



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 1, 2004

MEMORANDUM TO: Mr. Timothy Johnson, P.E.
Division 8 Engineer

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

for *MAlexander*

SUBJECT: Chatham County, US 421 Widening; TIP Number
R-2610A & B; State Work Order Number 6.529005T

Attached is the U. S. Army Corps of Engineers 404 Individual Permit and the Division of Water Quality 401 Water Quality Certification for the above referenced project. All environmental permits have been received for the construction of this project.

PSH/ma

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. John F. Sullivan, III, FHWA
Mr. Art King, Division 8 Environmental Officer



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

August 17, 2004

Regulatory Division

Action ID. 199700360; Tip No., R-2610

Dr. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
N.C. Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Dr. Thorpe:

In accordance with the written request of February 18, 2004, and the ensuing administrative record, enclosed is a permit to directly discharge dredged and/or fill material into Tick Creek, and tributaries to Deep River, Cedar Creek, Sandy Branch, Bear Creek, Tick Creek, and Welch Creek impacting a total of 2,354 linear feet of streams and 0.26 acres of wetlands to facilitate the construction of the U.S. 421, Transportation Improvements Project (TIP) R-2610, State Project Number 6.529005T, in Chatham County, North Carolina. The proposed 12.1 mile four-lane, partial control of access highway extends from the intersection of the existing SR-1007 (Plank Road)(LAT. DD 35.5572; LONG DD 79.2875) at Gulf and ends at the existing four-lane facility north of SR 2210 (Carter-Brooks Road)(LAT DD 35.6833; LONG DD 79.4179) south of Siler City in Chatham County.

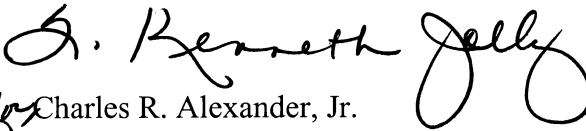
If any change in the authorized work is required because of unforeseen or altered conditions or for any other reason, the plans revised to show the change must be sent promptly to this office. Such action is necessary, as revised plans must be reviewed and the permit modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

- a. You must complete construction before December 31, 2007.
- b. You must notify this office in advance as to when you intend to commence and complete work.
- c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

Should you have questions, contact Mr. Richard K. Spencer of my Wilmington Field Office regulatory staff at telephone (910) 251-4172.

Sincerely,


for Charles R. Alexander, Jr.
Colonel, U.S. Army
District Engineer

Enclosures

Copy Furnished with enclosures:

Chief, Source Data Unit
NOAA/National Ocean Service
ATTN: Sharon Tear N/CS261
1315 East-West Hwy., Rm 7316
Silver Spring, MD 20910-3282

Mr. Ronald Mikulak, Chief
Wetlands Section - Region IV
Water Management Division
U.S. Environmental Protection Agency
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Copies Furnished with special conditions
and plans:

Mr. Pete Benjamin, Field Supervisor
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Doug Huggett
Division of Coastal Management
North Carolina Department of
Environment and Natural Resources
1638 Mail Service Center
Raleigh, North Carolina 27699-1638

Mr. Ron Sechler
National Marine Fisheries
Service, NOAA
Pivers Island
Beaufort, North Carolina 28516

Mr. William D. Gilmore, P.E.
EEP Transition Manager
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Mr. David Rackley
National Marine Fisheries
Service, NOAA
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

REGULATORY

NC Department of Transportation
Permittee
199700360
Permit No.
USAED, Wilmington
Issuing Office

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 :

To directly discharge dredged and/or fill material into Tick Creek, and tributaries to Deep River, Cedar Creek, Sandy Branch, Bear Creek, Tick Creek, and Welch Creek impacting a total of 2,354 linear feet of streams and 0.26 acres of wetlands to facilitate the construction of the U.S. 421, Transportation Improvements Project (TIP) R-2610, State Project Number 6.529005T. This authorization will also include the temporary construction of diversion structures consisting of two impervious dikes and a diversion pipe at stations 13+28, 52+75, 62+34, Section A. This authorization does not include the construction of temporary rock causeways in Bear Creek at Station 22+65 and Tick Creek at Station 97+00, Section B.

Project Location:

In the Cape Fear River basin, from the intersection of the existing SR-1007 (Plank Road)(LAT. DD 35.5572; LONG DD 79.2875) at Gulf to the existing four-lane facility north of SR 2210 (Carter-Brooks Road)(LAT DD 35.6833; LONG DD 79.4179) south of Siler City in Chatham County, North Carolina.

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).

(x) 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.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. **Reliance on Applicant's Data:** The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. **Reevaluation of Permit Decision.** This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.


b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. **Extensions.** General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



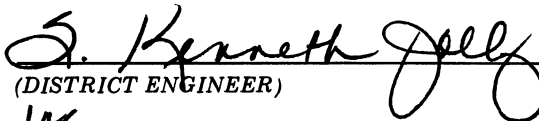

(PERMITTEE)

8/9/04

(DATE)

NC DEPARTMENT OF TRANSPORTATION

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.


(DISTRICT ENGINEER)

CHARLES R. ALEXANDER, JR. COLONEL

8/17/04

(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

SPECIAL CONDITIONS (Action ID. 1997-0-0360; NCDOT/TIP R-2610)

1. All work authorized by this permit must be prepared in strict compliance with the attached plans, which are a part of this permit. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. 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. Richard Spencer, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.

2. The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office, 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 meetings in order to provide that individual with ample opportunity to schedule and participate in the required meetings.

3. 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.

4. Prior to commencing construction within jurisdictional waters of the United States for any portion of the proposed highway project, the permittee shall forward the latest version of project construction drawings to the Corps of Engineers, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings will be acceptable.

5. No in-stream work shall be performed during the period from April 1 to October 15 of any year in Bear Creek or Tick Creek. No clearing or grubbing within 100 meters of Bear Creek or Tick Creek shall be performed during the period from November 15 to April 15 of any year to protect the Cape Fear Shiner.

6. The temporary rock causeways at L-station Station 22+83, Section B shall not extend into the natural stream channel.

7. The temporary rock causeways at L-station Station 97+00, Section B shall not extend more than ½ the width of the natural stream channel. The Causeway shall be placed on filter cloth and shall be removed in its entirety upon completion of bridge construction. Removal of the causeway and stabilization of the disturbed embankment area shall be accomplished within 30 calendar days following bridge completion or 30 calendar days following the end of the in-

stream work moratorium. A restoration plan shall be submitted to the Corps of Engineers, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager for review and approval 30 calendar days prior to the start of causeway removal.

8. The temporary diversion structures at L-stations 13+28, 52+75, and 62+34, Section A shall be constructed in accordance with Section 5.2.2 of the North Carolina Department of Transportation “*Best Management Practices for Construction and Maintenance Activities*”, dated August 2003. All temporary fill shall be removed in its entirety upon completion of the construction at that site.

9. Compensatory mitigation for the unavoidable impacts to 0.26 acres of wetland and 2,137 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 July 30, 2004 from William D. Gilmore, EEP Transition Manager. The EEP will provide 1.1 acres of preservation of non-riverine wetlands, 1.5 acres of preservation of riverine habitat and 15,900 linear feet of stream preservation in the Central Piedmont Eco-Region at the Allen Site in Wake County and 6,670 linear feet of preservation of warm water stream channel in the Central Piedmont Eco-Region at the Eno River – Wilderness Site in Durham 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 0.11 acres of restoration of non-riverine wetlands, 0.15 acres of restoration of riverine wetlands and 2,137 linear feet of restoration of warm water stream channel in the Cape Fear River basin (Hydrologic Cataloging Unit 03030003 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.

10. Stream Relocation Requirements:

- a. The permittee will relocate 253 linear feet of stream at the following locations:
 - i. The permittee shall mitigate for 36 linear feet of unavoidable impacts to an unnamed tributary to Deep River (Section A, Impact Site #1), an important stream channel, by completing 36 linear feet of onsite stream relocation, as described in the permit application
 - ii. The permittee shall mitigate for 217 linear feet of unavoidable impacts to an unnamed tributary to Cedar Creek (Section A, Impact Site #5), an important stream channel, by completing 217 linear feet of onsite stream relocation, as described in the permit application.
- b. The relocations will be performed subject to the following conditions.

i. The stream relocation shall be constructed in accordance with the North Carolina Wildlife Resources Commission's (NCWRC) "Stream Relocation Guidelines", and with the attached permit drawings. NCDOT shall consult with NCWRC on all stream relocations and implement all practicable recommendations in the design of specific site requirements for re-establishment of bank vegetation, and placement of meanders and habitat structures. Vegetation shall be used to the maximum extent practicable to stabilize banks, and riprap and other man-made structural measures shall be minimized.

ii. The permittee shall construct all channel relocations in a dry work area. The permittee shall stabilize the relocated channel before stream flows are directed into the new channel. Stream flows shall not be released into the new channel until approved by the Corps of Engineers, Wilmington District. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. Upon completion of the project, an as-built channel survey shall be conducted. It is recommended that stream surveys, for both project construction and project monitoring, follow the methodology contained in the USDA Forest Service Manual, *Stream Channel Reference Sites* (Harrelson, et.al, 1994). The survey shall document the dimension, pattern and profile of the relocated channel.

iii. The permittee shall identify a stable reference reach that is close to the proposed relocation site and will not be impacted by the proposed highway construction. The applicant will coordinate a field meeting with the Corps of Engineers to approve the reference reach selection prior to channel design and relocation of the existing stream. Baseline data on the reference reach channel dimension, pattern, and profile shall be collected and used as a blueprint for the relocation channel design. A detailed design plan of the relocation stream shall be submitted to this office for review prior to construction, including clearing activities.

iv. Vegetation used to stabilize banks shall be limited to native woody species, and will include establishment of a 50 foot wide vegetated buffer on the relocated channel. Stream banks will be planted with native vegetation that represents both woody (trees and shrubs) and herbaceous species. Species selection will be based on a survey of the vegetation from the approved reference reach. Survival of woody species planted at the stream mitigation sites must be at least 320 trees/acre through year three. A ten percent mortality rate will be accepted in year four (288 trees/acre) and another ten percent in year five, resulting in a required survival rate of 260 trees/acre through year five.

v. The permittee shall monitor the stream relocation site for a period of five years starting the year following construction. Monitoring data at the site should include the following: reference photos, plant survival and channel stability. Data shall be collected each year for 5 years at the same time of year. No less than two (2) bankfull flow events must be documented through the required 5-year monitoring period. If less than 2 bankfull events occur during the first 5 years, monitoring will continue until the second bankfull event is documented. The bankfull events must occur during separate monitoring years.

vi. If within any monitoring year, bank or stream stability is not acceptable as determined by the Corps of Engineers, and remedial action required by the Corps of Engineers is performed, the five-year monitoring period of the affected portions of the stream will start again

at monitor year one. The permittee will coordinate all remedial activities with the Corps of Engineers, Wilmington District, prior to taking any remedial action. The permittee will submit a brief written report with representative photographs within 90 days after the monitoring year is completed.

vii. The permittee shall provide the Corps of Engineers, Wilmington District with a stream mitigation construction sequencing schedule within 30 days following the project preconstruction meeting. The plan, shall at a minimum, indicate a date of start of construction at the relocation site, grading schedule, planting schedule, completion of construction, monitoring schedule, and a date of potential diversion into the new channel. All construction must be completed within one year from the date of issuance of this permit.

viii. The permittee and/or current and subsequent property owners shall maintain the mitigation site, including the buffer, in its natural condition, as altered by work in the mitigation plan, in perpetuity. Prohibited activities within the mitigation site specifically include, but are not limited to: the construction or placement of roads, walkways, buildings, signs, or structures of any kind (i.e., billboards, interior fences, etc.); filling, grading, excavation, leveling, or any other earth moving activity or activity that may alter the drainage patterns on the property; the cutting, mowing, destruction, removal, or other damage of any vegetation; disposal or storage of any debris, trash, garbage, or other waste material; except as may be authorized by the mitigation plans, or subsequent modifications that are approved by the Corps of Engineers. In addition, the permittee shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands or streams on the mitigation property, except as specifically authorized by this permit, or subsequent modifications that are approved by the Corps of Engineers, Wilmington District.

ix. Condition 2.b.viii, above, runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the mitigation property without subjecting the property to legally enforceable restrictions on the use of the property, to ensure its preservation in perpetuity. The instrument utilized to meet this condition must be approved in writing by the Wilmington District Corps of Engineers before execution.

11. 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.

12. 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 (#11) 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 (#11). 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.

13. The permittee shall comply with the conditions specified in the water quality certification, No. 3461, issued by the North Carolina Division of Water Quality on May 10, 2004.

14. The permittee shall place the inverts of culverts and other structures greater than 48 inches in diameter in waters, streams, and wetlands one foot below the bed of the stream to allow low flow passage of water and aquatic life, unless providing passage would be impractical and the Corps of Engineers has waived this requirement. For culverts 48 inches in diameter or smaller, culverts 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. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to, upstream or downstream of the structures.

15. The permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to assure compliance with the appropriate turbidity water quality standard.

16. The permittee shall use soil and erosion control measures for "High Quality Waters" in and within 100 meters of Bear Creek and Tick Creek for the protection of Cape Fear Shiner. These sediment and erosion control measures shall be installed prior to any demolition or land clearing activities and maintained throughout project construction.

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

18. The permittee shall take measures to prevent live or fresh concrete from coming into contact with any surface waters until the concrete has hardened.

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

20. No excavated or fill material shall be placed at any time in waters or wetlands outside the authorized permit area, nor will it be placed in any location or in any manner so as to impair surface water flow into or out of any wetland area.

21. The permittee shall 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 transferring it to a third party.

22. All fill material shall be clean and free of any pollutants except in trace quantities. Metal products, organic materials, or unsightly debris will not be used.

23. This Department of the Army permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

24. In issuing this permit, the Federal Government does not assume any liability for:

- 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 Federal activities initiated on behalf of the general public.
- c. Damages to other permitted or un-permitted activities or structures caused by the authorized activity.
- d. Design and construction deficiencies associated with the permitted work.
- e. Damage claims associated with any future modification, suspension, or revocation of this permit.



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. Smith, Deputy Director
Division of Water Quality

Spencer Ruel

RECEIVED

MAY 14 2004

May 10, 2004

RALEIGH REGULATORY FIELD OFFICE

RECEIVED

MAY 20 2004

REGULATORY

Dr. Gregory J. Thorpe, PhD, Manager
Planning and Environmental Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Dear Dr. Thorpe:

Re: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act,
Proposed widening of US 421 from South of SR 1007 (Plank Road) at Gulf to the Existing Four-Lane Bypass
North of SR 2210 (Carter-Brooks Road) South of Siler City in Chatham County.
WQC Project No. 040158

Attached hereto is a copy of Certification No. 3461 issued to The North Carolina Department of Transportation dated May 10, 2004. This certification authorizes the NCDOT to place fill material in 026 acres of jurisdictional wetlands, 2,354 linear feet of streams, and 0.34 acres of other surface waters in Chatham County. The project shall be constructed pursuant to the application dated January 30, 2004 (received March 24, 2004) to construct the widening of US 421 in Siler City.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Alan W. Klimek, P.E.

Attachments

- cc: Wilmington District Corps of Engineers
- Corps of Engineers Raleigh Field Office
- DWQ Raleigh Regional Office
- Bill Gilmore, Ecosystem Enhancement Program
- Central Files
- File Copy





NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500. This certification authorizes the NCDOT to place fill material in 026 acres of jurisdictional wetlands, 2,354 linear feet of streams, and 0.34 acres of other surface waters in Chatham County. The project shall be constructed pursuant to the application dated January 30, 2004 (received March 24, 2004) to construct the widening of US 421 in Siler City.

Wetland Impacts in the Cape Fear Basin

Section	Riverine (acres)	Non-Riverine (acres)	Total (acres)
Segment R-2610A			
Site 2 (Station L 16+20)	0.08	0	0.08
Site 7 (Station L 82+80)	0.03	0	0.03
Segment R-2610B			
Site 3A (Station L 37+57-37+90)	0.07	0	0.07
Site 6 (Station Number 76+52-76+80 -L)	0.08	0	0.08
Total	0.26	0	0.26

Surface Water Impacts for the Cape Fear River Basin

Section	Stream Impacts (linear feet)	Ponds (acres)	On-Site Natural Channel Design (linear feet)	Mitigation Required
Segment R-2610A				
Site 1 (Station Number 13+28)	105	0	36	-36
Site 3 (Station Number 52+75)	89	0	0	0
Site 4 (Station Number 62+34)	98	0	0	0
Site 5 (Station Number 68+80)	216	0	217	-1
Site 6 (Station Number 11+65)	49	0	0	0
Site 8 (Station Number 84+00)	98	0	0	0
Subtotal	655	0	253	0



Segment R-2610B				
Site 1 (Station Number 11+80-12+40)	144	0	0	0
Site 2 (Station Number 17+80-19+05)	443	0	0	443
Site 3 (Station Number 22+52-23+15)	20	0.01	0	0
Site 4 (Station Number 56+50)	52	0	0	0
Site 5 (Station Number 69+80)	95	0	0	0
Site 6 (Station Number 76+52-76+80)	121	0	0	0
Site 7 (Station Number 79+40)	75	0	0	0
Site 8 (Station Number 81+05-81+15)	92	0	0	0
Site 9 (Station Number 93+90-94+88)	292	0	0	292
Site 10 (Station Number 96+81-97+19)	62	0.02	0	0
Site 11 (Station Number 111+18)	125	0	0	0
Site 12 (Station Number 114+80-115+10)	72	0	0	0
Site 13 (Station Number 122+18-122+40)	105	0	0	0
Subtotal	1699	0.03	0	735
Total	2354	0.03	253	698

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear River in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your application, as described in the Public Notice. Should your project change, you are required to notify the DWQ and you may be required to submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation will be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire three years from the date of the cover letter from DWQ or on the same day as the expiration date of the corresponding Corps of Engineers Permit, whichever is sooner.



Condition(s) of Certification:

1. Construction will 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 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 requirements of the Sedimentation Pollution Control Act.
2. All 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 wetlands and waters is unavoidable, they shall be removed and the natural grade restored after the Division of Land Resources has released the project;
3. If an environmental document is required, this Certification is not valid until a FONSI or ROD is issued by the State Clearinghouse. All water quality-related conditions of the FONSI or ROD shall become conditions of this Certification;
4. No live or fresh concrete shall come into contact with waters of the state until the concrete has hardened.
5. There shall be no excavation from or waste disposal into jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit. Should waste or borrow sites be located in wetlands or stream, compensatory mitigation will be required since it is a direct impact from road construction activities.
6. 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 seedling 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 written justification and any calculations used to determine the extent of rip-rap coverage requested.
7. 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.



8. Placement of culverts and other structures in waters, streams, and wetlands must be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or stream beds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium shall be maintained if requested in writing by DWQ.
9. NCDOT shall provide documentation to the NC Division of Water Quality with 2 months of the issuance of this 401 Water Quality Certification that demonstrates acceptance of the riparian buffer mitigation by the NC Wetlands Restoration Program, or the NC Ecosystem Enhancement Program.
10. 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.
11. 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 elevations. The revegetation of the impacted areas with appropriate native species will be required.
12. Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.
13. 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.
14. Any riprap used must not interfere with thalweg performance and aquatic life passage during low flow conditions.
15. 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.
16. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
17. Two copies of the final construction drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the attached permit drawings contained in the application dated November 26, 2003, and Right-of Way plans submitted on February 13, 2004.
18. The outside 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.



19. 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 modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
20. The NCDOT shall strictly adhere to sediment and erosion control Best Management Practices as described for High Quality Waters entitled "Design Standards in Sensitive Watersheds" (15A NCAC 04B .0024) throughout design and construction of the project.
21. At no time, shall more than one fill causeway be permitted within the Haw River. At no time, shall a fill causeway obstruct greater than 50 percent of the cross-section of the Tick Creek be installed.
22. The temporary causeways located at Tick and Bear Creek shall be removed not later than 30 days after the completion of the bridge deck slab.
23. Compensatory mitigation for impacts to streams shall be done for 698 linear feet of stream impact at a replacement ratio of 1:1. Compensatory mitigation for impacts to jurisdictional streams shall be provided by onsite stream relocations of 217 linear feet of a tributary to Cedar Creek. The onsite stream relocation shall be constructed in accordance with the design submitted in your January 30, 2004 application. All stream relocations shall have 50-foot wooded buffers planted on both sides of the stream. As-Builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit within 30 days of the completion of the construction of the relocations. If the parameters of this condition are not met, then the NCDOT shall supply additional stream mitigation for the 217 linear feet of impacts. In addition to the 217 linear feet of on-site mitigation, compensatory mitigation for an additional 481 linear feet of streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through an in lieu payment to the North Carolina Ecosystem Enhancement Program (NCWRP), and that the EEP has agreed to implement the mitigation for the project. Mitigation for unavoidable impacts to streams shall be provided through an in-lieu payment to the North Carolina Ecosystem Enhancement Program (NCEEP) at a rate of \$200 per linear foot. Therefore, a total payment of \$96,200 shall be submitted to the NCEEP to offset the stream impacts associated with this project.
24. No construction activities shall begin anywhere on the project until a Secondary and Cumulative Impact Analysis for the project is submitted to, and approved by, the NC Division of Water Quality.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.



Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources
Alan W. Klimek, P.E. Director

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. 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. Box 27447, Raleigh, N.C. 27611-7447. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 10th day of May 2004

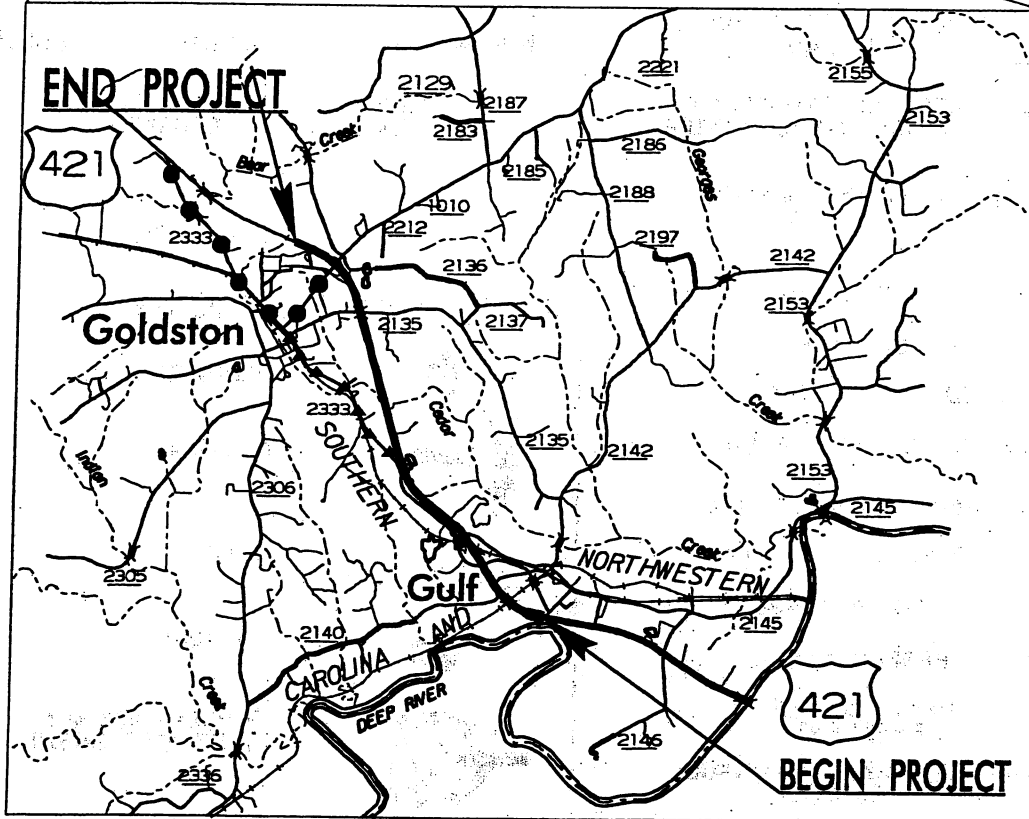
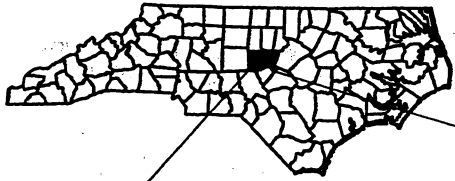
DIVISION OF WATER QUALITY

A handwritten signature in black ink, appearing to read "John E. Hemmsey", is written over the typed name "Alan W. Klimek, P.E.".

Alan W. Klimek, P.E.
Director

WQC No. 3461

VICINITY MAP


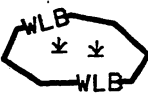


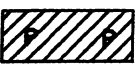


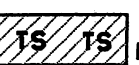
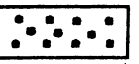
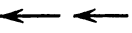


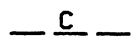
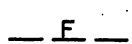

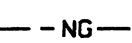
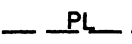



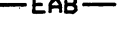







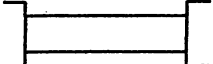
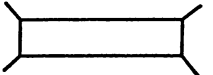




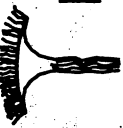
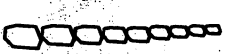

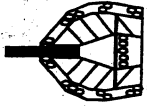

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

LEGEND

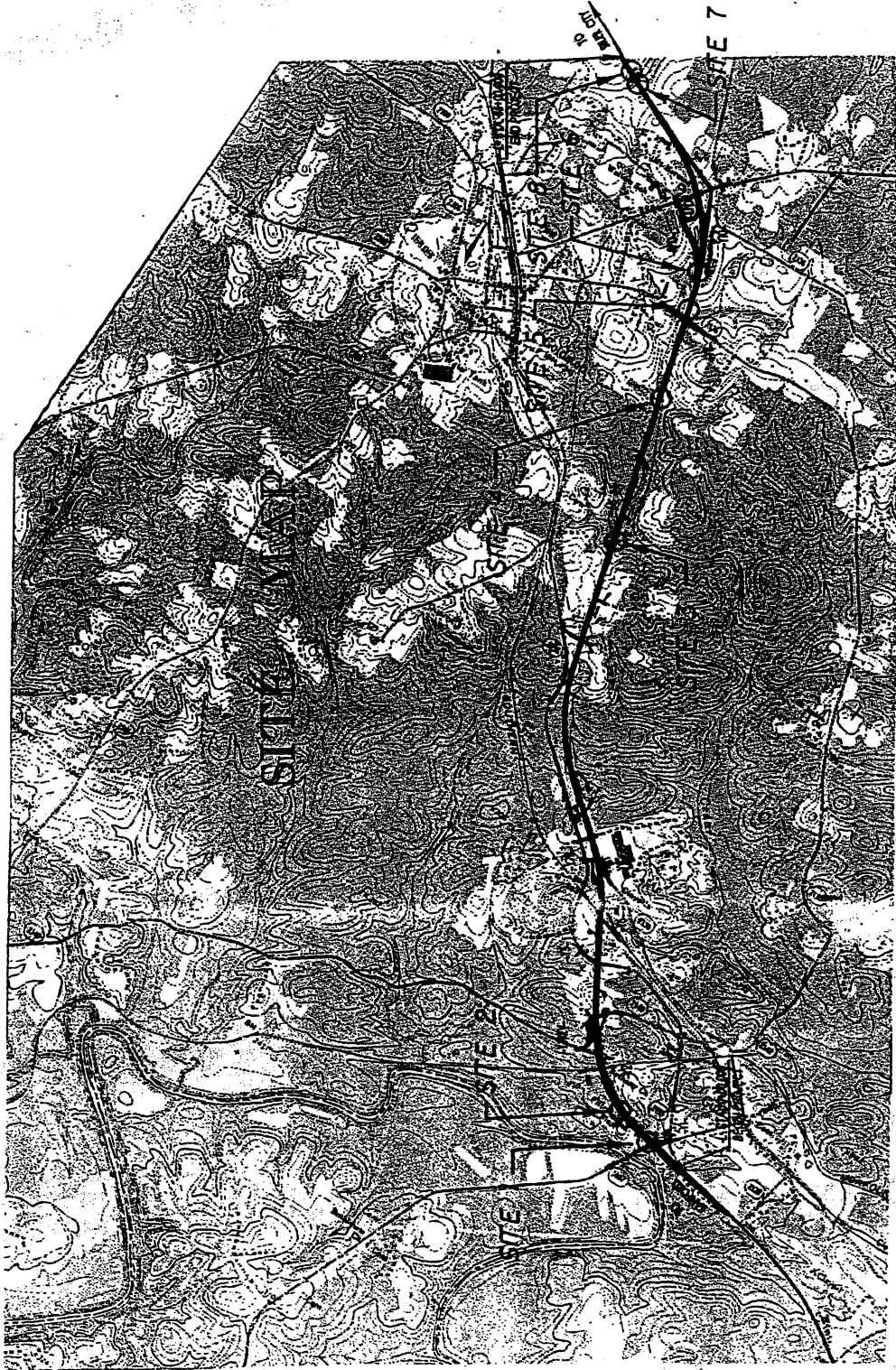
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-  WETLAND
-  DENOTES FILL IN WETLAND
-  DENOTES FILL IN SURFACE WATER
-  DENOTES FILL IN SURFACE WATER (POND)
-  DENOTES TEMPORARY FILL IN WETLAND
-  DENOTES EXCAVATION IN WETLAND
-  DENOTES TEMPORARY FILL IN SURFACE WATER
-  DENOTES MECHANIZED CLEARING
-  FLOW DIRECTION
-  TOP OF BANK
-  EDGE OF WATER
-  PROP. LIMIT OF CUT
-  PROP. LIMIT OF FILL
-  PROP. RIGHT OF WAY
-  NATURAL GROUND
-  PROPERTY LINE
-  TEMP. DRAINAGE EASEMENT
-  PERMANENT DRAINAGE EASEMENT
-  EXIST. ENDANGERED ANIMAL BOUNDARY
-  EXIST. ENDANGERED PLANT BOUNDARY
-  WATER SURFACE

-  LIVE STAKES
-  BOULDER
-  COIR FIBER ROLLS
-  ADJACENT PROPERTY OWNER OR PARCEL NUMBER
-  PROPOSED BRIDGE
-  PROPOSED BOX CULVERT
-  PROPOSED PIPE CULVERT
- (DASHED LINES DENOTE EXISTING STRUCTURES)
-  SINGLE TREE
-  WOODS LINE
-  DRAINAGE INLET
-  ROOTWAD
-  VANE
-  RIP RAP
-  RIP RAP ENERGY DISSIPATOR BASIN
-  BUFFER ZONE

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

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



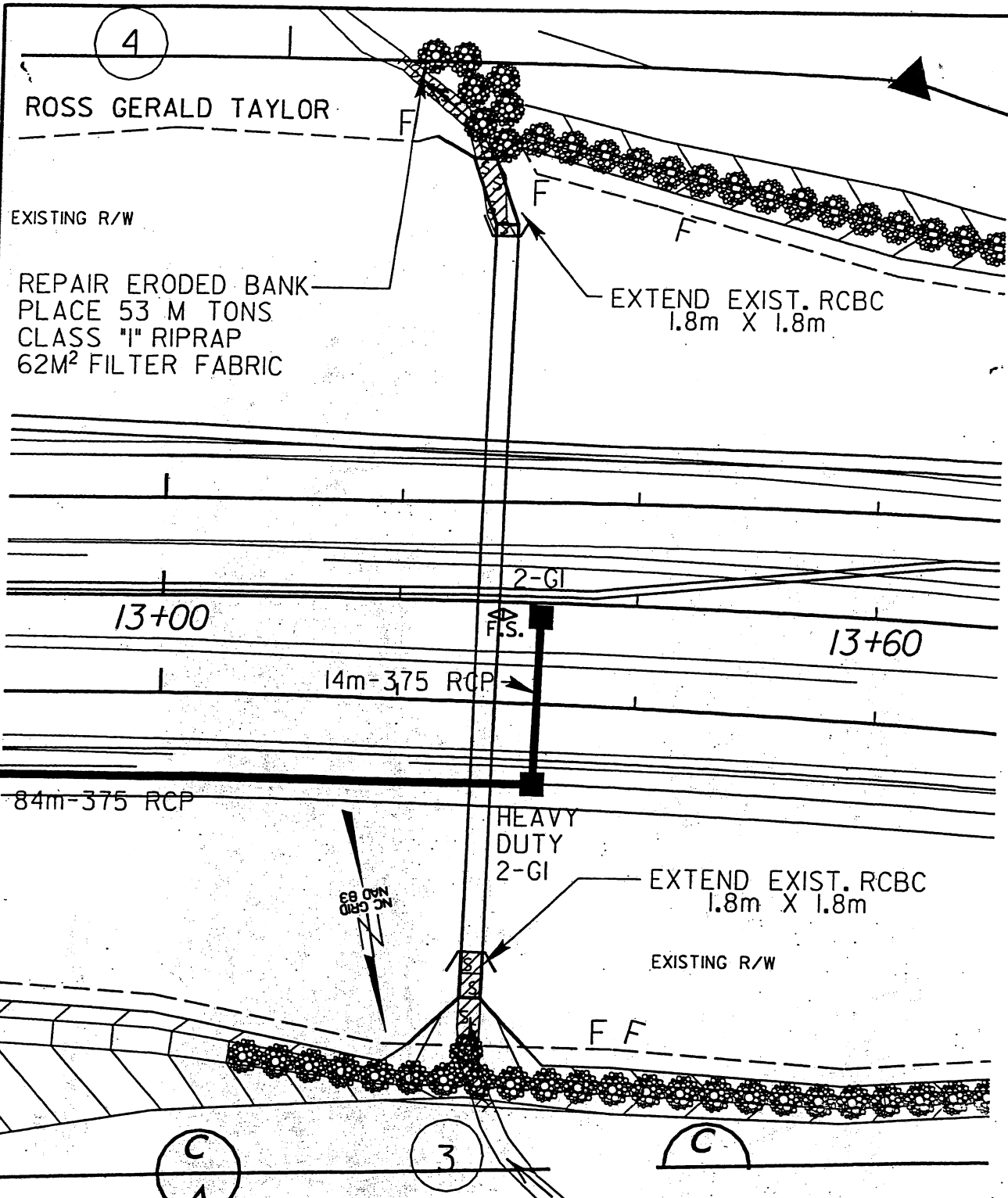
SCALE



N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

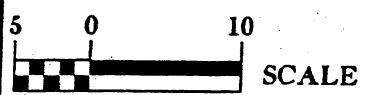
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



BRISTOL GROUP L.L.C.
(BRIAN D. JEDWAB)

PLAN VIEW
SITE 1



 DENOTES FILL IN SURFACE WATERS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

27m-600 RCP
CL IV W/
METHOD B
INSTALLATION

F

6

MARGARET J. ELLIS

EXISTING R/W

CONC.
COLLAR

87M OF

CL 16+10

87M OF

16+00

16+80

600 mm
CONC



SCALE

MODIFIED EXPWY. GTR.

PLAN VIEW SITE 2



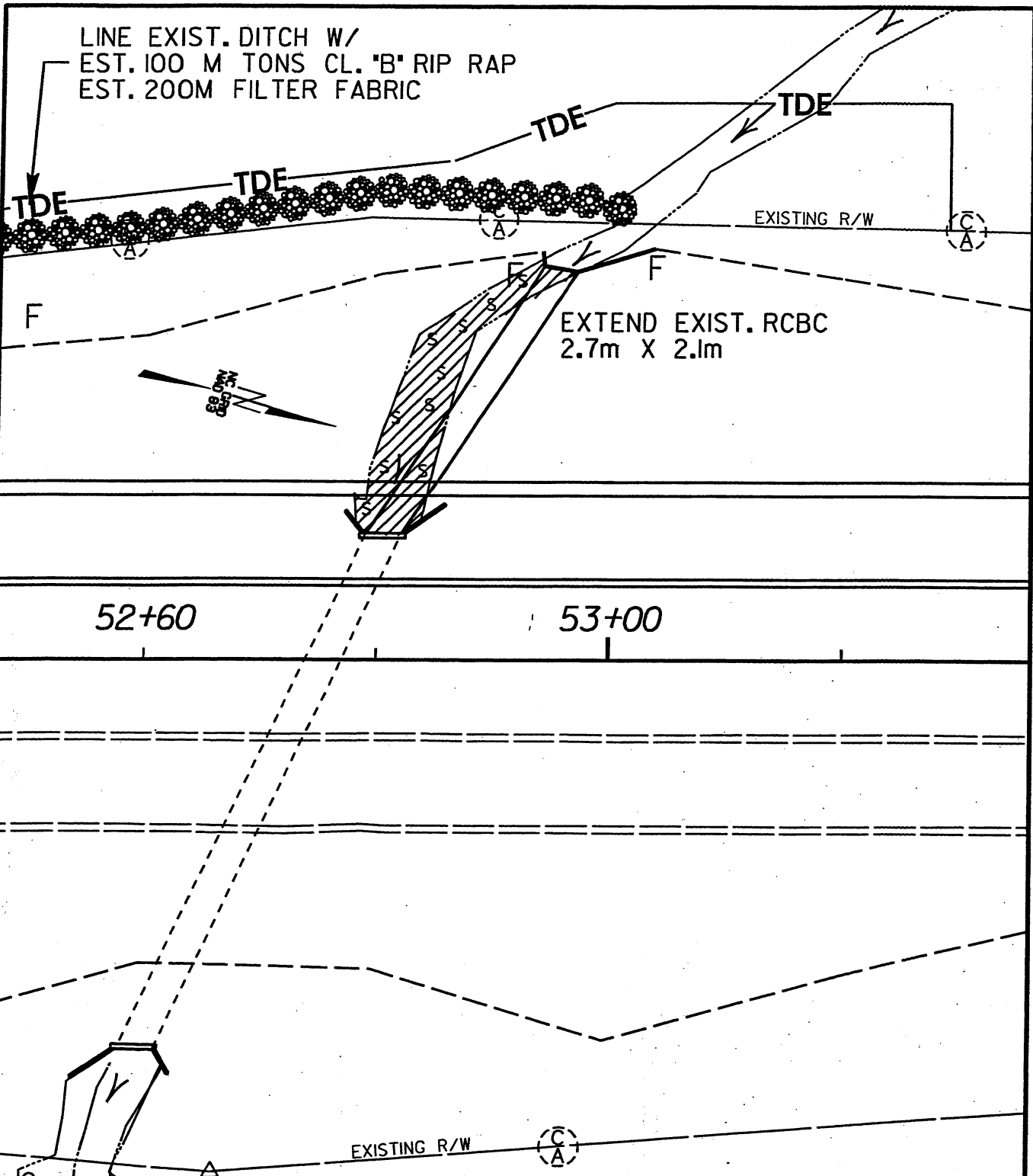
DENOTES FILL IN
WETLAND

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

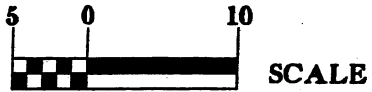
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

LINE EXIST. DITCH W/
EST. 100 M TONS CL. "B" RIP RAP
EST. 200M FILTER FABRIC



PLAN VIEW SITE 3

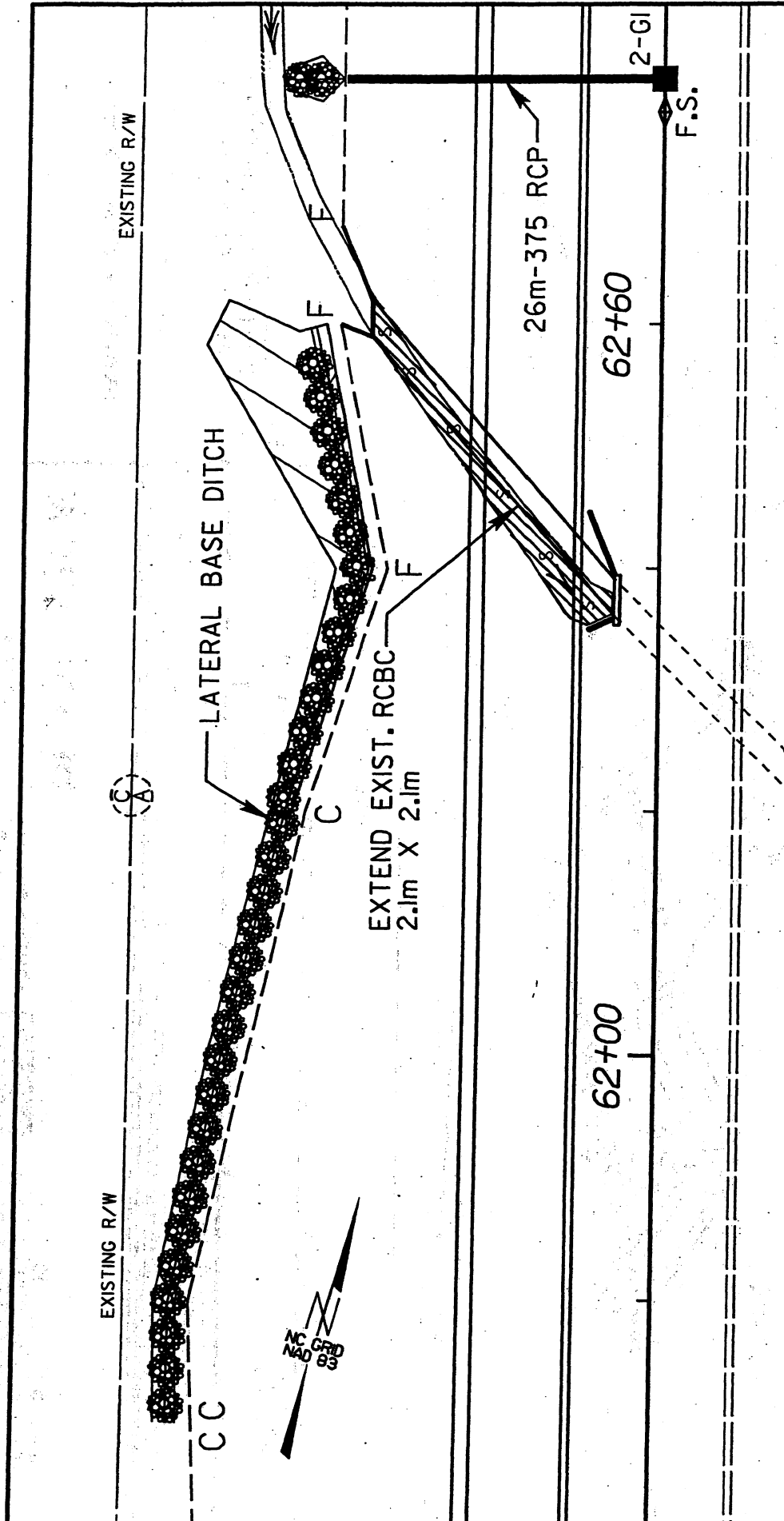


 DENOTES FILL IN
SURFACE WATERS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



N. C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610A)
 SHEET 7 OF 15 6/19/01

PLAN VIEW
 SITE 4

5 0 10 SCALE

DENOTES FILL IN SURFACE WATERS



EARL W. GOLDSTON

37

PDE

PDE

PDE

PDE

PDE

STREAM REALIGNMENT

EXISTING R/W

CLASS "B" RIP RAP
OUTLET PROTECTION

PDE

FFA

(C)

(A)

(C)

(A)

EXISTING R/W

C

F

(C)

(A)

(C)

(A)

(C)

(A)

(C)

(A)

(C)

(A)

(C)

(A)

(C)

(A)

(C)

(A)

LATERAL "V" DITCH

TIE TO
PROP.
STREAM

2-GI

16m-375 RCP

REMOVE

68+40

69+00

CONC DITCH

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

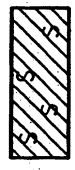
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

SHEET 8 OF 15

6/19/01

PLAN VIEW SITE 5



DENOTES FILL IN
SURFACE WATERS

Morphological Measurement Table

NCDOT Project : R-2610A Chatham County US 421
 Restoration Site: -L- 68+45 It to -L- 69+04 It (UT to Cedar Creek)
 Reference Reach: -L- 68+45 It to -L- 69+80 It (UT to Cedar Creek)

Variables	Existing Stream	Proposed Reach	USGS Station	Reference Reach
Stream Name	Trib. To Cedar Creek -L- Sta 68+45It to 69+80It	Trib. To Cedar Creek -L- Sta 68+45It to 69+04It	None Available	(Same as existing stream)
Stream Type	C5 upper reach	C5		
Drainage Area	0.26 sq. mi.	0.26 sq. mi.		
Bankfull Width	11 ft.	11 ft.		
Bankfull Mean Depth	0.8 ft	0.9 ft		
Width / Depth Ratio	13	12		
Bankfull Xsection Area	9 sq ft	10 sq ft		
Bankfull Mean Velocity	5.0 ft/sec	5.0 ft/sec		
Bankfull Discharge	45 cfs	45 cfs		
Bankfull Max Depth	1.3 ft	1.3 ft		
Width Flood Prone Area	20 ft	43 ft		
Entrenchment Ratio	1.8	2.5		
Meander Length	72 ft	88 ft		
Ratio of Meander Length to Bankfull Width	6.5	8		
Radius of Curvature	29 ft	27 ft		
Ratio of Radius of Curvature to Bankfull Width	2.6	2.5		
Belt Width	23 ft	19 ft		
Meander Width Ratio	2.1	1.7		
Sinuosity - Stream Length / Valley Length	1.1	1.1		
Valley Slope	.019 ft/ft	.018 ft/ft		
Average Stream Slope	.018 ft/ft	.016 ft/ft		
Pool Slope	.0047 ft/ft	.0058 ft/ft		
Ratio of Pool Slope to Average Slope	0.26	0.36		
Maximum Pool Depth	3.3 ft	2.5 ft		
Ratio of Average Pool Depth to Average Bankfull Depth	1.9 / 0.8	2.1 / 0.9		
Pool Width	14	14		
Ratio of Pool Width to Bankfull Width	1.3	1.3		
Pool to Pool Spacing	46	45		
Ratio of pool to pool spacing to bankfull width	4.2	4.1		

Materials:	Existing Channel	Proposed Reach	USGS Gage Station	Reference Reach
Particle Size Distribution of Channel Material (mm)				
D16	0.1	0.1		
D35	0.3	0.3		
D50	1.0	1.0		
D84	22.0	22.0		
D95	77.0	77.0		
Particle Size Distribution of Bar Material				
D16	N/A for sandbed	N/A for sandbed		
D35	N/A for sandbed	N/A for sandbed		
D50	N/A for sandbed	N/A for sandbed		
D84	N/A for sandbed	N/A for sandbed		
D95	N/A for sandbed	N/A for sandbed		
Largest Size Particle on Bar	N/A for sandbed	N/A for sandbed		

Sediment Transport:	Existing	Proposed	USGS Gage Station	Reference Reach
Sediment Transport Validation (Based on Bankfull Shear Stress)				
Movable Particle Size at Bkf Shear Stress from Shields Curve (mm)	60	55		
Computed Bkf Shear Stress, $\tau = GRS (16/12)$	0.90	0.85		
Critical dimensionless shear stress	N/A for sandbed	N/A for sandbed		
Minimal mean bbf (ft) calculated using critical dimensionless shear stress equations	N/A for sandbed	N/A for sandbed		

NCDOT Project R-2610A Chatham County US 421
 Restoration Site -L- 68+45 It to -L- 69+04 It (UT to Cedar Creek)
 Reference Reach -L- 68+45 It to -L- 69+80 It (UT to Cedar Creek)

SEDIMENT TRANSPORT ANALYSIS

Method 1 - Flow data from a single cross section

Station/Description	Avg Flow Depth (ft)	Slope (ft/ft)	Hyd. Rad.	Shear Stress (lb/ft ²)	Bed Material	Vel (ft/s)
Proposed	1.1	0.0180	0.8	0.889	Sand/Gravel	4.9
Reference	1.2	0.0180	0.8	0.913	Sand/Gravel	5.0

Method 2 Shields Diagram / HEC15

**** Critical Shear Stress** 0.05 lb/ft² for D50 of 1 mm at proposed site
***** Permissible Velocity** 3.0 - 5.0 ft/s Sand / Gravel

Method 3 Shields Dimensionless Shear Stress Equation for proposed average channel sections

Particle Size	<u>1.0 mm</u>	for D50 of 1 mm at proposed site
Particle Size	<u>0.039 in</u>	
Dimensionless Shear Stress	<u>2.5243 lb/ft²</u>	
Kinematic Viscosity	<u>0.00001400 ft²/s</u>	at 50° F
Mass Density	<u>1.94 slugs/ft³</u>	
Unit Weight (Particle)	<u>165.0 lb/ft³</u>	
Unit Weight (Water)	<u>62.4 lb/ft³</u>	
Reynolds Number	<u>155.1</u>	

Dimensionless Critical Shear Stress = 0.050 lb/ft² therefore particle will move since
 from Shields Diagram .05 < 0.9

References:

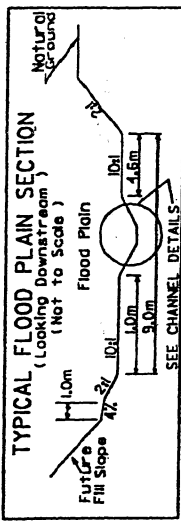
- * Shields Diagram
- ** Hydraulic Engineering (HEC) 15 - Chart 1
- *** NCDENR Erosion and Sediment Control Planning and Design Manual

Method 4 Dimensionless ratios for average channel cross sections

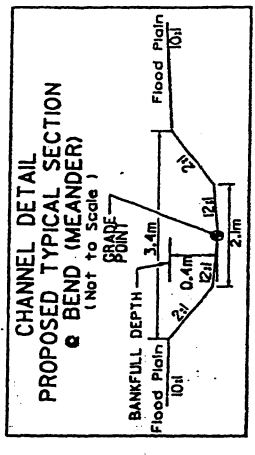
	<u>Proposed</u>	<u>Reference</u>
Q _{BKF}	<u>45.0 ft³/s</u>	<u>45.0 ft³/s</u>
W/D	<u>12.0</u>	<u>13.0</u>
Mannings n	<u>0.035</u>	<u>0.035</u>
Valley Slope	<u>0.0180 ft/ft</u>	<u>0.0190 ft/ft</u>
Avg Stream Slope	<u>0.0160</u>	<u>0.0180</u>
Sinuosity	<u>1.1</u>	<u>1.1</u>
Valley Slope/Sinuosity	<u>0.0160 ft/ft</u>	<u>0.0180 ft/ft</u>
Velocity	<u>5.0 ft/s</u>	<u>5.0 ft/s</u>
Area	<u>10.0 ft²</u>	<u>9.0 ft²</u>
W _{BKF}	<u>11.0 ft</u>	<u>11.0 ft</u>
Mean Depth	<u>0.9 ft</u>	<u>0.8 ft</u>
Wetted Perimeter	<u>11.8 ft</u>	<u>11.2 ft</u>
Hydraulic Radius	<u>0.85 ft</u>	<u>0.80 ft</u>
Shear Stress	<u>0.85 lb/ft²</u>	<u>0.90 lb/ft²</u>
Particle Moved	<u>55.0 mm</u>	<u>60.0 mm</u>
Stream Power:	<u>0.386 lb/ft/sec/ft of stream width</u>	<u>0.410 lb/ft/sec/ft of stream width</u>

Shear stress is greater than critical for both existing and proposed channel.
 Proposed shear / power is approximately equal to reference reach. Rock vanes
 will be used to ensure grade control.

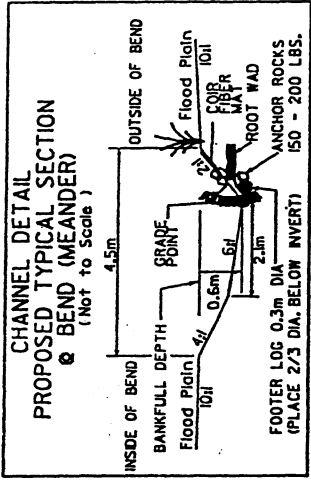
Summary



- NOTES:
1. NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE; ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE.
 2. STABILIZE BANKS AND FLOODPLAIN WITH WOODY VEGETATION AND GRASS.



TYPICAL SECTION BETWEEN BENDS



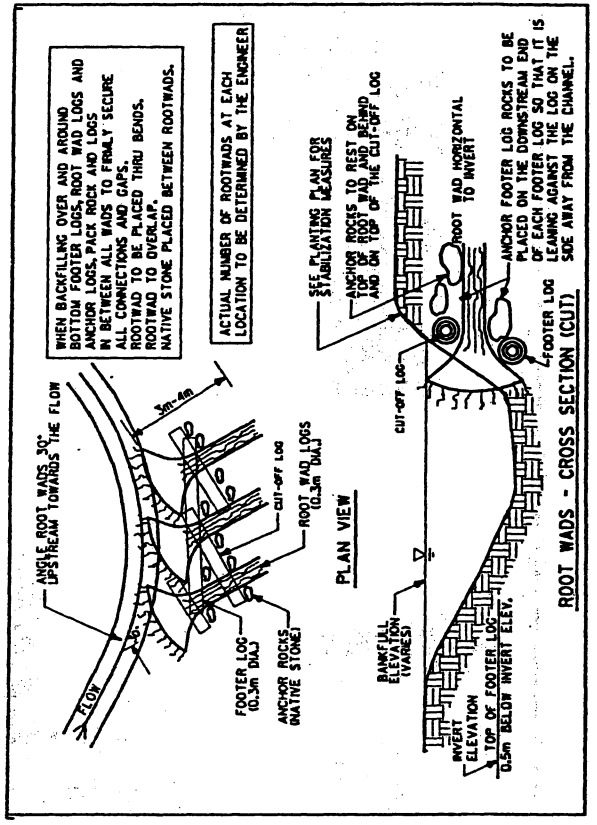
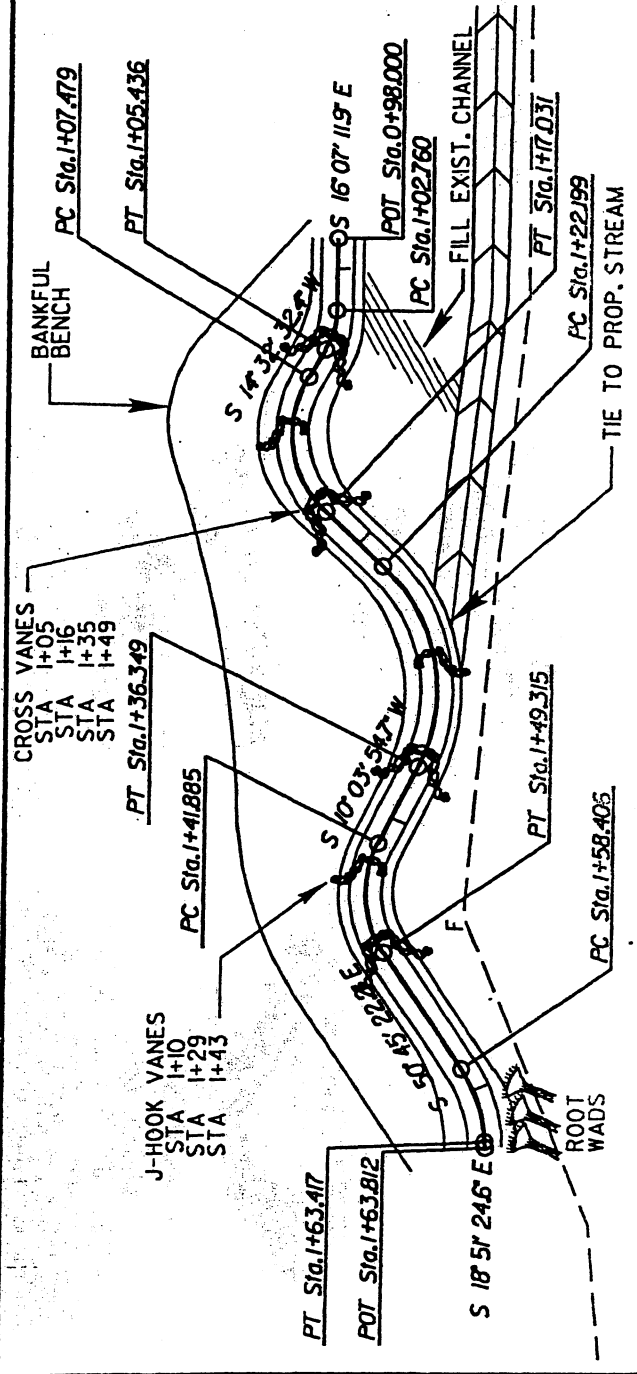
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

SHEET 9 OF 15

2 / 05 / 03

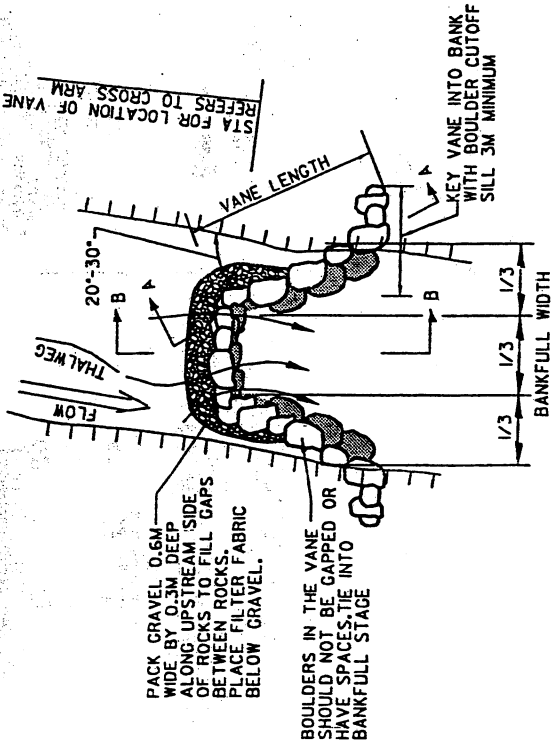


CHANNEL
PLAN VIEW

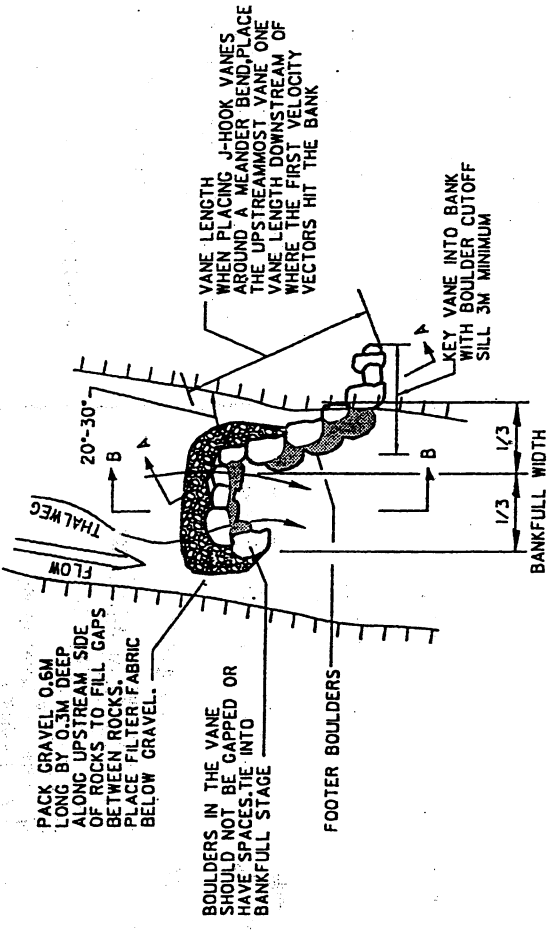
SITE 5



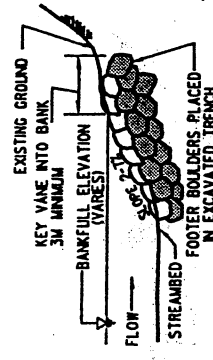
SCALE



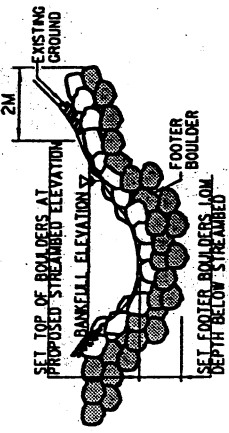
CROSS VANE - PLAN VIEW



J-HOOK VANE - PLAN VIEW

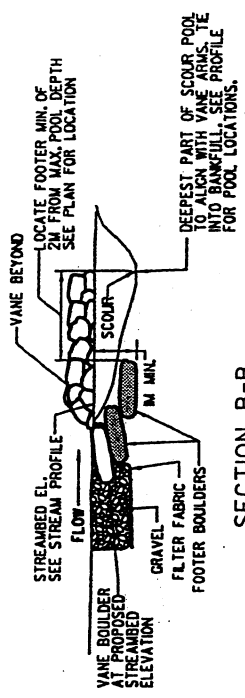


SECTION A-A



CROSS VANE CHANNEL CROSS SECTION VIEW

NOTE: ALL BOULDERS TO BE MINIMUM VOLUME OF 1 CUBIC YARD OR AS DIRECTED IN THE PROJECT SPECIFICATIONS AND SHALL BE ANGULAR, FLAT WITH ONE AXIS 3 TIMES AS LONG AS THE OTHERS TO RESIST ROLLING. BOULDER SHALL BE CLEAN AND FREE OF SEDIMENT

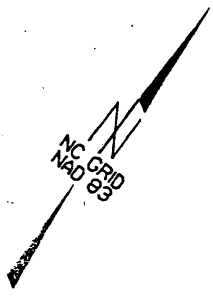


SECTION B-B

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



CLASS 'B' RIP RAP
OUTLET PROTECTION
(Not to be placed in
stream bed)

10m-1500 RCP
W/ ENDWALL
12m-375 RCP
STANDARD
BERM
DRAIN

EXISTING R/W
(A)

(C)
(A)

450 RCP
CONC. COLLAR

22m-375 RCP

F

450 mm
2-GI

375 mm
CMP

CONC. DITCH

REMOVE

6m-400 CSP
W/ ELBOWS

(C)

-RPD-

12+00

CONC.
COLLAR

1500

RETAIN - CONC.

2-GI

11+40



DENOTES FILL IN
SURFACE WATERS



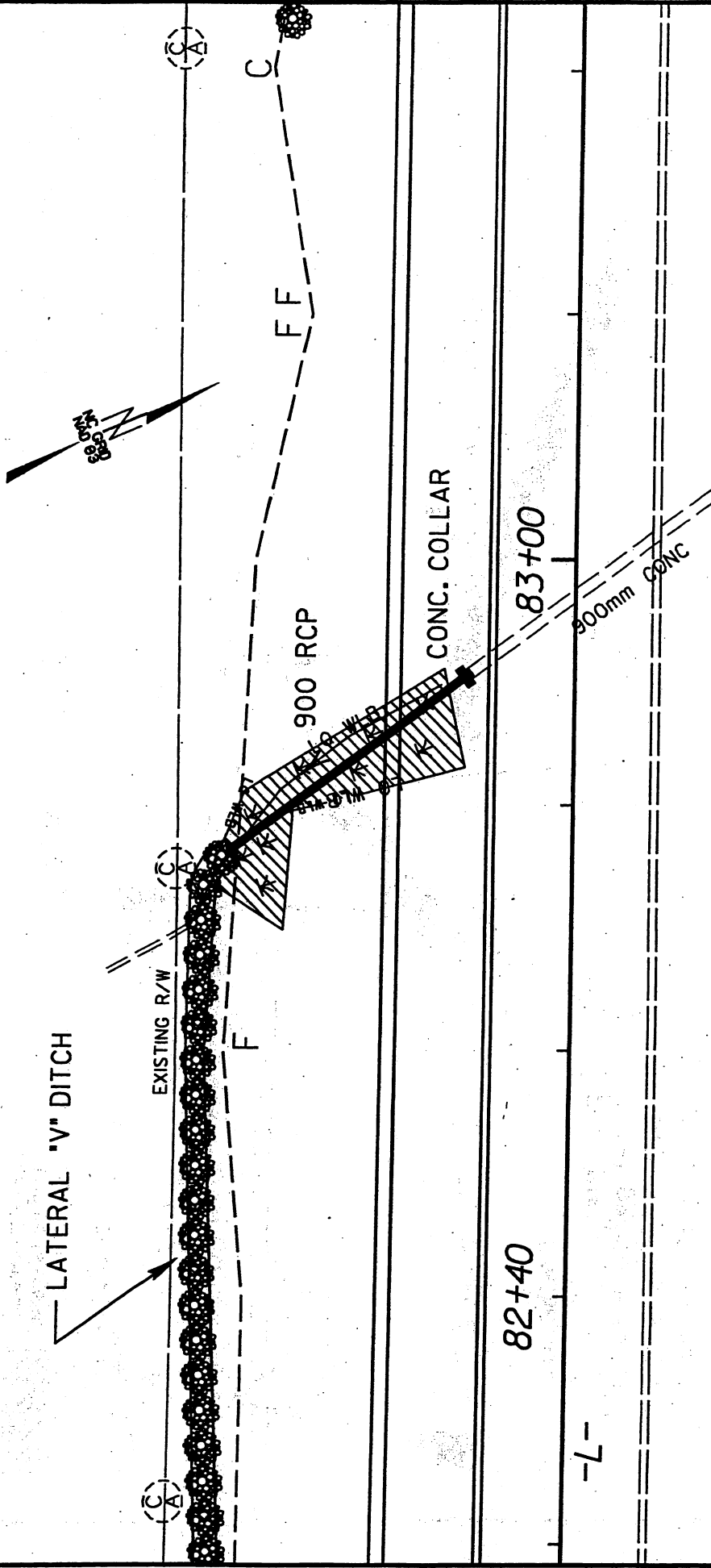
PLAN VIEW

SITE 6

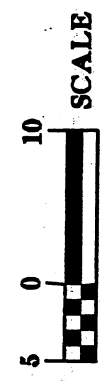
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

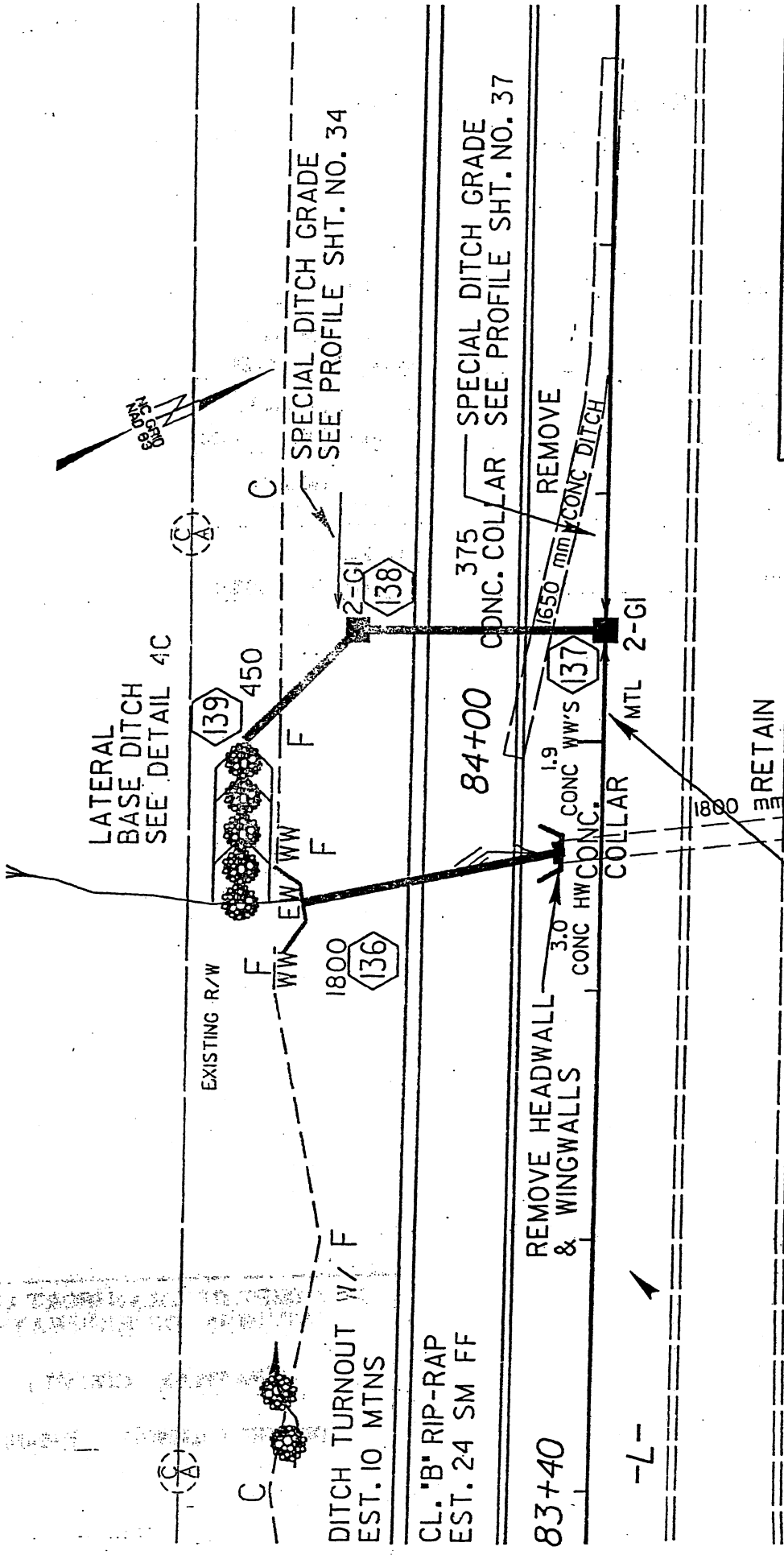


PLAN VIEW
SITE 7



DENOTES FILL IN
WETLAND

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610A)
SHEET 12 OF 15 6/19/01



SPECIAL DITCH GRADE
SEE PROFILE SHT. NO. 34

PLAN VIEW SITE 8

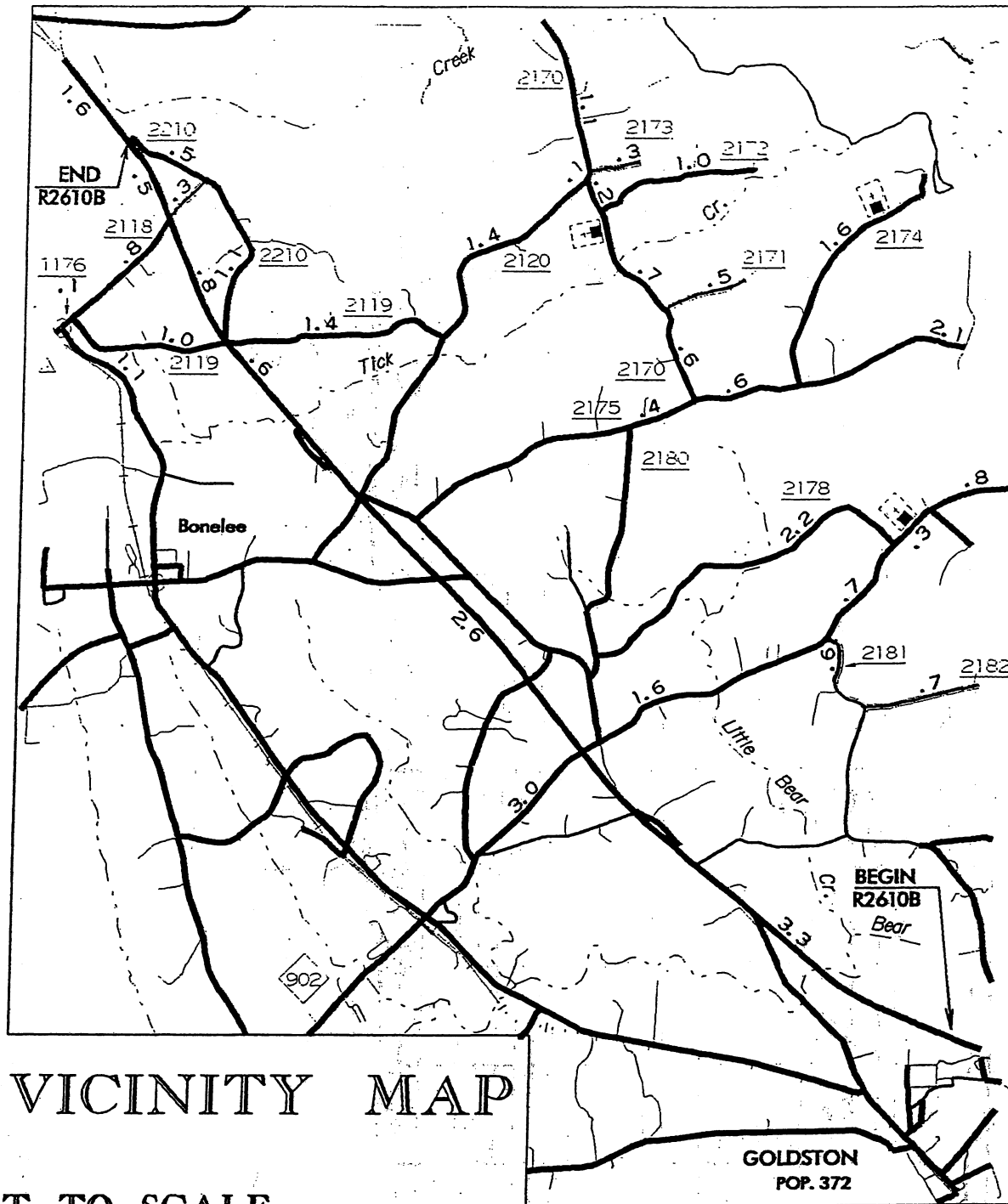


███ DENOTES FILL IN
███ WETLAND

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

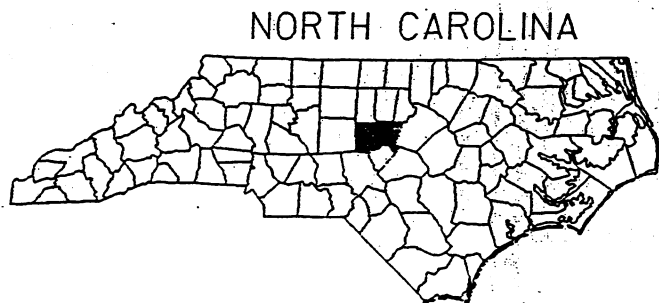
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



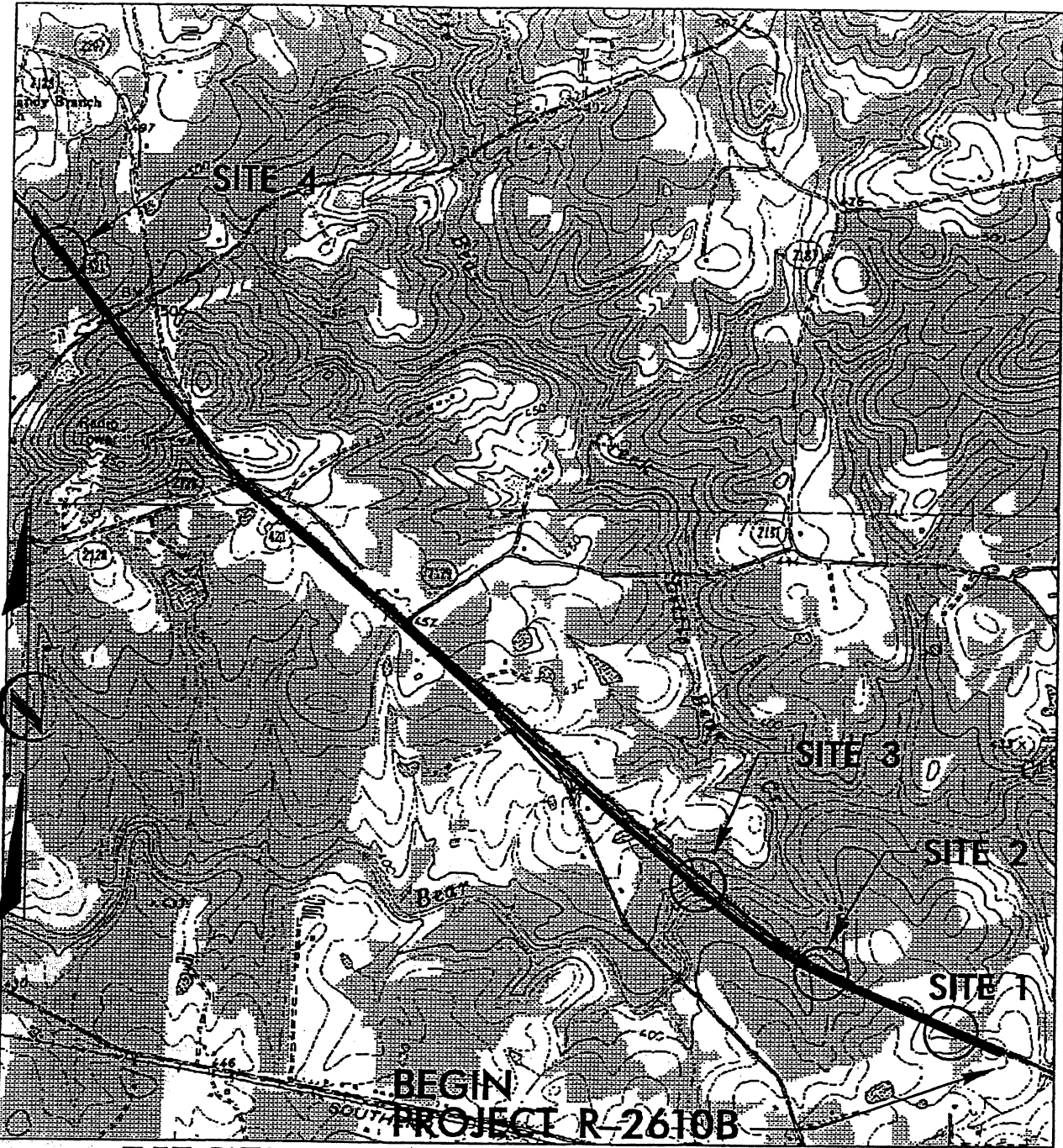
VICINITY MAP

NOT TO SCALE



NORTH CAROLINA

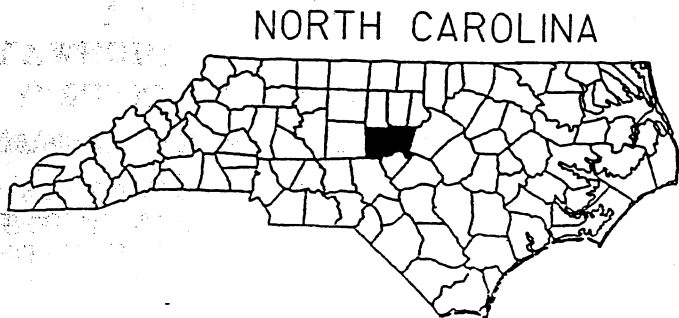
NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY



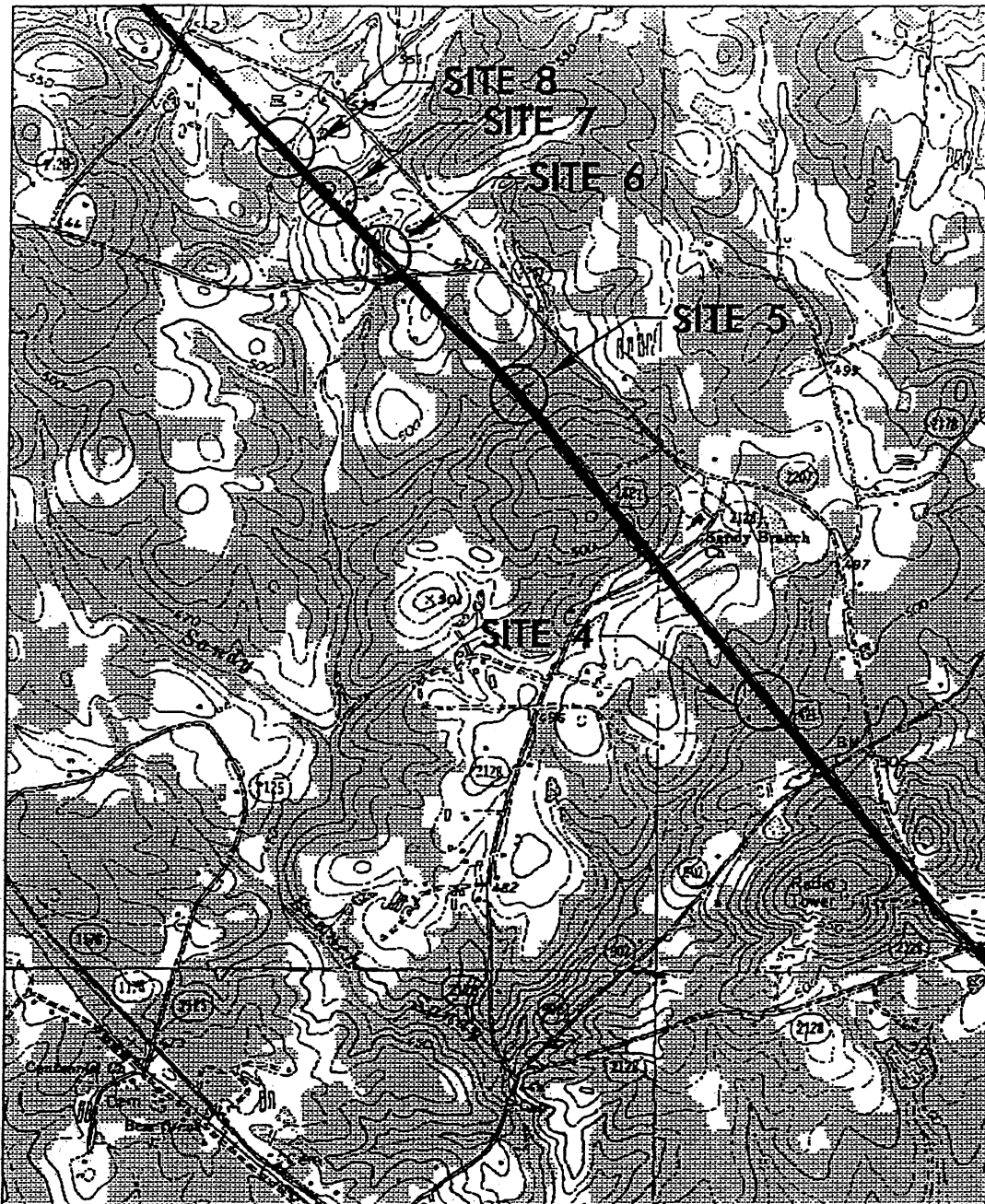
VICINITY MAP



SILER CITY NE, NC QUAD MAP
 GOLDSTON, NC QUAD MAP



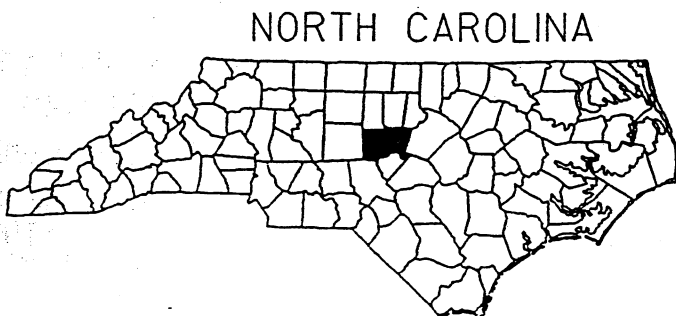
NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY



VICINITY MAP



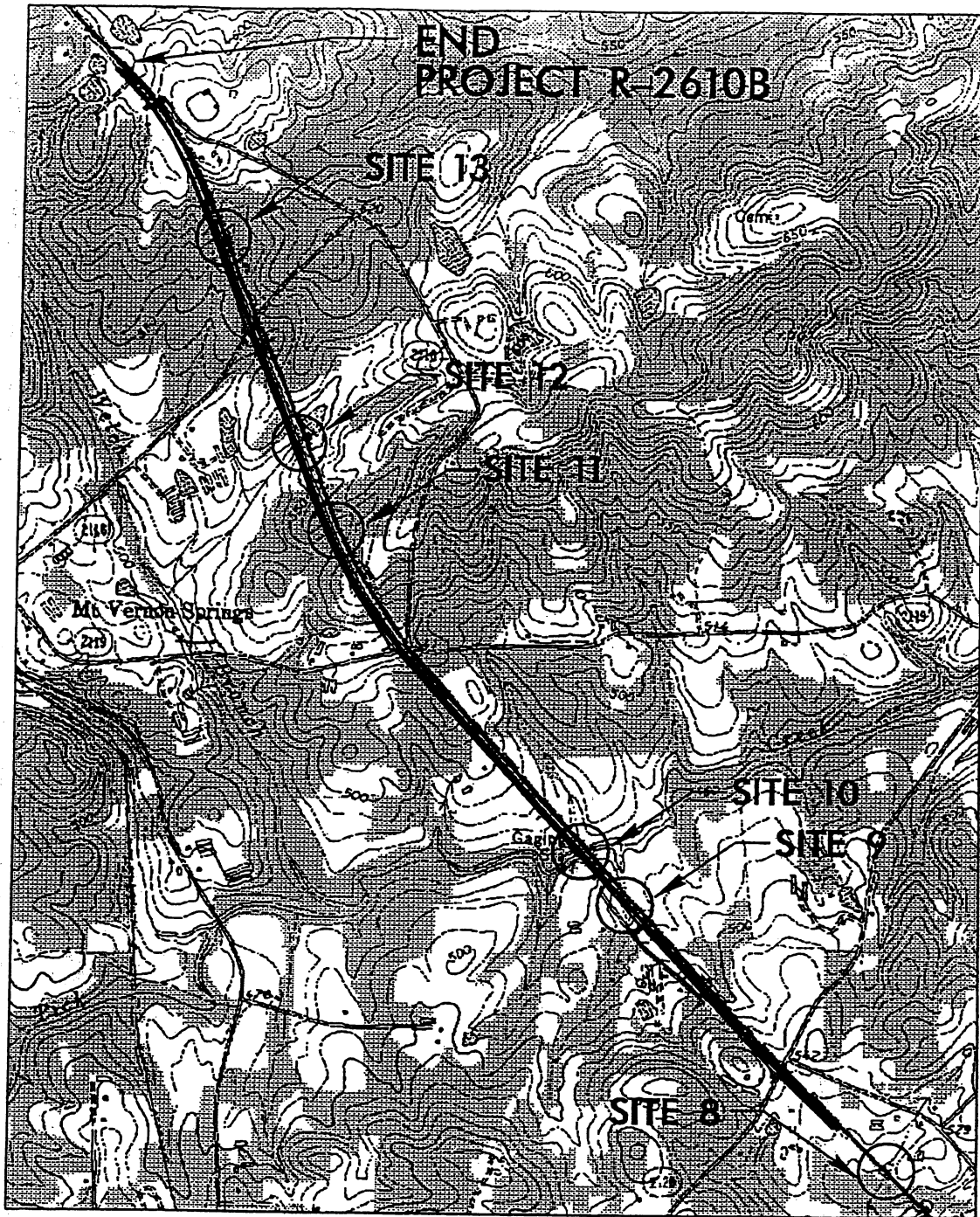
SILER CITY, NC QUAD MAP
 SILER CITY NE, NC QUAD MAP
 BEAR CREEK, NC QUAD MAP
 GOLDSTON, NC QUAD MAP



NORTH CAROLINA

NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
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 SILER CITY

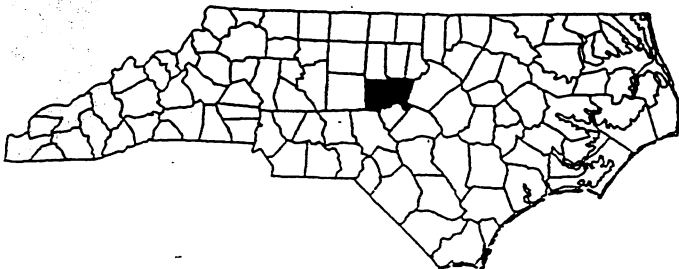


VICINITY MAP



SILER CITY, NC QUAD MAP

NORTH CAROLINA

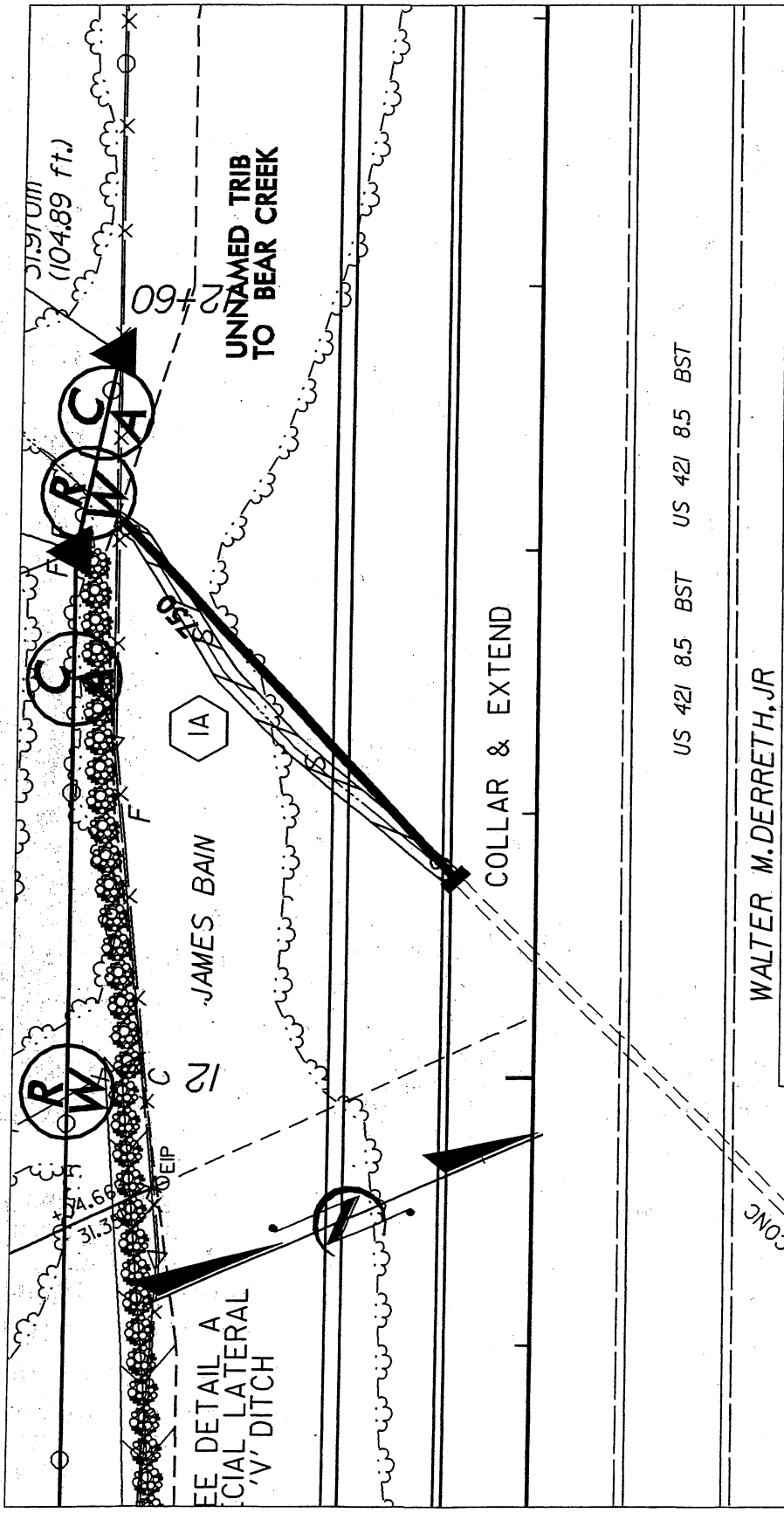


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DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
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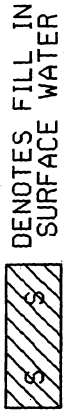
NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 5 OF 46 JULY 25, 2003

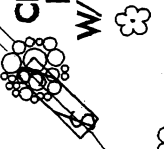
**SITE 1
 PLAN VIEW**

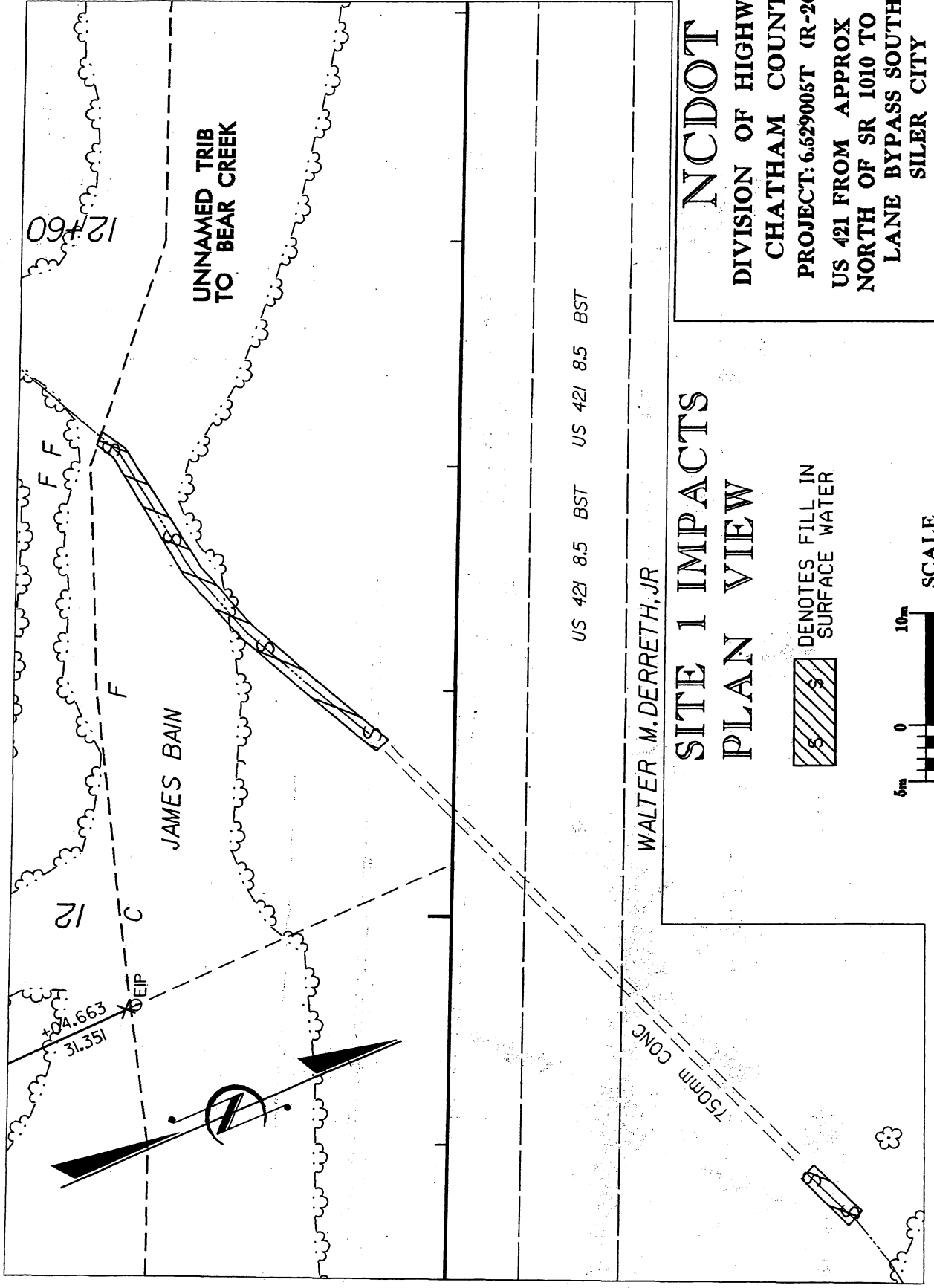
WALTER M. DERRETH, JR

US 421 8.5 BST US 421 8.5 BST



**CLASS B RIP RAP
 EST. 7.3 MTNS
 W/ 17.6 SM FILTER
 FABRIC**

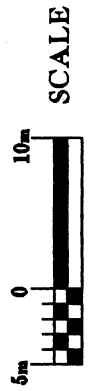




WALTER M. DERRETH, JR

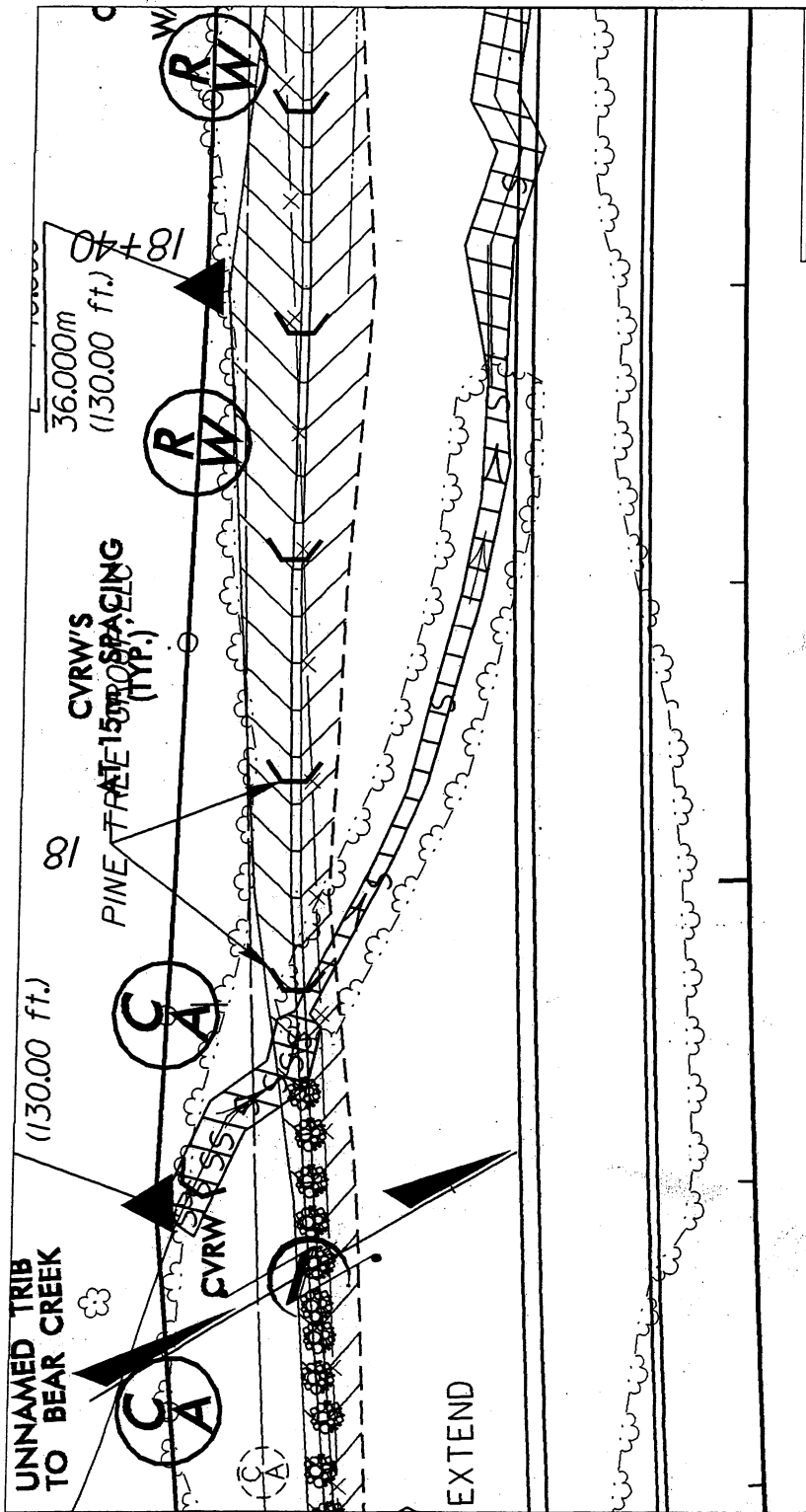
**SITE 1 IMPACTS
PLAN VIEW**

S DENOTES FILL IN
SURFACE WATER



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 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 6 OF 40 JULY 25, 2003



8C 6

PINE TREE GROUP, LLC

8C 6
 DENOTES FILL IN SURFACE WATER

SITE 2
 SCALE PLAN VIEW



NCDOT

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM

NORTH OF SR 1010 TO THE 4

LANE BYPASS SOUTH OF

SILER CITY

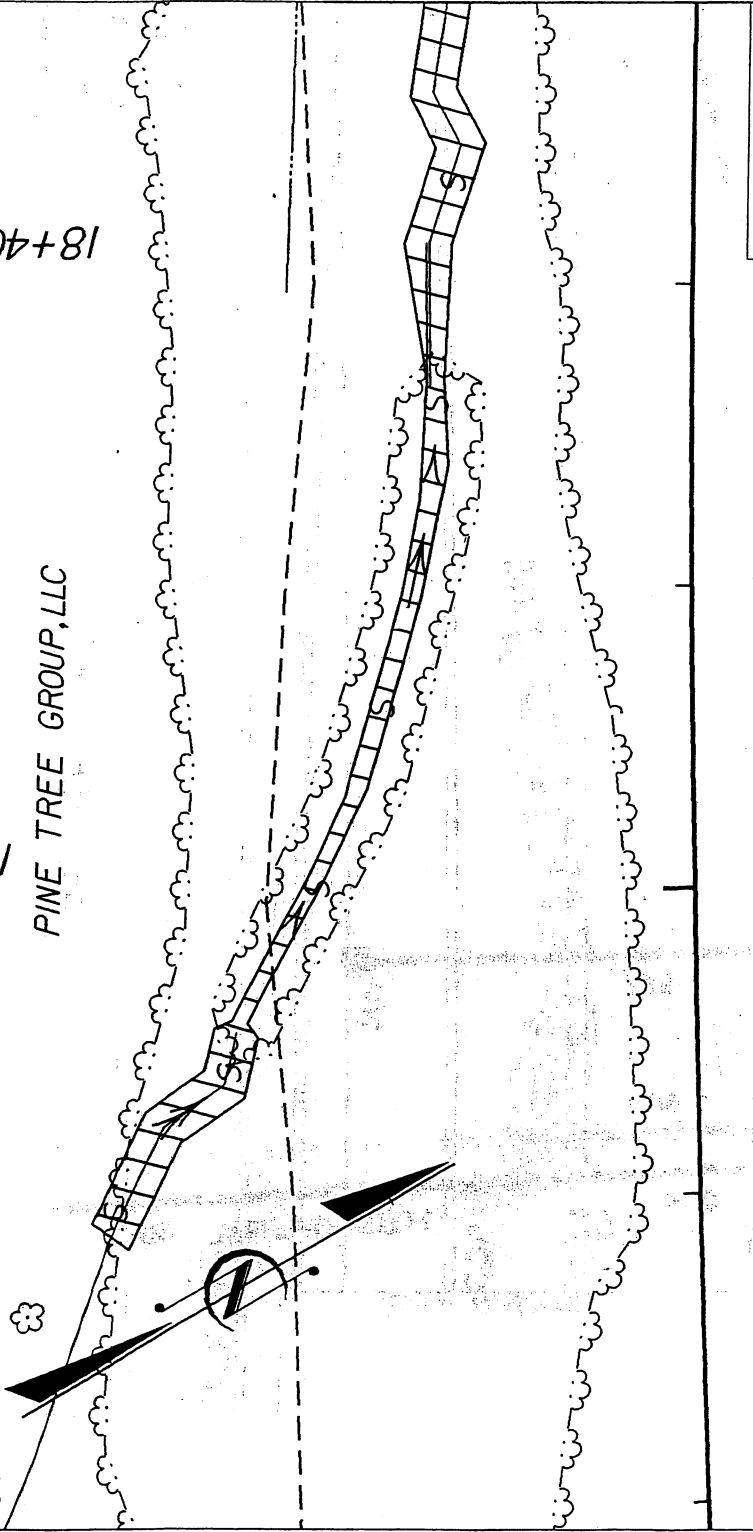
SHEET 7 OF 40 JULY 25, 2003

UNNAMED TRIBUTARY
TO BEAR CREEK

18

PINE TREE GROUP, LLC

18+40



MATCH LINE

PINE TREE GROUP, LLC

SITE 2 IMPACTS PLAN VIEW



DENOTES FILL IN
SURFACE WATER

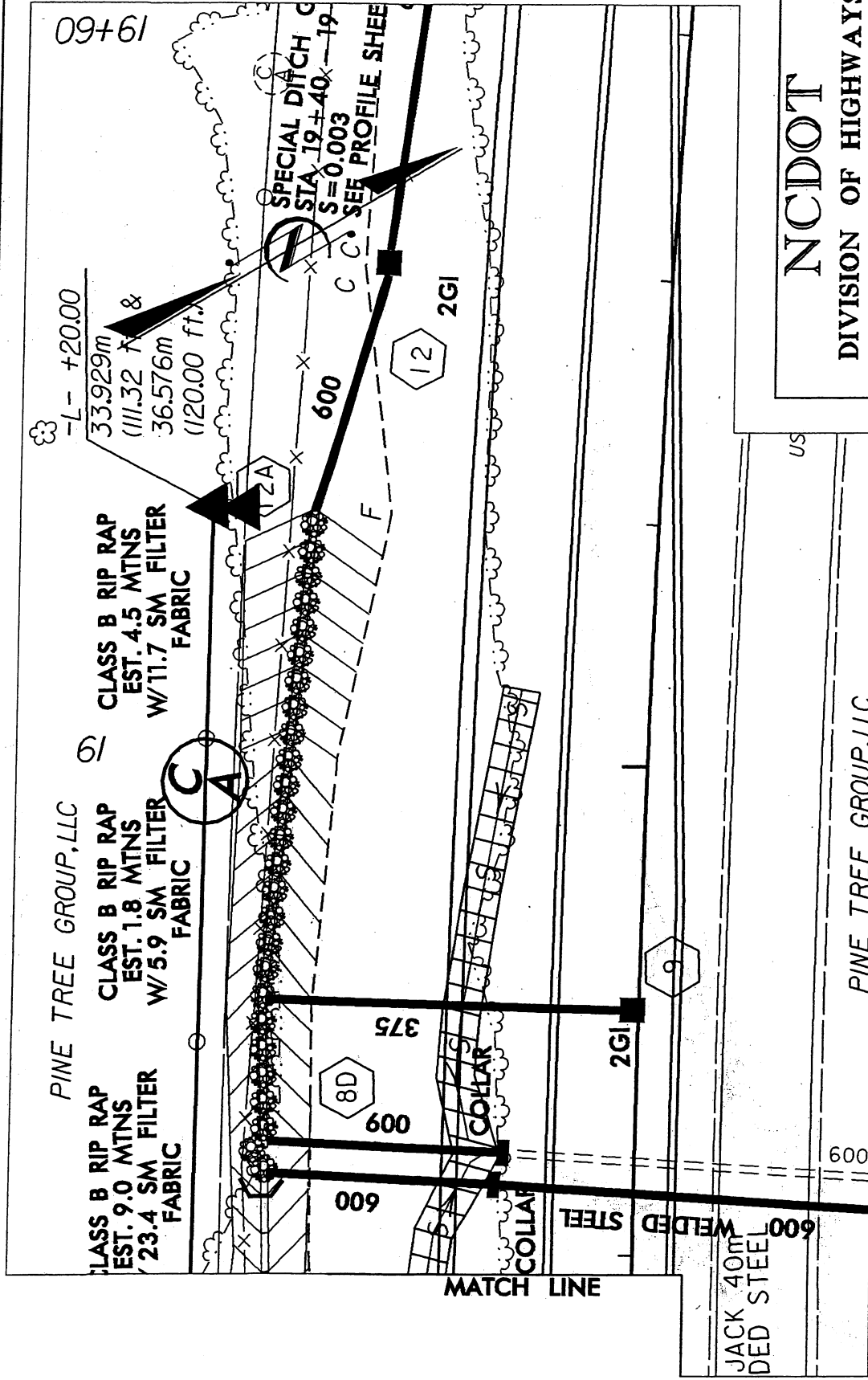
NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

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DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILVER CITY

SHEET 9 OF JULY 25, 2003

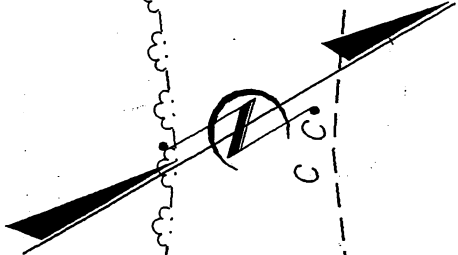
SITE 2
 SCALE PLAN VIEW



PINE TREE GROUP, LLC

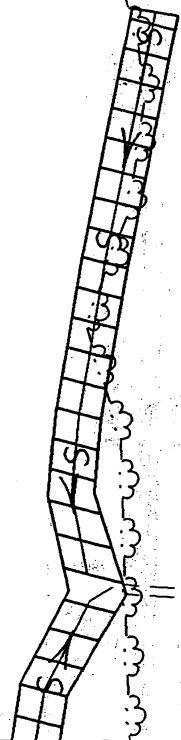
61

09+61



C C

F



MATCH LINE

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 10 OF JULY 25, 2003

US

PINE TREE GROUP, LLC

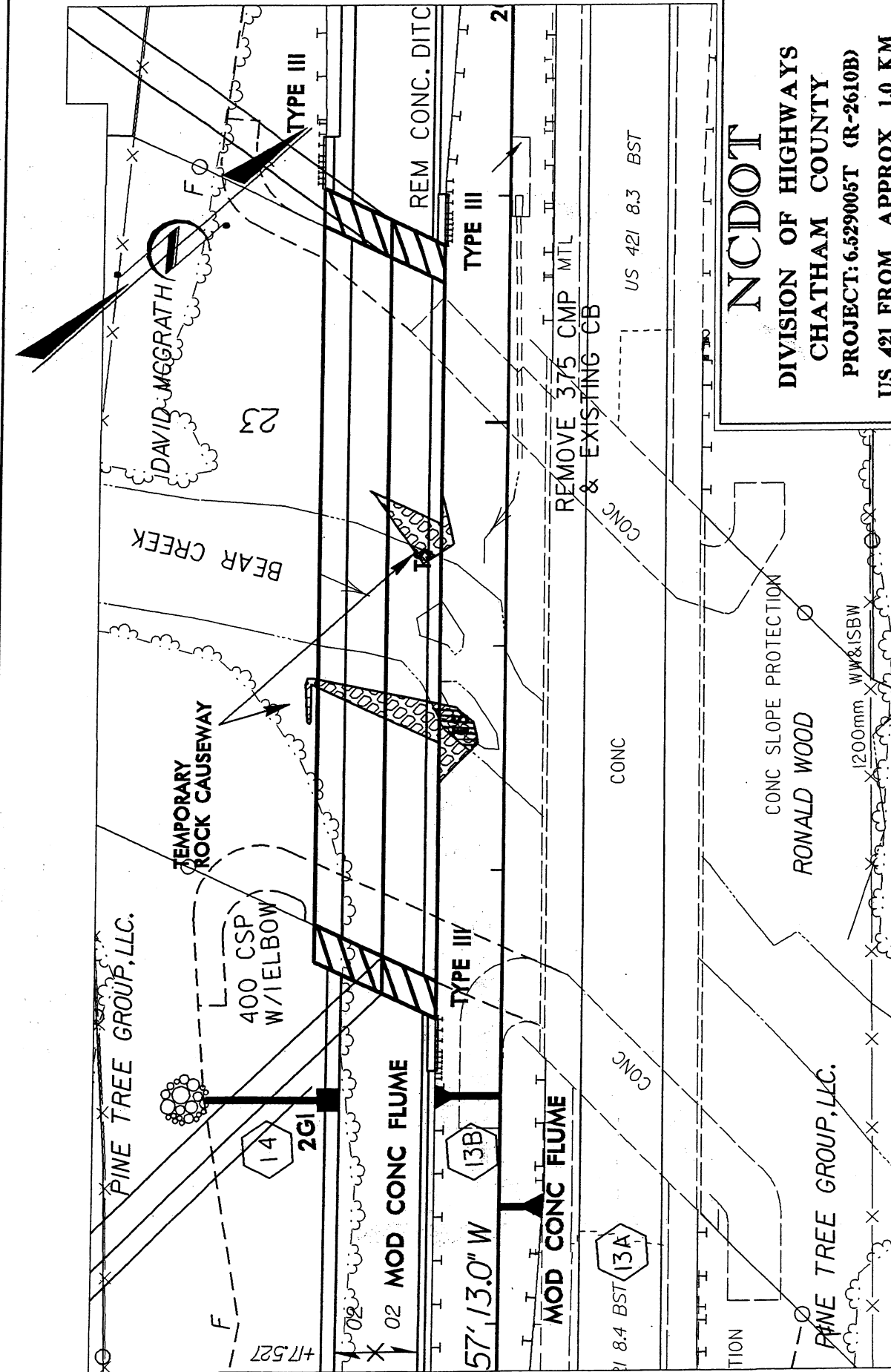
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SITE 2 IMPACTS PLAN VIEW

DENOTES FILL IN
SURFACE WATER



SCALE



NCDOT

**DIVISION OF HIGHWAYS
CHATHAM COUNTY**

**PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY**

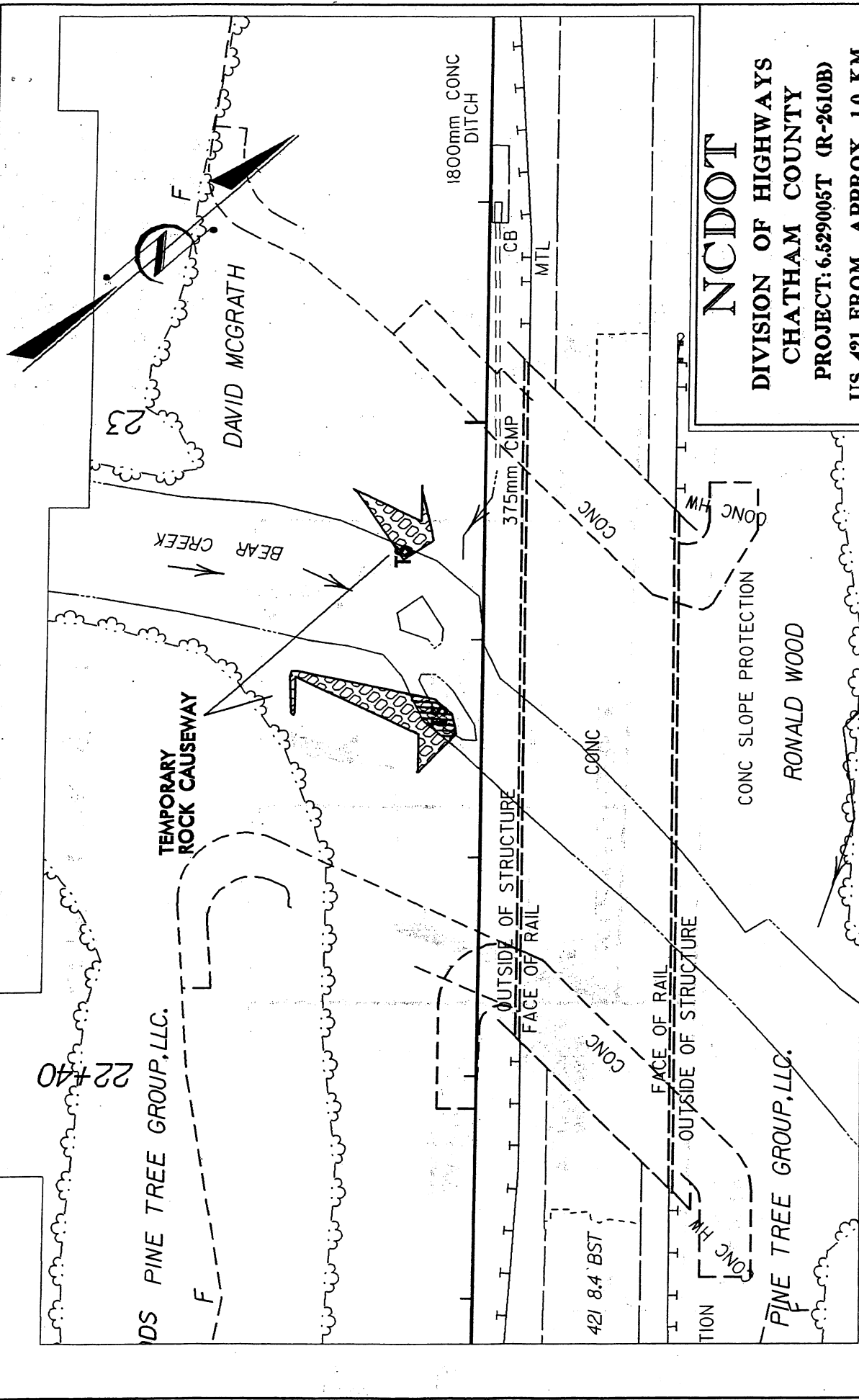
SHEET 1 OF 1 JULY 25, 2003

TS TS
DENOTES TEMPORARY
FILL IN SURFACE
WATER

**SITE 3
PLAN VIEW**

SCALE





NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY
SHEET 1 OF 16 JULY 25, 2003

TS TS
DENOTES TEMPORARY
FILL IN SURFACE
WATER

SITE 3 IMPACTS
SCALE PLAN VIEW



STA 22+83.4 -L- 10.6m LT TO CENTER OF TRAVELWAY
 RC DECK ON STEEL I-BEAMS - 1@18.0m, 1@26.2m, 1@18.0m
 GRADE PT. EL = 121.626m SKEW = 1/5

BEGIN BRIDGE
 -L- STA 22+52 +/-

END BRIDGE
 -L- STA 23+14 +/-

CLASS 'II'
 RIPRAP TO BERM
 BENEATH BRIDGE

1.5:1

500-yr WSEL = 119.69m
 100-yr WSEL = 118.80m
 50-yr WSEL = 118.46m

NORMAL WSEL = 113.56m

TEMPORARY ROCK
 CAUSEWAY

HISTORICAL
 HIGH WATER
 EL = 119.69m
 119.00m

CLASS 'II'
 RIPRAP

ROCK

123

121

119

117

115

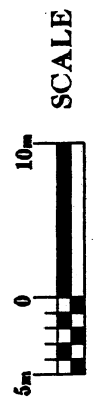
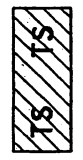
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 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

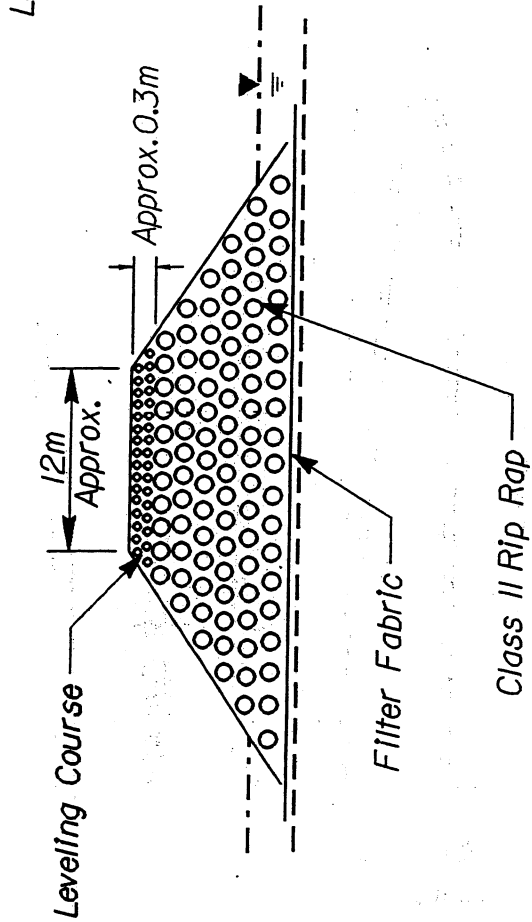
SHEET 13 OF 44 JULY 25, 2003

SITE 3 PROFILE

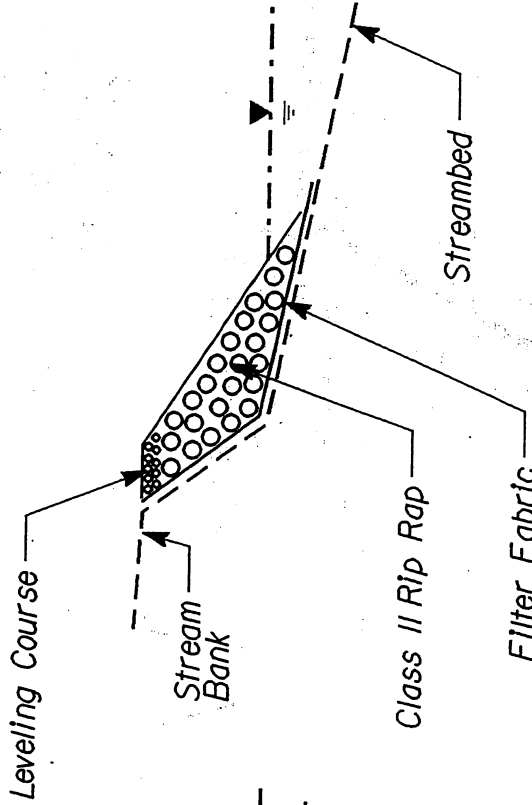
DENOTES TEMPORARY
 FILL IN SURFACE
 WATER



END VIEW



CROSS SECTION



TEMPORARY WORK PAD DETAIL

Note:
 The rock pad is to be used for access to the interior bridge bents at Bear Creek and Tick Creek.
 The pad locations are as shown in the plan and profile views of the permit drawings.
 All Rock placed in the stream and on the stream banks is to be removed.
 The leveling course is typically Class "A" rip rap, but not limited to a particular size.
 Reclaimed Rip Rap may be used for slope protection at the discretion of the Engineer.

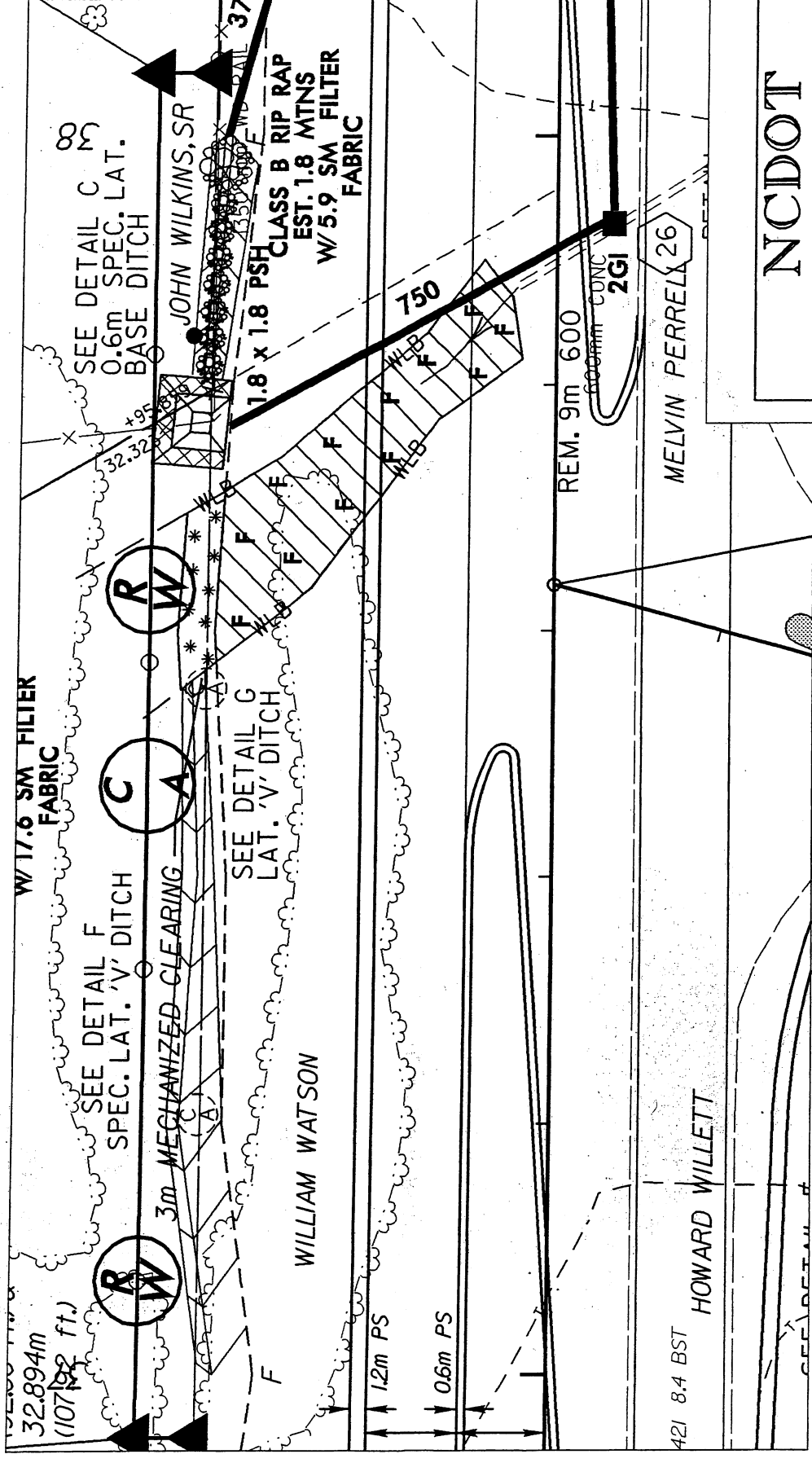
NCDOT

**DIVISION OF HIGHWAYS
 CHATHAM COUNTY**

PROJECT: 6.529005T (R-2610B)

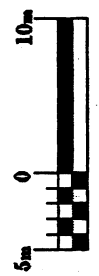
**US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY**

SHEET 14 OF 40 JULY 25, 2003

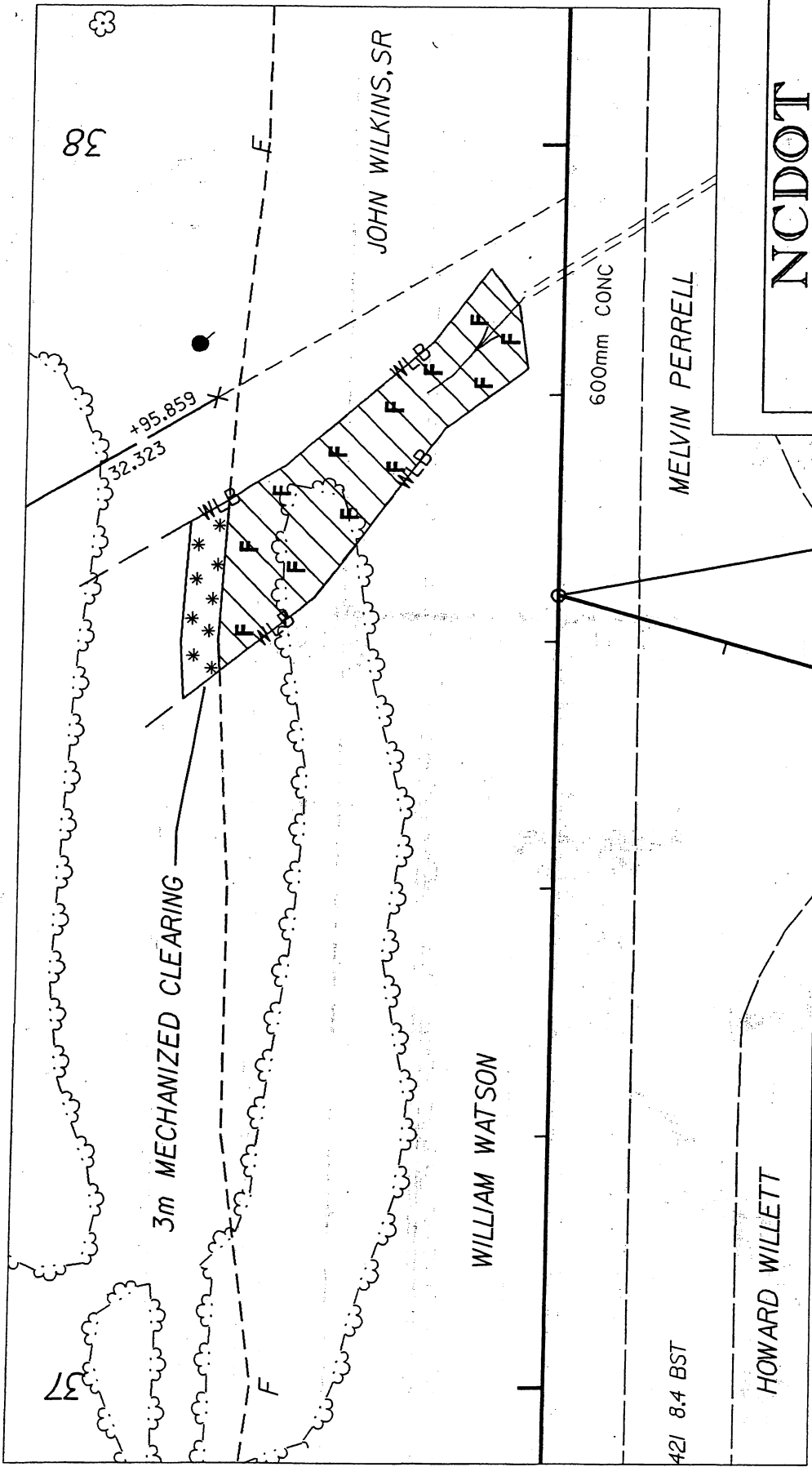


***** DENOTES MECHANIZED CLEARING
 F F DENOTES FILL IN WETLAND

**SITE 3A
 PLAN VIEW**





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 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY



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 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 16 OF 46 JULY 25, 2003

SITE 3A IMPACTS PLAN VIEW

-  DENOTES MECHANIZED CLEARING
-  DENOTES FILL IN WETLAND



785.000
 52m & 40.843m
 90 ft. & 134.00 ft.

UNNAMED TRIB TO SANDY BRANCH

CLASS B RIP RAP EST. 4.5 MTNS W/11.7 SM FILTER FABRIC

CLASS B RIP RAP EST. 0.9 MTNS W/4.2 SM FILTER FABRIC

SEE DETAIL H
 0.6m LAT. BASE DITCH

RONALD FIELDS
 COLLAR & EXTEND

END SHLD.BERM GUTTER STA 57+20 LT

400 CSP W/ 2 ELBOWS

200mm CONC

RETAIN

US 421 8.4 BST

US 421 8.4 BST

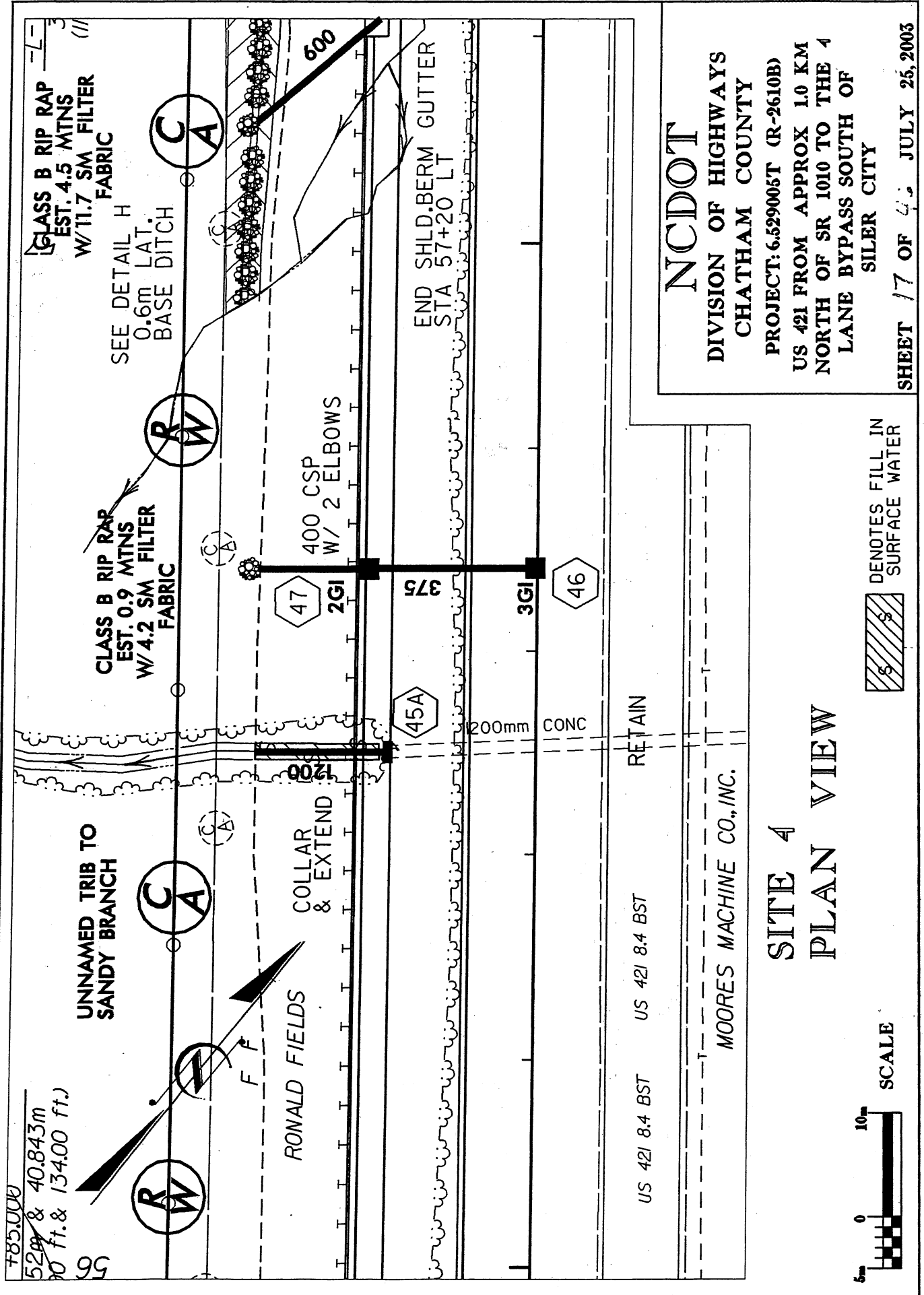
MOORES MACHINE CO., INC.

SITE 4
 PLAN VIEW



DENOTES FILL IN SURFACE WATER

NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM NORTH OF SR 1010 TO THE 4 LANE BYPASS SOUTH OF SILER CITY
 SHEET 17 OF 43 JULY 25, 2003



UNNAMED TRIB TO SANDY BRANCH

ROLAND FIELDS

F F

1200mm CONC

US 421 8.4 BST

US 421 8.4 BST

MOORES MACHINE CO., INC.

SITE 4 IMPACTS PLAN VIEW



SCALE



DENOTES FILL IN SURFACE WATER

57

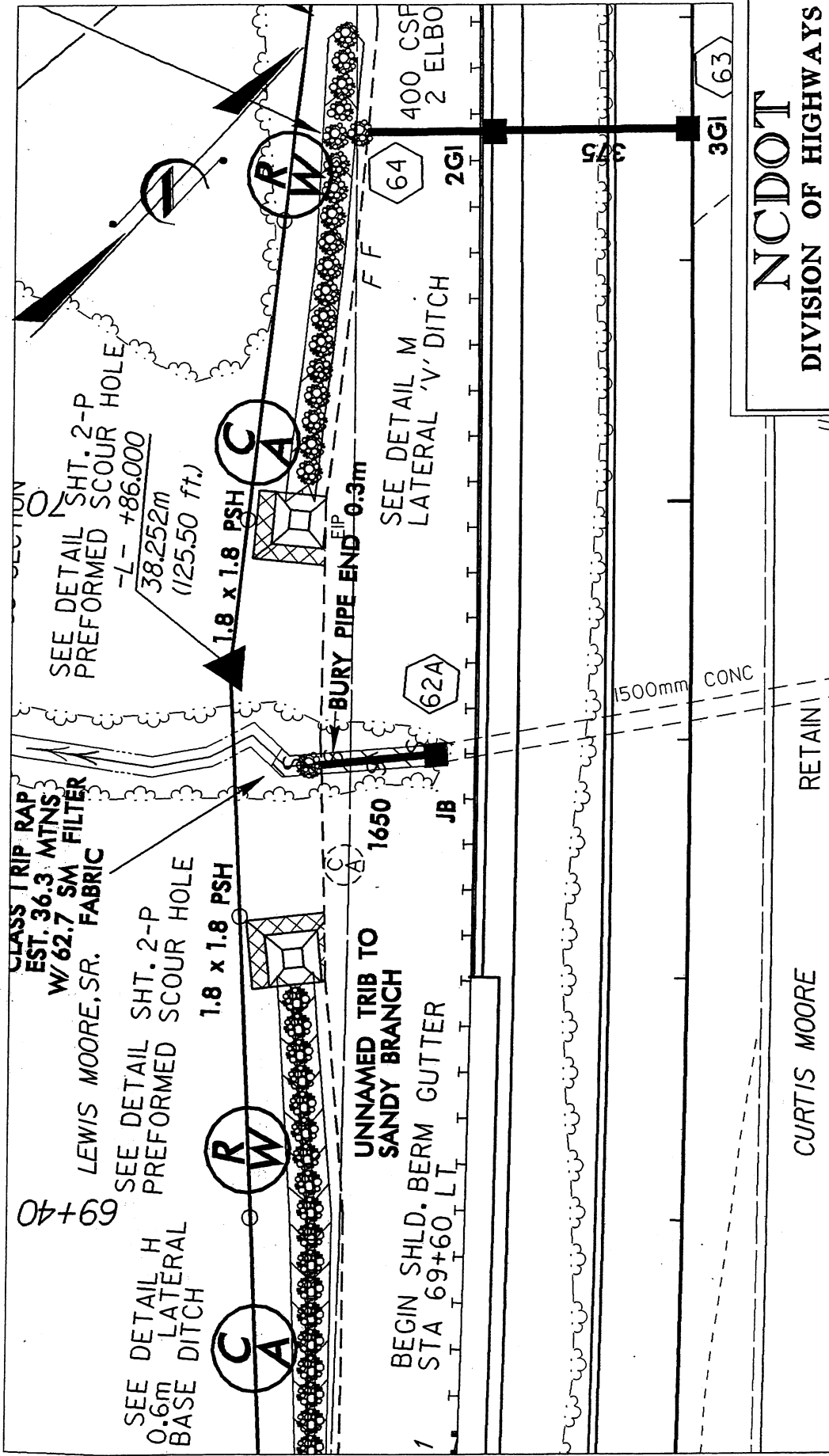
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NCDOT

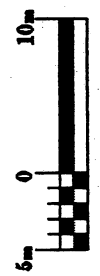
DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 18 OF 42 JULY 25, 2003



**SITE 5
PLAN VIEW**



SCALE



DENOTES FILL IN
SURFACE WATER

NCDOT
 DIVISION OF HIGHWAYS
 RANDOLPH COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 19 OF 42 JULY 25, 2003

69+40

LEWIS MOORE, SR.

70

UNNAMED TRIB TO SANDY BRANCH

FF

1500mm CONC

CURTIS MOORE

MATCH LINE

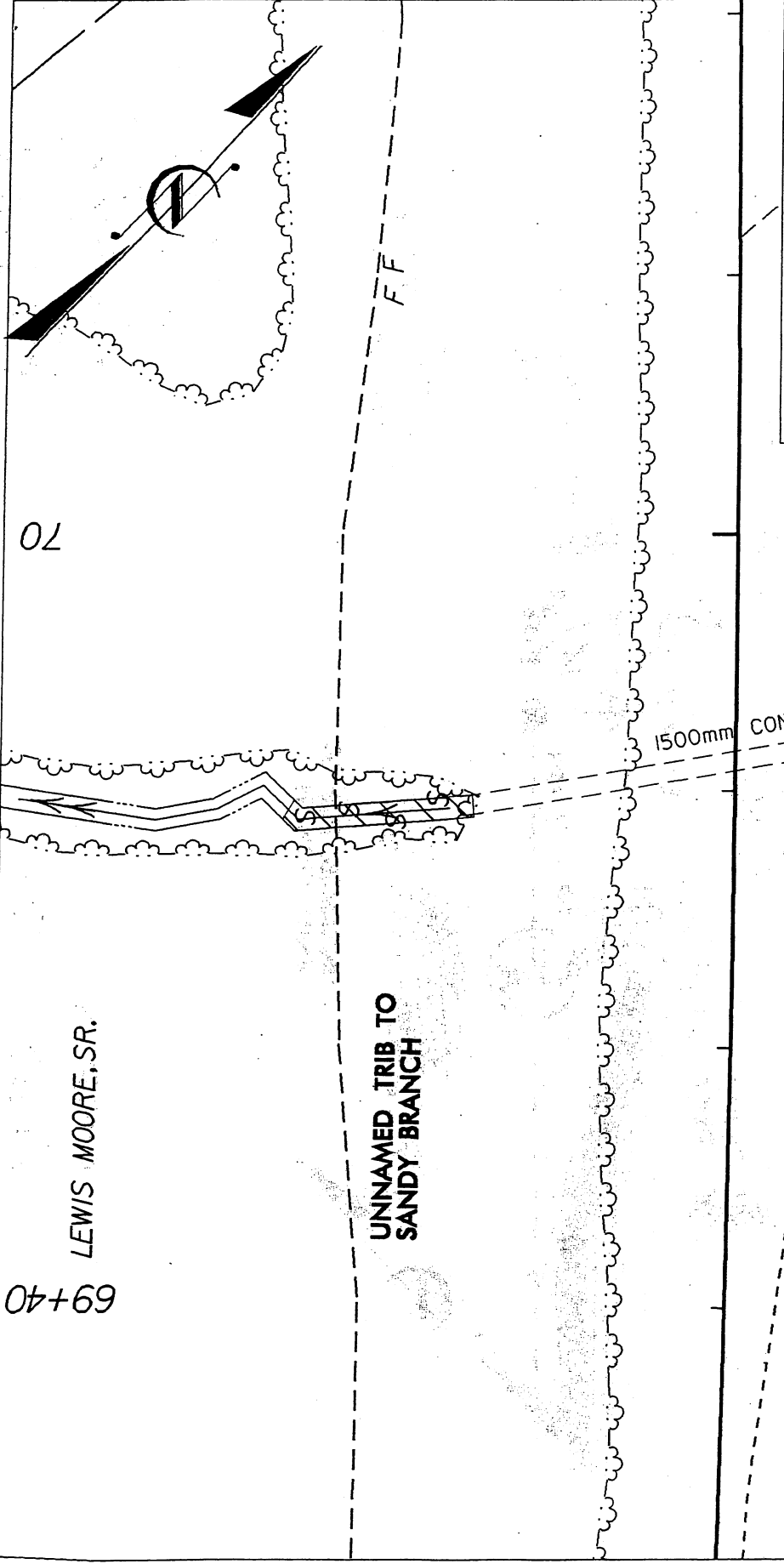
SITE 5 IMPACTS PLAN VIEW



SCALE



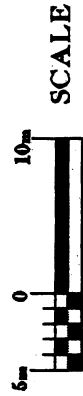
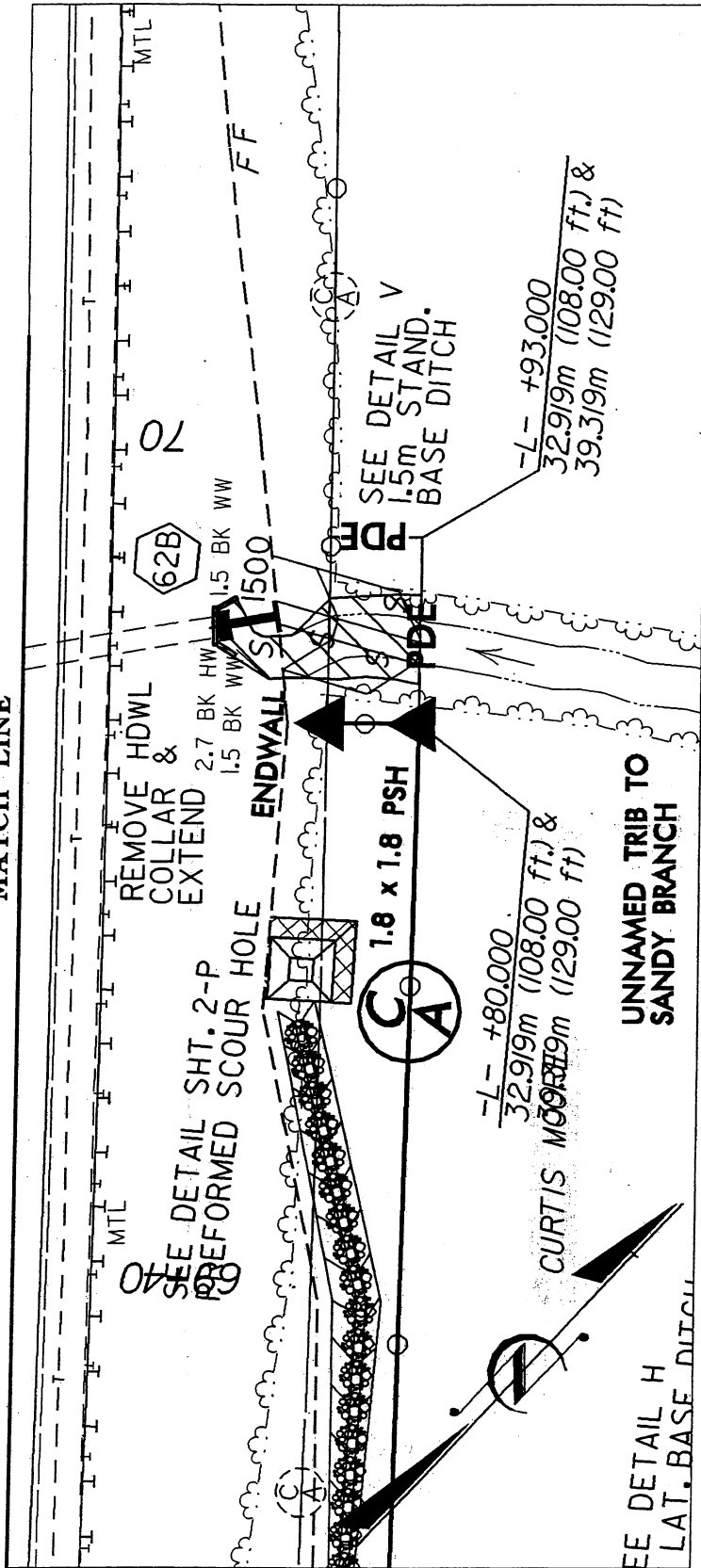
DENOTES FILL IN SURFACE WATER



NCDOT
 DIVISION OF HIGHWAYS
 RANDOLPH COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 20 OF JULY 25, 2003

MATCH LINE



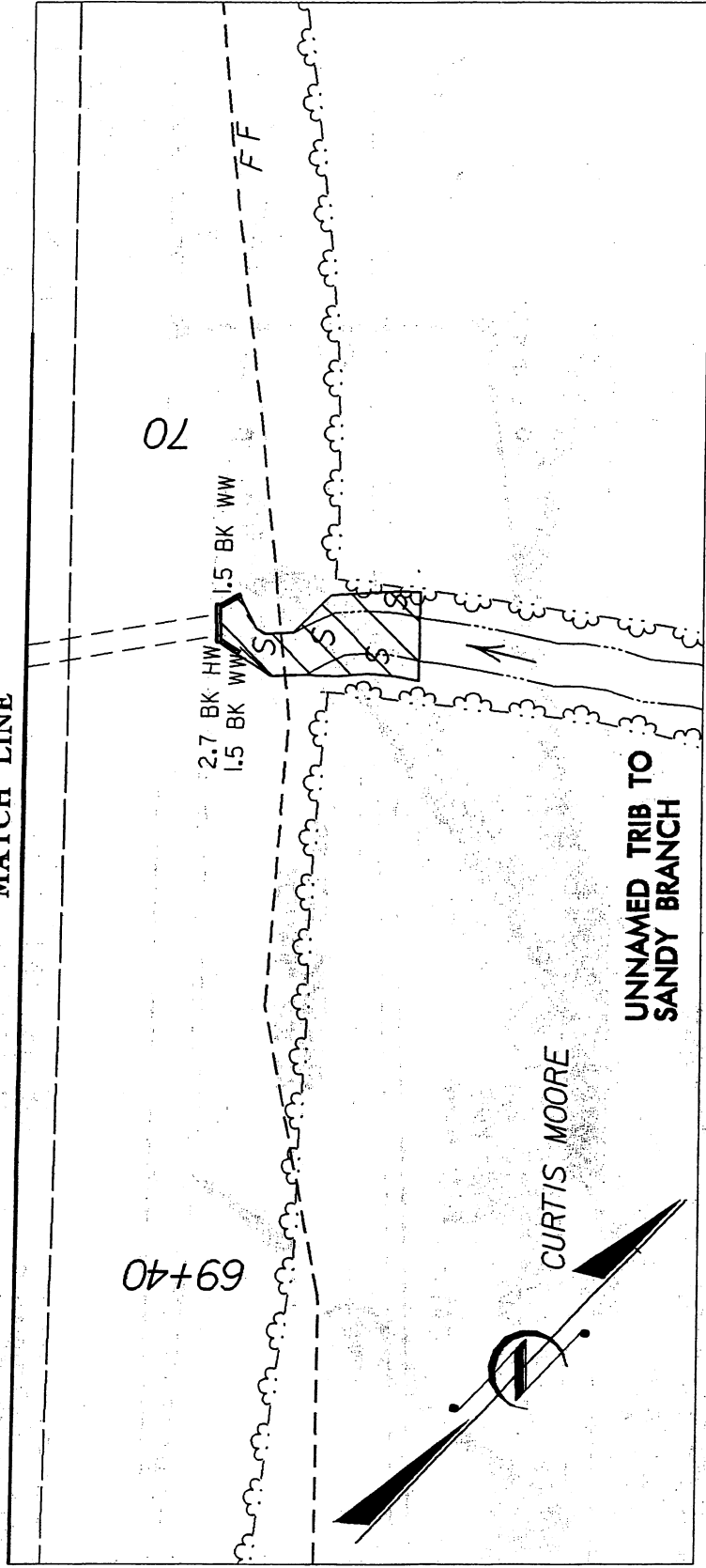

 DENOTES FILL IN
SURFACE WATER

**SITE 5
PLAN VIEW**

NC DOT
 DIVISION OF HIGHWAYS
 RANDOLPH COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 21 OF 46 JULY 25, 2003

MATCH LINE



69+40

70

2.7 BK HW
1.5 BK WW

1.5 BK WW

FF

CURTIS MOORE

UNNAMED TRIB TO SANDY BRANCH

NCDOT
 DIVISION OF HIGHWAYS
 RANDOLPH COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILVER CITY

SHEET 22 OF 26 JULY 25, 2003

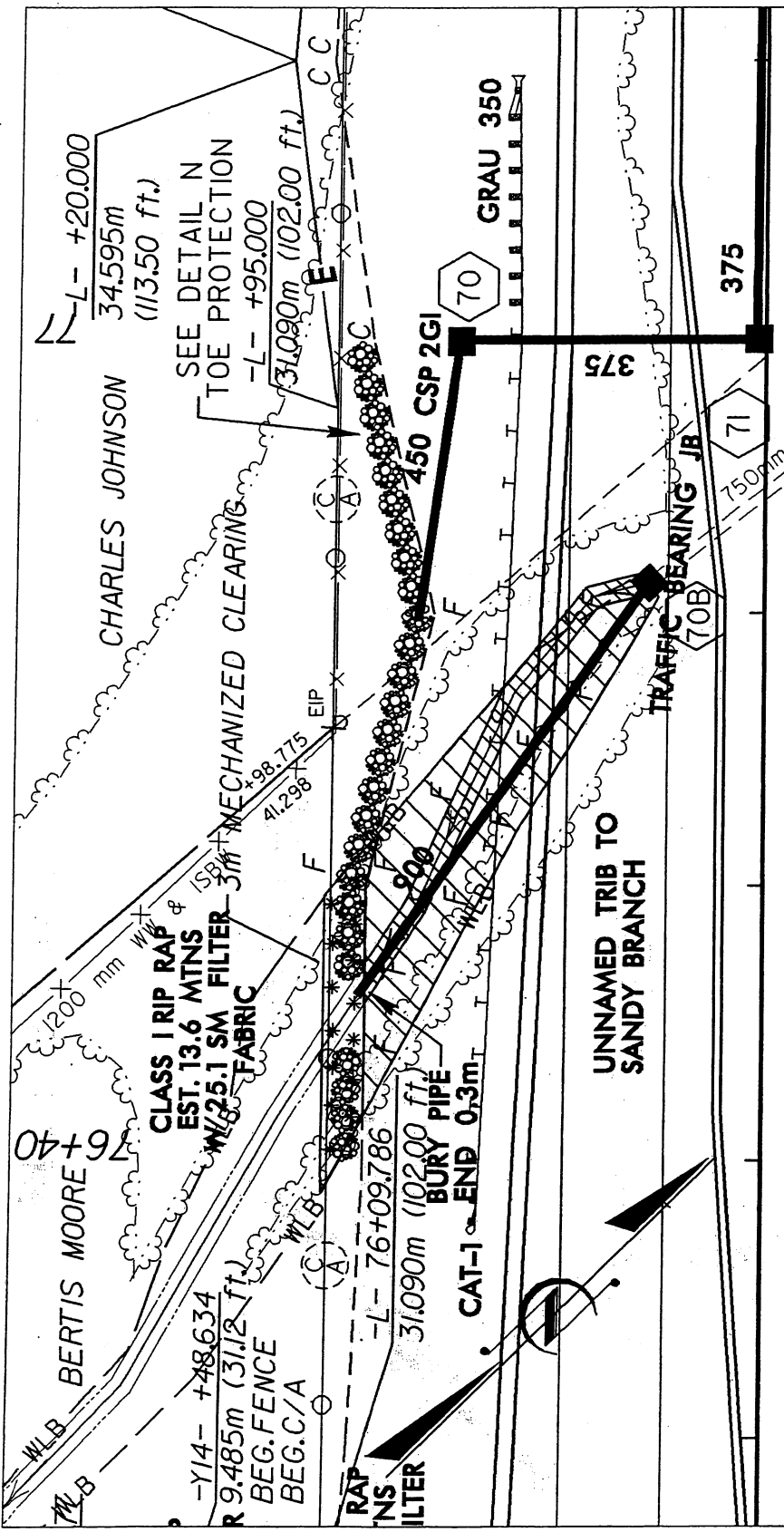
**SITE 5 IMPACTS
 PLAN VIEW**



SCALE



DENOTES FILL IN SURFACE WATER



NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 13 OF 14 JULY 25, 2003

DIAN UNDERDRAINS
 76+60 - 76+40
 SPECIAL MEDIAN DITCH GRADE
 SEE PROFILE SHT. 49
 LEWIS MOORE

***** DENOTES MECHANIZED CLEARING

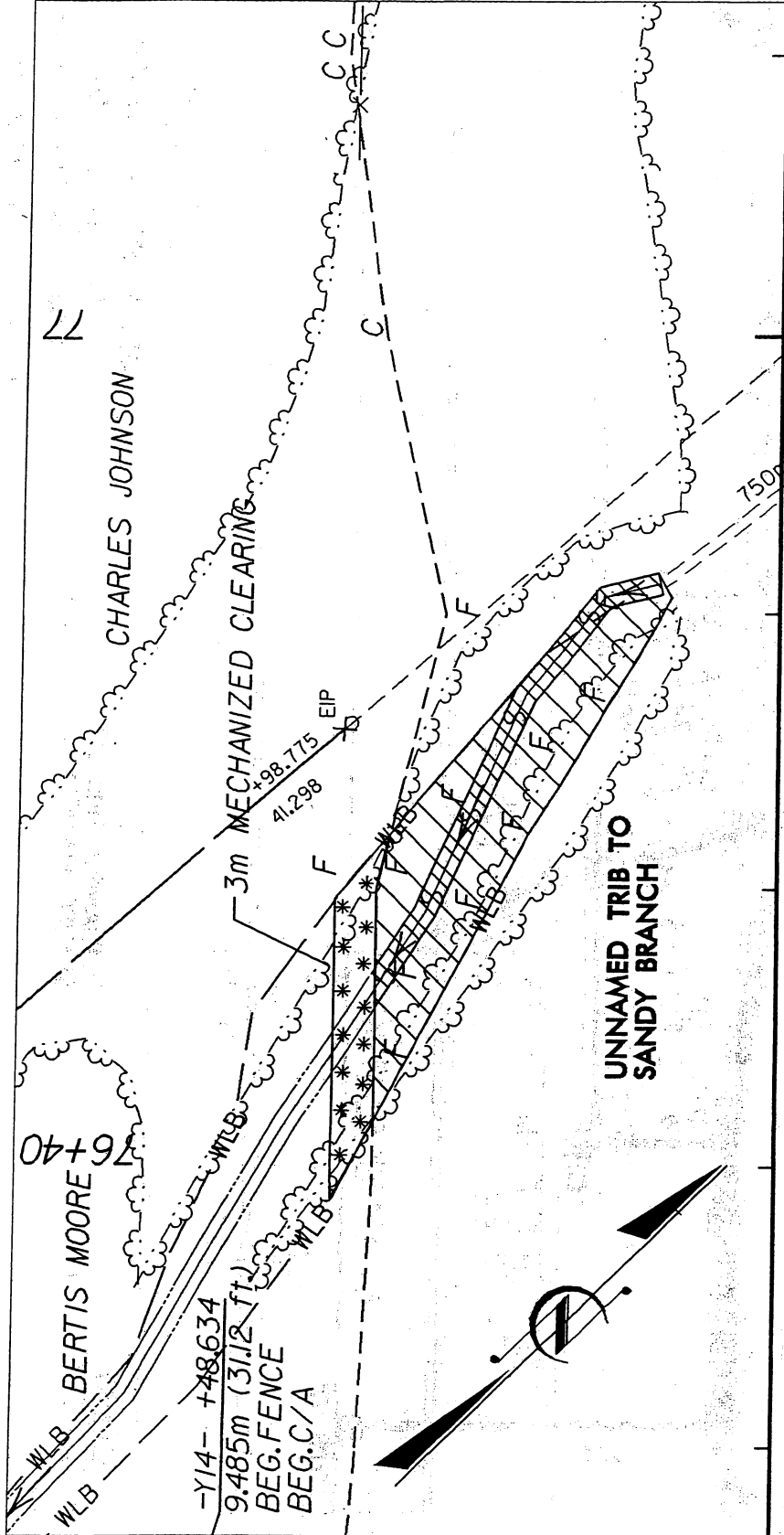
5m 10m SCALE

SITE 6 PLAN VIEW

RE

FF DENOTES FILL IN WETLAND

SS DENOTES FILL IN SURFACE WATER



NCDOT

**DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)**

**US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY**

SHEET 4 OF 4 JULY 25, 2003

LEGEND
 DENOTES FILL IN SURFACE WATER
 DENOTES FILL IN WETLAND

LEGEND
 DENOTES MECHANIZED CLEARING
SITE 6 IMPACTS
SCALE PLAN VIEW



LEWIS MOORE

CHARLES JOHNSON

BERTIS MOORE

UNNAMED TRIB TO SANDY BRANCH

3m MECHANIZED CLEARING

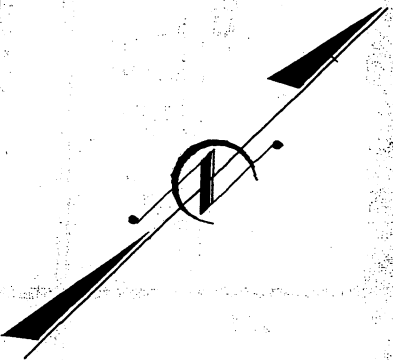
-Y14- +48634
9.485m (31.12 ft)
BEG. FENCE
BEG. C/A

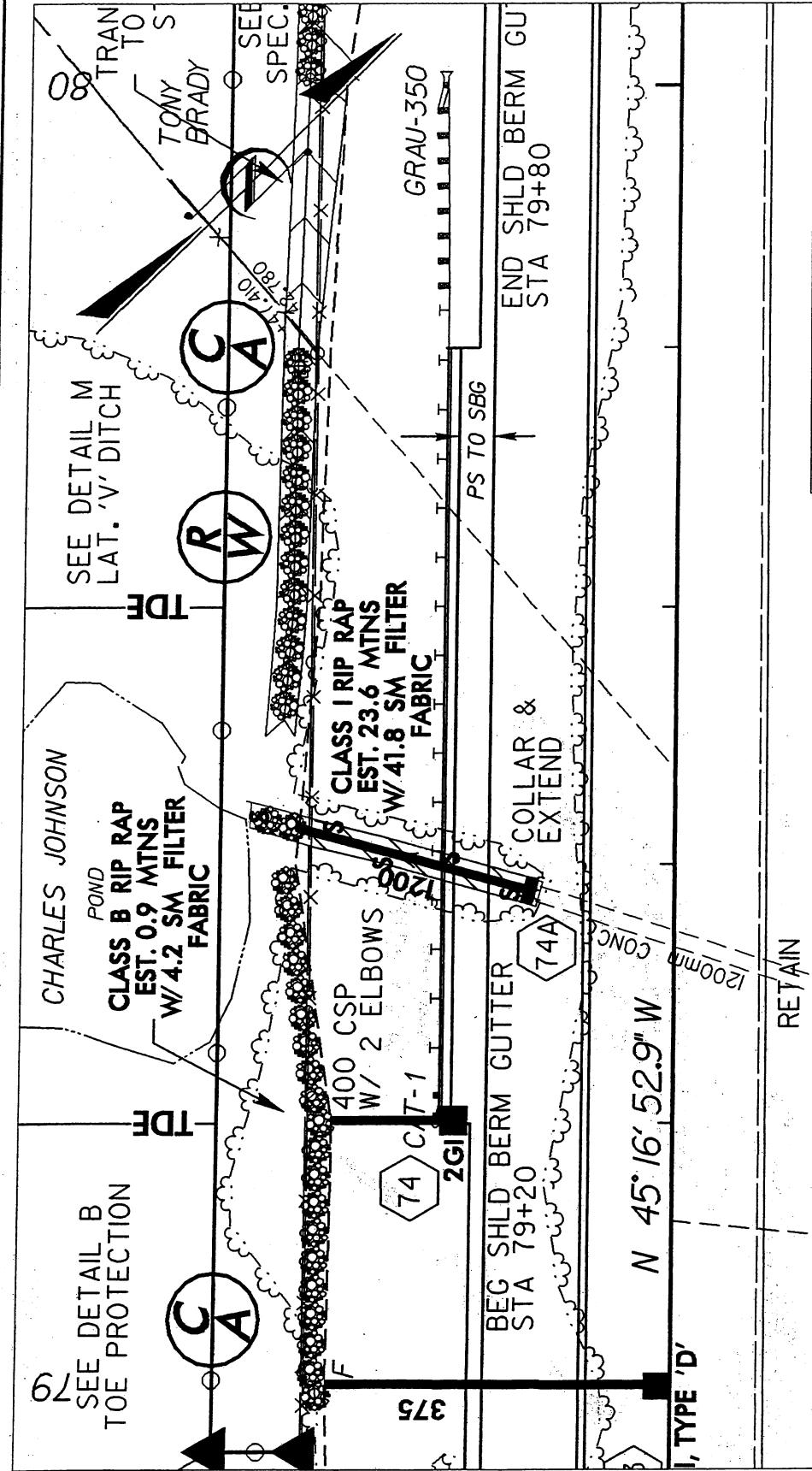
4.298

4.98.775

EIP

750mm





NCDOT

DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 5 OF 46 JULY 25, 2003

SEE DETAIL M
 LAT. 'V' DITCH

CHARLES JOHNSON
 POND

CLASS B RIP RAP
 EST. 0.9 MTNS
 W/ 4.2 SM FILTER
 FABRIC

CLASS I RIP RAP
 EST. 23.6 MTNS
 W/ 41.8 SM FILTER
 FABRIC

400 CSP
 W/ 2 ELBOWS

BEG SHLD BERM GUTTER
 STA 79+20

COLLAR &
 EXTEND

END SHLD BERM GUT
 STA 79+80

UNNAMED TRIB TO
 SANDY BRANCH GRADY BEAVERS

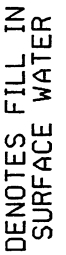
ROBERT
 BEAVERS

4.8 BK HW

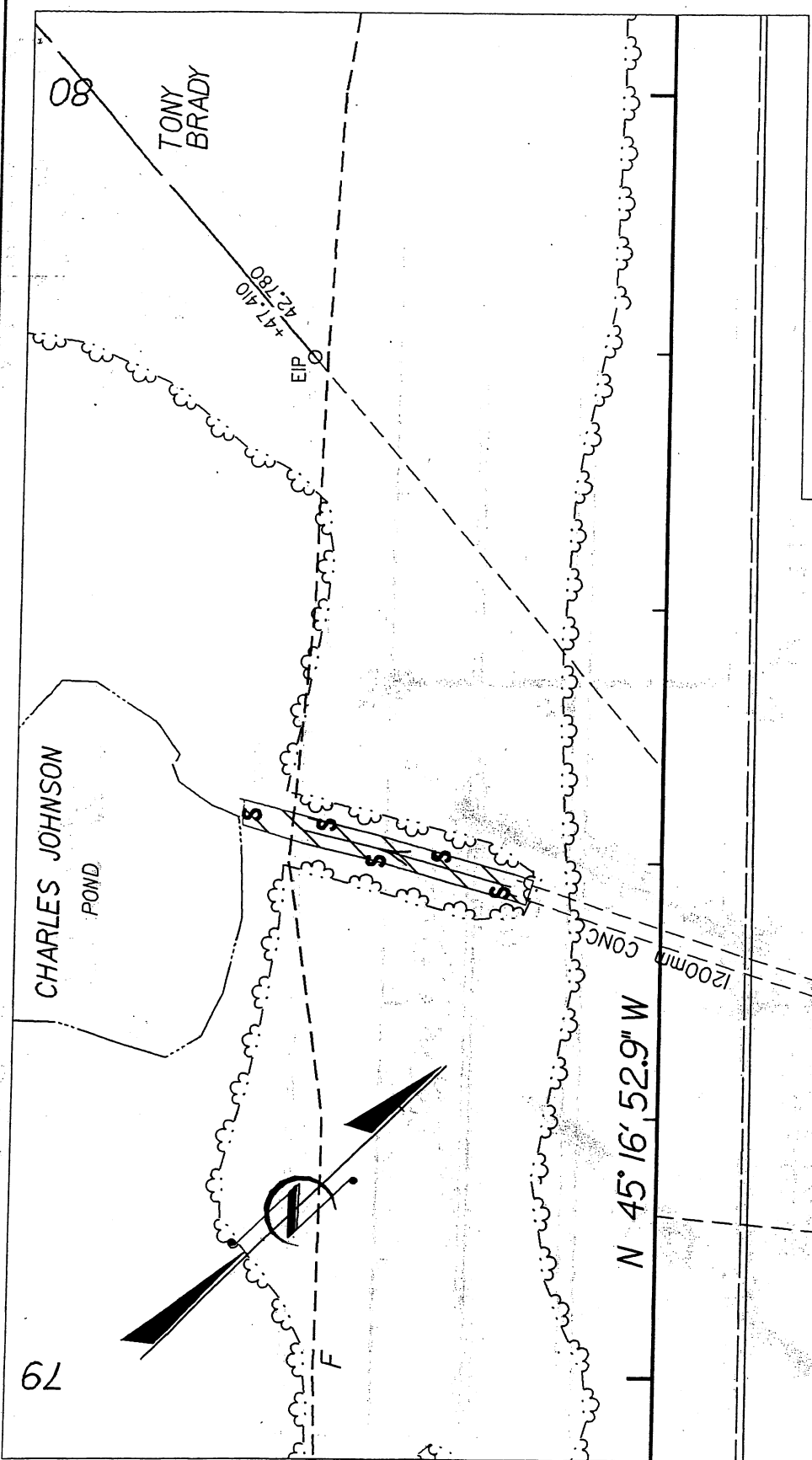
SITE 7
 PLAN VIEW



SCALE



DENOTES FILL IN
 SURFACE WATER



NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 06 OF 06 JULY 25, 2003

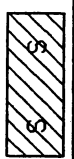
ROBERT BEAVERS

UNNAMED TRIB TO SANDY BRANCH GRADY BEAVERS

SITE 7 IMPACTS PLAN VIEW



SCALE



DENOTES FILL IN SURFACE WATER

-L- +00.00
28.042m (92.00 ft.) &
34.138m (112.00 ft.)

TONY BRADY

**BANK PROTECTION
CLASS 1 RIP RAP
SEE DETAIL U-1**

MAINTAIN EXISTING
DITCH X-SECTION

SEE DETAIL SHT. 2-P
PERFORMED SCOUR HOLE

12 x 1.2 PSH

(C)
(A)

EXISTING

1050

375

76A

1050mm CONC

COLLAR & EXTEND

2GI

77

ST US 421 8.2 BST

RETAIN

GRADY BEAVERS

UNNAMED TRIB TO
SANDY BRANCH

4.2
BK HW



SCALE

SITE 8
PLAN VIEW



DENOTES FILL IN
SURFACE WATER

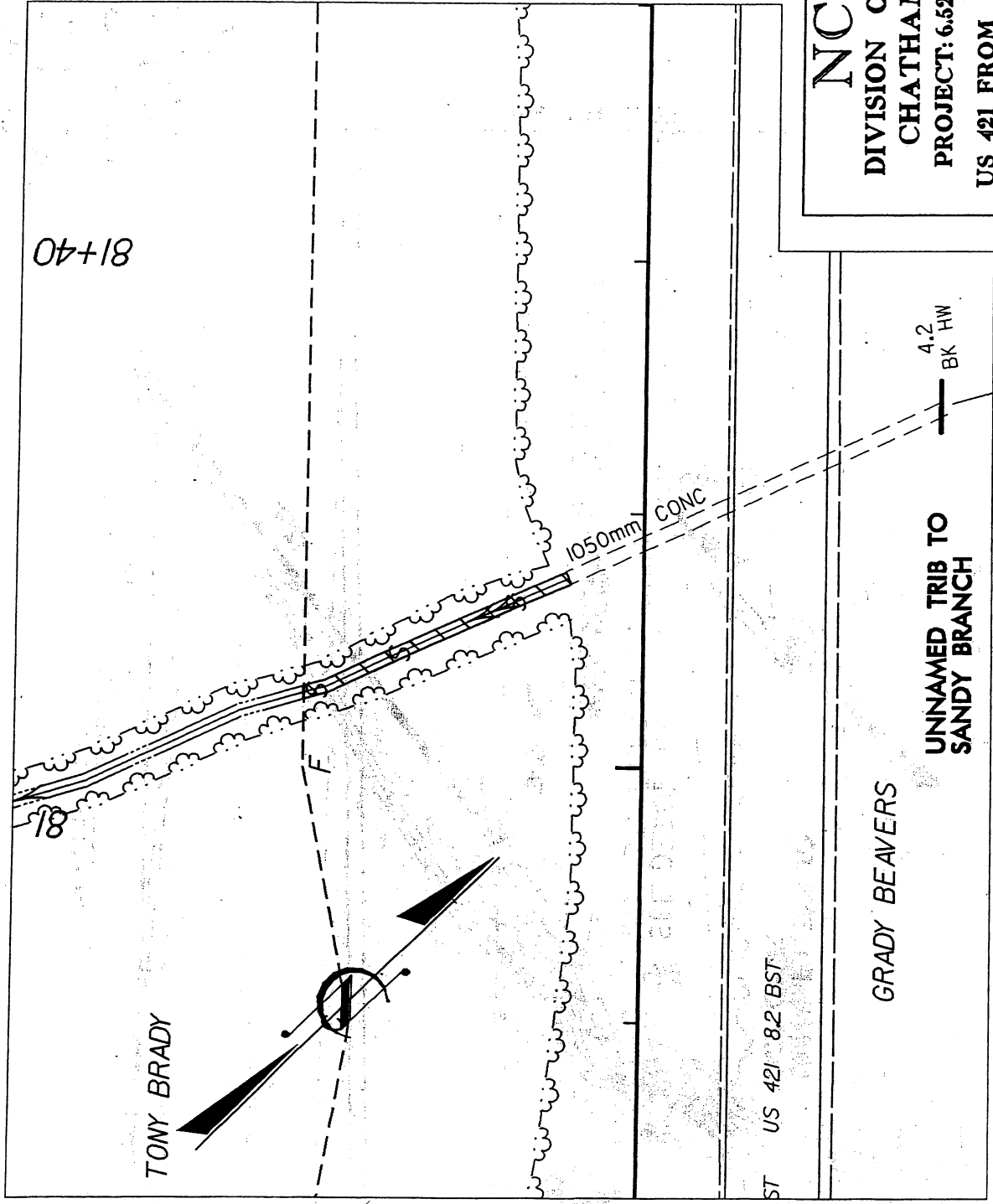
NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 27 OF 47 JULY 25, 2003



NCDOT

DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

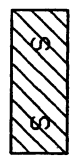
SHEET 28 OF 41 JULY 25, 2003

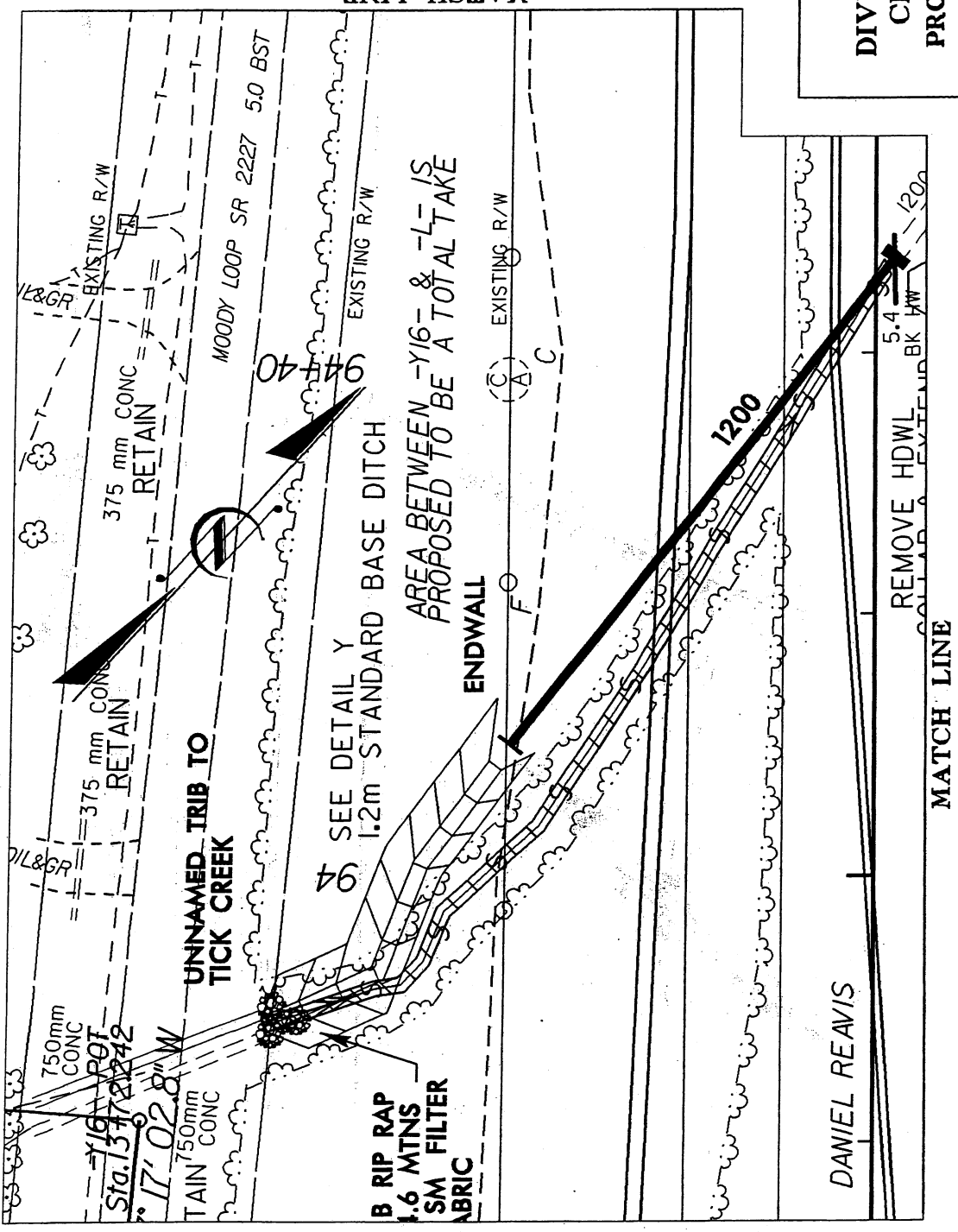
SITE 8
 PLAN VIEW



SCALE

DENOTES FILL IN
 SURFACE WATER





MATCH LINE

NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 9 OF 10 JULY 25, 2003

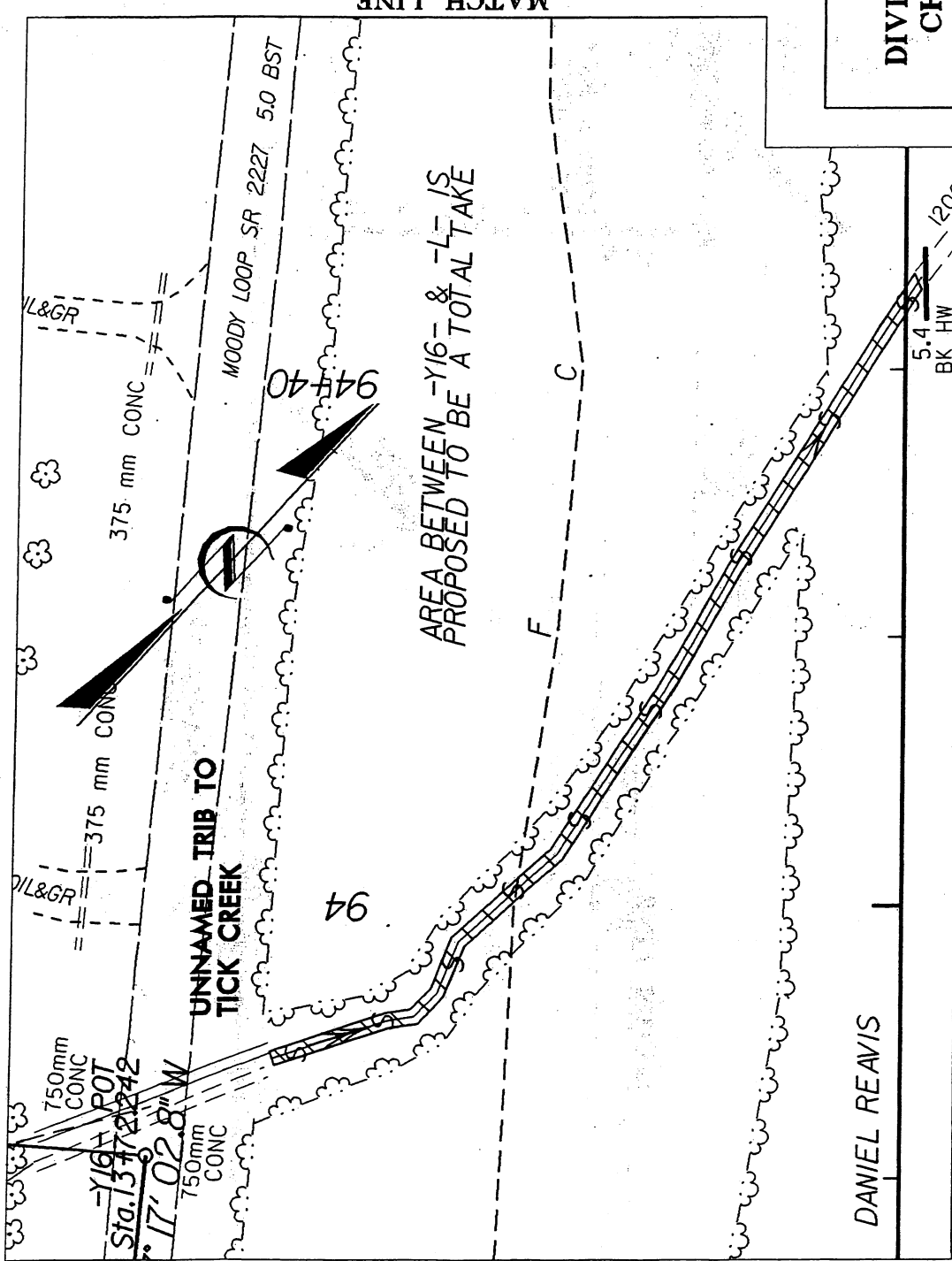
SCALE 10m

5m 0

5 5 5

DENOTES FILL IN SURFACE WATER

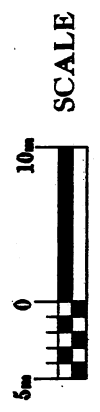
SITE 9 PLAN VIEW



NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 30 OF 34 JULY 25, 2003

**SITE 9 IMPACTS
 PLAN VIEW**



DENOTES FILL IN
 SURFACE WATER

MATCH LINE

95+20

89

-L- 89.218
031.060m

450

90

450
3GI

BORE & JACK W/
600 WELDED STEEL

BEGIN SPECIAL GR
-L- STA. 95+01.49

CLASS 1 RIP RAP

-L- +89.217
27.720m

88

2GI

009

RETAIN US 421 8.3 BST

US 421 8.3 BST

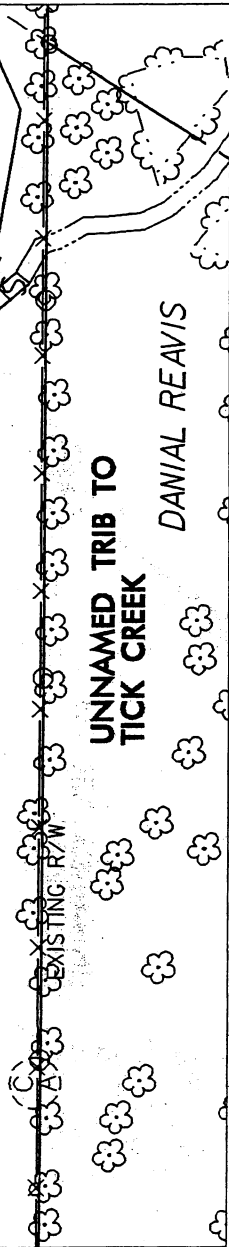
WELDED STEEL

COLLAR & EXT.

1200mm
1200C
87C

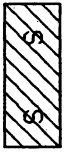
UNNAMED TRIB TO
TICK CREEK

DANIAL REAVIS



SCALE

SITE 9 PLAN VIEW



DENOTES FILL IN
SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

MATCH LINE

95+20

-L- +89.217
27.720m

-L- +89.218
31.060m

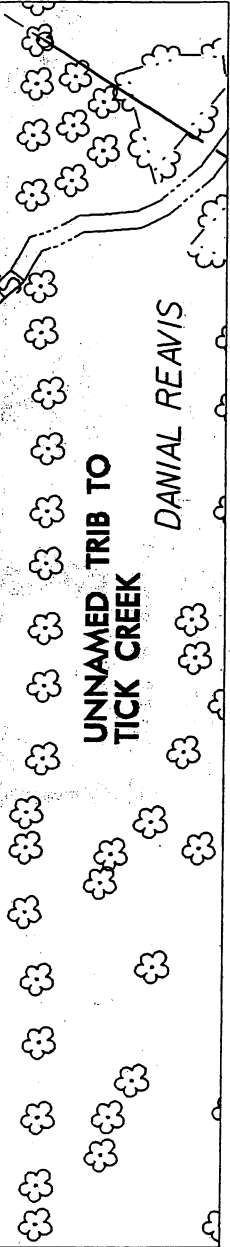
MATCH LINE

US 421 8.3 BST

US 421 8.3 BST

BEGIN SPECIAL GR
-L- STA. 95+01.49

1200mm CONC



UNNAMED TRIBUTARY TO
TICK CREEK

DANIAL REAVIS

SITE 9 IMPACTS PLAN VIEW



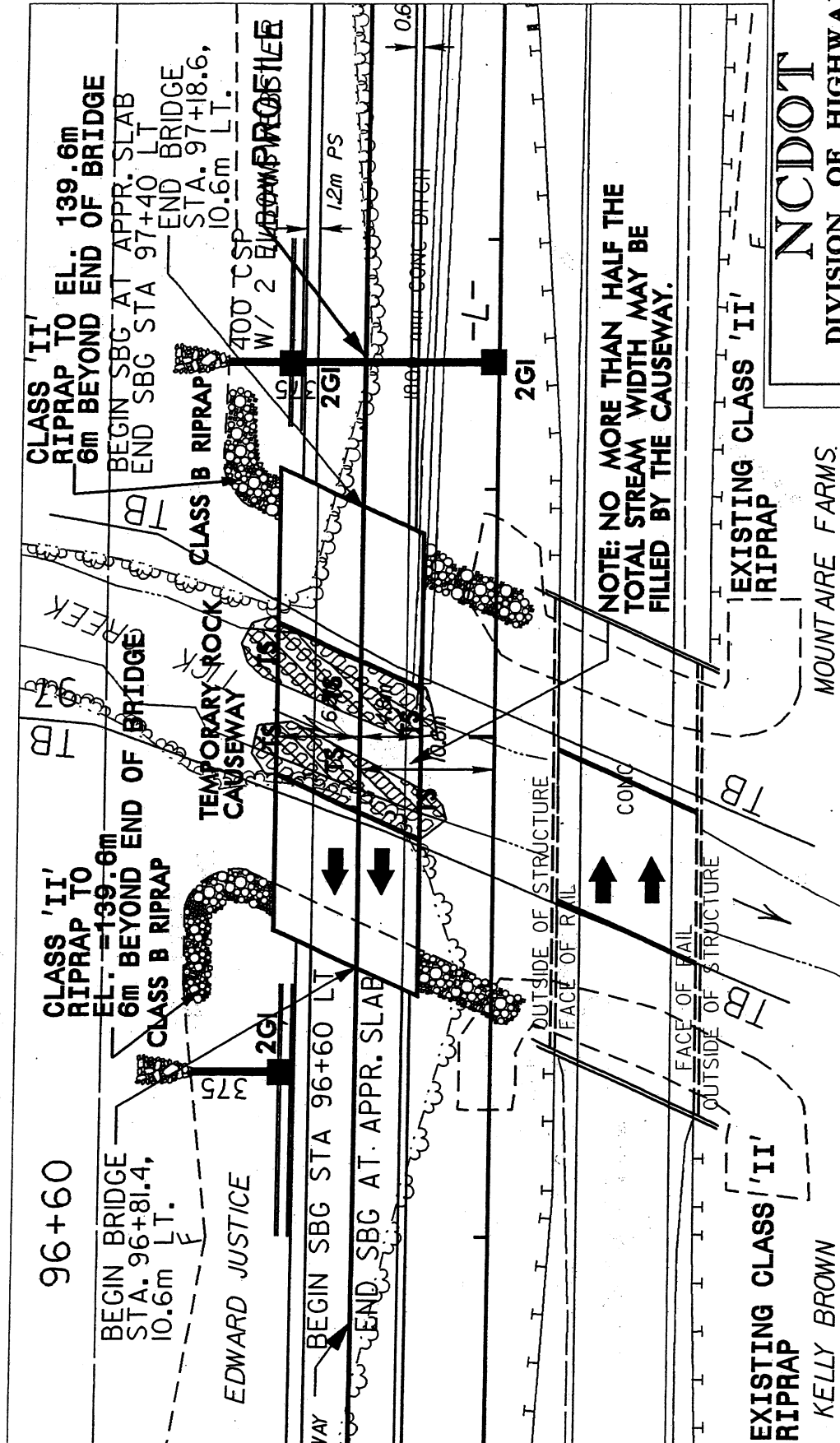
SCALE

DENOTES FILL IN
SURFACE WATER

NCDOT

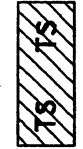
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.629005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY



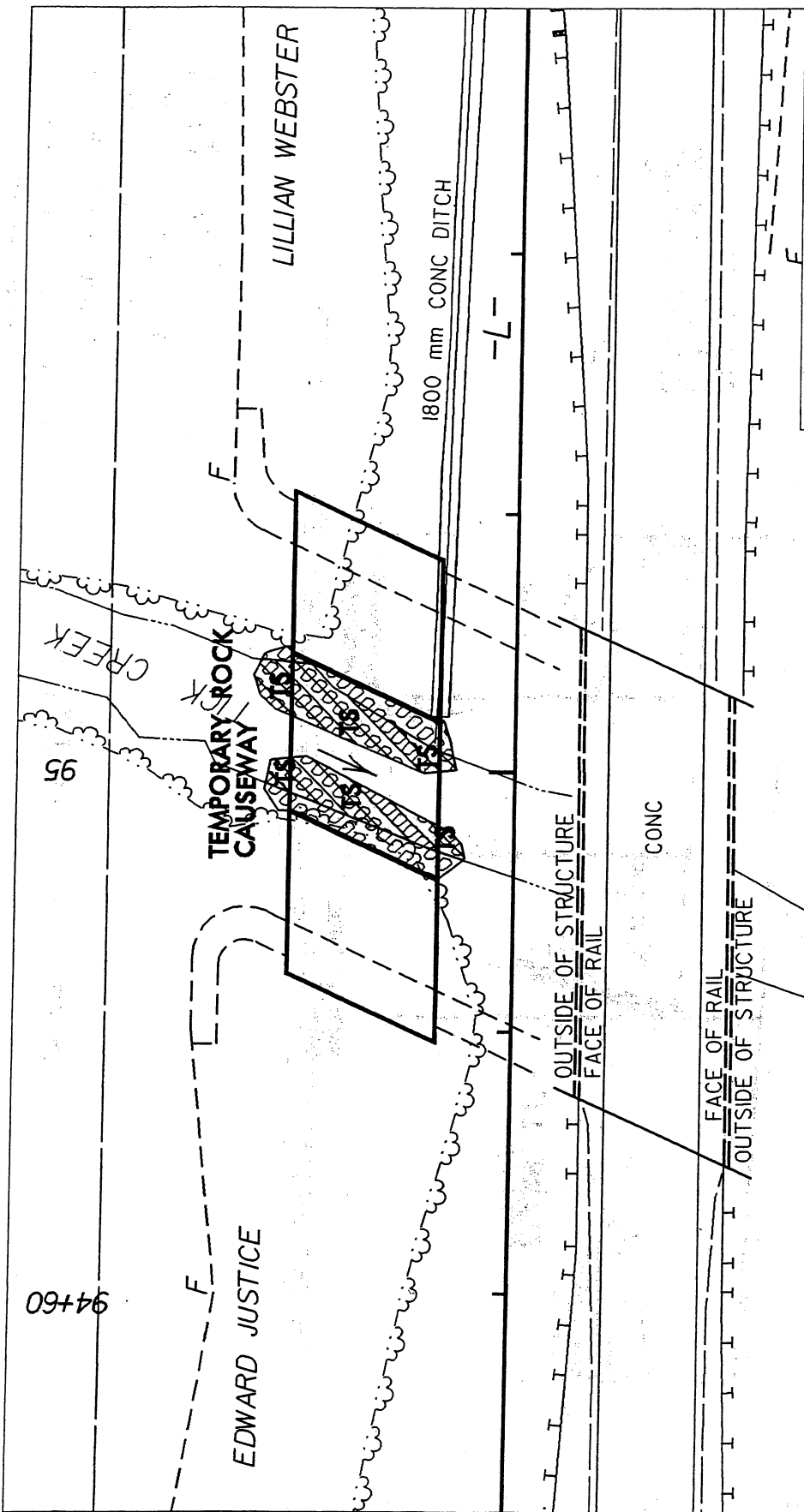
NOTE: NO MORE THAN HALF THE TOTAL STREAM WIDTH MAY BE FILLED BY THE CAUSEWAY.

TS TS DENOTES TEMPORARY FILL IN SURFACE WATER



SITE 10
PLAN VIEW

NC DOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM NORTH OF SR 1010 TO THE 4 LANE BYPASS SOUTH OF SILER CITY
 SHEET 3 OF 4 JULY 25, 2003

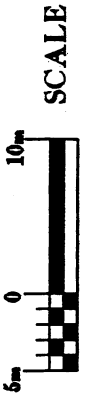


NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 4 OF 7 JULY 25, 2003

**SITE 10 IMPACTS
 PLAN VIEW**

TS DENOTES TEMPORARY
 FILL IN SURFACE
 WATER



STA. 97+00.00 -L-, 10.6m Lt. TO CENTER OF
 TRAVELWAY
 GRADE PT. EL 141.920m
 SKEW = 115°
 1@12.5m, 1@12.2m, 1@12.5m
 914mm P/S CONC. GIRDERS

-L-

CLASS 'II'
RIPRAP TO BERM
BENEATH BRIDGE

N.C.

500 YR WSEL
= 140.43m

50 YR WSEL
= 139.34m

100 YR WSEL
= 139.70m

CLASS 'II'
RIPRAP

Historical High
WSEL = 139.60
09/06/96

1.5:1

1.5:1

TEMPORARY ROCK
CAUSEWAY

NWSEL = 136.02m
04/10/01

N.C.

ROCK

ROCK

NCDOT

DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)

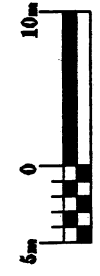
US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 35 OF 40 JULY 25, 2003

SITE 10 PROFILE

 DENOTES TEMPORARY
 FILL IN SURFACE
 WATER

SCALE



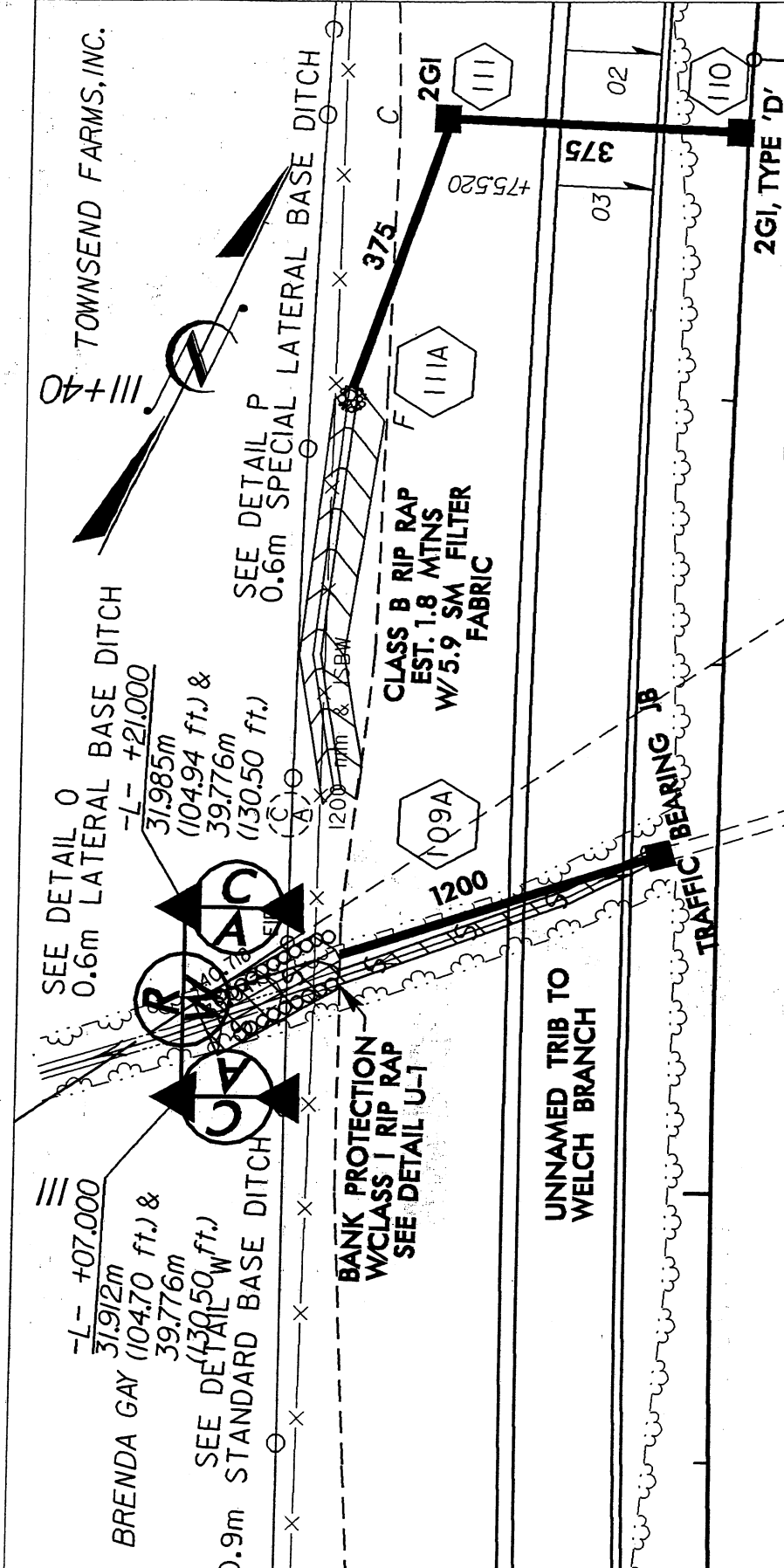
144

142

140

138

136

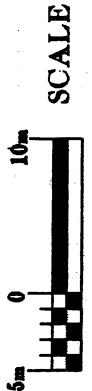


NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

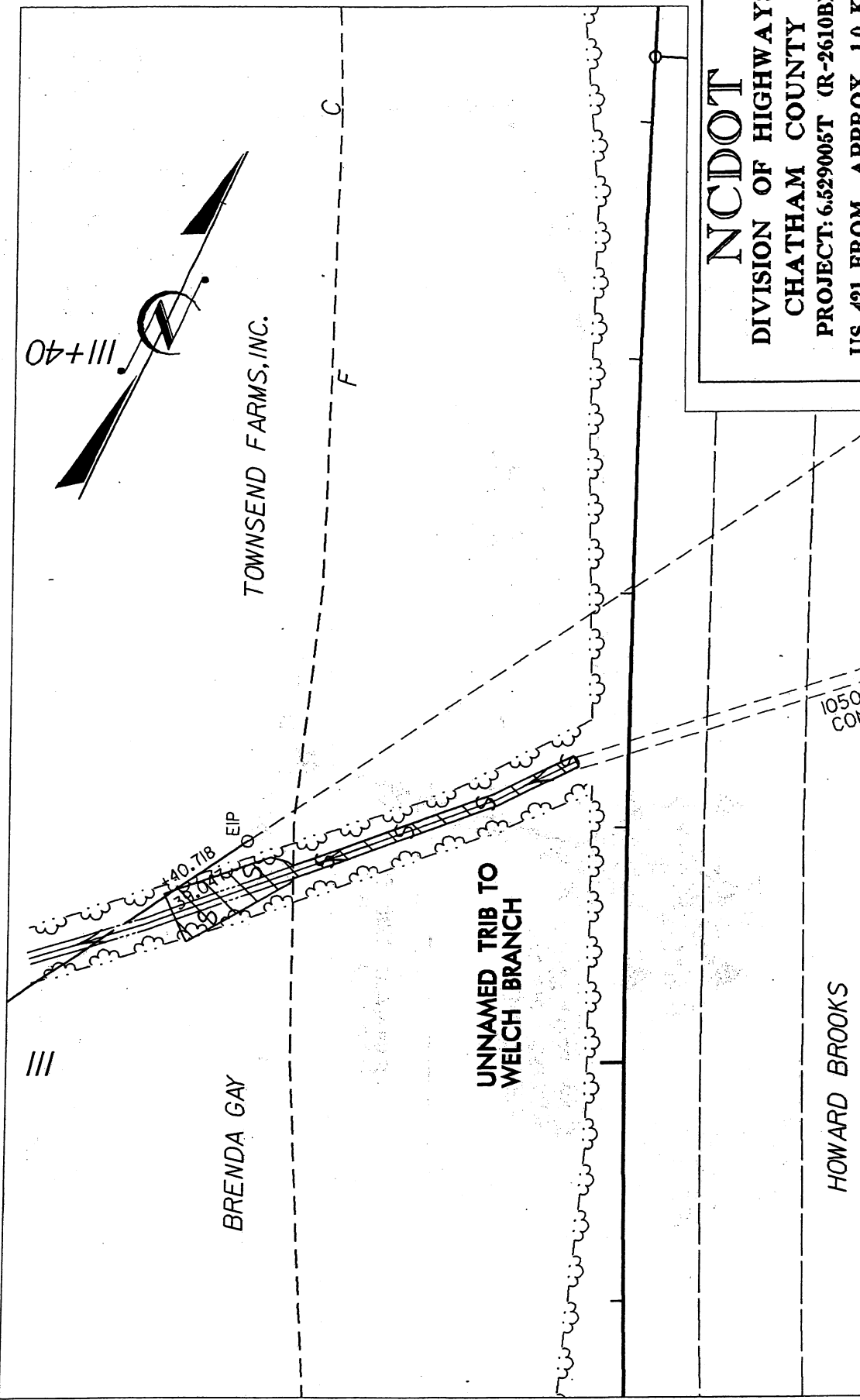
DENOTES FILL IN
 SURFACE WATER



**SITE 11
 PLAN VIEW**



SCALE



**SITE II IMPACTS
PLAN VIEW**



SCALE



DENOTES FILL IN
SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

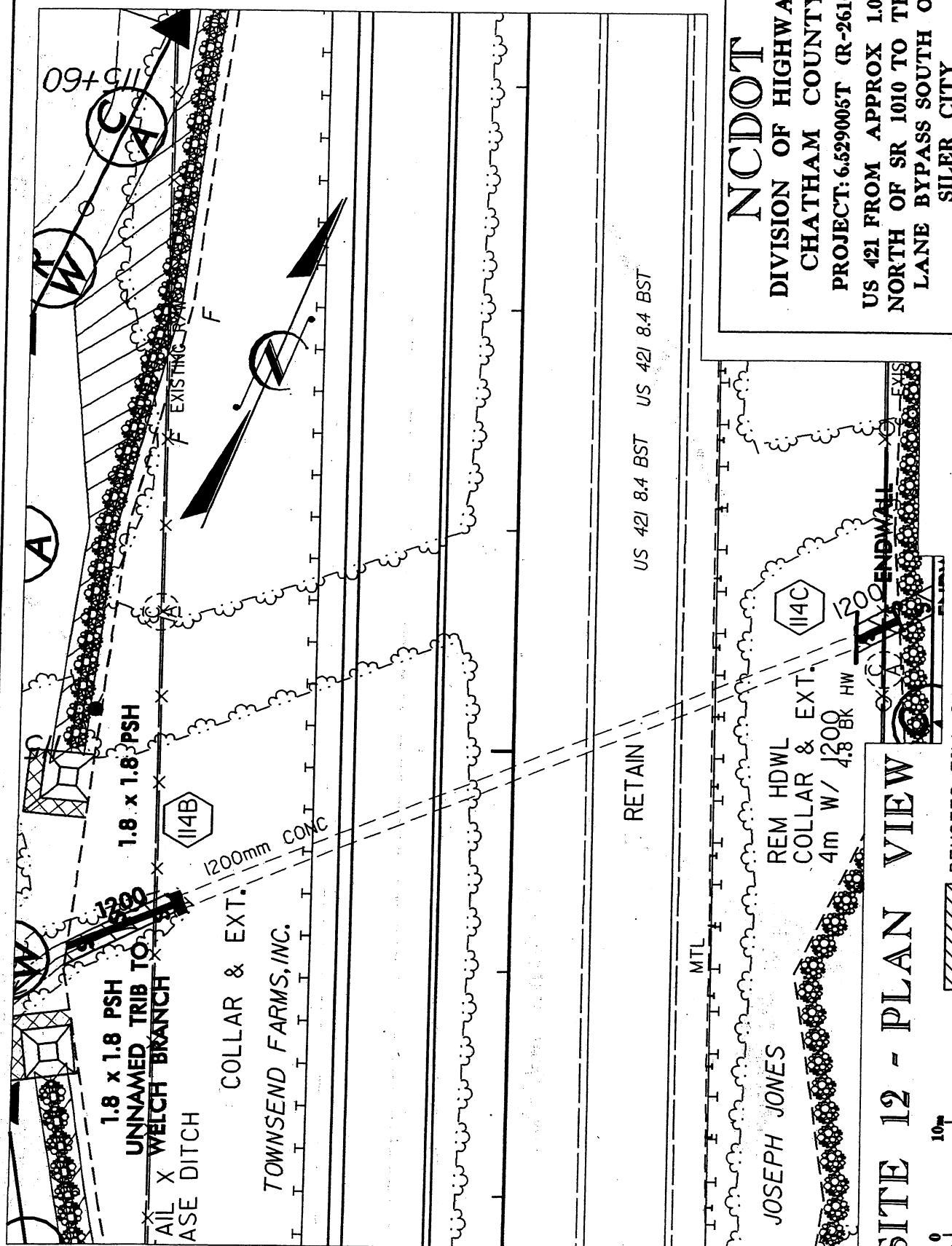
US 421 FROM APPROX 1.0 KM

NORTH OF SR 1010 TO THE 4

LANE BYPASS SOUTH OF

SILER CITY

SHEET 37 OF 46 JULY 25, 2003



SITE 12 - PLAN VIEW



SCALE



5 DENOTES FILL IN SURFACE WATER

NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM NORTH OF SR 1010 TO THE 4 LANE BYPASS SOUTH OF SILER CITY

SHEET 30 OF 40 JULY 25, 2003

US 421 8.4 BST US 421 8.4 BST

RETAIN

MTL

JOSEPH JONES

REM HDWL COLLAR & EXT. 4m W/ 4.8 BK HW

ENDWALL

1.8 x 1.8 PSH

1.8 x 1.8 PSH

09+51.1

09+60

UNNAMED TRIB TO WELCH BRANCH

TAIL X WELCH BRANCH

COLLAR & EXT.

TOWNSEND FARMS, INC.

1200mm CONC

EXISTING FENCE

09+51.1

09+60

114C

114B

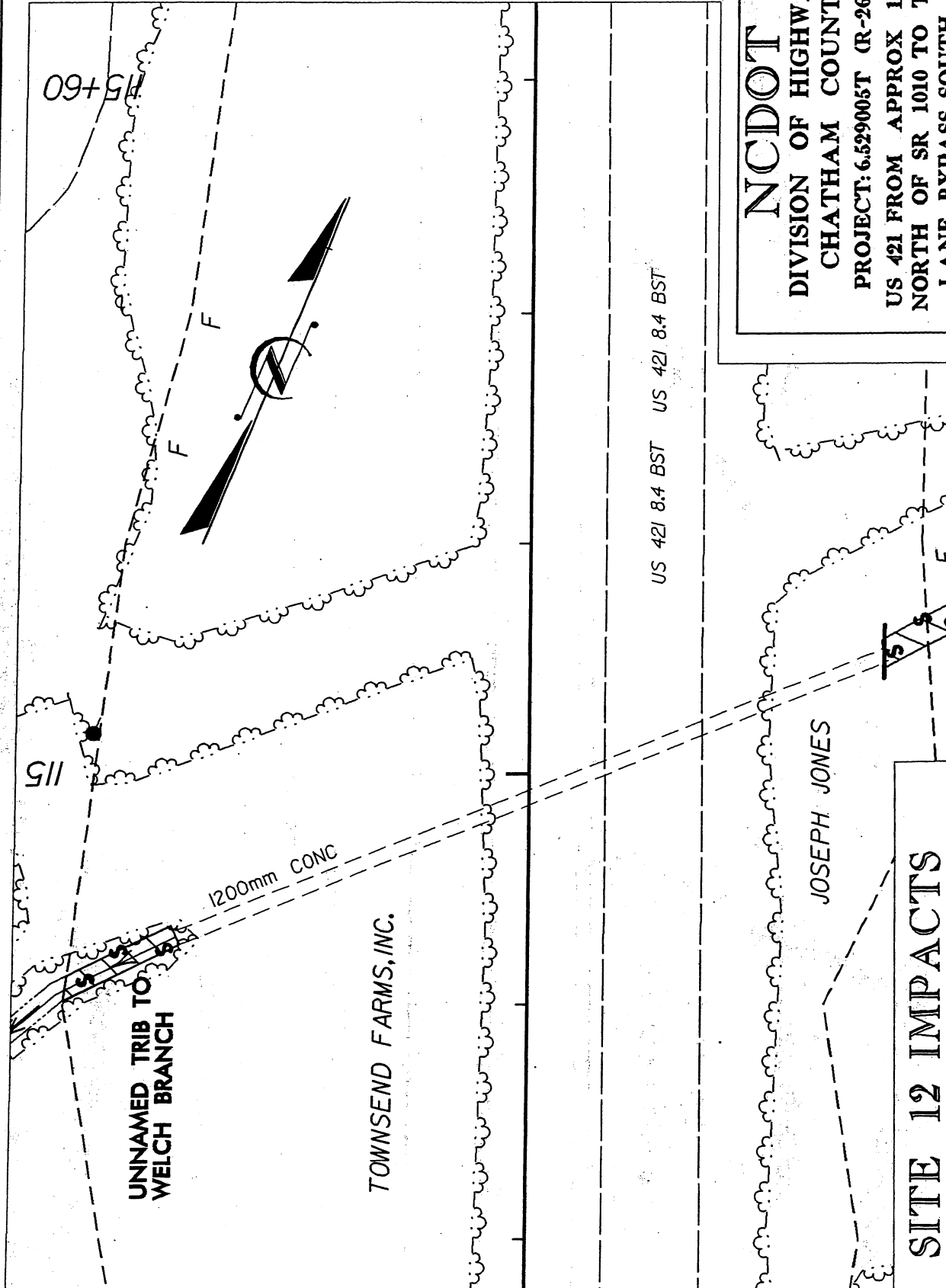
114A

114W

114C

114Z

114Y



UNNAMED TRIB TO
WELCH BRANCH

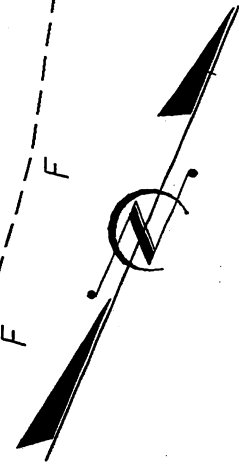
1200mm CONC

TOWNSEND FARMS, INC.

JOSEPH JONES

US 421 8.4 BST US 421 8.4 BST

15+60



SITE 12 IMPACTS
PLAN VIEW



SCALE

DENOTES FILL IN
SURFACE WATER



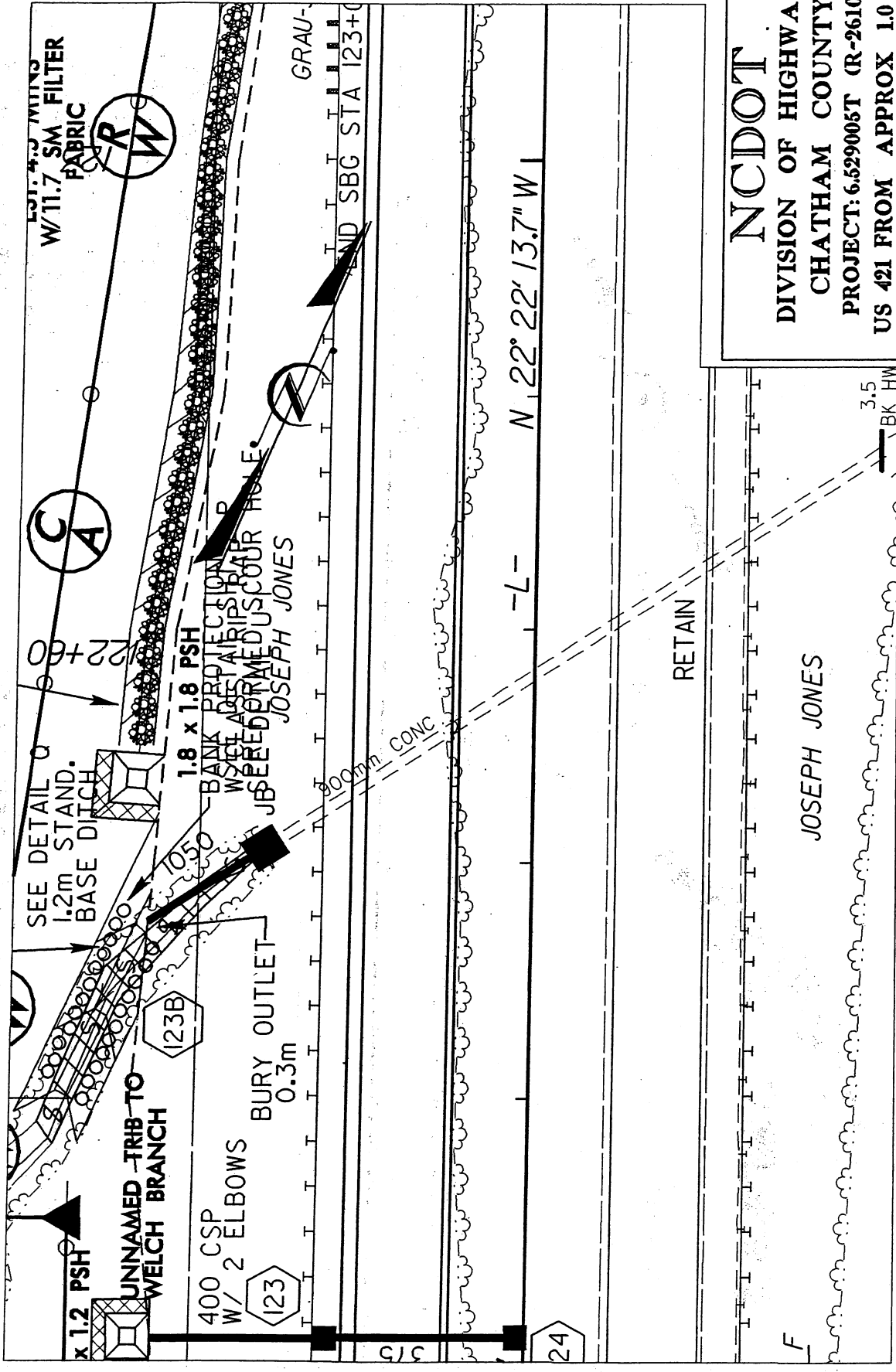
NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

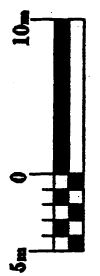
PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

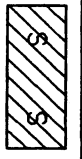
SHEET 39 OF 46 JULY 25, 2003



**SITE 13
PLAN VIEW**



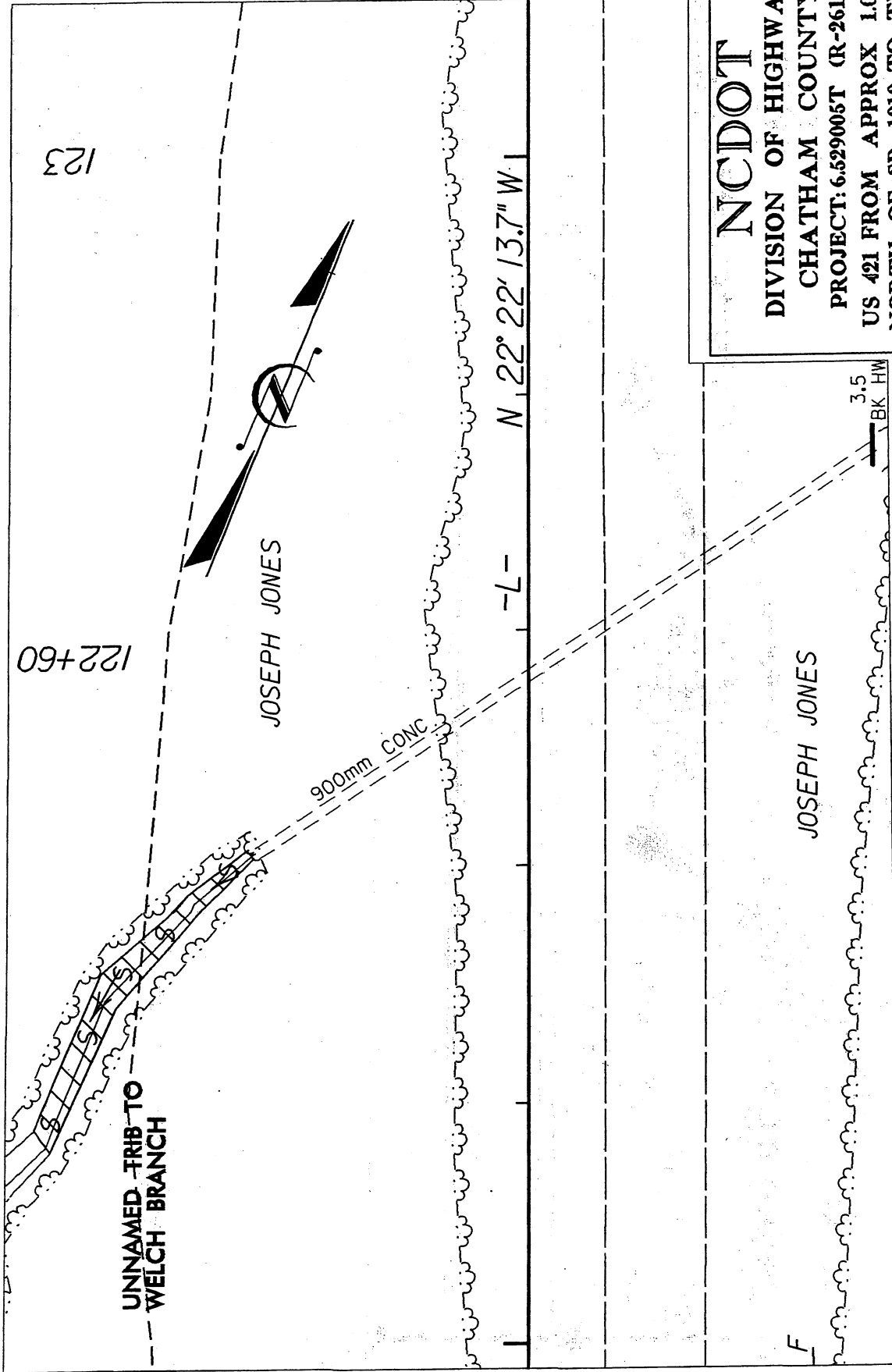
SCALE



DENOTES FILL IN SURFACE WATER

NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM NORTH OF SR 1010 TO THE 4 LANE BYPASS SOUTH OF SILER CITY

SHEET 40 OF 42 JULY 25, 2003



**SITE 13 IMPACTS
PLAN VIEW**

SCALE



 DENOTES FILL IN
 SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM

NORTH OF SR 1010 TO THE 4

LANE BYPASS SOUTH OF

SILER CITY

SHEET 41 OF 46 JULY 25, 2003

PROJECT COMMITMENTS

Widening of US 421 from south of SR 1007 (Plank Road) at Gulf to the existing four-lane Bypass north of SR 2210 (Carter-Brooks Road) south of Siler City
Chatham County
State Project No. 6.529005T
R-2610A and B

COMMITMENTS DEVELOPED THROUGH PROJECT DEVELOPMENT AND DESIGN

NCDOT best management practices for protection of surface waters will be followed during construction of this project to prevent siltation of nearby streams.

During construction, care will be taken to prevent damage to utilities located along the project, especially waterlines running parallel to and crossing the project and the fiber-optic cable and gas line running along the east side of US 421.

The following project commitments are proposed in order to avoid adverse effects to the Cape Fear shiner:

High quality water (HQW) erosion control standards will be utilized for the entire project.

Clearing and grubbing adjacent to Bear Creek and Tick Creek (within 100 meters (328 feet) of either end of the existing bridge) will only be performed during the growing season (between April 15th and November 15th).

Representatives of the NCDOT Natural Resources Section, the NC Wildlife Resources Commission, and the US Fish and Wildlife Service will be invited to the pre-construction conference for the project.

COMMITMENTS DEVELOPED THROUGH PERMITTING

Division 8, Roadside Environmental Unit (REU)

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 seedling establishment is allowable. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but NCDOT must provide written

justification and any calculations used to determine the extent of rip-rap coverage requested.

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 pre-construction contours and elevations. The re-vegetation of the impacted areas with appropriate native species will be required.

Roadway Design, Division 8

Two copies of the final construction drawings shall be furnished to NC Division of Water Quality (DWQ) prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the permit drawings contained in the application dated November 26, 2003, and Right-of-Way plans submitted on February 13, 2004.

Division 8

No in-stream work shall be performed during the period from April 1 to October 15 of any year in Bear Creek or Tick Creek.

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

At no time, shall more than one fill causeway be permitted within Tick Creek. At no time, shall a fill causeway obstruct greater than 50 percent of the cross-section of Tick Creek be installed.

The temporary causeways located at Tick Creek shall be removed no later than 30 days after the completion of the bridge deck slab.

The temporary rock causeways at L-station Station 22+83, Section B shall not extend into the natural stream channel.

The temporary rock causeways at L-station Station 97+00, Section B shall be placed on filter cloth and shall be removed in its entirety upon completion of bridge construction. Removal of the causeway and stabilization of the disturbed embankment area shall be accomplished within 30 calendar days following bridge completion or 30 calendar days following the end of the in-stream work moratorium. A restoration plan shall be submitted to the Corps of Engineers, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager for review and approval 30 calendar days prior to the start of causeway removal.

The temporary diversion structures at L-stations 13+28, 52+75, and 62+34, Section A shall be constructed in accordance with Section 5.2.2 of the North Carolina Department of Transportation “*Best Management Practices for Construction and Maintenance Activities*”, dated August 2003. All temporary fill shall be removed in its entirety upon completion of the construction at that site.

REU

The NCDOT shall strictly adhere to sediment and erosion control Best Management Practices as described for High Quality Waters entitled “Design Standards in Sensitive Watersheds” (15A NCAC 04B .0024) throughout design and construction of the project.

Project Development and Environmental Analysis Branch (PDEA), Division 8

Compensatory mitigation for impacts to streams shall be done for 698 linear feet of stream impact at a replacement ratio of 1:1. Compensatory mitigation for impacts to jurisdictional streams shall be provided by onsite stream relocations of 217 linear feet of a tributary to Cedar Creek. The onsite stream relocation shall be constructed in accordance with the design submitted in the January 30, 2004 application. All stream relocations shall have 50-foot wooded buffers planted on both sides of the stream. As-Builts for the completed streams shall be submitted to the DWQ 401 Wetlands Unit within 30 days of the completion of the construction of the relocations. If the parameters of this condition are not met, then the NCDOT shall supply additional stream mitigation for the 217 linear feet of impacts. In addition to the 217 linear feet of on-site mitigation, compensatory mitigation for an additional 481 linear feet of streams is required. DWQ understands that NCDOT has chosen to perform compensatory mitigation for impacts to streams through an in lieu payment to the NC Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. Mitigation for unavoidable impacts to streams shall be provided through an in-lieu payment to the EEP at a rate of \$200 per linear foot. Therefore, a total payment of \$96,200 shall be submitted to the EEP to offset the stream impacts associated with this project.

No construction activities shall begin anywhere on the project until a Secondary and Cumulative Impact Analysis for the project is submitted to, and approved by, the DWQ.

Compensatory mitigation for the unavoidable impacts to 0.26 acres of wetland and 2,137 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 July 30, 2004 from William D. Gilmore, EEP Transition Manager. The EEP will provide 1.1 acres of preservation of non-riverine wetlands, 1.5 acres of preservation of riverine habitat and 15,900 linear feet of stream preservation in the Central Piedmont Eco-Region at the Allen Site in Wake County and 6,670 linear feet of preservation of warm water stream channel in the Central Piedmont Eco-Region at the Eno River – Wilderness Site in Durham 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

0.11 acres of restoration of non-riverine wetlands, 0.15 acres of restoration of riverine wetlands and 2,137 linear feet of restoration of warm water stream channel in the Cape Fear River basin (Hydrologic Cataloging Unit 03030003 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.

Stream Relocation Requirements:

NCDOT will relocate 253 linear feet of stream at the following locations:

NCDOT shall mitigate for 36 linear feet of unavoidable impacts to an unnamed tributary to Deep River (Section A, Impact Site #1), an important stream channel, by completing 36 linear feet of onsite stream relocation, as described in the permit application.

NCDOT shall mitigate for 217 linear feet of unavoidable impacts to an unnamed tributary to Cedar Creek (Section A, Impact Site #5), an important stream channel, by completing 217 linear feet of onsite stream relocation, as described in the permit application.

The relocations will be performed subject to the following conditions:

The stream relocation shall be constructed in accordance with the North Carolina Wildlife Resources Commission's (NCWRC) "Stream Relocation Guidelines", and with the permit drawings. NCDOT shall consult with NCWRC on all stream relocations and implement all practicable recommendations in the design of specific site requirements for re-establishment of bank vegetation, and placement of meanders and habitat structures. Vegetation shall be used to the maximum extent practicable to stabilize banks, and riprap and other man-made structural measures shall be minimized.

NCDOT shall monitor the stream relocation site for a period of five years starting the year following construction. Monitoring data at the site should include the following: reference photos, plant survival and channel stability. Data shall be collected each year for 5 years at the same time of year. No less than two (2) bankfull flow events must be documented through the required 5-year monitoring period. If less than 2 bankfull events occur during the first 5 years, monitoring will continue until the second bankfull event is documented. The bankfull events must occur during separate monitoring years.

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Vegetation used to stabilize banks shall be limited to native woody species, and will include establishment of a 50 foot wide vegetated buffer on the relocated channel. Stream banks will be planted with native vegetation that represents both woody (trees and

shrubs) and herbaceous species. Species selection will be based on a survey of the vegetation from the approved reference reach. Survival of woody species planted at the stream mitigation sites must be at least 320 trees/acre through year three. A ten percent mortality rate will be accepted in year four (288 trees/acre) and another ten percent in year five, resulting in a required survival rate of 260 trees/acre through year five.

NCDOT shall use soil and erosion control measures for "High Quality Waters" in and within 100 meters of Bear Creek and Tick Creek for the protection of Cape Fear Shiner. These sediment and erosion control measures shall be installed prior to any demolition or land clearing activities and maintained throughout project construction.