STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 23, 2007

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

ATTENTION: Eric Alsmeyer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23 and 33, Section 401 Water Quality Certification, and Neuse Riparian Buffer Authorization** for the replacement of Bridge No. 311 over Lake Wheeler on SR 1379 (Penny Road), Wake County. Federal Aid Project Number BRZ-1379(1), WBS No. 33351.1.1, State Project No. 8.2408101, Division 5, T.I.P No. B-3917

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 311 over Lake Wheeler (an impoundment of Swift Creek). The project involves constructing the new bridge upstream (west) of the existing bridge, while maintaining traffic on the existing bridge during construction. The existing bridge is currently in poor condition and in need of replacement. The new bridge is intended to provide a safer bridge structure consistent with federal and state bridge standards.

The proposed structure will be approximately 189 feet in length with two spans at 46 feet-9 inches and two spans at 27 feet-8 inches. The superstructure will be composed of 36-inch pre-stressed concrete girder. The proposed bridge has 34 feet of clear roadway and will provide two travel lanes. The travel lanes will be 12 feet wide each with a 4 foot wide shoulder on the southbound lane and a 6 foot wide shoulder on the northbound lane. Traffic will be maintained on the existing bridge during construction.

The Categorical Exclusion (CE) states that sidewalks and adequate clearance for a greenway under the south side of the bridge were to be provided. However, the project was downscoped in order to limit impacts to Lake Wheeler and to allow the permanent structure to be as close as operations would allow to the existing structure to maintain traffic during construction. Please see the enclosed CE, Pre-Construction Notification, permit drawings, design plans, and Ecosystem Enhancement Program (EEP) acceptance letter for the subject project.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Neuse River Basin (subbasin 03-04-02). This area is part of Hydrologic Cataloging Unit 03020201 of the South Atlantic-Gulf Coast Region. Lake Wheeler, an impoundment of Swift Creek, [DWQ Index # 27-43-(1)] is the only water resource within the project area. Lake Wheeler

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

is assigned a Best Usage Classification of WS-III NSW. No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply (WS-II), waters occur within 1.0 mile of the study corridor.

The Final 2004 303(d) list includes a portion of Swift Creek and Lake Wheeler within the project area. The area is listed within Category 5 due to impaired biological integrity. However, "Design Standards in Sensitive Watersheds" will be implemented because Swift Creek, and the impounded portion that forms Lake Wheeler, are classified as Nutrient Sensitive Waters (NSW).

There are no wetlands located within the project area.

Permanent Impacts

The new alignment of the approaches will require extending the existing causeway further west, resulting in 0.36 acre of fill placed in Lake Wheeler (Site 1). It was determined that extending the causeway is more cost effective than lengthening the bridge.

Three bridge bents will be constructed in the Lake Wheeler (Site 3). Permanent surface water impacts from the bents are less than 0.01 acre.

Temporary Impacts

There will be 0.01 acre of surface water impacts resulting from the construction of a trestle that will provide access for the barge. The barge will access the project area via an access road located within a construction easement on southwest bank.

Approximately 0.01 acre of temporary impacts will be due to the construction of a temporary work pad to jurisdictional waters associated with this project (Site 2). Because of the high rock line at Bent No. 1, the work pad will be used to stabilize the permanent steel casing during construction of those drilled piers. The trestle and the work pad will be removed upon completion of construction.

Utility Impacts

Power and cable line located within the project area will be impacted by construction. The construction of the new bridge will require relocation of the poles that are jointly used by both utilities. There will be no impacts to wetlands or streams resulting from the relocation of these utilities.

Bridge Demolition

The existing bridge was constructed in 1956 and is 135-feet in length. It consists of eight spans between 16 and 18-feet each. The superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps on timber piles with concrete mudsills. At this time it is not known if the mudsills are located above or below the lakebed due to siltation or scour. NCDOT will attempt to extract the pile bents their entirety, however, due to deterioration of the timber piles; the piles may break during the process. If complete extraction is not possible, then the piles at Bents 1 and 7 will be cut at lakebed levels. If complete extraction of the piles at Bents 2 through 6 is not possible, they will be cut at the top of the mudsills or at the top of the lake bed level as directed by the engineer. If it is deemed necessary to cut the piles at the top of the mudsill, a minimum of 8 feet of clearance will be available for the boaters based on a normal water surface elevation of 283-feet.

There is a small potential for components of Bridges No. 311 to be dropped into Waters of the United States during bridge removal. The maximum potential temporary fill is 67.5 cubic yards that will be

immediately removed. Best Management Practices for Bridge Demolition and Removal will be implemented during the demolition and construction of both bridges.

IMPACTS TO NEUSE RIPARIAN BUFFER

Construction of the new bridge and approaches will result in impacts to the buffers of Lake Wheeler. Buffer impacts are described in Table 1 below. Under the Neuse Buffer Rules, impacts to buffers resulting from the construction of bridges are allowable. Impacts resulting from construction of the approaches are allowable with mitigation because the impacts exceed 150 linear feet or one-third of an acre. Compensatory mitigation for these buffer impacts will be provided through the EEP.

Table 1. Neuse River Buffer Impacts

	Bridge	Road Crossing
Zone 1 Impact (sq. ft)	2053	5037
Zone 2 Impact (sq. ft)	185	3511
Mitigation requirements (exempt, allowable or allowable with mitigation)	Allowable	Allowable with mitigation (impacts greater than 150 linear feet or one-third of an acre).*

* Buffer impacts associated with the construction of the approaches are 0.20 acre and 180 linear feet.

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

Utility Impacts to Riparian Buffers

Power and cable lines are located within the project area and will be impacted by construction. The construction of the new bridge will require relocation of poles that are jointly used by both utilities. One pole is currently located within Buffer Zone 2. Removal of the pole will not impact riparian buffers. The pole will be removed using a crane. If it is not possible to remove the pole using a crane, the pole will be cut off level to the ground.

The pole will be relocated within Buffer Zone 2. The pole will be relocated within areas impacted by construction of the approaches. The relocation of the utility pole will not result in additional impacts to riparian buffers.

RESTORATION PLAN

Following construction of the bridge, all material used in the construction of the structure will be removed. The impact area associated with the bridge is expected to recover naturally, since the natural streambed and plant material will not be removed. NCDOT does not propose any additional planting in this area. Class II riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored.

Following construction of the bridge, all material used in the construction of the structure will be removed. Class II riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored.

REMOVAL AND DISPOSAL PLAN

The contractor will be required to submit a reclamation plan for the removal of and disposal of all material off-site at an upland location. The contractor will use excavation equipment for removal of any earthen material. Heavy–duty trucks, dozers, cranes and various other pieces of mechanical equipment necessary for construction of roadways and bridges will be used on site. All material placed in the stream will be removed from the stream at that time. The contractor will have the option of reusing any of the materials that the engineer deems suitable in the construction of project. After the erosion control devices are no longer needed, all temporary materials will become the property of the contractor.

MITIGATION OPTIONS

Avoidance and Minimization and Compensatory Mitigation

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

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

Avoidance/Minimization

- 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).
- Design Standards in Sensitive Watersheds will be implemented.
- Best Management Practices for Protection of Surface Waters will be implemented.
- 1.5 to 1 side slopes will be used to reduce the footprint of the project in the vicinity of the crossing, minimizing impacts to surface waters.
- Curb and gutter was added to collect storm water from the bridge and causeway, piping it to an area outside the regulated buffer so it can drain through the entire buffer prior to flowing into the lake.
- Level spreader ditches used in conjunction with special false sumps will establish sheet flow of runoff prior to entering the riparian buffer.
- A preformed scour hole will be constructed on the northeast side of the bridge.

Compensatory Mitigation:

The proposed action includes all practicable methods to avoid and/or minimize jurisdictional stream and buffer impacts that may result from such use. It was determined that there are no practicable alternatives to the proposed construction in jurisdictional waters of the US and buffers. Replacing the bridge in its existing location was considered, however it is not practical due cost, right-of-way impacts, and the magnitude of community and commuter disruption caused by using an off-site detour during construction. Also, constructing the bridge on the new alignment has the least overall of impacts to surface waters.

The project will impact surface waters and riparian buffers. Mitigation is not proposed for the minimal impacts to Lake Wheeler. Compensatory mitigation is required for the 5037 square feet of impact to Buffer Zone 1 and 3511 square feet of impacts to Buffer Zone 2 (8548 square feet of impacts to riparian buffers) categorized as "allowable with mitigation." Compensatory mitigation will be provided through the EEP. The EEP acceptance letter, dated January 22, 2007, is attached. The offsetting mitigation will derive from an inventory of assets already in existence within the same 8-digit cataloguing unit.

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 4 species for Wake County. Table 2 lists the species and their federal status.

Table 2. Federally Protected Species in Wake County, NC

Common Name	Scientific Name	Federal Status*	Biological Conclusion	Habitat Present
Bald eagle	*Haliaeetus leucocephalus*	T (proposed for delisting)	No Effect	Yes
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect	No
Dwarf wedgemussel	*Alasmidonta heterodon*	E	No Effect	No
Michaux's sumac	*Rhus michauxii*	E	No Effect	No

*E= endangered, T=threatened

Biological conclusions of "No Effect" were issued for the red-cockaded woodpecker, dwarf wedgemussel, and Michaux's sumac due to lack of appropriate habitat. The most recent surveys for the bald eagle were performed on December 6, 7, and 8, 2005. Surveys were conducted within a 1-mile radius of the bridge. There is marginal habitat in the project area for the bald eagle, however, no eagles or eagle nests were observed during the surveyed areas. A biological conclusion of "No Effect" was issued for the bald eagle.

SCHEDULE

The project calls for a letting of September 18, 2007 (review date of August 7, 2007) with a date of availability of January 29, 2008. It is expected that the contractor will choose to start construction in January.

REGULATORY APPROVALS

Section 404 Permit: The project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (67 FR 2020; January 15, 2002). We are also requesting the issuance of a Nationwide Permit 33 for the temporary work pad associated with bridge construction within Lake Wheeler.

Section 401 Permit: We anticipate 401 General Certification numbers 3432 and 3334 will apply to this project. This project will impact Neuse Riparian Buffers and 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.

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. This project has been reviewed for jurisdiction under the Federal Clean Water Act (CWA).

A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call Erica McLamb at 715-1521.

Sincerely,

E. L. Lusk

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

w/attachment

Mr. John Hennessy, NCDWQ (5 Copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Michael Street, NCDMF
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, Project Services Unit
Mr. J. Wally Bowman, PE., Division Engineer
Mr. Chris Murray, DEO

w/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. John Conforti, PDEA
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch

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: NWP 23 and 33

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

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☒

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

II. Applicant Information

1. Owner/Applicant Information
   Name: Gregory J. Thorpe, Ph.D., Environmental Management Director
   Mailing Address: 1598 Mail Service Center
   Raleigh, NC 27699-1548
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address:

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

III. Project Information

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

1. Name of project: Replacement of Bridge No.311 over Lake Wheeler on SR 1379

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3917

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

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

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): 35.7001 °N 78.7222 °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: Lake Wheeler

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 land use in the surrounding area consists primarily of residential development with some forested areas.

10. Describe the overall project in detail, including the type of equipment to be used: Bridge No. 311 will be replaced west of the existing location. Traffic will be maintained on the existing bridge during construction. Heavy duty excavation equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

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

IV. Prior Project History

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

V. Future Project Plans

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

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. 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: see cover letter

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)
None					
Total Wetland Impact (acres)					

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

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

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
None						
Total Stream Impact (by length and acreage)						

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

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
1	Lake Wheeler	Fill	Lake	0.36
2	Lake Wheeler	Fill (temporary)	Lake	0.01
3	Lake Wheeler	Bridge Pier	Lake	<0.01
	Lake Wheeler	Tressle (temporary)	Lake	0.01
Total Open Water Impact (acres)				0.38

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

Stream Impact (acres):	0
Wetland Impact (acres):	0
Open Water Impact (acres):	0.38
Total Impact to Waters of the U.S. (acres)	0
Total Stream Impact (linear feet):	0

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

_____

_____

8. Pond Creation
If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):_____
Current land use in the vicinity of the pond:_____
Size of watershed draining to pond:_____ Expected pond surface area:_____

VII. Impact Justification (Avoidance and Minimization)

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

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

   Amount of stream mitigation requested (linear feet): NA
   Amount of buffer mitigation requested (square feet): 20,378
   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 Neuse)? 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	5037	3 (2 for Catawba)	15111
2	3511	1.5	5267
Total	8548		20378

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

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

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:

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).
None

E. L. Lupk 4.24.07

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

Ecosystem Enhancement PROGRAM

January 22, 2007

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-3917, Replace Bridge Number 311 over Lake Wheeler on SR 1379 (Penny Road), Wake County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the buffer mitigation for the subject project. Based on the information supplied by you in a letter dated January 17, 2007, the impacts are located in CU 03020201 of the Neuse River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Zone 1 Buffer:	5,037 square feet
Zone 2 Buffer:	3,511 square feet

If the buffer impacts or the amount of mitigation required for this project increases, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required.

All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund. The NCDOT will be responsible to ensure that appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from Tri-Party MOA Fund into the Riparian Restoration Buffer Fund. Upon completion of transfer payment, NCDOT will have completed its riparian buffer mitigation responsibility for TIP B-3917. Subsequently, EEP will conduct a review of current MOA mitigation projects in the river basin to

determine if available buffer mitigation credits exist. If there are buffer mitigation credits available, then the Riparian Restoration Buffer Fund will purchase the appropriate amount of buffer mitigation credits from Tri-Party MOA Fund.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Mr. Eric Alsmeyer, USACE-Raleigh
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3917

Ecosystem Enhancement PROGRAM

January 22, 2007

Mr. John Hennessy
N. C. Division of Water Quality
Mail Service Center 1650
Raleigh, North Carolina 27699-1650

Dear Mr. Hennessy:

Subject: EEP Mitigation Acceptance Letter:

B-3917, Replace Bridge Number 311 over Lake Wheeler on SR 1379 (Penny Road), Wake County, Neuse River Basin (Cataloging Unit 03020201)

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the buffer mitigation required for the subject project. The buffer impacts associated with this project are located in Cataloging Unit 03020201 of the Neuse River Basin. As indicated in the NCDOT's mitigation request letter dated January 17, 2007, the project will impact buffers only. The buffer impacts are 5,037 square feet in Zone 1 and 3,511 square feet in Zone 2. If the buffer impacts or the amount of mitigation required from EEP increases or decreases for this project, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required. All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund (Fund 2982).

The NCDOT will be responsible to ensure that the appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from Fund 2984 (Tri-Party MOA Account) into Fund 2982 and commit to provide the appropriate buffer mitigation to offset the impacts associated with this project.

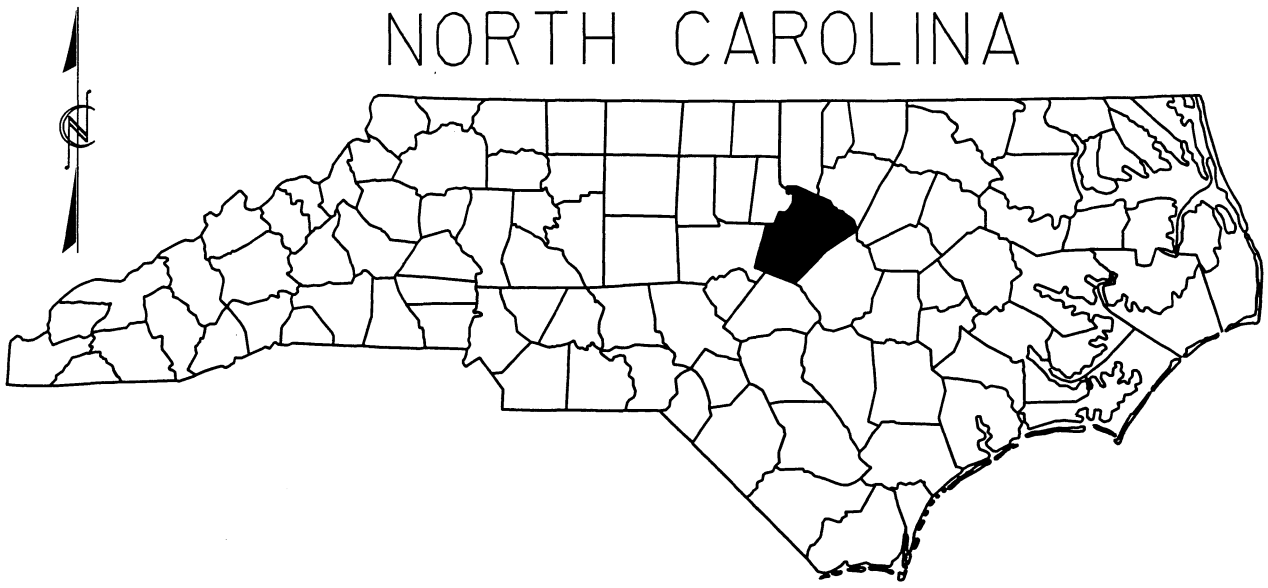
If you have any questions or need additional information, please contact Ms. Beth Harmon at (919) 715-1929.

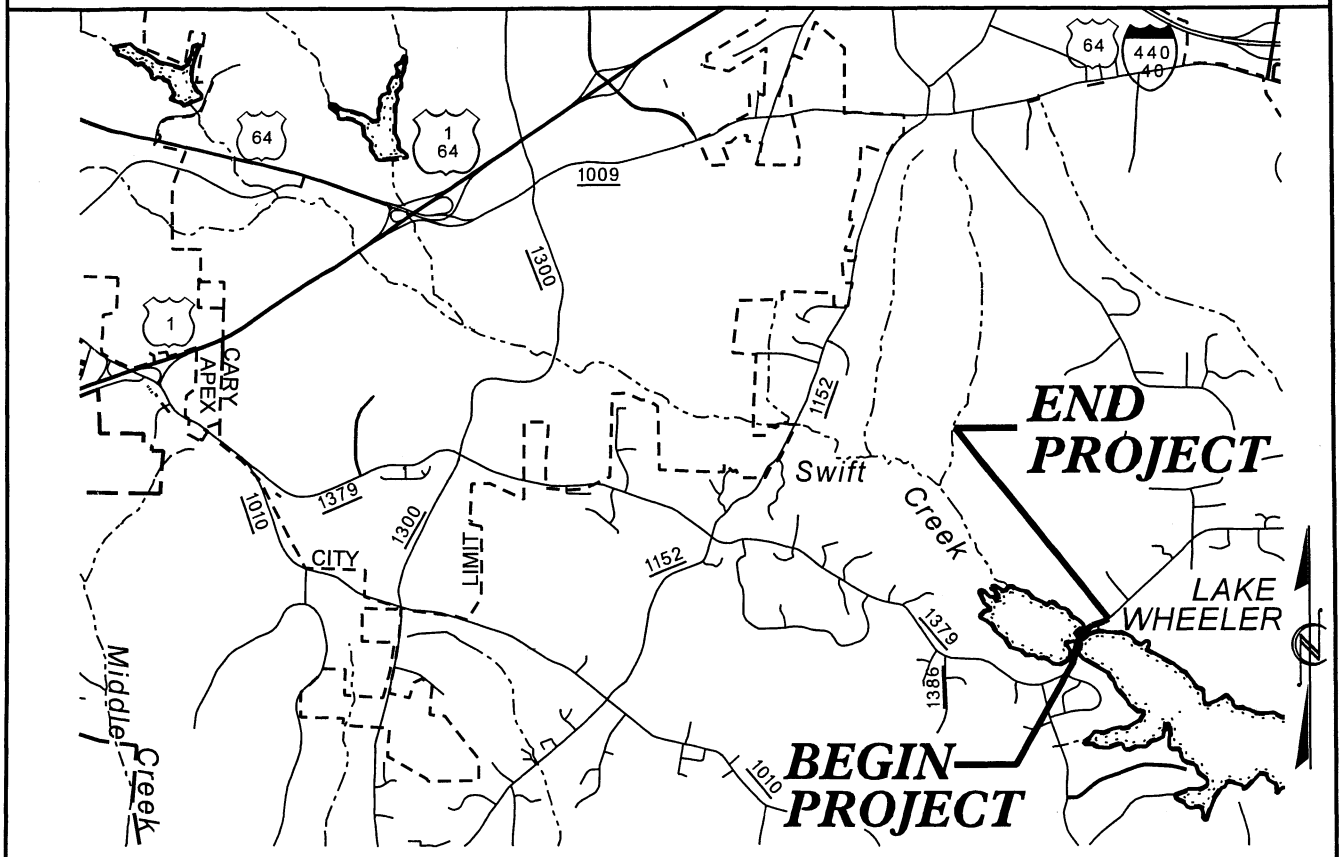
Sincerely,

James B. Stanfill for

William D. Gilmore, P.E.
EEP Director

cc: Mr. Gregory J. Thorpe, P.E., PDEA, NCDOT
Mr. Eric Alsmeyer, USACE – Raleigh
File: B-3917





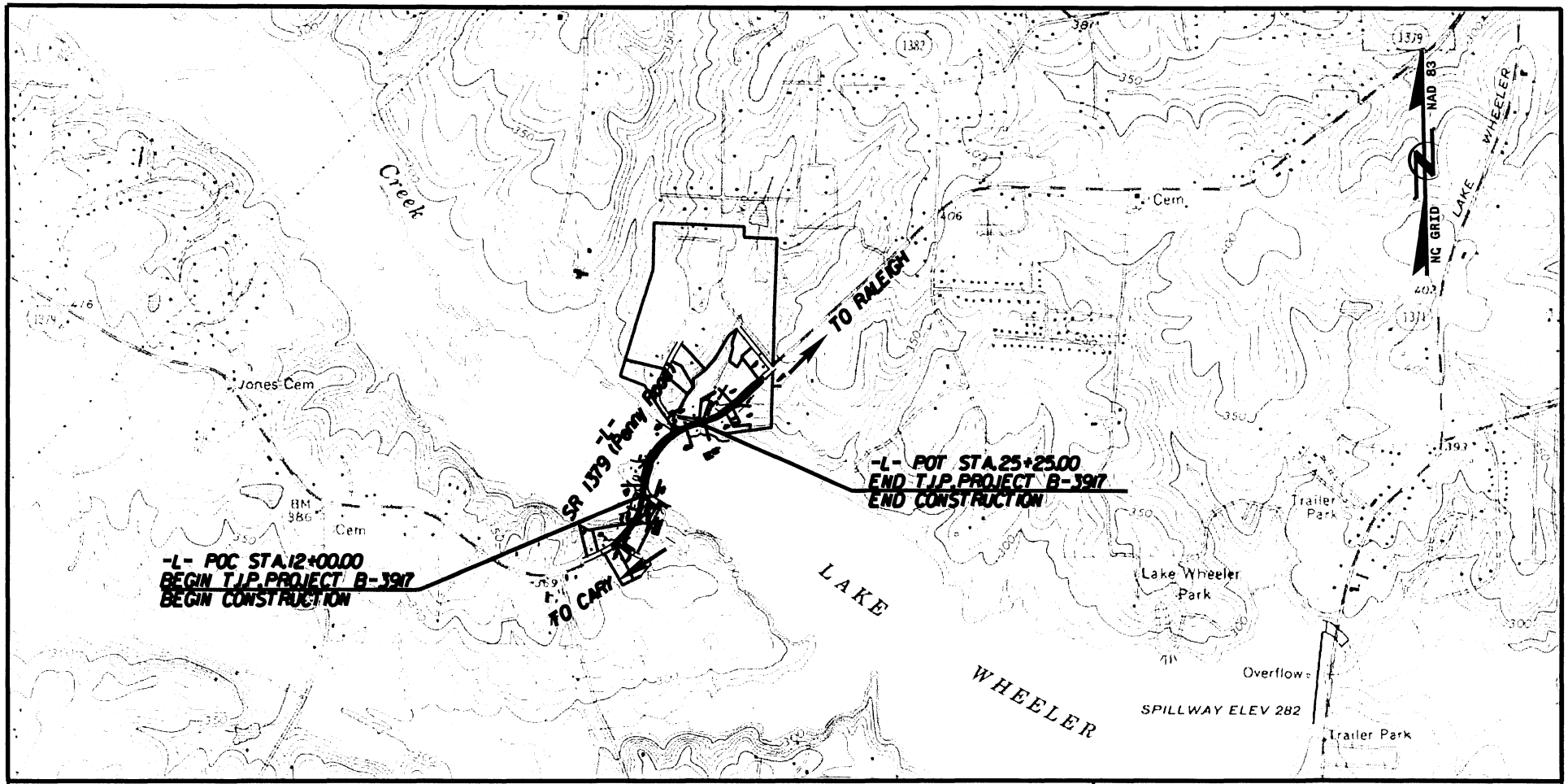
VICINITY MAPS

Wetland/Stream Permit Drawings

NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT: 33351.1.1 (B-3917)
PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

SHEET 1 OF 11 **06/14/06**



LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

SHEET 2 **OF** 11 **06/14/06**

WETLAND LEGEND

WLB WETLAND BOUNDARY

WETLAND

DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN SURFACE WATER (POND)

DENOTES TEMPORARY FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY FILL IN SURFACE WATER

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
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

LEVEL SPREADER (LS)

DITCH / GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT BRIDGE NO. 311 OVER SWIFT CREEK ON SR 1379 (PENNY ROAD)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	CITY OF RALEIGH	P.O. BOX 590 RALEIGH, NC 27602-0590
2	CITY OF RALEIGH	P.O. BOX 590 RALEIGH, NC 27602-0590

NCDOT

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

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	Sta 17+70-L-(LT)	Roadway Fill						0.356				
	to Sta 21+30-L-(LT)											
2	Temp. Work Pad								0.010			
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.36	0.01	0	0	0

METHOD II CLEARING USED IN WETLANDS

PIER IMPACTS = .001 ACRES

TRESSLE IMPACTS = 400 SQ. FT.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT 33351.1.1 (B-3917)
PROPOSED BRIDGE REPLACEMENT
BRIDGE NO.311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

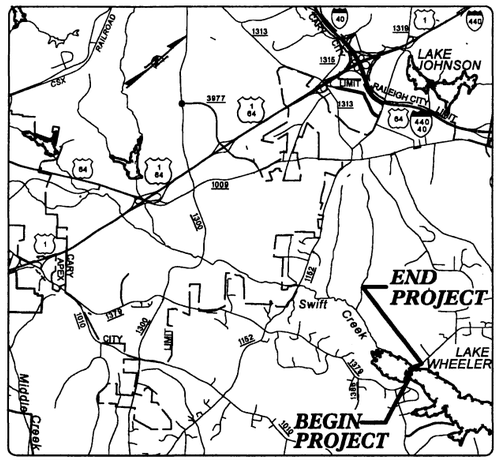
SHEET 5 OF 11 11/1/2006

ATN Revised 3/31/05

TIP PROJECT: B-3917

PROJECT: 33351.1.1

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



VICINITY MAP OF B-3917

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

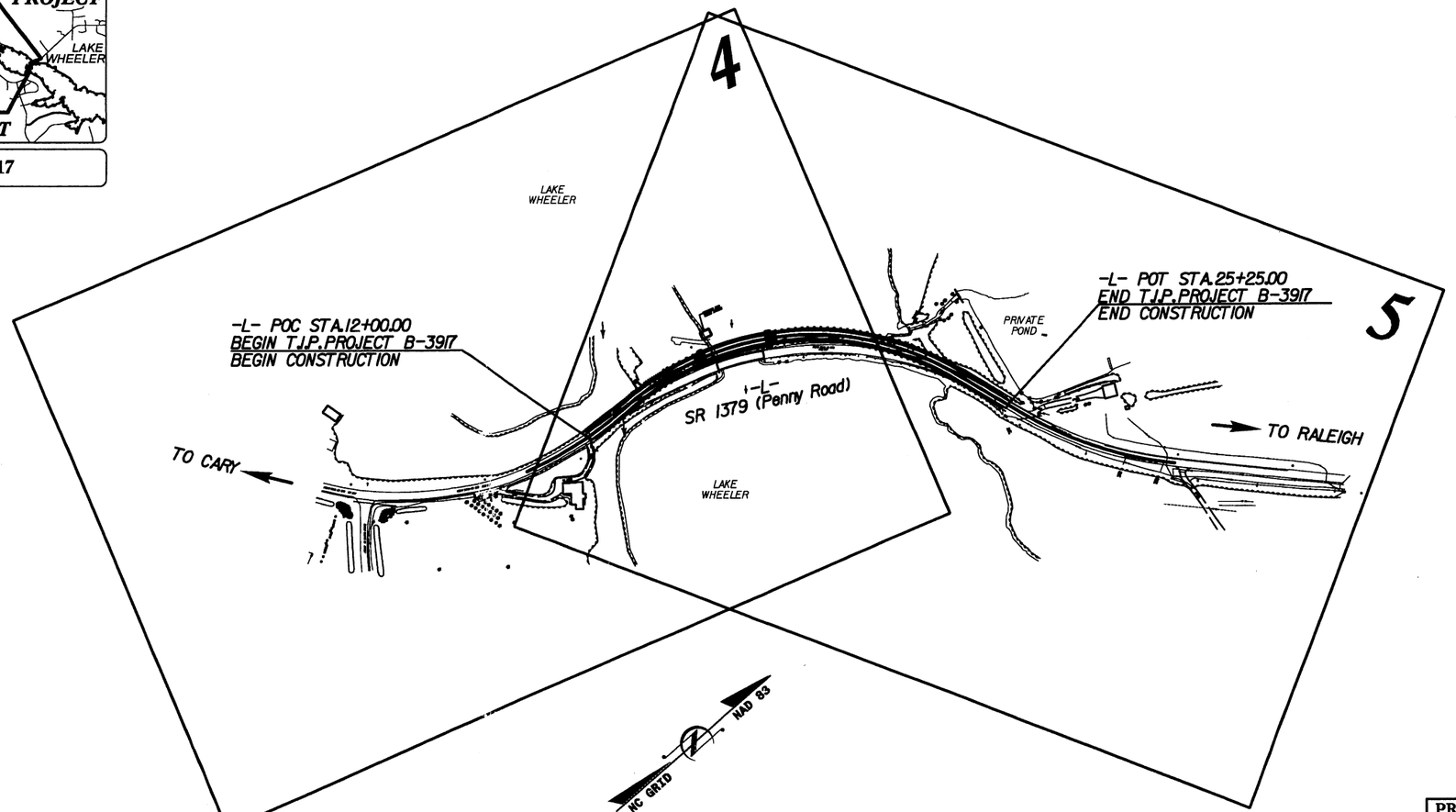
LOCATION: BRIDGE NO. 311 OVER LAKE WHEELER (SWIFT CREEK) ON SR 1379 (PENNY ROAD)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3917	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33351.1.1	BRZ-1379(1)	PE
33351.2.1	BRZ-1379(1)	R/W, UTIL

Permit Drawing
Sheet 6 of 11



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
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 2005 = 6,149
ADT 2024 = 13,800
DHV = 10%
D = 60%
T = 5%
TTST 2% DUAL 3%
V = 50 mph
FUNC CLASS = LOCAL
* DESIGN EXCEPTIONS FOR STOPPING SIGHT DISTANCE AND VERTICAL CURVE LENGTH ARE REQUIRED

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-3917 = 0.215 MILES
LENGTH STRUCTURES T.I.P. PROJECT B-3917 = 0.036 MILES
TOTAL LENGTH OF T.I.P. PROJECT B-3917 = 0.251 MILES

EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 30, 2005

LETTING DATE:
DECEMBER 19, 2006

NEIL J. DEAN, P.E.
EARTH TECH PROJECT MANAGER

DOUG TAYLOR, P.E.
NCDOT PROJECT ENGINEER

DAVIDIAN BYRD
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

JOHN D.R. NICHOLS, P.E.

ROADWAY DESIGN ENGINEER

NEIL J. DEAN, P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
B-3917	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing Sheet 7 of 11

Prepared in the Office of:
EarthTech
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS
01/16/2005 - NJD - ADDITIONAL TOPO ADDED
03/29/2006 - BRP - CONST EASEMENT ADDED FROM 13+85 TO 16+45 LT AND 16+50 TO 24+00 RT

S S FILL IN SURFACE WATER

TS TS TEMPORARY IMPACT

TEMPORARY WORK PAD (SITE #2) TO BE REMOVED WHEN CONSTRUCTION IS COMPLETE

NAD 83

SITE #2 (TEMPORARY) (WORK PAD)

SITE #1 (ROADWAY) FILL

SITE #3 (PIER IMPACTS)

BEGIN STATE PROJECT B-3917
POCSta. 12+00.00

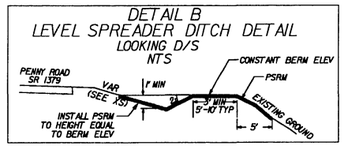
PI Sta 11+71.02
Δ = 17° 40' 27.8" (LT)
D = 5° 12' 31.3"
L = 339.32'
T = 171.02'
R = 1,100.00'
e = SEE PLANS
R.O.= SEE PLANS

PI Sta 19+19.22
Δ = 7° 52' 28.8" (RT)
D = 7° 09' 43.3"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O.= SEE PLANS

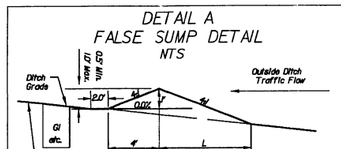
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "BELLMEADE" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 710,933.2894(ftI) EASTING: 2,083,739.1658(ftI)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989502
THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BELLMEADE" TO -L- STATION 12+00.00 IS
S 43° 20' 02.5" W 2,033.48 FT
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS

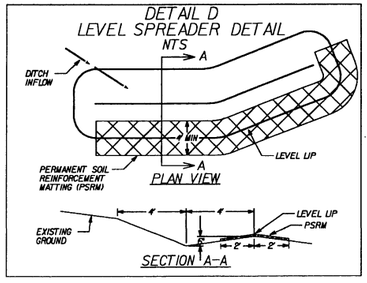


DETAIL A
FALSE SUMP DETAIL
NTS

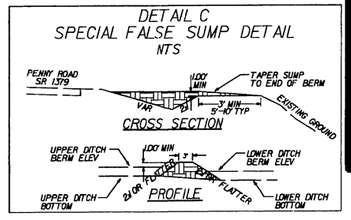


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	5'	4.0% To 6.0%	7'
2.0% To 4.0%	6'	Over 6.0%	10'

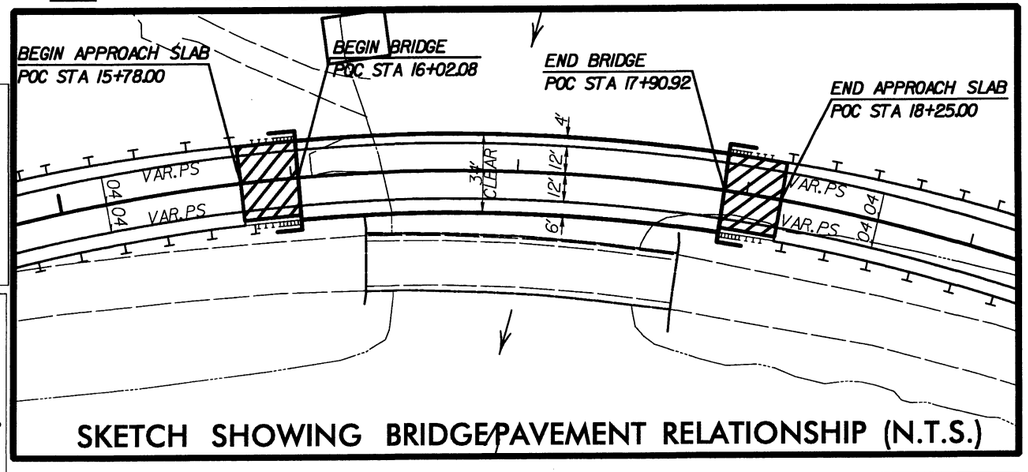
DETAIL D
LEVEL SPREADER DETAIL
NTS



DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



NOTE: TEMPORARY WORK PAD (SITE #2) TO BE REMOVED WHEN CONSTRUCTION IS COMPLETE



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S.)

FOR -L- PROFILE, SEE SHEET 6

USER: rbrady
DGN: 0475393-sht-3917hydraulics\039f.dgn
DATE: 6/13/2006
PLOT SCALE = 50.000 '/ IN

PROJECT REFERENCE NO.	SHEET NO.
B-3917	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing Sheet 8 of 11

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A Member of the Amec Group
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS
01/02/2005 - NJD - ADDITIONAL TOPO ADDED
03/29/2006 - RRP - CONST EASEMENT ADDED FROM 13+85 TO 16+45 TO 16+45 LT AND 16+50 TO 24+00 RT

FILL IN SURFACE WATER

TEMPORARY IMPACT

TEMPORARY WORK PAD (SITE #2) TO BE REMOVED WHEN CONSTRUCTION IS COMPLETE

NAD 83

SITE #2 (TEMPORARY) WORK PAD)

SITE #1 (ROADWAY FILL)

SITE #3 (PIER IMPACTS)

PBSCL 11+33.32

BL-2 -L- Sta 10+64.40 14.33' RT

BL-3 -L- Sta 15+01.23 6.20' Rt.

CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

CHRISTINE E. FOWLER DB 1816 PG 499

JAMES EDWARDS SR. & SHERRY B. MACQUEEN DB 5793 DB 809

JAMES EDWARDS & SHERRY B. MACQUEEN DB 5793 DB 809

MICHAEL ALLEN & JANICE BELL TUCKER DB 7359 PG 238

PEANT ROAD SR 1379

WOODS

DR DRIVE

EXISTING R/W

+75 55' & EXIST

PLACE SBG STA 12+00 TO STA 13+70 LT

FALSE SUMP (SEE DETAIL A)

+80 EXIST

+80 EXIST

+80 EXIST

+40 EXIST

OUTLET PROTECTION 3 TONS CLASS B 10 SY FF

LEVEL SPREADER DITCH BERM ELEV.= 298.75 STA 13+95 TO 14+50 100.5 SY PSRM (SEE DETAIL B)

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 297.00 STA 14+50 TO 15+00 115 SY PSRM (SEE DETAIL B)

LEVEL SPREADER UP ELEV.= 296.50 M SY PSRM (SEE DETAIL D)

TRESTLE FOR BARGE ACCESS

+20 75'

+30 75'

+40 75'

+45 75'

+45 55'

+35.32 55'

+35.32 55'

PDE

VAR PS

VAR PS

VAR PS

BRIDGE NO. 38 TIMBER AND CONCRETE BRIDGE ELEV.=291.68

SEAT ELEV.=280.34

SPECIAL FALSE SUMP (SEE DETAIL C)

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 295.50 STA 15+00 TO 15+50 130 SY PSRM (SEE DETAIL B)

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 294.00 STA 15+50 TO 16+00 125 SY PSRM (SEE DETAIL B)

OUTLET PROTECTION 3 TONS CLASS B 10 SY FF

MODIFIED CONCRETE FLUME (SEE DETAIL)

LEVEL SPREADER DITCH BERM ELEV.= 288.00 STA 18+10 TO STA 20+00 865 SY PSRM SPECIAL FALSE SUMP (SEE DETAIL B) (SEE (DETAIL C)

+00 85'

BERM ELEV. 295.50

MATCHLINE STA 20+00-SEE SHEET NO. 5

BEGIN STATE PROJECT B-3917
POCSta. 12+00.00

② CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

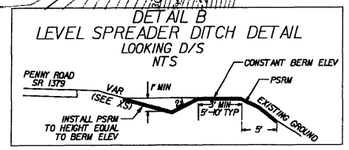
PI Sta 11+71.02
Δ= 11° 40' 27.8" (LT)
D = 5° 12' 31.3"
L = 339.32'
T = 171.02'
R = 1,100.00'
e = SEE PLANS
R.D.= SEE PLANS

PI Sta 19+19.22
Δ= 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.D.= SEE PLANS

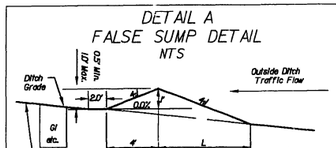
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "BELLMEADE" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 710,933.2894(FT) EASTING: 2,083,739.1658(FT) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989502 THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BELLMEADE" TO -L- STATION 12+00.00 IS S 43° 20' 02.5" W 2,033.48 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

DETAIL B
LEVEL SPREADER DITCH DETAIL
NTS

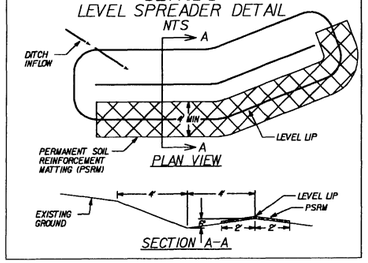


DETAIL A
FALSE SUMP DETAIL
NTS

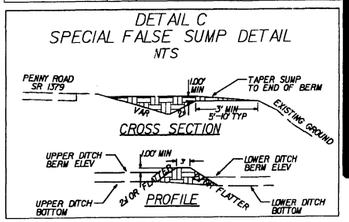


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	5'	4.0% To 6.0%	7'
2.0% To 4.0%	6'	Over 6.0%	10'

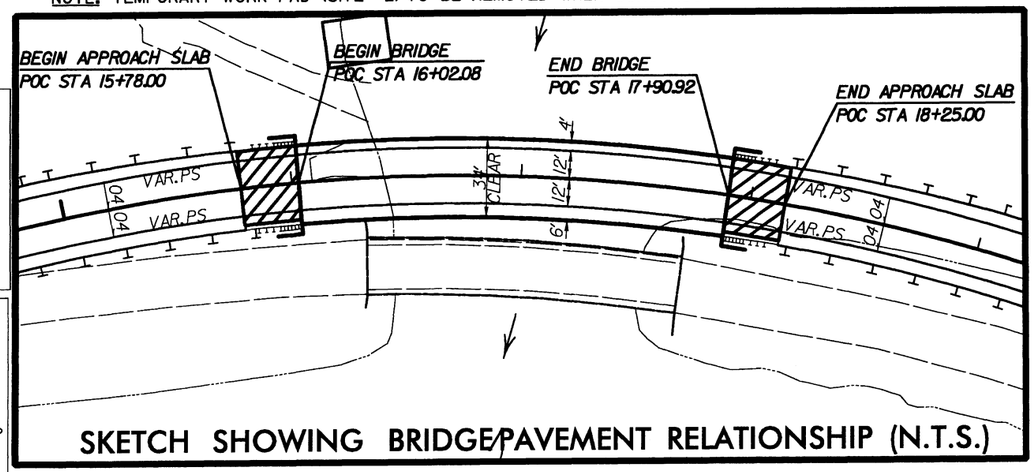
DETAIL D
LEVEL SPREADER DETAIL
NTS



DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



NOTE: TEMPORARY WORK PAD (SITE #2) TO BE REMOVED WHEN CONSTRUCTION IS COMPLETE



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S.)

FOR -L- PROFILE, SEE SHEET 6

USER: DRAWING
DGN: B-3917_SHEET_4.dgn
PLOT: 6/15/2006 8:41:16 AM

PROJECT REFERENCE NO.	SHEET NO.
B-3917	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing Sheet 9 of 11

Prepared in the Office of:
EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS
01/16/2006 - NJD - ADDITIONAL TOPO ADDED
02/07/2006 - NJD - R/W CALLOUTS CORRECTED
03/28/2006 - BRP - CONST EASEMENT ADDED FROM 16+50 TO 24+00 RT

FILL IN SURFACE WATER
TEMPORARY IMPACT
NAD 83

END STATE PROJECT B-3917
POT Sta. 25+25.00

MATCHLINE STA 20+00-SEE SHEET NO.4

SITE #1

① CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

② CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

③ DAN ERIC TUCKER & PAM HILLIARD

④ CITY OF RALEIGH NO REFERENCE FOUND

LOIS T DENNING DB 2437 PG 387

DAN ERIC TUCKER & PAM HILLIARD

JESSE W DRY DB 1241 PG 051

CITY OF RALEIGH DB 1273 PG 001

PENNY ROAD SR 1379

PC Sta. 23+42.88

PC Sta. 25+86.08

PI Sta. 30+33.66

SPECIAL FALSE SUMP (DETAIL C)

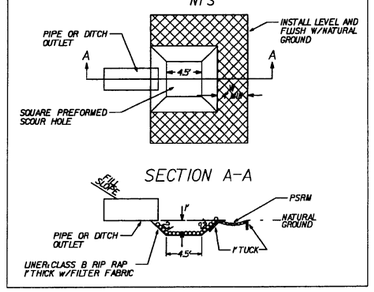
LEVEL SPREADER DITCH BERM ELEV.= 298.00 STA 20+00 TO 22+00 RT 20' SF PSRM (SEE DETAIL B)

PLACE SB6 STA. 22+00 TO STA 24+43 RT

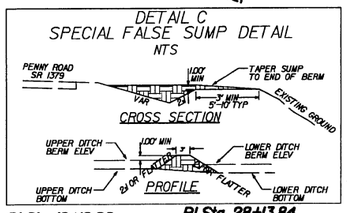
PLACE PRE-FORMED SCOUR HOLE 4.5 TONS CLASS B RIP RAP 23 SY FF 23 SY PSRM (SEE DETAIL E)

FOR -L- PROFILE, SEE SHEET 6

DETAIL E
PREFORMED SCOUR HOLE DETAIL
NTS



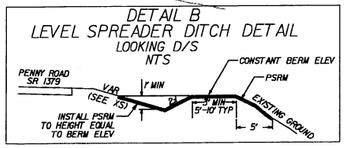
DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



PI Sta 19+19.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

PI Sta 28+13.84
Δ = 24° 28' 40.6" (LT)
D = 5° 27' 24.3"
L = 448.58'
T = 227.77'
R = 1,050.00'

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS



PROJECT REFERENCE NO.	SHEET NO.
B-3917	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 10 of 11

Prepared in the Office of: EarthTech
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS
01/16/2006 - NJD - ADDITIONAL TOPO ADDED
02/07/2006 - NJD - R/W CALLOUTS CORRECTED
03/29/2006 - BRP - CONST EASEMENT ADDED FROM 16+50 TO 24+00 RT

FILL IN SURFACE WATER
TEMPORARY IMPACT
NAD 83

END STATE PROJECT B-3917
POT Sta. 25+25.00

MATCHLINE STA 20+00-SEE SHEET NO. 4

SITE #1

① CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

② CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

③ DAN ERIC TUCKER & PAM HILLIARD

④ CITY OF RALEIGH NO REFERENCE FOUND

LOIS T DENNING DB 2437 PG 387

DAN ERIC TUCKER & PAM HILLIARD

JESSE W DRY DB 1241 PG 051

CITY OF RALEIGH DB 1273 PG 001

PENNY ROAD SR 1379

N 71° 08' 39.4" E 282.27'

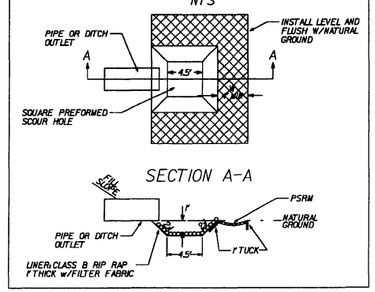
PI Sta 19+13.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

PI Sta 28+13.84
Δ = 24° 28' 40.6" (LT)
D = 5° 27' 24.3"
L = 448.58'
T = 227.77'
R = 1,050.00'

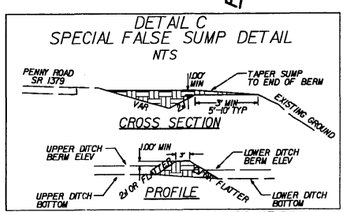
PCSta. 23+49.88

PCSta. 25+86.08

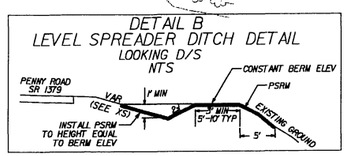
DETAIL E
PREFORMED SCOUR HOLE DETAIL
NTS



DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS



FOR -L- PROFILE, SEE SHEET 6

USER: rpatel
DGN: GX7350.dgn
DAW: 30" Hydraulics\X397_HYD_det_pe.dgn
REV: 8:41:12 AM
DATE: 6/1/2006
PLOTTED: 6/2/2006 2:45 PM

PROJECT REFERENCE NO.	SHEET NO.
B-3917	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet of

-L-

BEGIN STATE PROJECT B-3917
BEGIN GRADE -L- STA 12+00.00
ELEV. 318.29

BEGIN BRIDGE
-L- STA 16+03.00

PI = 16+07.67
EL = 292.43'
VC = 750'
K = 156

END BRIDGE
-L- STA 17+90.00

(-L-) 29.25

(-L-) 30.00

3'

1.5:1

TEMPORARY WORK PAD

VIEW A

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 6300 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 290.7 FT
BASE DISCHARGE	= 7950 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 291.7 FT
OVERTOPPING DISCHARGE	= 6300 CFS
OVERTOPPING FREQUENCY	= 50 YRS
OVERTOPPING ELEVATION	= 290.5 FT
OVERTOPPING POINT IS ON ROADWAY APPROACH NOT BRIDGE	
DATE OF SURVEY	= 06/08/2004
W.S. ELEVATION AT DATE OF SURVEY	= 283.0 FT

TBM-1 – 'BENCHLITE' NAIL IN TREE
N 709,570.77 E 2,082,323.83
-BL- STA 12+78 33' (L) EL. 304.14
-L- STA. 13+16.62 26.96'(L)

FOR -L- PLAN VIEW, SEE SHEET 4

-L-

PI = 21+40.00
EL = 290.83'
VC = 150'
K = 602

PI = 24+15.00
EL = 289.32'
VC = 220'
K = 66

END STATE PROJECT B-3917
END GRADE -L- STA 25+05.00
ELEV. 292.38

(-L-) 29.25

(-L-) 30.00

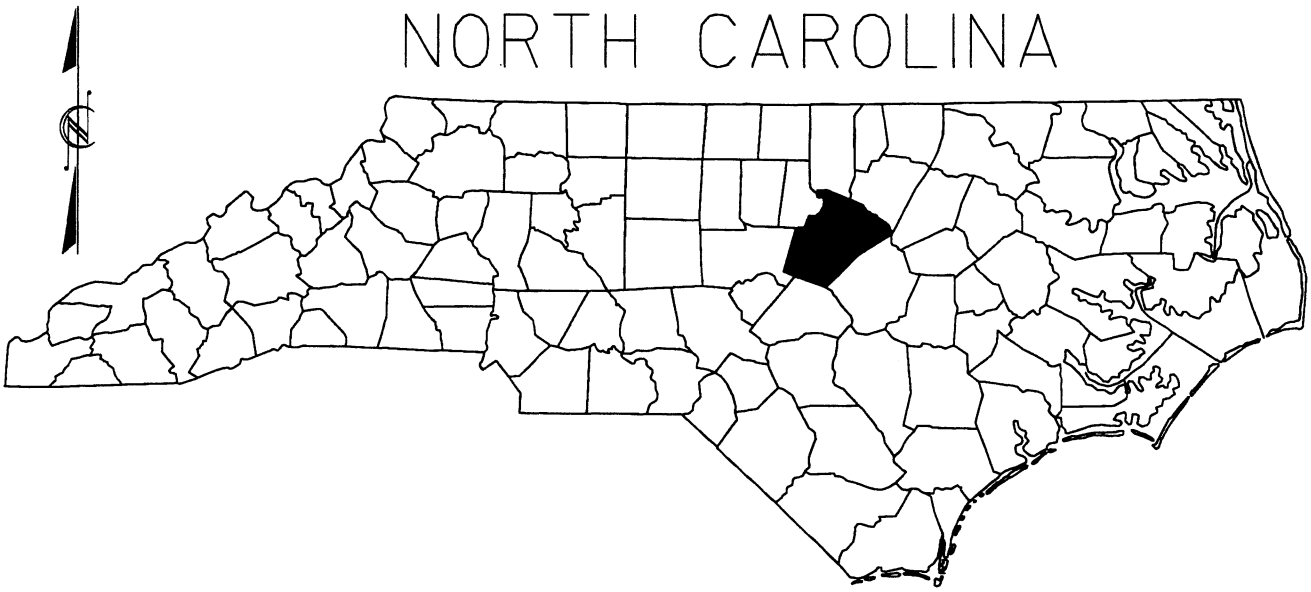
(-L-) 30.54932

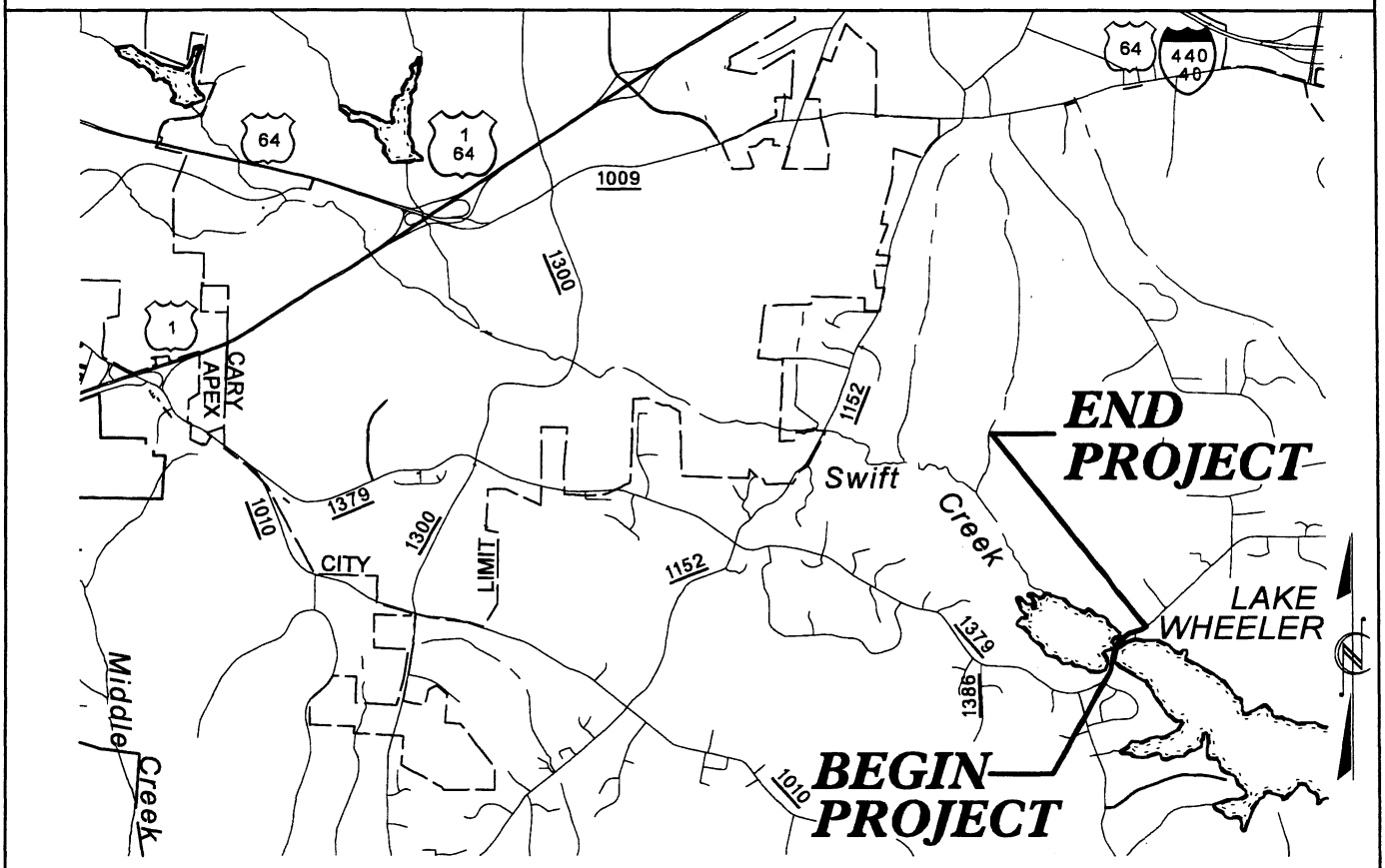
(-L-) 30.54932

(-L-) 30.12785R

TBM-2 – 'BENCHLITE' NAIL IN TREE
N 710,535.20 E 2,083,462.97
-BL- STA 28+56 59' (R) EL. 315.63
-L- STA. 29+21.33 76'(R)

FOR -L- PLAN VIEW, SEE SHEET 5





VICINITY MAPS

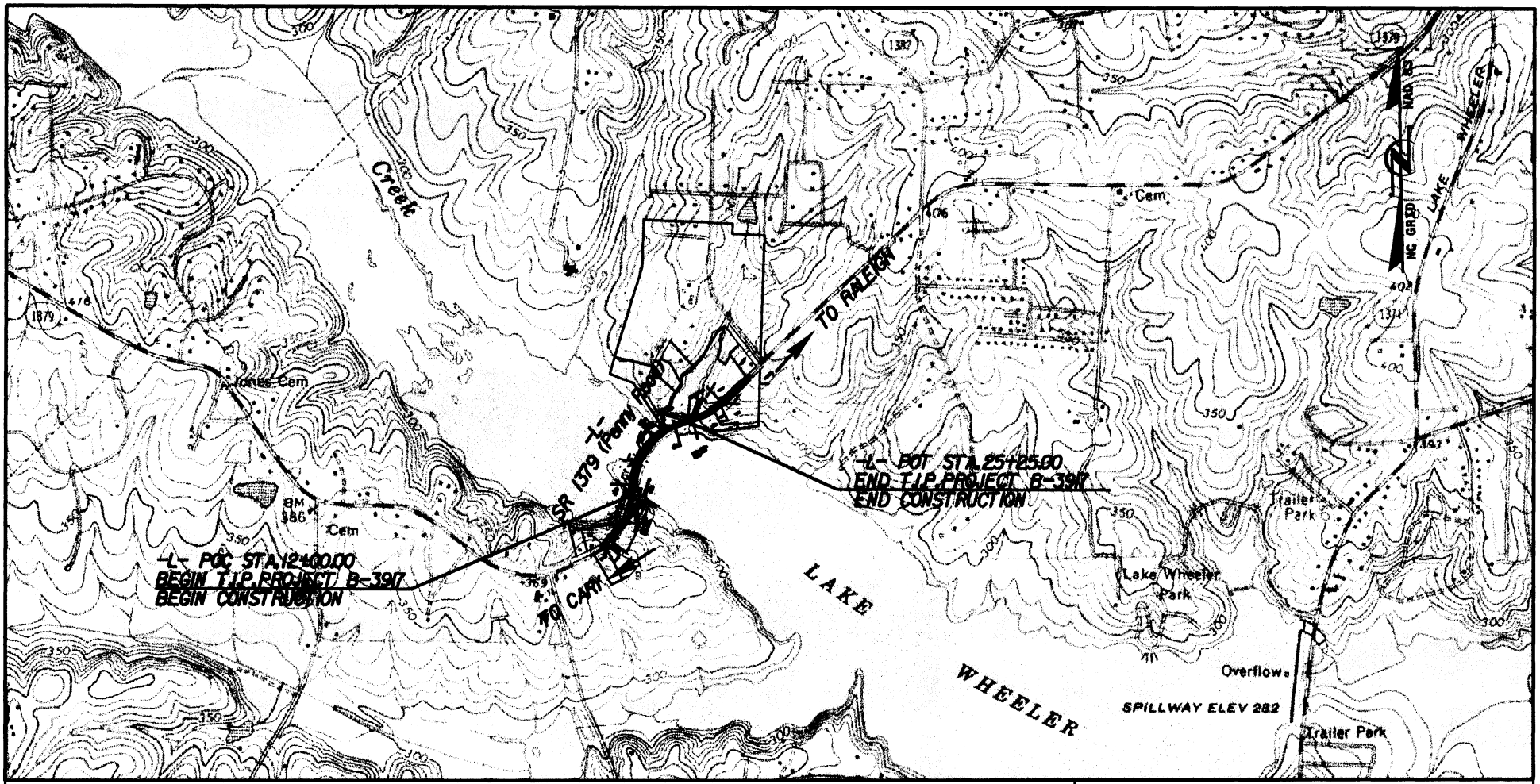
Neuse Buffer Permit Drawings

NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

SHEET 1 **OF** 10 **12/14/06**



400 200 0 400 800

LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

SHEET 2 **OF** 10 **12/14/06**

BUFFER LEGEND

WLB — WETLAND BOUNDARY

WETLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

ALLOWABLE IMPACTS WITH MITIGATION ZONE 1

ALLOWABLE IMPACTS WITH MITIGATION 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

CORE 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)

GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT BRIDGE NO. 311 OVER SWIFT CREEK ON SR 1379 (PENNY ROAD)

SHEET 3 **OF** 10 **11/30/06**

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	CITY OF RALEIGH	P.O. BOX 590 RALEIGH, NC 27602-0590
2	CITY OF RALEIGH	P.O. BOX 590 RALEIGH, NC 27602-0590
3	DAN ERIC TUCKER & PAM HILLIARD	6600 PENNY ROAD RALEIGH, NC 27606

NCDOT

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33351.1.1 (B-3917)

PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR 1379 (PENNY ROAD)

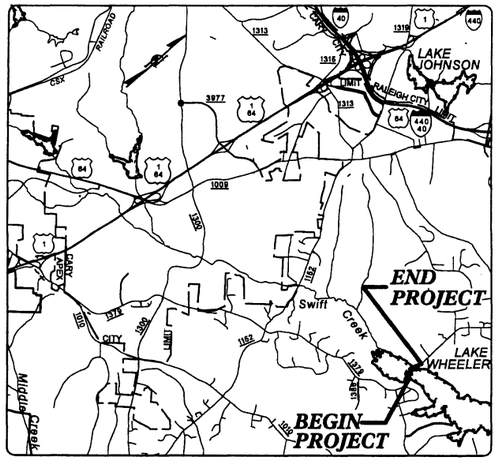
BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			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		-L- STA 12+27 RT	X					0.0	1084.0	693.0	1777.0		
		TO -L- STA 13+40 RT											
2		-L- STA 12+05 LT	X					0.0	0.0	476.0	476.0		
		TO -L- STA 13+00 LT											
3	BRIDGE	-L- STA 16+05 LT & RT TO		X		2053.0	185.0	2238.0	0.0	0.0	0.0		
		-L- STA 16+42 LT& RT											
4		-L- STA 15+80 LT	X					0.0	155.0	951.0	1106.0		
		TO -L- STA 16+42 LT											
5		-L- STA 21+19 LT	X					0.0	2907.0	862.0	3769.0		
		TO -L- STA 22+36 LT											
6		TO -L- STA 23+20 RT	X					0.0	891.0	529.0	1420.0		
		TO -L- STA 24+02 RT											
TOTAL:						2053.0	185.0	2238.0	5037.0	3511.0	8548.0		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 33351.1.1 (B-3917)
PROPOSED BRIDGE REPLACEMENT
BRIDGE NO. 311 OVER SWIFT CREEK
ON SR. 1379 (PENNY ROAD)
12/13/2006
SHEET 5 OF 10

Rev. May 2006

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



VICINITY MAP OF B-3917

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

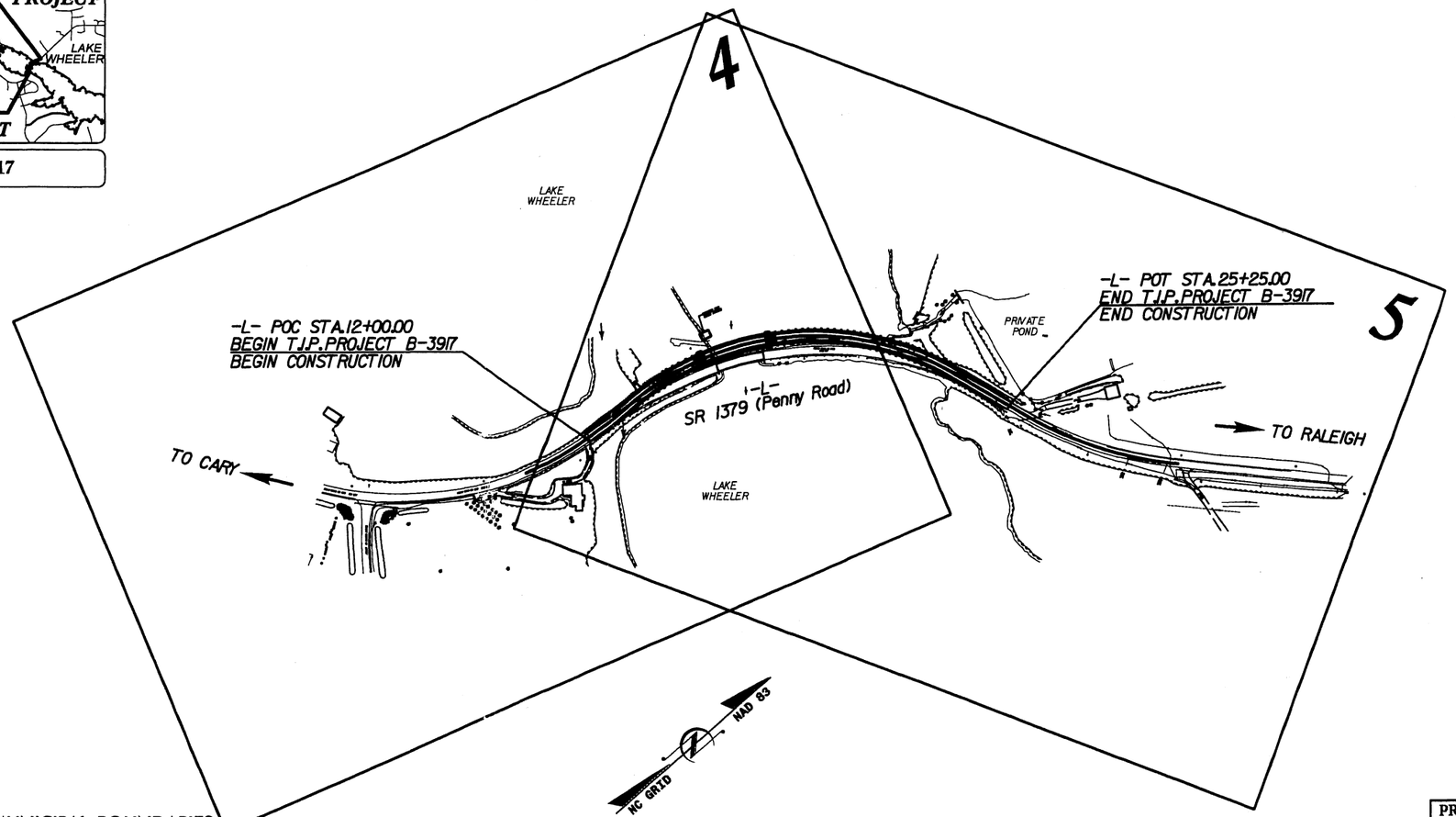
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3917	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33351.1.1	BRZ-1379(1)	PE
33351.2.1	BRZ-1379(1)	R/W, UTIL

Bluffer Drawing Sheet 6 of 12

LOCATION: BRIDGE NO. 311 OVER LAKE WHEELER (SWIFT CREEK) ON SR 1379 (PENNY ROAD)

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



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
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 2005 = 6,149
ADT 2024 = 13,800
DHV = 10%
D = 60%
T = 5%
TTST 2% DUAL 3%
V = 50 mph
FUNC CLASS = LOCAL
* DESIGN EXCEPTIONS FOR STOPPING SIGHT DISTANCE AND VERTICAL CURVE LENGTH ARE REQUIRED

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-3917 = 0.215 MILES
LENGTH STRUCTURES T.I.P. PROJECT B-3917 = 0.036 MILES
TOTAL LENGTH OF T.I.P. PROJECT B-3917 = 0.251 MILES

EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 30, 2005

LETTING DATE:
DECEMBER 19, 2006

NEIL J. DEAN, P.E.
EARTH TECH PROJECT MANAGER

DOUG TAYLOR, P.E.
NCDOT PROJECT ENGINEER

DAVIDIAN BYRD
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

JOHN D.R. NICHOLS, P.E.

ROADWAY DESIGN ENGINEER

NEIL J. DEAN, P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

TIP PROJECT: B-3917

PROJECT: 33351.1.1

1:19:26 PM
Q:\7539\B-3917\Hydraulics\b3917_HYD_PERMIT_tsh.dgn
rene.remy

PROJECT REFERENCE NO.	SHEET NO.
B-3917	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 7 of 10

Prepared in the Office of:
EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 (FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

ALLOWABLE IMPACTS WITH MITIGATION ZONE 2

ALLOWABLE IMPACTS WITH MITIGATION ZONE 1

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

NAD 83

REVISIONS
01/62005 - NJD - ADDITIONAL TOPO ADDED
03/292006 - BRP - CONST EASEMENT ADDED FROM 13+85 TO 16+45 LT AND 16+50 TO 24+00 RT

USER: DCHUNG
DGN: B-3917-Hydraulics-Permit.DGN
DATE: 10/12/2006
PRT: 24x36

CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 26, 1987

CHRISTINE F FOWLER DB 1816 PG 499

JAMES EDWARDS & SHERRY B MACQUEEN DB 5793 DB 809

MICHAEL ALLEN & JANICE BELL TUCKER DB 7350 PG 298

PENNY ROAD SR 1379

POCSta. 10+00.00

BL-2 L-Sta10+64.40 14.93' RT

POCSta. 13+39.32

BL-3 L-Sta15+01.25 8.20' RT.

SITE #1

SITE #2

SITE #3

SITE #4

BEGIN STATE PROJECT B-3917

POCSta. 12+00.00

PLACE SBG STA 12+00 TO STA 13+70 LT

FALSE SUMP (SEE DETAIL A)

OUTLET PROTECTION 3 TONS CLASS B 10 SY FF

LEVEL SPREADER DITCH BERM ELEV.= 298.75 STA 13+95 TO 14+50 100.5 SY PSRM (SEE DETAIL B)

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 297.00 STA 14+50 TO 15+00 115 SY PSRM (SEE DETAIL B)

ROCK PLATING EST 360 TONS CL II

LEVEL SPREADER UP ELEV= 296.50 14 SY PSRM (SEE DETAIL D)

TRESTLE FOR BARGE ACCESS

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 296.50 STA 15+00 TO 15+50 130 SY PSRM (SEE DETAIL B)

LEVEL SPREADER DITCH BERM ELEV.= 294.00 STA 15+50 TO 16+00 125 SY PSRM (SEE DETAIL B)

OUTLET PROTECTION 3 TONS CLASS B 10 SY FF

ROCK EMBANKMENT TO EL.285.00 EST 4450 TONS CL VII SELECT MATERIAL EST 1850 TONS CL VI SELECT MATERIAL EST 1700 SY FILTER FABRIC SEE GEOTECHNICAL PLANS

ROCK PLATING ABOVE EL.285.00 EST 550 TONS CL II RIP RAP EST 700 SY FILTER FABRIC SEE GEOTECHNICAL PLANS

MODIFIED CONCRETE FLUME (SEE DETAIL)

LEVEL SPREADER DITCH BERM ELEV.= 288.00 STA 18+10 TO STA 20+00 665 SY PSRM SPECIAL FALSE SUMP (SEE DETAIL B) (SEE (DETAIL C)

MATCHLINE STA 20+00-SEE SHEET NO. 5

BRIDGE NO. 38

PI Sta 11+71.02
Δ = 11° 40' 27.8" (LT)
D = 5° 12' 31.3"
L = 339.32'
T = 171.02'
R = 1,100.00'
e = SEE PLANS
R.O. = SEE PLANS

PI Sta 19+19.22
Δ = 11° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS

DETAIL A
FALSE SUMP DETAIL
NTS

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	5'	4.0% To 6.0%	7'
2.0% To 4.0%	6'	Over 6.0%	10'

DETAIL D
LEVEL SPREADER DETAIL
NTS

DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS

BEGIN APPROACH SLAB
POC STA 15+78.00

BEGIN BRIDGE
POC STA 16+02.08

END BRIDGE
POC STA 17+90.92

END APPROACH SLAB
POC STA 18+25.00

SEE GEOT

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S.)

FOR -L- PROFILE, SEE SHEET 6

PROJECT REFERENCE NO.	SHEET NO.
B-3917	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 8 of 10

Prepared in the Office of:
EarthTech
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

ALLOWABLE IMPACTS WITH MITIGATION ZONE 2

ALLOWABLE IMPACTS WITH MITIGATION ZONE 1

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

NAD 83

REVISIONS
01/12/2005 - NJD - ADDITIONAL TOPO ADDED
03/29/2006 - BRP - CONST EASEMENT ADDED FROM 13+85 TO 16+45 LT AND 16+50 TO 24+00 RT

CHRISTINE E FOWLER DB 1916 PG 499

JAMES EDWARDS & SHERRY B MACQUEEN DB 5733 DB 609

MICHAEL ALLEN & JANICE BELL TUCKER DB 7358 PG 338

① CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 28, 1987

② CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 28, 1987

PC Sta 10+00.00

BL-2 Sta 10+64.40 14.93' RT

PRC Sta 13+39.32

BL-3 Sta 15+01.25 6.20' Rt.

SITE #1

SITE #2

SITE #3

SITE #4

BEGIN STATE PROJECT B-3917

POC Sta. 12+00.00

SPECIAL FALSE SUMP (SEE DETAIL C)

LEVEL SPREADER DITCH BERM ELEV.= 298.75 STA 13+95 TO 14+50 100.5 SY PSRM (SEE DETAIL B)

LEVEL SPREADER DITCH BERM ELEV.= 297.00 STA 14+50 TO 15+00 115 SY PSRM (SEE DETAIL B)

LEVEL SPREADER DITCH BERM ELEV.= 295.50 STA 15+00 TO 15+50 130 SY PSRM (SEE DETAIL B)

LEVEL SPREADER DITCH BERM ELEV.= 294.00 STA 15+50 TO 16+00 125 SY PSRM (SEE DETAIL B)

LEVEL SPREADER DITCH BERM ELEV.= 288.00 STA 18+10 TO STA 20+00 665 SY PSRM (SEE DETAIL B)

OUTLET PROTECTION 3 TONS CLASS B 10 SY FF

ROCK PLATING EST 360 TONS CL II

ROCK EMBANKMENT TO EL.285.00
EST 4450 TONS CL VII SELECT MATERIAL
EST 1850 TONS CL VI SELECT MATERIAL
EST 1700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

ROCK PLATING ABOVE EL.285.00
EST 550 TONS CL II RIP RAP
EST 700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

TRESTLE FOR BARGE ACCESS

MODIFIED CONCRETE FLUME (SEE DETAIL)

MATCHLINE STA 20+00-SEE SHEET NO. 5

PI Sta 11+71.02
Δ = 11° 40' 27.8" (LT)
D = 5° 12' 31.3"
L = 339.32'
T = 171.02'
R = 1,100.00'
e = SEE PLANS
R.O. = SEE PLANS

PI Sta 19+19.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS

DETAIL A
FALSE SUMP DETAIL
NTS

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	5'	4.0% To 6.0%	7'
2.0% To 4.0%	6'	Over 6.0%	10'

DETAIL D
LEVEL SPREADER DETAIL
NTS

DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS

BEGIN APPROACH SLAB
POC STA 15+78.00

BEGIN BRIDGE
POC STA 16+02.08

END BRIDGE
POC STA 17+90.92

END APPROACH SLAB
POC STA 18+25.00

SEE GEOT

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S.)

FOR -L- PROFILE, SEE SHEET 6

USER: brp1599
DGN: B-3917-D-3917-Hydraulics Panel\N3917_HYD_GRADE_SHEET.dgn
DATE: 8/24/2006
PRF: brp1599

PROJECT REFERENCE NO.	SHEET NO.
B-3917	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 9 of 10

Prepared in the Office of:
EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

ALLOWABLE IMPACTS WITH MITIGATION ZONE 2

ALLOWABLE IMPACTS WITH MITIGATION ZONE 1

NAD 83

REVISIONS
01/16/2006 - NJD - ADDITIONAL TOPO ADDED
02/07/2006 - NJD - R/W CALLOUTS CORRECTED
03/28/2006 - BRP - CONST EASEMENT ADDED FROM 16+50 TO 24+00 RT

USER: DPILCHER
DGN: 0215556-39-39P-Hydraulics-Permit.dgn
DATE: 4/24/2006
PRT: ##PRT##

① CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

② CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

③ DAN ERIC TUCKER & PAM HILLIARD

LOIS T DENNING DB 2437 PG 387

④ CITY OF RALEIGH NO REFERENCE FOUND

DAN ERIC TUCKER & PAM HILLIARD

JESSE W DRY DB 1241 PG 051

CITY OF RALEIGH DB 1273 PG 001

END STATE PROJECT B-3917
POT Sta. 25+25.00

PI Sta. 30+34.66

ROCK EMBANKMENT TO EL. 285.00
EST 1450 TONS CL VII SELECT MATERIAL
EST 1850 TONS CL VI SELECT MATERIAL
EST 1700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

ROCK PLATING ABOVE EL. 285.00
EST 550 TONS CL II RIP RAP
EST 700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

SITE #5

SITE #6

MATCHLINE STA 20+00-SEE SHEET NO. 4

SPECIAL FALSE SUMP (DETAIL C)

LEVEL SPREADER DITCH BERM ELEV = 288.00 STA 24+00 TO 22+00 510 SY PSRM (SEE DETAIL B)

PLACE SB6 STA 22+00 TO STA 24+43 RT

PLACE PRE-FORMED SCOUR HOLE 2.75 TONS CLASS B 33 SY PSRM (SEE DETAIL E)

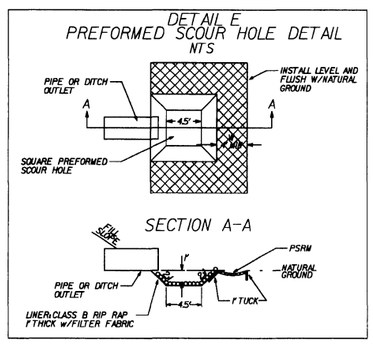
PI Sta 21+42.88

PC Sta. 25+86.08

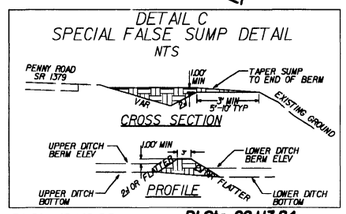
N 71° 08' 39" E

PENNY ROAD SR 1379

DETAIL E
PREFORMED SCOUR HOLE DETAIL
NTS



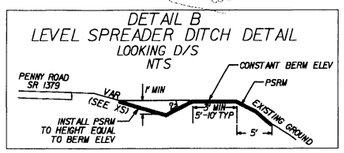
DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



PI Sta 19+19.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

PI Sta 28+13.84
Δ = 24° 28' 40.6" (LT)
D = 5° 27' 24.3"
L = 448.58'
T = 227.77'
R = 1,050.00'

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS



FOR -L- PROFILE, SEE SHEET 6

PROJECT REFERENCE NO.	SHEET NO.
B-3917	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 10 of 10

Prepared in the Office of:
EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

ALLOWABLE IMPACTS WITH MITIGATION ZONE 2

ALLOWABLE IMPACTS WITH MITIGATION ZONE 1

NAD 83

REVISIONS
01/16/2006 - NJD - ADDITIONAL TOPO ADDED
02/07/2006 - NJD - R/W CALLOUTS CORRECTED
03/28/2006 - BRP - CONST EASEMENT ADDED FROM 16+50 TO 24+00 RT

USER: rbrake
DGN: B-3917-Hydraulics-Permit-Sht.dgn
DATE: 12/12/2006
PRF: 24x36
PLOT SCALE: 1"=50'

CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

LOIS T DENNING DB 2437 PG 397

DAN ERIC TUCKER & PAM HILLIARD

ROCK EMBANKMENT TO EL.285.00
EST 4450 TONS CL VI SELECT MATERIAL
EST 1850 TONS CL VI SELECT MATERIAL
EST 1700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

ROCK PLATING ABOVE EL.285.00
EST 550 TONS CL II RIP RAP
EST 700 SY FILTER FABRIC
SEE GEOTECHNICAL PLANS

SITE #5

MATCHLINE STA 20+00-SEE SHEET NO. 4

SPECIAL FALSE SUMP (DETAIL C)

LEVEL SPREADER DITCH BERM ELEV = 288.00 SLA 84+00 TO 22+00 510 SY PSRM (SEE DETAIL B)

SPECIAL FALSE SUMP (SEE DETAIL C)

SITE #6

PLACE SBB STA 82+00 TO STA 24+43 RT

PLACE PRE-FORMED SCOUR HOLE STA 24+43 RT 1 EA CLASS B 5 SY FF 23 SY PSRM (SEE DETAIL E)

PTSta. 23+42.88

PCSta. 25+86.08

CITY OF RALEIGH (LAKE WHEELER) PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

END STATE PROJECT B-3917
POT Sta. 25+25.00

PTSta. 30+34.66

DAN ERIC TUCKER & PAM HILLIARD

JESSE W DRY DB 1241 PG 051

CITY OF RALEIGH NO REFERENCE FOUND

CITY OF RALEIGH DB 1273 PG 001

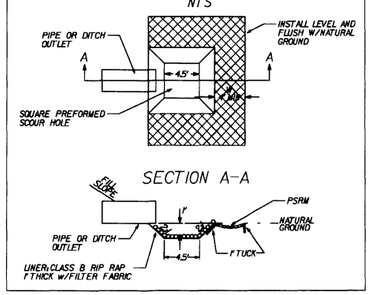
N 71° 08' 39" E

RET MIN

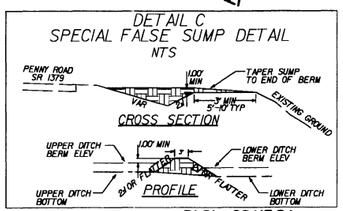
PI Sta 19+19.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

PI Sta 28+13.84
Δ = 24° 28' 40.5" (LT)
D = 5° 27' 24.3"
L = 448.58'
T = 227.77'
R = 1,050.00'

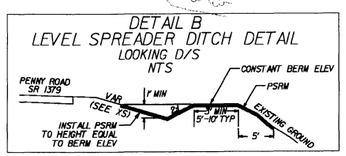
DETAIL E
PREFORMED SCOUR HOLE DETAIL
NTS



DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS



DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS



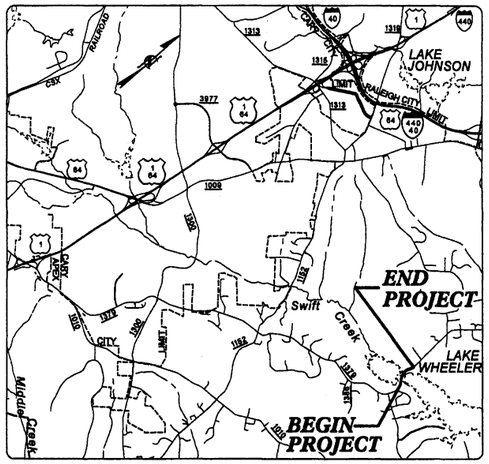
FOR -L- PROFILE, SEE SHEET 6

09/08/06

TIP PROJECT: B-3917

PROJECT: 33351.1.1

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



VICINITY MAP OF B-3917

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

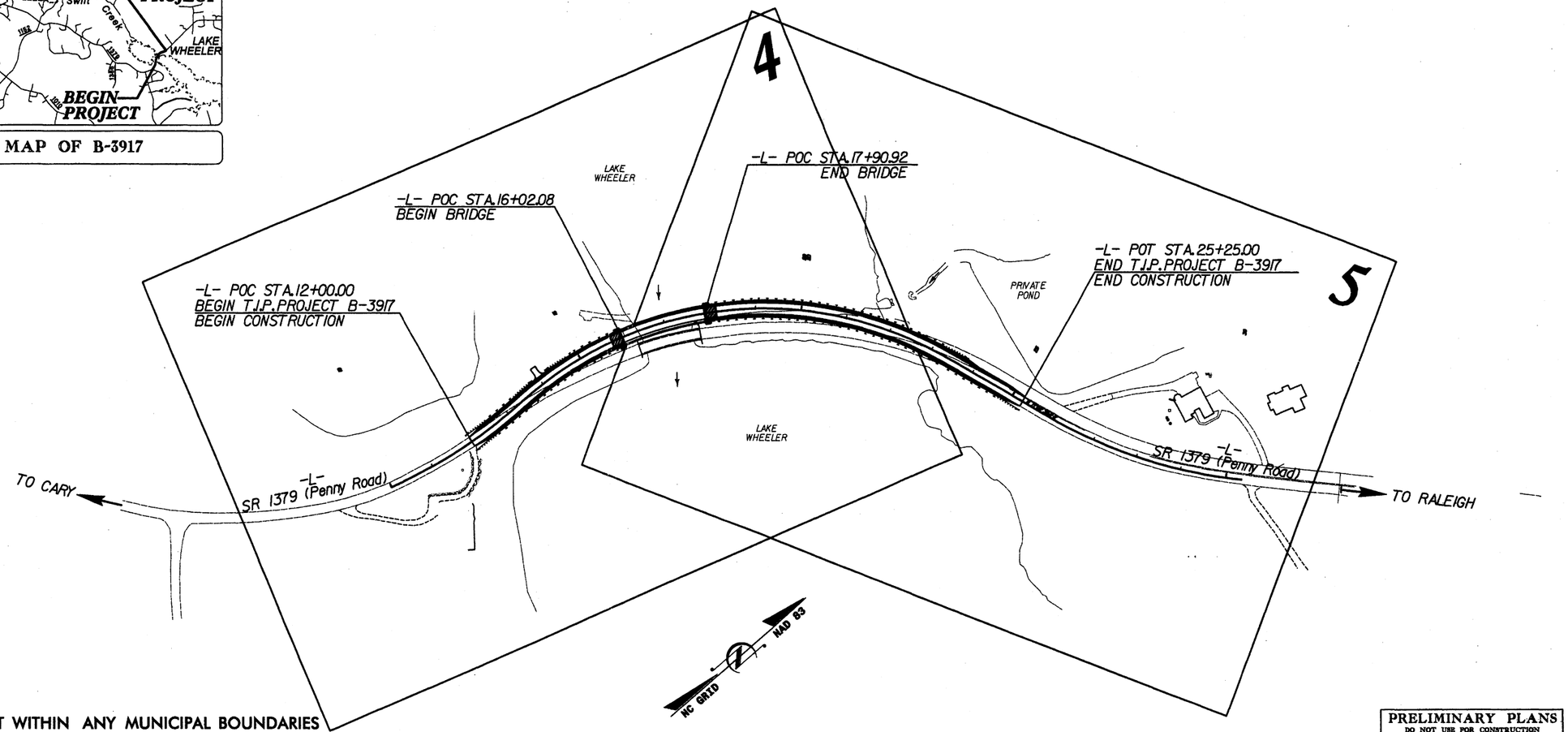
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3917	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33351.1.1	BRZ-1379(1)	PE
33351.2.1	BRZ-1379(1)	RW,UTIL

LOCATION: BRIDGE NO. 311 OVER LAKE WHEELER (SWIFT CREEK) ON SR 1379 (PENNY ROAD)

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



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
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 2005 = 6,149
ADT 2024 = 13,800
DHV = 10%
D = 60%
T = 5%
TTST 2% DUAL 3%
V = 50 mph
FUNC CLASS = LOCAL
* DESIGN EXCEPTIONS FOR STOPPING SIGHT DISTANCE AND VERTICAL CURVE LENGTH ARE REQUIRED

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-3917 = 0.215 MILES
LENGTH STRUCTURES T.I.P. PROJECT B-3917 = 0.036 MILES
TOTAL LENGTH OF T.I.P. PROJECT B-3917 = 0.251 MILES

EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 30, 2005

LETTING DATE:
DECEMBER 19, 2006

NEIL J. DEAN, P.E.
EARTH TECH PROJECT MANAGER

DOUG TAYLOR, P.E.
NCDOT PROJECT ENGINEER

DAVIDIAN BYRD
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

JOHN D.R. NICHOLS, P.E.

ROADWAY DESIGN ENGINEER

NEIL J. DEAN, P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

3:00:43 PM
G:\75399\b-3917\roadway\proj\b3917_rdy_tsh.dgn
brian.pease

PROJECT REFERENCE NO.	SHEET NO.
B-3917	1-A

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 — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ 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
- River Basin Buffer — RBB
- 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
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
B-3917	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
Earth Tech
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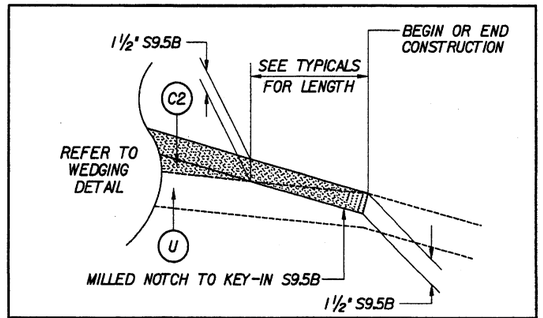
(919) 854-6200 - (919) 854-6259(FAX)

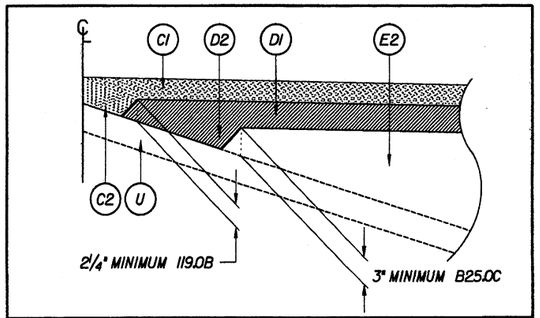
PAVEMENT SCHEDULE

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT SEE STANDARD WEDGING DETAIL

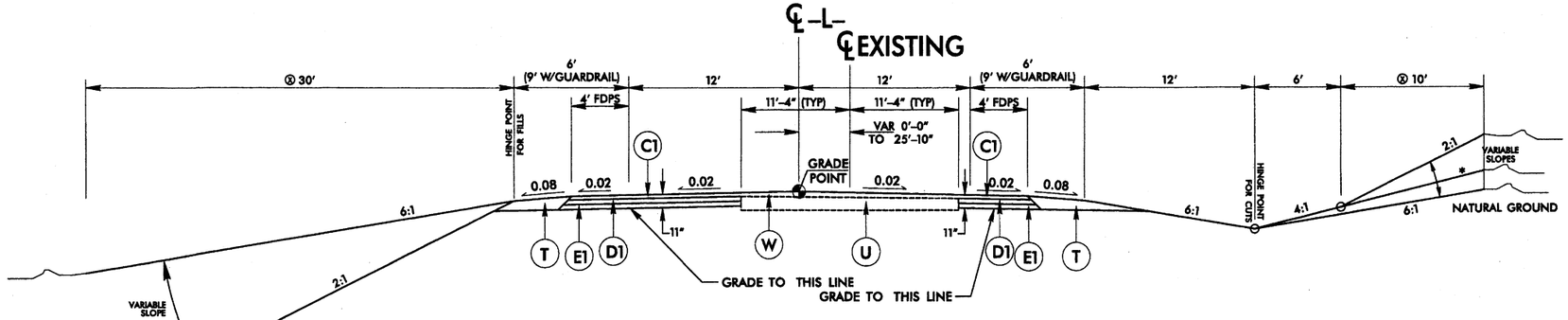
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



PROFILE DETAIL SHOWING TIE-INS AT PROJECT TERMINI



DETAIL SHOWING METHOD OF WEDGING (WI)



TYPICAL SECTION NO. 1

⊗ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 6:1 TO 2:1, THE DISTANCE BECOMES VARIABLE, AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED

USE TYPICAL SECTION NO. 1

FROM -L- STA. 12+00.00 TO -L- STA. 14+45.29
FROM -L- STA. 21+51.10 TO -L- STA. 25+25.00

SEE PLANS FOR LOCATIONS OF TAPERS

NOTE: IN LOCATIONS WITH GUARDRAIL, EXTEND PAVED SHOULDER TO THE FACE OF GUARDRAIL (SEE PLANS)

REVISIONS

USER: bhinsdale
DGN: FLXDesignPro10.55PI_nb_hndgn
DATE: 6/2/2006
TIME: 3:25:03 PM

PROJECT REFERENCE NO.	SHEET NO.
B-3917	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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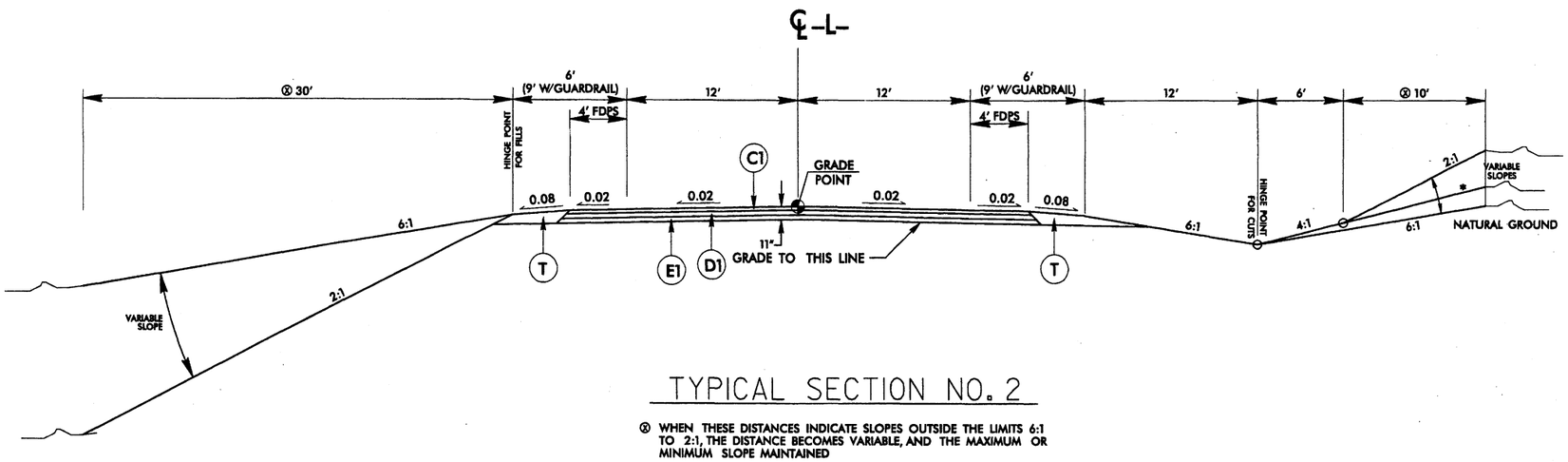
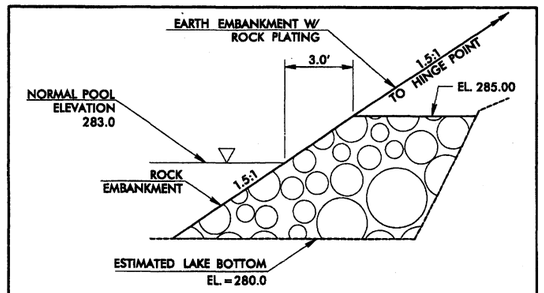


TYPICAL SECTION NO. 2

⊗ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 6:1 TO 2:1, THE DISTANCE BECOMES VARIABLE, AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED

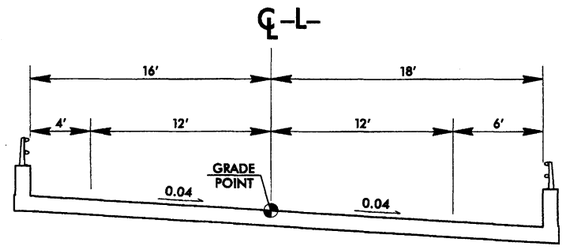


DETAIL SHOWING TYPICAL FILL IN LAKE

USE TYPICAL SECTION NO. 2

FROM -L- STA. 14+45.29 TO -L- STA 16+02.08 (BEGIN BRIDGE)
FROM -L- STA. 17+90.92 (END BRIDGE) TO -L- STA. 21+51.10

NOTE: IN LOCATIONS WITH GUARDRAIL, EXTAND PAVED SHOULDER TO THE FACE OF GUARDRAIL (SEE PLANS)



TYPICAL SECTION NO. 3

FROM -L- STA. 16+02.08 (BEGIN BRIDGE) TO STA. 17+90.92 (END BRIDGE)

PAVEMENT SCHEDULE	
C1	3" S9.5B
C2	VAR. DEPTH S9.5B,
D1	4" I19.0B
D2	VAR. DEPTH I19.0B
E1	4" B25.0B
E2	VAR. DEPTH B25.0B,
R	2'-6" CONCRETE CURB AND GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING

REVISIONS

USER: kthompson
DGN: B3917_sht_typdgn
DATE: 5/28/2014
PRE: 100.00%

PROJECT REFERENCE NO.	SHEET NO.
B-3917	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS
01/16/2006 - NJD - ADDITIONAL TOPO ADDED
02/07/2006 - NJD - R/W CALLOUTS CORRECTED
03/28/2006 - BRF - CONST EASEMENT ADDED FROM 16+50 TO 24+00 RT
05/03/2006 - BRF - UPDATED SURVEY REFERENCE FILE TO REFLECT CHANGE IN PROPERTY LINES

USER: bfarnese
DGN: 1_Plan_Sheet_Variable_Width_Dual_Lane_Roadway.dgn
DATE: 5/2/2006
PRINTED: 5/3/2006
PRF: BARNESE

NAD 83

END STATE PROJECT B-3917
POT Sta. 25+25.00

PT Sta. 30+34.66

PC Sta. 23+42.88

PT Sta. 21+86.08

MATCHLINE STA 20+00-SEE SHEET NO. 4

CITY OF RALEIGH
(LAKE WHEELER)
PER UNRECORDED MAP BY JOHN A. EDWARDS & CO. DATED MAY 21, 1987

DAN ERIC TUCKER & PAM HILLIARD TUCKER

PAUL JOSEPH WEBB
ELIZABETH WEBB
DB 1251 PG 1046
PB 2005 PG 399

JESSE W DRY
DB 1241 PG 051

CITY OF RALEIGH
NO REFERENCE FOUND

CITY OF RALEIGH
DB 1273 PG 001

PENNY ROAD SR 1379

N 71°08'39.4" E

BL-5 -L- Sta. 29+20.99
17.37' ±

BL-10 -L- Sta. 22+55.20
5.84' Lt.

PI Sta 19+19.22
Δ = 71° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

PI Sta 28+13.84
Δ = 24° 28' 40.6" (LT)
D = 5° 27' 24.3"
L = 448.58'
T = 227.77'
R = 1,050.00'

DETAIL E
PREFORMED SCOUR HOLE DETAIL
NTS

DETAIL C
SPECIAL FALSE SUMP DETAIL
NTS

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS

FOR -L- PROFILE, SEE SHEET 6

PROJECT REFERENCE NO.	SHEET NO.
B-3917	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

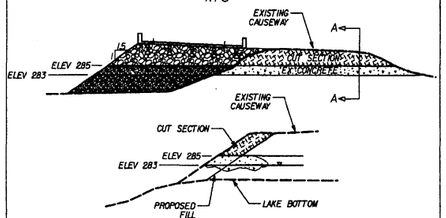
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

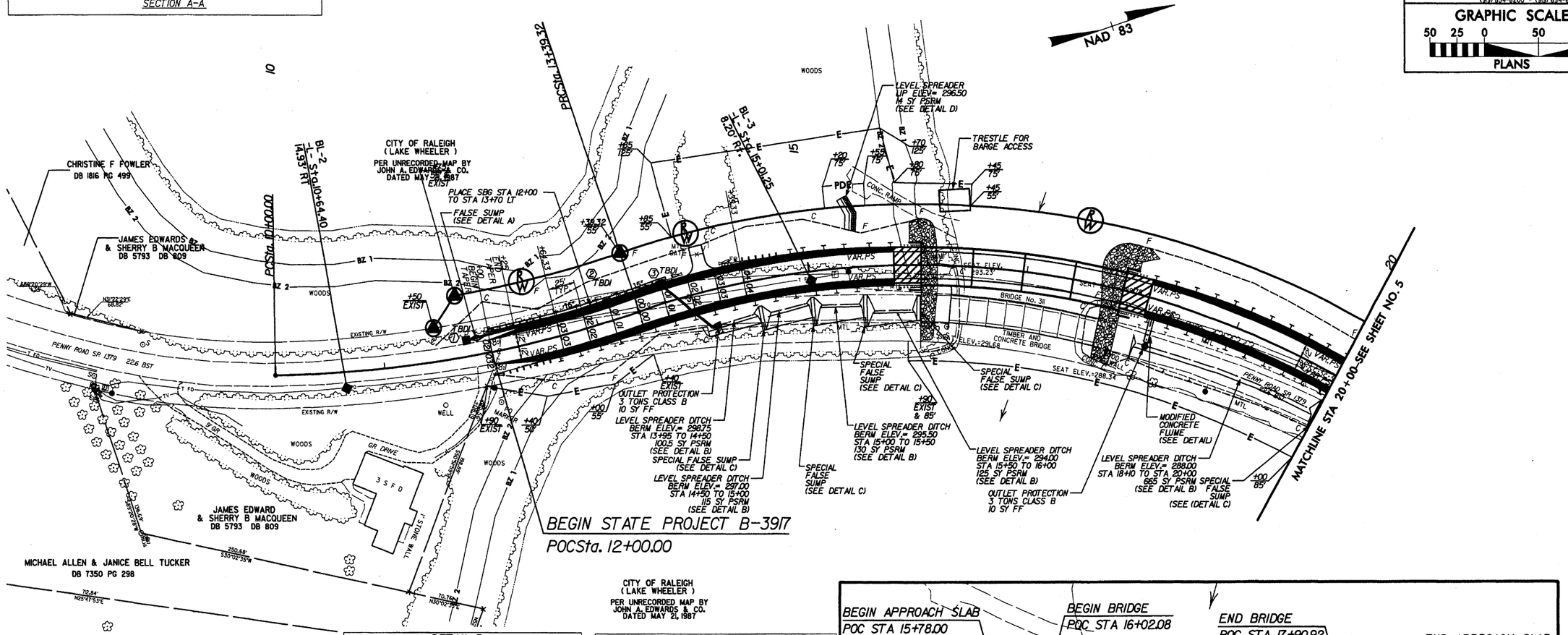
REVISIONS
01/6/2005 - NJD - ADDITIONAL TOPO ADDED
03/28/2006 - BRP - CONST EASEMENT ADDED FROM 13+85 TO 16+45 LT AND 16+50 TO 24+00 RT

NORTH ABUTMENT GRADING DETAIL
NTS



SECTION A-A

NAD 83



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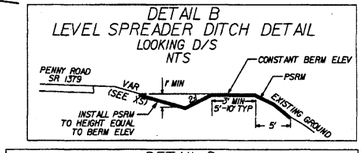
D = 5° 12' 31.3"
L = 339.32'
T = 171.02'
R = 1,100.00'
e = SEE PLANS
R.O. = SEE PLANS

PI Sta 19+19.22
Δ = 7° 52' 28.8" (RT)
D = 7° 09' 43.1"
L = 1,003.56'
T = 579.90'
R = 800.00'
e = 0.04 FT./FT.
R.O. = SEE PLANS

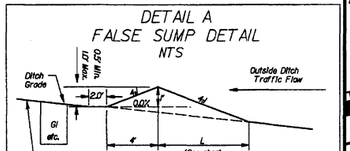
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "BELLMEADE" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 710,933.2894(ft) EASTING: 2,083,739.1658(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989502 THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BELLMEADE" TO -L- STATION 12+00.00 IS S 43° 20' 02.5" W 2,033.48 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

DETAIL B
LEVEL SPREADER DITCH DETAIL
LOOKING D/S
NTS

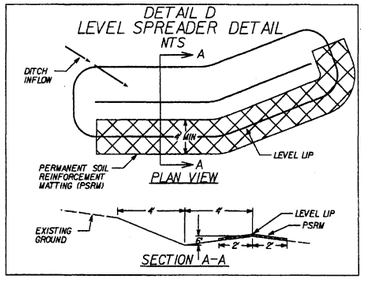


DETAIL A
FALSE SUMP DETAIL
NTS



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	5'	4.0% To 6.0%	7'
2.0% To 4.0%	6'	Over 6.0%	10'

DETAIL D
LEVEL SPREADER DETAIL
NTS



DETAIL C
SPECIAL FALSE SUMP DETAIL
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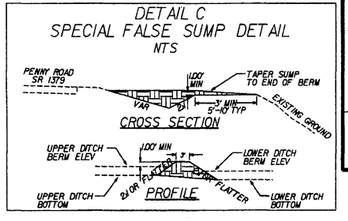
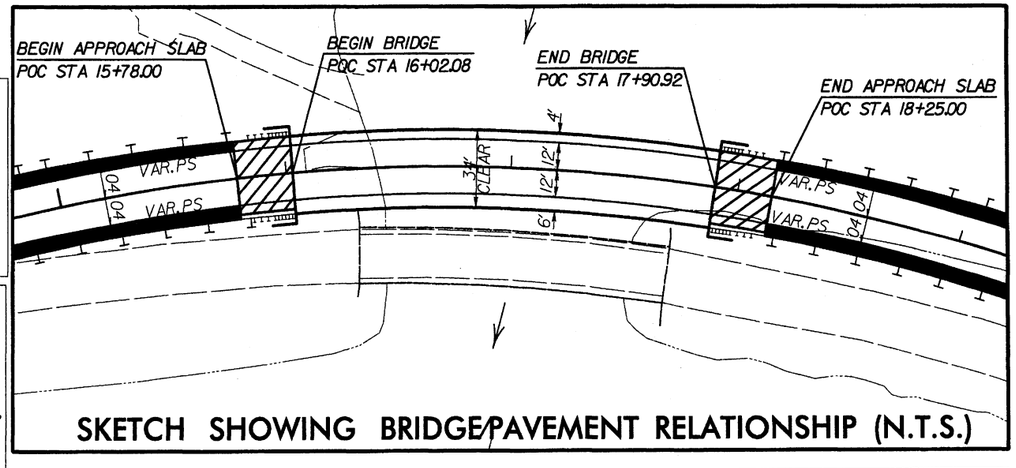


BEGIN APPROACH SLAB
POC STA 15+78.00

BEGIN BRIDGE
POC STA 16+02.08

END BRIDGE
POC STA 17+90.92

END APPROACH SLAB
POC STA 18+25.00



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S.)

FOR -L- PROFILE, SEE SHEET 6

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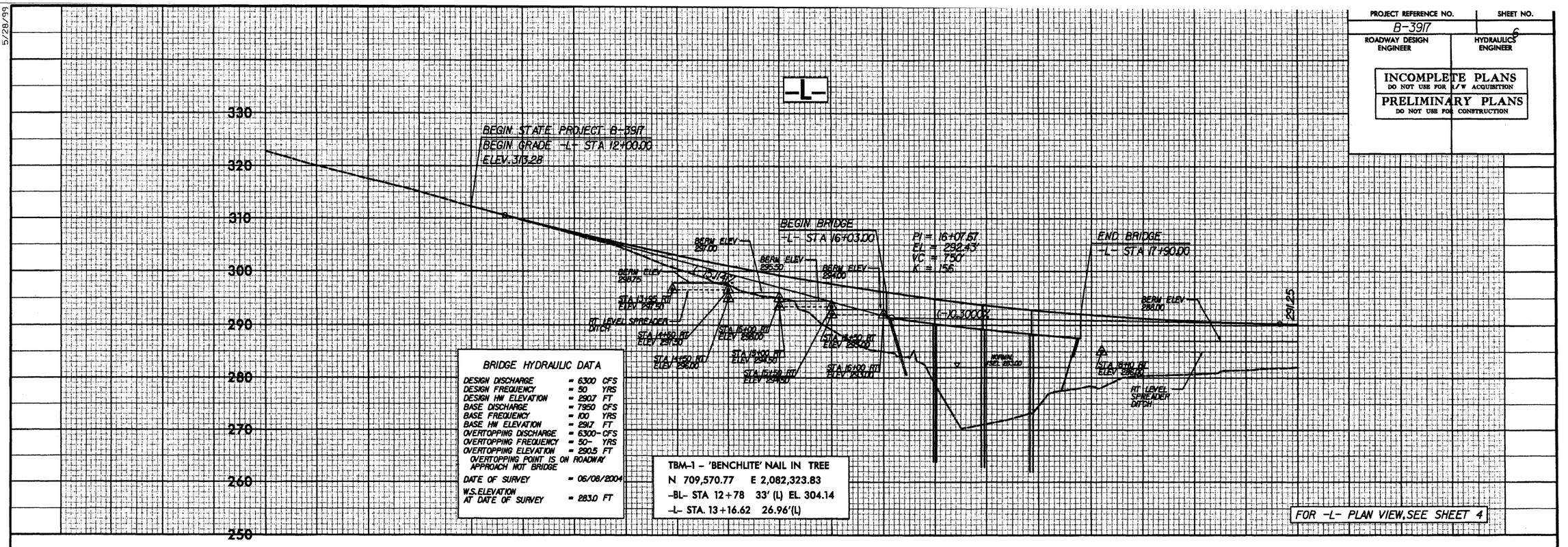
DGN: 0705990-39171-roadway/pro/sht39pr_rdy_pen.DGN
DATE: 5/31/2006 2:30:28 PM

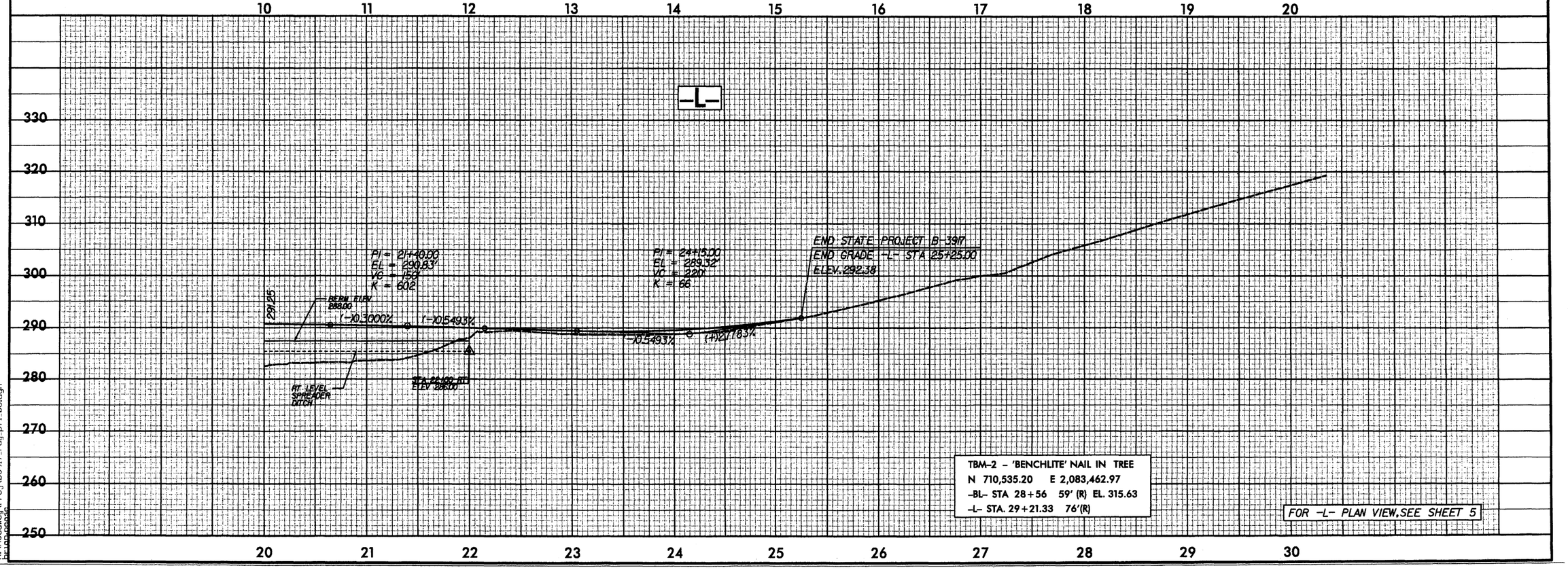
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-3917	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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8/23/94

0 10

PROJ. REFERENCE NO.	SHEET NO.
B-3917	X-2

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320
310
300
290

313.28
0.0210
0.0320
EC
ECP
EPC
ST
12+00.0000

320
310
300
290

316.10
EC
EC
11+50.0000

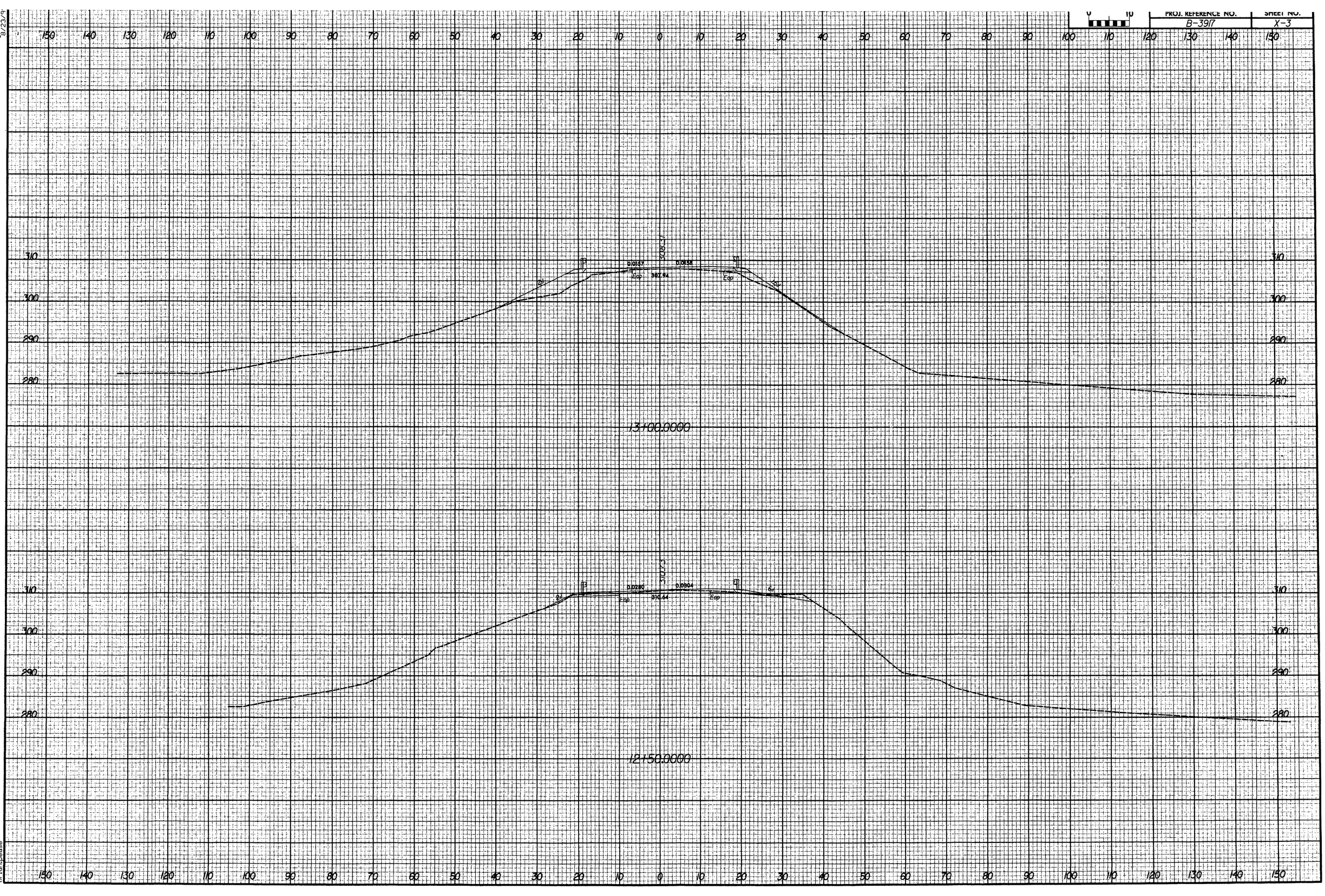
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

3:06:37 PM
X:\Highway\Proj\b3917\rdg_xpl.dgn
brian.pace

8/23/9

PROJ. REFERENCE NO.
B-3917

SHEET NO.
X-3



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Ken Capps

8/23/9

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-3917	X 4

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310
300
290
280

14+50.0000

-L-

PROPOSED DRIVEWAY

0.0400

0.0400

EOP

BOP

296.32

305.40

EOP

FALSE SUMP

CONSTANT BERM ELEV 298.75

UPSTATION BERM ELEV 297.00

297.50

296.00

EOP

14+00.0000

-L-

PROPOSED DRIVEWAY

0.0243

0.0242

BOP

305.40

EOP

BERM ELEV 298.75

EOP

297.50

13+50.0000

-L-

0.0043

0.0042

305.97 EOP

EOP

EOP

SS 300.05

3:06:26 PM
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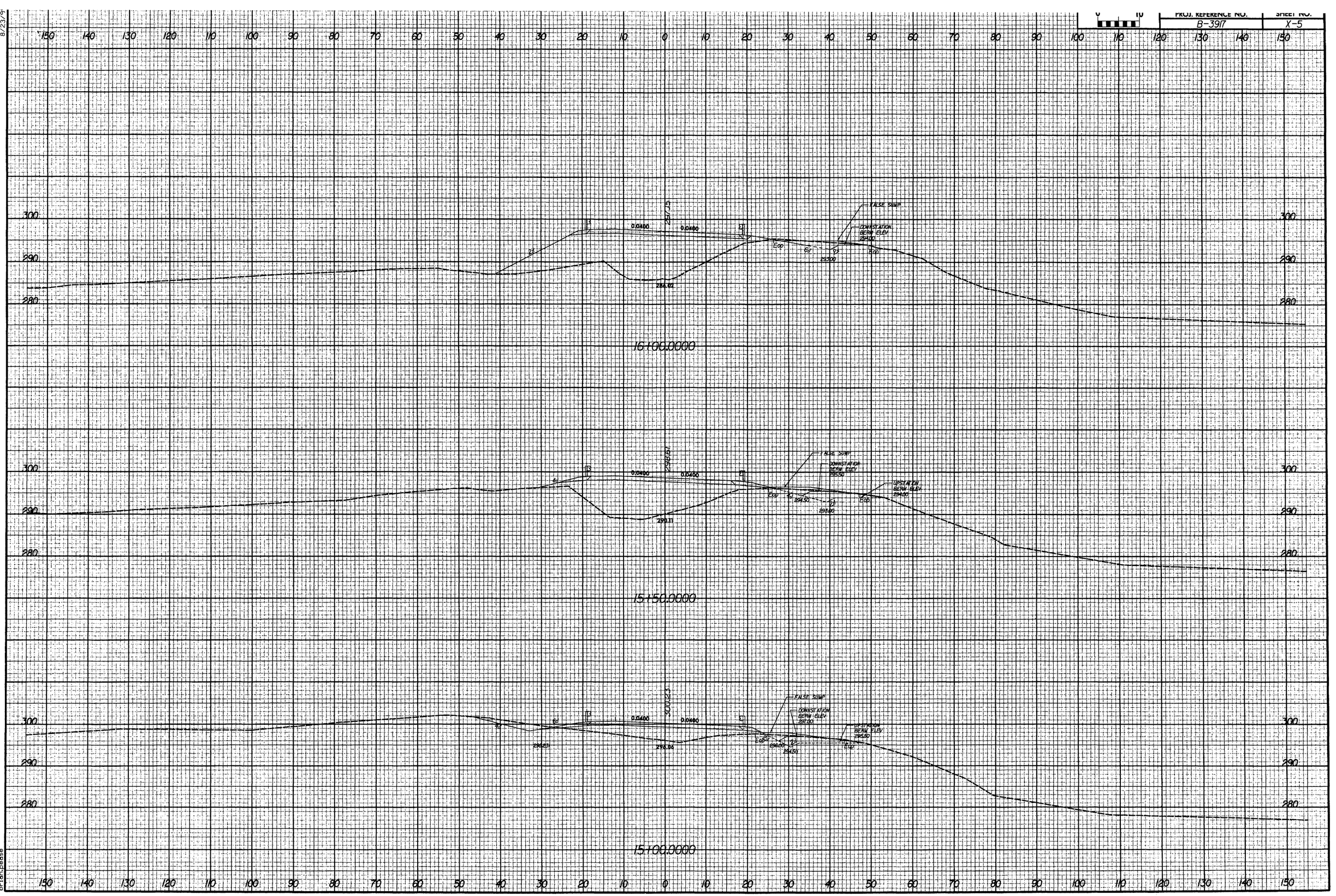
brianpage

8/23/99

PROJ. REFERENCE NO.
B-3917

SHEET NO.
X-5



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brian.pease

8/23/

PROJ. REFERENCE NO.	SHEET NO.
B-3917	X-6

0 10

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

300 290 280

295.05

0.0400 0.0400

Exist

Prop

276.44

17+50.0000

300 290 280 270

277.72

0.0400 0.0400

Exist

Prop

272.15

17+00.0000

300 290 280

295.26

Exist

Prop

276.67

16+50.0000

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brianpease

8/23/9

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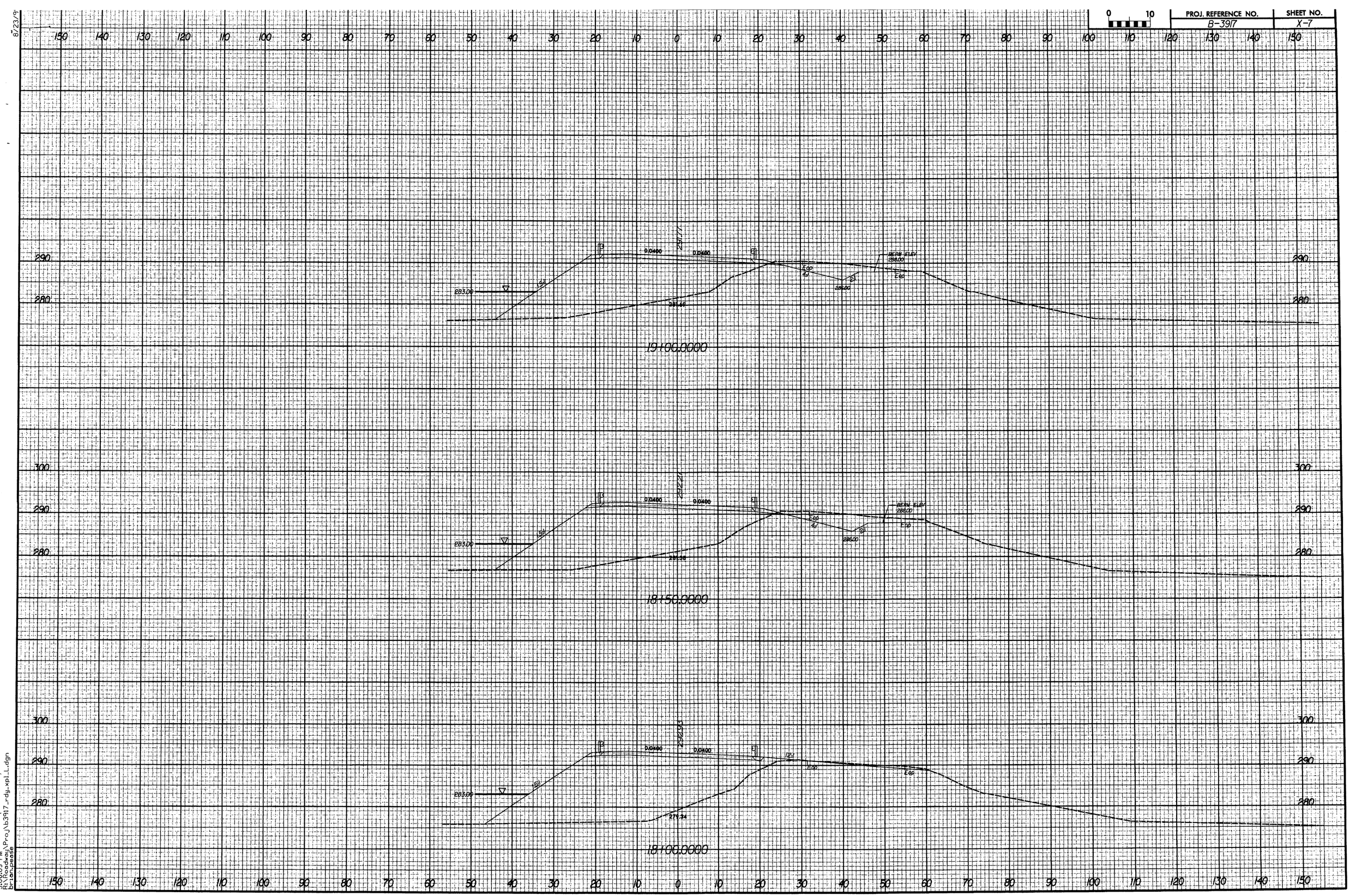

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brian.pease

8/23/9

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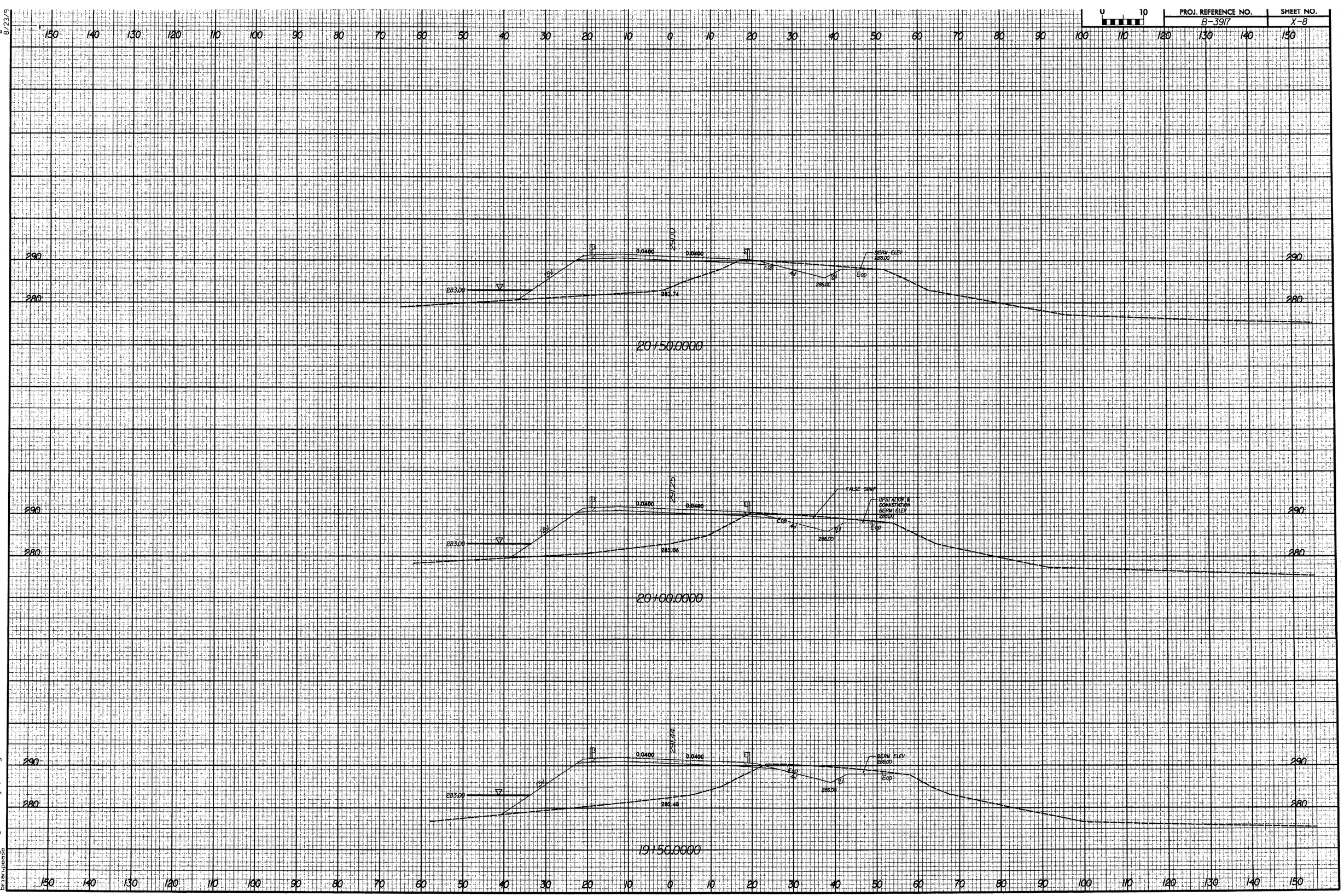

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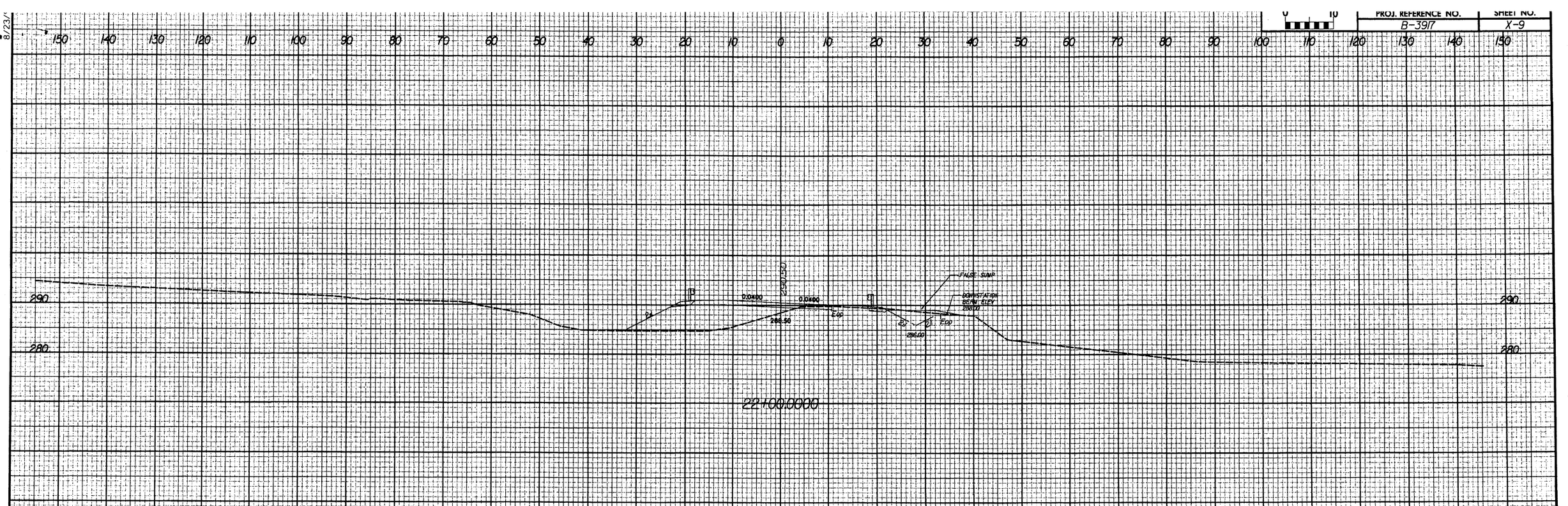
Bentley Systems

PROJ. REFERENCE NO.	SHEET NO.
B-3917	X-9



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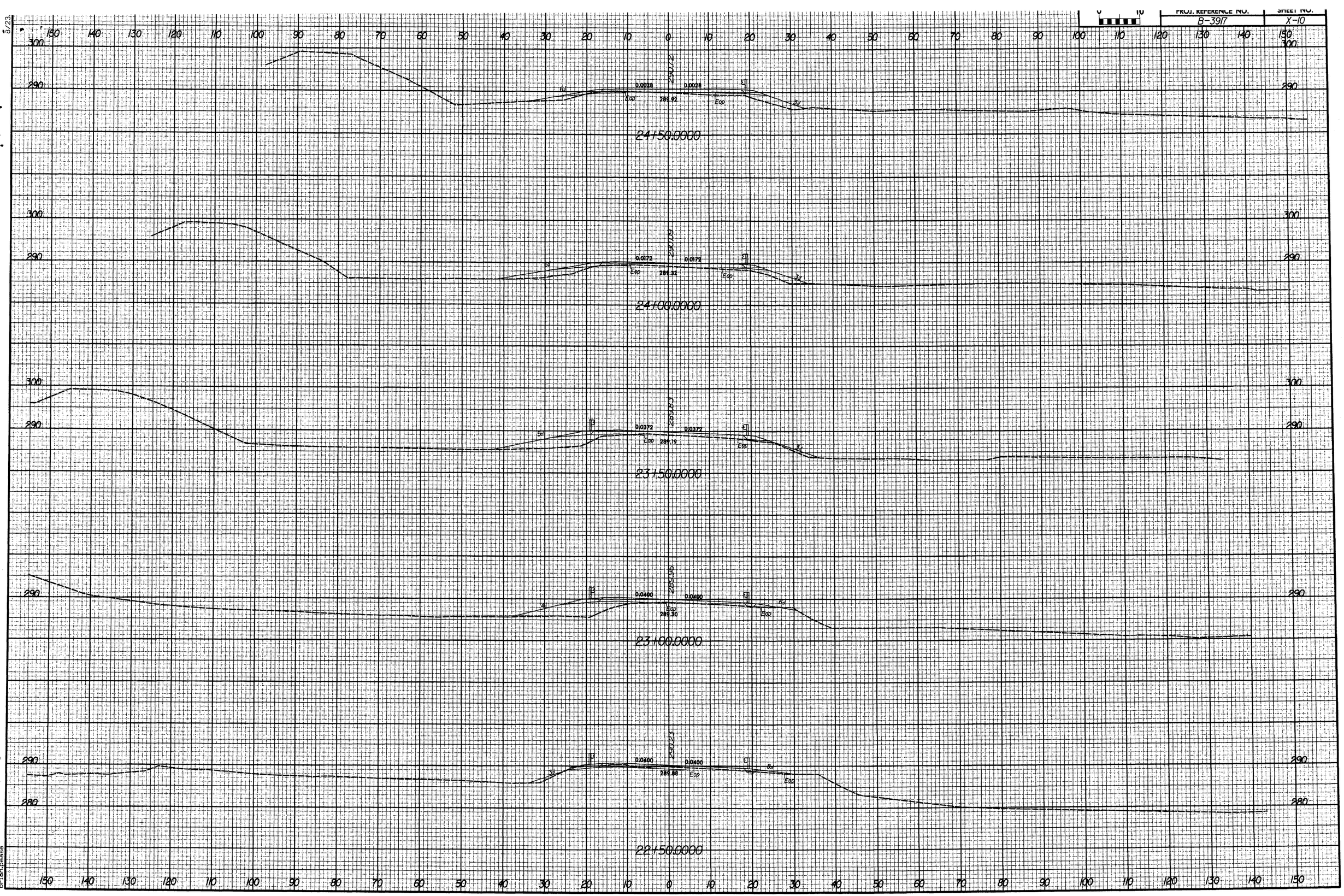

8/23/

PROJ. REFERENCE NO. B-3917

SHEET NO. X-11

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290

25+50.0000

EOD 293.38 EOD

300

290

292.38

0.0390 0.0270

EW 292.38 EOD

25+25.0000

300

290

6V

292.73

0.0222 0.0216

6V

EOD 291.44 EOD

25+00.0000

300

290

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

3:05:43 PM
C:\Roadway\Proj\b3917_rdwy_pil.dgn
brianmoore

Wake County

SR 1379

Bridge No. 311 Over Lake Wheeler

Federal Aid Project No. BRZ-1379 (1)

State Project 8.2408101

TIP Project No. B-3917

CATEGORICAL EXCLUSION

US DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

4/30/03
DATE

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

4/30/03
DATE

for Donald J. Voelker
Acting Division Administrator, FHWA

Wake County

SR 1379

Bridge No. 311 Over Lake Wheeler

Federal Aid Project No. BRZ-1379 (1)

State Project 8.2408101

TIP Project No. B-3917

CATEGORICAL EXCLUSION

April 2003

Document Prepared by

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

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

NORTH CAROLINA PROFESSIONAL SEAL 022546 ENGINEER EDWARD B McFALLS

4/30/03

for the North Carolina Department of Transportation

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

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

REGISTERED ENVIRONMENTAL MANAGER JOHN G. CONFORTI REM 9766 NREP

SPECIAL PROJECT COMMITMENTS

Wake County
SR 1379
Bridge No. 311 Over Lake Wheeler
Federal Aid Project No. BRZ-1379 (1)
State Project 8.2408101
TIP Project No. B-3917

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

Project Development and Environmental Analysis Branch, and Hydraulics Unit.

The stream impacts associated with the project will likely be lower than the 150 linear-foot (45.7 m) threshold. If it becomes apparent during final design that more than 150 linear feet (45.7 m) of stream will be impacted, mitigation measures will be considered.

Program Development Branch and Highway Division 5.

Because of the high concentration of highway and bridge construction projects in the study area, construction phasing will be coordinated with other area projects. TIP Project B-3375—which carries SR 1375 (Lake Wheeler Road) over the Lake Wheeler spillway—is scheduled to start construction in FY 2004, which is of particular concern.

Highway Design Branch

The portion of the old causeway that is not needed for the new facility will be removed, is requested by the Division of Water Quality.

Clearance for the proposed City of Raleigh greenway under the south end of the bridge will continue to be provided as designs are developed.

Barriers to discourage fishing from the bridge will be explored with the City of Raleigh during final design. At a minimum, 54-inch (1.4 m) rails will be provided to accommodate bicyclists.

Inform the City of Raleigh about the construction techniques anticipated to used to build the new bridge's substructure during final design.

A sidewalk section will be provided across the east side of the bridge and a berm wide enough to accommodate future sidewalks will be provided along the causeway.

Wake County
SR 1379
Bridge No. 311 Over Lake Wheeler
Federal Aid Project No. BRZ-1379 (1) Penny Rd.
State Project 8.2408101
TIP Project No. B-3917

INTRODUCTION: Bridge No. 311 is included in the 2002–2008 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP), Draft 2004–2010 NCDOT TIP, and in the Federal Aid Bridge Replacement Program. The location is shown in **Figure 1**. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

Bridge Maintenance Unit records indicated the bridge has a sufficiency rating of 37.4, out of a possible of 100 for a new structure. The bridge is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

SR 1379 (Penny Road) in Wake County is classified as "Local" route in the Statewide Functional Classification System.

Through the project area, SR 1379 has an 18-foot (5.5 m) wide pavement and 6-foot (1.8 m) wide unstabilized shoulders. Existing right-of-way is 60 feet (18.3 m). The horizontal and vertical alignments in the vicinity of the bridge are fair to poor. The speed limit on SR 1379 near the bridge is 45 mph. **Figures 2** shows a plan view of the existing bridge and roadway.

The existing bridge was constructed in 1956. The superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps on timber piles. The abutments are vertical. The existing bridge consists of eight spans between 16 and 18 feet (4.9 and 5.5 m) in length. The clear roadway width is 24 feet (7.3 m). The crown of the roadway is situated approximately 24 feet (7.3 m) over the bed of Lake Wheeler (Swift Creek). The posted weight limit is 20 tons for single vehicles and 28 tons for trucks with trailers. The bridge is located in a horizontal curve section of SR 1379. **Figure 4** includes photographs of the existing bridge and its approaches.

The average daily traffic volume on SR 1379 at Bridge No. 311 was 5,000 vehicles per day in 2002. By the design year 2025, the average daily traffic volume is expected to increase to 13,800 vehicles per day. The projected traffic volume includes three percent dual-tired vehicles and one percent truck-tractor semi-trailers. Twenty-five school buses each cross the bridge two times daily. Bicyclists frequently use SR 1379, though it is not a designated bicycle route.

Two accidents were reported within 500 feet (152 m) of Bridge No. 311 in the period between January 1, 1998 and December 31, 2000. These accidents occurred at opposite approaches to the bridge, resulting in the vehicle running off the road. One occurred in daylight and the other when dark.

Underground fiber optics line is located on the west shoulder of Penny Road south of the bridge.

III. ALTERNATIVES

A. Project Description

The project replaces the existing bridge with a new bridge at approximately the same location. The bridge will carry two lanes of traffic, including bicycles, and a pedestrian sidewalk across the bridge. **Figure 3** shows the typical cross-sections of the roadway approaches and bridge.

The northbound lane will be 14 feet (4.2 m) wide with curb-and-gutter to accommodate storm water drainage. There will be a 10-foot (3.0 m) wide berm on the approaches to accommodate a future sidewalk. There will be a 5.5-foot (1.7 m) pedestrian sidewalk on the bridge. 54-inch (1.4 m) bicycle-compatible bridge rail will be provided.

The southbound lane will be 12 feet (3.6 m) wide. The shoulder on the approaches will be 8 feet (2.4 m) wide, 4 feet (1.2 m) being paved. The shoulder on the bridge will be 4 feet (1.2 m) wide. Bicycle-compatible bridge rail will be provided.

The bridge will be constructed with adequate vertical clearance so the City of Raleigh can construct a greenway under the south end of the bridge in the future. The proposed design speed is 45 miles per hour (70 kilometers per hour). The vertical alignment required by the design speed is not substantially increased to accommodate the greenway. Vertical alignment is controlled by sight distance (crests by line of sight obstructions; sags by distance illuminated by headlights). Because of the high concentration of highway and bridge construction projects in the study area, construction phasing will be coordinated with other area projects. TIP Project B 3375—which carries SR 1375 (Lake Wheeler Road) over the Lake

Wheeler spillway—is scheduled to start construction in FY 2004, which is of particular concern.

B. Detailed Study Alternatives

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

Alternative 1. This alternative replaces the bridge just downstream (east) of the existing bridge, while maintaining traffic on the existing bridge during construction.

Alternative 2. This alternative replaces the bridge just upstream (west) of the existing bridge, while maintaining traffic on the existing bridge during construction.

Alternative 3. This alternative replaces the bridge on its existing horizontal alignment while maintaining traffic off-site during construction. The detour is shown on **Figure 1**. The total off-site detour length is 9.8 miles (15.8 km).

No Action. This alternative consists of short-term minor reconstruction and maintenance activities that are part of an ongoing plan for continuing operation of the existing bridge and roadway system in the project area.

C. Preferred Alternative

Alternative 2, replacing the existing bridge just upstream (west) of the existing bridge, while maintaining traffic on the existing bridge during construction, is the preferred alternative. **Alternative 2** was selected because:

- **Alternative 3** is not desirable because of the magnitude of community and commuter disruption caused by using an off-site detour during construction.
- It has the least overall natural resources impacts (including impacts to surface waters) of the build alternatives.
- It has the least right-of-way impacts of the on-site detour alternatives.
- It is the least costly of the build alternatives.
- Many of the structural elements are decaying or corroding. Decay and corrosion has already reduced the bridge's safe load-bearing capacity. Although further maintenance activities will slow the decay, the **No Action** alternative will eventually require the bridge to be closed.

Minimization and Mitigation of Impacts by Alternative 2. The original functional designs were developed on the assumption the existing causeway could be widened. To meet the requirements of the Neuse River Buffer Rules and current 401 Water Quality Certification Rules and address the City of Raleigh concerns to the lake, the following measures will be taken to minimize or mitigate impacts:

- New fill into the lake will be limited to a maximum of 0.3 acres (0.1 hectares) of surface waters (There will be a net of approximately 0.2 acres (0.1 hectares) of surface waters when the existing fill that will not be used is removed). The bridge length was increased to accommodate this requirement.

- Existing fill that will not be used will be removed from the lake.

- Curb-and-gutter was added to collect storm water from the bridge and causeway, piping it to an area outside the regulated buffer so it can drain through the entire buffer prior to flowing into the lake.

- Sidewalk was added to the east side of the bridge. A 10-foot (3.0 m) wide berm was added to the east side of the approaches to accommodate a future pedestrian sidewalk.

Figure 2d shows Alternative 2–Minimization.

IV. ESTIMATED COSTS

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

Table 1. Estimated Costs

	Alt. 1	Alt. 2	Alt. 2 Minimization	Alt. 3
Structure Removal	$ 27,000	$ 27,000	$ 27,000	$ 27,000
Structure	$ 332,800	$ 397,800	$ 1,203,300	$ 421,200
Roadway Approaches	$ 1,113,200	$ 646,900	$ 672,500	$ 669,900
Detour Structure & Approaches	n/a	n/a	n/a	n/a
Miscellaneous and Mobilization	$ 554,000	$ 354,300	$ 487,200	$ 369,900
Engineering and Contingencies	$ 323,000	$ 224,000	$ 360,000	$ 262,000
Right-of-way/Utilities/Relocations	$ 87,500	$ 83,800	$ 83,800	$ 80,000
Total Cost of Alternative	**$ 2,437,500**	**$ 1,733,800**	**$ 2,833,800**	**$ 1,830,000**

The estimated cost of the project, as shown in the Draft 2004-2010 Transportation Improvement Program, is $2,400,000 including $200,000 for right-of-way and $2,000,000 for construction. Right-of-way acquisition is scheduled for Federal Fiscal Year 2003, with construction to follow in Federal Fiscal Year 2004.

No residential relocations are anticipated under the preferred alternative.

V. NATURAL RESOURCES[1]

A. Methodology

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

- United States Geological Survey (USGS) quadrangle map (Lake Wheeler, 1987)
- United States Fish and Wildlife Service (USFWS) Draft National Wetlands Inventory (NWI) Map (Lake Wheeler, 1983)
- NCDOT aerial photograph of project area (1:1200)
- *Soil Survey of Wake County, North Carolina* (Natural Resources Conservation Service, 1970)
- North Carolina Department of Environment and Natural Resources (NCDENR) basin-wide assessment information (NCDENR, 1996)
- USFWS list of protected and candidate species. North Carolina Natural Heritage Program (NHP) files of rare species and unique habitats.

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

A general field survey was conducted along the proposed project route by Earth Tech biologists on August 23, 2000. Water resources were identified and their physical characteristics were recorded. For the purposes of this study, a brief habitat assessment was performed within the project area of Lake Wheeler. Plant communities and their associated wildlife were identified using a variety of observation techniques, including active searching, visual observations, and identifying characteristic signs of wildlife (sounds, tracks, scats, and burrows). Terrestrial community classifications generally follow Schafale and Weakley (1990) where appropriate and plant taxonomy follows Radford *et al.* (1968).

[1] Unless noted, the information in natural resources section of this document is based on alternatives where the bridge lengths were designed to provide a minimum hydraulic opening, which environmentally is the worst case.

Vertebrate taxonomy follows Potter *et al.* (1980), Martof *et al.* (1980), and Webster *et al.* (1985). Vegetative communities were mapped using aerial photography of the project site. Predictions regarding wildlife community composition involved general qualitative habitat assessment based on existing vegetative communities.

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

B. Physiography and Soils

The project area lies in the east-central portion of North Carolina within the Piedmont physiographic province. Elevations in the project area are approximately 300 feet (91.4 m) (National Geodetic Vertical Datum, 1929). The topography of the project vicinity is hilly with moderate to steep slopes rising from Lake Wheeler.

The proposed project is in a suburban area in Wake County approximately 5 miles (8 km) southeast of Cary, NC. Wake County's major economic resource is light industry. The population of Wake County in 1990 was 592,218 (North Carolina Office of State Budget, Planning and Management 1999).

Information about soils in the project area was taken from the Wake County Soil Survey published by NRCS in 1970. The map units in the project area are Wilkes soils, 20 to 45 percent slopes, and Appling sandy loam, 10 to 15 percent slopes.

- **Wilkes** soils are mapped along the south shore of Lake Wheeler within the project area. This soil is well drained and occurs on gently sloping to steep side slopes in Piedmont uplands. Wilkes soils have no hydric soil inclusions. In Wake County most of the acreage of this soil is in woodland.
- **Appling sandy loam** is mapped along the north shore of Lake Wheeler within the project area. These soils are gently sloping to strongly sloping, well drained soils of Piedmont uplands. Appling soils are suitable to all locally grown crops and much of the acreage was cultivated at one time. Appling soils do not have hydric soil inclusions.

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

- The Wilkes soils have a site index of 70-80 for loblolly pine (*Pinus taeda*) and 60-70 for shortleaf pine (*Pinus echinata*).

- The Appling soils have a site index of 75-85 for loblolly pine and yellow poplar (*Liriodendron tulipifera*), and 65-75 for shortleaf pine.

C. Water Resources

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

1. Waters Impacted

The project is located in the Neuse River basin (NEU2 sub-basin). Lake Wheeler is an impoundment of Swift Creek, which originates about 8 miles (12.8 km) west of the project area. Penny Road crosses the upper third of Lake Wheeler. From the project area, Lake Wheeler extends about 1.5 miles (2.4 km) to the dam.

Lake Wheeler is approximately 500 to 1,000 feet (152 to 305 m) wide in the study area. Penny Road crosses at a narrow point in the lake formed by a peninsula on the south shore. A causeway approximately 400 feet (122 m) long extends from the north shore to Bridge No. 311. The water was clear the day of the site visit.

The south shore is steeply sloping and vegetated by loblolly pine and sweetgum. The shore is stabilized with cement near the south bridge abutment. The north shore is gently sloping and vegetated by water oak and sweetgum. The causeway extending from the north shore is stabilized with riprap and vegetated by tag alder.

A 5.5-acre pond is located immediately to the west of Penny Road north of the lake crossing. The pond and pond outlet are outside of the project area and will not be impacted by the bridge replacement.

2. Water Resource Characteristics

Surface waters in North Carolina are assigned a classification by the DWQ that is designed to maintain, protect, and enhance water quality within the state. Swift Creek (Lake Wheeler) [Index # 27-43-(1)] is classified as WS-III NSW. WS-III streams are water supply streams in moderately developed areas. NSW refers to nutrient sensitive waters. These waters require additional nutrient management to control excessive vegetative and algal growth. In general, pollution controls require no increase in nutrients above background levels.

The project area is in a moderately developed watershed. Residential and commercial areas are the most common forms of development. Residential

areas are located in or near the project vicinity. Potential threats to stream quality in this area are agriculture and household fertilizer use, which may increase nutrient levels.

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

There are seven monitoring stations on Swift Creek (four above and three below the project area) covering a total of 30 miles (48 km). The nearest upstream station is located about 2.1 miles (3.4 km) from the project area. It was sampled in July 1995 and classified as Fair. The nearest downstream station is located about 10.8 miles (17.4 km) from the project area. It was sampled in July 1991 and also classified as Fair. Classification at all seven monitoring stations ranged from Poor at the uppermost station (March 1989) to Good at the farthest downstream station (July 1995).

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

There are four permits issued to discharge in tributaries of Swift Creek or Swift Creek in the project vicinity. The Heater Util.-Nottingham WTP holds Permit NC0055701 to discharge into an unnamed tributary of Swift Creek about 6 miles (9.7 km) downstream of the project area. This is a Minor Non-Municipal permit classified as "Water Plants and Water Conditioning (Groundwater)". Uniprop, Inc. and Mill Run MHP hold Permit NC0056499 to discharge into an unnamed tributary of Swift Creek about 6 miles (9.7 km) downstream of the project area. This is a Minor Non-Municipal permit classified as "Domestic-Mobile Home Parks." Pope Industrial Park II, LTD holds Permit NC0060526 to discharge into an unnamed tributary of Swift Creek about 3.6 miles (5.8 km) downstream of the project area. This is a Minor Non-Municipal permit classified as "Domestic-Industrial/Commercial". The Indian Creek Overlook subdivision holds Permit NC0060771 to discharge into Swift Creek about 8.4 miles (13.5 km) downstream of the project area. This is a Minor Non-Municipal permit classified as "Domestic-Subdivisions".

3. Anticipated Impacts to Water Resources

a) General Impacts

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

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

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

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

4. Impacts Related to Bridge Demolition and Removal

Lake Wheeler in the vicinity of the proposed project is a Class WS-III water, which is by definition a High Quality Water. Therefore, Case 1 applies to the proposed replacement of Bridge No. 311 over Swift Creek.

The superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps on timber piles at 8 feet (2.4 m) centers. The abutments are vertical. The existing bridge consists of eight spans. The total bridge length is 135 feet (41.1 m). The maximum potential fill is 67.5 cubic yards (51.6 cu m).

D. Biotic Resources

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

1. Plant Communities

Four terrestrial communities were identified within the project area: maintained landscape, lakeshore, mixed pine hardwood, and old field. Dominant faunal components associated with these terrestrial areas will be discussed in each community description. Many species are adapted to the entire range of habitats found along the project alignment, but may not be mentioned separately in each community description.

a) Maintained Landscape

This community covers the area along the road shoulders and causeway banks, and residential lawns on either end of the project area. Scattered trees, ornamental shrubs, and maintained grasses are located in the lawns. Other species include rush (*Juncus* sp.), Japanese grass (*Microstegium* sp.), morning glory (*Ipomea* sp.), Japanese honeysuckle (*Lonicera japonica*), and a milkweed (*Asclepias* sp.). Woody vegetation on the roadsides and causeway is limited to seedlings and saplings due to maintenance; species present are tag alder (*Alnus serrulata*), sweetgum (*Liquidambar styraciflua*), black cherry (*Prunus serotina*), and red maple (*Acer rubrum*). Schafale and Weakley do not describe this community.

b) Lakeshore

This community occurs along the banks of Lake Wheeler. Canopy species include sweetgum, loblolly pine (*Pinus taeda*), red maple, and willow oak (*Quercus phellos*). The understory includes flowering dogwood (*Cornus florida*), musclewood (*Carpinus caroliniana*), and American holly (*Ilex opaca*). Vine

species include grape (*Vitis rotundifolia*), greenbriar (*Smilax rotundifolia*), and poison ivy (*Toxicodendron radicans*). This community is not easily represented by descriptions in Schafale and Weakley (1990), although it does contain some elements of a Mesic Mixed Hardwood Forest-Piedmont Subtype. The TNC classification is most likely I.A.8.N.b.16 *Pinus taeda* Forest Alliance (A.130). The artificial impoundment of Lake Wheeler has introduced periodic flooding and a higher water table that has probably steered the composition of the community towards species more likely found in piedmont floodplains (*i.e.*, musclewood and willow oak)

c) Mixed Pine Hardwood

This community occupies the forested areas above the lakeshore community. Canopy species in this community include loblolly pine, yellow poplar (*Liriodendron tulipifera*), and sweetgum. The understory and shrub strata contain sassafras (*Sassafras albidum*), sweetleaf (*Symplocos tinctoria*), and highbush blueberry (*Vaccinium corymbosum*). Vine and herbaceous species present include Japanese honeysuckle, poison ivy, and Christmas fern (*Polystichum acrostichoides*). This community is classified as a disturbed Mesic Mixed Hardwood Forest-Piedmont Subtype as described by Schafale and Weakley (1990). The TNC classification is most likely I.A.8.N.b.16 *Pinus taeda* Forest Alliance (A.130).

d) Old Field

An old field community is present on the southern shore of Lake Wheeler at a former park site. In general, the plants within this community are pioneer species that have invaded this area following a cessation of maintenance. Dominant trees are absent due to the young age of the community. Species include loblolly pine, southern red oak (*Quercus falcata*), Japanese honeysuckle, lespedeza (*Lespedeza* sp.), and milkweed. Schafale and Weakley do not describe this community. The TNC equivalent is V.A.5.N.c.3 *Andropogon virginicus* Herbaceous Alliance (A.1208).

2. Wildlife Communities

a) Maintained Landscape

The animal species present in these disturbed habitats are opportunistic and capable of surviving on a variety of resources, ranging from vegetation to both living and dead faunal components. Northern mockingbird (*Mimus polyglottos*), starling (*Sturnus vulgaris*), and American robin (*Turdus migratorius*) are common birds that use these habitats. The area may also be used by the Virginia opossum (*Didelphis virginiana*), various species of mice (*Peromyscus* sp.), Eastern garter snake (*Thamnophis sirtalis*), and American toad (*Bufo americanus*). Other species likely to be found in the project area include tufted

titmouse (*Parus bicolor*), Carolina chickadee (*Parus carolinensis*), eastern chipmunk (*Tamias striatus*), gray squirrel (*Sciurus carolinensis*), and black rat snake (*Elaphe obsoleta*).

b) Lakeshore

Beaver (*Castor canadensis*) and raccoon (*Procyon lotor*) may be expected here, along with belted kingfisher (*Megaceryle alcyon*), Carolina wren (*Thryothorus ludovicianus*), and eastern box turtle (*Terrapene carolina*).

c) Mixed Pine-Hardwood

Inhabitants may include tufted titmouse, Carolina chickadee, downy woodpecker (*Picoides pubescens*), eastern chipmunk, gray squirrel, black rat snake, and red-backed salamander (*Plethodon cinereus*).

d) Old Field

Carolina chickadee, tufted titmouse, white-breasted nuthatch (*Sitta pusilla*), and eastern kingbird (*Tyrannus tyrannus*) were all observed in this community during a field visit. Mammals and reptiles that utilize this community are likely the same as those found in the lakeshore and mixed pine hardwood communities.

3. Aquatic Communities

Within the project area, Swift Creek is impounded forming Lake Wheeler. The bed material likely consists of silt. On the day of the site visit, the water was murky with moderate suspended sediment. No aquatic vegetation was observed.

*Fish species likely found in Lake Wheeler include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), longnose gar (*Lepisosteus osseus*), common carp (*Cyprinus carpio*), and yellow bullhead (*Ameiurus natalis*). Waterfowl species utilizing this aquatic community likely include mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), bufflehead* (Bucephala albeola*), common merganser (*Mergus merganser*), and ruddy duck (*Oxyura jamaicensis*). Reptiles likely found in Lake Wheeler are snapping turtle (*Chelydra serpentina*) and yellowbelly slider (*Chrysemys scripta*).*

4. Anticipated Impacts to Biotic Communities

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

Temporary and permanent impacts are considered here along with recommendations to minimize or eliminate impacts.

a) Terrestrial Communities

Terrestrial communities in the project area will be impacted permanently by project construction from clearing and paving. Estimated impacts are based on the length of the alternate and the entire study corridor width. Alternative 1 is 1,700 feet (518 meters [m]) long and 75 feet (22.9 m) wide. Alternative 2 is 1,329 feet (405 m) long and 75 feet (22.9 m) wide. Alternative 3 is 1,270 feet (387 m) long and 75 feet (22.9 m) wide. **Table 2** describes the potential impacts to terrestrial communities by habitat type. Because impacts are based on the entire study corridor width, the actual loss of habitat will likely be less than the estimate.

Table 2. Estimated Area of Impact to Terrestrial Communities

	Area of Impact in Acres		
Community	**Alternative 1**	**Alternative 2**	**Alternative 3**
Maintained Landscape	0.97	0.88	0.95
Lakeshore	0.74	0.40	0.55
Mixed Pine/Hardwood	0.27	0.39	0.23
Old Field	0.00	0.18	0.01
Total Impact	**1.98**	**1.85**	**1.74**

Destruction of natural communities along the project alignment will result in the loss of foraging and breeding habitats for the various animal species that utilize the area. Animal species will be displaced into surrounding communities. Adult birds, mammals, and some reptiles are mobile enough to avoid mortality during construction. Young animals and less mobile species, such as many amphibians, may suffer direct loss during construction. The plants and animals that are found in the upland communities are generally common throughout the North Carolina piedmont.

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

b) Aquatic Communities

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

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

Alternatives 1 and 2 will require construction of a new causeway built on fill material. Aquatic habitat will be lost permanently for the entire length and width of the causeway as a result.[2]

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

E. Special Topics

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

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

Project construction cannot be accomplished without infringing on the surface waters. Anticipated surface water impacts fall under the jurisdiction of the USACE and the DWQ.

Table 3: Jurisdictional Impacts

	Alternative 1	Alternative 2	Alternative 2 Minimization	Alternative 3
Length	730 ft. (223 m)	440 ft. (134 m)	250 ft. (76 m)	920 ft. (280 m)
Area	1.8 acre (0.7 hectare)	0.7 acre (0.3 hectare)	0.3 acre (0.1 hectare)	0.9 acre (0.4 hectare)

A total of 75 linear feet (22.9 m) of Lake Wheeler (Swift Creek) is located in each study area. If the final length of impacts to Lake Wheeler is greater than 150 linear feet (45.6 m) or 0.33 acre (0.13 hectare) of jurisdictional area, compensatory mitigation may be required.

[2] Alternative 2 Minimization, the preferred alternative, will restore (provide a net increase of) approximately 0.2 acre (0.1 hectare) of surface waters, because existing fill that will no longer be used will be removed from the lake.

No wetland impacts are anticipated.

2. Permits

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

a) Section 404 of the Clean Water Act

Due to the placement of fill associated with the crossing of jurisdictional surface waters, it may be necessary to obtain permits from the USACE. A final permitting strategy cannot be developed until a final alignment footprint has been determined and final construction impacts are quantified. However, the magnitude of impacts associated with crossing Lake Wheeler indicate an Individual 404 Permit may be required by the USACE.

Section 401 of the Clean Water Act (CWA) requires each state to certify that state water quality standards will not be violated for activities which either involve issuance of a federal permit or license, or require discharges to Waters of the US. The USACE cannot issue a Section 404 permit until 401 certification is issued. Therefore, NCDOT would need to apply to the DWQ for 401 Water Quality Certification as part of the permit process. If impacts are less than 150 linear stream feet (45.6 m) and less than 0.33 acre (0.13 ha) of jurisdictional area, a General 401 Certification applies. However, if impacts are greater than these thresholds the DWQ will have independent authority above USACE regulations to require mitigation. Impacts from bridge and causeway construction exceed these thresholds under either **Alternative 1** or **Alternative 2**. Therefore, stream and wetland mitigation may be necessary to obtain the 401 Water Quality Certification.

Alternative 3 construction is likely to be authorized by Nationwide Permit (NWP) No. 23, as promulgated under 61 FR 2020, 2082; January 15, 2002. This permit authorizes activities undertaken, assisted, authorized, regulated, funded, or financed in whole or in part, by another Federal agency or department where that agency or department has determined that, pursuant to the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act:

- the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment; and

- the Office of the Chief Engineer has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination.

b) Section 401 Water Quality Certification

This project will also require a 401 Water Quality Certification or waiver thereof, from the Department of Environment and Natural Resources (NCDENR) prior to issuance of the NWP 23. Section 401 of the Clean Water Act requires that the state issue or deny water quality certification for any federally permitted or licensed activity that results in a discharge into Waters of the United States. Final permit decision rests with the USACE.

c) Bridge Demolition and Removal

Demolition and removal of a highway bridge over Waters of the United States requires a permit from the U.S. Army Corps of Engineers if dropping components of the bridge into the water is the only practical means of demolition. Effective September 20, 1999, this permit is included with the permit for bridge reconstruction. The permit application henceforth will require disclosure of demolition methods and potential impacts to the body of water in the planning document for the bridge reconstruction.

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

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

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

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

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

Lake Wheeler in the vicinity of the proposed project is a Class WS-III water, which is by definition a High Quality Water. Therefore, Case 1 applies to the proposed replacement of Bridge No. 311 over Swift Creek.

The superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps on timber piles at 8 feet (2.4 m) centers. The abutments are vertical. The existing bridge consists of eight spans. The total bridge length is 135 feet (41.1 m). The maximum potential fill is 67.5 cubic yards (51.6 cu m).

3. Buffer Rules

Pursuant to 15 NCAC 2B .0233, Riparian Area Rules for Nutrient Sensitive Waters in the Neuse River Basin apply to this project. The rules state that roads, bridges, storm water management facilities, ponds, and utilities may be allowed within the 50-foot riparian buffer area of subject streams where no practical alternative exists. They also state that these structures shall be located, designed, constructed, and maintained to have minimal disturbance, to provide maximum erosion protection, to have the least adverse effects on aquatic life and habitat, and to protect water quality to the maximum extent practical through the use of best management practices. Every reasonable effort will be made to avoid and minimize wetland and stream impacts.

Table 4: Estimated Impacts to Riparian Buffers

	Neuse Buffer Impacts in Acres (Hectares)			
	Alternative 1	**Alternative 2**	**Alternative 2 Minimization**	**Alternative 3**
Zone 1	2.15 (0.87)	1.28 (0.52)	0.09 (0.03)	1.29 (0.52)
Zone 2	0.24 (0.10)	0.28 (0.11)	0.06 (0.02)	0.37 (0.15)
Total Impact	**2.39 (0.97)**	**1.56 (0.63)**	**0.15 (0.05)**	**1.66 (0.67)**

Estimated impacts to the riparian buffers are quantified in **Table 4**. Impacts to Zone 1 are based on a buffer width of 30 feet (9.1 m) measured landward from the top of bank or rooted vegetation. Impacts to Zone 2 are based on a buffer width of 20 feet (6.1 m) measured from the outer edge of Zone 1. Since no temporary detours are being considered all impacts are permanent.

4. Mitigation

In the event this project is authorized under a Nationwide Permit, mitigation for impacts to surface waters may or may not be required by the USACE. In accordance with the Division of Water Quality Wetland Rules [15A NCAC 211 .0506 (h)] "Fill or alteration of more than one acre (0.4 hectares) of wetlands will require compensatory mitigation; and fill or alteration of more than 150 linear feet

(45.7 m) of streams may require compensatory mitigation." No wetland impacts are associated with this project. A total of 75 linear feet (22.9 m) of Lake Wheeler (Swift Creek) is located in each study area. If the final length of stream impact is greater than 150 linear stream feet (45.6 m) or 0.33 acres of jurisdictional area (0.13 ha), compensatory mitigation may be required.

If mitigation is necessary, existing policy guidelines on mitigation sequencing should be employed. Measures to avoid, minimize, and compensate wetland and stream impacts should be employed in descending order of priority where feasible.

Avoidance: Due to the nature of the project, complete avoidance is not possible. Avoidance takes place during the preliminary design phase of the project.

Minimization: When avoidance is not possible, impacts should be minimized. Minimization efforts include use of bridges and reduction of fill slopes. Utilization of BMP's is recommended in an effort to minimize adverse impacts. BMP's may include strict erosion and sediment control procedures, careful containment of oil, gasoline, and other hazardous materials, and reduced canopy removal within riparian fringes along streams.

Compensation: Once avoidance and minimization occur, then compensatory mitigation is recommended for unavoidable losses. The USACE does not provide exact requirements for mitigation. Each project is determined on a case-by-case basis. However, the USACE typically uses the following ratios for different types of mitigation: 2:1 for restoration, 3:1 for creation, 4:1 for enhancement, and 10:1 for preservation. Currently the DWQ is requiring at a minimum 1:1 restoration to mitigate for jurisdictional impacts.

F. Rare and Protected Species

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

1. Federally Protected Species

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

The USFWS lists four species under federal protection for Wake County as of January 2003. These species are listed in **Table 5**.

Table 5. Species Under Federal Protection for Wake County

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

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

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

Family: Accipitridae
Federally Listed: 1967

A large raptor, the bald eagle has a wingspread of about 7 feet (2.1 m). Its plumage is mainly dark brown, and adults have a pure white head and tail. First year juveniles are often chocolate brown to blackish, sometimes with white mottling on the tail, belly, and underwings. The head and tail become increasingly white with age until full adult plumage is reached in the fifth or sixth year. An opportunistic predator, the bald eagle feeds primarily on fish but also takes a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available.

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

Bald eagles currently nest at Jordan Lake, which is 19 miles (30.6 km) to the west of Lake Wheeler. However, a review of the NHP files did not reveal any records of bald eagles in the project vicinity.

Biological Conclusion: **No Effect**

No current records of bald eagle nests exist in Wake County, and no eagles have ever been known to nest at Lake Wheeler. The last known active nest in this area was located at Yates Mill Pond, approximately two miles (3.24 km) from the proposed project site, in 1989. The closest nests known to be active this year are located at Falls Lake in Durham County and Jordan Lake in Chatham County. According to Harry LeGrand, bald eagles are occasionally observed at Lake Wheeler during migration. Eagles do not seem to use this location with regularity. Furthermore, it is unlikely that eagles from Lake Jordan or Falls Lake travel to this location to forage.

Earth Tech biologists visited Lake Wheeler on April 22, 2002 to conduct a survey for bald eagles and their nests. No eagles or eagle nests were observed on the day of the site visit. Little to no suitable nesting habitat is present. Therefore, it can be concluded that construction activities associated with the proposed replacement of bridge No. 311, on SR 1379, over Lake Wheeler will have no impact on this federally protected species. If eagles are observed near the project area, construction should be halted until a survey for active nests can be conducted.

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

Family: Picidae
Federally Listed: 1970

The red-cockaded woodpecker is 7 to 8 inches (18 to 20 cm) long with a wing span of 14 to 15 inches (35 to 38 cm). There are black and white horizontal stripes on its back, and its cheeks and underparts are white. Its flanks are black streaked. The cap and stripe on the side of the neck and the throat are black. The male has a small red spot on each side of the black cap. After the first post-fledgling molt, fledgling males have a red crown patch. This woodpecker's diet is composed mainly of insects, which include ants, beetles, wood-boring insects, caterpillars, and corn ear worms if available. About 16 to 18 percent of their diet includes seasonal wild fruit.

Open stands of pines with a minimum age of 80 to 120 years, depending on the site, provide suitable nesting habitat. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwood or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches (25.4 cm) or larger in diameter. In good, well stocked pine habitats, sufficient foraging substrate can be provided on 80 to 125 acres (32.4 to 50.6 ha).

Biological Conclusion: **No Effect**

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

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

Family: Unionidae
Federally Listed: 1990

The dwarf wedge mussel's shell rarely exceeds 1.5 inches (3.8 cm) in length. It's also the only North American freshwater mussel that has two lateral teeth on the right valve, but only one on the left (Fuller, 1977). The female's shell is inflated in the back where the marsupial gills are located. Little is known about the species' life history and reproductive cycle. Gravid females have been observed from late August until June (Clarke, 1981). Like other freshwater mussels, this species' eggs are fertilized in the female as sperm passes through its gills; the resulting larvae then attach to a fish host. Although this host is still unknown, strong evidence suggests that it is an anadromous fish, which migrates from the ocean into freshwater to spawn.

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

Biological Conclusion: **No Effect**

A mussel survey was conducted for the proposed bridge replacement on June 29, 2001 by NCDOT biologists. Mussel surveys were conducted at the bridge site and immediately above and below the bridge site. The survey results were that the dwarf wedge mussel does not occur in the project footprint. The North Carolina Natural Heritage Program does not list any known locations within relative proximity of the project. In addition, Swift Creek is significantly impounded at the project crossing into Lake Wheeler. The habitat found within the project area consists of mostly unconsolidated sediments and severely impounded water, which is not typical of dwarf wedge mussel habitat. In conclusion, project construction will not affect this species.

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

Family: Anacardiaceae
Federally Listed: 1989

Michaux's sumac or false poison sumac is a densely hairy shrub with erect stems, which are 1 to 3 feet (30 to 90 cm) in height. The shrub's compound leaves are narrowly winged at their base, dull on their tops, and veiny and slightly hairy on their bottoms. Each leaf is finely toothed on its edges. Flowers are greenish-yellow to white and are 4-5 parted. Each plant is unisexual. With a male plant the flowers and fruits are solitary, with a female plant all flowers are grouped in 3 to 5 stalked clusters. The plant flowers from April to June; its fruit, a dull red drupe, is produced in October and November.

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

Biological Conclusion: **No Effect**

No habitat exists in the project area for Michaux's sumac. A field survey and a search of the NHP database found no occurrences of Michaux's sumac in the project vicinity. It can be concluded that the project will not impact this threatened species.

2. Federal Species of Concern

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

Table 6. Federal Species of Concern in Wake County

Common Name	Scientific Name	State Status	Habitat present
Vertebrates			
Bachman's sparrow	*Aimophila aestivalis*	SC	No
Southeastern myotis	*Myotis austroriparius*	SC	Yes
Pinewoods shiner	*Lythrurus matutinus*	SR	No
Southern hognose snake	*Heterodon simus*	SR	No
Carolina darter	*Etheostoma collis lepidinion*	SR	No
Invertebrates			
Diana fritillary butterfly	*Speyeria diana*	SR	No
Atlantic pigtoe	*Fusconaia masoni*	T	No
Green floater	*Lasmigona subviridus*	E	No
Yellow lance	*Elliptio lanceolata*	T	No
Vascular Plants			
Bog Spicebush	*Lindera subcoriacea*	E	No
Carolina least trillium	*Trillium pusillum* var. *pusillum*	E	No
Sweet pinesap	*Monotropsis odorata*	C	No
Sources: Amoroso, ed., 1999; LeGrand and Hall, eds., 1999 Key: T = Threatened, E = Endangered, SC = Special Concern, C = Candidate, SR = Significantly Rare			

Bog spicebush does not appear on the January 2003 USFWS list of protected species for Wake County, however this species is listed by the NC NHP on their website (last updated July 2001) as a Federal Species of Concern. John Finnegan, Data Systems Manager of the NC NHP, stated on August 21, 2001 that the NC NHP has one record of bog spicebush from northern Wake County in 1997.

No FSC species were observed during the site visit, and none are recorded at NHP as occurring within 2 miles (3.2 km) of the project area.

3. Summary of Anticipated Impacts

No impacts to federally protected species are anticipated.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

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

B. Historic Architecture

A field survey of the Area of Potential Effect (APE) was conducted. All structures within the APE were photographed, and later reviewed by the State Historic Preservation Office (SHPO). In a concurrence form dated March 10, 2000, the SHPO concurred that there are no historic architectural resources either listed in or eligible for listing in the National Register of Historic Places within the APE. A copy of the concurrence form is included in Appendix A.

C. Archaeology

The SHPO, in a memorandum dated November 7, 2000 recommended that no archaeological investigation be conducted in connection with this project. A copy of the memorandum is included in Appendix A.

VII. ENVIRONMENTAL EFFECTS

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

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

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

No adverse effect on families or communities is anticipated. Right-of-way acquisition will be limited. There is one potential residential relocation.

There are no wildlife or waterfowl refuges of national, state, or local significance in the vicinity of the project. There is one publicly owned park, Lake Wheeler Park, in the vicinity of the project. Section 4(f) of the Department of Transportation Act does not apply, because the park is an incidental/secondary use of the lake. The primary use of the lake is to serve as a secondary water supply for the City of Raleigh. The project will have no adverse effect on Lake Wheeler Park. The City of Raleigh, which maintains the park, has been coordinated with regarding impacts and mitigation measures. There is a greenway planned for the south end of the project. The proposed project will not have any adverse effects on the proposed greenway as currently planned. The

bridge will be constructed with adequate vertical clearance so the City of Raleigh could construct a greenway under the south end of the bridge in the future. In addition, the berm along the east side of the causeway will be wide enough to accommodate future sidewalks.

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

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

Traffic volumes will not increase or decrease because of this project. 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 NAACO 2D.0520. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAAA and NEPA), and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the Division of Waste Management revealed neither underground storage tanks,

hazardous waste sites, regulated or unregulated landfills, nor dump sites in the project area.

Wake County is a participant in the National Flood Insurance Regular Program. Bridge No. 311 is located in a Federal Emergency Management Administration (FEMA) 100-year emergency flood hazard zone. The bridge location is in a detailed study area. **Figure 5** shows the 100-year emergency flood hazard zone in the vicinity of the bridge. The proposed replacement of the bridge is not anticipated to affect the 100-year floodplain.

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

VII. PUBLIC INVOLVEMENT

A Citizens Informational Workshop was held from 4:00 p.m. to 7:00 p.m. on August 16, 2001, at the Lake Wheeler Waterfront Program Center in Wake County. The Citizens Informational Workshop was a "drop-in" style workshop giving citizens an opportunity to meet "one-to-one" with project team member to ask questions and provide comments. The workshop was announced through advertisements and articles in the Raleigh News and Observer, a newsletter mailed to property owners in the project's vicinity, and a letter to local public officials. Approximately 60 people attended the workshop. Comment sheets were received either at the meeting or by mail afterwards.

Comments received at the workshop and later by mail expressed concern primarily about the magnitude of community and commuter disruption that **Alternative 3** may provide.

VIII. AREAS OF CONTROVERSY

There are no areas of controversy on this project.

IX. AGENCY COMMENTS

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

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

City of Raleigh. NCDOT and FHWA have had detailed consultations with the City of Raleigh Parks and Recreation Department staff concerning potential impacts and minimization, with the latest meeting on February 26, 2003. The City noted the following at the meeting:

- Concern regarding the project's impacts to the capacity of the water supply reservoir has been addressed. NCDOT anticipates less than 0.3 acres of surface waters will be impacted. In addition, the portion of the old causeway that is not needed for the new facility will be removed.

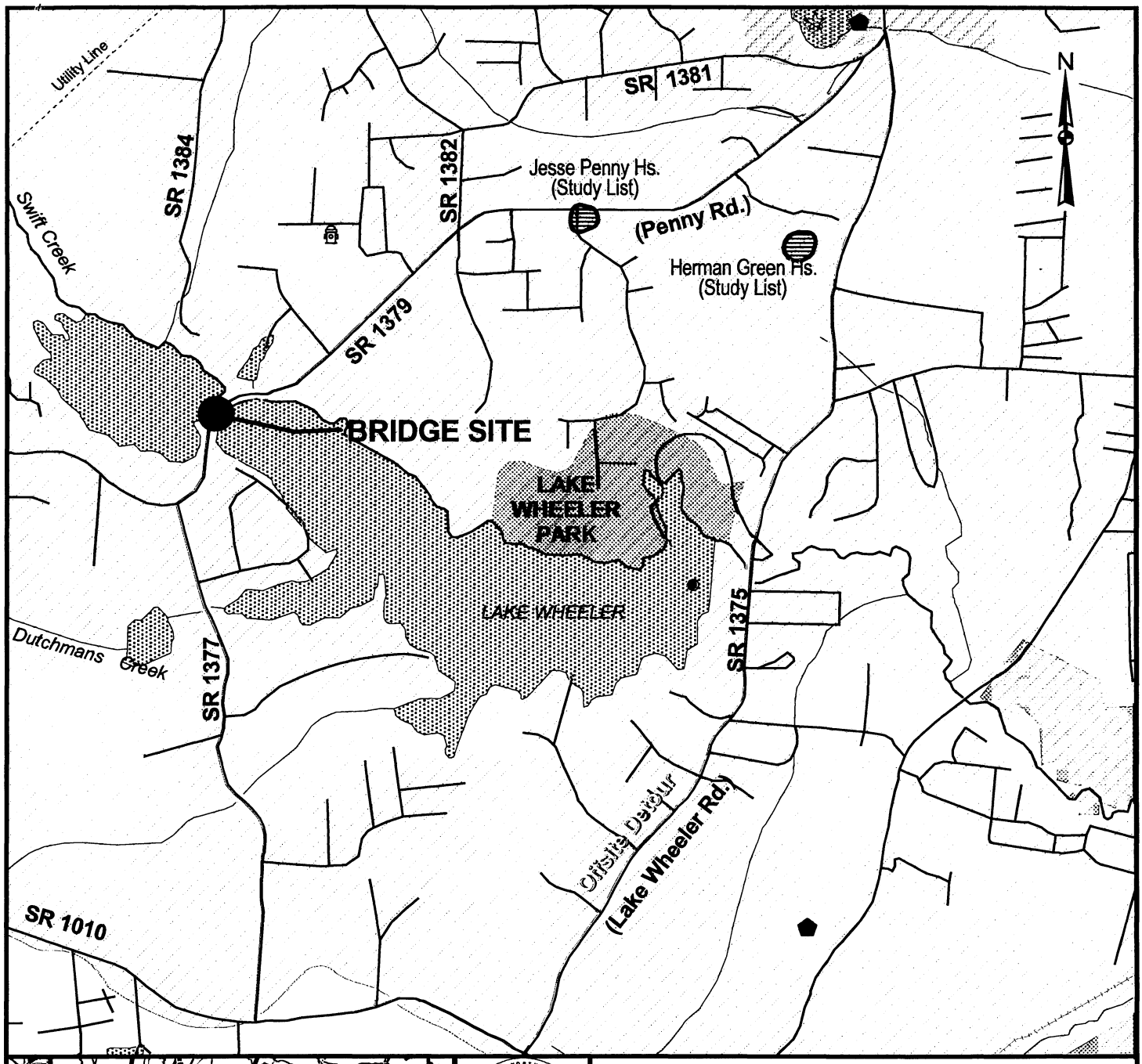
- Clearance for the proposed greenway on the south end should be provided as designs develop.

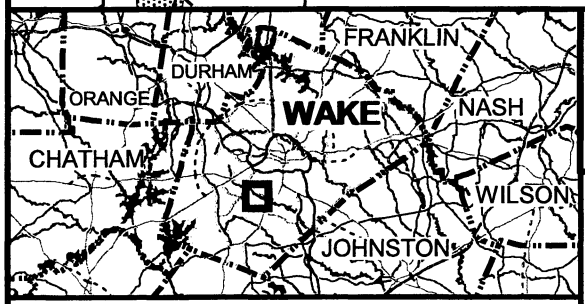
- The City is concerned about people trying to fish off of the bridge. A proposed 54-inch rail may limit fishing, however, if possible, we would like to see an even higher railing used.

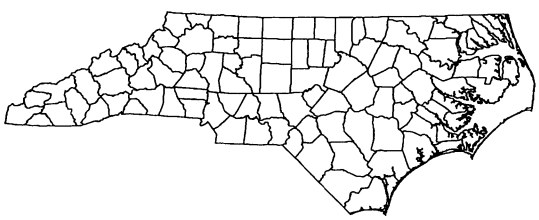
- The City is concerned about turbidity and emphasizes the need to minimize it. We requested NCDOT to inform us of the construction techniques anticipated to used to build the new bridge's substructure.

- The City agreed with the concept of providing a sidewalk section across the bridge and a berm wide enough for a future sidewalk on the causeway. We also agreed with the 4-foot paved shoulder on the southbound lane and the 14-foot northbound lane to accommodate bicyclists.

FIGURES





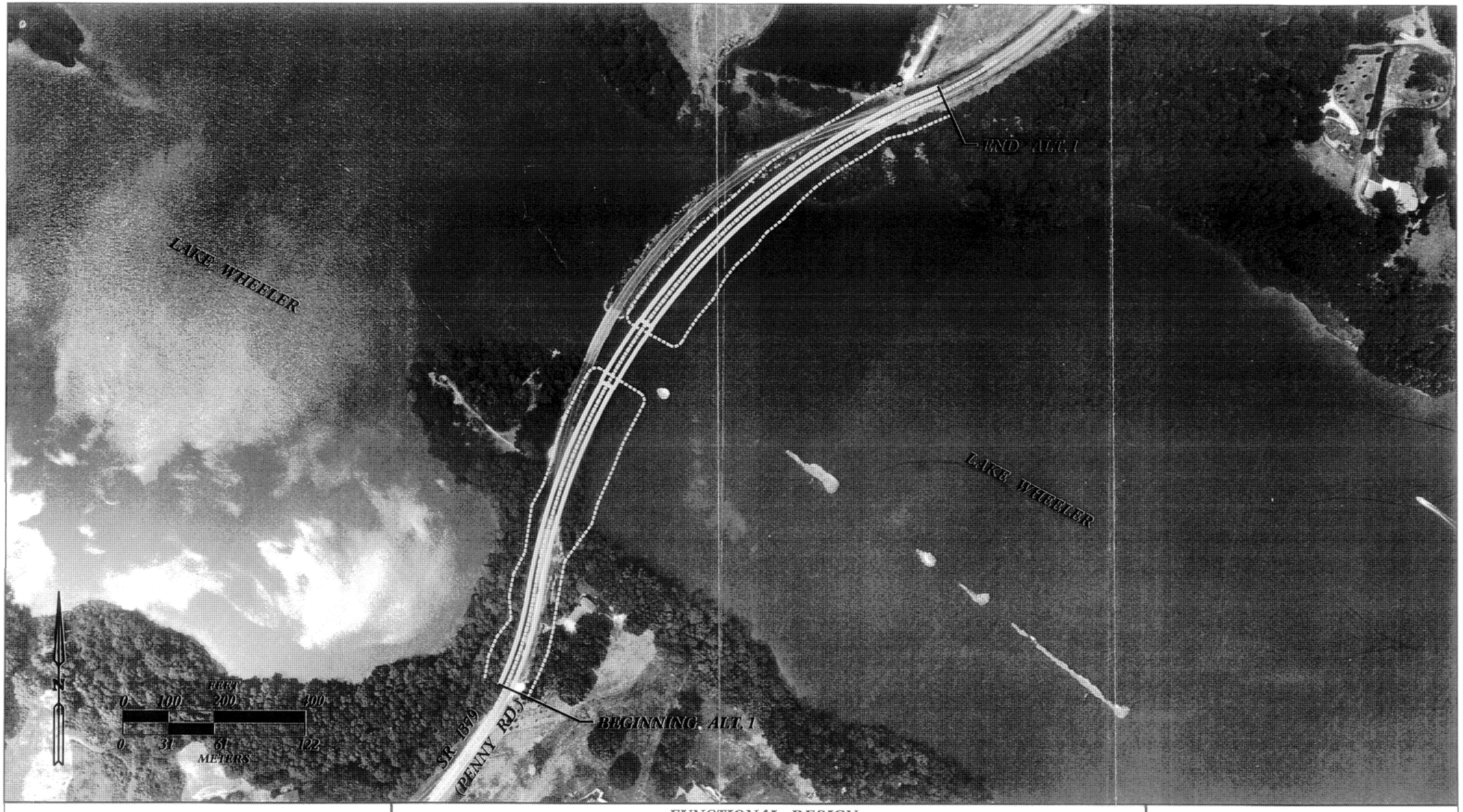


North Carolina - Department of Transportation
Division of Highways
Project Development and Environmental Analysis Branch

FIGURE 1
VICINITY MAP

REPLACEMENT OF BRIDGE NUMBER 311
ON SR 1379 OVER LAKE WHEELER (SWIFT CREEK)
WAKE COUNTY
TIP NO. B-3917

0.5 0 0.5 1 Miles



North Carolina Department of Transportation
Division of Highways
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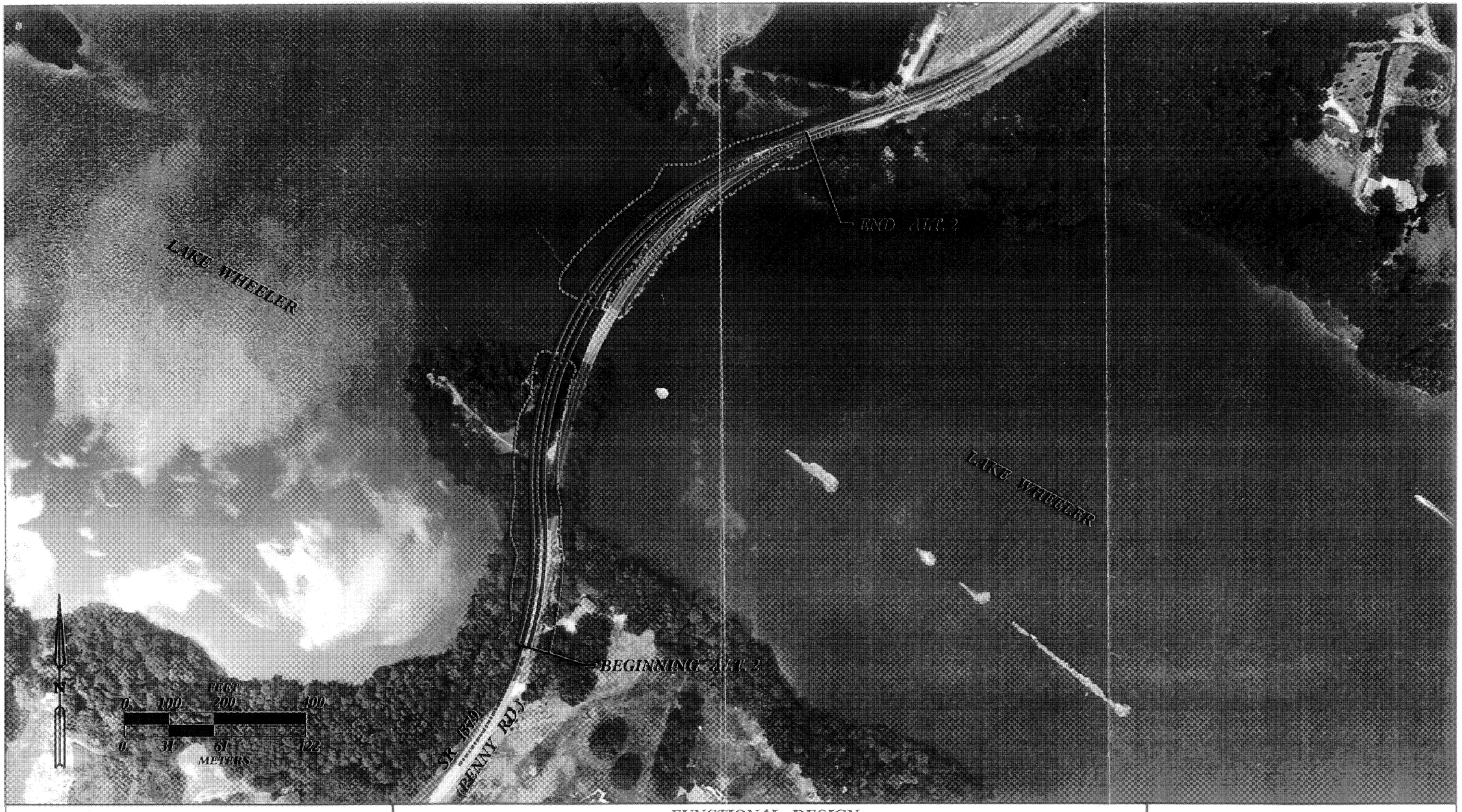
FUNCTIONAL DESIGN LEGEND

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

FIGURE 2a
ALTERNATIVE 1
REPLACEMENT OF BRIDGE NO. 311
ON SR 1379 OVER
LAKE WHEELER
WAKE COUNTY
TIP NO. B–3917

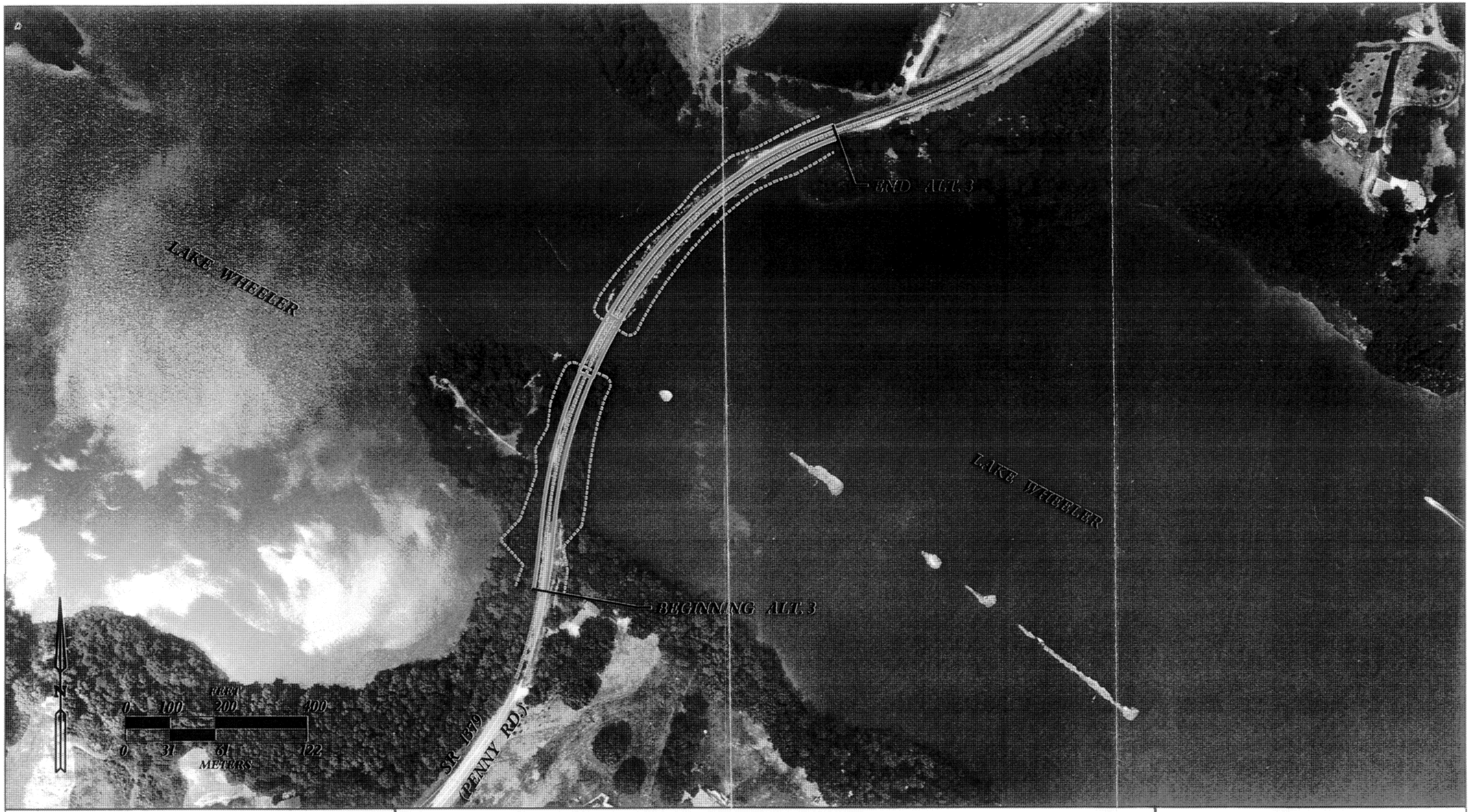


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

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

FIGURE 2b
ALTERNATIVE 2
REPLACEMENT OF BRIDGE NO. 311
ON SR 1379 OVER
LAKE WHEELER
WAKE COUNTY
TIP NO. B-3917

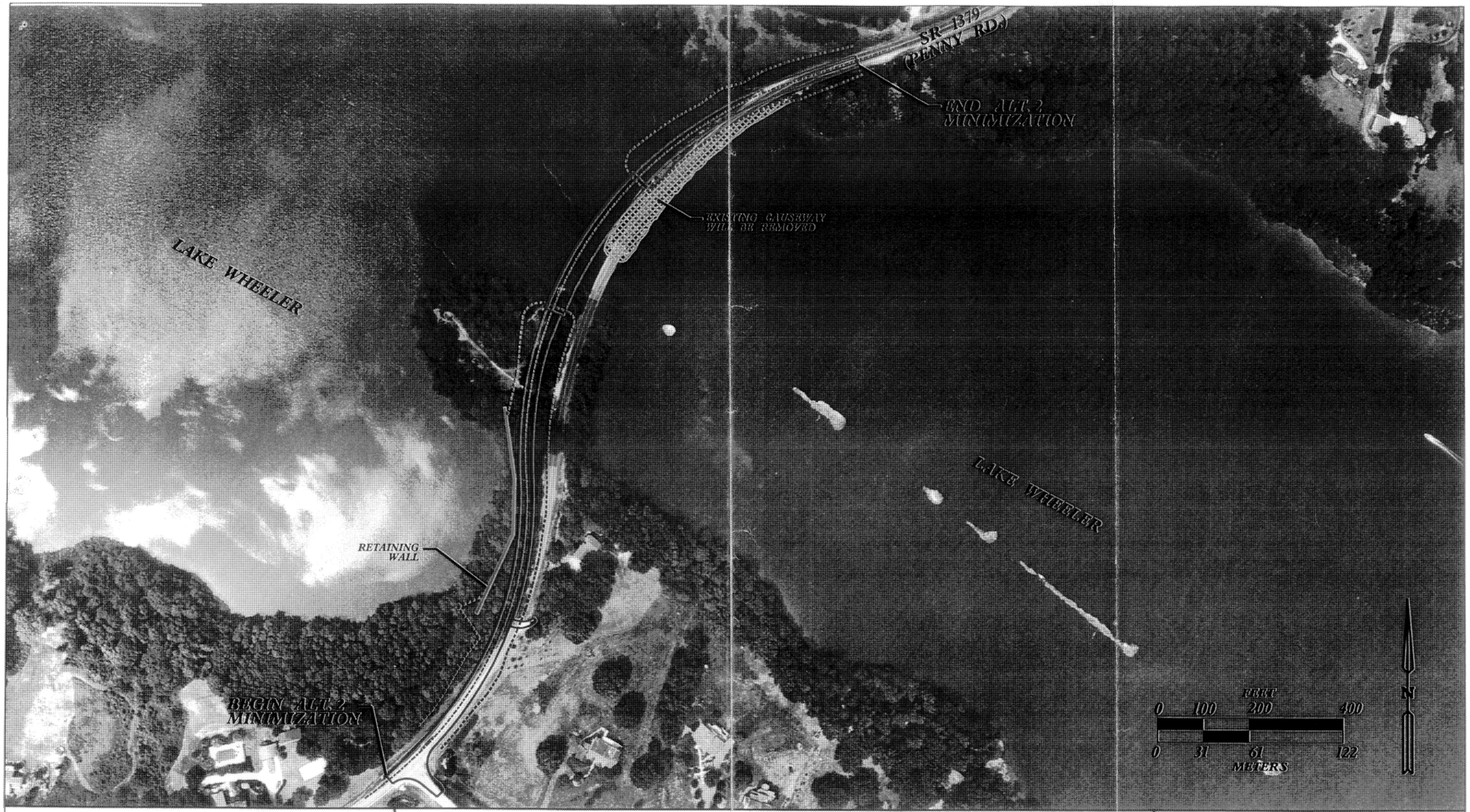


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

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

FIGURE 2c
ALTERNATIVE 3
REPLACEMENT OF BRIDGE NO. 311
ON SR 1379 OVER
LAKE WHEELER
WAKE COUNTY
TIP NO. B-3917

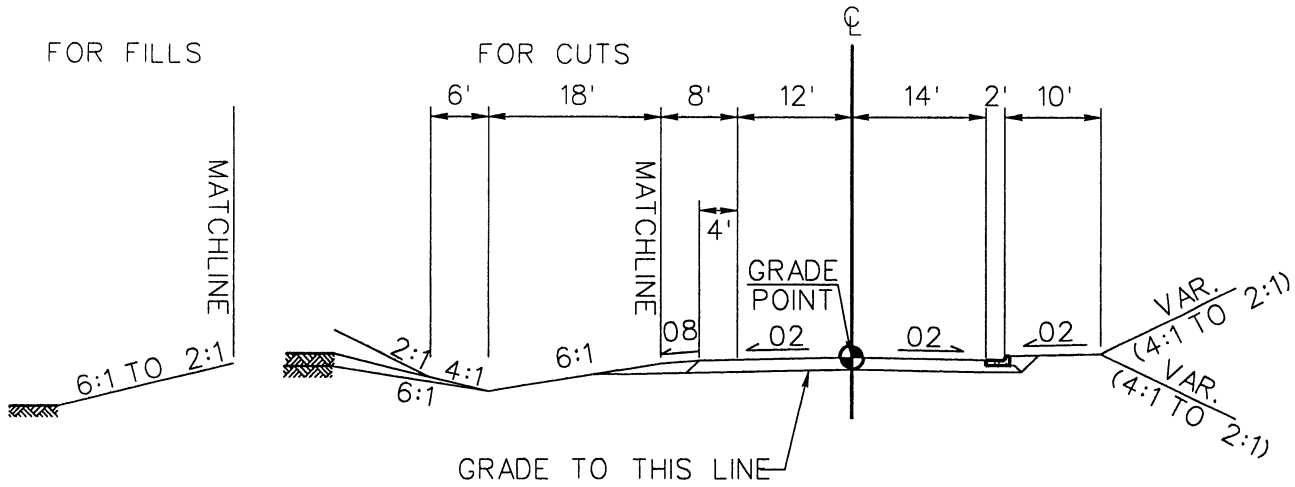


North Carolina Department of
Transportation
Division of Highways
Project Development & Environmental
Analysis Branch

FUNCTIONAL DESIGN
LEGEND

-------- Alt. 2, Centerline
——— Alt. 2, Edge of Pavement
- - - - Alt. 2, Construction Limits

FIGURE 2d
ALTERNATIVE 2 MINIMIZATION
REPLACEMENT OF BRIDGE NO. 311
ON SR 1379 OVER
LAKE WHEELER
WAKE COUNTY
TIP NO. B–3917



TYPICAL ROADWAY APPROACH SECTION

TRAFFIC DATA

ADT 2002	5000
ADT 2025	13800
DUAL	3%
TTST	2%

FUNCTIONAL CLASSIFICATION: RURAL LOCAL

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

WAKE COUNTY

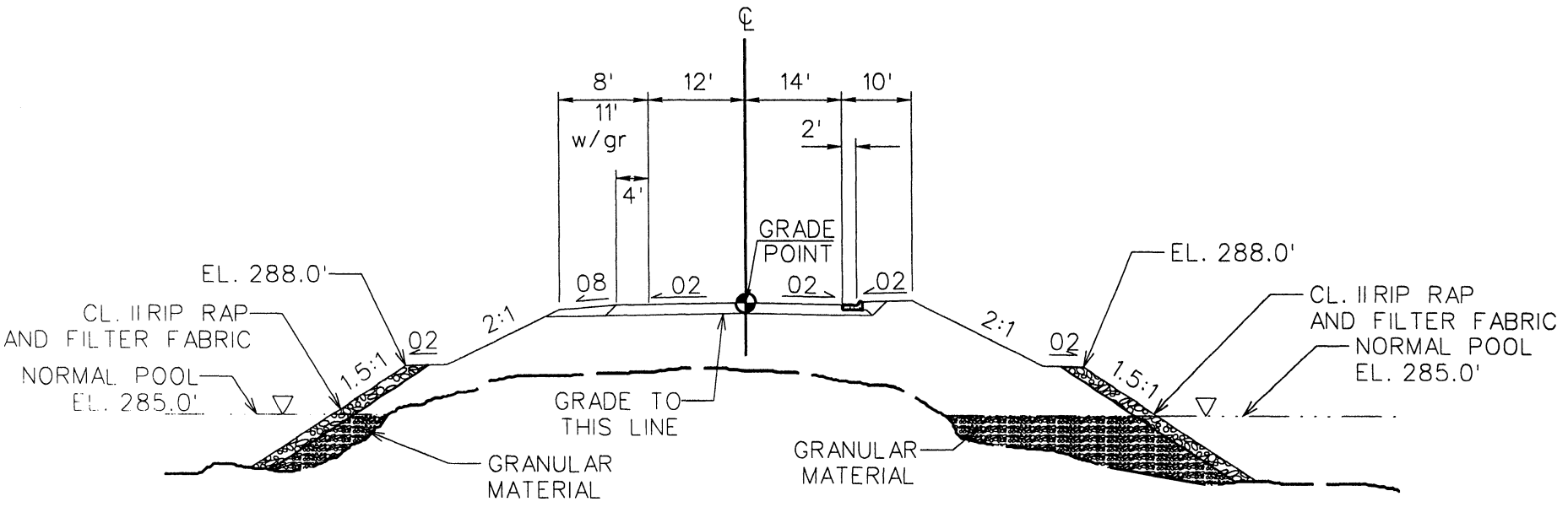
BRIDGE NO. 311 ON SR 1379
OVER LAKE WHEELER

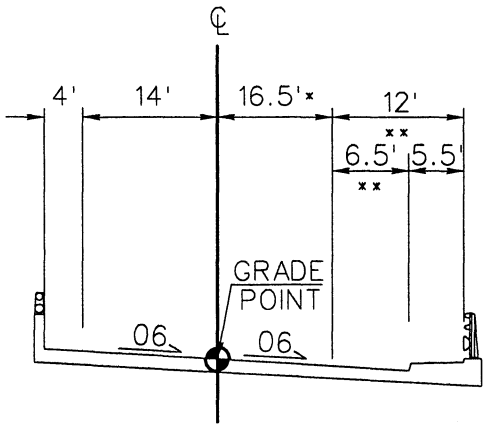
TYPICAL SECTION

TIP NO. B-3917

FIGURE 3a

NOT TO SCALE





* Includes 2.5' of Curve widening

** Includes Sight Distance Widening

TYPICAL SECTION ON STRUCTURE

TRAFFIC DATA

ADT 2002	5000
ADT 2025	13800
DUAL	3%
TTST	2%

FUNCTIONAL CLASSIFICATION: RURAL LOCAL

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

WAKE COUNTY

BRIDGE NO. 311 ON SR 1379
OVER LAKE WHEELER

TYPICAL SECTION

TIP NO. B-3917

FIGURE 3b

NOT TO SCALE

Looking north at the bridge.

Upstream side of the bridge.

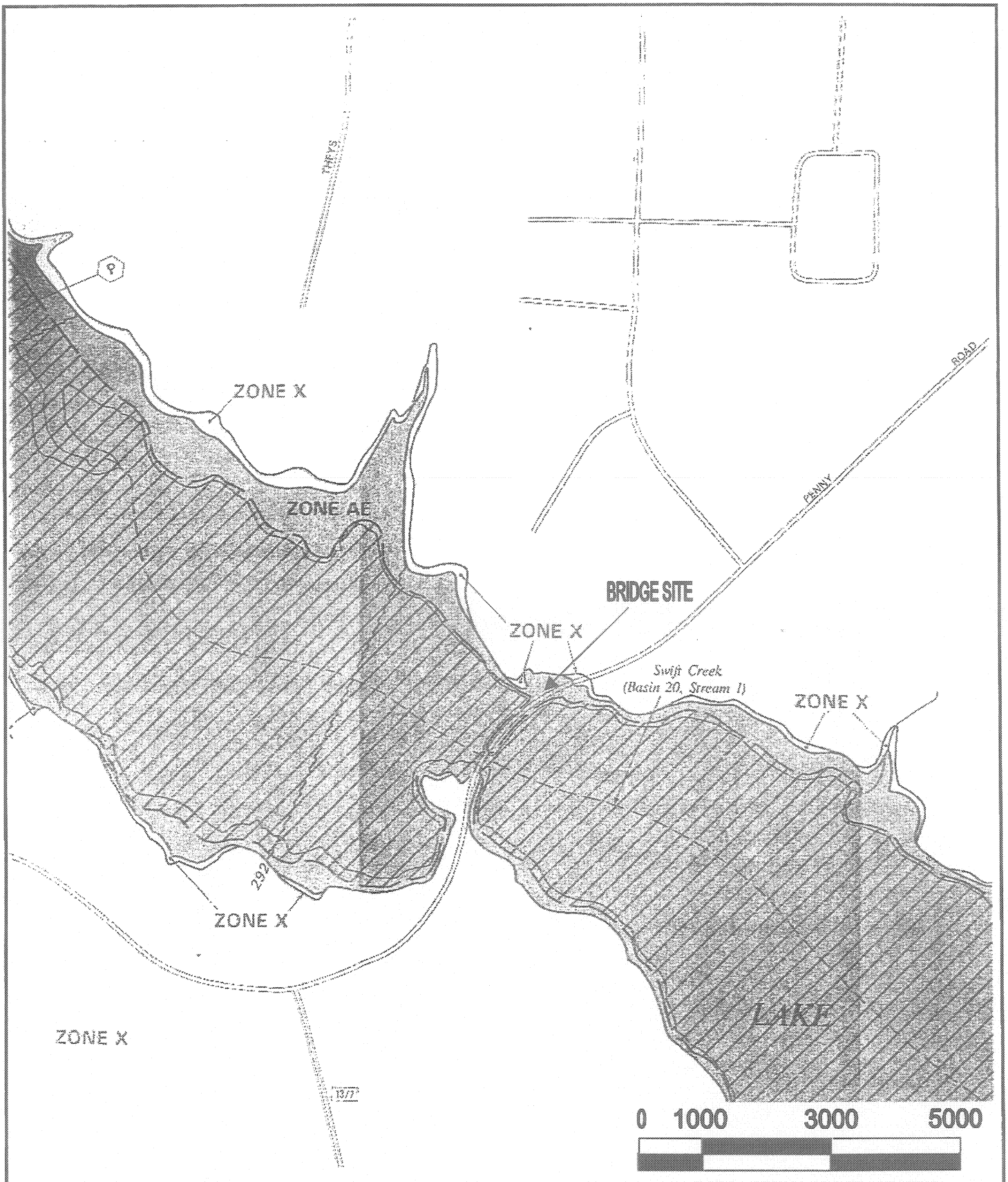
North Carolina – Department of Transportation

Division of Highways

Project Development and
Environmental Analysis Branch

FIGURE 4

REPLACEMENT OF BRIDGE NUMBER 311
ON SR 1379 OVER LAKE WHEELER
(SWIFT CREEK)
WAKE COUNTY
TIP NO. B-3917



North Carolina – Department of Transportation

Division of Highways

Project Development and Environmental Analysis Branch

FIGURE 5
FEMA 100 – YEAR FLOODPLAIN MAP
REPLACEMENT OF BRIDGE NUMBER 311
ON SR 1303 OVER LAKE WHEELER
(SWIFT CREEK)
WAKE COUNTY
TIP NO. B-3917

APPENDIX

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601
June 2, 2003

IN REPLY REFER TO
HO-NC

Mr. John G. Conforti, REM
North Carolina Department of Transportation
Planning Development & Environmental Analysis
Raleigh, North Carolina

Subject: Categorical Exclusion for B-3917 (Penny Road over Lake Wheeler) Wake County

Dear Mr. Conforti:

As per our previous discussions, Lake Wheeler is primarily used for water supply, not recreational purposes. Therefore, it does qualify for 4(f) considerations. If you have any questions, please call Jake Riggsbee of this office at (919) 856-5350 ext. 102.

Sincerely yours,

T. D. R., P.E.

For John F. Sullivan, III
Division Administrator

nited States
epartment of
griculture

atural
esources
onservation
ervice

405 Bland Rd.
uite 205
aleigh, NC 27609

)19) 873-2134

October 30, 2000

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

Dear Mr. Conforti:

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

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

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

Sincerely,

Mary K. Combs
State Conservationist

B-3917

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

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

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: October 8, 2001

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Project specific comments:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

B3917

Grimes

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

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

Division of Archives and History
Jeffrey J. Crow, Director

November 7, 2000

MEMORANDUM

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

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

Re: Bridge Group XXVIII Bridge Replacement Projects, Wake County, ER 01-7795

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

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

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

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

DB:kgc

3917

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

Complete

Federal Aid =BRZ-1379(1) *TIP* #B-3917 *County*: Wake

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

Project Description: Replace Bridge No. 311 on SR 1379 over Lake Wheeler

On February 17, 2000, representatives of the

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

Reviewed the subject project at

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

All parties present agreed

- [ ] there are no properties over fifty years old within the project's area of potential effect.
- [x] there are no properties less than fifty years old which are considered to meet Criterion Consideration G within the project's area of potential effect.
- [x] there are properties over fifty years old (list attached) within the project's area of potential effect, but based on the historical information available and the photographs of each property, properties identified as #1-3 are considered not eligible for the National Register and no further evaluation of them is necessary.
- [x] there are no National Register-listed properties located within the project's area of potential effect.

Signed:

Mary Pope Furr — 2.17.2000
Representative, NCDOT — Date

Michael T. Hanson — 2/17/2000
FHWA, for the Division Administrator, or other Federal Agency — Date

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

City Of Raleigh

North Carolina

February 12, 2002

Mr. John Conforti
NC Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Subject: Designs for the replacement of Bridge # 311 on SR 1379 over Lake Wheeler, TIP Project B-3917

Dear Mr. Conforti,

The following response is provided to address the impact this project will have on Lake Wheeler Park as outlined in Section 4(f) of the U.S. Department of Transportation Act of 1966. Lake Wheeler Park is an 865 acre park (including the lake itself) that provides water-related recreation activities for the general public. The lakes(parks) primary use is as a water supply source for the City. The secondary use is to provide recreation opportunities.

In order to accurately review the effects that this project (all three alternatives) will have on Lake Wheeler Park we require additional information for our Departmental review:

1. Please provide the limits of construction for this project in both land and water areas.
2. Please provide additional details on how the fill in the lake will be constructed.
3. Please provide details/information if the lake water level is proposed to be impacted by your work.
4. Extending the guard rails and adding "No Parking" signage along the bridge to eliminate roadside pull-off parking in this area should be considered.
5. Please provide section details of the bridge showing the height of the bottom of the bridge above the lake water level.
6. The City of Raleigh would like to retain a permanent "Right To Access" easement beneath the bridge for potential future greenway trail conections.

Please contact Matt Phillips @ 890-3293 when you have compiled this information and a meeting can be scheduled for further review of this project.

Sincerely,

Jack C. Duncan
Director, Parks and Recreation Department

City Of Raleigh
North Carolina

March 25, 2002

Mr. John Conforti
NC Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Subject: Replacement of Bridge # 311 on SR 1379 over Lake Wheeler, TIP Project B-3917

Dear Mr. Conforti,

The City of Raleigh Parks and Recreation Department staff has completed review of the three proposed alignment alternatives for TIP Project B-3917, the replacement of Bridge number 311 on Penny Rd., as submitted by NCDOT and EarthTech Engineering. Please note the following Parks and Recreation Department comments concerning this project:

1. Alternate 1 – replacing the bridge using the existing road alignment – is the favored alignment because it would have the least impact to the lake. In order to eliminate any additional fill in the lake either: 1. Extend the length of the bridge, to a point that requires no fill in the lake; or 2. Construct retaining walls along the sides of the road, within the existing land area to achieve the desired road elevation.
2. Include a raised **5'-0" minimum** width sidewalk on the bridge to accommodate pedestrian traffic on one side of the bridge.
3. Provide for a minimum of 8' of clearance from the bottom of the bridge to a point 2' above the water level (pond level), for a potential future trail, beneath the southwest end of the bridge. Although also desirable, it is understood from conversations with NCDOT and EarthTech that the roadway elevation will not allow for a similar crossing beneath the northeast end of the bridge.
4. The existing bridge should be removed at the completion of this project if Alternate 2 or 3 is chosen.
5. The proposed guardrails along Penny Rd. should be extended to the limits of construction for this project segment (at a minimum to the ends of the causeways on both sides) to eliminate pull-off parking. However, a securable vehicular access opening in the guardrail to the southwest peninsula area should be provided for maintenance access by the Parks and Recreation Department.
6. A permanent Encroachment Agreement for a future trail crossing beneath the bridge should be granted to the City of Raleigh.

Sincerely,

Jack C. Duncan
Director, Parks and Recreation Department