STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 27, 2007

U. S. Army Corps of Engineers
Regulatory Field Office
6508 Falls of the Neuse Rd., Suite 120
Raleigh, NC 27615

ATTENTION: Mr. Eric Alsmeyer
NCDOT Coordinator, Division 5

Dear Sir:

SUBJECT: **Application for Section 404 Nationwide Permits 23, 33, & 12, Section 401 Water Quality Certifications, and Neuse River Riparian Buffer Authorization.** Replacement of Bridge No. 429 on SR 1839 (Leesville Rd.) over Sycamore Creek in Wake and Durham Counties, North Carolina. Federal Aid Project No. BRZ-1839(1), State Project No. 8.2406801, WBS Element 33136.1.1, TIP No. B-3528.

$570.00 Debit from WBS Element 33136.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 429 on SR 1839 (Leesville Rd.) over Sycamore Creek, on the Wake and Durham County Line. The project proposes to demolish the existing bridge and replace with a reinforced concrete box-culvert because the drainage area is less than five square miles. Please see the enclosed copies of the permit drawings, buffer drawings, utility drawings, design plans, and Pre-Construction Notification (PCN) for the above-referenced project. The CE was completed for this project in October 2001 and the Construction Consultation was completed in October 2007, each were distributed shortly thereafter. Additional copies of these documents are available upon request.

IMPACTS TO WATERS OF THE UNITED STATES

General Description: The project is located in sub basin 03-04-02 of the Neuse River Basin in Wake and Durham Counties. This area is part of Hydrologic Cataloging Unit 03020201. The project area is located within the Central Piedmont ecoregion of North Carolina.
Sycamore Creek and an intermittent stream are located within the project study area and each has been assigned Stream Index Number 27-33-9 by the North Carolina Department of Water Quality

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

TELEPHONE: 919-715-1334 or
919-715-1335

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

(DWQ). Sycamore Creek enters the study area as a well-defined second order perennial stream. The creek is described as having a substrate consisting primarily of sand, gravel, cobble, and boulders, flowing southward towards Crabtree Creek and ultimately into the Neuse River. Within the project study area, Sycamore Creek is approximately 3-6 feet wide and averaging approximately 1 foot deep. An intermittent, unnamed tributary is also located within the project study area. This channel is approximately 3 feet wide and deeply incised, the channel has been dry during numerous site visits. The surface waters in the project study area have been assigned a Best Usage Classification of **B NSW**.

No portion of Sycamore Creek, its tributaries, or other surface waters within 1.0 mile of the project are listed on the North Carolina Division of Water Quality's (NCDWQ) 2006 Final 303(d) List of Impaired Waters.

No waters classified as High Quality Water (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area.

There is one jurisdictional wetland associated with this project. The wetland is located approximately 40 feet east of Leesville Road and 30 feet south of Sycamore Creek. The jurisdictional area is found between the natural stream levee and the base of an upland slope in the adjacent field.

U.S. Army Corps of Engineers (USACE) Regulatory Specialist Eric Alsmeyer visited the study area on July 2, 2004 and verified the delineation of the wetland and classification of the intermittent stream. A Notification of Jurisdictional Determination (Action ID. 200021137) was issued on December 9, 2005. During this investigation it was determined that the intermittent tributary to Sycamore Creek would not require mitigation.

Permanent Impacts: There will be 321 linear feet of permanent impacts to surface waters associated with this project. 226 feet (0.06 acre) of Sycamore Creek (Site 1) will be impacted due to the installation of the culvert, channel improvements, as well as rip rapping along the stream banks for bank stabilization. The remaining 95 feet (0.01 acre) of impacts occur to the intermittent stream (Site 2) located in the project study area. This stream will be piped through a 48-inch concrete pipe directly into the box culvert. It was determined during the JD visit, that the impacts to the intermittent stream will not require mitigation.

Permanent impacts to the jurisdictional wetland (Site 3) located in the study area will be minimal. Mechanized clearing for a construction easement will disturb less than 0.01 acre.

Temporary Impacts: There will be 127 linear feet (0.04 acres) of temporary jurisdictional impacts associated with the construction of this project. At Site 1, 111 linear feet (0.03 acres) will be disturbed as a result of the diversion channel constructed to de-water the channel during culvert construction. Once construction has been completed, the water will be rerouted to flow through the culvert, tying into the natural stream channel. The remaining 16 linear feet (<0.01 acres) of impacts directly result from the installation of the 48-inch concrete pipe (Site 2) in the intermittent stream. These impacts occur at the inlet end of the pipe.
Bridge Demolition: The existing two-lane structure has a timber deck supported by steel I-beams on concrete abutments, spanning Sycamore Creek. The substructure consists of reinforced

concrete full height abutments. The existing bridge will be removed without dropping components into Sycamore Creek. All guidelines for Bridge Demolition and Removal will be followed in addition to Best Management Practices for the Protection of Surface Waters.

Utility Impacts: There will be unavoidable utility impacts associated with this project. Final plan designs have the culvert lying on a 10-inch PVC sewer line. This line will have to be replaced, resulting in an open cut of the creek bed. A temporary diversion channel will be utilized to allow stream flow around in-channel construction. This will account for 0.01 acre of temporary surface water impacts. An additional 3 feet (trench width) of stream will be temporarily impacted during the installation of the new 10-inch restrained joint ductile iron sanitary sewer line. Two additional manholes will be constructed during this project, and one existing manhole will be modified. All utility construction will be maintained within the construction limits of the culvert, therefore no permanent linear stream footage or additional buffers will be impacted.

IMPACTS TO THE NEUSE RIVER RIPARIAN BUFFER

This project is located within the Neuse River Basin and is therefore subject to Neuse River riparian buffer rules (15A NCAC 2B .0233). The construction of the culvert and new road alignment will impact buffers along Sycamore Creek. These buffer impacts are classified as impacts resulting from a road crossing and are allowable with mitigation because over 150 linear feet of stream are being impacted. Impacts to the buffers of the intermittent stream are categorized as road impacts other than crossings of streams. During the installation of the 48-inch RCP, buffers adjacent to the unnamed tributary will be impacted. These impacts are allowable with mitigation. Zone 1 impacts account for 20,154 square feet, while 10,079 square feet of Zone 2 will be impacted. There will be 30,233 square feet of mitigable buffer impacts.

Practical Alternatives Analysis

This bridge has been determined to be structurally deficient and functionally obsolete. Replacement of this inadequate structure will result in safer and more efficient traffic operations. Because this bridge needs to be replaced, impacts to the riparian buffers of Sycamore Creek and the unnamed tributary to Sycamore Creek are unavoidable.

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. The United States Fish and Wildlife Service (USFWS) lists three Federally Protected species for Durham County and four Federally Protected species for Wake County, as of May 10, 2007. Table 1 lists the species and their federal status.

Table 1. Federally Protected Species in Wake and Durham Counties, NC

Common Name	Scientific Name	Federal Status	County	Biological Conclusion	Habitat Present
Bald Eagle	*Haliaeetus leucocephalus*	Delisted	Wake/Durham	Not Required	No
Michaux's Sumac	*Rhus michauxii*	T	Wake/Durham	No Effect	Yes
Smooth Coneflower	*Echinacea laevigata*	E	Durham	No Effect	No
Red-cockaded Woodpecker	*Picoides borealis*	E	Wake	No Effect	No
Dwarf Wedgemussel	*Alasmidonta heterodon*	E	Wake	No Effect	No

The bald eagle was officially delisted on August 8, 2007 (CFR 50 Part 17). The bald eagle is still afforded protection under the Golden and Bald Eagle Protection Act. A description of the bald eagle and its habitat is included in the CE. Suitable habitat for bald eagle nesting/foraging does not exist within the project study area. Additionally, a review of the Natural Heritage Program database (last updated in September 2007) revealed no occurrences of this species within 1.0 mile of the project study area. Therefore, the proposed project will not affect the bald eagle.

Suitable habitat for red-cockaded woodpecker and smooth coneflower is not present in the project study area. A survey for dwarf wedgemussel (DWM) was conducted on September 21, 2000 by NCDOT biologists and yielded no individual DWM. It was determined that suitable habitat for the dwarf wedgemussel does not exist in this reach of Sycamore Creek. The sedimentation from upstream development is too severe to support DWM. Therefore, the biological conclusion of "No Effect" is applicable to the DWM.

Suitable habitat for Michaux's sumac, in the form of sandy and/or rocky open woods and roadsides is present in the project area. Surveys for this species were conducted in September of 2000, on June 1, 2004, and most recently by NCDOT biologists, on May 30, 2006. No individuals of Michaux's sumac were observed during any of these surveys. Furthermore, a review of the Natural Heritage Program database (last updated September 2007) revealed no occurrences within 1.0 mile of the project study area. Based on survey results and the lack of documented occurrences, a biological conclusion of "No Effect" is warranted for Michaux's sumac.

AVOIDANCE, MINIMIZATION and MITIGATION

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

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 avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization: Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the US". The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts and to minimize impacts as part of the project design.

- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of Best Management Practices (BMPs) highlighted in NCDOT's "Best Management Practices for Construction and Maintenance Activities".
- Best Management Practices for Protection of Surface Waters and Bridge Demolition and Removal will be implemented during the entirety of this project.
- During construction, traffic will utilize an off-site detour, approximately 2.9 miles long.
- The culvert will be buried one-foot below the streambed in order to maintain aquatic habitat and flow regime.
- As an avoidance and minimization effort, Verizon will install a directional bore for telephone conduit under Sycamore Creek, avoiding impacts to the stream as well as leaving the existing buffer intact.
- All utility construction will be maintained within the construction limits of the culvert, therefore no permanent stream footage or additional buffers will be impacted.

Compensatory Mitigation:

The Jeffreys Warehouse Mitigation Site was originally constructed as on-site mitigation for R-1030, US 117 from south of NC 581 in Goldsboro to the US 264 Bypass in Wilson. There are two parcels associated with this mitigation site. The west parcel (approximately 50.2 acres) is bounded on the northwest by the Little River and on the southeast by the US 117 right-of-way. The east parcel (approximately 37.5 acres) is bounded on the northwest by the US 117 right-of-way, on the northeast by a Wayne County Board of Education school bus maintenance shop, and on the east and southeast by private property. The site was constructed in 2006 and has undergone one year of hydrologic and vegetative monitoring.

The site was originally debited for R-1030AA. To offset the unavoidable 226 linear feet of stream and 30,233 sq. ft. (0.694 acres) of buffer impacts associated with T.I.P B-3528, the Jeffreys Warehouse Mitigation Site will be debited 452 linear feet of stream restoration and 75,581 sq. ft. (1.735 acres) of Neuse Buffer Restoration. These debits are reflected in the debit ledger below (Table 2).

Table 2. Mitigation Debit Ledger

Site name	Site TIP	HUC	River Basin	Division	County
Jefferey's Warehouse (JALO)	R-1030AA	3020201	Neuse	4	Wayne

Mitigation Type	As Built Quantity	Available	Debit	Debit
			R-1030AA	B-3528
Stream Restoration	3,731	2,279	1,000	452(226@2:1)
Riverine Wetland Restoration	3.66	3.66		
Non-Riverine Wetland Restoration	23.02	23.02		
Riverine Wetland Preservation	12.36	12.36		
Neuse Buffer Restoration	7.266	5.531		1.735

SCHEDULE

The project calls for a let date of March 18, 2008 and a review date of January 29, 2008. This project has a date of availability of April 29, 2008. It is expected that the contractor will begin construction shortly after that date.

REGULATORY APPROVALS

Section 404 Permit: It is anticipated that the impacts from the construction of the box culvert will be authorized under a Section 404 Nationwide Permit 23, and impacts sustained during the sewer line installation will require a Nationwide Permit 12. A Nationwide Permit 33 will also be required during the construction phase of this project due to the need of dewatering the channel. We are therefore requesting the issuance of Nationwide Permits 12, 23, and 33 for the impacts sustained during the construction of this project.

Section 401 Permit: We anticipate Section 401 General Water Quality Certifications (WQC) 3699, 3701, and 3688 will be applicable to this project. This project will impact greater than 150 linear feet of stream and impact Neuse Riparian Buffers, written concurrence will be required. In accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review. In compliance with Section 143-215.3D(e) of the NCAC we will provide $570.00 to act as payment for processing the Section 401 permit application.

Buffer Certification: This project has been designed to comply with the Neuse Riparian Buffer Regulations (15A NCAC 2B.0242). NCDOT requests a Neuse Riparian Buffer Authorization from the Division of Water Quality.

A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html. If you have any questions or need additional information, please contact Ashley Cox at 919-715-5534 or acox@dot.state.nc.us.

Sincerely,

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

Cc:

w/attachment
- Mr. John Hennessy, NCDWQ (5 Copies)
- Mr. Travis Wilson, NCWRC
- Mr. Gary Jordan, USFWS
- Mr. Michael Street, NCDMF

w/o attachment (see permits website for attachments)
- Dr. David Chang, P.E., Hydraulics
- Mr. Mark Staley, Roadside Environmental
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Victor Barbour, P.E., Project Services Unit
- Mr. J. Wally Bowman, PE., Division Engineer
- Mr. Chris Murray, DEO
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Majed Alghandour, P. E., Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Scott McLendon, USACE, Wilmington
- Ms. Theresa Ellerby, PDEA Project Planning Engineer
- Ms. LeiLani Paugh, NEU
- Mr. Randy Griffin, NEU

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: NW 12, 23, & 33

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

4. If payment into the North Carolina 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: North Carolina Department of Transportation
   Mailing Address: Gregory J. Thorpe, Ph.D., Manager
   Project Development and Environmental Analysis Branch
   1598 Mail Service Center
   Raleigh, NC 27699-1598
   Telephone Number: 919-733-3141 Fax Number: 919-733-9794
   E-mail Address: gthorpe@dot.state.nc.us

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

III. Project Information

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

1. Name of project: Replace Bridge No. 429 over Sycamore Creek on SR 1839 with a culvert.

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3528

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

4. Location
   County: Wake/Durham Nearest Town: Raleigh
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): Site is located on SR 1839 (Leesville Road) on the Durham and Wake County line.

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): Please refer to attached drawings.

7. Name of nearest receiving body of water: Sycamore Creek

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

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The local area surrounding the proposed project consists of gently rolling hills and land use is best described as residential development and natural forest vegetation.

10. Describe the overall project in detail, including the type of equipment to be used: NCDOT proposes replace Bridge No. 429 over Sycamore Creek with a box culvert and realign SR 1839. Existing utilities will need to be rerouted to account for the realignment and culvert construction. Heavy construction equipment such as cranes, excavators and dump trucks will be utilized during construction.

11. Explain the purpose of the proposed work: The existing bridge was constructed in 1950 and received a sufficiency rating of 23.2 out of a possible 100 for a new structure during the last bridge inspection. Based on this rating, the bridge is considered functionally obsolete and structurally deficient. The project proposes to demolish the existing bridge and replace with a reinforced concrete box-culvert, resulting in safer transportation.

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. Notification of JD was issued on December 9, 2005. Site was initially inspected on July 2, 2004. Action ID: 200021137

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 riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: There will be approximately 226 linear feet of warm perennial stream will be impacted resulting from a box culvert. Another 95 linear feet, UT to Sycamore Creek, will be permanently impacted by a pipe culvert. Less than 0.01 acres of wetland will be impacted by mechanized clearing.

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)
Site 3	Mechanized clearing	Scrub/Shrub	Yes	30	< 0.01
Total Wetland Impact (acres)					< 0.01

3. List the total acreage (estimated) of all existing wetlands on the property: 0.24 acres

4. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included. To calculate acreage, multiply length X width, then divide by 43,560.

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
Site 1	Sycamore Creek	Box Culvert	Perennial	2.5 – 6 feet	226	0.06
Site 2	UT Sycamore Creek	Concrete Pipe	Intermittent	3 feet	95	0.01
Site 1 (TEMP)	Sycamore Creek	Box Culvert	Perennial	2.5 – 6 feet	111	0.03
Site 2 (TEMP)	UT Sycamore Creek	Concrete Pipe	Intermittent	3 feet	16	< 0.01
Total Stream Impact (by length and acreage)					448	0.11

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)
N/A				
Total Open Water Impact (acres)				0

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

Stream Impact (acres):	0.11
Wetland Impact (acres):	< 0.01
Open Water Impact (acres):	NA
Total Impact to Waters of the U.S. (acres)	0.12
Total Stream Impact (linear feet):	448

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.): N/A
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A
Current land use in the vicinity of the pond: N/A
Size of watershed draining to pond: N/A Expected pond surface area: N/A

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 letter.

VIII. Mitigation

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

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on January 15, 2002, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

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

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

   Compensatory mitigation will be derived from an inventory of assets already in existence within the same 8-digit cataloguing unit (Jeffereys Warehouse) .

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

(919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

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

IX. Environmental Documentation (required by DWQ)

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

2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation. Yes ☒ No ☐

3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes ☒ No ☐

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

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

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

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

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1	20,154	3	60,462
2	10,079	1.5	15,118
Total	30,233		75,580

* 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.

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. Mitigation will be provided by NCDOT, utilizing surplus credits from the Jeffereys Warehouse mitigation project located in HUC 03020201.

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

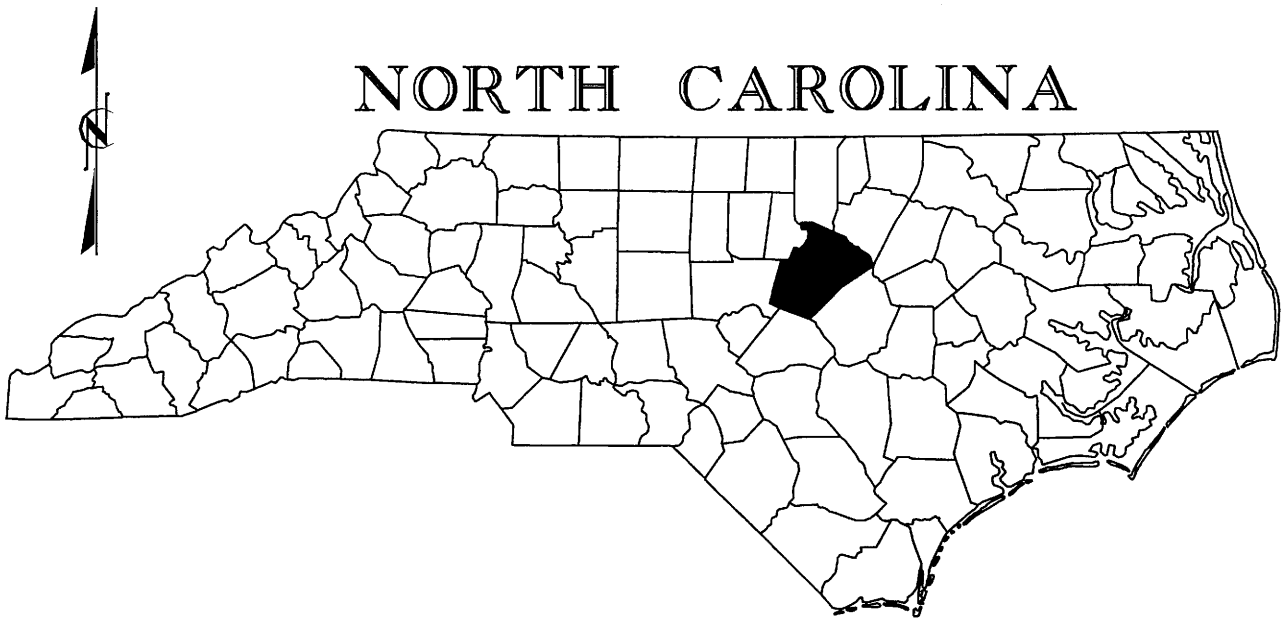
XV. Other Circumstances (Optional):

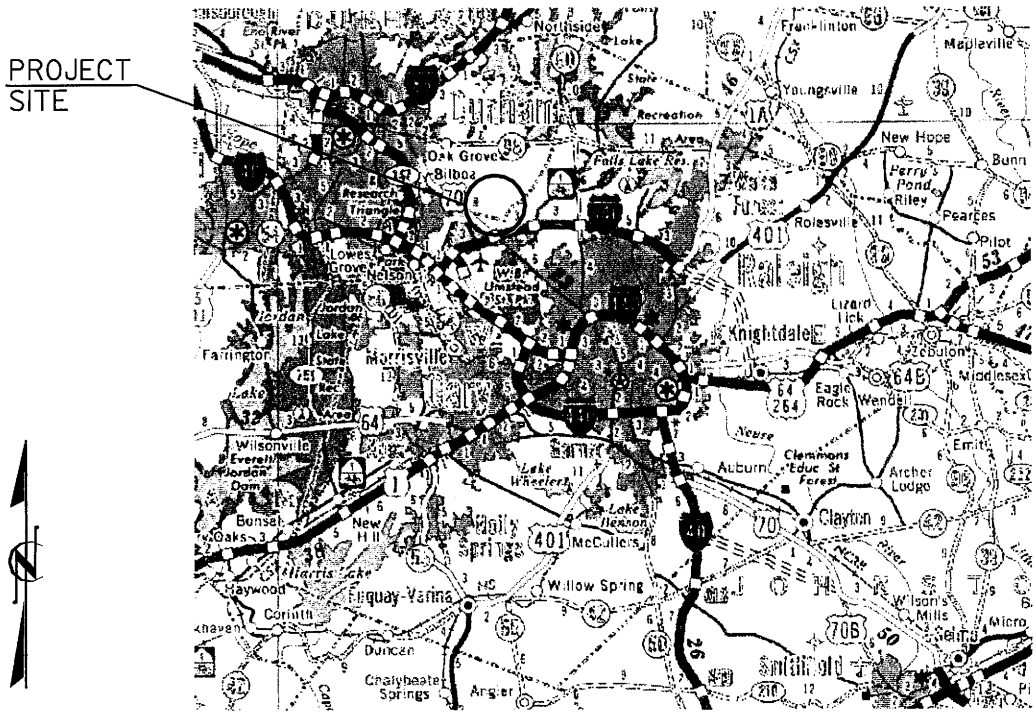
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., 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. L. Lusk 11·27·07

Applicant/Agent's Signature **Date**

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





VICINITY MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE / DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

SHEET 1 OF 10 **7 / 16 / 07**

7/16/2007
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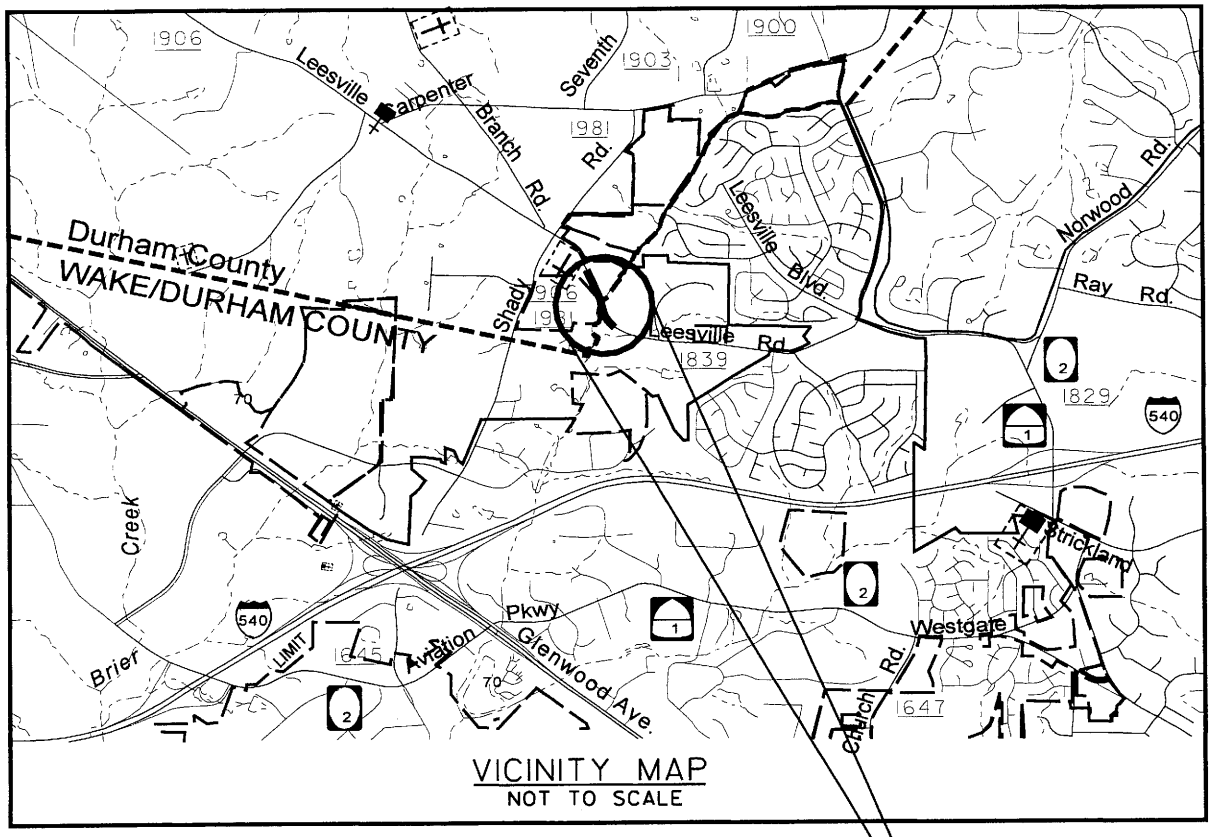
SITE MAP



SITE

NCDOT

DIVISION OF HIGHWAYS
WAKE / DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

SHEET 2 OF 10 **7 / 16 / 07**

7/16/2007
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WETLAND LEGEND

WLB — WETLAND BOUNDARY

WETLAND

DENOTES FILL IN WETLAND

DENOTES PERMANENT SURFACE WATER IMPACT

DENOTES PERMANENT SURFACE WATER IMPACT (POND)

DENOTES TEMPORARY FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY SURFACE WATER IMPACT

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

COIR FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT

(DASHED LINES DENOTE EXISTNG STRUCTURES)

12"-48" PIPES

54" PIPES & ABOVE

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE

LEVEL SPREADER (LS)

DITCH / GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS

WAKE / DURHAM COUNTY

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429 OVER SYCAMORE CREEK ON SR 1839

SHEET 3 OF 10 **7 / 16 / 07**

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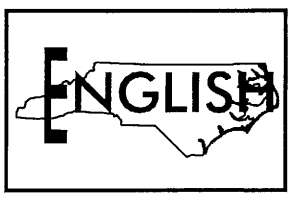
SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
(2)	LEESVILLE HOLLOW, LLC	7474 CREEDMOOR RD. RALEIGH, NC 27613	SITE 1
(3)	ZINA CHRISTIAN CENTER INC.	P.O. BOX 25613 RALEIGH, NC 27611	SITE 1 AND 2
(4)	ZINA CHRIASTIAN CENTER INC.	P.O. BOX 25613 RALEIGH, NC 27611	SITE 2
(5)	ALMA C. SORRELL	7603 LEESVILLE RD. DURHAM, NC 27703	SITE 1



NCDOT
DIVISION OF HIGHWAYS
WAKE / DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 17+66	2 @ 11' x 9' RCBC	---	---	---	---	---	0.06	0.03	226	111	---
**2	-L- 17+42 TO 18+24	48" RCP	---	---	---	---	---	0.01	< 0.01	95	16	---
3	-L- 17+81 RT					< 0.01						
TOTALS:						< 0.01		0.07	0.03	321	127	

** Intermittent Stream - No Mitigation Required

Perennial & Intermittent Total - Mitigation Req'd: 226 ft
Intermittent Total - Not Requiring Mitigation: 95 ft

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE/DURHAM COUNTY
WBS - 33136.1.1 (B-3528)

SHEET 5 OF 9 10/4/2007

ATN Revised 3/31/05

SHT 5 OF 10

6/2/99

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	2-B

SEAL SIGNATURE P.E.

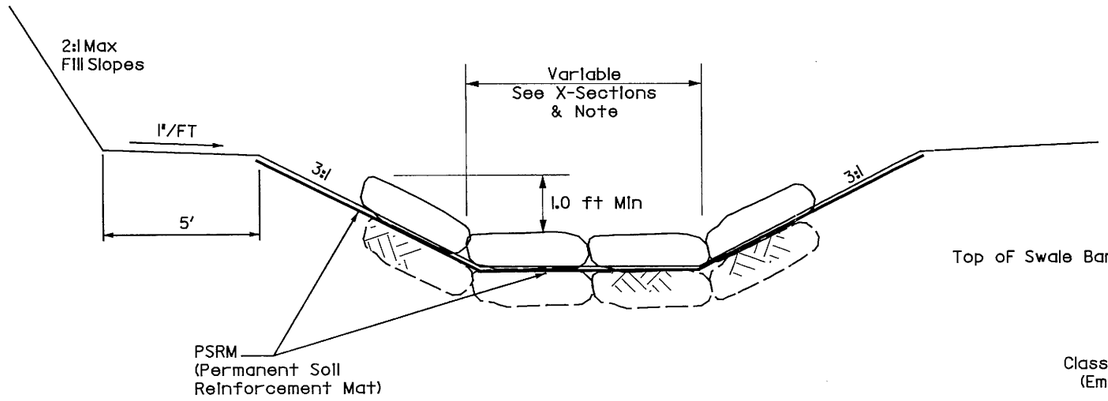
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEAL SIGNATURE P.E.

LATERAL SWALE/DITCH W/ROCK CHECKS

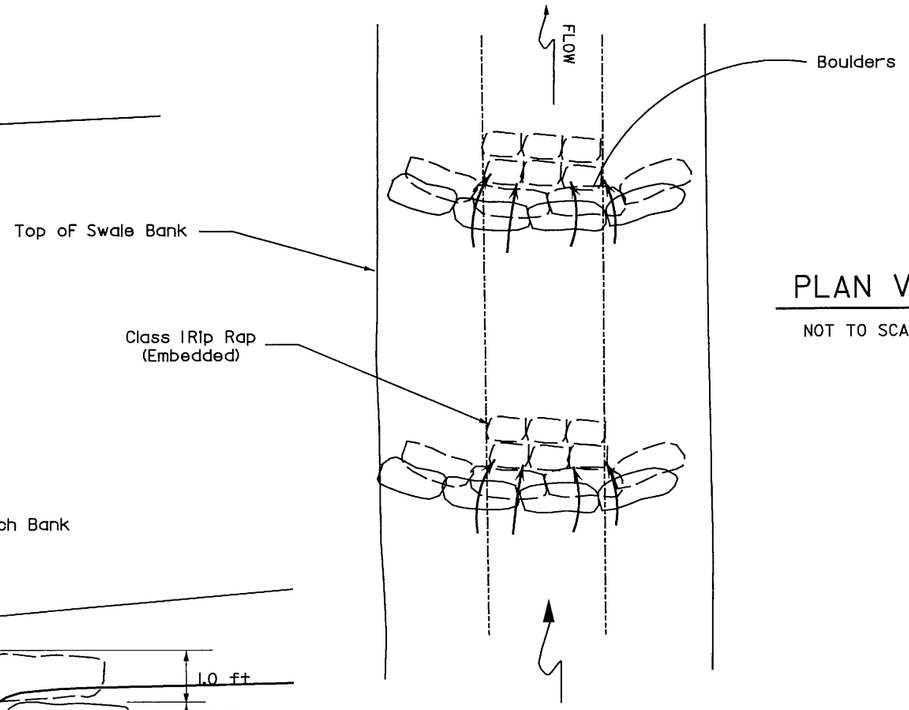
LOCATIONS

SHEET	ALIGN	STATION - STATIOIN	SIDE	REMARKS
4	-L-	18+26 - 20+00	LT	11' SPACING



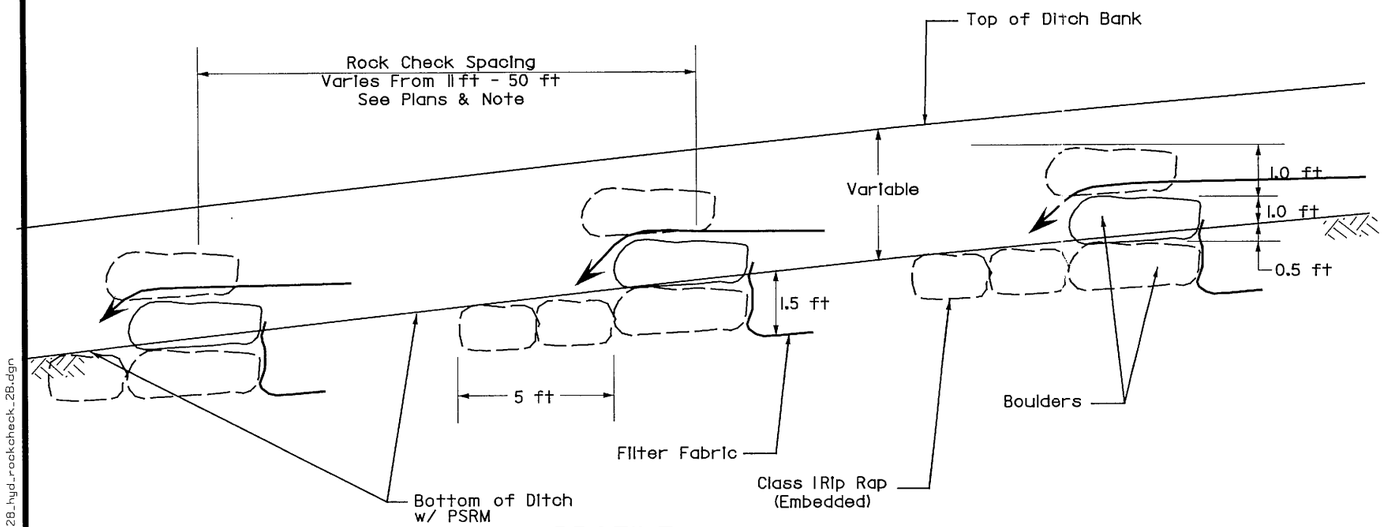
TYPICAL CROSS SECTION

NOT TO SCALE



PLAN VIEW

NOT TO SCALE



PROFILE

NOT TO SCALE

NOTE:

BOULDERS SHOULD BE ANGULAR AND OBLONG WITH APPROXIMATE DIMENSIONS OF 0.6m x 0.45m x 0.45m (2' x 1.5' x 1.5'). ROCK SHOULD FIT TIGHTLY TOGETHER WITH MINIMAL VOIDS. STAGGER BOULDER JOINTS.

ROCK CHECK SPACING IS DEPENDENT ON DITCH GRADES AT 1' DROP INTERVALS OR SLOPE CONTROL.

DITCH WIDTHS VARY. WIDEN TO EXTENT PRACTICAL WITHIN R/W LIMITS. SEE X-SECTIONS.

ENGLISH

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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 6 OF 10 7/16/07

7/16/2007
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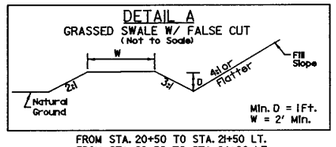
KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-6066

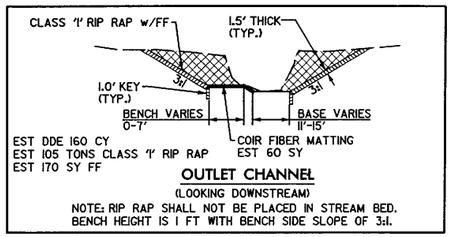
PROJECT REFERENCE NO.	SHEET NO.
B-3528	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS
R/W Revision 10/4/2007 Added PUE to Parcels 2,3 & 4. Revised TDE and TDE on same Parcels.



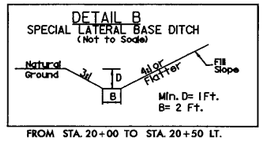
FROM STA. 20+50 TO STA. 21+50 LT.
FROM STA. 22+50 TO STA. 24+00 LT.



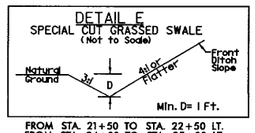
EST DDE 160 CY
EST 105 TONS CLASS 'I' RIP RAP
EST 170 SY FF

OUTLET CHANNEL
(LOOKING DOWNSTREAM)

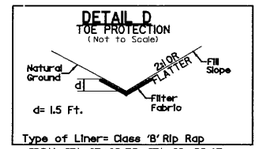
NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.



FROM STA. 20+00 TO STA. 20+50 LT.



FROM STA. 21+50 TO STA. 22+50 LT.
FROM STA. 24+00 TO STA. 25+00 LT.



Type of Liner= Class 'B' Rip Rap
FROM STA. 17+15 TO STA. 18+35 LT.

NC GRID / NAD 83

BEGIN PROJECT B-3528
-L- POC STA. 10+00

END PROJECT B-3528
-L- POT STA. 25+00

-BL-2 -L- POC 13+21.35, 12.5' LT 8+18.57 PINC =

-BL-3 -L- POC 18+59.30, 30.92' RT 13+54.76 PINC =

-BL-4 -L- POT 22+18.86, 9.25' LT 17+18.52 PINC =

-BL-1 -L- POT 10+05.33, 15.07' LT 5+00.00 POT =

1 LEESVILLE FOREST

2 LEESVILLE HOLLOW, LLC

3 ZINA CHRISTIAN CENTER

4 ZINA CHRISTIAN CENTER

5 ALMA C. SORRELL

6 ALMA C. SORRELL

7 ALMA C. SORRELL

8 BETTY A. BUNN

SITE 1

SITE 2

SITE 3
MECHANIZED CLEARING
< 0.01 AC

TEMPORARY SURFACE WATER IMPACT

CLASS 'I' RIP RAP ON BANKS ONLY

CLASS 'B' RIP RAP SLOPE PROTECTION

55 LF RETAINING WALL

60 LF OUTLET CHANNEL IMPROVEMENTS SEE DETAIL

TOE PROTECTION CLASS 'B' RIP RAP SEE DETAIL D

BURY INVERT 1'
CLASS 'I' RIP RAP
20 LF (BANKS ONLY)
EST 30 TONS
EST 30 SY FF

2' LATERAL BASE DITCH
W/ROCK CHECKS
EST 24 TONS HEADER/FOOTER ROCK
EST 12 TONS CLASS I RIP RAP
EST 348 SY PSRM
EST 150 CY DDE
SEE DETAIL SHEET 2-B

SPECIAL LATERAL BASE DITCH, SEE DETAIL B

GRASSED SWALE W/ FALSE CUT SEE DETAIL A

SPECIAL CUT GRASSED SWALE SEE DETAIL E

20 SY OF PSRM

TIE ROADWAY DITCH TO EXISTING SWALE LEESVILLE HOLLOW, LLC

TIE ROADWAY GRASSED SWALE TO EXISTING DITCH

REMOVE EXIST. BRIDGE AND BENTS

2' SILL

BURY INVERT 1'

60' OF INLET CHANNEL IMPROVEMENTS, SEE DETAIL
PIPE GOES STRAIGHT THRU MANHOLE NO INVERTS

PERMANENT SURFACE WATER IMPACT

SR 1839 - LEESVILLE ROAD

SECOND STAR CT.

DARLING STREET

DURHAM COUNTY

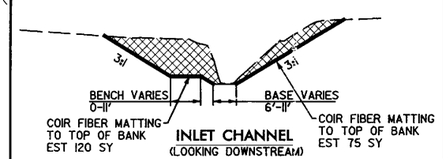
WAKE COUNTY

SITES 1, 2 AND 3
PLAN VIEW

100 0 50 100
SCALE: 1"= 100' HORIZ.

LEGEND
- DENOTES TEMPORARY SURFACE WATER IMPACT
- DENOTES PERMANENT SURFACE WATER IMPACT
- DENOTES MECHANIZED CLEARING

EST DDE 160 CY



INLET CHANNEL
(LOOKING DOWNSTREAM)

NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

ENGLISH

NCDOT
DIVISION OF HIGHWAYS
WAKE/DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

SHEET 7 OF 10 10/4/07

10/4/2007
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ks & associates, p.c.

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS
8/17/99
R/W Revision 10/4/2007 Added PUE to Parcels 2,3 & 4. Revised TCE and TDE on same Parcels.

DETAIL A
GRASSED SWALE W/ FALSE CUT
(Not to Scale)
W, 2:1 Natural Ground, 3:1, D, Ad or Flatter, Fill Slope
Min. D = 1Ft.
W = 2' Min.
FROM STA. 20+50 TO STA. 21+50 LT.
FROM STA. 22+50 TO STA. 24+00 LT.

CLASS 'I' RIP RAP W/FF
1.5' THICK (TYP.)
1.0' KEY (TYP.)
3:1, 3:1
BENCH VARIES 0-7'
BASE VARIES 11'-15'
COIR FIBER MATTING
EST DDE 160 CY
EST 105 TONS CLASS 'I' RIP RAP
EST 170 SY FF
EST 60 SY
OUTLET CHANNEL
(LOOKING DOWNSTREAM)
NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

DETAIL B
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, B, Ad or Flatter, Fill Slope
Min. D= 1Ft.
B= 2 Ft.
FROM STA. 20+00 TO STA. 20+50 LT.

NC GRID / NAD 83

DETAIL E
SPECIAL CUT GRASSED SWALE
(Not to Scale)
Natural Ground, 3:1, D, Ad or Flatter, Front Ditch Slope
Min. D= 1 Ft.
FROM STA. 21+50 TO STA. 22+50 LT.
FROM STA. 24+00 TO STA. 25+00 LT.

DETAIL D
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1 OR FLATTER, Fill Slope, Filter Fabric
d= 1.5 Ft.
Type of Liner= Class 'B' Rip Rap
FROM STA. 17+15 TO STA. 18+35 LT.

BEGIN PROJECT B-3528
-L- POC STA. 10+00

END PROJECT B-3528
-L- POT STA. 25+00

-BL-2 8+18.57 PINC = -L- POC 13+24.35, 12.5' LT
-BL-3 13+54.76 PINC = -L- POC 18+59.30, 30.92' RT
-BL-4 17+18.52 PINC = -L- POT 22+18.86, 9.25' LT
-BL-4 5+00.00 POT = -L- POT 10+05.33, 15.07' LT

1 LEESVILLE FOREST
2 LEESVILLE HOLLOW, LLC
3 ZINA CHRISTIAN CENTER
4 ZINA CHRISTIAN CENTER
5 ALMA C. SORRELL
6 ALMA C. SORRELL
7 ALMA C. SORRELL
8 BETTY A. BUNN

SITE 1
TEMPORARY SURFACE WATER IMPACT
CLASS 'I' RIP RAP ON BANKS ONLY
CLASS 'B' RIP RAP SLOPE PROTECTION
55 LF RETAINING WALL
60 LF OUTLET CHANNEL IMPROVEMENTS SEE DETAIL
TOE PROTECTION CLASS 'B' RIP RAP SEE DETAIL D
BURY INVERT 1' CLASS 'I' RIP RAP 20 LF (BANKS ONLY) EST 30 TONS EST 30 SY FF
BM #2 -BL- STA 12+16.94 LT 16.94 LT
BURY INVERT 1'
2' SILL
REMOVE EXIST. BRIDGE AND BENTS
TIE ROADWAY DITCH TO EXISTING SWALE LEESVILLE HOLLOW, LLC
20 SY OF PSRM
48 JB w/MH
PERMANENT SURFACE WATER IMPACT
SITE 3
MECHANICAL CLEARING
< 0.01 AC

SITE 2
2' LATERAL BASE DITCH W/ROCK CHECKS
EST 12 TONS CLASS I RIP RAP
EST 348 SY PSRM
EST 150 CY DDE
SEE DETAIL SHEET 2-B
TEMPORARY SURFACE WATER IMPACT
SPECIAL LATERAL BASE DITCH, SEE DETAIL B
GRASSED SWALE W/ FALSE CUT SEE DETAIL A
SPECIAL CUT GRASSED SWALE SEE DETAIL E
TIE ROADWAY GRASSED SWALE TO EXISTING DITCH
60' OF INLET CHANNEL IMPROVEMENTS, SEE DETAIL
REMOVE
15" REMOVE
8" PLASTIC
8" STEEL
EXIST. BRIDGE
SR 1839 LEESVILLE ROAD
SECOND STAR CT.
DURHAM COUNTY
WAKE COUNTY
ABANDONED
END NOT LOCATED
EXISTING R/W
EXIST R/W

SITES 1, 2 AND 3
PLAN VIEW

LEGEND
DENOTES TEMPORARY SURFACE WATER IMPACT
DENOTES PERMANENT SURFACE WATER IMPACT
DENOTES MECHANICAL CLEARING

100 0 50 100
SCALE: 1"= 100' HORIZ.

EST DDE 160 CY
3:1, 3:1
BENCH VARIES 0-1'
BASE VARIES 6'-11'
COIR FIBER MATTING TO TOP OF BANK EST 120 SY
INLET CHANNEL
(LOOKING DOWNSTREAM)
COIR FIBER MATTING TO TOP OF BANK EST 75 SY
NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

ENGLISH

NCDOT
DIVISION OF HIGHWAYS
WAKE/DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER SYCAMORE CREEK
ON SR 1839

SHEET 8 OF 10 10/4/07

10/4/2007
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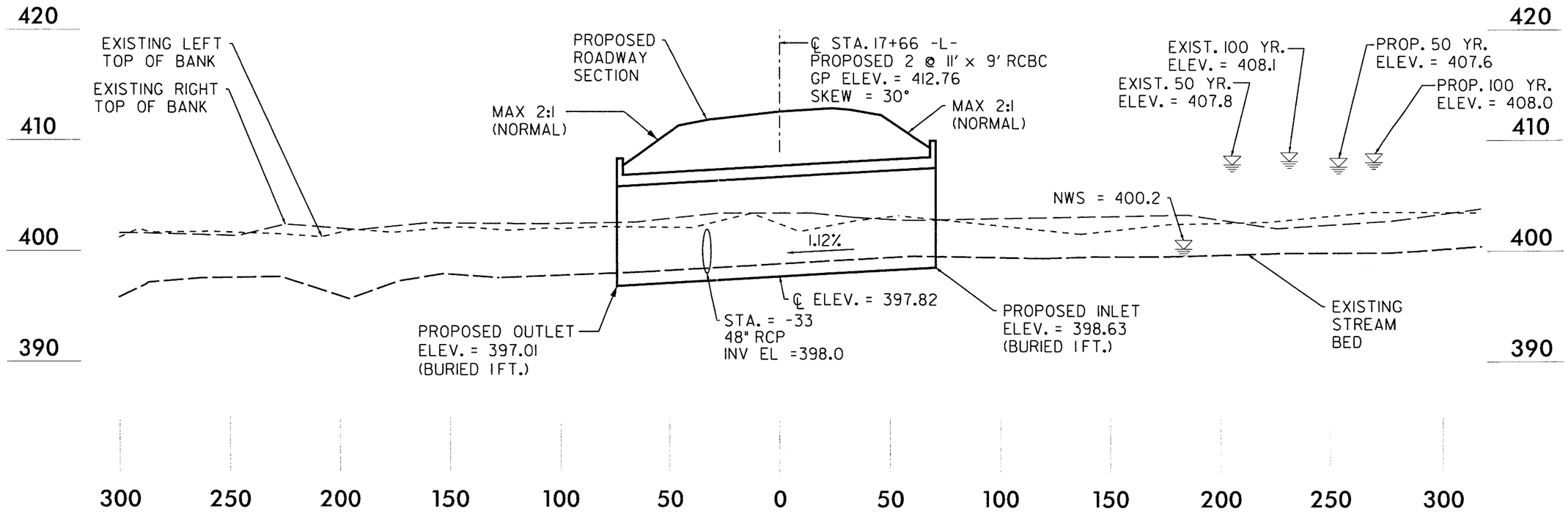
KO & Associates, P.

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 200 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SCALE:
1"= 50' HORIZONTAL
1"= 10' VERTICAL

PROFILE ALONG STRUCTURE
SITE 1

NCDOT
DIVISION OF HIGHWAYS
WAKE/DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

SHEET 9 OF 10 7/16/07

B.M.#1 EL = 404.98'
RR SPIKE SET IN 14" PINE
92' LT OF -BL- STA 4+84
108' LT OF -L- STA 10+00

B.M.#2 EL = 404.58'
RR SPIKE SET IN 13" CHERRY
117' LT OF -BL- STA 12+17
84' LT OF -L- STA 17+17

CULVERT HYDRAULIC DATA

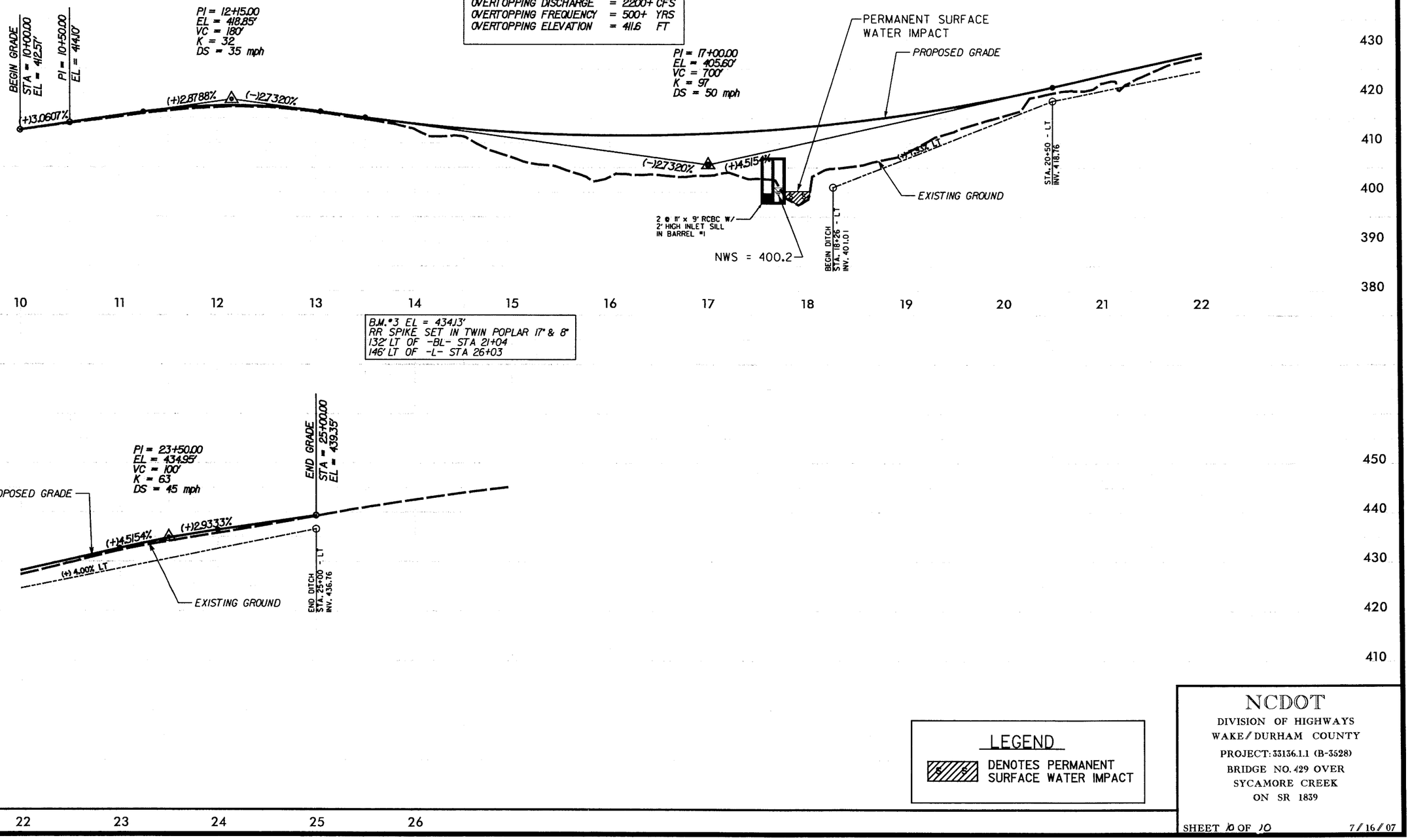
DESIGN DISCHARGE	= 1100	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 407.6	FT
BASE DISCHARGE	= 1200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 408.0	FT
OVERTOPPING DISCHARGE	= 2200+	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 411.6	FT

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH



LEGEND

DENOTES PERMANENT SURFACE WATER IMPACT

NCDOT
DIVISION OF HIGHWAYS
WAKE / DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)
BRIDGE NO. 429 OVER
SYCAMORE CREEK
ON SR 1839

SHEET 10 OF 10 7/16/07

7/16/2007
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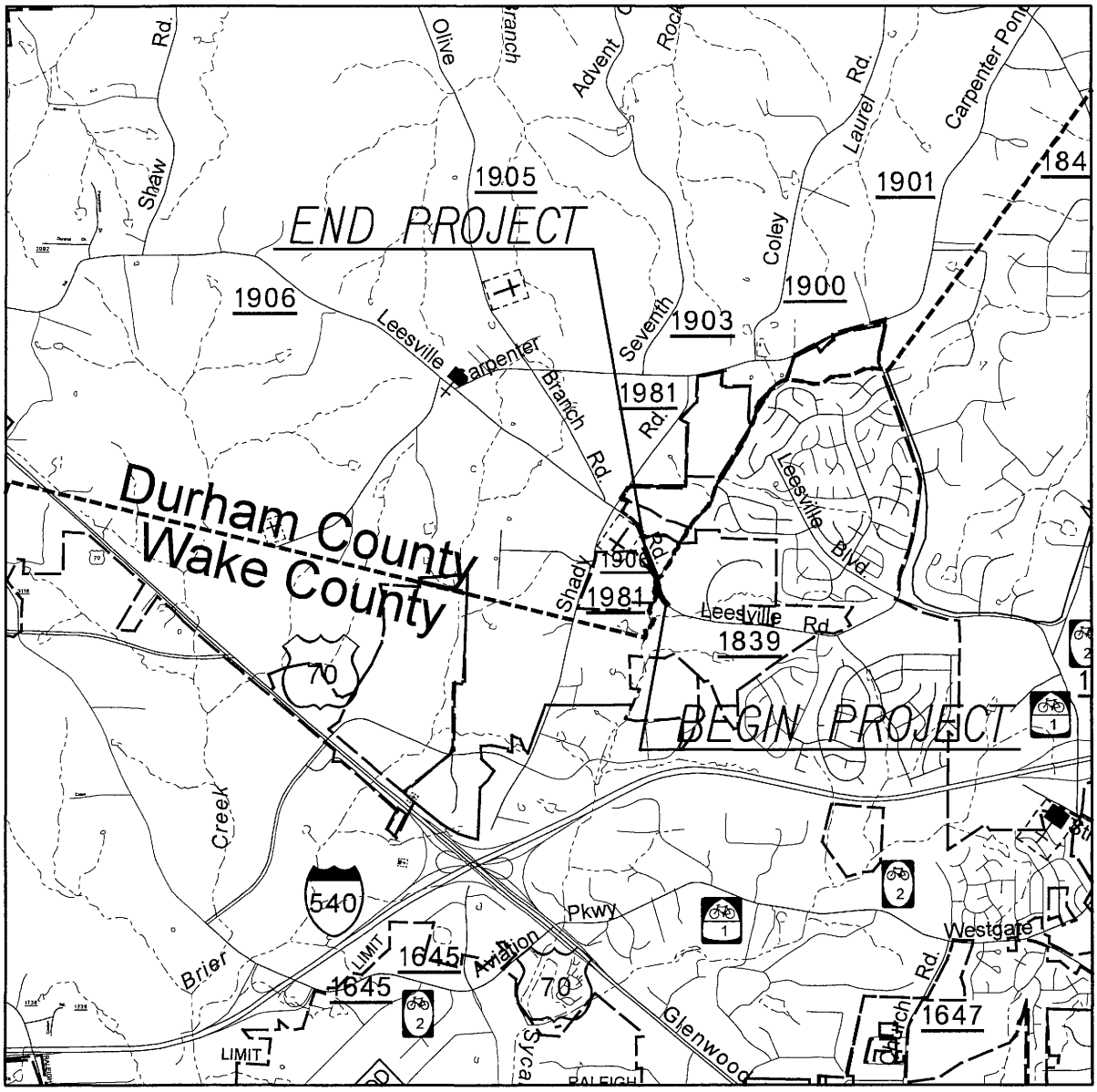

THIS PROJECT IS WITHIN THE
MUNICIPAL BOUNDARY OF RALEIGH

NOT TO SCALE

NEUSE RIVER BUFFER
VICINITY MAPS

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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 1 OF 6 7 / 16 / 07

7/16/2007
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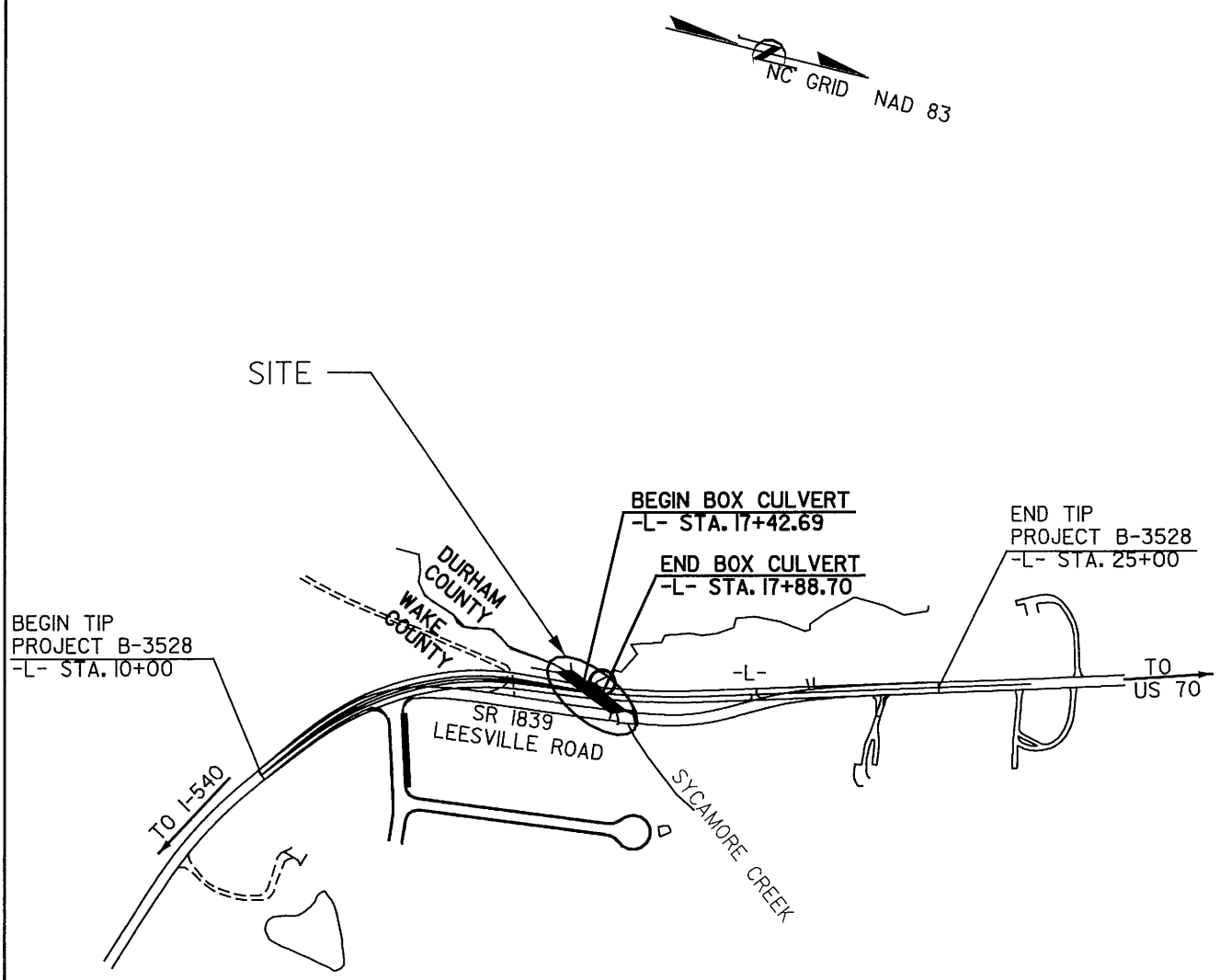

NOT TO SCALE

NEUSE RIVER BUFFER
LOCATION MAPS

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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 2 OF 6 7 / 16 / 07

7/16/2007
9:49:24 AM
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BUFFER LEGEND

WLB WETLAND BOUNDARY

WLB WETLAND WLB

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

BZ RIPARIAN BUFFER ZONE

BZ1 RIPARIAN BUFFER ZONE 1
30 ft (9.2m)

BZ2 RIPARIAN BUFFER ZONE 2
20 ft (6.1m)

FLOW DIRECTION

TB TOP OF BANK

WE EDGE OF WATER

C PROP. LIMIT OF CUT

F PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG NATURAL GROUND

PL PROPERTY LINE

TDE TEMP. DRAINAGE EASEMENT

PDE PERMANENT DRAINAGE EASEMENT

EAB EXIST. ENDANGERED ANIMAL BOUNDARY

EPB EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

COIR FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

DITCH/ GRASS SWALE

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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 3 OF 6 7 / 16 / 07

7/17/2007
8:22:30 AM
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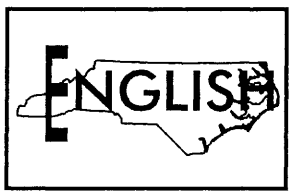
SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
(2)	LEESVILLE HOLLOW, LLC	7474 CREEDMOOR RD. RALEIGH, NC 27613	SITE 1
(3)	ZINA CHRISTIAN CENTER INC.	P.O. BOX 25613 RALEIGH, NC 27611	SITE 1 & 2
(4)	ZINA CHRIASTIAN CENTER INC.	P.O. BOX 25613 RALEIGH, NC 27611	SITE 1 & 2
(5)	ALMA C. SORRELL	7603 LEESVILLE RD. DURHAM, NC 27703	SITE 1 & 2



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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 4 OF 6 7 / 16 / 07

7/16/2007
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BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	2 @ 11' x 9' RCBC	-L- 14+66 - 19+47	X						20154	10079	30233		
TOTAL:						0	0	0	20154	10079	30233		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE/DURHAM COUNTY
PROJECT: 33136.1.1 (B-3528)

10/4/2007
SHEET 5 OF 6

Rev. May 2006

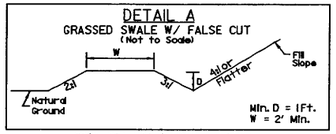
8/17/99

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 200 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

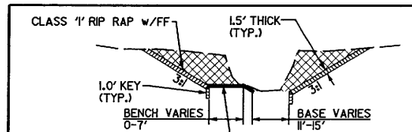
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL A
GRASSED SWALE W/ FALSE CUT
(Not to Scale)



FROM STA. 20+50 TO STA. 21+50 LT.
FROM STA. 22+50 TO STA. 24+00 LT.

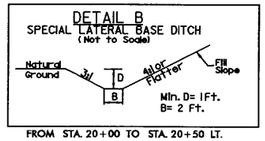
OUTLET CHANNEL
(LOOKING DOWNSTREAM)



EST DDE 160 CY
EST 105 TONS CLASS 'I' RIP RAP
EST 170 SY FF

NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

DETAIL B
SPECIAL LATERAL BASE DITCH
(Not to Scale)

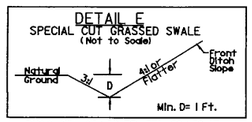


FROM STA. 20+00 TO STA. 20+50 LT.

GRASS SWALE

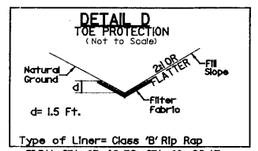
DA	0.89	Ac
Q2	2.7	cfs
V2	1.64	fps
Q10	3.8	cfs
V10	1.79	fps
REQUIRED LENGTH	89.3	ft
ACTUAL LENGTH	1200	ft
SLOPE	0.040	ft / ft
SIDE SLOPES	5	

DETAIL E
SPECIAL CUT GRASSED SWALE
(Not to Scale)



FROM STA. 21+50 TO STA. 22+50 LT.
FROM STA. 24+00 TO STA. 25+00 LT.

DETAIL D
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip Rap
FROM STA. 17+15 TO STA. 18+35 LT.

END PROJECT B-3528
-L- POT STA. 25+00

BEGIN PROJECT B-3528
-L- POC STA. 10+00

BUFFER SITE 1
PLAN VIEW

SCALE: 1"= 100' HORIZ.

GRASS SWALE

DA	1.99	Ac
Q2	6.0	cfs
V2	1.36	fps
Q10	8.4	cfs
V10	1.49	fps
REQUIRED LENGTH	199.2	ft
ACTUAL LENGTH	390	ft
SLOPE	0.013	ft / ft
SIDE SLOPES	4	

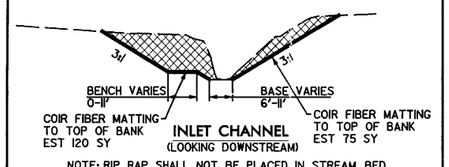
GRASS SWALE

DA	2.00	Ac
Q2	4.6	cfs
V2	1.91	fps
Q10	6.5	cfs
V10	2.08	fps
REQUIRED LENGTH	200.0	ft
ACTUAL LENGTH	1050	ft
SLOPE	0.039	ft / ft
SIDE SLOPES	5	

LEGEND

- BZ 1 — RIPARIAN BUFFER - ZONE 1
- BZ 2 — RIPARIAN BUFFER - ZONE 2
- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

EST DDE 160 CY



NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

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

PROJECT: 33136.1.1 (B-3528)

BRIDGE NO. 429
OVER SYCAMORE CREEK
ON SR 1839

SHEET 6 OF 6 - 10/4/07

10/4/2007
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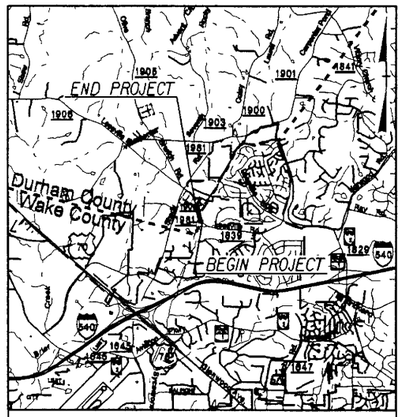
TIP PROJECT: B-3528

PROJECT: 33136.1.1

T.I.P. NO.	SHEET NO.
B-3528	UCP-1

Permit Drawing
Sheet 1 of 4

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF RALEIGH



VICINITY MAP

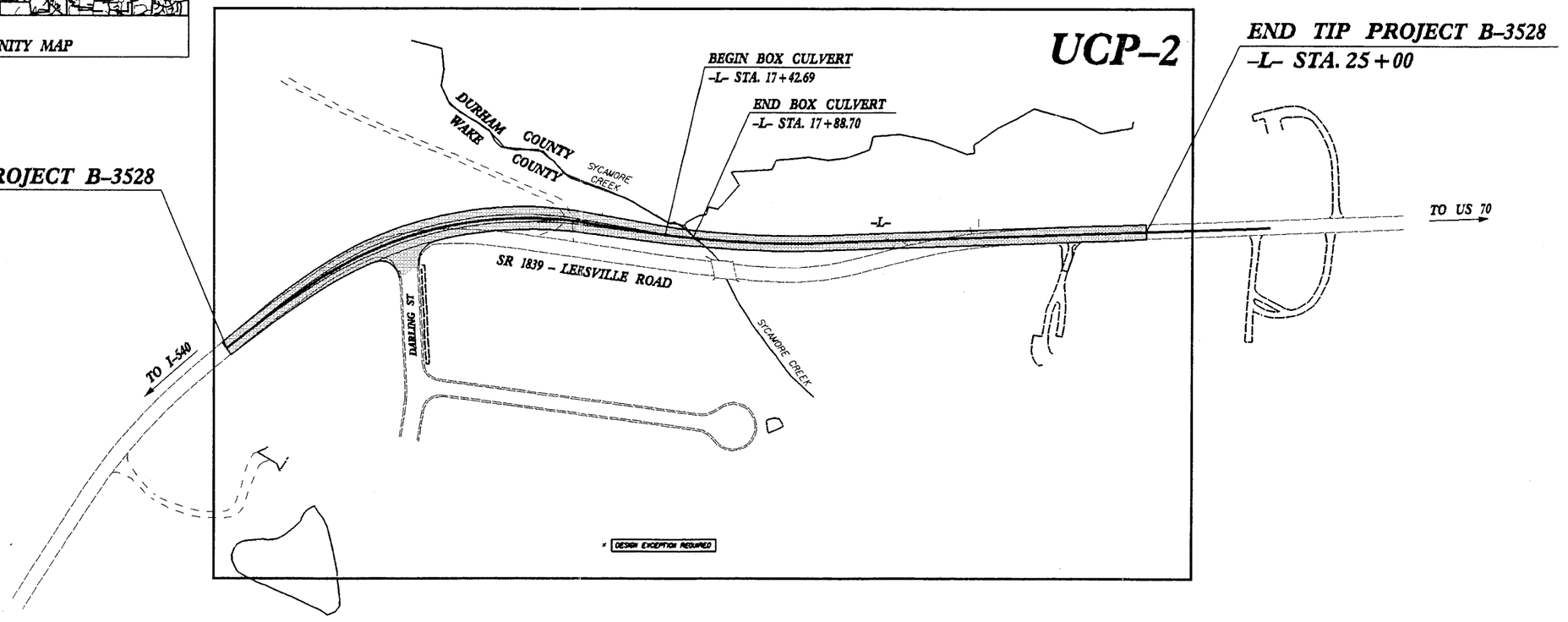
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWINGS
WAKE AND DURHAM COUNTIES

NC GRID NAD 83

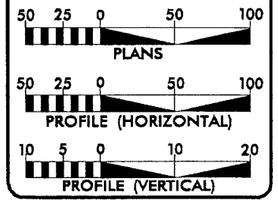
LOCATION: BRIDGE 429 OVER SYCAMORE CREEK ON S.R. 1839 AND APPROACHES

TYPE OF WORK: UTILITY CONSTRUCTION



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

GRAPHIC SCALES



INDEX OF SHEETS

UTILITY OWNERS ON PROJECT

(1) CITY OF RALEIGH - SANITARY SEWER
(2) VERIZON - TELEPHONE

PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
PROJECT SERVICES
UTILITY SECTION
1591 MAIL SERVICES CENTER
RALEIGH NC 27699-1591
PHONE (919) 250-4128
FAX (919) 250-4119

Roger Worthington, P.E. — *UTILITIES SECTION ENGINEER*
Steve McKee, P.E. — *UTILITIES SQUAD LEADER PROJECT ENGINEER*
Donald Proper — *UTILITIES PROJECT DESIGNER*

5/14/99

NOTES TO CONTRACTOR:

ALL PROPOSED MANHOLES SHALL BE FLAT TOP AND SHALL HAVE WATER-TIGHT RINGS AND BOLTED COVERS

PROJECT REFERENCE NO.	SHEET NO.
B-3528	UCP-2
DESIGNED BY: DWP	
DRAWN BY: DWP	
CHECKED BY: JSM	
APPROVED BY: JSM	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT SERVICES UNIT PHONE:(919)250-4128 FAX:(919)250-4119	UTILITY CONSTRUCTION PLANS ONLY

NORTH CAROLINA PROFESSIONAL SEAL 16832 ENGINEER JAMES S. MOORE

UTILITY CONSTRUCTION

Permit Drawing

Sheet 2 of 4

BEGIN PROJECT B-3528
-L- POC STA. 10+00

END PROJECT B-3528
-L- POT STA. 25+00

PROP. M.H. STA. 0+00.00
TOP ELEV. = 404.20
INVERT IN (2) = 395.27
INVERT OUT = 395.27

PROP. 187.00' 10" RESTRAINED JOINT DUCTILE IRON SEWER MAIN @ 0.28% GRADE

(2) PROP. CONCRETE THRUST COLLARS

PROP. M.H. STA. 1+87.00
TOP ELEV. = 404.70
INVERT IN = 397.50
INVERT OUT = 395.80

PROP. VERIZON TELEPHONE CONDUIT INSTALLED BY DIRECTIONAL BORE

STA. 13+49.65 69.65' LT.
STA. 13+42.05 58.33' LT.

1 CONNECT TO EXISTING TELEPHONE CABLES

-L- TS 10+73.27

-L- SC 11+73.27

-L- POT 10+00.00

-L- POT 10+05.33, 15.07' LT.

-L- PT 16+14.41

-L- PT 19+96.26

STA. 19+98.26 70' LT.
STA. 19+98.26 80' LT.

5 CONNECT TO EXISTING TELEPHONE CABLES

PROP. 172.38' 12" DUCTILE IRON SEWER MAIN REPLACE EXISTING PVC LINE IN SAME LOCATION @ 0.94% GRADE

PROP. BREAKDOWN AND REBUILD EXISTING M.H.

TIE ROADWAY DITCH TO EXISTING SWALE

TIE ROADWAY GRASSED SWALE TO EXISTING DITCH

BEGIN BOX CULVERT -L- STA. 17+42.69

END BOX CULVERT -L- STA. 17+88.70

60 LF OUTLET CHANNEL IMPROVEMENTS SEE DETAIL

CLASS 'B' RIP RAP SLOPE PROTECTION

CLASS 'I' RIP RAP ON BANKS ONLY

TOE PROTECTION CLASS 'B' RIP RAP SEE DETAIL D

BURY INVERT 1' CLASS 'I' RIP RAP 20 LF (BANKS ONLY) EST 30 TONS EST 50 SY FF

SPECIAL LATERAL BASE DITCH, SEE DETAIL B

GRASSED SWALE W/ FALSE CUT SEE DETAIL A

SPECIAL CUT GRASSED SWALE SEE DETAIL E

50' TAPER LT & RT

REMOVE

N 22°00'48" W

N 23°46'56" W

SR 1839 - LEESVILLE ROAD

LEESVILLE HOLLOW, LLC DB 10668 PG 1040 BM 2005 PG PG 1049

ZINA CHRISTIAN CENTER DB 2566 PG 238

ZINA CHRISTIAN CENTER DB 2850 PG 994

ALMA C. SORRELL DB 145 PG 12

ALMA C. SORRELL DB 369 PG 593

BETTY A. BUNN DB 6167 PG 845

DURHAM COUNTY

INTAKE COUNTY

SECOND STAR CT.

DARLING STREET

20' CITY OF RALEIGH SANITARY SEWER EASEMENT BM 2005 PG 1049

30' CITY OF RALEIGH SANITARY SEWER EASEMENT BM 2005 PG 1049

PIPE DOES STRAIGHT THRU MANHOLE NO INVERTS

END NOT LOCATED

GRASS SWALE		
DA	1.99	Ac
Q2	6.0	cfs
V2	1.36	fps
Q10	8.4	cfs
V10	1.49	fps
REQUIRED LENGTH	199.2	ft
ACTUAL LENGTH	390	ft
SLOPE	0.003	ft / ft
SIDE SLOPES	4	

GRASS SWALE		
DA	2.00	Ac
Q2	4.6	cfs
V2	1.91	fps
Q10	6.5	cfs
V10	2.08	fps
REQUIRED LENGTH	200.0	ft
ACTUAL LENGTH	1050	ft
SLOPE	0.039	ft / ft
SIDE SLOPE		

PI Sta 11+39.96
Δs = 4°46'28"
Ls = 100.00'
LT = 66.89'
ST = 33.36'

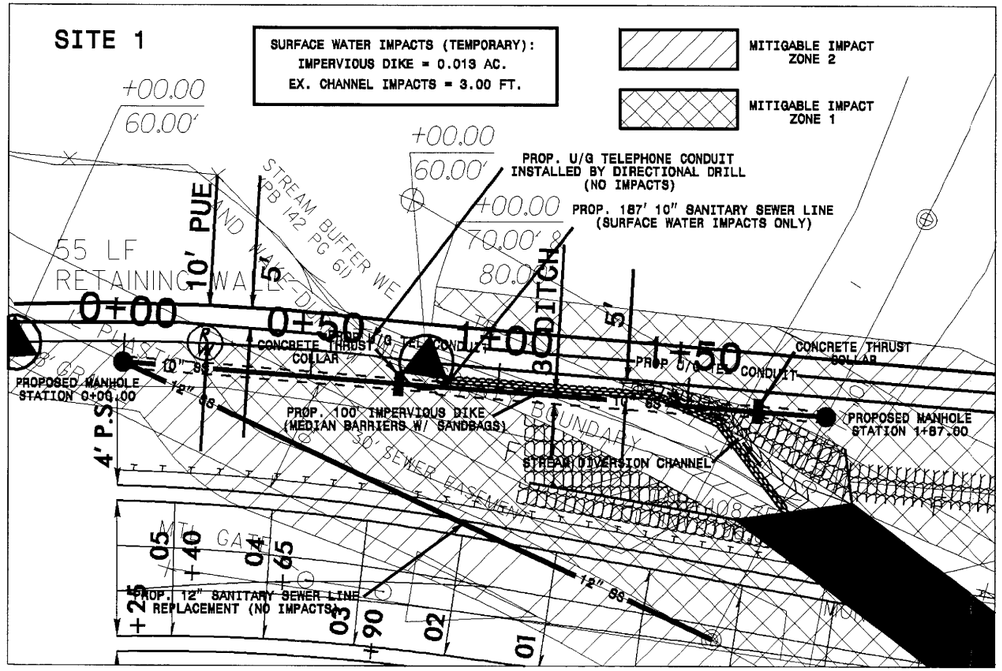
PI Sta 14+04.35
Δ = 42°07'32.5" (RT)
D = 9°32'57.5"
L = 441.14'
T = 231.07'
R = 600.00'
SE = 0.060
DS = 43 mph

PI Sta 18+56.32
Δ = 10°43'20.9" (LT)
D = 3°49'11.0"
L = 280.71'
T = 140.77'
R = 1,500.00'
SE = 0.050
DS = 50 mph

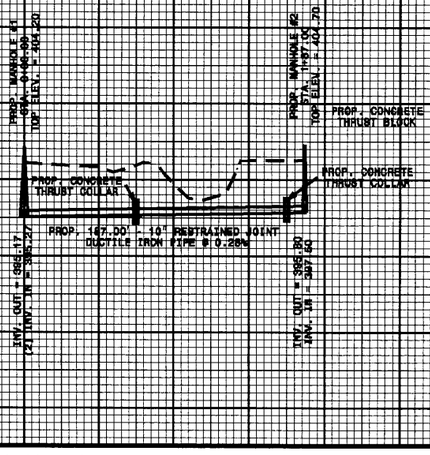
DESIGN EXCEPTION REQUIRED

24-OCT-2007 15:38
\\ssiis01\Highway\Projects\B-3528_rdy_dsn_permit_ucp_02.dgn

8/17/99



PROP. 10" SANITARY SEWER
STREAM CROSSING DETAIL



PROJECT REFERENCE NO.	SHEET NO.
B-3528	UCP-3
DESIGNED BY: DWP	
DRAWN BY: DWP	
CHECKED BY: JSM	
APPROVED BY: JSM	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT SERVICES UNIT PHONE:(919)250-4128 FAX:(919)250-4119	UTILITY CONSTRUCTION PLANS ONLY

NORTH CAROLINA PROFESSIONAL SEAL 16832 ENGINEER JAMES S. MCKEE

UTILITY CONSTRUCTION

Permit Drawing
Sheet 3 of 4

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			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	See Drawings	Imp. Dike w/ SB							0.013			
1	Station 1+40.00	10" San Sewer									3	
TOTALS:									0.013		3	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
WBS -33136.1.1 (B-3528)

SHEET 4 OF 4 (10/24/07)

ATN Revised 3/31/05

09/08/99

TIP PROJECT: B-3528

PROJECT: 33136.1.1

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE AND DURHAM COUNTIES

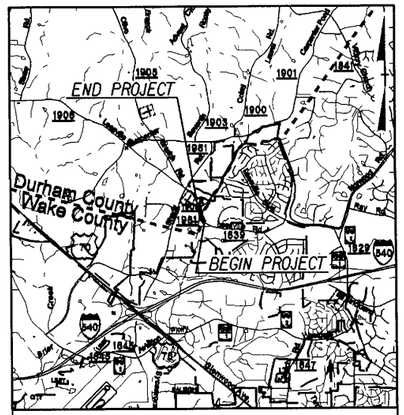
R/W PLANS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3528	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33136.1.1	BRZ-1839(1)	P.E.
33136.2.2	BRZ-1839(1)	R/W & UTIL.

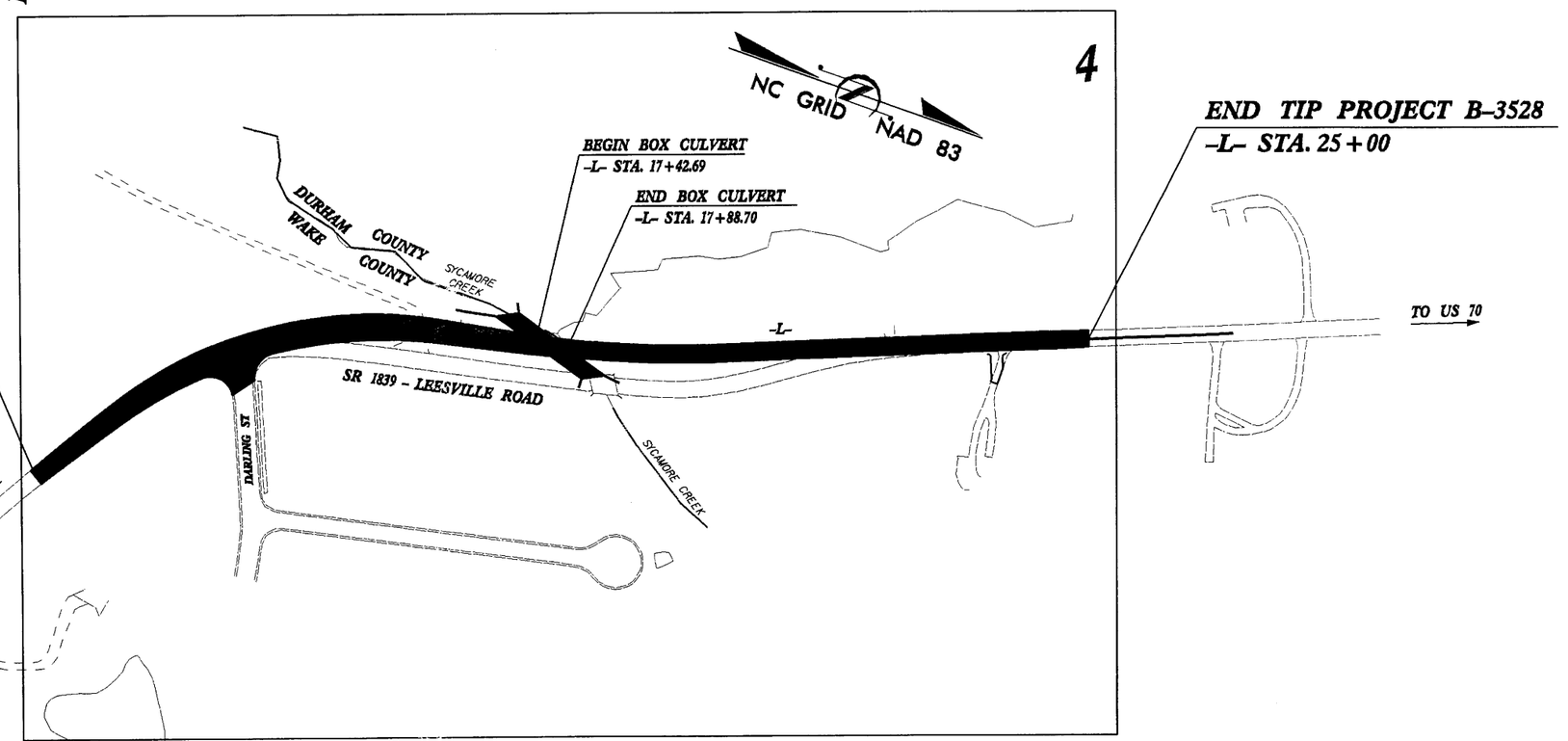
LOCATION: *Bridge 429 over Sycamore Creek on SR 1839 and Approaches*

TYPE OF WORK: *Grading, Drainage, Paving and R. C. Box Culvert*



VICINITY MAP

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF RALEIGH



** DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE AND HORIZONTAL SSD.

NCDOT CONTACT: CATHY HOUSER, P.E.
ROADWAY DESIGN - ENGINEERING COORDINATION

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

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 2007 = 11,600
ADT 2030 = 28,500
DHV = 12 %
D = 70 %
T = 3 % *
** V = 50 MPH

* TTST 1% DUAL 2%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3528	=	*0.275 mi.*
LENGTH OF STRUCTURE TIP PROJECT B-3528	=	*0.009 mi*
TOTAL LENGTH OF TIP PROJECT B-3528	=	*0.284 mi.*

Prepared In the Office of:
KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-5966

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: October 20, 2006

LETTING DATE: March 18, 2008

Brian A. Wiles, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

26-JUN-2007 09:48
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vrivers
AT HY22475

10/25/05

PROJECT REFERENCE NO.	SHEET NO.
B-3528	1-B

Note: Not to Scale

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

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 — IP
- Property Corner
- Property Monument — CM
- 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 — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access
- Existing Easement Line — E
- Proposed Temporary Construction Easement — TCE
- 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.

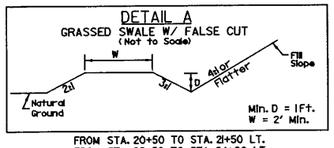
REVISIONS	
8/17/99	
R/W Revision 10/4/2007	Added PUE to Parcels 2,3 & 4. Revised TCE and TDE on some Parcels.

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 202 RALEIGH, N.C. 27606
(919) 851-6066

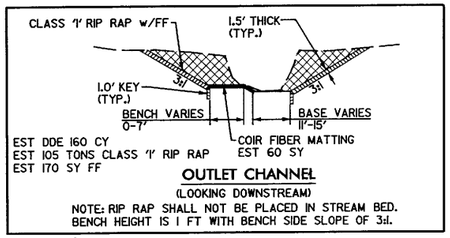
PROJECT REFERENCE NO.	SHEET NO.
B-3528	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL A
GRASSED SWALE W/ FALSE CUT
(Not to Scale)



FROM STA. 20+50 TO STA. 21+50 LT.
FROM STA. 22+50 TO STA. 24+00 LT.

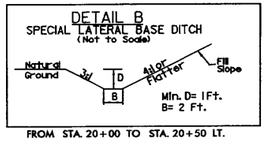


EST DDE 160 CY
EST 105 TONS CLASS 'I' RIP RAP
EST 170 SY FF

OUTLET CHANNEL
(LOOKING DOWNSTREAM)

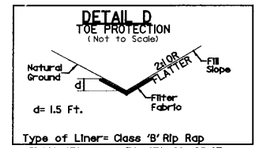
NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

DETAIL B
SPECIAL LATERAL BASE DITCH
(Not to Scale)



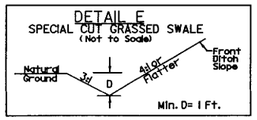
FROM STA. 20+00 TO STA. 20+50 LT.

DETAIL D
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip Rap
FROM STA. 17+15 TO STA. 18+35 LT.

DETAIL E
SPECIAL CUT GRASSED SWALE
(Not to Scale)



FROM STA. 21+50 TO STA. 22+50 LT.
FROM STA. 24+00 TO STA. 25+00 LT.

NC GRID / NAD 83

BEGIN PROJECT B-3528
-L- POC STA. 10+00

END PROJECT B-3528
-L- POT STA. 25+00

BEGIN BOX CULVERT
-L- STA. 17+42.69

END BOX CULVERT
-L- STA. 17+88.70

-L- PC 17+15.55

-L- PT 16+14.41

-L- PT 19+96.26

-L- POC 13+21.35, 12.5' LT

-L- TS 10+73.27

-L- SC 11+73.27

-L- POT 10+00.00

-BL-1 5+00.00 POT = -L- POT 10+05.33, 15.07' LT

-BL-2 8+18.57 PNC = -L- POC 13+21.35, 12.5' LT

-BL-3 13+54.16 PNC = -L- POC 18+59.30, 30.92' RT

-BL-4 17+18.52 PNC = -L- POT 22+18.86, 9.25' LT

3 ZINA CHRISTIAN CENTER
DB 2566 PG 738
60 LF OUTLET CHANNEL IMPROVEMENTS SEE DETAIL

4 ZINA CHRISTIAN CENTER
DB 2850 PG 994
2' LATERAL BASE DITCH W/ROCK CHECKS
EST 24 TONS HEADER/FOOTER ROCK
EST 12 TONS CLASS I RIP RAP
EST 348 SY PSRM
EST 150 CY DDE
SEE DETAIL SHEET 2-B

1 LEESVILLE FOREST
DB 8987 PG 450

2 LEESVILLE HOLLOW, LLC
DB 10668 PG 1040
BM 2005 PG PG 1049

5 ALMA C. SORRELL
DB 145 PG 12

6 ALMA C. SORRELL
DB 369 PG 593

7 ALMA C. SORRELL
DB 282 PG 152

8 BETTY A. BUNN
DB 6857 PG 845

CLASS 'I' RIP RAP ON BANKS ONLY
CLASS 'B' RIP RAP SLOPE PROTECTION
TOE PROTECTION CLASS 'B' RIP RAP SEE DETAIL D
BURY INVERT 1' CLASS 'I' RIP RAP 20 LF (BANKS ONLY) EST 30 TONS EST 30 SY FF
55 LF RETAINING WALL
SPECIAL LATERAL BASE DITCH, SEE DETAIL B
SPECIAL CUT GRASSED SWALE SEE DETAIL E
GRASSED SWALE W/ FALSE CUT SEE DETAIL A
TIE ROADWAY DITCH TO EXISTING SWALE
TIE ROADWAY GRASSED SWALE TO EXISTING DITCH
20 SY OF PSRM
R=720.00 L=96.26 CHORD=N 22° 19' 29" W CHORD LENGTH=96.19
R=720.00 L=57.52 CHORD=N 15° 12' 22" W CHORD LENGTH=57.50
R=25.00 L=37.84 CHORD=S 69° 31' 23" E CHORD LENGTH=34.33
R=25.00 L=44.32 CHORD=N 16° 18' 59" E CHORD LENGTH=38.74
R=800.00 L=83.37 CHORD=N 16° 52' 50" W CHORD LENGTH=83.34
60' OF INLET CHANNEL IMPROVEMENTS, SEE DETAIL
PIPE GOES STRAIGHT THRU MANHOLE NO INVERTS
20' PERMANENT SLOPE & CONSTRUCTION EASEMENT BM 2005 PG 1049
20' CITY OF RALEIGH SANITARY SEWER EASEMENT BM 2005 PG 1049
30' SEWER EASEMENT
SIGN & LANDSCAPE EASEMENT BM 2005 PG 1049
STREAM BUFFER 50' EACH SIDE
CENTERLINE OF CREEK IS PROPERTY LINE AND WALL CORNER
DITCH EOR UNKNOWN
SECOND STAR CT.
SR 1839 - LEESVILLE ROAD
EXIST R/W
DURHAM COUNTY
WAKE COUNTY
SEDIMENT POND
BURY INVERT 1'
TDE
PUE
TBJB W/MH
RETAIN
REMOVE
ABANDONED
END NOT LOCATED

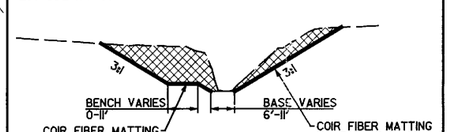
PI Sta 11+39.96
θs = 4° 46' 28.7"
Ls = 100.00'
LT = 66.69'
ST = 33.36'

PI Sta 14+04.35
Δ = 42° 01' 32.5" (RT)
D = 9° 32' 57.5"
L = 441.14'
T = 231.07'
R = 600.00'
SE = 0.060
DS = 43 mph

PI Sta 18+56.32
Δ = 10° 43' 20.9" (LT)
D = 3° 49' 11.0"
L = 280.71'
T = 140.77'
R = 1500.00'
SE = 0.050
DS = 50 mph

* DESIGN EXCEPTION REQUIRED

EST DDE 160 CY



NOTE: RIP RAP SHALL NOT BE PLACED IN STREAM BED. BENCH HEIGHT IS 1 FT WITH BENCH SIDE SLOPE OF 3:1.

LEGEND
PAVED SHOULDER

FOR RETAINING WALL DETAIL, SEE SHEET NO. 2-A
FOR -L- PROFILE, SEE SHEET NO. 5

10/5/2007
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KO & Associates, P.C.

5/28/99

B.M.#1 EL = 404.98'
RR SPIKE SET IN 14" PINE
92' LT OF -BL- STA 4+84
108' LT OF -L- STA 10+00

B.M.#2 EL = 404.58'
RR SPIKE SET IN 13" CHERRY
117' LT OF -BL- STA 12+17
84' LT OF -L- STA 17+17

KO & ASSOCIATES, P.C.
Consulting Engineers
1011 SCHAUB DR., SUITE 290 RALEIGH, N.C. 27606
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-3528	5

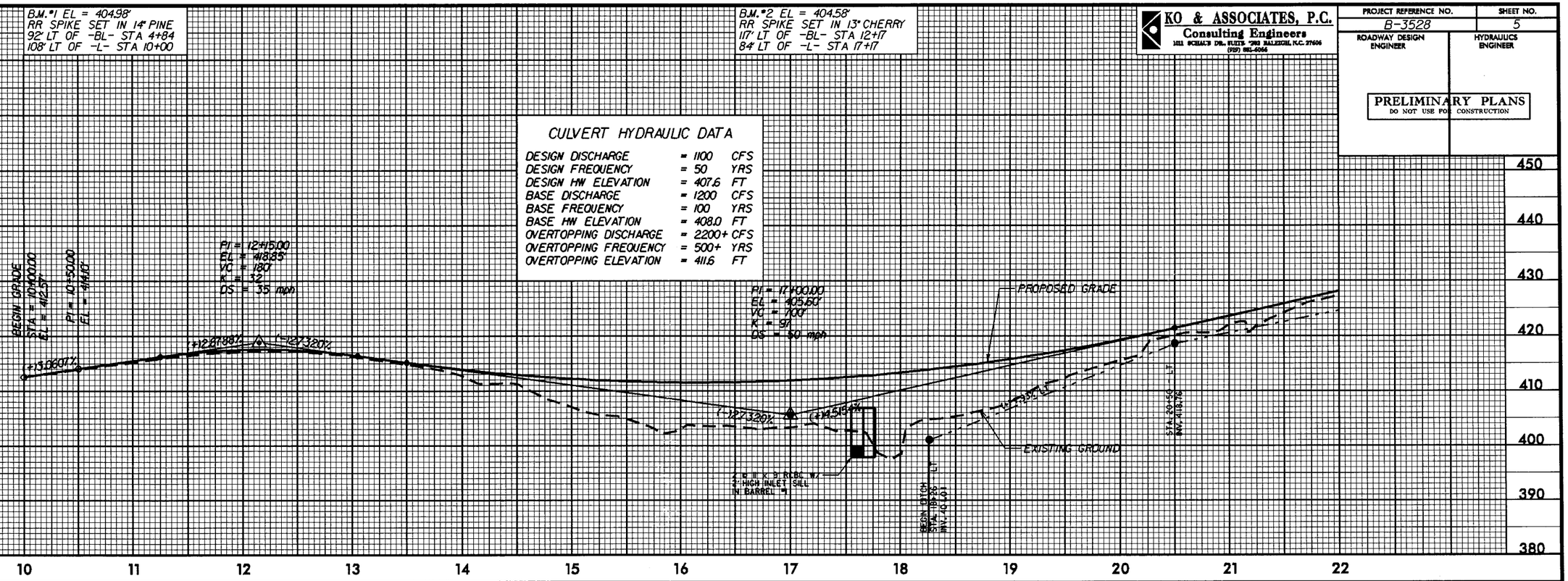
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

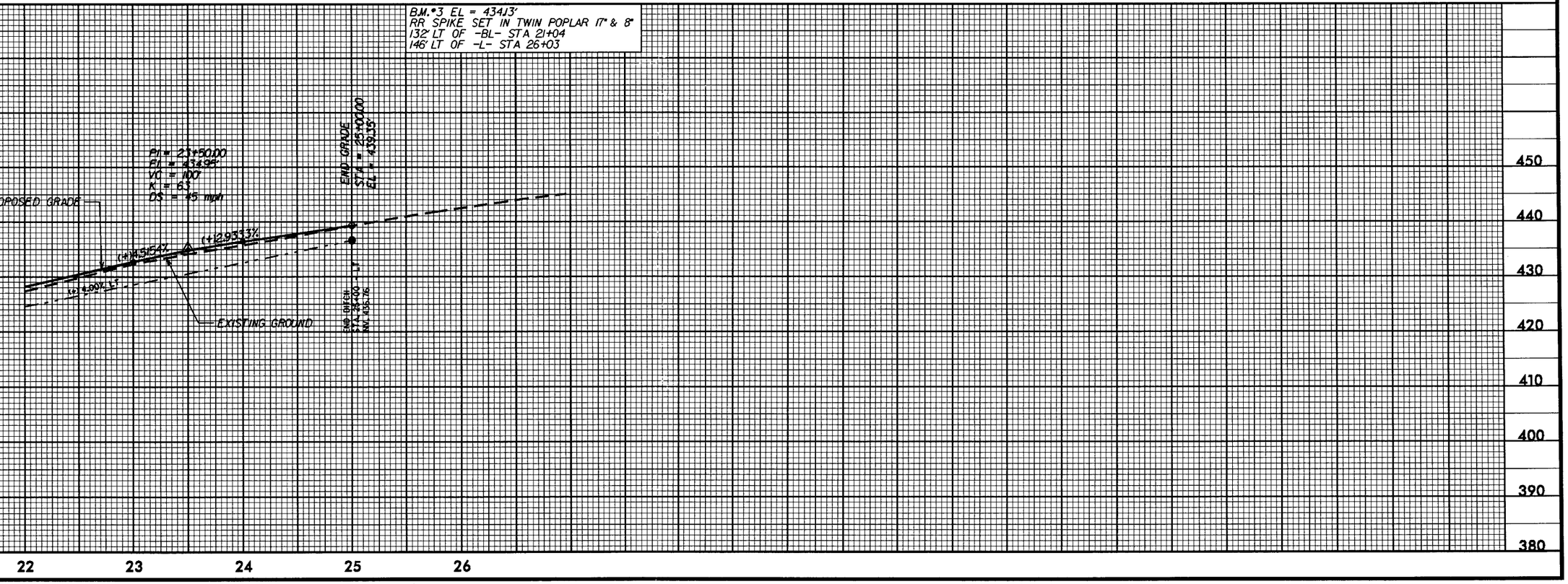
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1100	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 407.6	FT
BASE DISCHARGE	= 1200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 408.0	FT
OVERTOPPING DISCHARGE	= 2200+	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 411.6	FT



B.M.#3 EL = 434.13'
RR SPIKE SET IN TWIN POPLAR 17" & 8"
132' LT OF -BL- STA 21+04
146' LT OF -L- STA 26+03



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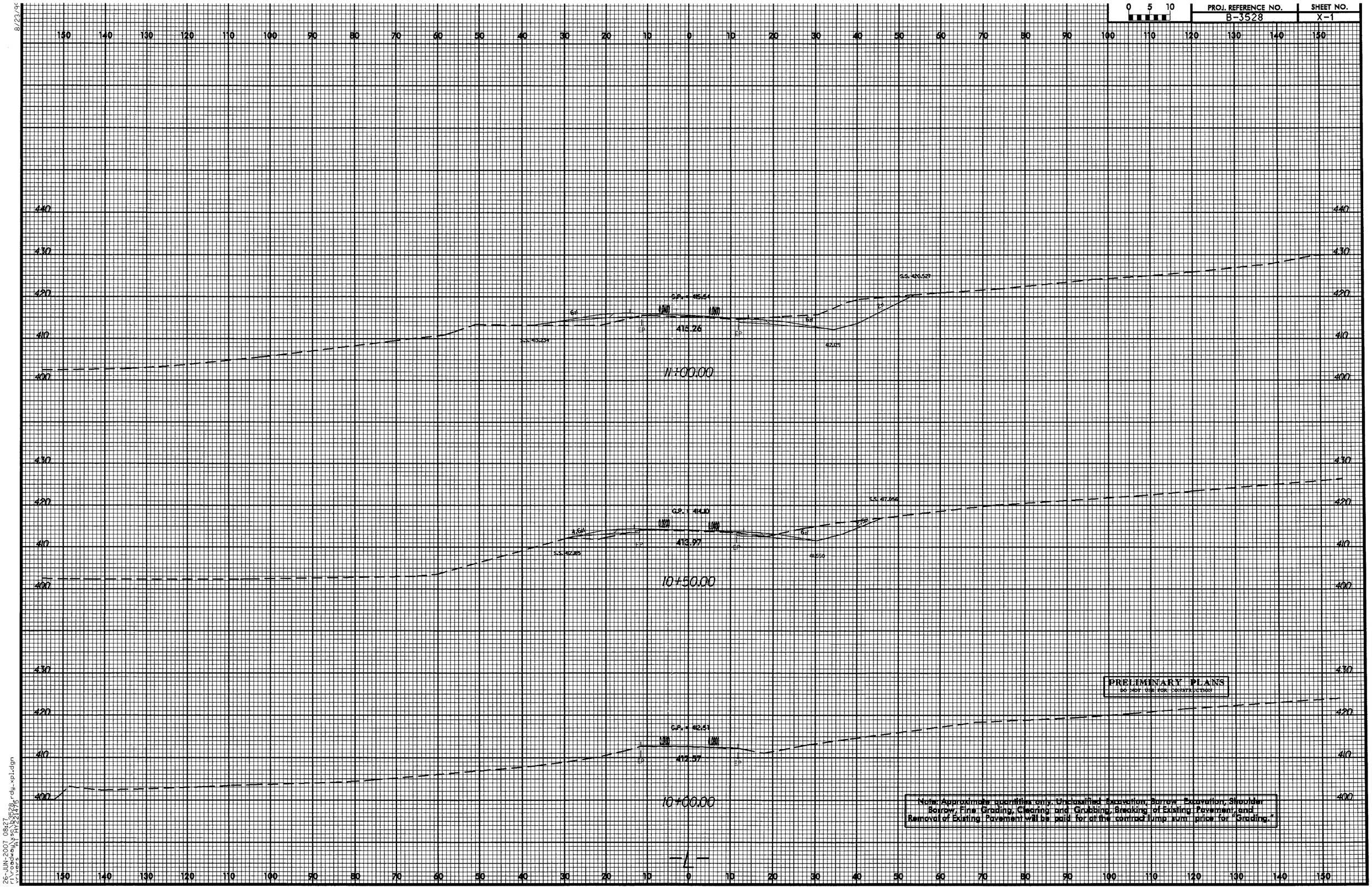
8/22/06

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-3528	X-1



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8/23/96

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-3528	X-2

13+00.00

G.P. = 416.52
414.30
S.S. 415.92
S.S. 413.607
412.884

12+50.00

G.P. = 417.42
417.25
S.S. 416.90
S.S. 416.80
413.814

12+00.00

G.P. = 417.54
417.23
S.S. 416.76
S.S. 423.401
414.000

11+50.00

G.P. = 416.88
416.30
S.S. 414.239
S.S. 422.238
413.459

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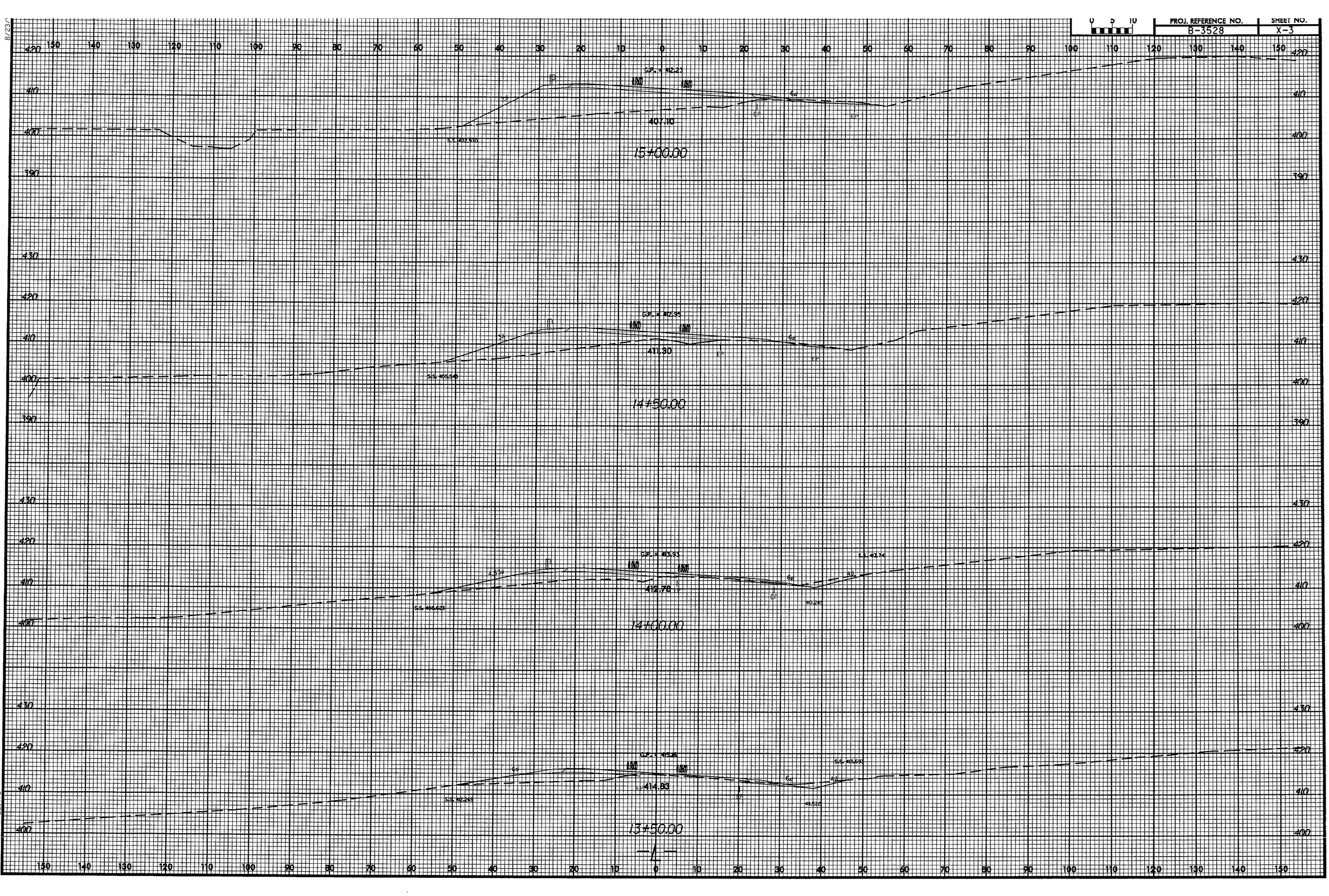
	B-3528	X-3



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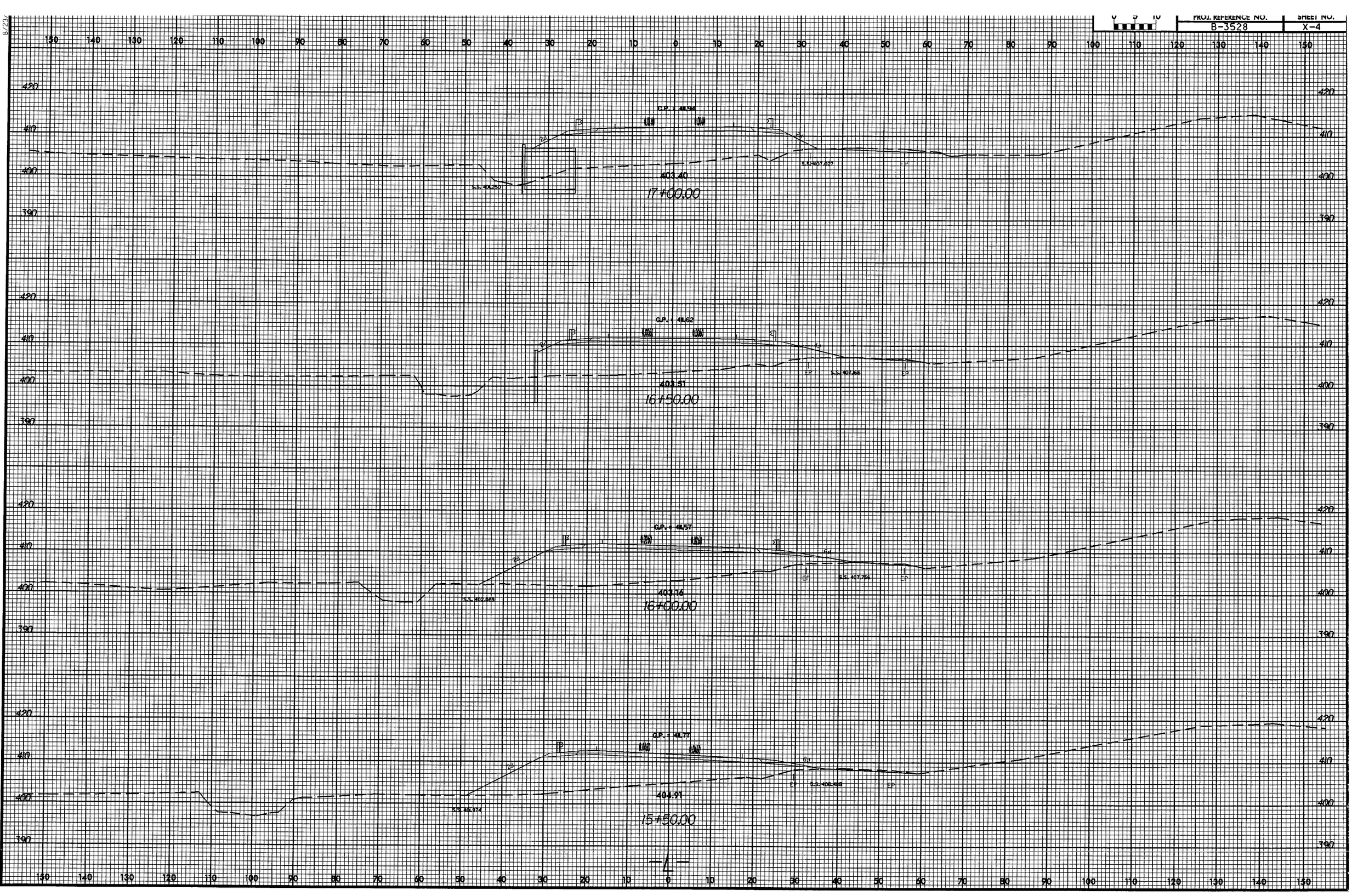
B-3528	X-4



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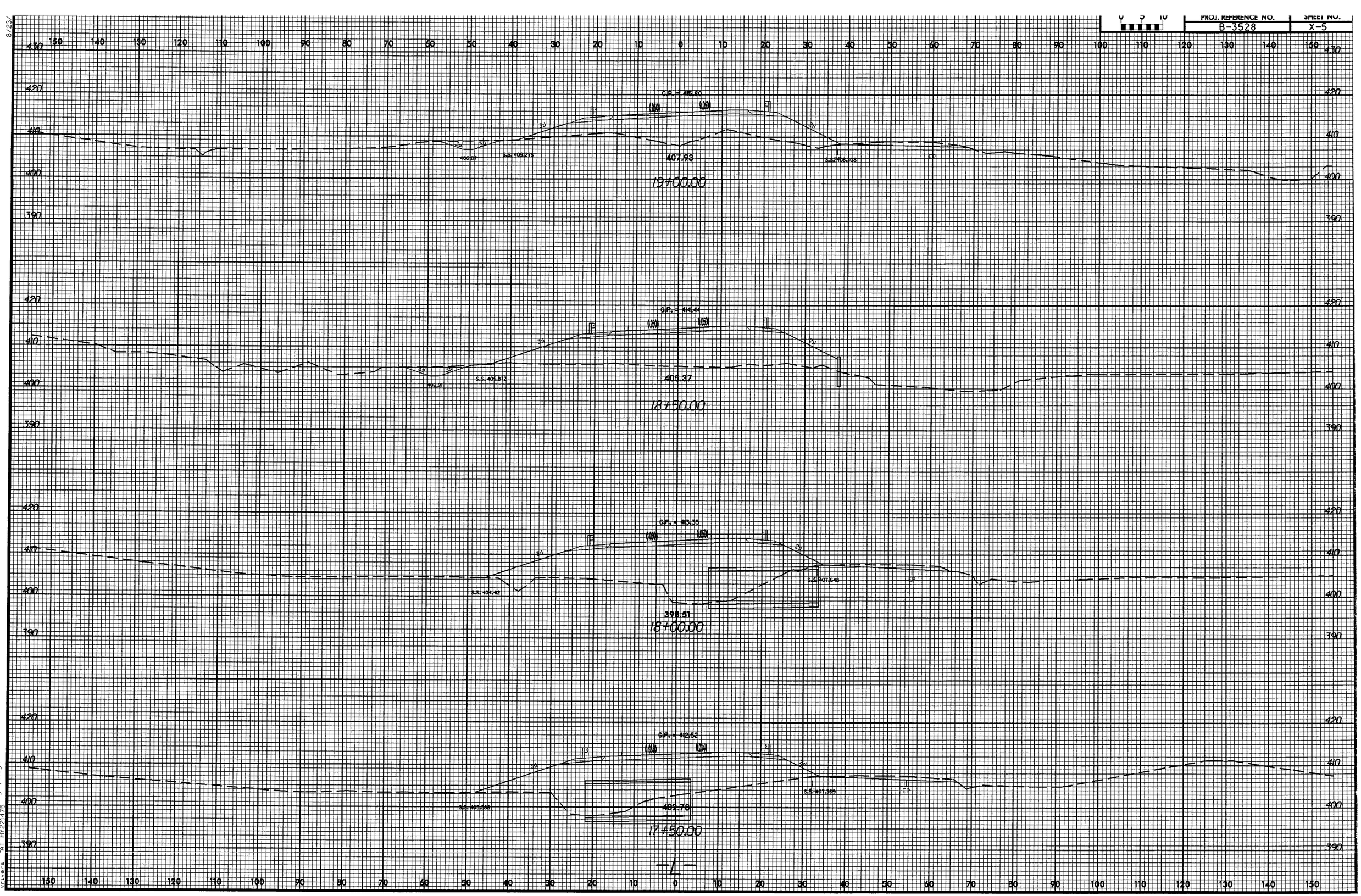
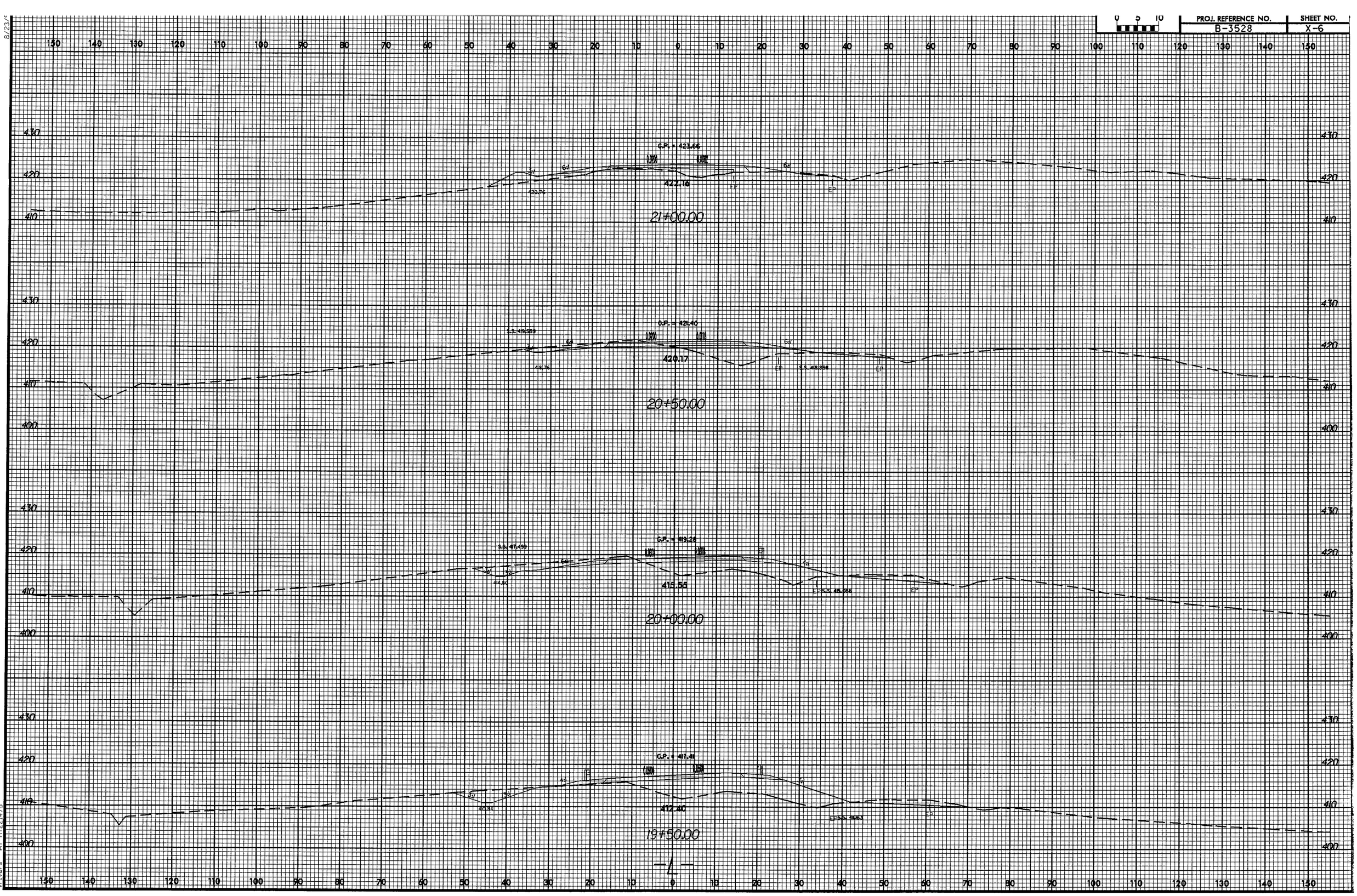
B-3528	X-5





8/23/

PROJ. REFERENCE NO. B-3528

SHEET NO. X-7

22+50.00

S.S. 428.672

426.76

G.P. = 430.43

429.87

S.S. 434.92

427.795

22+00.00

S.S. 426.900

421.74

G.P. = 426.8

421.38

S.S. 434.857

425.951

21+50.00

S.S. 421.334

423.16

G.P. = 425.92

424.28'

S.S. 431.482

423.473

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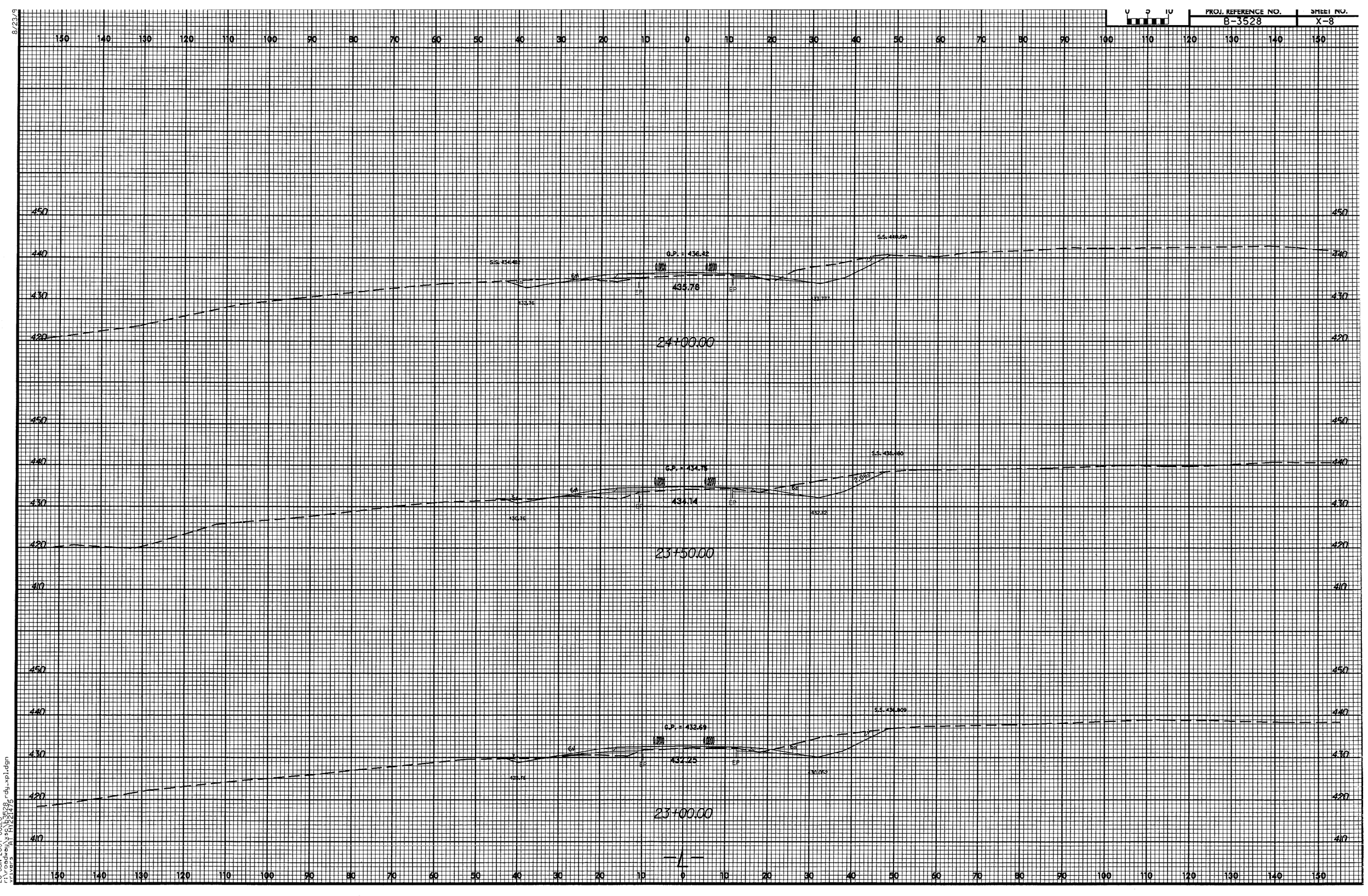
vrivers
"A" 02.2175

8/23/9

PROJ. REFERENCE NO. B-3528

SHEET NO. X-8



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Project HV221475

PROJ. REFERENCE NO.	SHEET NO.
B-3528	X-9

26+00.00

25+50.00

25+00.00

24+50.00

442.86

441.01

439.22

437.46

434.76

436.60

G.P. = 439.39

G.P. = 437.88

S.S. 438.20

S.S. 440.168

8/23/95

26-JUN-2007 08:02
rdy-xpl
1DKA200:[DRIVERS.RDY]B3528_rdy-xpl.dgn
Arial HYDRAULICS

Wake County
Bridge No. 429 on SR 1839
over Sycamore Creek
Federal Aid Project No. BRZ-1839(1)
State Project No. 8.2406801
T.I.P. No. B-3528

CATEGORICAL EXCLUSION

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

10.17.01
DATE

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

10-29-01
DATE

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

Wake County
Bridge No. 429 on SR 1839
over Sycamore Creek
Federal Aid Project No. BRZ-1839(1)
State Project No. 8.2406801
T.I.P. No. B-3528

CATEGORICAL EXCLUSION

October 2001

Documentation Prepared by:
Barbara H. Mulkey Engineering, Inc.

Tommy Register

Tommy Register, EI
Project Manager

10/08/01
Date

W S Hood

W. S. Hood, PE
Principle-In-Charge

10/08/01
Date

For the North Carolina Department of Transportation

Stacy B. Harris

Stacy B. Harris, PE
Project Manager
Consultant Engineering Unit

PROJECT COMMITMENTS

Wake County
SR 1839 (Leesville Road)
Bridge No. 429 Over Sycamore Creek
Federal-Aid Project No. BRZ-1839(1)
State Project No. 8.2406801
T.I.P. No. B-3528

In addition to the standard Nationwide Permit #23 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

Project Development and Environmental Analysis Branch, Roadway Design, Hydraulics Unit, Roadside Environmental, and Division Engineer

The following measures will be carried out for the replacement of Bridge No. 429.

In addition to NCDOT's Best Management practices for the Protection of Surface Waters (BMPs) there will be strict adherence to the NCDENR Riparian Buffer Rules for the Neuse River (15A NCAC 2B .0233).

Wake County
SR 1839 (Leesville Road)
Bridge No. 429 Over Sycamore Creek
Federal-Aid Project No. BRZ-1839(1)
State Project No. 8.2406801
T.I.P. No. B-3528

INTRODUCTION: Bridge No. 429 is included in the 2002-2008 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (T.I.P.) and in the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate the bridge has a sufficiency rating of 23.2 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 429 is located on SR 1839 (Leesville Road) on the Wake and Durham County Line. Leesville Road is classified as an Urban Local Route. Land use in the project area is rural with low-density residential development. Leesville Road is a two-lane facility that currently serves commuting and local traffic.

The existing bridge is a single-span structure with an overall length of 36 feet (10.8 meters) and a clear roadway width of 23.3 feet (7.0 meters). It was constructed in 1950. The bridge has timber rails and consists of timber flooring on I-beams with an asphalt-wearing surface, and is supported by reinforced concrete abutments. The bridge has a posted weight limit of 20 tons (20.3 metric tons) for single vehicle (SV) and 25 tons (25.4 metric tons) for truck-tractor semi trailer (TTST).

The approach roadway has two nine-foot (2.7 meter) travel lanes for a pavement width of 18 feet (5.4 meters), with five-foot (1.5 meter) grass shoulders. The approach roadway from the northwest is a curve with a radius of approximately 470 feet (143 meters) and the southeast approach, approximately 300 feet (90 meters) from the bridge, is on a curve with a radius of approximately 450 feet (137 meters). The posted speed limit is 45 miles per hour (mph) {70 kilometers per hour (kmh)}.

Land use to the east (upstream) of the bridge is agricultural, while the majority of the western stream reach is forested. There are two wooden tobacco barns in the northwest quadrant of the project. A power line right-of-way traverses the north side of SR 1839, and a sewer line corridor traverses the eastern banks of Sycamore Creek, crossing beneath SR 1839. There are MCI fiber optics along both sides of SR 1839. It is anticipated that the utility impacts will be low.

The 2001 estimated average daily traffic (ADT) volume is 8,200 vehicles per day (vpd). The projected ADT is 15,000 vpd by the design year 2025. The percentages of truck traffic is 2% DUALS and 1% TTST.

Three accidents were reported in the vicinity of Bridge No. 429 during the period from January 1, 1995 to December 31, 1997.

Three school buses cross Bridge No. 429 twice per day.

III. ALTERNATIVES

A. Project Description

Based on the preliminary hydraulics report the proposed replacement structure for Bridge No. 429 will be a reinforced concrete box culvert with three (3) barrels at eight feet (2.4 meters) by six feet (1.8 meters) and approximately 60 feet (18 meters) in length. The length and opening size of the proposed structure may increase or decrease as necessary to accommodate peak flows, as determined by a more detailed hydraulic analysis to be performed during the final design phase of the project.

The proposed approach roadway will consist of two 12-foot (3.6-meter) travel lanes and eight-foot (2.4-meter) shoulders, including four-foot (1.2-meter) paved shoulders. The proposed grade will be approximately the same as the existing roadway.

B. Reasonable and Feasible Alternatives

One (1) reasonable and feasible alternative studied for replacing the existing bridge is described below.

Alternative C (Preferred) replaces the bridge with a culvert on new alignment approximately 60 feet (18 meters) downstream (west) of the existing bridge. There will be approximately 470 feet (143 meters) of approach work to the north and approximately 360 feet (109 meters) of approach work to the south of the new structure. Traffic will be maintained on the existing structure during construction. The 470 foot (143 meter) curve on the northwest approach is replaced with 955 foot (291 meter) radius curve.

C. Alternatives Eliminated From Further Study

Alternative A replaces the bridge with a culvert at the existing location with a minimum of approach work. During construction, traffic will be maintained by an off-site detour. The detour is approximately 2.9 miles (4.7 kilometers) in length.

During the construction year 2002 the projected ADT for Leesville Road is 8,500 vpd. Alternative A was dropped as a reasonable and feasible alternative due to the poor horizontal alignment and high traffic volume. The off-site detour has a road user cost of approximately

$ 1,462,000. The road user cost is based on $0.325 per mile and a six-month construction period.

Alternative B replaces the bridge with a culvert on new alignment approximately 50 feet (15 meters) downstream of the existing bridge. Traffic will be maintained on the existing structure during construction. The 470-foot (143 meter) radius curve on the northwest approach is replaced with an 849-foot (259 meter) radius curve.

Alternative B was not selected as the preferred alternative due to concerns that the distance between the existing and proposed alignment may not provide enough clearance to maintain traffic on the existing bridge during construction. The lack of adequate clearance between structures may require road closure and a temporary off-site detour in order to complete construction of the proposed structure.

The "do-nothing' alternative will eventually necessitate removal of the existing structure and closure of SR 1839 (Leesville Road). This is not desirable due to the service provided by SR 1839 (Leesville Road).

Investigation of the existing structure by the Bridge Maintenance Unit indicates that rehabilitation of the existing structure is not feasible due to its age and deteriorated condition.

Utilizing an on-site detour was also eliminated from further study because of the need to improve the existing horizontal alignment. An on-site detour would not be cost effective.

D. Preferred Alternative

Alternative C was selected as the preferred alternative. Alternative C improves the existing horizontal alignment and sight distance. Alternative C will also provide more clearance from the existing structure during construction than Alternative B. This will make it easier to maintain traffic on-site during construction

The Division Engineer concurs with Alternative C as the preferred Alternative.

IV. Estimated Cost

The estimated costs, based on current prices are as follows:

	Alternative C (Preferred)
Structure Removal (Existing)	$ 6,540
Structure Proposed	78,700
Roadway Approaches	234,960
Miscellaneous and Mobilization	149,800
Engineering Contingencies	80,000
ROW/Const. Easements/Utilities	42,750

TOTAL	$592,750.00

The estimated cost of the project as shown in the 2002-2008 Transportation Improvement Program is $450,000, including $30,000 for right-of-way and $360,000 for construction.

V. Natural Resources

A. Methodology

Materials and research data in support of this investigation have been derived from a number of sources including applicable U.S. Geological Survey (USGS) topographic mapping (Bayleaf and Southeast Durham, NC 7.5 minute quadrangles), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping (Bayleaf and Southeast Durham, NC 7.5 minute quadrangles), Natural Resources Conservation Service (NRCS; formerly the Soils Conservation Service) soils mapping (USDA 1970, 1971), and recent aerial photography (scale 1:1200).

Bridge No. 429 was visited on July 21, 2000. The study corridor was walked and visually surveyed for significant features. For purposes of field surveys, the study corridor was assumed to be approximately 850 feet (259.1 meters) in length and 300 feet (91.4 meters) in width to ensure all proposed Alternatives received full and equal coverage. Impact calculations are based on right-of-way width, which is 60 feet (18.3 meters). Actual impacts will be limited to construction limits and are expected to be less than those shown for right-of-way. Special concerns evaluated in the field include: 1) protected species habitat, and 2) wetlands and water quality in and adjacent to Sycamore Creek.

Plant community descriptions are based on a classification system utilized by the North Carolina Natural Heritage Program (NHP) (Schafale and Weakley 1990). When appropriate, community classifications were modified to better reflect field observations. Vascular plant names follow nomenclature found in Radford *et al.* (1968). Jurisdictional areas were evaluated using the three-parameter approach following U.S. Army Corps of Engineers (COE) delineation guidelines (DOA 1987). Jurisdictional areas were characterized according to a classification scheme established by Cowardin *et al.* (1979). Aquatic and terrestrial wildlife habitat requirements and distributions were determined by supportive literature

(Martof *et al.* 1980; Webster *et al.* 1985; Menhinick 1991; Hamel 1992; Palmer *et al.* 1995; Rohde *et al.* 1994). Water quality information for area streams and tributaries was derived from available sources, North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ 1997, 1998). Quantitative sampling was not undertaken to support existing data.

The most current USFWS listing of federal-protected species with ranges, which extend into Wake and Durham Counties was obtained prior to initiation of the field investigation and updated via the Internet, March 22, 2001. In addition, NHP records documenting presence of federal- or state-listed species were consulted before commencing the field investigation.

B. Physiography and Soils

The study corridor is underlain by the Triassic Basins geologic formation within the Piedmont Physiographic province of North Carolina. Topography of the area is characterized as rolling with some steep areas along major streams. The study corridor is located in, and adjacent to, the floodplain of Sycamore Creek. Terrain in the study corridor is relatively level with elevations that average approximately 400 feet (121.9 meters) National Geodetic Vertical Datum (NGVD) (USGS Southeast Durham and Bayleaf quadrangles).

Soil mapping units within the study corridor are the Chewacla series (*Fluvaquentic Dystrocrepts*), Creedmoor series (*Aquic Hapludults*) (USDA 1970), Chewacla and Wehadkee (*Fluvaquentic Dystrocrepts*) series, and Mayodan sandy loam series (*Typic Hapludults*) (USDA 1971). The Chewacla series consists of nearly level, somewhat poorly drained soils with moderate to moderately-rapid permeability. These soils typically occur in floodplains of streams and are mapped adjacent to Sycamore Creek on the Wake County side. The Creedmoor series consists of gently sloping to moderately steep, moderately well-drained soils with slow permeability. These soils typically occur on rounded divides where the difference in elevation is about 50 feet (15.2 meters) between the highest and the lowest points, and are mapped on the southern side of the Sycamore Creek floodplain in Wake County. The Chewacla and Wehadkee series is dominated by Chewacla soils and has inclusions of Wehadkee soils. Wehadkee soils consists of nearly level, poorly drained soils with moderate permeability. The Chewacla and Wehadkee series is considered to be hydric in Durham County (USDA 1996), and is mapped adjacent to Sycamore Creek on the Durham County side. The Mayodan series consists of nearly level to moderately steep, well-drained soils with moderate permeability. These soils typically occur in uplands and are mapped on the northern side of the Sycamore Creek floodplain in Durham County.

C. WATER RESOURCES

1. Waters Impacted

The study corridor is located within sub-basin 03-04-02 of the Neuse River Basin (DWQ 1998). This area is part of USGS Hydrologic Unit 03020201 of the Mid-Atlantic/Gulf Region. The bridge targeted for replacement spans Sycamore Creek with no direct

involvement of additional streams or tributaries. This section of Sycamore Creek has been assigned Stream Index Number 27-33-9, by the North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ 1997).

2. Stream Characteristics

Sycamore Creek is a well-defined Piedmont stream with moderate flow and riffle-pool morphology. The area of the drainage basin for the creek at the site is 1.02 square miles (2.64 square kilometers). During recent field investigations, water clarity was good and water depth (beneath the bridge) was six inches (15 centimeters). Sycamore Creek differs in morphology upstream than downstream of the bridge. Upstream of the bridge, Sycamore Creek is six feet (1.8 meters) wide, straight, and has high three feet (0.9 meters), steep banks; substrate is sand/gravel with some cobbles. The associated floodplain extends throughout most of the study corridor and supports wetland conditions such as hydrophytic vegetation, hydric soils, and signs of occasional flooding and pooling. Downstream of the bridge, Sycamore Creek widens 15 feet (4.6 meters) and is more sinuous. The banks vary from steep to gradually sloping and the substrate is sand/gravel with some cobbles. The downstream floodplain is forested and without wetland conditions.

3. Best Usage Classifications and Water Quality

Classifications are assigned to waters of the State of North Carolina based on the existing or contemplated best usage of various streams or segments of streams in the basin. A best usage classifications of **B** and Nutrient Sensitive Waters (**NSW**) have been assigned to Sycamore Creek (DWQ 1998). The designation **B** denotes that appropriate uses include aquatic life propagation and survival, fishing, wildlife, primary recreation, and agriculture. Primary recreation refers to human body contact with waters on an organized or frequent basis. The supplemental classification **NSW** refers to waters needing additional nutrient management because they are subject to excessive growth of microscopic and macroscopic vegetation (DWQ 1998). No designated High Quality Waters (**HQW**), Outstanding Resource Waters (**ORW**), Water Supply I (**WS-I**), or Water Supply II (**WS-II**) waters occur within one mile (1.6 kilometers) of the study corridor.

The North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ) has initiated a whole basin approach to water quality management for the 17 river basins within the state. Water quality for the proposed study corridor is summarized in the Neuse River basinwide water quality plan (DWQ 1998). Sycamore Creek has a biological rating of **Good-Fair.** The biological rating is based on macro-invertebrate sampling in Sycamore Creek below Turkey Creek in 1991. Sycamore Creek is rated as **Supporting-threatened** of designated uses because of sediment and nutrient loading from point and non-point sources. This Neuse River sub-basin supports six major point-source dischargers and 58 minor dischargers. Total permitted flow for the six major dischargers is 74.70 million gallons per day (MGD) (282.8 million liters per day [MLD]) while total permitted flow for the minor dischargers is 3.95 MGD (15.0 MLD). One permitted site discharging less than 1.0 MGD (3.8 MLD) is located adjacent to Sycamore Creek approximately 1.4 miles (2.3 kilometers) from the bridge site. Five other minor dischargers

are located within 5 miles (8.0 kilometers) of the bridge site along Sycamore Creek (DWQ 1998).

4. Anticipated Impacts to Water Resources

a. General Impacts

The current bridge will be replaced with a culvert. The culvert will be buried one-foot (0.3-meter) below the streambed in order to maintain aquatic habitat and flow regime. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of a stringent erosion control schedule and the use of best management practices. The contractor will follow contract specifications pertaining to erosion control measures as outlined in 23 CFR 650 Subpart B and Article 107-13 entitled "Control of Erosion, Siltation, and Pollution" (NC DOT, Specifications for Roads and Structures). These measures include: the use of dikes, berms, silt basins, and other containment measures to control runoff; elimination of construction staging areas in floodplains and adjacent to waterways; re-seeding of herbaceous cover on disturbed sites; management of chemicals (herbicides, pesticides, de-icing compounds) with potential negative impacts on water quality; and avoidance of direct discharges into streams by catch basins and roadside vegetation.

The proposed bridge replacement will allow for continuation of pre-project stream flow in Sycamore Creek, thereby protecting the integrity of this waterway. Long-term impacts to adjacent reaches resulting from construction are expected to be negligible. In order to minimize impacts to water resources, NCDOT's Best Management Practices (BMPs) for the Protection of Surface Waters will be strictly enforced during the entire life of the project.

b. Impacts related to Bridge Demolition and Removal

In order to protect the water quality and aquatic life in the area affected by this project, the NCDOT and all potential contractors will follow appropriate guidelines for bridge demolition and removal. These guidelines are presented in three NCDOT documents entitled "Pre-Construction Guidelines for Bridge Demolition and Removal", "Policy: Bridge Demolition and Removal in Waters of the United States", and "Best Management Practices for Bridge Demolition and Removal" (all documents dated 9/20/99). Guidelines followed for bridge demolition and removal are in addition to those implemented for Best Management Practices for the Protection of Surface Waters.

Dropping any portion of the structure into waters of the United States will be avoided unless there is no other practical method of removal. In the event that no other practical method is feasible, a worst-case scenario is assumed for calculations of fill entering waters of the United States. The superstructure of Bridge No. 429 consists of a timber deck on steel I-beams. The substructure consists of two reinforced concrete abutments. Since the superstructure is composed completely of timber and steel, it will be removed without dropping any component into waters of the United States.

Under the guidelines presented in the documents noted in the first paragraph of this section, work done in the water for this project would fall under Case 3, where there are no special restrictions other than those outlined in Best Management Practices for Protection of Surface Waters. NCDOT has coordinated with the various resource agencies during project planning to ensure that all concerns regarding bridge demolition were resolved.

D. BIOTIC RESOURCES

1. Plant Communities

Two distinct plant communities were identified within the study corridor: 1) Piedmont bottomland forest, and 2) roadside/disturbed land. These plant communities are described below.

Piedmont Bottomland Forest: Piedmont bottomland forest occurs on floodplains, side slopes, and along stream margins of Sycamore Creek downstream of the subject bridge. Canopy species include sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), loblolly pine (*Pinus taeda*), river birch (*Betula nigra*), and red maple (*Acer rubrum*). Understory trees and shrubs include sourwood (*Oxydendrum arboreum*), American dogwood, (*Cornus florida*), ironwood (*Carpinus caroliniana*), American holly (*Ilex opaca*), hickory (*Carya* sp.), arrowwood (*Viburnum* sp.) and red maple. Yellow root (*Xanthorhiza simplicissima*), wild grape (*Vitis* sp.), poison ivy (*Rhus radicans*), blackberry (*Rubus* sp.), microstegium (*Microstegium vimineum*), cane (*Arundinaria gigantea*), lady fern (*Athyrium asplenioides*), and Christmas fern (*Polystichum acrostichoides*) are common herbs.

Roadside/Disturbed Land: Roadside/disturbed land occurs along present roadside margins, utility right-of-ways, and agricultural areas north of the bridge. Characteristic species include microstegium, goatsbeard (*Aruncus dioicus*), dog fennel (*Eupatorium capillifolium*), English plantain (*Plantago lanceolata*), broomsedge (*Andropogon virginicus*), lespedeza (*Lespedeza* sp.), panic grass (*Panicum* sp.), fescue (*Festuca* sp.), paspalum (*Paspalum* sp.), and horse nettle (*Solanum carolinense*). Areas along the stream banks north of the bridge are vegetated by hydrophytic shrubs such as tag alder (*Alnus serrulata*) and black willow (*Salix nigra*). Wet areas occurring in the floodplain north of the bridge include rushes (*Juncus* spp.), sedges (*Carex* spp.), flatsedge (*Cyperus* sp.), spike rush (*Elocharis* sp.), meadow beauty (*Rhexia* sp.), ironweed (*Vernonia* sp.), smartweed (*Poloygonum* sp.), cardinal flower (*Lobelia cardinalis*), and bishop-weed (*Ptilimnium capillaceum*).

2. Plant Communities within the Study Corridor

Plant community impact areas are estimated based on the amount of each plant community present within the projected 60-foot (18.2 meter) right-of-way (actual impacts within construction limits will be less). A summary of potential plant community impacts is presented below:

PLANT COMMUNITY	ESTIMATED AREA OF IMPACT ACRES (HECTARES)		
	Alternative A	Alternative B	Alternative C
Piedmont Bottomland Forest	0.06 (0.02)	0.43 (0.17)	0.47 (0.19)
Roadside/Disturbed Land	0.32 (0.13)	0.50 (0.20)	0.38 (0.15)
TOTAL:	0.38 (0.15)	0.93 (0.38)	0.85 (0.34)

Permanent impacts to plant communities resulting from bridge replacements are generally restricted to narrow strips adjacent to the existing bridges and roadway approach segments. Very little area of natural plant community is anticipated to be impacted by the proposed project.

The total right-of-way area for Alternative A is approximately one-half that of Alternatives B and C, and much of the proposed right-of-way is currently bounded by maintained roadside, utility lines, a sewer line, and hay fields. Therefore, Alternative A, will mostly impact roadside/disturbed land (88 percent), and only narrow strips of adjacent natural communities. Alternatives B and C, positioned west (downstream) of the facility, will result in a greater loss of natural community area than will Alternative A, potentially impacting roughly equal amounts of roadside/disturbed land and Piedmont bottomland forest.

From an ecological perspective, impacts of upgrading existing road facilities are minimal. No new fragmentation of plant communities will be created, as the project will result only in alteration of community boundaries. Roadside-forest edges typically serve as vectors for invasive species encroachment into adjacent natural communities. An example of an undesirable invasive species utilizing roadsides is kudzu (*Pueraria lobata*). The establishment of a hardy groundcover on road shoulders as soon as practicable will limit the availability of construction areas to invasive and undesirable plants.

Implementation of Alternatives B and C, resulting in a new alignment, will allow for removal of fill and bridge structures associated with the existing facility. These areas will be restored through planting with native vegetation.

3. Wildlife

a. Terrestrial

Signs of only one mammal, racoon (*Procyon lotor*), were observed within the study corridor. Other mammal species expected to occur within the study corridor are white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), meadow vole (*Microtus pennsylvanicus*), white-footed mouse (*Peromyscus leucopus*), short-tailed shrew (*Blarina brevicauda*), and little brown bat (*Myotis lucifugus*).

Birds observed within or adjacent to the corridor were green heron (*Butorides striatus*), mourning dove (*Zenaida macroura*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk

(*Buteo jamaicensis*), American robin (*Turdus migratorius*), common yellowthroat (*Geothlypis trichas*), American goldfinch (*Carduelis tristis*), American crow (*Corvus brachyrhynchos*), northern cardinal (*Cardinalis cardinalis*), and bluejay (*Cyanocitta cristata*). Additional avian species expected to occur within roadside/disturbed habitat of the study corridor are eastern meadowlark (*Sturnella magna*), eastern bluebird (*Sialia sialis*), brown-headed cowbird (*Molothrus ater*), and indigo bunting (*Passerina cyanea*). Avian species expected to occur within bottomland forest habitat of the study corridor are red-eyed vireo (*Vireo olivaceous*), yellow warbler (*Dendroica petechia*), northern parula (*Parula americana*), Baltimore oriole (*Icterus galbula*), downy woodpecker (*Picoides pubescens*), and barred owl (*Strix varia*).

There were two observations of terrestrial reptiles, rough green snake (*Opheodrys aestivus*) and black racer (*Coluber constrictor*), but no terrestrial amphibians within the study corridor. Other herptile species expected to occur in terrestrial areas of the study corridor are eastern box turtle (*Terrapene carolina*), eastern fence lizard (*Sceloporus undulatus*), five-lined skink (*Eumeces fasciatus*), worm snake (*Carphophis amoenus*), rat snake (*Elaphe obsoleta*), brown snake (*Storeria dekayi*), eastern garter snake (*Thamnophis sirtalis*), copperhead (*Agkistrodon contortrix*), and American toad (*Bufo americanus*).

b. Aquatic

Limited surveys resulted in documentation of two amphibian species: the bullfrog (*Rana catesbeiana*) and gray treefrog (*Hyla versicolor*). No aquatic reptile species were observed within the study corridor. Sycamore Creek does, however, provide suitable habitat for the snapping turtle (*Chelydra serpentina*), northern water snake (*Nerodia sipedon*), queen snake (*Regina septemvittata*), eastern newt (*Notophthalmus viridescens*), northern dusky salamander (*Desmognathus fuscus*), two-lined salamander (*Eurycea cirrigera*), green frog (*Rana clamitans*), southern leopard frog (*Rana sphenocephala*), and pickerel frog (*Rana palustris*).

No sampling was undertaken in Sycamore Creek to determine fishery potential. Visual surveys of Sycamore Creek revealed presence of fish, crayfish, and aquatic snails. Fish species which may be present in Sycamore Creek are rosefin shiner (*Notropis ardens*), rosyside dace (*Clinostomus funduloides*), bluehead chub (*Nocomis leptocephalus*), tessellated darter (*Etheostoma olmstedi*), northern hog sucker (*Hypentelium nigricans*), and margined madtom (*Noturus insignis*).

c. Anticipated Impacts to Wildlife

Due to the limited extent of infringement on natural communities, the proposed bridge replacements will not result in significant loss or displacement of known terrestrial animal populations. No significant habitat fragmentation is expected since most improvements will be restricted to existing roadside margins. Construction noise and associated disturbances will have short-term impacts on avifauna and migratory wildlife movement patterns, although long-term impacts are expected to be negligible. Potential down-stream impacts to aquatic habitat will be avoided by bridging the systems to maintain regular flow and stream

integrity. Short-term impacts associated with turbidity and suspended sediments will affect benthic populations. Temporary impacts to downstream habitat from increased sediment during construction will be minimized by the implementation of stringent erosion control measures.

E. SPECIAL TOPICS

1. Waters of the United States

Surface waters within the embankments of Sycamore Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "waters of the United States" (33 CFR section 328.3). Field investigations indicate that Sycamore Creek is primarily a bank-to-bank perennial stream (riverine) system with scattered adjacent wetlands.

Wetlands adjacent to Sycamore Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "waters of the United States" (33 CFR section 328.3). These areas are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology at or near the surface for a portion (12.5 percent) of the growing season (DOA 1987). NWI mapping indicates that areas adjacent to Sycamore Creek exhibit characteristics of a palustrine, broad-leaved, deciduous forest system that is temporarily flooded (PFO1A) (Cowardin *et al.* 1979). Field investigations indicate wetlands occur in the Sycamore Creek floodplain east (upstream) of the bridge and within the 300-foot (91-meter) study corridor. No jurisdictional wetlands occur west (downstream) of the bridge.

The potentially affected areas (acres) and lengths (feet) of jurisdictional stream and riparian buffer, and areas (acres) of jurisdictional wetlands located within the alternative 60-foot (18.2-meter) right-of-ways are shown as follows:

	JURISDICTIONAL AND BUFFER AREAS		
Jurisdictional Type	Alternative A	Alternative B	Alternative C
Stream Area acres (hectares)	0.01 (0.004)	0.02 (0.008)	0.03 (0.012)
Stream Linear Distance feet (meters)	50 (15.2)	55 (16.8)	60 (18.3)
Wetland Area acres (hectares)	0.01 (0.004)	0.0 (0.0)	0.0 (0.0)
Riparian Buffer Area acres (hectares)	0.22 (0.09)	0.23 (0.09)	0.24 (0.10)
Riparian Buffer Linear Distance feet (meters)	65 (19.8)	88 (26.8)	100 (30.5)

All alternatives call for replacement of the existing bridge over Sycamore Creek with concrete box culverts. Therefore, the proposed activity will result in permanent impacts to the stream area and length stated in the previous table.

The following jurisdictional wetlands occur at the base of outer floodplain slopes on both sides of Sycamore Creek, immediately east (upstream) of the existing bridge: 1) a narrow

wetland seep draining a larger floodplain wetland located outside of the study corridor, and 2) a narrow spring-fed seep on the outer floodplain slope. These wetlands satisfy the three-parameter approach outlined by the COE (DOA 1987; see attached Routine Wetland Determination data forms). Wetland vegetation is dominated by bishop-weed, smartweed, meadow beauty, spike rush, rushes, and sedges. These plants are growing on Chewacla soils which exhibit values, chromas, and mottles characteristic of hydric soils. Evidence of wetland hydrology includes surface drainage patterns, oxidized root channels, and water-stained leaves. Both wetlands are in the Alternative A study corridor, on roadside/disturbed land, and have a combined area coverage of approximately 0.01 acre (0.004 hectares) within the Alternative A right-of-way. No wetlands occur within the Alternative B and C right-of-ways.

2. Permits

This project is being processed as a Categorical Exclusion (CE) under Federal Highway Administration (FHWA) guidelines. Nationwide Permit (NWP) #23 (61 FR 65874, 65916; December 13, 1996) has been issued by the US Army Corps of Engineers (COE) for CEs due to expected minimal impact. DWQ has issued a General 401 Water Quality Certification for NWP #23. However, use of this permit will require written notice to DWQ. In the event that NWP #23 will not suffice, minor impacts attributed to bridging and associated approach improvements are expected to qualify under General Bridge Permit 031 issued by the Wilmington COE District. Notification to the Wilmington COE office is required if this general permit is utilized.

3. Riparian Buffer Protection Rules for the Neuse River Basin

The Neuse River Basin Rule applies to 50-foot (15.2-meter) wide riparian buffers directly adjacent to surface waters in the Neuse River Basin. This rule does not apply to portions of the riparian buffer where a use is existing and ongoing. Any change in land use within the riparian buffer is characterized as an impact. The Nutrient Sensitive Waters Management Strategy for the Protection and Maintenance of Riparian Buffers (15 A NCAC 2B .0233) provides a designation for uses that cause impacts to riparian buffers within the Neuse Basin. Expected activities involved with project development include a roadway crossing for Alternatives B and C, and bridge replacement for all three Alternatives. Both of these uses are designated **Allowable** within the riparian buffer, assuming project impacts are below 150 linear feet (45.7 linear meters) of buffer (measured parallel to the stream) and/or 0.33 acre (0.13 hectare). The **Allowable** designation means that the intended uses may proceed within the riparian buffer provided that there are no practical Alternatives, and that written authorization from the Division of Water Quality is obtained prior to project development.

The size of riparian buffer located within the proposed right-of-ways is within **Allowable** thresholds. For Alternative A, approximately 80 percent of the buffer area occurs in roadside/disturbed land areas, and 20 percent in bottomland forest areas. For Alternatives B and C, approximately 25 percent of the buffer area occurs in roadside/disturbed land areas, and 75 percent in bottomland forest areas.

4. Mitigation

Compensatory mitigation is not proposed for this project due to the limited nature of project impacts. However, utilization of BMPs is recommended in an effort to minimize impacts. Temporary impacts to floodplains associated with the construction activities could be mitigated by replanting disturbed areas with native wetland species and removing of temporary fill material upon project completion. Fill or alteration of area streams may require compensatory mitigation in accordance with 15 NCAC 2H .0506(h). A final determination regarding mitigation rests with the COE.

F. Protected Species

1. Federal Protected Species

Species with the federal classification of Endangered, Threatened, Threatened due to Similarity of Appearance, or officially Proposed for such listing, are protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The term "Endangered species" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range", and the term "Threatened species" is defined as "any species which is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. 1532). The term "Threatened due to Similarity of Appearance" is defined as a species, which is not "Endangered", or "Threatened", but "closely resembles an Endangered or Threatened species" (16 U.S.C. 1532). Species that are Threatened or Threatened due to Similarity of Appearance are not subject to Section 7 consultation and a biological conclusion is not required.

The following federal-protected species are recorded for Durham and Wake Counties (February 26, 2001, updated via the Internet, March 22, 2001, USFWS list):

Common Name	Scientific Name	County of Record	Status
Red-cockaded woodpecker	*Picoides borealis*	Wake	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Durham, Wake	Threatened
Dwarf wedgemussel	*Alasmidonta heterodon*	Wake	Endangered
Smooth coneflower	*Echinacea laevigata*	Durham	Endangered
Michaux's sumac	*Rhus michauxii*	Durham, Wake	Endangered

Red-cockaded Woodpecker - This small woodpecker seven to 8.5 inches (17.7 to 21.6 centimeters) long has a black head, prominent white cheek patch, and black-and-white barred back. Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (Potter *et al.* 1980). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly (*Pinus taeda*), long-leaf (*P. palustris*), slash (*P. elliotii*), and pond (*P. serotina*) pines (Thompson and Baker 1971). Nest cavities

are constructed in the heartwood of living pines, generally older than 70 years, which have been infected with red-heart disease. Nest cavity trees tend to occur in clusters, which are referred to as colonies (USFWS 1985). The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees. Pine flatwoods or pine-dominated savannas, which have been maintained by frequent natural fires, serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees.

Site plant communities are 1) roadside/disturbed, and 2) Piedmont bottomland forest dominated by 50-60 year old hardwoods. Neither of these plant communities support red-cockaded woodpecker nesting or foraging behavior. Furthermore, forested areas contain a dense understory. Suitable nesting habitat does not occur within one mile (1.6 kilometers) of the study corridor, and NHP records do not document the occurrence of red-cockaded woodpeckers in the vicinity of the study corridor.

BIOLOGICAL CONCLUSION: The study corridor contains no suitable habitat for red-cockaded woodpecker foraging and nesting. There is no nesting habitat within one mile (1.6 kilometers) of the study corridor, and NHP records have no documentation of red-cockaded woodpeckers in the vicinity of the study corridor. Based on a NHP record search and surveys conducted during field investigations, this project will not affect red-cockaded woodpecker. **NO EFFECT**

Bald Eagle - The bald eagle is a large raptor with a wingspan greater than six feet (1.8 meters). Adult bald eagles are dark brown with a white head and tail. Immature eagles are brown with whitish mottling on the tail, belly, and wing linings. Bald eagles typically feed on fish but may also take birds and small mammals. In the Carolinas, nesting season extends from December through May (Potter *et al.* 1980). Bald eagles typically nest in tall, living trees in a conspicuous location near open water. Eagles forage over large bodies of water and utilize adjacent trees for perching (Hamel 1992). Disturbance activities within a primary zone extending 750 to 1500 feet (228.6 to 457.2 meters) from a nest tree are considered to result in unacceptable conditions for eagles (USFWS 1987). The USFWS recommends avoiding disturbance activities, including construction and tree-cutting within this primary zone. Within a secondary zone, extending from the primary zone boundary out to a distance of 1.0 mile (1.6 kilometers) from a nest tree, construction and land-clearing activities should be restricted to the non-nesting period. The USFWS also recommends avoiding alteration of natural shorelines where bald eagles forage, and avoiding significant land-clearing activities within 1500 feet (457.2 meters) of known roosting sites.

Site plant communities are 1) roadside/disturbed, and 2) riparian hardwood forest dominated by 50-60 year old hardwoods; no large, open water bodies exist within the study corridor. Suitable nesting habitat does not occur in the vicinity of the study corridor, and NHP records do not document the occurrence of bald eagles within one mile (1.6 kilometers) of the study corridor.

BIOLOGICAL CONCLUSION: The study corridor contains no suitable habitat for bald eagle foraging and nesting. There is no nesting habitat within one mile (1.6

kilometers) of the study corridor, and NHP records have no documentation of bald eagle within one mile (1.6 kilometers) of the study corridor. Based on a NHP record search and surveys conducted during field investigations, this project will not affect bald eagle.
NO EFFECT

Dwarf Wedge Mussel - The dwarf wedge mussel is relatively small, averaging one to 1.5 inches (2.5 to 3.8 centimeters) long. The shells are olive-green to dark brown in color and are sub-rhomboidally shaped. The shells of females are swollen posteriorly, while males are generally flattened (TSCFTM 1990). The preferred habitats are streams with moderate flow velocities and bottoms varying in texture from gravel and coarse sand to mud, especially just downstream of debris and on banks of accreting sediment. This species was previously known only from a few, disjunct populations in the Neuse River basin (Johnston Co.) and Tar River basin (Granville Co.). Statewide surveys conducted since 1992 have expanded this species' range in North Carolina. This species is now known from the Neuse River Basin in Orange, Wake, Johnston, and Nash Counties, and from Tar River Basin in Granville, Vance, Warren, Franklin, Halifax, and Nash Counties.

BIOLOGICAL CONCLUSION: Stream habitat within the study corridor is characterized by moderate flow over a sand/gravel/mud substrate. Sycamore Creek south of the subject bridge has well-established riffle-pool structure with occasional sand-mud bars. Sycamore Creek also has a biological rating of Good-Fair; however, NHP files have no documentation of this species within one mile (1.6 kilometers) of the study corridor, and signs indicating the presence of freshwater mussels (i.e. shell fragments) were not observed. However, mussel surveys were conducted on September 21, 2000 at the bridge site for a distance of 300 feet (91 meters) upstream and downstream. The dwarf wedge mussel was not found. (See Memo from NCDOT Environmental Specialist dated August 24, 2001.)
NO EFFECT

Smooth coneflower - This species is a stiffly erect, rarely branched perennial that grows up to five feet (1.5 meters) tall. Basal and stem leaves are large, glabrous, lanceolate to narrowly ovate blades reaching three inches (7.6 centimeters) in length. This coneflower blooms from late May to July, producing solitary, heads of small purplish disk flowers with long drooping pink to purplish ray flowers (Kral 1983). This species occurs on calcareous, basic, or circumneutral soils on roadsides, clear-cut, or power line right-of-ways where there is abundant light and little herbaceous competition (Gaddy 1991). Fire-maintained woodlands also appear to provide potential habitat for the coneflower.

The study corridor supports areas of early successional roadside/disturbed land suitable for smooth coneflower. Therefore, the site was revisited on September 6, 2000 to conduct surveys for this species during the fruiting period. All roadsides, fields, meadows, and woodland edges within the study corridor were surveyed for distances 500 feet (152.4 meters) north and 650 feet (198.1 meters) south of the bridge. In addition, a sewerline corridor (traversing Sycamore Creek) was surveyed for a distance of 800 feet (243.8 meters) to the southwest of the bridge. The search resulted in no observations of smooth coneflower within the study corridor.

BIOLOGICAL CONCLUSION: Smooth coneflower occurs in cleared areas with abundant light and little competition from herbaceous vegetation. Portions of this project occur in areas, which contain roadside/disturbed and early-successional vegetation along road shoulders, a sewer line corridor, and hay fields. However, NHP files have no documentation of this species within one mile (1.6 kilometers) of the study corridor, and the species was not identified during a plant survey conducted on September 6, 2000. **NO EFFECT**

Michaux's sumac - Michaux's sumac is a densely pubescent, deciduous, rhizomatous shrub, usually less than two feet (0.6 meters) high. The alternate, compound leaves consist of nine to 13 hairy, round-based, toothed leaflets borne on a hairy rachis that may be slightly winged (Radford *et al.* 1968). Small male and female flowers are produced during June on separate plants; female flowers are produced on terminal, erect clusters followed by small, hairy, red fruits (drupes) in August and September. Michaux's sumac tends to grow in disturbed areas where competition is reduced by periodic fire or other disturbances, and may grow along roadside margins or utility right-of-ways. In the Piedmont, Michaux's sumac appears to prefer clay soil derived from mafic rocks or sandy soil derived from granite; in the Sandhills, it prefers loamy swales (Weakley 1993). Michaux's sumac ranges from south Virginia through Georgia in the inner Coastal Plain and lower Piedmont.

The study corridor supports areas of early successional roadside/disturbed land suitable for Michaux's sumac. Therefore, the site was revisited on September 6, 2000 to conduct surveys for this species during the fruiting period. All roadsides, fields, meadows, and woodland edges within the study corridor were surveyed for distances 500 feet (152.4 meters) north and 650 feet (198.1 meters) south of the bridge. In addition, a sewerline corridor (traversing Sycamore Creek) was surveyed for a distance of 800 feet (243.8 meters) to the southwest of the bridge. The search resulted in no observations of Michaux's sumac within the study corridor.

BIOLOGICAL CONCLUSION: Portions of this study occur in areas, which support roadside/disturbed and early-successional vegetation along road shoulders, hay fields, and a sewer line corridor. However, NHP files have no documentation of this species within one mile (1.6 kilometers) of the study corridor, and the species was not identified during a plant survey conducted on September 6, 2000. **NO EFFECT**

Federal Species of Concern - The February 26, 2001 USFWS list (updated via the Internet, March 22, 2001) also includes a category of species designated as "Federal species of concern" (FSC) for Durham and Wake Counties:

COMMON NAME	SCIENTIFIC NAME	COUNTY OF RECORD	POTENTIAL HABITAT	STATE STATUS **
Southeastern myotis	*Myotis austroriparius*	Wake*	yes	SC
Bachman's sparrow	*Aimophila aestivalis*	Wake*	no	SC
Southern hognose	*Heterodon simus*	Wake	no	SR (PSC)
Carolina darter	*Etheostoma collis lepidinionisis*	Durham, Wake	yes	SC
Pinewoods shiner	*Lythrurus matutinus*	Durham, Wake	yes	SR
Diana fritillary	*Speyeria diana*	Wake*	yes	SR
Septima's clubtail dragonfly	*Gomphus septima*	Durham*	no	SR
Atlantic pigtoe	*Fusconaia masoni*	Durham, Wake	no	T (PE)
Yellow lampmussel	*Lampsilis cariosa*	Durham	no	T (PE)
Green floater	*Lasmigona subviridus*	Durham, Wake	no	E
Yellow lance	*Elliptio lanceolata*	Wake	no	T (PE)
Panhandle pebblesnail	*Somatogyrus virginicus*	Durham, Wake*	no	SR
Tall larkspur	*Delphinium exaltatum*	Durham	no	E-SC
Carolina least trillium	*Trillium pusillum* var. *pusillum*	Wake*	no	E
Sweet pinesap	*Monotropsis odorata*	Durham, Wake*	no	C
Butternut	*Juglans cinerea*	Durham*	no	W5
A liverwort	*Plagiochila columbiana*	Durham*	no	W2

*Counties with historic populations not seen in the past 20 years

**Based on listings by Amoroso (1999) and LeGrand and Hall (1999): E = Endangered; T = threatened; SC = Special concern; SR = Significantly rare; C = Candidate; P = Species has been formally proposed for listing as Endangered, Threatened, or Special Concern; W5 = NC Plant Watch List rare because of severe decline; W2 = Rare, but taxonomically questionable .

The FSC designation provides no federal protection under the ESA for the species listed. NHP files have no documentation of listed FSC species within the study corridor or within one mile (1.6 kilometers) of the study corridor.

2. State Protected Species

Plant and animal species which are on the North Carolina state list as Endangered (E), Threatened (T), Special Concern (SC), Candidate (C), Significantly Rare (SR), or Proposed (P) (Amoroso 1999, LeGrand and Hall 1999) receive limited protection under the North Carolina Endangered Species Act (G.S. 113-331 *et seq.*) and the North Carolina Plant Protection Act of 1979 (G.S. 106-202 *et seq.*). NHP records indicate that no terrestrial or aquatic State-listed species have been documented within one mile of the study corridor.

VI. Cultural Resources

A. Compliance Guidelines

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

B. Historic Architecture

A field survey of the Area of Potential Effects (APE) was conducted on March 1, 2000. All structures within the APE were photographed, and later reviewed by the North Carolina State Historic Preservation Office (HPO). In a concurrence form dated May 18, 2000 the North Carolina State Historic Preservation Officer (SHPO) concurred that there are no historic architectural resources either listed or eligible for listing in the National Register of Historic Places within the APE. A copy of the concurrence form is included in the Appendix.

C. Archaeology

The North Carolina State Historic Preservation Officer (SHPO), in a memorandum dated June 28, 2000 stated, "We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance which would be affected by the project. Therefore, we have no comment on the project as currently proposed." A copy of the SHPO memorandum is included in the Appendix.

VII. Environmental Effects

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

The project is a Federal "Categorical Exclusion" due to its limited scope and lack of significant environmental consequences.

The bridge replacement will not have an adverse effect on the quality of the human or natural environment with the use of current NCDOT standards and specifications.

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

No adverse impact on families or communities is anticipated. Right of way acquisition will be limited. No relocatees are expected with implementation of the proposed alternative.

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) a review was conducted to determine whether minority or low-income populations were receiving disproportionately high and adverse human health or environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

No adverse effect on public facilities or services is anticipated. The project is not expected to adversely affect social, economic, or religious opportunities in the area.

There are no publicly owned recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). Since there are no prime or important farmlands in the immediate vicinity of the proposed bridge the Farmland Protection Policy does not apply.

The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for ozone (O_3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as "moderate" nonattainment area for O_3 and CO. However, due to improved monitoring data, these areas were redesignated as "maintenance" for O_3 on June17, 1994, and "maintenance" for CO on September 18, 1995, Section 176(c) of the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area 2025 Long Range Transportation Plan (LRTP) and the 2000-2006 Metropolitan Transportation Improvement Program (MTIP) has been determined to conform to the intent of the SIP. The USDOT air conformity approval of the LRTP was August 20, 1999 and the USDOT air quality conformity approval for the MTIP was October 1, 1999. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There have been no significant changes in the project's design concept or scope, as used in the conformity analyses.

The traffic volumes will not increase or decrease because of this project. There are no receptors located in the immediate project area. The project's impact on noise and air quality will not be significant.

Noise levels could increase during construction but will be temporary. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAAA and NEPA) and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no hazardous waste sites in the project area

Wake County is a participant in the National Flood Insurance Regular Program. The project site on Sycamore Creek is not included in a detailed Federal Emergency Management Agency (F.E.M.A.) flood study; however the approximate limits of the 100-year flood plain in the vicinity of the project is shown on the F.E.M.A. Flood Insurance Rate Map, Figure 3. The project site is located in a Zone A, Approximate F.E.M.A. flood study.

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

VIII. Public Involvement

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters. A newsletter was also mailed to local residents explaining the planning process and the selected Alternative.

IX. AGENCY COMMENTS

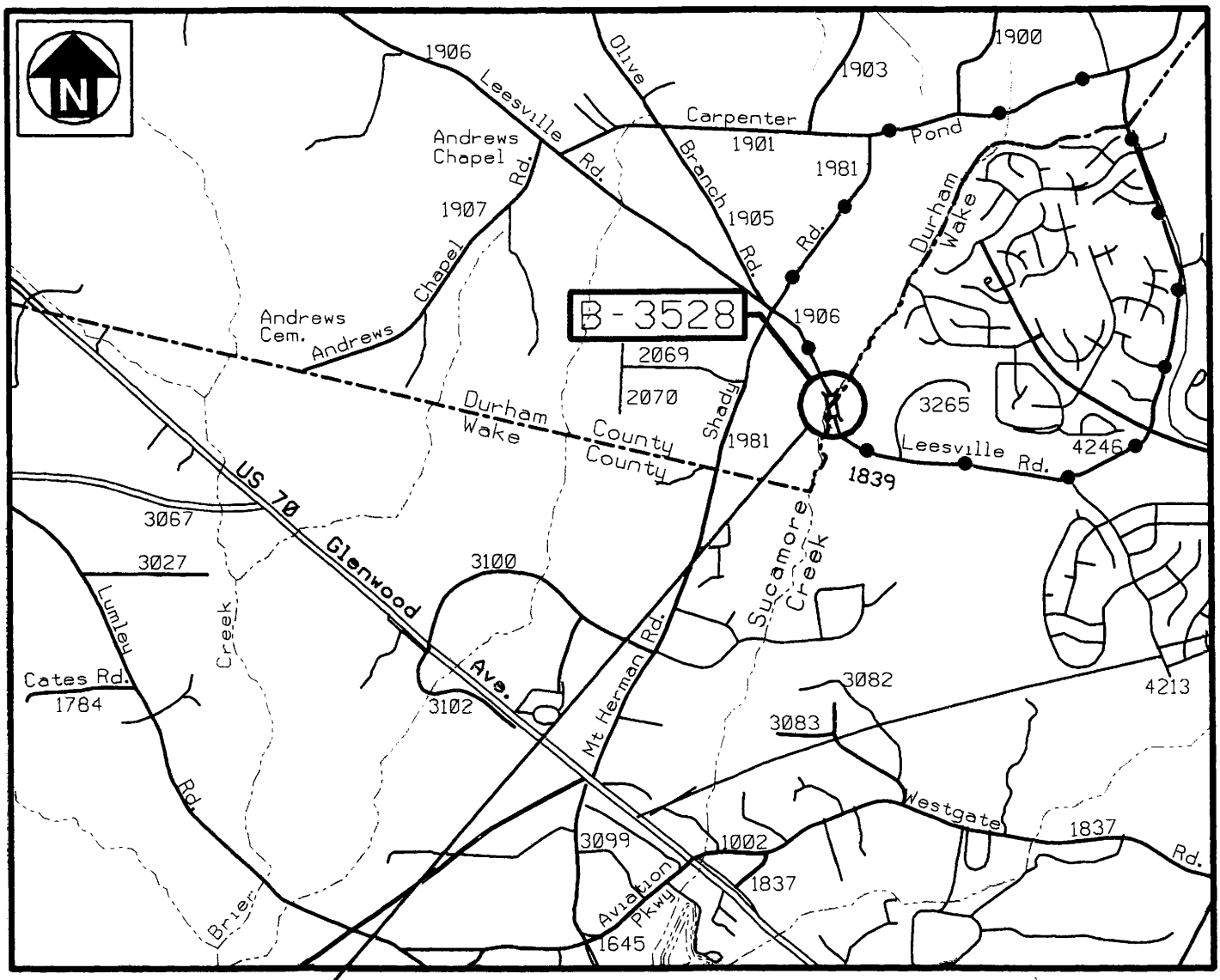
The following comments were received during the scoping process:

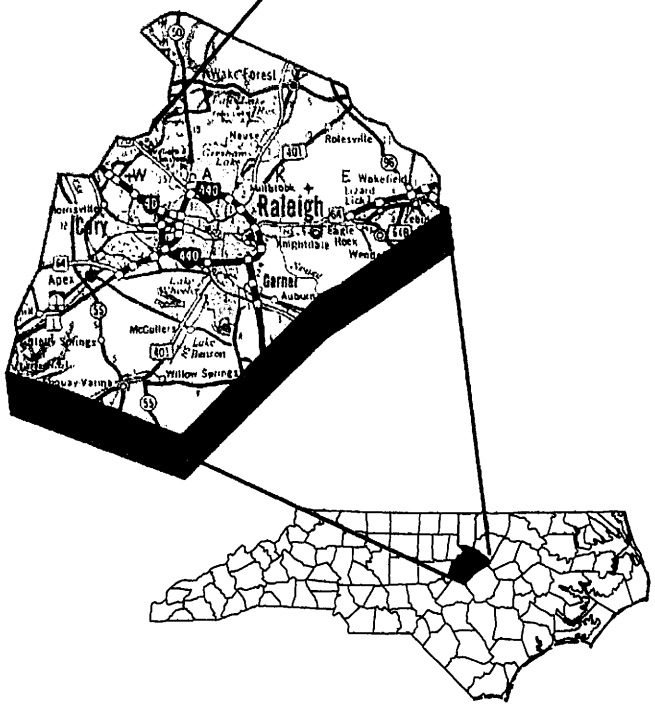
City of Raleigh:
Comment: *"...request that the bridge be designed to allow for future widening and pedestrian accommodation".*

Response: In order to accommodate the Capital Area Thoroughfare Plan and the Raleigh Comprehensive Plan the proposed culvert will be constructed in a manner that will allow for future widening.

City of Durham:
Comment: *"Include bike lanes in the proposed cross section."*

Response: This section of SR 1839 (Leesville Road) is not part of a designated bicycle route nor is it listed in the TIP as needing incidental bicycle accommodations.





LEGEND

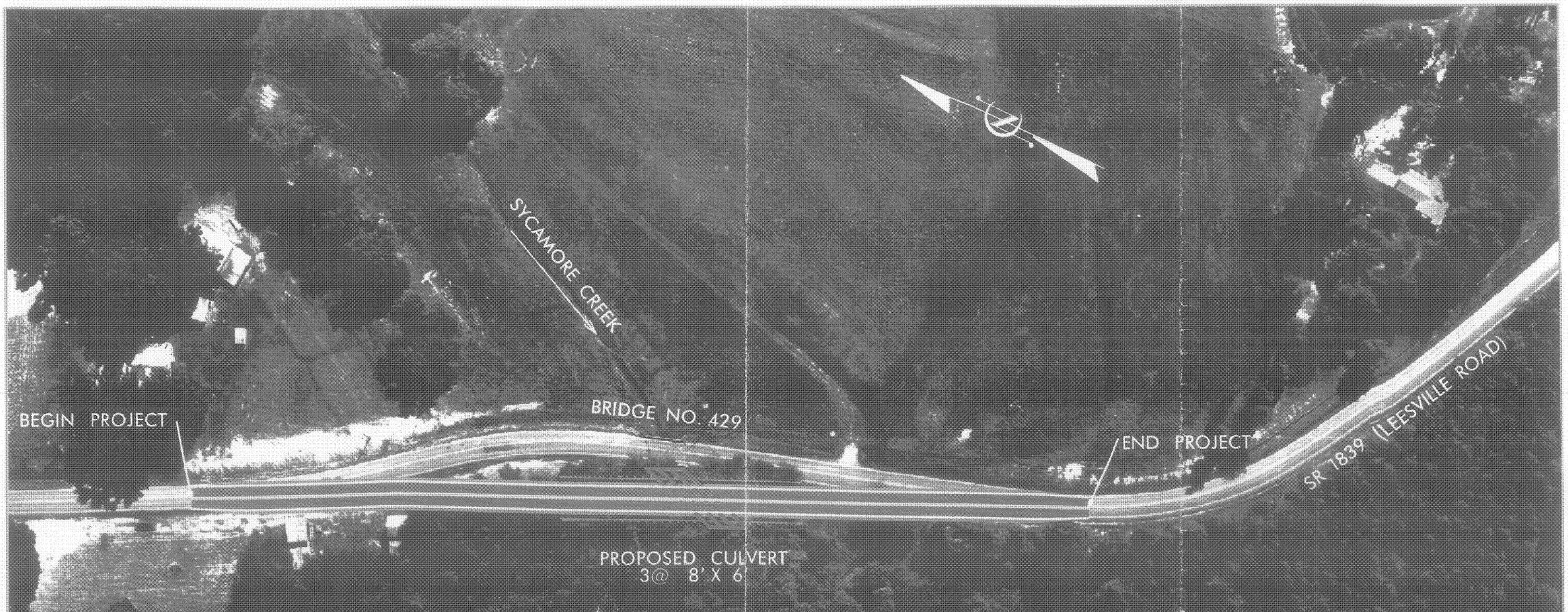
STUDIED DETOUR ROUTE

North Carolina Department Of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 429 ON SR 1839 OVER SYCAMORE CREEK
B-3528

0 kilometers 0.8 kilometers 1.6
0 miles 0.5 miles 1.0

FIGURE 1



ALTERNATE C

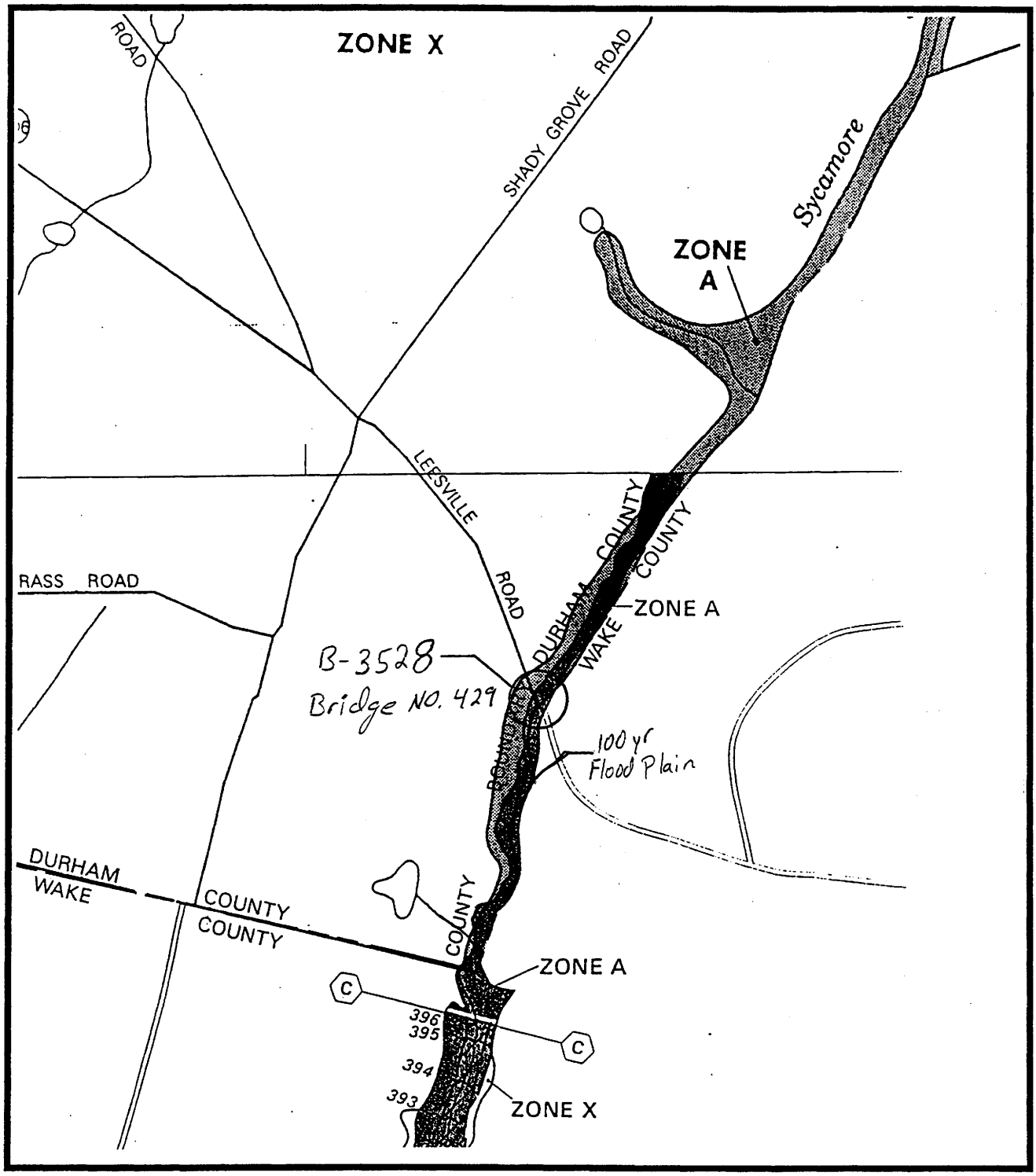
North Carolina Department Of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 429 ON SR 1839
OVER SYCAMORE CREEK

B-3528

SCALE

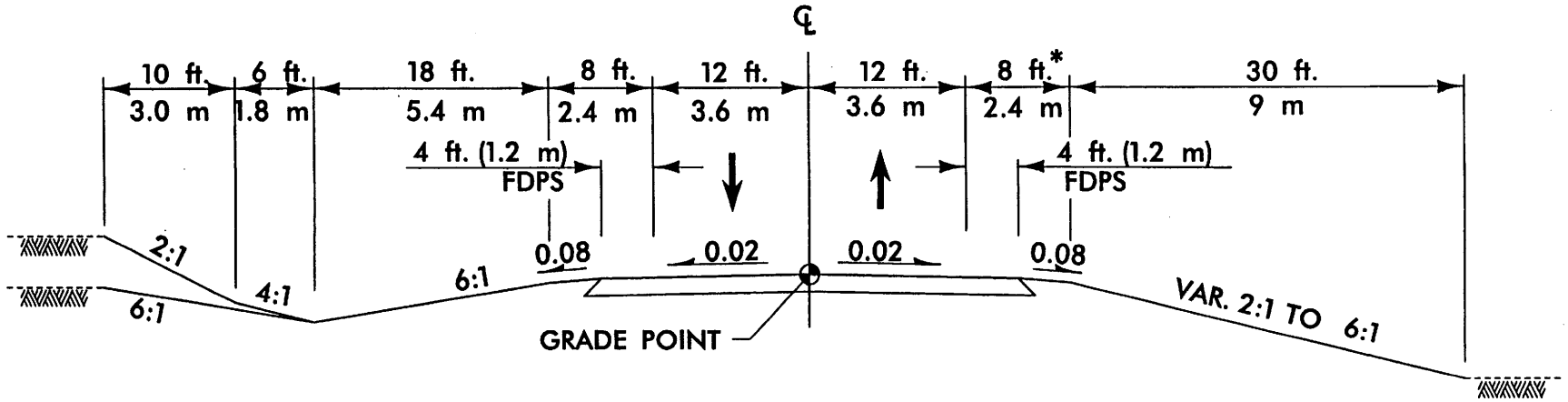
FIGURE 2



FEMA Flood Map, March 3, 1992
Wake County Panel 120 of 810
And
FEMA Flood Map, February 2, 1996
Durham County Panel 195 of 280

Figure 3

* 11 ft. With Guardrail



TYPICAL APPROACH SECTION (PROPOSED)

** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAX. OR MIN. SLOPE MAINTAINED

DESIGN DATA

(EXISTING) 2000 ADT = 7,960 LOS D
(CONST. YR.) 2002 ADT = 8,500 LOS D
(DESIGN YR.) 2025 ADT = 15,000 LOS E
DUAL 2%
TTST 1%

DESIGN SPEED 50 MPH (80 KMH)
POSTED SPEED LIMIT 45 MPH (70 KMH)
MAX. DEGREE OF CURVE 6 Degrees (Min Radius 250 m)
MAX. GRADE 6%
MIN. DES. K FAC.: Ksag = 90–110 Kcrest = 110–160
METRIC: Ksag = 25–32 Kcrest = 32–49

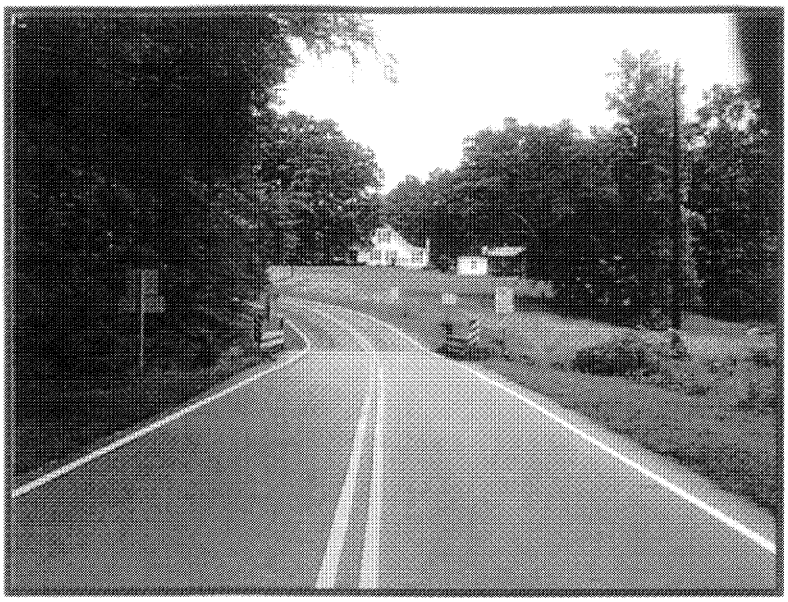
FUNCTIONAL CLASSIFICATION : URBAN LOCAL

ON SITE DETOUR DESIGN DATA: DESIGN SPEED 40 MPH MAX. DEGREE 11°

North Carolina Department
Of Transportation
Project Development &
Environmental Analysis

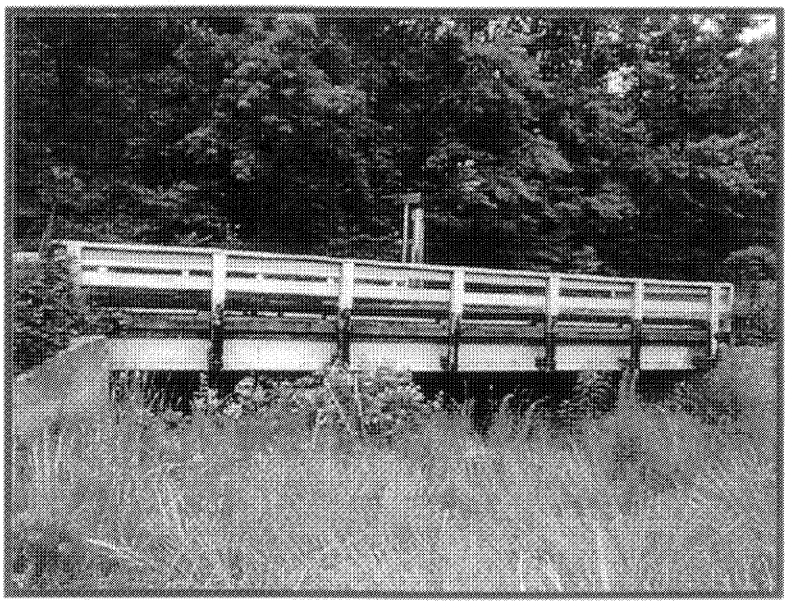
WAKE COUNTY
BRIDGE NO. 429 ON SR 1839
LEESVILLE ROAD
OVER SYCAMORE CREEK
TIP NO: B-3528

FIGURE 4



Bridge No. 429 View of west approach.

Bridge No. 429 View of utilities along north side of bridge and east approach.



Bridge No. 429 Profile View.

APPENDIX

United States Department of the Interior

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

June 30, 2000

Mr. William D. Gilmore, P.E., Manager
NCDOT
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Gilmore:

Thank you for your June 2, 2000 request for information from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of proposed bridge replacements in Wake and Durham Counties, North Carolina. This report provides scoping information and is provided in accordance with provisions of the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661-667d) and Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543). This report also serves as initial scoping comments to federal and state resource agencies for use in their permitting and/or certification processes for this project.

The North Carolina Department of Transportation (NCDOT) proposes to replace the following bridge structures:

1. B-3375 Bridge No. 301 over Swift Creek and Bridge No 471 over Lake Wheeler Spillway on SR 1375 (Lake Wheeler Road), Wake County;

2. B-3450 Bridge No. 217 over New Hope Creek and Bridge No. 122 over Sandy Creek on SR 1116 (Garrett Road), Durham County;

3. B-3451 Bridge No. 119 over Prong of Mud Creek on SR 1306 (Lemur Lane), Durham County;

4. B-3522 Bridge No. 215 over Buffalo Creek on SR 1007 (Poole Road), Wake County; and,

5. B-3528 Bridge No. 429 over Sycamore Creek on SR 1839 (Leesville Road), Wake and Durham Counties.

The following recommendations are provided to assist you in your planning process and to facilitate a thorough and timely review of the project.

Generally, the Service recommends that wetland impacts be avoided and minimized to the maximum extent practical as outlined in Section 404 (b)(1) of the Clean Water Act Amendments of 1977. In regard to avoidance and minimization of impacts, we recommend that proposed highway projects be aligned along or adjacent to existing roadways, utility corridors, or previously developed areas in order to minimize habitat fragmentation and encroachment. Areas exhibiting high biodiversity or ecological value important to the watershed and region should be avoided. Crossings of streams and associated wetland systems should use existing crossings and/or occur on a structure wherever feasible. Where bridging is not feasible, culvert structures that maintain natural water flows and hydraulic regimes without scouring, or impeding fish and wildlife passage, should be employed. Highway shoulder and median widths should be reduced through wetland areas. Roadway embankments and fill areas should be stabilized by using appropriate erosion control devices and techniques. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons.

The National Wetlands Inventory (NWI) maps of the Lake Wheeler, Knightdale, Southeast Durham, and Southwest Durham 7.5 Minute Quadrangles show wetland resources in the specific work areas. However, while the NWI maps are useful for providing an overview of a given area, they should not be relied upon in lieu of a detailed wetland delineation by trained personnel using an acceptable wetland classification methodology. Therefore, in addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action.

1. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory. Wetland boundaries should be determined by using the 1987 Corps of Engineers Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers.

2. If unavoidable wetland impacts are proposed, we recommend that every effort be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland impacts. Opportunities to protect mitigation areas in perpetuity, preferably via conservation easement, should be explored at the outset.

The enclosed lists identify the federally-listed endangered and threatened species, and Federal Species of Concern (FSC) that are known to occur in Durham and Wake Counties. The Service recommends that habitat requirements for the listed species be compared with the available habitats at the respective project sites. If suitable habitat is present within the action area of the project, biological surveys for the listed species should be performed. Environmental documentation that includes survey methodologies, results, and NCDOT's recommendations based on those results, should be provided to this office for review and comment.

FSC's are those plant and animal species for which the Service remains concerned, but further biological research and field study are needed to resolve the conservation status of these taxa. Although FSC's receive no statutory protection under the ESA, we encourage the NCDOT to be

alert to their potential presence, and to make every reasonable effort to conserve them if found. The North Carolina Natural Heritage Program should be contacted for information on species under state protection.

The Service appreciates the opportunity to comment on these projects. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of these projects. If you have any questions regarding these comments, please contact Tom McCartney at 919-856-4520, ext. 32.

Sincerely,

For Tom Augspurger

Dr. Garland B. Pardue
Ecological Services Supervisor

Enclosures

cc:
COE, Raleigh, NC (Eric Alsmeyer)
NCDWQ, Raleigh, NC (John Hennessey)
NCDNR, Northside, NC (David Cox)
FHWA, Raleigh, NC (Nicholas Graf)
EPA, Atlanta, GA (Ted Bisterfield)

FWS/R4:TMcCartney:TM:06/28/00:919/856-4520 extension 32:\bdgswake.dur

COMMON NAME	SCIENTIFIC NAME	STATUS
DAVIE COUNTY		
Vascular Plants		
Heller's trefoil	*Lotus helleri*	FSC*
Michaux's sumac	*Rhus michauxii*	Endangered
DUPLIN COUNTY		
Vertebrates		
American alligator	*Alligator mississippiensis*	T(S/A)*
Southern hognose snake	*Heterodon simus*	FSC*
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Invertebrates		
Croatan crayfish	*Procambarus plumimanus*	FSC
Vascular Plants		
Venus flytrap	*Dionaea muscipula*	FSC
Savanna cowbane	*Oxypolis ternata*	FSC
DURHAM COUNTY		
Vertebrates		
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Invertebrates		
Atlantic pigtoe	*Fusconaia masoni*	FSC
Septima's clubtail dragonfly	*Gomphus septima*	FSC
Yellow lampmussel	*Lampsilis cariosa*	FSC
Green floater	*Lasmigona subviridus*	FSC
Panhandle pebblesnail	*Somotogyrus virginicus*	FSC
Vascular Plants		
Tall larkspur	*Delphinium exaltatum*	FSC
Smooth coneflower	*Echinacea laevigata*	Endangered
Butternut	*Juglans cinerea*	FSC
Sweet pinesap	*Monotropsis odorata*	FSC
Michaux's sumac	*Rhus michauxii*	Endangered
Nonvascular Plants		
A liverwort	*Plagiochila columbiana*	FSC

COMMON NAME	SCIENTIFIC NAME	STATUS
WAKE COUNTY		
Vertebrates		
Bachman's sparrow	*Aimophila aestivalis*	FSC
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Southern hognose snake	*Heterodon simus*	FSC*
Southeastern myotis	*Myotis austroriparius*	FSC
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Invertebrates		
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered
Yellow lance	*Elliptio lanceolata*	FSC
Atlantic pigtoe	*Fusconaia masoni*	FSC
Green floater	*Lasmigona subviridus*	FSC
Diana fritillary butterfly	*Speyeria diana*	FSC*
Vascular Plants		
Sweet pinesap	*Monotropsis odorata*	FSC
Michaux's sumac	*Rhus michauxii*	Endangered
Carolina least trillium	*Trillium pusillum* var. *pusillum*	FSC
WARREN COUNTY		
Vertebrates		
Bachman's sparrow	*Aimophila aestivalis*	FSC
Invertebrates		
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered
Yellow lance	*Elliptio lanceolata*	FSC
Tar spinymussel	*Elliptio steinstansana*	Endangered
Atlantic pigtoe	*Fusconaia masoni*	FSC
Vascular Plants		
Heller's trefoil	*Lotus helleri*	FSC
WASHINGTON COUNTY		
Vertebrates		
Red wolf	*Canis rufus*	EXP
Rafinesque's big-eared bat	*Corynorhinus (=Plecotus) rafinesquii*	FSC
Waccamaw killifish	*Fundulus waccamawensis*	FSC
Bald eagle	*Haliaeetus leucocephalus*	Threatened

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF SOIL AND WATER CONSERVATION

SOIL & WATER CONSERVATION
Voices for Life

NCDENR

JAMES B. HUNT JR.
GOVERNOR

BILL HOLMAN
SECRETARY

DAVID S. VOGEL
DIRECTOR

MEMORANDUM: July 6, 2000

TO: Melba McGee

FROM: David Harrison

SUBJECT: NCDOT Bridge Replacement Projects B-3375, B-3450, B-3451, B-3522 and B-3528.

The detour routes included in the bridge replacement plans should eliminate any farmland impacts.

If additional land is needed beyond the existing right-of-way the environmental assessment should include information on adverse impacts to Prime or Statewide Important Farmland. The definition of Prime or Statewide Important Farmland is based on the soil series and not on its current land use. Areas that are developed or are within municipal boundaries are exempt from consideration as Prime or Important Farmland.

For additional information, contact the soils specialists with the Natural Resources Conservation Service, USDA, Raleigh, NC at (919) 873-2141.

Cc: Stacy Harris

FIRST IN AMERICA 2000

1614 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1614
PHONE 919-733-2302 FAX 919-715-3559

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

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

Division of Archives and History
Jeffrey J. Crow, Director

June 28, 2000

William D. Gilmore, PE, Manager
NCDOT
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Re: Replacement of Bridge No. 429 over Sycamore Creek on SR 1839 (Leesville Road), B-3528, Wake and Durham Counties, ER 00-10114

Dear Mr. Gilmore:

Thank you for your letter of June 2, 2000, concerning the above project.

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

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

Sincerely,

Renee Gledhill-Earley

for David Brook
Deputy State Historic Preservation Officer

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

TIP # B-3528 Federal Aid # BRZ-1839(1) County WAKE

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

Brief Project Description
REPLACE BRIDGE #429 ON SR 1839 OVER SYCAMORE CREEK

On 18 MAY 2000, representatives of the

- ✓ North Carolina Department of Transportation (NCDOT)
- ✓ Federal Highway Administration (FHwA)
- ✓ North Carolina State Historic Preservation Office (SHPO)
- ___ Other ___

reviewed the subject project at:

- ✓ A scoping meeting
- ✓ Historic architectural resources photograph review session/consultation
- ___ Other ___

All parties present agreed:

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

Signed:

Vanessa O. Patrick — 18 May 2000
Representative, NCDOT — Date

Michael C. Dawson — 5/18/00
FHwA, for the Division Administrator, or other Federal Agency — Date

[signature] — 5/18/2000
Representative, SHPO — Date

[signature] — 5/26/00

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

City Of Raleigh
North Carolina

August 11, 2000

Stacy Harris, PE
NCDOT Project Development &
Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Subject: Request for comments for B-3375 and B-3528

Dear Ms. Harris:

Thank you for the opportunity to provide comments on TIP Bridge Replacement Projects B-3375 and B-3528.

B-3375, which will replace Bridge No. 301 and Bridge No. 471 on Lake Wheeler Road, is outside of the City of Raleigh's current planning jurisdiction. However, these projects are extremely relevant to the City as Lake Wheeler is one of the City's water supply reservoir. These two bridges lie at the base of the Lake Wheeler dam and spillway, and the need to ensure the structural integrity of this dam during the demolition and construction process is paramount. You may wish to refer to the Phase II Evaluation of the Lake Wheeler Dam available from our Public Utilities Department. You may also wish to obtain a copy of the Lake Wheeler Park Master Plan from our Parks and Recreation Department. Additionally, Lake Wheeler Road is classified as a major thoroughfare in the Capital Area MPO Thoroughfare Plan and in the Raleigh Comprehensive Plan. City standards indicate Lake Wheeler Road should provide a 65-foot back-to-back curb and gutter section on 90 feet of right-of-way with 5-foot sidewalks along both sides. While this project may not provide the ultimate future cross-section of Leesville Road, we request that the bridge be designed to allow for future widening and pedestrian accommodation.

B-3528, which will replace Bridge 429 carrying Leesville Road over Sycamore Creek, is in a rapidly growing area of the City. This portion of Leesville Road is classified as a minor thoroughfare in the Capital Area Thoroughfare Plan and in the Raleigh Comprehensive Plan. The City's development standards require Leesville Road to provide a 53-foot back-to-back curb and gutter section on 80 feet of right-of-way with 5-foot sidewalks on both sides. While the immediate bridge replacement may not provide the ultimate future cross-section of Leesville Road, we request that the bridge be designed to allow for future widening and pedestrian accommodation.

Thank you again for the opportunity to provide input on these projects. If we can provide you with any assistance or if you need any additional information, please contact Ed Johnson or Eric Lamb at 890-3430.

Sincerely,

Dempsey E. Benton
City Manager

DEB/ejl

Cc: Jimmie Beckom, PE - Transportation Director
Stewart Sykes, PE – City Engineer
George Chapman, AICP – Planning Director
Dale Crisp, PE – Public Utilities Director

DURHAM
1 8 6 9
CITY OF MEDICINE

City of Durham
Transportation Division
Department of Public Works
101 City Hall Plaza
Durham, North Carolina 27701

Phone: (919) 560-4366
Fax: (919) 560-4561
www.ci.durham.nc.us

July 11, 2000

Ms. Stacy Harris, P.E.
Project Development & Environmental Analysis Branch
N. C. Department of Transportation
1548 Mail Service Center
Raleigh, N.C. 27699-1548

SUBJECT: Comments for Bridge Replacement Projects B-3450, B-3451, and B-3528 in Durham, North Carolina

Dear Ms. Harris:

In response to Mr. William Gilmore's letters of June 2, 2000 to Mayor Tennyson and P. Lamont Ewell, City Manager, the City of Durham offers the following comments concerning the subject bridge replacement projects. Please note that the Erwin Road (B-3451) and the Leesville Road (B-3528) projects are located outside the City limits. However, the proposed Erwin Road bridge detour route partially occurs within the City limits.

Project	Comments
B-3459 B-3450 (~~Bridge~~ No. 217 over New Hope Creek and Bridge No. 122 over Sandy Creek on Garrett Road)	1. The project design, scope, and schedule must be coordinated with projects U-4009 (US 15-501 Service Road relocation) and U-4012 (US 15-501 widening project). Avoid coinciding the respective project detour routes and schedules. 2. The proposed bridge should provide a five-lane curb and gutter cross section, with wide outside lanes for bicycles, consistent with U-4009. 3. Provide sidewalks for the extent of the curb and gutter section of the project limits, and/or extend to match proposed sidewalk construction requested as by the City as part of U-4009. 4. Due to existing traffic volumes on Garrett Road and severe congestion on the proposed detour route, a detour bridge or staged construction of a multi-lane structure should be incorporated into the project scope. The proposed detour route will adversely affect emergency vehicle response times, City bus service, and area traffic congestion. A detour route is not acceptable to the City. If NCDOT does not concur with this recommendation, please advise the City Manager and plan to hold a public workshop and/or hearing to advise the City Council and the public of the department's decision.

Project	Comments
B-3459 3450	5. Consider alternative bridge design concepts for aesthetic enhancement.
B-3451 (Bridge No. 119 over Prong of Mud Creek on NC 751)	1. Provide bike lanes in the proposed cross section. 2. The proposed detour schedule must not coincide with the detours of other area NCDOT projects, including U-4009, U-4012, and B-3459. 3. The proposed detour route will increase congestion at Cornwallis Road and US 15-501 ramp intersections. Appropriate traffic control measures should be studied and constructed as part of the project (such as traffic signals and turn lanes at Cornwallis Road and US 15-501 ramps). 4. Consider alternative bridge design concepts for aesthetic enhancement.
B-3528 Bridge No. 429 over Sycamore Creek on Leesville Road	1. Include bike lanes in the proposed cross section.

The City of Durham requests that these comments be included in the project record and addressed in the respective project environmental documents and project designs. Please keep the City advised of each projects' progress. If you need any additional information, please feel free to contact me at 560-4366. The N. C. Department of Transportation's coordination with the City of Durham is greatly appreciated.

Sincerely,

H. Wesley Parham, P.E.
Senior Transportation Engineer

cc: Mayor Nicholas J. Tennyson
P. Lamont Ewell, City Manager
Mark D. Ahrendsen, Transportation Manager
Stuart Carson, P.E., Civil Engineer III

DURHAM

1 8 6 9
CITY OF MEDICINE

Department of Public Works

101 City Hall Plaza
Durham, North Carolina 27701
Phone: (919) 560-4326
Fax: (919) 560-4316

June 23, 2000

NC Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548
Attention: Stacy Harris, P.E.

Re: Request for comments on NCDOT Bridge Replacement Projects B-3450, B-3451 and B-3528

Dear Ms. Harris:

This response is from the City of Durham Public Works Department, Engineering Division. Our primary interests in these projects are potential conflicts with City of Durham potable water and sanitary sewer infrastructure. We have reviewed the locations of the projects and have not identified any City potable water or sanitary sewer facilities in the vicinity of Projects B-3451 and B-3528.

Project B-3450 (replacement of Bridge No. 217 over New Hope Creek and Bridge No. 122 over Sandy Creek on SR 1116 (Garrett Road) is in the vicinity of an existing 16" diameter ductile iron potable water main (see attachments). According to City plans, the main is located outside of the pavement on the east side of Garrett Road and deflects away from both bridges and crosses beneath the channel beds upstream of the bridges. You will need to field locate the water main to confirm its actual location. Additionally, there is a 6" diameter sanitary sewer force main to the north of the project and a 42" diameter sanitary sewer gravity outfall to the south of the project (see attachments). Both the force main and outfall appear to be outside of the limits of impact by the project, but you will also need to field confirm their locations.

Please contact Don Greeley or me at (919) 560-4326 if you have any questions.

Very truly yours,

F. Stuart Carson, P.E.
Civil Engineer III

Attachments
Cc: file

RELOCATION REPORT

North Carolina Department of Transportation
AREA RELOCATION OFFICE

Harris

[X] E.I.S. [ ] CORRIDOR [ ] DESIGN

PROJECT:	8.2406801	COUNTY	Wake	Alternate A of	Alternate
I.D. NO.:	B-3528	F.A. PROJECT	N/A		
DESCRIPTION OF PROJECT:	Replace Bridge No. 429 on SR 1839 over Sycamore Creek at existing location with a Reinforced Concrete Box Culbert (3 @ 8' x 6'). During construction, traffic will be maintained by an off-site detour.				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	0	0	0
Businesses	0	0	0	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	0	0

VALUE OF DWELLING				DSS DWELLING AVAILABLE			
Owners		Tenants		For Sale		For Rent	
0-20M	N/A	$ 0-150	N/A	0-20M	N/A	$ 0-150	N/A
20-40M	N/A	150-250	N/A	20-40M	N/A	150-250	N/A
40-70M	N/A	250-400	N/A	40-70M	N/A	250-400	N/A
70-100M	N/A	400-600	N/A	70-100M	N/A	400-600	N/A
100 UP	N/A	600 UP	N/A	100 UP	N/A	600 UP	N/A
TOTAL	N/A		N/A		N/A		N/A

ANSWER ALL QUESTIONS

Yes	No	*Explain all "YES" answers.*
		1. Will special relocation services be necessary?
		2. Will schools or churches be affect by displacement?
		3. Will business services still be available after project?
		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
		5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
		7. Will additional housing programs be needed?
		8. Should Last Resort Housing be considered?
		9. Are there large, disabled, elderly, etc. families?
		10. Will public housing be needed for project?
		11. Is public housing available?
		12. Is it felt there will be adequate DSS housing housing available during relocation period?
		13. Will there be a problem of housing within financial means?
		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION?

REMARKS (Respond by Number)

THIS IS A NEGATIVE REPORT.

L. G. Scarborough — 9-14-00
Division R/W Agent, L. G. Scarborough — Date

L. R. Vick — 9/19/00
Approved by — Date

Form 15.4 Revised 02/95 d

Original & 1 Copy: State Relocation Agent
2 Copy Area Relocation Office

Flag SC-01

Wetland Rating Worksheet

Project name B-3528 Nearest road SR1839
County Wake & Durham Name of Evaluator MATT CUSACK Date 8-20-00

Wetland location
- _ on pond or lake
- _ on perennial stream
- ✓ on intermittent stream
- _ within interstream divide
- _ other

Adjacent land use (within 1/2 mile upstream)
forested/natural vegetation 40 %
agriculture, urban/suburban 50 %
impervious surface 10 %

Dominant Vegetation
(1) Betula nigra
(2) Fraxinus pennsylvanica
(3) Liquidambar styraciflua

Soil Series _____
- _ predominantly organic-humus, muck, or peat
- ✓ predominantly mineral- non-sandy
- _ predominantly sandy

Flooding and Wetness
- _ semipermanently to permanently flooded or inundated
- ✓ seasonally flooded or inundated
- _ intermittently flooded or temporary surface water
- _ no evidence of flooding or surface water

Hydraulic Factors
- _ steep topography
- _ ditched or channelized
- ✓ wetland width >/= 50 feet

Wetland Type (select one)
- ✓ Bottomland hardwood forest
- _ Headwater forest
- _ Swamp forest
- _ Wet flat
- _ Pocosin
- _ Pine savanna
- _ Freshwater marsh
- _ Bog/fen
- _ Ephemeral wetland
- _ Other

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

Water storage	1	*	4	=	4	
Bank/Shoreline stabilization	1	*	4	=	4	Total score
Pollutant removal	5	*	5	=	25	47
Wildlife habitat	2	*	2	=	4	
Aquatic life value	2	*	4	=	8	
Recreation/Education	2	*	1	=	1	

Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream

Flag SA-06

Wetland Rating Worksheet

Project name B-3528 Nearest road SR 1839
County Wake & Durham Name of Evaluator Matthew Cusack Date 8-20-00

Wetland location
- _ on pond or lake
- ✓ on perennial stream
- _ on intermittent stream
- _ within interstream divide
- _ other

Adjacent land use (within 1/2 mile upstream)
- forested/natural vegetation 40 %
- agriculture, urban/suburban 50 %
- impervious surface 10 %

Dominant Vegetation
- (1) Betula nigra
- (2) Fraxinus pennsylvanica
- (3) Acer rubrum

Soil Series _____
- _ predominantly organic-humus, muck, or peat
- ✓ predominantly mineral- non-sandy
- _ predominantly sandy

Flooding and Wetness
- _ semipermanently to permanently flooded or inundated
- ✓ seasonally flooded or inundated
- _ intermittently flooded or temporary surface water
- _ no evidence of flooding or surface water

Hydraulic Factors
- _ steep topography
- ✓ ditched or channelized
- _ wetland width >/= 50 feet

Wetland Type (select one)

- ✓ Bottomland hardwood forest
- _ Headwater forest
- _ Swamp forest
- _ Wet flat
- _ Pocosin
- _ Pine savanna
- _ Freshwater marsh
- _ Bog/fen
- _ Ephemeral wetland
- _ Other

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

Water storage	1	*	4	=	4	
Bank/Shoreline stabilization	3	*	4	=	12	Total score
Pollutant removal	5	*	5	=	25	52
Wildlife habitat	1	*	2	=	2	
Aquatic life value	2	*	4	=	8	
Recreation/Education	1	*	1	=	1	

Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream

SOILS

Map Unit Name (Series and Phase): Mapped as Chewaela Soils Drainage Class: Somewhat Poorly

Taxonomy (Subgroup): Fluvaquentic Dystrocryept 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	10YR 5/2	10YR 5/6		loam

Hydric Soil Indicators:

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

Remarks: Possible inclusion of Wahadka soils

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

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

Remarks:

Approved by HQUSACE 2/92

HJL
8/93

CB3 Wet

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

Project/Site: B-3528 Durham/Wake Co	Date: 7/21/00
Applicant/Owner: Barbara Mulkey	County: Durham
Investigator: ESC	State: NC
Do Normal Circumstances exist on the site? (Yes) No	Community ID: Pasture
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID: CB
Is the area a potential Problem Area? Yes (No)	Plot ID: 3 wet
(If needed, explain on reverse	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Poa sp.	H		9.		
2. Eleocharis sp.	H		10.		
3. Juncus sp.	H		11.		
4. Carex sp.			12.		
5. Polygonum sp.	H	OBL	13.		
6. Vernonia noveboracensis	H	Fact	14.		
7. Rhexia sp	H		15.		
8.			16.		

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

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: NA (in.)
- Depth to Free Water in Pit: NA (in.)
- Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- __Inundated
- __Saturated in Upper 12 Inches
- __Water Marks
- __Drift Lines
- __Sediment Deposits
- ✓Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓Oxidized Root Channels in Upper 12 Inches
- ✓Water-Stained Leaves
- __Local Soil Survey Data
- __FAC-Neutral Test
- __Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Mapped as Creedmore Sandy Loam, 6-10% slopes
Drainage Class: Moderately well
Taxonomy (Subgroup): Aquic Hapludults
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.
0-2	A	10YR 4/3			Sand
2-12	B	10YR 5/4			Sandy loam

Hydric Soil Indicators:

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

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

Remarks:

Approved by HQUSACE 2/92

HJL
8/93

CB S-

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

Project/Site: B-3528 Durham / Wake Co	Date: 7/21/00
Applicant/Owner: Barbara Mulkey	County: Durham Co.
Investigator: ESC	State: NC
Do Normal Circumstances exist on the site? Yes No	Community ID: Pasture
Is the site significantly disturbed (Atypical Situation)? Yes No	Transect ID: CB
Is the area a potential Problem Area? Yes No	Plot ID: 3 UP
(If needed, explain on reverse	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Eupatorium capillifolium	H	FACU	9.		
2. Rubus sp.	H	FAC	10.		
3. Rumex sp.	H	FAC	11.		
4. Lespedeza striata	H	FACU	12.		
5. Lonicera japonica	H	FAC-	13.		
6. Paspalum urvillei	H	FAC	14.		
7.			15.		
8.			16.		

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

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: N/A (in.)

Depth to Free Water in Pit: N/A (in.)

Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- __Inundated
- __Saturated in Upper 12 Inches
- __Water Marks
- __Drift Lines
- __Sediment Deposits
- __Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- __Oxidized Root Channels in Upper 12 Inches
- __Water-Stained Leaves
- __Local Soil Survey Data
- __FAC-Neutral Test
- __Other (Explain in Remarks)

Remarks:

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

1501 MAIL SERVICE CENTER, RALEIGH, N.C. 27699-1501

LYNDO TIPPETT
SECRETARY

August 24, 2001

Memorandum To: Brian Yamamoto, P.E.
Unit Head, Consultant Unit

From: Logan Williams, Environmental Specialist
Project Development and Environmental Analysis Branch

Subject: Protected species survey for dwarf wedge mussel (*Alasmidonta heterodon*) for replacement of bridge no. 429 on SR 1839 over Sycamore Creek, Wake County; B-3528.

Attention: Staci Harris, Project Planning and Environmental Analysis Consultant Unit

The following memo addresses the dwarf wedge mussel (*Alasmidonta heterodon*), a federally protected species listed by the U.S Fish and Wildlife Service for Wake County. A mussel survey was conducted for the proposed bridge replacement on September 21, 2000 by NCDOT biologists Logan Williams and Sue Brady.

Mussel surveys were conducted at the bridge site and for a distance of approximately 300 feet upstream and downstream using tactile methods and view buckets. Water depth at the bridge site averaged around 2 feet and visibility was fair. There were no mussels found during approximately two man-hours of survey time. The dwarf wedge mussel was not found.

Biological Conclusion: No Effect

Given the survey results it is apparent that dwarf wedge mussel does not occur in the project footprint. Therefore, it can be concluded that project construction will not impact this species.

PHONE 919-733-2520 FAX 919-733-9150