STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 19, 2007

U.S. Army Corps of Engineers
Raleigh Regulatory Field Office
6508 Falls of Neuse Road, Suite 120
Raleigh, NC 27615-6814

ATTENTION: Mr. Andrew Williams
NCDOT Coordinator, Division 7

Dear Sir:

SUBJECT: **Application for Section 404 Nationwide Permits 23 and 33** for the replacement of Bridge No. 108 over New Hope Creek on SR 1730 (Turkey Farm Rd.), Orange County, Division 7. Federal Aid Project No. BRZ-1730 (5), WBS Element 33563.1.1, T.I.P. No. B-4218.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 108 over New Hope Creek on SR 1730 (Turkey Farm Rd.) in Orange County. The project proposes to demolish the existing bridge and construct a two span, pre-stressed concrete box beam superstructure on concrete caps and drilled piers on the existing horizontal alignment. The interior bent of the bridge will be located within the area of normal stream flow in New Hope Creek. The new bridge will be 119 feet long and will have a clear roadway width of 27 feet, 6 inches. The structure will have two 10-foot lanes and 3-foot, 9-inch shoulders. The bridge approaches will have two 10-foot lanes, with 6-foot grass shoulders. The shoulders of the approaches will be widened to 9 feet where guardrail is present. During construction, SR 1730 will be closed near the existing bridge and traffic will be re-routed using an offsite detour.

Please see the enclosed copies of the permit drawings, design plans, Pre-Construction Notification (PCN), and U.S. Fish and Wildlife Service (USFWS) concurrence letter for the above-referenced project. The Programmatic Categorical Exclusion (PCE) was completed for this project in January 2006 and distributed shortly thereafter. Additional copies of this document are available upon request.

IMPACTS TO WATERS OF THE UNITED STATES

General Description

The project is located in the Cape Fear River Basin (sub-basin 03-06-05) in Orange County. This area is part of Hydrologic Cataloging Unit 03030002. New Hope Creek is the only water resource located within the construction limits of this project. A Jurisdictional Determination was issued for this project on June 6, 2003.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1334
FAX: 919-715-1501
WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD., SUITE 240
RALEIGH NC 27604

New Hope Creek is a perennial stream that flows northwest to southeast underneath the existing bridge. The portion of New Hope Creek that flows through the construction limits is assigned Stream Index Number 16-41-1-(0.5) (12/01/1983) by the N.C. Division of Water Quality (NCDWQ) and has a best usage classification of **C NSW**. The creek has a top of bank width of 50 to 75 feet, an average wetted width of 50 feet, and 3- to 10-foot tall stable stream banks. During field investigations associated with the NRTR, 1 to 3 feet of slow to fast flowing water was observed (conditions varied because a long reach of the channel was investigated). The water clarity was described as being clear with moderate sediment deposition and the substrate was primarily composed of bedrock, cobble, gravel, and sand.

Neither High Quality Waters (HQW), Water Supplies (WS I or WS II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area. Additionally, no portion of New Hope Creek, its tributaries, or other surface waters within 1.0 mile of the project are listed on the NCDWQ 2006 Final 303(d) List of Impaired Waters.

The North Carolina Wildlife Resource Commission (WRC) believes that a significant fishery for sunfish exists in New Hope Creek at this site and requests an in-water work moratorium for sunfish from April 1 to June 30. Due to the lack of statutory regulations requiring this moratorium and the minimal in-water work proposed, NCDOT does not believe this moratorium is warranted and will not adhere to the request.

Permanent Impacts

There will be a total of 29 square feet (less than 0.01 acres) of permanent stream impacts to New Hope Creek due to the placement of an interior bent within the area of normal stream flow (not shown on drawings, but at Site 1). The three drilled piers associated with the bent are 3 feet, 6 inches in diameter. Placing the interior bent in the creek is unavoidable because it is not possible to raise the grade of the road, get sufficient superstructure depth, and remove the bent from the water without affecting the 100-year floodway.

Temporary Impacts

A temporary causeway will be placed into New Hope Creek to allow for the construction of the new interior bent drilled piers (Site 1). The temporary structure will be constructed on the eastern side of the creek. The causeway will be composed of Class II rip rap topped with a coarse aggregate surface, as needed. The Class II rip rap will be placed on the streambed below the observed high water (OHW) mark and will result in 0.02 acres (55 linear feet) of temporary impacts to the stream.

Bridge Demolition

The superstructure of Bridge No. 108 consists of three spans, one at 17 feet, 9 inches, one at 40 feet, and one at 17 feet, 11 inches. The superstructure is comprised of an asphalt wearing surface on a timber deck atop steel I-beams. The existing substructure consists of timber caps on timber piles. The timber piles of the interior bents sit atop concrete footers and are surrounded by concrete encasements. The piles will be removed to the top of the concrete encasements.

NCDOT shall adhere to NCDOT's Best Management Practices (BMPs) for Bridge Demolition and Removal. While there is minimal potential for some of components of the bridge to be dropped into New Hope Creek, demolition should result in no appreciable fill.

Utility Impacts

No impacts to jurisdictional waters will occur as a result of utility work associated with this project. The only utility work being performed within the construction limits is associated with the relocation of a

power pole line. The existing overhead line is located on the south side of SR 1730 from Station 13+25 ± to Station 14+36 ±. The line will be relocated within the existing right-of way (ROW) on the same side of the road and will not impact New Hope Creek.

RESTORATION PLAN

The stone materials used as temporary fill in the construction of the causeway will be removed from the streambed. The temporary fill areas will be restored back to their pre-project elevations. NCDOT will also restore the streambed to its pre-project contours.

REMOVAL AND DISPOSAL PLAN

The temporary causeway will be removed from the stream after the in-water bent of the new structure is constructed. All stone material placed in the stream for construction of the causeway will be removed by the contractor using excavation equipment. The contractor will be required to submit a reclamation plan for the removal of and disposal of all material off-site at an upland location. The contractor will have the option of reusing any of the materials that the engineer deems suitable in the construction of project.

AVOIDANCE, MINIMIZATION, AND COMPENSATORY MITIGATION

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

According to the Clean Water Act (CWA) §404(b)(1) guidelines, NCDOT must avoid, minimize, and mitigate, in sequential order, impacts to waters of the US. The following is a list of the project's jurisdictional stream avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- In-stream activity will be limited to the use of a temporary causeway for bent construction and the placement of the bent into New Hope Creek.
- During construction, traffic will be re-routed using an off-site detour.
- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of NCDOT's BMPs for Protection of Surface Waters.
- Due to the presence of a unique freshwater mussel assemblage, including several Federal Species of Concern (FSC), Design Standards in Sensitive Watersheds will also be employed.
- NCDOT will implement its BMP's for Bridge Demolition and Removal during this project.

Compensatory Mitigation

No mitigation is proposed for the 29 square feet (less than 0.01 acres) of permanent stream impacts to New Hope Creek because of the minimal amount of impact.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of its most recent update on May 10, 2007, the USFWS website lists five federally-protected species for Orange County: the bald eagle (*Haliaeetus*

leucocephalus), red-cockaded woodpecker (*Picoides borealis*), dwarf wedgemussel (*Alasmidonta heteredon*), Michaux's sumac (*Rhus michauxii*), and smooth coneflower (*Echinacea laevigata*). USFWS concurrence for biological conclusions assigned to the above-listed species (except the bald eagle) was received on February 25, 2005 (concurrence letter attached). The bald eagle was not listed for Orange County at the time concurrence was requested.

Table 1. Federally protected species in Orange County

Scientific Name	Common Name	Federal Status	Biological Conclusion	Habitat Present
Haliaeetus leucocephalus	bald eagle	De-listed	Not Required	No
Picoides borealis	red-cockaded woodpecker	E	No Effect	No
Alasmidonta heteredon	dwarf wedgemussel	E	May Affect, Not Likely to Adversely Affect	Yes
Rhus michauxii	Michaux's sumac	E	No Effect	Yes
Echinacea laevigata	smooth coneflower	E	No Effect	Yes

The bald eagle was not listed for Orange County prior to the completion of the NRTR and was not included in either that document or the PCE. A survey for suitable bald eagle nesting and foraging habitat was conducted on March 16, 2007 by NCDOT biologists Jim Mason, Ashley Cox, and James Pflaum. No bald eagle individuals or nests were observed during the survey. Additionally, no suitable nesting or foraging habitat exists within the project study area or within 1.0 mile of the project. Furthermore, a search of the North Carolina Natural Heritage Program (NCNHP) database (GIS shapefiles most recently updated on September 28, 2007) revealed no known populations of this species within 1.0 mile of the project. Therefore, this project will not affect this species. According to a July 9, 2007 Federal Register release, the bald eagle was officially de-listed from the List of Endangered and Threatened Wildlife effective August 8, 2007 (50 CFR Part 17).

A species survey and habitat assessment for the red-cockaded woodpecker was performed as part of NRTR-related fieldwork in January 2003. No individuals or cavity trees were observed within the project area or on adjacent properties. Additionally, no suitable foraging or nesting habitat exists within the project study area. There were no large tracts of mature pines present and the tall/dense understory in the hardwood/pine forest was not usable foraging habitat for this species. Furthermore, a search of the NCNHP database on October 11, 2007 revealed no known populations of this species within 1.0 mile of the project. Therefore, a biological conclusion of **No Effect** has been rendered for this species.

New Hope Creek was surveyed by the Catena Group for dwarf wedgemussel habitat and individuals on April 24, 2004, September 14, 2004, and November 3, 2004. Multiple surveys were conducted because the diversity and abundance of mussel species observed required more in-depth and lengthy surveys. Visual and tactile methods were used and a total of 13.25 man-hours were spent within the survey reach. At least nine species of freshwater mussels were found in New Hope Creek, including the FSC-listed brook floater (*Alasmidonta varicosa*), Carolina creekshell (*Villosa vaughaniana*), and Atlantic pigtoe (*Fusconaia masoni*). No dwarf wedgemussel individuals were found. New Hope Creek could provide potential habitat for the dwarf wedgemussel; however, due to the limited and questionable records of this species from the Cape Fear River Basin, it is unlikely that the dwarf wedgemussel occurs in the surveyed reach of this creek. Additionally, a search of the NCNHP database on October 11, 2007 revealed no

known populations of this species within 1.0 mile of the project. Therefore, a biological conclusion of **May Affect, Not Likely to Adversely Affect** was assigned to this species.

A survey for Michaux's sumac was initially performed by NCDOT biologists Brett Feulner and Heather Montague on July 9, 2003. Suitable habitat for the species existed within the project study area, but individuals were not observed. Only winged sumac (*Rhus copallinum*) was identified. A re-survey was performed by NCDOT biologists James Mason and Ashley Cox on September 17, 2007. Again, potential habitat was observed, but no individuals were identified. Additionally, a search of the NCNHP database on October 11, 2007 revealed no known populations of this species within 1.0 mile of the project. Therefore, it can be concluded that this project will have **No Effect** on this species.

A survey for smooth coneflower was initially performed by NCDOT biologists Brett Feulner and Heather Montague on July 9, 2003. Suitable habitat for the species existed within the project study area, but individuals were not observed. A re-survey was performed by NCDOT biologists James Mason and Ashley Cox on September 17, 2007. Observations made during this survey were similar to the 2003 survey. A search of the NCNHP database on October 11, 2007 revealed no known populations of this species within 1.0 mile of the project. Therefore, it can be concluded that this project will have **No Effect** on this species.

SCHEDULE

The project calls for a review date of May 27, 2008, a letting of July 15, 2008, and a date of availability of August 26, 2008. It is expected that the contractor will choose to start construction in August/September 2008.

REGULATORY APPROVALS

Section 404 Permit: This project has been processed by the Federal Highway Administration as a "Categorical Exclusion" (CE) in accordance with 23 CFR 771.115(b). The NCDOT requests that activities described in the CE document be authorized by a Nationwide Permit 23 (72 FR 11092-11198; March 12, 2007).

A request is also hereby submitted for Nationwide Permit 33, issued under Section 404 of the CWA, authorizing activities associated with this project that will result in temporary impacts to jurisdictional waters.

Section 401 Permit: We anticipate that Section 401 General Water Quality Certifications (WQC) 3632 and 3634 will apply to this project. The NCDOT will adhere to all general conditions of these WQCs. Therefore, written concurrence from the NCDWQ is not required. In accordance with 15A NCAC 2H, Section .0500 (a) and 15A NCAC 2B, Section .0200, we are providing two copies of this application to the North Carolina Department of Environment and Natural Resources (NCDENR), NCDWQ, as notification.

A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information please call Mr. Jim Mason at (919) 715-5531.

Sincerely,

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

w/attachment

Mr. John Hennessy, NCDWQ (2 Copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Mark Staley, Roadside Environmental
Mr. J. M. Mills, P.E., Division 7 Engineer
Mr. Jerry Parker, Division 7 Environmental Officer

w/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Tracy Walter, PDEA Project Planning Engineer
Mr. Scott McLendon, USACE, Wilmington

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: Nationwides 23 and 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: Gregory J. Thorpe, Ph.D., Environmental Management Director
   Mailing Address: North Carolina Department of Transportation
   1598 Mail Service Center
   Raleigh, NC 27699-1598
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: _____

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

III. Project Information

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

1. Name of project: Replacement of Bridge No. 108 over New Hope Creek on SR 1730 (Turkey Farm Rd.).

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4218

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

4. Location
   County: Orange Nearest Town: Chapel Hill
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): West of Interstate 40, right on NC 86, right onto SR 1731 (Whitfield Rd), left onto SR 1730 (Turkey Farm Rd), 1st bridge at bottom of hill.

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): _____ °N _____ °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: New Hope Creek

8. River Basin: Cape Fear
   (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: Bridge 108 is 76 feet long and was constructed in 1953. Land use in the area is mainly agriculture- and forestry-based, with some low-density residential development.

10. Describe the overall project in detail, including the type of equipment to be used: The project proposes to demolish the existing bridge and construct a two span, pre-stressed concrete box beam superstructure on concrete caps and drilled piers on the existing horizontal alignment. The interior bent of the bridge will be located within the area of normal stream flow in New Hope Creek. The new bridge will be 119 feet long and will have a clear roadway width of 27 feet, 6 inches. The structure will have two 10-foot lanes and 3-foot, 9-inch shoulders. The bridge approaches will have two 10-foot lanes, with 6-foot grass shoulders. The shoulders of the approaches will be widened to 9 feet where guardrail is present. During construction, SR 1730 will be closed near the existing bridge and traffic will be re-routed using an offsite detour. Heavy duty excavation equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction

11. Explain the purpose of the proposed work: The current 76-foot bridge was constructed in 1953 and has a sufficiency rating of 24.2 out of a possible 100 (for a new structure). Additionally, the current bridge received both a structural appraisal and a deck geometry appraisal of 2 out of 9 according to Federal Highway Administration (FHWA) standards. It is therefore considered structurally deficient and functionally obsolete and eligible for FHWA's Highway Bridge Replacement Program.

IV. Prior Project History

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

V. Future Project Plans

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

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from rip rap 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: New Hope Creek is the only water resource located within the construction limits of this project. There will be a total of 29 square feet (less than 0.01 acres) of permanent stream impacts to New Hope Creek due to the placement of an interior bent within the area of normal stream flow. The three drilled piers associated with the bent are 3 feet, 6 inches in diameter. Placing the interior bent in the creek is unavoidable because it is not possible to raise the grade of the road, get sufficient superstructure depth, and remove the bent from the water without affecting the 100-year floodway. A temporary causeway will be placed into New Hope Creek to allow for the construction of the new interior bent drilled piers. The causeway will be composed of Class II rip rap topped with a coarse aggregate surface, as needed. The Class II rip rap will be placed on the streambed below the observed high water (OHW) mark and will result in 0.02 acres (55 linear feet) of temporary impacts to the stream.

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)
Total Wetland Impact (acres)					0.0

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

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)
1	New Hope Creek	In-water bent	Perennial	50		>0.01
1	New Hope Creek	Temp. causeway	Perennial	50	55	0.02
Total Stream Impact (by length and acreage)					55	0.02

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)
Total Open Water Impact (acres)				0.0

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

Stream Impact (acres):	0.02
Wetland Impact (acres):	0.0
Open Water Impact (acres):	0.0
Total Impact to Waters of the U.S. (acres)	0.02
Total Stream Impact (linear feet):	55

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.
   N/A

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. See cover sheet.

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.

N/A

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): 0
   Amount of buffer mitigation requested (square feet): 0
   Amount of Riparian wetland mitigation requested (acres): 0.0
   Amount of Non-riparian wetland mitigation requested (acres): 0.0
   Amount of Coastal wetland mitigation requested (acres): 0.0

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	0.0		0.0

* 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.N/A

XII. Sewage Disposal (required by DWQ)

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

XIII. Violations (required by DWQ)

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

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

XIV. 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:
N/A

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).
N/A

E.F. Lusk 10.19.07

Applicant/Agent's Signature **Date**
(Agent's signature is valid only if an authorization letter from the applicant is provided.)

B. Teulner

RECEIVED

FEB 28 2005

DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

February 25, 2005

Phil Harris
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

This letter is in response to your letter of February 11, 2005 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation (NCDOT) that the replacement of Bridge No. 108 on SR 1730 over New Hope Creek in Orange County (TIP No. B-4218) may affect, but is not likely to adversely affect the federally endangered dwarf wedgemussel. In addition, NCDOT had determined that the project will have no effect on the federally listed Michaux's sumac (*Rhus michauxii*), small whorled pogonia (*Isotria medeoloides*), smooth coneflower (*Echinacea laevigata*) and red-cockaded woodpecker (*Picoides borealis*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to information provided, mussel surveys were conducted at the project site on April 24, September 14 and November 3 of 2004. The surveys extended 100 meters upstream and 400 meters downstream of SR 1730. The dwarf wedgemussel was not observed. New Hope Creek is in the Cape Fear River Basin. Though there is one old and questionable record of the species in the Cape Fear River Basin, the record was never verified and no voucher specimen exists for the record. Current information suggests that the dwarf wedgemussel does not currently occur in the Cape Fear River Basin.

Though no federally protected mussel species were observed during the surveys, the surveys revealed a rich assemblage of mussel fauna at and near the site. Two federal species of concern, brook floater (*Alasmidonta varicosa*) and Carolina creekshell (*Villosa vaughaniana*), and an undescribed *Lampsilis* species were observed. The Service encourages NCDOT to make every effort to protect this diverse mussel bed. Typical conservation measures used for federally protected species would serve to help conserve this important resource.

The Service does not have any documentation for the 2004 surveys that NCDOT conducted for Michaux's sumac, small whorled pogonia, smooth coneflower and red-cockaded woodpecker. However, we have no reason to dispute your "no effect" determination for these species. Please note that small whorled pogonia is no longer listed for Orange County.

Based on the information provided and other information available, the Service concurs with your determination that the proposed bridge replacement may affect, but is not likely to adversely affect the dwarf wedgemussel. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

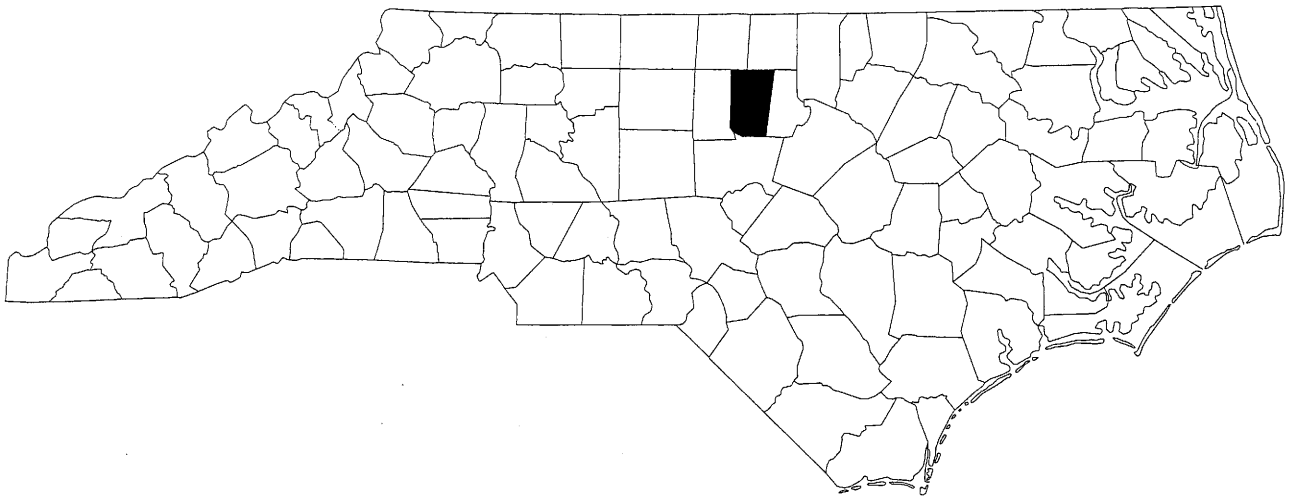
The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

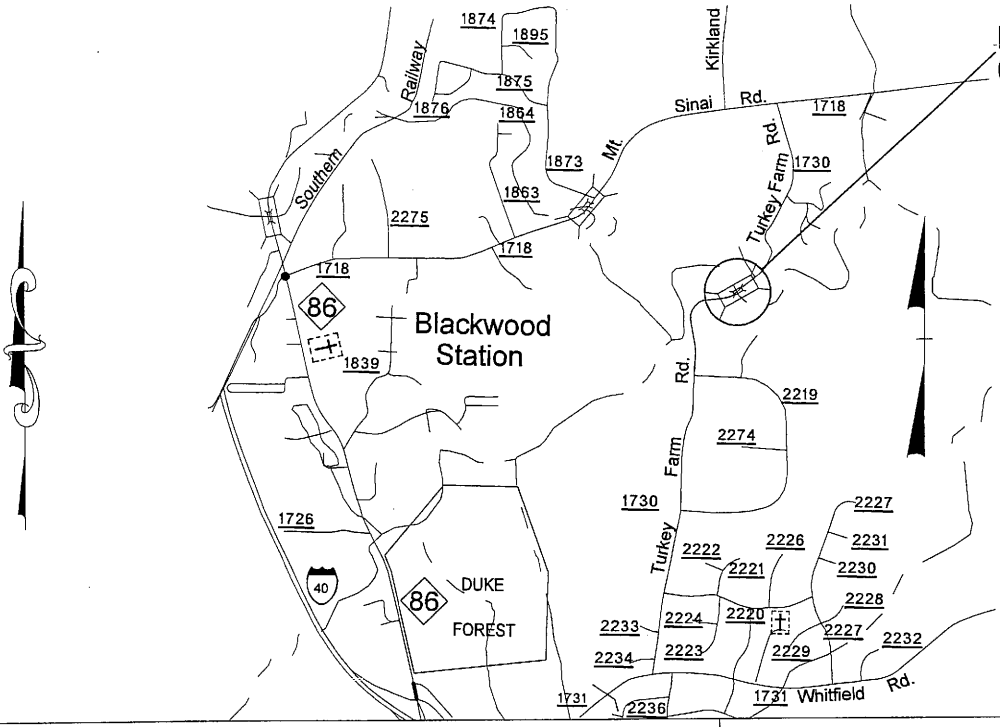
Sincerely,

John Hammond
Acting Ecological Services Supervisor

cc: John Thomas, USACE, Raleigh, NC
Beth Barnes, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC

NORTH CAROLINA





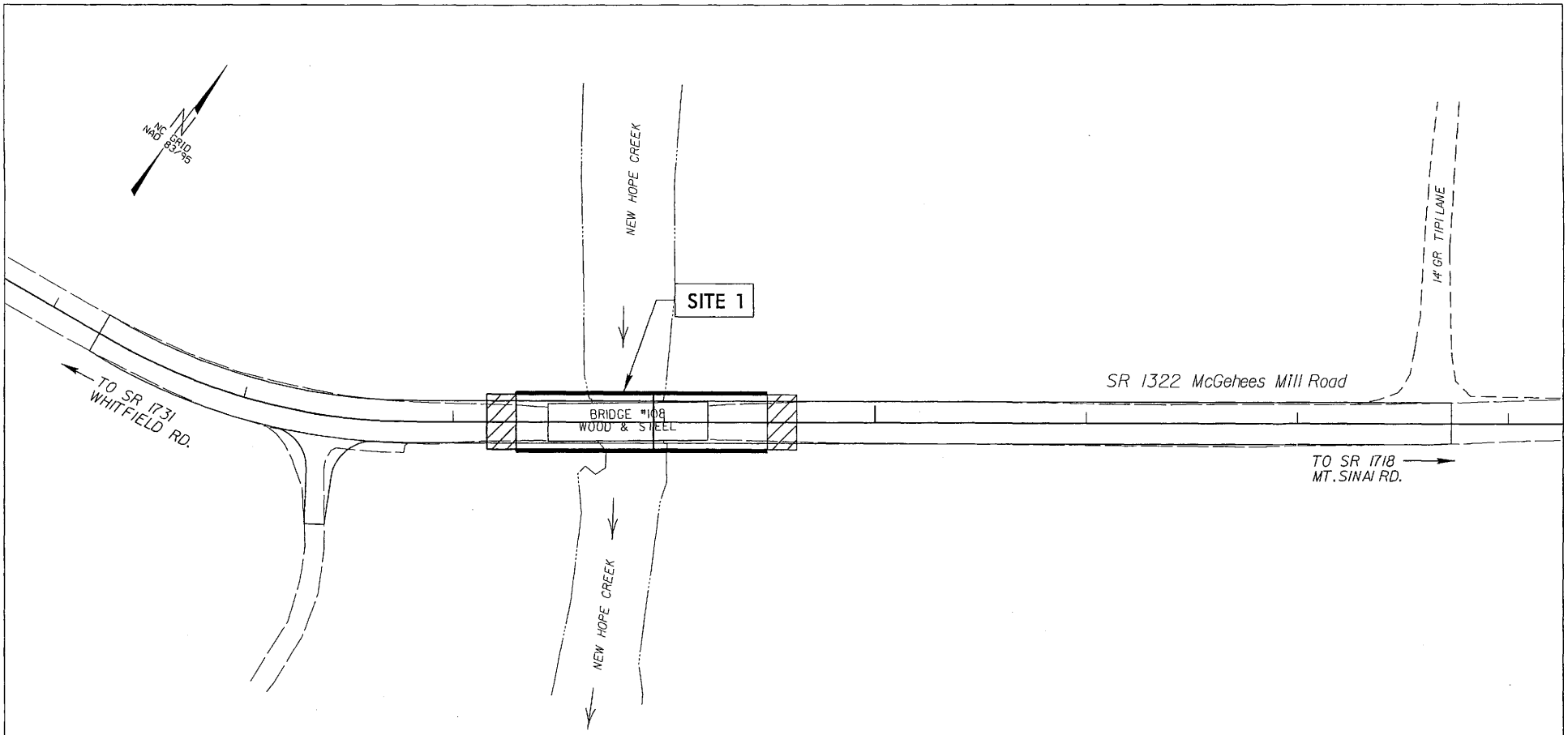
VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: B-4218
BRIDGE NO. 108 OVER
NEW HOPE CREEK
ON SR 1730
(TURKEY FARM ROAD)

SHEET 1 OF 8

7/26/2007



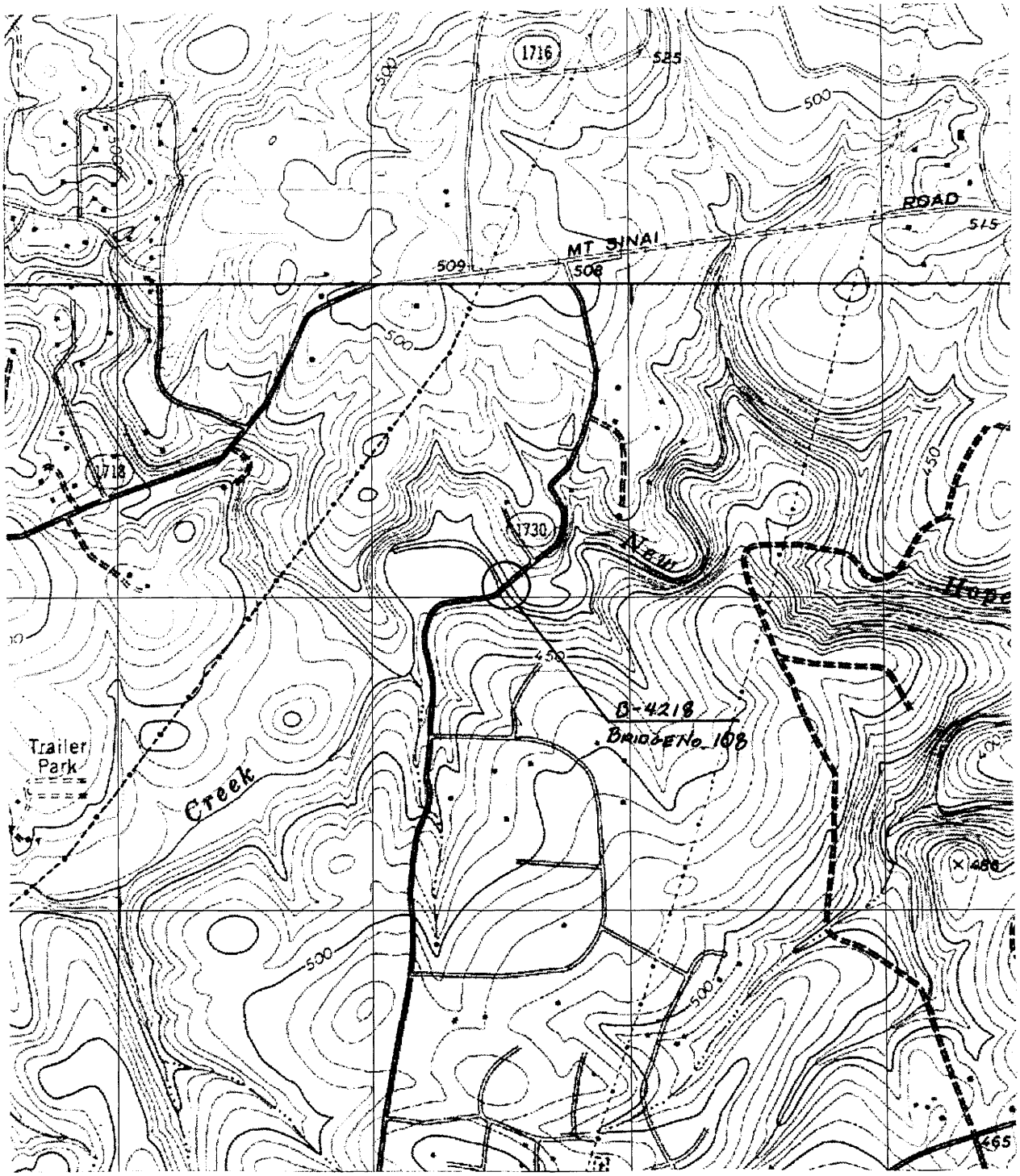
SITE MAP

NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: B-4218
BRIDGE NO. 108 OVER
NEW HOPE CREEK
ON SR 1730
(TURKEY FARM ROAD)

SHEET 2 OF 8 7 / 26 / 2007



TOPO MAP

SCALE: 1" : 1500'

NCDOT

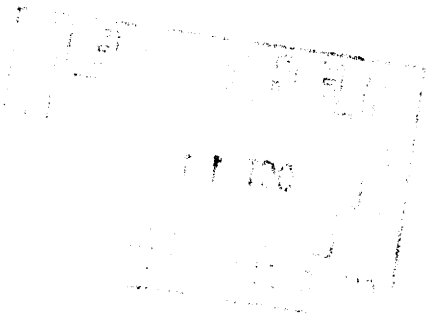
DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: B-4218
BRIDGE NO. 108 OVER
NEW HOPE CREEK
ON SR 1730
(TURKEY FARM ROAD)

SHEET 3 OF 8 7 / 26 / 2007

PROPERTY OWNERS

NAMES AND ADDRESSES

	NAMES	ADDRESSES
1	Triangle Land Conservancy	1100-A Wake Forest Road Raleigh, NC 27604
2	Granger Family Limited Partnership	5906 Turkey Farm Road Chapel Hill, NC 27514
3	Lockridge Community Association	5518 Turkey Farm Road Durham, NC 27705
4	Lockridge Community Association	5518 Turkey Farm Road Durham, NC 27705



NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: B-4218
BRIDGE NO. 108 OVER
NEW HOPE CREEK
ON SR 1730
(TURKEY FARM ROAD)

SHEET 4 OF 8 7/26/2007

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	13+90 -L- +/-	27" Box Beam							0.02		55	
		Bridge 2 Span										
		1@65', 1@54'										
TOTALS:									0.02		55	

NOTE: PERMANENT SURFACE WATER IMPACT DUE TO THE PROPOSED PIER IS 29 SQUARE FEET.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Orange County
Project: B-4218 (Bridge #108)

SHEET 5 of 8 9/7/2007

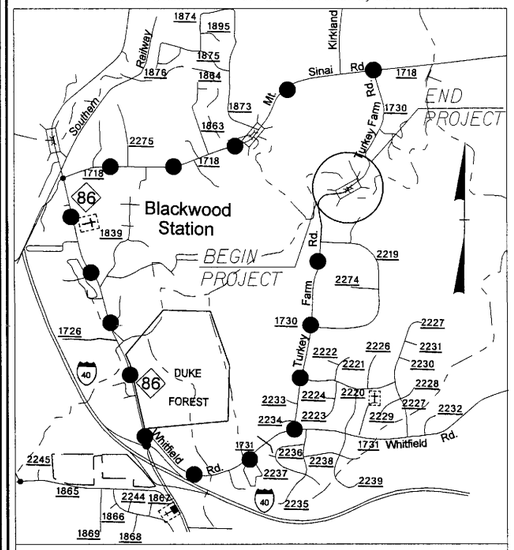
ATN Revised 3/31/05

09/08/99

TIP PROJECT: B-4218

PROJECT: 33563.2.1

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



VICINITY MAP
DETOUR ROUTE

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

NOTE:
DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVATURE, VERTICAL CURVE K VALUE, MAXIMUM SUPER AND MINIMUM SHOULDER WIDTH.

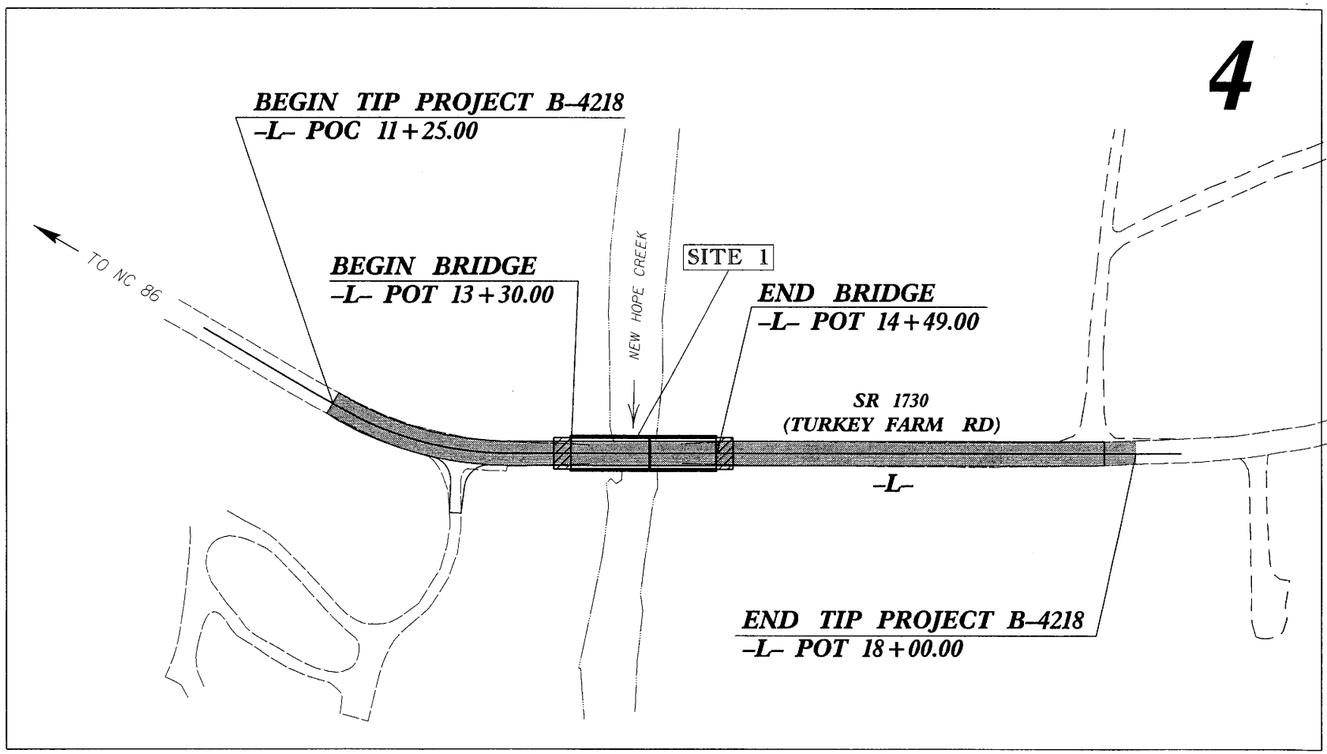
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ORANGE COUNTY

LOCATION: BRIDGE NO. 108 OVER NEW HOPE CREEK ON SR 1730 (TURKEY FARM ROAD)

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

STREAM & WETLAND IMPACTS



4

NAD 83/95

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4218	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33563.1.1	BRZ-1730(5)	P.E.
33563.2.1	BRZ-1730(5)	R/W & UTIL.

R/W PLANS
SUBMITTED: 7/17/07

Permit Drawing
Sheet 6 of 8

RECEIVED
SEP 10 2007
DIVISION OF HIGHWAYS
HYDRAULICS UNIT

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NCDOT CONTACT: CATHY HOUSER, PE
PROJECT ENGINEER - ROADWAY DESIGN, ENGINEERING COORDINATION
ROBERT J. STROUP, PE
PROJECT DESIGN ENGINEER - ROADWAY DESIGN, ENGINEERING COORDINATION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 681
ADT 2028 = 1,291
DHV = 10 %
D = 60 %
T = 4 % *
V = 40 MPH
* TTST 1 DUAL 3
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4218 = 0.105 mi
LENGTH STRUCTURE TIP PROJECT B-4218 = 0.023 mi
TOTAL LENGTH OF TIP PROJECT B-4218 = 0.128 mi

PLANS PREPARED BY:

CH ENGINEERING
PO BOX 3028 RALEIGH, NC 27622
TELE 919.788.0224 FAX 919.788.0232

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 20, 2007

LETTING DATE:
JULY 15, 2008

PLANS PREPARED FOR:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh, NC 27610

RHONDA B. EARLY, PE
PROJECT ENGINEER

THOMAS R. HEPLER, PE, PLS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

MULKEY, INC.

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

9/7/2007
R:\Hydraulics\Permits\B4218_hyd_prm_tsh.dgn
4:15:34 PM

9/7/2007 4:15:33 PM R:\Hydraulics\Permits\B4218_hyd_prm_tsh.dgn

STREAM & WETLAND IMPACTS

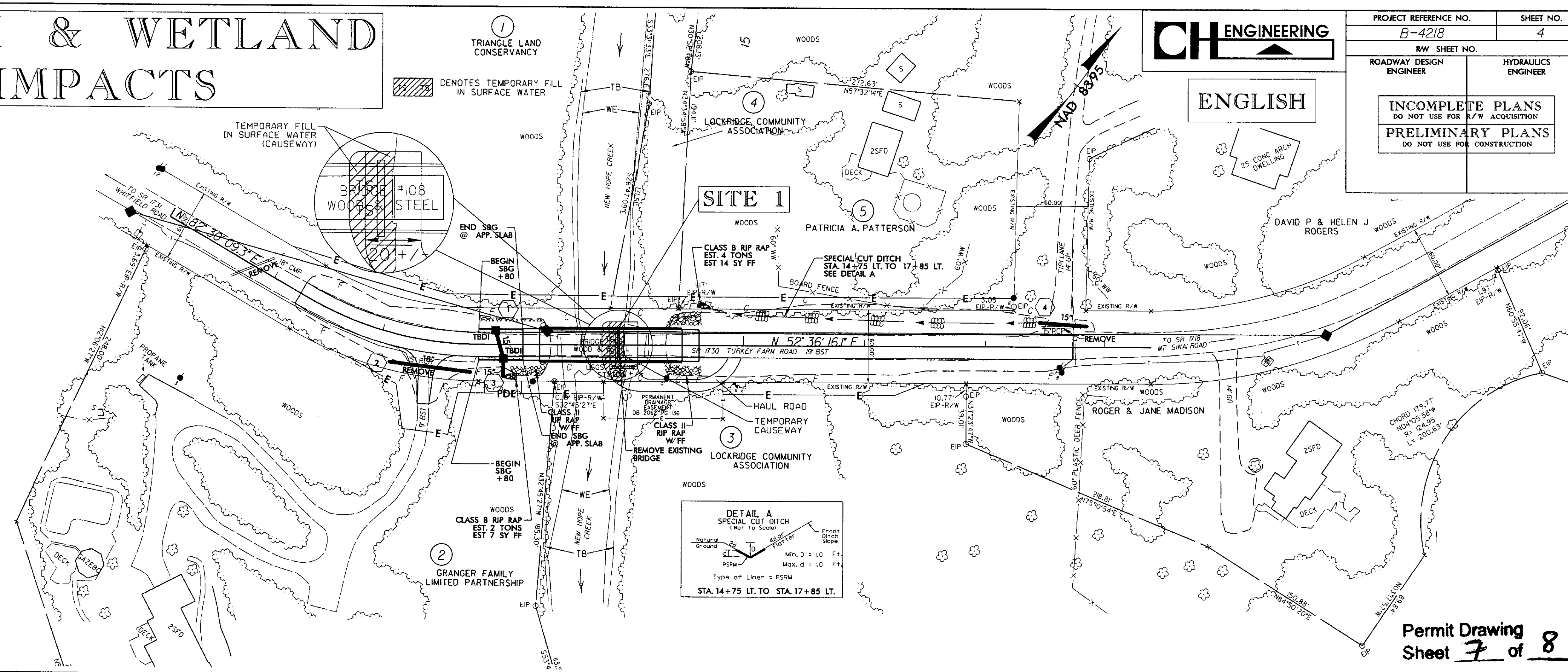
PROJECT REFERENCE NO.	SHEET NO.
B-4218	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

CH ENGINEERING

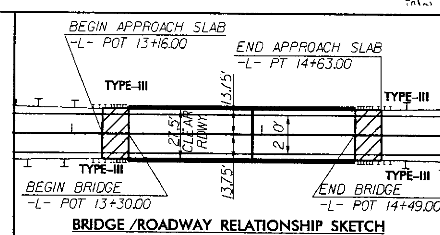
ENGLISH



DENOTES TEMPORARY FILL IN SURFACE WATER
TEMPORARY FILL IN SURFACE WATER (CAUSEWAY)
1 TRIANGLE LAND CONSERVANCY
2 GRANGER FAMILY LIMITED PARTNERSHIP
3 LOCKRIDGE COMMUNITY ASSOCIATION
4 LOCKRIDGE COMMUNITY ASSOCIATION
5 PATRICIA A. PATTERSON
DAVID P & HELEN J ROGERS
ROGER & JANE MADISON
SITE 1
NAD 83/95
BRIDGE #108 WOOD ST STEEL
NEW HOPE CREEK
SR 1730 TURKEY FARM ROAD
TO SR 1731 WHITFIELD ROAD
TO SR 1718 MT SINAI ROAD
CLASS B RIP RAP EST. 4 TONS EST 14 SY FF
SPECIAL CUT DITCH STA. 14+75 LT. TO 17+85 LT. SEE DETAIL A
CLASS B RIP RAP EST. 2 TONS EST 7 SY FF
HAUL ROAD
TEMPORARY CAUSEWAY
REMOVE EXISTING BRIDGE
END SBG @ APP. SLAB
BEGIN SBG +80
WOODS
DETAIL A SPECIAL CUT DITCH (Not to Scale)
STA. 14+75 LT. TO STA. 17+85 LT.

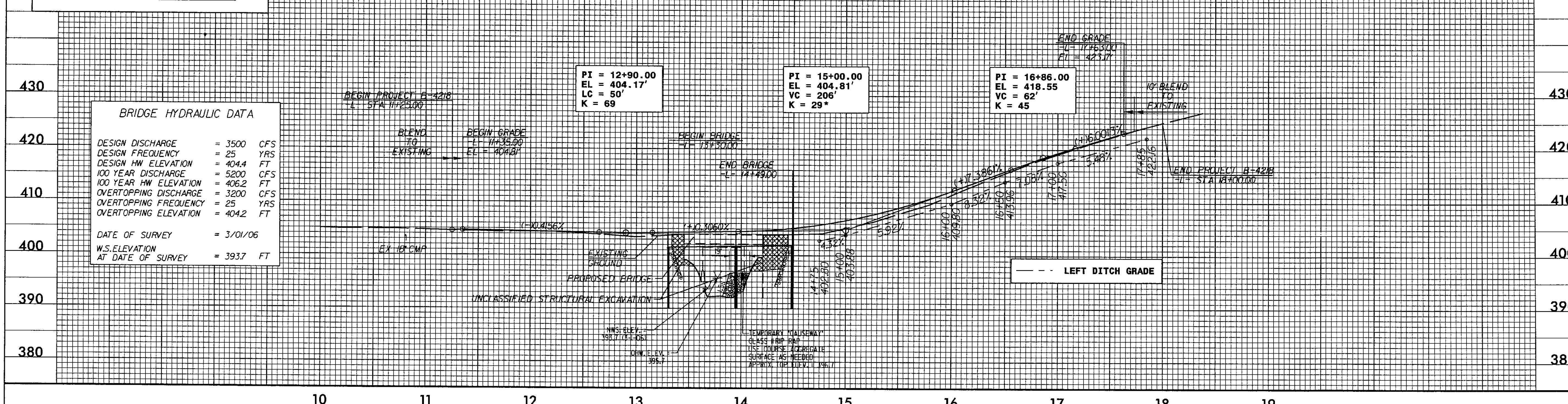
Permit Drawing Sheet 7 of 8

BM1 ELEVATION = 401.17
N 816236 E 1986332
BL STATION 8+12 275 LEFT
RR SPIKE IN 18" POPLAR



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3500	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 404.4	FT
100 YEAR DISCHARGE	= 5200	CFS
100 YEAR HW ELEVATION	= 406.2	FT
OVERTOPPING DISCHARGE	= 3200	CFS
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING ELEVATION	= 404.2	FT
DATE OF SURVEY	= 3/01/06	
W.S. ELEVATION AT DATE OF SURVEY	= 393.7	FT



PI = 12+90.00
EL = 404.17'
LC = 50'
K = 69
PI = 15+00.00
EL = 404.81'
VC = 206'
K = 29*
PI = 16+86.00
EL = 418.55
VC = 62'
K = 45
BEGIN PROJECT B-4218 -L- STA 11+25.00
BLEND TO EXISTING
BEGIN GRADE -L- 11+35.00 EL = 404.81
BEGIN BRIDGE -L- 13+30.00
END BRIDGE -L- 14+49.00
END GRADE -L- 17+63.00 EL = 423.17
10' BLEND TO EXISTING
END PROJECT B-4218 -L- STA 18+00.00
EX 18" CMP
EXISTING GROUND
PROPOSED BRIDGE
UNCLASSIFIED STRUCTURAL EXCAVATION
LEFT DITCH GRADE
430
420
410
400
390
380
10
11
12
13
14
15
16
17
18
19

STREAM & WETLAND IMPACTS

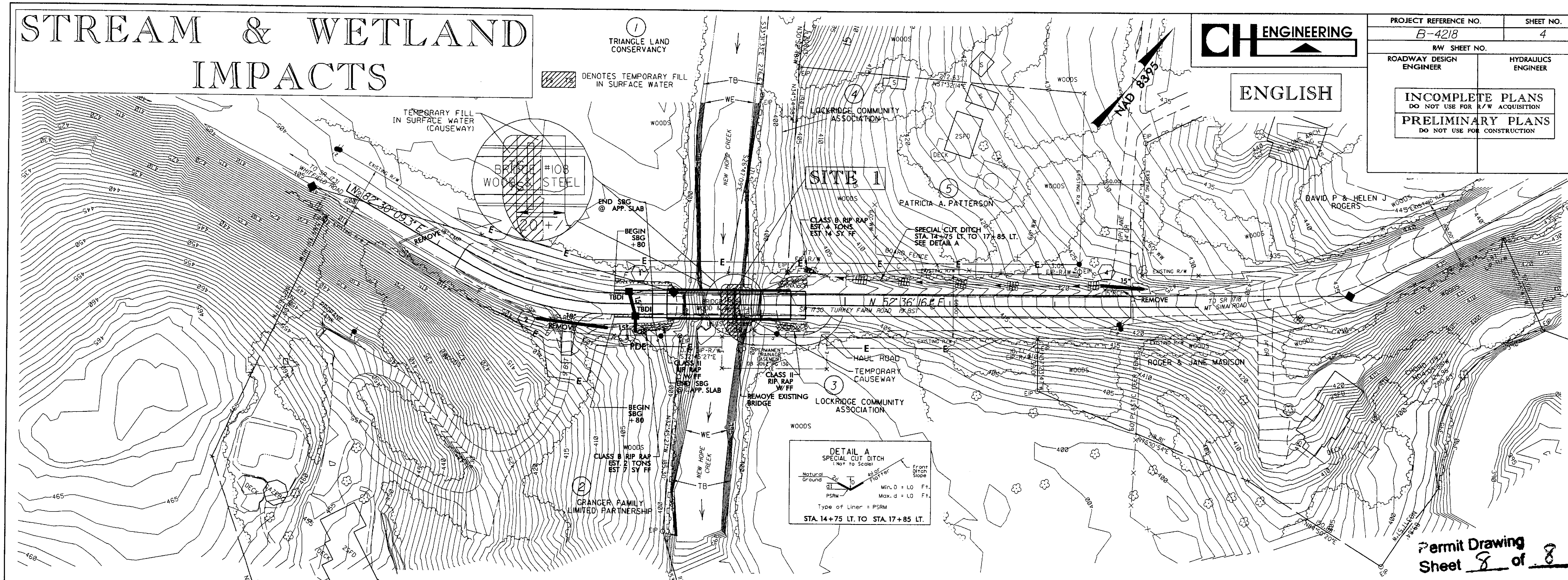
PROJECT REFERENCE NO.	SHEET NO.
B-4218	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CH ENGINEERING

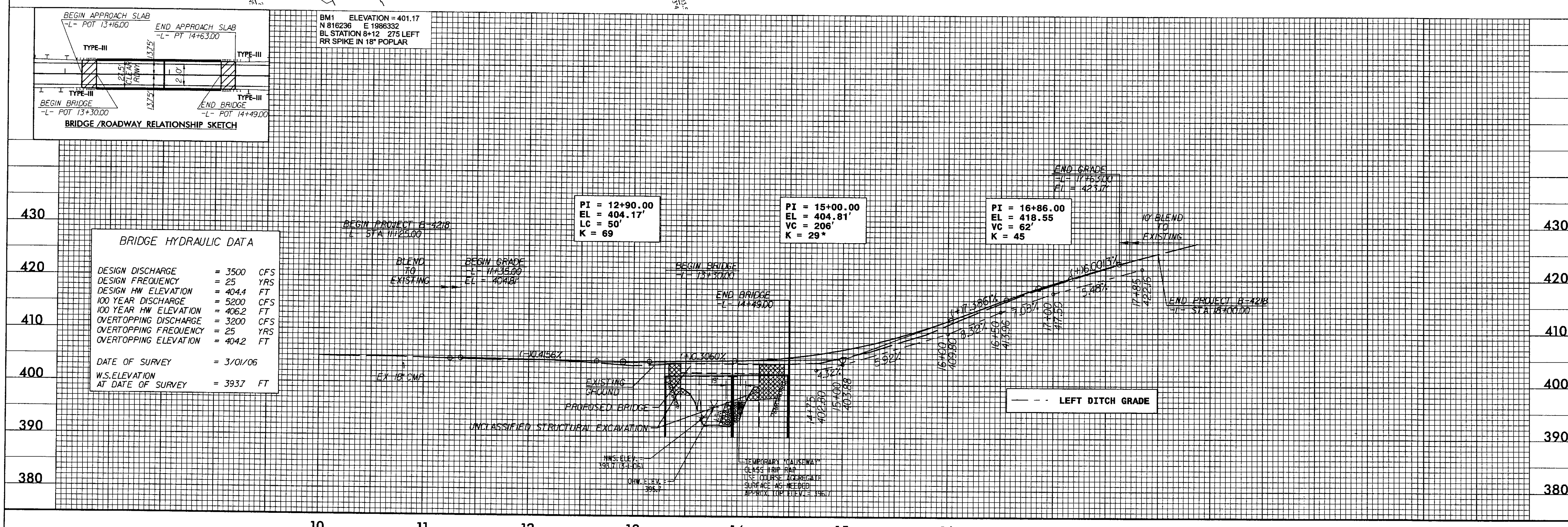
ENGLISH

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TRIANGLE LAND CONSERVANCY
DENOTES TEMPORARY FILL IN SURFACE WATER
TEMPORARY FILL IN SURFACE WATER (CAUSEWAY)
BRIDGE #108 WOOD & STEEL
NAD 83
SITE 1
LOCKRIDGE COMMUNITY ASSOCIATION
PATRICIA A. PATTERSON
DAVID P. & HELEN J. ROGERS
NEW HOPE CREEK
CLASS B RIP RAP EST. 4 TONS EST 14 SY FF
SPECIAL CUT DITCH STA. 14+75 LT. TO 17+85 LT. SEE DETAIL A
END SBG @ APP. SLAB
BEGIN SBG +80
REMOVE
SR 1730 TURKEY FARM ROAD
TO SR 1718 MT SINAI ROAD
N 52° 36' 16" E
HAUL ROAD
TEMPORARY CAUSEWAY
REMOVE EXISTING BRIDGE
CLASS II RIP RAP W/FF
ROGER & JANE MADISON
LOCKRIDGE COMMUNITY ASSOCIATION
CLASS B RIP RAP EST. 2 TONS EST 7 SY FF
GRANGER FAMILY LIMITED PARTNERSHIP
WOODS
DETAIL A
SPECIAL CUT DITCH (Not to Scale)
Natural Ground
Front Ditch Slope
PSRM
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
Type of Liner = PSRM
STA. 14+75 LT. TO STA. 17+85 LT.
Permit Drawing Sheet 8 of 8



BEGIN APPROACH SLAB -L- POT 13+16.00
END APPROACH SLAB -L- PT 14+63.00
TYPE-III
BEGIN BRIDGE -L- POT 13+30.00
END BRIDGE -L- POT 14+49.00
BRIDGE /ROADWAY RELATIONSHIP SKETCH
BM1 ELEVATION = 401.17
N 816236 E 1986332
BL STATION 8+12 275 LEFT
RR SPIKE IN 18" POPLAR
PI = 12+90.00
EL = 404.17'
LC = 50'
K = 69
PI = 15+00.00
EL = 404.81'
VC = 206'
K = 29*
PI = 16+86.00
EL = 418.55
VC = 62'
K = 45
BEGIN PROJECT B-4218 -L- STA 11+25.00
BLEND TO EXISTING
BEGIN GRADE -L- 11+35.00 EL = 404.81
BEGIN BRIDGE -L- 13+30.00
END BRIDGE -L- 14+49.00
END GRADE -L- 17+63.00 EL = 423.17
10' BLEND TO EXISTING
END PROJECT B-4218 -L- STA 18+00.00
EXISTING GROUND
PROPOSED BRIDGE
UNCLASSIFIED STRUCTURAL EXCAVATION
EX 18" CMP
LEFT DITCH GRADE
TEMPORARY "CAUSEWAY" CLASS II RIP RAP USE COURSE AGGREGATE SURFACE AS NEEDED
430
420
410
400
390
380
10
11
12
13
14
15
16
17
18
19

BRIDGE HYDRAULIC DATA

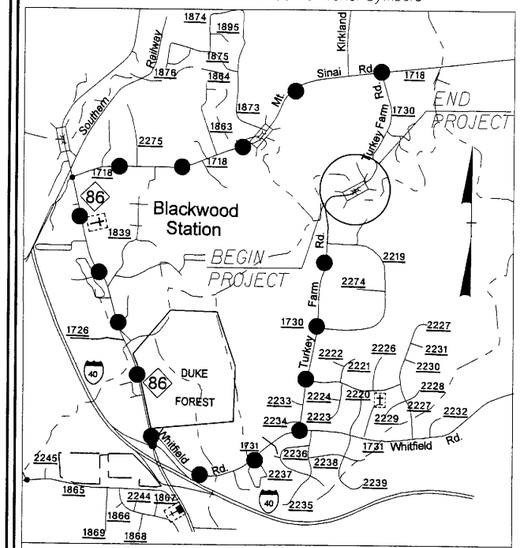
DESIGN DISCHARGE	= 3500	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 404.4	FT
100 YEAR DISCHARGE	= 5200	CFS
100 YEAR HW ELEVATION	= 406.2	FT
OVERTOPPING DISCHARGE	= 3200	CFS
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING ELEVATION	= 404.2	FT
DATE OF SURVEY	= 3/01/06	
W.S. ELEVATION AT DATE OF SURVEY	= 393.7	FT

03/08/99

TIP PROJECT: B-4218

PROJECT: 33563.2.1

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



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ORANGE COUNTY

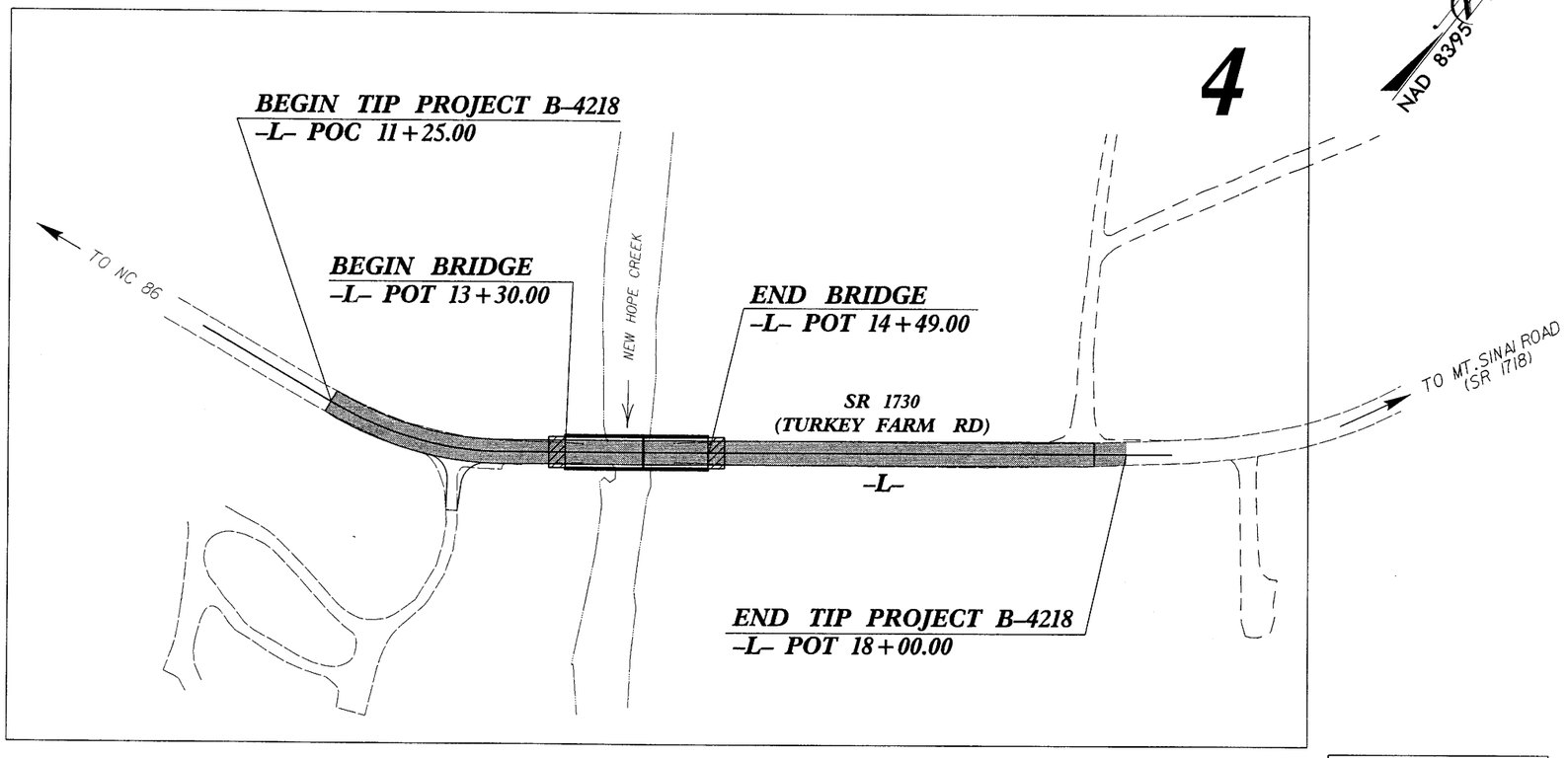
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4218	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33563.1.1	BRZ-1730(5)	P.E.
33563.2.1	BRZ-1730(5)	R/W & UTIL.

LOCATION: BRIDGE NO. 108 OVER NEW HOPE CREEK ON SR 1730 (TURKEY FARM ROAD)

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

R/W PLANS
SUBMITTED: 7/17/07



NOTE:
DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVATURE, VERTICAL CURVE K VALUE, MAXIMUM SUPER AND MINIMUM SHOULDER WIDTH.

NCDOT CONTACT: CATHY HOUSER, PE
PROJECT ENGINEER - ROADWAY DESIGN, ENGINEERING COORDINATION
ROBERT J. STROUP, PE
PROJECT DESIGN ENGINEER - ROADWAY DESIGN, ENGINEERING COORDINATION

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 681
ADT 2028 = 1,291
DHV = 10 %
D = 60 %
T = 4 % *
V = 40 MPH
* TTST 1 DUAL 3
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4218 = 0.105 mi
LENGTH STRUCTURE TIP PROJECT B-4218 = 0.023 mi
TOTAL LENGTH OF TIP PROJECT B-4218 = 0.128 mi

PLANS PREPARED BY:	*PLANS PREPARED FOR:*
CH ENGINEERING PO BOX 3028 RALEIGH, NC 27622 TELE 919.786.0224 FAX 919.788.0232	*DIVISION OF HIGHWAYS* *1000 Birch Ridge Dr. Raleigh, NC 27610*
2006 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: JULY 20, 2007	RHONDA B. EARLY, PE *PROJECT ENGINEER*
LETTING DATE: JULY 15, 2008	THOMAS R. HEPLER, PE, PLS *PROJECT DESIGN ENGINEER*

HYDRAULICS ENGINEER

MULKEY, INC.

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

9/7/2007
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4:01:51 PM

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

PROJECT REFERENCE NO.	SHEET NO.
B-4218	1-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — R/W
- Proposed Right of Way Line with Iron Pin and Cap Marker — R/W
- Proposed Right of Way Line with Concrete or Granite Marker — R/W
- Existing Control of Access — C/A
- Proposed Control of Access — C/A
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

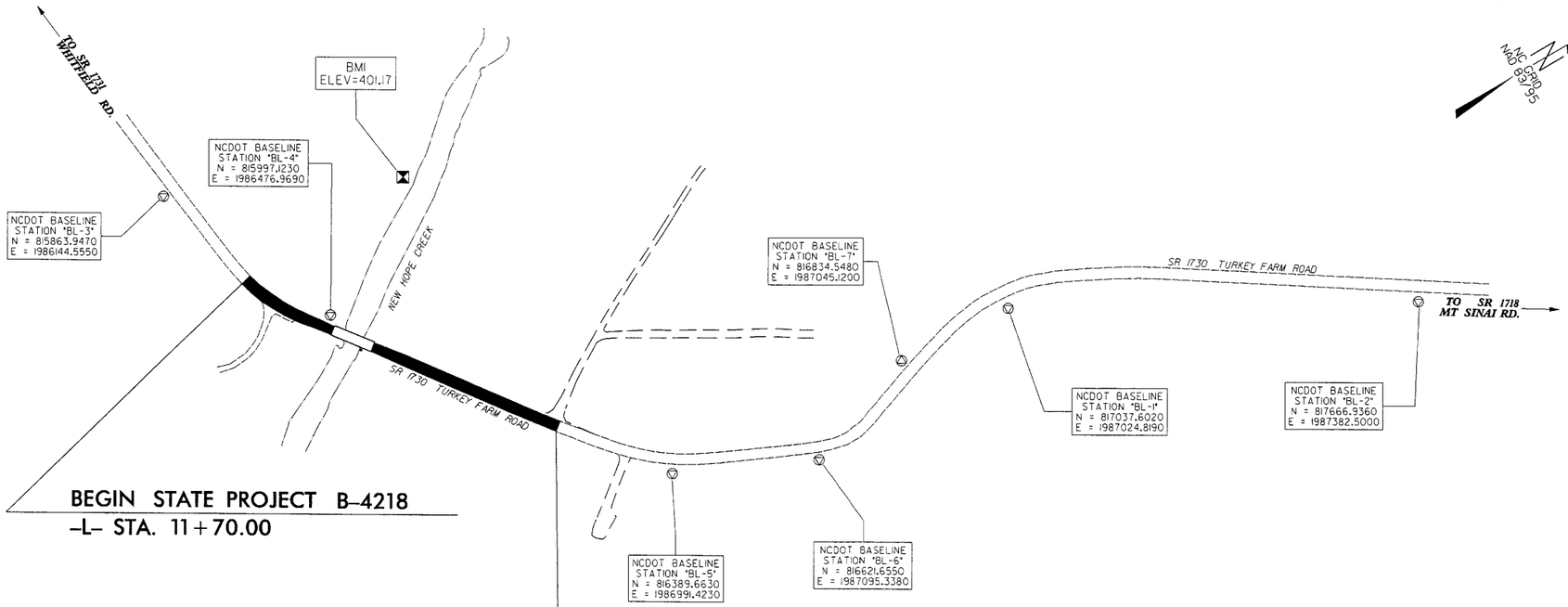
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

12/01/2005

PROJECT REFERENCE NO.	SHEET NO.
B-4218	1C
Location and Surveys	

B-4218 SURVEY CONTROL SHEET



BASELINE DATA

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
3	BL-3	815863.9470	1986144.5550	404.51	OUTSIDE PROJECT LIMITS	
4	BL-4	815997.1230	1986476.9690	403.40	13+36.32	11.20 LT
5	BL-5	816389.6630	1986991.4230	434.83	OUTSIDE PROJECT LIMITS	
6	BL-6	816621.6550	1987095.3380	441.82	OUTSIDE PROJECT LIMITS	
7	BL-7	816834.5480	1987045.1200	438.31	OUTSIDE PROJECT LIMITS	
1	B4218-1	817037.6020	1987024.8190	430.01	OUTSIDE PROJECT LIMITS	
2	B4218-2	817666.9360	1987382.5000	463.89	OUTSIDE PROJECT LIMITS	

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4218-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 817037.602(ft) EASTING: 1987024.819(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99994088
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4218-1" TO -L- STATION 11+25.00 IS S 32° 32' 43.27" W 1353.062 FT
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BENCHMARK DATA

BM1 ELEVATION = 401.17
N 816236 E 1986332
L STATION 13+66 289 LEFT
RR SPIKE IN 18" POPLAR

NOTES

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   b4218_ls_control_060424.txt

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

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

NOTE: DRAWING NOT TO SCALE

9/7/2007
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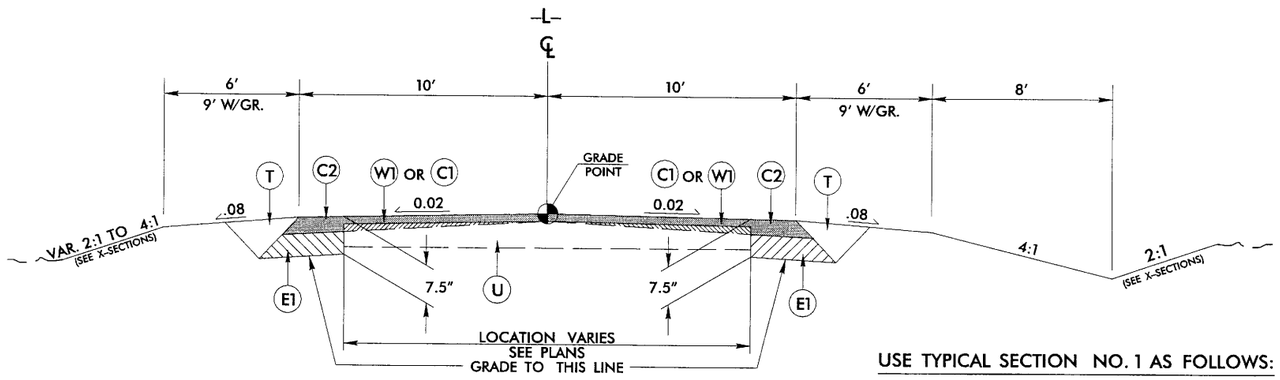


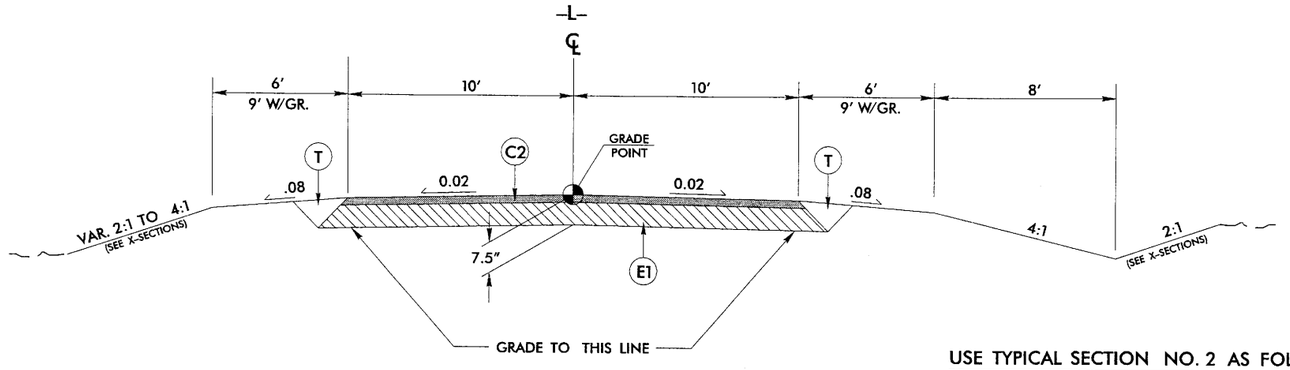
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:

-L- STA 11+35 TO -L- STA 12+70
-L- STA 15+40 TO -L- STA 17+63
(REFER TO INSET "A" FOR STA 16+00 TO STA 17+50 - LEFT)

TRANSITION FROM EXISTING TO T.S. NO. 1 FROM
-L- STA 11+25 TO -L- STA 11+35

TRANSITION FROM T.S. NO. 1 TO EXISTING FROM
-L- STA 17+63 TO -L- STA 17+73



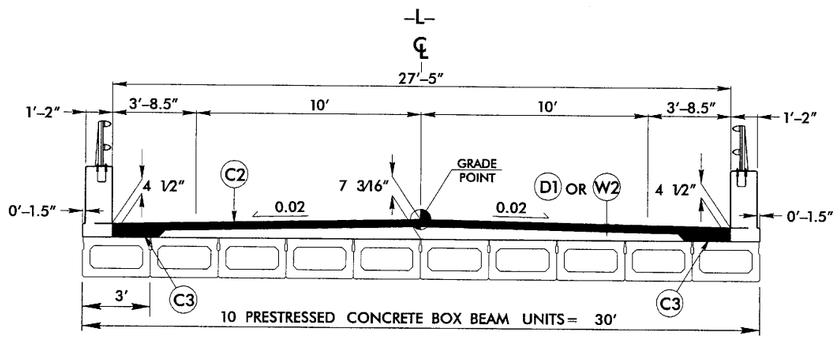
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-L- STA 12+70 TO -L- STA 13+30 (BEGIN BRIDGE)
-L- STA 14+49 (END BRIDGE) TO -L- 15+40

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 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. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE,TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1¼" OR GREATER THAN 1½" IN DEPTH.
D1	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE,TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2¼" OR GREATER THAN 4 " IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 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 GREATER THAN 5.5" IN DEPTH OR LESS THAN 3" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL 1)
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL 2)

NOTE : PAVEMENT EDGE SLOPE ARE 1:1 UNLESS SHOWN OTHERWISE



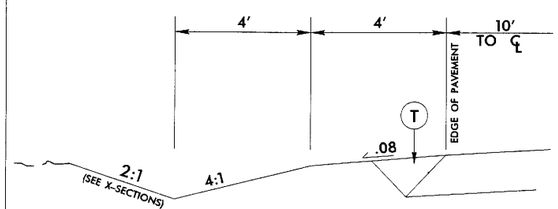
TYPICAL SECTION NO. 3

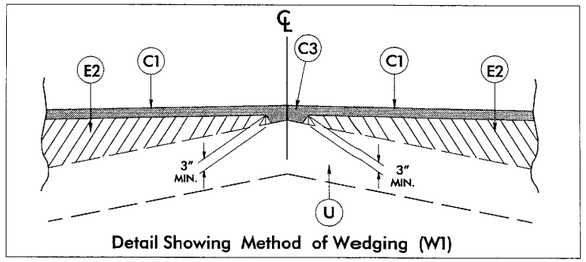
USE TYPICAL SECTION NO. 3 AS FOLLOWS:

-L- STA 13+30 (BEGIN BRIDGE) TO -L- STA 14+49 (END BRIDGE)

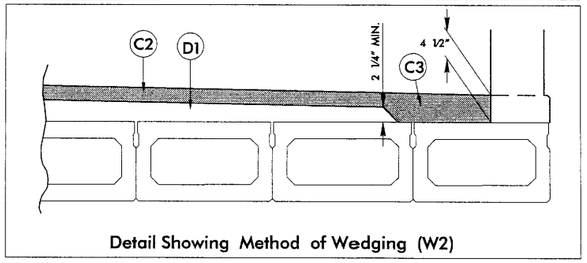
INSET "A"

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION NO. 1
FOR -L- STA 16+00 TO STA 17+50 (LEFT)





Detail Showing Method of Wedging (W1)



Detail Showing Method of Wedging (W2)

REVISIONS
Date: 072507 - Changed TS#3 & detail W2 to box beam bridge

8/17/99

9/7/2007
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Admin2.pkp

COMPUTED BY:	RBE	DATE:	7/26/2007
CHECKED BY:		DATE:	

PROJECT NO.	SHEET NO.
B-4218	3-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
PHASE I					
L- 11+25	13+30	10	145	135	0
L- 14+49	17+73	158	214	56	0
PHASE I SUBTOTALS:		167	359	192	0
PROJECT SUBTOTAL:		167	359	192	0
LOSS DUE TO CLEARING & GRUBBING		-50		50	
GRADE POINT UNDERCUT			0	0	
WASTE IN LIEU OF BORROW				0	0
REPLACE TOPSOIL ON BORROW PIT				12	
PROJECT TOTALS:		117	359	254	0
SAY		130		270	0

DRAINAGE DITCH EXCAVATION: 0 CY
SELECT GRANULAR MATERIAL (CLASS II AND III): 200 CY*
PAVEMENT STRUCTURE VOLUME: XXX CY

* PER GEOTECHNICAL REPORT DATED 7/20/2006

NOTE:

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

LINE	Station	Station	LOC LT/RT/CL	Avg. Width	SY
-L-	12+70	13+30	CL	19	127
-L-	14+49	15+40	CL	19	192
				TOTAL:	319
				SAY:	400

NOTE:

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

COMPUTED BY: K ALFORD DATE:
CHECKED BY: J SCARCE DATE:

PROJECT NO.	SHEET NO.
B-4218	3B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION SIZE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR-ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	M.D.I. TYPE "A" STD. 840.17 OR 840.26	M.D.I. TYPE "B" STD. 840.18 OR 840.27	M.D.I. TYPE "D" STD. 840.19 OR 840.28	M.D.I. FRAME WITH GRATE STD. 840.20	M.D.I. FRAME WITH TWO GRATES STD. 840.22	M.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	M.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29		T.B.D.I. STD 840.35 OR 840.36	T.B.D.I. FRAME WITH GRATE STD 840.37			MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54		J.B. STD. 840.31 OR 840.32						CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109																																																	
-L- 10+80	CL	1	2																																																																				
-L- 12+40	RT	2	OUT																							68																																													28	Remove existing 15" RD side drain
-L- 12+94	LT	1	3						24																																																														
-L- 13+00	RT	3	OUT																						16												1																	1	1																	
-L- 17+65	LT	4	OUT																						40												1																	1	1																32	Remove existing 15" RC side drain
SHEET TOTAL								0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	68	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0		0 @ 15'			60	

ABBREVIATIONS

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

COMPUTED BY: R B EARLY DATE: 7/25/2007
CHECKED BY: T HEPLER DATE: 7/25/2007

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

GUARDRAIL SUMMARY

LINE	BEG. STA.	END STA.	LENGTH LOC.	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPR. END	WARRANT POINT TRAIL. END	"N" DIST. FROM E.O.L.	TOTAL SHLDR WIDTH	FLARE LENGTH APPR. END	FLARE LENGTH TRAIL. END	W APPR. END	W TRAIL. END	ANCHORS XI MOD	XI	GRAU 350	M-350	III	AT-1	VI MOD	IMP. ATTEN. TYPE 350 EA	G	NG	REMOVE EXISTING GUARDRAIL		REMARKS
L	12+48.75	13+30.00	LT	81.3			13+30	13+30	3' 8.5"	9		50.0		1.0			1		1								RSD 862.01 SHEET 3
L	12+61.25	13+30.00	RT	62.5	23.5		13+30	13+30	3' 8.5"	9									1	1							RSD 862.01 SHEET 3
L	14+40.00	16+21.25	LT	181.3			14+40	15+50	3' 8.5"	9		50.0		1.0			1		1								RSD 862.01 SHEET 3
L	14+40.00	15+83.75	RT	143.8			14+40	14+40	3' 8.5"	9	50.0		1.0				1		1								RSD 862.01 SHEET 3
		TOTAL		468.75	23.5												3		4	1							
				492.25	TOTAL GUARDRAIL LENGTH																						
				-231.25	LESS ANCHOR DEDUCTIONS																						
				261.00	LF GUARDRAIL																						
	(10 ADDITIONAL POST)																										

ANCHOR DEDUCTIONS

150	3 @ 50' EACH PER GRAU 350
75	4 @ 18.75' EACH PER TYPE III
6.25	1 @ 6.25' EACH PER AT-1
231.25	LF REDUCTION

PROJECT REFERENCE NO.	SHEET NO.
B-4218	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CH ENGINEERING

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
Type of Liner = PSRM
STA. 14+75 LT. TO STA. 17+85 LT.

-L-
PI Sta 12+07.29
Δ = 29° 53' 53.1" (LT)
D = 20° 06' 13.6"
L = 148.72'
T = 76.09'
* R = 285.00'
* Se = 0.04
Ro = See Planview
DS = 30 mph

▨ UNCLASSIFIED STRUCTURAL EXCAVATION

* DESIGN EXCEPTION REQUIRED FOR:
- HORIZONTAL CURVATURE
- VERTICAL CURVE K VALUE
- MAXIMUM SUPER ELEVATION
- SHOULDER WIDTH

BM1 ELEVATION = 401.17
N 816236 E 1986332
BL STATION 8+12 275 LEFT
RR SPIKE IN 18" POPLAR

PI = 12+90.00
EL = 404.17'
LC = 50'
K = 69

PI = 15+00.00
EL = 404.81'
VC = 206'
K = 29*

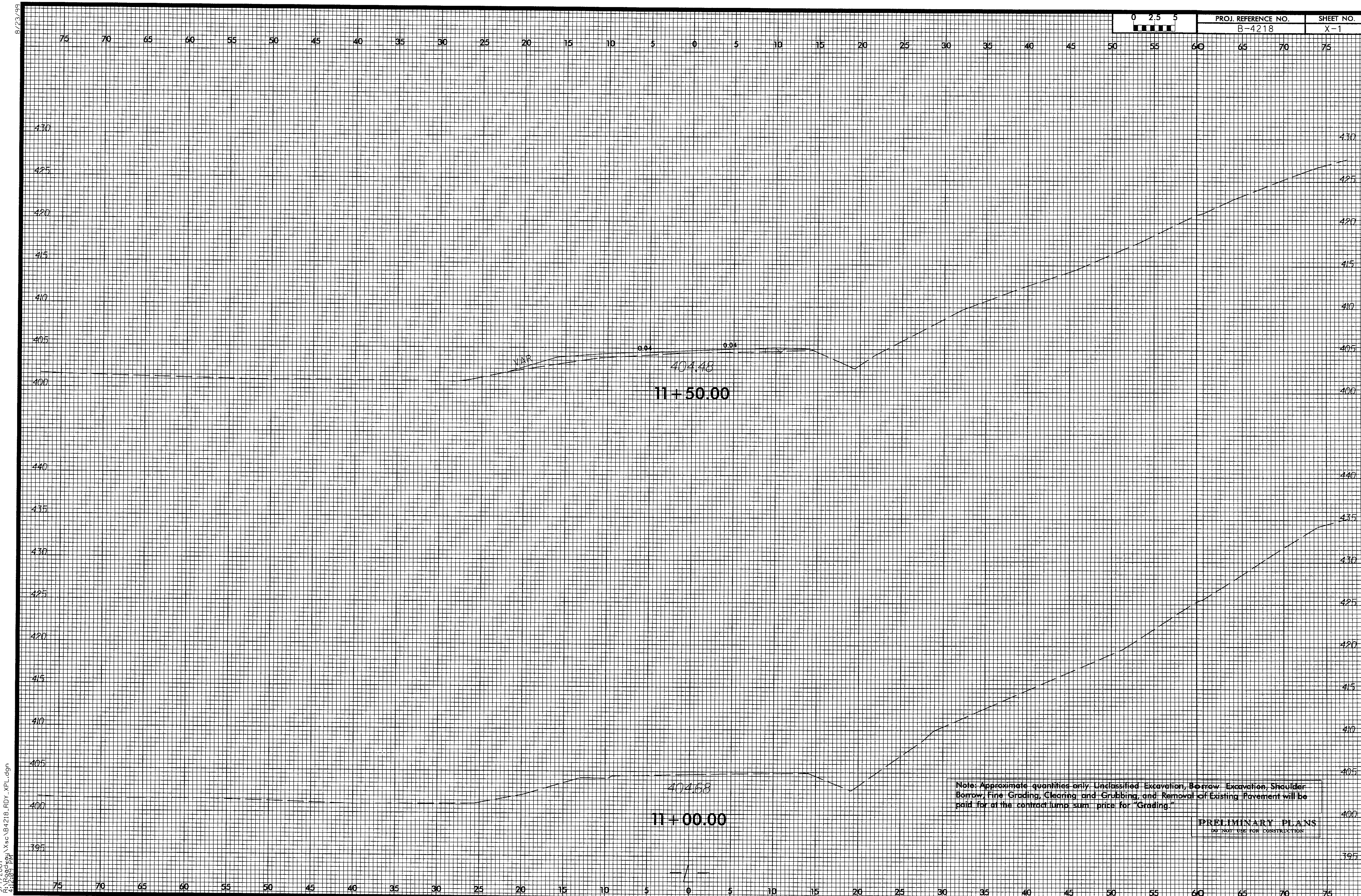
PI = 16+86.00
EL = 418.55
VC = 62'
K = 45

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3500	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 404.4	FT
100 YEAR DISCHARGE	= 5200	CFS
100 YEAR HW ELEVATION	= 406.2	FT
OVERTOPPING DISCHARGE	= 3200	CFS
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING ELEVATION	= 404.2	FT
DATE OF SURVEY	= 3/01/06	
W.S. ELEVATION AT DATE OF SURVEY	= 393.7	FT

PROJ. REFERENCE NO.	SHEET NO.
B-4218	X-1

0 2.5 5



Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/23/99

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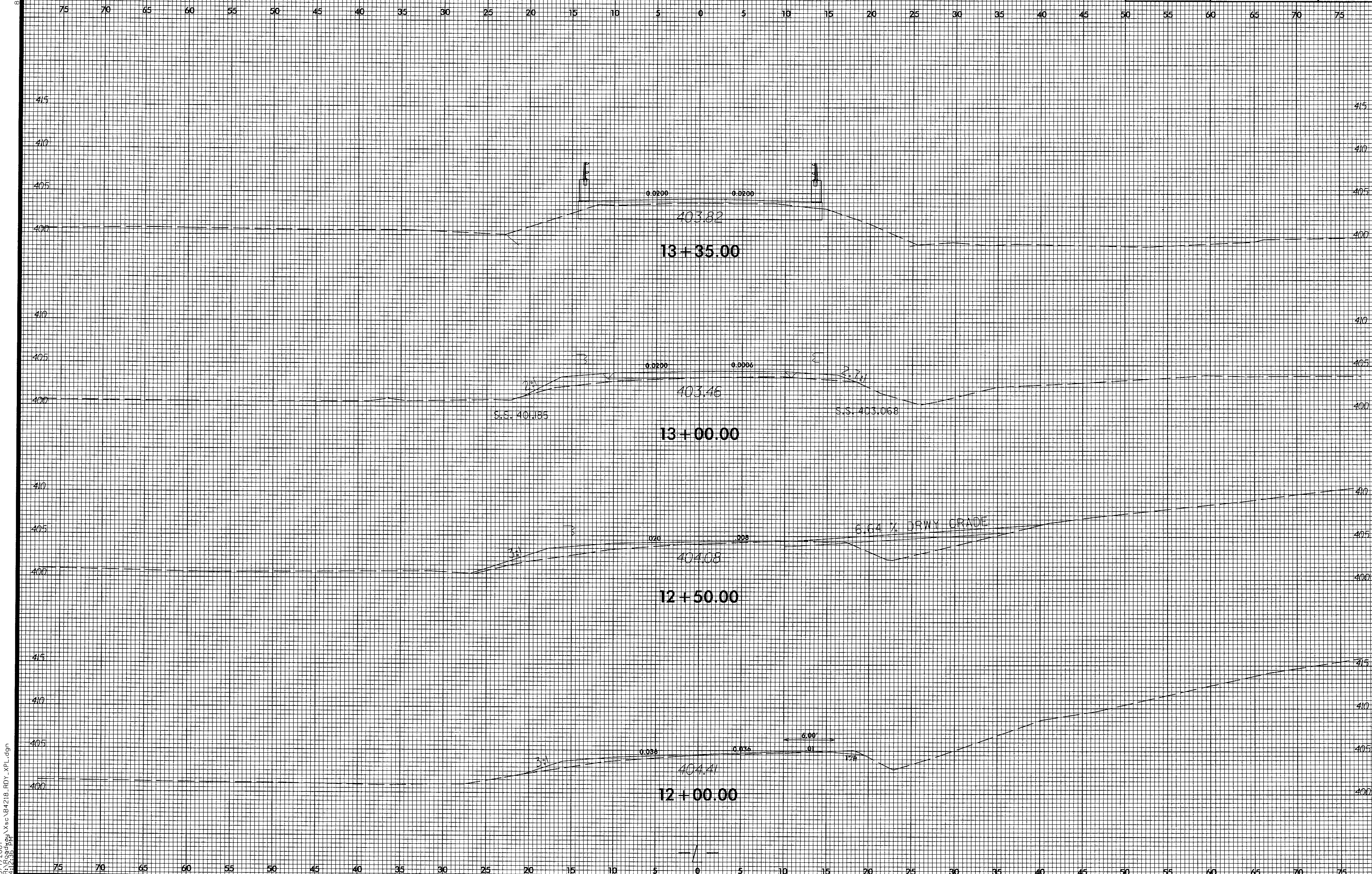
	B-4218	X-2



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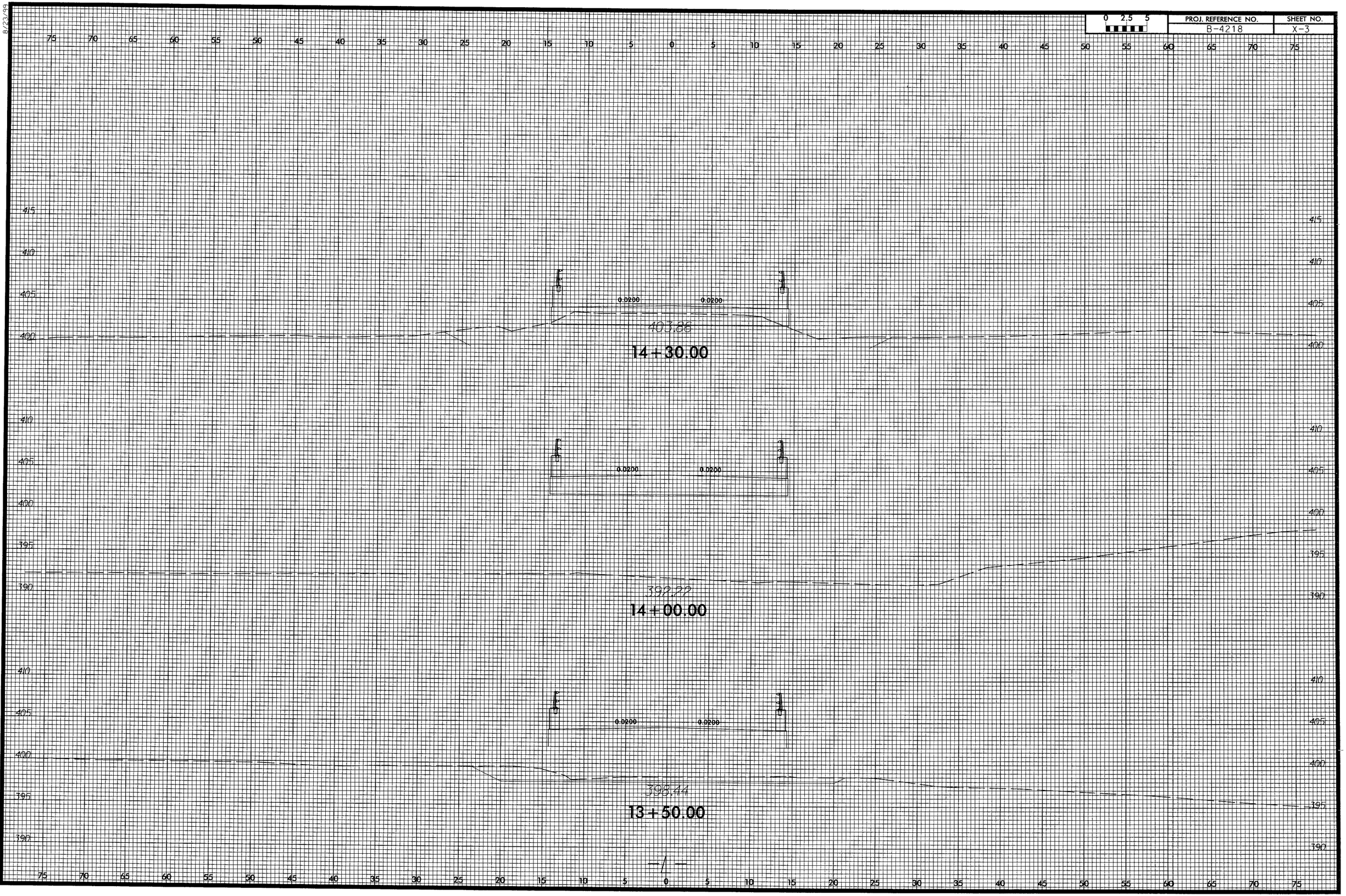

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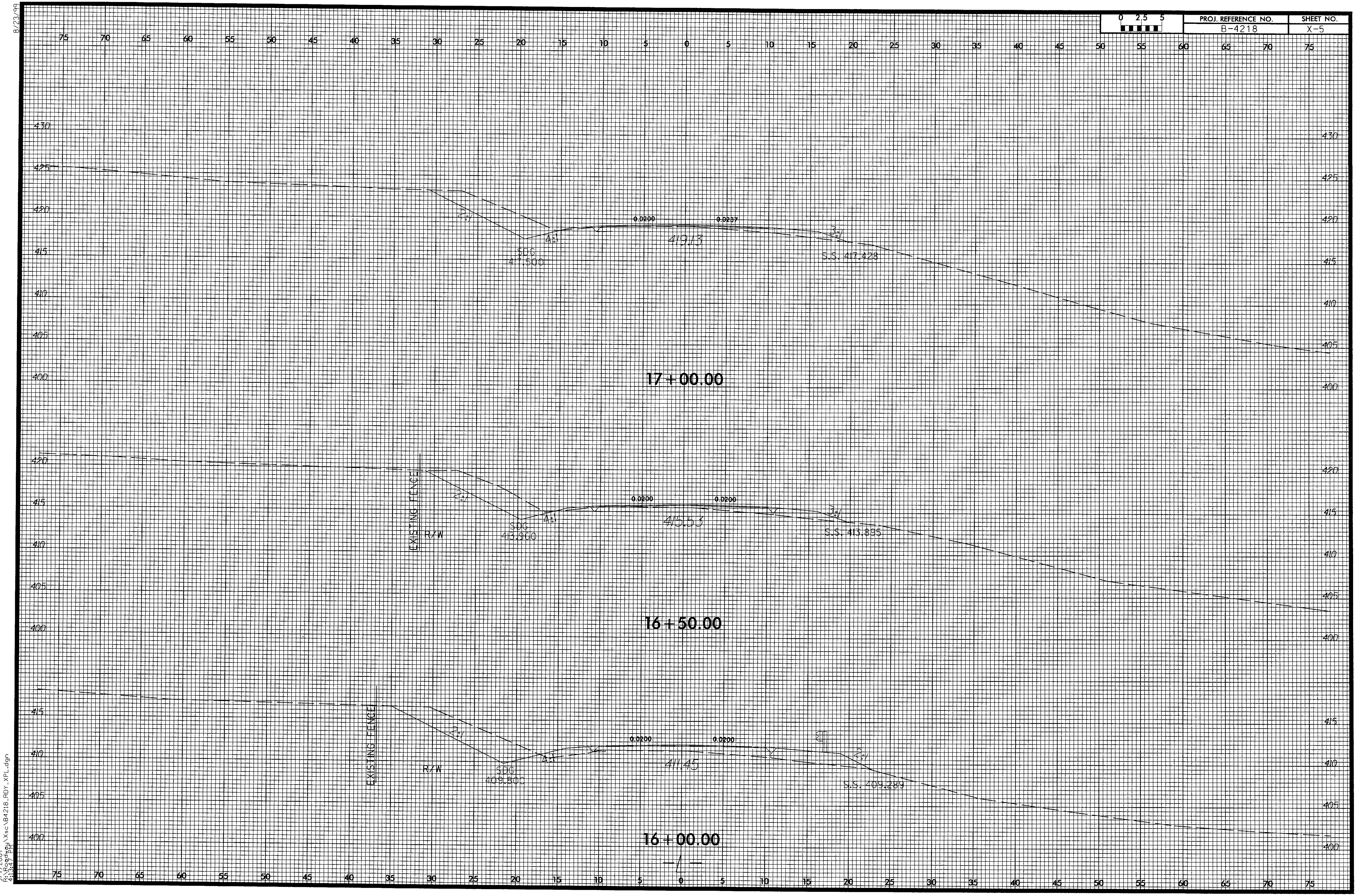

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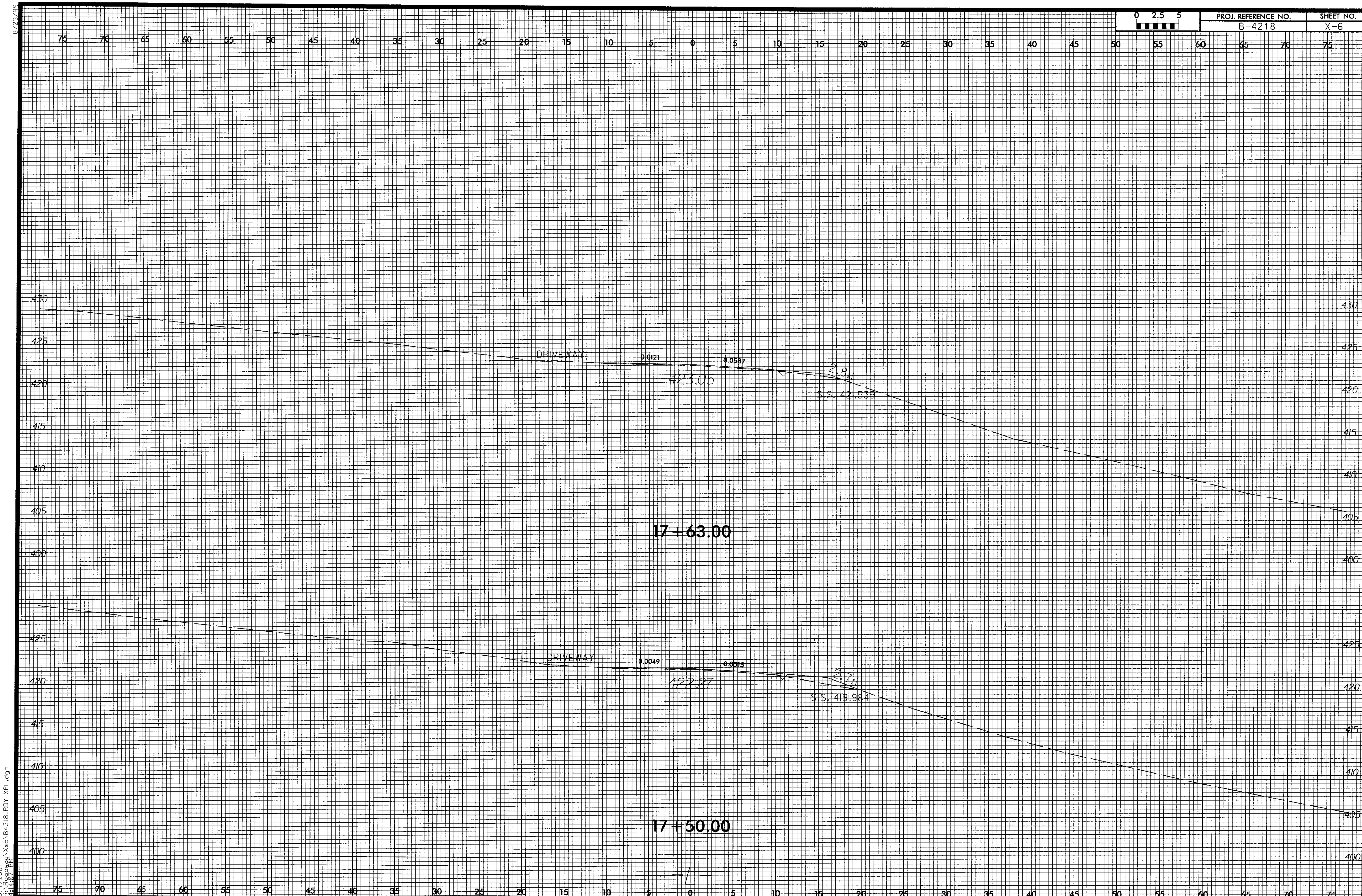

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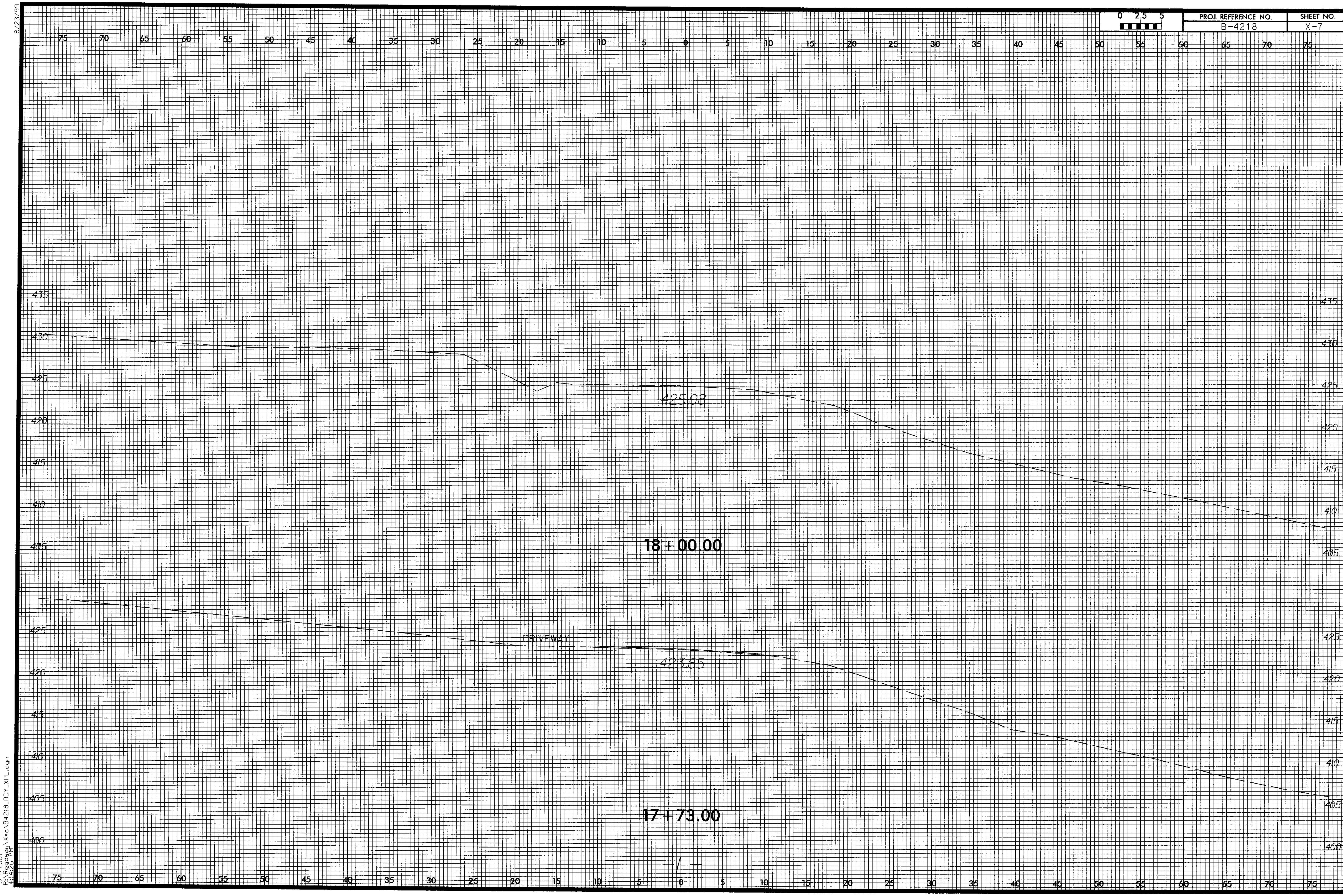

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CATEGORICAL EXCLUSION ACTION CLASSIFICATION FORM

TIP Project No.	**B-4218**
State Project No.	**8.2502301**
W.B.S. No.	**33563.1.1.0**
Federal Project No.	**BRZ-1730(5)**

A. Project Description:

The purpose of this project is to replace Orange County Bridge No. 108 on SR 1730 over New Hope Creek. The replacement structure will be a bridge approximately 95 feet long providing a minimum 28 feet clear deck width. The bridge will include two 10-foot lanes with 4-foot offsets. The roadway grade of the new structure will be approximately the same as the existing structure.

The approach roadway will extend approximately 140 feet from the southwest end of the new bridge and 350 feet from the northeast end of the new bridge. The approaches will include a 20-foot pavement width providing two 10-foot lanes. Six-foot grass shoulders will be provided on each side (9-foot shoulders where guardrail is included). The roadway will be designed as a Rural Local Route.

Traffic will be detoured off-site during construction (see Figure 1).

B. Purpose and Need:

NCDOT Bridge Maintenance Unit records indicate Bridge No. 108 has a sufficiency rating of 24.2 out of a possible 100 for a new structure. The bridge is considered structurally deficient and functionally obsolete due to both a structural appraisal and a deck geometry appraisal of 2 out of 9. Therefore, according to Federal Highway Administration (FHWA) standards Bridge No. 108 is eligible for FHWA's Highway Bridge Replacement and Rehabilitation Program.

Bridge No. 108 has a fifty-two year old timber substructure with a typical life expectancy between 40 to 50 years due to the natural deterioration rate of wood. Rehabilitation of a timber structure is generally practical only when a few members are damaged or prematurely deteriorated. However, past a certain degree of deterioration, timber structures become impractical to maintain and upon eligibility are programmed for replacement. Bridge No. 108 is approaching the end of its useful life.

C. Proposed Improvements:

Circle one or more of the following Type II improvements which apply to the project:

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

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

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

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

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

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

4. Transportation corridor fringe parking facilities.

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

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

7. Approvals for changes in access control.

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

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

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

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

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

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

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

D. Special Project Information:

Estimated Costs:

Total Construction	$ 675,000
Right of Way	$ 62,000
Total	$ 737,000

Estimated Traffic:

Current	-	600 vpd
Year 2025	-	1200 vpd
TTST	-	1%
Dual	-	3%

Accidents: Traffic Engineering has evaluated a recent three year period and found one accident occurring in the vicinity of the project. It was not associated with the geometry of the bridge or its approach roadways.

Design Exceptions: There is a horizontal alignment exception required for this project.

Bridge Demolition: Best Management Practices for Bridge Demolition & Removal will be implemented. Although the timber columns for the interior bents are encased in concrete, temporary fill is not anticipated with respect to bridge demolition. All other components will be removed without dropping components into Waters of the United States during construction.

Alternatives Discussion:

No Build - No build would result in eventually closing the road which is unacceptable given the volume of traffic served by SR 1730.

Rehabilitation – The bridge was constructed in 1953 and the timber materials within the bridge are reaching the end of their useful life. Rehabilitation would require replacing the timber components which would constitute effectively replacing the bridge.

Offsite Detour – Bridge No. 108 will be replaced on the existing alignment. Traffic will be detoured offsite (see Figure 1) during the construction period. NCDOT Guidelines for Evaluation of Offsite Detours for Bridge Replacement Projects considers multiple project variables beginning with the additional time traveled by the average road user resulting from the offsite detour. The offsite detour for this project would include SR 1731, NC 86, and SR 1718. The detour for the average road user would result in 7.0 minutes additional travel time (2.8 miles additional travel). Up to a ten-month duration of construction is expected on this project. Based on the guidelines, the delay for the average road user is acceptable.

Orange county Emergency Management Services, as well as Orange County school transportation has indicated that an offsite detour is acceptable and that services can be adequately re-routed during construction.

In view of the lower impacts to environment and property, project cost savings and no major opposition, an offsite detour is recommended. NCDOT Division 7 concurs in these recommendations.

Onsite Detour – An onsite detour was evaluated, but due to the presence of an acceptable offsite detour and to lessen the environmental impacts required, this alternate was eliminated.

New Alignment – Given that the alignment for SR 1730 is of severe curvature in the areas before and after Bridge No. 108, a new alignment would not improve these areas and so was not considered as an alternative.

Other Agency Comments:

The **N.C. Wildlife Resource Commission** states that a significant fishery for sunfish exists at this site and requests an in-water work moratorium for sunfish from April 1 to June 30.

Response: Since this moratorium is not a regulatory requirement, it will be honored if the project schedule allows.

The **United States Fish and Wildlife Service** responded with standard comments.

Public Involvement:

A letter was sent by the Location & Surveys Unit to all property owners affected directly by this project. Property owners were invited to comment. No comments have been received to date.

A newsletter has been sent to residents living in the areas directly before and after Bridge No. 108. One local resident requests a temporary pedestrian bridge be constructed to provide access across New Hope Creek during the construction of the new bridge. The same resident also expressed concerns about USPS delivery due to their mailbox location being on the opposite side of the bridge from their residence.

Response: NCDOT cannot at this time justify the cost of constructing a temporary pedestrian bridge, therefore will not be able to provide for this request.

The local residents whose mail delivery is directly effected by the replacement of Bridge No. 108 have worked out an agreement with the local Post Office for mail delivery during the construction of new bridge.

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-tenth (1/10) 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 materials sites?		X

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

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

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

F. Additional Documentation Required for Unfavorable Responses in Part E

None

G. CE Approval

TIP Project No.	**B-4218**
State Project No.	**8.2502301**
W.B.S. No.	**33563.1.1.0**
Federal Project No.	**BRZ-1730(5)**

A. Project Description:

The purpose of this project is to replace Orange County Bridge No. 108 on SR 1730 over New Hope Creek. The replacement structure will be a bridge approximately 95 feet long providing a minimum 28 feet clear deck width. The bridge will include two 10-foot lanes with 4-foot offsets. The roadway grade of the new structure will be approximately the same as the existing structure.

The approach roadway will extend approximately 140 feet from the southwest end of the new bridge and 350 feet from the northeast end of the new bridge. The approaches will include a 20-foot pavement width providing two 10-foot lanes. Six-foot grass shoulders will be provided on each side (9-foot shoulders where guardrail is included). The roadway will be designed as a Rural Local Route.

Categorical Exclusion Action Classification:

X TYPE II(A)
___ TYPE II(B)

Approved:

1/13/06
Date

Bridge Project Development Unit Head
Project Development & Environmental Analysis Branch

1/13/06
Date

Project Development Group Leader
Project Development & Environmental Analysis Branch

1/13/2006
Date

Project Development Engineer
Project Development & Environmental Analysis Branch

For Type II(B) projects only:

Not Applicable

Date

John F. Sullivan, III, PE, Division Administrator
Federal Highway Administration

PROJECT COMMITMENTS:

Orange County
Bridge No. 108 on SR 1730
Over Old Field Creek
Federal Aid Project No. BRZ-1730(5)
State Project No. 8.2502301
W.B.S. No. 33563.1.1.0
T.I.P. No. B-4218

Natural Environmental Unit – Bridge Demolition

Best Management Practices for Bridge Demolition & Removal will be implemented. Although the timber columns for the interior bents are encased in concrete, temporary fill is not anticipated with respect to bridge demolition. All other components will be removed without dropping components into Waters of the United States during Construction.

Division 7 – Length of Construction

In order to address specific requests from local residents, NCDOT will set the **minimum** reasonable contract time to reduce the period of road closure.

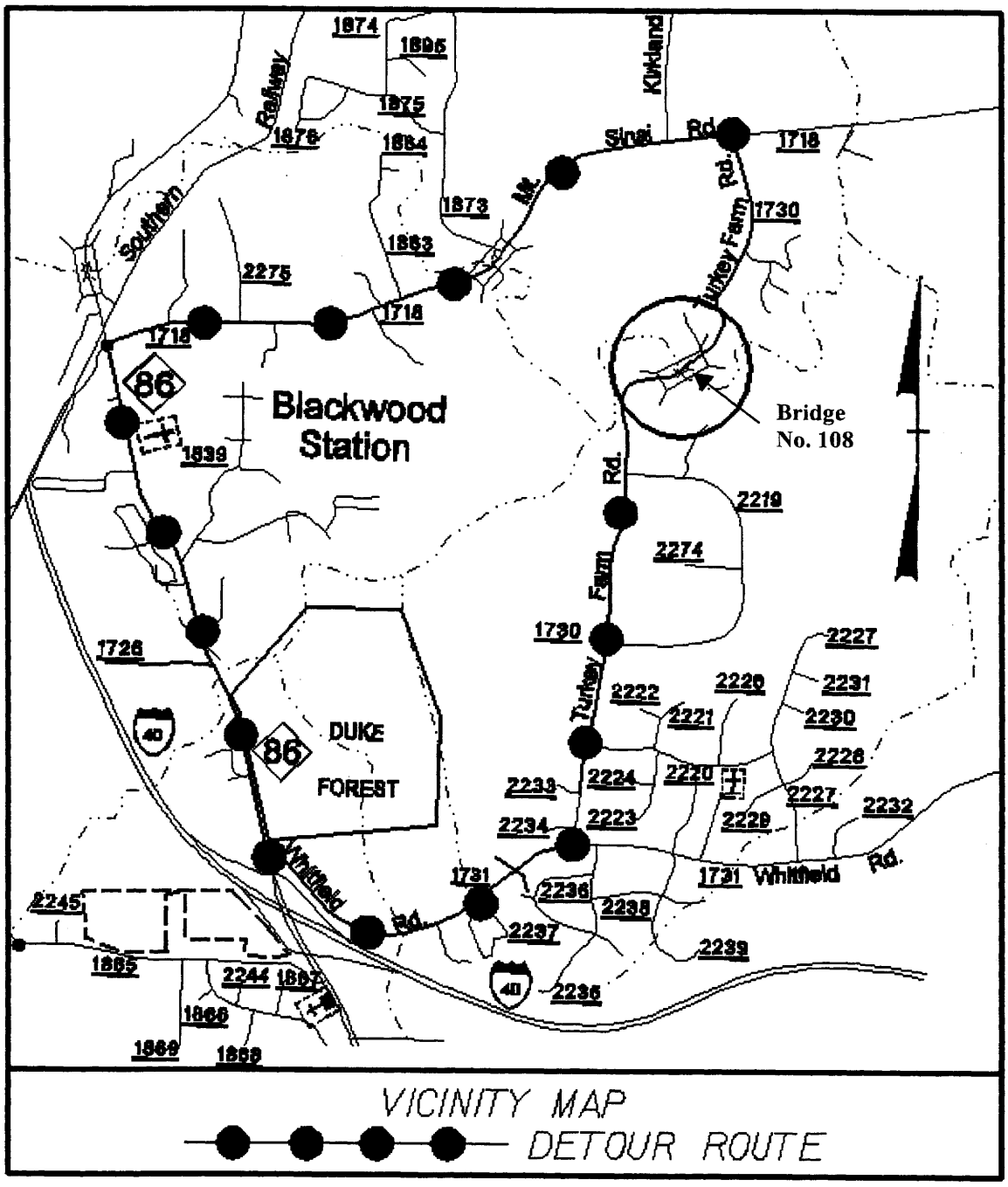
Division 7 Construction – Road Closure

The division is to notify the Orange County Office of Emergency Management two months prior to closing SR 1730 for replacement of Bridge No. 108.

The division is to notify the Lockridge Community Association, Jane Madison, at (919) 966-4755 two weeks prior to closing SR 1730 for replacement of Bridge No. 108. Also leave a message at (919) 933-8886.

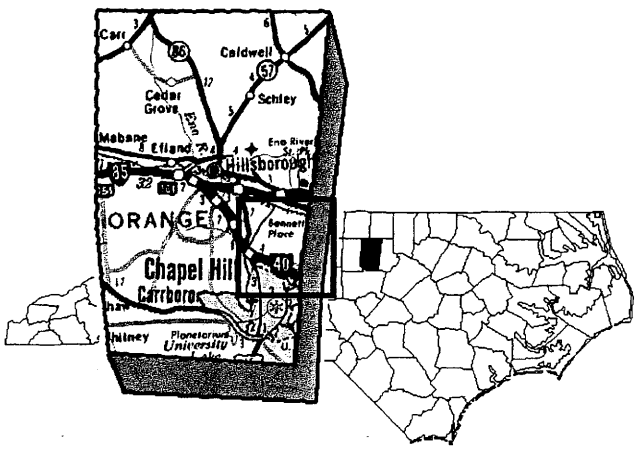
Structure Design – Bridge Rails

The proposed structure shall be designed and detailed to include bicycle safe rails (2 bar metal rail).



VICINITY MAP

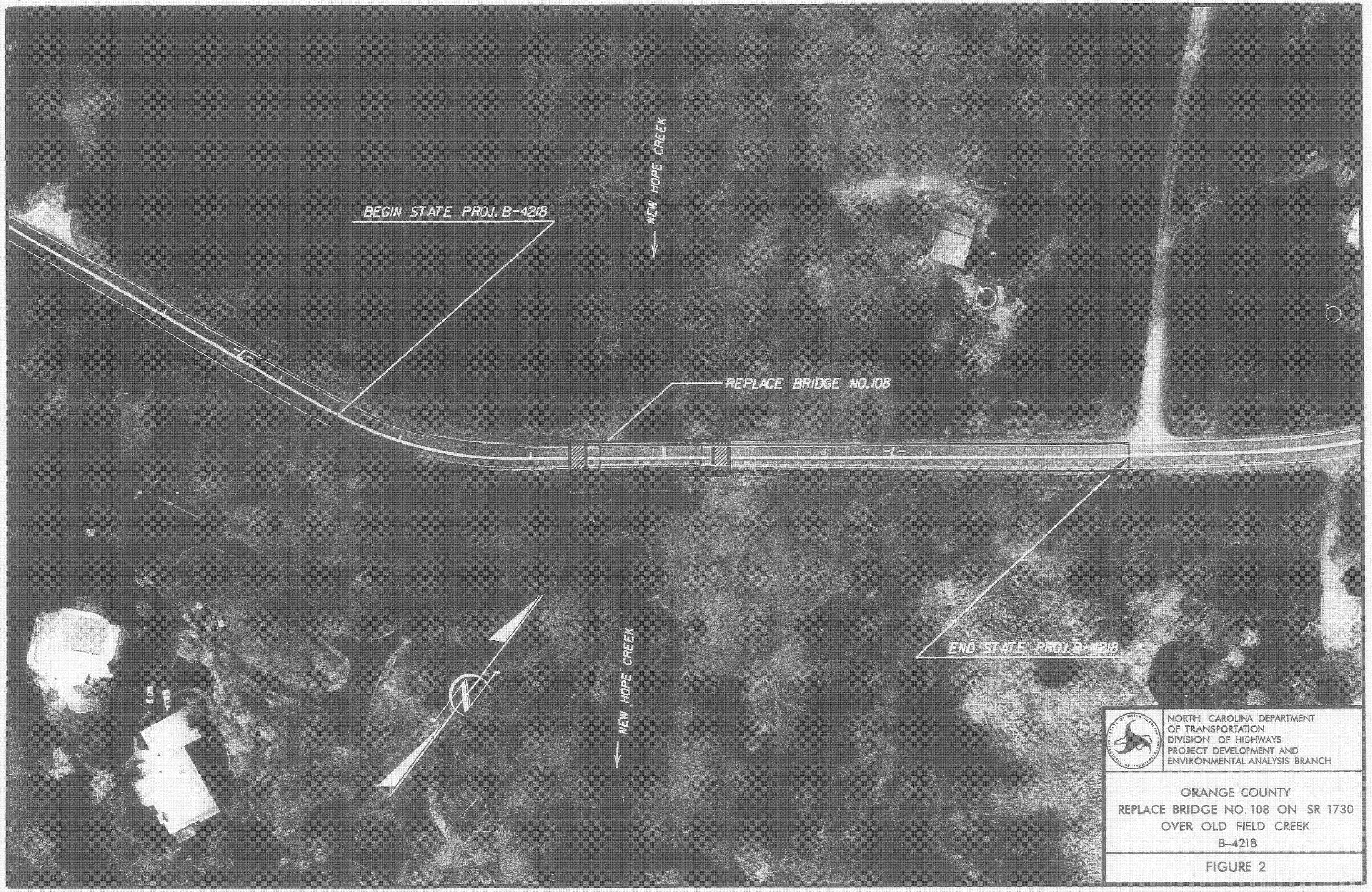
DETOUR ROUTE



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

ORANGE COUNTY
REPLACE BRIDGE NO. 108 ON SR 1730
OVER OLD FIELD CREEK
B-4218

Figure 1



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

ORANGE COUNTY
REPLACE BRIDGE NO. 108 ON SR 1730
OVER OLD FIELD CREEK
B-4218

FIGURE 2

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

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

Division of Historical Resources
David J. Olson, Director

June 27, 2003

MEMORANDUM

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

FROM: David Brook DSR for David Brook

SUBJECT: Replacement of Bridge No. 108 on SR 1730 over Old Field Creek, B-4218, Orange County, ER03-0956

Thank you for your memorandum of April 7, 2003, concerning the above project. We appreciate the complete documentation, including delineation of the area of potential effect (APE) for the proposed bridge replacement.

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

Given the high probability of the proposed project area, it is likely that new ground disturbance within any of the four quadrants or new road alignment will require archaeological investigation.

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

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

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

cc: Matt Wilkerson, NCDOT
Mary Pope Furr, NCDOT

North Carolina Department of Cultural Resources
State Historic Preservation Office

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

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

March 23, 2004

MEMORANDUM

TO: Gregory J. Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook Dlg for David Brook
Deputy State Historic Preservation Officer

SUBJECT: Archaeological Study and Evaluation, Replacement of Bridge No. 108 on SR 1730 over New Hope Creek, State Project 8.2502301, TIP B-4218, NCDOT Division 7, Orange County, ER03-0956

Thank you for your letter of February 24, 2004, transmitting the survey report by Gerold Glover of your staff for the above project.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following site is not eligible for listing in the National Register of Historic Places under criterion D:

31OR561

This Late Woodland, limited activity site contains few artifacts and retains no subsurface integrity.

The report meets our office's guidelines and those of the Secretary of the Interior. We concur with Dr. Glover's recommendation that no additional archaeological investigation is warranted for this project as presently proposed.

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

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

cc: Matt Wilkerson, NCDOT
Gerold Glover, NCDOT

Natural Resources Technical Report

Replacement of Bridge No. 108 on SR 1730
Over New Hope Creek
Orange County, North Carolina

State Project No. 8.2502301
TIP Project No. B-4218

North Carolina Department of Transportation
Project Development and Environmental Analysis Branch

February 2003

EXECUTIVE SUMMARY

B-4218
ORANGE COUNTY

Proposed replacement of Bridge No.108 on Turkey Farm Road (SR 1730) over New Hope Creek in Orange County.

INTRODUCTION

The proposed project, Transportation Improvement Project (TIP) No. B-4218, will replace Bridge No.108 on Turkey Farm Road (SR 1730) over New Hope Creek in Orange County, North Carolina. The bridge, constructed in 1953, is currently in poor condition and in need of replacement. The replacement is intended to provide a safer bridge structure consistent with federal and state bridge standards.

The proposed project is situated in the central portion of the Piedmont physiographic province. The geography consists predominantly of gently sloping uplands and broad, nearly level floodplains along most streams. The elevation of the project study area is approximately 450 feet (137 meters) above Mean Sea Level (MSL). The land uses surrounding and within the project study area mainly agriculture and forestry with some low-density residential development. Alluvial forests dominate the floodplain along New Hope Creek. Chewacla loam soils, located along the floodplain of New Hope Creek, are classified as hydric.

PHYSICAL CHARACTERISTICS

Water Resources

The proposed project is situated in NCDWQ Sub-basin 03-06-05 and the Hydrologic Unit Code (HUC) is 03030002 of the Cape Fear River Basin. The project study area contains approximately 1,183 linear feet of New Hope Creek and approximately 864 linear feet of an unnamed tributary of New Hope Creek. New Hope Creek is a perennial stream that meanders through the project study area flowing northwest to southeast underneath the bridge proposed for replacement. A perennial unnamed tributary of New Hope Creek crosses underneath SR 1730 via a culvert crossing, approximately 1,300 feet north/northeast of the existing bridge.

The best usage classification of New Hope Creek is **class "C-NSW"** waters. No High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur

within the project vicinity. The reach of New Hope Creek located within the project study area is not listed on the DWQ 2000 Draft 303 (d) list of impaired waters.

Biotic Resources

Three plant communities were observed in the project study area: piedmont alluvial forest, mesic mixed hardwood forest, and fallow field. Design alternatives have yet to be identified for this project, therefore, no estimated area of impact to these natural communities has been calculated at this time. The following table describes the acreage of plant communities within the project study area; however, actual impact acreage within the construction limits will be less.

Land Use within the Project Study Area.

Community Type	Acres (Hectares)	Percentage of Project Study Area
Piedmont Alluvial Forest	9.3 (3.8)	31%
Mesic Mixed Hardwood Forest	19.6 (8.0)	66%
Fallow Field	1.0 (0.4)	3%

JURISDICTIONAL TOPICS

Surface Waters and Wetlands

New Hope Creek and its unnamed tributary are jurisdictional surface waters under Section 404 of the Clean Water Act (CWA). Three jurisdictional wetlands were identified within the project study area. Since no alternatives have been selected, specific impacts to "Waters of the United States" cannot by determined. However, some impacts to New Hope Creek , the UT to New Hope Creek, and Wetland 3 could be anticipated for the proposed project. Wetland 1 and 2 are located along the northwestern edge of the project study area and could possibly be avoided. The following table describes the acreage of the wetlands and linear footage of the streams located within the project study area; however, actual impacts within the construction limits will be less.

Jurisdictional Wetlands and Streams within the Project Study Area.

Jurisdictional Wetland/Stream	Potential Impact Amount
Wetland 1	0.16 Acres (0.1 hectare)
Wetland 2	0.02 Acres (0.01 hectare)
Wetland 3	0.09 Acres (0.04 hectare)
New Hope Creek	1,183 Linear feet (361 meters)
UT New Hope Creek	864 Linear feet (263 meters)

All spans over New Hope Creek may be considered potential fill except for steel/timber structures. The superstructure is timber deck on I-beams with steel girders and a floor beam system. The substructure is timber caps and piles with interior bents of encased concrete. It is not known at this time if the superstructure and substructure of bridge No.108 are to be removed. Removal of the superstructure and substructure may cause fill.

Currently, the only buffer regulations in the Cape Fear River Basin apply to the Randleman Reservoir (15A NCAC 2B .0250 – Randleman Rules and Water Supply Buffer Requirements). New Hope Creek is not located within the Randleman Reservoir watershed, therefore, no buffer rules exist at this time for New Hope Creek and its associated tributaries.

New Hope Creek is not classified as C-Tr (Trout) and Orange County is not one of the 25 mountain counties designated by the North Carolina Wildlife Resource Commission (NCWRC) as containing Mountain Trout Waters (MTWs).

According to the North Carolina Wildlife Resources Commission (NCWRC), New Hope Creek supports a significant sunfish population and a moratorium on in-stream work from April 1 to June 15 will be required (2/19/03 memorandum from Shari Bryant, NCWRC fisheries biologist – Appendix E).

The following issues *do not apply* to the proposed project:

- Anadromous fish moratorium
- Trout moratorium
- 303(d) impaired waters
- Essential Fish Habitat
- High Quality Waters/ Outstanding Resource Waters
- Buffer rules

Permits

In accordance with the Federal Register (January 15, 2002), Part II, Volume 67, Number 10, the project will likely require authorization under a Section 404 Nationwide Permit #23 (Approved Categorical Exclusions). A Nationwide Permit # 33 (Temporary Construction, Access, and Dewatering) may be needed for temporary construction access if that is not addressed in the NEPA document. A final permitting strategy cannot be developed until a design alternative is selected.

Section 401 General Water Quality Certifications for NWP #23 and #33 are No. 3361 and 3366, respectively. Written concurrence from the N.C. Division of Water Quality (DWQ) is not required provided all standard conditions of these Certifications are met. Final determination of permit applicability lies with USACE. NCDOT will coordinate with the USACE after the completion of final design to obtain the necessary permits.

Mitigation

In accordance with 15A NCAC 2H.0506 (h) and 40 CFR 1508.20, mitigation will be required for impacts to jurisdictional streams requiring mitigation when these impacts are equal to or greater than 150 linear feet per stream. In addition, mitigation may be required for wetland impacts exceeding 0.10 acre. At this time, no design alternatives have been selected; however, once an alternative and right-of-way widths are established, specific impact calculations to wetlands and streams can be determined and mitigation requirement can be further evaluated.

It is anticipated that the bridge replacement over New Hope Creek will likely impact less than 150 linear feet of stream. Avoidance alternatives will need to be evaluated to avoid or minimize parallel encroachments into the portion of New Hope Creek located near the southern portion of the project study area. Avoidance alternatives will also need to be evaluated to avoid or minizime a potential parallel encroachments into the unnamed tributary of New Hope Creek in the northern portion of the project study area. Wetlands 1 and 2 are located near the northwestern edge of the project study area and could likely be avoided. Wetland 3 is located adjacent to SR 1730 in the northern portion of the project study area and avoidance of this area may not be feasible. However, the total acreage of Wetland 3 is less than the 0.10 mitigation threshold. Therefore, avoidance alternatives could possibly alleviate stream and wetland mitigation requirements. However, final permit/mitigation decisions will be determined by the USACE.

Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the ESA. According to the January 29, 2003 USFWS internet listing, there are four federally-protected species for Orange County. The red-cockaded woodpecker (*Picoides borealis*), dwarf wedge mussel (*Alasmidonta heterodon*), Michaux's sumac (*Rhus michauxii*), and smooth coneflower (*Echinacea laevigata*) are listed as endangered. Endangered species are in danger of extinction within the foreseeable future throughout all or a significant portion of their range. The small-whorled pogonia (*Isotria medeoloides*) is listed as threatened. Threatened species are likely to become endangered in the foreseeable future throughout all or a significant portion of their range.

Red-Cockaded Woodpecker

The listing for red-cockaded woodpecker in Orange County is based upon an obscure record. The date and/or location of the observation of this species is uncertain. No individual red-cockaded woodpeckers or cavity trees were observed within the project study area or on adjacent properties. Within the project site and adjacent area no large tracts of mature pine trees were present. The hardwood/pine forest had a tall dense understory that would discourage foraging activity of red-cockaded woodpeckers. Therefore, there is no suitable habitat in the project study area.

Biological Conclusion: No Affect

Dwarf Wedge Mussel

The dwarf wedge mussel inhabits stream and river areas with a slow to moderate current with a sand, gravel or muddy substrate. These areas must be nearly silt free.

Biological Conclusion: Unresolved

New Hope Creek provides suitable habitat for this species. Surveys for this species need to occur within the two year window prior to bridge replacement to determine the presence or absence of the mussel within the project study area.

Michaux's Sumac

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. This plant survives best in areas where some form of disturbance has provided an open area such as highway right-of-ways and areas with periodic fires.

Biological Conclusion: Unresolved

Suitable habitat for this species exists within the project study area along the existing road right-of-way and along a utility line corridor. Surveys for this species need to be conducted when the plant has its foliage (April to November).

Small Whorled Pogonia

Habitat for the small-whorled pogonia is open, dry, deciduous woods with acidic soil.

Biological Conclusion: Unresolved

Habitat for this species does occur within the project study area. Surveys for this species need to be conducted during the plants flowering season (mid-May to mid-June).

Smooth Coneflower

The listing of the smooth coneflower in Orange County is based upon a historic record. The species was last observed in the county more than 50 years ago. The habitat of the smooth coneflower is open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and powerline right-of-ways. Optimal sites are characterized by abundant sunlight and minimal competition in the herbaceous layer.

Biological Conclusion: Unresolved

Suitable habitat exists along the power line right-of-way and the maintained road shoulder. Surveys should be conducted in mid-May to July.

CONCLUSIONS

The project study area contains approximately 1,183 linear feet of New Hope Creek and approximately 864 linear feet of an unnamed tributary of New Hope Creek. The best usage classification of New Hope Creek and its associated tributary is class **"C-NSW"** waters. No

High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur within the project vicinity. New Hope Creek is not listed on the DWQ 2000 Draft 303(d) list of impaired waters. No buffer rules exist at this time for Jordan Creek and its associated tributaries. Because of the sunfish population within New Hope Creek, a warm water fish moratorium on in-stream work will apply form April 1 to June 15.

New Hope Creek does not support trout or anadromous fish species and is not designated as essential fish habitat. Three jurisdictional wetlands are located in the project study area. Wetland impacts could exceed 0.10 acre and may require mitigation. Stream impacts equal to or exceeding 150 linear feet per stream will require mitigation. It is not anticipated that the proposed bridge replacement would impact 150 linear feet of New Hope Creek, however, portions of New Hope Creek that meander into the southern portion of the project study area parallel SR 1730 for approximately 200 feet. The UT of New Hope Creek is located in the northern portion of the project study area and parallels SR 1730 for approximately 400 feet.

There are five federally protected species for Orange County, four of which carry an Unresolved Biological Conclusion. Surveys for dwarf wedge mussels should be conducted within two years prior to construction. Surveys for Michaux's sumac need to be conducted when the plant has its foliage (April to November). Surveys for small-whorled pogonia need to be conducted during the plants flowering season (mid-May to mid-June). Surveys for smooth coneflower should be conducted in mid-May to July.

TABLE OF CONTENTS

1.0 Introduction

Kimley-Horn and Associates, Inc. (KHA) has been retained by the North Carolina Department of Transportation (NCDOT) to complete natural resources investigations associated with the replacement of Bridge No. 108 over New Hope Creek in Orange County, North Carolina. The following Natural Resources Technical Report is submitted to assist in the preparation of the Categorical Exclusion (CE) for the proposed project.

1.1 Project Description

The proposed project, Transportation Improvement Project (TIP) No. B-4218, will replace Bridge No. 108 on Turkey Farm Road (SR 1730) over New Hope Creek in Orange County, North Carolina (Figure 1). The bridge, built in 1953, is currently in poor condition and in need of replacement. The replacement is intended to provide a safer bridge structure consistent with federal and state bridge standards. Photographs of the project study area are included in Appendix A.

For the purposes of this report, the following terminology is used define the limits of the natural resource investigations.

Project study area – denotes the area bound by the proposed right-of-way limits along the full length of the project alignment. No alternatives for the proposed project have been defined, therefore, the project study area is comprised of an area approximately 2,867 feet (874 meters) long and 500 feet (152 meters) wide consisting of nearly 30 acres (12 hectares). Approximately 1,183 linear feet of New Hope Creek is located within the project study area.

Project vicinity- denotes an area extending 0.5 miles (0.8 kilometers) on all sides of the project study area.

Project region – is equivalent to an area represented by a 7.5 minute USGS quadrangle map with the project study area occupying the central portion.

1.2 Purpose

The purpose of this technical report is to inventory, catalog, describe, and quantify the natural systems within the project study area. Specifically, the evaluations conducted for this study include: 1) an assessment of physical resources, including geology, soils, and water resources; 2) an assessment of biotic resources including plant communities, aquatic habitats, terrestrial wildlife and aquatic species;

Legend

Project Study Area

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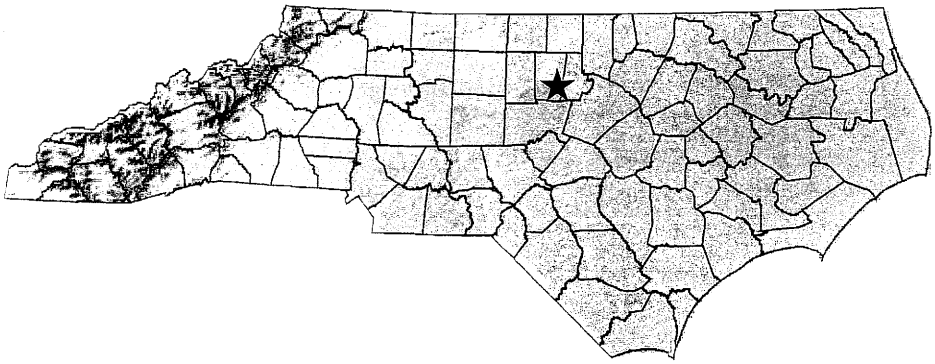
Feet



Title	Vicinity Map (USGS Quad Chapel Hill, North Carolina 1981)

Kimley-Horn and Associates, Inc.

Prepared For:

Project	Project Study Area T.I.P. No. B-4218 Replacement of Bridge #108 on SR 1730 Orange County, North Carolina		
Date:	**Scale:**	**Project No.**	**Figure:**
2/25/03	1 in. = 2,000 ft.	011700019	1

3) an evaluation of waters of the U.S. including surface waters and wetlands, along with a preliminary discussion of Section 404/401 permit requirements and conceptual mitigation needs; 4) an assessment of rare and protected species habitat; 5) mapping of natural resource features, including plant communities, jurisdictional surface waters and wetlands, and potential habitat for federally protected species; and 6) an evaluation of potential impacts resulting from construction, as well as recommendations for measure which may minimize resource impacts.

These descriptions and estimates are based on the existing project study area. If the criteria change, additional field investigations may be necessary.

1.3 Methodology

Qualified biologists from KHA and Edwards-Pitman Environmental, Inc. conducted field investigations along the project study area during the month of January 2003. Pedestrian surveys were undertaken to determine natural resource conditions and to document natural communities, wildlife, and the presence of protected species or their habitats.

Published information regarding the project study area and region was derived from a number of sources including: USGS 7.5-minute topographical quadrangle map (Chapel Hill, North Carolina), United States Fish and Wildlife Service (USFW) database reviews, National Wetland Inventory (NWI) Map, NCDOT aerial photography (1" = 200'), and Natural Resources Conservation Service (NRCS) soil survey mapping of Orange County.

Surface waters within the project study area were evaluated in the field to document their physical characteristics and jurisdictional status. The top of bank and/or centerline of streams, depending on channel widths, were surveyed and recorded in the field using Global Positioning Satellite (GPS) survey methods. Water resources information was obtained from publications of the North Carolina Department of Environment and Natural Resources Division of Water Quality (DENR-DWQ). Approximate boundaries of plant communities were mapped in the field utilizing aerial photography of the project study area. Dominant plant species were identified in each strata for each plant community. Plant community descriptions are based on the classifications utilized by Schafale and Weakly (1990). Plant names follow the nomenclature found in Radford *et al.* (1968).

Wildlife occurrences were determined through visual field observations, evaluation of habitat-types within the project study area, secondary indicators of species (tracks, scat, and burrows), as well as a review of supporting literature (Coe, 1994, Martof, *et al* 1980, and Webster, 1985). Field observations and literature reviews (Bogan, 2002, Jenkins and Burkhead, 1993) were utilized to assess aquatic life.

Information concerning the potential occurrence of federal and state protected species within the project study area and project vicinity was obtained from the U.S. Fish and Wildlife Service (USFWS) list of protected species (updated January 29, 2003) and the North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats (updated July, 2002). Field evaluations of the project study area were conducted to identify suitable habitat for protected species. If suitable habitat was identified, field surveys were conducted for Federally listed endangered or threatened species if the field investigation corresponded to the appropriate survey season for the species.

Jurisdictional wetlands were identified and delineated based upon the methodology outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). Wetland systems were classified based upon the U.S. Fish and Wildlife Service *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979). Wetland boundaries were located in the field using GPS methods with sub-meter accuracy.

1.4 Qualifications of Principal Investigators

Investigator:	Norton Webster, Environmental Scientist
Education:	BS, Business, Wake Forest University
	MS, Forestry, North Carolina State University
Experience:	Kimley-Horn and Associates, Inc., December 2000 to present
	Environmental Scientist, ARCADIS, Inc.
	June 1997 to December 2000
Expertise:	Wetland/Stream Delineation, Permitting, Threatened and Endangered Species Surveys

Investigator:	Rick Filer, Project Ecologist
Education:	BS, Biology, Kennesaw State University
Experience:	Edwards-Pitman Environmental, March 2001 to present
	Environmental Scientist, Environmental Aspecs of Georgia
	September 1999 to March 2001
Expertise:	Wetland/Stream Delineation, Permitting, Threatened and Endangered Species Surveys

2.0 Physical Resources

Orange County is situated in the central portion of the Piedmont physiographic province. The geography of the county consists predominantly of gently sloping uplands and broad, nearly level

floodplains along most streams. The elevation of the project study area is approximately 450 feet (137 meters) above Mean Sea Level (MSL) as depicted on the Chapel Hill, North Carolina, USGS topographic quadrangle map (Figure 1). The land uses surrounding and within the project study area mainly agriculture and forestry with some low-density residential development.

2.1 Geology

The geologic features underlying the project study area are associated with the Carolina slate belt, specifically, felsic metavolcanic rock. The rock is metamorphosed dacitic to rhyolitic flows and tuffs, light gray to greenish gray with interbedded with mafic and intermediate metavolcanic rock, meta-argillite, and metamudstone (North Carolina Geological Society, 1985).

2.2 Soils

Soil associations are classified as a group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a general region. The soils within an association generally vary in depth, slope, stoniness, drainage, and other characteristics. Based on information contained in the soil survey data for Orange County, the soils within the project study area are composed of five soil series.

Congaree fine sandy loam (Cp)

This nearly level, well-drained soil is found on narrow floodplain bands parallel to streams. Typically, the surface soil is a brown fine sandy loam and the subsoil is a yellowish brown sandy loam. The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is high, and the shrink-swell potential is low. The depth to bedrock is greater than 5 feet and the seasonal high water table is 2.5-4 feet in late winter and early spring.

Chewacla loam (Ch)

This nearly level, somewhat poorly drained soil is found on long flat floodplains parallel to major streams. Typically, the surface soil is a dark brown loam and the subsoil is yellowish brown sandy clay loam to a pale brown. The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is low. The depth to bedrock is greater than 5 feet and the seasonal high water table is 6-8 inches during late winter and early spring.

Georgeville silt loam (GeC) 2-6 % slopes

This well-drained soil is found on broad ridges in upland areas. Typically, the surface soil is yellowish red silt loam and the subsoil is a mottled red clay loam. The organic matter content of the surface layer

is low. Permeability is moderate, available water capacity is high, and the shrink-swell potential is low. The depth to bedrock is greater than 5 feet and the seasonal high water table is below 6 feet.

Goldston slaty silt loam (GiF) 15-45 % slopes

This well drained soil is found on side slopes adjacent to major drainageways and broad ridges in upland areas. Typically, the surface soil is a pale brown silt loam and the subsoil is a yellowish brown to a strong brown silt loam. The organic matter content of the surface layer is low. Permeability is moderately rapid, available water capacity is low, and the shrink-swell potential is low. The depth to bedrock is 20-40 inches and the seasonal high water table is below 6 feet.

Tatum silt loam (TaD) 8-25 % slopes

This well-drained soil is found on side slopes in upland areas. Typically, the surface soil is a strong brown silt loam and the subsoil is in the upper part a red silty clay and a red silty clay loam in the lower extent. The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is moderate. The depth to bedrock is 40-60 inches and the seasonal high water table is 4-6 feet.

The NRCS defines a hydric soil as one that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Such soils usually support hydrophytic vegetation. Based on information obtained from the Orange County soil survey, Congaree, Georgeville, Goldston, and Tatum are not classified as hydric and do not contain hydric inclusions. Chewacla is classified as a hydric soil.

2.3 Water Resources

Streams, creeks, and tributaries within the project vicinity are part of the Haw River watershed in the Cape Fear River Basin. The Cape Fear River basin is the largest river basin in the state covering 9,149 square miles in twenty-four counties. The Cape Fear River is formed by the confluence of the Deep and Haw Rivers.

New Hope Creek and an unnamed tributary of New Hope Creek represent the surface waters in the project study area. The project is located approximately one mile north of Chapel Hill. It is situated in NCDWQ Sub-basin 03-06-05 and the Hydrologic Unit Code (HUC) is 03030002. The project study area contains approximately 1,183 linear feet of New Hope Creek and approximately 864 linear feet of an unnamed tributary of New Hope Creek.

New Hope Creek is a perennial stream that meanders through the project study area flowing northwest to southeast underneath the bridge proposed for replacement. The top of bank width is approximately 50 to 75 feet wide with an average wetted width of 50 feet. One to three feet of slow to fast flowing water was observed within the channel during the site visit. Conditions within the channel varied due to the long distance of the channel. New Hope Creek has a bankfull depth of 5.5 feet throughout the project study area. The 3 to 10 feet tall stream banks appeared stable. The substrate consisted of bedrock, cobble, gravel, and sand. The water was clear with moderate sediment deposition. The channel exhibits strong geomorphologic features as well as excellent aquatic habitat. The stream received a DWQ stream classification of 62. DWQ stream classification forms are contained in Appendix B.

Based on Rosgen classification, New Hope Creek is an "F" channel. It is entrenched with a meandering, riffle/pool channel on a low gradient with a high width/depth ratio.

An unnamed tributary to New Hope Creek crosses underneath SR 1730 approximately 1,300 feet north/northeast of the existing bridge. The northwest to southeast flowing channel runs parallel to SR 1730 for approximately 400 feet. The top of bank width is approximately 2 feet wide with a wetted width of 1-foot. During the field review, 1 to 3 inches of moderately flowing water was observed in the channel. The stream has a bankfull depth of 6 inches throughout the project study area. The stream banks were stable. The substrate consisted of sand and silt with some gravel riffle sections. The water was clear and had little to no sediment deposition. The tributary received a DWQ classification of 40.75. Although the water levels observed in the channel during the non-growing season (January) would indicate that the channel was likely intermittent, other primary field indicators observed such as the channel geomorphology and biological indicators are characteristic of a perennial stream. The channel contained a well-defined bed and bank with riffle-pool sequences. Good aquatic habitat was available including deep pools with exposed tree roots. KHA will schedule a field verification meeting with the U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Quality (NCDWQ) to make a final jurisdictional determination for this tributary.

The North Carolina Division of Water Quality (NCDWQ) classifies surface waters of the state based on their intended best uses. New Hope Creek and its tributaries are classified as "C -NSW" waters. Class C denotes waters suitable for all general uses including aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. The supplemental classification, Nutrient Sensitive Waters (NSW), denotes waters subject to growths of microscopic or macroscopic vegetation requiring limitations on nutrient inputs.

No High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur within the project vicinity. Although downstream reaches of New Hope Creek are listed on the DWQ 2000 Draft 303(d) list of impaired waters, the reach of New Hope Creek within the project study area is not included on the 303(d) list.

New Hope Creek and its unnamed tributary are not classified as C-Tr (Trout) and Orange County is not one of the 25 mountain counties designated by the North Carolina Wildlife Resource Commission (NCWRC) as containing Mountain Trout Waters (MTWs). New Hope Creek does not support trout or anadromous fish; however, it supports a significant sunfish population and a warm water fish moratorium for in-stream work will be in effect from April 1 to June 15 (2/19/03 memorandum from Shari Bryant, NCWRC fisheries biologist – Appendix E). No essential fish habitat has been designated for New Hope Creek.

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine water quality monitoring stations strategically located for the collection of physical and chemical water data. The type of water quality data or parameters collected is determined by the waterbodies' classification and corresponding water quality standards. The AMS determines the "use support" status of waterbodies, meaning how well a waterbody supports its designated uses.

There are no AMS stations or benthic macroinvertebrate sampling locations within the project vicinity.

2.3.1 Point and Non-point Source Discharges

Point source dischargers are permitted through the National Pollutant Discharge Elimination System (NPDES) program and are required to register for a permit. Based upon DWQ's database, there are three NPDES permit locations within a half mile of the project study area. The three single family domestic wastewater dischargers are listed as Daniel R. Dalcorso residential (NCG 550140), William L. Triplett residential (NC0047601), and William Triplett residential (NCG 550143).

Non-point source discharge refers to runoff that enters surface waters through stormwater, snowmelt or atmospheric deposition. Land use activities such as land development, construction, mining operations, crop production, animal feeding lots, failing septic systems, landfills, roads and parking lots are contributors of non-point source pollutants. The land uses surrounding and within the project study area are mainly agriculture and forestry with some residential development. Sediment is the most widespread cause of non-point source pollution in North Carolina. In agriculture, sediment and nutrients are major polluters. Land clearing and plowing disturbs soils to a degree where they are

susceptible to erosion, which can lead to sedimentation in streams. Pesticides, chemical fertilizers, and land application of animal wastes can be transported via runoff to receiving streams and potentially elevate concentrations of toxic compounds and nutrients. Animal wastes can also be a source of bacterial contamination and elevate biochemical oxygen demand.

2.4 Physical Resources Impacts

The proposed project is expected to impact both soils and topography. The topography is gently sloping. The possible construction of a new bridge and/or road improvements is likely to require the removal of soils and the placement of fill. No adverse long-term impacts to soils and topography are expected from the proposed bridge replacement.

The primary sources of water-quality degradation in rural areas are nonpoint-source discharges and storm water runoff. Precautions should be taken to minimize impacts to water sources in the project vicinity. Aquatic organisms are very sensitive to discharges and inputs from construction. Appropriate measures must be taken to avoid petroleum spillage and control runoff. Potential impacts associated with construction of the proposed project include the following: increased sedimentation resulting from the clearing of streams and in-stream construction activities, soil compaction, loss of shading due to vegetation removal, and fertilizers and pesticides used in revegetation. Measures to minimize these potential impacts include formulation of an erosion and sedimentation control plan, provision for waste material and storage, stormwater management measures, and appropriate road-maintenance measures. NCDOT's Best Management Practices for Protection of Surface Waters (BMPs-PSW) and Sedimentation Control guidelines should be strictly enforced during the construction stages of the project. Limiting in-stream activities and revegetating stream banks immediately following the completion of grading can further reduce impacts. No adverse long-term impacts to water resources are expected to result from the proposed bridge replacement.

3.0 Biotic Resources

This section describes the existing vegetation and associated wildlife that occur within the project study area. The project study area is composed of three different vegetative communities based on topography, soils, hydrology, and disturbance. These systems are interrelated and in many aspects interdependent. Potential impacts affecting these communities are also discussed. Scientific nomenclature and common name (when applicable) are provided for each plant and animal species listed. Subsequent references to the same organism only include the common name.

3.1 Plant Communities

Three plant communities were observed in the project study area: piedmont alluvial forest, mesic mixed hardwood forest, and fallow field. These plant communities are mapped on Figure 2 and are quantified in Table 1.

Table 1. Land Uses within the Project Study Area.

Community Type	Acres (Hectares)	Percentage of Project Study Area
Piedmont Alluvial Forest	9.3 (3.8)	31%
Mesic Mixed Hardwood Forest	19.6 (8.0)	66%
Fallow Field	1.0 (0.4)	3%

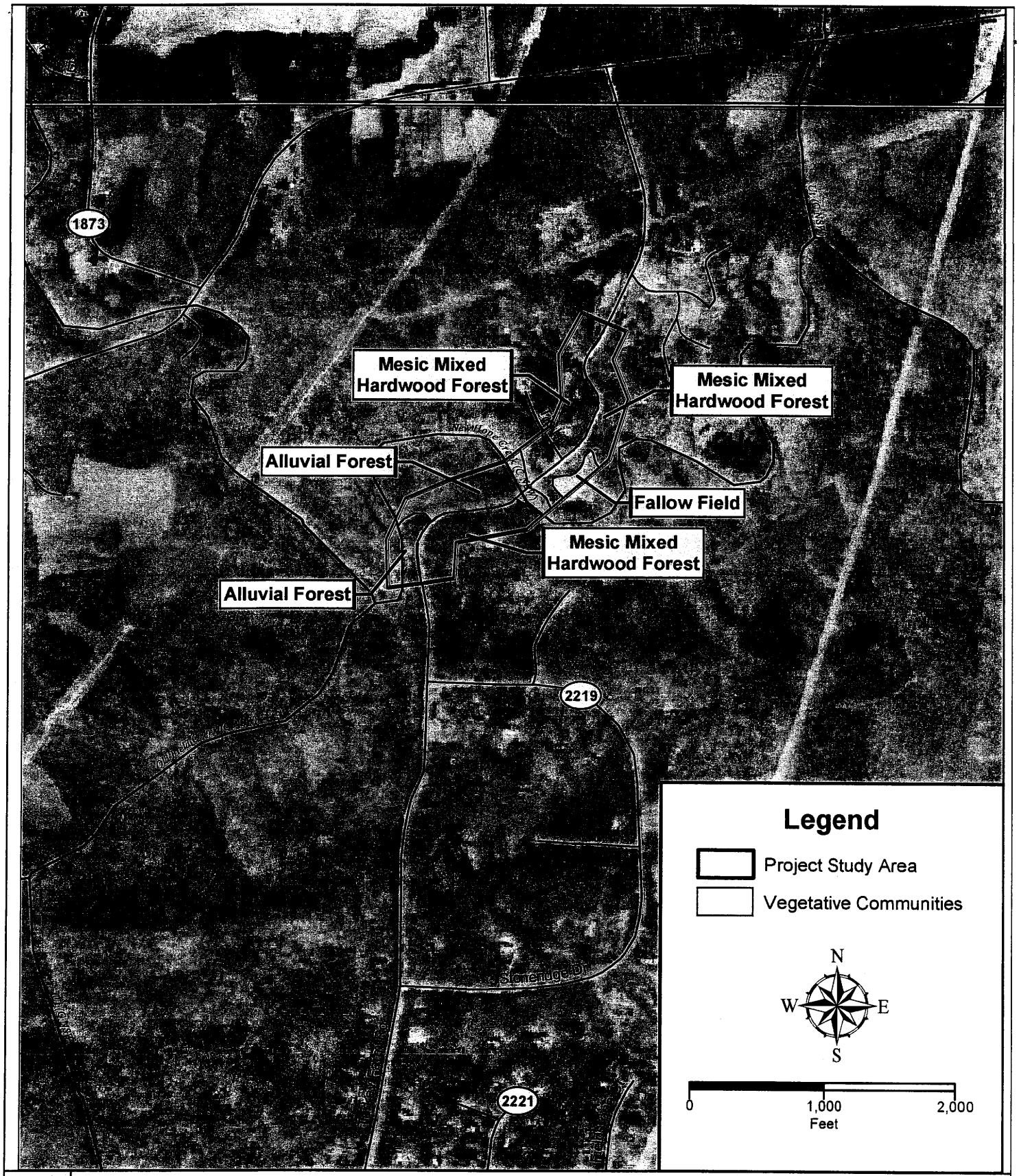
3.1.1 Piedmont Alluvial Forest

The piedmont alluvial forest community is situated along the floodplain of the New Hope Creek. This alluvial forest can best be characterized as a variation of the Piedmont Alluvial Forest (Schafale and Weakly, 1990). Approximately 9.3 acres (3.8 hectares) of this community are located within the project study area comprising 31% of the plant communities within the project study area. The canopy was dominated by white oak (*Quercus alba*), tulip polar (*Liriodendron tulipfera*), red bud (*Cercis canadensis*), sugar maple (*Acer saccharum*), American elm (*Ulmus americana*), sugarberry (*Celtis laevigata*), and green ash (*Fraxinus pennsylvanica*), with scattered black birch (*Betula nigra*), bitternut hickory (*Carya cardiformes*), black walnut (*Juglans nigra*), and blackgum (*Nyssa sylvatica*).

The understroy was dominated by flowering dogwood (*Cornus florida*), eastern red cedar (*Juniperus virginiana*), musclewood (*Carpinus caroliniana*), winged elm (*Ulmus alata*), buckeye (*Aesculus* sp.), viburnum (*Viburnum* sp.), Chinese privet (*Ligustrum sinese*), and American beech (*Fagus grandifolia*). Vines, herbs, and forbs included Japanese honeysuckle (*Lonicera japonica*), Christmas fern (*Polystichum acrostichoides*), wild onions (*Allium* sp.), strawberry bush (*Euonymus americanus*), muscadine (*Vitis* sp.), rattlesnake fern (*Botychium*sp.), greenbrier (*Smilax bona-nox* and *Smilax* sp.), blackbery (*Rubus argutus*), river oats (*Chasmanthium latifolium*), ginger (*Hexastylis* sp.), mulberry (*Morus rubra*), American holly (*Ilex opaca*), multiflora rose (*Rosa multiflora*), blackcherry (*Prunsu serotina*), pawpaw (*Asima triloba*), crane-fly orchid (*Tipularia discolor*), and spicebush (*Lindera benzoin*).

3.1.2 Mesic Mixed Hardwood Forest

The mesic mixed hardwood community is located on the upland slopes and ridges. Approximately 19.6 acres (8.0 hectares) of this community are located within the project study area comprising 66% of the plant communities within the project study area. This fragmented community was dominated



Title	Vegetative Communities and Landuse (1993 USGS Orthophoto)

Kimley-Horn and Associates, Inc.

Prepared For:

Project	Project Study Area T.I.P. No. B-4218 Replacement of Bridge #108 on SR 1730 Orange County, North Carolina

Date:	Scale:	Project No.	Figure:
2/25/03	1 in. = 1,000 ft.	011700019	2

by shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), scarlet oak (*Q. coccinea*), southern red oak (*Q. falcata*), northern red oak (*Q. rubra*), American beech, shagbark hickory (*Carya ovata*), and mockernut hickory (*C. tomentosa*). Herbs found on the forest floor included liverleaf (*Hepatica* sp.), ebony spleenwort (*Asplenium platyneuron*), and Christmas fern.

3.1.3 Fallow Field

The fallow field is located in association with a single-family residence. Approximately 1.0 acre (0.4 hectares) of this community is located within the project study area comprising 3% of the plant communities within the project study area. The field is dominated by fescue grass (*Festuca* spp.), Bermuda grass (*Cynadon dactylon*), multifora rose, iron weed (*Vernonia* sp.), trumpet vine (*Campsis radicans*), poison ivy (*Toxicodendron radicans*), royal paulownia (*Paulownai tomentosa*), and tree of heaven (*Ailanthus altissima*).

3.2 Terrestrial Wildlife

The fallow field provides rich ecotones for foraging, while the alluvial and mesic mixed hardwood forests provide foraging and cover. White-tailed deer (*Odocoilieus virginianus*) and raccoon (*Procyon lotor*) tracks were observed along New Hope Creek. Gray squirrels (*Sciurus carolinensis*) were seen foraging in the forested stands. Evidence of past beaver foraging were observed within the alluvial forest community.

Common mammals, which could be expected to utilize the project study area habitat, includes the opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*) and various shrews, moles, bats, and mice.

Common birds, which could be expected to utilize the project study area habitat, includes the cardinal (*Cardinalis cardinalis),* blue jay (*Cyanocitta cristata),* Carolina chickadee (*Parus carolinensis*), mockingbird (*Mimus polygottos*), wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), field sparrow (*Spizella pusilla*), robin (*Turdus migratorius*), and Carolina wren (*Thryothorus ludovicianus*).

Common reptiles and amphibians, which could be expected to utilize the project area habitat, includes eastern garter snake (*Thamnophis sirtalis sirtalis*), water snakes (*Nerodia* spp.), eastern box turtle (*Terrapene carolina*), five-lined skink (*Eumeces fasciathus*), toads (*Bufo* spp.), leopard frogs (*Rana* spp.), tree frogs (*Hyla* spp.), and salamanders (*Ambystoma* spp.).

3.3 Aquatic Habitats and Wildlife

New Hope Creek provides excellent aquatic habitat within the project study area. The physical characteristics (size and water quality) of the stream, as well as the adjacent terrestrial community, directly influence faunal composition of this aquatic community. The quality of aquatic habitat at this location is expected to be good due to a stable channel with a forested riparian buffer and minimal sediment deposition. Woody debris located throughout the stream provides habitat, shade, and concealment pockets for several aquatic species. Aquatic invertebrates are a major component of aquatic ecosystems, as primary and secondary consumers, as well as prey items for organisms higher in the food chain.

Insects typically found in this type of community include Mayflies (Ephemeroptera), stoneflies (Plecoptera), caddisflies (Tricoptera), dragonflies (*Odonta* sp.), aquatic beetles (Coleoptera), mosquito larvae (*Culicidae* sp.) and midges (*Chironomidae* sp.). Mayflies and caddisflies were observed during field review.

Fish species expected to occur within the project vicinity include bullhead catfish (*Ameiurus* spp.), largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis* spp.), chain pickerel (*Esox niger*), redfin pickerel (*E. americanus*), and shiners (*Notropis* spp. and *Cyprinella* spp.).

Freshwater mussels that may occur include spike (*Elliptio* spp.), Carolina lance (*E.angustata),* Carolina slabshell (*E.congaraea)* and pondhorn (*Uniomerus* sp.). Other species likely to be found include snapping turtle (*Chelydra serpentina*), Eastern mud turtle (*Kinosternon subrubrum*), sliders (*Chrysemys scripta*), and painted turtles (*Chrysemys picta*).

3.4 Biotic Resource Impacts

Design alternatives have yet to be identified for this project, therefore no estimated area of impact to these natural communities has been calculated at this time. Table 1 describes the acreage of plant communities within the project study area; however, actual impact acreage within the construction limits will be less. Impacts to plant communities associated with construction activities include the removal of vegetation, soil compaction, damaging and/or exposing root systems, as well as potential impacts associated with petroleum spills.

Due to the minimal disturbance of plant communities anticipated as a result of the bridge replacement, significant impacts to terrestrial wildlife populations are not expected.

Loss of wildlife is an unavoidable aspect of development. Temporary fluctuations in populations of animal species that utilize these communities are anticipated during the course of construction. Slow-moving, burrowing, and/or subterranean organisms will be directly impacted by construction activities, while mobile organisms will be displaced to adjacent communities. Competitive forces in the adapted communities will result in a redefinition of population equilibria.

Aquatic organisms are acutely sensitive to changes in their environment and environmental impacts from construction activities may result in long term or irreversible effects. Impacts usually associated with in-stream construction include alterations to the substrate and impacts to adjacent streamside vegetation. Such disturbance within the substrate lead to increased siltation, which can clog the gills and/or feeding mechanisms of benthic organisms, fish, and amphibian species. Siltation may also cover benthic macroinvertebrates with excessive amounts of sediment that inhibit their ability to obtain oxygen.

The removal of streamside vegetation and placement of fill material during construction enhances erosion and possible sedimentation. Quick revegetation of these areas helps to reduce the impacts by supporting the underlying soils. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, bars may form at and downstream of the site. Increased light penetration from the removal of streamside vegetation may increase water temperatures. Warmer water contains less oxygen, thus reducing aquatic life that depends on high oxygen concentrations.

4.0 Waters of the United States

Section 404 of the Clean Water Act requires regulation of discharges into "Waters of the United States." The U.S. Environmental Protection Agency (USEPA) is the principle administrative agency of the Clean Water Act; however, the U.S. Army Corps of Engineers (USACE) has the responsibility for implementation, permitting, and enforcement of the provisions of the Act. The USACE regulatory program is defined in 33 CFR 320-330.

Wetlands, streams, and open waters are regulated by the USACE pursuant to Section 404 of the Clean Water Act. The North Carolina DENR-DWQ also has regulatory input through Section 401 Water Quality Certification. Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Any action that proposes to place fill into these areas falls under the jurisdictional of the USACE under Section 404 of the Clean Water Act (33 USC 1344).

4.1 Surface Waters

The DWQ defines a perennial stream as a clearly defined channel that contains water for the majority of the year. These channels usually have some or all of the following characteristics: distinctive streambed and bank, aquatic life, and groundwater flow or discharge. New Hope Creek and its tributary were identified as perennial streams in the project study area. Detailed stream characteristics, including specific water-quality designations, are present in Section 2.3 Water Resources. DWQ stream data forms are contained in Appendix B.

4.2 Jurisdictional Wetlands

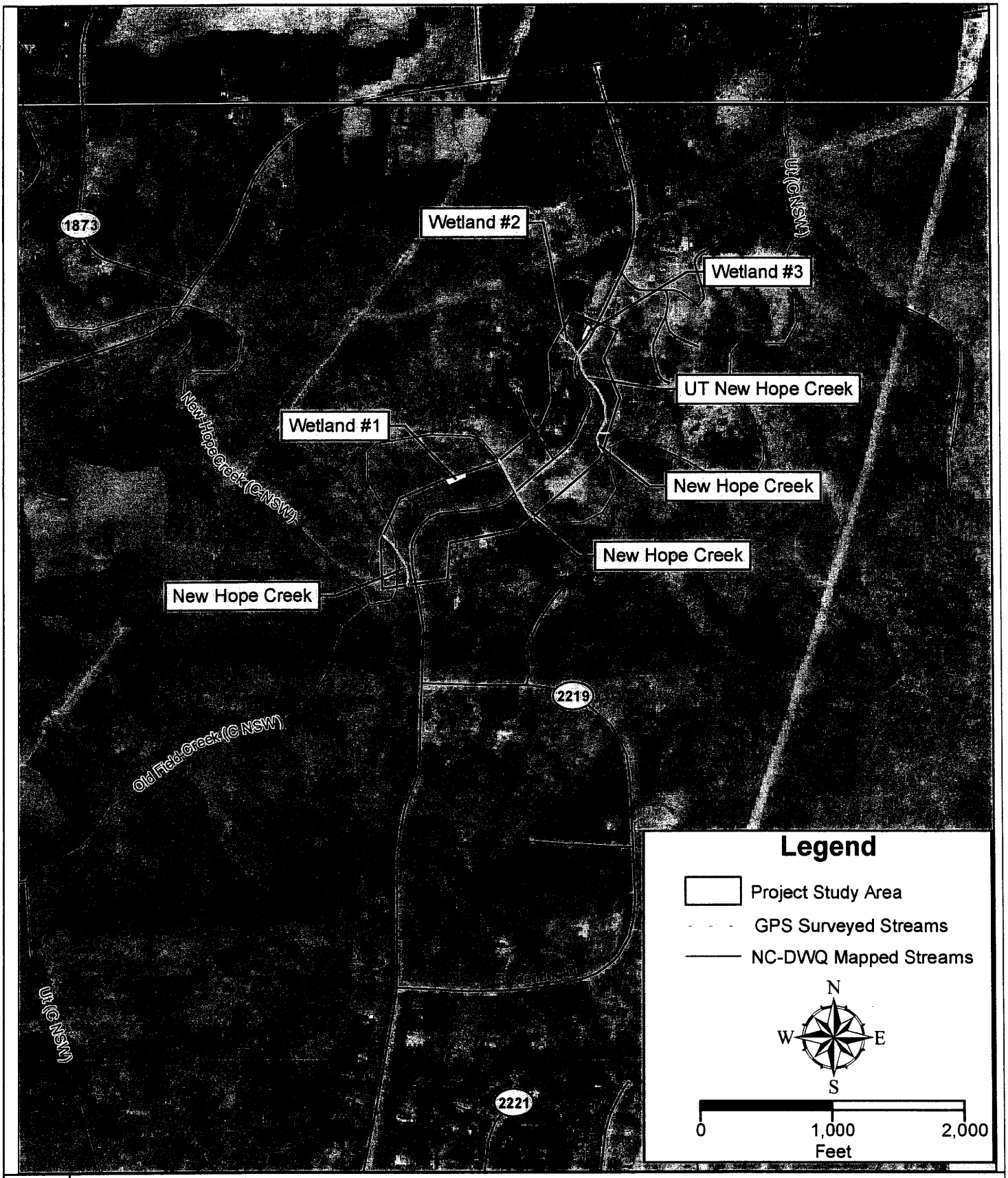
The project study area was surveyed for jurisdictional wetlands in accordance with guidelines for wetland definition as given in the *1987 Corps of Engineers Wetlands Delineation Manual.* This approach incorporates three criteria in delineating wetlands: (1) the presence of hydrophytic vegetation, (2) the presence of hydric soils, and (3) evidence of wetland hydrology. All three criteria must be present in a given location for an area to be considered a jurisdictional wetland.

Three jurisdictional wetlands were associated with the project study area. One wetland is located within the alluvial forest along the floodplain of New Hope Creek and the other two wetlands are located within the mesic mixed hardwood forest adjacent to the unnamed tributary of New Hope Creek. The boundaries of each of these wetland locations was identified in the field and located using GPS. The location of the wetlands is shown in Figure 3.

Wetland 1 is a forested wetland dominated by river birch, sweetgum, American elm, tulip poplar, shortleaf pine, sphagnum moss (*Sphagnum* sp.), and Japanese honeysuckle. Ponded water and water stained leaves were present. Based on the Cowardin classification, the wetland is a Palustrine Forested Broad Leaved Deciduous (PFO1). USACE data forms are contained in Appendix C.

Wetland 2 is dominated by green ash, American elm, sedges (*Carex* sp.), Japanese honeysuckle, tag alder (*Alnus serrulata*), and rush (*Juncus* sp.). Ground water seepage and drainage patterns were observed in this area. Based on the Cowardin classification, the wetland, dominated by trees, is also classified as a PFO1. USACE data forms are contained in Appendix C.

Wetland 3 is a scrub-shrub wetland dominated by black willow (*Salix nigra*), green ash, and sedges. It is located immediately downstream of a pond. Drainage patterns and water stained leaves were evident along with ground water seepage flow. Based on the Cowardin classification, the wetland dominated by trees is classified as a Palustrine Scrub-Shrub Broad Leaved Deciduous (PSS1). USACE data forms are contained in Appendix C.



Title	Jurisdictional Wetlands and Streams within the Project Study Area (1993 USGS Orthophoto)

Kimley-Horn and Associates, Inc.

Prepared For: State of North Carolina Department of Transportation

Project	Project Study Area T.I.P. No. B-4218 Replacement of Bridge #108 on SR 1730 Orange County, North Carolina

Date:	**Scale:**	**Project No.**	**Figure:**
2/26/03	1 in. = 1,000 ft.	011700019	3

4.3 Wetland Functional Assessment

Wetland values for each area within the project study area were evaluated using the Fourth Version of the *Guidance for Rating the Values of Wetlands in North Carolina.* This procedure rates wetlands according to six functional parameters: water storage, bank/shoreline stabilization, pollutant removal, wildlife habitat, aquatic life value, and recreational/educational value. Each parameter is numerically weighted to assess the water quality functions that the wetland system performs. The Wetland Ranking scores for each wetland is listed in Appendix D.

Wetland 1 received a numerical ranking of 28 and is considered a low quality wetland. Wetland 2 received a numerical ranking of 29 and is considered a low quality wetland. Wetland 3 received a numerical ranking of 25 and is also considered a low quality wetland.

4.4 Impacts to Waters of the United States

Since no alternatives have been selected, specific impacts to "Waters of the United States" cannot by determined. However, some impacts to New Hope Creek, the UT to New Hope Creek,Wetland 1, Wetland 2, and Wetland 3 could be anticipated for the proposed project. Table 2 quantifies the acreage of the wetlands and linear footage of the streams located within the project study area; however, actual impacts within the construction limits will be less.

Table 2. Jurisdictional Wetlands and Streams within the Project Study Area.

Jurisdictional Wetland/Stream	Potential Impact Amount
Wetland 1	0.16 Acres (0.1 hectare)
Wetland 2	0.02 Acres (0.01 hectare)
Wetland 3	0.09 Acres (0.04 hectare)
New Hope Creek	1,183 Linear feet (361 meters)
UT New Hope Creek	864 Linear feet (263 meters)

4.5 Permit Requirements

Impacts to "Waters of the United States" come under the jurisdiction of the USACE. Permits will be required for highway encroachment into jurisdictional wetlands and streams. The Nationwide Permit #23 (Approved Categorical Exclusions) should cover the impacts to jurisdictional wetlands and streams in the project study area. Nationwide Permit No. 33 (Temporary Construction, Access, and Dewatering) may be needed for temporary construction access if that is not addressed in the NEPA document. A final permitting strategy cannot be developed until a design alternative is selected.

A Section 401 General Water Quality Certification is also required for any activity which may result in a discharge into "Waters of the United States" or for which an issuance of a federal permit is required. The issuance of a required Section 401 certification is a prerequisite to the issuance of a

Section 404 permit. Section 401 General Water Quality Certifications for NWP #23 and #33 are No. 3361 and 3366, respectively. However, written concurrence from the N.C. Division of Water Quality (DWQ) is not required provided all standard conditions of these Certifications are met.

Final determination of permit applicability lies with USACE. NCDOT will coordinate with the USACE after the completion of final design to obtain the necessary permits.

4.6 Mitigation

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

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". According to a 1990 Memorandum of Agreement (MOE) between the U.S. Environmental Protection Agency (USEPA) and the USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes. Some unavoidable impacts to wetlands and surface waters may result from project construction.

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to "Waters of the United States". Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way widths, fill slopes, and/or road shoulder widths. The following methods are suggested to minimize adverse impacts to "Waters of the United States":

1. Strictly enforce Best Management Practices (BMP's) to control sedimentation during project construction.
2. Clearing and grubbing activity should be minimized.
3. Reestablishment of vegetation on exposed areas with judicious pesticides and herbicide management.
4. Minimization of "in-stream" activity.

5. Minimization of roadway footprint width.
6. Bridge lengthening in environmentally sensitive areas.

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

In accordance with 15A NCAC 2H.0506 (h) and 40 CFR 1508.20, mitigation will be required for impacts to jurisdictional streams requiring mitigation when these impacts are equal to or greater than 150 linear feet per stream. In addition, mitigation may be required for wetland impacts exceeding 0.10 acre. At this time, no design alternatives have been selected; however, once alternative and right-of-way widths are established, specific impact calculations for wetlands and streams can be determined and mitigation requirement can be further evaluated.

It is anticipated that the bridge replacement over New Hope Creek will likely impact less than 150 linear feet of stream. Avoidance alternatives will need to be evaluated to avoid or minimize parallel encroachments into New Hope Creek near the southern portion of the project study area as well as potential parallel encroachments into the unnamed tributary of New Hope Creek in the northern portion of the project study area. Wetlands 1 and 2 are located near the northwestern edge of the project study area and likely could be avoided. Wetland 3 is located adjacent to SR 1730 in the northern portion of the project study area and avoidance of this area may not be feasible. However, the total acreage of Wetland 3 is less than the 0.10 mitigation threshold. Therefore, avoidance alternatives could possibly alleviate stream and wetland mitigation requirements. However, final permit/mitigation decisions will be determined by the USACE.

4.7 Bridge Demolition into Waters of the United States

The demolition and removal of bridge No. 108 may involve dropping components of the bridge into New Hope Creek as the only practical means of removal. According to Section 402-2 of NCDOT's Standard Specifications for Roads and Structures, the chapter titled "Removal of Existing Structures" outlines restrictions and Best Management Practices for Bridge Demolition and Removal.

All spans over New Hope Creek may be considered potential fill except for structures that are all steel and timber. The superstructure is timber deck on I-beams with steel girders and a floor beam system. The substructure is timber caps and piles with interior bents of encased concrete. It is not known at this time if the superstructure and substructure of bridge No. 108 are to be removed. Removal of the superstructure and substructure will likely not cause fill.

4.8 Buffer Rules

Currently, the only buffer regulations in the Cape Fear River Basin apply to the Randleman Reservoir (15A NCAC 2B .0250 – Randleman Rules and Water Supply Buffer Requirements). New Hope Creek is not located within the Randleman Reservoir watershed, therefore, no buffer rules exist at this time for New Hope Creek and its associated tributary.

5.0 Rare and Protected Species

Federal law under the provisions of Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires that any action likely to adversely affect a federally-protected species, be subject to review by the U.S. Fish and Wildlife Service. Other species may warrant protection under separate state laws.

5.1 Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the ESA. According to the January 29, 2003 USFWS internet listing, there are four federally endangered and one federally threatened species listed for Orange County.

"Critical habitat," as defined in the Endangered Species Act (ESA), is a term for habitat given special protection for the benefit of a listed species. Critical habitat, as defined by the USFWS is not designated for any species listed in Orange County, North Carolina. In addition, according to North Carolina's Natural Heritage Program (NCNHP's) database, no federally threatened, endangered, or species of concern listed by the USFWS that have been documented within a 1-mile radius of the proposed project corridor.

Field assessments were conducted for potential habitat by biologists with KHA and EPEI in January 2003. The assessment included an evaluation of constraints to the presence of listed species within the proposed project study area.

Table 3. Federal Endangered and Threatened Species Listed for Orange County, North Carolina.

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirement	Habitat Present
Picoides borealis	Red-cockaded woodpecker	E**	E	Pine or pine/hardwood forest 30+ years of age with sparse understory	N
Alasmidonta heterodon	Dwarf wedge mussel	E	E	Stream and river areas with a slow to moderate current with a sand, gravel or muddy substrate	Y
Rhus michauxii	Michaux's sumac	E	E	Sandy or rocky open woods in association with basic soils	Y
Isotria medeoloides	Small-whorled pogonia	T	E	Open, dry, deciduous woods with acid soil	Y
Echinacea laevigata	Smooth coneflower	E*	E	Open woods, cedar barrens, roadsides, clearcuts	Y

Note: E-Endangered; T-Threatened; *Historic Record- species last observed in county more than 20 years ago; **Obscure Record- date and/or location of observation uncertain

Red Cockaded Woodpecker

Typically, red-cockaded woodpeckers (*Picoides borealis*) inhabit the Fall Line and Coastal Plain communities dominated by large tracts (i.e. 25 acres+) of pine trees. Suitable red-cockaded woodpecker foraging habitat includes pine or pine/hardwood stands 30 years of age or older. Nesting occurs in stands of mature 60+ year old pine trees, usually longleaf pine (*Pinus palustris*), with a sparsely vegetated under story less than 20 feet tall. Nesting occurs in live trees that are identifiable by the fresh glistening sap that surrounds the nesting cavity.

The listing of the red-cockaded woodpecker in Orange County is based upon an obscure record. The data and/or location of the observation of the species is uncertain. No individual red-cockaded woodpeckers or cavity trees were observed within the project area or on adjacent properties. Within the project site and adjacent area no large tracts of mature pine trees were present. The hardwood/pine forest had a tall dense understory that would discourage foraging activity of red-cockaded woodpeckers. Therefore, there is no suitable habitat in the project study area.

Biological Conclusion: No Affect

Dwarf Wedge Mussel

The dwarf wedge mussel (*Alasmidonta heterodon*) reaches approximately 56 mm in length. Male shells are ovate, compressed, and elongate, with female shells being more trapezoidal in shape and inflated in the posterior margin. The shells typically have uneven growth lines with a periostracum that varies from yellowish olive-brown to green to black and a bluish white nacre. The dwarf wedge

mussel inhabits stream and river areas with a slow to moderate current with a sand, gravel or muddy substrate. These areas must be nearly silt free. In North Carolina, this species is known to occur in the Neuse and Pamlico basins. The dwarf wedge mussel is known to occur in four populations in North Carolina: the Little River in Johnston County, the Tar River in Granville County, and two Tar River tributaries in Franklin County.

Biological Conclusion: Unresolved

New Hope Creek provides suitable habitat for this species. Surveys for this species need to occur to determine the presence or absence of the mussel within the project study area.

Michaux's Sumac

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

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. This plant survives best in areas where some form of disturbance has provided an open area such as highway right-of-ways and areas with periodic fires.

Biological Conclusion: Unresolved

Suitable habitat for this species exists within the project study area along the existing road right-of-way and along a utility line corridor. Surveys for this species need to be conducted when the plant has its foliage.

Small Whorled Pogonia

The small whorled pogonia is a perennial plant with long, pubescent roots and a smooth, hollow stem. A flower, or occasionally two flowers, is produced at the top of the stem. Flowering occurs from about mid-May to mid-June, with flowers only lasting a few days to a week. This plant does not necessarily flower annually and is known to have extended periods of dormancy. Typically, only one flower is produced per plant. If pollination occurs, a capsule may be formed which can contain several thousand minute seeds. The flower is believed to be self-pollinating by mechanical processes. This small spring ephemeral orchid is not observable outside or the spring growing season. Habitat for the small-whorled pogonia is open, dry, deciduous woods with acid soil.

Biological Conclusion: Unresolved

Habitat for this species does occur within the project study area. Surveys for this species need to be conducted during the plants flowering season (mid-May to mid-June).

Smooth Coneflower

The listing of smooth coneflower in Orange County is based upon a historic record. The species was last observed in Orange County more than 50 years ago. Smooth coneflower is a rhizomatous perennial herb that grows up to 1.5 meters tall from a vertical rootstock. The stems are smooth, with few leaves. Flowering occurs May through July and the rays of the flowers are light pink to purplish, usually drooping.

Habitat for the smooth coneflower consists of open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and powerline right-of-ways, usually on magnesium- and calcium-rich soils associated with limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Optimal sites are characterized by abundant sunlight and minimal competition in the herbaceous layer. Natural fires, as well as large herbivores, are part of the history of the vegetation in this species' range; many of the associated herbs are also cormophytic, sun-loving species, which depend on periodic disturbance to reduce the shade and competition of woody plants.

Biological Conclusion: Unresolved

Suitable habitat exists along the power line right-of-way and the maintained road shoulder. Surveys should be conducted in mid-May to July.

5.2 Federal Species of Concern

There are eleven federal species of concern listed by the USFWS for Orange County. Federal species of concern (FSC) are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Federal species of concern are defined as species under consideration for listing for which there is insufficient information to support listing as threatened or endangered. The federal status of these species may be upgraded in the future. Therefore, consideration should be given to potential occurrences within the project study area.

In addition, species which are listed as Endangered (E), Threatened (T), or Special Concern (SC) by the NCNHP list of Rare Plant and Animal Species are afforded state protection under the NC State Endangered Species Act and the NC Plant Protection and Conservation Act of 1979. The NCNHP list

of July 2002 included these species and identified an additional 12 species receiving protection under state law. Protections afforded to species listed under state law are not applicable to this project. However, these state listed species may be upgraded to federal protection status in the future, therefore, consideration should be given to potential occurrences within the project study area. Table 4 lists the federal species of concern, their state status, and the existence of suitable habitat within the project study area.

Table 4. Federal Species of Concern Listed for Orange County, North Carolina.

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available
Etheostoma collis lepidinion	Carolina darter	FSC	SC	Rivulets and creeks with infrequent short riffles	Yes
Moxostoma sp.	Carolina redhorse	FSC	N/L	Riverine habitat	No
Fusconaia masoni	Atlantic pigtoe	FSC	E	Medium to large streams w/swift water and sand/gravel substrate	Yes
Alasmidonta heterodon	Brook floater	FSC	E	Medium streams/rivers w/swift water and sand/gravel substrate	Yes
Diacyclops jeanneli putei	Carolina well diacyclops	FSC*	SR	Endemic to North Carolina- little known	Yes
Lasmigona subviridis	Green floater	FSC	E	Small/medium streams w/quiet pools; sand/gravel substrate	Yes
Toxolasma pullus	Savanna lilliput	FSC	E	Shallow water; sand, silty-sand or mud substrate	Yes
Lampsilis cariosa	Yellow lampmussel	FSC	E	Medium to large rivers with substrates that range from silt to cobble	No
Juglans cinerea	Butternut	FSC	N/L	Cove forests and rich woods	No
Monotropsis odorata	Sweet pinesap	FSC	SR-T	Mixed deciduous woods	Yes
Plagiochila columbiana	A liverwort	FSC	N/L	Sandstone and bolders subject to inundation	Yes
Desmodium ochroleucum	Creamy tick-trefoil	FSC*	SR-T	Sandy or rocky woodland openings	No
Pycnanthemum torrei	Torrey's mountain-mint	FSC	SR-T	Dry upland forests and woodlands	Yes

Note: FSC- Federal Species of Concern; E- Endangered; T- Threatened; SR- Significantly Rare; SR-T- Significantly Rare Throughout Range; N/L -No Listing; * Historic Record – species last observed in county more than 20 years ago.

6.0 Conclusions

The project study area contains approximately 1,183 linear feet of New Hope Creek and approximately 864 linear feet of an unnamed tributary of New Hope Creek. The best usage classification of New Hope Creek and its tributary is class **"C-NSW"** waters. No High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur within the project vicinity. New Hope Creek is not listed on the DWQ 2000 Draft 303(d) list of impaired waters. No buffer rules exist at this time for New Hope Creek and its associated tributary.

New Hope Creek does not support trout or anadromous fish. New Hope Creek does support warm water sunfish and will require an in-stream moratoriums from April 1 to June 15. Three jurisdictional wetlands are located in the project study area. Wetland impacts could exceed 0.10 acre and may require mitigation. Stream impacts equal to or exceeding 150 linear feet per stream will require mitigation. It is not anticipated that the proposed bridge replacement would impact 150 linear feet of New Hope Creek, however, a section of New Hope Creek meander into the southern portion of the project study area and parallels SR 1730 for approximately 200 feet. The UT of New Hope Creek is located in the northern portion of the project study area and parallels SR 1730 for approximately 400 feet.

There are five federally protected species for Orange County, four of which carry and Unresolved Biological Conclusion. Surveys for dwarf wedge mussels should be conducted within two years prior to construction. Surveys for Michaux's sumac need to be conducted when the plant has its foliage (April to November). Surveys for small-whorled pogonia need to be conducted during the plants flowering season (mid-May to mid-June). Surveys for smooth coneflower should be conducted in mid May to July.

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Appendix A

Site Photographs

Kimley-Horn
and Associates, Inc.

Project: B-4218
Orange County

Client: North Carolina Department of Transportation

Prepared by: DNW

Job Number: 011700019

Photo 1: Looking southwest at bridge No. 108 on SR 1730.

Photo 2: Looking northeast at bridge No. 108 from SR 1730.

Photo 3: Looking upstream of New Hope Creek from bridge No. 108.

Photo 4: Looking south from SR 1730 at UT of New Hope Creek.

Appendix B

DWQ Stream Classification Forms

NCDWQ Stream Classification Form

Project Name: B-4218 New Hope Creek | River Basin: Cape Fear | County: Orange | Evaluator: Dwebster

DWQ Project Number: | Nearest Named Stream: New Hope Creek | Latitude: | Signature:

Date: 01/13/03 | USGS QUAD: Chapel Hill, NC | Longitude: | Location/Directions: 1 mi. N of Chapel Hill, SR1730

***PLEASE NOTE:** *If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used**

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	2	(3)
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	(3)
3) Are Natural Levees Present?	0	1	2	(3)
4) Is The Channel Sinuous?	0	1	2	(3)
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	(3)
6) Is The Channel Braided?	0	1	2	(3)
7) Are Recent Alluvial Deposits Present?	0	1	2	(3)
8) Is There A Bankfull Bench Present?	0	1	2	(3)
9) Is A Continuous Bed & Bank Present? *(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*	0	1	2	(3)
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=*(3)		*No=*0	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 30

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	2	(3)

PRIMARY HYDROLOGY INDICATOR POINTS: 3

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	0	1	2	(3)
4) Are Bivalves Present?	0	1	2	(3)

PRIMARY BIOLOGY INDICATOR POINTS: 12

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	(1.5)
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 4

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	(1.5)
3) Are Wrack Lines Present?	0	.5	1	(1.5)
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)*	0	.5	1	(1.5)
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	(1.5)
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=*(1.5)		*No=*0	

SECONDARY HYDROLOGY INDICATOR POINTS: 9

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	(1)	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	(1)	1.5
7) Is Filamentous Algae Present?	0	.5	(1)	1.5

8) Are Wetland Plants In Streambed? *(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*)*	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
	2	(1)	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 4

TOTAL POINTS *(Primary + Secondary)*= 62 *(If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)*

NCDWQ Stream Classification Form

Project Name: B-4218 UT New Hope Creek | River Basin: Cape Fear | County: Orange | Evaluator: PNW

DWQ Project Number: | Nearest Named Stream: New Hope Creek | Latitude: | Signature: PNW

Date: 01/13/03 | USGS QUAD: Chapel Hill, NC | Longitude: | Location/Directions: 1 mi. N of Chapel Hill, SR 1730

***PLEASE NOTE:** *If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used**

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	(2)	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	(2)	3
3) Are Natural Levees Present?	0	(1)	2	3
4) Is The Channel Sinuous?	0	1	2	(3)
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	(1)	2	3
8) Is There A Bankfull Bench Present?	0	1	(2)	3
9) Is A Continuous Bed & Bank Present?	0	1	(2)	3
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=*(3)		*No=*0	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 18

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	2	(3)

PRIMARY HYDROLOGY INDICATOR POINTS: 3

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	(2)	1	0
2) Are Rooted Plants Present In Streambed?	3	(2)	1	0
3) Is Periphyton Present?	0	1	(2)	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	0	.5	(1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 3.5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	1.5	(1)	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	(1)	1	1.5
3) Are Wrack Lines Present?	0	(1)	1	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)*	0	.5	1	(1.5)
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	(1.5)
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=*(1.5)		*No=*0	

SECONDARY HYDROLOGY INDICATOR POINTS: 6.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	(1)	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	(1)	1.5
7) Is Filamentous Algae Present?	0	.5	(1)	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*)*	2	1	(.75)	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 3.75

TOTAL POINTS *(Primary + Secondary)*= 40.75 *(If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)*

Appendix C

USACE Wetland Data Forms

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

Project/Site: *SR 1730 over New Hope Creek*
Applicant/Owner: *NCDOT*
Investigator(s): *Norton Webster, Rick Filer*

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is this area a potential Problem Area? Yes (No)
(If needed, explain on reverse)

Date: *1/13/2003*
County: *Orange*
State: *North Carolina*

Community ID: *Wetland 1*
Transect ID:
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator
1.	*Betula nigra*	*Tree*	*FACW*
2.	*Liquidambar styraciflua*	*Tree*	*FAC+*
3.	*Ulmus american*	*Tree*	*FACW*
4.	*Pinus taeda*	*Tree*	*FAC*
5.	*Lonicera japonica*	*Vine*	*FAC-*
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

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

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks)
___ Stream, Lake, or tide Gauge
___ Aerial Photographs
___ Other
_X_ No Recorded Data Available

Field Observations:

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

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
_x_ 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
_x_ Water-Stained Leaves
___ Local Soil Survey Data
_x_ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name
(Series and Phase): *Chewacla loam*

Drainage Class: *somewhat poorly drained*

Taxonomy (Subgroup) *Fluvaquatic Dystradepts*

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	*A*	*10YR5/2*	*7.5YR 6/5*	*few*	*Sandy/Clay/Loam*

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions
- X 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:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual

Project/Site: *SR 1730 over New Hope Creek*
Applicant/Owner: *NCDOT*
Investigator(s): *Norton Webster, Rick Filer*

Date: *1/13/03*
County: *Orange*
State: *North Carolina*

Do Normal Circumstances exist on the site — (Yes) / No
Is the site significantly disturbed (Atypical Situation) — Yes / (No)
Is this area a potential Problem Area — Yes / (No)
(If needed, explain on reverse)

Community ID: *Wetland 2*
Transect ID:
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator
1.	*Fraxinus pennsylvanica*	*Tree*	*FACW*
2.	*Ulmus american*	*Tree*	*FACW*
3.	*Lonicera japonica*	*Vine*	*FAC-*
4.	*Carex* sp.	*Herb*	*FAC*
5.	*Juncus* sp.	*Herb*	*FAC*
6.	*Alnus serulata*	*Shrub*	*FACW*
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

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

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks
___ Stream, Lake, or tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations

Depth of Surface Water **0-1** (in.)
Depth to Free Water in Pit **0** (in.)
Depth to Saturated Soil **0** (in.)

Wetland Hydrology Indicators
Primary Indicators
x Inundated
x 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 Inche
x Water-Stained Leaves
___ Local Soil Survey Data
x FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): *Congaree fine-sandy loam*

Drainage Class: *Moderately well drained*

Taxonomy (Subgroup): *Oxyaquic udifluvents*

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0-12		*10YR2/1*			*Sandy/Clay/Loam-gravel*

Hydric Soil Indicators

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual

Project/Site: *SR 1730 over New Hope Creek*
Applicant/Owner: *NCDOT*
Investigator(s): *Norton Webster, Rick Filer*

Date: *1/13/03*
County: *Orange*
State: *North Carolina*

Do Normal Circumstances exist on the site — (Yes) No
Is the site significantly disturbed (Atypical Situation) — Yes (No)
Is this area a potential Problem Area — Yes (No)
(If needed, explain on reverse)

Community ID: *Wetland 3*
Transect ID:
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1.	*Fraxinus pennsylvanica*	*Tree*	*FACW*	9.			
2.	*Salix nigra*	*Tree*	*FACW*	10.			
3.	*Carex* sp.	*Herb*	*FACW+*	11.			
4.				12.			
5.				13.			
6.				14.			
7.				15.			
8.				16.			

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

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks
___ Stream, Lake, or tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations

Depth of Surface Water **0-1** (in.)
Depth to Free Water in Pit **0** (in.)
Depth to Saturated Soil **0** (in.)

Wetland Hydrology Indicators
Primary Indicators
x Inundated
x 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 Inche
x Water-Stained Leaves
___ Local Soil Survey Data
x FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name
(Series and Phase) *Congaree fine-sandy loam*

Drainage Class: *Moderately well drained*

Taxonomy (Subgroup) *Oxyaquic udifluvent*

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		*10YR2/1*			*Sandy/Clay/Loam-gravel*

Hydric Soil Indicators

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Appendix D

DWQ Wetland Rating Worksheet

WETLAND RATING WORKSHEET Fourth Version

Project Name: B-4218 (SR1730 over New Hope Creek) Nearest road: SR1730

County: Orange Wetland area: _____ acres (Wetland 1) Wetland width: _____ feet

Name of evaluator: DN Webster Date: 01/13/03

Wetland location

_____ on pond or lake
__X__ on perennial stream
_____ on intermittent stream
_____ within interstream divide
_____ other:_____

Soil series Chewacla

_____ predominantly organic (humus, muck, or peat)
__X__ predominantly mineral (non-sandy)
_____ predominantly sandy

Hydraulic factors

___ steep topography
___ ditched or channelized
___ total riparian wetland width ≥ 100 ft

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

_____ forested/natural vegetation 70 %
_____ agriculture, urban/suburban 25 %
_____ impervious surface 5 %

Dominant vegetation

1) Betula nigra
2) Liquidambar styraciflua
3) Ulmus americana

Flooding and wetness

_____ semipermanently to permanently flooded or inundated
__X__ seasonally flooded or inundated
_____ 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		
R	Water storage	3	x	4.00	=	12
A	Bank/Shoreline stabilization	1	x	4.00	=	4
T	Pollutant removal	1 [1]	x	5.00	=	5
I	Low flow augmentation	1	x	2.00	=	2
N	Wildlife habitat	1	x	4.00	=	4
G	Aquatic life	1	x	1.00	=	1

Total Score: 28

Low

[1] Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

WETLAND RATING WORKSHEET Fourth Version

Project Name: B-4218 (SR 1730 over New Hope Creek) Nearest road: SR 1730

County: Orange Wetland area: Wetland 2 _____ acres Wetland width: _____ feet

Name of evaluator: DNWebster Date: 01/13/03

Wetland location

_____ on pond or lake
__X__ on perennial stream
_____ on intermittent stream
_____ within interstream divide
_____ other: _____

Soil series Chewacla

_____ predominantly organic (humus, muck, or peat)
__X__ predominantly mineral (non-sandy)
_____ predominantly sandy

Hydraulic factors

___ steep topography
___ ditched or channelized
___ total riparian wetland width ≥ 100 ft

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

_____ forested/natural vegetation 70 %
_____ agriculture, urban/suburban 25 %
_____ impervious surface 5 %

Dominant vegetation

1) Fraxinus pennsylvanica
2) Ulmus americana
3) Lonicera japonica

Flooding and wetness

_____ semipermanently to permanently flooded or inundated
__X__ seasonally flooded or inundated
_____ intermittently flooded or temporary surface water
_____ no evidence of flooding or surface water

Wetland type (select one)

_____ Bottomland hardwood forest
__X__ 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		
R	Water storage	3	x	4.00	=	12
A	Bank/Shoreline stabilization	1	x	4.00	=	4
T	Pollutant removal	1 [1]	x	5.00	=	5
I	Low flow augmentation	1	x	2.00	=	2
N	Wildlife habitat	1	x	4.00	=	4
G	Aquatic life	2	x	1.00	=	2

Total Score: 29

[1] Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

WETLAND RATING WORKSHEET Fourth Version

Project Name: B-4218 (SR1730 over New Hope Creek) Nearest road: SR1730

County: Orange Wetland area: Wetland 3 _____ acres Wetland width: _____ feet

Name of evaluator: DN Webster Date: 01/13/03

Wetland location

_____ on pond or lake
_____ on perennial stream
_____ on intermittent stream
_____ within interstream divide
__X__ other: pond outfall

Soil series _____

_____ predominantly organic (humus, muck, or peat)
__X__ predominantly mineral (non-sandy)
_____ predominantly sandy

Hydraulic factors

___ steep topography
___ ditched or channelized
___ total riparian wetland width ≥ 100 ft

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

_____ forested/natural vegetation 70 %
_____ agriculture, urban/suburban 25 %
_____ impervious surface 5 %

Dominant vegetation

1) Fraxinus pennsylvanica
2) Salix nigra
3) Carex sp.

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)

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

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

				weight		
R	Water storage	2	x	4.00	=	8
A	Bank/Shoreline stabilization	1	x	4.00	=	4
T	Pollutant removal	1[1]	x	5.00	=	5
I	Low flow augmentation	1	x	2.00	=	2
N	Wildlife habitat	1	x	4.00	=	4
G	Aquatic life	2	x	1.00	=	2

Total Score: 25

[1]Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

Appendix E

North Carolina Wildlife Resources Commission Correspondence

North Carolina Wildlife Resources Commission

1721 Mail Service Center, Raleigh, North Carolina 27699-1721, 919-733-3633
Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Norton Webster
Kimley-Horn

FROM: Shari Bryant, Fisheries Biologist
Division of Inland Fisheries

DATE: February 19, 2003

SUBJECT: Request for information regarding N.C. Department of Transportation bridge replacement projects in Alamance, Guilford, and Orange Counties, North Carolina.

Below is the aquatic and fisheries information you requested regarding the subject bridge replacement projects.

1. Alamance Co. – Jordan Creek: Jordan Creek is in the Cape Fear River watershed and has a water quality classification of WSII-NSW. No threatened or endangered aquatic species are documented in Jordan Creek. Fishery data has been collected from two sites. Below is the species list for each site. Given the diverse sunfish population in Jordan Creek, I request a moratorium on instream work from April 1 to June 15.

   Date: 4 November 1993
   Site: SR-1002
   Collectors: N.C. Division of Water Quality

Gizzard shad	*Dorosoma cepedianum*
Highfin shiner	*Notropis altipinnis*
Bluehead chub	*Nocomis leptocephalus*
Coastal shiner	*Notropis petersoni*
Creek chub	*Semotilus atromaculatus*
Creek chubsucker	*Erimyzon oblongus*

Yellow bullhead	*Ameiurus natalis*
Speckled killifish	*Fundulus rathbuni*
Flier	*Centrarchus macropterus*
Redbreast sunfish	*Lepomis auritus*
Green sunfish	*Lepomis cyanellus*
Pumpkinseed	*Lepomis gibbosus*
Warmouth	*Lepomis gulosus*
Bluegill	*Lepomis macrochirus*
Redear sunfish	*Lepomis microlophus*
Largemouth bass	*Micropterus salmoides*
Tessellated darter	*Etheostoma olmstedi*

Date: 1 August 2001
Site: SR-1763
Collectors: N.C. State Museum of Natural Sciences

Crescent shiner	*Luxilus cerasinus*
Highfin shiner	*Notropis altipinnis*
Bluehead chub	*Nocomis leptocephalus*
Golden shiner	*Notemigonus crysoleucas*
Swallowtail shiner	*Notropis procne*
Rosyside dace	*Clinostomus funduloides*
Creek chub	*Semotilus atromaculatus*
Creek chubsucker	*Erimyzon oblongus*
Notchlip redhorse	*Moxostoma collapsum*
Speckled killifish	*Fundulus rathbuni*
Redbreast sunfish	*Lepomis auritus*
Pumpkinseed	*Lepomis gibbosus*
Tessellated darter	*Etheostoma olmstedi*

2. Alamance Co. – Wells Creek: Wells Creek is a tributary to Cane Creek in the Cape Fear River watershed and has a water quality classification of C-NSW. There is no fishery survey data for Wells Creek or Cane Creek. Fish (1968) lists the stream as too small to be of fishing significance. No threatened or endangered aquatic species are documented in Wells Creek. It likely supports a typical piedmont stream fishery including shiners, minnows, dace and sunfish. No instream moratorium is requested on this stream, however, stringent sediment and erosion control methods should be implemented at all times.

3. Guilford Co. – Bull Run: Bull Run is a tributary to the Deep River in the Cape Fear River watershed and has a water quality classification of C. There is no fishery survey data for this stream. No threatened or endangered aquatic species are documented in Bull Run. It likely supports a typical piedmont stream fishery including shiners, minnows, dace and sunfish. In addition, the lower section of Bull Run might support bullheads and largemouth bass. No instream moratorium is requested on this stream, however, stringent sediment and erosion control methods should be implemented at all times.

4. Orange Co. – New Hope Creek: New Hope Creek is in the Cape Fear River watershed and has a water quality classification of C-NSW. No threatened or endangered aquatic species are documented in New Hope Creek. Fish (1968) states that large catches of sunfish have been reported from the section between the NC-54 bridge and SR-1734 and this section of stream has an ecological classification of robin/warmouth. Data has been collected from one site on New Hope Creek. Below is the species list. It is likely that New Hope Creek in Orange County supports a good sunfish population, therefore, I request a moratorium on instream work from April 1 to June 15.

   Date: 31 August 1988
   Site: Bridge at Hollow Rock on Erwin Rd.
   Collectors: Duke University

Chain pickerel	*Esox niger*
Redfin pickerel	*Esox americanus*
Pirateperch	*Aphredoderus sayanus*
Largemouth bass	*Micropterus salmoides*
Redear sunfish	*Lepomis auritus*
Creek chubsucker	*Erimyzon oblongus*
Silvery minnow	*Hybognathus nuchalis*
Whitemouth shiner	*Notropis alborus*
Flat bullhead	*Ameiurus brunneus*
Johnny darter	*Etheostoma nigrum*

References:
Fish, F.F. 1968. A Catalog of the Inland Fishing Waters in North Carolina. Division of Inland Fisheries, Raleigh, North Carolina. 312 pp.

If you have any questions regarding this information, please contact me at 336-449-7625 or bryants5@earthlink.net.

cc: Travis Wilson, Highway Project Coordinator (e-mail)
Brian McRae, District 5, Assistant Fisheries Biologist