STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 23, 2005

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Ms. Angie Pennock
NCDOT Coordinator

Dear Madam:

SUBJECT: **Nationwide 33 Permit Application** for the replacement of Bridge No. 94 over East Prong Hunting Creek on SR 1972, Burke County. Federal Aid Project No. BRZ-1972(6), State Project No. 33413.1.1, TIP Project No. B-4047.

The NC Department of Transportation (NCDOT) proposes to replace Bridge No. 94 over East Prong Hunting Creek on SR 1972, with new bridge on the existing alignment at a slightly higher elevation. Bridge No. 94 is a two-lane, single span structure 30 feet long and 19 feet wide with a timber deck on steel I-beams. The new bridge will be a two-lane structure approximately 140 feet in length and 28 feet in width. A travel way of 22 feet will be accommodated, with an offset of 3 feet on each side of the bridge. The approach roadway will consist of two 11-foot travel lanes. Grass shoulder widths will be 5 feet on each side and increased to 8 feet where guardrail is warranted. Traffic will be detoured off-site, along surrounding roads, during construction. Total project length will be approximately 950 feet.

IMPACTS TO WATERS OF THE UNITED STATES

There will be no permanent impacts to jurisdictional waters or wetlands as a result of this project. There will be temporary impacts to Waters of the United States in the form of surface waters as a result of construction activities. A temporary rock workpad is proposed along the west bank of the stream in order to facilitate construction of the new bridge. The workpad will temporary fill 0.01 acre of surface waters. East Prong Hunting

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

TELEPHONE: 919-733-3141
FAX: 919-733-9794
WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

Creek is located in the Catawba River Basin, subbasin 03-08-31, DWQ classification is WS-IV, and DWQ index of 11-36-1.

BRIDGE DEMOLITION

Bridge No. 94 is a single span structure that consists of a timber floor on I-beams with an asphalt-wearing surface. The end bents are composed entirely of timber. The existing bridge was constructed in 1962. The existing bridge will be removed without dropping components into Waters of the United States. This bridge is classified as "Case 3" where there are no special restrictions beyond those outlined in Best Management Practices for Protection of Surface Waters.

BRIDGE CONSTRUCTION

The new bridge will be a two span, prestressed box beam supperstructure. The substructure will include one set of drilled piers for the single central bent. The piers will be located outside the stream channel on the west bank. To facilitate construction of the new bridge a temporary workpad along the west side of the creek will be constructed.

TEMPORARY WORKPAD

There will be 0.01 acres of temporary impacts in East Prong Hunting Creek from the construction of a temporary workpad. The workpad is required for the drilling equipment that will be used for the drilled piers. It will extend 5 feet out into the channel, using filter fabric covered by 2 feet of Class II Rip Rap.

No permanent fill will result from the subject activity. The materials used as temporary fill in the construction of the rock workpad, will be completely removed. The entire workpad footprint shall be returned to the original contours and elevations after the purpose of the workpad has been served. After the workpad is no longer needed, the contractor will use excavating equipment to remove all materials. All workpad 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

The original project design proposed replacing Bridge No. 94 with a reinforced concrete box culvert. The current design calls for a new longer bridge at a slightly higher elevation that will have no permanent impacts to the stream channel and may actually allow more room for natural channel migration under the new bridge. The bridge will be replaced at the existing location. Piers for the new bridge will be located outside of the stream channel. Traffic will be maintained using an off-site detour. Best management practices (BMP's) will be utilized to minimize water quality impacts. In compliance with 15A NCAC 02B.0104(m) we have incorporated the use of BMP's in the design of the project.

FEDERALLY-PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under Endangered Species Act §§7 and 9. As of January 29, 2003, the US Fish and Wildlife Service (USFWS) lists 7 federally protected species for Burke County (Table 1). The biological conclusion of "No Effect" was reached for all 7 federally protected species for this county at this site. Initial field investigations in July 2000 found an unknown *Hexastylis* sp. in the project area. A follow-up survey in March 2002 revealed no specimens of *Hexastylis naniflora*. Another survey conducted in May of 2005 found no specimens *Hexastylis* sp. and dense herbaceous and shrub cover along most of the stream bank within the project area. The Biological Conclusion of "No Effect" will remain valid for all endangered and threatened species for this project. NCDOT will resurvey for any species for which the project has habitat, before construction starts.

Table 1. Federally Protected Species for Macon County

SCIENTIFIC NAME	COMMON NAME	STATUS	BIOLOGICAL CONCLUSION
Clemys muhlenbergii	Bog turtle	T(S/A)	No Effect
Haliaeetus leucocephalus	Bald Eagle	T (proposed for delisting)	No Effect
Hexastylis naniflora	Dwarf-Flowered Heartleaf	T	No Effect
Liatris helleri	Heller's Blazing Star	T	No Effect
Hudsonia montana	Mountain Golden Heather	T	No Effect
Isotria medeoloides	Small whorled pogonia	T	No Effect
Geum radiatum	Spreading Avens	E	No Effect

STATUS:

"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 endangered species within the foreseeable future throughout all or a significant portion of its range).

"T(S/A)" Denotes Threatened due to similarity of appearance (a species that is threatened due to similarity of appearance with other rare species and is listed for its protection).

REGULATORY APPROVALS

Section 404 Permit: It is anticipated that the construction of the temporary workpad 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 workpad.

Section 401 Permit: We anticipate 401 General Certification number 3366 will apply to this project. 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.

We anticipate that the Corps of Engineers will request comments from the North Carolina Wildlife Resources Commission (NCWRC) prior to authorization. By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers.

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

If you have any questions or need additional information, please contact Mr. Chris Manley at (919) 715-1487 or cdmanley@dot.state.nc.us.

Sincerely,

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

The "cc" List:

W/attachment

Mr. John Hennessy, Division of Water Quality (2 copies)
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Mr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. J.J. Swain, P.E., Division 13 Engineer
Mr. Roger Byran, DEO

W/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. David Franklin, USACE, Wilmington (Cover Letter Only)
Mr. William T. Goodwin, P.E., PDEA

Office Use Only: Form Version March 05

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
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: Nationwide 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 Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, 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. 94 on SR 1972 over East Prong Hunting Creek

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4047

3. Property Identification Number (Tax PIN): 95 96 2 7; 95 96, 95 98; 95 96 1 3

4. Location
   County: Burke Nearest Town: Morganton
   Subdivision name (include phase/lot number):
   Directions to site (include road numbers/names, landmarks, etc.): I-40 to 18 south to SR 1972

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): _____ºN _____ºW

6. Property size (acres): N/A

7. Name of nearest receiving body of water: East Prong Hunting Creek

8. River Basin: Catawba
   (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/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: Two lane paved roadway leading to two lane bridge over the East Prong Hunting Creek. Adjacent land use is agricultural and residential.

10. Describe the overall project in detail, including the type of equipment to be used: The existing timber bridge will be replaced with a two span, pre-stressed box beam structure on the existing alignment at a slightly higher elevation. The new bridge will be a two-lane structure approximately 140 feet in length and 28 feet in width. A travel way of 22 feet will be accommodated, with an offset of 3 feet on each side of the bridge. The approach roadway will consist of two 11-foot travel lanes. Traffic will be detoured off-site along surrounding roads and the old bridge will be removed. A temporary workpad on the west side of East Prong Hunting Creek is needed to provide construction access for drilling the piers for the new bridge. Equipment will consist of typical grading machinery such as track hoes, dozers, dump trucks, and a crane for the bridge construction and new roadway approaches.

11. Explain the purpose of the proposed work: To replace a deteriorating bridge with a new longer bridge at a slightly higher elevation that will provide a greater passage of flood flows with a reduced chance of overtopping the roadway.

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.
No

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. Each impact must be

listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should 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:
0.01 acre of temporary fill in surface waters for a temporary workpad

2. Individually list wetland impacts. Types of 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.

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
N/A					
Total Wetland Impact (acres)					

3. List the total acreage (estimated) of all existing wetlands on the property: N/A

4. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, 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. To calculate acreage, multiply length X width, then divide by 43,560.

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
Site 1	East Prong Hunting Creek	Temporary Fill	Perennial	15 feet	60 feet	0.01

Total Stream Impact (by length and acreage)						

5. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.). Open water impacts include, but are not limited to fill, excavation, dredging, flooding, drainage, bulkheads, etc.

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
Site 1	East Prong Hunting Creek	Temporary Fill in SW	Stream	0.01
Total Open Water Impact (acres)				

6. List the cumulative impact to all Waters of the U.S. resulting from the project:

Stream Impact (acres):	N/A
Wetland Impact (acres):	
Open Water Impact (acres):	
Total Impact to Waters of the U.S. (acres)	
Total Stream Impact (linear feet):	

7. Isolated Waters
   Do any isolated waters exist on the property? ☐ Yes ☒ No
   Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.

   _____

   _____

8. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____
   Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):_____
   Current land use in the vicinity of the pond:_____
   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 original project design proposed replacing Bridge No. 94 with a reinforced concrete box culvert. The current design calls for a new longer bridge at a slightly higher elevation that will have no permanent impacts to the stream channel and may actually allow more room for natural channel migration under the new bridge. The bridge will be replaced at the existing location. Piers for the new bridge will be located outside of the stream channel. Traffic will be maintained using an off-site detour. Best management practices (BMP's) will be utilized to minimize water quality impacts. In compliance with 15A NCAC 02B.0104(m) we have incorporated the use of BMP's in the design of the project.

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 January 15, 2002, 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 NCEEP 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.

Compensatory mitigation is not proposed for this project.

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

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

IX. Environmental Documentation (required by DWQ)

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes ☒ No ☐

2. 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 ☐

3. 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.

1. Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 02B .0243 (Catawba) 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)? Yes ☐ No ☒

2. If "yes", identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

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

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

3. If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Riparian Buffer Restoration / Enhancement, or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0244, or .0260. N/A

XI. Stormwater (required by DWQ)

Describe impervious acreage (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. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level.
Impervious area will remain about the same. NCDOT will use Best Management Practices for erosion control during construction.

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 ☒

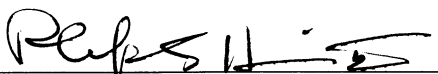
Is this an after-the-fact permit application? Yes ☐ No ☒

XIV. Cumulative Impacts (required by DWQ)

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at http://h2o.enr.state.nc.us/ncwetlands. If no, please provide a short narrative description:_____

XV. 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).



Applicant/Agent's Signature 6/23/05 **Date**

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

CATEGORICAL EXCLUSION ACTION CLASSIFICATION FORM

TIP Project No.	**B-4047**
WBS No.	**33413.1.1**
State Project No.	**8.2853401**
Federal Project No.	**BRZ-1972 (6)**

A. Project Description:

Replacement of Bridge No. 94 on SR 1972 over East Prong Hunting Creek in Burke County. Bridge No. 94 will be replaced with a 3 @ 10 feet (3 meters) x 10 feet (3 meters) reinforced concrete box culvert (RCBC) at approximately the same location and roadway elevation of the existing structure. The approach roadway will consist of two 11-foot (3.3-meter) travel lanes and shoulder widths of at least 5 feet (1.5 meters). Shoulder widths will be increased at least 3 feet (1 meter) where guardrail is warranted. Traffic will be detoured off-site, along surrounding roads, during construction. Total project length will be approximately 950 feet (290 meters).

B. Purpose and Need:

Bridge No. 94 has a sufficiency rating of 38.9 out of 100. The deck is only 19.2 feet (5.9 meters) wide and the structure is composed mainly of timber. For these reasons, Bridge No. 94 needs to be replaced.

C. Proposed Improvements:

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

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

    a. Restoring, Resurfacing, Rehabilitating, and Reconstructing pavement (3R and 4R improvements)
    b. Widening roadway and shoulders without adding through lanes
    c. Modernizing gore treatments
    d. Constructing lane improvements (merges, auxiliary, and turn lanes)
    e. Adding shoulder drains
    f. Replacing and rehabilitating culverts, inlets, and drainage pipes, including safety treatments
    g. Providing driveway pipes
    h. Performing minor bridge widening (less than one through lane)
    i. Slide Stabilization
    j. Structural BMP's for water quality improvement

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

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

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

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

4. Transportation corridor fringe parking facilities.

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

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

7. Approvals for changes in access control.

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

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

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

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

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

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

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

D. Special Project Information:

Estimated Costs:

Total Construction	$ 300,000
Right of Way	$ 38,000
Total	**$ 338,000**

Estimated Traffic:

Current	-	600 vpd
Year 2025	-	1000 vpd
TTST	-	1%
Dual	-	2%

Proposed Typical Cross Section:

The approach roadway will consist of two 11-foot (3.3-meter) travel lanes and shoulder widths of at least 5 feet (1.5 meters). Shoulder widths will be increased at least 3 feet (1 meter) where guardrail is warranted.

Design Speed:

60 mph (100 kmh)

Design Exceptions:

None

Functional Classification:

SR 1972 is classified as a Rural Local Route in the Statewide Functional Classification system.

Division Office Comments:

The Division 13 Construction Engineer supports the chosen alternate and proposed method for detouring traffic during construction.

Bridge Demolition:

The superstructure of Bridge No. 94 consists of a double timber floor on I-beams with an asphalt-wearing surface. The end bents are composed entirely of timber, which can be removed without any falling debris. Therefore, Bridge No. 94 will be removed without dropping components into Waters of the United States during construction.

Alternatives Discussion: (including Studied Offsite Detour Evaluation)

According to the Transportation Director for Burke County Schools, there are six school bus crossings per day over Bridge No. 94.

Emergency Management Services states they can handle an offsite detour.

The detour route will utilize SR 1924 and NC 18 (see Figure 1). There will be 7.9 miles of additional travel.

Only one "build" Alternative was studied. "Do-nothing" is not practical; requiring the eventual closing of the road as the existing bridge completely deteriorates. Rehabilitation of the existing deteriorating bridge is neither practical nor economical.

E. Threshold Criteria

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

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

PERMITS AND COORDINATION		YES	NO
(10)	If the project is located within a CAMA county, will the project significantly affect the coastal zone and/or any "Area of Environmental Concern" (AEC)?		X
(11)	Does the project involve Coastal Barrier Resources Act resources?		X
(12)	Will a U. S. Coast Guard permit be required?		X

(13)	Will the project result in the modification of any existing regulatory floodway?		X
(14)	Will the project require any stream relocations or channel changes?		X

SOCIAL, ECONOMIC, AND CULTURAL RESOURCES		YES	NO
(15)	Will the project induce substantial impacts to planned growth or land use for the area?		X
(16)	Will the project require the relocation of any family or business?		X
(17)	Will the project have a disproportionately high and adverse human health and environmental effect on any minority or low-income population?		X
(18)	If the project involves the acquisition of right of way, is the amount of right of way acquisition considered minor?	X	
(19)	Will the project involve any changes in access control?		X
(20)	Will the project substantially alter the usefulness and/or land use of adjacent property?		X
(21)	Will the project have an adverse effect on permanent local traffic patterns or community cohesiveness?		X
(22)	Is the project included in an approved thoroughfare plan and/or Transportation Improvement Program (and is, therefore, in conformance with the Clean Air Act of 1990)?	X	
(23)	Is the project anticipated to cause an increase in traffic volumes?		X
(24)	Will traffic be maintained during construction using existing roads, staged construction, or on-site detours?	X	
(25)	If the project is a bridge replacement project, will the bridge be replaced at its existing location (along the existing facility) and will all construction proposed in association with the bridge replacement project be contained on the existing facility?	X	
(26)	Is there substantial controversy on social, economic, or environmental grounds concerning the project?		X

(27)	Is the project consistent with all Federal, State, and local laws relating to the environmental aspects of the project?	X	
(28)	Will the project have an "effect" on structures/properties eligible for or listed on the National Register of Historic Places?		X
(29)	Will the project affect any archaeological remains, which are important to history or pre-history?		X
(30)	Will the project require the use of Section 4(f) resources (public parks, recreation lands, wildlife and waterfowl refuges, historic sites, or historic bridges, as defined in Section 4(f) of the U. S. Department of Transportation Act of 1966)?		X
(31)	Will the project result in any conversion of assisted public recreation sites or facilities to non-recreation uses, as defined by Section 6(f) of the Land and Water Conservation Act of 1965, as amended?		X
(32)	Will the project involve construction in, across, or adjacent to a river designated as a component of or proposed for inclusion in the Natural System of Wild and Scenic Rivers?		X

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

Item (2) Threatened and Endangered Species Habitat
An unknown *Hexastylis* sp. was observed within the project area during a field investigation on July 12, 2001, outside the flowering period for *Hexastylis*. The North Carolina's Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of this species have been recorded in the project vicinity. HSMM, Inc. conducted a survey for dwarf-flowered heartleaf (*Hexastylis naniflora*) throughout the project area on March 20, 2002 and no individuals were found. A biological conclusion of No Effect was rendered.

Item (8) Mountain Trout County
Burke County is listed as a mountain trout county. East Prong Hunting Creek does not have a water resource classification involving trout and the NC Wildlife Resources Commission does not have this creek listed as a trout stream.

G. CE Approval

TIP Project No.	**B-4047**
WBS No.	**33413.1.1**
State Project No.	**8.2853401**
Federal Project No.	**BRZ-1972 (6)**

Project Description:

Replacement of Bridge No. 94 on SR 1972 over East Prong Hunting Creek in Burke County. Bridge No. 94 will be replaced with a 3 @ 10 feet (3 meters) x 10 feet (3 meters) reinforced concrete box culvert (RCBC) at approximately the same location and roadway elevation of the existing structure. The approach roadway will consist of two 11-foot (3.3-meter) travel lanes and shoulder widths of at least 5 feet (1.5 meters). Shoulder widths will be increased at least 3 feet (1 meter) where guardrail is warranted. Traffic will be detoured off-site, along surrounding roads, during construction. Total project length will be approximately 950 feet (290 meters).

Categorical Exclusion Action Classification:

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

Approved:

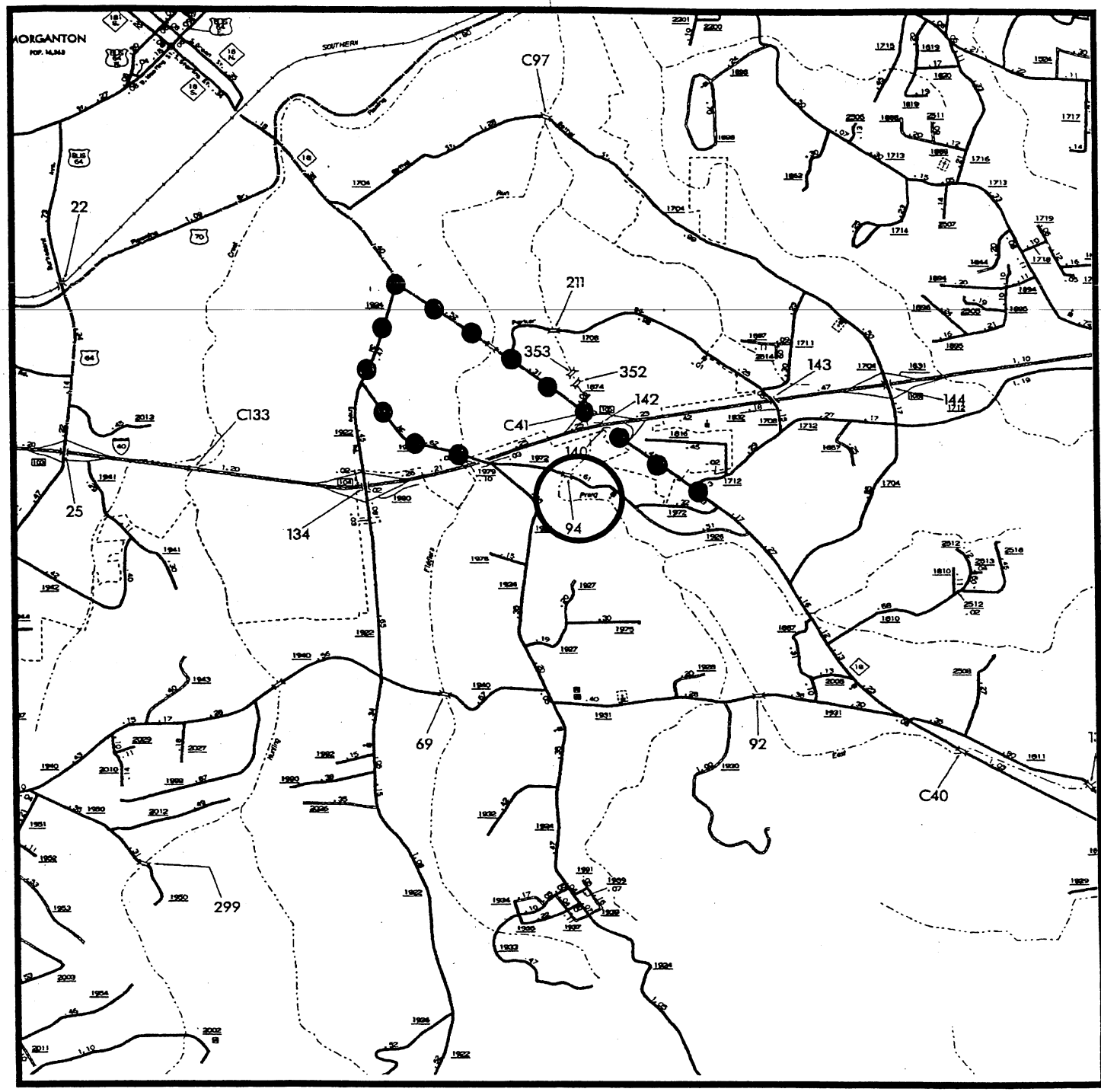
9-19-03 — Teresa Hart
Date — Assistant Manager, Teresa Hart, PE, CPM
Project Development & Environmental Analysis Branch

9-16-03 — William T. Goodwin, Jr.
Date — Project Planning Unit Head, William T. Goodwin, Jr., PE
Project Development & Environmental Analysis Branch

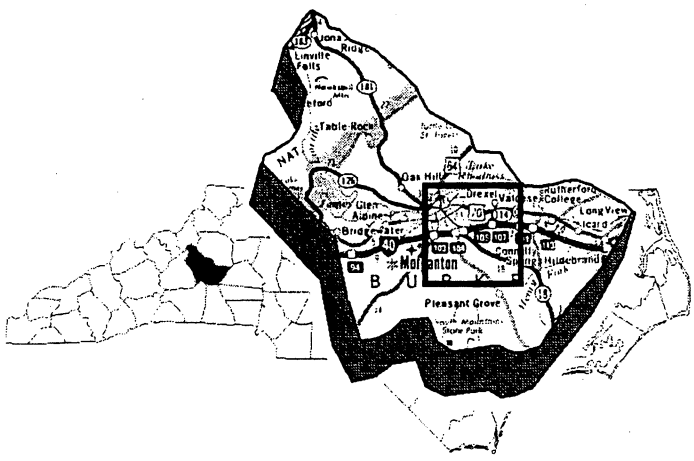
9-16-03 — Robin Y. Hancock
Date — Project Development Engineer, Robin Y. Hancock
Project Development & Environmental Analysis Branch

For Type II(B) projects only:

9/22/03 — for Clarence W. Coleman, Jr.
Date — John F. Sullivan, III, Division Administrator
Federal Highway Administration



Detour Route



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

BURKE COUNTY
REPLACE BRIDGE NO. 94 ON SR 1972
OVER EAST PRONG HUNTING CREEK
B-4047

Figure 1

TR. young

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

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

Division of Historical Resources
David J. Olson, Director

January 29, 2002

MEMORANDUM

TO: William D. Gilmore, Manager
NCDOT, Division of Highways

FROM: David Brook DB for David Brook

SUBJECT: Replace Bridge 94 on SR 1972 over Creek, TIP B-4047, Burke County, ER 02-8507

Thank you for your letter of September 25, 2001, regarding the above project.

Because of the location and topography of the project area, it is unlikely that any archaeological sites which may be eligible for listing in the National Register of Historic Places will be affected by the proposed construction. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

We have conducted a search of our maps and files and have located the following structures of historical or architectural importance within the general area of the project:

Stroupe House, north side SR 1972, .3 mile east of SR 1924, on State Study List.

An architectural historian for the Department of Transportation should inventory and evaluate this property and any others, that are fifty years old or older and located within the area of potential effect.

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

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

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

Federal Aid #BRZ-1972 (b) TIP # B-4047 County: Burke

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

Project Description: Replace Bridge No. 94 on SR 1972 over the East Prong of Hunting Creek in Burke County.

On July 8, 2003, representatives of the

- ☒ North Carolina Department of Transportation (NCDOT)
- ☒ Federal Highway Administration (FHWA)
- ☒ North Carolina State Historic Preservation Office (HPO)
- ☐ Other

Reviewed the subject project at

- ☐ Scoping meeting
- ☒ Historic architectural resources photograph review session/consultation
- ☐ Other

All parties present agreed

- ☐ There are no properties over fifty years old within the project's area of potential effects.
- ☒ There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- ☒ There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the properties identified as **(List Attached)** are considered not eligible for the National Register and no further evaluation of them is necessary.
- ☒ There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- ☒ All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- ☒ There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Renee Gledhill-Earley — 7.8.2003
Representative, NCDOT — Date

[signature] — 7/14/03
FHWA, for the Division Administrator, or other Federal Agency — Date

[signature] — July 8, '03
Representative, HPO — Date

David Brook — 7/15/03
State Historic Preservation Officer — Date

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

North Carolina Wildlife Resources Commission

512 N. Salisbury Street, Raleigh, North Carolina 27604-1188, 919-733-3391
Charles R. Fullwood, Executive Director

TO: William T. Goodwin, Jr., PE, Unit Head
Bridge Replacement & Environmental Analysis Branch

FROM: Ron Linville, Habitat Conservation Coordinator
Habitat Conservation Program

DATE: May 10, 2002

SUBJECT: NCDOT Bridge Replacements in Burke County:
Bridge No. 26, NC183, Linville River, B-4038
Bridge No. 51, SR1424, Parks Creek, B-4043
Bridge No. 251, SR1128, Hall Creek, B-4040
Bridge No. 4, SR1515, Smoky Creek, B-4044
Bridge No. 57, SR1244, Canoe Creek, B-4041
Bridge No. 94, SR1972, East Prong Hunting Creek, B-4047
Bridge No. 19, SR1736, Camp Creek, B-4045
Bridge No. 91, SR1127, Silver Creek, B-4039

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).

Our standard recommendations for bridge replacement projects of this scope 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 aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream and downstream ends to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel(s) during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.

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 along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

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

Project specific comments:

1. Bridge No. 26, NC183, Linville River, B-4038, RED LIGHT, Significant & historic resource, Proposed Critical Habitats, Game Lands, Trout clubs, National Park Service, Blue Ridge Parkway, Moratoriums proposed (15 Feb. – 30 May, Walleye and White Bass; 15 Oct – 31 March, Brown Trout), Brook floater (*Alasmidonta varicosa*) populations. NEW Spanning Bridge.

2. Bridge No. 51, SR1424, Parks Creek, B-4043 – YELLOW LIGHT, Santee Chub in John's River, No sport fish concerns indicated.

3. Bridge No. 251, SR1128, Hall Creek, B-4040 - GREEN LIGHT, No concerns indicated. Standard requirements.

4. Bridge No. 4, SR1515, Smoky Creek, B-4044 - YELLOW LIGHT, Moratorium for warm water fish species.

5. Bridge No. 57, SR1244, Canoe Creek, B-4041 - GREEN LIGHT, No concerns indicated. Standard requirements.

6. Bridge No. 94, SR1972, East Prong Hunting Creek, B-4047 - GREEN LIGHT, No concerns indicated. Standard requirements.

7. Bridge No. 19, SR1736, Camp Creek, B-4045 - GREEN LIGHT, No concerns indicated. Standard requirements.

8. Bridge No. 91, SR1127, Silver Creek, B-4039 - GREEN LIGHT, No concerns indicated. Standard requirements.

NCDOT should routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. Restoring previously disturbed floodplain benches should narrow and deepen streams previously widened and shallowed during initial bridge installation. 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 and reduce habitat fragmentation.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (336) 769-9453. Thank you for the opportunity to review and comment on these projects.

Cc: David Cox, WRC

PROJECT COMMITMENTS

Burke County
Bridge No. 94 on SR 1972
Over East Prong Hunting Creek
Federal Project BRZ-1972 (6)
WBS 33413.1.1
State Project 8.2853401
TIP No. B-4047

Commitments Developed Through Project Development and Design

Roadside Environmental Unit, Division 13 Construction, Structure Design Unit
Bridge Demolition: Best Management Practices for Bridge Demolition & Removal will be implemented. The superstructure of consists of a double timber floor on I-beams with an asphalt-wearing surface. The end bents are composed entirely of timber, which can be removed without any falling debris. Therefore, Bridge No. 94 will be removed without dropping components into Waters of the United States during construction.

Division 13 Construction
In order to allow Emergency Management Services (EMS) time to prepare for road closure, the NCDOT Resident Engineer will notify Clint Patton with Burke County EMS at (828) 433-6609 of the bridge removal 30 days prior to road closure.

In order to allow Burke County Schools time to prepare for road closure, the NCDOT Resident Engineer will notify the Burke County School Transportation Director, Eric Calhoun, at (828) 438-8803 of the bridge removal 30 days prior to road closure.

REPLACE BRIDGE NUMBER 94 ON SR 1972
OVER EAST PRONG HUNTING CREEK
BURKE COUNTY, NORTH CAROLINA

TIP NUMBER B-4047
STATE CONTRACT NUMBER A303718
STATE WORK ORDER NUMBER 8.2853401

NATURAL RESOURCES TECHNICAL REPORT
B-4047

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

FEBRUARY 2002

REPLACE BRIDGE NUMBER 94 ON SR 1972
OVER EAST PRONG HUNTING CREEK
BURKE COUNTY, NORTH CAROLINA

TIP NUMBER B-4047
STATE CONTRACT NUMBER A303718
STATE WORK ORDER NUMBER 8.2853401

NATURAL RESOURCES TECHNICAL REPORT
B-4047

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1.0 INTRODUCTION

The following Natural Resources Technical Report is submitted to assist in the preparation of a Categorical Exclusion (CE) for the proposed project. The purpose of this report is to inventory and describe the natural resources which occur within the proposed right-of-way boundaries and which have a probability of being impacted by the proposed action. Assessments of the nature and severity of probable impacts to these natural resources are provided, along with recommendations for measures that will minimize resource impacts.

This report identifies areas of particular environmental concerns that may affect the selection of a preferred alignment or may necessitate changes in design criteria. Such environmental concerns should be addressed during the preliminary planning stages of the proposed project in order to maintain environmental quality in the most efficient and effective manner. The analyses contained in this document are relevant only in the context of the existing preliminary boundaries and design. If design parameters and criteria change, additional field investigations may be necessary.

1.1 Project Description

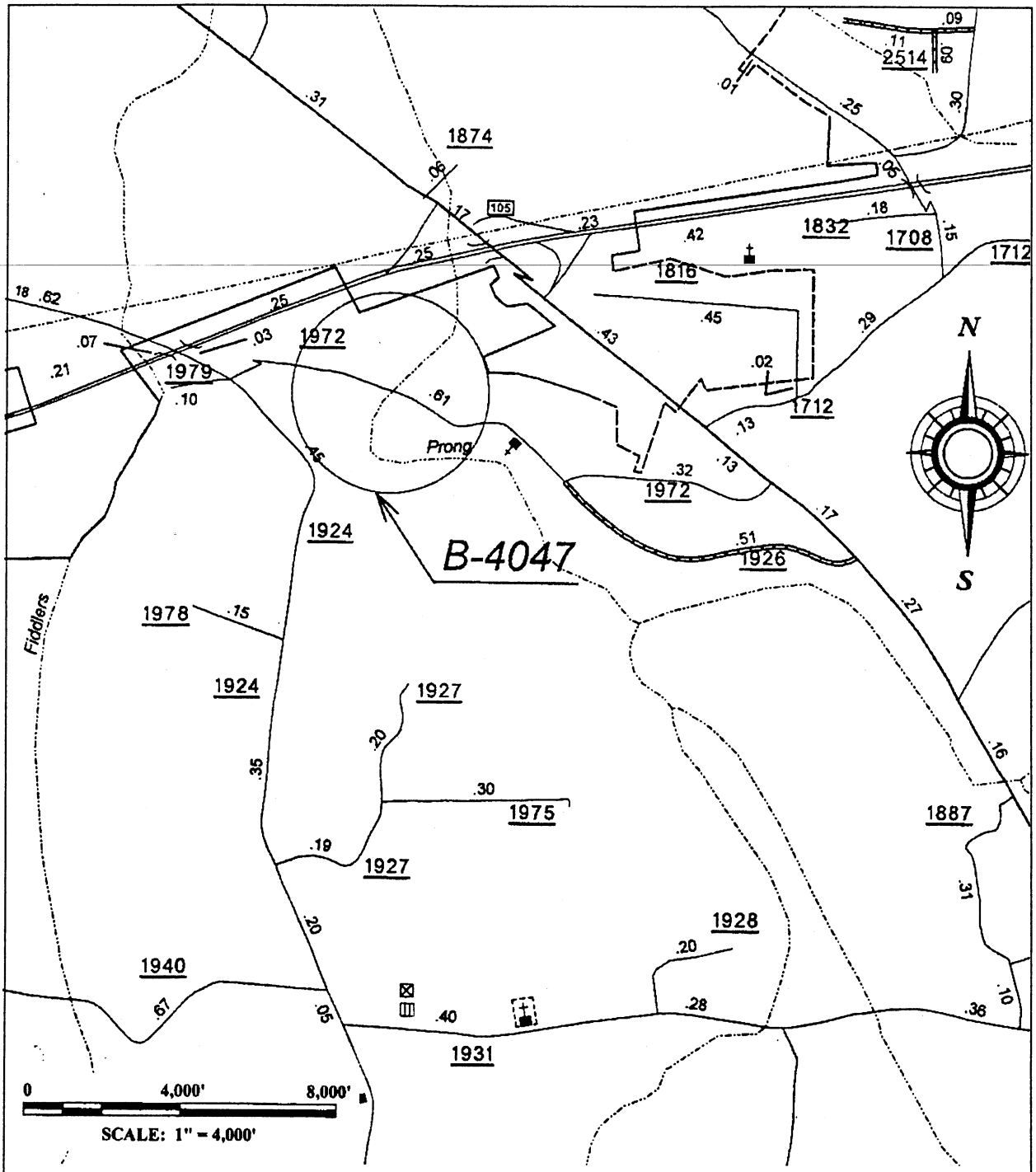
The project calls for the replacement of Bridge Number 94 on SR 1972 in Burke County, North Carolina. The proposed project crosses East Prong Hunting Creek, approximately 0.9 mile (1.5 kilometers) southeast of Morganton (Figure 1).

1.2 Methodology

Research was conducted prior to the field investigations. Published resource information pertaining to the project area was collected and reviewed. Resources utilized in this preliminary investigation of the project area include:

- U.S. Geological Survey (USGS) Morganton South 7.5–minute topographic quadrangle map.
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for Morganton South 7.5–minute quadrangle (1995).
- North Carolina Department of Transportation (NCDOT) aerial photographs of the project area (1:1,200 scale).
- U.S. Department of Agriculture, Natural Resource Conservation Service (formerly the Soil Conservation Service) provisional soil survey of Burke County, North Carolina (unpublished).
- U.S. Environmental Protection Agency Water Discharges and RCRA Map accessed via EPA's EnviroMapper Program (September 2001).

Water research information was obtained from publications of the North Carolina Department of Environment and Natural Resources (NCDENR, 1999; 2000, 2001). Information concerning the occurrence of federal and state protected species in the project area was obtained from the U.S. Fish and Wildlife Service list of protected and candidate species (3 March 2001) and from the North Carolina



SITE VICINITY MAP
SR 1972 BRIDGE REPLACEMENT
OVER EAST PRONG HUNTING CREEK (TIP B-4047)
BURKE COUNTY, NORTH CAROLINA
(Excerpted from NCDOT County Highway Map, 2000)

FIGURE 1

Natural Heritage Program (NCNHP) database of rare species and unique habitats (NCNHP, January 2001). NCNHP files were reviewed for documented occurrences of state-listed or federal-listed species. USFWS Recovery Plans for federal-listed species were reviewed, where applicable.

Environmental scientists on the staff of HSMM, Inc. conducted field investigation of natural resources within the project area on 12 July 2001. Qualifications of environmental scientists who conducted the field investigations are provided in Appendix B. Water resources were identified and categorized, and their physical characteristics were documented while in the field. Plant communities and their associated wildlife were also identified and documented. The *Classification of Natural Communities of North Carolina, Third Approximation* (Schafale and Weakley, 1990) was used to classify plant communities, where possible. Plant taxonomy was based primarily upon the *Manual of the Vascular Flora of the Carolinas* (Radford, et al., 1968). Animal taxonomy was based primarily upon *Amphibians and Reptiles of the Carolinas and Virginia* (Martof, et al., 1980), *Freshwater Fishes of the Carolinas, Virginia, Maryland, and Delaware* (Rohde, et al., 1994), *Birds of the Carolinas* (Potter, et al., 1980), and *Mammals of the Carolinas, Virginia, and Maryland* (Webster, et al., 1985).

Approximate boundaries of major vegetations communities were mapped while in the field utilizing aerial photography of the project site. Wildlife identification involved active searching of known or suspected species, incidental visual observations, incidental auditory indicators (such as birdsong and other sounds), and secondary indicators of species presence or site utilization (such as scat, tracks, and burrows). Predictions regarding wildlife community composition were supplemented utilizing a general qualitative habitat assessment based on existing vegetation communities and aquatic habitat.

Wetlands subject to regulation by the Corps of Engineers under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 were identified and delineated according to methods prescribed in the 1987 *Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1)* and the Corps' 6 March 1992 guidance document titled *Clarification and Interpretation of the 1987 Manual.* Values of wetlands delineated were assessed utilizing the *Guidance for Rating the Values of Wetlands in North Carolina* (NCDEHNR, 1995). Wetland types were classified based on the U.S. Fish and Wildlife Service *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979). Wetland boundaries were surveyed and recorded in the field using Global Positioning Satellite (GPS) survey methods.

1.3 Terminology and Definitions

For the purpose of this document, the following terms are used concerning the limits of natural resources investigations:

- Project area – denotes the area bound by the proposed right-of-way limits along the full length of the project alignment.
- Project vicinity –denotes an area extending 0.6 mile (1.0 kilometer) on all sides of the project area.
- Project region – denotes an area equivalent in size to the area represented by a 7.5-minute USGS quadrangle map (i.e., 60.8 square miles or 157.5 square kilometers).

2.0 PHYSICAL RESOURCES

Soil and water resources that occur in the project area are discussed below with respect to possible environmental concerns. Soil properties and site topography can significantly influence the potential for soil erosion and compaction, along with other possible construction limitations or management concerns. Water resources within the project area present important management limitations due to the need to regulate water movement and the increased potential for water quality degradation. Excessive soil disturbance resulting from construction activities can potentially alter both the flow and the quality of the water resources, potentially limiting downstream uses. In addition, soil characteristics and the availability of water directly influence the composition and distribution of flora and fauna in biotic communities, thus affecting the characteristics of these resources.

2.1 Regional Characteristics

Burke County lies in the Blue Ridge (Southern Appalachian) Mountains Physiographic Province of western North Carolina. The county encompasses 511 square miles (1,323 square kilometers) and is primarily rural. The county ranges in elevation from approximately 935 feet (285 meters) mean sea level (msl) where the Catawba River flows into Catawba County to 4,350 feet (1,326 meters) msl. Elevations within the project area range from approximately 1,070 to 1,080 feet (326 to 329 meters) msl, with the stream bed in the vicinity of the bridge lying at approximately 1,065 feet (325 meters) msl.

East Prong Hunting Creek is located within the Catawba River basin. The headwaters of the Catawba River and its tributaries are located within the mountain physiographic region. This river basin originates on the eastern side of the Blue Ridge Mountains and flows towards the North Carolina – South Carolina border near Charlotte. The basin encompasses all of Burke and Catawba Counties, as well as portions of Alexander, Avery, Caldwell, Gaston, Iredell, Lincoln, McDowell, Mecklenburg, Union, and Watauga Counties. Fifty-eight municipalities are located in the resource basin with several areas of the basin being classified for water supply use. Over 45% of the land in the Catawba River basin is covered in forests (NCDENR, 1999).

2.2 Soils

The portion of Burke County within which the project area lies (NRCS map panel C-6) has been mapped by NRCS under the currently provisional (unpublished) soil survey. Official soil series descriptions were also obtained by the NRCS (USDA: http://www.statlab.iastate.edu/soils/osd). A brief description of unofficial soil types observed during field investigation is as follows:

- Unison fine sandy loam (2 to 8 percent slopes) (UnB) is a very deep and well-drained soil found on mountain footslopes and stream terraces. Unison fine sandy loam has a moderate permeability and medium to rapid surface runoff. Unison fine sandy loams underlie moderately sloping land surfaces within the western portion of the project area. Unison fine sandy loam is not listed as a hydric soil of Burke County (USDA, 1999).

- Colvard sandy loam (0-3 percent slopes) (CvA) is a very deep, well-drained, and occasionally

flooded soil formed in floodplains in southern Appalachian Mountains. Colvard sandy loam has a slow surface runoff and moderately rapid permeability. Colvard sandy loams underlie the floodplain of East Prong Creek and gently sloping land surfaces adjoining the floodplain within the project area. This soil unit is not listed as a hydric soil of Burke County; however, it is listed as a soil unit that typically contains inclusions of Hatboro hydric soils (USDA, 1999).

- Fairview sandy clay loam (8 to 15 and 15 to 25 percent slopes) (FaC2, FaD2) is a very deep, well-drained, and eroded soil found on ridges and back slopes at 300 to 1,400 feet (91 to 427 meters). Fairview sandy clay loam has a medium to very rapid surface runoff and moderate permeability. Fairview sandy clay loams underlie moderately sloping to steep land surfaces within the eastern portion of the project area. Fairview sandy clay loam is not listed as a hydric soil of Burke County (USDA, 1999).

2.3 Water Resources

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

A perennial stream, East Prong Hunting Creek, comprises the single water resource within the project area (Figure 2). The portion of East Prong Hunting Creek flowing through the project area is located within the Catawba River Drainage Basin. The Catawba River watershed encompasses 3,279 square miles (8,493 square kilometers).

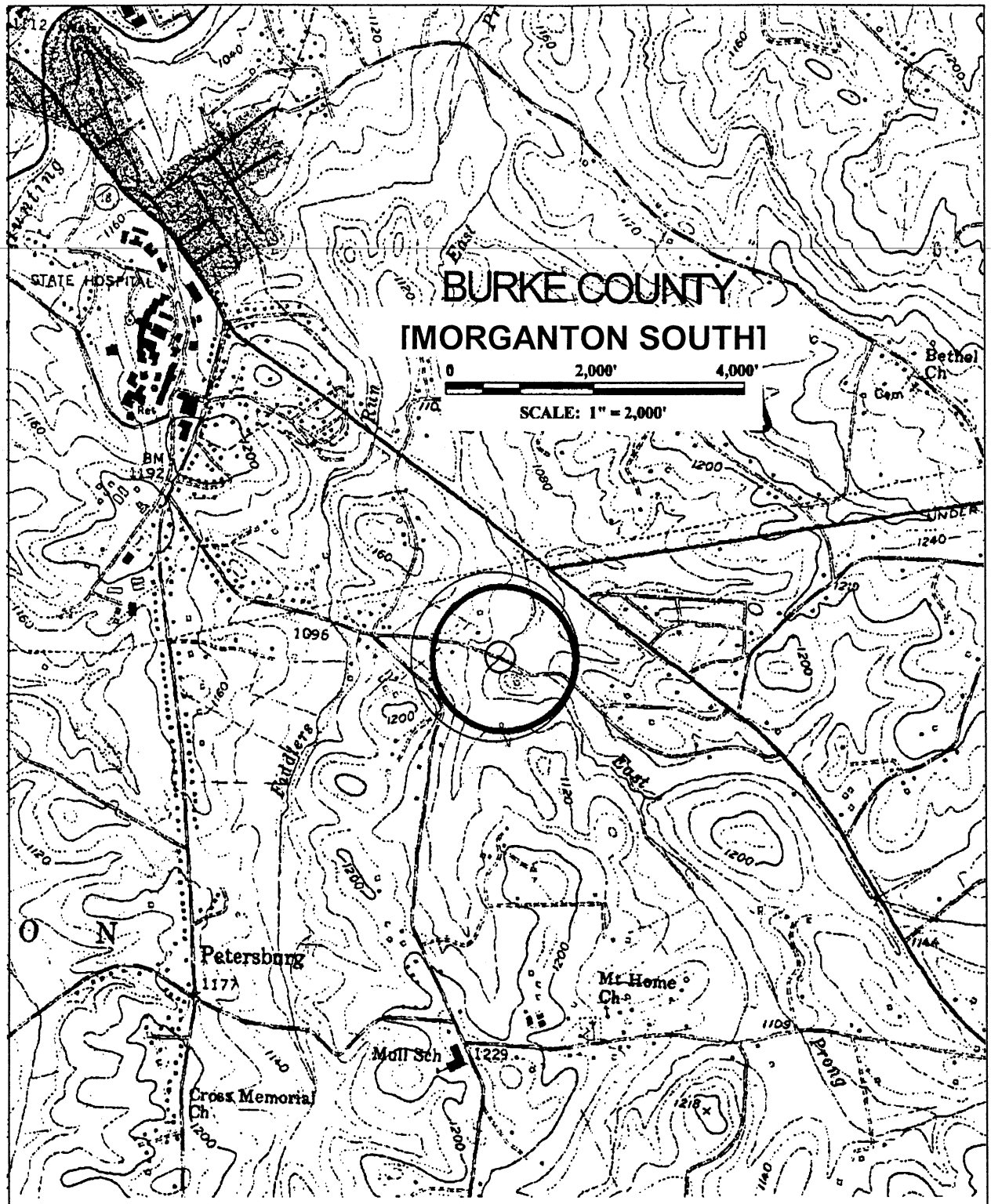
Under the federal system for cataloging drainage basins, the drainage basin containing the project area is designated as USGS Hydrologic Unit 03050101 (the Upper Catawba drainage basin). Under the North Carolina DWQ system for cataloging drainage basins, the drainage basin containing the project area is designated as Subbasin 03-08-31 (the Warrior Fork, Johns River, and Rhodhiss Lake Subbasin).

2.3.1 Best Usage Classification

Streams and rivers have been assigned a best usage classification by the North Carolina Division of Water Quality (DWQ). The assigned best usage classification reflects water quality conditions and potential resource usage. Unnamed tributaries receive the same classification as the named streams to which they flow.

The single water resource located in the project area, East Prong Hunting Creek, is designated as DWQ Stream Index Number 11-36-1. East Prong Hunting Creek in the project vicinity has been assigned a primary water resource classification of "WS-IV". Class "WS-IV" refers to water supplies used for drinking and culinary purposes. These waters are found in moderately to highly developed watersheds.

No surface waters classified as High Quality Water (HQW) or Outstanding Resource Waters (ORW)



WATER RESOURCES AND PHYSIOGRAPHY OF THE REGION
SR 1972 BRIDGE REPLACEMENT
OVER EAST PRONG HUNTING CREEK (TIP B-4047)
BURKE COUNTY, NORTH CAROLINA
(Excerpted from USGS Morganton South 7.5-minute Quadrangle, 1995)

FIGURE 2

occur within 0.6 mile (1.0 kilometer) of the project area. These findings are based on review of the most recently updated state-maintained databases as made available through the date of preparation of this report.

2.3.2 Physical Characteristics of the Stream and Surface Waters

As previously discussed, East Prong Hunting Creek comprises the single water resource within the project area. The proposed project crosses East Prong Hunting Creek on SR 1972 approximately 0.9 mile (1.5 kilometers) southeast of Morganton. East Prong Hunting Creek is approximately 15 feet (4.6 meters) wide within the project area, with observed depths ranging from 0.5 to 1.5 feet (0.2 to 0.5 meter) at the time of field investigation. Water levels appeared to be at or near the ordinarily high water level at the time of investigation.

The substrate of East Prong Hunting Creek in the project area is comprised of sediments ranging in size from fine sand to cobbles. The stream within the project area is relatively straight and appears to exhibit a relatively simple trapezoidal cross-section. No sand bars or channel meanders were observed. A shallow scour pool (approximately 1.5 feet (0.5 meter) in depth) occurs beneath and immediately upstream of the bridge

The left and right stream banks (both upstream and downstream of the bridge), although steep, are fairly well vegetated and exhibit indicators of low to moderate erosion. Approximately 20 feet (6.1 meters) of the right stream bank (looking upstream) immediately south of the bridge is armored with riprap where a 12 inch (30 centimeters) corrugated metal pipe outlets to the stream bank. The stream banks are comprised of unconsolidated poorly sorted sediments of alluvial and colluvial origin.

2.3.3 Water Quality

This section describes the quality of water resources within the project area. Potential sediment loads and toxin concentrations of these waters from both point and nonpoint sources are evaluated. Water quality assessments are made based on published resource information and existing general watershed characteristics. This data provides insight into the value of the water resources within the project area with respect to their ability to meet human needs and to provide suitable habitat for aquatic organisms.

2.3.3.1 Biological Monitoring

The Basinwide Monitoring Program, managed by the DWQ, is part of an ongoing ambient water quality monitoring program that addresses long-term trends in water quality. The program monitors ambient water quality by sampling at fixed sites for selected benthic macroinvertebrate organisms that are sensitive to water quality conditions. Samples are evaluated on the number of taxa of intolerant groups (Ephemeroptera, Plecoptera, Tricoptera or "EPT") present and a taxa richness value (EPT S) is calculated. A biotic index value that summarizes tolerance data for all species in each collection is also calculated for the sample. The two rankings are given equal weight in final site classification. The biotic index and EPT taxa richness values primarily reflect the effects of chemical pollution and are a poor

measure of the effects of such physical pollutants as sediment.

No previously monitored or presently monitored benthic monitoring stations exist on East Prong Hunting Creek within the project area or upstream of the project within the project vicinity.

2.3.3.2 Point and Nonpoint Source Discharges

Point source discharge is defined as "any discharge that enters surface waters through a pipe, ditch, or any other well-defined point" (NCDEHNR, 1993). The term commonly refers to discharges associated with wastewater treatment plants. Discharges from stormwater collection systems at industrial sites and in large urban areas are also considered point source discharges. Point source discharges within North Carolina are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Any point source discharger is required to apply for a permit.

No registered point discharges are located within 1.0 mile (1.6 kilometers) of the project area (EPA, 2001).

Nonpoint source discharge refers to runoff that enters surface waters through stormwater or snowmelt (NCDEHNR, 1993). Agricultural activities may serve as a source for various forms of nonpoint source pollutants. Land clearing and plowing disturbs soils to a degree where they are susceptible to erosion, which can lead to sedimentation in streams. Sediment is the most widespread cause of nonpoint sources pollution in North Carolina (NCDEHNR, 1993). Pesticides, chemical fertilizers, and land application of animal waste can be transported to receiving streams and waterways via runoff - potentially elevating concentrations of toxic compounds and nutrients. Animal wastes can also be the source of bacterial contamination and can elevate the biochemical oxygen demand (BOD). Drainage ditches on poorly drained soils can contribute to the influence of stormwater pollutants into surface waters (NCDEHNR, 1993).

Under the NC Unified Watershed Assessment (UWA) program, the Upper Catawba River Hydrologic Unit (03050101), within which the project area is located, is classified by DWQ as a UWA Category "II" watershed for nonpoint source pollution. Under this classification, the watershed is identified as a watershed "meeting goals, including those needing action to sustain water quality" (NCDENR, 2000).

2.4 Summary of Anticipated Water Quality Impacts

Impacts to water resources in the project area are likely to result from activities associated with project construction. Activities likely to result in impacts consist of clearing and grubbing along stream banks, removal of riparian canopy, instream construction, use of fertilizers and pesticides as part of revegetation operations, and installation of pavement. The following impacts to surface water resources are likely to result from the aforementioned construction activities:

- Short-term increases in sedimentation and siltation downstream of the crossing associated with increased erosion potential in the project area during and immediately following construction.
- Short-term changes in incident light levels and turbidity due to increased sedimentation rates and

vegetation removal.

- Short-term alteration of water levels and flows due to interruptions and/or additions of surface water and groundwater during construction.
- Short-term increases in nutrient loading during construction via runoff from temporarily exposed land surfaces.
- A short-term increase in the potential for the release of toxic compounds (such as petroleum products) from construction equipment and other vehicles.
- Changes in and possible destabilization of water temperature regimes due to removal of vegetation within or overhanging the watercourse.
- Increased concentrations of pollutants typically associated within roadway runoff.

To minimize potential impacts to water resources in and downstream of the project area, NCDOT's *Best Management Practices for the Protection of Surface Waters* will be strictly enforced during the construction phase of the project (NCDOT, 1997). Means to minimize impacts will include (1) utilizing construction methods that will limit instream activities as much as practicable, (2) restoring the streambed as needed, and (3) revegetating stream banks immediately following the completion of grading. Because the project is located in a North Carolina Wildlife Resources Commission (NCWRC) trout county, the NCWRC may require a moratorium for instream construction from November to March.

3.0 BIOTIC RESOURCES

This section describes the biotic communities observed within the project area, as well as the basic relationships between fauna and flora within these communities. Biotic resources assessed as part of this investigation include discernable terrestrial and aquatic communities. The composition and distribution of biotic communities within the project area are a function of topography, soils, hydrology, and past and present land uses.

Terrestrial systems are discussed primarily from the perspective of dominant plant communities and are classified in accordance with the *Classification of Natural Communities of North Carolina: Third Approximation* (Schafale and Weakley, 1990) where applicable. Representative animal species likely to inhabit or utilize biotic communities of the project area (based on published range distributions) are also discussed. Species observed during field investigation are listed.

3.1 Biotic Communities

Boundaries between contiguous biotic communities are gradational in certain portions of the project area, making boundaries sometimes difficult to delineate. Five discernable terrestrial communities are located within the project area (Figure 3). Four of these communities have been altered to the extent that they cannot be classified as a natural vegetation community under the *Classification of Natural Communities of North Carolina*. These altered communities consist of: (1) altered right-of-way communities, (2) landscaped areas, (3) cropland, and (4) successional sapling and scrub/shrub communities. The remaining community with in the project area retains enough of its natural characteristics as to be classifiable under the *Classification of Natural Communities of North Carolina* as a Piedmont/Mountain Bottomland Forest. In addition to the aforementioned terrestrial components, the

aquatic community associated with East Prong Hunting Creek was assessed within the project area.

3.1.1 Altered Right-of-Way Communities

These communities are located along the right-of-way bordering on SR 1972 (Communities No. 1 of Figure 3). Vegetation within these areas has been maintained in an early succession through mechanical and possibly chemical vegetation management practices. It is estimated that 0.52 acre (0.21 hectare) of this community exists within the project area.

No woody plant species were observed at the time of site investigation within altered rights-of-way communities of the project area. Dominant herbaceous species observed at the time of site investigation include common milkweed (*Asclepias syriaca*), bitter nightshade (*Solanum dulcamara*), common plantain (*Plantago major*), wild yam (*Dioscorea villosa*), Curtis' goldenrod (*Solidago curtisii*), dandelion (*Taraxacum officinale*), common ragweed (*Ambrosia artemisiifolia*), white clover (*Trifolium repens*), and unidentified grasses (Poaceae).

3.1.2 Landscaped Areas

This community consists of cleared, landscaped, and vegetatively managed areas around a residential dwelling located in the southwest quadrant of the project area (Community No. 2 of Figure 3). These communities are underlain by well-drained Colvard sandy loams and Fairview sandy clay loams. It is estimated that 0.65 acre (0.26 hectare) of this community exists within the project area.

Dominant plant species observed at the time of site investigation include scrub pine (*Pinus virginiana*), persimmon (*Diospyros virginiana*), eastern red cedar (*Juniperus virginiana*), assorted cultivars, unidentified grasses (Poaceae), dandelion (*Taraxacum officinale*), common plantain (*Plantago major*), and common ragweed (*Ambrosia artemisiifolia*).

3.1.3 Cropland

These communities consist of a recently tilled field in the northwest quadrant of the project area and a recently harvested hay field located in the southwest quadrant of the project area (Communities No. 3 of Figure 3). These communities occur on gently to moderately sloping land surfaces adjacent to a very narrow floodplain terrace, which separates the croplands from East Prong Hunting Creek. These communities are underlain by well-drained Colvard sandy loams and Fairview sandy clay loams. It is estimated that 0.93 acre (0.38 hectare) of this community exists within the project area.

Other pioneer or opportunistic species observed in and around the edges of the cropland at the time of field investigation include blackberry (*Rubus* sp.), Queen Anne's lace (*Daucus carota*), common plantain (*Plantago major*), common ragweed (*Ambrosia artemisiifolia*), bitter nightshade (*Solanum dulcamara*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), curly dock (*Rumex crispus*), foxtail grass (*Setaria* sp.), joint head (*Arthraxon hispidus*), unidentified grasses (Poaceae), and poison ivy (*Toxicodendron radicans*).

N

LEGEND

1 ALTERED RIGHT-OF-WAY
2 LANDSCAPED AREAS
3 CROPLAND (HAY)
4 SUCCESSIONAL SAPLING AND SCRUB/SHRUB COMMUNITIES
5 PIEDMONT/MOUNTAIN BOTTOMLAND FOREST (WITH DISCONTINUOUS WETLAND FRINGE ALONG CREEK)
6 AQUATIC HABITAT

SCALE: 1" = 100' (1" = 30.5 m)

BIOTIC COMMUNITIES
OF THE B-4047 PROJECT AREA

FIGURE 3

3.1.4 Successional Sapling and Scrub/Shrub Communities

This community occurs in the northwest quadrant of the project area, between the right-of-way of SR 1972 and landscaped open areas to the north (Community No. 4 of Figure 3). The first successional sapling and scrub/shrub community occurs along a narrow band (less than 20 feet (6.1 meters) wide), and appears to be the remnant of a once-larger natural forested community. This community is underlain by well-drained Colvard sandy loams exhibiting high chromas. It is estimated that 0.14 acre (0.06 hectare) of this community exists within the project area.

The first successional sapling and scrub/shrub community, as mapped, supports only several mature trees. Tree species occurring within this community include black walnut (*Juglans nigra*), silver maple (*Acer saccharinum*), black cherry (*Prunus serotina*), persimmon (*Diospyros virginiana*), black locust saplings (*Robinia pseudo-acacia*), hickory saplings (*Carya* spp.), scrub pine saplings (*Pinus virginiana*), and white oak saplings (*Quercus alba*). Shrub species occurring within this community include smooth sumac (*Rhus glabra*), Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), and blackberry (*Rubus* sp.). Dominant herbaceous species observed at the time of site investigation include pokeweed (*Phytolacca americana*), Curtis' goldenrod (*Solidago curtisii*), asters (*Aster* sp.), Joe-pye-weed (*Eupatorium fistulosum*), violets (*Viola* sp.), joint head (*Arthraxon hispidus*), and unidentified grasses (Poaceae). Dominant vine species observed at the time of site investigation include poison ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*), common greenbrier (*Smilax rotundifolia*), trumpet creeper (*Campsis radicans*), and Virginia creeper (*Parthenocissus quinquefolia*).

3.1.5 Piedmont/Mountain Bottomland Forest

This community occurs along the banks and floodplain of East Prong Hunting Creek in all four quadrants of the project area (Communities No. 5 of Figure 3). It is estimated that 0.33 acre (0.13 hectare) of this community exists within the project area. The Piedmont/Mountain Bottomland Forest occurs upon a gently sloping floodplain terrace perched approximately 3.5 to 5.5 feet (1.1 to 1.7 meters) above the stream bed. The terrace is largely underlain by well-drained Colvard sandy loams exhibiting relatively high chromas but, where poorly drained conditions or semi-permanent flooding prevail, hydric soil inclusions are observed. Portions of the Piedmont/Mountain Bottomland Forest underlain by these hydric soils have been mapped as wetlands and are discussed in section 4.1 of this report.

Dominant tree species observed within the Piedmont/Mountain Bottomland Forest at the time of site investigation include black walnut (*Juglans nigra*), tulip tree (*Liriodendron tulipifera*), hickories (*Carya* spp.), sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), black willow (*Salix nigra*), pecan (*Carya illinoensis*), red maple (*Acer rubrum*), and black gum (*Nyssa sylvatica*). Dominant sapling and shrub species observed at the time of site investigation include smooth sumac (*Rhus glabra*), multiflora rose (*Rosa multiflora)*, boxwood (*Buxus* sp.), and Chinese privet (*Ligustrum sinense*). Dominant herbaceous species observed at the time of site investigation include pokeweed (*Phytolacca americana*), frost aster (*Aster pilosus*), Curtis' goldenrod (*Solidago curtisii*), common ragweed (*Ambrosia artemisiifolia*), violets (*Viola* sp.), creeping grass (*Microstegium vimineum*), wood sorrel (*Oxalis* sp.), river oats (*Chasmanthium latifolium*), dayflower (*Commelina communis*), galactia (*Galactia volubilis*), and Joe-pye-

weed (*Eupatorium fistulosum*). Dominant vine species observed at the time of site investigation include poison ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*), common greenbrier (*Smilax rotundifolia*), summer grape (*Vitis aestivalis),* Canada moonseed (*Menispermum canadense*), and Virginia creeper (*Parthenocissus quinquefolia*).

Wetlands Component: The Piedmont/Mountain Bottomland Forest contains several narrow bands of wetlands that are generally less than 10 feet (3.0 meters) wide. These bands of wetlands occur along the lower and middle stream banks of East Prong Hunting Creek and upon several small (several hundred square feet each) terraces perched approximately 1.0 foot (0.3 meter) above the stream bed. These wetlands bands are dominated by hydrophytic vegetation including box elder (*Acer negundo*), river birch (*Betula nigra*), black willow (*Salix nigra*), sycamore saplings (*Platanus occidentalis*), silky dogwood (*Cornus amomum*), tag alder (*Alnus serrulata*), buttonbush (*Cephalanthus occidentalis*), multiflora rose (*Rosa multiflora*), green ash saplings (*Fraxinus pennsylvanica*), black raspberry (*Rubus* sp.), dewberry (*Rubus hispidus*), river oats (*Chasmanthium latifolium*), joint head (*Arthraxon hispidus*), orange jewelweed (*Impatiens capensis*), creeping grass (*Microstegium vimineum*), violets (*Viola* sp.), false nettle (*Boehmeria cylindrica*), Curtis' goldenrod (*Solidago curtisii*), dayflower (*Commelina communis*), sedges (*Carex* sp.), clearweed (*Pilea pumila*), arrowleaf tearthumb (*Polygonum sagittatum*), dotted smartweed (*Polygonum punctatum*), riverside grape (*Vitis riparia*), Japanese honeysuckle (*Lonicera japonica*), poison ivy (*Toxicodendron radicans*), and common greenbrier (*Smilax rotundifolia*). The soils underlying the wetlands are comprised of (1) a thin layer (generally less than 4.0 inches (10 centimeters)) of gleyed to weakly mottled gravelly sands over cobbles and boulders or (2) a 6.0 to 8.0 inch (15 to 20 centimeter) layer of weakly to moderately mottled clayey silty sands along lower stream banks. These soils were saturated within the upper 8.0 inches (20 centimeters) at the time of investigation. The wetlands also exhibited sediment deposits and drift lines.

3.1.6 Terrestrial Fauna of the Project Area

Most of the communities within the project vicinity have been altered or affected by man's activities to varying degrees. Due to forest tract fragmentation common to the project region, species that require large contiguous tracts of forests are not likely to utilize the site on a normal basis. Certain opportunistic wildlife species, such as white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), and eastern cottontail rabbit (*Sylvilagus floridanus*), can be expected to utilize edge habitat present within the project area. Due to the relatively small size of the project area and the fact that many wildlife species are capable of moving between and/or utilizing adjoining communities, no distinct terrestrial wildlife habitat can be assigned to any one terrestrial plant community within the project area.

No mammals were observed in the project vicinity at the time of field investigation; however tracks of raccoon (*Procyon lotor*) were observed. Although not observed, other mammals common to the project region which can be expected to periodically utilize habitat of the project area include: Virginia opossum (*Didelphis virginiana*), shrews and moles (Insectivora), gray squirrel (*Sciurus carolinensis*), beaver (*Castor canadensis*), eastern harvest mouse (*Reithrodontomys humulis*), white-footed mouse (*Peromyscus leucopus*), golden mouse (*Ochrotomys nuttalli*), hispid cotton rat (*Sigmodon hispidus*), eastern woodrat (*Neotoma floridana*), meadow vole (*Microtus pennsylvanicus*), woodland vole (*Microtus pinetorum*), muskrat (*Ondatra zibethicus*), black rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), house mouse

(*Mus musculus*), meadow jumping mouse (*Zapus hudsonius*), woodland jumping mouse (*Napaeozapus insignis*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), long-tailed weasel (*Mustela frenata*), eastern spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), and bobcat (*Felis rufus*).

The scrub/shrub community on the project site provides limited but suitable habitat and forage areas for a variety of birds. Birds observed at the time of field investigation include common crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), mockingbird (*Mimus polyglottos*), and cardinal (*Cardinalis cardinalis*). Songs and/or calls of the following birds were also noted within the project vicinity at the time of field investigation: eastern phoebe (*Sayornis phoebe*), American goldfinch (*Carduelis tristis*), cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), and red-eyed vireo (*Vireo olivaceus*). A wide variety of resident and migratory songbirds can be expected to periodically utilize forested tracts immediately to the east of the project area. The open landscaped areas and the croplands within the project vicinity provide probable hunting grounds for birds of prey, such as hawks and owls.

No reptiles were observed on the project site at the time of field investigation. A variety of reptile species may, however, use the communities located in the project area. These animals include the rat snake (*Elaphe obsoleta*), eastern box turtle (*Terrapene carolina*), and five-lined skink (*Eumeces fasciatus*). Several adult green frogs (*Rana clamitans*) were observed along East Prong Hunting Creek. Fish species are discussed in following sections. Terrestrial insects observed in the project area include organpipe mud daubers (*Tryploxylon* sp.) and West Virginia white butterflies (*Lycaena phlaeas*).

3.1.7 Aquatic Community

The aquatic community of the project area consists of East Prong Hunting Creek below the ordinary high water line. Dominant aquatic habitats within this section of East Prong Hunting Creek include cobble/boulder substrate, snags, and root mats. The surveyed area contains well-defined riffle and run habitat and a wide variety of pools. Riffles within the project area are as wide as the stream and extend distances equivalent to at least twice the width of the stream. Several of the pools were being used as fish breeding habitat. Embeddedness was 20 to 40 percent at the time of field investigation. The riparian vegetation zone was 20 to 40 feet (6.0 to 12 meters) on both banks.

3.1.7.1 Flora

A single buttonbush (*Cephalanthus occidentalis*) was the only aquatic vegetation observed below the ordinary high water line of East Prong Hunting Creek at the time of field investigation. A narrow band (generally less than 10 feet (3.0 meters) wide) of hydrophytic vegetation occurs along the lower to middle portions of the stream banks. This hydrophytic vegetation is discussed as a component of the Piedmont/Mountain Bottomland Forest of section 3.1.5.

3.1.7.2 Fauna

Aquatic or water-dependent vertebrates observed within the project area at the time of field

investigation include the following: green frogs (*Rana clamitans*), greenhead shiners in breeding colors (*Notropis chlorocephalus*), numerous unidentified juvenile finfish, and unidentified minnows (Cyprinidae). Aquatic or water-dependent invertebrates observed within the project area at the time of field investigation include the following: crayfish (Cambaridae), numerous gilled snails (Pleuroceridae), caddisfly larvae (Hydropsychidae), abundant mayfly larvae (Heptageniidae), water striders (Gerridae), and midges (Chironomidae).

3.2 Summary of Anticipated Impacts to Biotic Communities

3.2.1 Terrestrial Impacts

Terrestrial impacts can result in changes in both species numbers and composition. Plant communities found along the proposed project area often serve as nesting and sheltering habitat for wildlife. The proposed project construction may reduce the existing habitat for these species, thereby diminishing fauna numbers. Additionally, the reduction of habitat within the project area concentrates wildlife into smaller areas of refuge, therefore causing some species to become more susceptible to disease, predation, and starvation.

Ecological impacts can also occur outside of the project area because of habitat reduction. Typically, those areas modified by construction (but not paved) will become road shoulders and early successional habitat. The increased traffic noise and reduction/change of habitat, while attracting other wildlife, may displace existing wildlife further from the roadway. The animals displaced by construction activities may repopulate other areas suitable for the species. However, the increased animal density can result in an increase in competition for the remaining resources.

Construction of the project will result in certain unavoidable impacts to biotic resources within the project area. Following development of project alternatives, temporary and permanent impacts will be assessed from the perspective of impact areas (the acres or hectares of affected biotic communities) and from the perspective of resource functions and values, where possible. Impacts to the previously identified communities will not exceed those acreages stated in their respective sections. Practicable means to avoid or minimize impacts will be evaluated and recommended, where applicable. Temporary impacts will be subject to restoration.

3.2.2 Aquatic Impacts

The replacement of the bridge over East Prong Hunting Creek at SR 1972 (TIP Number B-4047) will result in certain unavoidable impacts to the aquatic community of the creek. Probable impacts will be associated with the physical disturbance of the benthic aquatic habitat and water column habitat disturbances resulting from changes in water quantity and quality. Significant disturbance of stream segments can have an adverse effect on aquatic community composition by reducing species diversity and the overall quality of aquatic habitats. Physical alterations to aquatic habitats can result in the following impacts to aquatic communities:

- Inhibition of plant growth.

- Resuspension of organic detritus and removal of aquatic vegetation, which can lead to increased nutrient loading. Nutrient loading can, in turn, lead to algal blooms and ensuing depletion of dissolved oxygen levels.
- Increases in suspended and settleable solids that can, in turn, lead to clogging of feeding structures of filter-feeding organisms and the gills of fish.
- Loss of benthic macroinvertebrates through increased scouring and sediment loading.
- Loss of fish shelter through removal of overhanging stream banks and snags.
- Increases in seasonal water temperatures resulting from removal of riparian canopy.
- Burial of benthic organisms and associated habitat.

Unavoidable impacts to aquatic communities within and immediately downstream of the project area will be minimized to the fullest degree practicable through strict adherence to NCDOT's *Best Management Practices for the Protection of Surface Waters* (NCDOT, 1997) and other applicable guidelines pertaining to best management practices. Means to minimize impacts will include (1) utilizing construction methods that will limit instream activities as much as practicable, (2) restoring the streambed as needed, and (3) revegetating stream banks immediately following the completion of grading.

4.0 JURISDICTIONAL TOPICS

The following sections provide an inventory of resource areas and species and an assessment of possible impacts for (1) waters of the United States and (2) rare and protected species. Waters of the United States and rare and protected species are of particular significance when assessing impacts because of federal and state mandates that regulate their protection. The following sections address those measures that will be required in order to comply with regulatory permit conditions prior to project construction.

4.1 Waters of the United States

Certain surface waters considered significant to interstate commerce and wetlands adjacent to these waters fall under the broad category of "waters of the United States" (as defined in codified federal regulation 33 CFR 328.3). The discharge of dredged or fill material to waters of the United States is regulated by the Corps of Engineers under the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Regulated surface waters typically consist of standing or flowing waters that have commercial and/or recreational value to the general public. As a category of waters of the United States, wetlands are defined as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions".

To determine whether wetlands exist within the project area, vegetation, soils, and hydrology were assessed using criteria set forth in the 1987 Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1). As specified in the Manual, wetlands are identified based on the presence of hydrophytic vegetation, hydric soils, and wetlands hydrology – all three of which must be present for an area to meet the federal definition of a wetland.

4.1.1 Waters of the United States, Including Wetlands, Affected

Temporarily flooded/saturated, broad-leaf deciduous, forested palustrine wetlands (PFO1A of USFWS classification) have been mapped within the project area under the National Wetlands Inventory (NWI) program. These forested wetlands occur as narrow bands (generally less than 10 feet (3.0 meters) wide) of hydrophytic vegetation along the lower to middle portions of the stream banks and on several small terraces. This hydrophytic vegetation is associated with seasonally saturated, gleyed and/or mottled soils, and is discussed as a component of the successional sapling and scrub/shrub communities of section 3.1.5. It is estimated that 0.08 acre (0.03 hectare) of wetlands occurs within the project area.

Despite the fact that the stream bank wetlands are located adjacent to a perennial waterway, their relatively steep slopes and limited extent limit certain of their values. Utilizing NCDENR's *Guidance for Rating the Values of Wetlands in North Carolina*, the stream bank wetlands within the project area have been estimated to have the following ratings for values assessed: 8 of 20 for water storage, 12 of 20 for bank/shoreline stabilization, 10 of 25 for pollutant removal, 6 of 10 for wildlife habitat, 16 of 20 for aquatic life value, and 2 of 5 for recreation/education - for a total rating of 54.

Although not depicted as such on the NWI map for the Morganton South 7.5-minute quadrangle, the portion of East Prong Hunting Creek flowing through the project area is a permanently flooded, upper perennial riverine habitat with an unconsolidated bottom (R3UBH of USFWS classification). Two hundred feet (61 meters) of waters of the United States exist within the project area.

4.1.2 Permits

Based on wetland field indicators observed at the time of field investigation, waters of the United States, including wetlands, subject to regulation under section 404 of the Clean Water Act and the North Carolina 401 Water Quality Certification program have been delineated and mapped within the proposed project area. Impacts to jurisdictional surface waters are anticipated to occur as a result of project construction. As a result, proposed construction activities will require permits and certifications from the various state and federal regulatory agencies in charge of protecting the water quality of public water resources.

Based on past experience with similar actions, if non-tidal wetland impacts at each bridge crossing are less than 0.5 acre (0.2 hectare) and none of the activities jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, the action would be considered a Class II Action as defined under FHWA regulation 23 CFR 771.115(b). As a Class II Action, bridge rehabilitation, reconstruction, or replacement would qualify as a Categorical Exclusion as defined under FHWA regulation 23 CFR 771.117.

As a categorically excluded Class II Action and a public linear transportation project in non-tidal waters, bridge rehabilitation, reconstruction, or replacement impacting less than 0.5 acre (0.2 hectare) of waters of the United States at a stream crossing could be authorized under the provisions of a U.S. Army Corps of Engineers Nationwide 23 Permit for Categorical Exclusions or a Nationwide 14 Permit for Linear Transportation Projects, respectively. The proposed project is located in a designated "Trout" county;

therefore, authorization of the project by the COE under the provisions of a nationwide or individual permit is conditional on concurrence of the NCWRC.

If the proposed work cumulatively impacts more that one-half acre of non-tidal waters of the United States, an Individual Permit may be required at the discretion of the U.S. Army Corps of Engineers unless authorization is granted under the provisions of Department of the Army General Permit Number 198200031 (for NCDOT bridge crossings). If the proposed work involves greater than 1.0 acre (0.4 hectare) of wetland impacts, the Corps could not make a discretionary determination regarding Nationwide Permit applicability nor could the General Permit option be exercised and, therefore, an Individual Permit would be mandatory.

In addition to the aforementioned permit requirements, a 401 Water Quality Certification from the North Carolina Department of Environmental and Natural Resources, Division of Water Quality (DWQ) will be required for the project prior to issuance of a Corps of Engineers permit. Section 404 of the Clean Water Act requires that the state issue or deny water quality certification for any federally permitted or licensed activity that may result in a discharge to waters of the United States. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land disturbance. A DWQ Section 401 Water Quality General Certification is required prior to the issuance of a Section 404 Individual Permit.

4.1.2.1 Bridge Demolition

The bridge addressed under TIP Number B-4047 is located on SR 1972 over East Prong Hunting Creek in Burke County. The possibility exists that demolition materials (such as asphalt, concrete rubble, portions of the deck timbers, etc.) could be inadvertently dropped into waters of the United States during bridge demolition. Should this occur, such materials would be removed from waters of the United States as soon as possible, where conditions allow. The resulting temporary fill associated with bridge demolition will be determined later.

4.1.3 Avoidance, Minimization, Mitigation

The 14 December 1989 Memorandum of Agreement (MOA) between EPA and the Department of the Army on Clean Water Act Section 404(b)(1) Guidelines sets forth the policy and procedures to be used in the determination of the type and level of mitigation necessary to demonstrate compliance with the Clean Water Act. The purpose of the MOA is to implement the objective of the Clean Water Act to restore and maintain the chemical, physical, and biological integrity of the Nation's waters, including wetlands. As part of the MOA, a project assessment procedure is set forth requiring a sequential assessment of (1) impact avoidance, (2) impact minimization, and (3) compensatory mitigation for unavoidable impacts. Adherence to sequencing during project planning and design stages is intended to assist in attaining a goal of no net overall loss of wetland functions and values.

The impact avoidance stage of the sequencing procedure entails an assessment of all appropriate and practicable alternatives for avoiding impacts to waters of the United States. Cost, existing technology, significant adverse environmental consequences to other resources, and logistics in light of overall project purposes are considered in identifying "appropriate and practicable" avoidance alternatives.

The impact minimization stage of the sequencing procedure entails an assessment of all measures that would minimize unavoidable impacts to waters of the United States to the fullest degree practicable. The final determination regarding the availability of practicable minimization measures lies with the reviewing regulatory agencies and, if it is determined that additional minimization measures are available, such measures will be required through project modifications and/or permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way widths, fill slopes, and/or shoulder widths.

Compensatory mitigation measures are not considered until such time that it has been demonstrated that no practicable avoidance alternatives exist, and that all practicable measures for minimizing unavoidable impacts have been incorporated into project design. Compensatory mitigation includes such measures as restoration, creation, enhancement, and preservation. Where possible, mitigation should be in-kind and within the same watershed as near to the impacted area as conditions allow. Compensatory mitigation is conventionally required for projects authorized under Individual Permits or certain Nationwide Permits that result in the fill or alteration of more than 0.1 acre (0.04 hectare) of all wetlands and/or 150 feet (46 meters) of streams within or adjacent to tidal waters. Under the nationwide permit program, the District Engineer must be notified if proposed discharge to wetlands will exceed 0.1 acre (0.04 hectare). Discharges to wetlands exceeding 0.1 acre (0.04 hectare), for which authorization under a Nationwide Permit 14 is being sought, require submittal of compensatory mitigation plan as part of the Notification.

4.2 Rare and Protected Species

The Endangered Species Act of 1973, as amended, requires that any action likely to adversely affect a species listed as a federally protected threatened or endangered species be subject to review by the U.S. Fish and Wildlife Service (USFWS). Other species (such as state-listed threatened or endangered species) may receive additional protection under separate state laws.

4.2.1 Federally-Protected Species

Plants and animals with federal classifications of endangered (E), threatened (T), proposed endangered (PE), and proposed threatened (PT) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of 22 March 2001, the USFWS lists 6 federally protected species for Burke County (Table 1). Brief descriptions of the characteristics and habitat requirements for these species are provided in Appendix A. A review the North Carolina Natural Heritage Program (NHP) database of rare species and unique habitats indicates no occurrences of federally protected species in the project area. An unknown *Hexastylis* sp. was observed within the project area during the field investigation, but. the field investigation was performed outside the flowering period for *Hexastylis*. Consequently, the biological conclusion for *Hexastylis naniflora* is "Unresolved".

Table 1. Federally Protected Species for Burke County

Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald Eagle	Threatened
Hexastylis naniflora	Dwarf-flowered Heartleaf	Threatened
Liatris helleri	Heller's Blazing Star	Threatened
Hudsonia montana	Mountain Golden Heather	Threatened
Isotria medeoloides	Small-whorled Pogonia	Threatened
Geum radiatum	Spreading Avens	Endangered

Note:

- "Endangered" denotes a species in danger of extinction throughout all or a significant portion of its range.
- "Threatened" denotes a species likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

4.2.2 Federal Species of Concern and State Listed Species

A federal species of concern (FSC) is defined as a species that is under consideration for listing for which there is insufficient information to support listing. The U.S. Fish and Wildlife Service (USFWS) lists 12 federal species of concern in Burke County (Table 2). Federal species of concern are not afforded federal protection under the Endangered Species Act and are not subject to any of the provisions included in Section 7 until they are formally proposed or listed as threatened or endangered. The status of these species is subject to change, so their status should be periodically monitored prior to project construction if individuals or suitable habitat is present within the project area. In addition to the federal program, organisms that are listed as endangered (E), threatened (T), or special concern (SC) by the North Carolina Natural Heritage Program on its list of Rare Plants and Animal Species are afforded state protection under the NC State Endangered Species Act and the NC Plant Protection and Conservation Act of 1979.

Table 2 lists federal species of concern, the state status of these species (if afforded state protection), and the potential for suitable habitat in the project area. This species list is provided for information purposes, as the protection status of these species may change in the future.

The NCNHP database of rare and unique habitat (as updated through January 2001) was reviewed. The database shows no occurrences of federal species of concern (FSC) within 0.6 mile (1.0 kilometer) of the project area. Determinations regarding the presence of suitable FSC habitat, as indicated in Table 2, were based on site conditions observed at the time of field investigation and search of published literature.

Table 2. Federal Species of Concern for Burke County

Scientific Name	Common Name	NC Status	Habitat Present
Neotoma floridana haematoreia	Southern Appalachian Woodrat	---	No
Neotoma magister	Allegheny Woodrat	---	No
Alasmidonta varicosa	Brook Floater	T	Yes
Ophiogomphus edmundo	Edmund's Snaketail Dragonfly	SR	Yes
Ophiogomphus howei	Pygmy Snaketail Dragonfly	SR	Yes
Speyeria diana	Diana Fritillary Butterfly	SR	Yes
Juglans cinerea	Butternut	---	No
Monotropis odorata	Sweet Pinesap	C	No
Saxifraga caroliniana	Carolina saxifrage	C	No
Cephaloziella obtusilobula	a Liverwort	C	No
Plagiochila sullivantii var. *spinigera*	a Liverwort	C	No
Plagiochila sullivantii var. *sullivantii*	a Liverwort	C	No

Notes:

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

T A "Threatened" species is any native or once native species that is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a threatened species pursuant to the Endangered Species Act.

C A "Candidate" is any species that is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction.

SR A "Significantly Rare" species is not listed as "E", "T", or "SC", but which exists in the state in small numbers and has been determined to need monitoring.

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APPENDIX A

Biological Conclusions for Federally Protected Species Found in Burke County, North Carolina

Bald Eagle (*Haliaeetus leucocephalus*) **Threatened**
Animal Family: Accipitridae
Date Listed: Endangered, 1967; Threatened, 1995

Characteristics:
The bald eagle is a large raptor. The characteristic adult plumage consists of a white head and tail with a dark brown body. Juvenile eagles are completely dark brown and do not fully develop the majestic white head and tail until the fifth or sixth year. Fish are the primary food source but bald eagles will also take a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available. Adults average about three feet from head to tail, weigh approximately 10 to 12 pounds (4.5 to 5.4 kilograms) and have a wingspread that can reach 7.0 feet (2.1 meters). Generally, female bald eagles are somewhat larger than the males.

Distribution:
Breeds primarily in eastern third of Texas (mostly east of I-35); winters wherever open water occurs.

Habitat:
Quiet coastal areas, rivers or lakeshores with large, tall trees. Man-made reservoirs have provided excellent habitat

Bald Eagles in North Carolina:
In 1982, there were zero bald eagle nests in North Carolina. In 1998, there were 17 nests; in 2000, there were 34 nests. Several new nests have been located so far during the 2001 nesting season. The Bald Eagle's recovery has lead to a proposal for de-listing the bald eagle from the Endangered/Threatened Species List.

Threats to Species:
The decline of the Bald Eagle coincided with the introduction of the pesticide DDT in 1947. Birds of prey at the top of the food chain, such as eagles, ingested relatively high levels of the pesticide, which was concentrated in the fatty tissues of their prey. Eagles contaminated with DDT failed to lay eggs or produced thin eggshells that broke during incubation. In 1972, DDT was banned in the United States, and a slow recovery for the Bald Eagle began. Loss of nesting habitat due to development along the coast and near inland rivers and waterways also has resulted in decreasing numbers of Bald Eagles.

Distinguishing Characteristics:
Bald Eagle (*Haliaeetus leucocephalus*) adults have white heads and tails, a dark brownish black body, with yellow bill, eyes and feet. Immature species are variable in plumage but generally have dark brown blotchy head tail and bodies, brownish bill, yellow feet and pale yellow-gray eyes. They are normally found near water, but during migration may occur in any part of the state. Their size is approximately 3 feet (0.9 meter). long with a 7 feet (2.1 meters). wingspan.

Investigation:
The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project area was investigated on 12 July 2001. No individual organisms, populations, or suitable habitat were observed within the project area.

Biological Conclusion: **No Effect**

Spreading Avens (*Geum radiatum*) **Endangered**
Plant Family: Rosaceae
Date Listed: April 5, 1990

Characteristics:
Spreading avens is a perennial herb. Spreading avens is topped with an indefinite cyme of large, bright yellow flowers. Its leaves are mostly basal with large terminal lobes and small laterals, and they arise from horizontal rhizomes. Plant stems grow 7.9 to 19.7 inches (20.0 to 50.0 centimeters) tall. Flowering occurs from June through September, and the fruits (achenes) are produced from August through October.

Distribution:
The species is restricted to a few, scattered mountaintops in western North Carolina and eastern Tennessee. Spreading avens was originally known from 16 sites, and 11 of these sites still support populations. Three of the remaining spreading avens populations are in Ashe County, North Carolina. Two others are situated on the Mitchell County, North Carolina/Carter County, Tennessee line; and on the Avery/Watauga County line in North Carolina. One population each remains in Avery, Transylvania, Watauga, Burke, and Yancey Counties, North Carolina. Seven of these 11 avens sites have less than 50 plants each. In fact, three of the seven sites support less than 10 individuals.

Habitat:
The species inhabits high elevation cliffs, outcrops, and steep slopes that are exposed to full sun. The adjacent spruce/fir forests are dominated by red spruce (*Picea rubens*) and a federal candidate species, Fraser fir (*Abies fraseri*). Heller's blazing star (*Liatris helleri*) and/or Blue Ridge goldenrod (*Solidago spithamaea*), both federally-listed as threatened species, are also present at some sites. The substrate at all the population sites is composed of various igneous, metamorphic, and metasedimentary rocks (Massey, et al., 1980; Morgan, 1980; Kral, 1983; Department of the Interior, 1990).

Threat to Species:
The species is being seriously impacted by recreational and residential development. Their population sites occur on open mountain summits, which are prime areas for recreational facilities. The construction of trails, parking lots, roads, buildings, observation platforms, and other facilities, combined with the increased foot traffic from sightseers, has already severely decreased populations. Eight of the remaining 11 spreading avens populations face increasing impacts from soil compaction, soil erosion, and trampling. In addition, the spruce/fir forests surrounding these species' populations are suffering from airborne pollution and an exotic insect pest, the balsam woody aphid. It is not known as yet how the decline of these forests will affect the species. Scientists speculate that the moist habitat required by both species may become drier. It's already known that spreading avens individuals located on dry sites usually fail to produce seeds. Also, because of the plants' low numbers and the scarcity of their habitat, there may be little genetic adaptability within populations. The species also faces threats from collection, natural succession (becoming over-shaded and crowded by other woody species), and natural events such as rockslides.

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Distinguishing Characteristics:
Spreading avens (*Geum radiatum*), of the rose family, is characterized by stems 8 to 20 inches tall (2 to 5 decimeters tall) and an indefinite cyme of large bright yellow flowers. Leaves are mostly basal, with large terminal lobes and small laterals arise from horizontal rhizomes. The flowers occur from June to September. They are found in the Southern Blue Ride Mountains on (1) high elevations cliffs, rock crevices, and steep slopes in full sunlight with soil composed of thin gravelly soils or (2) grassy balds near summit outcrops on high elevations from 4,200 to 6,300 feet (1,280 to 1,920 meters) and in the vicinity adjacent to spruce/fir forest (red spruce [*Picea rubens*] and Fraser fir [*Abies fraseri*]).

Investigation:
The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project area was investigated on 12 July 2001. Spreading avens is reported to occur at elevations ranging from 4,200 to 6,300 feet (1,280 to 1,920 meters). The maximum elevation of 1,080 feet (329 meters) within the project area is considered too low to serve as suitable habitat. No individual organisms, populations, or suitable habitat were observed within the project area.

Biological Conclusion: **No Effect**

Dwarf Flower Heartleaf (*Hexastylis naniflora*) **Threatened**
Plant Family: Aristolochiaceae
Date Listed: April 14, 1989

Characteristics:
This species has the smallest flowers of any North American plant in the genus *Hexastylis*. The flowers of most individuals are less than 0.4 inch (1 centimeter) long, and their sepal tubes are narrow, never more than 0.2 to 0.3 inch (0.6 to 0.7 centimeter) wide even in flower. Flower color usually ranges from beige to dark brown; sometimes it is greenish or purplish. The flowers are jug-shaped, and the plant's dark green leaves are heart-shaped, evergreen, and leathery. Plant stalks are long and thin, originating from an underground root. Another name for this species is dwarf-flowered wild ginger.

Distribution:
Found in the upper piedmont regions of South Carolina and North Carolina.

Habitat:
Dwarf-flowered heartleaf grows in acidic, sandy loam soils along bluffs and nearby slopes, in boggy areas adjacent to creekheads and streams, and along the slopes of hillsides and ravines. Soil type is the most important habitat requirement. The species needs Pacolet, Madison gravelly sandy loam, or Musella fine sandy loam soils to grow and survive. Provided the soil type is right, the plant can survive in either dry or moderately moist habitat. For maximum flowering, the plant needs sunlight in early spring. Creekheads where shrubs are rare and bluffs with light gaps are the habitat types most conducive to flowering and high seed production. Seed output is lowest in bluff populations with a lot of shade.

Threats to Species:
Timber harvesting, urbanization, conversion from woodlands to pasture, reservoir construction, pond construction, trash, and insecticide use are threatening the remaining populations. The eight populations in Greenville, South Carolina are all endangered by residential, industrial, and commercial expansion. The largest population in South Carolina (1,400 plants) once contained over 4,000 plants, but this population was reduced by reservoir construction in Spartanburg. Any use of insecticides in or around plant populations could reduce flies, thrips, and ants, thus reducing the plant's reproductive capacity.

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Distinguishing Characteristics:
Dwarf flower heartleaf (*Hexastylis naniflora*) is a member of the birthwort family (Aristolochiaceae). They have leathery evergreen leaves, which are dark green and heart shaped; and long, thin stalks that originate from an underground stem. Flowers are jug-shaped, beige to dark brown, and 0.4 inch (1 centimeter) long, with narrow sepal tubes around 0.3 inch (0.7 centimeter) wide (flower is sometimes greenish or purplish). It flowers from mid March to early June. They are found in acidic sandy loam soils; along bluffs and nearby slopes, hillsides, and ravines; and in boggy areas adjacent to creek heads and streams. The soil types are Pacolet, Madison, or Musella. They need sunlight for maximum seed production.

Investigation:
The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project area was

investigated on 12 July 2001. An unknown *Hexastylis* sp. was observed within the project area during the field investigation. The field investigation was performed outside the flowering period for *Hexastylis*. Consequently, the biological conclusion for *Hexastylis naniflora* is "Unresolved".

Biological Conclusion: **Unresolved**

Mountain Golden Heather (*Hudsonia montana*) **Threatened**
Plant Family: Cistaceae
Date Listed: October 20, 1980

Characteristics:
Mountain golden heather is a low, needle-leaved shrub with yellow flowers and long-stalked fruit capsules. It usually grows in clumps of 4 to 8 inches (10.2 to 20.3 centimeters) across and about 6 inches (15.2 centimeters) high, and sometimes is seen in larger patches of 1 to 2 feet (0.3 to 0.6 meter) across. The plants have the general aspect of a big moss or a low juniper, but their branching is more open; their leaves are about 0.25 inch (0.6 centimeter) long; and the plant is often somewhat yellow-green in color, especially in shade. The leaves from previous years appear scale-like and persist on the older branches. The flowers appear in early or mid-June, and are yellow, nearly 1 inch (2.5 centimeters) across, with 5 blunt-tipped petals and 20 to 30 stamens. The fruit capsules are on 0.5 inch (1.3 centimeters) stalks, and are roundish with 3 projecting points at the tips. These fruits often persist after opening, and may be seen at any time of the year.

Distribution:
This plant is found only in Burke and McDowell Counties, North Carolina, at elevations of 2,800 to 4,000 feet (853 to 1,219 meters). Originally discovered on Table Rock Mountain in 1816, Mountain golden heather has since been found at several other sites in Linville Gorge and on Woods Mountain. All sites are on public land within the Pisgah National Forest. Mountain golden heather is known from several localities within its range with the total number of plants possibly numbering 2,000 to 2,500. Monitoring is needed to determine if the plant's abundance may be cyclic.

Habitat:
Mountain golden heather grows on exposed quartzite ledges in an ecotone between bare rock and *Leiophyllum* dominated heath balds that merge into pine/oak forest. The plant persists for some time in the partial shade of pines, but it appears less healthy than in open areas.

Critical Habitat:
Burke County. The area bounded by the following: on the west by the 2,200-foot contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2,200-foot contour and the Short Off Mountain Trail to where it intersects the 3,400-foot contour at the "Chimneys", then follow the 3,400-foot contour north until it re-intersects with the Wilderness Boundary, then follow the Wilderness Boundary again northward until it intersects the 3200-foot contour extending west from its intersection with the Wilderness Boundary until it begins to turn south, at this point the Boundary extends due east until it intersects the 2,200-foot contour. (The Woods Mountain sites were unknown at the time Critical Habitat was designated.)

Threats to Species:
Fire suppression and trampling. Recreational use by hikers and campers has resulted in a loss of plants due to trampling and soil compaction. Competition with other shrubs has also reduced size and vigor of populations. The small size and number of populations increases the plant's vulnerability to extinction through both natural and man-made factors.

References:
Morse, Larry E. 1979. Report on the Conservation Status of *Hudsonia montana*, A Candidate Endangered Species. Prepared by the Cooperative Parks Study Unit of the New York Botanical Garden. 37 pp.

U.S. Fish and Wildlife Service. 1983. Mountain Golden Heather Recovery Plan. U.S. Fish and Wildlife Service. Atlanta, Georgia. 26 pp.

Distinguishing Characteristics:
Mountain golden heather (*Hudsonia montana*) is a member of the rockrose family (Cistaceae) that is characterized as a small needle-leaved shrub with yellow flowers nearly 1 inch (2.5 centimeters) across and long-staked fruit capsules. It is usually growing in clumps 4 to 8 inches (10.2 to 20.3 centimeters) across and 6 inches (15.2 centimeters) high. The flowers are made up of 5 blunt tipped petals, and flowering occurs from mid-June to July. Non-flowering plants resemble large moss or small juniper with leaves about 0.25 inch (0.6 centimeter) long and somewhat yellow-green in color. Fruit capsules are on 0.5 inch (1.3 centimeters) stalks that are roundish with three projecting points at the tips. They are found in exposed quartzite ledges at elevations from 2,200 to 3,400 feet (671 to 1,036 meters), between bare rock and sand myrtle-dominated heath balds that merge into pine/oak forest. The plant can persist for some time in the partial shade of pines to open areas.

Investigation:
The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in

September of 2001. No populations of the species have been recorded in the project vicinity. The project area was investigated on 12 July 2001. Mountain Golden Heather is reported to occur at elevations ranging from 2,800 to 4,000 feet (853 to 1,219 meters). The maximum elevation of 1,080 feet (329 meters) within the project area is considered too low to serve as suitable habitat. No individual organisms, populations, or suitable habitat were observed within the project area.

Biological Conclusion: **No Effect**

Small Whorled Pogonia (*Isotria medeoloides*) **Threatened**
Plant Family: Orchidaceae
Date Listed: October 6, 1994

Characteristics:
Small whorled pogonia is a perennial with long, pubescent roots and a smooth, hollow stem 3.7 to 9.8 inches (9.5 to 25 centimeters) tall terminating in a whorl of five or six light green, elliptical leaves that are somewhat pointed and measure up to 3.1 by 1.6 inches (8 by 4 centimeters). A flower, or occasionally two flowers, is produced at the top of the stem. Small whorled pogonia's nearest relative is *I. verticillata*, which looks similar but can be distinguished by its purplish stem and by differences in the flower structure. *I. verticillata* is much more common and widespread than the small whorled pogonia. When not in flower, young plants of Indian cucumber-root (*Medeola virginiana*) also resemble small whorled pogonia. However, the hollow stout stem of *Isotria* will separate it from the genus *Medeola*, which has a solid, more slender stem.

Flowering occurs from about mid-May to mid-June, with the flowers apparently lasting only a few days to a week or so. Also, this plant doesn't necessarily flower annually. Usually only one flower is produced per plant. If pollination occurs, a capsule may be formed which can contain several thousand minute seeds. No evidence of insect pollination has been observed. This plant is believed to be self-pollinating by mechanical processes. The flower lacks both nectar guides and fragrance. There is no evidence for asexual reproduction. Individual plants may not flower every year; and extended dormancy, although not scientifically documented, is purported to occur under certain conditions.

Distribution:
This plant formerly occurred in 48 counties in 16 eastern states and Canada, but when listed as endangered in 1982 it was known to exist in only 16 counties in 10 states, and one county in Ontario, Canada. By 1991, a total of 86 sites in 15 states were known, and by 1993, there were a known total of 104 sites in 15 states. Most populations are centered in the foothills of the Appalachian Mountains in New England and northern coastal Massachusetts, The 23 populations in the Southeast Region occur in North Carolina (five populations); South Carolina (four populations); Georgia (13 populations); and Tennessee (one population). Most southeastern populations number less than 25 plants. South Carolina has one population of over 25 plants, and Georgia has two populations numbering about 100 plants. Small whorled pogonia is also known from Virginia, Delaware, New Jersey, Pennsylvania, Ohio, Michigan, Illinois, and Ontario, Canada.

This plant was reclassified from endangered to threatened because the number of known populations increased from 34 in 1985 to 104 in 1993. Also, the species' 1992 revised recovery plan stipulates that at least 25 percent of the plant's self-sustaining populations were protected through public ownership or private landowner management agreement. According to the October 6, 1994 *Federal Register* notice, which officially down-listed the species, a total of 46 small whorled pogonia sites are currently protected rangewide, 24 of which have self-sustaining populations. In the southeast, North Carolina has two protected sites, both of which are viable; South Carolina has four protected sites, two of which are viable; and Georgia has seven protected sites, four of which are viable.

Habitat:
This species is generally known from open, dry, deciduous woods with acid soil. It occurs in habitat where there is relatively high shrub coverage or where high sapling density flowering appears to be inhibited.

Threat to Species:

The current status of small whorled pogonia is attributed to loss of habitat and over-utilization for scientific and private collections. However, some populations observed for a number of years have also declined for unknown reasons.

References:
Correll, D.S. 1950. Native Orchids of North America. Chronica Botanica Co., Massachusetts. 399 pp.
Department of the Interior, Fish and Wildlife Service. October 6, 1994. Endangered and Threatened Wildlife and Plants: Final Rule to Reclassify the Plant Isotria medeoloides (Small Whorled Pogonia) From Endangered to Threatened. *Federal Register* 59:193. p. 50852-50857.
Luer, C.A. 1975. The Native Orchids of the United States and Canada. New York Botanical Garden. W.S. Cowell Ltd., Ipswich, England. 361 pp.
Mehrhoff, L.A. 1980. Abstracts of Papers to be Presented at the University of British Columbia, Vancouver. 12-16 July 1980. Botanical Society of America. Miscellaneous Series Publ. 158 pp.

U.S. Fish and Wildlife Service. 1992. Small Whorled Pogonia (Isotria medeoloides) Recovery Plan First Revision. Prepared by Susanna L. von Oettingen for U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 75 pp.

U.S. Fish and Wildlife Service. 1985. Small Whorled Pogonia Recovery Plan. Prepared by Peter G. Poulos for U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 45 pp.

Distinguishing Characteristics:

Small whorled pogonia (*Isotria medeoloides*) of the Orchidaceae family is characterized by its hollow stem that is 3.7 to 9.8 inches (9.5 to 25 centimeters) tall and its whorl of five to six light green elliptical leaves that are somewhat pointed and measure 3.1 by 1.6 inches (8 by 4 centimeters). Flowering from May to June, the flower is yellowish green and is produced on top of the stem. When not in bloom, the plant resembles the Indian cucumber-root (stem not hollow). The plant is found in open, dry, deciduous woods with acid soils of third growth upland forest. The areas are generally flat to moderately sloped to the northern or eastern direction, in habitat of relatively high shrub cover or high sapling density with flecks of sunlight play on the forest floor throughout the day. Soils are acidic sandy loams with low to very low nutrient contents.

Investigation:

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project area was investigated on 12 July 2001. No individual organisms, populations, or suitable habitat were observed within the project area.

Biological Conclusion: **No Effect**

Heller's Blazing Star (*Liatris Helleri*) **Threatened**
Plant Family: Asteraceae
Date Listed: November 19, 1987

Characteristics:
Heller's blazing star is a perennial herb that has 1 or more erect or arching stems arising from a tuft of narrow pale green basal leaves. Its stems reach up to 1.3 feet (0.4 meter) in height and are topped by a showy spike of lavender flowers, which are 2.8 to 7.9 inches (7 to 20 centimeters) long (Porter, 1891). Its flowering season lasts from July through September, and its fruits are present from September through October (Kral, 1983; Radford et al., 1964). This plant is differentiated from other similar high altitude *Liatris* species by a much shorter pappus, ciliate petioles, internally pilose corolla tubes, and a lower, stockier habit (Cronquist, 1980; Gaiser, 1946). Work is being conducted on populations in two locations, which may result in their being reclassified as a new taxon (Sutter, in preparation). If so, these plants will still remain protected under the Endangered Species Act.

Distribution:
Heller's blazing star is endemic to the northern Blue Ridge Mountains of North Carolina. Although nine populations were originally reported, only seven still exist. A former population in Watauga County is thought to have been destroyed by residential development, and one in Mitchell County apparently succumbed to intensive recreational use. Four of the seven remaining populations are in Avery County with one population each remaining in Caldwell, Ashe, and Burke Counties.

Habitat:
The plant exists on high elevation ledges of rock outcrops in shallow, acid soils, which are exposed to full sunlight.

Threats to Species:
Commercial and recreational developments pose the greatest threats. Heller's blazing star is threatened not only by the construction of buildings, roads, and other facilities, but also by the associated habitat disturbances such as soil erosion and compaction. Unintentional trampling by hikers is another danger. Of the seven remaining populations, five occur on privately-owned land, one on Forest Service land, and one on National Park Service land. Four of the sites in private ownership are recreational facilities. The two sites in public ownership also undergo heavy recreational use. Potential threats to the latter two sites include the use of aerially-applied fire retardants, road construction, and the issue of permits for mineral exploration. Only the site owned by The Nature Conservancy receives full protection from human disturbance; three of the seven sites receive partial protection. In future years, woody vegetation may overcrowd and overshade the plant making it impossible for the species to survive unless this threat is mitigated by proper habitat management and planning. The species' small numbers, possible lack of genetic variability, natural rockslides, and severe storms or droughts are also threats.

References:
Cronquist, A. 1980. Vascular Flora of the Southeastern U.S., Vol. 1 (Asteraceae). UNC Press, Chapel Hill. P. 204.

Gaiser, L.O. 1946. The Genus *Liatris*. Rhodora 48:572-576.

Kral, R. 1983. A Report on some Rare, Threatened, or Endangered Forest-related Vascular Plants of the South. Tech. Publ. R-8-TP-2. USDA Forest Service. Pp. 1191-1194.

Massey, J., P. Whitson, and T. Atkinson. 1980. Endangered and Threatened Plant Survey of 12 Species in the Eastern Part of Region 4. Report Submitted to U.S. Fish and Wildlife Service, Southeast Region, Under Contract 14-16-004-78-108.

Porter, T.C. 1981. A New *Liatris* from North Carolina. Rhodora 18:147-148.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1964. Manual of the Vascular Flora of the Carolinas. UNC Press, Chapel Hill. Pp. 1048-1051.

Sutter, R. In Preparation. Taxonomic Analysis of *Liatris helleri*, a North Carolina Endemic.

U.S. Fish and Wildlife Service. 1987. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for *Liatris Helleri*. *Federal Register*, 52(223):44397-44401.

U.S. Fish and Wildlife Service. 1989. Recovery Plan for Heller's Blazing Star (*Liatris helleri* Porter). U.S. Fish and Wildlife Service, Atlanta, Georgia. 24 pp.

Distinguishing Characteristics:
Heller's blazing star (*Liatris helleri*) is of the aster family (Asteraceae), and is characterized by lavender spiked flowers with one or more erect stems with a maximum height of 16 inches (40.6 centimeters). The flowers arise from a tuft of narrow, pale green basal leaves. It differs from other *Liatris* by its much shorter pappus (half the length of corolla tube or less), ciliated petioles, internally pilose corolla tubes, and lower, stockier habit. They are found in

high elevations along ledges of rock outcropping and cliffs in shallow acid soils in full sunlight. Flowering occurs from July to August.

Investigation:
The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project area was investigated on 12 July 2001. Known populations of this plant occur at elevations of 3,500 to 6,000 feet (1,067 to 1,829 meters). The maximum elevation of 1,080 feet (329 meters) within the project area is considered too low to serve as suitable habitat. No individual organisms, populations, or suitable habitat were observed within the project area.

Biological Conclusion: **No Effect**

APPENDIX B

Qualifications of Principal Investigators

Investigator: Martin L. Mitchell
Education: B.U.S. (double major in Geology and Biology), University of New Mexico
M.A. in Marine Science, College of William and Mary
Certification: Professional Geologist
Virginia License Number 001351 (1997)
Experience: Project Manager/Environmental Scientist, HSMM, Inc. 1988 to present.
Project Manager/Environmental Scientist, The BSC Group, 1986 to 1988.
Wetlands Ecologist / Coastal Geologist, Massachusetts Department of Environmental Quality Engineering, Wetlands and Waterways Division, 1984 to 1986.
Geologist, Virginia Division of Mineral Resources, 1981 to 1983.
Expertise: Wetland delineations, wetland function and value assessments, wetland mitigation and stream restoration, biotic community inventories and mapping, threatened and endangered species investigations, environmental regulatory permit processing.

Investigator: Anne L. Timm
Education: B.A. Biology, Luther College
Master of Environmental Science, Indiana University
Certification: Aquatic Insect Collection Protocols Certification through NCDWQ
Experience: Environmental Scientist, HSMM, Inc., 2000 to present
Intern, Fallwood Nature Center, 2000.
Data Management Assistant, Wisconsin Department of Natural Resources, Bureau of Watershed Management, 1997 to 1998.
Science and Biology Teacher, U.S. Peace Corps, 1994 to 1996.
Aquatic Biology Research Assistant, PEW Research Fellowship, Luther College, 1993.
Expertise: Aquatic and wetland habitat assessments, biotic community inventories and mapping, rapid bioassessment, benthic macroinvertebrate sampling and identification, wetland delineation, wetland function and value assessments, wetland habitat restoration, GPS surveys.

APPENDIX C

Wetland Data Forms

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: NE1U

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juglans nigra*	Tree	UPL	9. *Campsis radicans*	Vine	FAC
2. *Nyssa sylvatica*	Tree	FAC	10.		
3. *Solidago caesia var. curtisii*	Herb	FACU	11.		
4. *Rhus glabra*	Herb	NL	12.		
5. *Vitis riparia*	Herb	FACW	13.		
6. *Eupatorium fistulosum*	Herb	FAC+	14.		
7. *Rosa multiflora*	S/S	UPL	15.		
8. *Parthenocissus quinquefolia*	Vine	FAC	16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 55%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.
Dry

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

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations
Confirmed Mapped Type? Yes

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A	10YR 5/4			SILTY SAND

Hydric Soil Indicators:

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

Remarks:
Units mapped by NRCS are non-hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES		
Wetland Hydrology Present?	NO	Is this Sampling Point Within a Wetland?	NO
Hydric Soils Present?	NO		

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: NE2W

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. *Acer negundo*	Tree	FACW
2. *Salix nigra*	S/S	OBL
3. *Rosa multiflora*	S/S	UPL
4. *Chasmanthium latifolium*	Herb	FAC-
5. *Arthraxon hispidus*	Herb	NL
6. *Impatiens capensis*	Herb	FACW
7. *Cephalanthus occidentalis*	S/S	OBL
8. *Vitis sp.*	Herb	
9. *Platanus occidentalis* -	Tree	FACW-
10. *Cornus amomum*	S/S	FACW+
11. *Microstegium vimineum*	Herb	FAC+
12. *Toxicodendron radicans*	Vine	FAC
13. *Viola sp.*	Herb	
14. *Rubus hispidus*	Herb	FACW
15. *Campsis radicans*	Vine	FAC
16. *Lonicera japonica*	Vine	FAC-

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 62%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- XX Saturated in Upper 12 Inches
- ___ Water Marks
- XX Drift Lines
- XX Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

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

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations
Confirmed Mapped Type? No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A	10YR 4/2	5YR 4/6	10%	SILTY SAND

Hydric Soil Indicators:

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

Remarks:
Units mapped by NRCS are non-hydric.
Soils observed likely represent hydric soil inclusion, which USDA reports to occur within Colvard map units, or fluvaquents.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? YES

Wetland Hydrology Present? YES

Hydric Soils Present? YES

Is this Sampling Point Within a Wetland? YES

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: NW1U

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juglans nigra*	Tree	UPL	9. *Ligustrum sinense*	S/S	FAC
2. *Platanus occidentalis*	Tree	FACW-	10. *Chasmanthium latifolium*	Herb	FAC-
3. *Carya illinoensis*	Tree	FAC+	11.		
4. *Viola sp.*	Herb		12.		
5. *Microstegium vimineum*	Herb	FAC+	13.		
6. *Solidago caesia var. curtisii*	Herb	FACU	14.		
7. *Oxalis sp.*	Herb		15.		
8. *Parthenocissus quinquefolia*	Herb	FAC	16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 50%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: 16 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

DATA FORM (continued)

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations

Confirmed Mapped Type? Yes

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A	7.5yr 4/6			SILTY SAND

Hydric Soil Indicators:

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

Remarks:

Units mapped by NRCS are non-hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	Is this Sampling Point Within a Wetland?	NO
Wetland Hydrology Present?	NO		
Hydric Soils Present?	NO		

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: NW2W

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. *Alnus serrulata*	S/S	FACW
2. *Rosa multiflora*	S/S	UPL
3. *Fraxinus pennsylvanica*	S/S	FACW
4. *Cornus amomum*	S/S	FACW+
5. *Vitis riparia*	Vine	FACW
6.		
7.		
8.		

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

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

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- XX Saturated in Upper 12 Inches
- ___ Water Marks
- XX Drift Lines
- XX Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

DATA FORM (continued)

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations

Confirmed Mapped Type? No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A				SILTY SAND

Hydric Soil Indicators:

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

Remarks:

Units mapped by NRCS are non-hydric.

Soils observed likely represent hydric soil inclusion, which USDA reports to occur within Colvard map units, or fluvaquents.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	Is this Sampling Point Within a Wetland?	YES
Wetland Hydrology Present?	YES		
Hydric Soils Present?	YES		

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: SE4U

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. *Carya sp.*	Tree	
2. *Rhus glabra*	S/S	NL
3. *Vitis riparia*	Herb	FACW
4. *Lonicera japonica*	Herb	FAC-
5. *Liriodendron tulipifera*	S/S	FACU
6. *Juglans nigra*	S/S	FACU
7. *Aster sp.*	Herb	
8. *Phytolacca americana*	Herb	FACU+

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

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 13%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: 32 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

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

SOILS

Map Unit Name
(Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations
Confirmed Mapped Type? Yes

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A				SILTY SAND

Hydric Soil Indicators:

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

Remarks:
Units mapped by NRCS are non-hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	NO		
Wetland Hydrology Present?	NO	Is this Sampling Point Within a Wetland?	NO
Hydric Soils Present?	NO		

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: SE4W

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. *Fraxinus pennsylvanica*	Tree	FACW
2. *Acer negundo*	S/S	FACW
3. *Lonicera japonica*	Herb	FAC-
4. *Impatiens capensis*	Herb	FACW
5. *Vitis riparia*	Vine	FACW
6. *Pilea pumila*	Herb	FACW
7. *Viola sp.*	Herb	
8. *Microstegium vimineum*	Herb	FAC+
9. *Polygonum pensylvanicum*	Herb	FACW
10. *Polygonum punctatum*	Herb	FACW
11. *Cornus asperifolia*	S/S	FACW-
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 82%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:
- Depth of Surface Water: _____ (in.)
- Depth to Standing Water in Pit: _____ (in.)
- Depth to Saturated Soil: 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- XX Saturated in Upper 12 Inches
- ___ Water Marks
- XX Drift Lines
- XX Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

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

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A) Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents Field Observations Confirmed Mapped Type? No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A	10YR 4/2	5YR 4/6	10%	SILTY SAND

Hydric Soil Indicators:

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

Remarks:
Units mapped by NRCS are non-hydric.
Soils observed likely represent hydric soil inclusion, which USDA reports to occur within Colvard map units, or fluvaquents.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? YES
Wetland Hydrology Present? YES
Hydric Soils Present? YES

Is this Sampling Point Within a Wetland? YES

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: _____ Transect ID: _____ Plot ID: SW3U

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Platanus occidentalis*	S/S	FACW-	9. *Soligado caesia var. curtisii*	Herb	FACU
2. *Acer negundo*	S/S	FACW	10. *Salix nigra*	S/S	OBL
3. *Carya illinoensis*	S/S	FAC+	11. *Lonicera japonica*	Vine	FAC-
4. *Vitis riparia*	Vine	FACW	12.		
5. *Menispermum canadense*	Vine	FACU	13.		
6. *Rosa multiflora*	S/S	UPL	14.		
7. *Carya sp.*	S/S		15.		
8. *Commelina communis*	Herb	FAC	16. *Boxwood*		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 58%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: 16 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

DATA FORM (continued)

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations

Confirmed Mapped Type? Yes

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A				SILTY SAND

Hydric Soil Indicators:

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

Remarks:

Units mapped by NRCS are non-hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	Is this Sampling Point Within a Wetland?	NO
Wetland Hydrology Present?	NO		
Hydric Soils Present?	NO		

Remarks:

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

Project/Site: B-4047 Bridge Replacement NRTR Applicant/Owner: NCDOT Investigator: Martin Mitchell (HSMM, Inc.)	Date: July 12, 2001 Co./City: Burke County State: North Carolina
Do Normal Circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation)? No Is the area a potential Problem Area? No (If needed, explain on reverse)	Community ID: Transect ID: Plot ID: SW3W

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. *Betula nigra*	S/S	FACW
2. *Platanus occidentalis*	S/S	FACW-
3. *Microstegium vimineum*	Herb	FAC+
4. *Acer negundo*	S/S	FACW
5. *Cornus asperifolia*	S/S	FACW-
6. *Rubus sp.*	S/S	
7. *Pilea pumila*	Herb	FACW
8. *Toxicodendron radicans*	Vine	FAC
9. *Arthraxon hispidus*	Herb	NL
10. *Commelina communis*	Herb	FAC
11. *Smilax rotundifolia*	Vine	FAC
12. *Lonicera japonica*	Vine	FAC-
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 75%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other (Explain in Remarks)

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Standing Water in Pit: _____ (in.)

Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- XX Saturated in Upper 12 Inches
- ___ Water Marks
- XX Drift Lines
- XX Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: Adjacent to waterway shown in NCDOT black and white aerial photo.

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

SOILS

Map Unit Name (Series and Phase): Colvard sandy loam (14A)

Drainage Class: Well drained

Taxonomy (Subgroup): Mesic Typic Udifluvents

Field Observations
Confirmed Mapped Type? No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structures, etc.
	A				SILTY SAND

Hydric Soil Indicators:

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

Remarks:
Units mapped by NRCS are non-hydric.
Soils observed likely represent hydric soil inclusion, which USDA reports to occur within Colvard map units, or fluvaquents.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	Is this Sampling Point Within a Wetland?	YES
Wetland Hydrology Present?	YES		
Hydric Soils Present?	YES		

Remarks:

APPENDIX D

Wetland Rating Worksheets

WETLAND RATING WORKSHEET Fourth Version

Project Name NCDOT B-4047 Bridge Replacement NRTR Nearest Road SR1972
County Burke Wetland Area < 2 acres Wetland Width < 10 feet
Name of evaluator Martin Mitchell (HSMM, Inc.) Date 7/12/01

Wetland Location

___ on pond or lake
_x_ on perennial stream
___ on intermittent stream
___ within interstream divide
___ other _____

Soil Series Colvard sandy loam

___ predominantly organic – humus, muck, or peat
___ predominantly mineral – non-sandy
_x_ predominantly sandy

Hydraulic Factors

_x_ steep topography
___ ditched or channelized
___ total wetland width ≥ 100 feet

Adjacent land use
(within ½ mile upstream, upslope, or radius)

_x_ forested/natural vegetation 49 %
_x_ agriculture, urban/suburban 49 %
_x_ impervious surface 2 %

Dominant vegetation

(1) *Acer negundo*
(2) *Cornus amomum*
(3) *Arthraxon hispidus*

Flooding and wetness

___ semipermanently to permanently flooded or inundated
___ seasonally flooded or inundated
_x_ intermittently flooded or temporary surface water
___ no evidence of flooding or surface water

Wetland type (select one)*

_x_ Bottomland hardwood forest
___ Headwater forest
___ Swamp forest
___ Wet flat
___ Pocosin
___ Bog forest
___ Pine savanna
___ Freshwater marsh
___ Bog/fen
___ Ephemeral wetland
___ Carolina Bay
___ Other _____

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

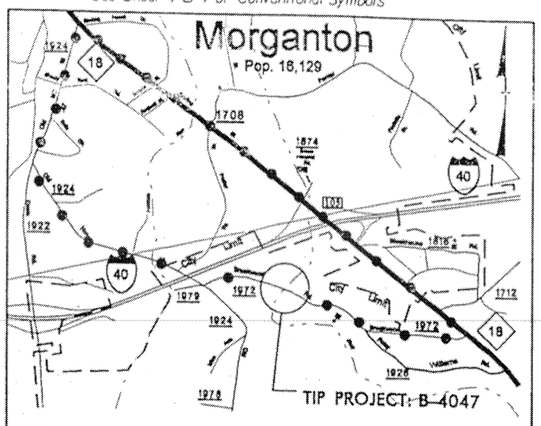
			weight		Wetland Rating
R	Water storage	2	x 4.00 =	8	
A	Bank/Shoreline stabilization	3	x 4.00 =	12	
T	Pollutant removal	2	x 5.00 =	10	
I	Wildlife habitat	3	x 2.00 =	6	
N	Aquatic life value	4	x 4.00 =	16	
G	Recreation/Education	2	x 1.00 =	2	
					54

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

TIP PROJECT: B-4047

CONTRACT:

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



VICINITY MAP

OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4047	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33413.1.1	BRZ-1972(6)	PE	

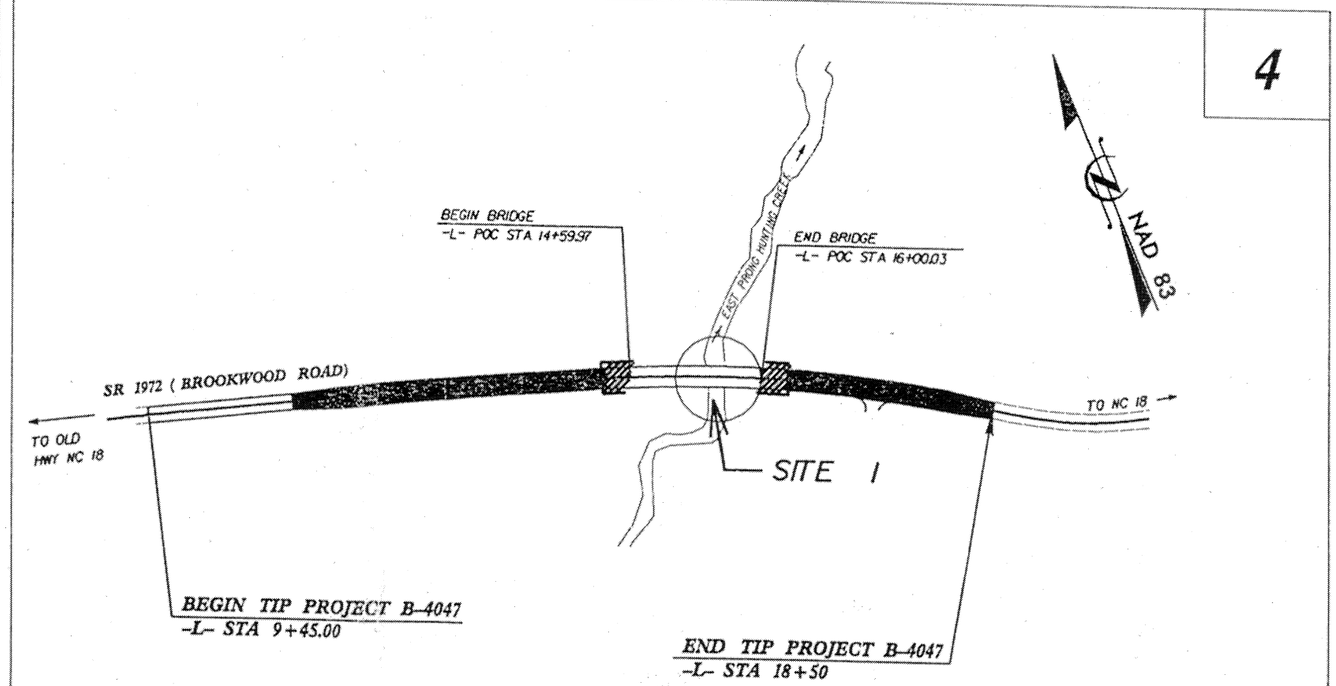
12/13/04

LOCATION: BRIDGE NO. 94 OVER A CREEK ON SR 1972

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

PERMIT DRAWINGS

4



NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2005 = 653
ADT 2025 = 1000
DHV = 12 %
D = 55 %
T = 3 % *
V = 60 MPH
FUNC CLASS = RURAL LOCAL
* TTST 1% + DUAL 2%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4047 = 0.145 MI
LENGTH STRUCTURE TIP PROJECT B-4047 = 0.026 MI
TOTAL LENGTH TIP PROJECT B-4047 = 0.171 MI

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 17, 2004

LETTING DATE: SEPTEMBER 21, 2005

GARY LOVERING, P.E.
PROJECT ENGINEER

ANTHONY WEST
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

13-DEC-2004 08:25
R:\Hydraulics\permit\b4047_tsh_vicmap.dgn
pshepard A

PROJECT REFERENCE NO.	SHEET NO.
B-4047	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

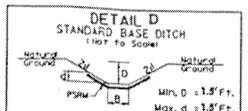
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50 0 50
SCALE
12/13/04

REVISIONS

B-4172

DETAIL D
STANDARD BASE DITCH
(Not to Scale)



Type of Liner = PSRM
STA. 14+70 TO STA. 15+45 -L- LT.

NC GRID NAD 83

TEMPORARY WORK PAD
(TEMPORARY CLASS 'II' RIP RAP & FILTER FABRIC)

CL. II RIP RAP EST. 3 TONS

2' BASE LATERAL DITCH W/PSRM SEE DETAIL B

STD. 2' BASE DITCH W/PSRM SEE DETAIL D

SPECIAL CUT DITCH W/PSRM SEE DETAIL A

REMOVE SYSTEM

FLAT GRATE

2' BASE LATERAL DITCH W/PSRM SEE DETAIL B

STD. 'V' DITCH SEE DETAIL C

CL. II RIP RAP @ EMBANKMENT SEE DETAIL E EST. 150 TONS EST. 190 SY F.F.

CL. II RIP RAP

SEPTIC TANK APPROX. LOCATION

DRAIN LINES

FILL HOLES & GRADE TO PROVIDE MIN. 1' COVER OVER PIPE EST. 35 CY

PLATTEN BANK TO 2:1 FROM 35' LT. TO 68' RT.

SPECIAL CUT DITCH SEE DETAIL F

SPECIAL CUT DITCH SEE DETAIL G

CLEAN OUT & MONITORING STATIONS

BROOKWOOD BAPTIST CHURCH

HARRIET T. STROUPE

JOHN & KATHY STROUPE

FALLON

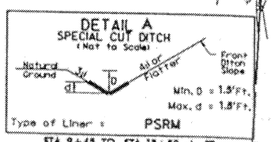
ISFD, BARN, ISF&BKD, ISBLK G, ISBK PARSONAGE, ISBK BROOKWOOD BAPTIST CHURCH, WOODS, FALLOW, GRAVEL, BST PKNG, PROPANE TANK, WOOD HANDICAPPED RAMP, SEPTIC TANK, DRAIN LINES, CARPORT

SR 1972 (BROOKWOOD CHURCH RD.)
TO OLD NC 18 SR 1972 (BROOKWOOD CHURCH RD.)
EXISTING R/W
15' PLASTIC
8' CONC
15' RCP
18" RCP
18" C.M.P.
24" RCP
TDE
DRAIN LINES
EIP

TS TS DENOTES TEMPORARY FILL IN SURFACE WATER

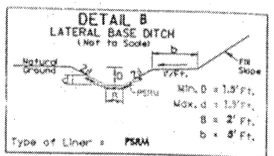
NOTE: EXTEND SBG FROM STA. 14+28 -L- RT. TO BEGIN BRIDGE RT. AND FROM END BRIDGE RT. TO STA. 16+35 -L- RT.

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



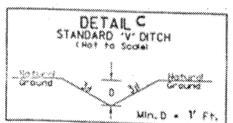
Type of Liner = PSRM
STA. 9+45 TO STA. 13+50 -L- RT.
STA. 10+00 TO STA. 13+50 -L- LT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



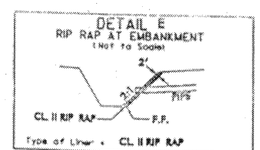
Type of Liner = PSRM
STA. 13+50 TO STA. 14+70 -L- LT.
STA. 13+50 TO STA. 14+50 -L- RT.

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)



RT. OF STA. 14+45 -L-

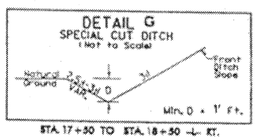
DETAIL E
RIP RAP AT EMBANKMENT
(Not to Scale)



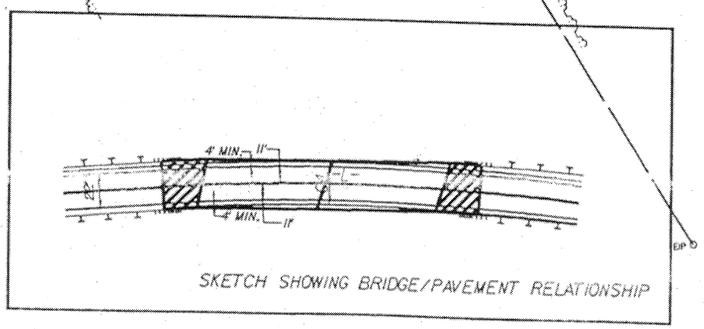
Type of Liner = CL. II RIP RAP
STA. 15+55 TO STA. 15+80 -L- FROM 25' LT. TO 68' RT.

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)

DETAIL G
SPECIAL CUT DITCH
(Not to Scale)



STA. 17+50 TO STA. 18+50 -L- RT.



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

13-DEC-2004 08:39
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cbeard

PROJECT REFERENCE NO.	SHEET NO.
B-4047	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50 0 50
SCALE
12/13/04

REVISIONS

NC GRID NAD 83

HARRIET T. STROUPE

JOHN & KATHY STROUPE

TEMPORARY WORK PAD
(TEMPORARY CLASS 'II' RIP RAP & FILTER FABRIC)

CL II RIP RAP EST. 3 TONS

2' BASE LATERAL DITCH W/PSRM SEE DETAIL B

STD. 2' BASE DITCH W/PSRM SEE DETAIL D

SPECIAL CUT DITCH W/PSRM SEE DETAIL A

REMOVE SYSTEM

MAT. GRATE

SPECIAL CUT DITCH SEE DETAIL F

STD. 'V' DITCH SEE DETAIL C

CL II RIP RAP @ EMBANKMENT SEE DETAIL E EST. 150 TONS EST. 190 SY F.F.

DRAIN LINE

SEPTIC TANK APPROX. LOCATION

DRAIN LINE

FILL HOLE & GRADE TO PROVIDE MIN. 1' COVER OVER PIPE EST. 35 CY

PLANTING BANK TO BE FROM 35' LT. TO 65' RT.

SPECIAL CUT DITCH SEE DETAIL G

BST PKNG

BROOKWOOD BAPTIST CHURCH

ISRA

FALLOW

TS DENOTES TEMPORARY FILL IN SURFACE WATER

NOTE: EXTEND SBG FROM STA. 14+28 -L- RT. TO BEGIN BRIDGE RT. AND FROM END BRIDGE RT. TO STA. 16+35 -L- RT.

SKETCH SHOWING BRIDGE/PAVEMENT RELATIVE

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 2V to d1, Ad or Flatter, Front Ditch Slope

Min. D = 1.5' Ft.
Max. d = 1.8' Ft.
Type of Liner = PSRM

STA. 9+45 TO STA. 13+50 -L- RT.
STA. 10+00 TO STA. 13+50 -L- LT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2V to d1, 3H to h, Fill Slope, B

Min. D = 1.5' Ft.
Max. d = 1.8' Ft.
B = 2' Ft.
b = 8' Ft.
Type of Liner = PSRM

STA. 13+50 TO STA. 14+70 -L- LT.
STA. 13+50 TO STA. 14+50 -L- RT.

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)

Natural Ground, 3H to D, 3H to Natural Ground

Min. D = 1' Ft.

RT. OF STA. 14+45 -L-

DETAIL D
STANDARD BASE DITCH
(Not to Scale)

Natural ground, 2V to d1, 2H to Natural ground, B

Min. D = 1.5' Ft.
Max. d = 1.5' Ft.
B = 2' Ft.
Type of Liner = PERM

STA. 14+70 TO STA. 15+45 -L- LT.

DETAIL E
RIP RAP AT EMBANKMENT
(Not to Scale)

2', 2H to 1V, RIPR, CL II RIP RAP, F.F.

Type of Liner = CL II RIP RAP

STA. 15+55 TO STA. 15+80 -L- FROM 25' LT. TO 65' RT.

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 3V to 24-36" PERF., Front Ditch Slope, GIP

Min. D = 1' Ft.

DETAIL G
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 2.5V to 2.0, 3H, Front Ditch Slope

Min. D = 1' Ft.

STA. 17+50 TO STA. 18+50 -L- RT.

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PROJECT REFERENCE NO.	SHEET NO.
B-4047	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

12/13/04

13+00 14+00 15+00 16+00 17+00 18+00

5'

EX. GRADE

PROP. GRADE

NG LT.

PI = 12+86.00
EL = 1075.35'
K = 137
VC = 350'

℄ STA. 15+30 -L-
2@70'
2'7" PRESTRESSED CONC. BOX BEAM
℄ GRADE ELEV. =1074.34
SKEW=105°

NG RT.

PI = 17+35.00
EL = 1073.49'
K = 163
VC = 230'

1080

(-)2.9759%

(-)0.4145%

NG RT.

1070

EX. BRIDGE
(TO BE REMOVED)

(+)0.4145%

(+)0.9982%

NG LT.

1060

CL II RIP RAP TO SHLDR. PT. ELEV. (TYP.)

NORMAL WSEL=1062.8
2/16/04

CHANNEL ℄ U/S FACE

MIN. 3' EXC. BELOW BRIDGE
FOR INSPECTION (TYP.)
EST. 620 CY EXC. TOTAL

FILTER FABRIC

TEMPORARY WORK PAD
CLASS II RIP RAP

arm_pfl.dgn

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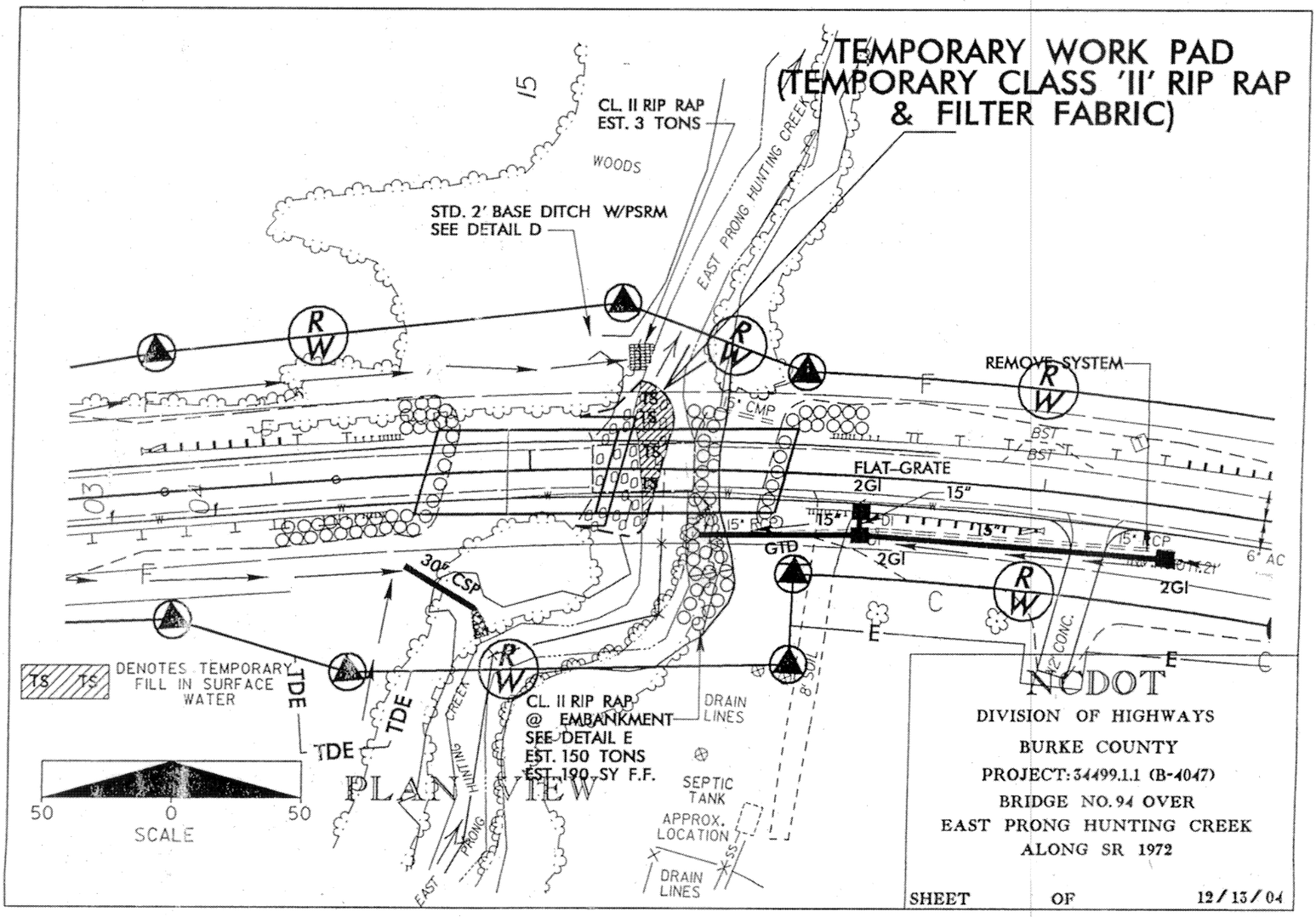
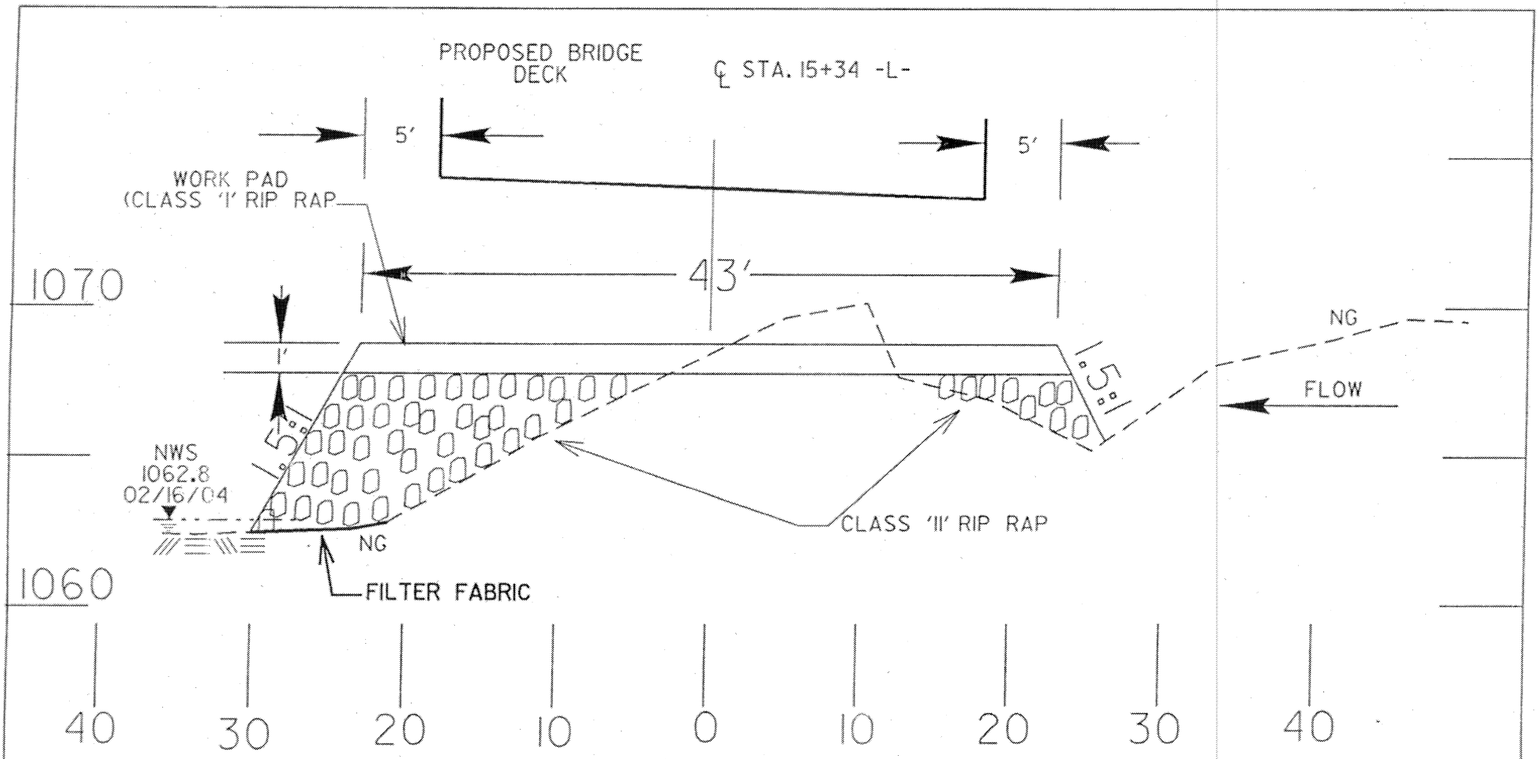




CROSS SECTION

ESTIMATE OF QUANTITIES

VOLUME OF CLASS 'II' RIP RAP BELOW O.H.W. = 212 YD.^{3}

AREA OF CLASS 'II' RIP RAP BELOW O.H.W. = 0.01 AC.

EST. TONS CLASS 'II' RIP RAP BELOW O.H.W. = 114 TONS

NCDOT
DIVISION OF HIGHWAYS
BURKE COUNTY
PROJECT: 34499.1.1 (B-4047)
BRIDGE NO. 94 OVER
EAST PRONG HUNTING CREEK
ALONG SR 1972

SHEET OF 12/13/04

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)
1	15+38-L- +/-	TEMP. WORK PAD	0	0	0	0	0	0	0.01	0	0
	15+54-L- +/-										
TOTALS:			0	0	0	0	0	0	0.01	0	0

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BURKE COUNTY
PROJECT:34499.1.1 (B-4047)

Form Revised 3/22/01

SHEET OF 12/13/2004

Property List

TIP#: B-4047 Project #: 8.2853401 WBS County: BURKE

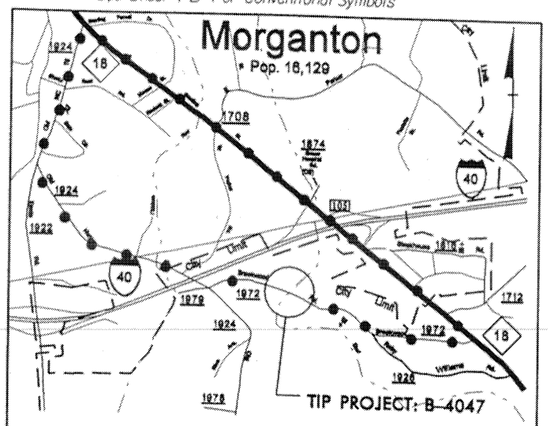
	Property Owners	Tax Parcel	DB / Page #		Address			
1	Brookwood Baptist Church Trustees	95 96 2 7	214	252	231 Brookwood Church	Morganton	NC	2 8655
2	Harriet T. Stroup	95 96, 95 98	100	625	117 Brookwood Road	Morganton	NC	2 8655
3	John & Kathy Stroup	95 96 1 3	650297-298		111 Brookwood Church	Morganton	NC	2 8655

09/28/

TIP PROJECT: B-4047

CONTRACT: C201292

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



VICINITY MAP

OFFSITE DETOUR

Current Roadway Plans

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4047	1	

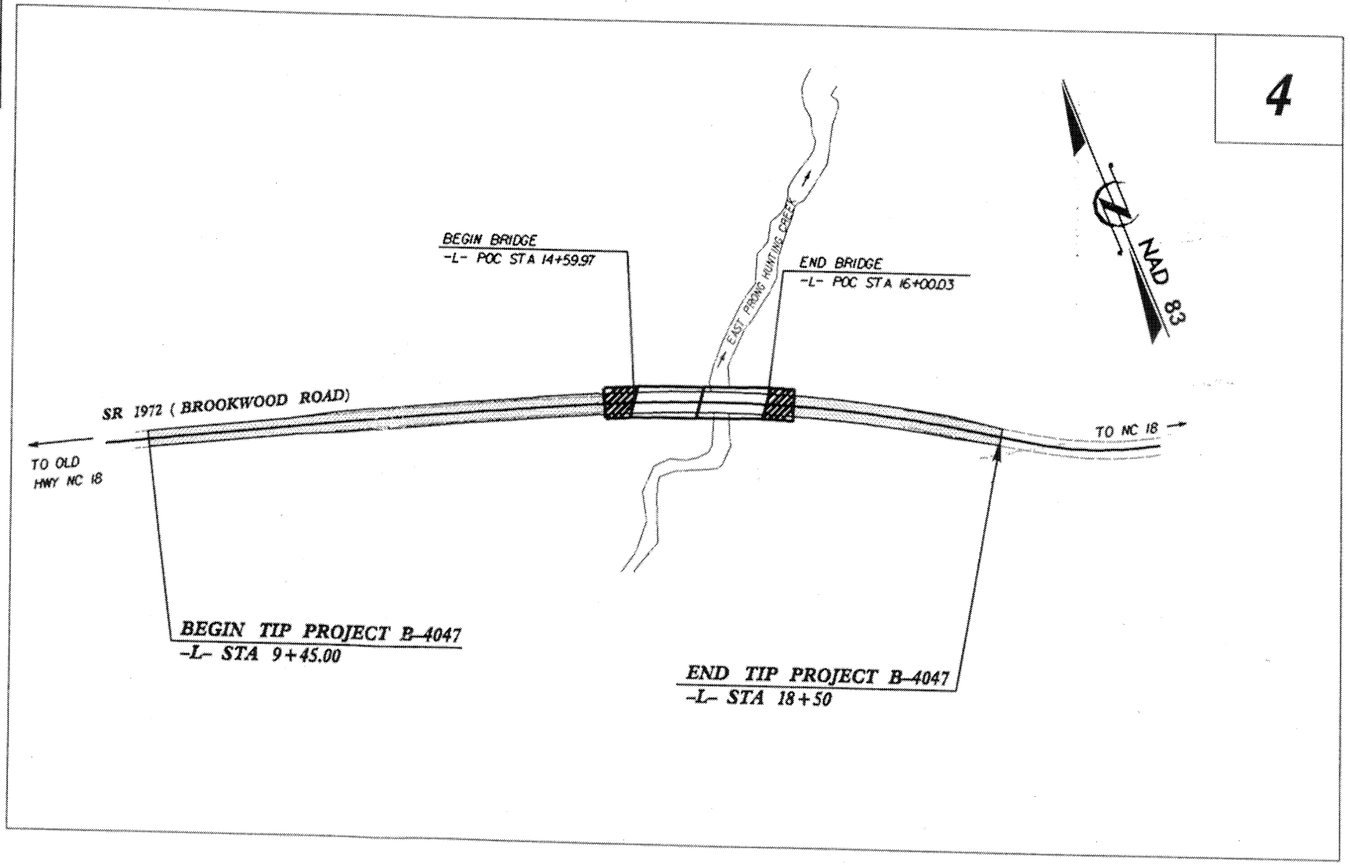
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33413.1.1	BRZ-1972(6)	PE
33413.2.1	BRZ-1972(6)	ROW & UTIL
33413.3.1	BRZ-1972(6)	CONSTR.

LOCATION: BRIDGE NO. 94 OVER A CREEK ON SR 1972

TYPE OF WORK: GRADING, DRAINAGE, STRUCTURE AND PAVING

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

4



GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2005 = 653
ADT 2025 = 1000
DHV = 12 %
D = 55 %
T = 3 % *
V = 60 MPH
FUNC CLASS = RURAL LOCAL
* TTST 1% + DUAL 2%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4047 = 0.145 MI
LENGTH STRUCTURE TIP PROJECT B-4047 = 0.026 MI
TOTAL LENGTH TIP PROJECT B-4047 = 0.171 MI

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 24, 2004

LETTING DATE: SEPTEMBER 20, 2005

GARY LOVERING, P.E.
PROJECT ENGINEER

ANTHONY WEST
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

16-DEC-2004 14:57
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mduval AT RDI88649

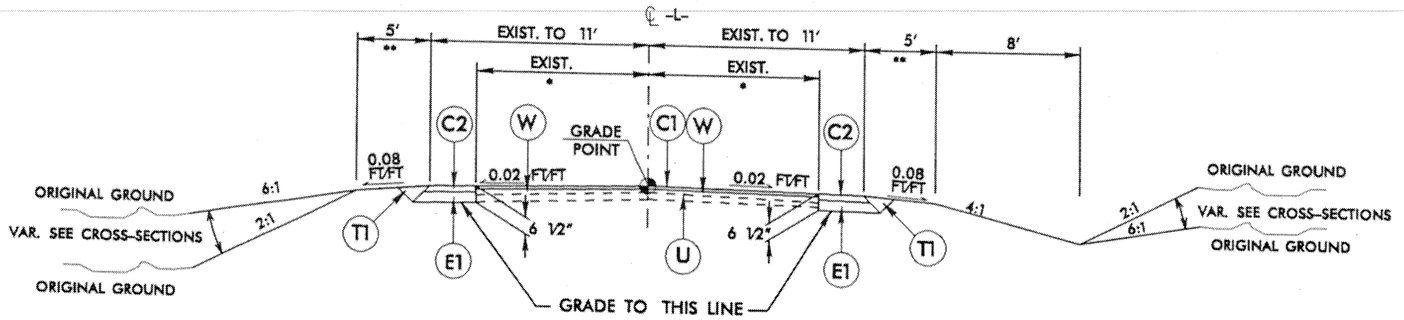
PROJECT REFERENCE NO.	SHEET NO.
B-4047	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE. TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD .
C2	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T1	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL).

** 8' W/GUARDRAIL



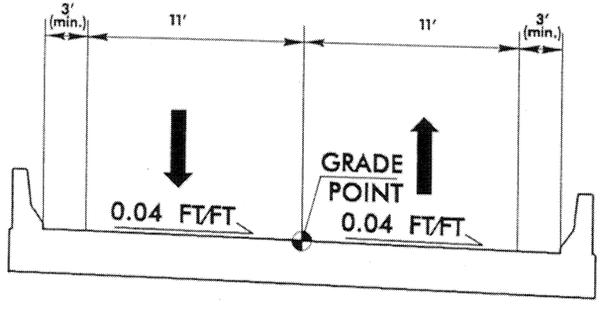
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

* -L- STA. 9+45 TO 11+00.00 (1 1/2" SF9.5A RESURFACING ONLY)

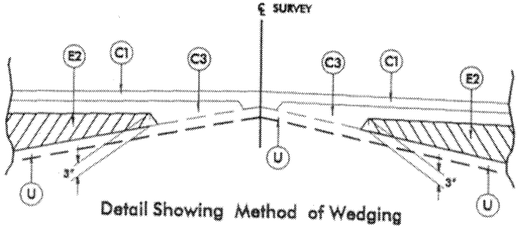
-L- STA. 11+00.00 TO 12+50.00

-L- STA. 16+50.00 TO 18+50.00



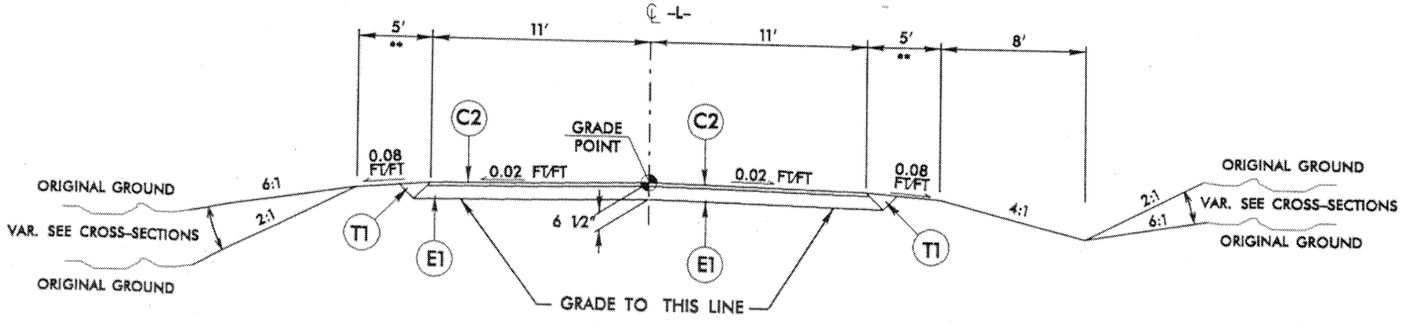
TYPICAL SECTION ON STRUCTURE

-L- STA 14+59.97 TO -L- STA. 16+00.03



Detail Showing Method of Wedging

** 8' W/GUARDRAIL



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 12+50.00 TO 14+59.97 (BRIDGE)

-L- STA. 16+00.03 (BRIDGE) TO 16+50.00

PROJECT REFERENCE NO.	SHEET NO.
B-4047	4
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/

PI Sta 9+54.09
Δ = 0° 57' 39.2" (RT)
D = 1° 08' 45.3"
L = 83.85'
T = 41.93'
R = 5,000.00'

PI Sta 12+72.70
Δ = 1° 44' 00.4" (RT)
D = 1° 00' 18.7"
L = 172.45'
T = 86.23'
R = 5,700.00'
e = SEE PLAN

PI Sta 16+14.58
Δ = 14° 21' 59.3" (RT)
D = 3° 48' 25.3"
L = 377.37'
T = 189.68'
R = 1,505.00'
e = SEE PLAN

PI Sta 20+19.28
Δ = 39° 27' 59.5" (LT)
D = 15° 29' 07.2"
L = 254.86'
T = 132.72'
R = 370.00'

NC GRID
NAD 83

POT Sta. 9+00.00

BEGIN TIP PROJECT B-4047
-L- STA 9+45

PT Sta. 9+96.01

-L- PC Sta. 11+86.47

-L- PT Sta. 13+58.92

-L- PC Sta. 14+24.90

BEGIN BRIDGE
-L- POC STA 14+59.97

BEGIN APPROACH SLAB
-L- POC STA 14+29.38

END BRIDGE
-L- POC STA 16+00.03

END OF APPROACH SLAB
-L- POC STA 16+28.32

PCSta. 18+86.56

-L- PT Sta. 18+02.27

END TIP PROJECT B-4047
-L- STA 18+50.00

1 JOHN & KATHY STROUPE
D.B. 650 PG 297-298

2 HARRIET T. STROUPE
D.B. 85 PG 11E N/A
D.B. 100 PG 625
D.B. 271 PG 659-660

3 HOVIS LEE & BETTY GENE GLADDEN
D.B. 142 PG 607

4 BROOKWOOD BAPTIST CHURCH
DB 214 PG 252

-BL- 2 -L- STA 11+99.75 (12.36' LT)

-BL- 6 -L- STA 15+19.77 (11.37' LT)

-BL- 3 -L- STA 17+50.99 (12.99' LT)

BM #1 -L- STA 12+01.53 (27.26' LT) ELEV. = 1078.74

BM #2 -L- STA 15+89.97 (82.76' LT) ELEV. 1072.55'

STD. 2' BASE DITCH W/PSRM SEE DETAIL D

2' BASE LATERAL DITCH W/PSRM SEE DETAIL B

SPECIAL CUT DITCH W/PSRM SEE DETAIL A

CL II RIP RAP EST. 3 TONS

S 74° 35' 39" E

S 75° 37' 59.9" E

S 77° 53' 59.5" E

S 57° 32' 00.2" E

R 12.00'

50.0' TAPER LT AND RT

40.0' INC.

26.5' INC.

BEGIN SBG STA. 14+23

END SBG STA. 16+35

CL II RIP RAP @ EMBANKMENT SEE DETAIL E EST. 150 TONS EST. 190 SY F.F.

CL II RIP RAP 7 TONS 17 SY FF

SPECIAL CUT DITCH SEE DETAIL G

SPECIAL CUT DITCH SEE DETAIL F

SPECIAL CUT DITCH W/PSRM SEE DETAIL A

2' BASE LATERAL DITCH W/PSRM SEE DETAIL B

STD. 'V' DITCH SEE DETAIL C

PILL HOLE & GRADE TO PROVIDE MIN. 1' COVER OVER PIPE EST. 35 CY

PLATTEN BANK TO 2:1 FROM 55' LT. TO 65' RT.

CLEAN OUT & MONITORING STATIONS

DRAIN LINES

SEPTIC TANK

GARDEN

ISBK PARSONAGE

ISBK BROOKWOOD BAPTIST CHURCH

BROOKWOOD CHURCH RD.

EAST PRONG HUNTING CREEK

SPRING CREEK

TELEPHONE

REMOVE SYSTEM

FALLOW

WOODS

BEGIN BRIDGE -L- POC STA 14+59.97
END BRIDGE -L- POC STA 16+00.03
END APPROACH SLAB -L- POC STA 16+28.32
TYPE III
3' MIN.
-L- POC Sta. 14+29.38 BEGIN APPROACH SLAB

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

NOTE : SEE SHEET 5 FOR -L- PROFILE
SEE SHEETS 5I TO 5 FOR STRUCTURE DESIGN

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Type of Liner = PSRM
STA. 9+45 TO STA. 13+50 -L- RT.
STA. 10+00 TO STA. 13+50 -L- LT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 2 Ft.
b = 5 Ft.
Type of Liner = PSRM
STA. 13+50 TO STA. 14+70 -L- LT. 76 CM DDE
STA. 13+50 TO STA. 14+50 -L- RT. 68 CM DDE

NOTE: EXTEND SBG FROM STA. 14+23 -L- RT. TO BEGIN BRIDGE RT. AND FROM END BRIDGE RT. TO STA. 16+35 -L- RT.

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)
Min. D = 1 Ft.
RT. OF STA. 14+45 -L-

DETAIL D
STANDARD BASE DITCH
(Not to Scale)
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 2 Ft.
Type of Liner = PSRM
STA. 14+70 TO STA. 15+45 -L- LT.

DETAIL E
RIP RAP AT EMBANKMENT
(Not to Scale)
CL II RIP RAP
PIPE
F.F.
Type of Liner = CL II RIP RAP
STA. 15+55 TO STA. 15+80 -L- FROM 25' LT. TO 65' RT.

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1 Ft.
STA. 16+10 TO STA. 17+00 -L- RT.

DETAIL G
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1 Ft.
STA. 17+50 TO STA. 18+50 -L- RT.

1"=100'

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mburt

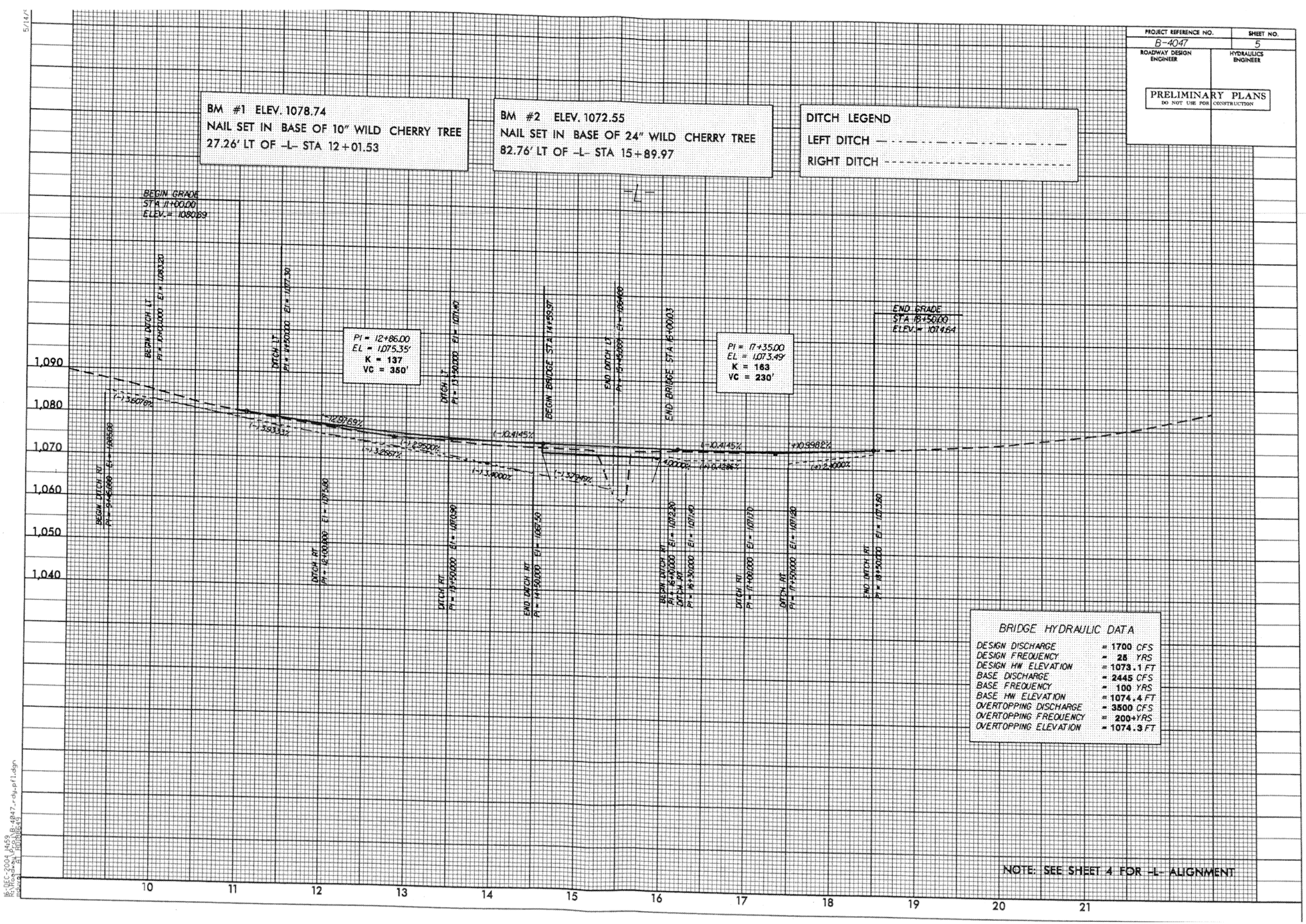
PROJECT REFERENCE NO.	SHEET NO.
B-4047	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM #1 ELEV. 1078.74
NAIL SET IN BASE OF 10" WILD CHERRY TREE
27.26' LT OF -L- STA 12+01.53

BM #2 ELEV. 1072.55
NAIL SET IN BASE OF 24" WILD CHERRY TREE
82.76' LT OF -L- STA 15+89.97

DITCH LEGEND
LEFT DITCH — - — - — - — - — - —
RIGHT DITCH -



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1700 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 1073.1 FT
BASE DISCHARGE	= 2445 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1074.4 FT
OVERTOPPING DISCHARGE	= 3500 CFS
OVERTOPPING FREQUENCY	= 200+YRS
OVERTOPPING ELEVATION	= 1074.3 FT

NOTE: SEE SHEET 4 FOR -L- ALIGNMENT

16-DEC-2004 14:59
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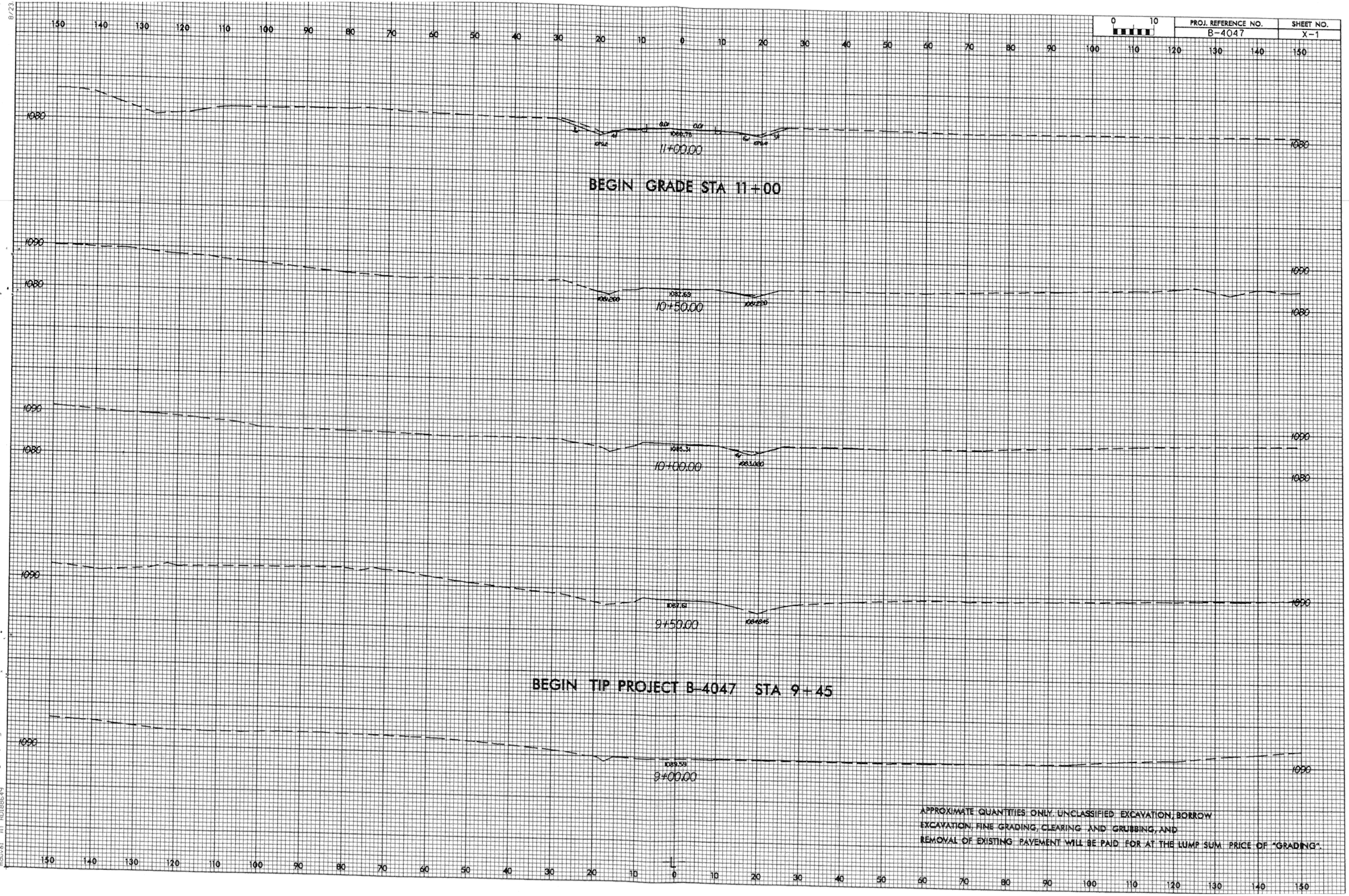
mdw1
24" PORTRAIT

	PROJ. REFERENCE NO.	SHEET NO.
0 10	B-4047	X-1



BEGIN GRADE STA 11+00

BEGIN TIP PROJECT B-4047 STA 9+45

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW
EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND
REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE OF "GRADING".

16-DEC-2004 15:00
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mduvel AT RD188649

PROJ. REFERENCE NO.	SHEET NO.
B-4047	X-2

0 10

13+00.00

12+50.00

12+00.00

11+50.00

1080

1090

16-DEC-2004 15:00
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mdot_pw_user

PROJ. REFERENCE NO.	SHEET NO.
B-4047	X-3

0 10

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

1070

0.04 0.04

1069.82

15+50.00

1070

0.04 0.04

1075.38

2% 2% 1065.7

15+00.00

BEGIN BRIDGE STA 14+59.97

1070

0.04 0.04

1073.66

2% 2% 1067.6 1067.5

14+50.00

1070

0.04 0.04

1075.95

2% 2% 1069.3 1069.2

14+00.00

1080

1070

0.035 0.035

1074.64

2% 2% 1070.4 1070.3

13+50.00

1070

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

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mdavis
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PROJ. REFERENCE NO.	SHEET NO.
B-4047	X-4

17+50.00

17+00.00

16+50.00

END BRIDGE STA 16+00.03

16+00.00

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Bentley PowerPlot V8i (SELECTseries 1)

PROJ. REFERENCE NO.	SHEET NO.
B-4047	X-5

1074.97
19+00.00

1074.52
18+50.00

END TIP PROJECT STA 18+50

1074.03
15+00.00

16-DEC-2004 15:03
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