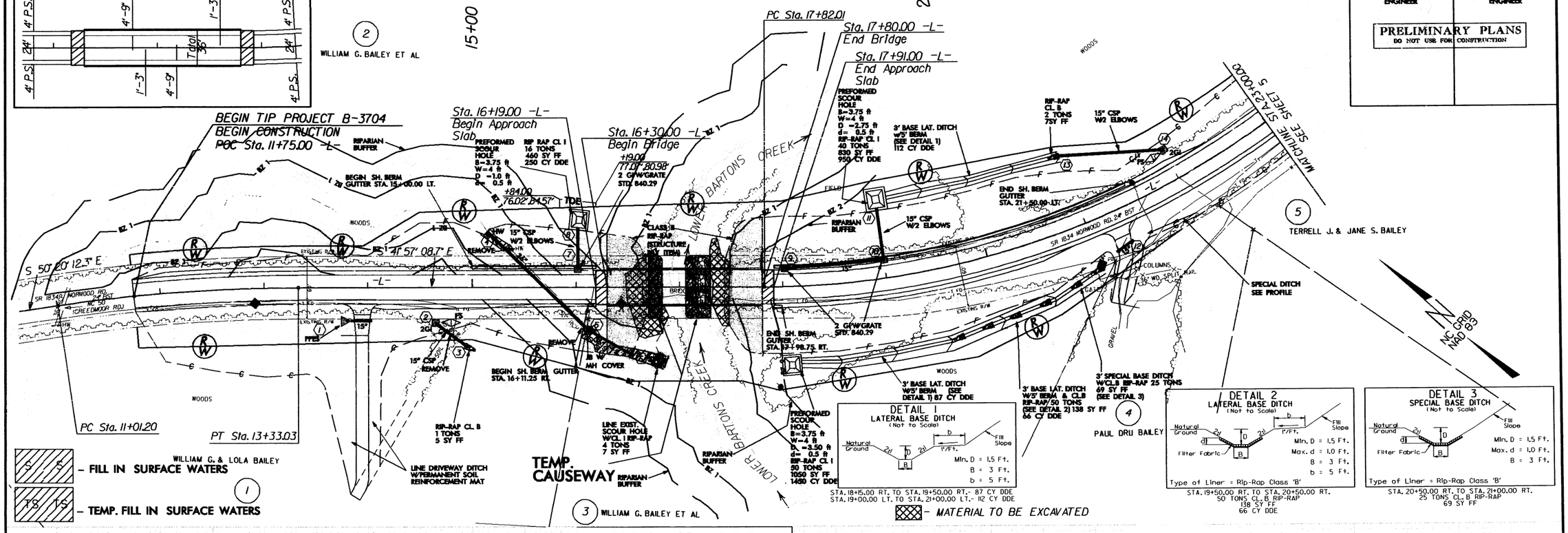
WETLAND/STREAM IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
B-3704	3 of 9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY





DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
B = 3 Ft.
b = 5 Ft.

STA. 18+15.00 RT. TO STA. 19+50.00 RT.- 87 CY DDE
STA. 19+00.00 LT. TO STA. 21+00.00 LT.- 112 CY DDE

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 3 Ft.
b = 5 Ft.

Type of Liner = Rip-Rap Class 'B'
STA. 19+50.00 RT. TO STA. 20+50.00 RT.
50 TONS CL. B RIP-RAP
138 SY FF
66 CY DDE

DETAIL 3
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 3 Ft.

Type of Liner = Rip-Rap Class 'B'
STA. 20+50.00 RT. TO STA. 21+00.00 RT.
25 TONS CL. B RIP-RAP
69 SY FF

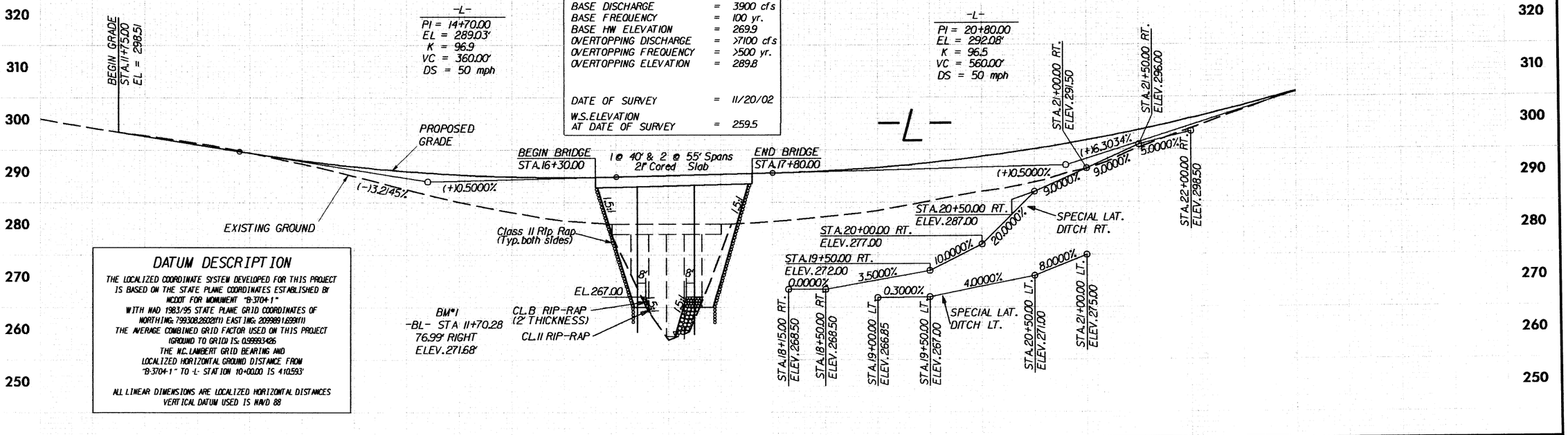
TS TS – TEMP. FILL IN SURFACE WATERS

– MATERIAL TO BE EXCAVATED

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	3000 cfs
DESIGN FREQUENCY	=	25 yr.
DESIGN HW ELEVATION	=	268.9
BASE DISCHARGE	=	3900 cfs
BASE FREQUENCY	=	100 yr.
BASE HW ELEVATION	=	269.9
OVERTOPPING DISCHARGE	=	>7100 cfs
OVERTOPPING FREQUENCY	=	>500 yr.
OVERTOPPING ELEVATION	=	289.8
DATE OF SURVEY	=	11/20/02
W.S.ELEVATION AT DATE OF SURVEY	=	259.5

SEE STRUCTURE PLANS S- THRU S-



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-3704-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 799308.2802(ft) EASTING: 2099891.6991(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999931426
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-3704-1" TO -L- STATION 10+00.00 IS 410.593'

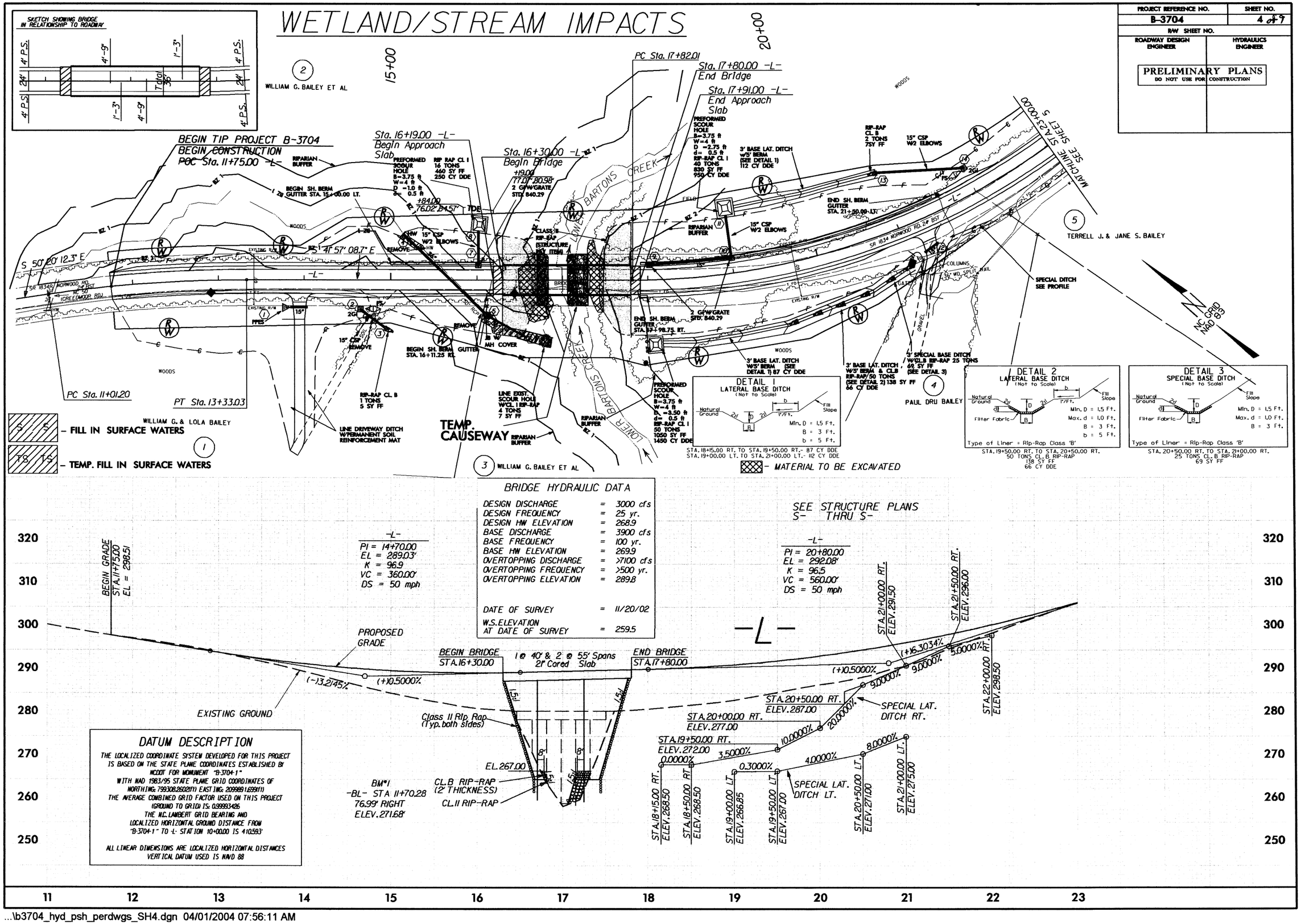
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

WETLAND/STREAM IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
B-3704	4 of 9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY



S S – FILL IN SURFACE WATERS

TS TS – TEMP. FILL IN SURFACE WATERS

DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

STA. 18+15.00 RT. TO STA. 19+50.00 RT.- 87 CY DDE
STA. 19+00.00 LT. TO STA. 21+00.00 LT.- 112 CY DDE

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Type of Liner = Rip-Rap Class 'B'
STA. 19+50.00 RT. TO STA. 20+50.00 RT.
50 TONS CL. B RIP-RAP
138 SY FF
66 CY DDE

DETAIL 3
SPECIAL BASE DITCH
(Not to Scale)

Type of Liner = Rip-Rap Class 'B'
STA. 20+50.00 RT. TO STA. 21+00.00 RT.
25 TONS CL. B RIP-RAP
69 SY FF

– MATERIAL TO BE EXCAVATED

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	3000 cfs
DESIGN FREQUENCY	=	25 yr.
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BASE DISCHARGE	=	3900 cfs
BASE FREQUENCY	=	100 yr.
BASE HW ELEVATION	=	269.9
OVERTOPPING DISCHARGE	=	>7100 cfs
OVERTOPPING FREQUENCY	=	>500 yr.
OVERTOPPING ELEVATION	=	289.8
DATE OF SURVEY	=	11/20/02
W.S. ELEVATION AT DATE OF SURVEY	=	259.5

SEE STRUCTURE PLANS S- THRU S-

DATUM DESCRIPTION

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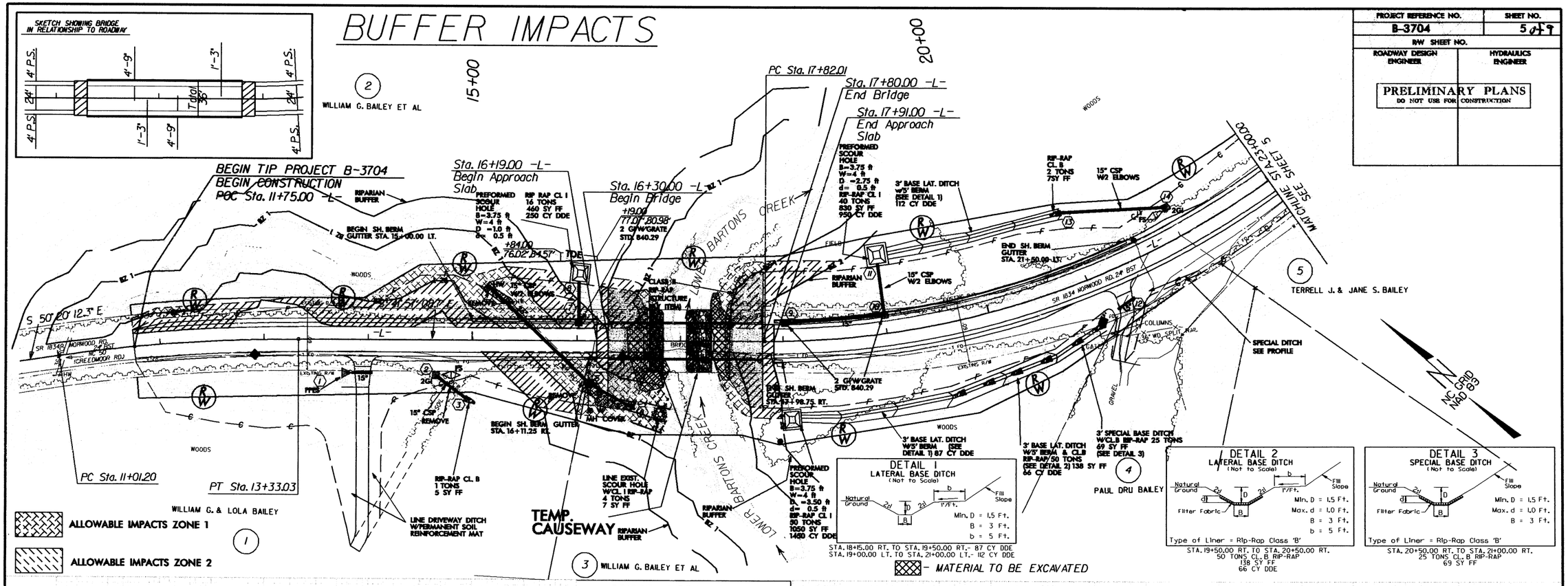
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BUFFER IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
B-3704	5 of 9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY



DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

STA. 18+15.00 RT. TO STA. 19+50.00 RT.- 87 CY DDE
STA. 19+00.00 LT. TO STA. 21+00.00 LT.- 112 CY DDE

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

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STA. 19+50.00 RT. TO STA. 20+50.00 RT.
50 TONS CL B RIP-RAP
138 SY FF
66 CY DDE

DETAIL 3
SPECIAL BASE DITCH
(Not to Scale)

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STA. 20+50.00 RT. TO STA. 21+00.00 RT.
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69 SY FF

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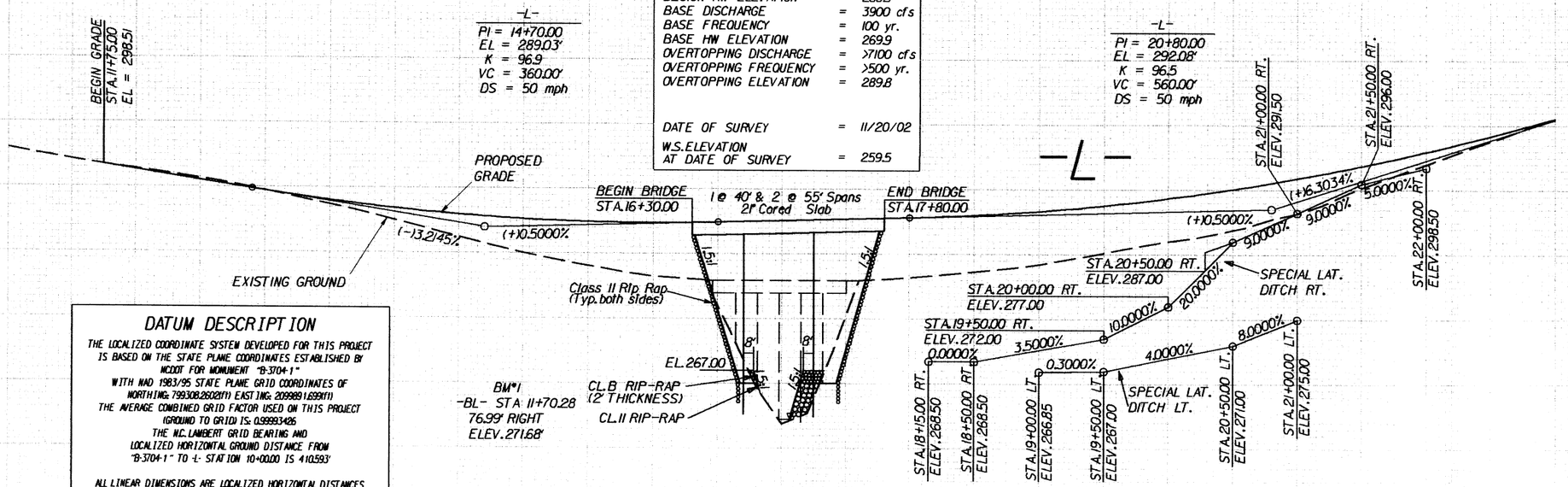
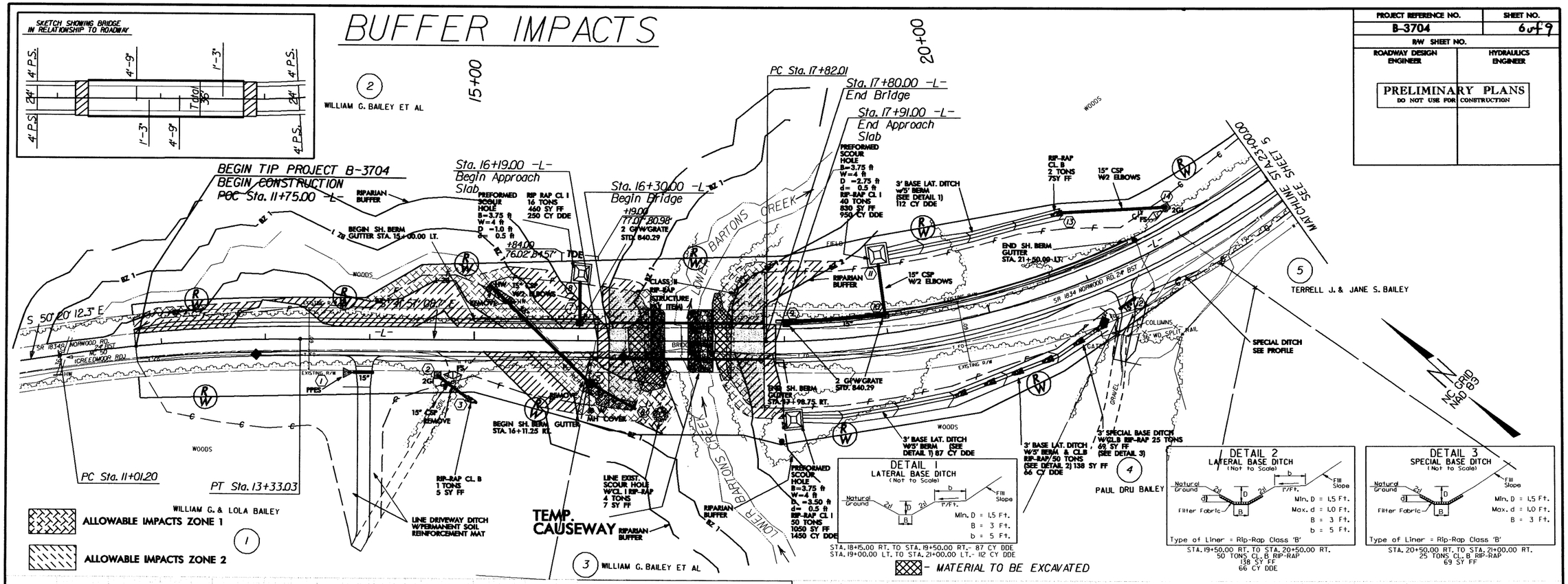


BUFFER IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
B-3704	6 of 9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY



DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

STA. 18+15.00 RT. TO STA. 19+50.00 RT.- 87 CY DDE
STA. 19+00.00 LT. TO STA. 21+00.00 LT.- 112 CY DDE

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Type of Liner = Rip-Rap Class 'B'
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50 TONS CL.B RIP-RAP
138 SY FF
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DETAIL 3
SPECIAL BASE DITCH
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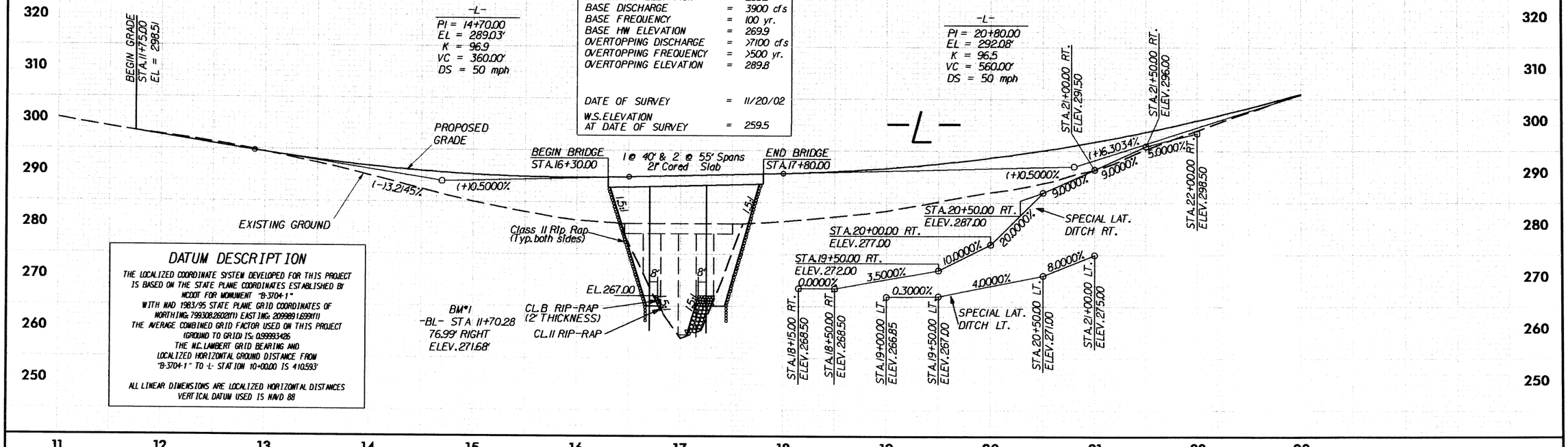


PROPERTY OWNERS

NAMES AND ADDRESSES

NO.	NAMES	ADDRESSES
1	WILLIAM G. & LOLA BAILEY	14000 Norwood Road Raleigh, NC 27614
2	WILLIAM G. BAILEY ET. AL.	14000 Norwood Road Raleigh, NC 27614
3	WILLIAM G. BAILEY ET. AL.	14000 Norwood Road Raleigh, NC 27614
4	PAUL DRU BAILEY	14020 Norwood Road Raleigh, NC 27614
5	TERRELL J. & JANE S. BAILEY	14032 Norwood Road Raleigh, NC 27614

N.C.D.O.T.

DIVISION OF HIGHWAYS

WAKE COUNTY

BRIDGE NO. 108 ON SR 1834 OVER LOWER BARTON'S CREEK

STATE PROJECT B-3704

SHEET 1 OF 9

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	SURFACE WATER IMPACTS: Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
2	15+70.00	36" RCP					0.03			108	
3	16+74.00 to 17+34.00	Temporary Causeway							0.02	62	
TOTALS:			0	0	0	0	0.03	0	0.02	170	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT B-3704

Apr-04

Form Revised 3/22/01

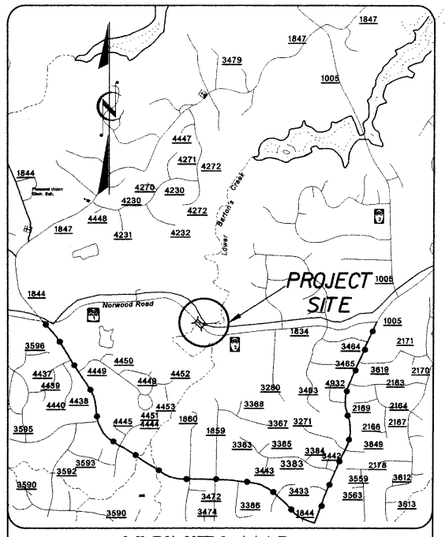
BUFFER IMPACTS SUMMARY

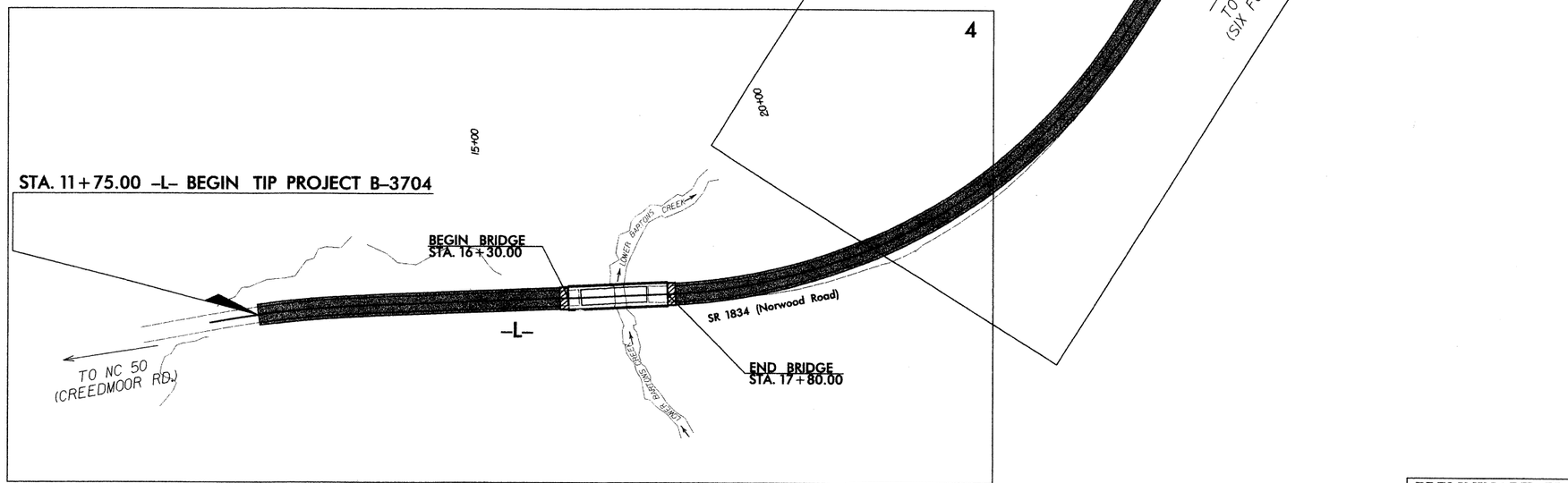
			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	3 @ 50' SPANS BRIDGE	17+05.00	X		3,113.0	7,117.0	10,230.0					
2	36" RCP	15+70	X					10307.0	12396.0	22703.0		
3	TEMPORARY CAUSEWAY	16+74 TO 17+34	X		382.0	50.0	432.0					
TOTAL:					3,495.0	7,167.0	10,662.0	10307.0	12396.0	22703.0		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: B-3704

Apr-04





CONTRACT:

TIP:B-3704

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

VICINITY MAP

OFFSITE DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

LOCATION: BRIDGE NO. 108 OVER LOWER BARTON'S CREEK ON SR 1834 (NORWOOD ROAD)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3704	1	

WBS NO.	F. A. PROJ. NO.	DESCRIPTION
33244.1.1	BRZ-1834(2)	P.E.
33244.2.1	BRZ-1834(2)	R/W & UTILITIES

NCDOT CONTACT: TERESA BRUTON, P.E.
PROJECT ENGINEER - DESIGN SERVICES

"CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD II."

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 1700
ADT 2024 = 5320
DHV = 10 %
D = 60 %
T = 3 % *
V = 50 MPH

* (TTST 1% + DUAL 2%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3704 =	0.265 mi.
LENGTH STRUCTURE TIP PROJECT B-3704 =	0.028 mi.
TOTAL LENGTH TIP PROJECT B-3704 =	0.293 mi.

Prepared In the Office of:
**WANG ENGINEERING COMPANY, INC.
CARY, N.C.**
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:
JUNE 15, 2004

GREG S. PURVIS, P. E.
PROJECT ENGINEER

SCOTT L. KENNEDY
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

P.E.
STATE DESIGN ENGINEER

**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

APPROVED
DIVISION ADMINISTRATOR DATE

Roadway\Proj\B3704_rdy_tsh.dgn 06/27/2003 08:13:10 AM

PROJECT REFERENCE NO.	SHEET NO.
B-3704	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

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

RIGHT OF WAY

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

HYDROLOGY

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

STRUCTURES

MAJOR

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

MINOR

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

UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal
- U/G Telephone Cable Hand Hold
- Cable TV Pedestal
- U/G TV Cable Hand Hold
- U/G Power Cable Hand Hold
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole
- Telephone Booth
- Cellular Telephone Tower
- Water Manhole
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box
- Fiber Optic Splice Box
- Television or Radio Tower
- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS
- Recorded Water Line — W
- Designated Water Line (S.U.E.*) — W
- Sanitary Sewer — SS
- Recorded Sanitary Sewer Force Main — FSS
- Designated Sanitary Sewer Force Main(S.U.E.*) — FSS
- Recorded Gas Line — G
- Designated Gas Line (S.U.E.*) — G
- Storm Sewer — S
- Recorded Power Line — P
- Designated Power Line (S.U.E.*) — P
- Recorded Telephone Cable — T
- Designated Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Unknown Utility (S.U.E.*) — ?UTL
- Recorded Television Cable — TV
- Designated Television Cable (S.U.E.*) — TV
- Recorded Fiber Optics Cable — FO
- Designated Fiber Optics Cable (S.U.E.*) — FO
- Exist. Water Meter
- U/G Test Hole (S.U.E.*)
- Abandoned According to U/G Record — ATTUR
- End of Information — E.O.I.

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol
- Exist. Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Property Number — 123
- Parcel Number — 6
- Fence Line
- Existing Wetland Boundaries — WLB
- High Quality Wetland Boundary — HQ WLB
- Medium Quality Wetland Boundaries — MQ WLB
- Low Quality Wetland Boundaries — LQ WLB
- Proposed Wetland Boundaries — WLB
- Existing Endangered Animal Boundaries — EAB
- Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

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

TOPOGRAPHY

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

VEGETATION

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

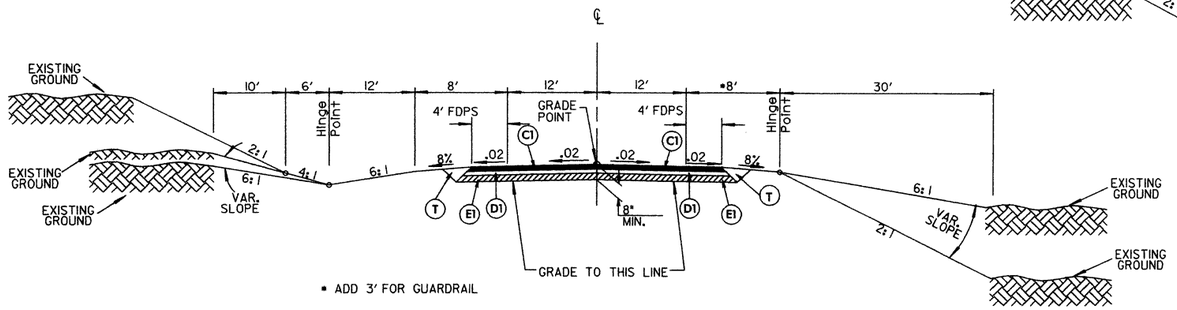
RAILROADS

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

revised 02/02/00

PROJECT REFERENCE NO.	SHEET NO.
B-3704	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

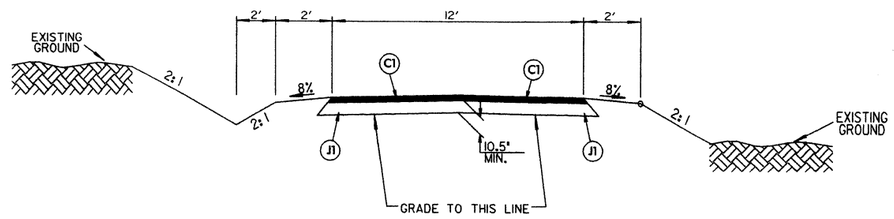


* ADD 3' FOR GUARDRAIL

TYPICAL SECTION NO. 1

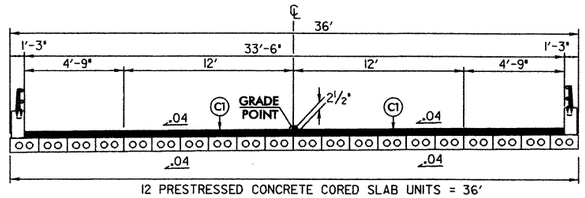
USE TYPICAL SECTION NO. 1 AS FOLLOWS

-L- Sta. 11+75.00 to Sta. 16+30.00 (BRIDGE)
-L- Sta. 17+80.00 (BRIDGE) to Sta. 27+25.00



DRIVEWAY DETAIL

-L- Sta. 14+00.00 RT.



12 PRESTRESSED CONCRETE CORED SLAB UNITS = 36'

TYPICAL BRIDGE SECTION

Sta. 16+30.00 to Sta. 17+80.00

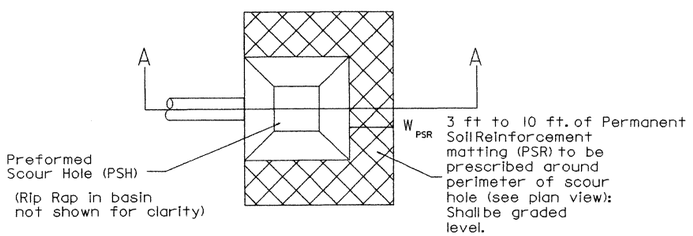
PAVEMENT SCHEDULE

C1	PROP. APPROX. 2.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5A, AT AN AVERAGE RATE OF 140 LBS PER SQ. YD. IN EACH OF TWO LAYERS.
D1	PROP. APPROX. 2.5" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS PER SQ. YD.
E1	PROP. APPROX. 3.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS PER SQ. YD.
J1	8" AGGREGATE BASE COURSE
T	EARTH MATERIAL

NOTE: ALL SLOPES 1:1 UNLESS OTHERWISE SPECIFIED

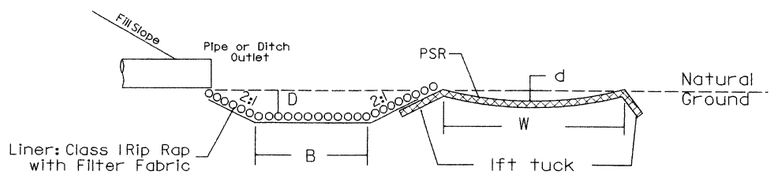
PREFORMED SCOUR HOLE

(Not to scale)



STATION	B FT	D FT	W_{PSR} FT	d FT	CLASS I RIP RAP TONS	DDE FT^3	FILTER FABRIC FT^2
16+19 -L- LT.	3.75	1	4	0.5	16	250	460
18+50 -L- RT.	3.75	3.50	4	0.5	50	1450	1050
19+00 -L- LT.	3.75	2.75	4	0.5	40	950	830

Section A-A



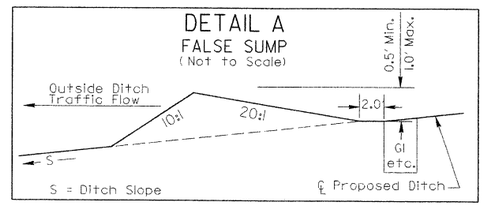
NOTE: "B" denotes size of basin; For example: 5ft x 5ft PSH, B=5

NOTE: The Permanent Soil Reinforcement matting (PSR) shall be seeded with native grasses at installation.

DETAIL A

FALSE SUMP

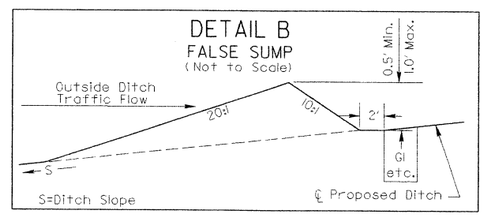
(Not to Scale)



DETAIL B

FALSE SUMP

(Not to Scale)



COMPUTED BY: GSP	DATE: 5/16/2003
CHECKED BY: SLK	DATE: 6/4/2003

PROJECT NO.	SHEET NO.
B-3704	3-A

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

LINE	Station	Station	Uncl. Excav. YD³	Undercut YD3	Embank. + % YD³	Borrow YD³	Waste YD³
BEFORE BRIDGE							
-L-	11+75.00	16+30.00	2725		6719	3994	
		SUB TOTAL	2725		6719	3994	
AFTER BRIDGE							
-L-	17+80.00	27+25.00	1718		13457	11739	
		SUB TOTAL	1718		13457	11739	
		TOTAL	**4443**		**20176**	**15733**	
Loss due to C&G							
		SUBTOTAL	**4443**		**20176**	**15733**	
WASTE TO REPLACE BORROW:							
Estimate 5% for topsoil repl.						787	
		GRAND TOTALS:	**4443**			**16520**	
		SAY:	**4450**			**16550**	

RIGHT OF WAY AREA DATA

PARCEL No.	PROPERTY OWNERS NAME	TOTAL ACREAGE		AREA TAKEN		RIGHT OR LEFT OF -L- CENTER	AREA REMAINING RIGHT		AREA REMAINING LEFT		CONST. EASEMENT		PERM DRAINAGE EASEMENT		TEMP DRAINAGE EASEMENT	
1	WILLIAM G. & LOLA BAILEY	3.06	AC	10512.30	SF	RT	2.82	AC			16042.85	SF	606.92	SF		
2	WILLIAM G. BAILEY ET AL	12.02	AC	1.27	AC	LT			10.75	AC	1386.69	SF	218.04	SF		
3	WILLIAM G. BAILEY ET AL	4.32	AC	26344.30	SF	RT	3.71	AC			23.47	SF				
4	PAUL DRU BAILEY	1.56	AC	482.86	SF	RT	1.55	AC			2166.88	SF				
5	TERRELL J. & JANE S. BAILEY	3.86	AC	2006.82	SF	RT	3.81	AC			4614.13	SF				
6	WILLIAM G. BAILEY ET AL	1.72	AC	768.61	SF	RT	1.70	AC			535.06	SF				

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

LINE	STATION TO STATION		LOC LT/RT/CL	YD²
L	11+75.00	13+69.00	CL	503.0
L	22+36.00	27+25.00	CL	1299.0
			TOTAL	1802.0
			SAY	**1810.0**

SUMMARY OF BREAKING EXISTING ASPHALT

LINE	STATION TO STATION		LOC LT/RT/CL	YD²
L	13+69.00	16+45.61	CL	709.0
L	17+50.59	22+36.00	CL	1302
			TOTAL	2011
			SAY	**2020.0**

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

GUARDRAIL SUMMARY

				LENGTH			WARRANT POINT		"N"		FLARE LENGTH		W		ANCHORS							IMP. ATTEN. TYPE 350				
LINE	BEG. STA.	END STA.	LOC.	STRAIGHT	SHOP CURVED	DOUBLE FACED	APPR. END	TRAIL. END	DIST. FROM E.O.L.	TOTAL SHLDR WIDTH	APPR. END	TRAIL. END	APPR. END	TRAIL. END	XI MOD	TYPE III	GRAU 350	M-350	XII	CAT-1	VI MOD	EA	G	NG	REMOVE EXISTING GRDRAIL	REMARKS
-L-	12+03.00	BRIDGE	LT.	427.00			BRIDGE	13+03.00	8'	11'		50'		1'		1	1									
-L-	14+17.50	BRIDGE	RT.	212.50			14+17.50	BRIDGE	8'	11'	50'		1'			1	1									
-L-	BRIDGE	22+00.00	LT.	420.00			21+00.00	BRIDGE	8'	11'	50'		1'			1	1									
-L-	BRIDGE	20+50.00	RT.	270.00			BRIDGE	20+00.00	8'	11'		50'		1'		1	1									
		SUBTOTAL		1329.50												**4**	**4**									
		TYPE III @ 18.75' X 4		-75.00																						
		GRAU-350 @ 50' X 4		-200.00																						
		TOTAL		1054.50																						
		SAY		**1062.50**																						

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT IN ELEVATION	INVERT OUT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" 0.064	15" 0.064	18" 0.064	24" 1.63	30" 0.079	36" 0.079	42" 0.109	48" 0.109
13+94.00	RT.																						
14+65.00	RT.																						
14+92.00	RT.																36						
15+15.00	RT.												136										
16+12.00	RT.																						
16+56.00	RT.												52										
16+01.54	LT.																						
16+01.54	LT.																40						
18+02.00	LT.																						
18+50.00	LT.								96														
19+00.00	LT.																						
19+00.00	LT.																52						
21+27.00	RT.																						
21+00.00	LT.																100						
22+00.00	LT.																						
24+49.00	RT.																						
26+08.00	RT.																						
							TOTAL:		96				188				228						

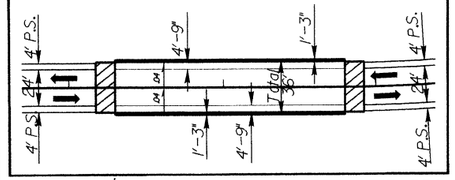
STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES 'TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') PER EACH (0' THRU 5.0')	YARDS A 5' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	M.D.I. TYPE "A" STD. 840.17 OR 840.26	M.D.I. TYPE "B" STD. 840.18 OR 840.27	M.D.I. TYPE "D" STD. 840.19 OR 840.28	M.D.I. FRAME WITH GRATE STD. 840.20	M.D.I. FRAME WITH TWO GRATES STD. 840.22	M.D.I. FRAME WITH TWO GRATES STD. 840.29	JUNCTION BOX STD. 840.31	15" PARALLEL PIPE END SECTION	15" CS PIPE ELBOWS,	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" YD³ STD. 840.72	CONC. & BRICK PIPE PLUG, YD³ STD. 840.71	PIPE REMOVAL (FEET)
13+94.00	20																					1								
14+65.00						1										1			1											
14+92.00																														25
15+15.00				2.8																										
16+12.00						1															1					1				
16+56.00																														
16+01.54						1										1				1										
16+01.54																							2							
18+02.00						1										1				1										
18+50.00																														
19+00.00						1										1				1										
19+00.00																							2							
21+27.00	20																													
21+00.00																							2							
22+00.00						1										1			1											
24+49.00	20																					1								20
26+08.00	20																					1								21
TOTAL:	80			2.8		6										5			2	3	1	3	6			1				66

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

PROJECT REFERENCE NO.	SHEET NO.
B-3704	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY



-L-
PI Sta 12+17.32
Δ = 8° 23' 03.6" (RT)
D = 3° 36' 59.4"
L = 231.83'
T = 116.12'
R = 1,584.28'
DS = 50 mph
e = .05

BEGIN TIP PROJECT B-3704
BEGIN CONSTRUCTION
POC Sta. 11+75.00 -L-

-BL- 102
PINC 7+99.43
STA. 12+90.00 -L-
14.27' RT.

Sta. 16+19.00 -L-
Begin Approach Slab

Sta. 16+30.00 -L-
Begin Bridge

-BL- 103 PINC 11+51.91
ELEV= 280.53'
REBAR & CAP
STA.16+43.47 -L-
15.53' RT.

PC Sta. 17+82.01

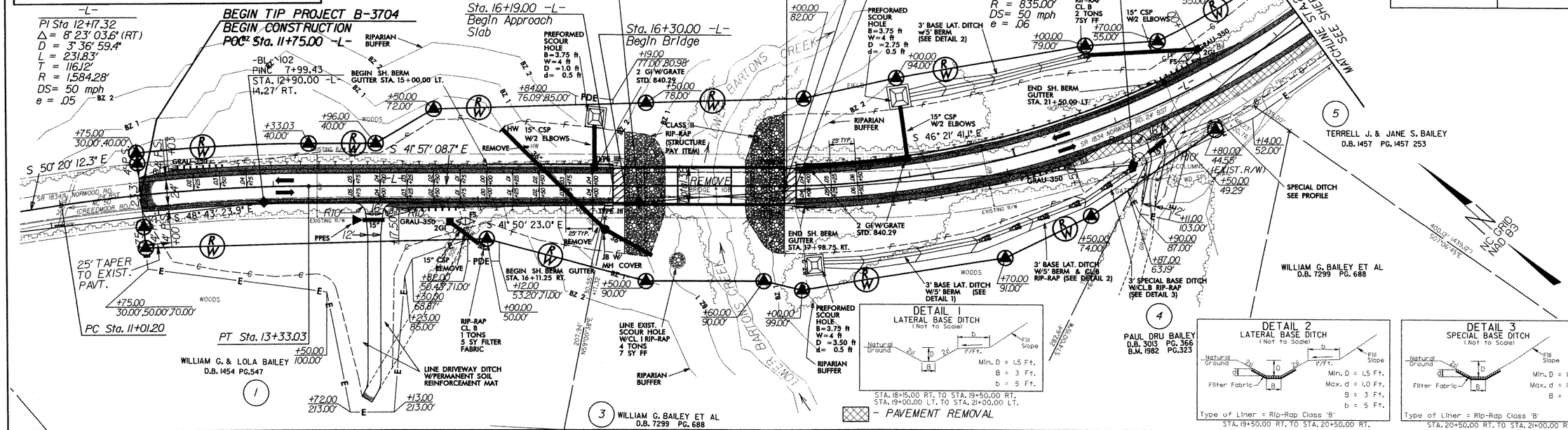
Sta. 17+80.00 -L-
End Bridge

Sta. 17+91.00 -L-
End Approach Slab

-L-
PI Sta 22+19.31
Δ = 55° 16' 57.7" (LT)
D = 6° 51' 42.4"
L = 805.66'
T = 437.30'
R = 835.00'
DS= 50 mph
e = .06

-BL- 104
PINC 16+17.95
STA. 20+99.94 -L-
42.55' RT.

15+00
20+00



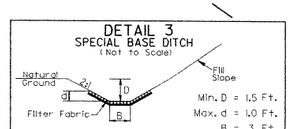
DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

STA. 18+15.00 RT. TO STA. 19+50.00 RT.
STA. 19+00.00 LT. TO STA. 21+00.00 LT.

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Type of Liner = Rip-Rap Class 'B'
STA. 19+50.00 RT. TO STA. 20+50.00 RT.

DETAIL 3
SPECIAL BASE DITCH
(Not to Scale)



Type of Liner = Rip-Rap Class 'B'
STA. 20+50.00 RT. TO STA. 21+00.00 RT.

- PAVEMENT REMOVAL

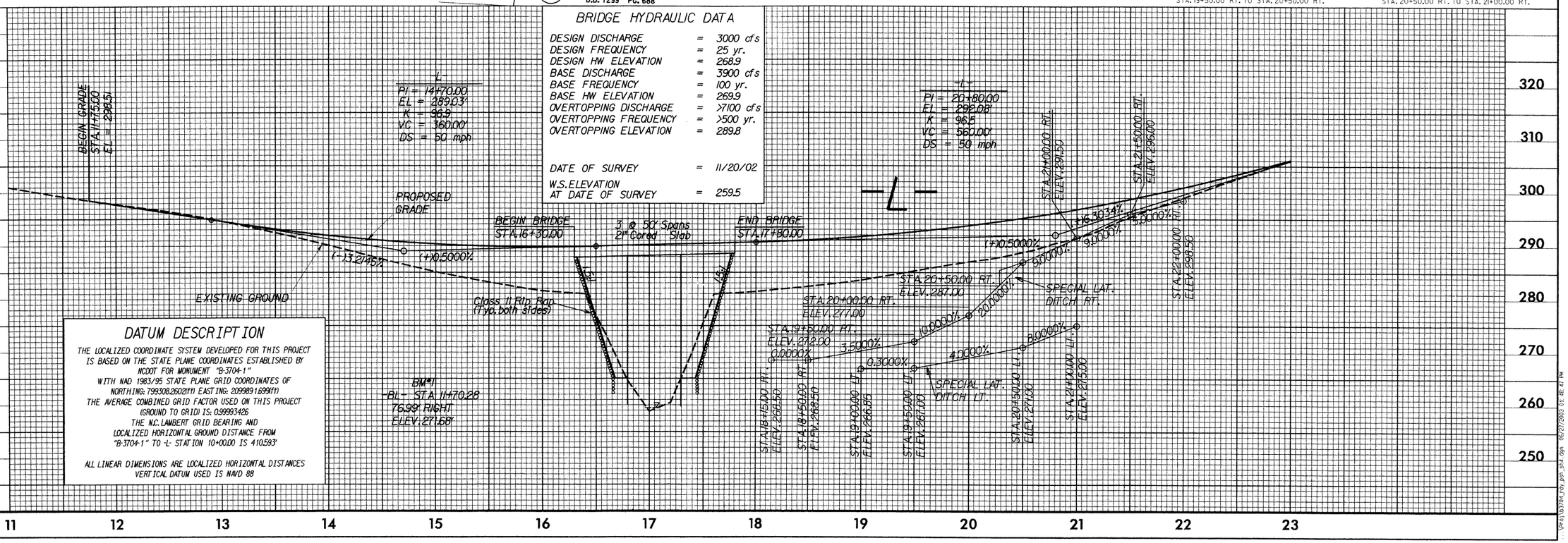
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	3000 cfs
DESIGN FREQUENCY	=	25 yr.
DESIGN HW ELEVATION	=	268.9
BASE DISCHARGE	=	3900 cfs
BASE FREQUENCY	=	100 yr.
BASE HW ELEVATION	=	269.9
OVERTOPPING DISCHARGE	=	>7100 cfs
OVERTOPPING FREQUENCY	=	>500 yr.
OVERTOPPING ELEVATION	=	289.8
DATE OF SURVEY	=	11/20/02
W.S. ELEVATION AT DATE OF SURVEY	=	259.5

DATUM DESCRIPTION

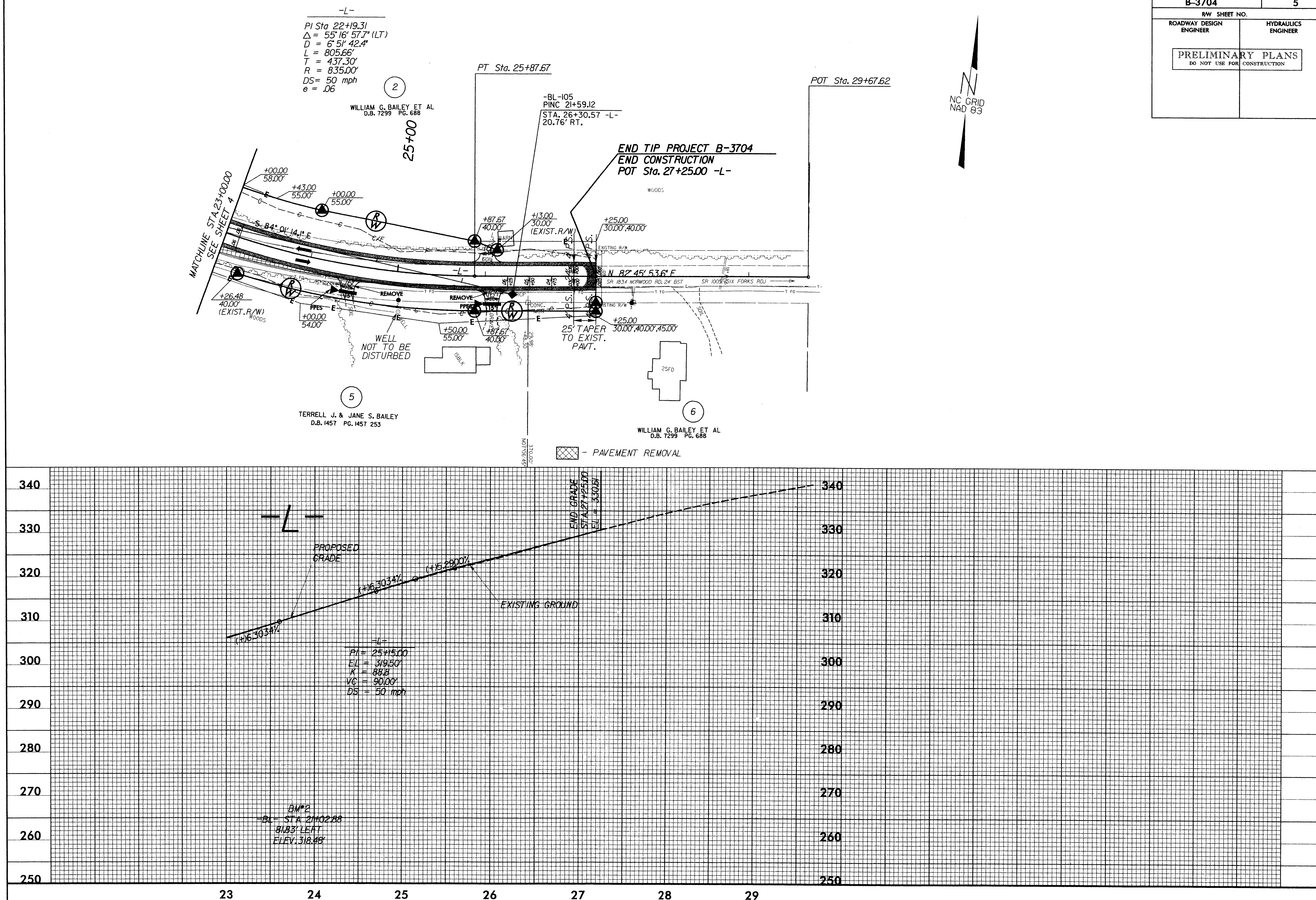
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-3704-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 799308.2602(ft) EASTING: 2099891.699(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99993426 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-3704-1" TO -L- STATION 10+00.00 IS 410.593'

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



PROJECT REFERENCE NO.	SHEET NO.
B-3704	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L-
PI Sta 22+19.31
Δ = 55° 16' 57.7" (LT)
D = 6° 51' 42.4"
L = 805.66'
T = 437.30'
R = 835.00'
DS= 50 mph
e = .06
PT Sta. 25+87.67
POT Sta. 29+67.62
NC GRID
NAD 83
WILLIAM G. BAILEY ET AL
D.B. 7299 PG. 688
25+00
-BL-105
PINC 21+59.12
STA. 26+30.57 -L-
20.76' RT.
END TIP PROJECT B-3704
END CONSTRUCTION
POT Sta. 27+25.00 -L-
WOODS
MATCHLINE STA.23+00.00
SEE SHEET 4
S 84° 01' 14.1" E
N 82° 45' 53.6" E
SR 1834 NORWOOD RD. 24' BST
SR 1005 (SIX FORKS RD)
REMOVE
WELL
NOT TO BE
DISTURBED
25' TAPER
TO EXIST.
PAVT.
TERRELL J. & JANE S. BAILEY
D.B. 1457 PG. 1457 253
WILLIAM G. BAILEY ET AL
D.B. 7299 PG. 688
- PAVEMENT REMOVAL
-L-
PROPOSED
GRADE
(+)6.3034%
(+)5.2900%
EXISTING GROUND
END GRADE
STA 27+25.00
EL = 330.61
-L-
PI = 25+15.00
EL = 319.50'
K = 88.8
VC = 90.00'
DS = 50 mph
BM#2
-BL- STA 21+02.88
81.83' LEFT
ELEV. 318.48'
340
330
320
310
300
290
280
270
260
250
23
24
25
26
27
28
29

Wake County

SR 1834

Bridge No. 108 Over Lower Bartons Creek

Federal Aid Project No. BRZ-1834(2)

State Project 8.2407901

TIP Project No. B-3704

CATEGORICAL EXCLUSION

US DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

7/31/02 — DATE

for L. Gail Grimes, P.E., Assistant Manager
Project Development and Environmental Analysis Branch
NCDOT

7/31/02 — DATE

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

Wake County

SR 1834

Bridge No. 108 Over Lower Bartons Creek

Federal Aid Project No. BRZ-1834(2)

State Project 8.2407901

TIP Project No. B-3704

CATEGORICAL EXCLUSION

July 2002

Document Prepared by

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Edward B. McFalls, P.E., Project Manager
Earth Tech

NORTH CAROLINA PROFESSIONAL SEAL 022546 ENGINEER EDWARD B MCFALLS

for the North Carolina Department of Transportation

Brian F. Yamamoto, Unit Head
Consultant Engineering Unit
Project Development and Environmental Analysis Branch

John Conforti, REM, Project Manager
Consultant Engineering Unit
Project Development and Environmental Analysis Branch

REGISTERED ENVIRONMENTAL MANAGER JOHN G. CONFORTI REM 9766 NREP

SPECIAL PROJECT COMMITMENTS

Wake County
SR 1834
Bridge No. 108 Over Lower Bartons Creek
Federal Aid Project No. BRZ-1834(2)
State Project 8.2407901
TIP Project No. B-3704

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

Highway Design Branch
To accommodate bicycle traffic, the approaches will have 4-foot (1.2 m) paved shoulders, and the bridge will have 4-foot (1.2 m) shoulders and 54-inch (1.4 m) bridge rails.

Project Development and Environmental Analysis Branch
The stream impacts associated with the project will likely be lower than the 150 linear-foot (45.7 m) threshold for mitigation set by Division of Water Quality Wetland Rules. If it becomes apparent during final design that more than 150 linear feet (45.7 m) of stream will be impacted, mitigation measures will be considered.

Wake County
SR 1834
Bridge No. 108 Over Lower Bartons Creek
Federal Aid Project No. BRZ-1834(2)
State Project 8.2407901
TIP Project No. B-3704

INTRODUCTION: Bridge No. 108 is included in the 2002–2008 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and in the Federal-Aid Bridge Replacement Program. The location is shown in **Figure 1**. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

NCDOT Bridge Maintenance Unit records indicate the bridge has a sufficiency rating of 19.5 out of a possible of 100 for a new structure. The bridge is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

SR 1834 (Norwood Road) in Wake County is functionally classified as an "Urban Local" route in the Statewide Functional Classification System.

Through the project area, SR 1834 has two 9-foot (2.7 m) lanes and a 60-foot (18.3 m) wide right-of-way. The speed limit posted on SR 1834 is 45 mph near the bridge. This area is located in a rural, yet highly developing residential area of Wake County. The existing vertical and horizontal alignments are good. **Figure 2** shows the existing bridge and roadway.

The existing bridge was constructed in 1964. The superstructure consists of a re-enforced concrete floor and timber joists. The substructure consists of timber caps on timber piles at 8-foot (2.4 m) centers. The existing bridge consists of six spans: one end-span at 17 feet 10 inches (5.4 m), four mid-spans at 17 feet (5.2 m), one end-span at 17 feet 10 inches (5.4 m), and the clear roadway width is 24 feet (7.3 m). The crown of the roadway is approximately 21 feet (6.4 m) over the bed of Lower Bartons Creek. Presently, the posted weight limit is 20 tons for single vehicles and 29 tons for trucks with trailers. The bridge is located in a tangent section of SR 1834. The bridge crosses Lower Bartons Creek at 90 degrees. **Figure 4** includes photographs of the existing bridge and its approaches.

The average daily traffic volume on SR 1834 at Bridge No. 108 was 800 vehicles per day in 1999. By the design year 2025, the average daily traffic volume is expected to increase to 5,500 vehicles per day. The projected traffic volume includes two percent dual-tired vehicles and one percent truck-tractor semi-trailers. Five school buses each cross the bridge two times daily. SR 1834 is part of a designated bicycle route called "NC-2 Mountains to Sea Bicycling Highway".

Two accidents were reported within 1,000 feet (305 m) of Bridge No. 108 in the period between January 1, 1998 and December 31, 2000. One accident was hitting an animal, which was not related to the geometry of the bridge or its approaches. The other accident involved one vehicle running off the road. This vehicle was traveling west on SR 1834 at an estimated speed of 60 mph (the posted speed limit is 45 mph), lost control in the curve, eventually striking the south-side bridge rail. Circumstances contributing to the collision were exceeding the speed limit and failure to reduce speed. The bridge and approaches geometry did not contribute to the accident, because the vehicle was operating at a substantially higher speed than the posted speed limit.

Overhead utility lines cross SR 1834 east of the site and crosses Lower Bartons Creek several hundred feet south of the site. Markers indicate the presence of fiber optic cables buried near SR 1834's south shoulder.

III. ALTERNATIVES

A. Project Description

The project replaces the existing bridge carrying SR 1834 over Lower Bartons Creek with a new bridge crossing at approximately the same location. To accommodate bicycle traffic, the approaches will have two 12-foot (3.6 m) lanes with 4-foot (1.2 m) paved shoulders, and the bridge will have two 12-foot (3.6 m) lanes with 4-foot (1.2 m) shoulders and 54-inch (1.4 m) bridge rail. **Figure 3** shows the typical cross-sections for the roadway approaches and bridge.

B. Build Alternatives

Three alternatives were carried forward for detailed study in this Categorical Exclusion. They are shown on **Figure 2** and described below.

Alternative 1 replaces Bridge Number 108 in its existing location, while using an off-site detour to maintain traffic during construction. The off-site detour consists of SR 1834 (Norwood Road), SR 1005 (Six Forks Road), and SR 1847 (Mt. Vernon Church Road). The total off-site detour length is 4 miles (6.5 km). However, through traffic will only have to travel an additional 2 miles (3.2km). The new bridge would be approximately 120 feet (36.6 m) long.

Alternative 2 replaces Bridge Number 108 in its existing location, while using a temporary on-site detour southwest of the existing bridge to maintain traffic during construction. The new bridge would be approximately 120 feet (36.6 m) long.

Alternative 3 replaces Bridge Number 108 approximately 90 feet (27.4 m) southwest from the existing location's centerline on a new alignment, while maintaining traffic on the existing bridge and alignment during construction. The new bridge would be approximately 120 feet (36.6 m) long.

C. Alternatives Eliminated from Further Study

No Action. This alternative consists of short-term minor re-construction and maintenance activities that are part of an ongoing plan for continuing operation of the existing bridge and roadway system in the project area. Many of the structural elements are decaying. Decay has already reduced the bridge's safe load-bearing capacity. Although further maintenance activities will slow the decay, closing the bridge will eventually be necessary.

D. Preferred Alternative

Alternative 1, replace Bridge Number 108 in its existing location, while using an off-site detour to maintain traffic during construction, is the preferred alternative. The road alignment will remain the same as the existing, minimizing impacts to the human and natural environment that could be incurred if the bridge were replaced on new location or an on-site detour were constructed. This alternative will not relocate any residences or businesses. Costs associated with a temporary on-site detour (Alternative 2) are high for the amount of traffic that uses this part of SR 1834. Alternative 3 was not selected because it would require the relocation of a home. **Alternative 1** was selected because it incurs the least impacts to the human and natural environment.

IV. ESTIMATED COSTS

Construction and right-of-way cost estimates for the alternatives studied are presented below in **Table 1**.

Table 1: Estimated Costs

	Preferred Alternative 1	Alternative 2	Alternative 3
Structure Removal	$20,800	$20,800	$20,800
Structure	$234,000	$234,000	$241,800
Roadway Approaches	$593,950	$593,950	$696,050
Detour Structure & Approaches	N/A	$690,175	N/A
Miscellaneous and Mobilization	$381,250	$692,075	$431,350
Engineering and Contingencies	$220,000	$369,000	$210,000
Right-of-way/Utilities/Relocations	$73,700	$160,000	$201,350
Total Cost of Alternative	**$1,523,700**	**$2,760,000**	**$1,801,350**

The estimated cost of the project, as shown in the 2002-2008 Transportation Improvement Program is $670,000, including $50,000 for right-of-way and $500,000 for construction. Right-of-way acquisition is scheduled for Federal Fiscal Year 2002, with construction to follow in Federal Fiscal Year 2003.

V. NATURAL RESOURCES

An evaluation of natural resources in the immediate area of potential project impact was performed. The evaluation included 1) an assessment of biological features along the alignment including descriptions of vegetation, wildlife, protected species, wetlands, and water quality issues; 2) an evaluation of probable impacts resulting from construction; and 3) a preliminary determination of permit needs and conceptual mitigation options. The information included in this report was taken from the Natural Resources Technical Report, which is on file in the Project Development and Environmental Analysis Branch.

A. Methodology

Published information and resources were collected prior to the field investigation. Information sources used to prepare this report include the following:

- United States Geological Survey (USGS) quadrangle map (Bayleaf, 1987 United States Fish and Wildlife Service (USFWS)
- National Wetlands Inventory (NWI) Map (Bayleaf, 1995)
- NCDOT aerial photograph of project area (1:1200)
- *Soil Survey of Wake County, North Carolina*, Natural Resources Conservation Service [NRCS], 1970).
- North Carolina Department of Environment and Natural Resources (NCDENR) basin-wide assessment information (NCDENR, 1996)
- USFWS list of protected and candidate species
- North Carolina Natural Heritage Program (NHP) files of rare species and unique habitats

Water resource information was obtained from publications posted on the World Wide Web by NCDENR Division of Water Quality. Information concerning the occurrence of federally protected species in the study area was obtained from the USFWS list of protected and candidate species (last update March, 2002), posted on the World Wide Web by the Ecological Services branch of the USFWS office in North Carolina. Information concerning species under state protection was obtained from the NHP database of rare species and unique habitats. NHP files were reviewed for documented sightings of species on state or federal lists and locations of significant natural areas.

A general field survey was conducted along the proposed project route by Earth Tech biologists on December 7, 2000. Water resources were identified and their physical characteristics were recorded. For the purposes of this study, a brief habitat assessment was performed within the project area of Lower Bartons Creek. Plant communities and their associated wildlife were identified using a variety of observation techniques, including active searching, visual observations, and identifying characteristic signs of wildlife (sounds, tracks, scats, and burrows). Terrestrial community classifications generally follow Schafale and Weakley (1990) where appropriate and plant taxonomy follows Radford *et al.* (1968). Vertebrate taxonomy follows Potter *et al.* (1980), Martof *et al.* (1980), and Webster *et al.* (1985). Vegetative communities were mapped using aerial photography of the project site. Predictions regarding wildlife community composition involved general qualitative habitat assessment based on existing vegetative communities.

Jurisdictional wetlands, if present, were delineated and evaluated based on criteria established in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE, 1987). Wetlands were classified based on Cowardin *et al.* (1979).

B. Physiography and Soils

Soil and water resources that occur in the project area are discussed with respect to possible environmental concerns.

1. Regional Characteristics

The project area lies in the central portion of North Carolina within the Piedmont physiographic province. Elevations in the project area are approximately 270 feet (82.3 m). (National Geodetic Vertical Datum, 1929). The topography of the project vicinity is rolling hills with gentle slopes rising from both riverbanks.

The proposed project is in a rural area in northern Wake County along Norwood Rd. (SR 1834) between Creedmoor Rd. (NC 50) and Six Forks Rd. (SR 1005). Wake County's major economic resources are business, education, and

industry. The population of Wake County in 1999 was 592,218 (North Carolina Office of State Budget, Planning and Management 1999).

2. Soils

Information about soils in the project area was taken from the *Soil Survey of Wake County, North Carolina* (NRCS, 1970). The map units in the project area are Chewacla loam, Wilkes loam, 20 to 45 percent slope, and Lloyd loam, 10 to 15 percent slopes, eroded.

- **Chewacla loams (Cm)** are formed by alluvial deposits of fine material and are mapped along the banks of Lower Bartons Creek within the project area. This soil type is found in nearly level, frequently but briefly flooded areas, and is somewhat poorly drained. The seasonally high water table is usually at a depth of 1.5 feet (0.2m). The Chewacla soil series is on the state list of hydric soils.
- **Wilkes loams (WwF), 20 to 45 percent slope**, are found on the sides of slopes bordering major drainage ways in upland areas of the Piedmont. This soil is mapped within the project area. Surface runoff is very rapid and infiltration is good. These soils form under a forest from weathered mixed acidic and basic rocks. They are usually found on rather steep slopes with shallow soil, where the water table lies below the solum.
- **Lloyd loams (LdD2), 6 to 10 percent slopes**, eroded, are found within the project area as well. These soils are found on narrow, forested side slopes bordering drainage ways and are formed in material that weathered from hornblende gneiss. Infiltration is fair, surface runoff is extremely rapid, and soils may be quite shallow. The water table lies below the solum.

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

- The Chewacla soils have a site index of 100 for tulip poplar (Liriodendron tulipifera), 97 for sweetgum (Liquidambar styraciflua), 96 for loblolly pine (Pinus taeda), and 86 for water oak (Quercus nigra).
- The Wilkes soils have a site index of 82 for sweetgum, 79 for post oak (Quercus stellata), 76 for southern red oak (Quercus rubra), 75 for loblolly pine, and 63 for shortleaf pine (Pinus echinata).
- The Lloyd soils have a site index of 75 to 80 for loblolly pine, tulip poplar, and sweetgum, 65 to 75 for shortleaf pine (Pinus echinata) and southern red oak (Quercus rubra), and 55 to 65 for Virginia pine (Pinus virginiana).

C. Water Resources

This section contains information concerning water resources likely to be impacted by the proposed project. Water resources assessments include the physical characteristics likely to be impacted by the proposed project (determined by field survey), best usage classifications, and water quality aspects of the water resources. Probable impacts to surface waters are also discussed, as well as means to minimize impacts.

1. Waters Impacted

The project is located in the Neuse River basin (NEU01 sub-basin). Lower Bartons Creek originates about four miles (6.4 km) southwest of the project area. Many man-made ponds about four miles (6.4 km) to half a mile (0.8 km) upstream of the study site feed Lower Bartons Creek. From the project area, the creek continues to be fed by man-made ponds as it flows in a northeasterly direction for 2.5 miles (4.0 km) to its confluence with Falls Lake. The Neuse River drains this lake.

Lower Bartons Creek is approximately 30 feet (9.1 m) wide in the study area. The stream has sluggish flow, poor water clarity, and is approximately 2-4 feet (0.6-1.2 m) deep. The substrate is silt and sand, with a few boulders scattered along the bank. Vertical to slightly sloping banks are 5-12 feet (1.5-36.6 m) tall and moderately vegetated with some slumping. There is 80% canopy cover containing mostly hardwoods, and a medium-sized floodplain.

A small tributary flows under SR 1834 from the northwest side and empties into Lower Bartons Creek on the southwest side of SR 1834. It originates from a man-made pond 800 feet (240 m) from the bridge. At the confluence with Lower Bartons Creek, on the downstream side of Bridge Number 108, it is deeply incised with 7-foot (2.1 m) vertical banks, and a width of 1-2 feet (0.3-0.6 m). The substrate is silt and sand with bedrock in some places. On the northwest side of SR 1834, crayfish and salamanders were found. The stream has a series of pools and runs with good bedform. By Division of Water Quality standards, this stream is will require mitigation upstream to where it crosses SR 1834 a second time. It may also require mitigation by Army Corp of Engineers standards.

Surface waters in North Carolina are assigned a classification by the DWQ that is designed to maintain, protect, and enhance water quality within the state. Lower Bartons Creek [(Index #27-16(1) and Index #27-16(2)] is classified as a Class WS-IV NSW and Class WS-IV NSW CA water body (NCDENR, 1999). Classification and index numbers for Lower Bartons Creek change where it flows under SR 1834. Class WS-IV waters are protected for water supply and lie within moderately to highly developed areas. Class NSW waters are nutrient sensitive and require limitations on nutrient inputs. The CA supplemental classification indicates a critical area where there are special restrictions on stream inputs due

to proximity of a water supply source. All these classifications fall under a larger category called Class C waters. This means the water resources are protected for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses involving body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

No waters classified as High Quality Water (HQW), Water Supplies (WS-I or WS-II) or Outstanding Resource Waters (ORW) occur within 1 mile (1.6 km) of the project study area.

The project area is in a moderately forested, somewhat developed watershed. Disturbances in the landscape immediately surrounding the project area include small-scale farming and dairy production, and some sedimentation already present in the stream. Potential threats to stream quality in this area are forestry operations that would result in increased soil erosion, and continued development of residential areas that would result in higher sediment loads.

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

One monitoring station is located on Lower Bartons Creek about one mile (1.6 km) downstream from the project site. It was sampled in June 1985 and December 1995, and was classified as Good-Fair each time.

Point source discharges in North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) program administered by the DWQ. Municipal, industrial, and other facilities that discharge directly into surface waters must obtain a permit. Homes that use a municipal wastewater system or a septic system, and do not discharge to surface waters do not require a permit under the program.

There is one permit (#NC0063614) issued to Wildwood Green Subdivision to discharge Minor, Non-municipal waste in an unnamed tributary of Lower Bartons Creek as of January 2001 (NCDENR 2001). This permit is classified as "Domestic, Subdivisions". This tributary is more than three miles (6.4 km) upstream from the project site.

3. Anticipated Impacts to Water Resources

a) General Impacts

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

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

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

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

The preferred alternative, **Alternative 1**, is not anticipated to impact more than 150 feet (46 m) of the streams. No stream relocation is required. If, during final design, it is apparent impacts greater than the 150 foot (46 m) threshold will result, mitigation may be required by the Division of Water Quality.

b) Impacts Related to Bridge Demolition

Lower Bartons Creek, in the vicinity of the bridge is classified as Class-IV NSW waters. Just downstream of the bridge, the stream is designated as a critical area (CA). However, since the stream is not designated as a special resource water, is not associated with fish migration or spawning, and does not support any threatened and endangered species in the project area, Case 3 of NCDOT's

Best Management Practices for Bridge Demolition and Removal applies to the project.

D. Biotic Resources

Terrestrial and aquatic communities are included in the description of biotic resources. Living systems described in the following sections include communities of associated plants and animals. These descriptions refer to the dominant flora and fauna in each community and the relationships of these biotic components. Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow Schafale and Weakley (1990) where possible. They are also cross-referenced to *The Nature Conservancy International Classification of Ecological Communities: Terrestrial Vegetation of the Southeastern United States* (Weakley *et al.,* 1998), which has recently been adopted as the standard land cover classification by the Federal Geographic Data Committee. Representative animal species that are likely to occur in these habitats (based on published range distributions) are also cited. Scientific nomenclature and common names (when applicable) are used for the plant and animal species described. Subsequent references to the same species are by the common name only.

1. Terrestrial Communities

Five terrestrial communities were identified within the project area: a disturbed roadside community, a floodplain forest, an upland forest, a power line right-of-way, and a cornfield community. Dominant faunal components associated with these terrestrial areas will be discussed in each community description. Many species are adapted to the entire range of habitats found along the project alignment, but may not be mentioned separately in each community description.

a) Disturbed Roadside Community

This community covers the area along the road shoulders in the project area. The road had been recently graded prior to the site visit, thus, the vegetation was rather sparse. Species include plantain (*Plantago* sp.), violet (*Viola* sp.), Japanese honeysuckle (*Lonicera japonica*), and dandelion (*Taraxacum officinale*).

The animal species present in these disturbed habitats are opportunistic and capable of surviving on a variety of resources, ranging from vegetation to both living and dead faunal components. Northern mockingbird (*Mimus polyglottos*), starling (*Sturnus vulgaris*), and American robin (*Turdus migratorius*) are common birds that use these habitats. The area may also be used by the woodchuck (*Marmota monax*), Virginia opossum (*Didelphis virginiana*), various species of

mice (*Peromyscus* sp.), eastern garter snake (*Thamnophis sirtalis*), and American toad (*Bufo americanus*).

b) Floodplain Forest Community

This community occurs along the banks of the Lower Bartons Creek. Canopy species include tulip poplar (*Liriodendron tulipifera*), sugar maple (*Acer barbatum),* pignut hickory (*Carya glabra*), American beech (*Fagus grandifolia*), and river birch (*Betula nigra*). The understory includes hornbeam (*Ostrya virginiana),* ironwood (*Carpinus caroliniana*), giant cane (*Arundinaria gigantea*), Japanese honeysuckle, greenbriar (*Smilax* sp.), Christmas fern (*Polystichum acrostichoides),* various grasses, and privet (*Ligustrum* sp.). This community probably represents a marginal example of a Piedmont/Mountain Bottomland Forest as described by Schafale and Weakley (1990). The TNC classification is most likely I.B.2.N.a.24 *Liriodendron tulipifera* Forest Alliance.

Incisor marks girdling the base of some trees indicated the presence of beaver (*Castor canadensis*) in this community. Raccoon (*Procyon lotor*) and white-tailed deer (*Odocoileus virginianus*) tracks were also observed. Other animals that were observed here include Carolina wren (*Thryothorus ludovicianus*), red-bellied woodpecker (*Melanerpes carolinus*), eastern bluebird (*Sialia sialis*), and northern dusky salamanders (*Desmognathus fuscus fuscus*) in the tributary leading to Lower Bartons creek. Red-eyed vireo (*Vireo olivaceous*), yellow-rumped warbler (*Dendroica coronata*), eastern box turtle (*Terrapene carolina*), and eastern garter snake can also be expected in this area.

c) Upland Forest Community

This community type occurs in the slightly more upland area surrounding Lower Bartons Creek, but still within the project area. Canopy species include tulip poplar, American beech, and white oak (*Quercus alba*). The understory includes loblolly pine (*Pinus taeda*), red cedar (*Juniperus virginiana*), southern red oak (*Quercus falcata*), sweetgum (*Liquidambar styraciflua*), ebony spleenwort (*Asplenium platyneuron*), Christmas fern, wild ginger (*Hexastylis* sp.), and Japanese grass (*Microstegium* sp.). This community is an example of a Basic Mesic Forest (Piedmont Subtype) as described by Schafale and Weakley (1990). The TNC classification is most likely I.B.2.N.d.9 *Fagus grandifolia* Temporarily Flooded Forest Alliance.

Animal species expected here include eastern gray squirrel (*Sciurus carolinensis*), white-tailed deer, northern flicker (*Colaptes auratus*), and white-breasted nuthatch (*Sitta carolinensis*).

d) Powerline Right-of-Way Community

This community type is found on the southeast side of the road and is intermittently maintained to keep woody plants from growing under the powerlines. This community contains partridge pea (*Cassia fasciculata*), giant cane, sweetgum seedlings, Japanese grass, privet, Japanese honeysuckle, and various composites (*Aster* sp.).

Animals from neighboring communities will likely use this area for foraging. Various species of mice (*Peromyscus* sp.), and gray catbirds (*Dumetella carolinensis*) may nest here.

e) Corn Field Community

A small cornfield exists on the east side of SR 1834. This field is planted entirely with an agricultural corn (*Zea mays*) crop, and has weedy areas along its periphery similar to those found in the disturbed roadside community and powerline right-of-way communities.

Animal species expected here include raccoon, white-tailed deer, eastern harvest mouse (*Reithrodontomys humilis*), eastern screech owl (*Otus asia*), white-throated sparrow (*Zonotrichia albicolis*), and northern cardinal (*Cardinalis cardinalis*).

2. Wildlife

Wildlife in the project area is described with its respective community above.

3. Aquatic Communities

Within the project area, Lower Bartons Creek is a low-gradient, second-order stream. The bed material consists mostly of sand and gravel, with a large percentage of silt. On the day of the site visit, the water was cloudy with suspended sediment. The riparian community is mostly deciduous trees and mixed evergreen-deciduous shrubs, and is described in Sections V.D.1.b. No aquatic vegetation was observed.

The small tributary which flows from the pond mentioned above contained no aquatic vegetation. Southern leopard frog (*Rana utricularia*), northern dusky salamander, and freshwater crayfish (family Cambaridae) were found in the section of this tributary downstream from where it initially flows underneath SR 1834.

Lower Bartons Creek has not been identified by fisheries biologists at the Wildlife Resources Commission as an important spawning area for any anadromous fishes.

4. Anticipated Impacts to Biotic Communities

Project construction will have various impacts to the previously described terrestrial and aquatic communities. Any construction activities in or near these resources have the potential to impact biological functions. This section quantifies and qualifies potential impacts to the natural communities within the project area in terms of the area impacted and the plants and animals affected. Temporary and permanent impacts are considered here along with recommendations to minimize or eliminate impacts.

a) Terrestrial Communities

Terrestrial communities in the project area will be impacted permanently by project construction from clearing and paving. Estimated impacts are based on the length of the Alternative and the entire study corridor width. The bridge replacement portion of Alternative 1 is 770 feet (233 m) long and 115 feet (35 m) wide. Alternative 2 is 770 feet (233 m) long and 115 feet (35 m) wide, and the temporary detour is 1349 feet (409 m) long. The width of the temporary detour varies from 100 feet (30 m) to 140 feet (42 m) wide. Alternative 3 is 1,615 feet long and the width varies from 100 feet (30 m) to 180 feet (55 m). **Table 2** describes the potential impacts to terrestrial communities by habitat type. Because impacts are based on the entire study corridor width, the actual loss of habitat will likely be less than the estimate.

Table 2: Estimated Area of Impact to Terrestrial Communities

	Estimated Area of Impact in Acres (Hectares)			
	Alternative1 (Preferred)	Alternative 2		Alternative 3
Community	**Permanent**	**Temporary[1]**	**Permanent**	**Permanent**
Disturbed Roadside	0.52 (0.19)	0.52 (0.18)	0.52 (0.19)	0.52 (0.19)
Floodplain Forest	0.28 (0.10)	0.43 (0.16)	0.28 (0.10)	0.43 (0.16)
Upland Forest	0.44 (0.16)	2.44 (0.89)	0.44 (0.16)	2.44 (0.89)
Power line R.O.W.	0.07 (0.03)	0.14 (0.05)	0.07 (0.03)	0.14 (0.05)
Corn Field	0.04 (0.01)	0.00 (0.00)	0.04 (0.01)	0.00 (0.00)
Pond	0.00 (0.00)	0.12 (0.04)	0.00 (0.00)	0.12 (0.16)
Total Impact	**1.35 (0.49)**	**3.65 (1.32)**	**1.35 (0.49)**	**3.65 (1.45)**

[1] Temporary impacts are from the temporary on-site detour. Areas disturbed by the temporary on-site detour would be restored to its pre-existing condition after construction of the new bridge on the existing alignment.

Destruction of natural communities along the project alignment will result in the loss of foraging and breeding habitats for the various animal species that utilize the area. Animal species will be displaced into surrounding communities. Adult

birds, mammals, and some reptiles are mobile enough to avoid mortality during construction. Young animals and less mobile species, such as many amphibians, may suffer direct loss during construction. The plants and animals that are found in the upland communities are generally common throughout the piedmont of North Carolina.

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

b) Wetland Communities

No wetlands will be impacted.

c) Aquatic Communities

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

Temporary and permanent impacts to aquatic organisms may result from increased sedimentation. Aquatic invertebrates may drift downstream during construction and recolonize the disturbed area once it has been stabilized. Sediments have the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, affecting the habitat by scouring and filling of pools and riffles, altering water chemistry, and smothering different life stages. Increased sedimentation may cause decreased light penetration through an increase in turbidity.

Wet concrete should not come into contact with surface water during bridge construction. Potential adverse effects can be minimized through the implementation of NCDOT *Best Management Practices for Protection of Surface Waters*. Because the stream in the proposed project area is designated as a WS-IV water, erosion control methods for high quality waters will be implemented as included in *NCDOT's Best Management Practices for Protection of Surface Waters* and *Erosion and Sediment Control Guidelines*.

E. Jurisdictional Topics

This section provides inventories and impact analyses for two federal and state regulatory issues: "Waters of the United States" and rare and protected species.

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

Wetlands and surface waters fall under the broad category of "Waters of the United States" as defined in 33 CFR § 328.3 and in accordance with provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344). These waters are regulated by the U.S. Army Corps of Engineers (USACE). Any action that proposes to dredge or place fill material into surface waters or wetlands falls under these provisions.

The Bayleaf, NC NWI map shows a riverine permanently flooded and a palustrine forested temporarily flooded wetland on the banks of Lower Bartons Creek within the proposed project area. No jurisdictional wetlands were observed the day of the site visit. Lower Bartons Creek meets the definition of surface waters, and is therefore classified as Waters of the United States. The channel is 30 feet (9.1 m) wide within the project area.

Project construction cannot be accomplished without infringing on the surface waters. Anticipated surface water impacts fall under the jurisdiction of the USACE and the DWQ. Within the project area, Lower Bartons Creek is 30 feet (9.1m) wide. As mentioned earlier in Section V.C.1, an unnamed tributary flows from a farm pond on the southwest side of SR 1834 into Lower Bartons Creek just south of Bridge Number 108.

Table 3 shows the estimated impacts to both Lower Bartons Creek and its unnamed tributary based on maximum corridor widths.

The small pond that lies within the project area will be impacted by the realignment of **Alternative 3**. Approximately 0.12 acres (0.04 hectares) of the pond will be impacted.

Table 3: Estimated Area of Impact to Jurisdictional Streams

	Alternative 1 (Preferred)	Alternative 2			Alternative 3
	Replacement	Replacement	Detour	Total	Realignment
Maximum Corridor Width in feet (meters)	115 (34.8)	115 (34.8)	180 (54.5)	295 (89.4)	140 (42.4)
Stream Impact to Lower Bartons Creek in linear feet (linear meters)	115 (34.8)	115 (34.8)	180 (54.5)	295 (89.4)	140 (42.4)
Stream Impact to Jurisdictional Tributary in linear feet (linear meters)	127 (38.5)	127 (38.5)	58 (17.5)	185 (56.0)	56 (17.1)
Total Surface Water Impact in square feet (square meters)	**3704 (1122)**	3704 (1122)	5515 (1671)	**9219 (2793)**	**5512 (1670)**

2. Permits

a) Section 404 of the Clean Water Act

Impacts to jurisdictional surface waters are anticipated from the proposed project. Permits and certifications from various state and federal agencies may be required prior to construction activities.

Construction is likely to be authorized by Nationwide Permit (NWP) No. 23, as promulgated under 61 FR 2020, 2082; January 15, 2002. This permit authorizes activities undertaken, assisted, authorized, regulated, funded, or financed in whole or in part, by another Federal agency or department where that agency or department has determined that, pursuant to the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act:

- the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment; and
- the Office of the Chief Engineer has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination.

b) Section 401 Water Quality Certification

This project will also require a 401 Water Quality Certification or waiver thereof, from the Department of Environment and Natural Resources (DENR) prior to issuance of the NWP 23. Section 401 of the Clean Water Act requires that the

state issue or deny water certification for any federally permitted or licensed activity that results in a discharge into Waters of the U.S. Final permit decision rests with the USACE.

c) Bridge Demolition and Removal

Demolition and removal of a highway bridge over Waters of the United States requires a permit from the U.S. Army Corps of Engineers if dropping components of the bridge into the water is the only practical means of demolition. Effective 9/20/99, this permit is included with the permit for bridge reconstruction. The permit application henceforth will require disclosure of demolition methods and potential impacts to the body of water in the planning document for the bridge reconstruction.

Section 402-2 "Removal of Existing Structures" of NCDOT's Standard Specifications for Roads and Structures stipulates that "excavated materials shall not be deposited...in rivers, streams, or impoundments," and "the dropping of parts or components of structures into any body of water will not be permitted unless there is no other practical method of removal. The removal from the water of any part or component of a structure shall be done so as to keep any resulting siltation to a minimum." To meet these specifications, NCDOT shall adhere to Best Management Practices for the Protection of Surface Waters, as supplemented with Best Management Practices for Bridge Demolition and Removal.

In addition, all in-stream work shall be classified into one of three categories as follows:

Case 1) In-water work is limited to an absolute minimum, due to the presence of special resource waters or threatened and/or endangered species, except for the removal of the portion of the sub-structure below the water. The work is carefully coordinated with the responsible agency to protect the Special Resource Water or T&E species.

Case 2) No work at all in the water during moratorium periods associated with fish migration, spawning, and larval recruitment into nursery areas.

Case 3) No special restrictions other than those outlined in Best Management Practices for Protection of Surface Waters.

Case 3 applies to this bridge replacement project because Lower Bartons Creek has not been identified as a special resource water, is not associated with fish migration, spawning or larval recruitment, and does not contain any threatened or endangered species.

The superstructure consists of reinforced concrete with timber joints. The substructure consists of end bents and internal bents, and timber caps on timber piles. The maximum potential fill is 51.9 cubic yards (17.3 cubic meters).

The stream bed in the project area is nearly all silt, sand, and small gravel. Therefore, conditions in the stream raise sediment concerns and a turbidity curtain is recommended.

3. Buffer Rules

Pursuant to 15 NCAC 2B.0233, Riparian Area Rules for Nutrient Sensitive Waters apply. The rules state that roads, bridges, stormwater management facilities, ponds, and utilities may be allowed within the 50-foot riparian buffer area of subject streams 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 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 wetland and stream impacts.

Estimated impacts to the riparian buffers are quantified below in **Table 4**. Impacts to Zone 1 are based on a buffer width of 30 feet measured landward from the top of bank or rooted vegetation. Impacts to Zone 2 are based on a buffer width of 20 feet measured landward from the outer edge of Zone 1. The Authorization Certificate for Neuse Buffer Impacts will be requested along with the 401 Water Quality Certification.

Table 4: Estimated Impacts to Riparian Buffers

Water Resource	**Biotic Community**	**Impacts to Zone 1** in Acres (Hectares)	**Impacts to Zone 2** in Acres (Hectares)	**Total Impacts** in Acres (Hectares)
Alt. 1, LBCreek	FP, DR	0.08 (0.03)	0.05 (0.02)	0.13 (0.05)
Alt. 1, UT	FP, UF, DR	0.09 (0.04)	0.06 (0.02)	0.15 (0.06)
Alt. 2, LBCreek	FP, DR	0.10 (0.04)	0.06 (0.03)	0.16 (0.07)
Alt. 2, UT	FP	0.04 (0.02)	0.03 (0.01)	0.07 (0.03)
Alt 3, LBCreek	FP, PR	0.12 (0.05)	0.08 (0.03)	0.20 (0.08)
Alt 3, UT	FP, DR	0.04 (0.02)	0.03 (0.01)	0.07 (0.03)
Pond	UF, DR	0.12 (0.05)	0.08 (0.03)	0.2 (0.08)
Note: FP = Floodplain Forest, UF = Upland Forest, PR = Powerline Right-of-way, DR = Disturbed Roadside				

4. Mitigation

Because this project will likely be authorized under a Nationwide Permit, mitigation for impacts to surface waters may or may not be required by the USACE. In accordance with the Division of Water Quality Wetland Rules [15A

NCAC 211 .0506 (h)] "Fill or alteration of more than one acre of wetlands will require compensatory mitigation; and fill or alteration of more than 150 linear feet of streams may require compensatory mitigation." Because there will be no impacted wetlands, wetland mitigation will not be required. **Alternatives 2** and **3** will impact a total of 100 linear feet (30.3 m) of Lower Bartons Creek within the study corridor for the proposed project. **Alternative 1** will only impact 50 linear feet (15.2 m) of the creek. If the final length of stream impact is greater than 150 linear feet (45.6 m), compensatory mitigation may be required.

Alternative 1 will impact a total of 127 linear feet (386 m) of the jurisdictional portion of the unnamed tributary that flows into Lower Bartons Creek. **Alternative 2** will impact a total of 145 linear feet (44 m) of the jurisdictional portion of this tributary. **Alternative 3** will impact a total of 183 linear feet (56 m) of the jurisdictional portion of this tributary. If the final length of stream impact is greater than 150 linear feet (46 m), compensatory mitigation may be required.

F. Rare and Protected Species

Some populations of plants and animals are declining either as a result of natural forces or their difficulty competing with humans for resources. Rare and protected species listed for Wake County, and any likely impacts to these species as a result of the proposed project construction, are discussed in the following sections.

1. Species Under Federal Protection

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

The USFWS lists four species under federal protection for Wake County as of March 2002. These species are listed in **Table 5**.

Table 5: Species Under Federal Protection for Wake County

Common Name	Scientific Name	Federal Status
Vertebrates		
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Invertebrates		
Common Name	**Scientific Name**	**Federal Status**
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered
Vascular Plants		
Michaux's sumac	*Rhus michauxii*	Endangered
Notes:	Endangered-A species that is threatened with extinction throughout all or a significant portion of its range. Threatened-A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.	

A brief description of the characteristics and habitat requirements of each species follows, along with a conclusion regarding potential project impact.

***Haliaeetus leucocephalus* (bald eagle)** **Threatened**

Family: Accipitridae
Federally Listed: 1967

A large raptor, the bald eagle has a wingspread of about 7 feet (2.12 m). Its plumage is mainly dark brown, and adults have a pure white head and tail. First year juveniles are often chocolate brown to blackish, sometimes with white mottling on the tail, belly, and underwings. The head and tail become increasingly white with age until full adult plumage is reached in the fifth or sixth year. An opportunistic predator, the bald eagle feeds primarily on fish but also takes a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available.

The bald eagle is primarily riparian, associated with coasts, rivers, and lakes, usually nesting near bodies of water where it feeds. Selection of nesting sites varies tremendously depending on the species of trees growing in a particular area. In the Southeast, nests are constructed in dominant or codominant pines or cypress. Nests are usually constructed in living trees, but bald eagles will occasionally use dead ones.

Biological Conclusion: **No Effect**

No suitable nesting sites exist in the project area, and Lower Bartons Creek is not large enough to provide an adequate food source for bald eagles. A review of the NHP files did not reveal any records of bald eagles in the project vicinity. It can be determined that the project will not impact this threatened species.

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

Family: Picidae
Federally Listed: 1970

The red-cockaded woodpecker is a small to medium sized bird about 8 inches (20.32 centimeters [cm]) long, with a wingspan of 13.8 to 14.96 inches (35 to 38 cm). There are black and white horizontal stripes on its back, and its cheeks and underparts are white. Its flanks are black streaked. The cap and stripe on the side of the neck and the throat are black. The male has a small red spot on each side of the black cap. After the first post-fledgling molt, fledgling males have a red crown patch. This woodpecker's diet is composed mainly of insects, which include ants, beetles, wood-boring insects, caterpilars, and corn ear worms if available. About 16 to 18 percent of the diet includes seasonal wild fruit.

Open stands of pines with a minimum age of 80 to 120 years, depending on the site, provide suitable nesting habitat. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwood, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 in (25.4 cm) or larger in diameter. In good, well-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres (29.2 to 45.6 hectares).

Biological Conclusion: **No Effect**

Within the project area no suitable red-cockaded woodpecker habitat exists. These birds are not associated with mixed hardwood riparian areas or human-dominated maintained habitats. A search of the NHP files did not reveal any records of red-cockaded woodpeckers in the project vicinity. It can be concluded that the project will not threaten this endangered species.

***Alasmidonta heterodon* (dwarf wedge mussel)** **Threatened**

Family: Unionidae
Federally Listed: 1990

The dwarf wedge mussel's shell rarely exceeds 1.5 in (3.81 cm) in length. It is also the only North American freshwater mussel that has two lateral teeth on the right valve, but only one on the left (Fuller, 1977). The female's shell is inflated in the back where the marsupial gills are located. Little is known about the species' life history and reproductive cycle. Gravid females have been observed from late August until June (Clarke, 1981). Like other freshwater mussels, this species' eggs are fertilized in the female as sperm passes through its gills; the resulting larvae than attaches to a fish host. Although this host is still unknown, strong evidence suggests that it is an anadromous fish which migrates from the ocean into freshwater to spawn.

The dwarf wedge mussel inhabits creek and river areas with a slow to moderate current and a sand, gravel, or muddy bottom. These areas must be nearly silt free. Four of the existing populations are located in North Carolina. One occurs in the Little River (Johnston County); another on the Tar River (Granville County); and one each in two of the Tar River Tributaries (Franklin County).

Biological Conclusion: **No Effect**

A search of the NHP files did not reveal any records of dwarf wedge mussels occurring in the project vicinity. NCDOT biologists performed surveys for the dwarf wedge mussel on September 21, 2000. No mussels were found during the survey. Habitat in the vicinity of the bridge was determined to be somewhat degraded due to sediment loads. It can be concluded that this project will not impact this threatened species.

***Rhus michauxii* (Michaux's sumac)** **Endangered**

Family: Anacardiaceae
Federally Listed: 1989

Michaux's sumac or false poison sumac is a densely hairy shrub with erect stems, which are 1 to 3 feet (0.3-0.9 m) in height. The shrub's compound leaves are narrowly winged at their base, dull on their tops, and veiny and slightly hairy on their bottoms. Each leaf is finely toothed on its edges. Flowers are greenish-yellow to white and are 4-5 parted. Each plant is unisexual. With a male plant the flowers and fruits are solitary, with a female plant all flowers are grouped in 3 to 5 stalked clusters. The plant flowers from April to June; its fruit, a dull red drupe, is produced in October and November.

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. Apparently, this plant survives best in areas where some form of disturbance has provided an open area. Eleven of the plant's 16 remaining populations are on highway rights-of way, roadsides, or on the edges of artificially maintained clearings. Two other populations are in areas with periodic fires, and two more populations exist on sites undergoing natural succession. One population is situated in a natural opening on the rim of a Carolina bay. Currently, the plant survives in the following North Carolina Counties: Richmond (6 populations); Hoke (3 populations); Scotland (2 populations); Franklin (1 population); Davie (1 population); Robeson (1 population); and Wake (1 population).

Biological Conclusion: **No Effect**

No habitat exists in the project area for Michaux's sumac. The soils in the project area are all acidic. A search of the NHP (Natural Heritage Program) database

found no occurrences of Michaux's sumac in the project vicinity. It can be concluded that the project will not impact this threatened species.

2. Federal Species of Concern

Federal Species of Concern (FSC) are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. **Table 6** includes FSC species listed for Wake County and their state classifications. Organisms which are listed as Endangered (E), Threatened (T), or Special Concern (SC) on the North Carolina Natural Heritage Program list of Rare Plant and Animal Species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. However, the level of protection given to state-listed species does not apply to NCDOT activities.

Table 6: Federal Species of Concern in Wake County

Common Name	Scientific Name	State Status	Habitat present
Vertebrates			
Southeastern Bat *	*Myotis austroriparius*	SC	No
Bachman's Sparrow *	*Aimophila aestivalis*	SC	No
Southern Hognose Snake **	*Heterodon simus*	SR	No
Pinewoods Shiner	*Lythrurus matutinus*	SR	No
Carolina darter	*Etheostoma collies lepidinion*	SR	No
Invertebrates			
Yellow Lance	*Elliptio lanceolata*	T	No
Atlantic Pigtoe	*Fusconaia masoni*	T	No
Green Floater	*Lasmigona subviridis*	E	No
Diana Fritillary **	*Speyeria diana*	SR	No
Vascular Plants			
Bog spicebush	*Lindera subcoriacea*	E	No
Sweet Pinesap *	*Monotropsis odorata*	C	No
Carolina Least Trillium *	*Trillium pusillum* var *pusillum*	E	No

Sources: Amoroso, ed., 1999; LeGrand and Hall, eds., 1999
Key: T = Threatened, E = Endangered, SC = Special Concern, C = Candidate, SR = Significantly Rare
*=Historic record. The species was last observed in the county more than 50 years ago.
**=Obscure record. The date and/or location of observation is uncertain.

Bog spicebush does not appear on the March 2001 USFWS list of protected species for Wake County, however this species is listed by the NC NHP on their website (last updated July 2001) as a Federal Species of Concern. John Finnegan, Data Systems Manager of the NC NHP, stated on August 21, 2001 that the NC NHP has one record of bog spicebush from northern Wake County in 1997. For this reason the bog spicebush remains on Table 6.

No FSC species were observed during the site visit, however one is recorded by the NHP as occurring within 2 miles (3.2 km) of the project area. The pinewoods shiner (*Lythrurus matutinus)* prefers midwater areas in sandy runs and pools of creeks or small rivers. A current record of this species places it in Upper Bartons Creek (approximately 2 miles away from the project area) within the last 20 years. No individuals of this species were observed on the day of the site visit. It can be concluded that this species will not be affected by this bridge replacement project.

3. Summary of Anticipated Impacts

No impacts to federally protected species are anticipated.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires that if a federally funded, licensed, or permitted project has an effect on a property listed on or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation be given an opportunity to comment.

B. Historic Architecture

A field survey of the Area of Potential Effect (APE) was conducted on December 15, 1999. All structures within the area were photographed, and later reviewed by the State Historic Preservation Office (HPO). In a concurrence form dated February 17, 2000 and a memorandum dated November 16, 2000, the State Historic Preservation Officer (SHPO) concurred that there are no historic architectural resources either listed in or eligible for listing in the National Register of Historic Places within the APE. Copies of the concurrence form and memorandum are included in the Appendix.

C. Archaeology

The SHPO, in a memorandum dated November 16, 2000, said they were aware of no properties of archaeological significance that would be affected by the project. They did not recommend an archaeological survey. A copy of the SHPO memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

Anticipated impacts to the resources in the project area are described in this section. The project is considered to be a Federal "Categorical Exclusion" because of its limited scope and insignificant environmental consequences. The project is expected to have an overall positive impact. Replacement of an inadequate bridge will result in safer traffic operations.

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

No adverse effect on families or communities is anticipated. Right-of-way acquisition will be limited. There are no relocations.

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 Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the U.S. Natural Resources Conservation Service. No prime or important farmlands will be impacted by the proposed project. In addition, the proposed project is anticipated to require limited right of acquisition.

This project is an air quality "neutral" project, so it is not required to be included in the regional emission analysis (if applicable) and a project level CO analysis is not required. The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for ozone (O_3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as "moderate" nonattainment area for O_3 and CO. However, due to improved monitoring data, these areas were redesignated as "maintenance" for O_3 on June 17, 1994 and "maintenance" for CO on September 18, 1995. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area 2025 Long Range Transportation Plan (LRTP) and the 2002-2008 Metropolitan Transportation Improvement Program (MTIP) has been determined to conform to the intent of the SIP. The USDOT air quality conformity approval for the LRTP was August 20, 1999 and the USDOT air quality conformity approval for the MTIP was October 1, 2001. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There has been no significant changes in the project's design concept or scope, as used in the conformity analyses.

Traffic volumes will not increase or decrease because of this project; therefore, there will not be substantial changes in noise and air quality due to this project.

Noise levels could increase during construction but will be temporary. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NAACO 2D.0520. This evaluation completes the

assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAAA and NEPA), and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the Division of Waste Management revealed neither underground storage tanks, hazardous waste sites, regulated or unregulated landfills, nor dump sites in the project area.

Wake County is a participant in the National Flood Insurance Program (NFIP). Flood Insurance Study maps for Wake County show that Bridge No. 28 is located in a FEMA 100-year floodplain. Replacement of this bridge is not expected to affect the 100-year floodplain. The hydraulic opening of the new bridge is greater than that of the existing bridge.

Impacts to water resources, natural communities, and federally protected species were discussed in previous sections.

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

VIII. PUBLIC INVOLVEMENT

A newsletter was circulated in October 2001 to inform residents in the area of the proposed project.

VII. AREAS OF CONTROVERSY

There are no areas of controversy on this project.

VIII. AGENCY COMMMENTS

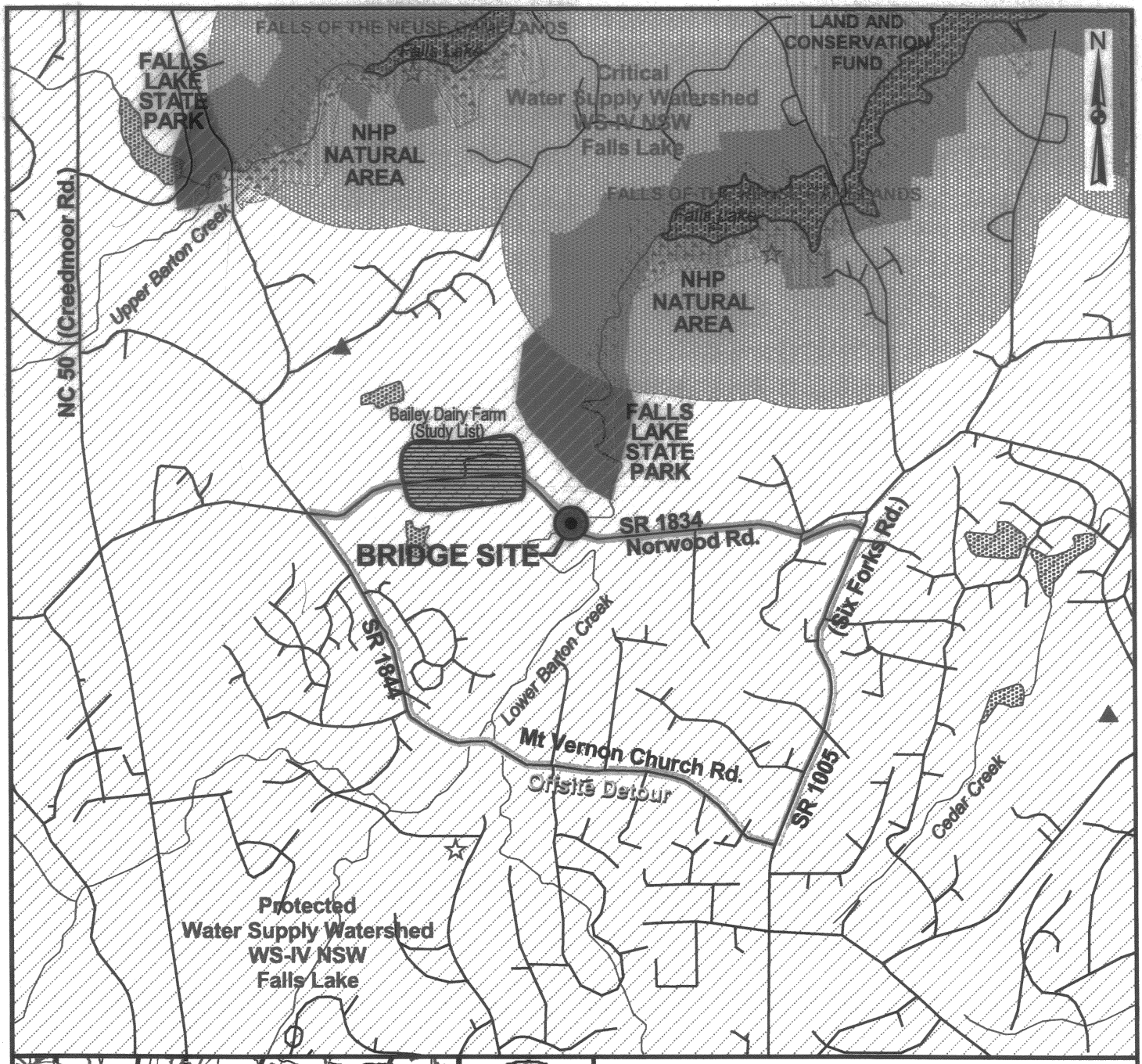
United States Department of Agriculture – Natural Resources Conservation Service
The Natural Resources Conservation Service has no comment at this time.

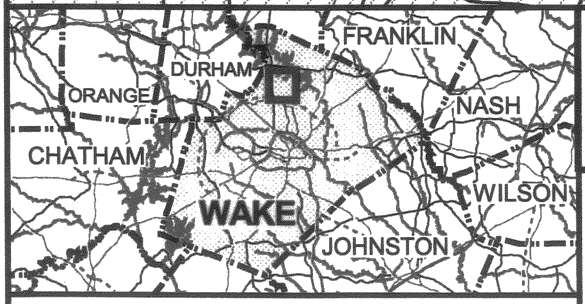
North Carolina State Historic Preservation Office
They are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. Therefore, they have no comments on the project as currently proposed.

North Carolina Wildlife Resources Commission

The Wildlife Resource Commission conducted a review of the project and is not aware of any threatened or endangered species in the project vicinity. In addition, they had several general comments.

FIGURES



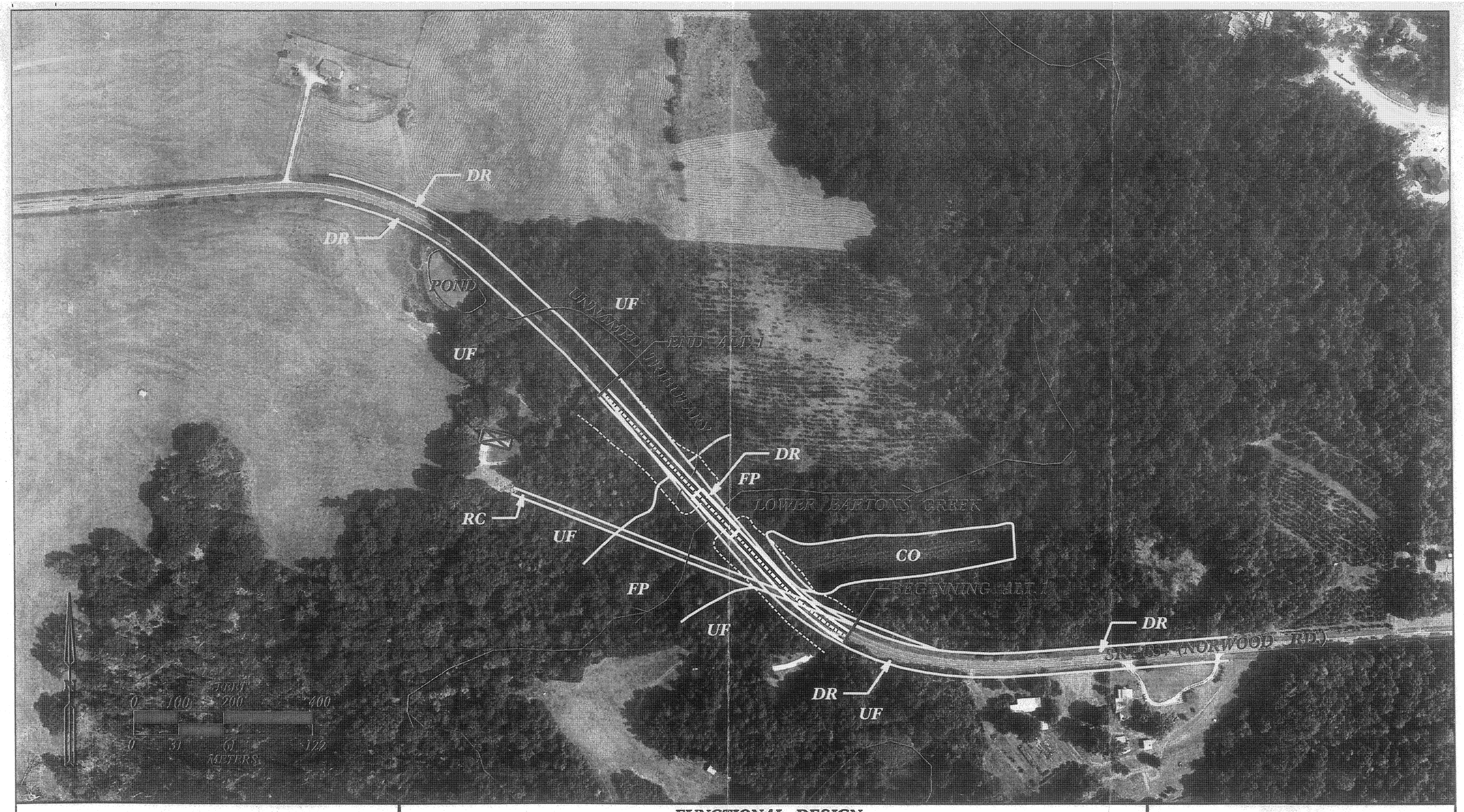


North Carolina - Department of Transportation
Division of Highways
Project Development and Environmental Analysis Branch

FIGURE 1
VICINITY MAP

REPLACEMENT OF BRIDGE NUMBER 108
ON SR 1834 OVER LOWER BARTON CREEK
WAKE COUNTY
TIP NO. B-3704

0.5 0 0.5 1 Miles

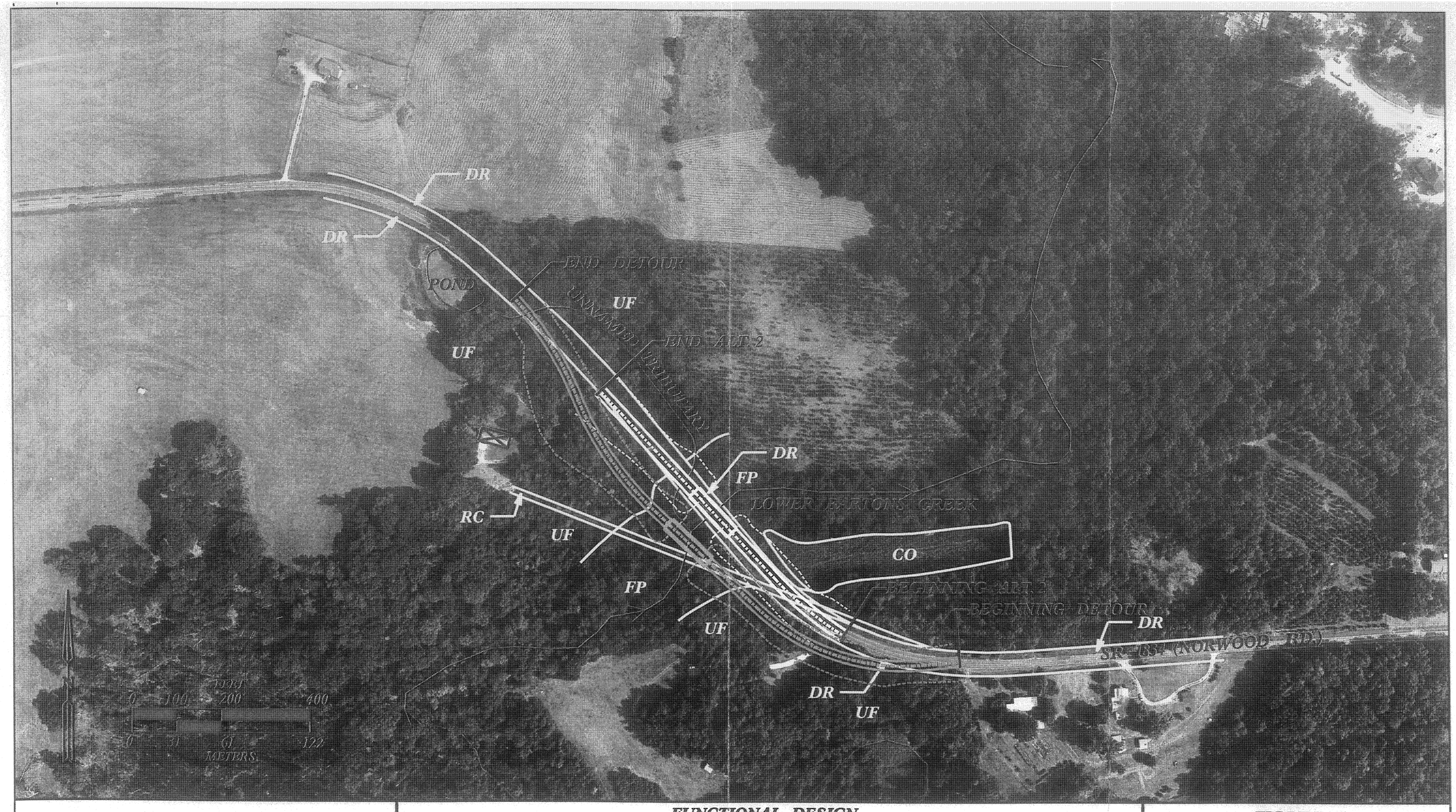


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

Alt. 1, Centerline
Alt. 1, Edge of Pavement
Alt. 1, Construction Limits

FIGURE 2a
ALTERNATIVE 1
REPLACEMENT OF BRIDGE NO. 108
ON SR 1834 OVER
LOWER BARTONS CREEK
WAKE COUNTY
TIP NO. B-3704

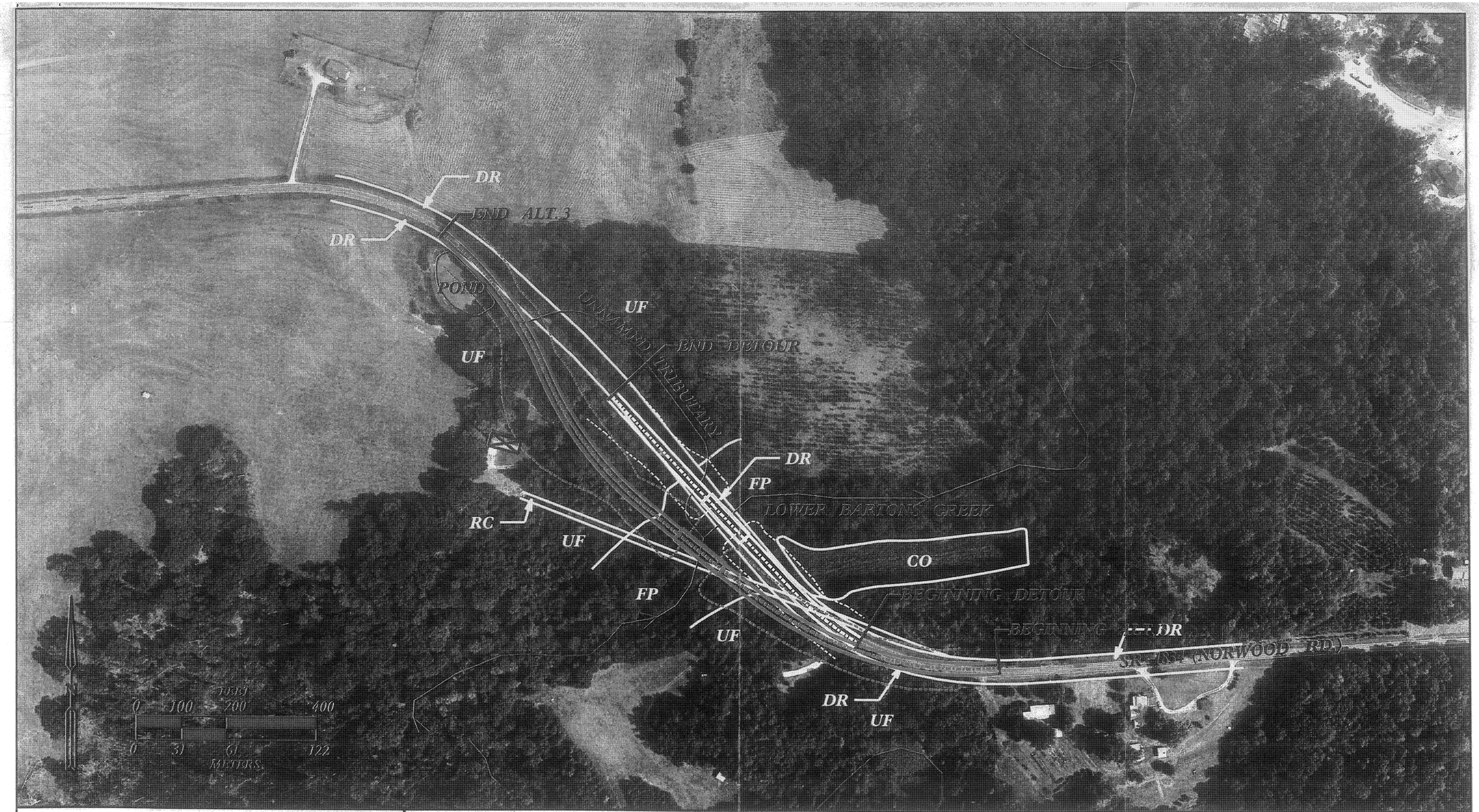


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

- Alt. 2, Centerline
- Alt. 2, Edge of Pavement
- Alt. 2, Construction Limits
- Detour for Alt. 2, Centerline
- Detour for Alt. 2, Edge of Pavement
- Detour for Alt. 2, Construction Limits

FIGURE 2b
ALTERNATIVE 2
REPLACEMENT OF BRIDGE NO. 108
ON SR 1834 OVER
LOWER BARTONS CREEK
WAKE COUNTY
TIP NO. B-3704

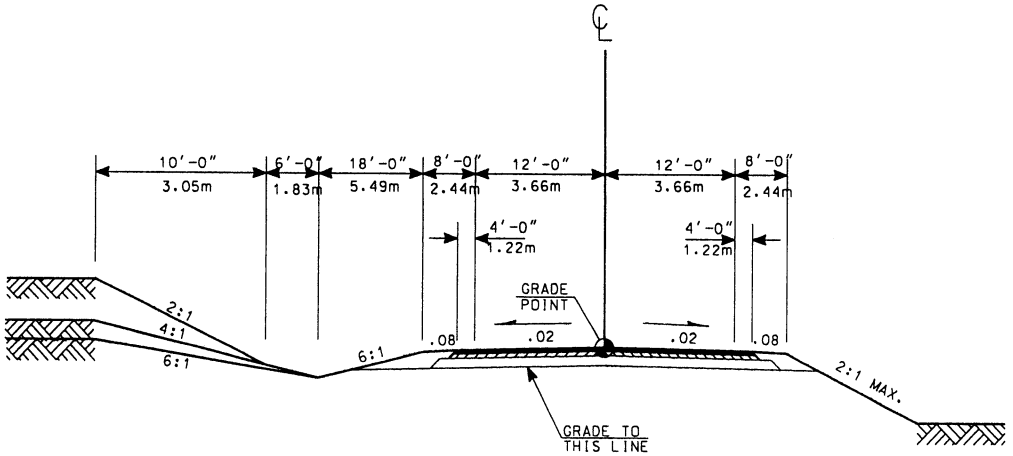


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

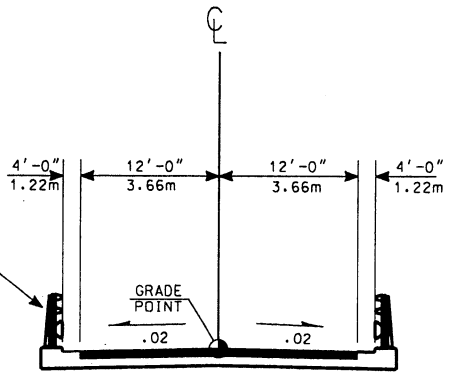
- Alt. 3, Centerline
- Alt. 3, Edge of Pavement
- Alt. 3, Construction Limits
- Detour for Alt. 3, Centerline
- Detour for Alt. 3, Edge of Pavement
- Detour for Alt. 3, Construction Limits

FIGURE 2c
ALTERNATIVE 3
REPLACEMENT OF BRIDGE NO. 108
ON SR 1834 OVER
LOWER BARTONS CREEK
WAKE COUNTY
TIP NO. B-3704



TYPICAL ROADWAY APPROACH SECTION

SEE "NC BICYCLE FACILITIES PLANNING AND DESIGN GUIDELINES" FOR BRIDGE RAIL REQUIREMENTS



TYPICAL SECTION ON STRUCTURE

TRAFFIC DATA

ADT 2001	1162
ADT 2025	5500
DUAL	2%
TTST	1%

FUNCTIONAL CLASSIFICATION: URBAN LOCAL

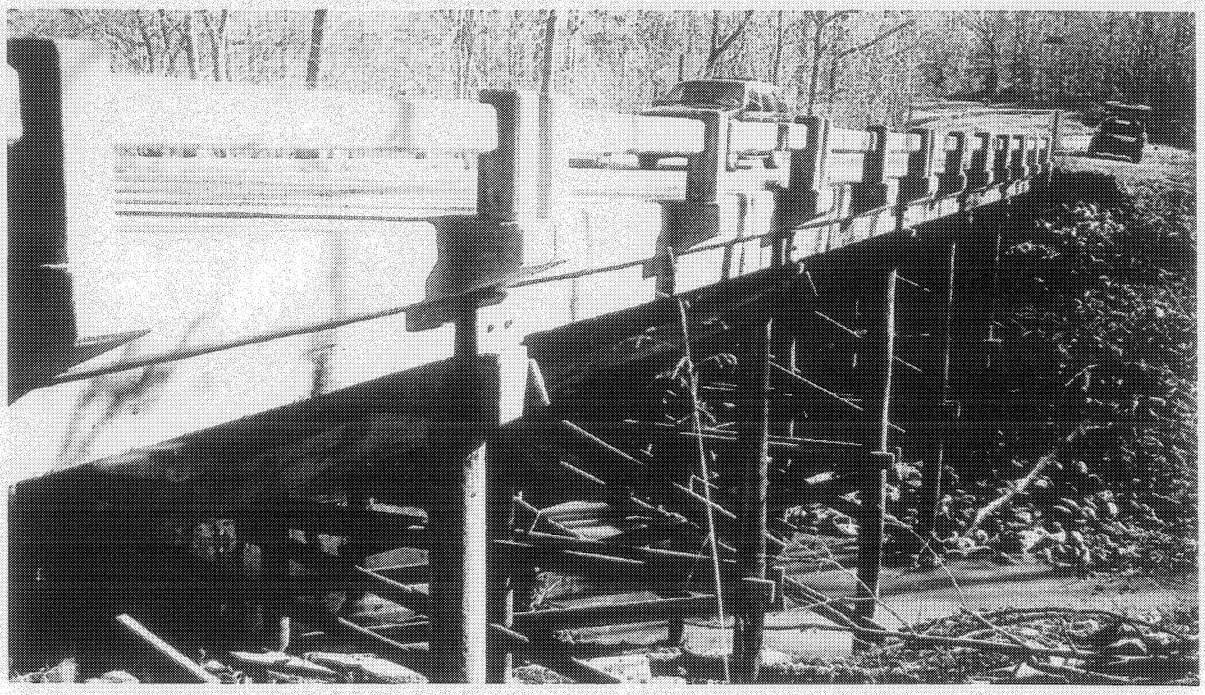
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

BRIDGE NO. 108 ON SR 1834
OVER LOWER BARTONS CREEK
WAKE COUNTY

TIP B-3704

FIGURE 3

NOT TO SCALE



Upstream side of the bridge.

Looking downstream from the bridge.

North Carolina – Department of Transportation

Division of Highways

Project Development and
Environmental Analysis Branch

FIGURE 4a

REPLACEMENT OF BRIDGE NUMBER 108
ON SR 1834 OVER LOWER BARTONS
CREEK
WAKE COUNTY
TIP NO. B-3704

Looking northwest from the Bridge.

Looking southeast from the bridge.

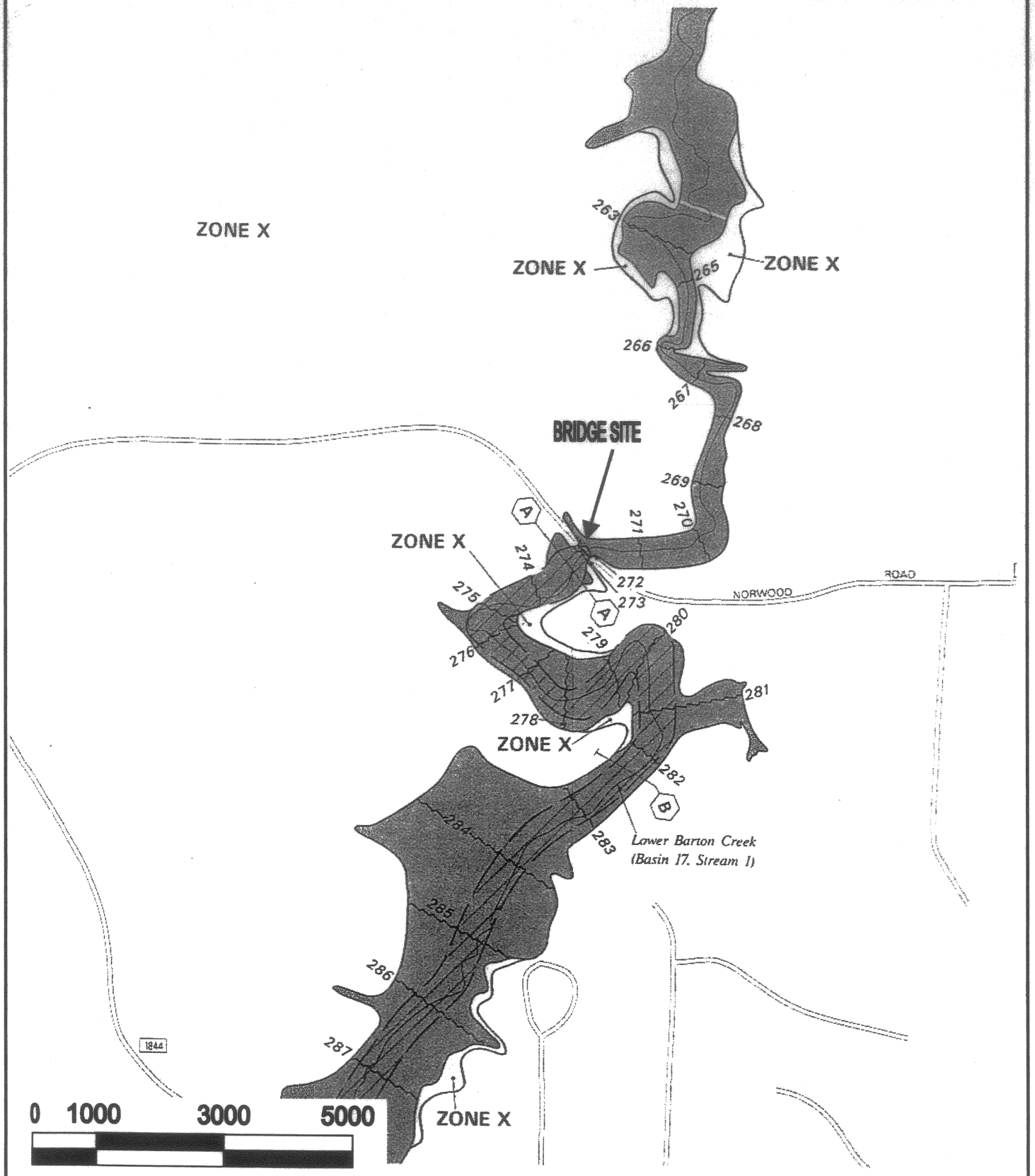
North Carolina – Department of Transportation

Division of Highways

Project Development and
Environmental Analysis Branch

FIGURE 4b

REPLACEMENT OF BRIDGE NUMBER 108
ON SR 1834 OVER LOWER BARTONS CREEK
WAKE COUNTY
TIP NO. B-3704



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	North Carolina – Department of Transportation Division of Highways Project Development and Environmental Analysis Branch	FIGURE 5 FEMA 100 – YEAR FLOODPLAIN MAP REPLACEMENT OF BRIDGE NUMBER 108 ON SR 1834 OVER LOWER BARTONS CREEK VANCE COUNTY TIP NO. B-3704

APPENDIX

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

4405 Bland Rd.
Suite 205
Raleigh, NC 27609

(919) 873-2134

October 30, 2000

Mr. John Conforti
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Conforti:

Thank you for the opportunity to provide comments on Bridge Group XXVIII bridge replacement projects listed below:

TIP Project No.	County	Bridge Number	Road Carried	Stream Crossed
B-3643	Granville	72	SR1004 (Providence Rd.)	Hachers Run
B-3644	Granville	226	SR1120 (Veasey Rd.)	Knap of Reeds Creek
B-3645	Granville	201	SR 1435 (Davis Chapel Rd.)	Little Grassy Creek
B-3653	Halifax	162	SR1450 (Branch Rd.)	Chockoyotte Creek
B-3853	Halifax	82	NC561	Marsh Swamp
B-3702	Vance	19	SR 1305 (Barker Rd.)	Flat Creek
B-3915	Vance	21	SR 1303 (Hicksboro Rd.)	Flat Creek
B-3521	Wake	273	SR 1006 (Old Stage Rd.)	Middle Creek
B-3523	Wake	525	SR 1300 (Kildaire Farm Rd.)	Swift Creek
B-3530	Wake	174	SR 2320 (Riley Hill Rd.)	Buffalo Creek
B-3703	Wake	317	SR 1404 (Johnson Pond Rd.)	Middle Creek
B-3704	Wake	108	SR 1834 (Norwood Rd.)	Lower Bartons Creek
B-3705	Wake	125	SR 2045 (Burlington Mills Rd.)	Smiths Creek
B-3917	Wake	311	SR 1379 (Penny Rd.)	Lake Wheeler (Swift Cr.)
B-3918	Wake	127	SR 2044 (Ligon Mill Rd.)	Tom Creek

The Natural Resources Conservation Service does not have any comments at this time.

Sincerely,

Mary K. Combs
State Conservationist

B3704

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: Yvonne G. G. Howell, PE
Earth Tech

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: October 8, 2001

SUBJECT: NCDOT Bridge Replacements in Granville, Halifax, Vance, and Wake counties of North Carolina. TIP Nos. B-3643, B-3644, B-3645, B-3653, B-3853, B-3702, B-3915, B-3521, B-3523, B-3530, B-3703, B-3704, B-3705, B-3917, and B-3918.

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

On bridge replacement projects of this scope our standard recommendations are as follows:

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

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

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

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

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain

saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.

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

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

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

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

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

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

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

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

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

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

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

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

1. The culvert must be designed to allow for fish passage. Generally, this means that the culvert or pipe invert is buried at least 1 foot below the natural stream bed. If multiple cells are required the second and/or third cells should be placed so that their bottoms are at stream bankful stage (similar to Lyonsfield design). This could be

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

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

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

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

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

Project specific comments:

1. B-3643 – Granville County – Bridge No. 72 over Hatchers Run. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

2. B-3644 - Granville County – Bridge No. 226 over Knap of Reeds Creek. NCDOT should be aware that NCWRC has designated NCWRC gamelands in the vicinity of this bridge. Impacts to gameland properties should be avoided. There are also records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge.

3. B-3645 – Granville County – Bridge No. 201 over Little Grassy Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

4. B-3653 – Halifax County – Bridge No. 162 over Chockoyotte Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

5. B-3853 – Halifax County – Bridge No. 82 over Marsh Swamp. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

6. B-3702 – Vance County – Bridge No. 19 over Flat Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

7. B-3915 - Vance County – Bridge No. 21 over Flat Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

8. B-3521– Wake County – Bridge No 273 over Middle Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. There are also records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

9. B-3523 – Wake County – Bridge No. 525 over Swift Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

10. B-3530 - Wake County – Bridge No. 174 over Buffalo Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

11. B-3703 – Wake County – Bridge No. 317 over Middle Creek. There are records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

12. B-3704 – Wake County – Bridge No. 108 over Lower Bartons Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

13. B-3705 – Wake County – Bridge No. 125 over Smiths Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

14. B-3917 Wake County – Bridge No. 311 over Lake Wheeler (Swift Creek). Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

15. B-3918 – Wake County – Bridge No. 127 over Tom Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks, reducing habitat fragmentation and vehicle related mortality at highway crossings.

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

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

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

Division of Archives and History
Jeffrey J. Crow, Director

November 16, 2000

MEMORANDUM

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

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

Re: Bridge Group XXVII Bridge Replacement Projects, Bridge #108, SR 1834 (Norwood Rd) over Lower Bartons Creek, Wake County, B-3704, ER 01-7793

Thank you for your memorandum of October 2, 2000, concerning the above project.

We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. Therefore, we have no comment on the project as currently proposed.

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc

cc: Mary Pope Furr, NC DOT
T. Padgett, NC DOT

3704

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

Compare

Federal Aid #BRZ-1834(2) *TIP* #B-3704 *County*: Wake

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

Project Description: Replace Bridge No. 108 on SR 1834 over Lower Bartons Creek

On February 17, 2000, representatives of the

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

Reviewed the subject project at

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

All parties present agreed

- [ ] there are no properties over fifty years old within the project's area of potential effect.
- [x] there are no properties less than fifty years old which are considered to meet Criterion Consideration G within the project's area of potential effect.
- [x] there are properties over fifty years old (list attached) within the project's area of potential effect, but based on the historical information available and the photographs of each property, properties identified as #1 - 5 are considered not eligible for the National Register and no further evaluation of them is necessary.
- [x] there are no National Register-listed properties located within the project's area of potential effect.

Signed:

Mary Pope Furr — 2.17.2000
Representative, NCDOT — Date

Michael T. Hinson — 2/17/00
FHWA, for the Division Administrator, or other Federal Agency — Date

Renee Gledhill-Earley — 2/17/2000
Representative, SHPO — Date

David Brook, Deputy — 2/23/2000
State Historic Preservation Officer — Date

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