



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 26, 2004

MEMORANDUM TO: Mr. H. Allen Pope, P.E.
Division 3 Engineer

FROM: *fa* Philip S. Harris, III, P.E., Manager *PH Harris*
Office of the Natural Environment
Project Development and
Environmental Analysis Branch

SUBJECT: New Hanover County, Military Cutoff Road (SR1409) widening
from north of US 74 to US 17.; Work Order Number 8.2251001;
TIP Number U-2734

Attached is the U. S. Army Corps of Engineers Individual Permit, the DWQ 401 Water Quality Certification, the CAMA Consistency Determination, the Stormwater Permit, and the greensheet for the above referenced project. All environmental permits have been received for the construction of this project. Copies of these permits and the permit applications are posted at <http://www.ncdot.org/planning/pe/naturalunit/Permit.html>.

PSH/eah

Attachment

cc: Mr. Art McMillan, P.E.
Mr. Omar Sultan
Mr. Jay Bennett, P.E.
Mr. David Chang, P.E.
Mr. Randy Garris, P.E.
Mr. Greg Perfetti, P.E.
Mr. Mark Staley
Mr. Mr. John F. Sullivan, III, FHWA
Mr. Mason Herndon, Division 3 Environmental Officer

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

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.DOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

PROJECT COMMITMENTS

Wilmington
Military Cutoff Road (SR 1409)
From Multilanes North of US 74 (Eastwood Road) to US 17 (Market Street)
New Hanover County
Federal Project No. NHF-1409(3)
State Project No. 8.2251001
TIP No. U-2734

Commitments Developed Through Project Development and Design

Project Development & Environmental Analysis Branch/ Roadway Design Unit/ Program Development Branch

From north of Drysdale Drive to the Gordon Road Extension, the project includes a 3-meter (10-foot) bicycle and pedestrian path along the east side of the roadway. NCDOT will share in 60 percent of the construction cost for the path up to a limit of 5 percent of the project construction cost within the city's jurisdiction. The City of Wilmington will participate in 40 percent of the construction cost, will be responsible for the additional right of way for the path, and will maintain the path after it is constructed. Additional responsibilities between NCDOT and the City will be included in a municipal agreement.

Roadway Design Unit/ Hydraulics Unit/ Division 3

Additional cross pipes will be installed at Howe Creek to equalize flow across the floodplain.

The existing 72" pipes are being replaced with 9 ft by 7 ft and additional cross pipes.

Roadway Design Unit / Division 3

The median width at the crossing of Howe Creek will be 3.6 meters (12 feet).

This has been incorporated into the design.

Roadway Design Unit/ Hydraulics Unit/ Division 3

Because Howe Creek is an Outstanding Resource Water (ORW), hazardous spill catch basins are proposed on each side of Howe Creek east of the roadway. These basins will be constructed outside of wetland areas.

This has been incorporated into the design.

Project Development & Environmental Analysis Branch/ Hydraulics Unit

Because the project involves an ORW, the DENR – Division of Water Quality (DWQ) requested a stormwater management plan for the project. A stormwater management plan will be submitted to the DWQ for approval prior to applying for the 401 Water Quality Certification.

PROJECT COMMITMENTS

Roadway Design Unit/Hydraulics Unit/ Roadside Environmental Unit/ Division 3

Since the proposed project crosses waters classified as Outstanding Resource Waters (ORW) and a High Quality Water (HQW) zone, NCDOT's High Quality Water Guidelines (Design Standards in Sensitive Watersheds) will be implemented.

This has been incorporated into the design.

Roadside Environmental Unit/ Division 3 Construction

NCDOT will strictly enforce sedimentation and erosion control measures for high quality waters during project construction.

This will be implemented during construction.

Roadway Design Unit/ Division 3 Construction

The project will include 3:1 fill slopes in wetland areas to eliminate the need for guardrail.

This has been incorporated into the design.

Division 3 Construction

"In-stream" construction activities will be minimized.

This will be implemented during construction.

Roadway Design Unit/ Division 3 Construction

Clearing and grubbing activities will be reduced in wetland areas to avoid further impacts.

This will be implemented during construction.

Commitments Developed Through Permitting

Division 3 Construction

404 Condition #1

All work must be performed as shown on the attached plans, which are a part of this permit. Failure to institute and carry out the details of the following special conditions, below, will result in a directive to cease all ongoing and permitted work within waters and/or wetlands associated with the permitted project, or such other remedies and/or fines as the District Engineer or his authorized representatives may seek.

PROJECT COMMITMENTS

Division 3 Construction (cont.)

401 Condition #16

NCDOT, and its authorized agents, shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303 (d) of the Clean Water Act) and any other appropriate requirements of State law and Federal law. If DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the certification, DWQ shall notify NCDOT and the U.S. Army Corps of Engineers, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to NCDOT in writing, shall be provided to the United States Army Corps of Engineers for reference in any permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project.

401 Condition #17

A copy of this Water Quality Certification shall be posted on the construction site at all times. In addition, the Water Quality Certification (and all subsequent modification, if any), shall be maintained with the Division Engineer and the on-site project manager.

404 Condition #2

One copy of the final construction drawings shall be furnished to the District Engineer prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the attached permit drawings. The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any deviation in the construction design plans shall be brought to the attention of the Corps of Engineers, Mr. Dave Timpy, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.

401 Condition # 21

Two copies of the final construction drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided along with these final construction drawings which states that the final construction drawings comply with the attached permit drawings contained in the application dated October 28, 2003.

404 Condition #3

The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager, prior to any work within jurisdictional

PROJECT COMMITMENTS

Division 3 Construction (cont.)

waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall notify the Corps of Engineers Project Manager a minimum of thirty (30) days in advance of the scheduled meeting in order to provide that individual with ample opportunity to schedule and participate in the required meeting.

404 Condition #4

The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. Copies of this permit shall be available for review at the construction site at all times. All violations of the authorized permit shall be reported to the District Engineer within 24 hours of the violation.

401 Condition #4

The outside edge of the buffer, wetland or water boundary as well as along the construction corridor within these boundaries approved under this authorization shall be clearly marked by orange fabric fencing for the areas that have been approved to infringe within the buffer, wetland or water prior to any land disturbing activities.

404 Condition #10, CAMA Condition #14, 401 Condition #6

No live or fresh concrete shall come into contact with waters of the state until the concrete has hardened. Adequate precautions must be taken to prevent direct contact between wet (uncured) concrete and stream water due to the potential for elevated pH that can cause a fish kill. Water that has contacted uncured concrete should not be discharged to surface waters.

404 Condition #11

The permittee will maintain the authorized work in good condition and in conformance with the terms and conditions of this permit. The permittee is not relieved of this requirement if he abandons the permitted activity without having it transferred to a third party.

404 Condition #12

No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

PROJECT COMMITMENTS

Division 3 Construction (cont.)

404 Condition #13

The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration of the structures or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable water, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

404 Condition #16, 401 Condition #7

The permittee and its contractors and/or agents shall not excavate, fill, or perform mechanized land clearing at any time in the construction or maintenance of this project within waters and/or wetlands, or cause the degradation of waters and/or wetlands, except as authorized by this permit, or any modification to this permit. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project.

404 Condition #17

To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall ensure that all such areas comply with the preceding condition (17.) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition (17.). All information will be available to the Corps of Engineers upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work. All jurisdictional wetland lines on borrow and waste sites shall be verified by the Corps of Engineers and shown on the approved reclamation plans.

PROJECT COMMITMENTS

Division 3 Construction (cont.)

404 Condition #21

All conditions attached to the Section 401 Water Quality Certification for this project, issued March 17, 2004, are incorporated as conditions of this permit.

401 Condition #9

During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S. or protected riparian buffers.

CAMA Condition #17

Any relocation of utility lines that is not already depicted on the workplan drawings, or described within the permit application, will require approval by DCM, either under the authority of this consistency determination, or by the utility company obtaining separate authorization.

404 Condition #5

The temporary placement or double handling of excavated or fill material or construction equipment and materials within waters and wetlands is not authorized.

404 Condition #7

All fill material will be clean and free of any pollutants except in trace quantities.

CAMA Condition #9 and #10, 401 Condition #18, 404 Condition #19

Culverts and pipes must be designed to allow for aquatic life and fish passage. All culverts in the 20 coastal counties, requiring CAMA authorization must be buried to a depth of one foot below the bed of the stream to be consistent with CAMA requirements. The project is located within the twenty (20) counties of North Carolina designated as coastal counties by the Coastal Area Management Act (CAMA), therefore all pipe and culvert inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by CAMA, and/or all streams appearing as blue lines on United States Geological Survey (USGS) quad sheets. For streams (or ditches) that do not appear as blue lines on the USGS quad sheets, culvert inverts will be buried a minimum of one foot below the bed of the stream for culverts greater than 48 inches in diameter. Culverts 48 inches in diameter or smaller must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. These measurements must be based on natural thalweg depths. This may require increasing the size of the culvert to meet flow conveyance requirements. If any of the existing pipes are perched, they shall be removed and replaced, and re-installed correctly, unless demonstrated that this is topographically unfeasible.

PROJECT COMMITMENTS

Division 3 Construction (cont.)

401 Condition #14

All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids or other toxic materials.

401 Condition #12

The dimension, pattern and profile of the stream above and below the crossing should not be modified by widening the stream channel or reducing the depth of the stream. Disturbed floodplains and streams should be restored to natural geomorphic conditions.

401 Condition #22

Upon completion of the project, the NCDOT shall complete and return the enclosed "Certification of Completion Form" to notify DWQ when all work included in the 401 Certification has been completed. The responsible party shall complete the attached form and return it to the 401/Wetlands Unit of the Division of Water Quality upon completion of the project.

Division 3 Construction, Hydraulics

CAMA Condition #11

The dimension, pattern and profile of the stream above and below the base flow barrel(s) should not be modified by widening the stream channel or reducing the depth of the stream.

CAMA Comment

If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s) during low flows to accommodate fish movement. Install alternating or notched baffles in a manner that mimics existing stream pattern. This should enhance aquatic life passage by depositing sediments in the barrel, maintaining channel depth and flow regimes, and providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.

CAMA Comment

Stormwater should be routed to buffer areas and not discharge directly to the stream.

PROJECT COMMITMENTS

Division 3 Construction, Roadside Environmental Unit

CAMA Condition #13

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

404 Condition #6

All fill material must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

CAMA Condition #1

NCDOT shall comply with the Stormwater Permit (No. SW8 030816) issued on 10/20/03 by the N.C. Division of Water Quality (DWQ) under stormwater management rules of the Environmental Management Commission.

401 Condition #10

All temporary fills in wetlands and surface waters shall be removed upon completion of the project. In addition, the post-construction removal of any temporary bridge structures or fill will need to return the project site to its preconstruction contours and elevation. The re-vegetation of the impacted areas with appropriate native species will be required.

404 Condition #15

All land disturbing activity associated with the highway construction will be conducted in a way that prevents a significant increase in turbidity outside the area of construction or construction-related discharge. Increases such that the turbidity in the water body is 50 NTU's or less is not considered significant.

401 Condition # 8

All channel relocations will be constructed in a dry work area, and stabilized before stream flows are diverted. Channel relocations will be completed and stabilized prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30 foot wide wooded and an adjacent 20 foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transitional phase incorporating coir fiber and seeding establishment is allowable. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide additional, written justification and any calculations used to determine the extent of rip-rap coverage requested.

PROJECT COMMITMENTS

Division 3 Construction, Roadside Environmental Unit (cont.)

401 Condition #13

Any riprap used must not interfere with the location or dimensions of the stream's thalweg or aquatic passage during low flow conditions.

CAMA Condition # 12

Riprap place for bank stabilization should be limited to the streambank below the high water mark, and vegetation should be used for stabilization above the high water elevation.

404 Condition #20

Aquatic Life Movements. No activity may substantially disrupt the movements of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in stream must be installed to maintain low flow conditions.

Roadside Environmental Unit

404 Condition #8

The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and restore natural grades in those areas, prior to final inspection of the project.

404 Condition #9

This permit authorizes the clearing of an additional ten feet beyond the slope stake limits in wetlands, as shown on the plans, to install the necessary sediment and erosion control measures.

CAMA Condition #6 and #7, 401 Condition # 3

In accordance with NCDOT's cover letter for the Section 404 and 401 permit application dated 10/28/03, construction related impacts associated with the proposed action will be minimized through the use of High Quality Waters erosion and sediment control measures throughout design and construction of the entire project (TIP U-2734). As described in "Design Standards in Sensitive Watersheds" (15A NCAC 04B.0124), the permittee shall follow Best Management Practices for the protection of Surface Waters and sedimentation and erosion control measures sufficient to protect aquatic resources.

401 Condition #1

Construction must be conducted in such a manner as to prevent a significant increase in turbidity outside the area of construction or construction-related discharge. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management

PROJECT COMMITMENTS

Roadside Environmental Unit (cont.)

Practices in order to assure compliance with the appropriate turbidity water quality standard.

- a. The erosion and sediment control measures for the project must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the North Carolina Sediment and Erosion Control Planning and Design Manual. These devices shall be maintained on all construction sites, borrow sites and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
- b. For borrow pit sites, the erosion and sediment control measures must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the North Carolina Surface Mining Manual. The reclamation measures and implementation must comply with the reclamation in accordance with the requirement of the Sedimentation Pollution Control Act.

CAMA Condition # 16

In accordance with the N.C. Division of Land Resources, all DOT land disturbing activity must be in compliance with the N.C. Sedimentation Pollution Control Act and conform with the Memorandum of Understanding the DOT has with the N.C. Division of Land Resources (CAMA).

401 Condition #2

Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetland and waters is unavoidable, they shall be removed and the natural grade restored after and the Division of Land Resources has released the project (401).

401 Condition # 12

Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

401 Condition #15, CAMA Condition #15

Discharging hydroseeding mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is strictly prohibited.

Project Development and Environmental Analysis

404 Condition #14, CAMA Condition #3 and #4, 401 Condition #19 and #20

Compensatory mitigation for the 1.45 acres of wetland impacts and 1480 feet of perennial stream impacts associated with his project shall be performed as described in the letter

PROJECT COMMITMENTS

from the North Carolina Department of Transportation to the Ecosystem Enhancement Program (EEP) dated February 6, 2004 and as detailed in the following conditions:

- a. Natural channel design and relocation of 456 linear feet of stream impacted within Site 1 of U-2734 at a mitigation ratio of 1:1. The restoration shall be constructed in accordance with a final design approved by the NC Division of Water Quality.
- b. Preservation of 614 linear feet of stream within the Site 1 right-of-way of U-2734 at a mitigation ratio of 5:1 or 122 (614/5) mitigation credits. This stream is located at Stations 22+10 to 22+80 and 23+40 to 24+50.
- c. The EEP will provide the compensatory mitigation to address the remaining 902 linear feet of stream impacts.

Compensatory mitigation for the unavoidable impacts to 1.45 acres of wetland and 902 linear feet of perennial stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated March 11, 2004 from William D. Gilmore, EEP Transition Manager. The EEP will provide 14.5 acres of preservation of non-riverine wetlands and 9,020 linear feet of preservation of warm water stream channel in the Southern Outer Coastal Plain Eco-Region at the Hancock Timber Site in Pender County that has been acquired and protected by the EEP.

Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003, the EEP will provide a minimum of 1.45 acres/ 2.9 acres (401 requirement of 2:1 replacement ratio) of restoration of non-riverine wetlands and 902 linear feet of restoration of warm water stream channel in the Howe Creek watershed (Hydrologic Cataloging Unit 03030001040020; Note: a mitigation site located in Hydrologic Catalog Unit 03030001040010 may be used if a mitigation site in Hydrologic Catalog Unit 03030001040020 is not available) by July 22, 2005 and half of the proposed preservation mitigation would be available at that time for mitigation for other project impacts. Flexible wetland mitigation in the Howe Creek watershed is acceptable to the Division of Water Quality to meet a portion of this requirement.

Construction within wetlands on the permitted highway project shall begin only after the EEP has provided written confirmation to the District Engineer that the EEP and not the NCDOT is responsible for providing the required mitigation, pursuant to paragraph VI.B.7 of the MOA. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA. If the NC Division of Water Quality does not comment on or approve the previously submitted on-site stream mitigation plan by April 12, 2004, then that plan is automatically approved (401 condition).

PROJECT COMMITMENTS

Project Development and Environmental Analysis (cont.)

404 Condition # 18

If the permittee discovers any previously unknown historic or archeological remains while accomplishing the authorized work, he will immediately notify the Wilmington District Engineer who will initiate the required State/Federal coordination.

Division 3 Construction, Roadside Environmental Unit, PDEA

404 Condition # 4

All water quality-related conditions of the FONSI or ROD shall become conditions of this Certification.

CAMA Condition # 2

NCDOT shall comply with Water Quality Certification No. 3453 (DWQ Project No. 03-1327) issued on March 17, 2004 by the N.C. Division of Water Quality (DWQ).

CAMA Condition #8

In accordance with NCDOT's cover letter for the Section 404 and 401 permit application dated 10/28/03, the project shall not result in any temporary wetland impacts.

DEPARTMENT OF THE ARMY PERMIT

Permittee NC Department of Transportation

Permit No. 199701755

Issuing Office USAED, Wilmington

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Place fill material impacting a total of impacting a total of 1.45 acre of wetlands and 1,480 linear feet of perennial stream, for construction of the Military Cutoff Widening project (T.I.P. No. U-2734).

Project Location:

On Military Cutoff Road between Eastwood Wood and US Highway 17 and includes the widening of Military Cutoff Road to four lanes with a divided median and bicycle and pedestrian path, in New Hanover Counties.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2007. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

See enclosed sheet.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - () Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.



North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Michael F. Easley, Governor

Charles S. Jones, Director

William G. Ross Jr., Secretary

March 18, 2004

Colonel Charles R. Alexander
U.S. Army Corps of Engineers
Wilmington District
P.O. Box 1890
Wilmington, NC 28402-1890

Reference: TIP No. U-2734. Widening of Military Cutoff Road (SR 1409) from North of Eastwood Road (US 74) to Market Street (US 17) in New Hanover County. USACE Public Notice issued on 12/8/03. Action ID No. 199701755.

Dear Colonel Alexander:

The N.C. Division of Coastal Management (DCM) has completed its review of the above referenced Public Notice pursuant to 15 CFR 930 Subpart D, Consistency for Activities requiring a Federal License and NC Executive Order 15, Consistency for State Activities. As part of its review, DCM has also circulated the U.S. Army Corps of Engineers' (USACE) public notice to state agency reviewers for comment.

According to the USACE public notice issued on 12/8/03, the USACE is reviewing an application from the N.C. Department of Transportation (NCDOT) to widen Military Cutoff Road (SR 1409) from two lanes to a four lane divided facility with a raised median from Drysdale Drive to US 17 (Market Street). From Drysdale Drive to 0.2 miles north of Drysdale Drive and from Station Road to Paradise Way, a four-lane divided with raised median roadway with grassed shoulders is proposed on the west side and curb and gutter is proposed along the east side of Military Cutoff. From 0.2 miles north of Drysdale Drive to Station Road, a four-lane grassed shoulder section is proposed. From Paradise Way to US 17, a four-lane curb and gutter section is proposed. A 10-foot wide bicycle and pedestrian path is proposed along the east side of Military Cutoff from Drysdale Drive to the Gordon Road Extension project (TIP Project No. U-2725)

According to the USACE public notice issued on 12/8/03, the proposed project crosses Howe Creek and four of its unnamed tributaries. The portion of Howe Creek and its tributaries within the project have been assigned a DWQ Index No. of 18-87-23 and best usage classification of SA, ORW. Waters with a classification of SA, ORW are defined as High Quality Waters by the North Carolina Division of Water Quality.

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According to the USACE public notice issued on 12/8/03, construction of the proposed project will permanently impact 1.45 acres of non-riverine wetlands and 1480 feet of jurisdictional stream associated with Howe Creek. Permanent impacts to jurisdictional wetlands are summarized as follows: wet pine flatwoods (0.06 acres); bottomland hardwoods (0.32 acres); and pond pine woodland (1.07 acres). The NCDOT is proposing to use onsite mitigation opportunities and the North Carolina Ecosystem Enhancement Program (EEP) to provide the necessary compensatory mitigation for the unavoidable wetland and stream impacts associated with this project.

DCM has determined that the proposed project as described in the USACE public notice issued on 12/8/03 is **consistent** with the North Carolina Coastal Management Program provided the following conditions are met:

1. NCDOT shall comply with the Stormwater Permit (No. SW8 030816) issued on 10/20/03 by the N.C. Division of Water Quality (DWQ) under stormwater management rules of the Environmental Management Commission.
2. NCDOT shall comply with the revised Water Quality Certification No. 3453 (DWQ Project No. 03-1327) issued on 3/17/04 by the N.C. Division of Water Quality (DWQ).
3. In accordance with NCDOT's permit application for Section 404 and 401 permits dated 10/28/03, compensatory mitigation for 1.45 acres of non-riverine wetland impacts will be provided by the North Carolina Ecosystem Enhancement Program (EEP).
4. In accordance with the NCDOT letter to the Ecosystem Enhancement Program dated 2/6/04, compensatory mitigation for 1480 feet of stream impacts will be as follows: Natural channel design and relocation of 456 linear feet of stream impacted within Site 1 of U-2734 at a mitigation ratio of 1:1; preservation of 614 linear feet of stream within the Site 1 right-of-way of U-2734 at a mitigation ratio of 5:1; and compensatory mitigation provided by the EEP for the remaining 902 linear feet of stream impacts.
5. This project must comply with the Design Standards in Sensitive Watersheds, 15A NCAC 4B .0124.
6. In accordance with NCDOT's cover letter for the Section 404 and 401 permit application dated 10/28/03, construction related impacts associated with the proposed action will be minimized through the use of High Quality Waters erosion and sediment control measures.
7. The permittee shall follow Best Management Practices for the protection of Surface Waters and sedimentation and erosion control measures sufficient to protect aquatic resources.
8. In accordance with NCDOT's cover letter for the Section 404 and 401 permit application dated 10/28/03, the project shall not result in any temporary wetland impacts.

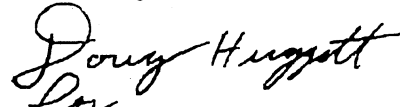
9. Culverts and pipes must be designed to allow for aquatic life and fish passage. The inverts of all pipes and culverts that are placed within streams appearing as blue lines on United States Geological Survey (USGS) quad sheets must be buried at least one foot below normal bed elevation.
10. The inverts of culverts and pipes that are not placed within streams appearing as blue lines on United States Geological Survey (USGS) quad sheets must be buried a minimum of one foot below the bed of the stream for pipes and culverts greater than 48 inches in diameter, and must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the pipe or culvert for pipes and culverts that are 48 inches in diameter or smaller to allow for aquatic life passage. These measurements must be based on natural thalweg depths.
11. The dimension, pattern and profile of the stream above and below the base flow barrel(s) should not be modified by widening the stream channel or reducing the depth of the stream.
12. Riprap placed for bank stabilization should be limited to the streambank below the high water mark, and vegetation should be used for stabilization above the high water elevation.
13. Heavy equipment should be operated from the bank rather than in the stream channel in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into the streams.
14. If concrete is used during construction, adequate precautions must be taken to prevent direct contact between wet (uncured) concrete and stream water due to the potential for elevated pH that can cause a fish kill. Water that has contacted uncured concrete should not be discharged to surface waters.
15. Discharging hydroseeding mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is strictly prohibited.
16. In accordance with comments received from the N.C. Division of Land Resources, all DOT land disturbing activity must be in compliance with the N.C. Sedimentation Pollution Control Act and conform with the Memorandum of Understanding that DOT has with the N.C. Division of Land Resources.
17. Any relocation of utility lines that is not already depicted on the workplan drawings, or described within the permit application, will require approval by DCM, either under the authority of this consistency determination, or by the utility company obtaining separate authorization.

In addition to the above conditions, DCM also offers the following comments.

- If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s) during low flows to accommodate fish movement. Install alternating or notched baffles in a manner that mimics existing stream pattern. This should enhance aquatic life passage by depositing sediments in the barrel, maintaining channel depth and flow regimes, and providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.
- Stormwater should be routed to buffer areas and not discharge directly to the streams.

If you have any questions regarding DCM's finding or conditions, please contact Cathy Brittingham at (919) 733-2293 x238 or via e-mail at Cathy.Brittingham@ncmail.net. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,


for
Charles S. Jones

Cc: Dave Timpy, USACE
John Hennessy, NCDWQ
Linda Lewis, NCDWQ
Jim Gregson, NCDCM
Bill Arrington, NCDCM
Travis Wilson, NCWRC
Elizabeth Lusk, NCDOT
Bill Gilmore, NCDENR-EEP

SPECIAL CONDITIONS

Military Cutoff Widening TIP Project No. U-2734 Action ID 199701755

Special Conditions to be placed on the Department of the Army permit:

1. All work must be performed as shown on the attached plans, which are a part of this permit. Failure to institute and carry out the details of the following special conditions, below, will result in a directive to cease all ongoing and permitted work within waters and/or wetlands associated with the permitted project, or such other remedies and/or fines as the District Engineer or his authorized representatives may seek.
2. One copy of the final construction drawings shall be furnished to the District Engineer prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the attached permit drawings. The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any deviation in the construction design plans shall be brought to the attention of the Corps of Engineers, Mr. Dave Timpy, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.
3. The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall notify the Corps of Engineers Project Manager a minimum of thirty (30) days in advance of the scheduled meeting in order to provide that individual with ample opportunity to schedule and participate in the required meeting.
4. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. Copies of this permit and any modifications authorized by the USACE shall be available for review at the construction site at all times. All violations, including non-compliance of these conditions, of the authorized permit shall be reported to the District Engineer within 24 hours of the violation.
5. The temporary placement or double handling of excavated or fill material or construction equipment and materials within waters and wetlands is not authorized.
6. All fill material must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

7. All fill material will be clean and free of any pollutants except in trace quantities.
8. The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and restore natural grades in those areas, prior to final inspection of the project.
9. This permit authorizes the clearing of an additional ten (10) feet beyond the slope stake limits in wetlands, as shown on the plans, to install the necessary sediment and erosion control measures.
10. The permittee shall take measures to prevent live or fresh concrete from coming into contact with any surface waters until the concrete has hardened.
11. The permittee will maintain the authorized work in good condition and in conformance with the terms and conditions of this permit. The permittee is not relieved of this requirement if he abandons the permitted activity without having it transferred to a third party.
12. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.
13. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration of the structures or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable water, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
14. Compensatory mitigation for the 1.45 acres of wetland impacts and 1480 feet of perennial stream impacts associated with his project shall be performed as described in the letter from the North Carolina Department of Transportation dated February 6, 2004 and as detailed in the following conditions:
 - a. Natural channel design and relocation of 456 linear feet of stream impacted within Site 1 of U-2734 at a mitigation ratio of 1:1 or 456 mitigation credits.
 - b. Preservation of 614 linear feet of stream within the Site 1 right-of-way of U-2734 at a mitigation ratio of 5:1 or 122 (614/5) mitigation credits. This stream is located at Stations 22+10 to 22+80 and 23+40 to 24+50.
 - c. The EEP will provide the compensatory mitigation to address the remaining 902 linear feet of stream impacts.

Compensatory mitigation for the unavoidable impacts to 1.45 acres of wetland and 902 linear feet of perennial stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated March 11, 2004 from William D. Gilmore, EEP Transition Manager. The EEP will provide 14.5 acres of preservation of non-riverine wetlands and 9,020 linear feet of preservation of warm water

stream channel in the Southern Outer Coastal Plain Eco-Region at the Hancock Timber Site in Pender County that has been acquired and protected by the EEP. Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003, the EEP will provide a minimum of 1.45 acres of restoration of non-riverine wetlands and 902 linear feet of restoration of warm water stream channel in the Howe Creek watershed (Hydrologic Cataloging Unit 03030001040020; Note: a mitigation site located in Hydrologic Catalog Unit 03030001040010 may be used if a mitigation site in Hydrologic Catalog Unit 03030001040020 is not available) by July 22, 2005 and half of the proposed preservation mitigation would be available at that time for mitigation for other project impacts. Construction within wetlands on the permitted highway project shall begin only after the EEP has provided written confirmation to the District Engineer that the EEP and not the NCDOT is responsible for providing the required mitigation, pursuant to Paragraph VI.B.7 of the MOA. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

15. All land disturbing activity associated with the highway construction will be conducted in a way that prevents a significant increase in turbidity outside the area of construction or construction-related discharge. Increases such that the turbidity in the water body is 50 NTU's or less is not considered significant.

16. The permittee and its contractors and/or agents shall not excavate, fill, or perform mechanized landclearing at any time in the construction or maintenance of this project within waters and/or wetlands, or cause the degradation of waters and/or wetlands, except as authorized by this permit, or any modification to this permit. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project.

17. To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall ensure that all such areas comply with the preceding condition (17.) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition (17.). All information will be available to the Corps of Engineers upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work. All jurisdictional wetland lines on borrow and waste sites shall be verified by the Corps of Engineers and shown on the approved reclamation plans.

18. If the permittee discovers any previously unknown historic or archeological remains while accomplishing the authorized work, he will immediately notify the Wilmington District Engineer who will initiate the required State/Federal coordination.

19. All culverts must be buried to a depth of at least one foot below the bed of the stream or wetland.

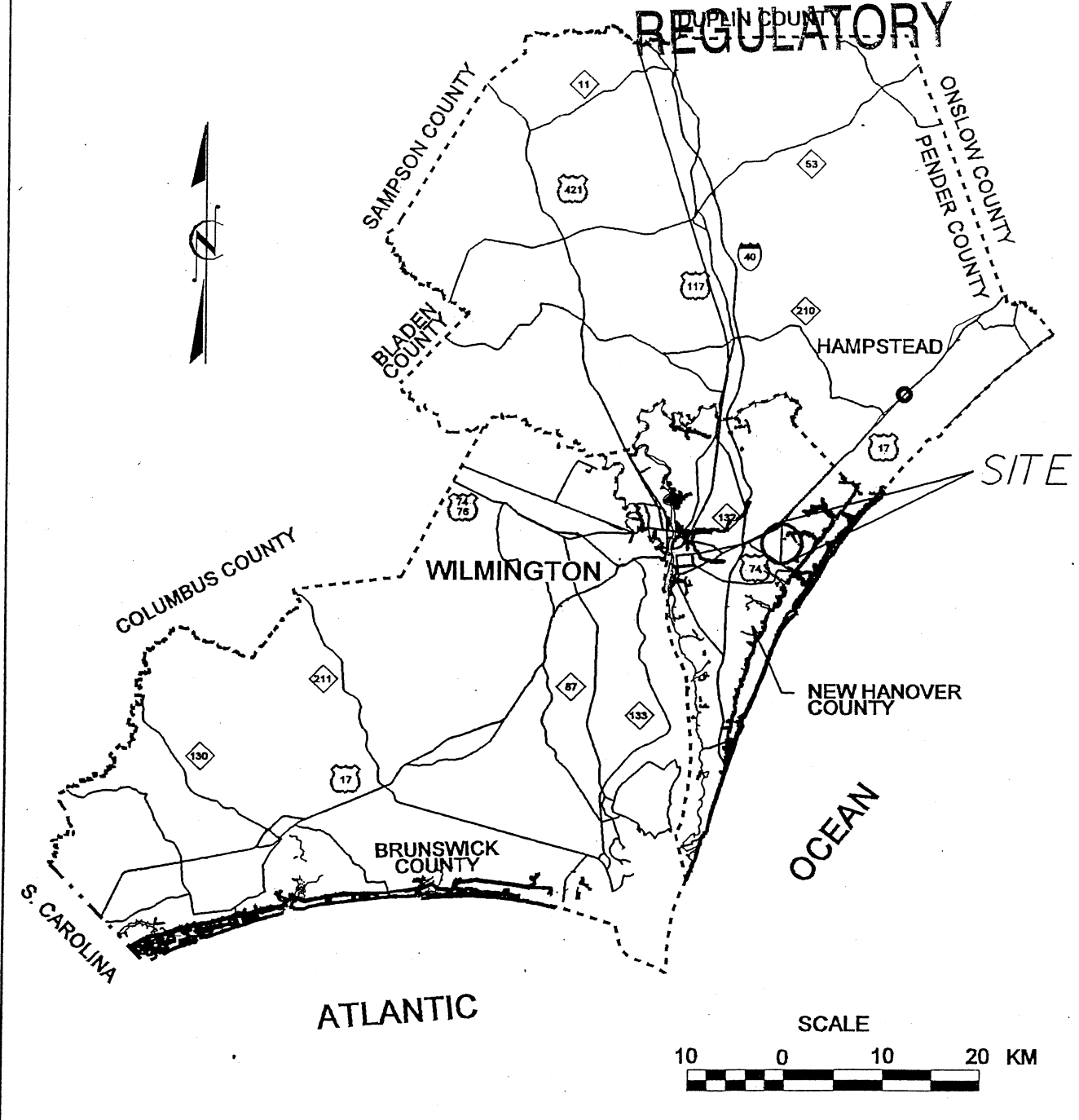
20. Aquatic Life Movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

21. All conditions attached to the Section 401 Water Quality Certification for this project, issued March 17, 2004, are incorporated as conditions of this permit.

RECEIVED

OCT 29 2004

REGULATORY



VICINITY
MAP

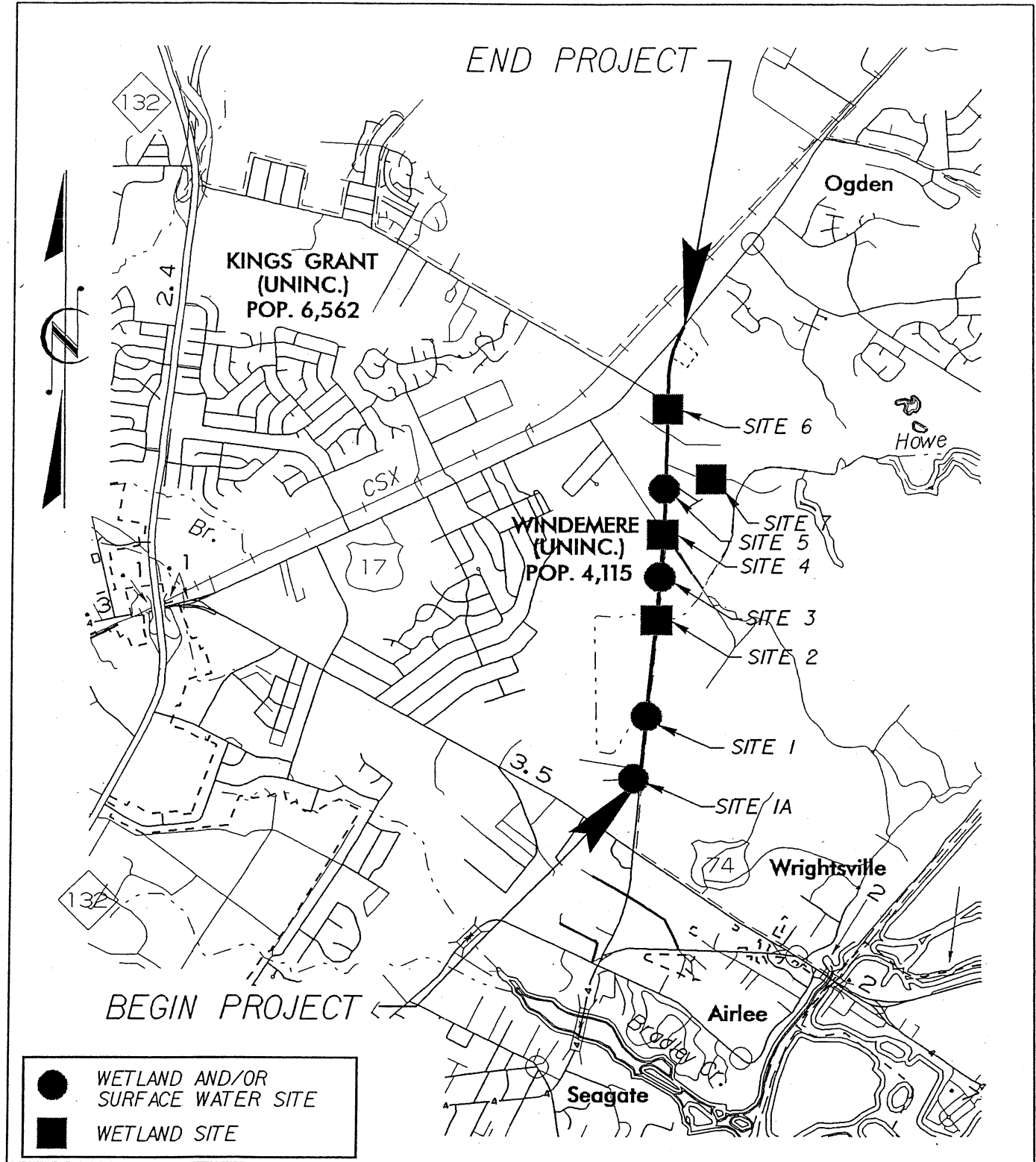
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY
PROJECT 34857.1.1 (U-2734)

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 1 OF 34

9/03




●	WETLAND AND/OR SURFACE WATER SITE
■	WETLAND SITE

SITE MAP

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT: 34857.1.1 (U-2734)
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC

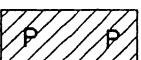
LEGEND


— WLB — WETLAND BOUNDARY

 WETLAND

 DENOTES FILL IN WETLAND

 DENOTES FILL IN SURFACE WATER

 DENOTES FILL IN SURFACE WATER (POND)

 DENOTES TEMPORARY FILL IN WETLAND

 DENOTES EXCAVATION IN WETLAND

 DENOTES TEMPORARY FILL IN SURFACE WATER

 DENOTES MECHANIZED CLEARING

← ← FLOW DIRECTION

— TB — TOP OF BANK

--- WE --- EDGE OF WATER

--- C --- PROP. LIMIT OF CUT

--- F --- PROP. LIMIT OF FILL

—▲— PROP. RIGHT OF WAY

--- NG --- NATURAL GROUND

--- PL --- PROPERTY LINE

— TDE — TEMP. DRAINAGE EASEMENT


— PDE — PERMANENT DRAINAGE EASEMENT

— EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

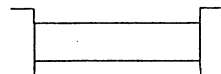
— EPB — EXIST. ENDANGERED PLANT BOUNDARY

---▽--- WATER SURFACE


 LIVE STAKES

 BOULDER


— — — CORE FIBER ROLLS

 PROPOSED BRIDGE

 PROPOSED BOX CULVERT

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

(DASHED LINES DENOTE EXISTING STRUCTURES)


 SINGLE TREE

———— WOODS LINE

———— DRAINAGE INLET

 LOG VANE

 RIP RAP

 5
ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

———— BZ1 ———— BUFFER ZONE 1

———— BZ2 ———— BUFFER ZONE 2

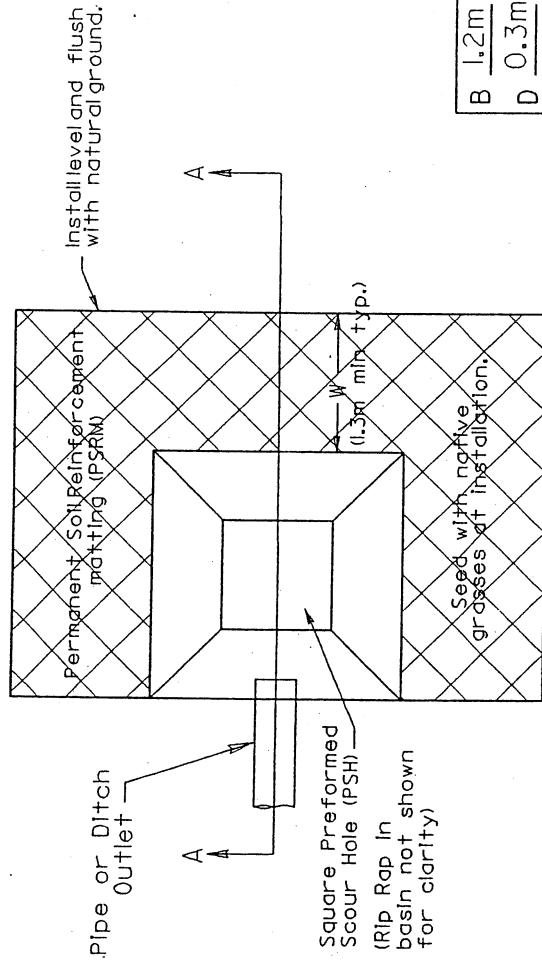
**N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS**

NEW HANOVER COUNTY

**PROJECT: 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC**

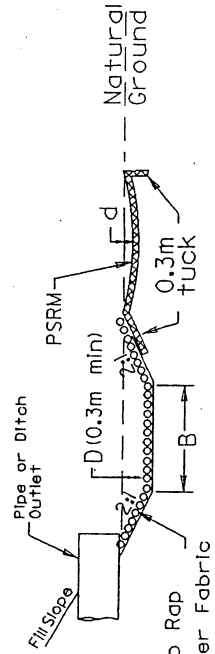
PREFORMED SCOUR HOLE

PLAN VIEW



B	1.2m
D	0.3m
W	1.3m
d	0.15m

SECTION A-A

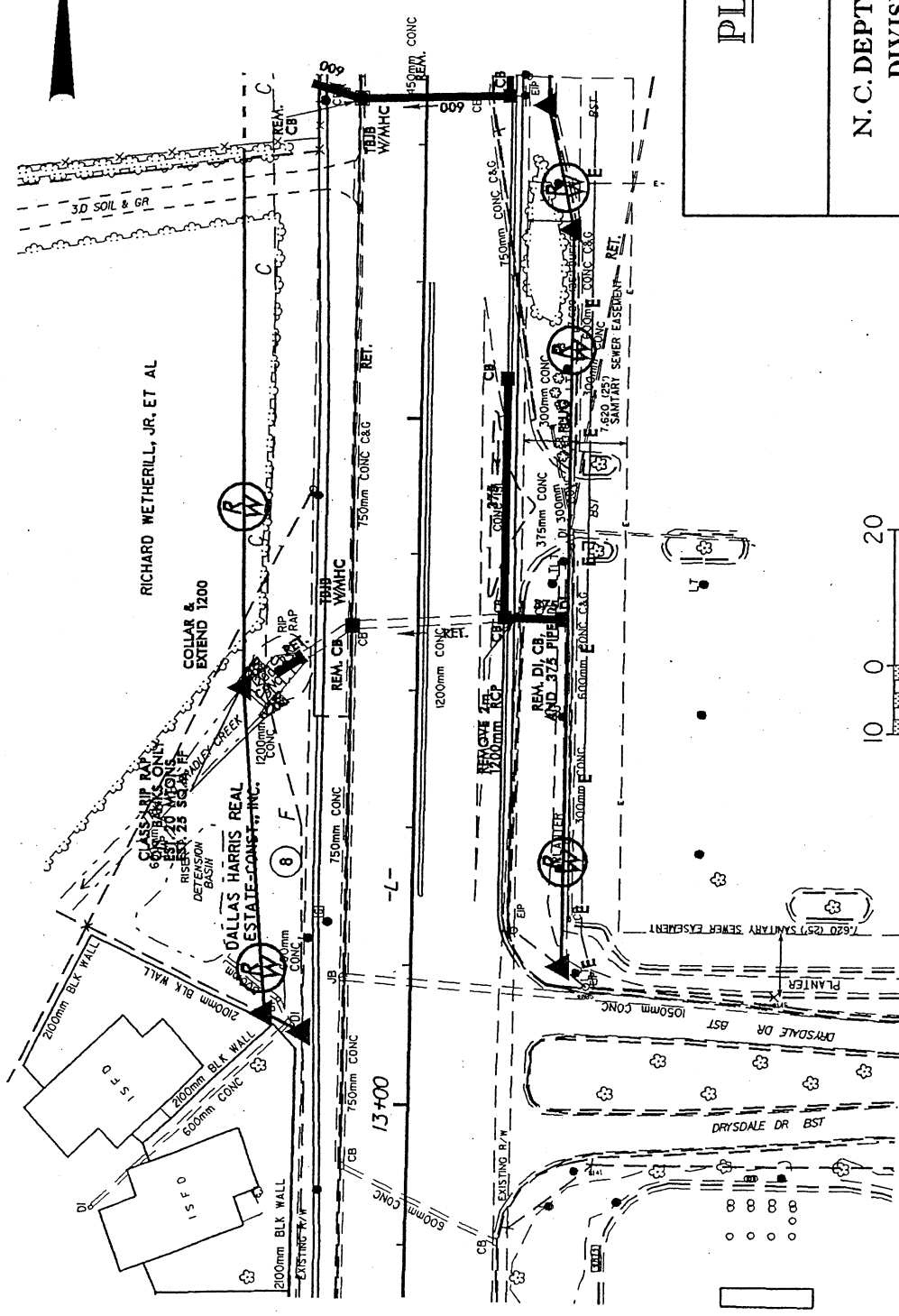


Liner: Class B Rip Rap
0.3m thick with Filter Fabric

NCDOT

DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT: 34857.1.1 (U-2734)

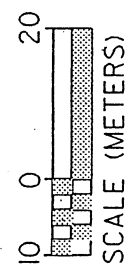
MILITARY CUTOFF ROAD
 IN WILMINGTON, NC



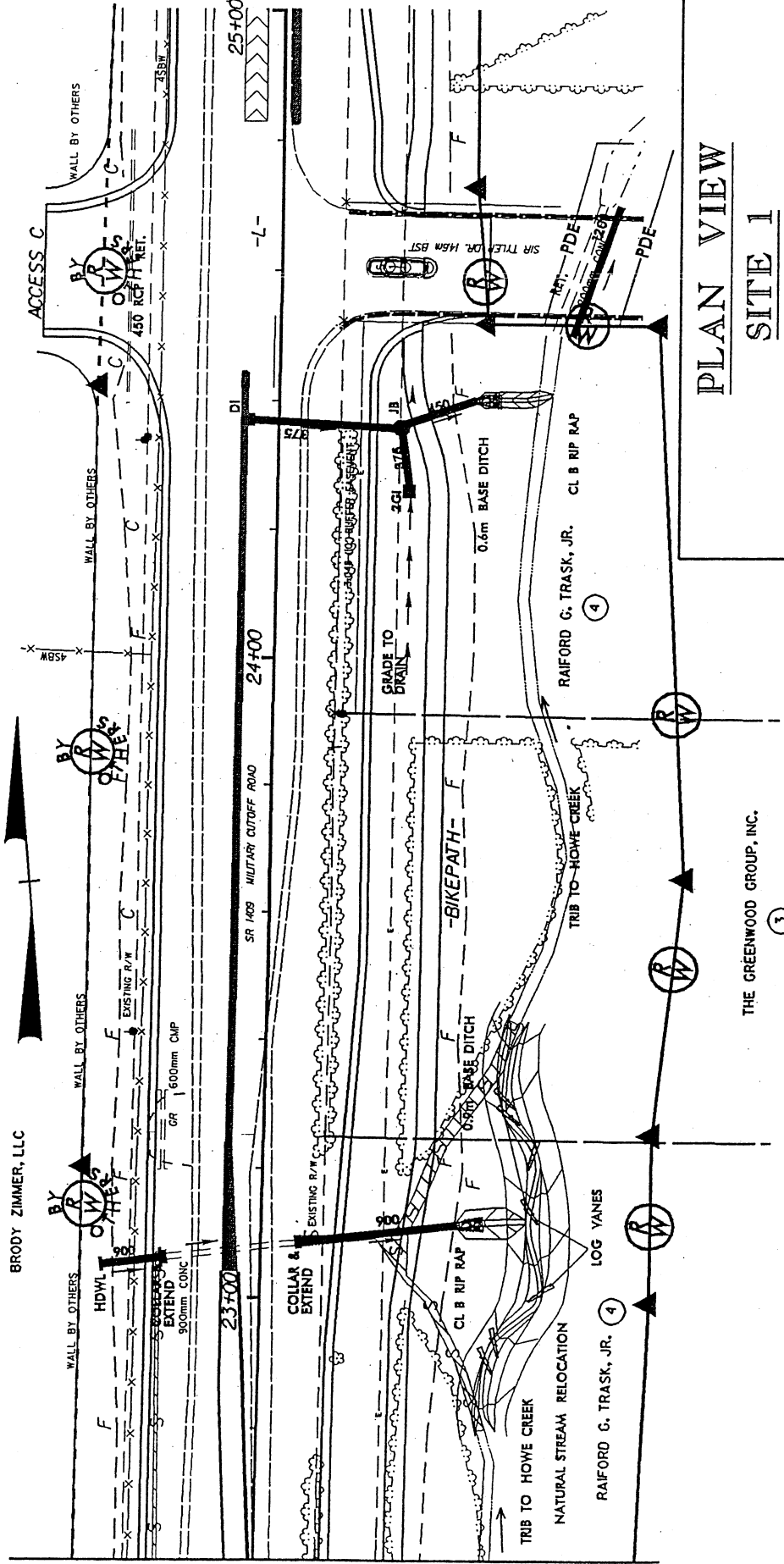
PLAN VIEW
SITE 1A

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 5 OF 34 9/03



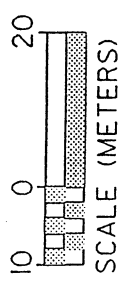
 DENOTES FILL IN SURFACE WATER



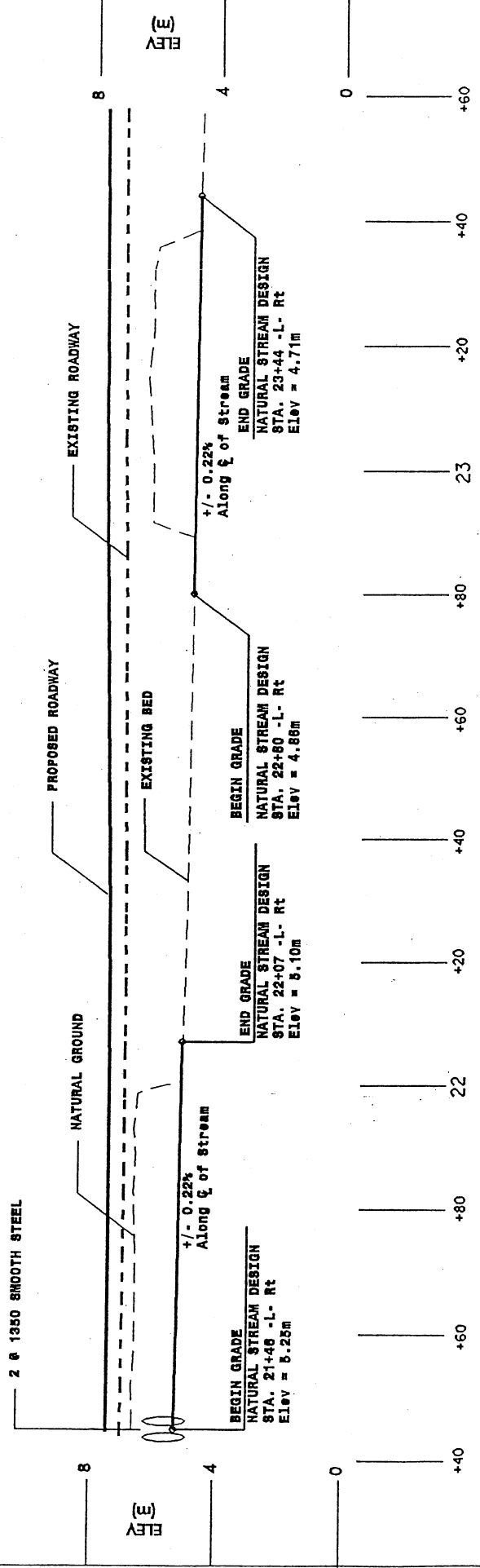
-L- STA.22+60

PLAN VIEW
SITE 1

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



DENOTES FILL IN SURFACE WATER



PROFILE

NATURAL STREAM DESIGN
 STA 21 + 46 TO 22 + 07 -L- (RT)
 STA 22 + 80 TO 23 + 44 -L- (RT)

NCDOT
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT: 34857.1.1 (U-2734)
 MILITARY CUTOFF ROAD
 IN WILMINGTON, NC

SHEET 8 OF 34 9/03

-L-

WETLANDS LIMITS

10

5

6:1

2 @ 1350 SMOOTH STEEL

SLOPE = 0.44%

EXISTING STREAM BED

-BIKEPATH-

3:1

EXISTING STREAM BED

PROPOSED STREAM BED

5

0



HORIZONTAL SCALE



SITE 1
SECTION A-A

NCDOT
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC
SHEET 9 OF 34 9/03

NOTES:

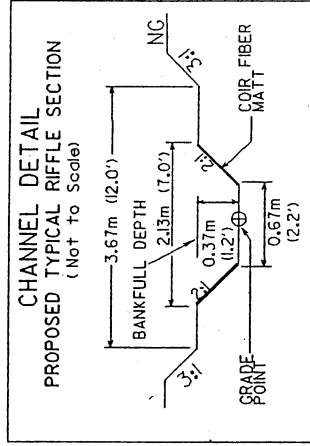
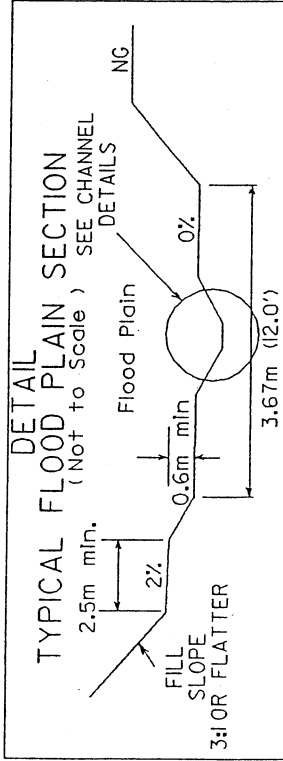
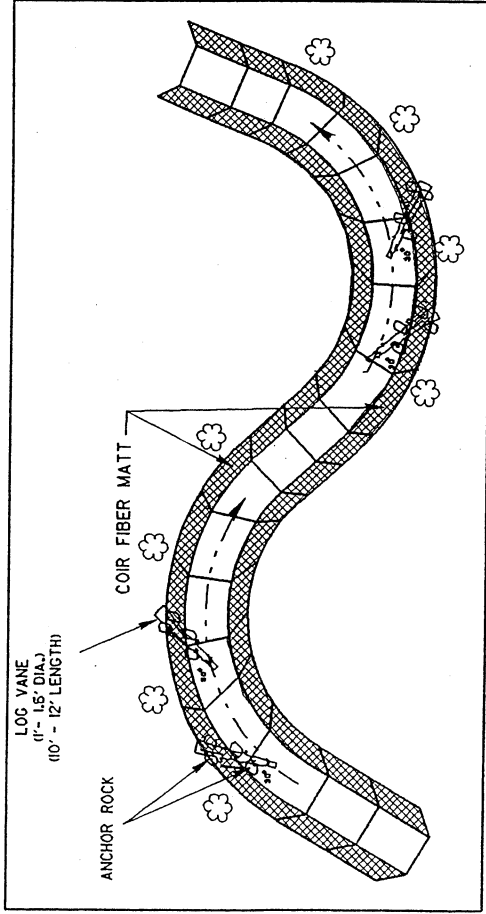
BURY APPROXIMATELY 1/3 OF LOG VANE LENGTH IN THE OUTSIDE POOL BANK AND 1/3 IN THE STREAM BED, WITH THE REMAINING 1/3 EXPOSED.

THE EXPOSED PORTION OF LOG VANE SHOULD BE APPROXIMATELY HALF OF THE BANKFULL WIDTH

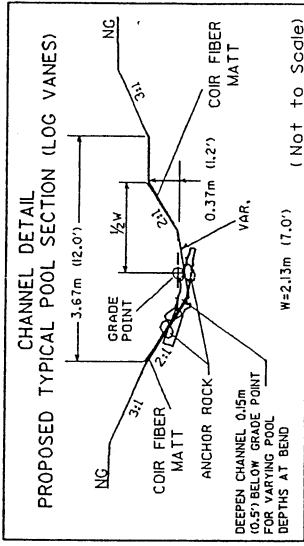
WHEN BACKFILLING OVER AND AROUND LOG VANES AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH MIN. LOG VANE DIA = 0.3m. UTILIZE LOGS AT SITE.

USE ANCHOR ROCK APPROXIMATELY 100 - 200 LBS.



TYPICAL SECTION BETWEEN BENDS



TYPICAL SECTION AT BENDS

**NATURAL STREAM DESIGN
STA 21 + 46 TO 22 + 07 -L- (RT)
STA 22 + 80 TO 23 + 44 -L- (RT)**

NCDOT

**DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC**

PROJECT #: 8.2251001 (U-2734)
COUNTY: New Hanover
DESCRIPTION: Widening of Military Cutoff Road (SR 1409)
in Wilmington, NC
STREAM: Tributary to Howe Creek

NATURAL STREAM DESIGN
Sta 21+46 – Sta 22+07 –L- (Rt)
and from Sta 22+80 – Sta 23+44 –L- (Rt)

The proposed widening of Military Cutoff Road (SR 1409) will result in the impact (fill) of a portion of stream east and west of the existing facility. The stream is a tributary to Howe Creek. The stream design/classification will be based on Dave Rosgen's principles and techniques for river morphology.

The basin is urbanizing and is located in the Coastal hydrologic region. Presently, the existing stream approaches the roadway from the southwest, "heads up", and then traverses down the west side in the roadway ditch to a 36" cross pipe. It then traverses through the cross pipe to the east side of Military Cutoff Road and back into the existing natural stream. Also, from previous field meetings with NCDOT personnel and agency representatives, it was observed that another existing stream is located on the east side of Military Cutoff Road south of the location of the 36" outlet. Portions, of which, will be filled in by the widening project. It was therefore recommended to connect to this existing stream at a location further south of the present crossing and provide restoration for those portions of existing stream to be filled in.

The original stream relocation proposed the use of parallel pipe culverts crossing under Military Cutoff Road at an approximate 30° skew and reconnecting to the existing stream at Sta 21+90 –L-(Rt). From this point downstream to Sir Tyler Drive (approximately 890 ft) the stream would be redesigned and relocated. This included portions of the stream that would be filled in by the proposed roadway widening and portions of the stream that would not be impacted by the project but were to be relocated and improved. A stream reach downstream of Sir Tyler Drive was used as the reference. This design was produced in February of 2001 and was recommended until March of 2003. At this time, another field review meeting was held with Dave Timpy (USACE). From this meeting several design changes were recommended. The recommendations included:

Reconnect to the existing stream further south than original proposal, allowing for additional stream restoration.

Eliminate relocating/altering that portion of remnant stream that is not being impacted by the proposed widening.

Use the existing stream along the portion of relocation as the reference reach.

The existing stream was resurveyed to observe its morphological characteristics. These characteristics include bankfull area, depth, width and discharge. This information was then compared to data generated from the available (yet unapproved to date) NC Stream Restoration Institute's Coastal Regional equations and with the USGS Rural Coastal equations. Data was then analyzed using the HEC-RAS modeling system to compare the accuracy of all the characteristics between the surveyed reference and the regional equations.

The reference reach (existing stream) was observed to be stable, yet moderately entrenched. The stream banks were deep but vegetated. The floodplain is also vegetated, except for a portion next to Sir Tyler Road. The stream was observed to have a meandering thalweg within the main channel banks. While the main stream channel is slightly meandering the thalweg has more significant meandering. Also, the stream was observed to have a low sediment supply and deposition. Based on the observed field data, NCSRI regional information and hydraulic modeling the reference stream was classified as an E6 stream.

The proposed stream was designed to retain the bankfull characteristics of the reference stream while improving the dimensions from that of the reference reach. Flatter side slopes and a slightly wider bankfull floodplain are proposed to improve the entrenchment characteristics. A meandering thalweg is also proposed within the main stream channel. To aid in bank stability, log vanes are proposed in the bend/pool areas. Also, coir fiber mat will be placed on the banks. This will assist in stabilizing the banks and thus assist in establishing vegetation along the stream banks. With the modifications to the prescribed channel dimensions it is believed an improved E6 stream will be provided.

In addition, it is proposed to leave the portion of stream that will not be impacted by the widening in its present condition without additional channel form improvements. The proposed stream channel form is similar to that of the existing stream. It is believed the risk of adversely effecting the existing stream vegetation and stability outweighs the attempt to acquire minimal channel form improvement. It is stated in Rosgen's **Applied River Morphology** that E6 streams "are very stable unless the streambanks are disturbed and significant changes in sediment supply and/or streamflow occur." The portion of restored and preserved stream, and their buffers, will be contained within Right-of-Way from the outlet of the dual 54" pipes to Sir Tyler Road.

The bed material was found to be fine sand, silt and organic material. Shear stress and sediment transport properties for fine sand were analyzed. Shear stresses were calculated based on velocities and flow depths generated from the HEC-RAS modeling system. This information was then compared to values for critical velocity and shear stress for fine sand in the HEC-15 and HDS-5 manuals from the FHA. The Shields Diagram was also used to observe the size of particle moved by the stream energy. The comparison showed the proposed stream to be within acceptable velocity and shear stress limits that would allow proper sediment transport under bankfull conditions.

Appendix B

Morphological Measurement Table

Variables	Existing Channel	Proposed Reach	USGS Station	** Reference Reach
1. Stream type	E6	E6	N/A	E6
2. Drainage area	110 Ac (44.5 Ha)	110 Ac (44.5 Ha)		110 Ac (44.5 Ha)
3. Bankfull width	7.0' (2.1m)	7.0' (2.1m)		7.0' (2.1m)
4. Bankfull mean depth	0.8' (0.24m)	0.8' (0.24m)		0.8' (0.24m)
5. Width/depth ratio	8.8	8.8		8.8
6. Bankfull cross-sectional area	5.8 ft ² (0.54m ²)	5.5 ft ² (0.51m ²)		5.8 ft ² (0.54m ²)
7. Bankfull mean velocity	1.7 ft/s (0.52 m/s)	1.8 ft/s (0.55 m/s)		1.7 ft/s (0.52 m/s)
8. Bankfull discharge, cfs	10 cfs (0.28 cms)	10 cfs (0.28 cms)		10 cfs (0.28 cms)
9. Bankfull max depth	1.3' (0.40m)	1.2' (0.37m)		1.3' (0.40 m)
10. Width of floodprone area	14.5' (4.4m)	19.2' (5.9m)		14.5' (4.4m)
11. Entrenchment ratio	2.1	2.7		2.1
12. Meander length	50'-75'	50'		50'-75'
13. Ratio of meander length to bankfull width	7.1-10.7	7.1		7.1-10.7
14. Radius of curvature	102' (31m)	50' (15m)		102' (31m)
15. Ratio of radius of curvature to bankfull width	14.6	7.1		14.6
16. Belt width	36' (11m)	33' (10m)		36' (11m)
17. Meander width ratio	5.1	4.7		5.1
18. Sinuosity (stream length/valley length)	1.10	1.10		1.10
19. Valley slope	0.24%	0.24%		0.24%
20. Average slope	0.22%	0.22%		0.22%
21. Pool slope	0.00%	0.00%		0.00%
22. Ratio of pool slope to average slope	0.00	0.00		0.00
23. Maximum pool depth	1.8' (0.55m)	1.7' (0.52m)		1.8' (0.55 m)
24. Ratio of pool depth to average bankfull depth	2.3	2.1		2.3
25. Pool width	7.0' (2.1m)	7.0' (2.1m)		7.0' (2.1m)
26. Ratio of pool width to bankfull width	1.00	1.50		1.00
27. Pool to pool spacing	25'-40'	30'-40'		25'-40'
28. Ratio of pool to pool spacing to bankfull width	3.6-5.7	4.3-5.0		3.6-5.7
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	0.77	1.0		0.77

Military Cutoff Stream Mitigation Site (U-2734)
Sta 21+46 -L- (Rt) - Sta 23+44 -L- (Rt)

SEDIMENT TRANSPORT ANALYSIS

Station/Description	Flow Depth (ft)	Flow Slope (ft/ft)	Shear Stress (lb/ft ²)	Bed Material	Velocity (ft/s)
Proposed	1.2	0.0022	0.099	Sand/Silt	1.8
Reference	1.3	0.0022	0.105	Sand/Silt	1.7

Note: Velocities determined from HEC-RAS Model

Proposed Morphology

** Critical Shear Stress 0.10 lb/ft²

*** Permissible Velocity 1.5-2.2 ft/s

Clear Water Fine Sand - Firm Loam w/ Fine Sand

* Shields:

Particle Size	5.0	mm
Dimensionless Shear Stress	0.0590	lb/ft ²
Kinematic Viscosity	0.00001400	ft ² /s
Mass Density	1.94	slugs/ft ³
Unit Weight (Particle)	165.0	lb/ft ³
Unit Weight (Water)	62.4	lb/ft ³
Reynolds Number	265.2	
Dimensionless Shear Stress from Shields Diagram	0.054	lb/ft ²

References:

- * Shields Diagram
- ** Hydraulic Engineering (HEC) 15 - Chart 1
- *** Hydraulic Design Series (HDS) 3 - Table 2

Proposed

Q _{BKF}	10.0	ft ³ /s
W/D	8.8	
Side Slope	2.0	
Mannings n	0.032	
Valley Slope	0.0024	ft/ft
Sinuosity	1.10	

Valley Slope/Sinuosity	0.0022	ft/ft
Velocity	1.8	ft/s
Area	5.5	ft ²
W _{BKF}	7.0	ft
Base Width	2.2	ft
Mean Depth	0.8	ft
Wetted Perimeter	7.6	ft
Hydraulic Radius	0.72	ft
Shear Stress	0.10	lb/ft ²
Particle Moved	5.0	mm

Reference

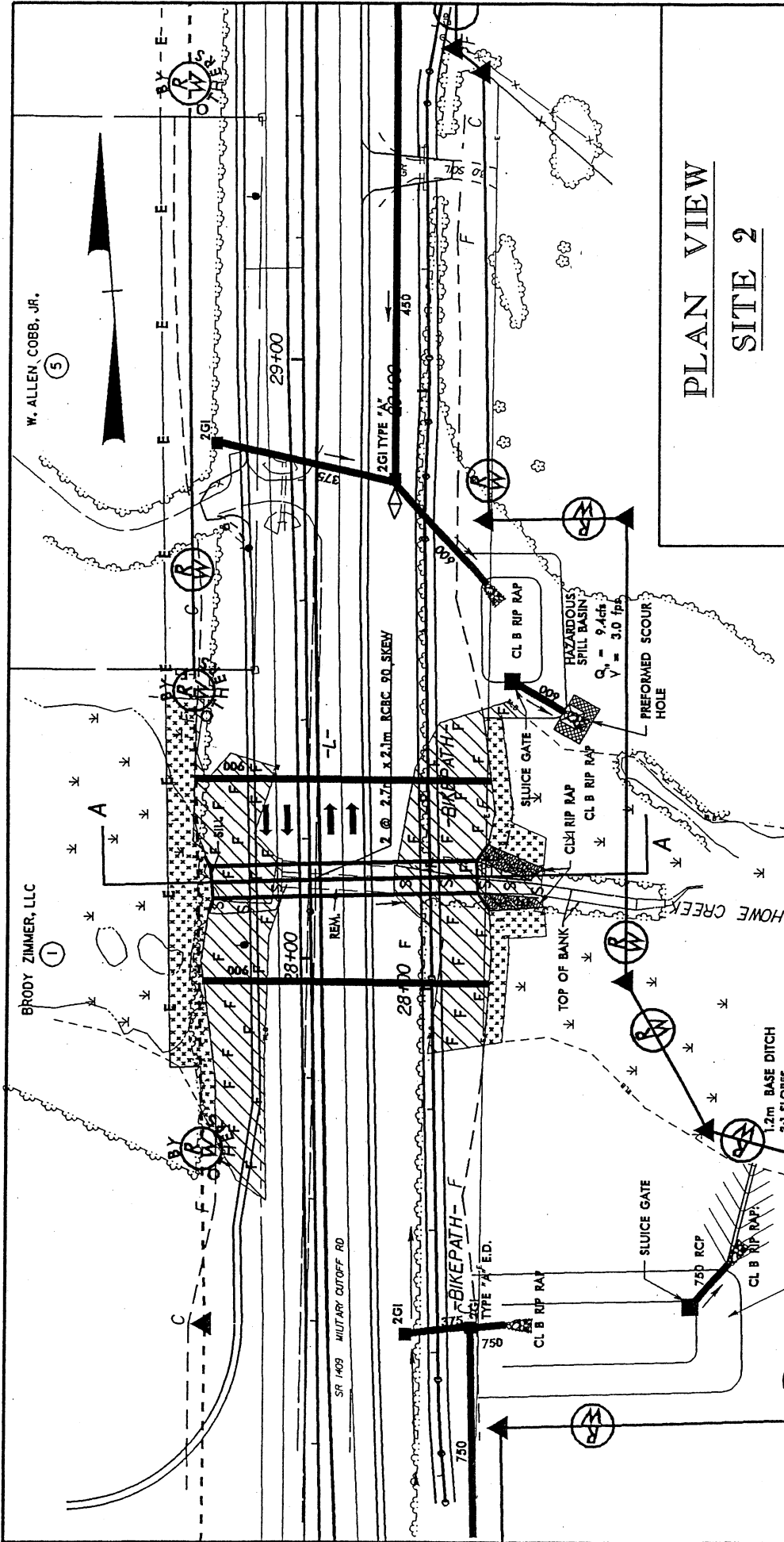
	10.0	ft ³ /s
	8.8	
	1.0	
	0.003	
	0.0024	ft/ft
	1.10	

	0.0022	ft/ft
	1.7	ft/s
	5.8	ft ²
	7.0	ft
	2.5	ft
	0.8	ft
	7.6	ft
	0.76	ft
	0.10	lb/ft ²
	5.0	mm

Stream Power:

Reference:
stream power = 0.025 lb/ft/sec

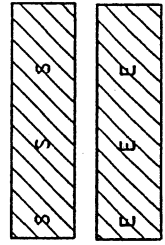
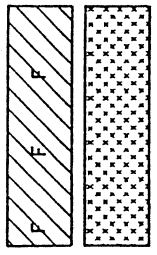
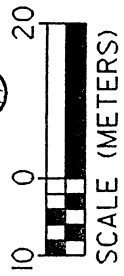
Proposed:
stream power = 0.026 lb/ft/sec



PLAN VIEW
SITE 2

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 16 OF 34 9/03



W. ALLEN COBB, JR. (5)

BRODY ZIMMER, LLC (1)

RAIFORD G. TRASK, JR. (4)

SR 1409 MILITARY CUTOFF RD

BIKEPATH-F

2.0m RCBC 90. SKEW

1.2m BASE DITCH
3:1 SLOPES
Q_s = 13cfs
V = 2.0 fps

HAZARDOUS SPILL BASIN
Q_s = 9.4cfs
V = 3.0 fps

PERFORMED SCOUR HOLE

SLUICE GATE

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

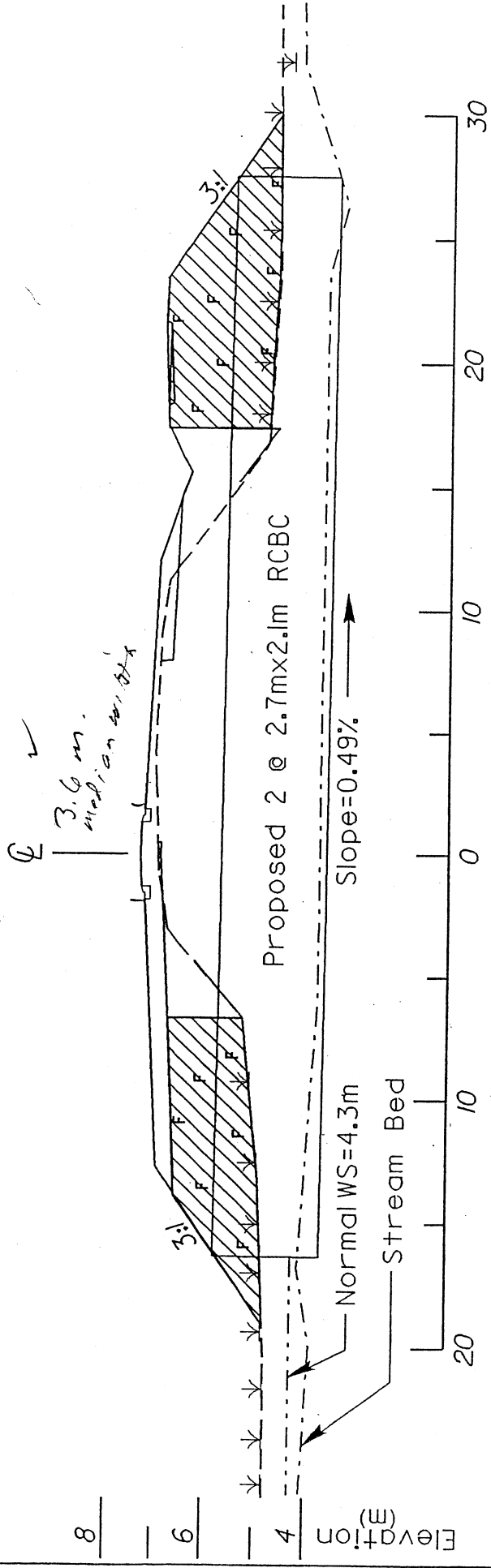
CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

CL B RIP RAP

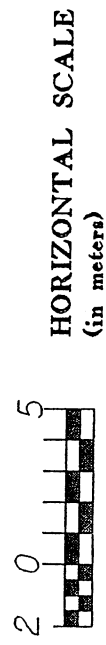


SITE 2

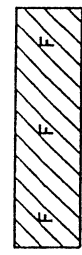
SECTION A-A

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC

SHEET 17 OF 34 9/03



DENOTES FILL
 IN WETLAND



+20 | +40 | +60 | +80 | +20 | +40 | +60 | +80 | +20 | +40 | +60 | +80 | +20 | +40 | +60 | +80 |

PI = 28+00.000
EL = 7.180
VC = 120m

PI = 28+90.000
EL = 7.630
VC = 60

PROPOSED GRADE

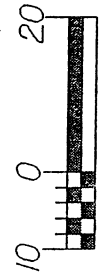
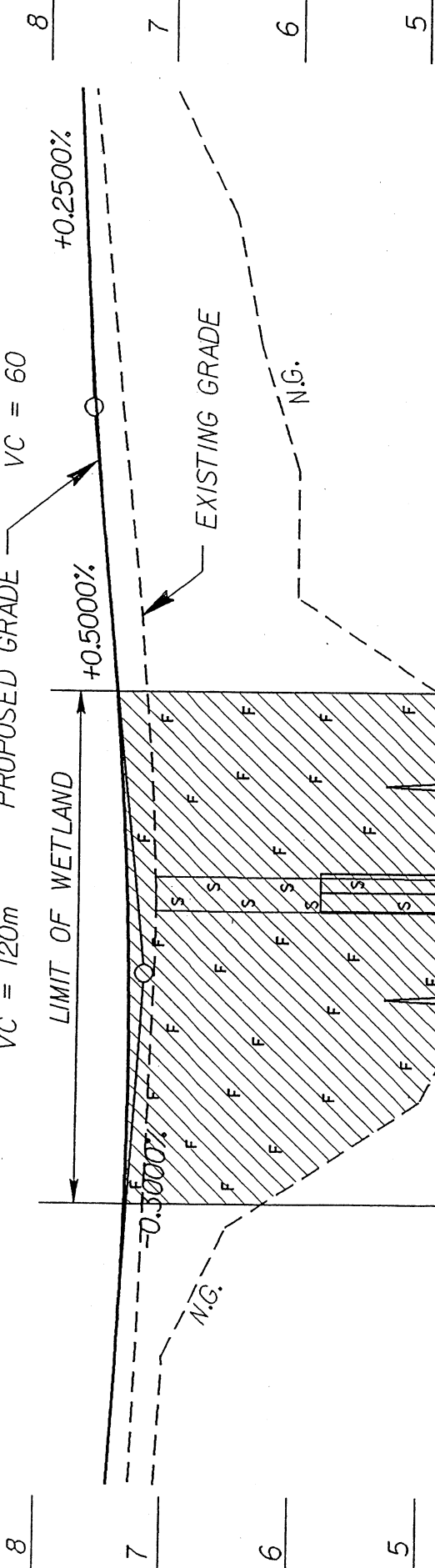
LIMIT OF WETLAND

+0.5000%

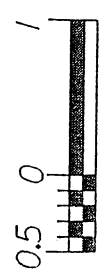
+0.2500%

EXISTING GRADE

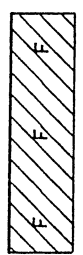
N.G.



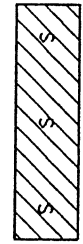
HORIZONTAL SCALE
(in meters)



VERTICAL SCALE
(in meters)



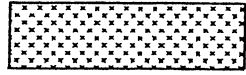
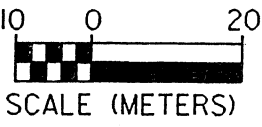
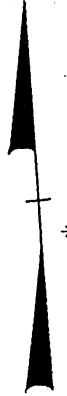
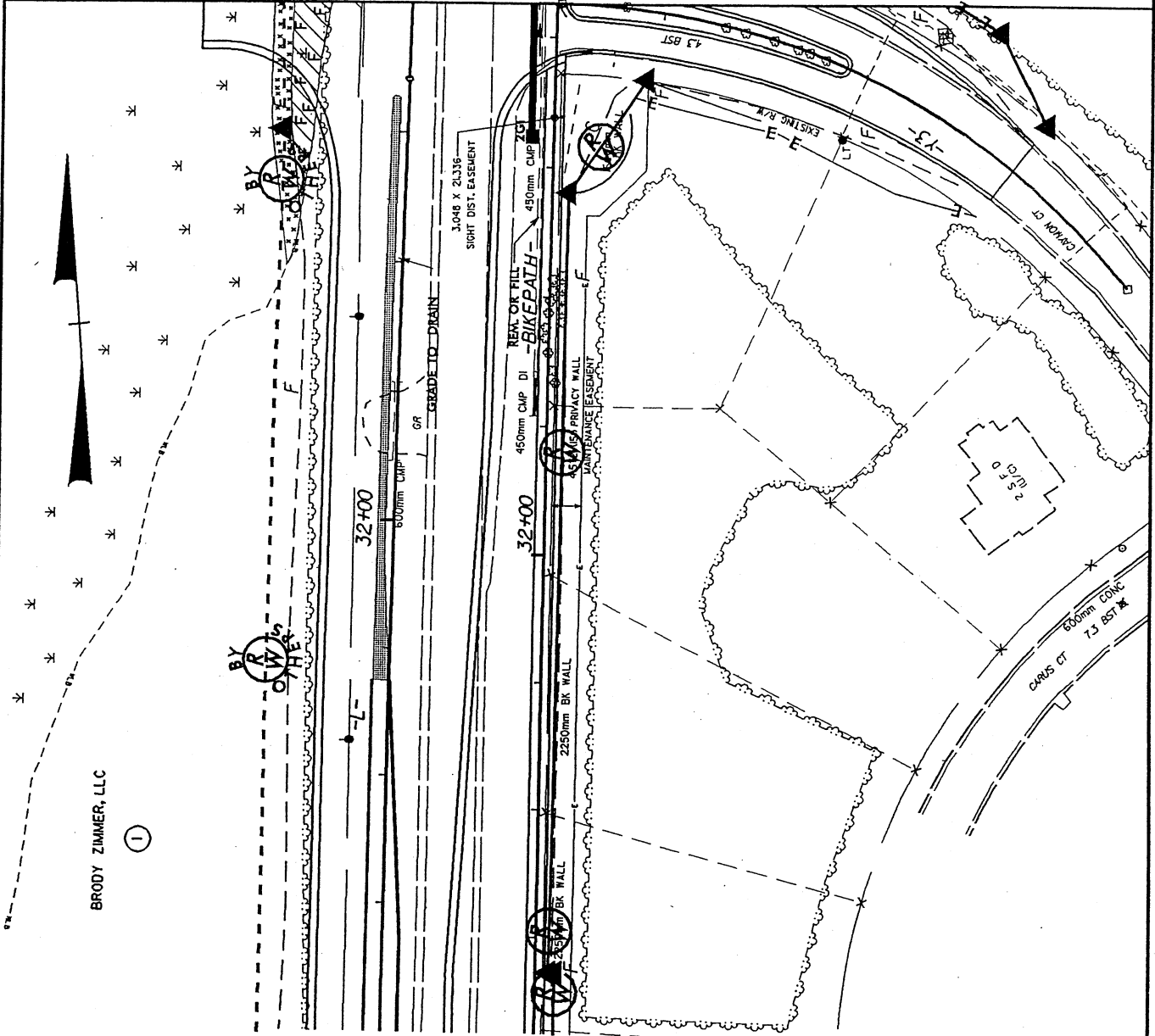
DENOTES FILL
IN WETLAND



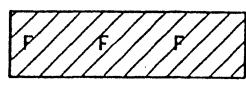
DENOTES FILL
IN SURFACE WATER

PROFILE VIEW
SITE 2

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



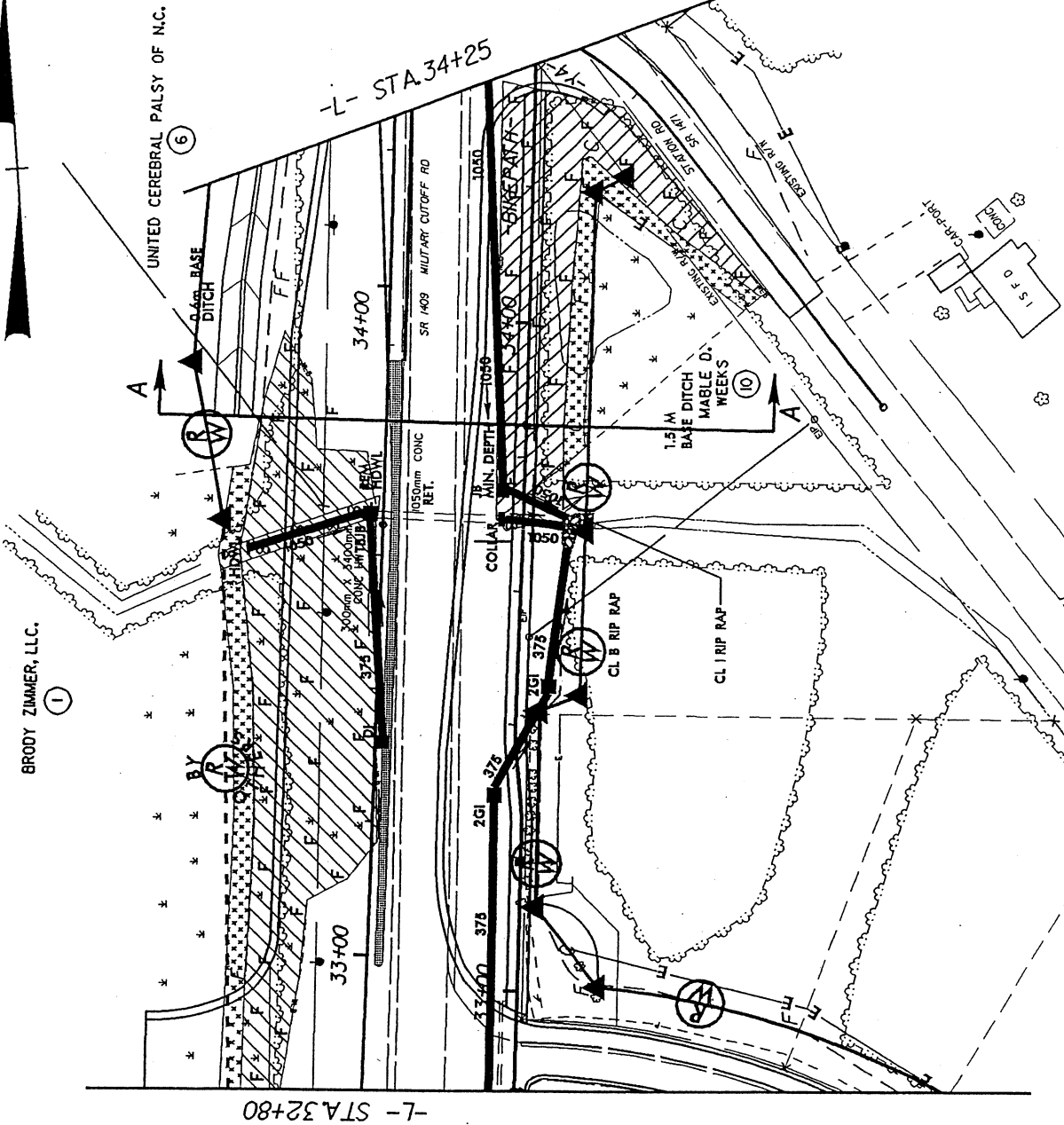
DENOTES
MECHANIZED
CLEARING



DENOTES FILL
IN WETLAND

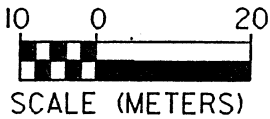
**PLAN VIEW
SITE 3**

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



PLAN VIEW
SITE 3

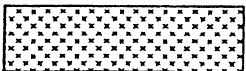
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



DENOTES FILL
IN SURFACE WATER



DENOTES FILL
IN WETLAND



DENOTES
MECHANIZED
CLEARING

+60 |
+80 |
31 |
+20 |
+40 |
+60 |
+80 |
32 |
+20 |
+40 |
+60 |
+80 |
+80 |

PI = 31+90.000
EL = 9.399
VC = 100

LIMIT OF WETLAND (LT)

PROPOSED GRADE

+0.8494%

-0.6489%

NG

EXISTING GRADE

SEE SHEET 2, L - STA. 32+80

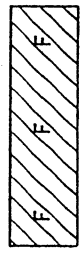
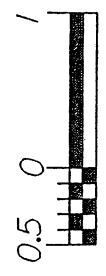
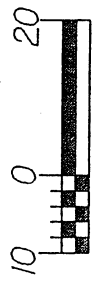
10

9

8

7

6



PROFILE VIEW
SITE 3

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

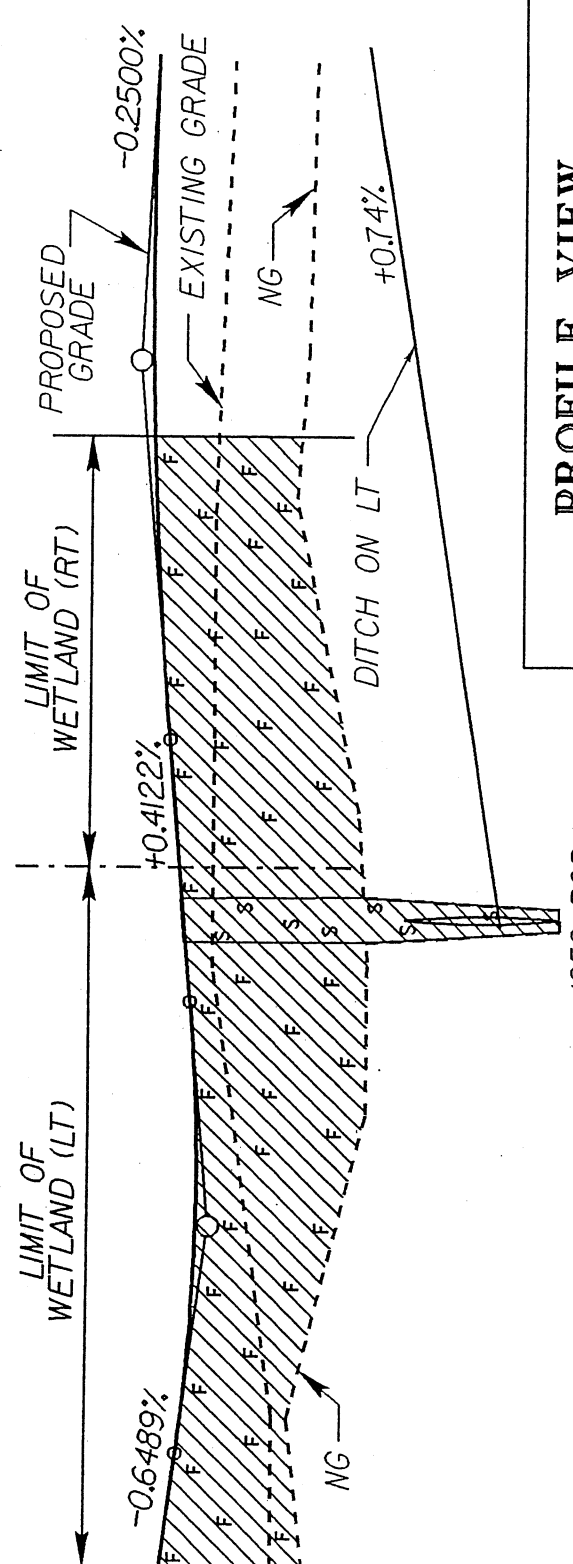
SHEET 21 OF 34 9/03

+60 | | | | | | | | | |
 +80 | | | | | | | | | |
 +60 | | | | | | | | | |
 +80 | | | | | | | | | |
 +33 | | | | | | | | | |
 +20 | | | | | | | | | |
 +40 | | | | | | | | | |
 +60 | | | | | | | | | |
 +80 | | | | | | | | | |
 +34 | | | | | | | | | |
 +20 | | | | | | | | | |
 +40 | | | | | | | | | |
 +60 | | | | | | | | | |
 +80 | | | | | | | | | |

$PI = 34+40.000$
 $EL = 8.997$
 $VC = 100$

$PI = 33+25.000$
 $EL = 8.523$
 $VC = 60$

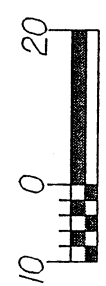
SEE SHEET 1-L - STA. 32+80



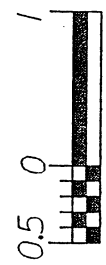
PROFILE VIEW
SITE 3

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC
 SHEET 22 OF 34 9/03

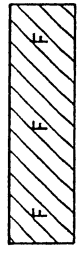
HORIZONTAL SCALE
 (in meters)



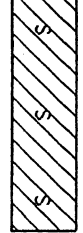
VERTICAL SCALE
 (in meters)

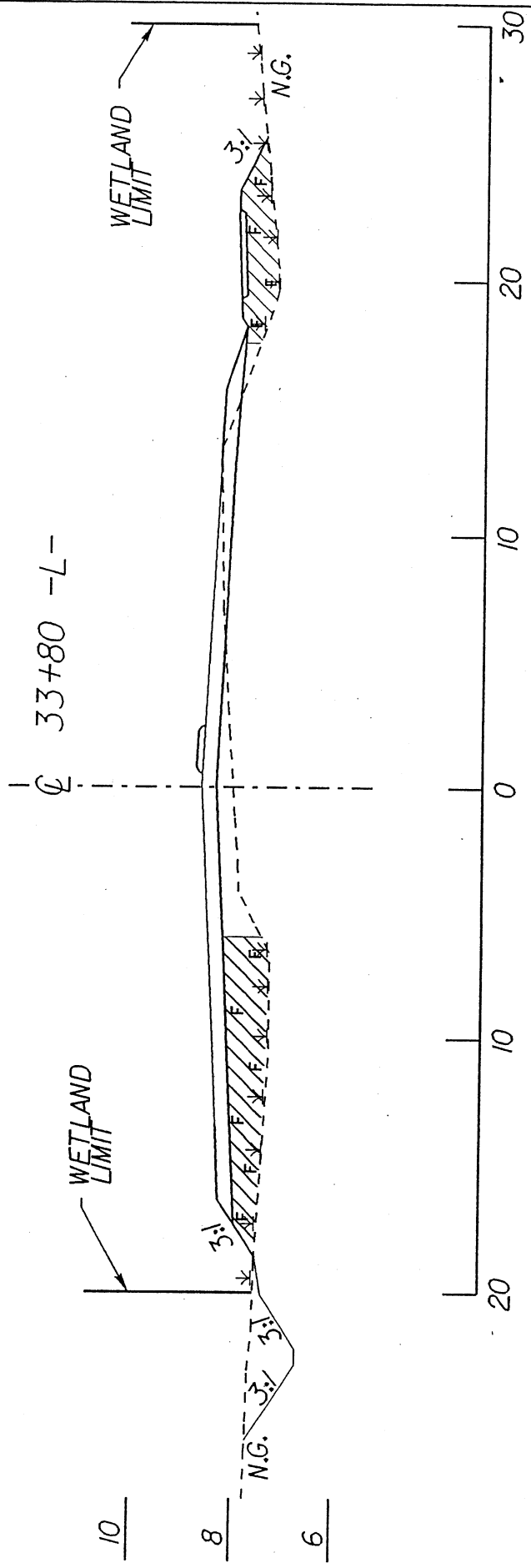


DENOTES FILL
 IN WETLAND



DENOTES FILL
 IN SURFACE WATER

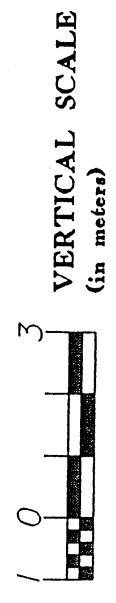
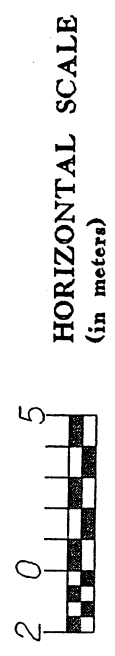




SITE 3

SECTION A-A

N. C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT: 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC



DENOTES FILL
 IN WETLAND

UNITED CEREBRAL PALSY OF N.C.

(6)

LIFT STATION

A

ACCESS EASEMENT

0.6m BASE DITCH

-L- STA 34+25

34+40

35+00

1050

MILITARY CUTOFF RD

SR 1409

1050 RCP

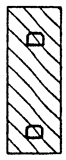
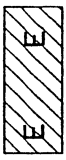
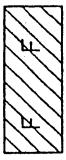
CB

BIKEPATH

PLAN VIEW

SITE 4

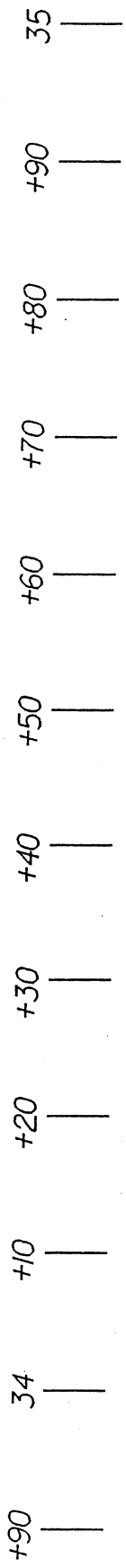


-  DENOTES DRAINED WETLANDS
-  DENOTES EXCAVATION IN WETLAND
-  DENOTES FILL IN WETLAND

JOHN W. BRIDGES

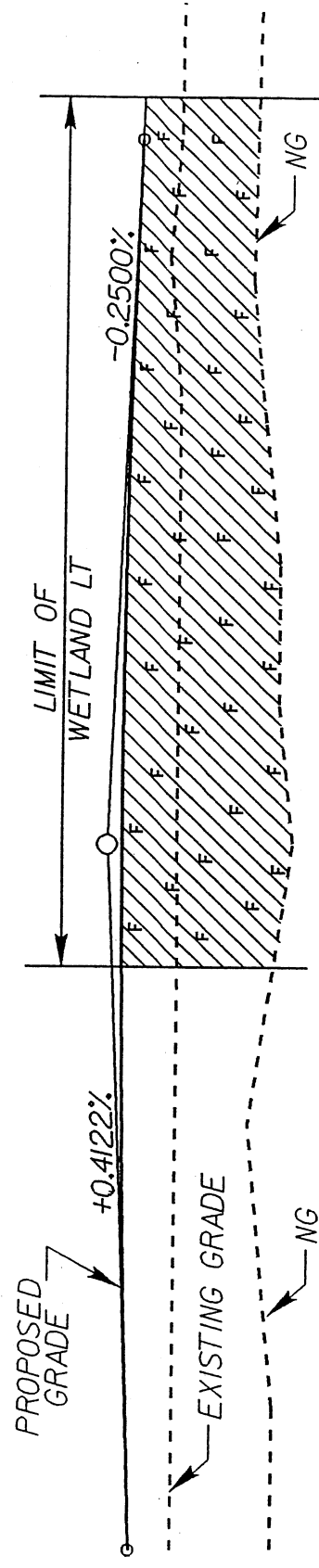
N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC

SHEET 24 OF 34 9/03



$PI = 34 + 40.000$
 $EL = 8.997$
 $VC = 100$

10

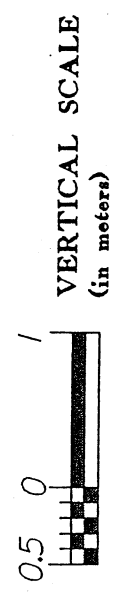
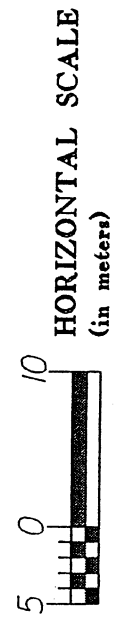


9

8

7

6

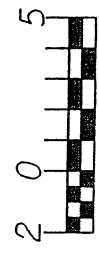
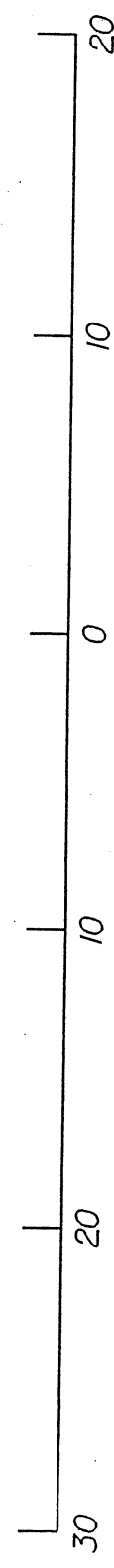
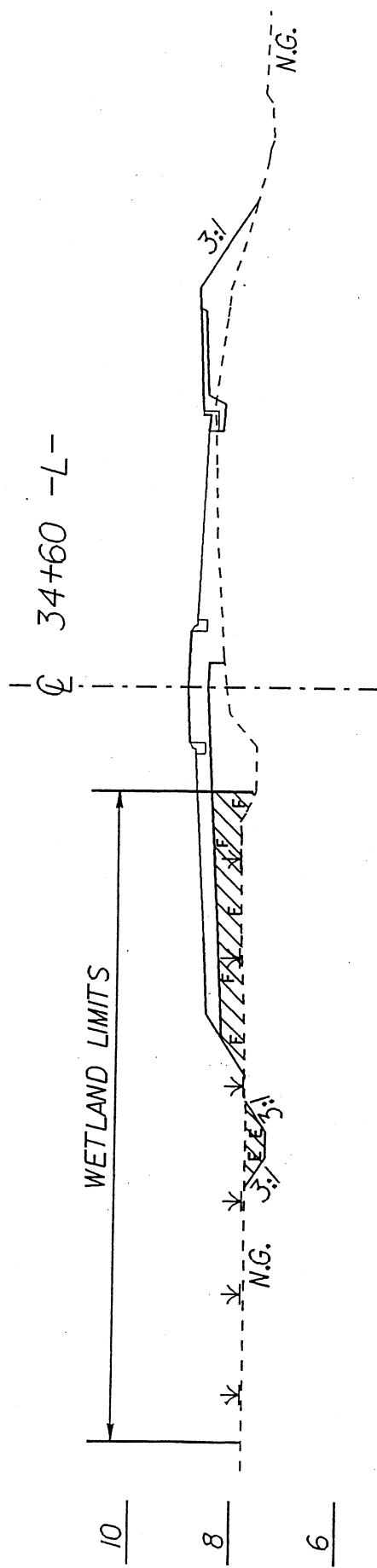


PROFILE VIEW

SITE 4

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY
 PROJECT 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC

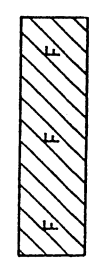
SHEET 25 OF 34 9/03



HORIZONTAL SCALE
(in meters)



VERTICAL SCALE
(in meters)



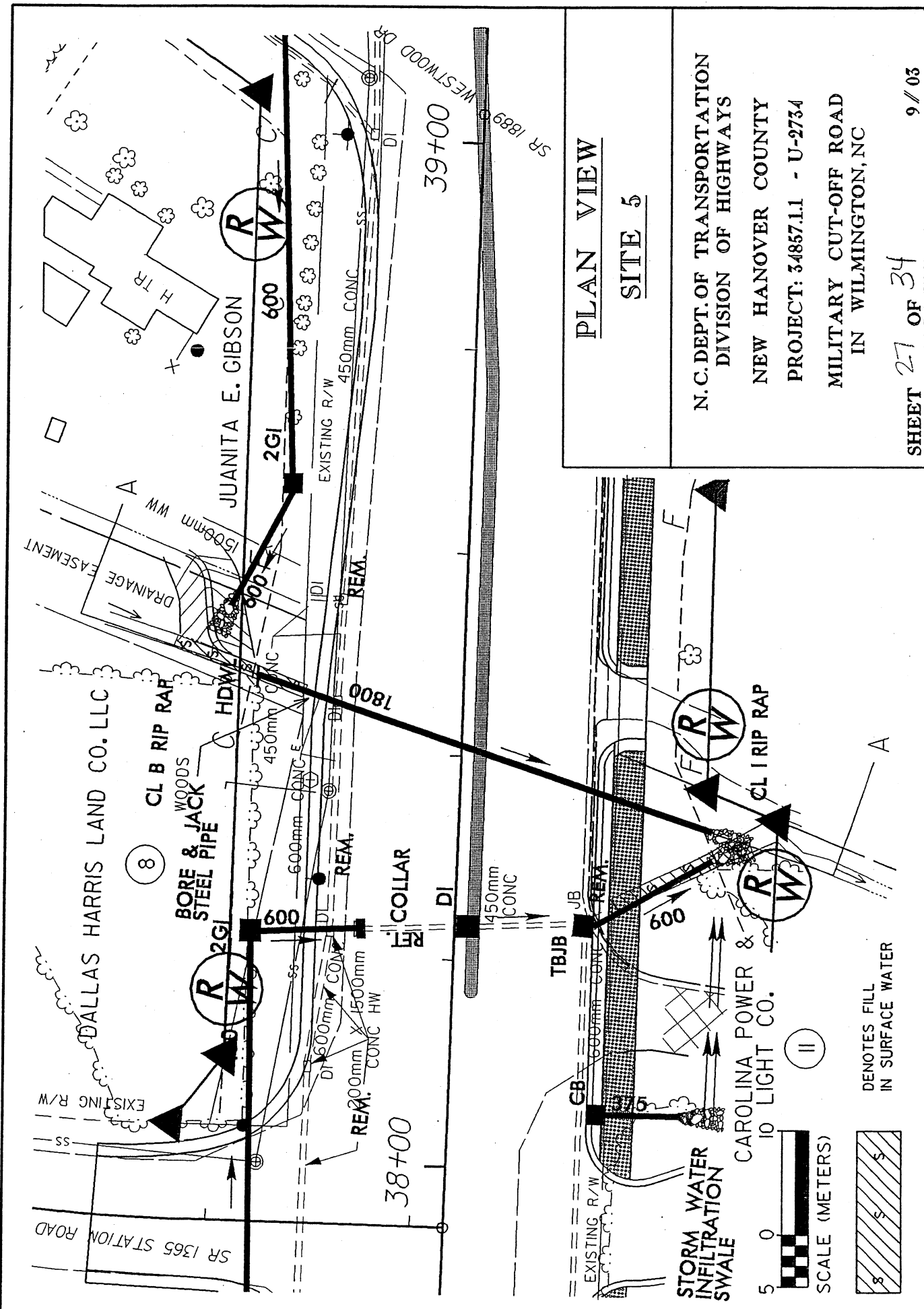
**DENOTES FILL
IN WETLAND**

SITE 4

SECTION A-A

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 26 OF 34 9/03



PLAN VIEW
SITE 5

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.11 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 27 OF 34 9/03

STORM WATER INFILTRATION SWALE

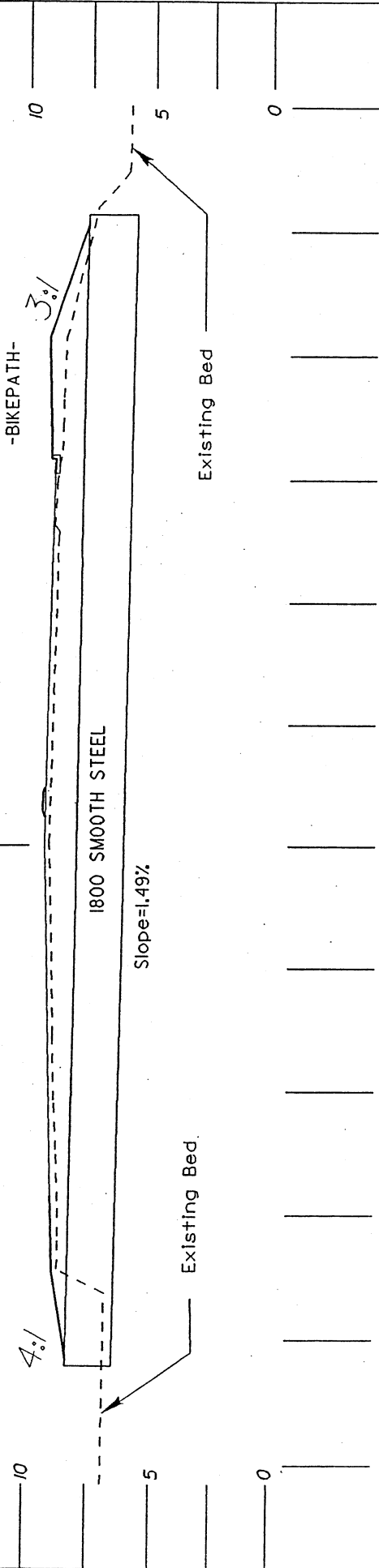
5 0 SCALE (METERS)

CAROLINA POWER & LIGHT CO.

II

DENOTES FILL IN SURFACE WATER

-L-



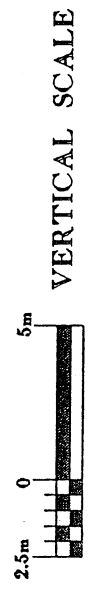
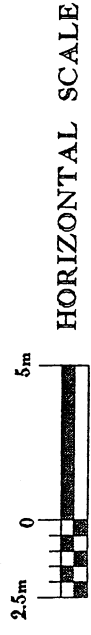
5 0 5

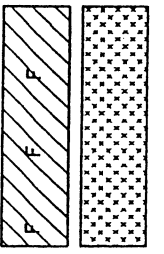
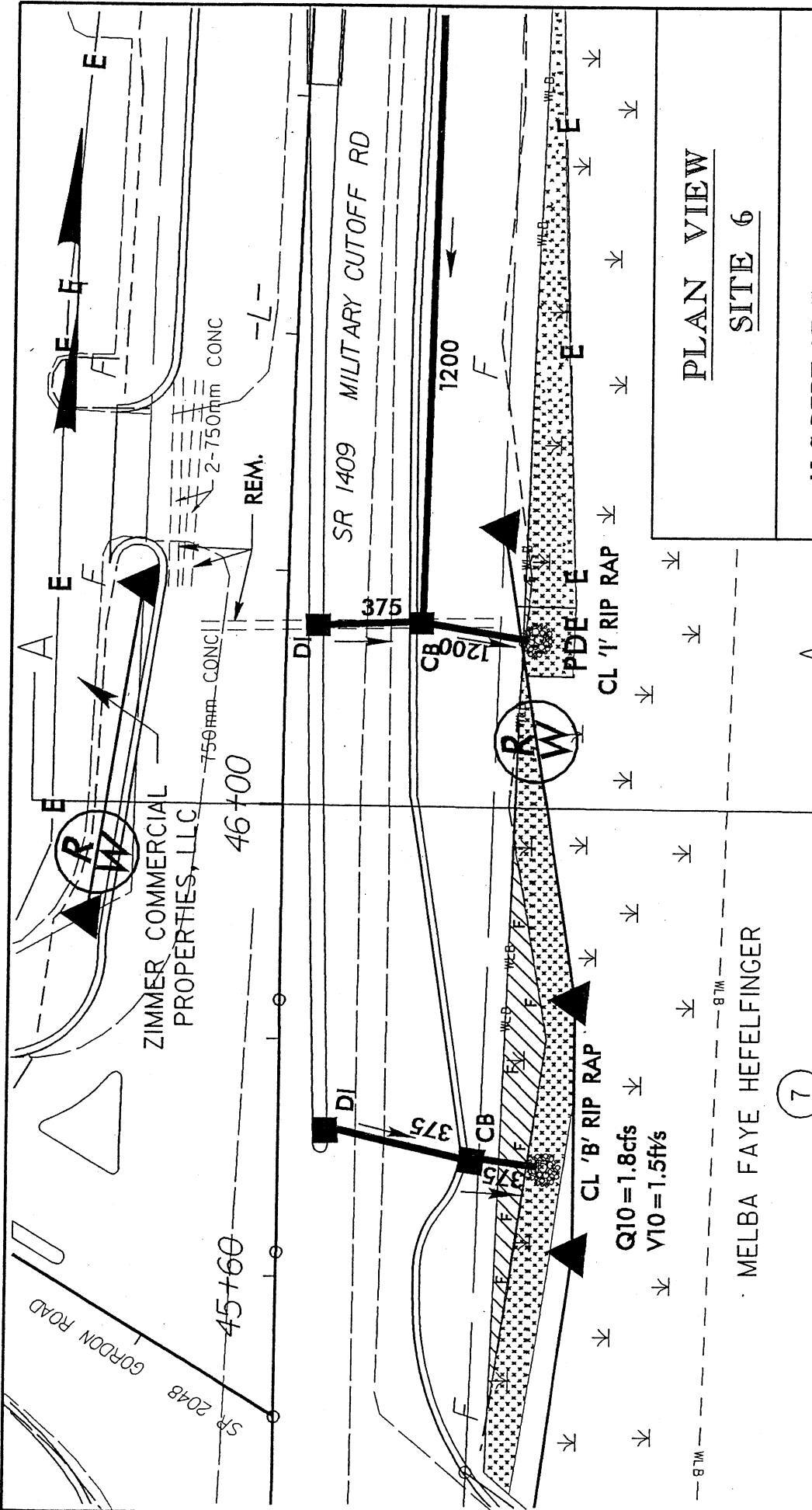
SITE 5
SECTION A-A

NCDOT
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
 MILITARY CUTOFF ROAD
 IN WILMINGTON, NC

SHEET 28 OF 34 9/03





7

MELBA FAYE HEFELFINGER

CL 'B' RIP RAP
 $Q_{10} = 1.8 \text{ cfs}$
 $V_{10} = 1.5 \text{ ft/s}$

CL 'T' RIP RAP

PLAN VIEW
 SITE 6

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734
 MILITARY CUT-OFF ROAD
 IN WILMINGTON, NC

-L-

WETLAND LIMITS

15

10

10

5

N.G.

5

0

5

0

5



HORIZONTAL SCALE



VERTICAL SCALE

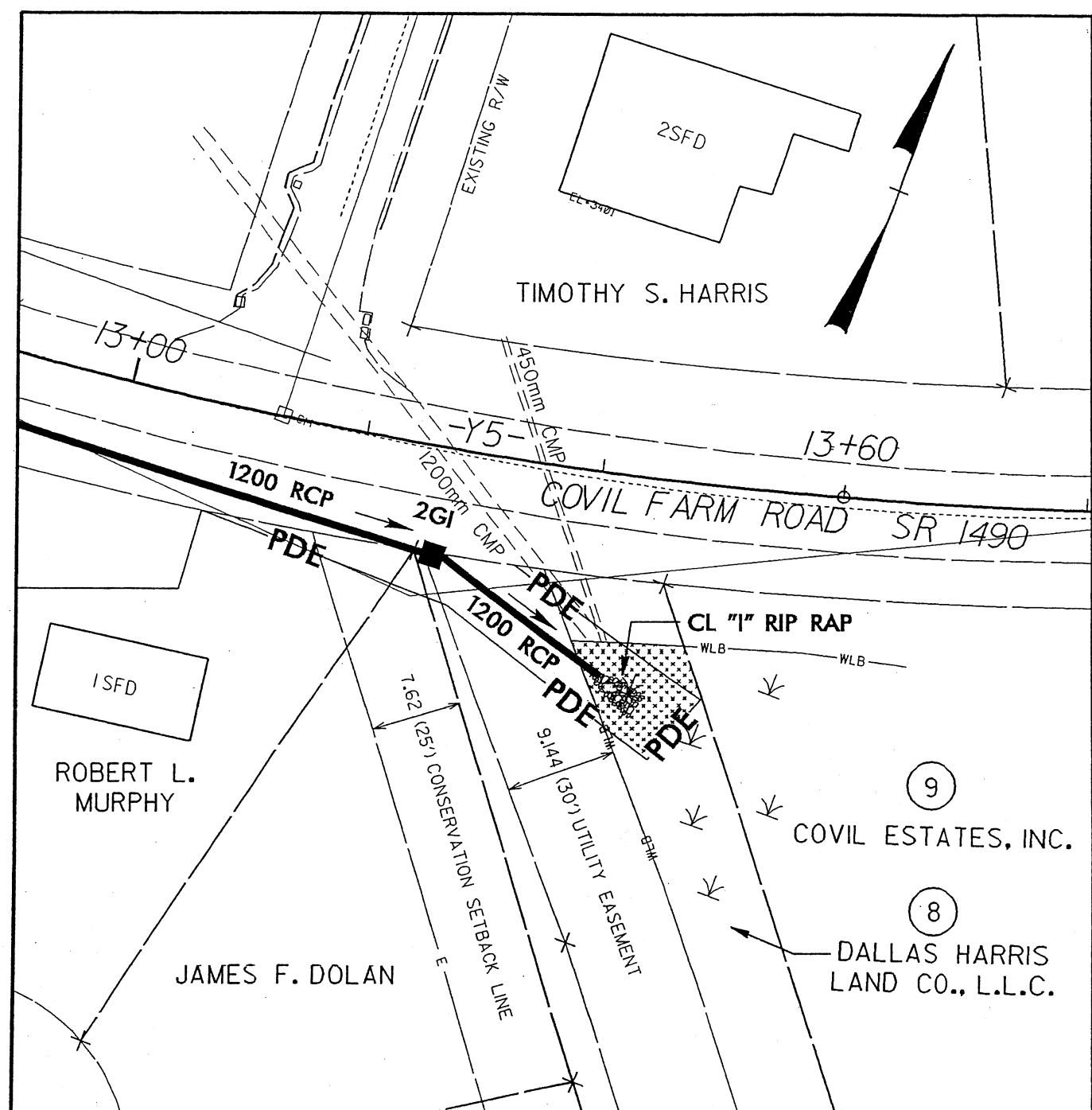
SITE 6
SECTION A-A

NCDOT

DIVISION OF HIGHWAYS
NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC

SHEET 30 OF 34 9/03



PLAN VIEW

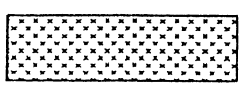
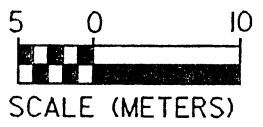
SITE 7

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



DENOTES
MECHANIZED
CLEARING

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS						
			Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)		
1A	13+60 -L- (Lt)	Extend 48" RCP					0.01					30	
1	21+00 (Lt) to 23+44 (Rt) -L-	2 @ 54" Steel Pipe	0.04			0.02	0.081					1099	*1070
2	27+76 to 28+45 (Lt & Rt) -L-	2 @ 9' x 7' RCBC w/ 2' sill	0.031		0.02	0.14	0.03					131	
3	31+25 to 34+30 (Lt & Rt) -L-	Extend 42" RCP	0.6			0.15	0.02					128	
4	34+40 to 34+70 (Lt) -L-		0.12		** 0.20								
5	38+26 (Rt) to 38+50 (Lt) -L-	72" RCP					0.01					92	
6	45+40 to 46+30 (Rt) -L-		0.02			0.09							
7	13+40 (Rt) -Y5-	48" RCP				0.02							
TOTALS:			0.81	0	0.22	0.42	0.151	0	0	0	1480	1070	

* Includes 456' of relocated natural stream design + 614' of preserved (in FWW) stream = 1070' Total

** 0.16 Ac Drained + 0.04 Ac Excavated = 0.20 Ac Total

NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 PROJECT: 34857.1.1 (U-2734)
 NEW HANOVER COUNTY
 MILITARY CUTOFF ROAD

SHEET 32 OF 34

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS					
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)	
1A	Sta 13+60 -L- (Lt)	Extend 1200 RCP					0.004				9	
1	21+00 (Lt) to 24+50 (Rt) -L-	2 @ 1350 Steel Pipe	0.015			0.006	0.034				335	*326
2	27+76 to 28+45 (Lt & Rt) -L-	2 @ 2.7m x 2.1m RCBC w/ 0.6m sill	0.127		0.008	0.058	0.011				40	
3	31+25 to 34+30 (Lt & Rt) -L-	Extend 1050 RCP	0.242			0.060	0.008				39	
4	34+40 to 34+70 (Lt) -L-		0.047		** 0.080							
5	38+26 (Rt) to 38+50 (Lt) -L-	1800 RCP					0.004				28	
6	45+40 to 46+30 (Rt) -L-		0.009			0.035						
7	13+40 (Rt) -Y5-	1200 RCP				0.008						
TOTALS:			0.440		0.088	0.167	0.061				451	326

* Includes 139m of relocated natural stream design + 187m of preserved (in RW) stream = 326m Total

** 0.064 Ha Drained + 0.016 Excavated = 0.080 Ha Total

NCDOT

DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 (U-2734)

MILITARY CUTOFF ROAD
IN WILMINGTON, NC

SHEET **33** OF **34**

Oct-03

PROPERTY OWNER

PROP. NO.	SITE NO.	OWNER'S NAME	ADDRESS
1	1, 2, 3	BRODY ZIMMER, L.L.C.	3111 PRINCESS ST. WILMINGTON, NC 28401
2	1	TCT OF WILMINGTON, L.L.C.	P.O. BOX 1810 WILMINGTON, NC 28401
3	1	THE GREENWOOD GROUP, INC.	1122 OBERLIN RD. RALEIGH, NC 27605
4	1, 2	RAIFORD G. TRASK, JR.	1202 EASTWOOD RD. WILMINGTON, NC 28403
5	3	W. ALLEN COBB, JR.	P.O. BOX 1064 WILMINGTON, NC 28402
6	4	UNITED CEREBRAL PALSEY OF N.C.	P.O. BOX 27707 RALEIGH, NC 27611
7	6	MELBA HEFELFINGER	62 PELICAN DRIVE WRIGHTSVILLE BEACH, NC 28480
8	1A, 5, 7	DALLAS HARRIS LAND CO., L.L.C.	P.O. BOX 531 WRIGHTSVILLE BEACH, NC 28480
9	7	COVIL ESTATES, INC.	7158 MARKET ST. WILMINGTON, NC 28405
10	3	MABLE D. WEEKS	3413 BELLEVUE RD. RALEIGH, NC 27609
11	5	CP & L (PROGRESS ENERGY)	P.O. BOX 1551 RALEIGH, NC 27602

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC



Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E., Director
Division of Water Quality
Coleen H. Sullins, Deputy Director
Division of Water Quality

U.S. AG

October 20, 2003

Gregory J. Thorpe, Ph.D., Director
NCDOT, PDEA
1548 Mail Service Center
Raleigh, NC 27699-1548

**Subject: Permit No. SW8 030816
U-2734 Military Cutoff Widening
Other Stormwater Permit
Linear Public Road / Bridge Project
New Hanover County**

Dear Mr. Thorpe:

The Wilmington Regional Office received a complete Stormwater Management Permit Application for U-2734 Military Cutoff Widening on October 13, 2003. Staff review of the plans and specifications has determined that the project, as proposed, will comply with the Stormwater Regulations set forth in Title 15A NCAC 2H .1000. We are forwarding Permit No. SW8 030816 dated October 20, 2003, for the construction of the subject project.

This permit shall be effective from the date of issuance until rescinded and shall be subject to the conditions and limitations as specified therein.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, P.O. Drawer 27447, Raleigh, NC 27611-7447. Unless such demands are made this permit shall be final and binding.

If you have any questions, or need additional information concerning this matter, please contact either Linda Lewis or me at (910) 395-3900.

Sincerely,

Rick Shiver

Rick Shiver
Water Quality Regional Supervisor

RSS/arl: S:\WQS\STORMWAT\PERMIT\030816.oct03
cc: David Thomas, P.E., NCDOT Division Maintenance Engineer
Marshall Clawson, P.E.
Tony Roberts, New Hanover County Building Inspections
Beth E. Wetherill, New Hanover County Engineering
Division of Coastal Management
Linda Lewis
Wilmington Regional Office
Central Files

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WATER QUALITY

STATE STORMWATER MANAGEMENT PERMIT

OTHER PERMIT

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules and Regulations

PERMISSION IS HEREBY GRANTED TO

Gregory J. Thorpe, NCDOT PDEA

U-2734 Military Cutoff Widening

New Hanover County

FOR THE

construction of a public road in compliance with the provisions of 15A NCAC 2H .1000 (hereafter referred to as the "*stormwater rules*") and the approved stormwater management plans and specifications, and other supporting data as attached and on file with and approved by the Division of Water Quality and considered a part of this permit.

The Permit shall be effective from the date of issuance until rescinded and shall be subject to the following specific conditions and limitations:

I. DESIGN STANDARDS

1. The runoff from the impervious surfaces has been directed away from surface waters as much as possible.
2. The amount of built-upon area has been minimized as much as possible.
3. Best Management Practices (BMP) are employed which minimize water quality impacts. Approved BMP's include hazardous spill basins, grassed swales, raised inlets in ditches to reduce the amount of runoff that enters Howe Creek and encourage infiltration and deposition of sediments, natural stream design, stream restoration, and use of wetlands to filter runoff.
4. Approved plans and specifications for projects covered by this permit are incorporated by reference and are enforceable parts of the permit.
5. Vegetated roadside ditches have 3:1 or flatter side slopes.

II. SCHEDULE OF COMPLIANCE

1. The permittee shall at all times provide adequate erosion control measures in conformance with the approved Erosion Control Plan.
2. The permittee shall submit all information requested by the Director or his representative within the time frame specified in the written information request.

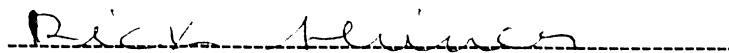
3. The Director may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the Director for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the Director that the changes have been made.
4. The permittee shall submit to the Director and shall have received approval for revised plans, specifications, and calculations prior to construction for the following items:
 - a. Major revisions to the approved plans, such as road section, road realignment, deletion of any proposed BMP, changes to the drainage area or scope of the project, etc.
 - b. Project name change.
 - c. Redesign of, addition to, or deletion of, the approved amount of built-upon area, regardless of size.
 - d. Alteration of the proposed drainage.
5. The Director may determine that other revisions to the project should require a modification to the permit.
6. The permittee shall at all times provide the operation and maintenance necessary to assure that the permitted BMP's function at optimum efficiency. The following items shall be considered minimum procedures:
 - a. Grass height shall not exceed 6".
 - b. Drop inlets, ditches, wetlands, and pipes shall be kept clear of trash.
 - c. Eroded areas shall be repaired and reseeded in a timely manner.
 - d. Accumulated sediment shall be removed.

III. GENERAL CONDITIONS

1. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to an enforcement action by the Division of Water Quality, in accordance with North Carolina General Statutes 143-215.6A to 143-215.6C.
2. The permit issued shall continue in force and effect until revoked or terminated.
3. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and reissuance, or termination does not stay any permit condition.
4. The issuance of this permit does not prohibit the Director from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit as allowed by the laws, rules, and regulations contained in Title 15A of the North Carolina Administrative Code, Subchapter 2H.1000; and North Carolina General Statute 143-215.1 et. al.
5. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state and federal) which have jurisdiction.

Permit issued this, the 20th day of October, 2003

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION



for Alan W. Klimek, P.E., Director
Division of Water Quality
By Authority of the Environmental Management Commission



State of North Carolina
 Department of Environment and Natural Resources
 Division of Water Quality

JAN 2 / 2003

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 LINEAR ROADWAY PROJECT

DIVISION OF HIGHWAYS
 HYDRAULICS UNIT

This form may be photocopied for use as an original.

DWO Stormwater Management Plan Review:

A complete stormwater management plan submittal includes this application form, a supplement form for each BMP proposed (see Section V), design calculations, and plans and specifications showing all road and BMP details.

I. PROJECT INFORMATION

NCDOT Project Number: 8.2251001 (U-2734) County: New Hanover

Project Name: Military Cutoff Road

Project Location: Wilmington, North Carolina

Contact Person: Mr. Marshall Clawson Phone: (919) 250-4100 Fax: 250-4108

Receiving Stream Name: Howe Creek River Basin: Intra-coastal waterway Class: ORW

Proposed linear feet of project: 12,375 feet

Proposed Structural BMP and Road Station *(attach a list of station and BMP type if more room is needed):*

Hazardous Spill Basins: Station -L- 27+60 right and Station -L-28+60 right / Raised inlets in ditches / natural stream design

Type of proposed project: *(check all that apply):* / Stream restoration / bury pipes

New Widening 2 lane* 4 lane* Curb and Gutter Bridge Replacement

Other *(Describe)* Bicycle path on east side of roadway

**2 lane and 4 lane imply that roadside ditches are used unless Curb and Gutter is also checked.*

II. REQUIRED ITEMS CHECKLIST

Initial in the space provided below to indicate the following design requirements have been met and supporting documentation is attached. Supporting documentation shall, at a minimum, consist of a brief narrative description including (1) the scope of the project, (2) how the items below are met, (3) how the proposed best management practices minimize water quality impacts, and (4) any significant constraints and/or justification for not meeting a, b, c and d to the maximum extent practicable.

Designer's Initials

- GNS a. The amount of impervious surface has been minimized as much as possible.
- GNS b. The runoff from the impervious areas has been diverted away from surface waters as much as possible.
- GNS c. Best Management Practices are employed which minimize water quality impacts.
- GNS d. Vegetated roadside ditches are 3:1 slope or flatter.

cc Stormwater Management Plan (Attached)

II. OPERATION AND MAINTENANCE AGREEMENT

I acknowledge and agree by my initials below that the North Carolina Department of Transportation is responsible for the implementation of the four maintenance items listed. I agree to notify DWQ of any operational problems with the BMP's that would impact water quality or prior to making any changes to the system or responsible party.

Maintenance Engineer's Initials

- DA a. BMP's shall be inspected and maintained in good working order.
DA b. Eroded areas shall be repaired and reseeded as needed.
DA c. Stormwater collection systems, including piping, inlets, and outlets, shall be maintained to insure proper functioning.

Maintenance Engineer's Name: DAVID L. THOMAS, SR. P.E.

Title: DIVISION MAINTENANCE ENGINEER

IV. APPLICATION CERTIFICATION

I, (print or type name) _____ of _____ Branch, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans and that the proposed project complies with the requirements of 15A NCAC 2H .1000.

Title: ENVIRONMENTAL UNIT LEAD

Address: 1598 MAIL SERVICES CENTER, RALEIGH, NC 27699-1548

Signature: (D) Dambett Thomas Date: 8-11-23

V. SUPPLEMENT FORMS

The applicable state stormwater management permit supplement form(s) listed below must be submitted for each BMP specified for this project. Contact the Stormwater and General Permits Unit at (919) 733-5083 for the status and availability of these forms.

Form SWU-102	Wet Detention Basin Supplement
Form SWU-103	Infiltration Basin Supplement
Form SWU-104	Low Density Supplement
Form SWU-105	Curb Outlet System Supplement
Form SWU-106	Off-Site System Supplement
Form SWU-107	Underground Infiltration Trench Supplement
Form SWU-108	Neuse River Basin Supplement
Form SWU-109	Innovative Best Management Practice Supplement
Form SWU-110	Extended Dry Detention Basin Supplement

STORMWATER MANAGEMENT PLAN

Project: 8.2251001, TIP No. U-2734

6/10/03

New Hanover County

Hydraulics Project Manager: Gus N. Saporilas and William T. Stephens, Jr., P.E. (TGS Engineers),
Galen Cail, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project involves the widening of SR 1409 (Military Cutoff Road) in New Hanover County from just north of US 74 (Eastwood Road) to US 17 (Market Street). The overall length of the project is approximately 2.33 miles. The existing roadway is a predominately 30-foot wide roadway with two 12-foot wide lanes and 2-foot paved shoulders. The existing roadway has been widened in places to accommodate turning lanes due to heavy development along the route. With Project U-2734, it is proposed to widen Military Cutoff Road to a four-lane, shoulder section roadway with a raised grass median. Curb and gutter is proposed to be added to the section along the east side of the roadway starting at -L- Station 34+60 +/- to US 17 and to the west side of the roadway from -L- Station 43+60 +/- to US 17. A 10-foot bicycle path is also proposed along the majority of the east side of the project. The project crosses one stream, (Howe Creek) and a box culvert is proposed at this crossing. The project drainage system consists of cross pipes, grated inlets and associated pipe systems, and side and lateral stormwater ditches and swales.

ENVIRONMENTAL DESCRIPTION

The project is located in the Cape Fear River Basin. The one stream crossing along the project is of Howe Creek at approximate -L- Station 28+12. Howe Creek is designated as an Outstanding Resource Water (ORW) by the Department of Coastal Management and the Division of Water Quality. There are seven wetland sites that will be impacted by the proposed project. Wetland impacts will be kept to a minimum by symmetrical widening of the roadway.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMPs and measures that will be used on this project to reduce stormwater impacts are grassed swales, raised grated inlets in ditch lines, hazardous spill basins and natural stream design. In addition, the proposed 2-barrel box culvert at Howe Creek will be buried 1-foot below the stream bed with a sill installed in one barrel to maintain the normal stream flow and channel characteristics. Infiltration basins were considered as required by the Division of Water Quality during the initial phase of the stormwater management plan. However, the infiltration basins were determined to be an unfeasible measure due to the high water tables in the project area.

The following summarizes the BMPs to be used on the proposed project:

GRASSED SWALES

Grassed swales are proposed at various locations as indicated below in the table. In addition, typical cut ditches and the ditch between the proposed roadway and bicycle path will also be used for stormwater storage by raising grated inlets 6-inches above the ditch bed.

The following table summarizes the location and storage potential for grassed swales and ditches proposed for the project.

Grassed Swale and Ditch Stormwater Runoff Storage

Location of Swale Station to Station	Lt or Rt	Storage Volume (cu. ft) (6" uniform depth)	Pavement Runoff Storage (inches)	Swale Description
-L- 16+80+/- to 18+40+/-	LT	150	0.10	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 17+00+/- to 18+47+/-	RT	122	0.07	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 18+90+/- to 19+60+/-	RT	185	0.25	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 19+00+/- to 20+47+/-	LT	185	0.10	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 21+00+/- to 21+90+/-	RT	246	0.26	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 21+90+/- to 23+20+/-	RT	540	0.46	"V"- 6:1 FRONT, 6:1 BACK SLOPE
-L- 22+00+/- to 23+00+/-	LT	985	0.50	2 FT BASE, 3:1 SLOPES
-L- 23+20+/- to 24+40+/-	RT	493	0.35	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 24+80+/- to 25+50+/-	LT	288	0.24	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 24+80+/- to 25+50+/-	RT	308	0.38	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 25+50+/- to 26+50+/-	LT	370	0.26	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 25+50+/- to 26+50+/-	RT	512	0.52	"V"- 6:1 FRONT, 6:1 BACK SLOPE
-L- 26+60+/- to 27+80+/-	RT	328	0.28	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 27+80+/- to 28+77+/-	RT	288	0.35	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 28+78+/- to 29+80+/-	RT	226	0.29	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 28+80+/- to 30+00+/-	LT	225	0.20	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 30+00+/- to 31+00+/-	LT	144	0.15	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 30+00+/- to 31+80+/-	RT	185	0.11	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 35+40+/- to 37+00+/-	LT	675	0.52	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 35+50+/- to 38+22+/-	RT	1412	0.37	2 FT BASE, 3:1 SLOPES
-L- 37+00+/- to 37+84+/-	LT	356	0.37	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 38+65+/- to 41+20+/-	LT	1080	0.43	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 40+20+/- to 41+30+/-	RT	270	0.14	"V" - 3:1 SLOPES
-L- 41+68+/- to 43+40+/-	LT	850	0.28	2 FT BASE- 4:1 FR., 3:1 B. SLOPE
-L- 41+70+/- to 44+20+/-	RT	1278	0.31	2 FT BASE, 3:1 SLOPES

RAISED GRATED INLETS

Where practicable, grated inlets in proposed grassed swales, cut ditches and the ditch between the roadway and the bicycle path will be raised 6-inches above the ditch line to promote stormwater storage and infiltration.

HAZARDOUS SPILL BASINS

Hazardous spill basins will be provided on both sides of the Howe Creek crossing at approximately -L- Station 27+60 RT and -L- Station 28+60 RT. The function of these basins will be to aid in the containment and cleanup of a potential accidental hazardous spill.

These basins will not be used as a storage device during a normal rainfall event. A mechanical gate will be installed at outlet end of the basin to interrupt and contain normal free flow of runoff in the event of a hazardous spill.

NATURAL STREAM DESIGN

It appears that the stream left of -L- Station 21+00 once crossed Military Cutoff Road and connected with the remnant stream to the right of -L- Station 21+40. Presently, the stream on the left has been channelized into a straight lateral roadway ditch for approximately 650 feet before crossing under Military Cutoff Road and connecting back to the natural stream on the right. It was recommended during a field review by the NCDOT and agency personnel to install a pipe across Military Cutoff Road from the existing live stream on the left of the roadway to the remnant stream on the right at a point further south, thus providing restoration. Natural stream design methods in accordance with those recommended in, "Applied River Morphology" (Rosgen, 1996) will be used to relocate the filled in stream on the right from Station 21+46 to Station 22+07 -L- Rt and from Station 22+80 to Station 23+44 -L- Rt. The length of the natural stream design is approximately 456 feet. The length of restored remnant stream is approximately 246 feet.

BOX CULVERT

At -L- Station 28+14 an existing double line of 72-inch corrugated metal pipes will be replaced by a double barrel 9-foot by 7-foot reinforced concrete box culvert. The normal stream flow and channel characteristics will be maintained at the crossing by burying the culvert 1-foot below the stream bed and installing a sill in one barrel to divert low flow through the other barrel. Additionally, 36-inch overflow pipes will be installed in the floodplain on each side of the box culvert to aid floodplain and wetland drainage between the two sides of the roadway.

Two locations where BMP devices are not proposed are on the east side of Military Cutoff Road from -L- Station 13+00 to 17+00 and from -L- Station 45+00 to the end of project. Existing heavy development in these two areas prohibits the use of such devices. Additionally, at the end of the project in the intersection of Military Cutoff Road and US 17 there are properties with groundwater contamination from a service station. A sealed, watertight drainage system will be required in this area in order to prevent combining of the contaminated groundwater and the stormwater. The drainage system which collects stormwater runoff from -L- Station 45+00 to the end of the project will be discharged at approximately -L- Station 46+00 RT into a wetlands area which will aid in the filtration of stormwater before it reaches a receiving stream.

Subject: Minutes from Interagency Hydraulic Design Review Meeting on March 28, 2002 for U-2734 (Military Cutoff Road Widening), New Hanover County

Participants: Marshall Clawson, NCDOT Hydraulics John Hennessey, NCDWQ
Galen Cail, NCDOT Hydraulics Cathy Brittingham, NCDCM
David Chang, NCDOT Hydraulics Bill Arrington, NCDCM
Sue Flowers, NCDOT Roadway Howard Hall, USFWS
Anthony West, NCDOT Roadway Gus Saporilas, TGS Engineers
Dave Timpy, USACE Bill Stephens, TGS Engineers
Lindsey Riddick, NCDOT PD & EA

The meeting began with the distribution of the Stormwater Management Plan and a review of the overall project layout. Marshall Clawson and Bill Stephens proceeded to review each redline plan sheet and field agency comments and questions. The question/comments are summarized as follows:

- 1) Wetland and Stream Impacts at Howe Creek: The wetland limits at Howe Creek need be reinvestigated. Additional delineation may be required to determine which side is more suitable for hazardous spill basins (East or West side of Military Cutoff Road). Lindsey Riddick will check delineation. It was also questioned whether stormwater could even outlet in the wetlands or within 575' on each side of Howe Creek since it is considered an Outstanding Resource Water and falls under CAMA jurisdiction. Cathy Brittingham investigated and informed that, since no CAMA permit is required for this section of Howe Creek (non-navigatable) and it is not an AEC, stormwater can outlet within the 575' buffer and in the wetlands. However, velocities must be non-erosive.

It was determined to keep the proposed hazardous spill basins on the east side of Military Cutoff based on the following:

- The extent of the wetland boundaries are comparable on either side of the road*
- The basins will not impact the wetlands except for the minimal ditching required to enable the basin riser pipe to outlet*
- The future Mayfaire development has proposed detention in the Southwest quadrant of the crossing*
- The east side of Military Cutoff is the downstream side of the crossing and thus the discharge in the basins will not have to pass back through the proposed box culvert.*

- 2) Hazardous Spill Basins at Howe Creek: Dave Timpy emphasized the importance of constructing the basins on the side which will result in the least impact to the wetlands. John Hennessey wanted to know what treatment is provided since the hazardous spill basin is not a treatment facility. He was informed that treatment is acquired as stormwater traverses to the basins through grassed swales and also through storage provided by raised grated inlets (6" at each inlet) in the swales. John also emphasized that outlet velocities into the Howe Creek basin need to be non-erosive and flow spreaders should be considered. Also the basins, as designed, need to be relocated out of the wetlands.

See above responses.

- 3) Environmental Issues from Prior Review Meetings: Dave Timpy expressed concern that stormwater issues brought up in prior meetings and summarized in memos dated 10/2/200 and 12/5/00 may not have been addressed. He said these issues should have already been incorporated in the plans or justification provided as to why not. The memos will be reviewed and these issues will be addressed in the plans, if they have not been so.

The environmental commitments have been reviewed and will be adhered to including the addition of hazardous spill basins and overflow pipes at Howe Creek, retention in the ditches along the bike path, and the relocation/reconnection of the jurisdictional stream at the beginning of the project with natural stream design.

- 4) Proposed Pipe Culverts at Sta 21+43 -L- with Natural Stream Design: Bill Stephens and Marshall Clawson informed that the existing stream flowing towards Military Cutoff Road Sta 21+00 -L- (Lt) does not traverse under the road to Sta 21+90 -L- (Rt) as it seemingly should do based on the natural alignment of the stream. However, pipes are proposed to do so along with natural stream design (nsd) for those portions of stream impacted. All agency representatives wanted information detailing the nsd including stream morphology, typicals, and alignment.

NSD info provided in permit.

- 5) System Sta 35+10 -L- Examined: The 1050 RCP system crossing at Sta 35+10 -L- which outlets at Sta 33+66 -L- (Rt) was questioned as to its sufficiency at stormwater treatment. It was explained that additional treatment is limited by the proximity of development to the roadway and the lack of suitable outlets. To route the stormwater in a swale would require a deep channel and would impact a building along -L- (Rt) and would impact additional wetlands along -L- (Lt).
- 6) System Along -Y5 (Covil Farm Road) Right: The system along Covil Farm Road right was explained to be necessary due to the poor condition of the existing ditch right and the constraints of the site development to improve this ditch. Therefore, the system was provided to eliminate future erosion of this ditch. Dave Timpy

questioned whether wetlands were present at the proposed outlet of this system. Lindsey Riddick will investigate to see if delineation has been done or whether if it will need to be. John Hennessey emphasized that if wetlands are present the outlet velocities need to be non-erosive.

System was relocated to left side of road to reduce R/W impacts. Wetlands were delineated at the outlet of the system by Lindsey. Class I rip rap used at outlet.

- 7) Potential Mitigation Site at Sta 46+00 -L- (Rt) (Hefelfinger Property): Dave Timpy mentioned the Hefelfinger property as a potential mitigation site that had been discussed in the past. The potential acquisition of this site will be investigated by the PD & EA Unit.

- 8) Sealed System at Intersection of Military Cutoff Road and Market Street: Bill and Marshall pointed out that a sealed system is proposed from Sta 48+83 to the End of Project in the vicinity of the Mid State Petroleum, Inc. property due to the presence of contaminated soil. Agency representatives seemed satisfied with the system.