



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

November 10, 2003

IN REPLY REFER TO

Regulatory Division

Action ID. 200321137; U-2524AB and AC

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 July 21, 2003 and the ensuing administrative record, enclosed is a permit to authorize the discharge of dredged and fill material into waters of the United States, for construction of Sections AB and AC of the Greensboro Western Urban Loop (T.I.P. No. U-2524AB and AC), impacting Long Branch, Reddicks Creek and its unnamed tributaries, unnamed tributaries of Bull Run, South Buffalo Creek, and Hickory Creek, and adjacent wetlands, from I-85, to I-40, on the southwest side of Greensboro, in Guilford County, North Carolina.

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.

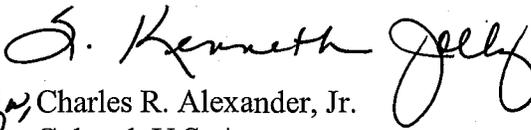
Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

- a. You must complete construction before December 31, 2006.
- 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.

4PT

Should you have questions, contact Mr. Eric Alsmeyer of my Raleigh Field Office regulatory staff at telephone (919) 876-8441, extension 23.

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

RECEIVED

NOV 04 2004

DEPARTMENT OF THE ARMY PERMIT

REGULATORY

Permittee NC Department of Transportation

Permit No. 200321137

Issuing Office USAED, Wilmington

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

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

Project Description:

Place fill material impacting a total of 11,460 linear feet of stream, 4.14 acres of wetlands, and 8.62 acres of ponds, for construction of Sections AB and AC of the Greensboro Western Urban Loop (T.I.P. No. U-2524AB and AC), impacting Long Branch, Reddicks Creek and its unnamed tributaries, unnamed tributaries of Bull Run, South Buffalo Creek, and Hickory Creek, and adjacent wetlands.

Project Location:

From I-85, to I-40, on the southwest side of Greensboro, in Guilford County, North Carolina.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2006. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

See enclosed sheet.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

- () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
- () Section 404 of the Clean Water Act (33 U.S.C. 1344).
- () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

- a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
- b. This permit does not grant any property rights or exclusive privileges.
- c. This permit does not authorize any injury to the property or rights of others.
- d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
- d. Design or construction deficiencies associated with the permitted work.

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.

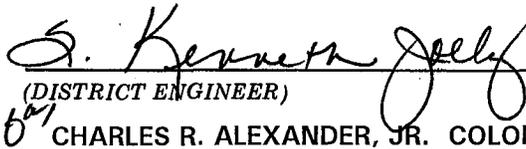


(PERMITTEE)
NC DEPARTMENT OF TRANSPORTATION

31 Oct 03

(DATE)

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

11/10/03

(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)



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

IN REPLY REFER TO
SPECIAL CONDITIONS (Action ID. 200321137; NCDOT/TIP U-2524AB & AC)

a. All work authorized by this permit must be completed in strict compliance with the attached plans, which are a part of this permit. The permittee will 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 will be brought to the attention of the Corps of Engineers, Raleigh Regulatory Field Office prior to any active construction in waters or wetlands.

b. The permittee shall mitigate for 8,905 linear feet of important stream impact and 4.14 acres of emergent marsh, emergent seep, and headwater and palustrine forest wetland impact for this project, as described below (4,472 linear feet of stream re-location, 1.32 acres of wetland restoration at the Sandy Creek wetland mitigation site, 15.84 acres of wetland restoration at the Blue Tract wetland mitigation site, 1,195 linear feet of stream restoration and stream enhancement at the Woodlyn Way stream mitigation site, 6,679 linear feet of stream restoration and stream preservation at the Tick Creek stream mitigation site, and 1,806 linear feet of stream restoration at the UT Bear Creek stream mitigation site).

ONSITE STREAM RELOCATION

c. IMPLEMENTATION: The permittee shall mitigate for 4,472 linear feet of unavoidable impacts to perennial stream channel associated with this project by completing 4,472 linear feet of onsite stream relocation, as described in the permit application. All stream relocations shall be constructed in accordance with the North Carolina Wildlife Resources Commission's (NCWRC) "Stream Relocation Guidelines." 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. The relocations shall be constructed in a dry work area, and stabilized before the stream is diverted.

d. AS-BUILT SURVEY: The permittee shall complete an as-built channel survey within sixty days of completion of the stream relocation construction. The permittee shall document changes in the dimension, pattern, profile, vegetation plantings, and structures installed, of the relocated channel from the proposed design. The permittee shall also include in the as-built survey: photo documentation at representative segments and structures; and a plan view diagram.

e. MONITORING SCHEDULE: The permittee shall perform the following components of Level I monitoring each year for the 5-year monitoring period: Reference photos; plant survival (i.e., identify specific problem areas (missing, stressed, damaged or dead plantings), estimated causes, and proposed/required remedial action); visual inspection of channel stability.

Physical measurements of channel stability/morphology will not be required. The permittee shall submit the monitoring reports to the Corps of Engineers, Raleigh Regulatory Field Office Project Manager, within sixty days after completing the monitoring. If less than two bankfull events occur during the first 5 years, the permittee shall continue monitoring until the second bankfull event is documented. The bankfull events must occur during separate monitoring years. In the event that the required bankfull events do not occur during the five-year monitoring period, the Corps of Engineers, in consultation with the resource agencies, may determine that further monitoring is not required. It is suggested that all bankfull occurrences be monitored and reported through the required monitoring period. The permittee shall perform and submit photo documentation twice each year (summer and winter) for the 5-year monitoring period, and for any subsequently required monitoring period.

f. MONITORING DATA/REPORT: The permittee shall include the following information in the Level I monitoring report for the site: reference photos; plant survival notes and recommendations, as appropriate; and a report on the visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. The permittee shall complete the Monitoring Data Record, Sections 1, 2 and 3 (pages 1, 2 and 3, attached), for each representative segment of the channel, and for each year of monitoring (twice each year (summer and winter) for reference photos). The permittee shall include in the monitoring reports a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situation.

g. STREAM RELOCATION SUCCESS CRITERIA: The relocation success criteria, and required remediation actions, will be generally based on the attached Appendix II, and the Photo Documentation, Ecological Function, and Channel Stability criteria in the "Stream Mitigation Guidelines", dated April, 2003 (available on the internet at http://www.saw.usace.army.mil/wetlands/Mitigation/stream_mitigation.html), pages 24 and 25, under "Success Criteria: ".

SANDY CREEK WETLANDS RESTORATION

h. The permittee shall provide the restoration described in condition i. below through continued implementation of the compensatory wetland mitigation plan "Wetland Mitigation Plan – Sandy Creek Site", dated April, 1999.

i. The permittee shall mitigate for 0.66 acre of unavoidable impacts to wetlands associated with this project with 1.32 acres of wetland restoration at the Sandy Creek Mitigation Site.

j. NCDOT will do a survey of the 1.32 acres of wetland restoration at the Sandy Creek Mitigation Site, and submit a copy of the survey to the District Engineer within 60 days after the survey is completed.

k. The permittee will continue monitoring the site vegetation between June 1 and November 30, inclusively, of each year, and document plant mortality and stress. A minimum of three 0.05 acre sample plots will be used for the entire site. The permittee will continue monitoring of the planting areas annually until the respective performance criteria are met, as described below.

SANDY CREEK MITIGATION MONITORING

l. Performance criteria for tree planting areas will be met if sample plots demonstrate that for each of the first three complete years of monitoring, 320 target-species trees per acre have survived, such that at the end of three years, 320 three-year old target-species trees per acre have survived on the site, and, in years four and five, 288 and 260 trees per acre, respectively, have survived on the site, such that at the end of year five, 260 five-year old target-species trees per acre have survived on the site.

m. If for any monitoring year, vegetation survival is not favorable, as determined by the Corps of Engineers, any remedial action required by the Corps of Engineers will be performed, the required restoration areas will be replanted, and the five-year monitoring period will begin again with year one.

n. Hydrology in the restoration areas will be monitored through the use of monitoring gauges during each growing season for the first five years of the vegetative monitoring, or until performance criteria have been met, whichever occurs later. A minimum of six groundwater gauges will be used within the total wetland restoration area at Sandy Creek.

o. To meet the hydrology success criteria, the monitoring data must show that for each normal precipitation year within the monitoring period, the site has been inundated or saturated within the upper 12 inches of the soil for a minimum of 12.5% of the growing season (29 consecutive days for Randolph County). WETS tables for Randolph County will be utilized as appropriate to determine normal precipitation years.

p. If there are no normal precipitation years during the first five years of monitoring, to meet performance criteria, the permittee will continue to monitor hydrology on the site until it shows that the site has been inundated or saturated as described above during a normal precipitation year.

q. In the alternative, and at the Corps' discretion, a site may be found to meet the hydrology performance criteria on the basis of comparison of monitoring data taken from the site with monitoring data taken from an established jurisdictional mitigation reference site approved by the Corps. The Corps retains the discretion to find that the hydrology criteria are met if such monitoring data from the mitigation site and the reference site are substantially the same. This finding by the Corps may be made during years with or without normal rainfall.

r. In the event there are years of normal precipitation during the monitoring period, and the data for those years do not show that the site has been inundated or saturated within the upper 12 inches of the soil for a minimum of 12.5 % of the growing season (29 consecutive days) during a normal precipitation year, the Corps may require remedial action. The permittee shall

perform such required remedial action, and continue to monitor hydrology on the site until it displays that the site has been inundated or saturated as described above, during a normal precipitation year. If the Corps determines that further remediation is not appropriate, other options will be considered, including use of a different site to mitigate for project impacts.

s. The permittee will submit yearly mitigation monitoring reports by the first day of February after each assessment period, for five years following final site manipulation. These reports will include, at a minimum, sample plot, well and rainfall data; number of individuals of each tree species within each sample plot; photographs, including a location key; and problems/resolution, and will be provided to both the Corps and the North Carolina Division of Water Quality.

BLUE TRACT WETLANDS PRESERVATION

t. The permittee shall continue implementation of the compensatory wetland mitigation plan entitled "Blue Tract Mitigation Planning Document", dated June 11, 2001, to provide the preservation described in condition u. below.

u. The permittee shall mitigate for 0.66 acres of unavoidable impacts to wetlands associated with this project with 15.84 acres of wetland preservation, and additional upland buffer and stream preservation, at the Blue Tract Mitigation Site.

v. NCDOT will submit a copy of a survey of the 15.84 acres of wetland preservation at the Blue Tract Mitigation Site, to the District Engineer within 90 days after this permit is issued.

GENERAL WETLANDS MITIGATION

w. The permittee and/or current and subsequent property owners shall maintain the Sandy Creek and Blue Tract mitigation sites in their natural condition, as altered by work in the mitigation plans, in perpetuity. Prohibited activities within the mitigation sites 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 properties, which will adversely impact the wetlands or streams on the mitigation properties, except as specifically authorized by this permit, or subsequent modifications that are approved by the Corps of Engineers.

x. The permittee shall make every effort to convey the Sandy Creek, and Blue Tract Mitigation Site properties to a nonprofit conservation organization or a natural resource agency, which is willing to hold the areas in perpetuity for conservation purposes, and which is

acceptable to the Corps of Engineers. The annual monitoring reports, as required, will include the status of the conveyance efforts.

y. The permittee shall not sell or otherwise convey any interest in the wetland mitigation properties used to satisfy mitigation requirements for this permit, to any third party, without 10 days prior notification to Wilmington District Corps of Engineers in writing, which writing shall reference this permit Action ID number.

z. Any sale, lease, or other conveyance of the wetland mitigation site properties shall include restrictions on the use of the properties as described in condition w. above, which conditions shall be enforced by the North Carolina Department of Transportation. Such restrictions shall include language providing for third party enforcement rights in favor of the Corps of Engineers. Such restrictions must be approved by the Corps of Engineers prior to conveyance.

WOODLYN WAY STREAM MITIGATION

aa. The permittee shall mitigate for 381 linear feet of impacts to stream channel associated with this project with 1,150 linear feet of stream restoration and 45 linear feet of stream enhancement, as described in the "Woodlyn Way Stream Mitigation Plan, Guilford County, North Carolina", dated January 2002 (Action ID. 200220514). The permittee shall complete the construction and planting at the Woodlyn Way Mitigation Site concurrently with the construction of TIP U-2524AB and AC.

TICK CREEK STREAM MITIGATION

bb. The permittee shall mitigate for 2,095 linear feet of impacts to stream channel associated with this project with 2,946 linear feet of stream restoration and 3,733 linear feet of stream preservation, as described in the "Stream Mitigation Plan, Tick Creek, Condoret Property, Chatham County, North Carolina", dated September 2002 (Action ID. 200320295). The permittee shall complete the construction and planting at the Tick Creek Mitigation Site by December 31, 2004.

UT BEAR CREEK STREAM MITIGATION

cc. The permittee shall mitigate for 1,145 linear feet of impacts to stream channel associated with this project with 1,806 linear feet of stream restoration, as described in the "UT Bear Creek Mitigation Plan, Chatham County, North Carolina", dated June 2003 (Action ID. 200320314), to the extent necessary to provide the required mitigation. The permittee shall complete all the construction and planting at the UT Bear Creek Mitigation Site, by December 31, 2004.

WOODLYN WAY, TICK CREEK AND UT BEAR CREEK SITE MONITORING

dd. PROHIBITED ACTIVITIES: The permittee, and current and subsequent property owners, shall maintain the Woodlyn Way, Tick Creek, and UT Bear Creek stream mitigation sites in their natural condition, as altered by work in the mitigation plan and subsequent remediation, in perpetuity. Prohibited activities within the mitigation sites 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, except as specifically stated in the mitigation plan; 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, and current and subsequent property owners, shall take no action, whether on or off the mitigation properties, which will adversely impact the streams on the mitigation properties, except as specifically authorized by this permit, or subsequent modifications that are approved by the Corps of Engineers.

ee. AS-BUILT SURVEY: The permittee shall complete an as-built channel survey for each of the three sites within sixty days of completion of the stream mitigation construction at each site. The permittee shall document changes in the dimension, pattern, profile, vegetation plantings, and structures installed, of the constructed channel from the proposed design. The permittee shall also include in the as-built surveys: photo documentation at representative segments and structures; and plan view diagrams.

ff. MONITORING SCHEDULE: The permittee shall perform the following components of Level I monitoring each year of a 5-year monitoring period: Reference photos; plant survival (i.e., identify specific problem areas (missing, stressed, damaged or dead plantings), estimated causes, and proposed/required remedial action); visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. The permittee shall submit the monitoring reports to the Corps of Engineers, Raleigh Regulatory Field Office Project Manager, within sixty days after completing the monitoring. If less than two bankfull events occur on either site during the first 5 years, the permittee shall continue monitoring that site until the second bankfull event is documented. The bankfull events must occur during separate monitoring years for each site. In the event that the required bankfull events do not occur during the five-year monitoring period, the Corps of Engineers, in consultation with the resource agencies, may determine that further monitoring is not required. It is suggested that all bankfull occurrences be monitored and reported through the required monitoring period. The permittee shall perform and submit photo documentation for each site twice each year (summer and winter) for the 5-year monitoring period, and for any subsequently required monitoring period.

gg. MONITORING DATA/REPORT: The permittee shall include the following information in the Level I monitoring report for each site: reference photos; plant survival notes and recommendations, as appropriate; and a report on the visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. The permittee shall complete the Monitoring Data Record, Sections 1, 2 and 3 (pages 1, 2 and 3, attached), for each

representative segment of the channels, and for each year of monitoring (twice each year for each site, summer and winter, for reference photos). The permittee shall include in the monitoring reports a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situations.

hh. STREAM MITIGATION SUCCESS CRITERIA: The mitigation success criteria, and required remediation actions, will be generally based on the attached Appendix II, and the Photo Documentation, Ecological Function, and Channel Stability criteria in the "Stream Mitigation Guidelines", dated April, 2003 (available on the internet at http://www.saw.usace.army.mil/wetlands/Mitigation/stream_mitigation.html), pages 24 and 25, under "Success Criteria: "

WOODLYN WAY, TICK CREEK AND UT BEAR CREEK SITE PROPERTY DISPENSATION

ii. The permittee shall purchase the mitigation sites in fee simple, or shall secure a conservation easement on the mitigation sites, to ensure the maintenance of the mitigation sites by the current and subsequent property owners, in their natural condition, as altered by work in the mitigation plans, in perpetuity. In addition, the permittee, and current and subsequent property owners, shall take no action, whether on or off the mitigation properties, which will adversely impact the streams on the mitigation properties, except as specifically authorized by this permit, or subsequent modifications that are approved by the Corps of Engineers.

PRE-CONSTRUCTION

jj. Prior to commencing construction within jurisdictional waters of the United States, the permittee shall forward the latest version of project construction drawings to the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings are acceptable.

kk. The permittee shall schedule an environmental preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall provide the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager, with a copy of the final plans at least two weeks prior to the preconstruction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the environmental preconstruction meeting for a time when the Corps of Engineers and North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall invite the Corps and NCDWQ Project Managers a minimum of four weeks in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting.

ll. 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, except as authorized by this permit, or any modification to this permit. There shall be no excavation from, or waste disposal into, 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.

mm. 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 (ll.) 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 (ll.). 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.

nn. 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.

oo. The permittee shall implement the recommendations (1 – 7) in the attached September 16, 2003 letter from the North Carolina Wildlife Resources Commission, with the exception that NCDOT shall not be required to install alternating or notched baffles in culverts with slopes less than 0.5%.

WATER QUALITY CERTIFICATION

pp. The permittee shall comply with the conditions specified in the water quality certification, No. 3435 (modification), issued by the North Carolina Division of Water Quality on October 24, 2003.

qq. The permittee shall conduct construction 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 standards.

rr. 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.

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

OTHER CONDITIONS

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

uu. No excavated or fill material will be placed at any time in waters or wetlands outside the permitted construction areas, 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.

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

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

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

yy. This permit does not grant any property rights or exclusive privileges.

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

1. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

2. Damages to the permitted project or uses thereof as a result of current or future Federal activities initiated on behalf of the general public.

3. Damages to other permitted or unpermitted activities or structures caused by the authorized activity.

4. Design and construction deficiencies associated with the permitted work.

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

aaa. Any violation of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District, U. S Army Corps of Engineers, within 24 hours of the violation.



North Carolina Department of Environment and Natural Resources

William G. Ross Jr., Secretary
Alan W. Klimek, P.E., Director
Division of Water Quality
Coleen H. Sullins, Deputy Director
Division of Water Quality

October 24, 2003

Mr. Gregory J. Thorpe, Ph.D., Environmental Director
NCDOT Planning and Environmental Branch
1548 Mail Service Center
Raleigh, NC, 27699-1548

Dear Dr. Thorpe:

Re: MODIFICATION TO Water Quality Certification Pursuant to §401 of the Federal Clean Water Act,
Greensboro Western Urban Loop, from I-85 south of Groometown to south of I-40 Interchange,
Guilford County.
F.A. Project No. STPNHF-NHF-124-1(1); State Project No. 8.U492101
TIP No. U-2524 AB/AC and AB Part I
DWQ Project No. 030909

Attached hereto is a copy of the Modification to Certification No. 3435 issued to The North Carolina
Department of Transportation dated October 24, 2003.

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
Eric Alsmeyer, USACE Raleigh Field Office
NCDWQ Winston-Salem Regional Office
Christopher Miltscher, US Environmental Protection Agency - Region IV
Ron Ferrell, NC Wetlands Restoration Program
William D. Gilmore, P.E., Transition Manager, NC DENR Division of Ecosystem Enhancement
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 .0500. This Certification authorizes the NCDOT to incur the following permanent impacts:

- 4.14 acres of wetlands through fill, excavation and mechanized clearing;
- 3.92 acres of fill in ponds;
- 4,610 linear feet of on-site stream relocation
- 6,919 linear feet of jurisdictional stream loss;
- 20.46 acres of Zone 1 Randleman Lake Riparian Buffers
- 11.79 acres of Zone 2 Randleman Lake Riparian Buffers

The U-2524 AB/AC and AB Part I projects shall be constructed pursuant to the application dated July 21, 2003 and Modification request dated October 24, 2003 to construct the Greensboro Western Urban Loop from I-85 south of Groometown to south of I-40 Interchange in Guilford County.

The Application provides adequate assurance that the discharge of fill material into the waters of the state 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. All work authorized by this Certification must be done in strict compliance with the plans attached to the Application. If this project changes, incurring additional impacts to streams, wetlands or buffers, you are required to notify the DWQ *in writing*, and you may be required to submit a new application. Additional compensatory mitigation may 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, Non-discharge and Water Supply watershed regulations. This Certification shall expire three (3) years from the date of the cover letter from DWQ or on the same day as the expiration date of the corresponding US Army Corps of Engineers Permit, whichever is later.

Condition(s) of Certification:

1. Construction shall be performed so that no violations of state water quality standards, statutes, or rules occur.
 - a. 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 protect surface water quality standards.
 - b. The erosion and sediment control measures for the U-2524AB/AC and AB Part 1 projects 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 projects included under this Certification.
 - c. 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*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

- e. NCDOT shall strictly adhere to North Carolina regulations entitled, *Design Standards in Sensitive Watersheds* (15A NCAC 4B .0124 (b) –(e) only), for activities undertaken in all waters classified as WS (Water Supply) and draining to the Critical Area, including: Hickory Creek, Reddick's Creek and Bull Run, as well as their unnamed tributaries. NCDOT will *not* be required to comply with 15A NCAC 2B .0124(a), which restricts clearing to 20 acres at a time.
2. For streams in the Randleman Lake Watershed (Hickory Creek, Reddick's Creek and Bull Run and their unnamed tributaries), stormwater shall be directed to flow as diffuse flow at non-erosive velocities across the stream buffers using level spreaders, retention basins, pre-formed scour holes or other site-appropriate devices. For all streams that are *not* in the Randleman Lake watershed (South Buffalo Creek and its unnamed tributaries), stormwater shall be transported by vegetated conveyance before discharge into the streams. In either case, stormwater shall not be routed to flow directly into streams. Existing wooded stream buffers shall not be mowed in order to allow them to provide diffuse stormwater flow and/or streambank stabilization.
 3. 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 within 30 days after the project has been released.
 4. 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 to ensure compliance with 15A NCAC 2B .0250.
 5. NCDOT and its contractors and/or agents shall not excavate, fill, or perform mechanized land clearing at any time in the construction or maintenance of this project within waters and/or wetlands, except as authorized by this Certification, or any modification to this Certification. There shall be no excavation from or waste disposal into jurisdictional wetlands or waters associated with this Certification without appropriate modification. If this occurs, compensatory mitigation will be required since it is a direct impact from road construction activities.
 6. Excavation of stream crossings should be conducted in the dry unless demonstrated by the applicant or its authorized agent to be unfeasible. Sandbags, cofferdams, flexible pipe, or other diversion structures should be used to minimize excavation in flowing water.
 7. Live or fresh concrete shall not come into contact with waters of the state until the concrete has hardened.
 8. Discharging hydroseeding mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is strictly prohibited.
 9. The natural dimension, pattern and profile of the stream above and below the crossing should not be modified by widening the stream channel or changing the depth of the stream.
 10. The removal of vegetation in riparian areas should be minimized. NCDOT is encouraged to use existing on-site vegetation and materials for stream bank stabilization and to minimize the use of rip rap. Riprap shall not be placed in the stream bottom.

11. Riparian vegetation, using native trees and shrubs, must be re-established within the construction limits of the project by the end of the growing season following completion of construction to reestablish the riparian zone and to provide long-term erosion control.
12. Placement of culverts and other structures in waters, streams, and wetlands shall be placed below the elevation of the streambed to allow low flow passage of water and aquatic life unless it can be shown to DWQ that providing passage would be impractical. 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 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.
13. Heavy equipment should be operated from the bank rather than in the stream channel unless demonstrated by the applicant or its authorized agent to be unfeasible. All mechanized equipment operated near surface waters should be inspected and maintained regularly to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids or other toxic substances.
14. *On-Site Stream Relocations:* The five on-site stream relocations (listed below) shall utilize natural channel design:
- AB Part 1 Site 7 from Sta. 11+60 to Sta. 11+67 -40SB REV-
 - AB Part 1 Site 17 from Sta. 11+00 to Sta. 13+00 -40 SB REV-
 - AB Site 3 from Sta. 34+00 to Sta. 37+10 -L-
 - AC Site 1 from Sta. 57+80 Lt to Sta. 58+57 Rt -L-
 - AC Site 2BA from Sta. 101+80 -L- to Sta. 12+70 -Ramp D-
 - The relocations must be constructed in a dry work area, and stabilized before the stream flow is diverted. Each stream relocation shall be completed and stabilized prior to diverting water into the new channels. The channels must 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 each relocated channel to the *maximum extent practical*. A transitional phase incorporating coir fiber and seedling establishment is allowable. 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 the calculations used to determine the extent of rip-rap coverage requested.
 - If any of the relocated channels or the associated riparian area has been determined to be unstable, the stream shall be repaired or stabilized using only natural channel design techniques. Additionally, the vegetation in the riparian area shall be maintained and/or replaced according to the approved plans. Rip-rap and other hard structures may *only* be used if required by the Division of Land Resources or a Delegated Local Program. Additionally, all repair designs must be submitted to and receive written approval from the Division before the repair work is performed.
 - Monitoring for geomorphological stability shall be performed for each relocated channel in accordance with accepted protocols established by US Army Corps of Engineers (USACE) and NCDWQ.
 - Biological Monitoring shall be performed in accordance with the Stream Restoration protocols found in the *Interim, Internal Technical Guide Summary: Benthic Macroinvertebrate Monitoring Protocols for Compensatory Stream Restoration and Enhancement Level 1 Projects* (NC Division of Water Quality, 401 Water Quality Certification Program, May 16, 2001 <http://h2o.enr.state.nc.us/ncwetlands/stnmjto.htm>).
 - The relocated channels and associated riparian buffer areas shall be preserved in perpetuity through a deed notification, preservation easement or some other legally

binding mechanism or agreement. The easements or other legally binding mechanisms or agreements must be in place before any construction impacts approved under this Certification can take place. The NCDOT Division 9 Right of Way Office shall provide NCDWQ with evidence that the additional right of way has been purchased within two (2) months of issuance of the US Army Corps of Engineers 404 Permit.

- o The on-site stream relocation must be completely constructed and maintained according to the plans approved by the Division before the Greensboro Western Urban Loop (TIP U-2524 AB/AC and AB Part 1) is opened and any mitigation credit is given.

15. *Mitigation:* Compensatory mitigation shall be the same as that approved by the US Army Corps of Engineers as long as the mitigation required equals a ratio of 1:1 restoration or creation of lost wetland acres as described in 15A NCAC 2H.0506 (h)(6).

Wetland Mitigation

Compensatory mitigation for 4.14 acres of wetland impacts shall be provided through the following schemes:

- NC Wetlands Restoration Program (WRP) has agreed to provide compensatory mitigation for 2.82 acres of wetland impacts incurred for construction of U-2524AB Part 1. DWQ acknowledges that this payment has been made under the §401 WQC for TIP Project No. I-2402 (reference WRP letter of September 6, 1999).
- NCDOT proposes to use 1.32 acres of mitigation from Sandy Creek Mitigation Site in Randolph County (HU 03030003). This site has been approved by NCDWQ.
- NCDOT proposes to use preservation credits from Blue Tract Mitigation Site in Moore County (HU 03030004) at a 12:1 ratio for 7.92 acres of mitigation. This site and the mitigation ratios have previously been approved by Federal and State resource agencies.

Randleman Riparian Buffer Mitigation

NC Division of Ecological Enhancement (DEE) has agreed to provide compensatory mitigation in a letter dated September 25, 2003. NCDOT will be paying into the WRP for the DEE to perform the mitigation work. The buffer impacts and mitigation are as follows:

<i>Zone</i>	<i>Impacts (ac.)</i>	<i>Mitigation (ac.)</i>
1	18.09	45.96
2	10.23	14.30
		60.26 ac. total

Stream Mitigation

NCDOT proposes to use the following sites as compensatory mitigation for 7,171 linear feet of stream impacts incurred for construction of U-2524AB Part 1:

- Woodlyn Way Mitigation Site
- Tick Creek Mitigation Site
- UT to Bear Creek Mitigation Site

<i>Site Name</i>	<i>Available Mit'n.</i>	<i>Mitigation Used</i>	<i>Remaining Mit'n.</i>
Woodlyn Way	1,195	1,195	0
Tick Creek	4,190	4,190	0
UT Bear Creek	3,850	1,806	2,044
Total	9,235	7,191	2,044

- NCDOT shall provide 100% design plans for the UT to Bear Creek site within three (3) months of issuance of this Modification.

In accordance with 15A NCAC 2R.0500, this contribution will satisfy NC Division of Water Quality's compensatory mitigation requirements under 15A NCAC 2H.0506(h). Until the WRP receives and clears your payments for the Randleman buffer mitigation, wetland or stream fill shall not occur. The payment to NCWRP shall be sent within two (2) months of issuance of the 404 permit.

16. 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 July 21, 2003.
17. 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.
18. NCDOT and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State law and Federal law. If DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the certification, DWQ shall notify NCDOT and the US Army Corps of Engineers, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to NCDOT in writing, shall be provided to the United States Army Corps of Engineers for reference in any permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project.

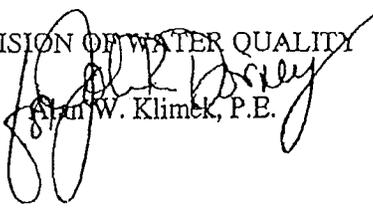
NCDOT shall require its contractors (and/or agents) to comply with all of the terms of this Certification, and shall provide each of its contractors (and/or agents) a copy of this Certification.

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 Permit. This Certification shall expire upon the expiration of the 404 Permit.

If you do not accept any of the conditions of this certification, you may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. To ask for a hearing, send a written petition that conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This Certification and its conditions are final and binding unless you ask for a hearing.

This the 24th day of October 2003

DIVISION OF WATER QUALITY


Alan W. Klimek, P.E.

WQC No. 3435

DWQ Project No.: _____

County: _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401/Wetlands Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to DWQ by the applicant, the applicant's authorized agent, or the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project, for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

**NORTH CAROLINA - DIVISION OF WATER QUALITY
401 WATER QUALITY CERTIFICATION
SUMMARY OF PERMITTED IMPACTS AND MITIGATION REQUIREMENTS**

In accordance with 15A NCAC 2H.0500, NCDOT, DWQ Project No. 030909, is authorized to impact the surface waters of the State of North Carolina as indicated below for the purpose of constructing Greensboro Western Urban Loop from I-85 south of Groometown to south of I-40 interchange (TIP Nos. U-2524AB/AC and AB Part 1). All activities associated with these authorized impacts must be conducted in accordance with the conditions listed in the attached certification transmittal letter.
THIS CERTIFICATION IS NOT VALID WITHOUT THE ATTACHMENTS.

COMPENSATORY MITIGATION REQUIREMENTS FOR RANDLEMAN BUFFER RESTORATION:

LOCATION: Greensboro Western Urban Loop from I-85 south of Groometown to south of I-40 interchange.
COUNTY: Guilford
BASIN/SUBBASIN: Cape Fear River Basin, Cataloging Unit 03030002

As required by 15A NCAC 2B .0250 and 15A NCAC 2H .0506(h), and the conditions of this certification, you are required to compensate for impacts through the restoration, creation, enhancement or preservation of wetlands, buffers, and surface waters as outlined below *prior* to conducting any activities that impact or degrade waters of the state.

The Randleman buffer impacts and mitigation (to be performed by NC DENR Division of Ecological Enhancement) are as follows:

<i>Zone</i>	<i>Impacts (ac.)</i>	<i>Mitigation (ac.)</i>
1	18.09	45.96
2	10.23	14.30
		60.26 ac. total

Note: Acreage requirements proposed to be mitigated through the Wetland Restoration Program must be rounded to one-quarter increments according to 15A 2R .0503(b).

One of the options you have available to satisfy the compensatory mitigation requirements is through payment of a fee to the Wetland Restoration Program per 15A NCAC 2R .0503. If you choose this option, please sign this form and mail it to the Wetlands Restoration Fund at the address listed below. An invoice for the appropriate amount of payment will be sent to you upon receipt of this form.
PLEASE NOTE, THE ABOVE IMPACTS ARE NOT AUTHORIZED UNTIL YOU RECEIVE NOTIFICATION THAT YOUR PAYMENT HAS BEEN PROCESSED BY THE WETLANDS RESTORATION PROGRAM.

Signature

Date

WETLANDS RESTORATION PROGRAM
DIVISION OF WATER QUALITY
1619 Mail Service Center
RALEIGH, NC, 27699-1619
(919) 733-5219



2003-2-1137

⊠ North Carolina Wildlife Resources Commission ⊠

Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Eric Alsmeyer, U.S. Army Corps of Engineers
Raleigh Field Office

FROM: Travis W. Wilson, Highway Project Coordinator *T. W. Wilson*
Habitat Conservation Program

DATE: September 16, 2003

SUBJECT: U.S. Army Corps of Engineers Public Notice for Action ID No. 200321137, review of application for North Carolina Department of Transportation (NCDOT) to discharge dredge or fill material into waters and wetlands to construct Sections AB and AC of the Greensboro Western Urban Loop in Guilford County, North Carolina. TIP No. U-2524AB and AC.

Staff biologists with the N. C. Wildlife Resources Commission (NCWRC) have reviewed the information provided by the U.S. Army Corps of Engineers. Our comments are provided in accordance with certain provisions of the Clean Water Act of 1977 (33 U.S.C. 466 et seq.) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

NCDOT proposes to impact 4.14 acres of jurisdictional wetlands 11,460 linear feet of jurisdictional streams, and 8.62 acres of ponds to construct sections AB and AC of the Greensboro Western Urban Loop, with a new interchange at Wendover Avenue and expanded interchanges at I-85 and I-40.

NCDOT has proposed the use of two wetland mitigation sites (Sandy Creek and Blue), and three stream mitigation sites (Woodlyn Way, Tick Creek, and Unnamed Tributary to Bear Creek) to mitigate for a portion of the stream and wetland impacts. NCDOT has mitigated for the remainder of stream and wetland impacts by payment to the North Carolina Wetland Restoration Program. Two stream relocations are associated with this project, Long Branch south of I-40 and an unnamed tributary to Reddick's Creek. NCDOT has committed to using natural stream designs and wooded buffers for these relocations.

We feel that NCDOT has minimized impacts to wetlands and streams to the maximum extent practicable. The mitigation proposed for the unavoidable impacts appears to be sufficient. We do not object to the issuance of the '404' permit for this project provided the following conditions are part of the permit:

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

1. Riprap placed for bank stabilization should be limited to the streambank below the high water mark, and vegetation should be used for stabilization above the high water elevation.
2. Culverts and pipes must be designed to allow for aquatic life and fish passage. Culverts 48" or larger should be buried approximately 1' into the streambed. Culverts less than 48 inches in diameter should be buried to a depth equal to or greater than 20% their size to allow for aquatic life passage. These measurements must be based on natural thalweg depths. If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s). Sufficient water depth should be provided in the base flow barrel(s) during low flows to accommodate fish movement. Install alternating or notched baffles in a manner that mimics existing stream pattern. This should enhance aquatic life passage by depositing sediments in the barrel, maintaining channel depth and flow regimes, and providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.
3. The dimension, pattern, and profile of the stream above and below the base flow barrel(s) should not be modified by widening the stream channel or reducing the depth of the stream.
4. Stormwater should be routed to buffer areas and not discharge directly to the streams.
5. Heavy equipment should be operated from the bank rather than in the stream channel in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into the streams.
6. If concrete is used during construction, adequate precautions must be taken to prevent direct contact between wet (uncured) concrete and stream water due to the potential for elevated pH that can cause a fish kill. Water that has contacted uncured concrete should not be discharged to surface waters.
7. Discharging hydroseeding mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is strictly prohibited.

Thank you for the opportunity to comment on this permit application. If you have any questions or we can be of further assistance please call me at (919) 528-9886.

cc: Gary Jordan, U.S. Fish and Wildlife Service, Raleigh
John Hennessy, DWQ, Raleigh

RECEIVED

JUL 21 2003

SUBJECT: Stormwater Management Plan for U-2524AB Part1, Guilford County.
Greensboro - Western Loop from North of I-85 near Groometown
Road to North of High Point Road

ROADWAY DESCRIPTION:

The U-2524AB1 project goal is to provide a connection between the new Greensboro Bypass and existing I-40. The project is primarily a new interchange at the Greensboro bypass and the I-40 connector. There are three existing box culverts located on the project that are to be retained and extended. All three culverts are on Unnamed Tributaries to Hickory Creek. There are two other jurisdictional streams that are being relocated and several wetland sites that will be impacted.

ENVIRONMENTAL DESCRIPTION:

The Tributaries to Hickory Creek are in the Cape Fear River Basin and are a part of the Randleman Reservoir Watershed. The stream classification for Hickory Creek is WS-IV. The unnamed tributaries to Hickory Creek are not specified on the DENR Stream Classification List. There are four sites that appear on the soils map. There are a total of fifteen permitted sites on the project, with impacts totaling 1399 m (4590 ft.) of stream with 575 m (1887 ft.) of relocated stream utilizing Natural Channel Design, 10.86 ha (26.84 Ac.) of wetlands, and 4.34 ha (10.74 ac.) of Randleman Reservoir Riparian Buffers.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES:

Best Management Practices (BMP's) utilized on this project consist of grassed swales and preformed scour holes.

The following summarizes the locations of each BMP:

Grassed Swales

-I40SBREV-

- Station 12+00 to 15+40 Lt.
- Station 15+80 to 17+00 Rt.
- Station 19+00 to 19+40 Lt.
- Station 20+00 to 21+00 Lt.

-I1140NB-

- Station 13+40 to 15+90 Lt.
- Station 19+00 to 22+00 Lt.
- Station 20+60 to 20+90 Rt.

-CSLIP-

- Station 17+00 to 18+00 Lt.
- Station 17+00 to 18+20 Rt.
- Station 18+80 to 19+60 Rt.
- Station 18+80 to 19+80 Lt.

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- Station 30+05 Rt. – This system outlet is a 600mm (24") pipe. Per design guidelines, the maximum pipe diameter for a preformed scour hole is 450mm (18"). Other methods were investigated, but there is limited space.

-II40NB- Station 18+60 Lt. – This system outlets into an existing system. Rerouting this water was investigated; however, due to elevation constraints, no other alternative was feasible.

-CSLIP- Station 25+48 and 25+88 Rt. – These pipes empty into an existing roadside ditch on a small service road. There is no room for any other BMP.

-IIFLY- Station 19+00 Lt. – This system empties into an existing ditch with no room for any other BMP.

-IIRPA- Station 11+60 to 14+50 Rt. – These pipes empty into an existing ditch with no room for any other BMP.

Major Structures

Station 31+70 –L- (Tributary to Hickory Creek) Existing 1 @ 2.7m x 1.5m (9 ft. x 5 ft.) reinforced concrete box culvert is to be retained and extended on the outlet end.

Station 11+75 –LoopC- (Tributary to Hickory Creek) Existing 1 @ 2.4m x 1.5m (8 ft. x 5 ft.) reinforced concrete box culvert will be retained and extended on the inlet end.

Station 25+35 –CSLIP- (Tributary to Hickory Creek) Existing 1 @ 2.4m x 1.8m (8 ft. x 6 ft.) reinforced concrete box culvert is to be retained and extended on the outlet end.

Reference Reach

Due to the existing, unstable condition of the UT, a stable stream (UT Varnals Creek) outside of the project area was selected as the reference reach. This channel was selected based on its watershed components, stream type, and other general characteristics. The reference reach channel is situated in Alamance County and classifies as a B4a. It exhibits a drainage area of 0.24 sq. mi (0.62 sq. km) and a bankfull cross sectional area of 7.9 sq. ft. Based on surveys, the channel is stable and exhibits very low bank height ratios. Its valley characteristics are very comparable with the existing channel. Little to no bank erosion was noted during the survey. A detailed summary of reference conditions are also presented in the attached morphological table.

Proposed Channel

The proposed channel was based on dimensionless ratios derived from the reference reach survey and data interpretation. The bankfull width will be increased from 4.1 ft (1.25 m) to 9.0 ft (2.7 m) and the bankfull mean depth will be reduced from 1.0 ft (0.30 m) to 0.7 ft (0.21 m). As a result, the width/depth ratio will increase to approximately 13 from the existing 4.3 ratio. A decrease in the bankfull mean velocity will occur with the new channel. The design stream will exhibit additional floodprone area; however, minimal pattern will be provided due to site constraints. Slopes will be actually decrease due to a change in the valley; however, an excess energy will be dissipated via step/pool morphology characteristic with the B stream type. Rock cross vanes will be the primary method influencing the step/pool morphology. These cross vanes will be established throughout the channel in riffle sections and used to provide grade control, center the thalweg, and protect the stream banks on both sides of the new channel until vegetation is established. The cross vanes will also decrease shear stresses throughout the reach. The riparian zone adjacent to the channel will be planted with native vegetation conducive to wetter, floodplain areas.

Proposed channel stabilization characteristics are presented on the attached detail sheet. It is anticipated that the riparian zone will be planted with native trees and shrubs above bankfull depth and herbaceous species within the channel.

Sediment Transport

Based on pebble counts and bar samples taken along the existing channel, the D50 averages 2.0 mm and the D84 averages approximately 17.0 mm. The existing channel exhibits a critical shear stress of 0.67 lbs/ft² which may entrain up to a 40 mm particle. Based on the design, the proposed channel will exhibit a critical shear stress of 0.28 lbs/ft² entraining up to a 18 mm particle. This reduction in entrainment will further reduce degradation. In addition, cross vanes will be installed throughout the riffle sections to further reduce the possibility of additional channel degradation.

References

North Carolina Department of Environment and Natural Resources (NCDENR), 1998. Yadkin/Pee Dee Basinwide Water Quality Management Plan.

Rosgen, D. and L. Silvey, 1998. Field Guide for Stream Classification. Wildland Hydrology, Inc.

July 03
Tip # 11-2524AB
Part 1
Sheet 5 of 55

Natural Channel Design Summary
Unnamed Tributary to Meadow Creek (Site 28)
TIP No. U-2524AB1
State Project No. 8.U492101
Guilford County, North Carolina

Prepared by Mulkey Engineers and Consultants

May 2003

This natural channel design summary is presented to the North Carolina Department of Transportation (NCDOT) as part of on-site compensatory mitigation for the proposed construction of the Greensboro Western Loop. The proposed roadway extends from north of I-85 near Groometown Road to north of High Point Road on new location. An unnamed tributary (UT) to Hickory Creek, situated immediately west of SR 1117 (Holden Road) and north of Roberts Court Road, will be relocated southward from its existing location outside of the proposed fill limits. The UT has been identified as a perennial stream and is part of the Cape Fear River Subbasin 03-06-08 (USGS Hydrologic Unit 03030002). A morphological table, complete with existing channel, reference reach, and proposed reach characteristics is attached. In addition, proposed design and detail sheets are also included with this summary. The project is within the Piedmont physiographic province.

The headwaters associated with the UT to Hickory Creek originate at the intersection of SR 1117 (Holden Road) and SR 1392 (Drummond Road). The UT flows in a westerly direction approximately 1.0 mi (1.6 km) before converging with Hickory Creek, then another 5.0 mi (8.0 km) to the southwest to unite with the Deep River. The drainage area at the project site is approximately 0.10 sq. mi (0.26 sq. km). It is considered urban with primarily residential development. The proposed project will require the stream to be relocated due to existing fill slope design requirements. Overall stream length will be reduced and slope will be increased in order to correctly align the new channel with its modified valley type.

Existing Channel

A 1600-foot (488-meter) section of the single thread channel associated with the UT to Hickory Creek was surveyed during March 2003. This section was located near Sta. 29+20 -40SBREV- Right, near the eastern terminus of the proposed project area. The surveyed reach exhibited channel characteristics similar to an E4/1 stream type, as noted by the Rosgen Classification of Natural Rivers. The E4 stream type exhibits low to moderate sinuosities, gentle to moderately steep channel gradients, and very low channel width/depth ratios. This stream type is generally stable due to the influence of riparian vegetation and planform resistance. Bank erosion and bedload transport rates are typically high and the ratio of bedload to total sediment load often exceeds 50%. These stream types are very sensitive to disturbance and tend to make significant adverse channel adjustments to changes streambank vegetation and in flow regime and sediment supply from the watershed (Rosgen and Silvey, 1998). The existing channel at this location classes out as an E type and it is in a state of relative stability. The channel has previously incised but has reestablished a small floodplain at a lower elevation. Due to recent ice storms, there was a large amount of woody debris in the channel creating localized instability. Significant bedrock was noted in several area along the existing channel which is helping prevent further incision. The UT exhibited a bankfull cross sectional area of 5.6 sq. ft (0.52 sq. m), an average slope of 0.012ft/ft, and a D50 of

Tip# U-2524AB part 1
sheet # 7 of 55

July 03

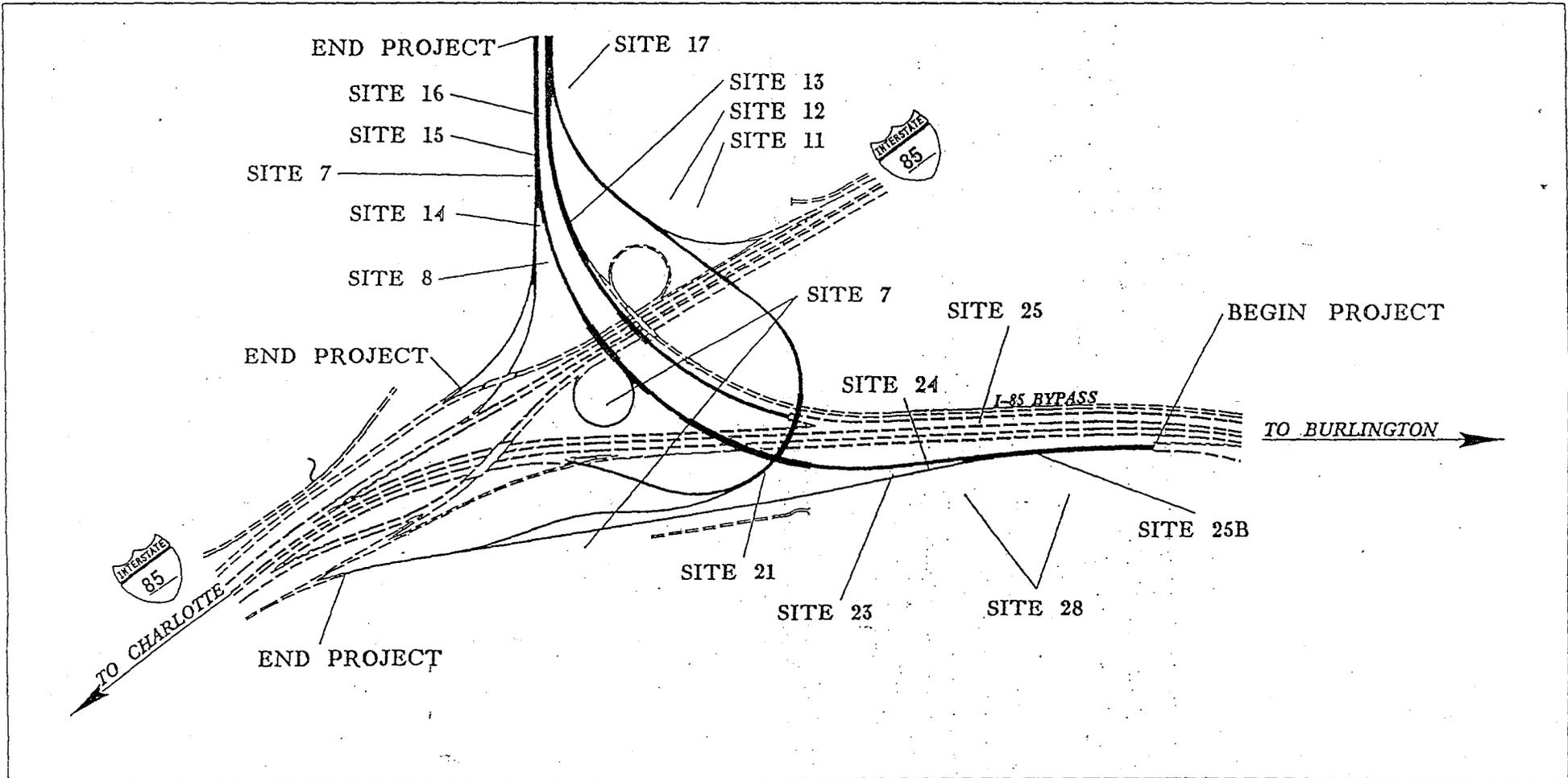
Tip# 4-2524AP Part 1

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Appendix B

Morphological Measurement Table (Site 28)

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream type	E4	C4	N/A	C4
2. Drainage area	57Ac. - 75Ac.	57Ac. - 75Ac.		160 Ac.
3. Bankfull width	6.3 ft.	8.5 ft.		9.5 ft.
4. Bankfull mean depth	0.9 ft.	0.66 ft.		0.8 ft.
5. Width/depth ratio	7	13		11.7
6. Bankfull cross-sectional area	5.6 sq. ft.	5.6 sq. ft.		7.7 sq. ft.
7. Bankfull mean velocity	4.06 ft/s	3.9 - 4.0 ft/s		4.55 ft/s
8. Bankfull discharge, cfs	22.7 cfs	22.7 cfs		35 cfs
9. Bankfull max depth	1.5 ft.	1.1 ft.		1.3 ft.
10. Width of floodprone area	65 ft.	Range: 32 - 56 ft. Avg: 41.3 ft.		36 ft.
11. Entrenchment ratio	10.3	4.85		3.8
12. Meander length	Range: 85-150 ft. Avg: 120 ft.	Range: 43-114.5 ft. Avg: 73 ft.		Range: 29-69 ft. Avg: 50.2 ft.
13. Ratio of meander length to bankfull width	19	8.6		5.3
14. Radius of curvature	Range: 10.2-36 ft. Avg: 22 ft.	Range: 19-49 ft. Avg: 29.8 ft.		Range: 5.3-22 ft. Avg: 9.7 ft.
15. Ratio of radius of curvature to bankfull width	3.5	3.5		1.02
16. Belt width	Range: 46-63 ft. Avg: 52.5 ft.	Range: 11.8-35 ft. Avg: 21.0 ft.		Range: 26-40 ft. Avg: 33 ft.
17. Meander width ratio	8.3	2.5		3.5
18. Sinuosity (stream length/valley length)	1.35	1.02		1.35
19. Valley slope	1.60%	1.85%		0.76%
20. Average slope	1.20%	U/S: 1.78% D/S: 1.66%		0.57%
21. Pool slope	0.26%	0.35%		Range: 0.012-0.13%. Avg: 0.047%
22. Ratio of pool slope to average slope	0.22	0.2		0.082
23. Maximum pool depth	2.3 ft.	2.0 ft.		2.9 ft.
24. Ratio of pool depth to average bankfull depth	2.56	3.0		3.6
25. Pool width	8.9 ft.	12.2 ft.		10.5
26. Ratio of pool width to bankfull width	1.41	1.4		1.1
27. Pool to pool spacing	58.5 ft.	Range: 24-63 ft. Avg: 39.4 ft.		Range: 20.7-54.8ft. Avg: 40.2 ft.
28. Ratio of pool to pool spacing to bankfull width	9.3	Range: 2.8-7.4 Avg: 4.5		Range: 2.2-5.8 Avg: 4.23

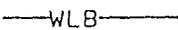
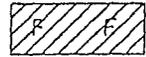
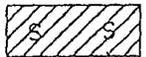
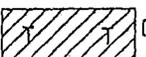
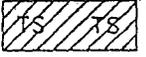
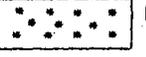
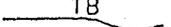
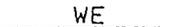
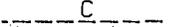
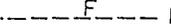
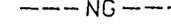
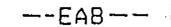
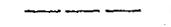
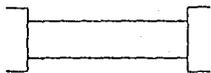
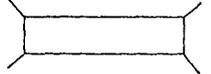
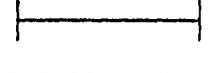
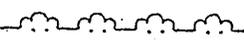
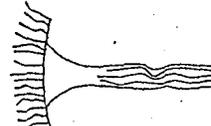
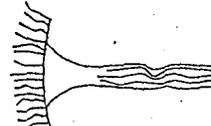
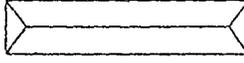
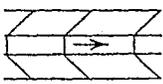


SITE MAP

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 11 OF 55

5/15/03

WETLAND LEGEND

- | | |
|---|---|
| <p>  WETLAND BOUNDARY
  WETLAND
  DENOTES FILL IN WETLAND
  DENOTES FILL IN SURFACE WATER
  DENOTES FILL IN SURFACE WATER (POND)
  DENOTES TEMPORARY FILL IN WETLAND
  DENOTES EXCAVATION IN WETLAND
  DENOTES TEMPORARY FILL IN SURFACE WATER
  DENOTES MECHANIZED CLEARING
  FLOW DIRECTION
  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
  CORE FIBER ROLLS </p> | <p>  PROPOSED BRIDGE
  PROPOSED BOX CULVERT
  PROPOSED PIPE CULVERT
 <p style="font-size: small;">(DASHED LINES DENOTE EXISTING STRUCTURES)</p> <p style="font-size: x-small;">12'-48' PIPES
54' PIPES & ABOVE</p>  SINGLE TREE
  WOODS LINE
  DRAINAGE INLET
  ROOTWAD
  RIP RAP
  ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE
  PREFORMED SCOUR HOLE
  LEVEL SPREADER (LS)
  DITCH / GRASS SWALE </p> |
|---|---|

NCDOT

DIVISION OF HIGHWAYS

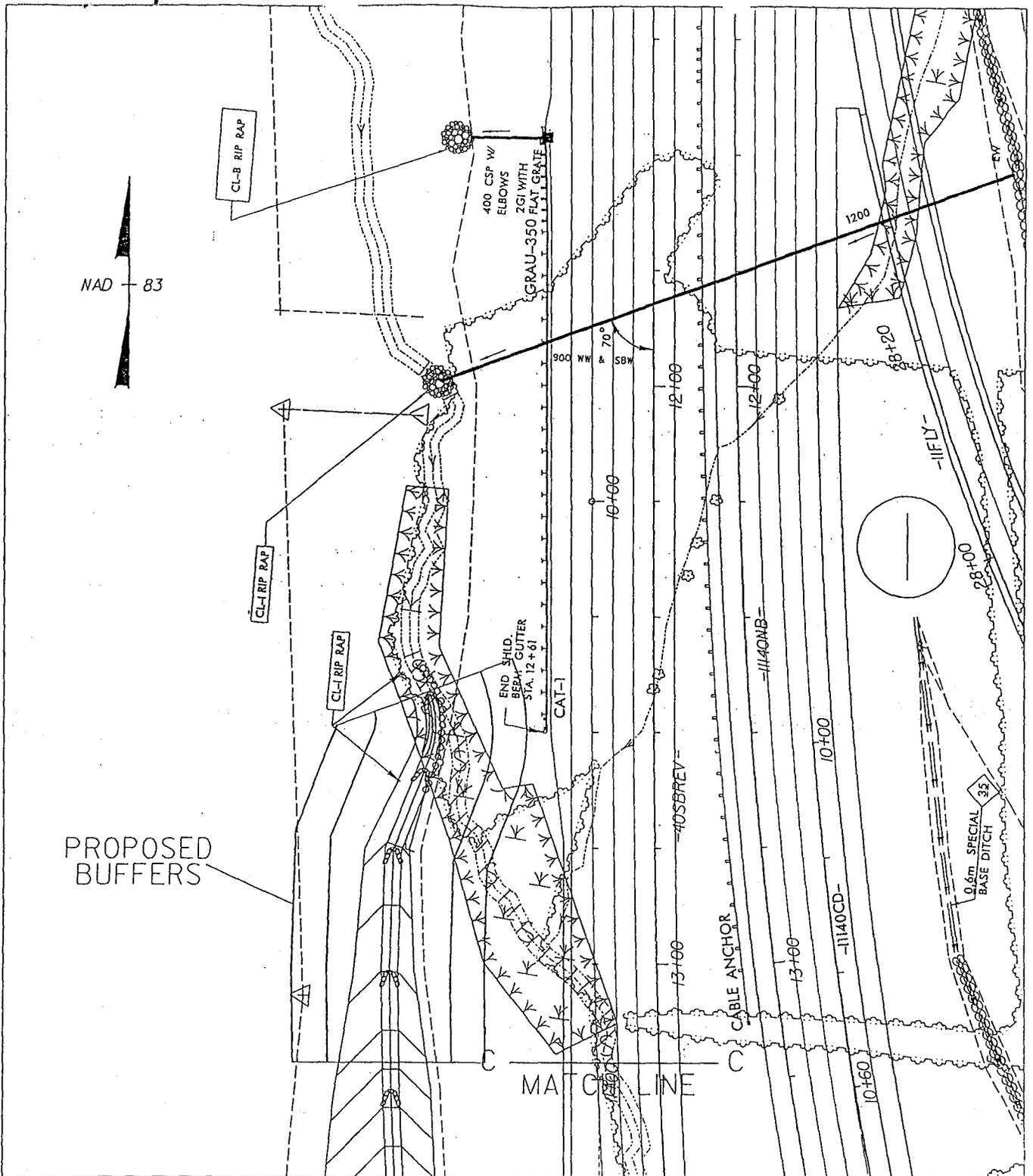
GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AB)

GREENSBORO - WESTERN LOOP FROM NORTH OF I-85 NEAR GROOMETOWN TO NORTH OF HIGH POINT ROAD

SHEET 14 OF 55

5/15/05

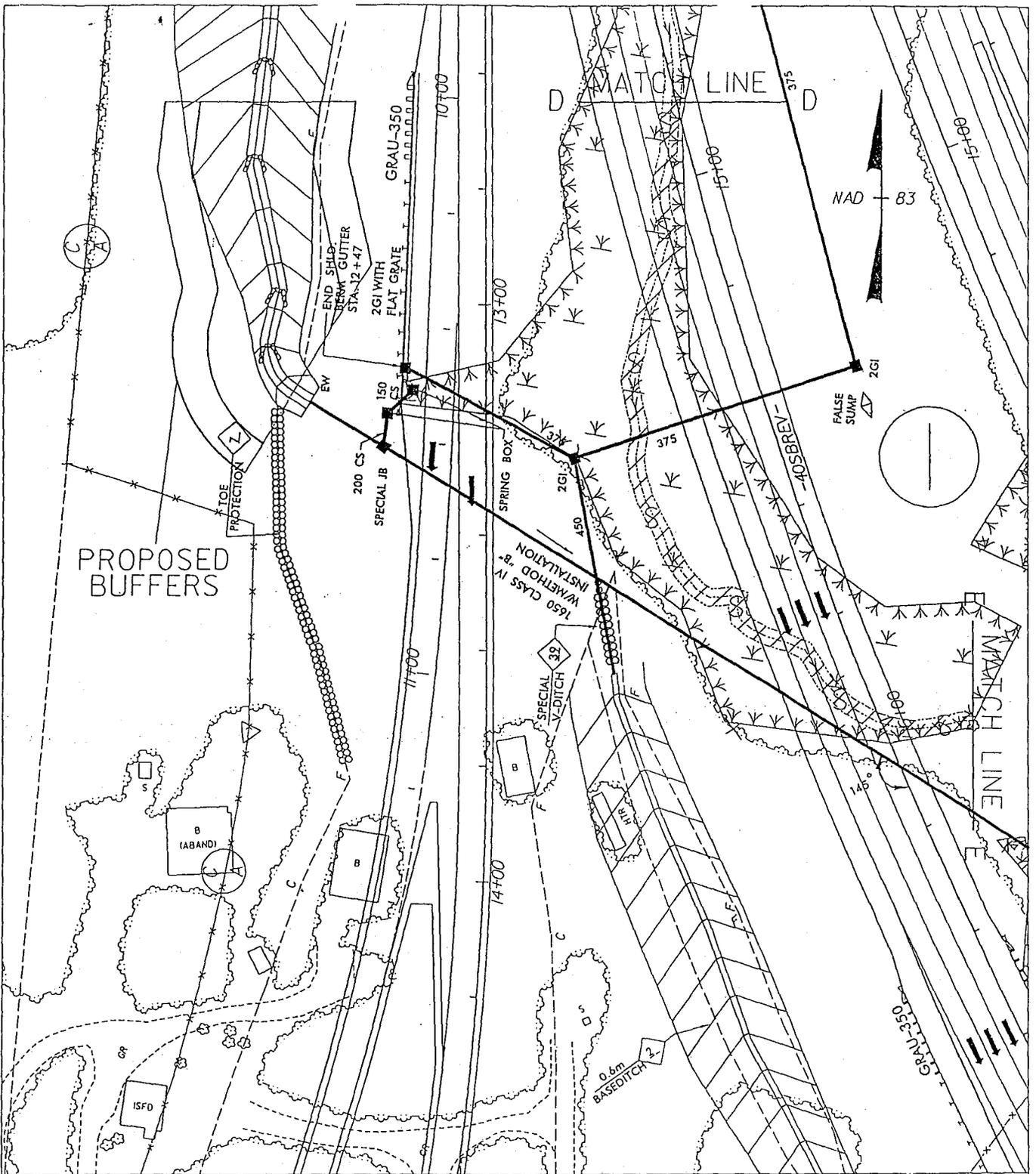


PROPOSED
BUFFERS

PLAN VIEW
STREAM
IMPACTS
SITE 7

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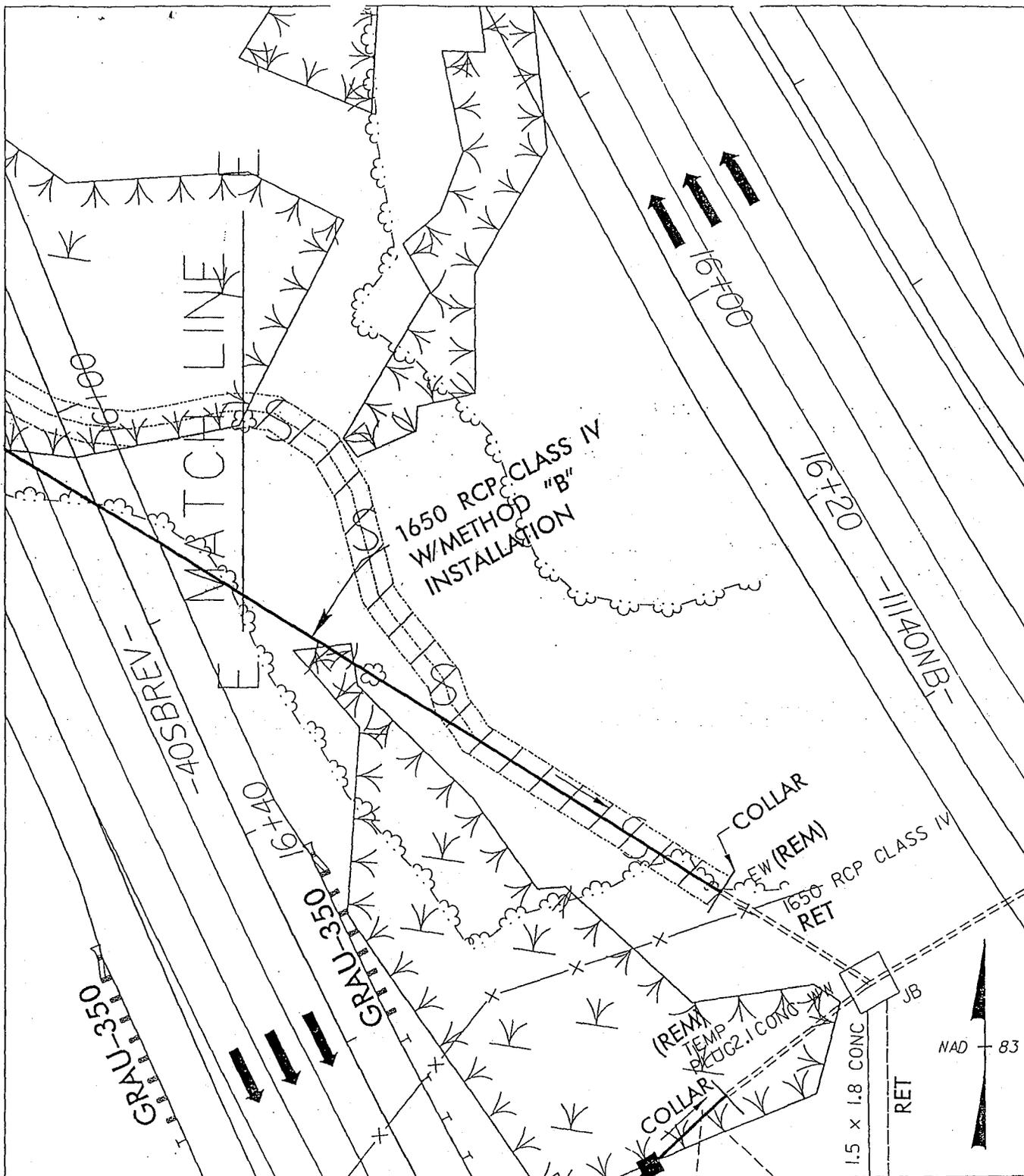
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GUILFORD COUNTY
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GREENSBORO - WESTERN LOOP FROM
NORTH OF I-85 NEAR GROOMETOWN
TO NORTH OF HIGH POINT ROAD
SHEET 15 OF 55



PLAN VIEW
 STREAM
 IMPACTS
 SITE 7
 SCALE = 1:1000

DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-252-AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 17 OF 55

6/26/05



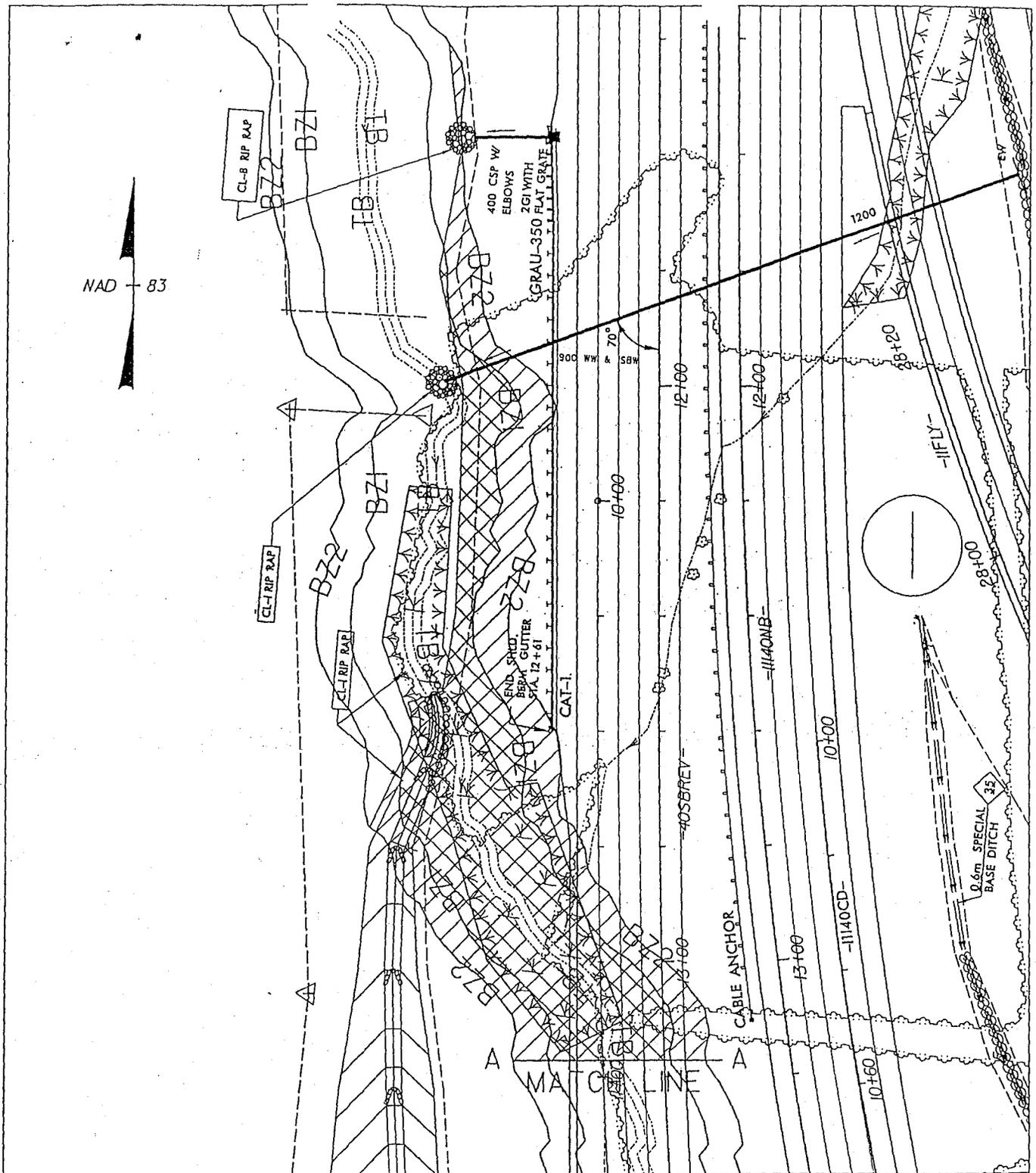
PLAN VIEW
 STREAM
 IMPACTS
 SITE 7

SCALE = 1:500

NCDOT

DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 19 OF 55

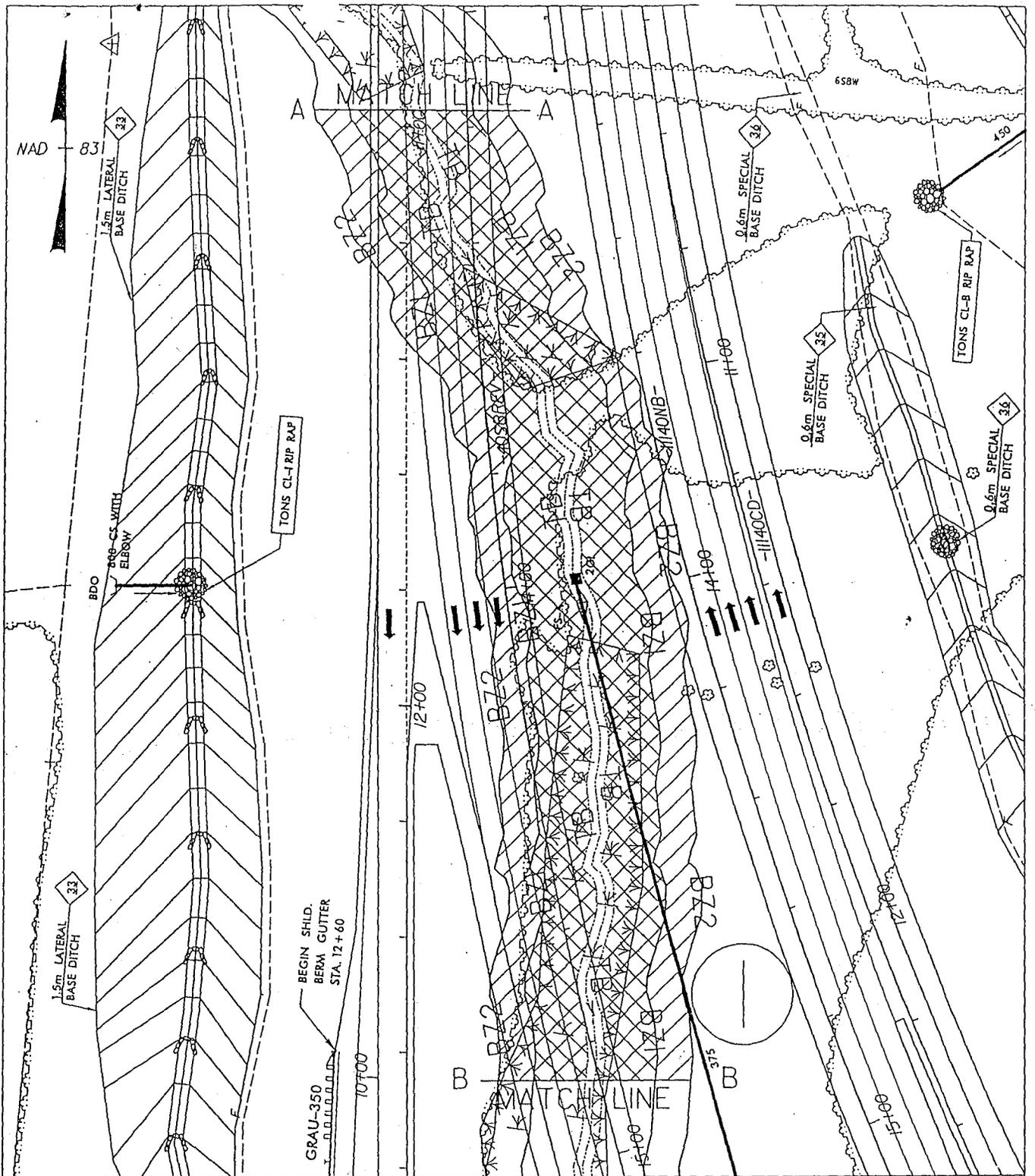
6/25/03



PLAN VIEW
 BUFFER
 IMPACTS
 SITE 7

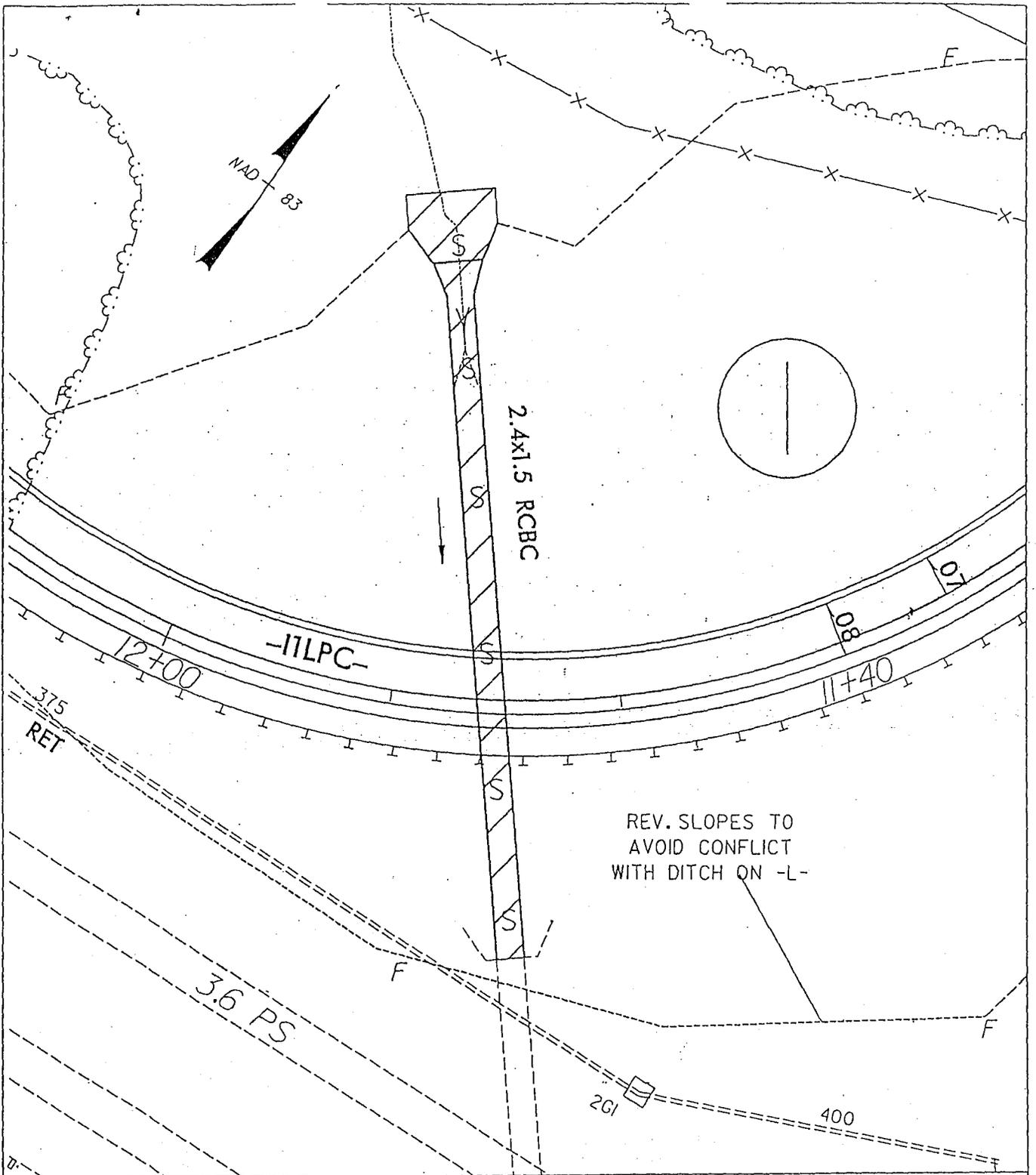
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 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 21 OF 55
 5/15/05



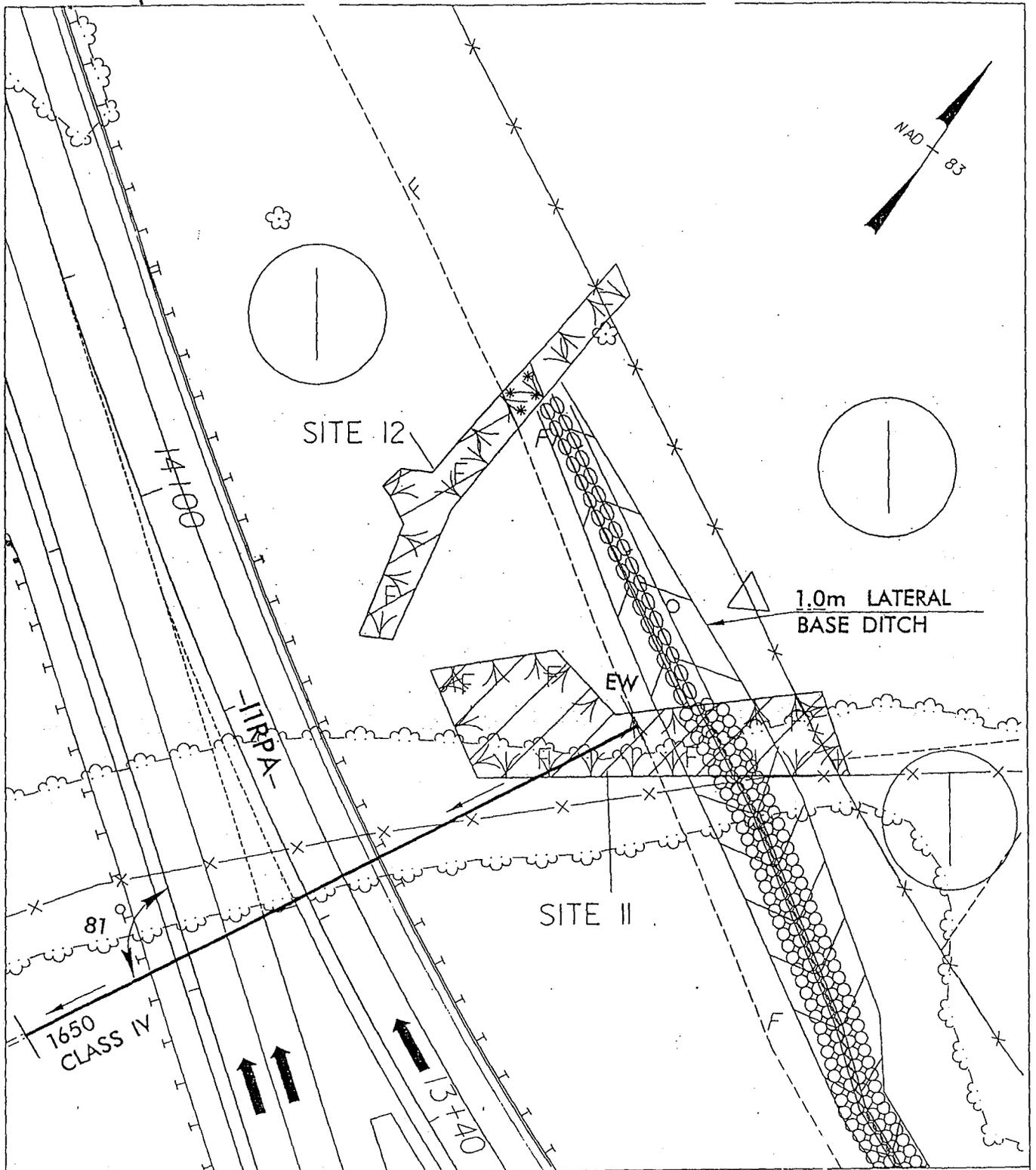
PLAN VIEW
 BUFFER
 IMPACTS
 SITE 7
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DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 23 OF 55
 5/15/03



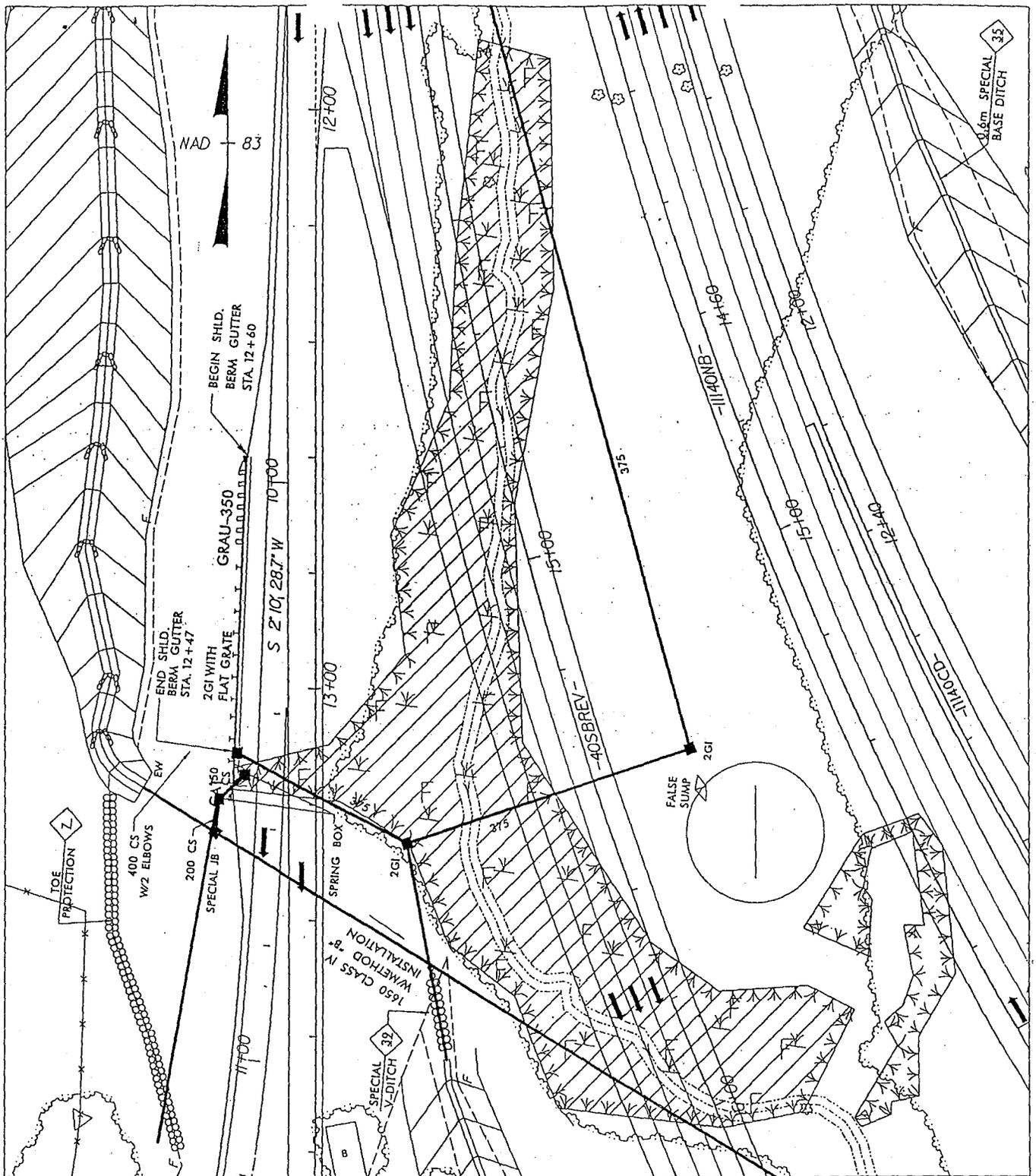
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 STREAM
 IMPACTS
 SITE 7
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 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 25 OF 55
 5/15/03



PLAN VIEW
 WETLAND
 IMPACTS
 SITES II & 12
 SCALE = 1:500

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 29 OF 55
 6/30/05

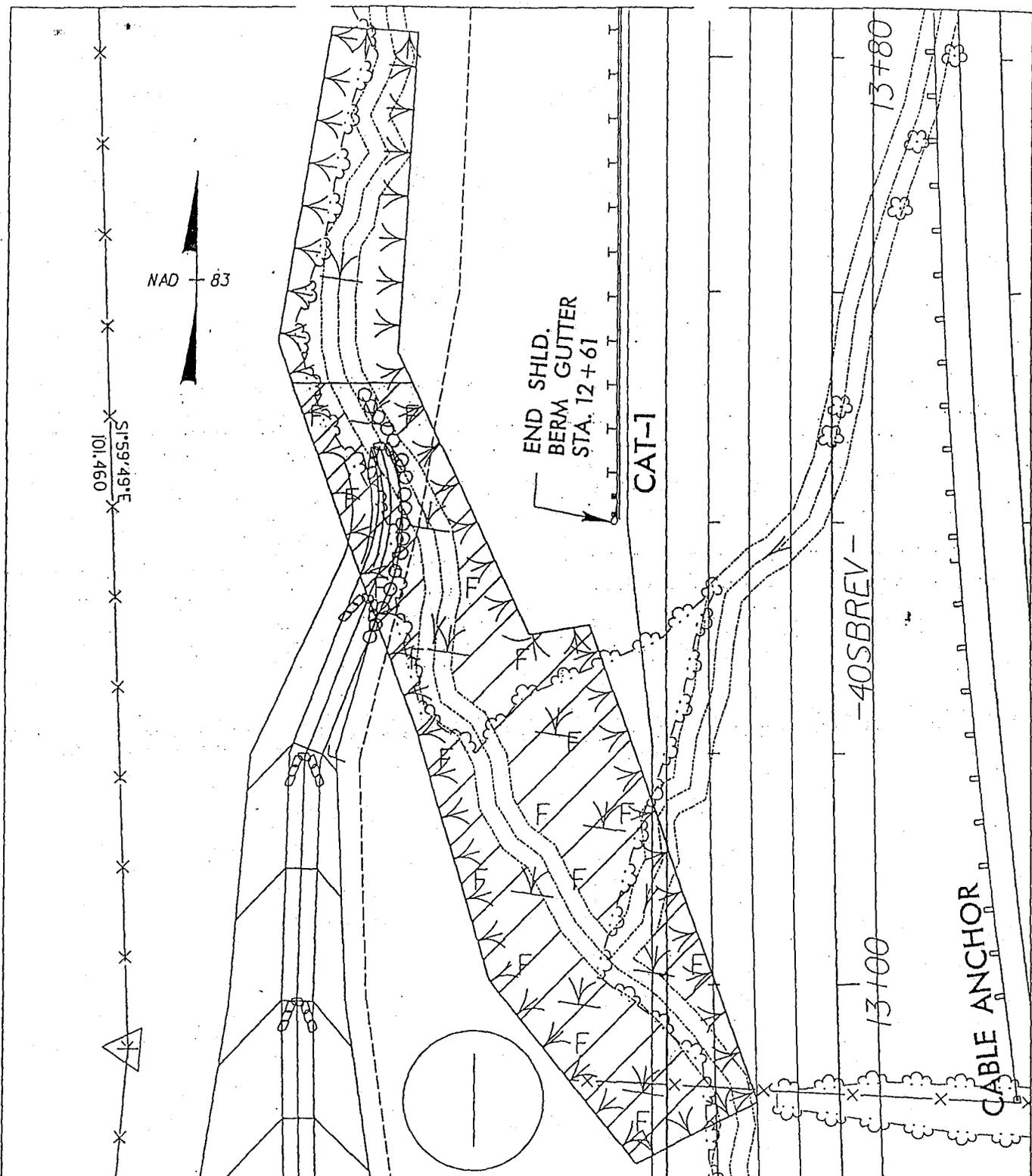


PLAN VIEW
WETLAND
IMPACTS
SITE 14

SCALE = 1:1000

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DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.U492101 (U-2524AB)
GREENSBORO - WESTERN LOOP FROM
NORTH OF I-85 NEAR GROOMETOWN
TO NORTH OF HIGH POINT ROAD
SHEET 31 OF 55

6/24/03



PLAN VIEW
WETLAND
IMPACTS
SITES 16

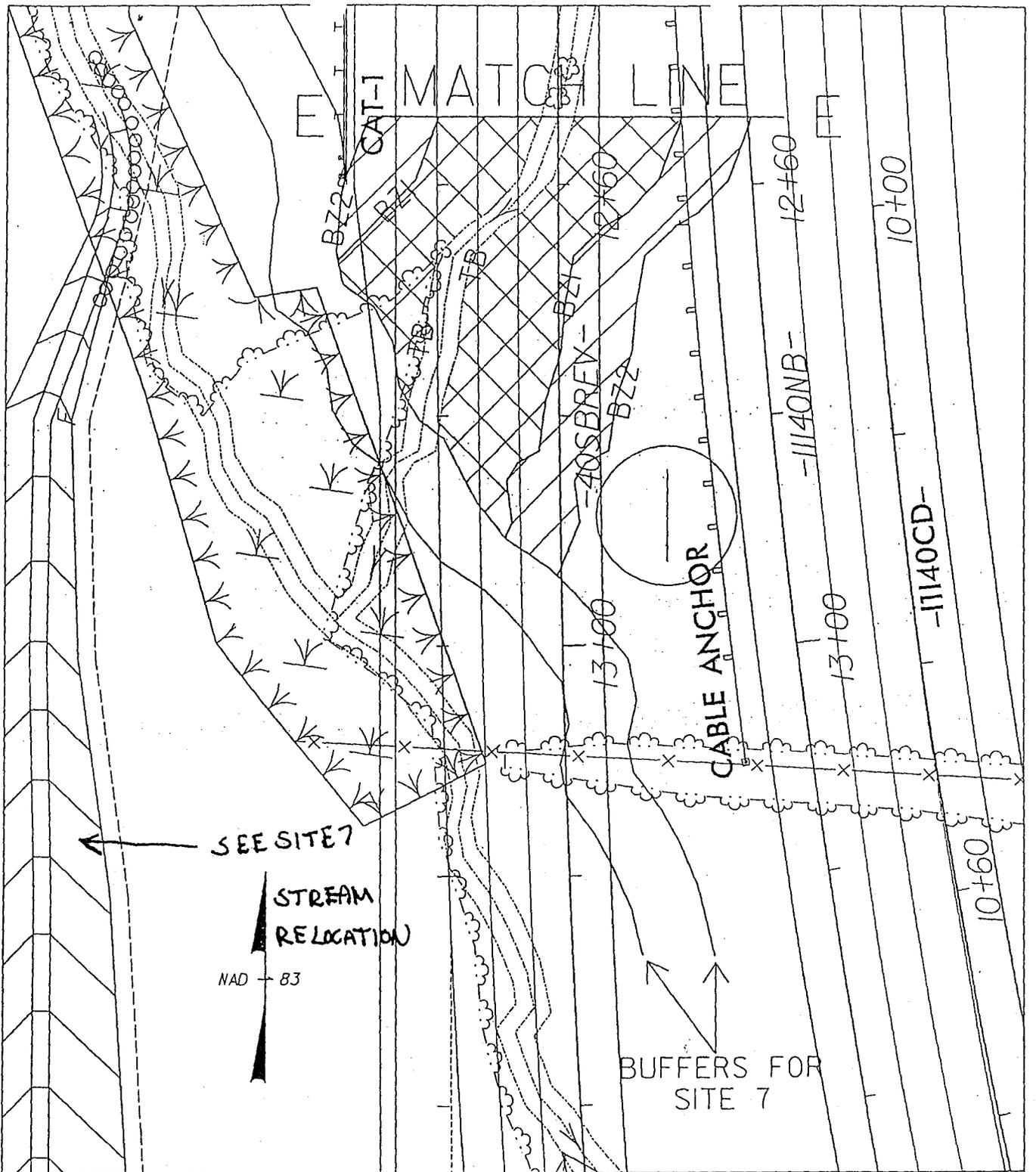
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DIVISION OF HIGHWAYS
GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AB)
GREENSBORO - WESTERN LOOP FROM
NORTH OF I-85 NEAR GROOMETOWN
TO NORTH OF HIGH POINT ROAD
SHEET 33 OF 55

5/15/03



PLAN VIEW
 BUFFER
 IMPACTS
 SITES 17

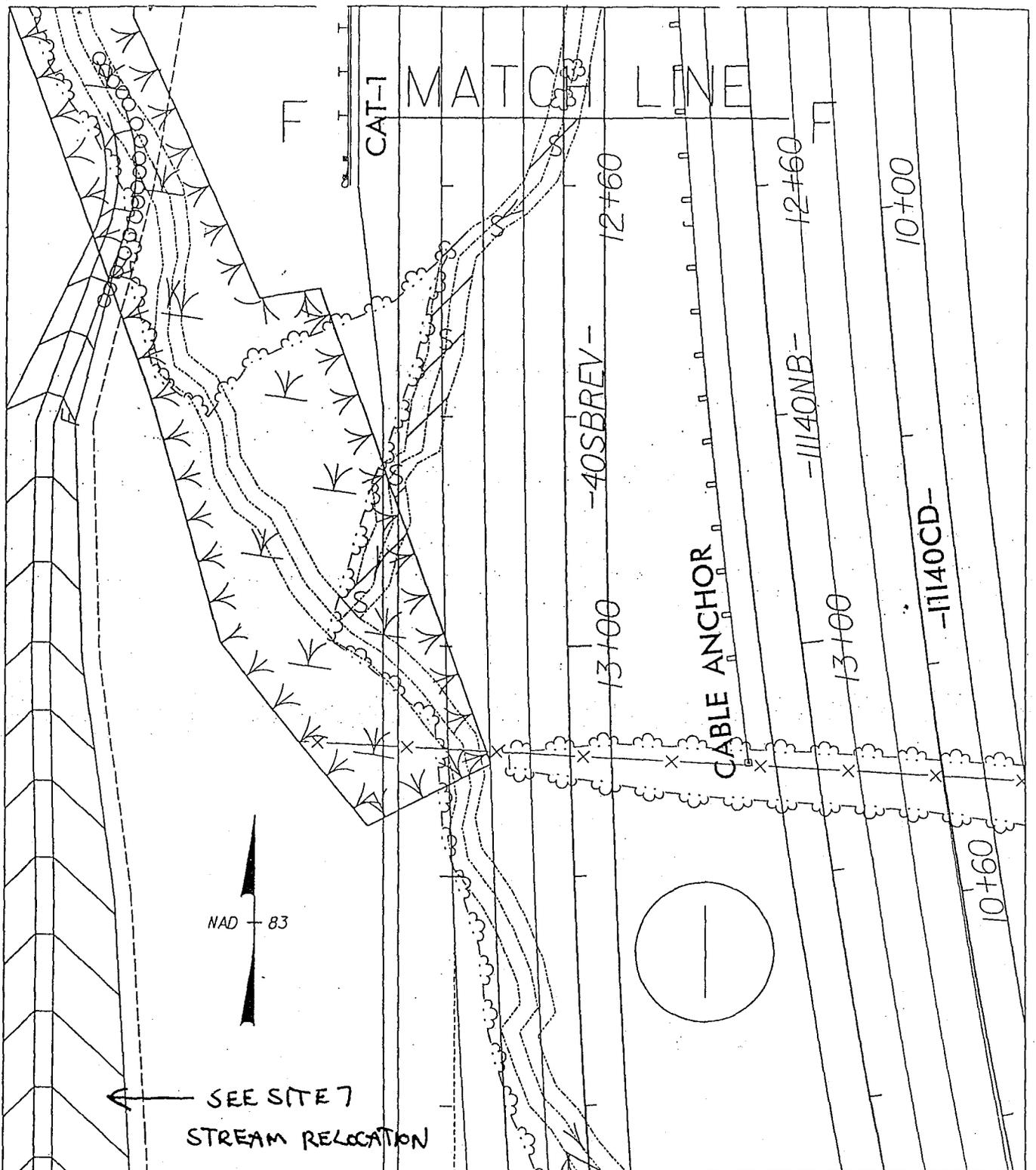
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NCDOT

DIVISION OF HIGHWAYS
 GUILFORD COUNTY

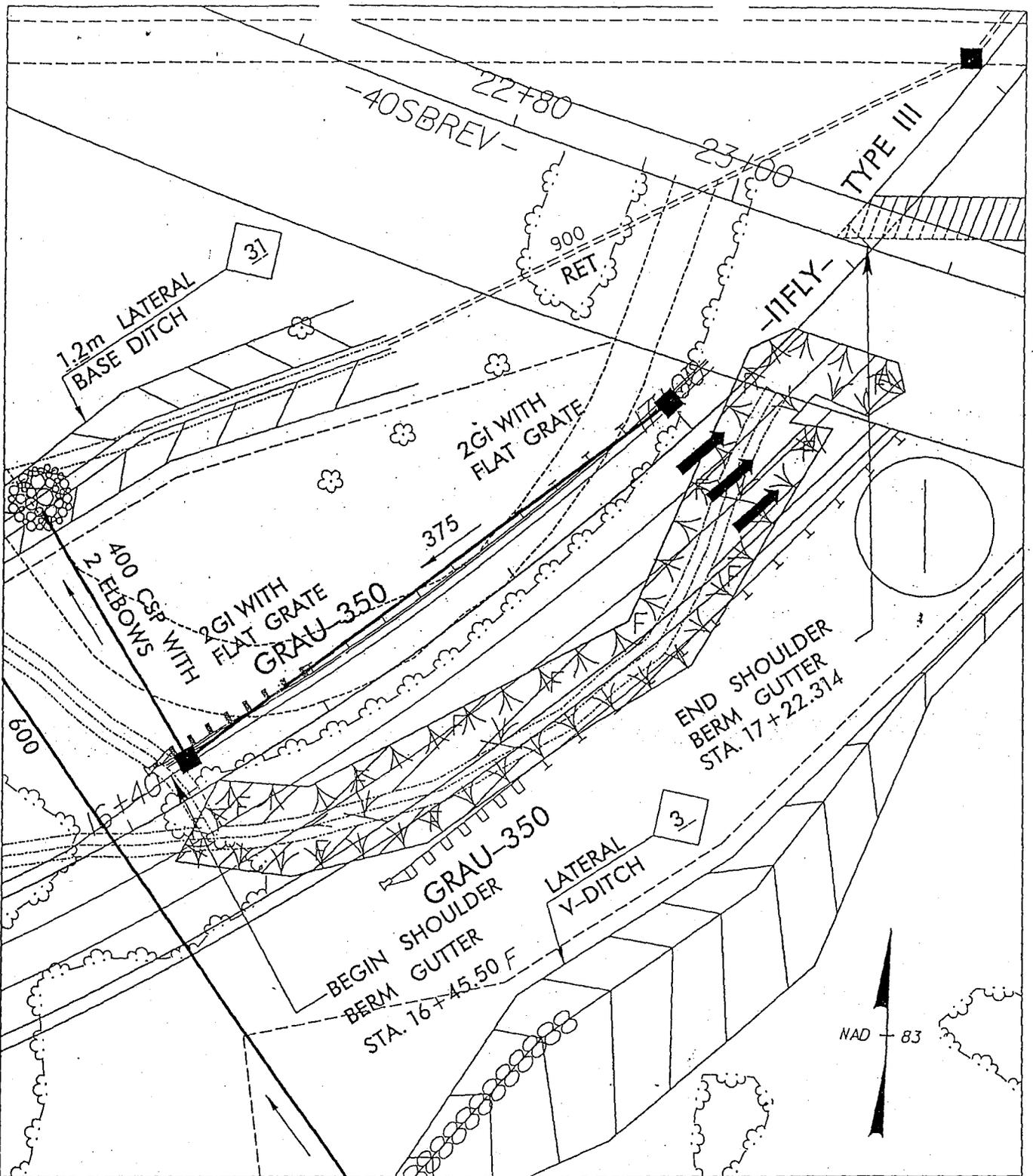
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 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 35 OF 55

5/15/03



PLAN VIEW
 STREAM
 IMPACTS
 SITES 17
 SCALE = 1:500

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 37 OF 55
 5/15/03



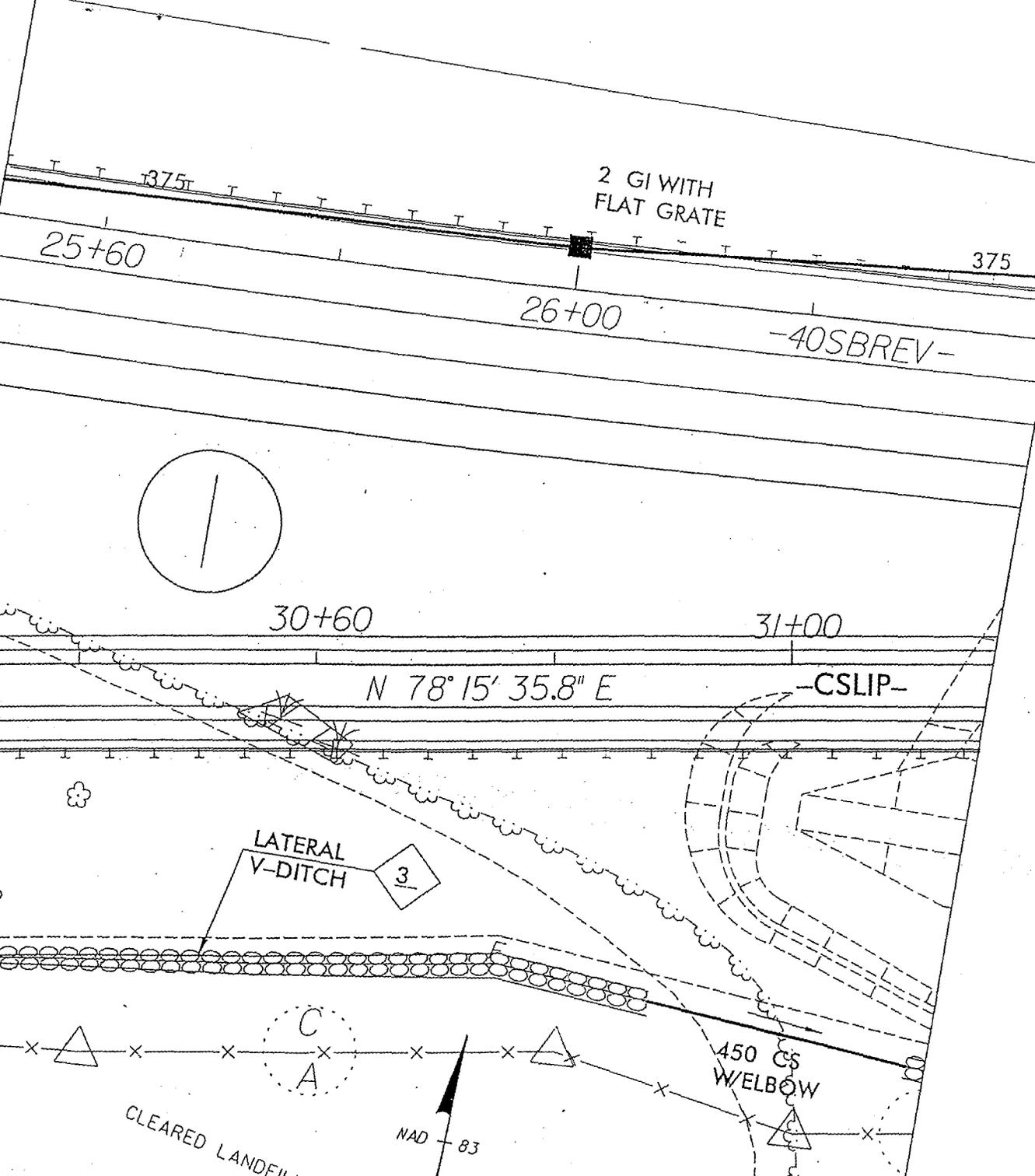
PLAN VIEW
 WETLAND
 IMPACTS
 SITE 21

SCALE = 1:500

NCDOT

DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 39 OF 55

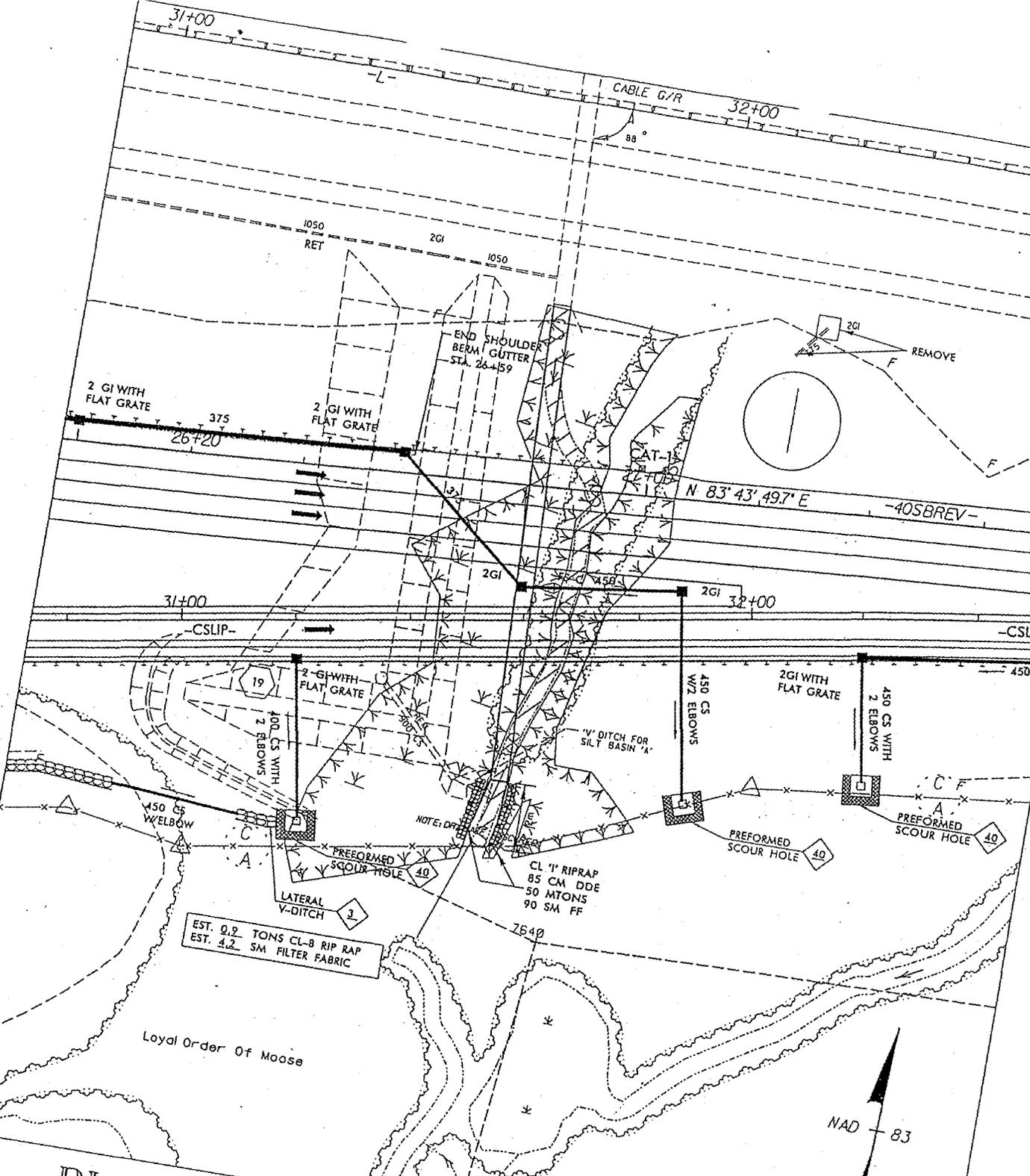
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PLAN VIEW
WETLAND
IMPACTS
SITE 24
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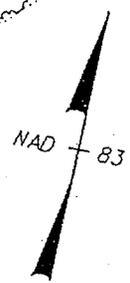
NCDOT
DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.U492101 (U-2524.AB)
GREENSBORO - WESTERN LOOP FROM
NORTH OF I-85 NEAR GROOMETOWN
TO NORTH OF HIGH POINT ROAD
SHEET 4 / OF 55

6/24/07



EST. 0.2 TONS CL-8 RIP RAP
 EST. 4.2 SM FILTER FABRIC

Loyal Order Of Moose

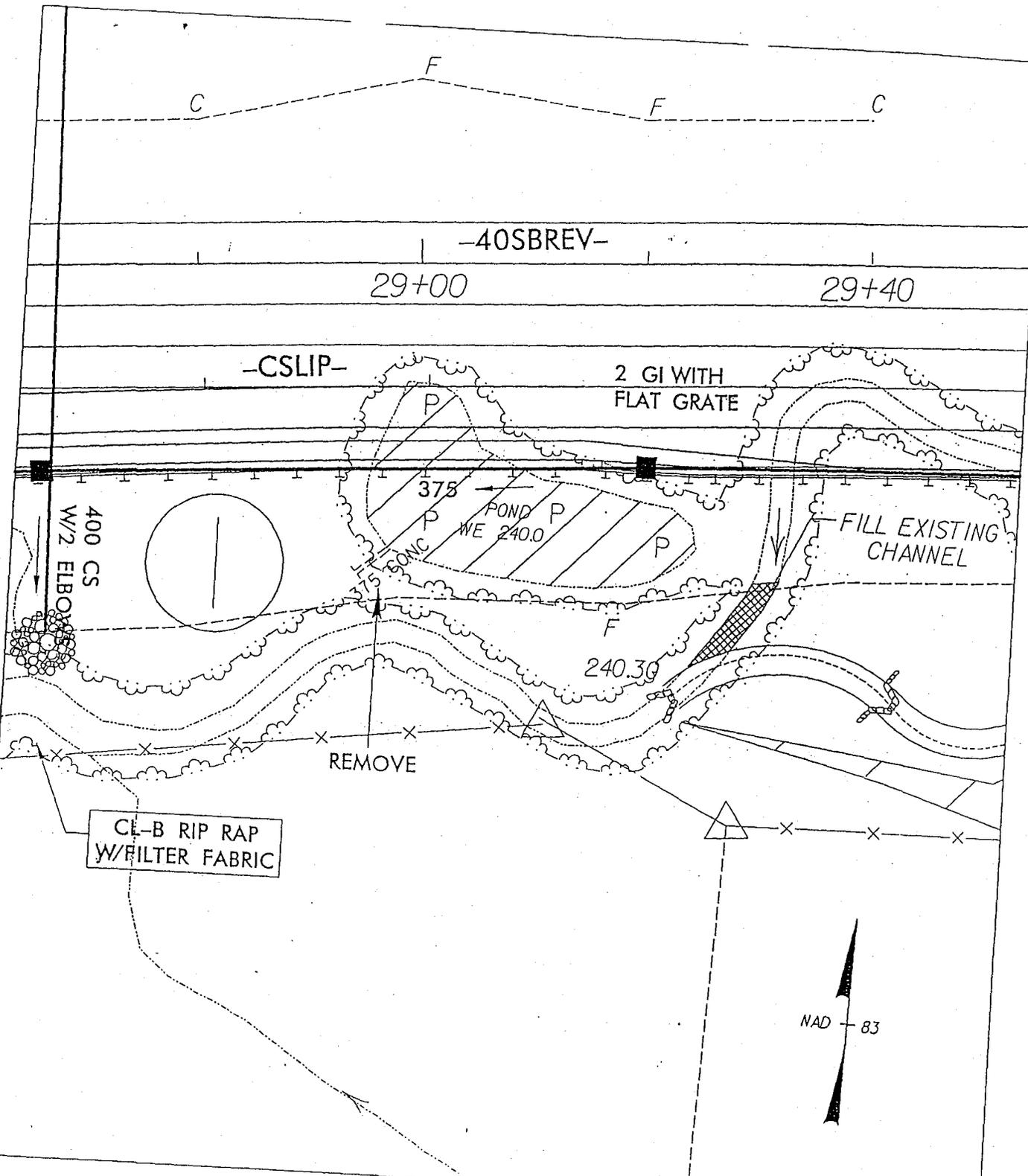


Jessie W. Morgan

PLAN VIEW
 STREAM
 IMPACTS
 SITE 25
 SCALE = 1:1000

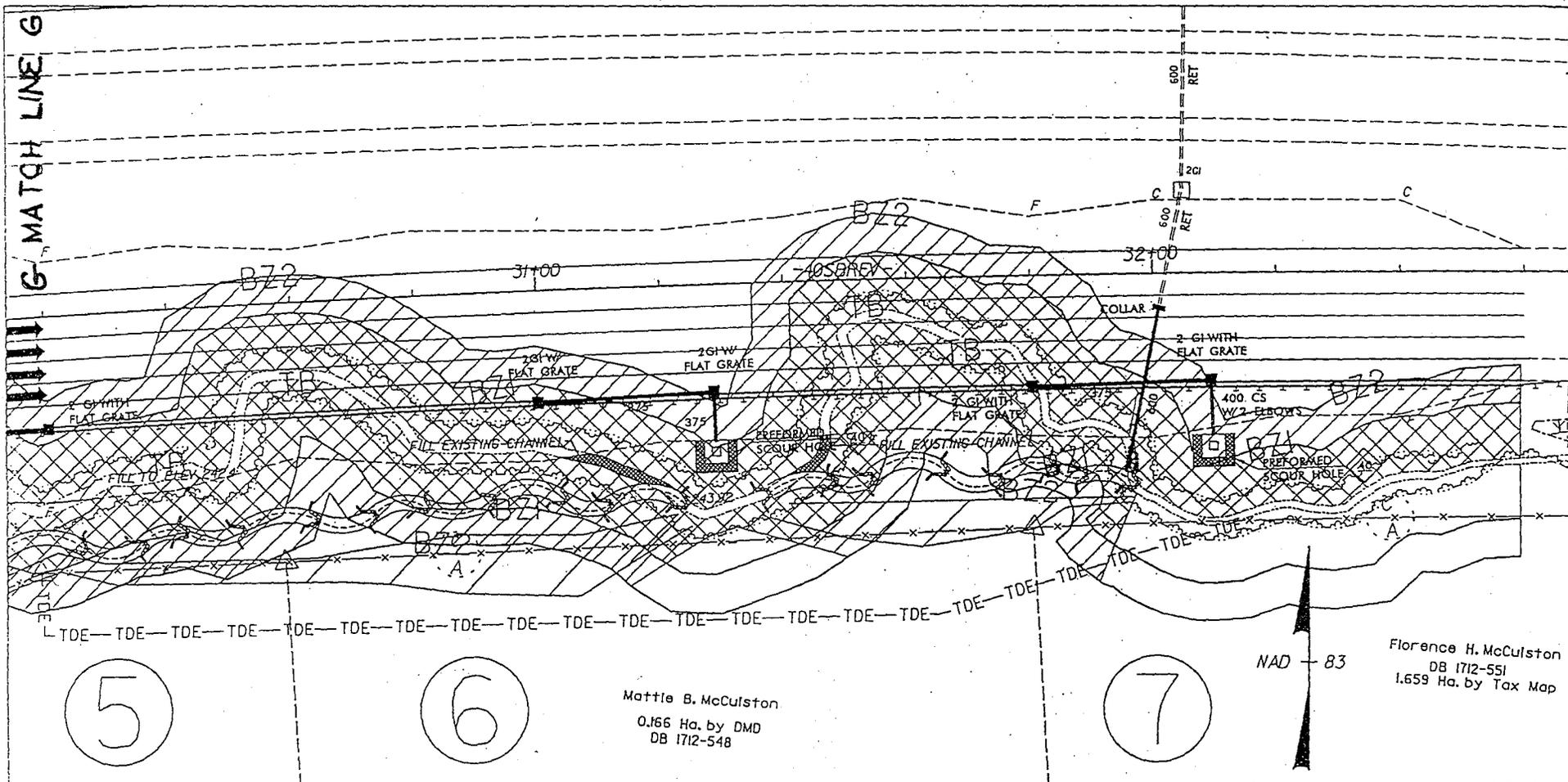
NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 43 OF 55

6/24/03



PLAN VIEW
 POND
 IMPACTS
 SITE 25B
 SCALE = 1:500

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 45 OF 55
 6/24/05



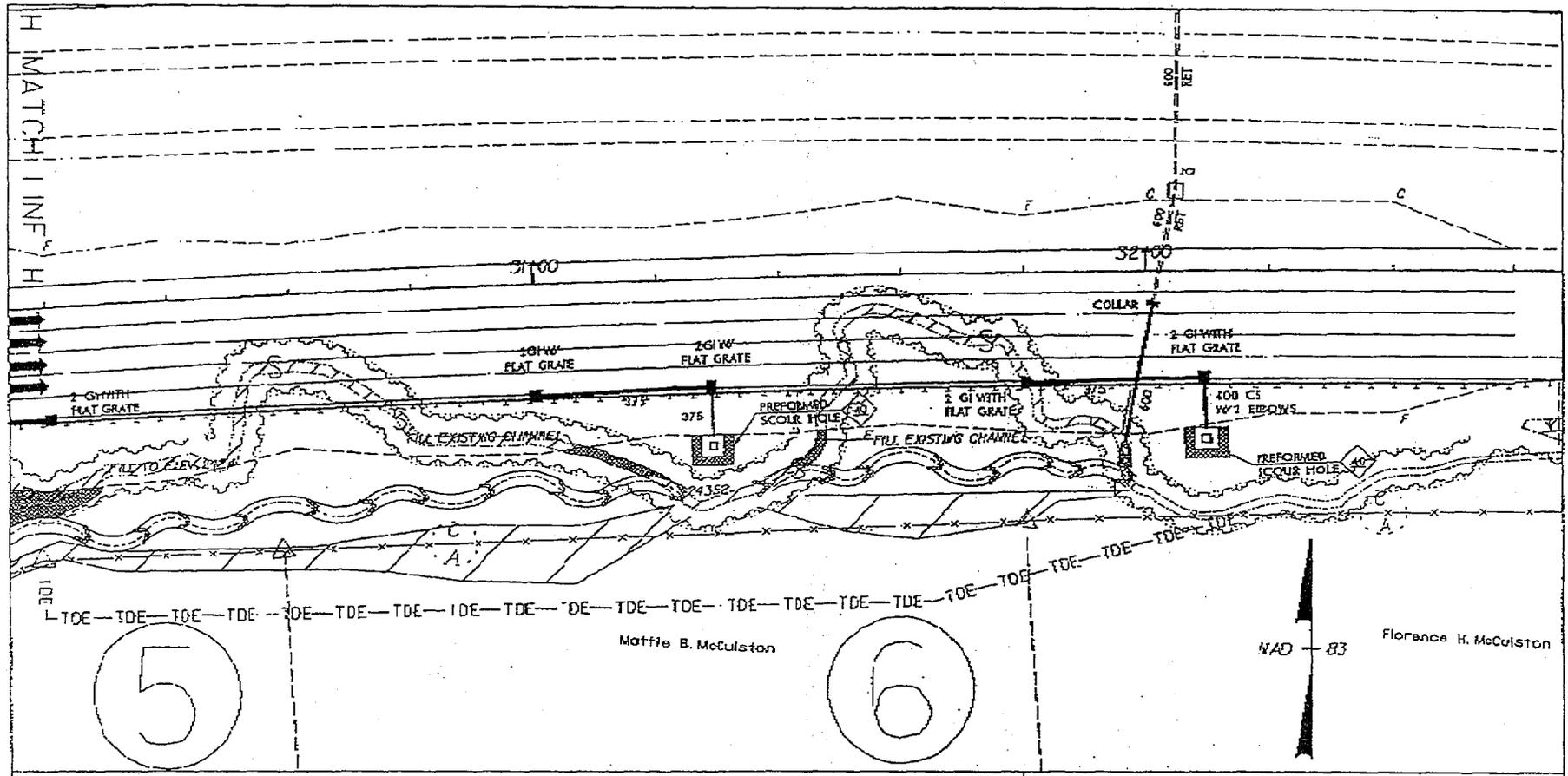
Mattie B. McCulston
 0.166 Ha. by DMD
 DB 1712-548

Florence H. McCulston
 DB 1712-551
 1.659 Ha. by Tax Map

PLAN VIEW
 BUFFER
 IMPACTS
 SITE 28

SCALE = 1:1000

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 47 OF 55
 5/15/03



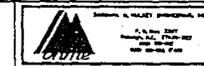
PLAN VIEW
 STREAM
 RESTORATION
 SITE 28
 SCALE = 1:1000

NCDOT
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 PROJECT: 8.U492101 (U-2524AB)
 GREENSBORO - WESTERN LOOP FROM
 NORTH OF I-85 NEAR GROOMETOWN
 TO NORTH OF HIGH POINT ROAD
 SHEET 49 OF 55
 7/10/03

July 03

CHANNEL ALIGNMENT DATA & PROFILE INFORMATION

SITE # 28



PROJECT REFERENCE NO. U-2524AB	SHEET NO.
DESIGNED BY	CHECKED BY
PRELIMINARY PLANS	
DO NOT USE FOR Bidding	
INCOMPLETE PLANS	
DO NOT USE FOR CONSTRUCTION	

STA (40SBREV)	OFFSET FROM 40SBREV	RADIUS	L _c	INVERT (THALVEG) (m)	BANKFULL (FLOODPLAIN) (m)
PC 29+22.7	38.0m RT.			240.30	240.60
PI 29+32.9	29.9m RT.	15.0m	21.7m		
PC/PT 29+42.5	39.1m RT.			240.66	240.96
PI 29+49.8	46.6m RT.	11.0m	16.3m		
PC/PT 29+57.4	39.4m RT.			240.93	241.23
PI 29+67.2	29.8m RT.	10.0m	19.2m		
PC/PT 29+74.0	41.7m RT.			241.25	241.55
PI 29+80.4	53.6m RT.	8.5m	17.1m		
PC/PT 29+88.5	42.7m RT.			241.53	241.83
PI 29+92.3	37.4m RT.	7.0m	10.6m		
PC/PT 29+98.0	40.8m RT.			241.71	242.01
PI 30+04.3	44.4m RT.	9.5m	12.3m		
PC/PT 30+09.5	39.4m RT.			241.91	242.21
PI 30+16.9	32.5m RT.	11.0m	16.4m		
PC/PT 30+24.0	38.3m RT.			242.18	242.48
PI 30+30.0	42.5m RT.	8.0m	10.6m		
PC/PT 30+34.5	38.0m RT.			242.36	242.66
PI 30+37.8	35.2m RT.	6.5m	7.5m		
PC/PT 30+41.5	37.2m RT.			242.48	242.78
PI 30+46.3	39.3m RT.	9.5m	9.4m		
PC/PT 30+50.8	36.7m RT.			242.64	242.94
PI 30+56.7	32.8m RT.	12.0m	12.7m		
PC/PT 30+62.9	36.2m RT.			242.85	243.15
PI 30+67.9	38.4m RT.	9.0m	9.7m		
PC/PT 30+72.3	35.3m RT.			243.00	243.30

STA (40SBREV)	OFFSET FROM 40SBREV	RADIUS	L _c	INVERT (THALVEG) (m)	BANKFULL (FLOODPLAIN) (m)
PI 30+76.0	32.7m RT.	7.5m	8.2m		
PC/PT 30+80.0	34.4m RT.			243.14	243.44
PI 30+86.3	37.5m RT.	12.0m	12.4m		
PC/PT 30+92.0	33.6m RT.			243.35	243.65
PI 30+97.9	29.9m RT.	9.0m	11.8m		
PC/PT 31+03.5	34.9m RT.			243.54	243.84
PI 31+06.9	38.1m RT.	6.5m	8.8m		
PC/PT 31+11.0	35.3m RT.			243.69	243.99
PI 31+17.3	31.6m RT.	10.0m	12.1m		
PC/PT 31+22.9	35.8m RT.			243.90	244.20
PI 31+24.4	31.4m RT.	12.0m	11.0m		
PC/PT 31+29.0	33.4m RT.			244.50	244.80
PI 31+31.4	34.7m RT.	6.0m	6.5m		
PC/PT 31+33.9	32.1m RT.			244.61	244.91
PI 31+40.3	26.9m RT.	9.0m	13.2m		
PC/PT 31+45.9	32.2m RT.			244.85	245.15
PI 31+47.5	36.4m RT.	7.0m	9.6m		
PC/PT 31+47.5	32.9m RT.			245.02	245.32
PI 31+49.4	29.9m RT.	8.5m	9.4m		
PC/PT 31+48.2	32.7m RT.			245.18	245.48
PI 31+48.3	33.7m RT.	6.0m	5.0m		
PC/PT 31+48.9	32.9m RT.			245.27	245.57
PI 31+53.5	32.0m RT.	9.0m	8.5m		
PT 31+57.0	35.0m RT.			245.45	245.75

Tip # U-2524AB part 1
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PROPERTY OWNERS

NAMES AND ADDRESSES

REFERENCE NO.	NAMES	ADDRESSES
1	NORTH CAROLINA DOT	1500 MAIL SERVICE CENTER RALEIGH, NC 27699-1500
4	WET 'N WILD EMERALD POINTE WATER PARK	3910 SOUTH HOLDEN RD. GREENSBORO, NC 27406
5	George W. McCuiston	3100 S. DIXIE HIGHWAY BOCA RATON, FL. 33432
6	Mattie B. McCuiston	3923 S. HOLDEN ROAD GREENSBORO, NC 27406
7	Florence H. McCuiston	3923 S. HOLDEN ROAD GREENSBORO, NC 27406

NCDOT

DIVISION OF HIGHWAYS

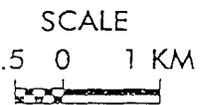
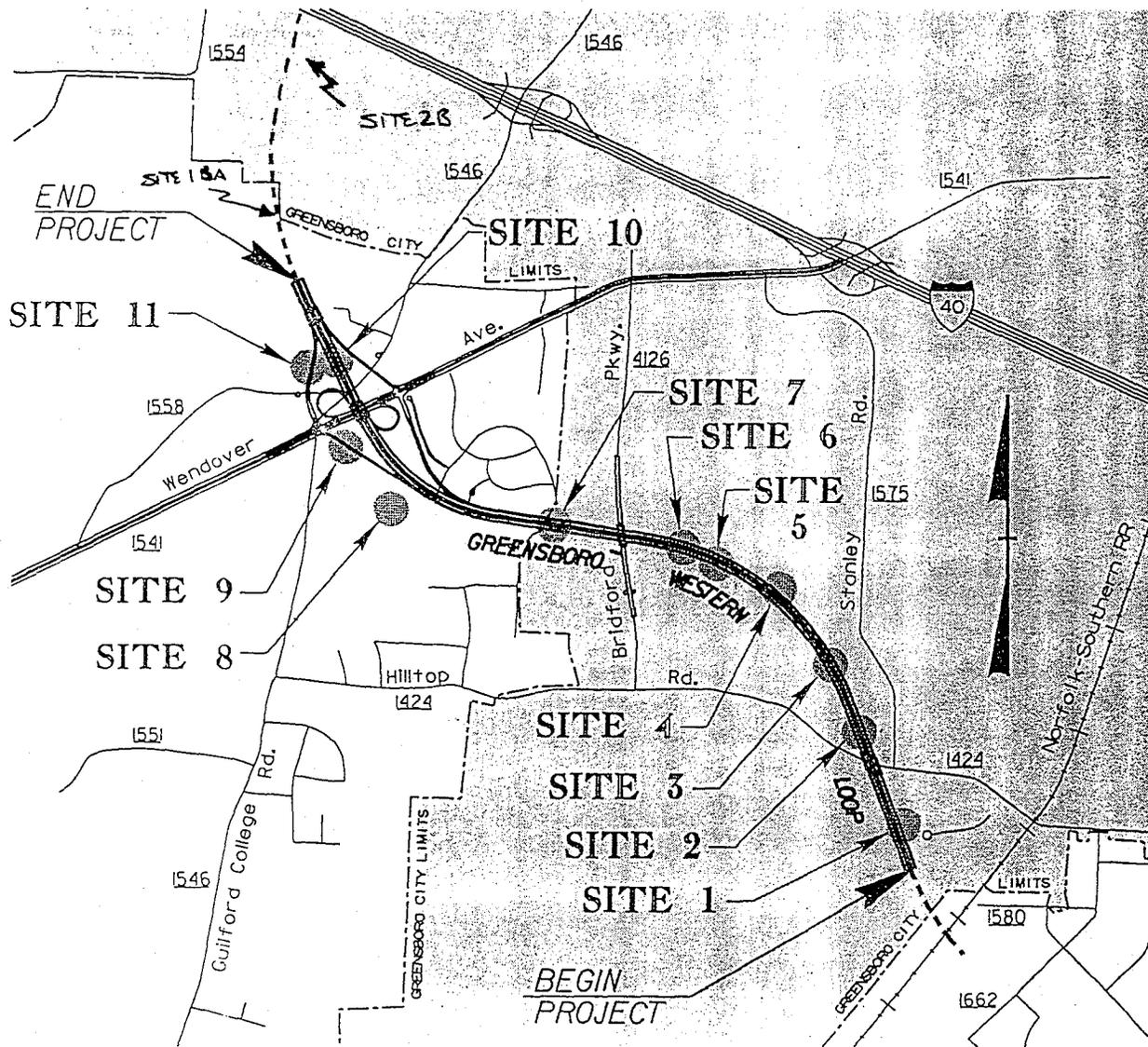
GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AB)

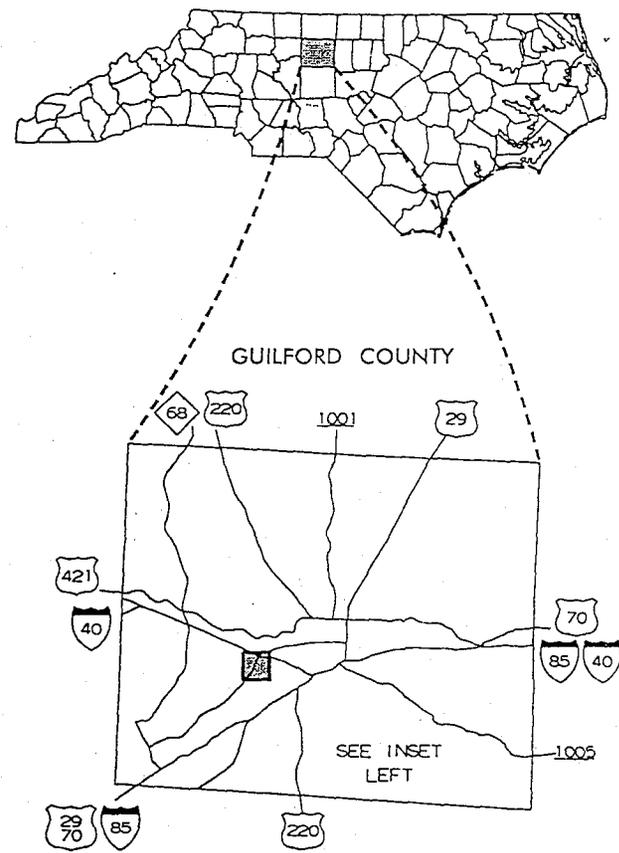
GREENSBORO - WESTERN LOOP FROM
NORTH OF I-85 NEAR GROOMETOWN
TO NORTH OF HIGH POINT ROAD

SHEET 55 OF 55

6/30/03



LOCATION MAP



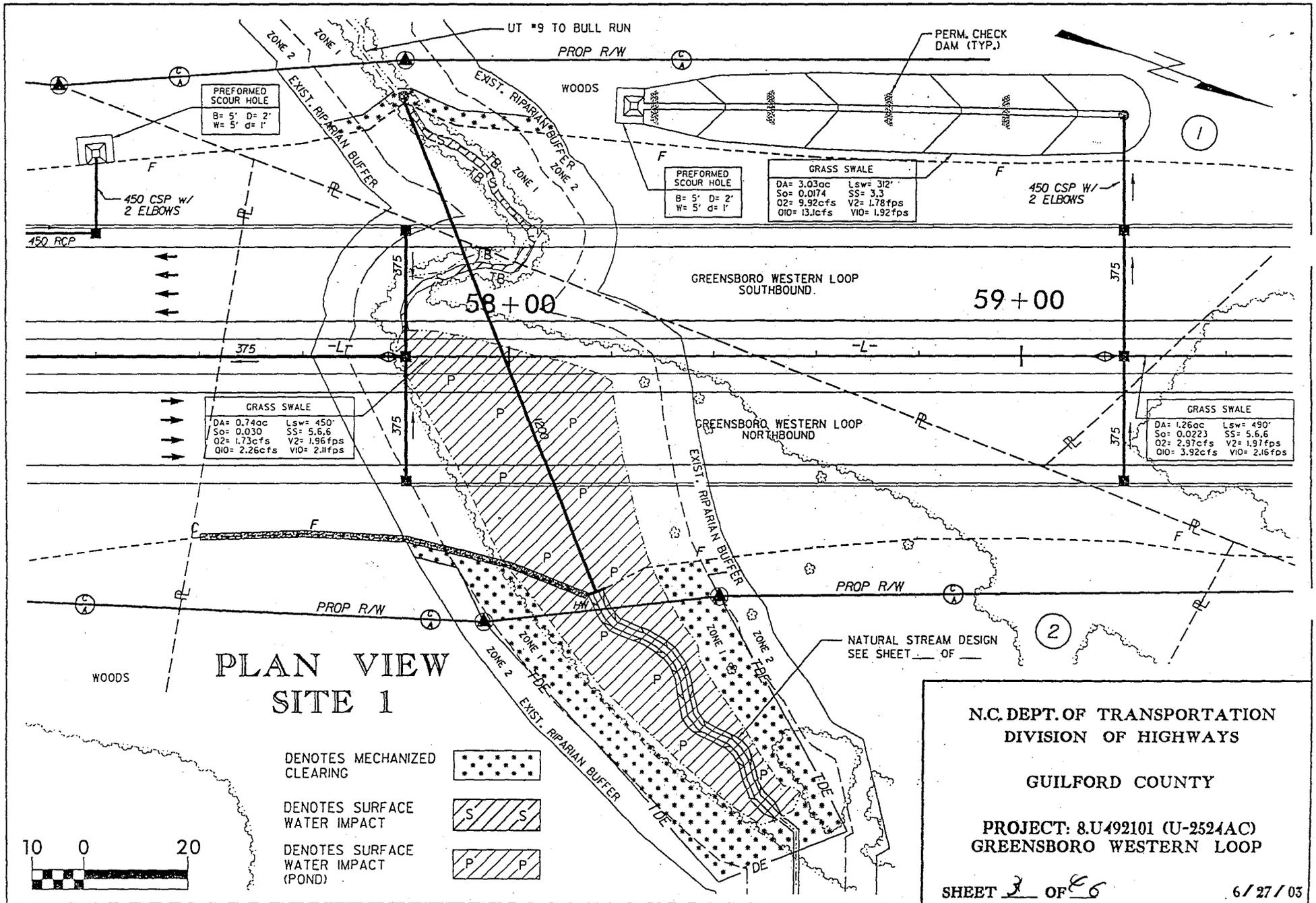
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

SHEET 1 OF 46

6/27/03



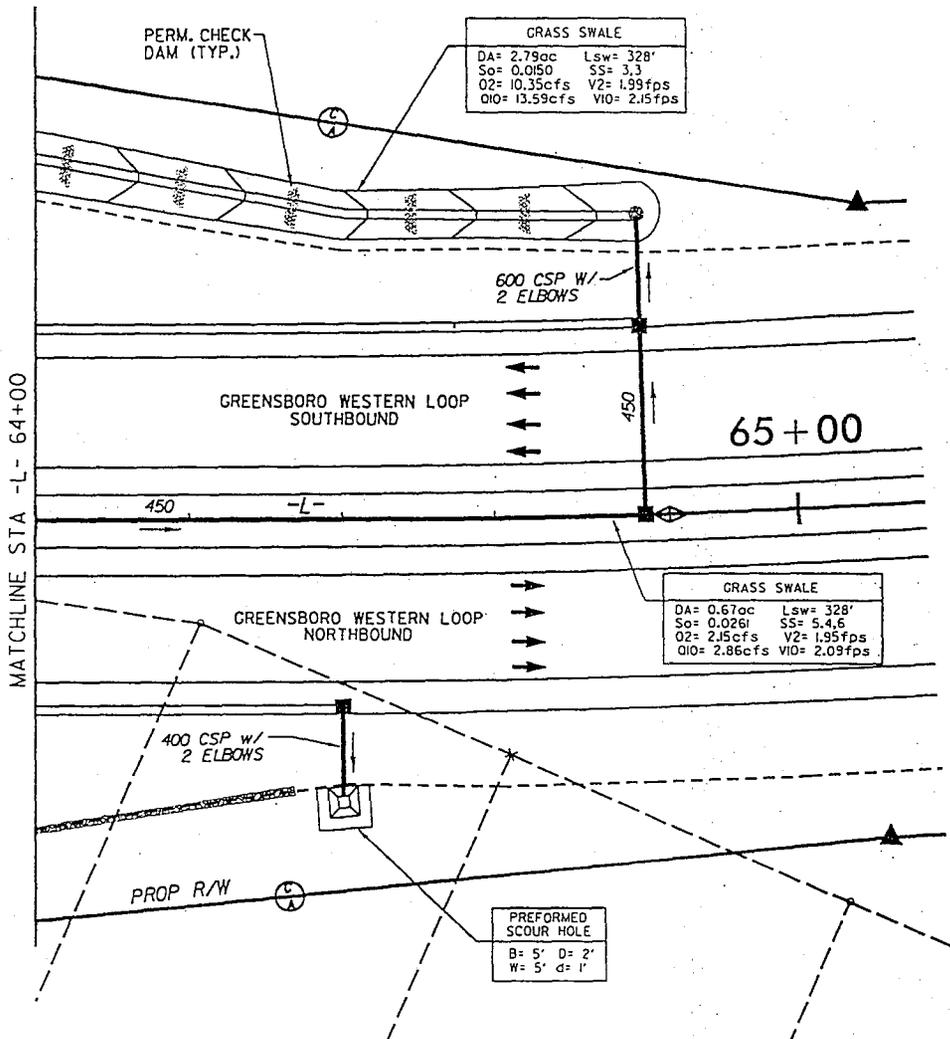
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DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

SHEET 2 OF 6

6/27/03



GRASS SWALE	
DA= 2.79ac	Lsw= 328'
So= 0.0150	SS= 3.3
O2= 10.35cfs	V2= 1.99fps
O10= 13.59cfs	V10= 2.15fps

GRASS SWALE	
DA= 0.67ac	Lsw= 328'
So= 0.0261	SS= 5.46
O2= 2.15cfs	V2= 1.95fps
O10= 2.86cfs	V10= 2.09fps

PREPARED SCOUR HOLE	
B= 5'	D= 2'
W= 5'	d= 1'

PLAN VIEW
SITE 2



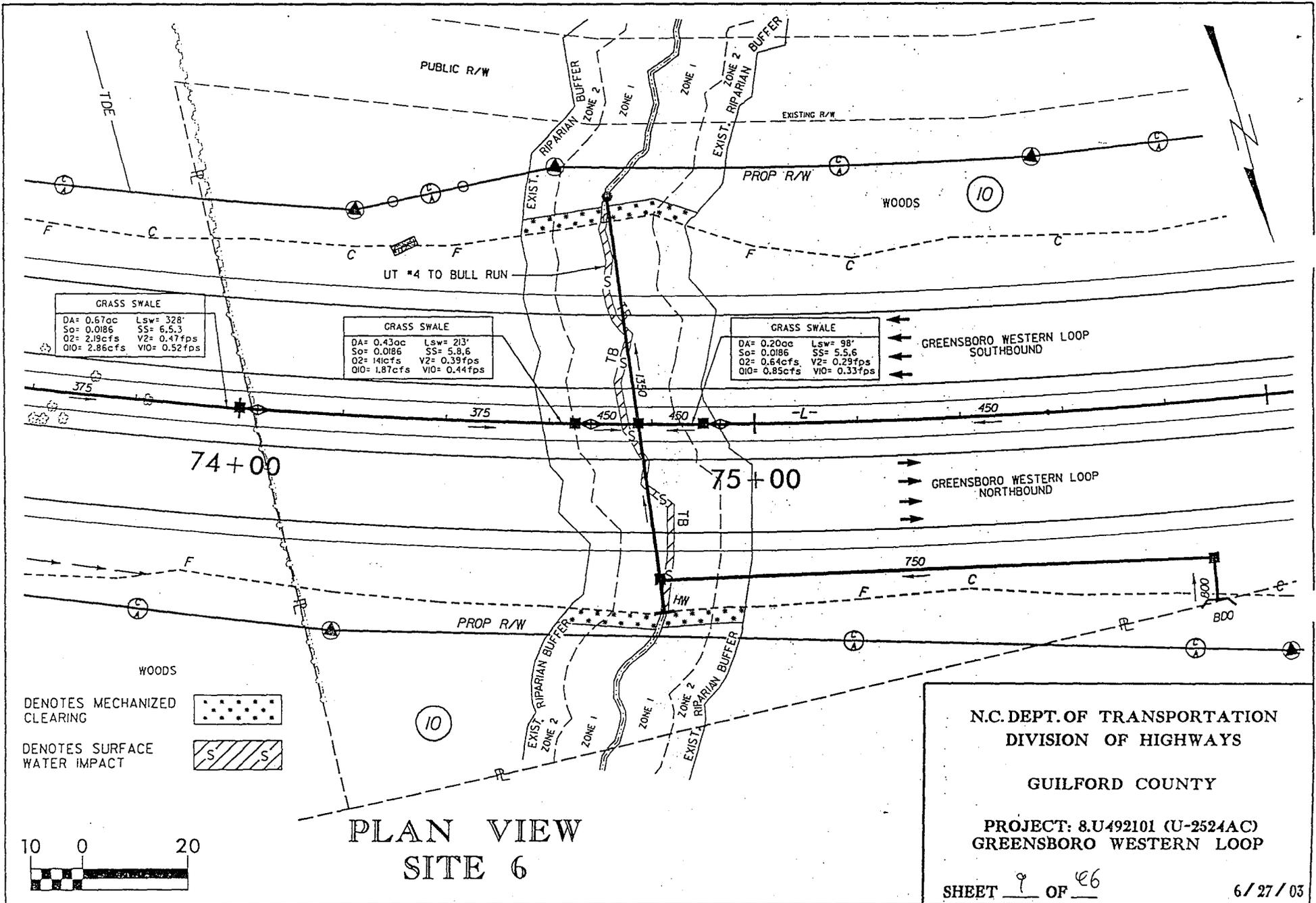
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

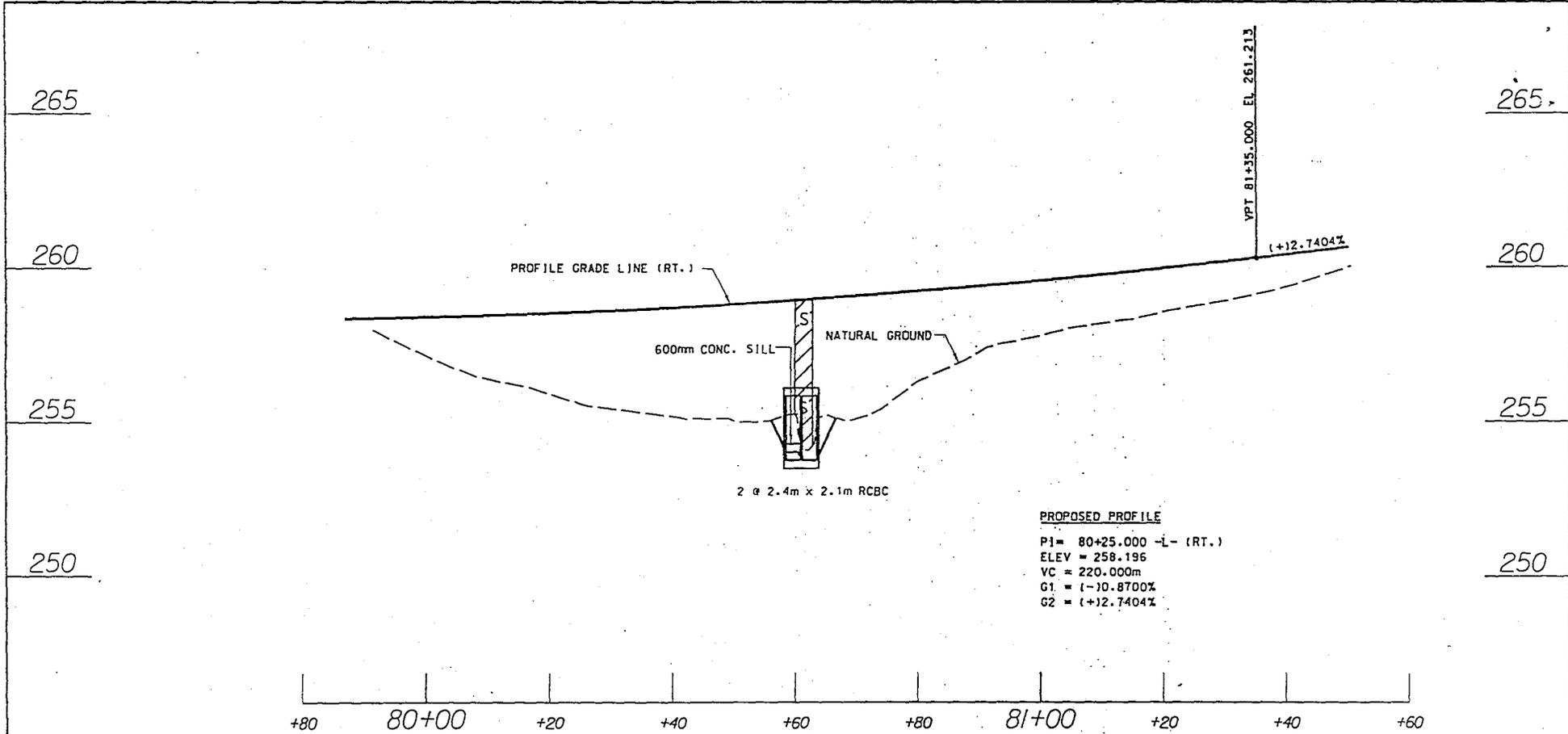
GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

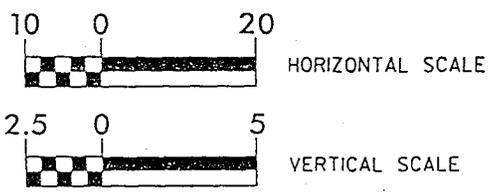
SHEET 5 OF 96

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PROFILE SITE 7



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

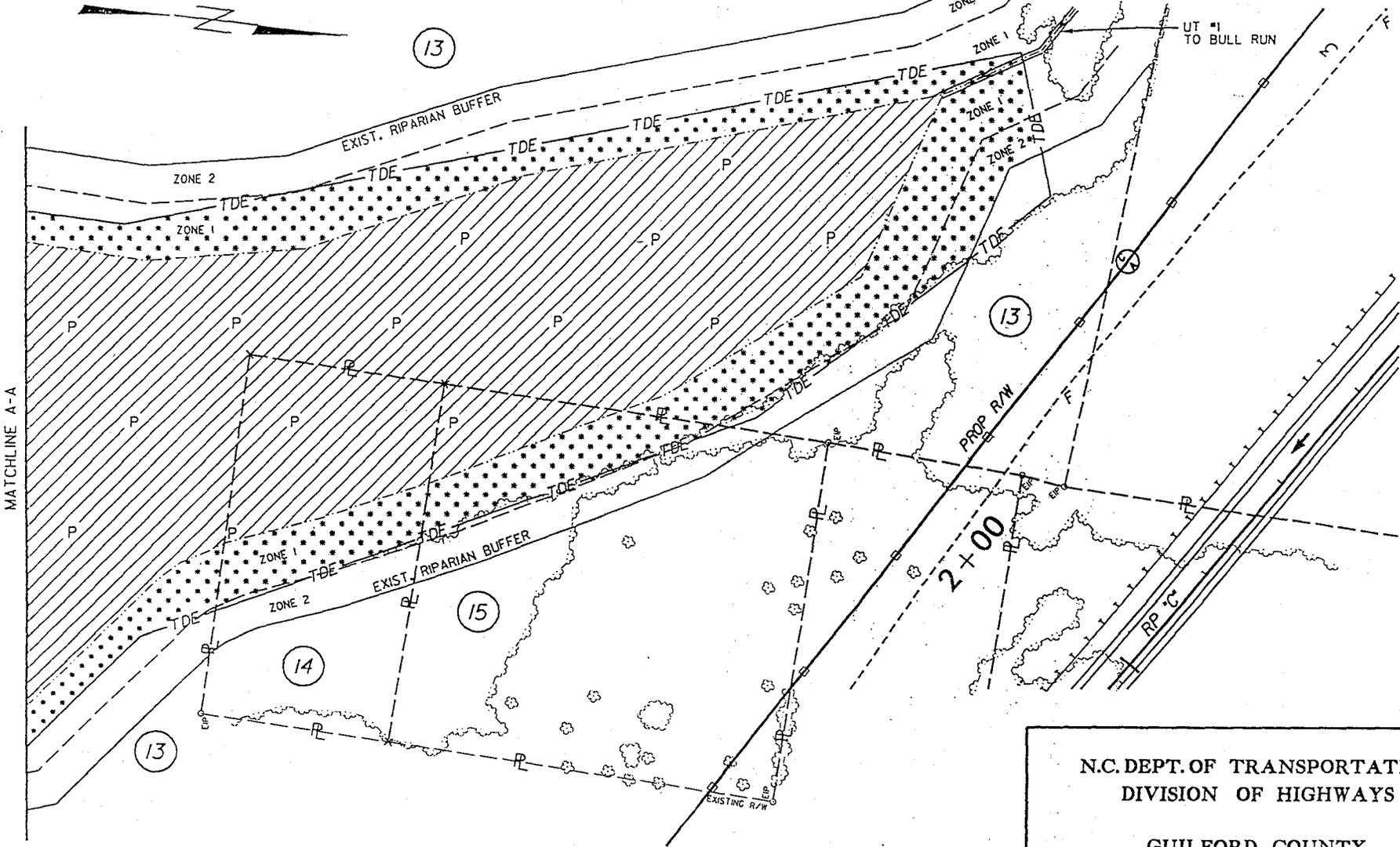
GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

SHEET 11 OF 46

6/26/03

13



MATCHLINE A-A

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

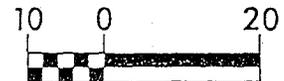
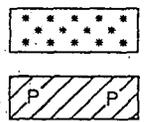
SHEET 13 OF 46

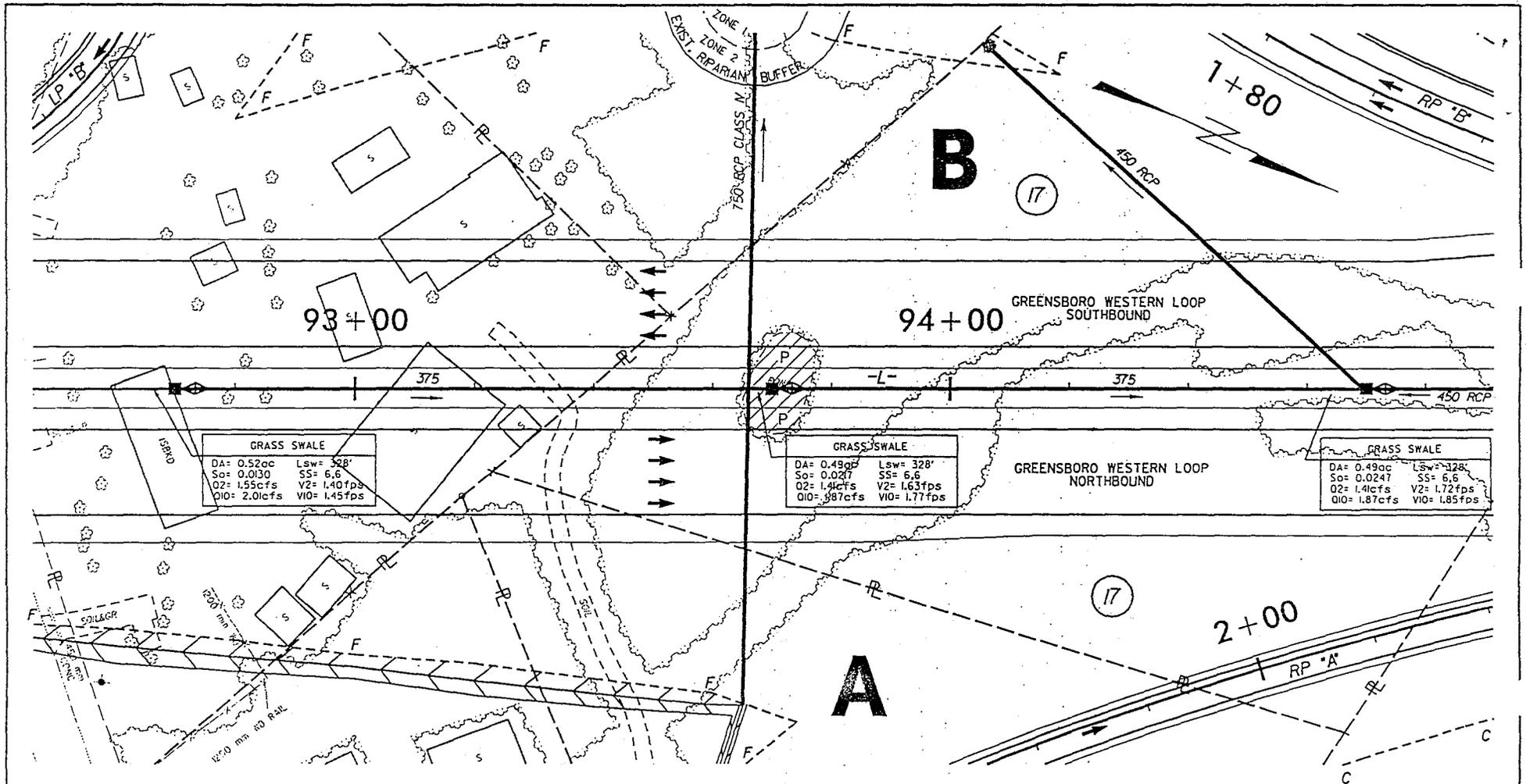
6/27/03

PLAN VIEW SITE 8

DENOTES MECHANIZED
CLEARING

DENOTES FILL IN
SURFACE WATERS
(POND)





PLAN VIEW
SITE 10



DENOTES SURFACE
WATER IMPACT
(POND)



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AC)
GREENSBORO WESTERN LOOP

SHEET 15 OF 66

6/27/03

NCDOT Project No. 8.U492101
T.I.P. No. U-2524AC
Guilford County, NC
Greensboro-Western Loop from North of
Norfolk Southern Railroad to North of SR 1541.

NATURAL STREAM DESIGN
UNNAMED TRIBUTARY NO. 9 TO BULL RUN
Right of -L- Project Station 58+15

Prepared by:
TranSite Consulting Engineers, Inc.
1300 Paddock Dr., Suite G-10
Raleigh, NC 27609

REFERENCE REACH

Since the proposed relocation site is currently a pond, a "reference reach" was surveyed downstream of the pond outlet. The selected reach is located approximately 25 meters downstream of the pond outlet and is 100 meters in length. This reach was chosen because it represents the current natural stream conditions.

Based on field survey data gathered, this stream reach was classified as an E5 stream. The bed material for this reach was found to be a medium sand with some gravel. The HEC-RAS computer model was used to determine the hydraulic characteristics of the stream such as velocity, shear stress and stream power.

Design and morphological data for the Reference and Proposed streams are shown in the "Morphological Measurement Table".

PROPOSED CHANNEL

The proposed stream is designed to have an E5 classification. The gradient of the proposed stream is controlled by the tie to the head of the pond upstream and the inlet of the 1200mm (48") RCP downstream. The proposed stream is designed to have an average bankfull depth of 0.45 meters (1.5') and an average pool depth of 0.75m (2.5'). The natural banks of the existing pond will serve as the flood prone limits for the proposed stream.

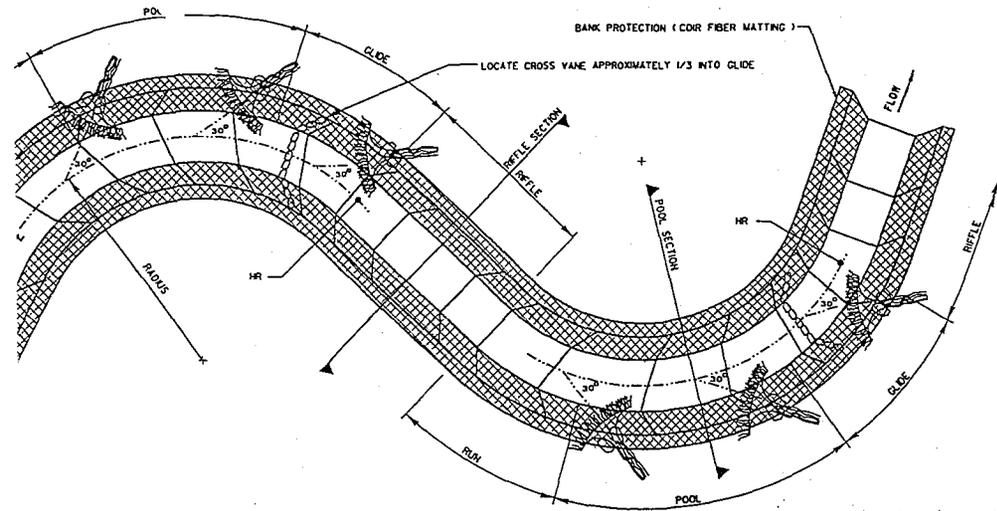
Proposed stream stabilization is shown on the attached detail sheet and will be grass with coir fiber matting along the entire length of both banks. The flood prone limits and other disturbed areas will be stabilized with native woody vegetation. To aid in stability and reduce stream gradient, cross vane rock weirs with 0.3 meter (1.0') channel drops will be placed downstream of all meanders in the "glide section". In addition, rootwads will be

July 03

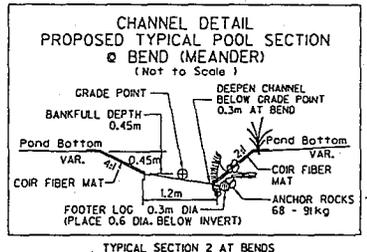
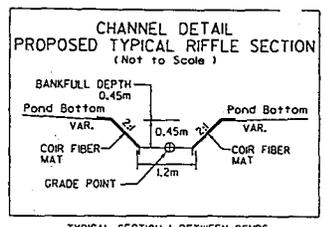
Appendix B

Morphological Measurement Table
U-2524AC, Guilford Co.Tip - 4-25 24 AC
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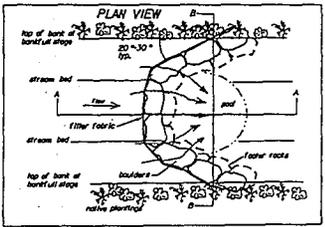
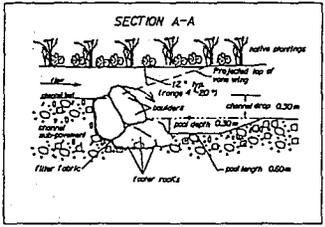
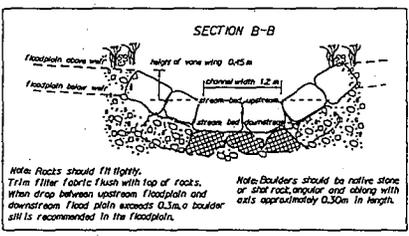
Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream Type	Pond	E5	-	E5
2. Drainage Area (D.A.)	14.4 ha / 35.6 ac	14.4 ha / 35.6 ac	-	14.4 ha / 35.6 ac
3. Bankfull Width (W_{bkl})	-	3.00 m / 9.84 ft	-	2.10 m / 6.89 ft
4. Bankfull Mean Depth (d_{bkl})	-	0.32 m / 1.03 ft	-	0.37 m / 1.20 ft
5. Width/Depth Ratio (W_{bkl}/d_{bkl})	-	9.55	-	5.74
6. Bankfull Cross-Sectional Area (A_{bkl})	-	0.94 m ² / 10.17 ft ²	-	0.77 m ² / 8.29 ft ²
7. Bankfull Mean Velocity (V_{bkl})	-	0.95 m/s / 3.13 ft/s	-	1.10 m/s / 3.62 ft/s
8. Bankfull Discharge (Q_{bkl})	-	0.90 m ³ /s / 31.8 ft ³ /s	-	0.85 m ³ /s / 30.0 ft ³ /s
9. Bankfull Max Depth (d_{mbkl})	-	0.45 m / 1.48 ft	-	0.60 m / 1.97 ft
10. Width of Floodprone Area (W_{fpa})	-	35.9 m / 117.86 ft	-	10.6 m / 34.9 ft
11. Entrenchment Ratio (W_{fpa}/W_{bkl})	-	11.97	-	5.07
12. Meander Length (L_m)	-	29.0 m / 95.1 ft	-	20.0 m / 65.6 ft
13. Ratio of Meander Length to Bankfull Width (L_m/W_{bkl})	-	9.67	-	9.52
14. Radius of Curvature (R_c)	-	4.10 m / 13.45 ft	-	5.75 m / 18.9 ft
15. Ratio of Radius of Curvature to Bankfull Width (R_c/W_{bkl})	-	1.37	-	2.74
16. Belt Width (W_{bit})	-	9.7 m / 31.8 ft	-	4.5 m / 14.8 ft
17. Meander Width Ratio (W_{bit}/W_{bkl})	-	3.23	-	2.14
18. Sinuosity (K) (stream length/valley length)	-	1.18	-	1.06
19. Valley Slope (VS)	-	2.00%	-	2.12%
20. Average Slope (CS)	-	1.69%	-	2.00%
21. Pool Slope	-	0.00%	-	0.00%
22. Ratio of Pool Slope to Average Slope	-	0.00	-	0.00
23. Maximum Pool Depth (dp_{max})	-	0.75 m / 2.46 ft	-	0.80 m / 2.63 ft
24. Ratio of Pool Depth to Average Bankfull Depth (dp/d_{bkl})	-	2.34	-	2.19
25. Pool Width (W_p)	-	3.9 m / 12.8 ft	-	4.0 m / 13.1 ft
26. Ratio of Pool Width to Bankfull Width (W_p/W_{bkl})	-	1.30	-	1.90
27. Pool to Pool Spacing	-	18.0 m / 59.0 ft	-	13.0 m / 42.7 ft (avg.)
28. Ratio of Pool to Pool Spacing to Bankfull Width	-	6.00	-	6.20
29. Ratio of Lowest Bnk Height to Bankfull Height (or Max Bankfull Depth) (Bh_{low}/d_{mbkl})	-	1.00	-	0.83



TYPICAL PLAN
NOT TO SCALE



NATURAL CHANNEL DESIGN TYPICALS

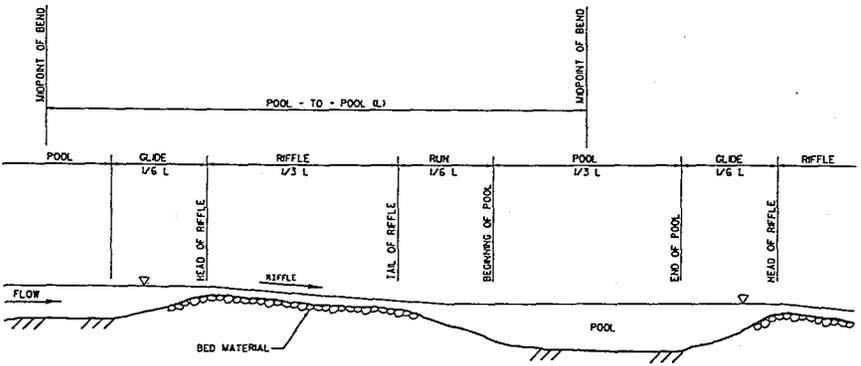


CROSS VANE ROCK WEIR DETAILS

- NOTES:
- THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT WHICH SHALL CONSIST OF STAKING OUT THE CENTER OF EACH RADIUS, SCRIBING THE CENTER LINE OF THE CHANNEL FOR EACH BEND USING THE INDICATED RADIUS, AND SCRIBING CENTERLINE OF THE TANGENT SECTIONS BY CONNECTING SUCCESSIVE BENDS WITH STRAIGHT LINE, $R_1 = \pm 4.0$ m / 13.45 ft.
 - FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO AVOID CERTAIN OBSTACLES. APPROVAL BY THE ENGINEER OF THE STAKE-OUT ALIGNMENT SHALL BE REQUIRED PRIOR TO INITIATION OF THE CONSTRUCTION OF THE CHANNEL.
 - LOCATE ROCK VANES ACCORDING TO PLAN SHEET.
 - NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE.
 - ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE.
 - FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE CHANNEL.
 - WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, ROOTWAD LOGS AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND CAPS.
 - PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH.

MORPHOLOGICAL MEASUREMENT TABLE

VARIABLES	EXISTING CHANNEL	PROPOSED REACH	USGS STATION	REFERENCE REACH
1) STREAM TYPE	POOL	ES	-	ES
2) DRAINAGE AREA	14.4 ha / 35.6 ac	14.4 ha / 35.6 ac	-	14.4 ha / 35.6 ac
3) BANKFULL WIDTH	-	3.00 m / 9.84 ft	-	2.00 m / 6.59 ft
4) BANKFULL MEAN WIDTH	-	0.32 m / 1.03 ft	-	0.37 m / 1.20 ft
5) WIDTH/DEPTH RATIO	-	5.55	-	5.14
6) BANKFULL CROSS-SECTIONAL AREA	-	0.94 sq m / 10.17 sq ft	-	0.71 sq m / 7.62 sq ft
7) BANKFULL MEAN VELOCITY	-	0.95 m/s / 3.12 fpm	-	1.00 m/s / 3.62 fpm
8) BANKFULL DISCHARGE	-	0.90 cms / 3.8 cfs	-	0.85 cms / 30.0 cfs
9) BANKFULL MAX DEPTH	-	0.45 m / 1.48 ft	-	0.60 m / 1.97 ft
10) WIDTH OF FLOODPHONE AREA	-	35.9 m / 117.8 ft	-	0.6 m / 34.8 ft
11) ENTRENCHMENT RATIO	-	8.97	-	5.07
12) MEANDER LENGTH	-	29.0 m / 95.1 ft	-	20.0 m / 65.6 ft
13) RATIO OF MEANDER LENGTH TO BANKFULL WIDTH	-	9.67	-	5.52
14) RADIUS OF CURVATURE	-	4.0 m / 13.45 ft	-	3.75 m / 12.3 ft
15) RATIO OF RADIUS OF CURVATURE TO BANKFULL WIDTH	-	1.37	-	2.14
16) BELT WIDTH	-	9.7 m / 31.8 ft	-	4.5 m / 14.8 ft
17) MEANDER WIDTH RATIO	-	3.23	-	2.41
18) IRREGULARITY STREAM LENGTH/VALLEY LENGTH	-	1.08	-	1.06
19) VALLEY SLOPE	-	2.00%	-	2.02%
20) AVERAGE SLOPE	-	1.93%	-	2.00%
21) POOL SLOPE	-	0.00%	-	0.00%
22) RATIO OF POOL SLOPE TO AVERAGE SLOPE	-	0.00	-	0.00
23) MAXIMUM POOL DEPTH	-	0.75 m / 2.46 ft	-	0.80 m / 2.65 ft
24) RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	-	2.34	-	2.11
25) POOL WIDTH	-	3.9 m / 12.8 ft	-	4.0 m / 13.1 ft
26) RATIO OF POOL WIDTH TO BANKFULL WIDTH	-	1.30	-	1.90
27) POOL TO POOL SPACING	-	8.0 m / 26.2 ft	-	0.0 m / 42.7 ft (var)
28) RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	-	6.00	-	6.20
29) RATIO OF LOWEST BELT HEIGHT TO BANKFULL HEIGHT MAX BANKFULL DEPTH	-	1.00	-	0.83



TYPICAL PROFILE
NOT TO SCALE

- NOTES:
- THE POOL TO POOL SPACING (L) SHALL BE MEASURED AS THE DISTANCE FROM THE MIDPOINT OF THE UPSTREAM BEND TO THE MIDPOINT OF THE DOWNSTREAM BEND.
 - REFER TO MORPHOLOGICAL MEASUREMENT TABLE AND PLAN SHEET FOR DIMENSIONS. NOTE THAT POOL TO POOL SPACING VARIES.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.U292101 (U-2524AC)
GREENSBORO-WESTERN LOOP

NCDOT Project No. 8.U492101

T.I.P. No. U-2524AC

Guilford County, NC

Greensboro-Western Loop from North of
Norfolk Southern Railroad to North of SR 1541.

**STORMWATER MANAGEMENT
PLAN**

Prepared by:

TranSite Consulting Engineers, Inc.

1300 Paddock Dr., Suite G-10

Raleigh, NC 27609

July 03

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Based on the Division of Environmental Management (DEM) Classifications of the impacted streams, all of the sites listed in Table 1 require "Special Consideration".

POTENTIAL IMPACTS

The project is located within the City of Greensboro Corporate Limits and Unincorporated areas of Guilford County. The project is located entirely within the drainage basin of the Randleman Lake and is therefore subject to the requirements of 15A NCAC 2B .0250, Randleman Lake Water Supply Watershed; Protection and Maintenance of Riparian Areas. The purpose of these rules are to protect and preserve the riparian buffers along all streams that drain into the Randleman Lake and maintain their nutrient removal functions.

The Randleman Buffer Rules require that a 50-foot wide riparian buffer directly adjacent to surface waters that drain into the Randleman Reservoir be maintained. The Rule also requires that concentrated runoff from new ditches or manmade conveyances be converted to diffused flow before the runoff enters the riparian buffer.

BEST MANAGEMENT PRACTICES (BMPs)

As noted in Table 1, the proposed project contains seven jurisdictional stream crossings. All seven crossings meet the requirements of 15A NCAC 2B .0251 requiring treatment of stormwater runoff. The following discusses each Site and its proposed BMPs:

Site 1 – UT #9 to Bull Run (-L- Sta. 58+20)

The proposed work at Site 1 involves construction of -L- on new location, a 1 @ 48" RCP and 213 linear feet of natural stream through the drained pond. To facilitate formation of a natural stream bed through the pipe, the upstream and downstream inverts will be buried a minimum of 0.5'. The natural stream is designed in accordance with Rosgen techniques for natural stream design and has an E5 Stream Classification. Based on "Level Spreader" design criteria in Forested Areas, the Northwest, Southwest and Southeast quadrants surrounding the existing and proposed streams have natural ground slopes through the buffer in excess of 6% and therefore are not suitable for installation of level spreaders. In the Northeast quadrant, the natural ground is

Site 4 – UT #5 to Bull Run (-L- Sta. 74+74)

The proposed work at this location involves the construction of -L- on new location and a 1 @ 54" RCP. To facilitate formation of a natural stream bed through the pipe, the upstream and downstream inverts will be buried a minimum of 0.5'. In the Northwest and Southwest quadrants, the presence of existing right of way for the extension of Ruffin Road precludes the use of level spreaders. In the Northeast and Southeast quadrants, irregular natural topography is not suitable for level spreaders. Since level spreader design criteria can not be met, grass swales will be used to provide treatment of stormwater.

Site 7 – Bull Run (-L- Sta. 80+61)

The proposed work at this location involves the construction of -L- on new location and a 2 @ 8' x 7' RCBC. The RCBC inverts will be buried a minimum of 1.0' upstream and downstream to facilitate formation of a natural stream bed through the RCBC length. Additionally, a 2.0' concrete sill in the left RCBC barrel restricts daily and low flows to the right barrel. In the Northwest and Southwest quadrants, irregular natural topography and the presence of Ruffin Road preclude the use of level spreaders. In the Northeast and Southeast quadrants, irregular natural topography also precludes the use of level spreaders. Since level spreader design criteria can not be met, grass swales and preformed scour holes will be used to provide treatment of stormwater.

Site 11 – UT #2 to Long Branch (-RPB- Sta. 2+52)

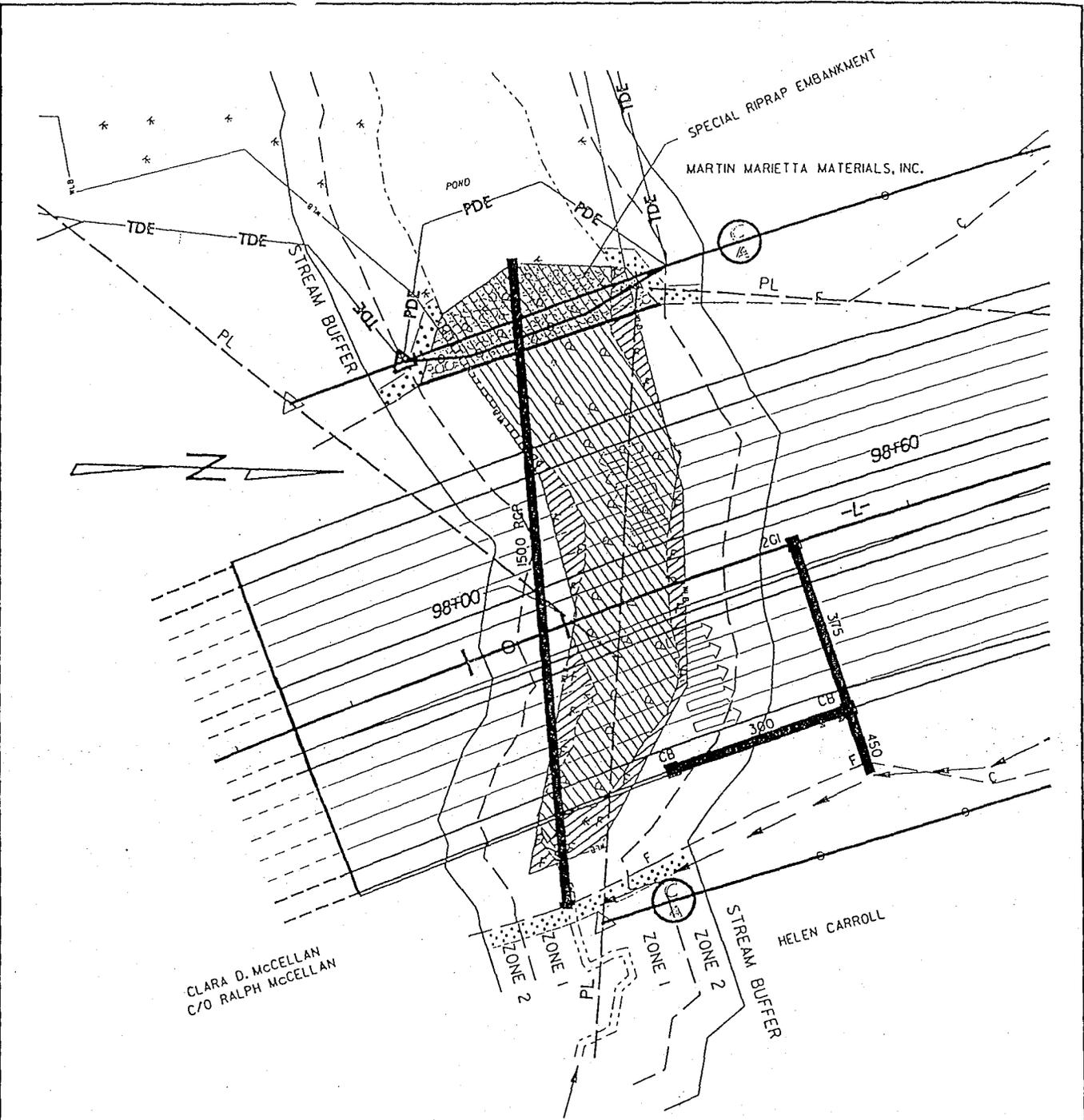
The proposed work at this location involves the construction of Ramp B on new location and a 1 @ 36" RCP. To facilitate formation of a natural stream bed through the pipe, the upstream and downstream inverts will be buried a minimum of 0.5'. The Northeast and Southeast quadrants are located within the proposed interchange and are not suitable for installation of level spreaders. In the Southwest quadrant, the slope of natural ground through the buffer is in excess of 6% and therefore are not suitable for installation of level spreaders. Since level spreader design criteria can not be met, grass swales and a preformed scour hole will be used to provide treatment of stormwater.

July 03

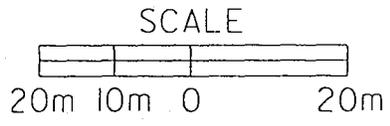
Table 2. BMP Locations

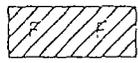
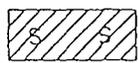
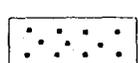
BMP	Location	Plan Sheet
Enhanced Grass Swale	-L- 58+25 to 59+20 (Lt)	4, 5
	-L- 63+80 to 64+80 (Lt)	6
Grass Swale	-L- 57+00 to 57+80 (M)	4
	-L- 57+80 to 59+20 (M)	4, 5
	-L- 59+20 to 60+80 (M)	5
	-L- 61+70 to 63+55 (M)	5, 6
	-L- 63+55 to 63+80 (M)	6
	-L- 63+80 to 64+80 (M)	6
	-L- 64+80 to 66+49 (M)	6, 7
	-L- 66+49 to 66+90 (M)	7
	-L- 66+90 to 68+40 (M)	7
	-L- 68+40 to 70+20 (M)	7, 8
	-L- 71+58 to 73+00 (M)	8, 9
	-L- 73+00 to 74+00 (M)	9
	-L- 74+00 to 74+65 (M)	9
	-L- 74+65 to 74+90 (M)	9
	-L- 74+90 to 76+25 (M)	9, 10
	-L- 75+10 to 76+25 (Lt)	9, 10
	-L- 75+30 to 76+25 (Rt)	9, 10
	-L- 76+25 to 77+21 (Lt)	10
	-L- 76+25 to 77+29 (M)	10
	-L- 76+25 to 77+36 (Rt)	10
	-L- 77+60 to 79+68 (Lt)	10, 11
	-L- 77+65 to 79+68 (M)	10, 11
	-L- 77+70 to 79+68 (Rt)	10, 11
	-L- 79+68 to 80+10 (Lt)	11
	-L- 79+68 to 81+30 (M)	11
	-L- 79+68 to 79+90 (R)	11
	-L- 81+30 to 81+80 (M)	11
-L- 81+80 to 83+28 (M)	11, 12	
-L- 91+70 to 94+70 (M)	14	
-L- 92+40 to 93+66 (Rt)	14	
-L- 94+70 to 95+50 (M)	14	
-L- 95+50 to 95+65 (M)	14	
-RPA- 1+02 to 2+48 (Lt)	14	
-RPB- 2+55 to 3+56 (Lt)	14	

July 03



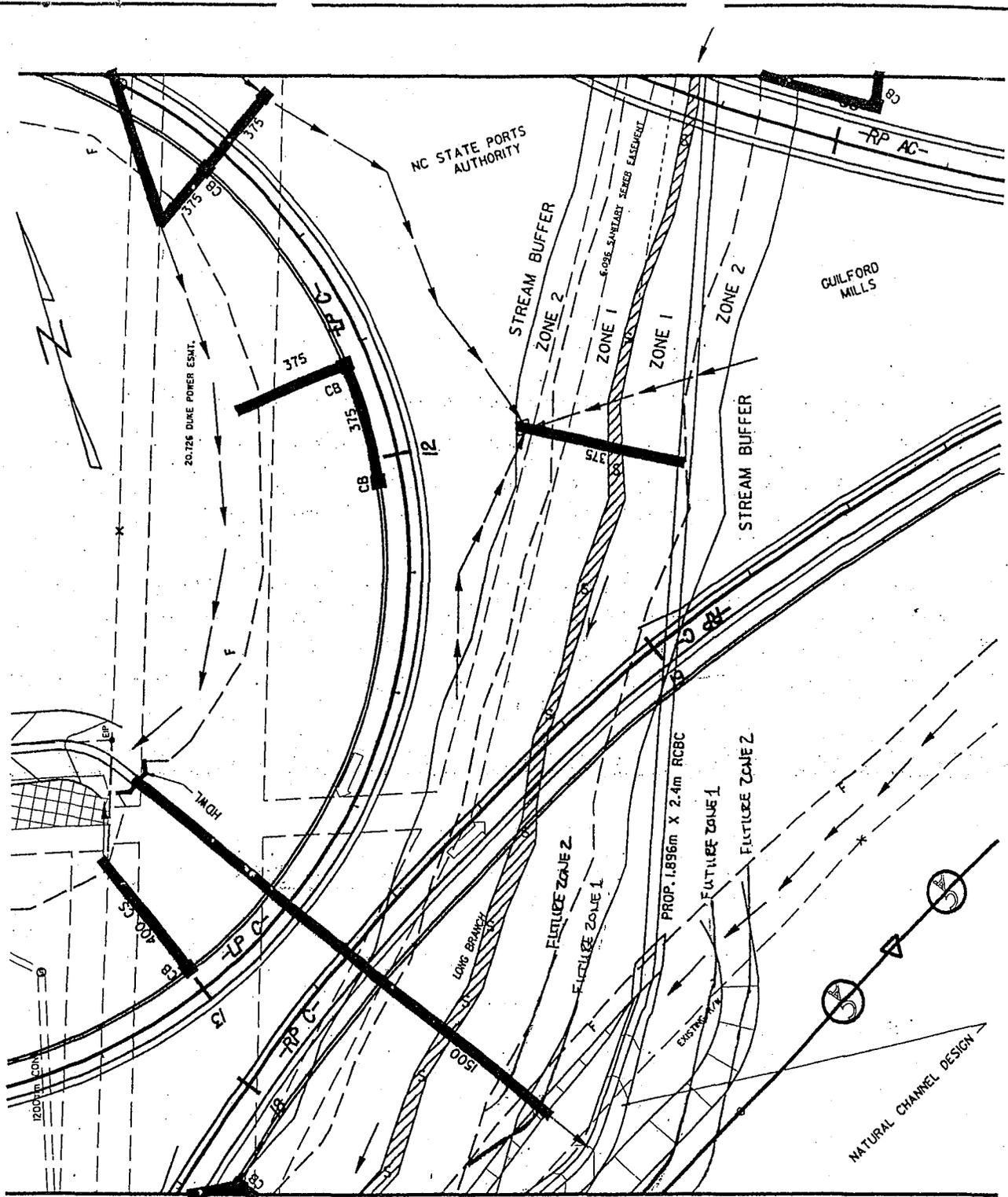
SITE # | BA



-  DENOTES FILL IN WETLAND
-  DENOTES FILL IN SURFACE WATER
-  DENOTES FILL IN SURFACE WATER (POND)
-  DENOTES MECHANIZED CLEARING

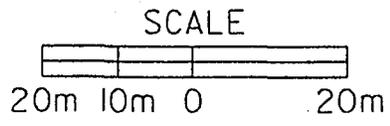
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GULFORD COUNTY
 8.U492101 U-2524AC

SCALE AS SHOWN
 SHEET 31 OF 46
 JULY 2003



MATCHLINE 3

SITE 2 BA



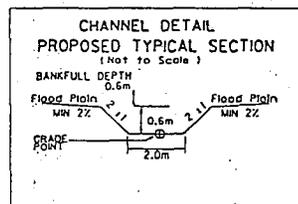
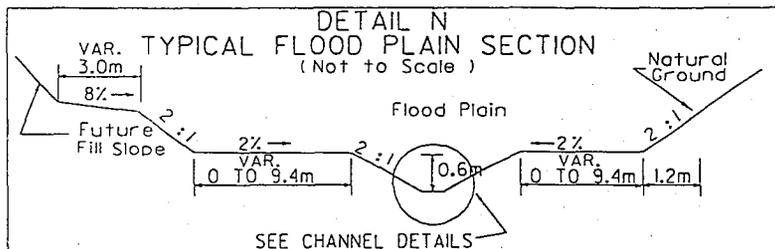
DENOTES FILL IN SURFACE WATER

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 8.U492101 U-2524AC
 GREENSBORO WESTERN URBAN LOOP

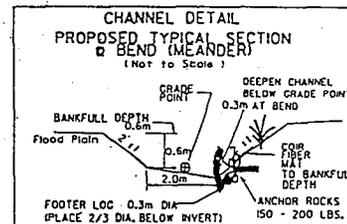
SCALE AS SHOWN
 SHEET 35 OF 46

REVISED
 6/30/03

NATURAL CHANNEL DESIGN TYPICALS



TYPICAL SECTION 1 BETWEEN BENDS



TYPICAL SECTION 2 AT BENDS

NOTES:

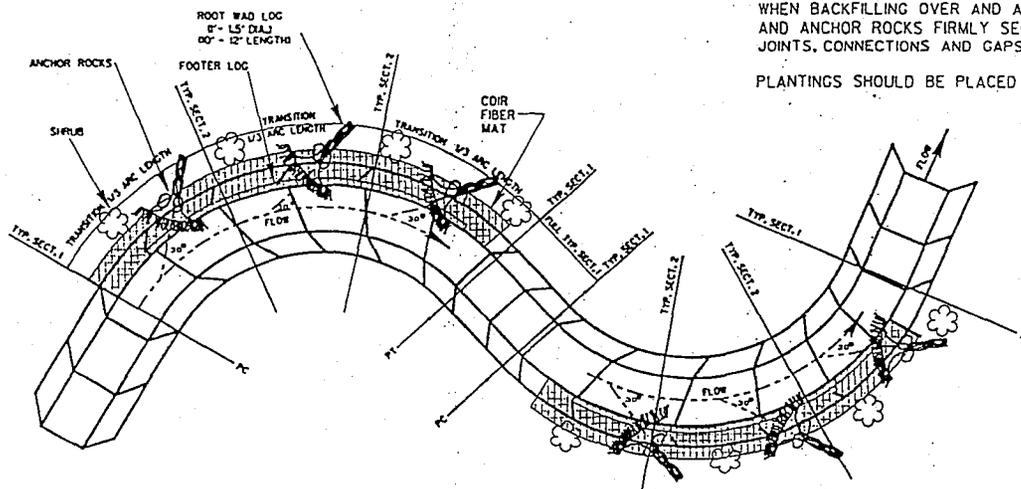
NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE

ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE

FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE CHANNEL.

WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, ROOTWAD LOGS AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH



CHANNEL PLAN VIEW
LONG BRANCH
SITE 23A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GUILFORD COUNTY
 8.U492101
 GREENSBORO WESTERN URBAN LOOP
 U-2524
 SCALE AS SHOWN
 SHEET 37 OF 46
 JULY 2003

U-2524 AC (SITES 1BA & 2BA)
(metric)

Permit Site #	Str. #	DA (ha)	required treatment length (m)	actual treatment length (m)	M 1	M 2	Base (m)	Slope	Q2 (cms)	V2 (m/s)	Q10 (cms)	Stable?
1BA	3	0.51	38.4	40+	6	6	0.0	0.02474	0.080	0.34	0.100	Y
	2 outlet	0.34	25.4	30.0	3	3	2.4	0.03	0.230	0.44	0.300	Y
2BA*	15**	0.09	7.1	12.0**	2**	2**	1.0	0.016667	0.028	0.63**	0.036	Y
	19	0.15	11.3	85.0	3	3	0.0	0.0133	0.040	0.24	0.047	Y
	20	0.14	10.5	60.0	6	10	0.0	0.0142	0.030	0.13	0.044	Y
	21	0.10	7.5	22.0	4	10	0.0	0.006	0.030	0.09	0.040	Y
	22	0.69	52.0	144.0	3	3	0.0	0.0121	0.150	0.46	0.190	Y
	23	0.44	33.1	140.0	6	6	0.0	0.01	0.100	0.25	0.130	Y
	24	0.38	28.6	220.0	6	6	0.0	0.025778	0.090	0.39	0.110	Y
	27	0.20	15.1	75.0	3	3	0.0	0.007467	0.060	0.23	0.080	Y

* Pre-formed scour holes were placed at the outlet of structure # 16A and 26 in the floodplain of stream. Topographical constraints will not allow the systems to be discharged to the left into the gore area.

** Structure #15 outlet ditch has 2:1 side slopes and is lined with rip rap.

Project No. 8.U492101 (U-2524AC)
Property Owner List
For
Each Wetland Site

Site NO.	Station	No.	Name	Address
7	-L- 80+58 Lt. to -L- 80+66 Lt.	11	Wendover South Associates, LP	1900 Interstate Tower Greensboro, NC 28202
	-L- 80+54 Lt. to -L- 80+66 Lt.	12	Susan C. Foster, Trustee of James A. Coomes & Frederica Brown Coomes Inter Vivos Trust	5535 Wayne Rd. Greensboro, NC 27407-7316
8	-RPC- 0+15 Lt. to -RPC- 2+53 Lt.	13	Ms. Lucille Brown, Widow	5740 Ruffin Rd. Jamestown NC 27282
		14	Ms. Patricia M. Brown, Widow	5740 Ruffin Rd. Jamestown NC 27282
		15	NCDOT	P.O. Box 20521 Raleigh, NC 27611
9	-RPC- 3+69 Lt. to -RPC- 5+12 Lt.	16	NCDOT	P.O. Box 20521 Raleigh, NC 27611
10	-L- 93+55 Rt. to -L- 93+78 Lt.	17	Ralph Edward McClellan	P.O. Box 7 Wanchese, NC 27981
11	-RPB- 2+59 Rt. to -RPB- 3+06 Rt.	18	Eunice J. Pitts	5912 Hickory Grove Rd. Greensboro, NC 27409

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.U492101 (U-2524AC)
 GREENSBORO WESTERN LOOP

PROPERTY OWNERS

NAME AND ADDRESS

OWNER'S NAME

ADDRESS

Mid-America Apartments, L.P.

6584 Polar Ave., Ste.340
Memphis, TN 38138-0612

Alfred K. Sampson, and Wife,
Vouline P. Sampson

** Owned by NCDOT **

Kilpatrick Associates

Mast Enterprises

*Greensboro Equipment Care Center, LLC
Mr. Ron Dana
P.O. Box 962
Woodbridge, N.C. 27095-6962*

PROPERTY OWNER INFORMATION
SITE # 2BA

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT No. 8.U492101 U-2524 AC
GREENSBORO WESTERN URBAN LOOP FROM

SHEET 43 OF 46

JULY 2003

IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size	WETLAND IMPACTS				SURFACE WATER IMPACTS					BUFFER IMPACTS			
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Relocated Channel (m)	Enclosed Channel (m)	Zone 1 (ha)	Zone 2 (ha)	
7	-L- 80+58 Rt to 58+57 Rt	2 @ 2.4 x 2.1 RCBC					0.021				104.4		75.0	0.212	0.116
8	-RPC- 0+15 Lt to 2+53 Lt	-												1.108	0.488
9	-L- 3+68 Lt to 5+12 Lt	-	0.392			0.041									
10	-L- 93+55 Rt to 93+78 Lt	-													
11	-RPB- 2+94 Lt to 3+42 Lt	900					0.007	0.217			74.1		61.2	0.147	0.107
SHEET TOTAL			0.392	0.000	0.000	0.041	0.028	1.866	0.000		178.5	0.0	136.2	1.467	0.711
PROJECT TOTAL			0.392	0.000	0.000	0.041	0.090	3.093	0.000		665.5	60.5	632.0	2.677	1.481

☐ DENOTES DRAINING OF POND IMPACT. POND AT SITE 8 IS A TEMPORARY IMPACT.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.U492101
NCDOT T.I.P. No: U-2524AC

IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size	WETLAND IMPACTS				SURFACE WATER IMPACTS					BUFFER IMPACTS		
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Relocated Channel (m)	Zone 1 (ha)	Zone 2 (ha)	
1BA*	98+00 -L-	1500 RCP	0.05	0.00	0.00	<0.01	<0.01	0.17			13	0	0.20	0.13
2BA	101+80 -L- / 12+20 -RP D-	2@2.1 x 2.1 RCBC	0.00	0.00	0.00	0.00	0.11	0.00			925	540	1.67	1.12
TOTALS:			0.05	0	0	0	0.11	0.17	0		938	540	1.87	1.25

* SITE 1 - BEAVER IMPOUNDMENT AREA. A TEMPORARY IMPACT WILL OCCUR IN ADDITION TO ABOVE LISTED QUANTITIES DUE TO TEMPORARY LOWERING OF WATER LEVEL.

METHOD III CLEARING IN WETLANDS (3.0M BEYOND CONSTRUCTION LIMITS)

Buffer restoration at Site 2BA is 0.49 ha for Zone 1 and 0.30 ha for Zone 2

N.C. DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS GUILFORD COUNTY	
PROJECT: 8.U492101	U-2524AC
SHEET 46 OF 46	July 2003