STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 7, 2007

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

ATTN: Mr. David Baker
NCDOT Coordinator

Subject: **Nationwide Permit 23 and 33 and Section 401 Water Quality Certification Application** for replacement of Bridge No. 335 on SR 1238 (Pearl Lane) over Mud Creek, Federal Aid No. BRZ-1238(2), State Project No. 8.2982301, Henderson County, Division 14, TIP No. B-3856. WBS Element No. 33301.1.1. Debit Work Order No. 33301.1.1 $475

Dear Sir:

Please see the enclosed Pre-Construction Notification (PCN), Ecosystem Enhancement Program (EEP) mitigation acceptance letter, onsite stream relocation summary, permit drawings, design plans and Categorical Exclusion (CE) for the subject project. The North Carolina Department of Transportation (NCDOT) proposes to replace the 47 foot Bridge No. 335 with a three barrel, 9-foot wide by 9-foot high reinforced concrete box culvert. The new structure will be built on the same alignment as the existing bridge. The box culvert was chosen for this project because of durability, cost effectiveness, and it is considered acceptable from a hydraulic conveyance standpoint. During construction, traffic will be routed to a temporary onsite detour alignment to the west of the existing bridge. A driveway entrance southwest of Bridge No. 335 will be relocated to the south, away from Mud Creek. There will be a total of 420 feet of permanent impacts to three separate jurisdictional streams due to installation of the new box culvert and relocation of two streams. Onsite Natural Stream Design will be utilized to offset 370 feet of impacts associated with the stream relocation. There are no jurisdictional wetlands within the project study area.

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501
WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
2728 CAPITOL BOULEVARD
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27699

IMPACTS TO WATERS OF THE UNITED STATES

General Description: There are three jurisdictional streams on the project site: Mud Creek, UT1 and UT2 to Mud Creek. These water resources are located in the French Broad River Basin (subbasin 04-03-02, Hydrological Cataloguing Unit 06010105). The North Carolina Division of Water Quality (NCDWQ) index number for Mud Creek is 6-55. Mud Creek is classified by the Division of Water Quality as a **C** water body. Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II) nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project area. The average baseflow width of Mud Creek is approximately 5 feet. Average depth is approximately 7 inches. The average baseflow width of the UT1 is 2 feet, with an average depth of 4 inches. The average baseflow width of the UT2 to Mud Creek is 3 feet, with an average depth of 4 inches.

Permanent Impacts: There will be 420 feet of permanent impacts to jurisdictional streams due to the installation of a new box culvert and relocation of two streams. Stream relocation comprises a total of 380 feet of impacts to UT1 and UT2.. There will be 215 feet of impacts to UT1 and 165 feet of impacts to UT2. The installation of a box culvert comprises 40 feet of impacts to Mud Creek.

Temporary Impacts: There will be 0.03 acre of temporary impacts to jurisdictional streams due to the installation of a new box culvert, relocation of two streams and placement of a temporary detour pipe. Installation of a new box culvert and temporary detour pipe comprises 0.03 acre of impact. The temporary detour pipe consists of a 90 inch corrugated steel pipe that will be removed after construction of the box culvert is completed. Relocation of UT1 and UT2 accounts for <0.01 acre of temporary impacts each.

Bridge Demolition: Bridge No. 335 is composed entirely of timber. Therefore, there will be no fill in "Waters of the United States" resulting from bridge demolition.

Utility Impacts: There are no utilities attached to the existing structure, but an underground phone line becomes aerial across the creek on the west side of the bridge. There will be no impacts to jurisdictional waters due to utilities.

Schedule: The project schedule calls for a September 18, 2007 Let date with a date of availability on October 23, 2007. The review date for the project is July 31, 2007.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2007

the United States Fish and Wildlife Service (USFWS) list 8 species under federal protection for Henderson County: small-whorled pogonia, bunched arrowhead, mountain sweet pitcher plant, white irisette, Appalachian elktoe, and oyster mussel are listed as endangered and swamp pink is listed as threatened. The bog turtle is listed threatened with similarity of appearance and does not require a biological conclusion. It was determined that there was no habitat for the listed species. The NC Natural Heritage database of rare species and unique habitats was reviewed in March 2007. There is no documentation of rare species or unique habitats found within 1 mile of the project area.

Table 1. Species Under Federal Protection in Henderson County

Common Name	Scientific Name	Federal Status	Habitat	Biological Conclusion
Bog turtle	*Clemmys muhlenbergii*	T (S/A)	No	Not required
Small-whorled pogonia	*Isotria medeoloides*	E	No	No Effect
Swamp pink	*Helonias bullata*	T	No	No Effect
Bunched arrowhead	*Sagittaria fascilulata*	E	No	No Effect
Mountain sweet pitcher plant	*Sarracenia rubra var. jonsii*	E	No	No Effect
White irisette	*Sisyrinchium dichotomum*	E	No	No Effect
Appalachian elktoe	*Alasmidonta raveneliana*	E	No	No Effect
Oyster mussel	*Epioblasma capsaeformis*	E	No	No Effect

AVOIDANCE, MINIMIZATION AND MITIGATION

Avoidance and Minimization:
Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". 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 stages; minimization measures were incorporated as part of the project design.

- Best Management Practices will be followed for this project as outlined in "NCDOT's Best Management Practices for Construction and Maintenance Activities".
- Reduction of clearing and grubbing activities.
- Re-establishment of vegetation on exposed areas
- Judicious pesticide and herbicide usage
- Litter/debris control

Mitigation:
Natural Stream Design will be used to offset 370 feet of permanent impacts associated with the relocation of two unnamed tributaries to Mud Creek. The existing stream slopes will be replicated for both streams. Function and stability will be enhanced using natural stream design techniques. These include constructing a bankfull bench to provide flood relief at bankfull stage, and using rock cross vanes to establish grade control. Because of the small drainage areas of these two streams, bankfull dimensions were verified by

hydrologic and hydraulic techniques instead of the regional curves. The proposed stream will have a Rosgen classification of "E4b". The relocated channels will be reforested and preserved with permanent right of way and easements. (Please see attached onsite stream relocation summary).

The remaining 50 feet of impacts associated with the placement of the box culvert will be mitigated through the use of EEP (Please see attached mitigation acceptance letter date March 29, 2007).

REGULATORY APPROVALS

Section 404 Permit : It is anticipated that the construction of a temporary on-site detour will be authorized under Section 404 Nationwide Permit No. 33 (Temporary Construction Access and Dewatering). We are therefore requesting the issuance of a Nationwide Permit 33 authorizing the temporary dewatering of Mud Creek. It is anticipated that the use of Natural Stream Design for on-site mitigation and the placement of the box culvert will be authorized under the Nationwide Permit No. 23. All other aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR § 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (FR number 10, pages 2020-2095; January 15, 2002).

Section 401 Permit: In compliance with Section 143-215.D9(e) of the NCAC, we will provide $475.00 to act as payment for processing the Section 401 (General Certification Numbers 3403, 3495, and 3366) permit application previously noted in this application (see Subject line). 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.

We also anticipate that comments from the North Carolina Wildlife Resources Commission (NCWRC) will be required prior to authorization by the Corps of Engineers. By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

Thank you for your assistance with this project. If you have any questions or need additional information please contact Jason Dilday at jldilday@dot.state.nc.us or (919) 715-5535. The application will be posted at http://207.4.62.65/PDEA/PermApps/.

Sincerely,

for E. L. Lusk

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

cc:
W/attachment

Mr. John Hennessy, NCDWQ (5 Copies)
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Mr. Harold Draper, TVA
Mr. Clarence W. Coleman, P.E., FHWA
Dr. David Chang, P.E., Hydraulics
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. J. B. Setzer, P.E. (Div. 14), Division Engineer
Mr. Mark Davis (Div. 14), 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
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch
Ms. Natalie Lockhart, Project Planning Engineer

Office Use Only: Form Version March 05

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

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

I. Processing

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

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

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

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

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

II. Applicant Information

1. Owner/Applicant Information
   Name: Gregory J. Thorpe, Ph.D., Environmental Management Director
   Mailing Address: 1598 Mail Service Center
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: jldilday@dot.state.nc.us

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

III. Project Information

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

1. Name of project: Bridge No. 335 over Mud Creek

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3856

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

4. Location
   County: Henderson Nearest Town: Hendersonville
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): SR 1238, Pearl Lane

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): 35'14'43' °N -82'31'31' °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: French Broad River

8. River Basin: French Broad Basin
   (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: Agricultural, minor residental with some early successional forest communities

10. Describe the overall project in detail, including the type of equipment to be used: Bridge No. 335 replaced with triple box culvert and the relocation of two unnamed streams by natural stream design using standard bridge demolition and construction equipment.

11. Explain the purpose of the proposed work: Improve the safety of travelers along SR 1238 by replacing a structurally absolete structure.

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: 570 feet of impacts to jurisdictional streams (420 feet permanent, 150 feet temporary) as a result of installation of a box culvert, relocation of two streams and a temporary detour pipe. 370 feet of permenant impacts will be offset using natural stream design for the two unnamed tributaries.

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)
No wetlands					
Total Wetland Impact (acres)					0

3. List the total acreage (estimated) of all existing wetlands on the property: 0

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

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
1	Roadside Canal	Temp	Perennial	2 ft	10	0.001
1	Roadside Canal	Perm	Perennial	2.ft	215	0.017
2	Mud Creek	Temp	Perennial	5 ft	130	0.024
2	Mud Creek	Perm	Perennial	5 ft	40	0.009
3	UT of Mud Creek	Temp	Perennial	3 ft	10	0.001
3	UT of Mud Creek	Perm	Perennial	3 ft	165	0.012
Total Permanent Stream Impact (by length and acreage)					420	0.038

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)
No Impacts				
Total Open Water Impact (acres)				0

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

Stream Impact (acres):	0.026 (temp) 0.038 (permanent)
Wetland Impact (acres):	0
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0.026 (temp) 0.038 (permanent)
Total Stream Impact (linear feet):	150 (temp) 420 (permanent)

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.Traffic will be placed on a

temporary onsite detour alignment to the west (upstream) of the existing bridge to provide the best alignment while having minimal impact on the floodplain and on adjacent properties. The typical section is a shoulder section with grass shoulders and grass ditches. No curb and gutter will be used on this project. The proposed 3@8' x8' RCBC will be buried below the stream 1 foot below the channel bed and will have sills on the outer two barrels allowing normal low flow to be maintained in the center barrel. The box culvert was chosen for this project because of durability, more cost effective and it is considered acceptable from a hydraulic conveyance standpoint. The 90" CSP detour pipe will be buried 1 foot below the channel bed.

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.

   Onsite mitigation will be used to offset 370 feet of permanent impacts that occur from the relocation of two unnamed triburtaries that occur on the project site. This will be

accomplished through natural stream design. 50 feet of permanent impacts that occur from stream relocation and the placement of the box culvert will be mitigated through the use of EEP.

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): 50
   Amount of buffer mitigation requested (square feet): 0
   Amount of Riparian wetland mitigation requested (acres): 0
   Amount of Non-riparian wetland mitigation requested (acres): 0
   Amount of Coastal wetland mitigation requested (acres): 0

IX. Environmental Documentation (required by DWQ)

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

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

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

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

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

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

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

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

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

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

XI. Stormwater (required by DWQ)

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level.The overall project is 0.14 miles and approximately 0.05 acres of permanent additional pavement will be added. An additional 0.016 acres of temporary (detour) pavement will be added and removed as a result of the detour. Through natural stream design, a bankfull bench to provide flood relief at bankfull stage and cross veins will be placed in the two unnamed tributaries to diffuse flow before entering into Mud Creek.

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:
The culvert will be installed at the existing alignment.

XV. Other Circumstances (Optional):

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

E. L. Lusk 4-20-07

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

Ecosystem Enhancement PROGRAM

March 29, 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-3856, Replace Bridge Number 335 over Mud Creek on SR 1238 Henderson County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation for the subject project. Based on the information supplied by you on March 16, 2007, the impacts are located in CU 06010105 of the French Broad River Basin in the Southern Mountains (SM) Eco-Region, and are as follows:

Stream: 50 feet

During the review of this request, it was noted that the 2007 Impact Projection Database listed no wetland or stream impacts for this project; however, EEP will provide the requested stream mitigation. The need for additional stream mitigation in this cataloging unit will be included it in the 2007-2008 biennial budget. EEP commits to implementing sufficient compensatory stream mitigation to offset the impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

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. David Baker, USACE – Asheville
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3856

Ecosystem Enhancement Program

March 29, 2007

Mr. David Baker
U. S. Army Corps of Engineers
Asheville Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, North Carolina 28801-5006

Dear Mr. Baker:

Subject: EEP Mitigation Acceptance Letter:

B-3956, Replace Bridge Number 335 over Mud Creek on SR 1238, Henderson County; French Broad River Basin (Cataloging Unit 06010105); Southern Mountains (SM) Eco-Region

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation for the unavoidable impact associated with the above referenced project. As indicated in the NCDOT's mitigation request dated March 16, 2007, compensatory stream mitigation from EEP is required for approximately 50 feet of stream impacts.

Compensatory stream mitigation associated with this project will be provided in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the N. C. Department of Environment and Natural Resources, the N. C. Department of Transportation, and the U. S. Army Corps of Engineers fully executed on March 8, 2007 (Tri-Party MOA). EEP commits to implement sufficient compensatory stream mitigation up to 100 stream credits to offset the impacts associated with this project by the end of the MOA year in which this project is permitted. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

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. Gregory J. Thorpe, Ph.D., NCDOT-PDEA
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3856

State Project: WBS 33303.1.1 (B-3856)
McDowell County

ON-SITE STREAM RELOCATION SUMMARY

In addition to the removal and replacement of Bridge No. 335 on Pearl Lane (SR 1238), the project includes the relocation of two unnamed tributaries to Mud Creek that parallel the project. These streams are identified as Site 1 and Site 3 in the impact summary, and are further described below.

Site 1 Existing Condition

This stream parallels Pearl Lane to the west and south of Mud creek and drains 47 acres. It enters the project area through a 30" metal drive pipe and flows for 310 feet before entering Mud Creek.. Within the project limits, the stream has a 2' base with a slope that varies from about 2% to 4%. The Rosgen classification is "G". Herbaceous vegetation, periodically mowed, exists along both banks of the channel. The project will require the relocation of 215 feet of this stream.

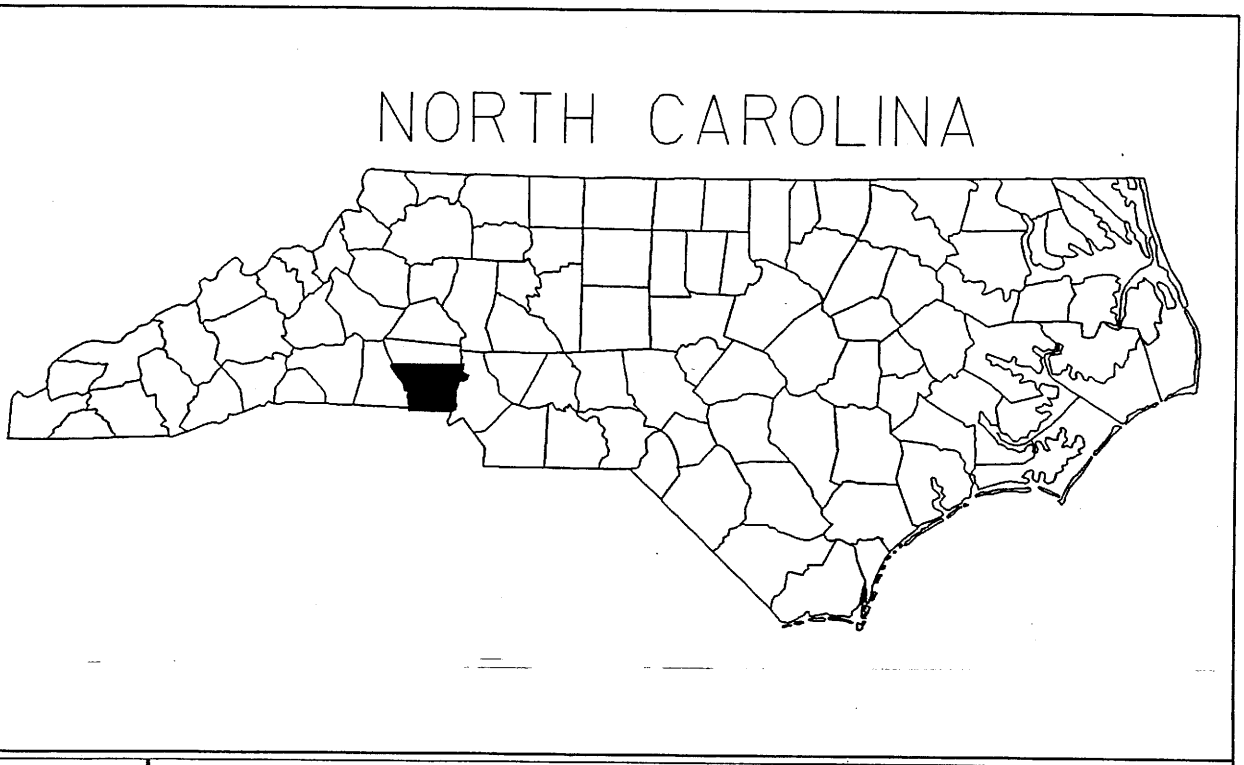
Site 3 Existing Condition

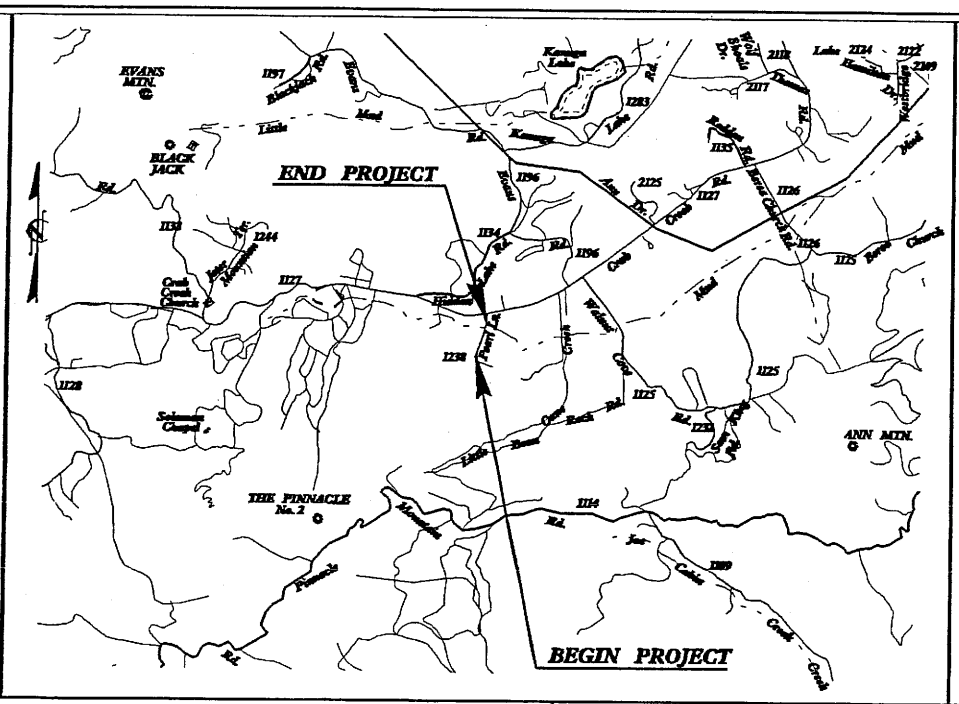
This stream parallels Pearl Lane to the east and north of Mud creek and drains 100 acres. It enters the project area through a 36" concrete pipe under SR 1127 and flows for 350 feet before entering Mud Creek. In the vicinity of the project, the stream has a 3' base with a slope of 1.9%. The Rosgen classification is "G". Herbaceous vegetation, periodically mowed, exists along both banks of the channel. The project will require the relocation of 165 feet of this stream.

Proposed Conditions

The existing stream slopes will be replicated for both streams. Function and stability will be enhanced using natural stream design techniques. These include constructing a bankfull bench to provide flood relief at bankfull stage, and using rock cross vanes to establish grade control. Because of the small drainage areas of these two streams, bankfull dimensions were verified by hydrologic and hydraulic techniques instead of the regional curves. The proposed stream will have a Rosgen classification of "E4b".

The relocated channel will be reforested and preserved with permanent right of way and easements.





VICINITY MAPS

NCDOT

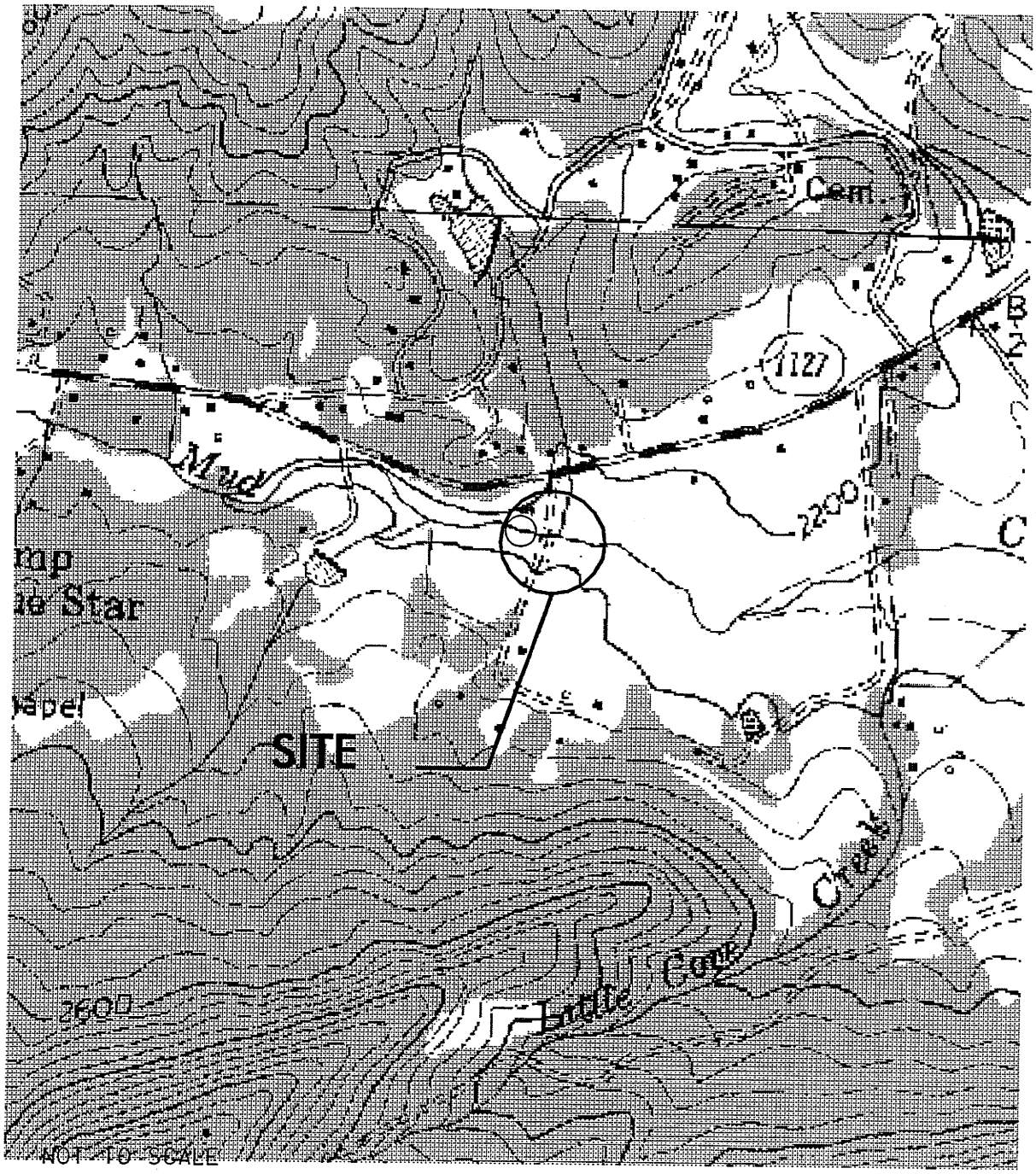
DIVISION OF HIGHWAYS
HENDERSON COUNTY
PROJECT: 8.2952301 (B3856)
BRIDGE NO. 335 ON SR 1238
OVER MUD CREEK

Permit Drawing
Sheet ____ of ____

SHEET 1

3/1/07

Permit Drawing
Sheet 1 of 14



LOCATION MAPS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952301 (B3856)

BRIDGE NO. 335 ON SR 1238
OVER MUD CREEK

SHEET 2 OF 14

3/1/07

Sheet 2 of 14

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	James R. McDowell Juanita Cole McDowell	Rt. 3 Box 200 Hendersonville, NC 28739
2	Charles A. Barker, Jr Evelyn Barker Pearl B. McDowell	288 Pearl Lane Hendersonville, NC 28739
3	Grover Franklin Coggins Toshi Coggins	Rt. 3 Box 198 Hendersonville, NC 28739
4	Cora A. Mundy	P.O. Box 683 East Flat Rock, NC 28768

NCDOT

DIVISION OF HIGHWAYS

MCDOWELL COUNTY

PROJECT: WBS 33303.1.1 (B-3856)

BRIDGE NO. 335

ON SR 1238 OVER MUD CREEK

Permit Drawing

Sheet 13 of 14

SHEET OF

3/1/07

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 11+35 LT							0.017	0.001	215	10	202
	-L- 13+45 LT											
2	-L- 13+55	3 @ 8' x 8' RCBC						0.009	0.024	40	130	
		90" CSP DETOUR PIPE										
3	-L- 13+85 RT							0.012	0.001	165	10	168
	-L- 15+65 RT											
TOTALS:								0.038	0.026	420	150	370

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

HENDERSON COUNTY
WBS - 33303.1.1 (B-3856)
BRIDGE NO. 335 OVER MUD CREEK
SHEET 3/1/2007

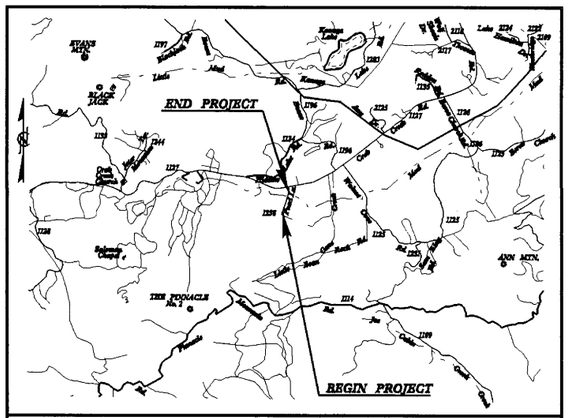
ATN Revised 3/31/05

Permit Drawing
Sheet 14 of 14

09/08/99

TIP PROJECT: B-3856

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

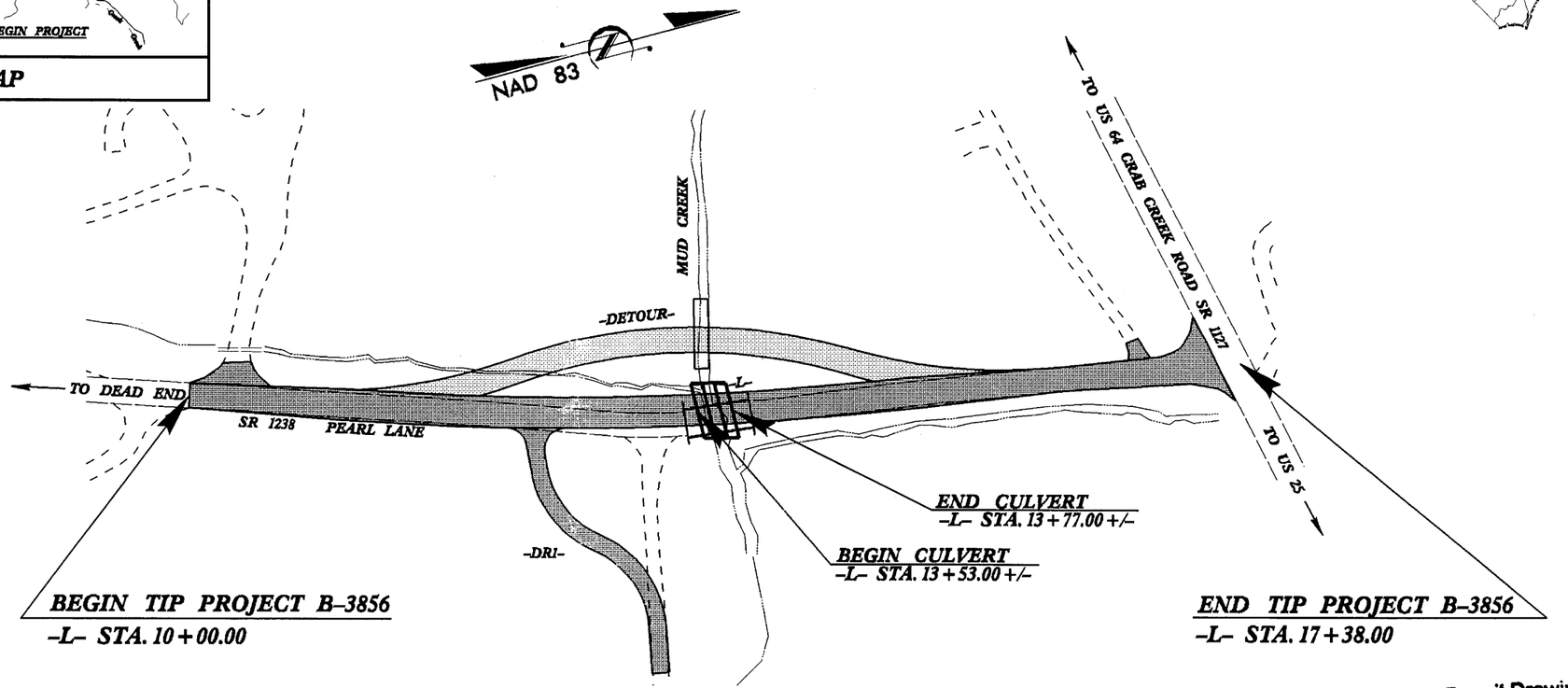
HENDERSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3856	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33303.1.1	BRZ-1238(2)	P.E.
33303.2.1	BRZ-1238(2)	R/W & UTIL.

LOCATION: BRIDGE NO. 335 OVER MUD CREEK AND APPROACHES ON SR 1238 (PEARL LANE)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND CULVERT



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
** ***DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.***

Permit Drawing Sheet 3 of 14

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

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 2006 = 250 VPD
ADT 2030 = 450 VPD
DHV = 25 %
D = 65 %
* T = 3 %
** V = 60 MPH

* (TTST 1% + DUAL 2%)
FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3856 = 0.135 MILES
LENGTH STRUCTURE TIP PROJECT B-3856 = 0.005 MILES
TOTAL LENGTH OF TIP PROJECT B-3856 = 0.140 MILES

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: FEBRUARY 22, 2006

LETTING DATE: SEPTEMBER 18, 2007

GLENN W. MUMFORD, P.E.
PROJECT ENGINEER

JEFFREY L. TEAGUE, E.I.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

01-MAR-2007 09:25
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$$$$USERNAME$$$$

8/17/99

DETOUR

PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETOUR		
PI Sta 10+78.24	PI Sta 12+78.53	PI Sta 14+66.86
Δ = 23° 16' 05.4" (LT)	Δ = 36° 12' 07.1" (RT)	Δ = 21° 35' 12.7" (LT)
D = 15° 04' 40.2"	D = 15° 04' 40.2"	D = 15° 04' 40.2"
L = 154.32'	L = 240.10'	L = 143.17'
T = 78.24'	T = 124.21'	T = 72.44'
R = 380.00'	R = 380.00'	R = 380.00'
SE = SEE PLANS	SE = NC	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS

-L-
PI Sta 12+91.18
Δ = 8° 39' 11.0" (LT)
D = 2° 51' 53.2"
L = 302.05'
T = 151.31'
R = 2,000.00'
SE = 0.04
RO = 84'

NAD 83

CLYDE E. KNIGHT
LINDA A. KNIGHT

3
TOSHI COGGINS

2
CHARLES A. BARKER, Jr.

FRED W. FEW, Jr.
JUDI C. FEW

FRED W. FEW, Jr.
JUDI C. FEW

TEMP. LAT BASE DITCH
SEE DETAIL A
EST. 200 CY

NOTE: 36" CSP TO BE REMOVED W/DETOUR INSTALL 2' STREAM RELOCATION (PER PLANS)

DETOUR CULVERT
W/SANDBAG ENDWALL
1 @ 90' CSP

SITE 2

CHARLES A. BARKER, Jr.
EVELYN M. BARKER

SITE 1

ROBERT D. KRILL
MICHELLE L. KRILL

N 9° 35' 20.0" E

W 18° 14' 31.0" E

SPECIAL CUT DITCH
SEE DETAIL B
PLAN SHEET 4

SPECIAL LATERAL BASE DITCH
SEE DETAIL A
PLAN SHEET 4

DANIEL E. PRINCE
DEBRA McDOWELL PRINCE

SITE 3

4
CAROL ANN ANDERSON

-L- SLOPE STAKES-

CLASS B RIP RAP
EST. 9 TONS
FILTER FABRIC
EST. 10 SY

CLASS B RIP RAP
EST. __ TONS
FILTER FABRIC
EST. __ SY

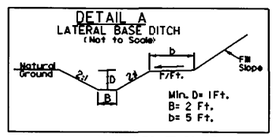
JAMES R. McDOWELL
JUANITA COLE McDOWELL

1
JAMES R. McDOWELL
JUANITA COLE McDOWELL

DANIEL N. McDOWELL
MISTY L. McDOWELL

FRADY FAMILY LIMITED PARTNERSHIP

DETAIL A
LATERAL BASE DITCH
(Not To Scale)



-DET- STA.13+00 TO STA.14+65 LT

-DRI-	
PI Sta 10+57.61	PI Sta 11+87.51
Δ = 70° 49' 21.0" (LT)	Δ = 65° 03' 44.0" (PT)
D = 114° 35' 29.6"	D = 114° 35' 29.6"
L = 61.80'	L = 56.78'
T = 35.55'	T = 31.89'
R = 50.00'	R = 50.00'
SE = NC	SE = NC

S — DENOTES PERMANENT SURFACE WATER IMPACTS

TS — DENOTES TEMPORARY SURFACE WATER IMPACTS

NOTES:
1) FOR -L- PLAN VIEW SEE SHEET 4.
2) FOR -L- PROFILE SEE SHEET 5.
3) FOR -DETOUR- PROFILE SEE SHEET 5.
4) FOR -DRI- PLAN VIEW SEE SHEET 4.
5) FOR -DRI- PROFILE SEE SHEET 5.
6) ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.

Permit Drawing
Sheet 4 of 14

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8/17/99

DETOUR

PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-B
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETOUR		
PI Sta 10+78.24	PI Sta 12+78.53	PI Sta 14+66.86
Δ = 23° 16' 05.4" (LT)	Δ = 36° 12' 07.1" (RT)	Δ = 21° 35' 12.7" (LT)
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SE = SEE PLANS	SE = NC	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS

-L-
PI Sta 12+91.18
Δ = 8° 39' 11.0" (LT)
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NAD 83

CLYDE E. KNIGHT
LINDA A. KNIGHT

3 TOSHI COGGINS

2 CHARLES A. BARKER, Jr.

FRED W. FEW, Jr.
JUDI C. FEW

FRED W. FEW, Jr.
JUDI C. FEW

TEMP. LAT BASE DITCH
SEE DETAIL A
EST. 000 CY

NOTE: 36" CSP TO BE REMOVED W/DETOUR
INSTALL 'K' STREAM RELOCATION (SEE PLANS)

DETOUR CULVERT
W/SANDBAG ENDWALLS
1 @ 10' CSP

SITE 2

ROBERT D. KRILL
MICHELLE L. KRILL

CHARLES A. BARKER, Jr.
EVELYN M. BARKER

SITE 1

N 9° 35' 20.0" E

W 18° 14' 31.0" E

DANIEL E. PRINCE
DEBRA McDOWELL PRINCE

SPECIAL CUT DITCH
SEE DETAIL B
PLAN SHEET 4

SPECIAL LATERAL BASE DITCH
SEE DETAIL A
PLAN SHEET 4

SITE 3

4 CAROL ANN ANDERSON

CLASS B RIP RAP
EST. 3 TONS
FILTER FABRIC
EST. 10 SY

CLASS B RIP RAP
EST. TONS
FILTER FABRIC
EST. SY

-L- SLOPE STAKES-

JAMES R. McDOWELL
JUANITA COLE McDOWELL

1

JAMES R. McDOWELL
JUANITA COLE McDOWELL

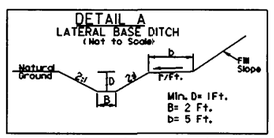
DANIEL N. McDOWELL
MISTY L. McDOWELL

FRADY FAMILY LIMITED PARTNERSHIP

S DENOTES PERMANENT SURFACE WATER IMPACTS

TS DENOTES TEMPORARY SURFACE WATER IMPACTS

DETAIL A
LATERAL BASE DITCH
(Not to Scale)



-DET- STA.13+00 TO STA.14+65 LT

-DRI-	
PI Sta 10+57.61	PI Sta 11+87.51
Δ = 70° 49' 21.0" (LT)	Δ = 65° 03' 44.0" (PT)
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R = 50.00'	R = 50.00'
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NOTES:
1) FOR -L- PLAN VIEW SEE SHEET 4.
2) FOR -L- PROFILE SEE SHEET 5.
3) FOR -DETOUR- PROFILE SEE SHEET 5.
4) FOR -DRI- PLAN VIEW SEE SHEET 4.
5) FOR -DRI- PROFILE SEE SHEET 5.
6) ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.

Permit Drawing
Sheet 5 of 14

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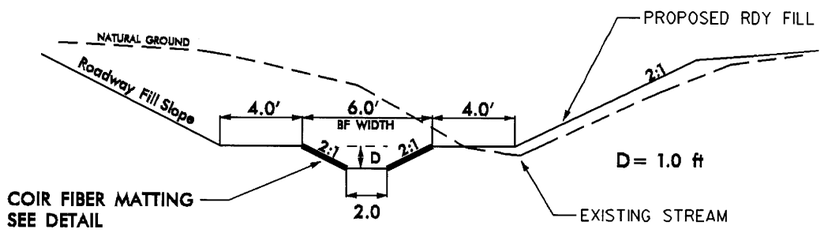
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

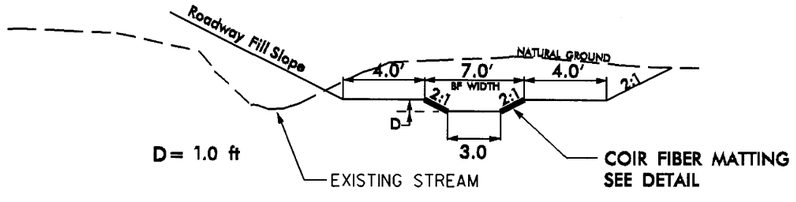
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STREAM RELOCATION DETAIL
-L- STA. 11+50 TO STA. 13+50 LT
NOT TO SCALE

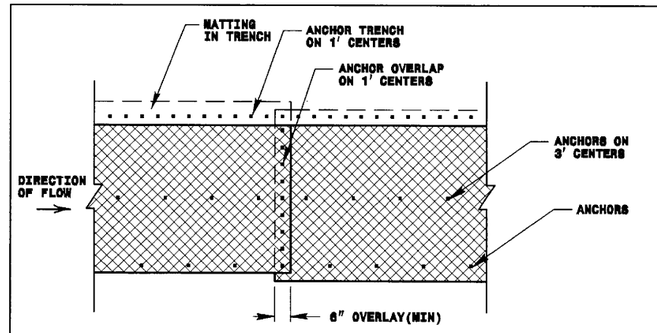


NOTE: TRANSITION FROM EXISTING STREAM TO PROPOSED STREAM DETAIL FROM -L- STA. 11+50 TO STA. 12+00 LT.

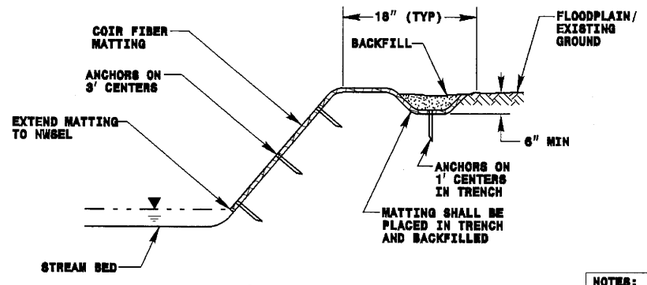
STREAM RELOCATION DETAIL
-L- STA. 13+85 TO STA. 15+50 RT
NOT TO SCALE



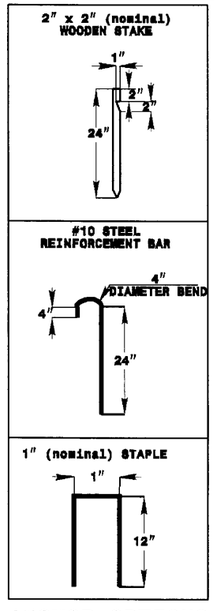
NOTE: TRANSITION FROM EXISTING STREAM TO PROPOSED STREAM DETAIL FROM -L- STA. 15+50 TO STA. 15+00 RT.



PLAN VIEW



TYPICAL CROSS SECTION



ANCHOR OPTIONS

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

COIR FIBER MATTING DETAIL
NOT TO SCALE

Permit Drawing
Sheet 6 of 14

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PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

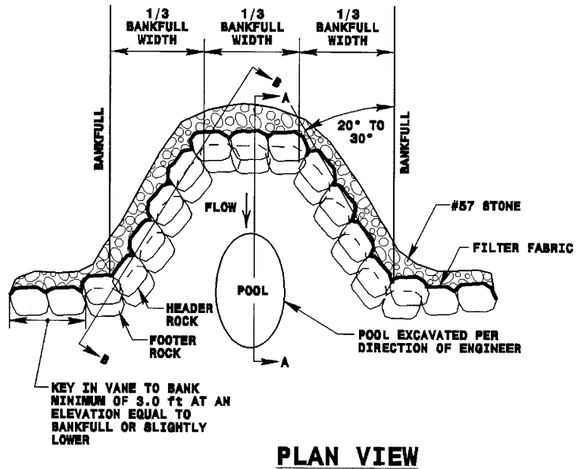
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

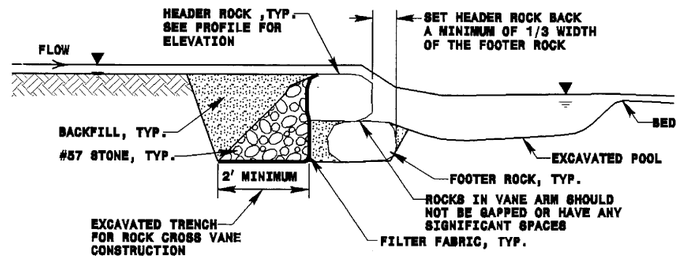
REVISIONS

ROCK CROSS VANE DETAIL

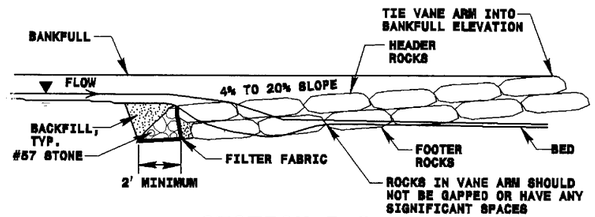
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

BOULDER DIMENSIONS ARE 3x2x1 (LxWxH, ft.)

NOTES:

1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

LOCATIONS AND HEADER ROCK ELEVATIONS

Left of -L-	
Station	Elevation
11+50	2181.2
12+00	2180.1
12+50	2178.9
12+75	2177.9
13+00	2176.9
13+25	2175.9

Right of -L-	
Station	Elevation
13+88	2175.2
14+50	2176.4
15+00	2177.4
15+50	2178.4

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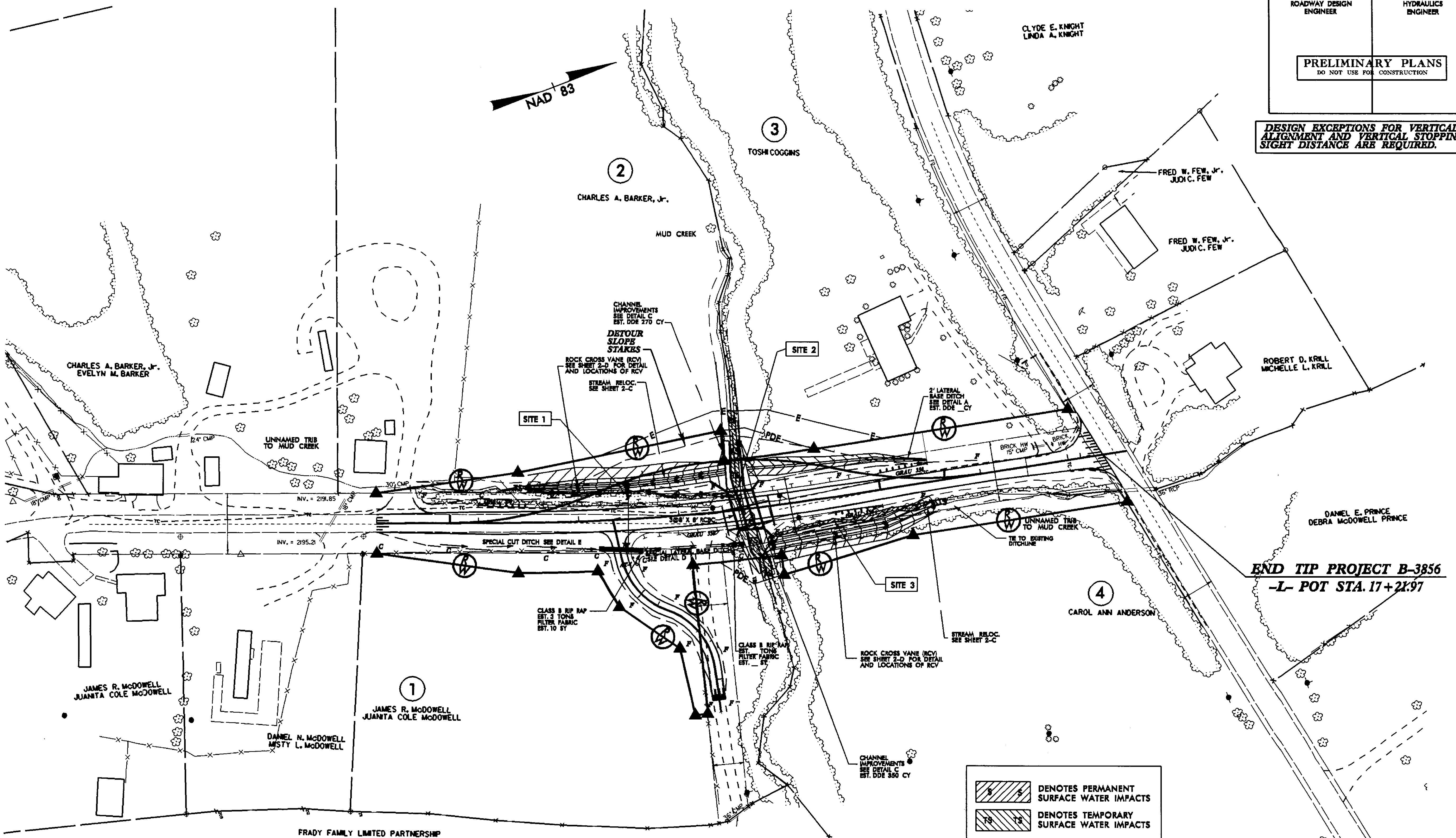
Permit Drawing
Sheet 7 of 14

PROJECT REFERENCE NO.	SHEET NO.
B-3856	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

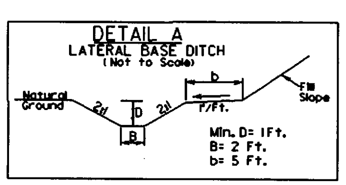
DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.

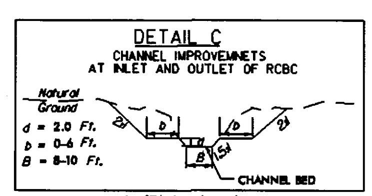


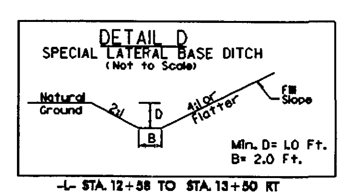
NAD 83
CLYDE E. KNIGHT
LINDA A. KNIGHT
3
TOSHI COGGINS
2
CHARLES A. BARKER, Jr.
MUD CREEK
FRED W. FEW, Jr.
JUDI C. FEW
CHARLES A. BARKER, Jr.
EVELYN M. BARKER
CHANNEL IMPROVEMENTS SEE DETAIL C EST. DDE 270 CY
DETOUR SLOPE STAKES
ROCK CROSS VANE (RCV) SEE SHEET 2-D FOR DETAIL AND LOCATIONS OF RCV
STREAM RELOC. SEE SHEET 2-C
SITE 1
SITE 2
SITE 3
ROBERT D. KRILL
MICHELLE L. KRILL
2' LATERAL BASE DITCH SEE DETAIL A EST. DDE _CY
UNNAMED TRIB TO MUD CREEK
BRICK HW 15" CMP
INV. = 2191.85
INV. = 2195.21
SPECIAL CUT DITCH SEE DETAIL E
SPECIAL LATERAL BASE DITCH SEE DETAIL D
DANIEL E. PRINCE
DEBRA McDOWELL PRINCE
TIE TO EXISTING DITCHLINE
END TIP PROJECT B-3856
-L- POT STA. 17+21.97
4
CAROL ANN ANDERSON
CLASS B RIP RAP EST. 3 TONS FILTER FABRIC EST. 10 SY
CLASS B RIP RAP EST. _ TONS FILTER FABRIC EST. _ SY
STREAM RELOC. SEE SHEET 2-C
ROCK CROSS VANE (RCV) SEE SHEET 2-D FOR DETAIL AND LOCATIONS OF RCV
JAMES R. McDOWELL
JUANITA COLE McDOWELL
1
JAMES R. McDOWELL
JUANITA COLE McDOWELL
DANIEL N. McDOWELL
MISTY L. McDOWELL
CHANNEL IMPROVEMENTS SEE DETAIL C EST. DDE 350 CY
FRADY FAMILY LIMITED PARTNERSHIP

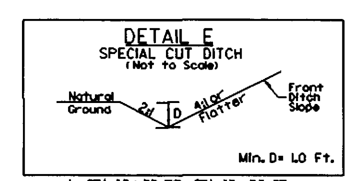
DENOTES PERMANENT SURFACE WATER IMPACTS

DENOTES TEMPORARY SURFACE WATER IMPACTS









NOTES:

1) FOR -L- PROFILE SEE SHEET 5.
2) FOR -DR1- PROFILE SEE SHEET 5.
3) FOR -DETOUR- PLAN VIEW SEE SHEET 2-B.
4) FOR -DETOUR- PROFILE SEE SHEET 5.
5) ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.
6) FOR CULVERT PLANS SEE SHEET C-1 THRU ?.

Permit Drawing
Sheet 8 of 14

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-3856	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.

NAD 83

CLYDE E. KNIGHT
LINDA A. KNIGHT

3 TOSHI COGGINS

2 CHARLES A. BARKER, Jr.

MUD CREEK

FRED W. FEW, Jr.
JUDI C. FEW

FRED W. FEW, Jr.
JUDI C. FEW

CHARLES A. BARKER, Jr.
EVELYN M. BARKER

UNNAMED TRIB TO MUD CREEK

CHANNEL IMPROVEMENTS SEE DETAIL C EST. DDE 270 CY

DETOUR SLOPE STAKES

ROCK CROSS VANE (RCV) SEE SHEET 2-D FOR DETAIL AND LOCATIONS OF RCV

STREAM RELOC. SEE SHEET 2-C

SITE 1

SITE 2

2' LATERAL BASE DITCH SEE DETAIL A EST. DDE _ CY

ROBERT D. KRILL
MICHELLE L. KRILL

DANIEL E. PRINCE
DEBRA McDOWELL PRINCE

UNNAMED TRIB TO MUD CREEK

TIE TO EXISTING DITCHLINE

SPECIAL CUT DITCH SEE DETAIL E

SPECIAL LATERAL BASE DITCH SEE DETAIL D

SITE 3

END TIP PROJECT B-3856
-L- POT STA. 17+21.97

4 CAROL ANN ANDERSON

CLASS B RIP RAP EST. 3 TONS FILTER FABRIC EST. 10 SY

CLASS B RIP RAP EST. TONS FILTER FABRIC EST. _ SY

STREAM RELOC. SEE SHEET 2-C

ROCK CROSS VANE (RCV) SEE SHEET 2-D FOR DETAIL AND LOCATIONS OF RCV

CHANNEL IMPROVEMENTS SEE DETAIL C EST. DDE 350 CY

JAMES R. McDOWELL
JUANITA COLE McDOWELL

DANIEL N. McDOWELL
MISTY L. McDOWELL

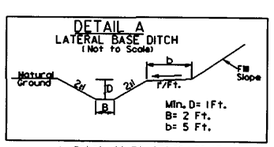
1 JAMES R. McDOWELL
JUANITA COLE McDOWELL

FRADY FAMILY LIMITED PARTNERSHIP

S C DENOTES PERMANENT SURFACE WATER IMPACTS

TS TS DENOTES TEMPORARY SURFACE WATER IMPACTS

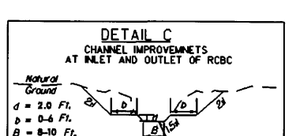
DETAIL A
LATERAL BASE DITCH
(Not to Scale)



Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.

-L- STA.13+80 TO STA.15+50 LT

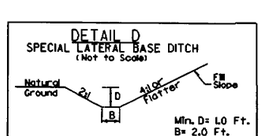
DETAIL C
CHANNEL IMPROVEMENTS AT INLET AND OUTLET OF RCBC



d = 2.0 Ft.
b = 0-6 Ft.
B = 8-10 Ft.

-L- STA 13+65 LT/RT

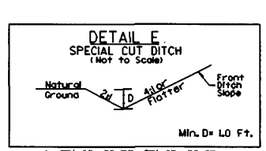
DETAIL D
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.

-L- STA. 12+50 TO STA. 13+50 RT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.

-L- STA. 10+50 TO STA. 12+20 RT

NOTES:

1) *FOR -L- PROFILE SEE SHEET 5.*
2) *FOR -DRI- PROFILE SEE SHEET 5.*
3) *FOR -DETOUR- PLAN VIEW SEE SHEET 2-B.*
4) *FOR -DETOUR- PROFILE SEE SHEET 5.*
5) *ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.*
6) *FOR CULVERT PLANS SEE SHEET C-1 THRU ?.*

Permit Drawing
Sheet 9 of 14

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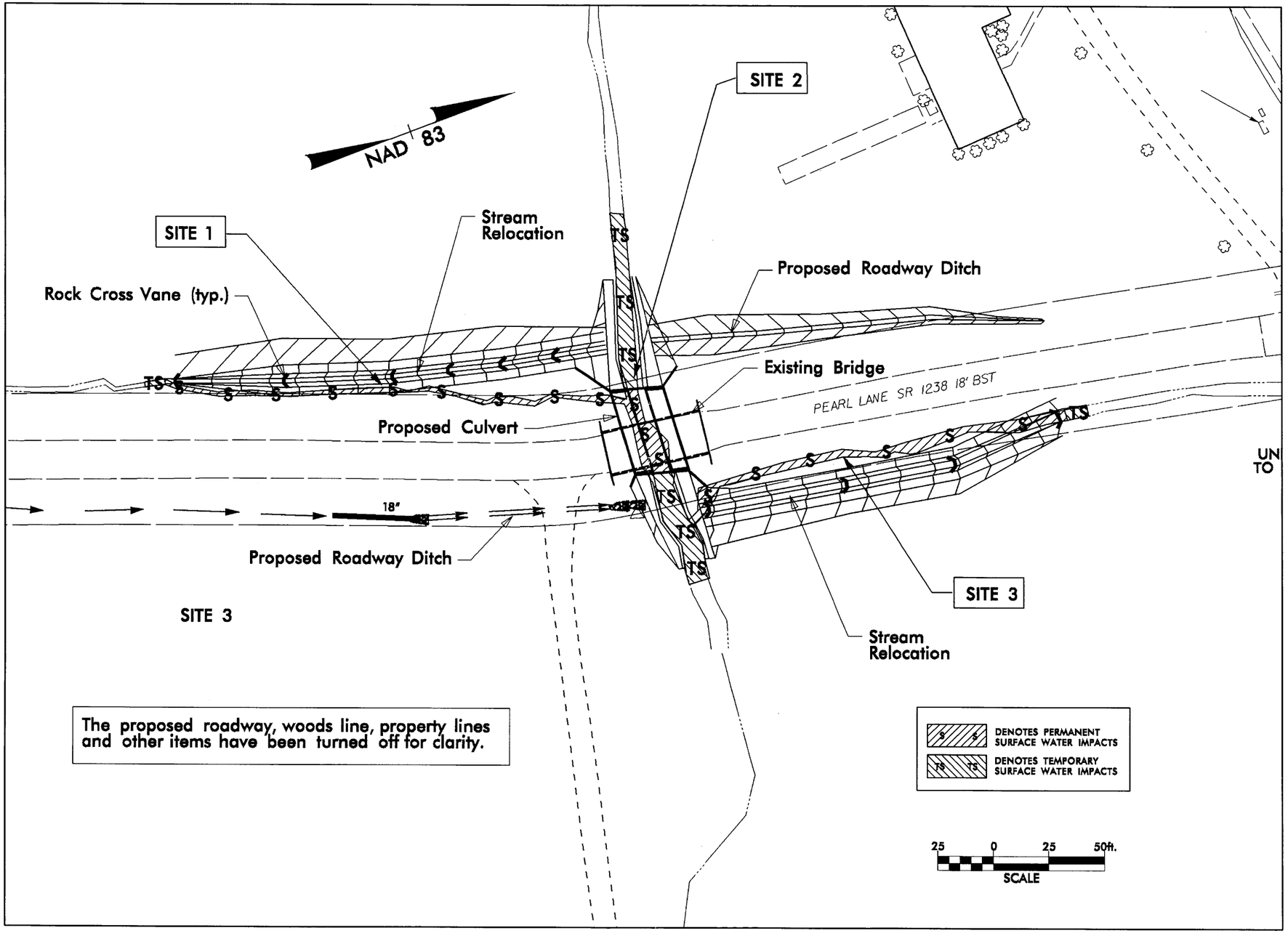
smorgan

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-3856	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Enlargement



The proposed roadway, woods line, property lines and other items have been turned off for clarity.

Permit Drawing
Sheet 10 of 14

02-MAR-2007 08:24
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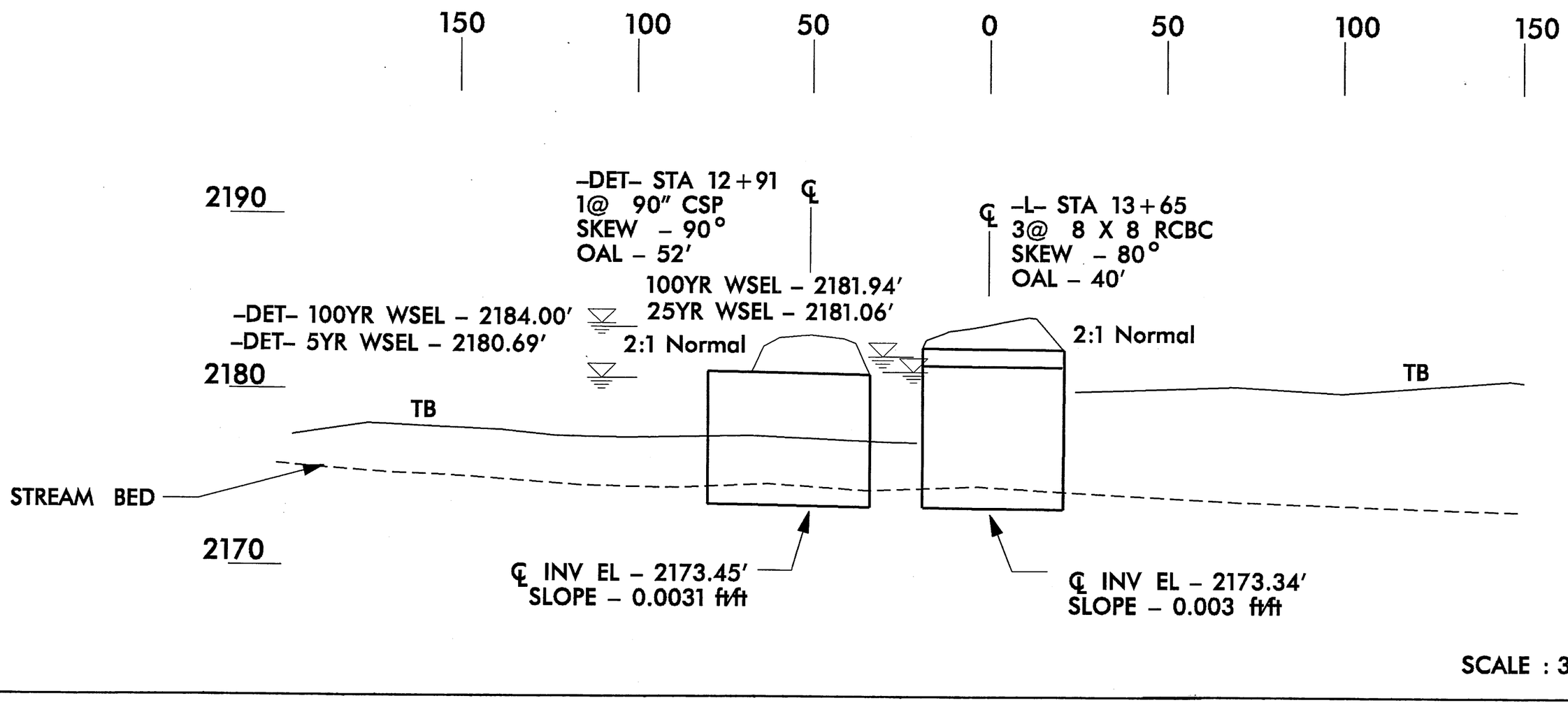
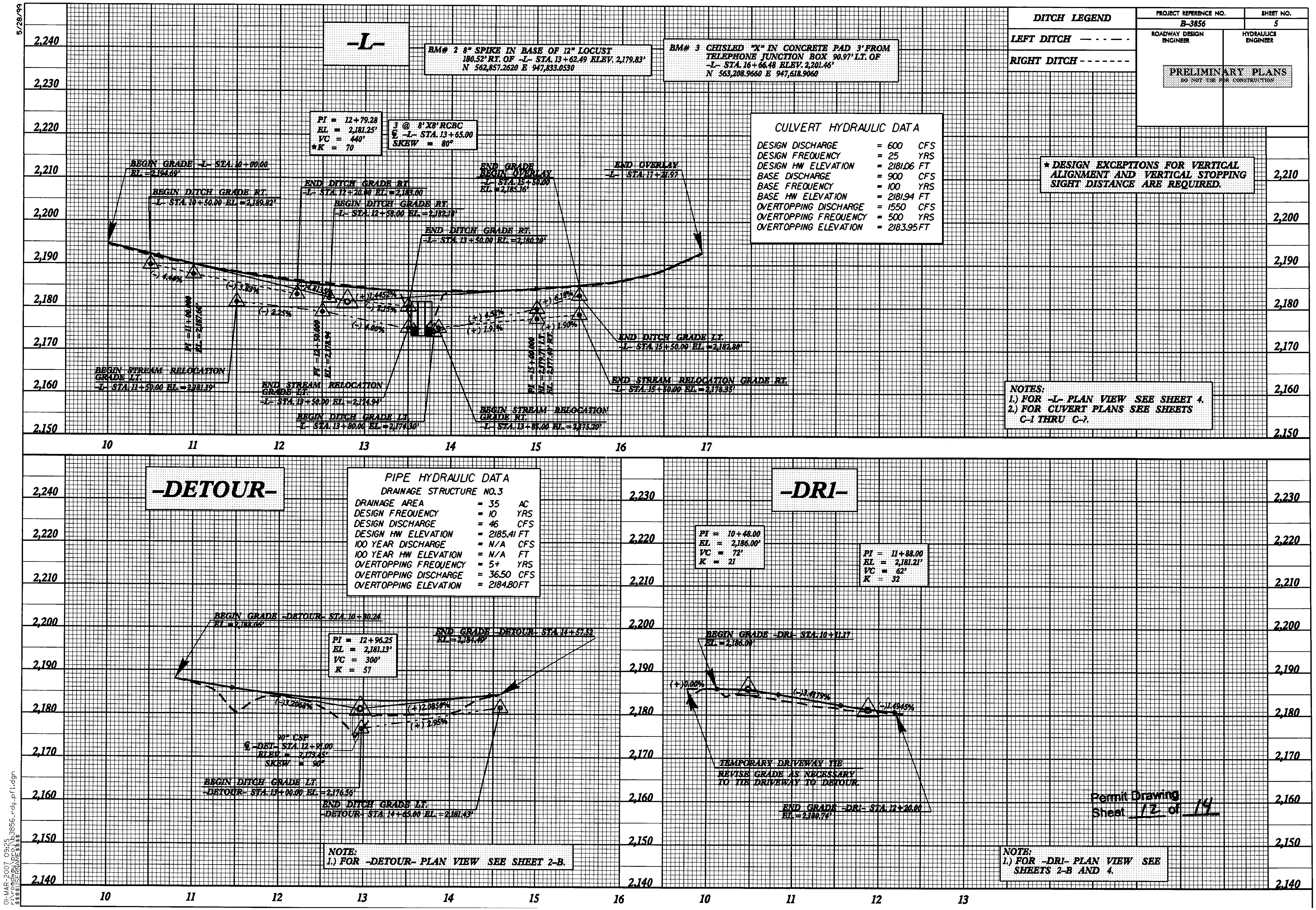
amorgan AT HY221528



Permit Drawing
Sheet 11 of 14


5/28/99
DITCH LEGEND
LEFT DITCH — - - —
RIGHT DITCH - - - - - - -
PROJECT REFERENCE NO. B-3856
SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-L-
BM# 2 8" SPIKE IN BASE OF 12" LOCUST 180.52' RT. OF -L- STA. 13+62.49 ELEV. 2,179.83' N 562,857.2620 E 947,833.0530
BM# 3 CHISLED "X" IN CONCRETE PAD 3' FROM TELEPHONE JUNCTION BOX 90.97' LT. OF -L- STA. 16+66.48 ELEV. 2,201.46' N 563,208.9660 E 947,618.9060
PI = 12+79.28 EL = 2,181.25' VC = 440' *K = 70
3 @ 8' X 8' RCBC ℄ -L- STA. 13+65.00 SKEW = 80°
CULVERT HYDRAULIC DATA
DESIGN DISCHARGE = 600 CFS
DESIGN FREQUENCY = 25 YRS
DESIGN HW ELEVATION = 2181.06 FT
BASE DISCHARGE = 900 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 2181.94 FT
OVERTOPPING DISCHARGE = 1550 CFS
OVERTOPPING FREQUENCY = 500 YRS
OVERTOPPING ELEVATION = 2183.95 FT
* DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.
BEGIN GRADE -L- STA. 10+00.00 EL. = 2,194.69'
BEGIN DITCH GRADE RT. -L- STA. 10+50.00 EL. = 2,189.82'
END DITCH GRADE RT. -L- STA. 12+20.00 EL. = 2,183.00
BEGIN DITCH GRADE RT. -L- STA. 12+58.00 EL. = 2,182.18'
END DITCH GRADE RT. -L- STA. 13+50.00 EL. = 2,180.20'
END GRADE BEGIN OVERLAY -L- STA. 15+50.00 EL. = 2,185.16'
END OVERLAY -L- STA. 17+21.97
(-) 4.44%
(-) 3.33%
(-) 2.25%
(-) 4.00%
(-) 2.25%
(+) 1.4452%
(+) 4.51%
(+) 1.91%
(+) 1.90%
(+) 6.18%
PI = 11+00.00 EL. = 2,187.66'
PI = 12+50.00 EL. = 2,178.94
PI = 15+00.000 EL. = 2,179.71' LT. EL. = 2,177.80' RT.
BEGIN STREAM RELOCATION GRADE LT. -L- STA. 11+50.00 EL. = 2,181.19'
END STREAM RELOCATION GRADE LT. -L- STA. 13+50.00 EL. = 2,174.94'
BEGIN DITCH GRADE LT. -L- STA. 13+80.00 EL. = 2,174.30'
BEGIN STREAM RELOCATION GRADE RT. -L- STA. 13+85.00 EL. = 2,175.20'
END DITCH GRADE LT. -L- STA. 15+50.00 EL. = 2,182.80'
END STREAM RELOCATION GRADE RT. -L- STA. 15+50.00 EL. = 2,178.35'
NOTES:
1.) FOR -L- PLAN VIEW SEE SHEET 4.
2.) FOR CUVERT PLANS SEE SHEETS C-1 THRU C-?.
2,240 2,230 2,220 2,210 2,200 2,190 2,180 2,170 2,160 2,150
10 11 12 13 14 15 16 17
-DETOUR-
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.3
DRAINAGE AREA = 35 AC
DESIGN FREQUENCY = 10 YRS
DESIGN DISCHARGE = 46 CFS
DESIGN HW ELEVATION = 2185.41 FT
100 YEAR DISCHARGE = N/A CFS
100 YEAR HW ELEVATION = N/A FT
OVERTOPPING FREQUENCY = 5+ YRS
OVERTOPPING DISCHARGE = 36.50 CFS
OVERTOPPING ELEVATION = 2184.80 FT
BEGIN GRADE -DETOUR- STA. 10+80.24 EL. = 2,188.06'
PI = 12+96.25 EL = 2,181.13' VC = 300' K = 57
END GRADE -DETOUR- STA. 14+57.52 EL. = 2,184.49'
(-) 3.2068%
(+) 2.0850%
(+) 2.95%
90" CSP ℄ -DET- STA. 12+91.00 ELEV. = 2,173.45' SKEW = 90°
BEGIN DITCH GRADE LT. -DETOUR- STA. 13+00.00 EL. = 2,176.56'
END DITCH GRADE LT. -DETOUR- STA. 14+65.00 EL. = 2,181.43'
NOTE:
1.) FOR -DETOUR- PLAN VIEW SEE SHEET 2-B.
-DR1-
PI = 10+48.00 EL = 2,186.00' VC = 72' K = 21
PI = 11+88.00 EL = 2,181.21' VC = 62' K = 32
BEGIN GRADE -DR1- STA. 10+11.17 EL. = 2,186.00'
(+) 0.00%
(-) 3.4179%
(-) 1.4945%
TEMPORARY DRIVEWAY TIE
REVISE GRADE AS NECESSARY TO TIE DRIVEWAY TO DETOUR.
END GRADE -DR1- STA. 12+26.00 EL. = 2,180.74'
NOTE:
1.) FOR -DR1- PLAN VIEW SEE SHEETS 2-B AND 4.
2,240 2,230 2,220 2,210 2,200 2,190 2,180 2,170 2,160 2,150 2,140
10 11 12 13 14 15 16
10 11 12 13
Permit Drawing Sheet 12 of 14
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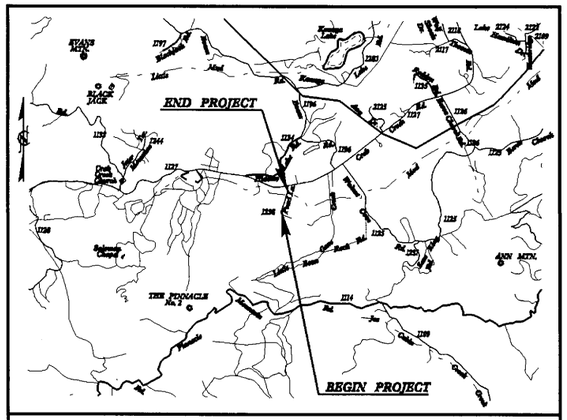
09/08/06

TIP PROJECT: B-3856

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

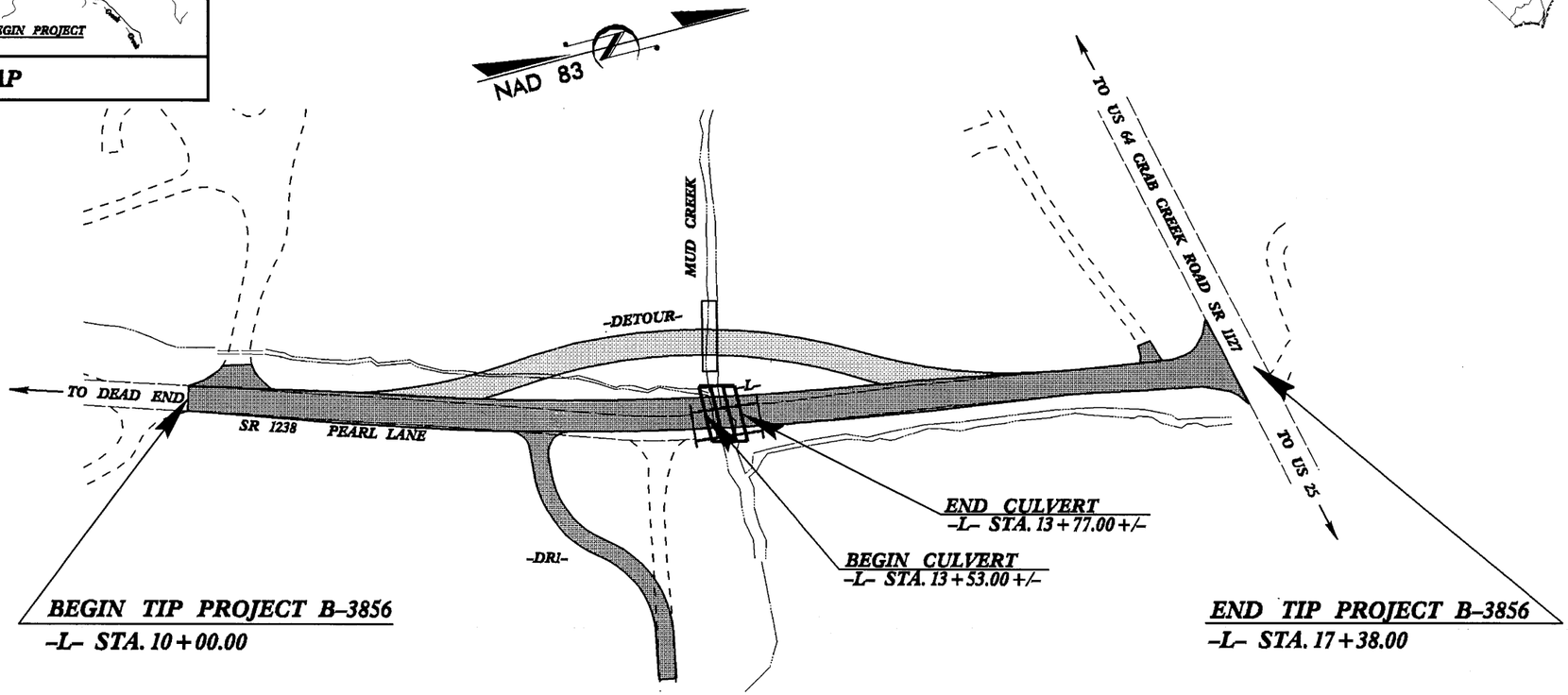
HENDERSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3856	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33303.1.1	BRZ-1238(2)	P.E.
33303.2.1	BRZ-1238(2)	R/W & UTIL.

LOCATION: BRIDGE NO. 335 OVER MUD CREEK AND APPROACHES ON SR 1238 (PEARL LANE)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND CULVERT



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
** ***DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.***

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2006 = 250 VPD
ADT 2030 = 450 VPD
DHV = 25 %
D = 65 %
* T = 3 %
** V = 60 MPH

* (TTST 1% + DUAL 2%)
FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3856 = 0.135 MILES
LENGTH STRUCTURE TIP PROJECT B-3856 = 0.005 MILES
TOTAL LENGTH OF TIP PROJECT B-3856 = 0.140 MILES

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: FEBRUARY 22, 2006

LETTING DATE: SEPTEMBER 18, 2007

GLENN W. MUMFORD, P.E.
PROJECT ENGINEER

JEFFREY L. TEAGUE, E.I.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3856	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — 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 — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- 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

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-3856	1-C
LOCATION AND SURVEYS	

NOTES

B-3856 SURVEY CONTROL SHEET

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

   HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   FILE: B3856_LS_CONTROL_050902.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT.

IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	562217.7640	947438.6600	2212.25	OUTSIDE PROJECT LIMITS	
2	BL-2	562823.1180	947660.3280	2184.56	12+94.22	19.65 RT
3	BL-3	563229.8160	947692.7500	2194.02	16+99.32	21.63 LT

BY

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
4	BY-4	563171.9950	947326.1190	2217.48	15+81.23	373.51 LT
33	BL-3	563229.8160	947692.7500	2194.02	16+99.32	21.63 LT
5	BY-5	563287.4290	947910.1300	2189.79	OUTSIDE PROJECT LIMITS	

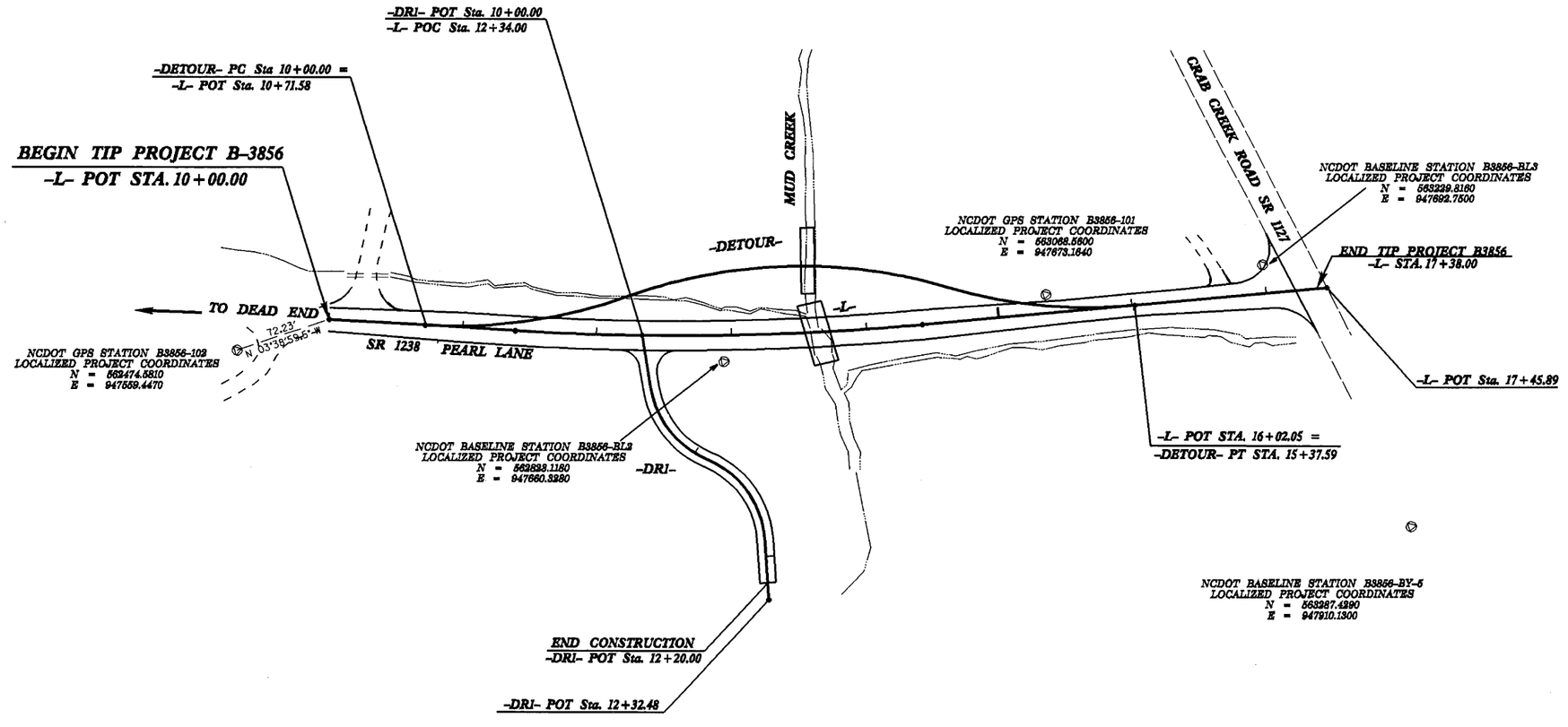
****
BM1 ELEVATION = 2210.84
N 562225 E 947424
L STATION 10+00
S 22° 06' 43.4" W DIST 347.47
CHISLED X IN ROCK
****

****
BM2 ELEVATION = 2179.83
N 562857 E 947833
L STATION 13+62 180 RIGHT
8 INCH SPIKE IN BASE OF 12 INCH LOCUST TREE
****

****
BM3 ELEVATION = 2201.46
N 563209 E 947619
L STATION 16+66 91 LEFT
CHISLED X IN CONCRETE PAD
****

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3856-GPS 102" WITH NAD 1983 STATE PLANE GRID COORDINATES OF NORTHING: 562474.58 10(ft) EASTING: 947559.4470(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: .99976777
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3856, GPS 102" TO -L- STATION 10+00.00 IS N 03°38'59.5" W DISTANCE 72.23'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING USER SERVICE (OPUS)

NOTE: DRAWING NOT TO SCALE

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6/2/99

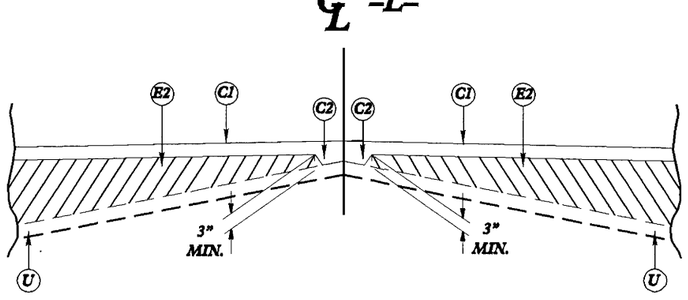
PROJECT REFERENCE NO.	SHEET NO.
B-3856	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

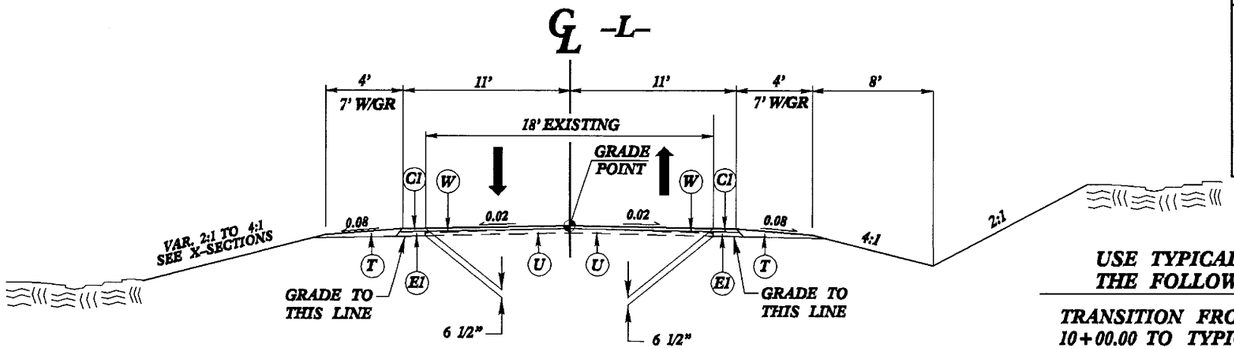
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1 1/2" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
J	PROP. 6" AGGREGATE BASE COURSE
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.



DETAIL SHOWING METHOD OF WEDGING
USE IN CONJUCTION WITH TYPICAL SECTION NO. 1



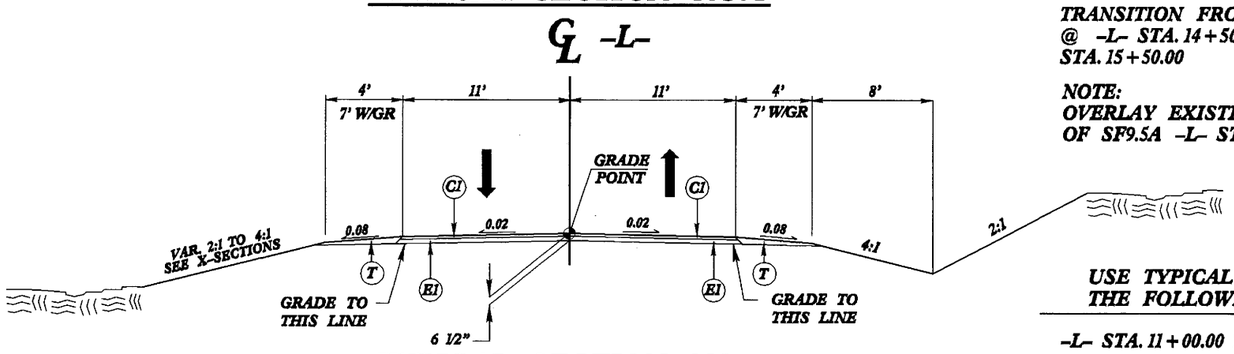
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATIONS:

TRANSITION FROM EXISTING @ -L- STA. 10+00.00 TO TYPICAL SECTION NO. 1 @ -L- STA. 11+00.00

TRANSITION FROM TYPICAL SECTION NO. 1 @ -L- STA. 14+50.00 TO EXISTING @ -L- STA. 15+50.00

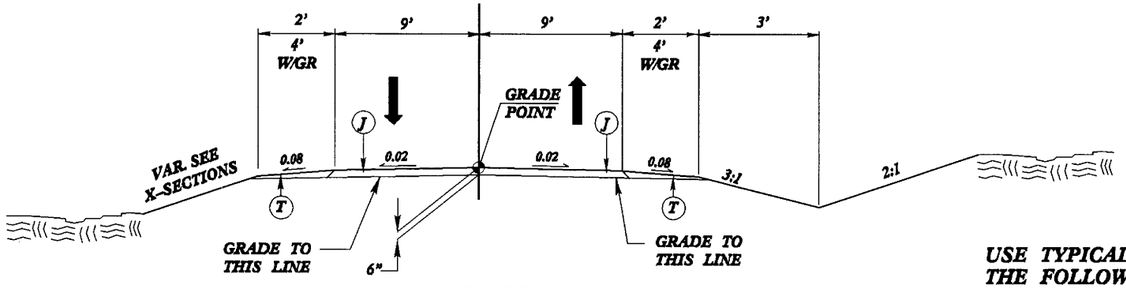
NOTE:
OVERLAY EXISTING PAVEMENT WITH 1 1/4" OF SF9.5A -L- STA. 15+50.00 TO 17+21.97



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AT THE FOLLOWING LOCATION:

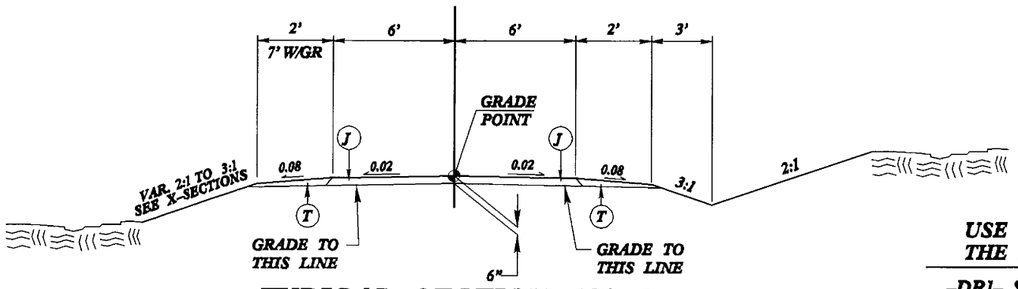
-L- STA. 11+00.00 TO STA. 14+50.00



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 AT THE FOLLOWING LOCATION:

-DETOUR- STA. 10+80.24 TO 14+57.52



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AT THE FOLLOWING LOCATION:

-DRI- STA. 10+12.26 TO 12+20.00

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DETOUR

PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

7-10-06 RIGHT OF WAY REVISIONS: R/W LINES HAVE BEEN ADJUSTED TO TIE TO THE EXISTING R/W ON PARCELS 1 & 2. THE R/W LABELS FOR THE MARKERS LOCATED ON THE EXISTING R/W HAVE BEEN CHANGED TO SHOW THE CORRECT OFFSETS ON PARCELS 1 & 2. R/W LABEL FOR THE MARKER LOCATED RIGHT OF -DRI- STA. 12+32.48 HAS BEEN CHANGED TO SHOW THE CORRECT OFFSET ON PARCEL 1. STATION LABEL RIGHT OF -L- HAS BEEN CHANGED FROM EX. R/W EASEMENT TO +09.38 ON PARCEL 1. STATION LABELS LEFT AND RIGHT OF -L- HAVE BEEN CHANGED FROM EX. R/W TO -38.00 & +95.39 ON PARCELS 3 & 4. THE SOUTHERN PROPERTY LINE ON PARCEL 1 HAS BEEN ADDED TO THE JAMES R. McDOWELL AND JUANITA COLE McDOWELL PARCEL (D. B. 462 PG. 283), DIVIDING IT INTO TWO PARCELS. -L- ALIGNMENT AND END PROJECT LIMITS HAVE BEEN EXTENDED. KMD

DETOUR		
PI Sta 10+78.24	PI Sta 12+78.53	PI Sta 14+66.86
Δ = 23° 16' 05.4" (LT)	Δ = 36° 12' 07.1" (RT)	Δ = 21° 35' 12.7" (LT)
D = 15° 04' 40.2"	D = 15° 04' 40.2"	D = 15° 04' 40.2"
L = 154.32'	L = 240.10'	L = 143.17'
T = 78.24'	T = 124.21'	T = 72.44'
R = 380.00'	R = 380.00'	R = 380.00'
SE = SEE PLANS	SE = NC	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS

-L-
PI Sta 12+91.18
Δ = 8° 39' 11.0" (LT)
D = 2° 51' 53.24"
L = 302.05'
T = 151.31'
R = 2,000.00'
SE = 0.04
RO = 84'

NAD 83

BEGIN CONSTRUCTION
-DETOUR- PC STA. 10+00.00

-DETOUR- PC Sta. 10+00.00 = -L- POT Sta. 10+71.58

-L- PC Sta. 11+39.87

-DRI- POT Sta. 10+00.00

-L- POT Sta. 12+34.00

-DETOUR- PRC Sta. 11+54.32

-DETOUR- PRC Sta. 13+94.42

-BL-1 5+00.00 POT

CHARLES A. BARKER, Jr.
EVELYN M. BARKER

BM #1
-BL- STA 5+01.54
16.12' LEFT
ELEV. 2210.84'

-L- POT Sta. 10+00.00

TEMPORARY (-DRI-) DRIVEWAY TIE

-L- SLOPE STAKES

-DRI- PC Sta. 10+40.00

-L- POT STA. 12+94.22=
-BL-2 STA. 11+44.66 PINC
(19.65 RT.)

-DRI- PRC Sta. 11+10.72

-DRI- PT Sta. 11+88.16

END CONSTRUCTION
-DRI- POT Sta. 12+20.00

-DRI- POT Sta. 12+32.48

-DETOUR- PT STA. 15+37.59 = -L- POT STA. 16+02.05

END CONSTRUCTION
-DETOUR- PT STA. 15+37.59

-L- PT Sta. 14+41.91

-L- POT STA. 16+99.32 = -BL-3 15+52.65 POT= -BY- 8+71.16 PINC (2.63 LT.)

-L- POT Sta. 17+45.89

5+00.00 POT -BY-4

10+96.05 POT -BY-5

BM #3
-BY- STA 7+94.97
9.09' RIGHT
ELEV. 2201.46'
-L- STA 16+66.48
90.97' LEFT

BM #2
-BL- STA 11+92.42
169.47' RIGHT
ELEV. 2179.83'
-L- STA. 13+62.49
180.52' RIGHT

CLYDE E. KNIGHT
LINDA A. KNIGHT

TOSHI COGGINS

CHARLES A. BARKER, Jr.

JAMES R. McDOWELL
JUANITA COLE McDOWELL

DANIEL N. McDOWELL
MISTY L. McDOWELL

FRADY FAMILY LIMITED PARTNERSHIP

FRED W. FEW, Jr.
JUDI C. FEW

ROBERT D. KRILL
MICHELLE L. KRILL

DANIEL E. PRINCE
DEBRA McDOWELL PRINCE

CAROL ANN ANDERSON

TEMP. LAT BASE DITCH SEE DETAIL A EST. DDE _CY

DETOUR CULVERT w/SANDBAG ENDWALL 1 @ 90° CMP

NOTE: 36" CSP TO BE REMOVED W/DETOUR INSTALL 2" STREAM RELOCATION (PER PLANS)

SPECIAL CUT DITCH

SPECIAL LATERAL BASE DITCH

CLASS B RIP RAP EST. 3 TONS FILTER FABRIC EST. 10 SY

CLASS B RIP RAP EST. TONS FILTER FABRIC EST. SY

DETAIL A
LATERAL BASE DITCH
(Not to Scale)

Natural Ground | 2d | d | 2d | b | F/Ft. | Fill Slope

Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.

-DET- STA.13+00 TO STA.14+65 LT

-DRI-	
PI Sta 10+57.61	PI Sta 11+87.51
Δ = 70° 49' 21.0" (LT)	Δ = 65° 03' 44.0" (RT)
D = 114° 35' 29.6"	D = 114° 35' 29.6"
L = 61.80'	L = 56.78'
T = 35.55'	T = 31.89'
R = 50.00'	R = 50.00'
SE = NC	SE = NC

STREAM MITIGATION AREA
SEE PLAN SHEET 4

NOTES:
1) FOR -L- PLAN VIEW SEE SHEET 4.
2) FOR -L- PROFILE SEE SHEET 5.
3) FOR -DETOUR- PROFILE SEE SHEET 5.
4) FOR -DRI- PLAN VIEW SEE SHEET 4.
5) FOR -DRI- PROFILE SEE SHEET 5.
6) ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.

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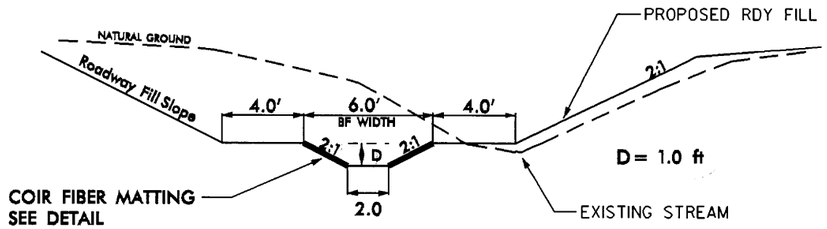
PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

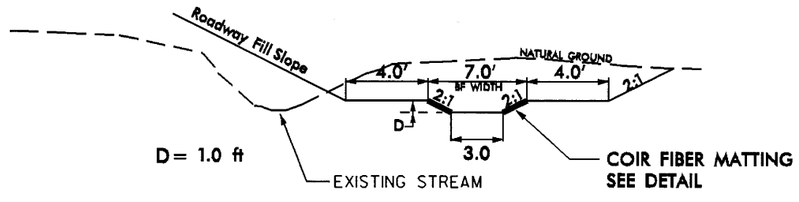
REVISIONS

STREAM RELOCATION DETAIL
–L– STA. 11+50 TO STA. 13+50 LT
NOT TO SCALE

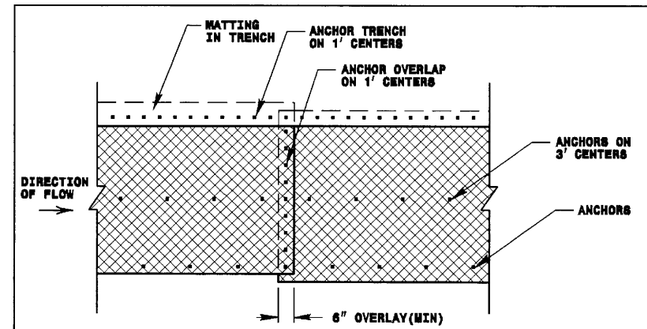


NOTE: TRANSITION FROM EXISTING STREAM TO PROPOSED STREAM DETAIL FROM –L– STA. 11+50 TO STA. 12+00 LT.

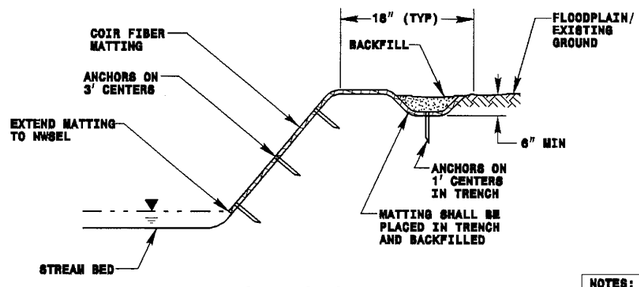
STREAM RELOCATION DETAIL
–L– STA. 13+85 TO STA. 15+50 RT
NOT TO SCALE



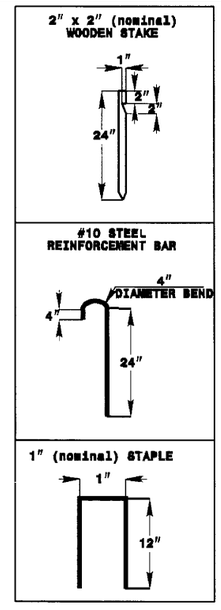
NOTE: TRANSITION FROM EXISTING STREAM TO PROPOSED STREAM DETAIL FROM –L– STA. 15+50 TO STA. 15+00 RT.



PLAN VIEW



TYPICAL CROSS SECTION



ANCHOR OPTIONS

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

COIR FIBER MATTING DETAIL
NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
B-3856	2-D
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

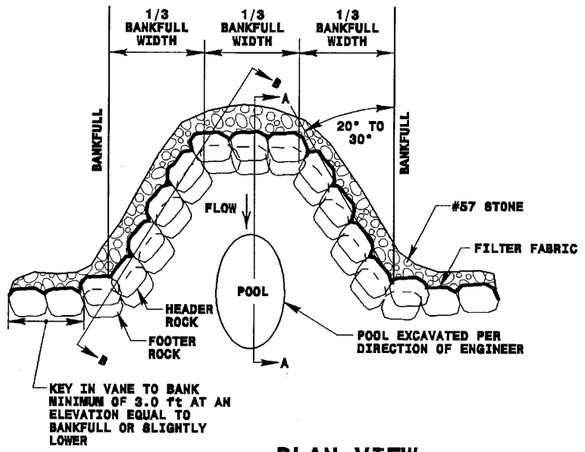
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

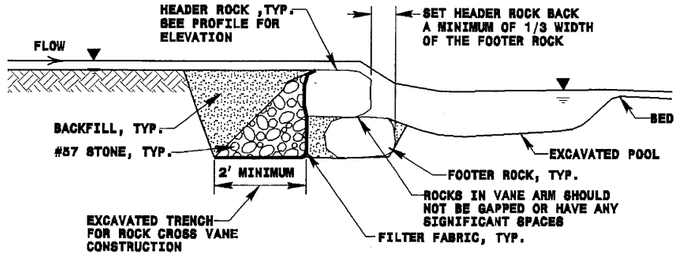
REVISIONS

ROCK CROSS VANE DETAIL

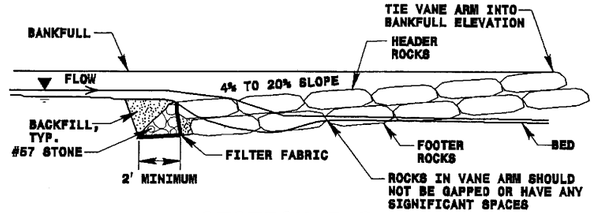
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

BOULDER DIMENSIONS ARE 3x2x1 (LxWxH, ft.)

NOTES:

1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

LOCATIONS AND HEADER ROCK ELEVATIONS

Left of -L-	
Station	Elevation
11+50	2181.2
12+00	2180.1
12+50	2178.9
12+75	2177.9
13+00	2176.9
13+25	2175.9

Right of -L-	
Station	Elevation
13+88	2175.2
14+50	2176.4
15+00	2177.4
15+50	2178.4

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8/17/99

7-10-06 RIGHT OF WAY REVISIONS: RW LINES HAVE BEEN ADJUSTED TO TIE TO THE EXISTING RW ON PARCELS 1 & 2. THE RW LABELS FOR THE MARKERS LOCATED ON THE EXISTING RW HAVE BEEN CHANGED TO SHOW THE CORRECT OFFSETS ON PARCEL 1. STATION LABEL RIGHT OF -L- HAS BEEN CHANGED FROM EX. RW OF -DRI- STA. 12+32.48 HAS BEEN CHANGED TO SHOW THE CORRECT OFFSET ON PARCEL 1. STATION LABELS LEFT AND RIGHT OF -L- HAVE BEEN CHANGED FROM EX. RW TO +38.00 & +95.39 ON PARCELS 3 & 4. EASEMENT TO +09.38 ON PARCEL 1. STATION LABELS LEFT AND RIGHT OF -L- HAVE BEEN CHANGED FROM EX. RW TO +38.00 & +95.39 ON PARCELS 3 & 4. THE SOUTHERN PROPERTY LINE ON PARCEL 1 HAS BEEN REVISED. A PROPERTY LINE HAS BEEN ADDED TO THE JAMES R. MCDOWELL AND JUANITA COLE MCDOWELL PARCEL (D. B. 462 PG. 283), DIVIDING IT INTO TWO PARCELS. -L- ALIGNMENT AND END PROJECT LIMITS HAVE BEEN EXTENDED. KAD

PROJECT REFERENCE NO.	SHEET NO.
B-3856	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.

DETOUR		
PI Sta 10+78.24	PI Sta 12+78.53	PI Sta 14+66.86
Δ = 23° 16' 05.4" (LT)	Δ = 36° 12' 07.1" (RT)	Δ = 21° 35' 12.7" (LT)
D = 15° 04' 40.2"	D = 15° 04' 40.2"	D = 15° 04' 40.2"
L = 154.32'	L = 240.10'	L = 143.17'
T = 78.24'	T = 124.21'	T = 72.44'
R = 380.00'	R = 380.00'	R = 380.00'
SE = SEE PLANS	SE = NC	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS

-L-
PI Sta 12+91.18
Δ = 8° 39' 11.0" (LT)
D = 2° 51' 53.2"
L = 302.05'
T = 151.31'
R = 2,000.00'
SE = 04
RO = 84'

-DRI-	
PI Sta 10+78.71	PI Sta 11+53.94
Δ = 57° 53' 05.3" (LT)	Δ = 63° 23' 04.0" (RT)
D = 81° 51' 04.0"	D = 81° 51' 04.0"
L = 70.72'	L = 77.44'
T = 38.71'	T = 43.22'
R = 70.00'	R = 70.00'
SE = NC	SE = NC

BEGIN TIP PROJECT B-3856
-L- POT STA. 10+00.00

-BL-1 5+00.00 POT

CHARLES A. BARKER, Jr.
EVELYN M. BARKER

BM #1
-BL- STA 5+01.54
16.12' LEFT
ELEV. 2210.84'

JAMES R. McDOWELL
JUANITA COLE McDOWELL

DANIEL N. McDOWELL
MISTY L. McDOWELL

-DETOUR- PC Sta. 10+00.00 =
-L- POT Sta. 10+71.58

-L- PC Sta. 11+39.87

-DETOUR- PRC Sta. 11+54.32

-DRI- POT Sta. 10+00.00

-L- POC Sta. 12+34.00

CHARLES A. BARKER, Jr.

JAMES R. McDOWELL
JUANITA COLE McDOWELL

-DRI- PC Sta. 10+40.00

-L- POT STA. 12+94.22=
-BL-2 STA. 11+44.66 PINC
(19.65 RT.)

-DRI- PRC Sta. 11+10.72

-DRI- PT Sta. 11+88.16

-DRI- +32.48
12.92'
& 25'

END CONSTRUCTION
-DRI- POT Sta. 12+20.00

-DRI- POT Sta. 12+32.48

FRADY FAMILY LIMITED PARTNERSHIP

TOSHI COGGINS

-DETOUR- PRC Sta. 13+94.42

BEGIN CULVERT
-L- STA. 13+53.00+/-

END CULVERT
-L- STA. 13+77.00
+/-

CLYDE E. KNIGHT
LINDA A. KNIGHT

5+00.00 POT
-BY-4

FRED W. FEW, Jr.
JUDIC. FEW

BM #3
-BY- STA 7+94.97
9.09' RIGHT
ELEV. 2201.46'
-L- STA 16+66.48
90.97' LEFT

-L- POT STA. 16+99.32 =
-BL-3 15+52.65 POT=
-BY- 8+71.16 PINC
(21.63 LT.)

ROBERT D. KRILL
MICHELLE L. KRILL

-L- POT Sta. 17+45.89

DANIEL E. PRINCE
DEBRA McDOWELL PRINCE

END TIP PROJECT B-3856
-L- POT STA. 17+38.00

40+96.05 POT -BY-5

CAROL ANN ANDERSON

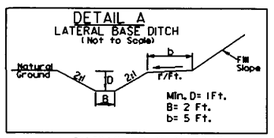
-L- PT Sta. 14+41.92

-L- POT STA. 16+02.05 =
-DETOUR- PT STA. 15+37.59

BM #2
-BL- STA 11+92.42
169.47' RIGHT
ELEV. 2179.83'
-L- STA. 13+62.49
180.52' RIGHT

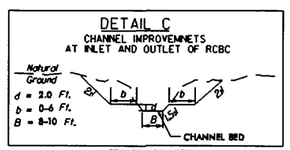
STREAM MITIGATION AREA

DETAIL A
LATERAL BASE DITCH
(Not to Scale)



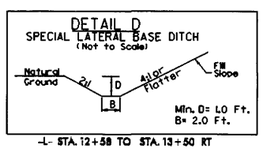
-L- STA.13+80 TO STA.15+50 LT

DETAIL C
CHANNEL IMPROVEMENETS
AT INLET AND OUTLET OF RCBC



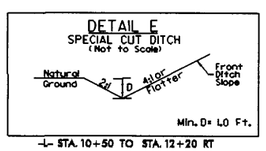
-L- STA 13+65 LT/RT

DETAIL D
SPECIAL LATERAL BASE DITCH
(Not to Scale)



-L- STA. 12+58 TO STA. 13+50 RT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



-L- STA. 10+50 TO STA. 12+20 RT

NOTES:

1) FOR -L- PROFILE SEE SHEET 5.
2) FOR -DRI- PROFILE SEE SHEET 5.
3) FOR -DETOUR- PLAN VIEW SEE SHEET 2-B.
4) FOR -DETOUR- PROFILE SEE SHEET 5.
5) ALL DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED.
6) FOR CULVERT PLANS SEE SHEET C-1 THRU ?.

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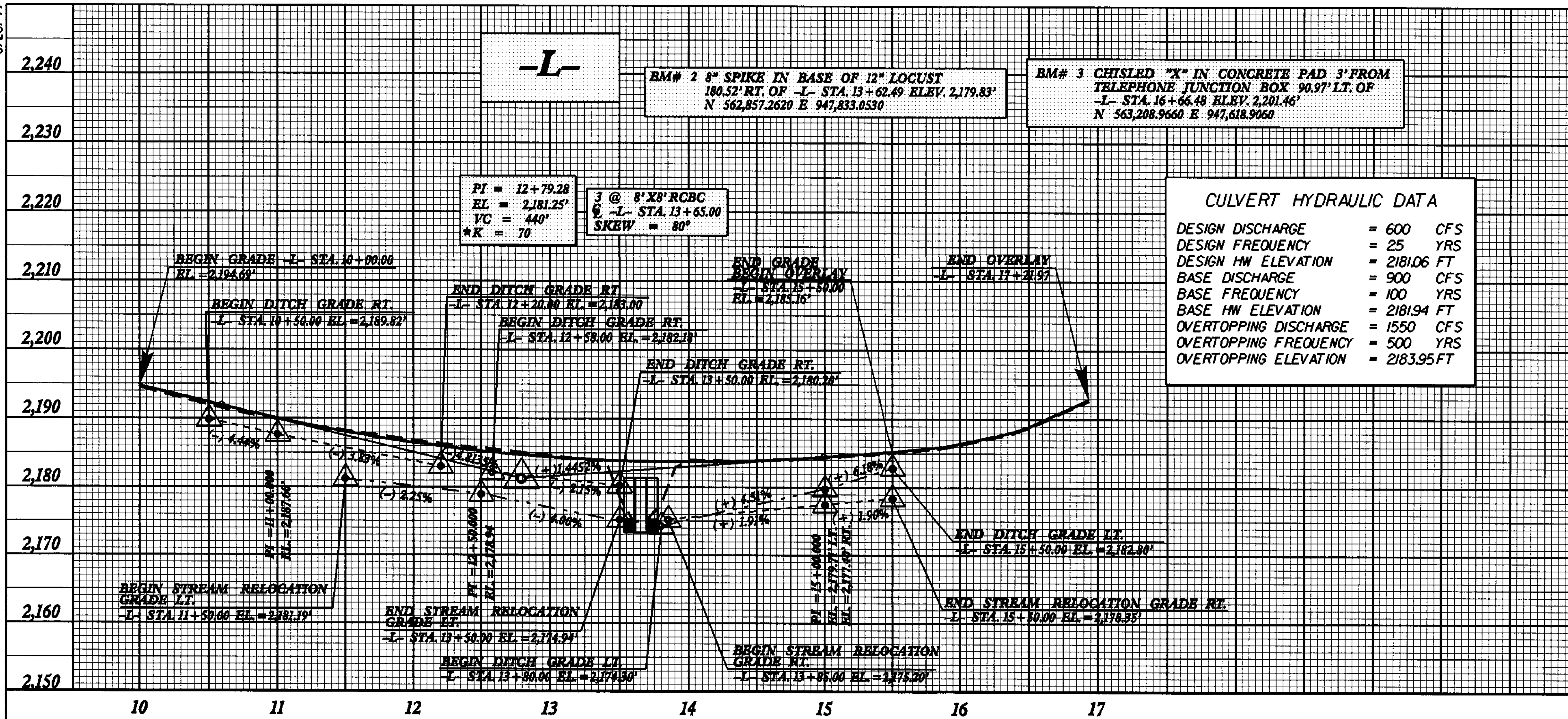
PROJECT REFERENCE NO.	SHEET NO.
B-3856	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

-L-



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	600	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	2181.06	FT
BASE DISCHARGE	=	900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2181.94	FT
OVERTOPPING DISCHARGE	=	1550	CFS
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING ELEVATION	=	2183.95	FT

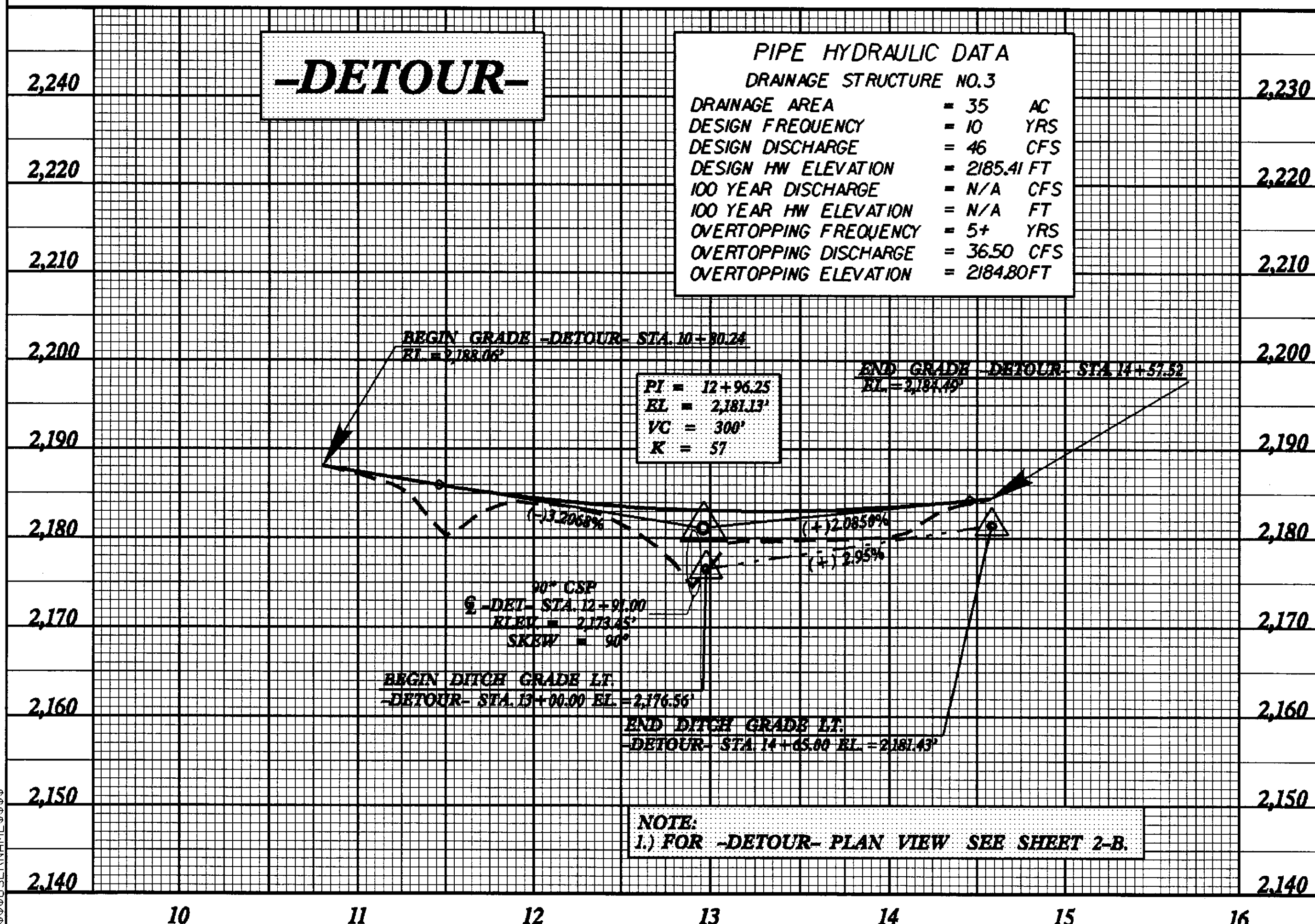
* DESIGN EXCEPTIONS FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE ARE REQUIRED.

NOTES:
1.) FOR -L- PLAN VIEW SEE SHEET 4.
2.) FOR CUVERT PLANS SEE SHEETS C-1 THRU C-?.

-DETOUR-

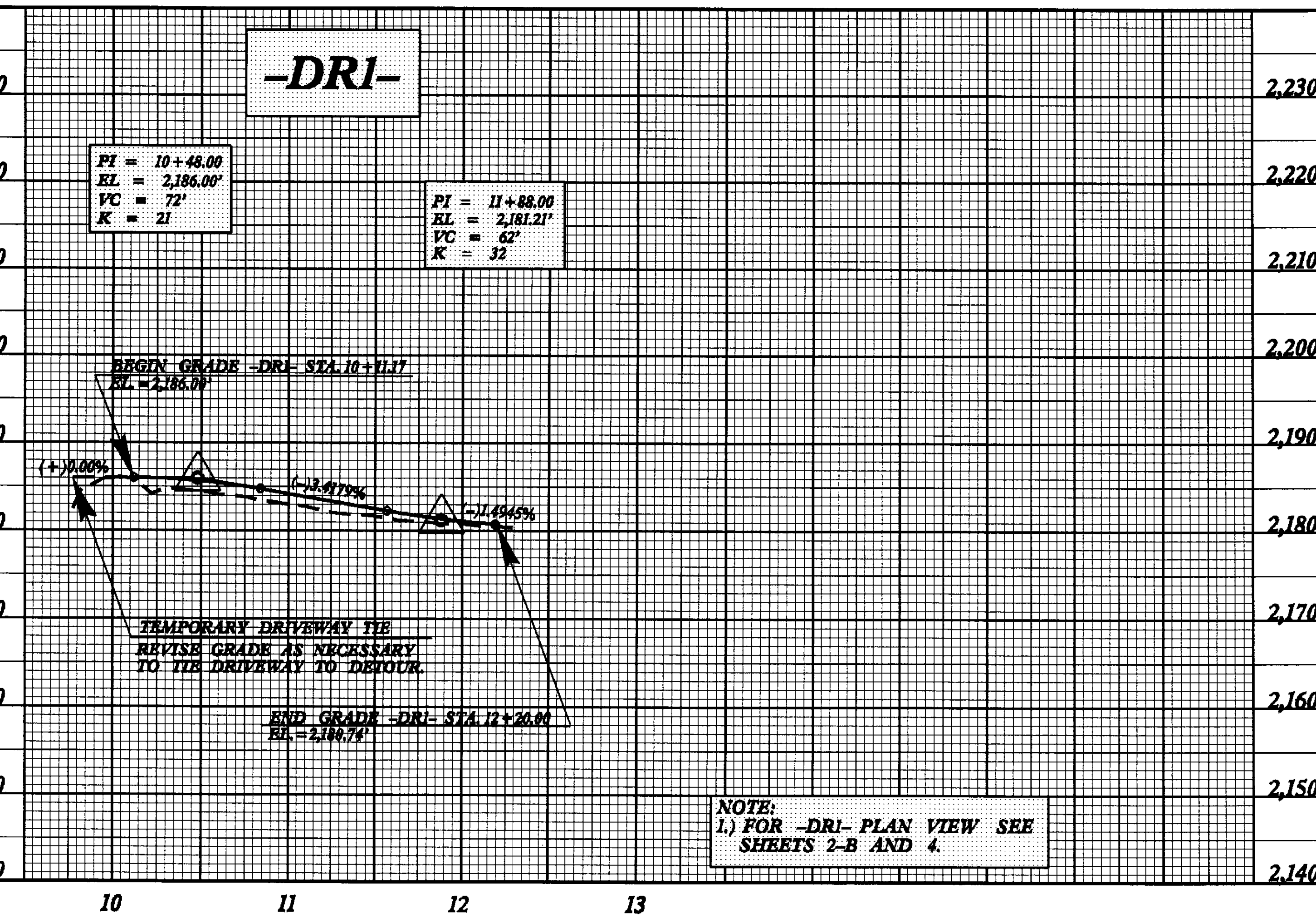
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.3

DRAINAGE AREA	=	35	AC
DESIGN FREQUENCY	=	10	YRS
DESIGN DISCHARGE	=	46	CFS
DESIGN HW ELEVATION	=	2185.41	FT
100 YEAR DISCHARGE	=	N/A	CFS
100 YEAR HW ELEVATION	=	N/A	FT
OVERTOPPING FREQUENCY	=	5+	YRS
OVERTOPPING DISCHARGE	=	36.50	CFS
OVERTOPPING ELEVATION	=	2184.80	FT



NOTE:
1.) FOR -DETOUR- PLAN VIEW SEE SHEET 2-B.

-DR1-



NOTE:
1.) FOR -DR1- PLAN VIEW SEE SHEETS 2-B AND 4.

5/28/99

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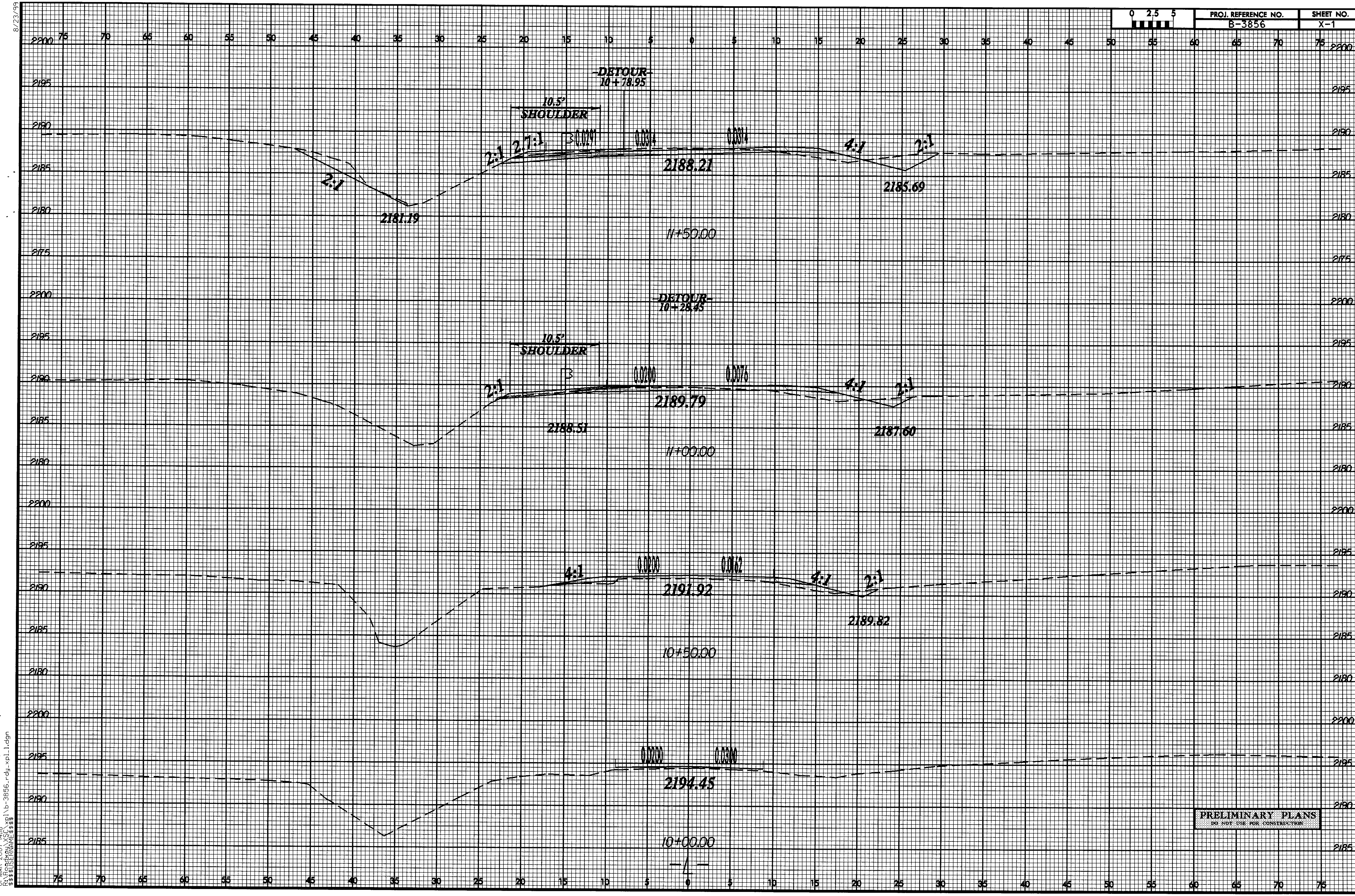
PROJ. REFERENCE NO.	SHEET NO.
B-3856	X-1



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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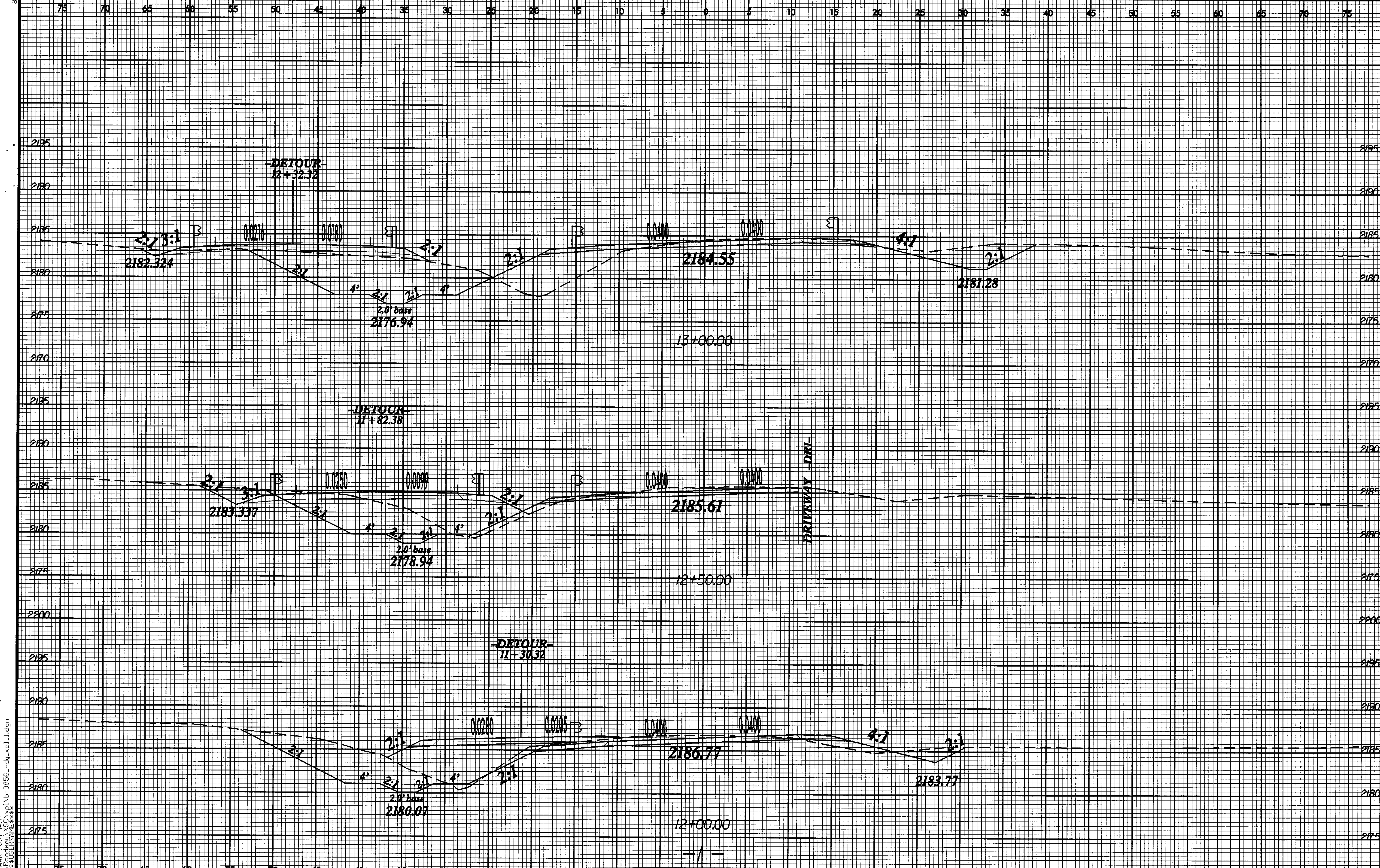
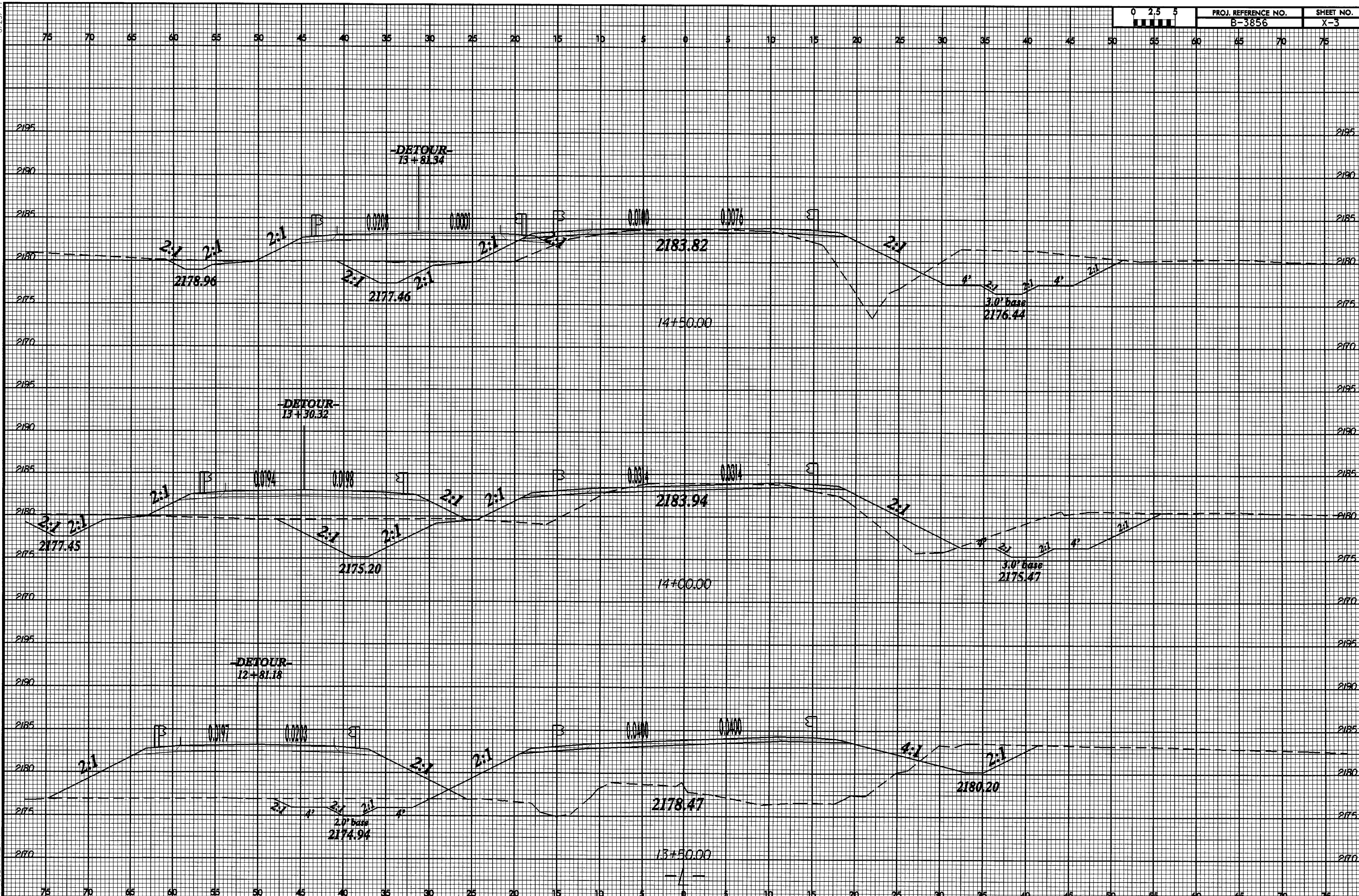
B-3856	X-2



PROJ. REFERENCE NO.	SHEET NO.
B-3856	X-3



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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-3856	X-4

-DETOUR-
15+35.54

2186.19

16+00.00

-DETOUR-
14+85.38

3:1

2184.96

2182.84

2178.35

15+50.00

-DETOUR-
14+34.27

2:1

2184.23

2180.52

2179.71

3.0' base
2177.40

15+00.00

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-3856	X-5

2205

2200

2195

2190

2185

2180

2193.18

17+00.00

2188.67

16+50.00

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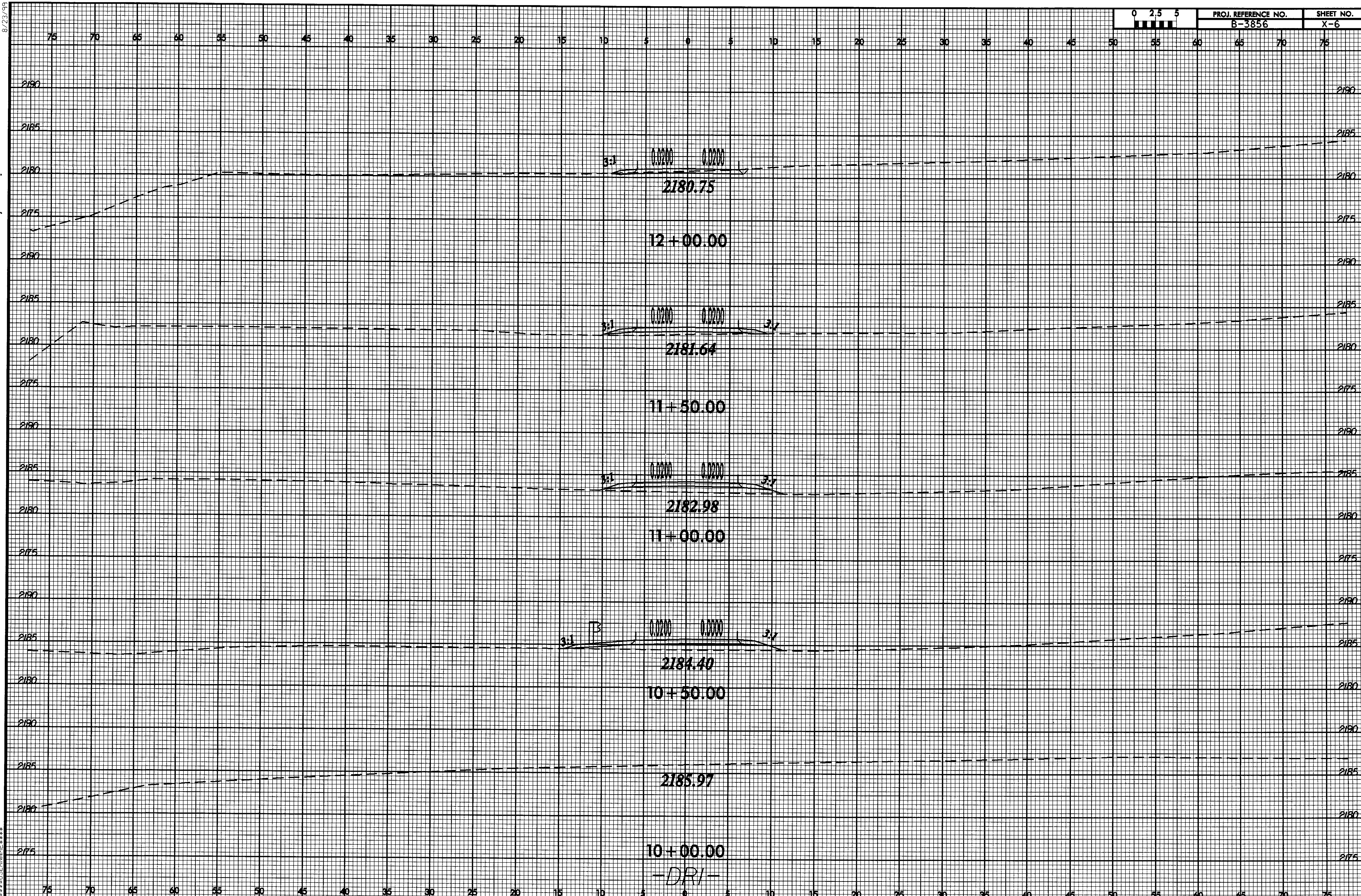
B-3856	X-6



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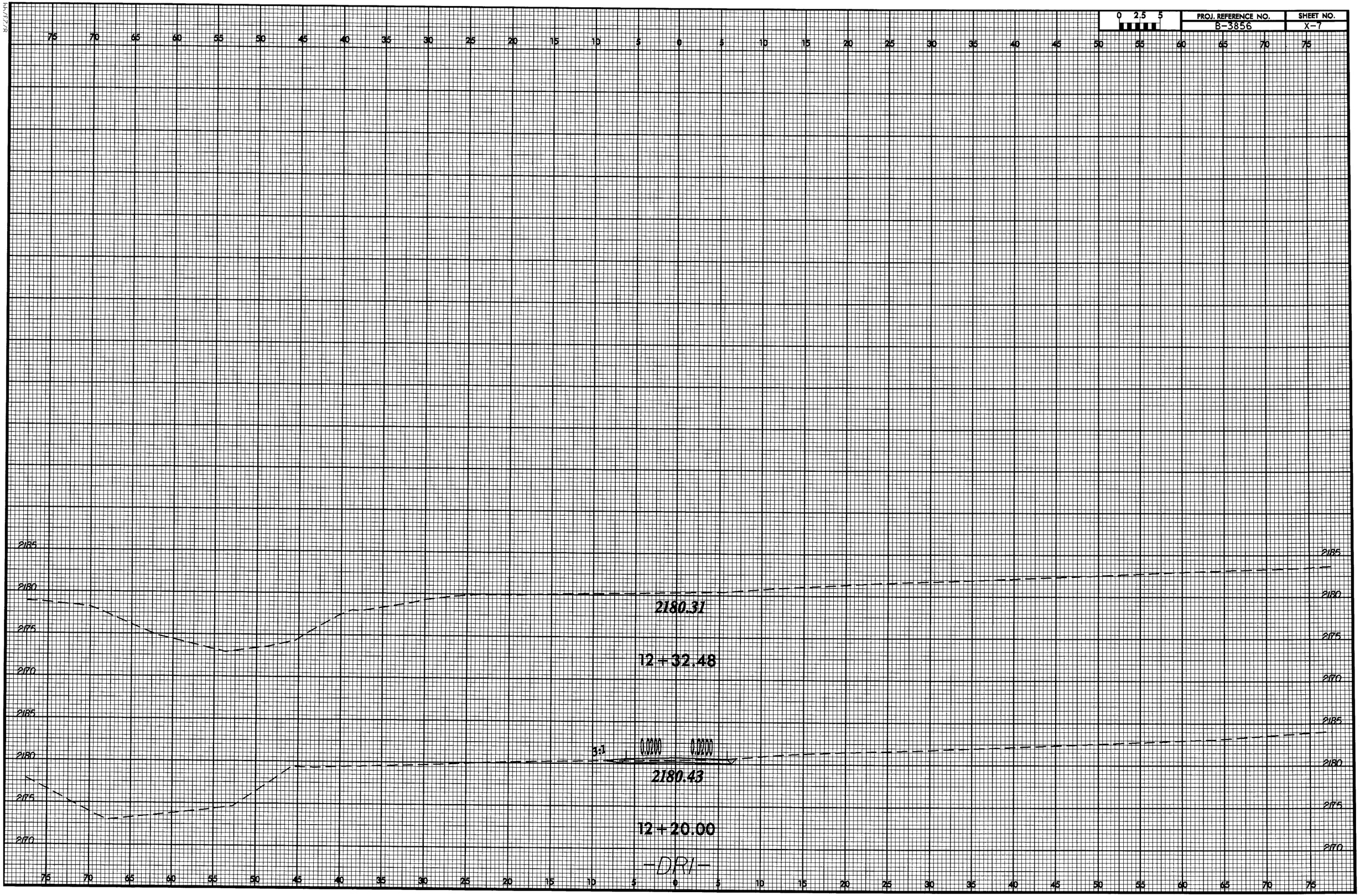
	B-3856	X-7



Henderson County
Bridge No. 335 on SR 1238
Over Mud Creek
Federal Project BRZ-1238(2)
State Project 8.2982301
TIP No. B-3856

CATEGORICAL EXCLUSION

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

10/23/03
DATE

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

10/23/03
DATE

Clarence W. Coleman Jr. for John F. Sullivan, III
Division Administrator, FHWA

Henderson County
Bridge No. 335 on SR 1238
Over Mud Creek
Federal Project BRZ-1238(2)
State Project 8.2982301
TIP No. B-3856

CATEGORICAL EXCLUSION

Documentation Prepared in
Project Development and Environmental Analysis Branch By:

October 2003

John L. Williams, P. E.
Project Planning Engineer

William T. Goodwin Jr., P. E., Unit Head
Bridge Replacement Unit

PROJECT COMMITMENTS:

B-3856, Henderson County

Bridge No. 335 on SR 1238
Over Mud Creek
Federal Project BRZ-1238(2)
State Project 8.2982301

Hydraulics Unit

The Wildlife Resource Commission has indicated that Mud Creek is not a trout stream but still has concerns for fish and wildlife passage. They recommend that the culvert should be designed to allow for fish passage by burying the bottom of any culvert or pipe by at least 1 foot below the natural streambed. If this is not possible the Hydraulics Unit should coordinate with the WRC on the stream design.

The Wildlife Resource Commission has also requested that any culverts or pipes should be situated such that it does not involve either channel realignment. They assert that these design features can have an undesirable change in water depth and water velocity.

Structure Design

This project will require a TVA Permit.

Henderson County
Bridge No. 335 on SR 1238
Over Mud Creek
Federal Project BRZ-1238(2)
State Project 8.2982301
TIP No. B-3856

INTRODUCTION: Bridge No. 335 is included in the 2004-2010 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program 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 STATEMENT

Bridge Maintenance Unit records indicate the bridge has a sufficiency rating of 43.1 out of a possible 100 for a new structure. The bridge is 35 years old, constructed entirely of timber, and considered to be structurally deficient. The width of the bridge is 7 feet (2.1 meters) less than present day standards and therefore functionally obsolete. The replacement of this inadequate structure will result in safer traffic operations.

II. EXISTING CONDITIONS

The project is located in southwestern rural Henderson County (see Figure 1). Development in the area is agricultural and residential in nature.

SR 1238 (Pearl Lane) is a paved road classified as rural local route in the Statewide Functional Classification System. This route is not a designated bicycle route and there is no indication that an unusual number of bicyclists use this roadway.

In the vicinity of the bridge, SR 1238 has an 18-foot (5.5-meter) pavement width with 2-foot (0.6-meter) grass shoulders (see Figures 3 and 4). The roadway grade is in a sag vertical curve through the project area. The existing bridge is on a tangent. SR 1238 is a dead end road. The roadway is situated approximately 10 feet (3.0 meters) above the creek bed.

Bridge No. 335 is a three-span structure that consists of timber floor on timber joists with an asphalt wearing surface. Both the end bents and interior bents consist of timber caps on timber piles. The existing bridge (see Figure 3) was constructed in 1967. The overall length of the structure is 47 feet (14.3 meters). The clear roadway width is 19.0 feet (5.8 meters). The posted weight limit on this bridge is 15 tons for single vehicles and 22 tons for TTST's.

There are no utilities attached to the existing structure, but an underground phone line becomes aerial across the creek on the west side of the bridge. Utility impacts are anticipated to be low.

The current traffic volume of 200 vehicles per day (VPD) is expected to increase to 400 VPD by the year 2025. The projected volume includes one percent truck-tractor semi-trailer (TTST) and

two percent dual-tired vehicles (DT). There is no posted speed limit and therefore subject to a statutory 55 mile (90 kilometer) per hour speed limit in the project area.

There have been no accidents reported in the vicinity of Bridge No. 335 during a recent three-year period.

There are no school busses currently using the bridge.

III. ALTERNATIVES

A. Project Description

The replacement structure will consist of a double barrel, 9-foot (2.7-meter) wide by 9-foot (2.7-meter) high reinforced concrete box culvert.

The roadway will be designed as according to the AASHTO publication: *Guidelines for Geometric Design of Very Low-Volume Local Roads*. Therefore the structure will be of sufficient length to provide two 9-foot (2.7-meter) lanes with 4-foot (1.2-meter) shoulders on each side. The shoulder widths will be increased by 3 feet (1 meter) where guardrail is warranted. The roadway grade of the new structure will be approximately the same as the existing grade at this location. The design speed will be 40 miles per hour (65 kilometers per hour). A design exception is anticipated for vertical alignment.

B. Reasonable and Feasible Alternatives

One build alternative for replacing Bridge No. 335 was studied and is described below.

Replace the structure along the existing roadway alignment. Traffic will be maintained on a temporary onsite detour 56 feet (17 meters) to the west of the existing bridge. The temporary structure will be a pair of 60-inch (1500-millimeter) corrugated steel pipes. Improvements to the approach roadways will be required for a distance of approximately 400 feet (122 meters) to the east and west of the structure.

All other build alternates would involve more significant impacts to the surrounding human and natural environment. A new alignment to either side might be somewhat less costly but would have greater environmental impacts and introduce an undesirable alignment. A temporary onsite detour to the east would require even further modification of the private road that intersects with SR 1238 on the southeast corner of the bridge. Therefore, the only practical build alternate is to replace the bridge on the existing location maintaining traffic with a temporary onsite detour to the west.

C. Alternatives Eliminated From Further Consideration

The "do-nothing" alternative will eventually necessitate closure of the bridge. This is not acceptable because SR 1238 is a dead end road and several residences and businesses are located along SR 1238 past the bridge.

Timber structures typically do not last beyond 30 to 40 years of age due to the natural deterioration rates of wood. Rehabilitation of a timber structure is generally practical only when a few members are damaged or prematurely deteriorated. However, past a certain degree of deterioration, timber structures become impractical to maintain and are programmed for replacement.

D. Preferred Alternative

Bridge No. 335 will be replaced at the existing location with a box culvert as described in Section A above and as illustrated in Figure 2. Because SR 1238 is a dead-end road, traffic will be placed on a temporary onsite detour alignment to the west of the existing bridge. This proposal will provide the best alignment while having minimal impact on the floodplain and on adjacent properties.

The NCDOT Division 14 Engineer concurs with this recommendation.

IV. ESTIMATED COSTS

The estimated costs are as follows for the build alternative:

Item	Cost
Roadway Approaches & Side Road	$ 226,000
Structure (Box Culvert)	90,000
Existing Structure Removal	8,000
Detour Approaches (Construct & Remove)	161,500
Detour Structure (Pipes)	10,000
Misc. & Mob.	231,000
Eng. & Contingencies	178,000
Total Construction Cost	$ 1,150,000
Right-of-way Costs	$ 60,000
Total Project Cost	$ 1,210,000

V. NATURAL RESOURCES

PHYSICAL RESOURCES

Soil and water resources that occur in the project area are discussed below. Soils and availability of water directly influence composition and distribution of flora and fauna in any biotic community.

The project area lies within the Blue Ridge Mountain Physiographic Province. The topography in this section of Henderson County is characterized by mountain ranges, isolated peaks, large rolling valleys, and stream floodplains. Project elevation is approximately 2,200 feet (670) above mean sea level (msl).

Soils

Four soil series occur within the project area: Codorus loam, Delanco loam, Tate fine sandy loam, and Rosman loam. Soil phase description information was obtained from the Soil Survey of Henderson County, North Carolina (1980). They are as follows:

- Codorus loam is a nearly level, moderately well drained to somewhat poorly drained soil found in slight depressional areas on wide and narrow floodplains. Permeability is moderate and the seasonal high water table occurs 1 to 2 feet (0.3 to 0.6 meters) below the surface for two to six months in most years. Wetness and flooding are the major limitations for this soil type.

- Delanco loam with 2 to 7 percent slopes is a moderately well drained soil found on somewhat elevated stream terraces and at the head of small drainage ways. Permeability is moderate and the seasonal high water table occurs at a depth of 30 inches (76 centimeters) for two to three months in most years. The seasonal high water table is the main limitation for this soil type.

- Tate fine sandy loam with 2 to 7 percent slopes is a well drained soil found on smooth foot slopes and in lower coves. Permeability is moderate and the seasonal high water table occurs at a depth of more than 6 feet (1 meters). There are no major limitations for this soil type.

- Rosman loam is a nearly level, well drained and moderately well drained soil found in slightly elevated positions commonly adjacent to streams on wide floodplains. Permeability is moderately rapid and the seasonal high water table occurs below a depth of 4 feet (1.2 meters). The seasonal high water table and flooding are the major limitations for this soil type.

Water Resources

This section contains information concerning those water resources within the project area. Water resource information encompasses physical aspects of the resource, its relationship to major water systems, Best Usage Standards, and water quality of the resources. Surface water resources and minimization methods are also discussed.

Surface Water Characteristics

Mud Creek, an unnamed tributary to Mud Creek, and a roadside canal are surface water resources within the project area. These water resources are located in sub-basin 04-03-02 of the French Broad River Basin. The average baseflow width of Mud Creek is approximately 5.00 feet (1.5 meters). Average depth is approximately 7 inches (18 centimeters). The average baseflow width of the tributary of Mud Creek is 3 feet (0.9 meters), with an average depth of 4 inches (10 centimeters). The average baseflow width of the roadside canal is 2.5 feet (0.8 meters), with an average depth of 4 inches (10 centimeters). The substrates of Mud Creek, the tributary to Mud Creek, and the roadside canal are composed of silt and gravel. For all conveyances, flows are moderate and water clarity is fair.

Best Usage Classification

All streams have been assigned a best usage classification by the N.C. Division of Water Quality. The classification of Mud Creek in the project area is **C** (NCDENR, 2000). Class **C** refers to waters suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture.

Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped watersheds) nor Outstanding Resource Waters (ORW) occur within 1.0 mile (1.6 kilometers) of the project area.

Water Quality

The DWQ has initiated a basin-wide approach to water quality management for each of the 17 river basins within the state. To accomplish this goal the DWQ collects biological, chemical, and physical data that can be used in basinwide assessment and planning. All basins are reassessed every five years. Prior to the implementation of the basinwide approach to water quality management, the Benthic Macro invertebrate Ambient Network (BMAN) assessed water quality by sampling for benthic macroinvertebrate organisms at fixed monitoring sites throughout the state. **There is no BMAN station located on Mud Creek within 1.00 mile (1.61 kilometers) of the project area.**

Many benthic macroinvertebrates have life cycle stages that can last from six months to one year. Therefore, the adverse effects of a toxic spill may not be overcome until the next generation. Different taxa of macroinvertebrates have different tolerances to pollution, therefore, long-term changes in water quality conditions can be identified by population shifts from pollution

sensitive to pollution tolerant organisms (and vice versa). Overall, the species present, the population diversity, and the biomass are reflections of long-term water quality conditions.

In North Carolina, point source dischargers are permitted through the National Pollutant Discharge Elimination System (NPDES) Program. Permits are required for all point source discharges. **There is no point source discharger on Mud Creek within 1.0 mile (1.6 kilometers) of the project area.**

Ecological Impacts

Replacing an existing structure in the same location with a road closure during construction is almost always preferred. It poses the least risk to aquatic organisms and other natural resources. Bridge replacement at a new location usually results in greater impacts. Usually, project construction does not disturb the entire right-of-way; therefore, actual impacts will be less than reported in Table 1.

Project construction may result in the following impacts to surface waters:

1. Increased sedimentation and siltation from demolition debris and/or erosion resulting from vegetation removal and soil disturbance during construction,

2. Changes in light incidence and water clarity due to increased sedimentation and vegetation removal,

3. Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction,

4. Changes in water temperature due to increased sun and wind exposure resulting from streamside vegetation removal,

5. Increased nutrient loading from the stormwater runoff of areas disturbed during construction, and/or

6. Increased input of toxic compounds from demolition, construction, toxic spills, and highway runoff.

Precautions must be taken to minimize impacts to water resources in the project area. The NCDOT's Best Management Practices (BMP) for the Protection of Surface Waters must be strictly enforced during the construction stage of the project. Guidelines for these BMPs include, but are not limited to minimizing built upon area and diverting stormwater away from surface water supply waters as much as possible. Provisions to prevent water resource contamination by toxic substances during the demolition and construction phases must also be strictly enforced.

BIOTIC RESOURCES

Biotic resources include aquatic and terrestrial ecosystems. This section describes those ecosystems encountered in the project area, as well as, the relationships between flora and fauna within these ecosystems. Composition and distribution of biotic communities throughout the project area are reflective of topography, hydrologic influences, and past and present land uses in the project area. Descriptions of the terrestrial systems are presented in the context of plant community classifications and follow descriptions presented by Schafale and Weakley (1990) where possible. Dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

Scientific nomenclature and common names (when applicable) are provided for each plant and animal species described. Plant taxonomy generally follows Radford *et al.* (1968). Animal taxonomy follows Martof *et al.* (1980), Potter *et al.* (1980), and Webster *et al.* (1985). Subsequent references to the same organism will include the common name only. Fauna observed during the site visits are denoted with an asterisk (*). Published range distributions and habitat analysis are used in estimating fauna expected to be present within the project area.

Terrestrial Communities

Two distinct terrestrial communities are identified in the project area: early successional and maintained/disturbed. Faunal species likely to occur within the project area will exploit all community types for shelter, foraging opportunities, and/or as wildlife corridors.

Early Successional

The early successional community is adjacent to the maintained/disturbed community for the length of the project area and also occurs adjacent to the banks of Mud Creek, the tributary to Mud Creek, and the roadside canal. The canopy of this community is composed of tag alder (*Alnus serrulata*), black cherry (*Prunus serotina*), red maple (*Acer rubrum*), and dogwood (*Cornus florida*). Shrubs and herbaceous vegetation found in this community type include Chinese privet (*Ligustrum sinense*), blackberry (*Rubus argutus*), rose (*Rosa* sp.), pokeweed (*Phytolacca americana*), sumac (*Rhus* sp.), and broom sedge (*Andropogon virginicus*). Vines include Japanese honeysuckle (*Lonicera japonica*) and greenbrier (*Smilax rotundifolia*).

Avian species associated with this community type include: field sparrow* (*Spizella pusilla*), black-capped chickadee (*Parus atricapillus*), chestnut-sided warbler (*Dendroica pensylvanica*), and dark-eyed junco (*Junco hyemalis*).

Wildlife species associated with this community type include white-tailed deer (*Odocoileus virginianus)*, gray squirrel (*Sciurus carolinensis*), northern short-tailed shrew (*Blarina brevicauda*), New England cottontail (*Sylvilagus transitionalis*), white-footed mouse (*Peromyscus leucopus*), and raccoon* (*Procyon lotor*).

Maintained/Disturbed

The maintained/disturbed community encompasses areas of pasture, a residential lot, and roadside shoulders. The pastures are located south of Mud Creek on both sides of SR 1238. The maintained lot is located north of Mud Creek and west of SR 1238. The roadside shoulders exist along SR1238 for the entire length of the project area. The maintained/disturbed community is predominantly vegetated by grass (*Festuca* sp.). Faunal species frequenting the maintained/disturbed community will include those inhabiting the early successional community.

Aquatic Communities

Mud Creek, the tributary to Mud Creek, and the roadside canal are aquatic communities located within the project area. Physical characteristics of a water body and the condition of the water resource influence faunal composition of aquatic communities. Terrestrial communities adjacent to a water resource also greatly influence aquatic communities. Vegetation along the banks of Mud Creek, the tributary to Mud Creek, and the roadside canal includes those species present in the early successional community.

Fauna associated with these aquatic communities includes various invertebrate and vertebrate species. Aquatic species likely to occur in Mud Creek include gizzard shad (*Dorosoma cepedianum*), central stoneroller (*Campostoma anomalum*), grass carp (*Ctenopharyngodon idella*), creek chub (*Semotilus atromaculatus*), eastern ribbon snake (*Thamnophis sauritus*), pickerel frog (*Rana palustris*), and two-lined salamander (*Eurycea bislineata*). Invertebrates that would be present include various species of caddisfly (Trichoptera), mayfly (Ephemeroptera), crayfish (Decapoda), dragonfly (Odonata), and damselfly (Odonata).

Habitat Summary

Construction of the subject project will have various impacts on the biotic resources described. Any construction related activities in or near these resources have the potential to impact biological functions. Table 1 quantifies the habitat communities within the project area.

Table 1. Habitat Within Project Area

Community	Wetland	Upland	Totals
Early Successional	-	0.31 ac (0.13 ha)	0.31 ac (0.13 ha)
Maintained/Disturbed	-	0.48 ac (0.19 ha)	0.48 ac (0.19 ha)
Roadside Canal	-	-	0.03 ac (0.01 ha)
Tributary of Mud Creek	-	-	0.01 ac (0.004 ha)
Mud Creek	-	-	0.01 ac (0.004 ha)
Total	0.00 ac (0.00 ha)	0.79 ac (0.32 ha)	0.84 ac (0.338 ha)

ac – acres (ha – hectares)

Plant communities found within the proposed project area serve as nesting and sheltering habitat for various wildlife species. Replacing Bridge No. 335 and its associated improvements may reduce habitat for some faunal species. However, due to the size and scope of this project, it is anticipated that impacts to fauna will be minimal.

Areas modified by construction (but not paved) will become road shoulders and early succession habitat. Reduced habitat may displace some wildlife further from the roadway while attracting other wildlife by the creation of early successional habitat. Animals temporarily displaced by construction activities may repopulate areas suitable for the species.

Aquatic communities are sensitive to even small changes in their environment. Stream channelization, scouring, siltation, sedimentation, and erosion from project-related work may affect water quality and biological constituents. Although direct impacts may be temporary, environmental impacts from these construction processes may result in long term or irreversible effects.

Impacts often associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the stream substrate and may remove streamside vegetation at the site. Disturbances to the substrate will produce siltation, which in excessive amounts can clog the gills and/or feeding mechanisms of benthic organisms (sessile filter-feeders and deposit-feeders), fish, and amphibian species. Benthic organisms may also be covered by excessive amounts of sediment. Some of these organisms may be slow to recover or repopulate a stream.

The removal of streamside vegetation and placement of fill material at the construction site alters the terrain. Alterations of the streambank enhance the likelihood of erosion and sedimentation. Revegetation stabilizes and holds the soil thus mitigating these processes. Erosion and sedimentation carry soils, toxic compounds, and other materials into aquatic communities at the construction site. These processes increase turbidity and can cause the formation of sandbars at the site and downstream, thereby altering water flow and the growth of vegetation. Streamside clearing also leads to more direct sunlight penetration causing elevations in water temperatures, which may impact some species.

JURISDICTIONAL TOPICS

This section provides descriptions, inventories, and impact analysis pertinent to two important issues: "Waters of the United States" and rare and protected species.

Waters of the United States

Surface waters and jurisdictional wetlands fall under the broad category of "Waters of the United States," as defined in Section 33 of the Code of Federal Regulations (CFR) Part 328.3. Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Any action that proposes to place fill into these areas falls under the jurisdiction of the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (33 U.S.C. 1344).

Wetlands and Surface Waters

Potential wetland communities were investigated pursuant to the 1987 Corps of Engineers *Wetlands Delineation Manual.* The three-parameter approach was used. Hydric soils, hydrophytic vegetation, and certain specific hydrologic characteristics must **all** be present for an area to be considered a wetland. **Wetlands are not present within the project area.**

Mud Creek, a tributary to Mud Creek, and a roadside canal are surface waters under Section 404 of the Clean Water Act (33 USC 1344). Mud Creek covers 0.01 acres (0.004 hectares) and 82 linear feet (24 linear miles) of the project area. The tributary to Mud Creek covers 0.01 acres (0.004 hectares) and 180 linear feet (55 linear meters) of the project area. The roadside canal covers 0.03 acres (0.01 hectares) and 335 linear feet (102 linear meters) of the project area. Discussion of the biological, physical, and water quality aspects of all surface waters in the project area are presented in previous sections of this report.

Permits

Impacts to jurisdictional surface waters are anticipated from the proposed project. As a result, construction activities will require permits and certifications from various regulatory agencies in charge of protecting the water quality of public water resources.

Nationwide Permit 23 (33 CFR 330.5(a) (23)) is likely to be applicable for all impacts to "Waters of the United States" resulting from the proposed project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded, or financed in whole or part by another federal agency or department where that agency or department has determined that pursuant to the Council on Environmental Quality regulation 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 of Engineers has been furnished notice of the agencies or department's application for the categorical exclusion and concurs with that determination.

This project will also require a 401 Water Quality Certification from the DWQ prior to the issuance of the Nationwide Permit. Section 401 of the Clean Water Act requires that the state issue or deny water certification for any federally permitted or licensed activity that may result in a discharge to "Waters of the United States." Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulation. The issuance of a 401 permit from the DWQ is a prerequisite to issuance of a Section 404 permit.

A North Carolina Division of Water Quality (DWQ) Section 401 Water Quality General Certification is required prior to the issuance of the Section 401 Individual Permit. Since the proposed project is located in a designated "Trout" county, the authorization of a nationwide permit by the COE is conditioned upon the concurrence of the Wildlife Resource Commission (WRC).

The proposed project is located in the Tennessee Valley Authority's (TVA) Land Management District. A permit pursuant to Section 26a of the TVA Act, is required for all construction or development involving streams or floodplains in the Tennessee River drainage basin.

Bridge Demolition

Bridge No. 335 is composed entirely of timber. Therefore there will be no fill in "Waters of the United States" resulting from bridge demolition.

Mitigation

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

Avoidance

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States." According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the COE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

Minimization

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to "Waters of the United States." Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way widths, fill slopes, and/or road shoulder widths. Other practical mechanisms to minimize impacts to "Waters of the United States" crossed by the proposed project include: strict enforcement of sedimentation control BMP's for the protection of surface waters during the entire life of the project; reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams; reduction of runoff velocity; re-establishment of vegetation on exposed areas; judicious pesticide and herbicide usage; minimization of "in-stream" activity; and litter/debris control.

Compensatory Mitigation

Compensatory mitigation is not normally considered until anticipated impacts to "Waters of the United States" have been avoided **and** minimized to the maximum extent practicable. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation may be required for unavoidable, adverse impacts that remain after all appropriate and practicable minimization has been performed. Compensatory actions often include restoration, creation, and enhancement of "Waters of the United States." Such actions should be undertaken in areas adjacent to or contiguous to the discharge site whenever practicable. Compensatory mitigation is not usually necessary with a Nationwide Permit No. 23. **Impact thresholds for mitigation are as follows:**

- **0.10 to 1.00 acre (0.04 to 0.40 hectares) of wetland impacts may require mitigation;**
- **1.00ac (0.40 hectares) or more of wetland impacts will require mitigation;**
- **150.00 linear feet (45.72 linear miles) or more of stream impacts will require mitigation.**

Rare and Protected Species

Some populations of flora and fauna have been in, or are in, the process of decline either due to natural forces or their inability to coexist with human activities. Federal law (under the provisions of the Endangered Species Act of 1973, as amended) requires that any action, likely to adversely affect a species classified as federally protected, be subject to review by the U.S. Fish and Wildlife Service (FWS). Other species may receive additional protection under separate state laws.

Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the FWS lists six federally-protected species for Henderson County

(Table 2). A brief description of the characteristics and habitat requirements for these species along with a conclusion regarding potential project impacts follows.

Table 2. Federally-protected species of Henderson County.

Scientific Name	Common Name	Federal Status
Clemmys muhlenbergii	Bog turtle	Threatened (S/A)
Isotria medeoloides	Small-whorled pogonia	Threatened
Helonias bullata	Swamp pink	Threatened
Sagittaria fasciculata	Bunched arrowhead	Endangered
Sarracenia jonesii	Mountain sweet pitcher plant	Endangered
Sisyrinchium dichotomum	White irisette	Endangered

Endangered – A taxon "in danger of extinction throughout all or a significant portion of its range."
Threatened – A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
Threatened (S/A) – Threatened due to similarity of appearance (e.g., American alligator)—a species that is threatened due to similarity of appearance with other rare species and is listed for its protection.

Clemmys muhlenbergii (bog turtle) **Threatened (S/A)**
Family: Emydidae
Federally Listed: December 1, 1997

The bog turtle is North Carolina's smallest turtle, measuring 3 to 4 inches (8 centimeters to 10 centimeters) in length. It has a dark brown carapace and a black plastron. The bright orange or yellow blotch on each side of the head and neck is a readily identifiable characteristic. The bog turtle inhabits damp grassy fields, bogs, and marshes in the mountains and western Piedmont.

The bog turtle is shy and secretive, and will burrow rapidly in mud or debris when disturbed. The bog turtle forages on insects, worms, snails, amphibians, and seeds. In June or July, three to five eggs are laid in a shallow nest in moss or loose soil. The eggs hatch in about 55 days.

The bog turtle is listed as Threatened due to Similarity of Appearance (T S/A). This is due to its similarity of appearance to another rare species that is listed for protection. T S/A species are not subject to Section 7 consultation and **a biological conclusion for this species is not required.**

Isotria medeoloides (small-whorled pogonia) **Endangered**
Family: Orchidaceae
Federally Listed: September 10, 1982

The small-whorled pogonia was known historically from Maine to Georgia, with the exception of Delaware, along the eastern seaboard and in Michigan, Illinois, and Missouri. In North Carolina it is found in the Nantahala National Forest, Macon County, and near the town of Flat Rock in Henderson County.

This perennial orchid has long pubescent roots and a hollow stem 4 to 10 inches (10 to 25 centimeters) tall. Stems terminate in a whorl of five to six light green, elliptical leaves. Leaves

measure approximately 3 inches by 1 inches (7 centimeters by 3 centimeters). One to two light green flowers are produced at the end of the stem from mid-May to mid-June. Flowers have short sepals that are only 1 inch (2 centimeters) in length.

The small-whorled pogonia grows in "second growth deciduous" or deciduous-coniferous forests, with an open canopy, open shrub layer, and sparse herb layer. It prefers acidic soils. Flowering is inhibited in areas where there is relatively high shrub coverage or high sapling density.

BIOLOGICAL CONCLUSION: NO EFFECT

The deciduous-coniferous forests, with an open canopy, open shrub layer, and sparse herb layer required by the small-whorled pogonia are not present in the project area. A plant by plant survey was not conducted for this species nor were any observed during the November 14, 2001 site investigation. Additionally, a review of the North Carolina Natural Heritage Program database on November 9, 2001 revealed no records of existing populations of the small-whorled pogonia within 1.00 mile (1.61 kilometers) of the project area. Therefore, project construction will not affect the small-whorled pogonia.

Helonias bullata (swamp pink) **Threatened**
Plant Family: Liliaceae
Federally Listed: September 9, 1988
Flowers Present: May (first half)

Swamp pink, a fresh water wetland plant, once occurred in wetlands from New York to Georgia. It is now believed to be extirpated from New York. Of the 60 known populations, seven are found in North Carolina. The North Carolina populations are limited to bogs in the southern Appalachians in Transylvania, Jackson, and Henderson counties.

This perennial plant grows from tuberous rhizomes. It has lance-shaped, smooth, evergreen leaves that grow in a basal rosette. The hollow stem, 12 to 24 inches (30 to 60 centimeters) in length, is topped with a short, dense, spike-like raceme of pink or purplish flowers. The fruit is a three lobed, papery capsule, 0.1 to 0.2 inches (0.2 to 0.5 centimeters) long, and 0.4 to 0.5 inches (1.0 to 1.3 centimeters) wide.

This species is found in freshwater wetland areas including spring seepage, swamps, bogs, meadows, and along the margins of meandering streams. Soils it occurs in are described as being slightly acidic (pH: 4.2 to 4.9), having a thin layer of decomposed organic matter, underlain by a black to dark gray silt loam that is slightly sticky, with many small roots, and fine mica chips. Populations are found in areas with varying amounts of shade although populations in open areas are less vigorous due to increased competition from other species.

BIOLOGICAL CONCLUSION: NO EFFECT

The freshwater wetlands required by the swamp pink are not present in the project area. A plant by plant survey was not conducted for this species nor were any observed during the November

14, 2001 site visit. Additionally, a review of the North Carolina Natural Heritage Program database on November 9, 2001 revealed no records of existing populations of the swamp pink within 1.0 mile (1.6 kilometers) of the project area. Therefore, project construction will not affect the swamp pink.

Sagittaria fascilulata (bunched arrowhead) **Endangered**
Plant Family: Alismataceae
Federally Listed: July 25, 1979
Flowers Present: April - June

This plant is found in North Carolina and South Carolina. It is presently known from only one population in Henderson County, North Carolina and four populations in South Carolina. Historically it was found in seven additional locations in Henderson County along the French Broad River Valley from south of East Flat Rock north to Asheville.

The bunched arrowhead is an immersed aquatic perennial herb that grows from 6.0 to 12.0 inches (15.2 to 30.5 centimeters) in height. It has spatulate leaves that stem from the base of the plant. The leaves are 12. inches (30.5 centimeters) long and 0.8 inches (2.0 centimeters) wide. The erect flowering stalk has both male and female flowers. Male flowers have three reflexed sepals, three white petals, and numerous stamens with pubescent dilated filaments. Female flowers have three spreading or reflexed sepals, three white petals, and numerous separate carpels. The fruiting head is composed of numerous achenes that ascend from the stalks of the lowest whorl of flowers.

The bunched arrowhead can be found in gently sloping bogs with a slow, continuous flow of cool, clean water, underlain by a clay layer. In these bogs water temperatures are variable, soil and water pHs are between 4.8 and 6.6, and water depths are constant. These plants occur naturally in shaded sites, but smaller, less vigorous populations do occur in unshaded areas. Soils are characterized as sandy loam below a muck layer ranging in depth from 10 to 24 inches (25 to 60 centimeters).

BIOLOGICAL CONCLUSION: NO EFFECT

The gently sloping bogs required by the bunched arrowhead are not present in the project area. A plant by plant survey was not conducted for this species nor were any observed during the November 14, 2001 site visit. Additionally, a review of the North Carolina Natural Heritage Program database on November 9, 2001 revealed no records of existing populations of the bunched arrowhead within 1.0 mile (1.6 kilometers) of the project area. Therefore, project construction will not affect the bunched arrowhead.

Sarracenia rubra var. jonsii (mountain sweet pitcher plant) **Endangered**
Plant Family: Sarraceniaceae
Federally Listed: March 10, 1988
Flowers Present: May (late)

The mountain sweet pitcher plant is found in bogs and streams in southwestern North Carolina and northwestern South Carolina. The four North Carolina populations are found in the French Broad River drainage basin in Henderson and Transylvania counties. Although this species has been reported in Buncombe County it is not known to currently survive there.

This insectivorous, rhizomatous, perennial herb grows from 9 to 29 inches (22 to 73 centimeters) in height. It has numerous erect leaves that grow in clusters. Each leaf is shaped like a hollow, trumpet shaped, almost tubular pitcher covered by a chordate hood. Pitchers are a waxy dull green color and reticulately veined with maroon-purple. The inside of the pitcher is retrorsely haired and usually partially filled with liquid and decaying insect parts. The maroon colored flowers are borne singly on erect scapes and have recurving sepals. Fruits appear in August.

The mountain sweet pitcher plant is found in mountain bogs and along streamsides. This habitat is characterized by deep, poorly drained wetlands with soils that are combinations of loam, sand, and silt, with a high organic content, and medium to highly acidic pH. Sites are intermittently exposed to flooding. This plant is an early successional plant that relies on drought, water fluctuation, periodic fire, and ice damage to maintain its habitat.

BIOLOGICAL CONCLUSION: NO EFFECT

The mountain bogs characterized by deep, poorly drained wetlands required by the mountain sweet pitcher plant are not present in the project area. A plant by plant survey was not conducted for this species nor were any observed during the November 14, 2001 site visit. Additionally, a review of the North Carolina Natural Heritage Program database on November 9, 2001 revealed no records of existing populations of the mountain sweet pitcher plant within 1.0 mile (1.6 kilometers) of the project area. Therefore, project construction will not affect the mountain sweet pitcher plant.

Sisyrinchium dichotomum (white irisette) **Endangered**
Plant Family: Iridaceae
Federally Listed: October 28, 1991
Flowers Present: June

White irisette is endemic to the upper piedmont of North Carolina. This herb is limited to an area bounded by White Oak Mountain, Sugar Loaf Mountain, Chimney Rock, and Melrose Mountain.

The white irisette is a perennial herb with dichotomously branching stems. The basal leaves are bluish green in color and are one-third to one-half the overall height of the plant. White flowers are borne at the ends of winged stems. The fruit is a round, pale to medium brown capsule containing three to six round or elliptical black seeds.

The white irisette is found in sunny clearings and along the edges of upland woods where a thin canopy is present. These open areas often occur where runoff has removed the deep litter layer that is usually present. This herb occurs on rich, basic soils that are probably weathered from

amphibolite. White irisette depends on a form of disturbance to maintain the open quality of its habitat.

BIOLOGICAL CONCLUSION: NO EFFECT

The upland woods with a thin canopy where runoff has removed the deep litter layer required by the white irisette are not present in the project area. A plant by plant survey was not conducted for this species nor were any observed during the November 14, 2001 site visit. Additionally, a review of the North Carolina Natural Heritage Program database on November 9, 2001 revealed no records of existing populations of the white irisette within 1.0 mile (1.6 kilometers) of the project area. Therefore, project construction will not affect the white irisette.

Federal Species of Concern and State Listed Species

Federal Species of Concern are not afforded federal protection under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally listed or proposed as Threatened or Endangered. However, the status of these species is subject to change, and therefore should be included for consideration. Federal Species of Concern (FSC) are defined as a species that is under consideration for listing but for which there is insufficient information to support listing. In addition, organisms, which are listed as Endangered (E), Threatened (T), or Special Concern (SC) by the North Carolina Natural Heritage Program list of Rare Plant and Animal Species, are afforded state protection under the N.C. State Endangered Species Act and the N.C. Plant Protection and Conservation Act of 1979.

There are twenty Federal Species of Concern listed by the FWS for Henderson County. A survey for these species was not conducted during the site visit, nor were any of these species observed. A review of the NCNHP database of rare species and unique habitats on November 9, 2001 revealed one federal species of concern, Schweinitz's sedge (*Carex schweinitzii*), within 1.0 mile (1.6 kilometers) of the project area. However, the occurrence of Schweinitz's sedge is located outside of the project area and therefore will not be impacted by project construction.

Table 3. Federal Species of Concern for Henderson County.

Scientific Name	Common Name	NC Status	Habitat
Myotis leibii	Eastern small-footed bat	SC	No
Aneides aeneus	Green salamander	E	No
Cryptobranchus alleganiensis	Hellbender	SC	No
Neotoma floridana haematoreia	Southern Appalachian woodrat	SC	No
Speyeria diana	Diana fritillary butterfly	SR	Yes
Cambarus reburrus	French Broad crayfish	W2	No
Lasmigona holstonia	Tennessee heelsplitter	E	No
Narthecium americanum	Bog asphodel	C	No
Juglans cinerea	Butternut	W5	No
Senecio millefolium	Divided-leaf ragwort	T*	No
Lysimachia fraseri	Fraser's loosestrife	E**	Yes
Hexastylis rhombiformis	French Broad heartleaf	C	No
Lilium grayi	Gray's lily	T-SC*	No
Marshallia grandiflora	Large-flowered Barbara's buttons	C*	No
Silene ovata	Mountain catchfly	C	No
Hexastylis contracta	Mountain heartleaf	E	No
Juncus caesariensis	Rough rush	E	No
Carex schweinitzii	Schweinitz's sedge	E	No
Monotropsis odorata	Sweet pinesap	C**	Yes
Plantantherea integrilabia	White fringeless orchid	E*	No

"E"-- A taxon in danger of extinction throughout all or a significant portion of it's range.

"T" -- A taxon likely to become extinct within the foreseeable future throughout all or a significant portion of it's range.

"C"--A Candidate species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is also either rare throughout its range or disjunct in North Carolina from a main range in a different part of the country or the world.

"SR"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation, or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.

"SC"--A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.

"W2"-- Includes species that are rare to uncommon in North Carolina, but are not necessarily considered to be declining or otherwise in trouble.

"W5"-- Includes species which have declined sharply in North Carolina, but which do not appear yet to warrant sit-specific monitoring.

* -- Historic record - the species was last observed in the county more than 50 years ago.

** -- Obscure record – the date the species was last observed within the county or quad is uncertain.

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 Title 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places and afford the Advisory Council a reasonable opportunity to comment on such undertakings.

B. Historic Architecture

The State Historic Preservation Office (SHPO) reviewed the subject project. There are no known architectural or historic sites within the proposed project area. The SHPO concurs that the project is not likely to affect any resources of historical significance (see concurrence form dated November 29, 2001).

C. Archaeology

The Office of State Archaeology (OSA) has reviewed the subject project and requested a field investigation. NCDOT performed a field investigation that revealed no issues of concern. The OSA concurred with these findings (see letter dated December 19, 2002).

VII. GENERAL ENVIRONMENTAL EFFECTS

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

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

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

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

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

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

The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland of all land acquisition and construction projects. With the exception of the construction of a temporary detour, all work will be done within the existing right-of-way. There are no soils classified as prime, unique, or having state or local importance in the vicinity of the project. Therefore, the project will not involve the direct conversion of farmland acreage within these classifications.

This project is an air quality "neutral" project, so it is not required to be included in the regional emissions analysis and a project level CO analysis is not required.

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 State Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520. This evaluation completes the assessment requirements for highway traffic noise of Title 23, Code of Federal Regulation (CFR), Part 772 and for air quality (1990 Clean Air Act Amendments and the National Environmental Policy Act) and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Environmental Management, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no underground storage tanks or hazardous waste sites in the project area.

Henderson County is a participant in the National Flood Insurance Program. There are no practical alternatives to crossing the floodplain area. Any shift in alignment will result in an impact area of about the same magnitude. The proposed project is not anticipated to increase the level or extent of upstream flood potential.

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

VIII. AGENCY COMMENTS

A. Wildlife Resources Commission

In a January 31, 2002 letter to NCDOT the Wildlife Resources Commission, in a general comment, requested that the existing bridge be replaced with a spanning structure.

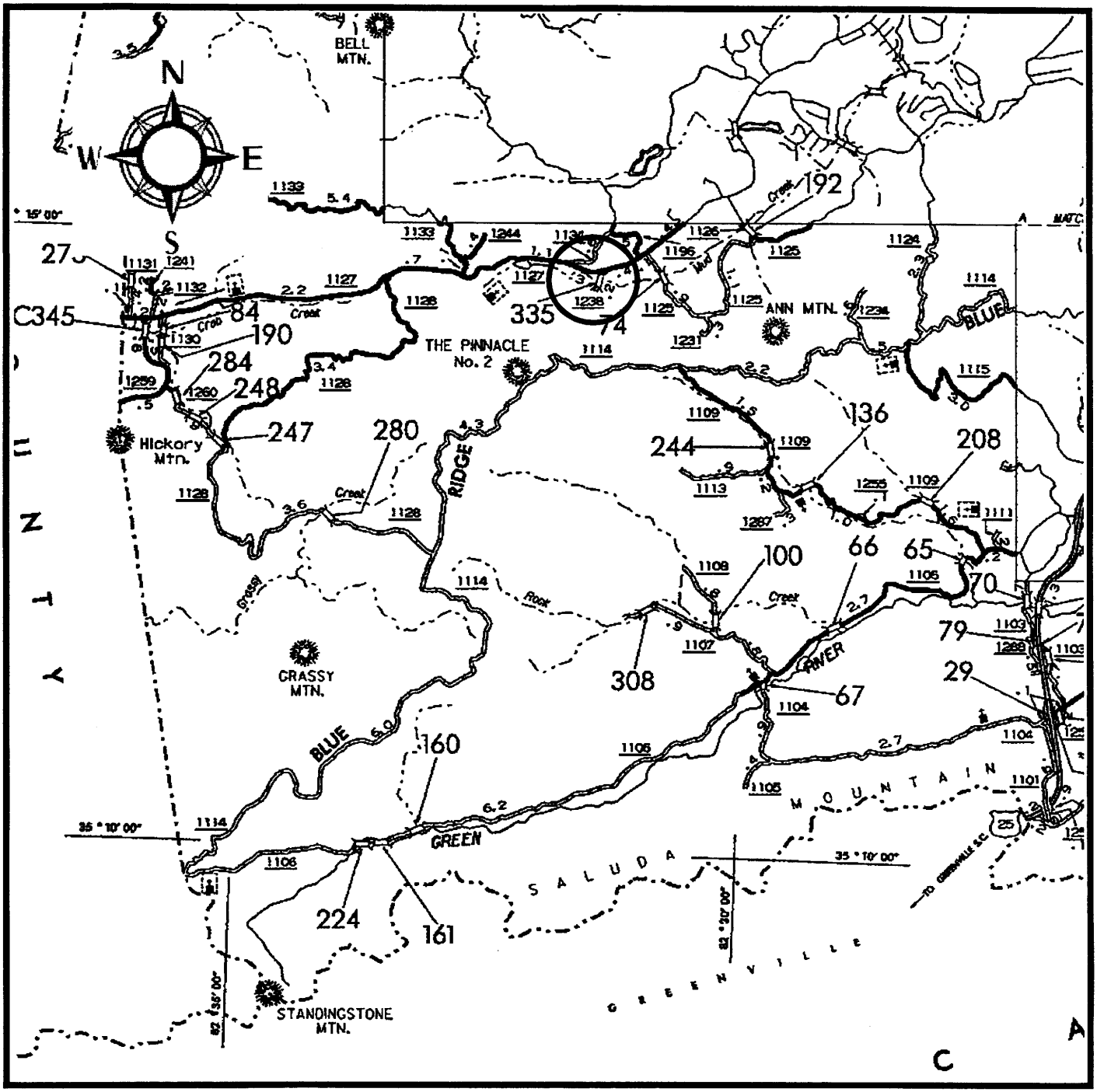
Response: Standard NCDOT practice includes consideration of a replacement bridge during the preliminary hydraulic evaluation for all bridge replacement projects. At smaller stream crossing it is more economical to replace bridges with box culverts. Culverts cost less than bridges, require less maintenance throughout their service life than bridges, and last longer than bridges.

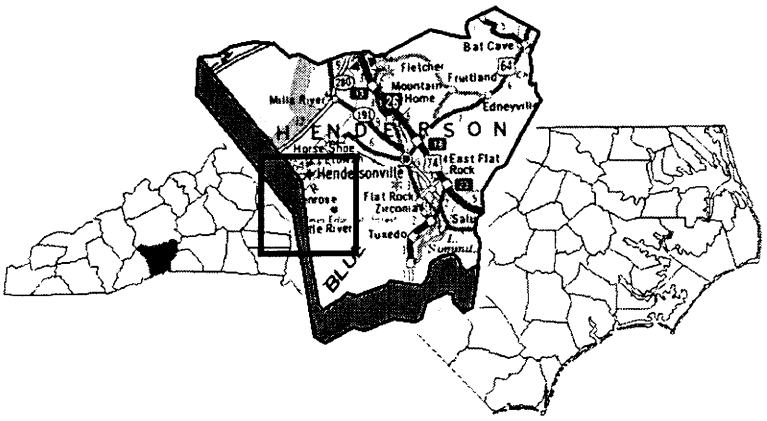
Therefore, where appropriate NCDOT prefers to use box culverts to replace bridges. There are cases where special resources, such as trout waters, where NCDOT will defer to the request of a bridge even though a culvert would serve the hydraulic need but this is not one of those situations.

The proposed culvert will be designed according to current NCDOT design practices which include such measures as buried box bottoms to facilitate fish passage, dry cell(s) to allow wildlife passage, and placement to minimize channel widening and realignment.

B. Other Comments

All other comments received as part of this project are either included in standard design practices or in Best Management Practices for Protection of Surface Waters.

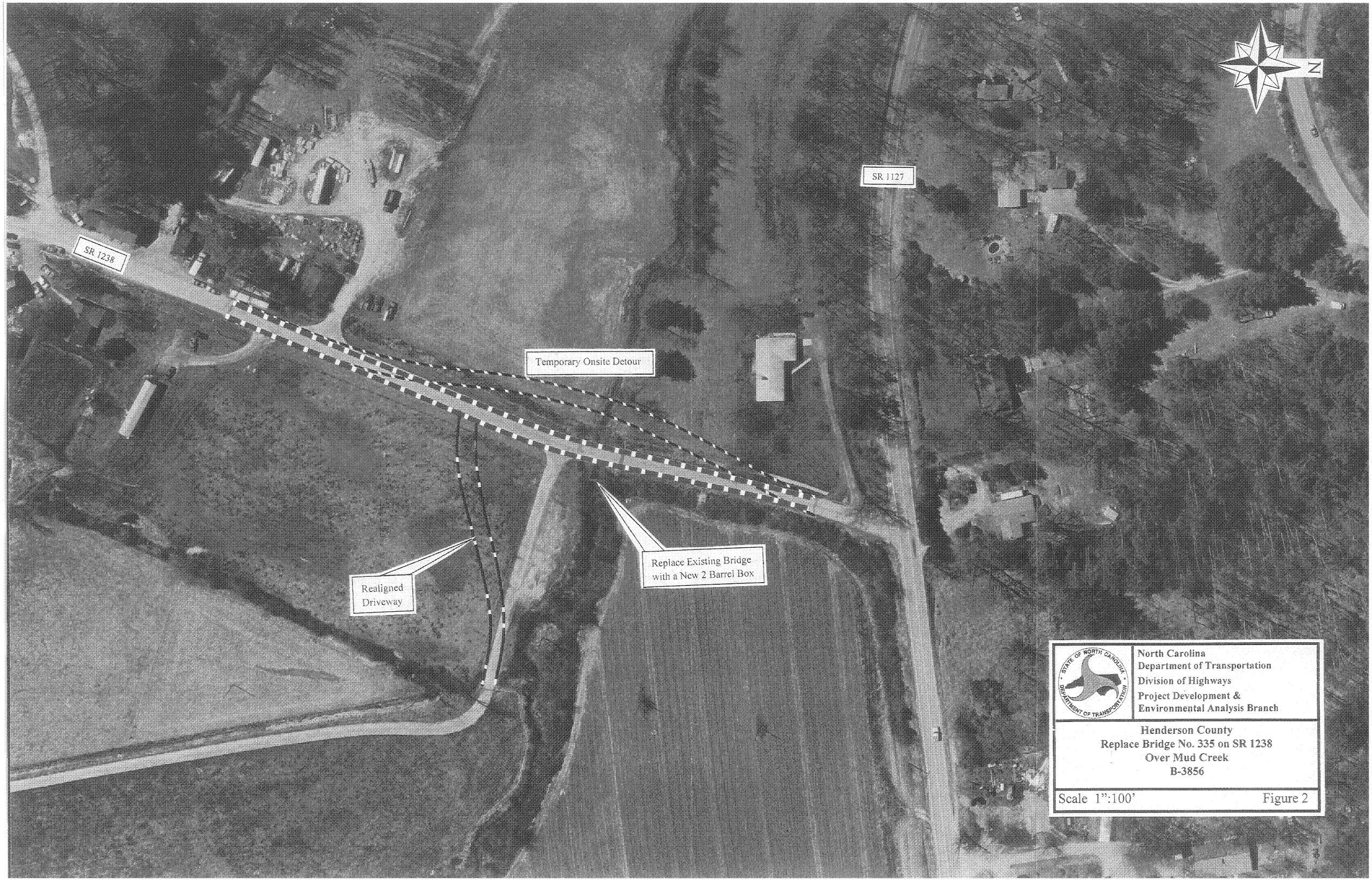




NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS BRANCH

HENDERSON COUNTY
REPLACE BRIDGE NO. 335 ON SR 1238
OVER MUD CREEK
B-3856

Figure 1



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

Henderson County
Replace Bridge No. 335 on SR 1238
Over Mud Creek
B-3856

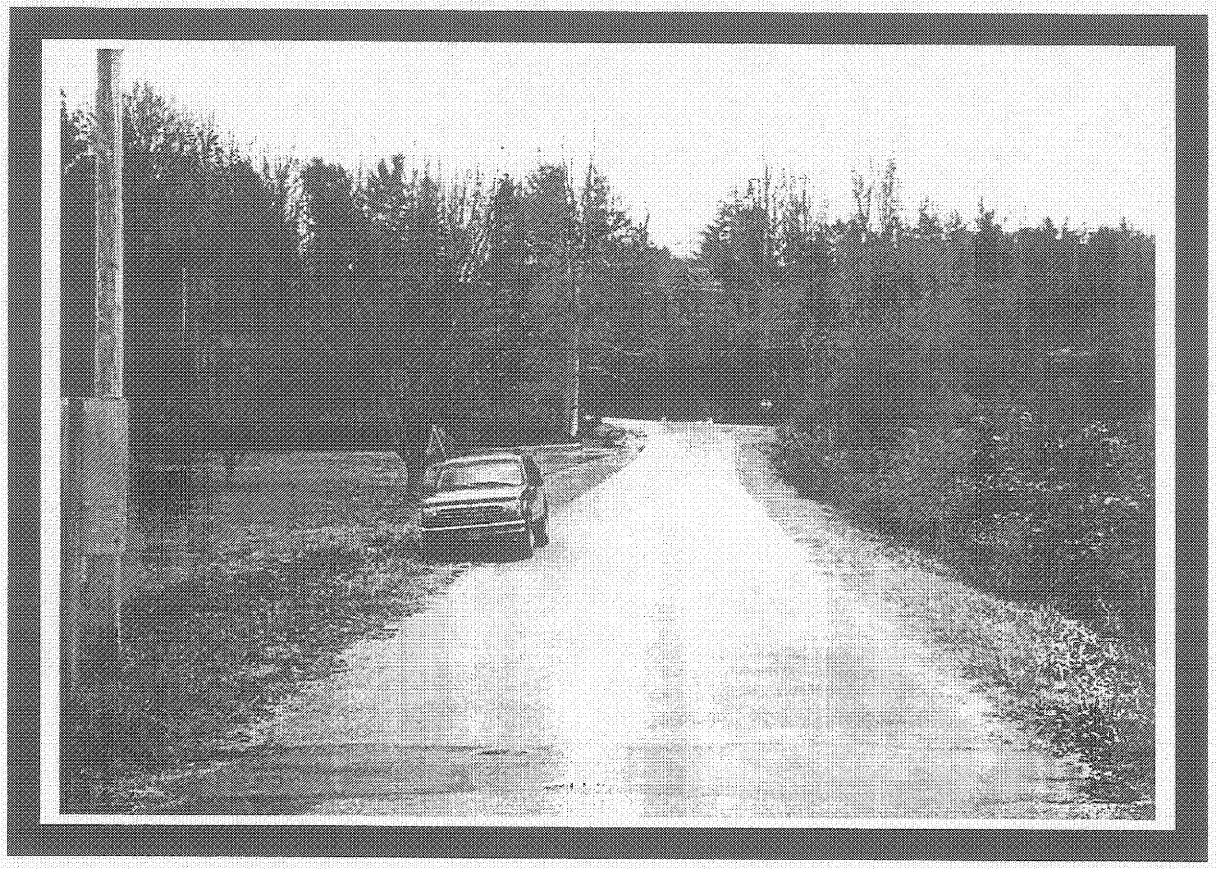
Scale 1":100' Figure 2

West Face of Bridge

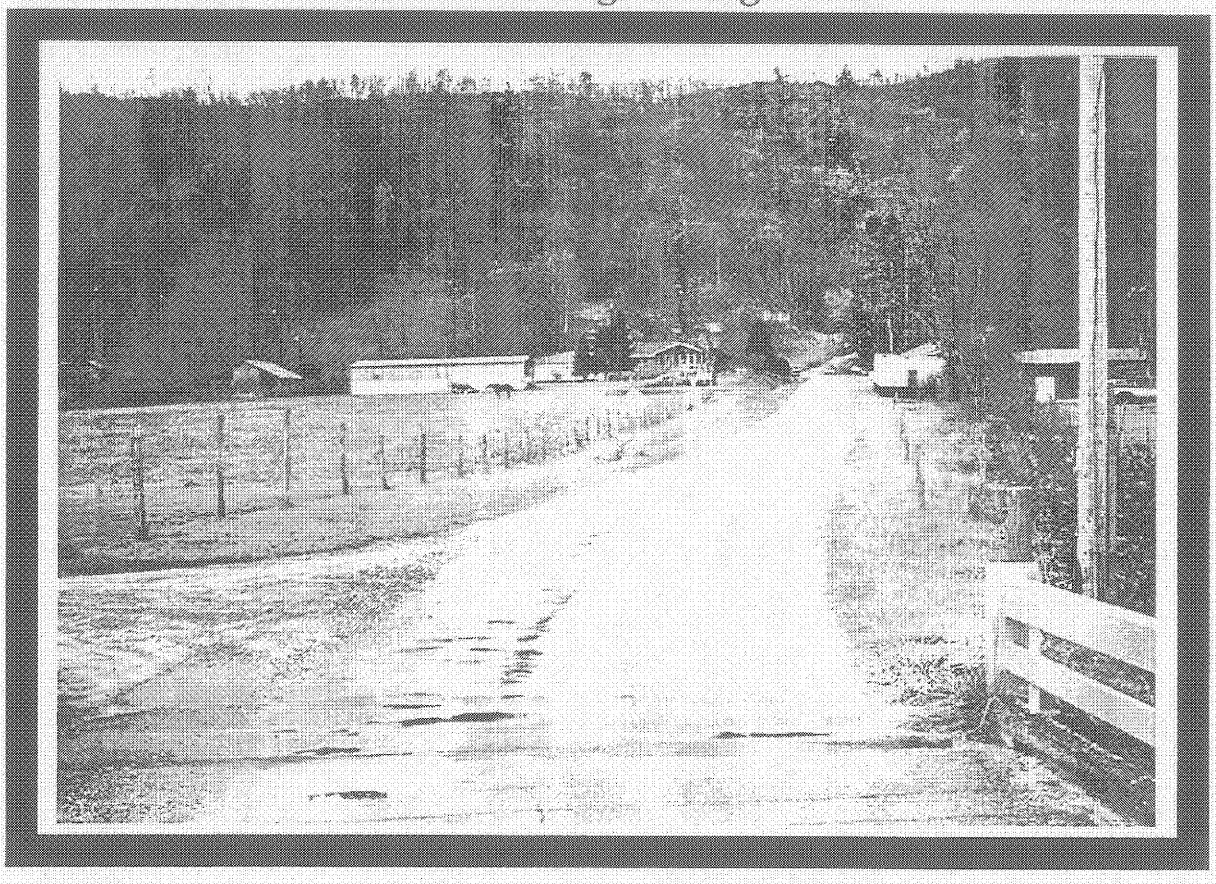
House located in NW Quadrant of Bridge

B-3856

FIGURE 3A



Center of Bridge Facing North

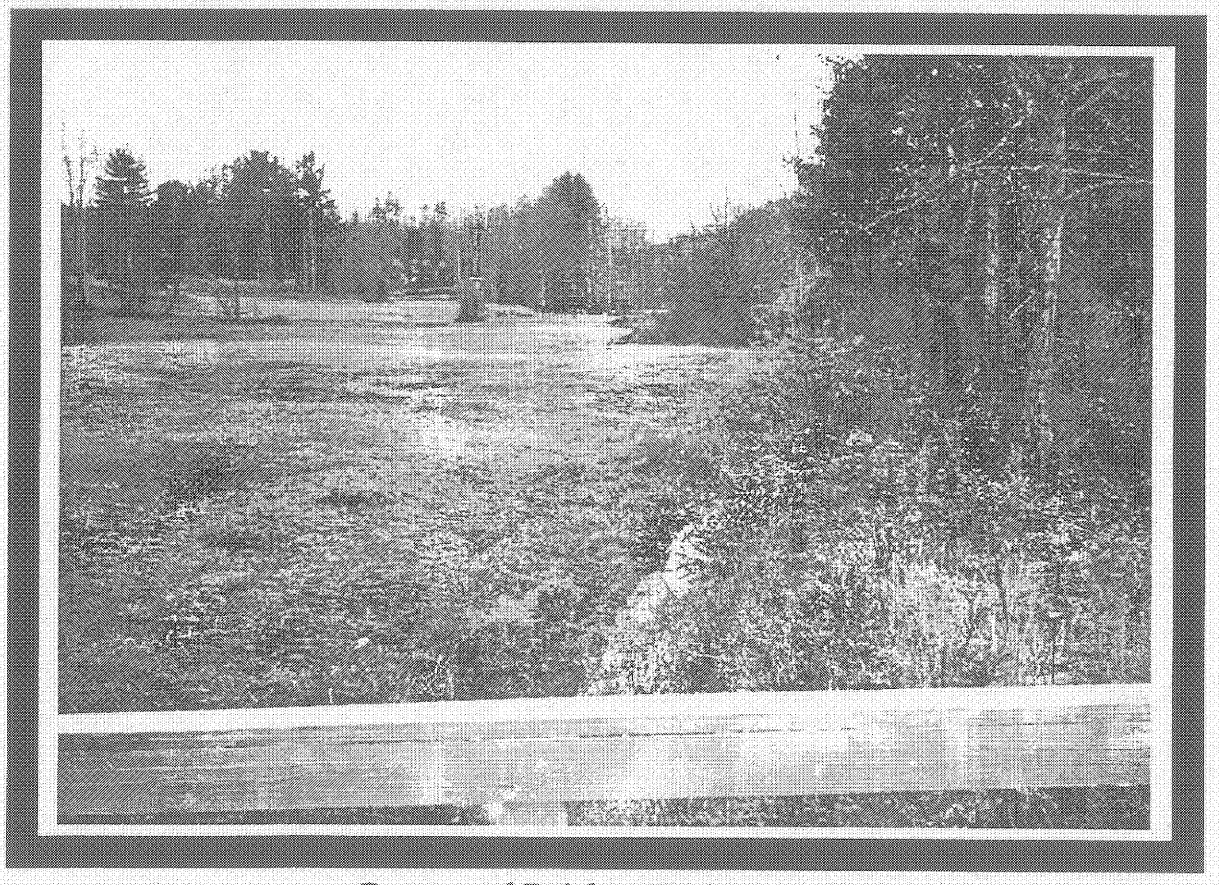


Center of Bridge Facing South

B-3856

FIGURE 3B

Center of Bridge Facing East



Center of Bridge Facing West

B-3856

FIGURE 3C

Federal Aid # BRZ-1238(2) *TIP* # B-3856 *County*: Henderson

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

Project Description: Replace Bridge No. 335 on SR 1238 over Mud Creek

On 11/29/2001, representatives of the

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

Reviewed the subject project at

- [ ] Scoping meeting
- [x] Historic architectural resources photograph review session/consultation
- [ ] Other

All parties present agreed

- [ ] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [x] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as Property #1 is considered not eligible for the National Register and no further evaluation of it is necessary.
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [x] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Mary Pope Furr — 11/29/2001
Representative, NCDOT — Date

Michael C. Dawson — 11/29/01
FHWA, for the Division Administrator, or other Federal Agency — Date

Ann V. Swallow — 11/29/01
Representative, HPO — Date

Renee Gledhill-Earley — 11/29/01
State Historic Preservation Officer — Date

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

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

December 28, 2001

MEMORANDUM

TO: John Williams
Project Development and Environmental Analysis Branch
Division of Highways
Department of Transportation

FROM: David Brook
Deputy State Historic Preservation Officer

SUBJECT: Replacement of Bridge No. 335 on SR 1238 over Mud Creek,
TIP No. B-3856, Henderson County, ER 01-7917

Thank you for your memorandum of December 6, 2001 forwarding additional information concerning the above project.

The aerial photograph indicating the location of the temporary on-site detour and the driveway realignment for the project and the location shown on the USGS map accompanying your memorandum do not match. The area that corresponds with the aerial photograph is the road to the east of that depicted on the USGS map. If the proposed replacement is to be undertaken at the area shown on the aerial photograph, we recommend that an archaeological survey be conducted of the area of potential effect (APE), which should include both the temporary detour structure and the driveway realignment. If the location is that shown on the USGS map, then no survey is recommended.

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

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

DB:kgc

cc: Gerold Glover, NCDOT

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

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

Division of Historical Resources
David J. Olson, Director

December 19, 2002

Mr. Matt Wilkerson
Office of Human Environment
NC Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699

Re: Archaeological Survey Report, Bridge #335 on SR 1238 over Mud Creek
Henderson County, ER01-7917

Dear Mr. Wilkerson:

Thank you for your letter September 5, 2002, of transmitting the archaeological survey report by Mr. Caleb Smith for the above project.

During the course of the survey, no sites were located within the project area. Mr. Smith has recommended that no further archaeological investigation be conducted in connection with this project. We concur with this recommendation since the project will not involve significant archaeological resources.

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

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

Sincerely,

David Brook

DB:doc

cc: Caleb Smith, NCDOT
Greg Thorpe, NCDOT

Williams

North Carolina Department of Cultural Resources

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

Division of Archives and History
William S. Price, Jr., Director

January 9, 2001

MEMORANDUM

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

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

Re: Replacement of Bridge No. 335 on SR 1238 over Mud Creek,
TIP No. B-3856, Henderson County, ER 01-7917

On December 12, 2000, April Montgomery of our staff met with the North Carolina Department of Transportation (NCDOT) staff for a meeting of the minds concerning the above project. She reported our available information on historic architectural and archaeological surveys and resources along with our recommendations. NCDOT provided project area photographs and aerial photographs at the meeting. Based upon our review of the photographs and the information discussed at the meeting, we offer our preliminary comments regarding this project.

In terms of historic architectural resources we are aware of one historic structure located within the area of potential effect:

Lambert House, located on the north side of SR 1100, 0.3 mile west of its junction with US 276.

We recommend that and architectural historian with your staff evaluate the above property to determine its eligibility for listing in the National Register of Historic Places and report the findings to us. In addition, we recommend that an historic architectural survey be conducted for this project.

There are no known archaeological sites within the project area. Based on our present knowledge of the area, it is possible that there are archaeological resources located within the area of potential effect. If the alternative selected suggests replacing the bridge on new location or replacing the bridge in place with an on-site detour we will need detailed drawings of those alternatives prior to making our survey recommendations. However, if the alternative selected is to replace the bridge in place with an off-site detour, we recommend that no archaeological investigation be conducted in connection with this project.

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 any questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919 733-4763.

cc: T. Padgett

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: John Williams, Bridge Replacement Planning Unit
Project Development & Environmental Analysis, NCDOT

FROM: Maryellen Haggard, Highway Project Coordinator
Habitat Conservation Program Maryellen Haggard

DATE: January 31, 2002

SUBJECT: NCDOT Bridge Replacement No. 335 over Mud Creek in Henderson County, North Carolina. TIP B-3856

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 Clean Water Act of 1977 (33 U.S.C. 466 et seq.).

NCDOT proposes to replace Bridge No. 335 over Mud Creek on SR 1238 with a box culvert on the existing location. Traffic will be maintained using a temporary alignment during construction. We do not anticipate trout in upper Mud Creek and will not impose a moratorium. The replacement of the bridge with a spanning structure of some type, as opposed to a box culvert, is recommended. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearance provided by bridges allows for human and wildlife passage beneath the structure and does not block fish passage. Otherwise, on bridge replacement projects of this scope our standard recommendations are as follows:

If the bridge is replaced with another bridge:

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

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

3. 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.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 733-3633 ext. 281 • **Fax:** (919) 715-7643

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

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

In addition, 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 streambed. If multiple cells are required the second and/or third cells should be placed so that their bottoms are at stream bankfull 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. 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.

3. Riprap should not be placed on the streambed.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (336) 527-1549. Thank you for the opportunity to review and comment on this project.