PROJECT SPECIAL PROVISION

(10-18-95) Z-1

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DENR State of North Carolina
Buffer Certification	Division of Environmental Management, DENR State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-14 of the *Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

July 14, 2009

Regulatory Division

Action ID SAW-2008-01316; TIP No. R-2814 (US 401 Widening and Rolesville Bypass)

Mr. Gregory Thorpe, PhD
Environmental Manager Director
Project Development and Environmental Analysis Branch
N.C. Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Thorpe:

Enclosed is a Department of the Army permit to authorize placement of fill material impacting 5,036 linear feet of streams, 10.08 acres of ponds, and 7.68 acres of wetlands (including isolated wetlands), for construction of the US 401 Widening and Rolesville Bypass (TIP R-2814), crossing Harris, Cedar Fork, Perry, Brandy, Crooked and Cedar Creeks, Wolfpen Branch, the Little River, and unnamed tributaries. An 18.5 mile corridor along and to the east of existing US 401, from SR 2044 (Ligon Mill Road) southeast of Rolesville, in Wake County, to SR 1700 (Fox Park Road) southeast of Louisburg, in Franklin County, North Carolina.

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been 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 conditions require that:

a. You must complete construction before December 31, 2014.

b. 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.

You must notify this office in advance as to when you intend to commence and complete work.

You should address all questions regarding this authorization to Eric Alsmeyer of my Raleigh Regulatory Field Office regulatory staff at (919) 554-4844, extension 23.

Sincerely,

for Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

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, Maryland 20910-3282

Copies Furnished (with special conditions and plans):

Mr. Ronald J. Mikulak, Chief
Wetlands Regulatory Section
61 Forsyth Street
Atlanta, Georgia 30303

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

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

Mr. Doug Huggett
Division of Coastal Management
N.C. Department of Environment
and Natural Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

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

DEPARTMENT OF THE ARMY PERMIT

Permittee: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Permit No: 200801316

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 the office acting under the authority of the commanding officer.

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

Project Description: Place fill material impacting 5,036 linear feet of streams, 10.08 acres of ponds, and 7.68 acres of wetlands (including isolated wetlands), for construction of the US 401 Widening and Rolesville Bypass (TIP R-2814), crossing Harris, Cedar Fork, Perry, Brandy, Crooked and Cedar Creeks, Wolfpen Branch, the Little River, and unnamed tributaries.

Project Location: An 18.5 mile corridor along and to the east of existing US 401, from SR 2044 (Ligon Mill Road) southeast of Rolesville, in Wake County, to SR 1700 (Fox Park Road) southeast of Louisburg, in Franklin County, North Carolina.

Permit Conditions:

General Conditions:

1. The time Limit for completing the work authorized ends on December 31, 2014 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 Conditions 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 eligible for listing in the National Register of Historic Places.

4. If you sell the property associate 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 ATTACHED SPECIAL CONDITIONS**

Further Information:

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

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. C. 403).

(X) Section 404 of the clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

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

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

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

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

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United states in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

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

 ***U.S. GOVERNMENT PRINTING OFFICE: 1986 – 717-425**

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was mad 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 33CFR 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 measure 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.

E. L. Lusk for Gregory J. Thorpe, PhD June 30, 2009

(PERMITTEE) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION *(DATE)*

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

7/14/09

(DISTRICT Commander) JEFFERSON M. RYSCAVAGE, COLONEL, U. S. ARMY DISTRICT COMMANDER *(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)*

 *U.S. GOVERNMENT PRINTING OFFICE: 1986 – 717-425

SPECIAL CONDITIONS - Action ID. 2008-01316; NORTH CAROLINA DEPARTMENT OF TRANSPORTATION/TIP R-2814)

Work Limits

a) All work authorized by this permit must be performed in strict compliance with the attached plans, which are a part of this permit. Any modification to these plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.

b) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

c) Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.

Related Laws

d) All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-5083, Ext. 526 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

Project Maintenance

e) The permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

f) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

g) 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. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project

SPECIAL CONDITIONS - Action ID. 2008-01316; NORTH CAROLINA DEPARTMENT OF TRANSPORTATION/TIP R-2814)

h) The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

i) The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

j)

Enforcement

k) Violations 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 permittee's discovery of the violation.

Mitigation

* l) NCDOT shall provide compensatory mitigation for the unavoidable impacts to 0.75 acre of wooded wetlands, and 3.64 acres of non-wooded wetlands, associated with Sections A and B of TIP R-2814, by debiting 2.62 acres of riverine and 1.77 acres of non-riverine wetland restoration, and 3.75 acres of riverine wetland preservation, from the Jeffreys Warehouse Mitigation Site (aka JALO), described in the September 17, 2004 "Jeffreys Warehouse Conceptual Mitigation Plan, Wayne County, North Carolina".

* m) NCDOT shall provide compensatory mitigation for the unavoidable impacts to 3,141 linear feet of warm-water streams, associated with Sections A and B of TIP R-2814, as follows:

1. By debiting 3,141 linear feet of stream restoration from the Marks Creek, Phase II, Mitigation Site (AID 2008-02072), described in the September 2001 "Stream and Wetland Mitigation Plan, Marks Creek, Phase II, Wake County, North Carolina".

2. Compensatory mitigation shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated September 20, 2005 from William D. Gilmore, EEP Director; pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003, the EEP will provide 3,141 linear feet of warm-water restoration equivalent stream mitigation, in the Upper Neuse River basin (Hydrologic Cataloging Unit 03020201) by one year of the date of this permit. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

SPECIAL CONDITIONS - Action ID. 2008-01316; NORTH CAROLINA DEPARTMENT OF TRANSPORTATION/TIP R-2814)

* n) NCDOT shall provide compensatory mitigation for the unavoidable impacts to wetlands and streams, associated with Sections C and D of TIP R-2814, no later than 5 years in advance of the anticipated construction let date for each section. Specific mitigation information for each of these sections will be provided when NCDOT submits their request to modify the existing permit to allow construction of these later phases once final design has been completed, and the District Commander has made a determination that minimization of impacts has been achieved to the maximum extent practicable.

Threatened and Endangered Species

o) NCDOT shall implement the ~~eight~~ nine on 8/7/2009 conservation measures listed in NCDOT's December 5, 2005 Biological Assessment for this project, and shall reinitiate consultation with the US Fish and Wildlife Service under Section 7 of the Endangered Species Act for Sections C and D when they are scheduled for construction.

Historic Properties

o) NCDOT shall comply with its commitments regarding the following historic properties: Timberlake Historic District, Perry-Fuller House, Jeffreys-Ellington Farm, Rogers-Whitaker-Haywood House, and Cascine Plantation. Specifically, NCDOT shall not acquire any right-of-way or easements from these historic properties, and shall use landscaping measures along the properties' right-of-ways (with the exception of the Cascine Plantation), shall provide reasonable access to the property owners.

Culverts

p) All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the pipe will be buried at least one foot below the bed of the stream unless burial would be impractical and the Corps of Engineers has waived this requirement. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands or streambeds or banks, adjacent to, upstream or downstream of the structures. In order to allow for the continued movement of bed load and aquatic organisms, existing stream channel widths and depths will be maintained at the inlet and outlet ends of culverts. Riprap armoring of streams at culvert inlets and outlets shall be minimized above the ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted, woody plants.

SPECIAL CONDITIONS - Action ID. 2008-01316; NORTH CAROLINA DEPARTMENT OF TRANSPORTATION/TIP R-2814)

Preconstruction Meeting

q) The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Raleigh Regulatory Field Office, 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 USACE, Raleigh Regulatory Field Office, 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 preconstruction meeting for a time when the USACE 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 thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting.

Borrow And Waste

r) 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 provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as the permittee has that information. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any streams or wetlands. All jurisdictional wetland lines on borrow and waste sites shall be verified by the Corps of Engineers and shown on the approved reclamation plans. The permittee shall ensure that all such areas comply with Condition b) 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 Condition b). All information will be available to the USACE upon request. The permittee 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.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION/ TIP R-2814	File Number: 2008-01316	Date: June 24, 2009
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
X	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I – The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION

If you have questions regarding this decision and/or the appeal process you may contact: Ms. Jean Manuele U.S. Army Corps of Engineers, Wilmington District Raleigh Regulatory Field Office 3331 Heritage Trade Drive, Suite 105 Wake Forest, North Carolina 27587	If you only have questions regarding the appeal process you may also contact: Mr. Michael Bell Administrative Appeal Review Officer CESAD-ET-CO-R U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 9M15 Atlanta, Georgia 30303-8801

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

DIVISION ENGINEER:
Commander
U.S. Army Engineer Division, South Atlantic
60 Forsyth Street, Room 9M15
Atlanta, Georgia 30303-3490

COPY

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

June 16, 2009

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

Subject: REVISED 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS for Proposed improvements to US 401 in Wake County, Federal Aid Project No. STP-401(4), State Project No. 81403001, TIP No. R-2814 (A&B). NCDWQ Project No. 20090104 ver.1.

Dear Dr. Thorpe:

Attached hereto is a copy of the Revised Certification No. 3790 issued to The North Carolina Department of Transportation (NCDOT) dated June 16, 2009

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

Sincerely,

for Coleen H. Sullins
Director

Attachments

cc: Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
Chris Murray, Division 5 Environmental Officer
Rachelle Beauregard, NCDOT NEU
LeiLani Paugh, NCDOT PDEA
File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: http://h2o.enr.state.nc.us/ncwetlands/

Revised 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT with ADDITIONAL CONDITIONS

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 (NCDWQ) Regulations in 15 NCAC 2H .0500, 15A NCAC 2B.0233 and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000. This certification authorizes the NCDOT to impact 2.82 acres of jurisdictional wetlands, 1.58 acres of isolated wetlands, 3,782 linear feet of jurisdictional streams and 488,260 square feet of protected riparian buffers in Wake County. The project shall be constructed pursuant to the application dated received February 2, 2009. The authorized impacts are as described below:

Section A Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Bank Stabilization to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	69	0	6	0	0	0	75	0
3	148	0	12	0	0	0	160	0
4	0	0	0	376	32	16	424	376
5	111	0	0	0	0	0	111	0
6	95	31	0	0	0	0	126	0
7	0	0	0	185	13	14	212	185
Total	**423**	**31**	**18**	**561**	**45**	**30**	**1108**	**561**

Total Section A Stream Impact for Project: 1,108 linear feet

Preliminary Section B Stream Impacts in the Neuse River Basin*

Site	Permanent Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	281	0	281	0
4	0	115	115	0
6	0	22	22	0
7	0	495	495	495
8	0	518	518	518
9	0	626	626	0
11	0	22	22	0
12	258	0	258	0
16	0	337	337	337
Total	**539**	**2135**	**2674**	**1350**

Total Preliminary Section B Stream Impact for Project: 2,674 linear feet

**Phased Project: impacts for this section are preliminary and will be modified (including possible temporary impacts) in future certifications prior to construction of this section.*

Section A Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Temporary Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)	Mitigation Ratio	Wetland Mitigation Required (ac)
1	0.01	0.01	0	0	0.02	1:1	0.01
2	< 0.01	0	0.01	< 0.01	0.02	1:1	0.02
3	0.03	0	0	0	0.03	1:1	0.03
4	0.01	0	0	0	0.01	1.1	0.01
6	0.08	0	0	0	0.08	2:1	0.16
Total	**< 0.14**	**0.01**	**0.01**	**< 0.01**	**0.16**		**0.23**

Total Section A Wetland Impact for Project: 0.16 acres.

Preliminary Section B Wetland Impacts in the Neuse River Basin *

Site	Permanent Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)	Mitigation Ratio	Wetland Mitigation Required (ac)
2	0.17	0	0.03	0.20	1:1	0.20
3	0.21	0	0.05	0.26	1:1	0.26
4	0.24	0	0.02	0.26	1:1	0.26
7	0.64	0.10	0.15	0.89	1:1	0.89
13	0.19	0	0	0.19	2:1	0.38
14	0.34	0	0.14	0.48	2:1	0.96
17	0.38	0	0	0.38	1:1	0.38
Total	**2.17**	**0.10**	**0.39**	**2.66**		**3.33**

Total Preliminary Section B Wetland Impact for Project: 2.66 acres.

**Phased Project: impacts for this section are preliminary and will be modified (including possible temporary impacts) in future certifications prior to construction of this section.*

Preliminary Section B Isolated Wetland Impacts in the Neuse River Basin *

Site	Permanent Fill (ac)	Total Wetland Impact (ac)	Mitigation Ratio	Wetland Mitigation Required (ac)
15	1.58	1.58	1:1	1.58
Total	**1.58**	**1.58**		**1.58**

Total Preliminary Section B Isolated Wetland Impact for Project: 1.58 acres.

**Phased Project: impacts for this section are preliminary and will be modified (including possible temporary impacts) in future certifications prior to construction of this section.*

Open Water (Ponds) Impacts in the Neuse River Basin

Section / Site	Fill in Open Waters (ac)
A / 6	0.01
*B / 9	1.25
*B / 11	7.29
Total	**8.55**

Total Open Water Impact for Project: 8.55 acres.

**Phased Project: impacts for Section B are preliminary and will be modified (including possible temporary impacts) in future certifications prior to construction of this section.*

Section A Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)	Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
1	23783	174	23609	70827	14893	0	14893	22340
2	6809	2918	3891	N/A	6357	0	6357	N/A
3	28137	0	28137	84411	10592	0	10592	15888
4	8999	0	8999	26997	5662	0	5662	8493
Totals	**67728**	**3092**	**64636**	**182235**	**37504**	**0**	**37504**	**46721**

* n/a = Total for Site is less than 1/3 acre and 150 linear feet of impact, no mitigation required

Total Section A Buffer Impact for Project: 105,232 square feet.

Preliminary Section B Neuse Riparian Buffer Impacts*

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)	Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
1	16659	0	16659	49977	10795	0	10795	16193
2	0	0	0	0	308	78	230	345
5	24014	4830	19184	57552	6146	1192	4954	7431
6	506	0	506	N/A	0	0	0	N/A
7	33763	28915	4848	14544	16966	8416	8550	12825
8	28103	0	28103	84309	15151	0	15151	22727
9	54775	0	54775	164325	31813	0	31813	47719
10	3169	0	3169	9507	5385	0	5385	8077
11	23441	0	23441	70323	13334	0	13334	20001
12	18124	0	18124	54372	15041	0	15041	22562
15	19154	16637	2517	7551	15890	8113	7777	11665
16	19130	0	19130	57390	11361	45	11316	16974
Totals	**240838**	**50382**	**190456**	**569850**	**142190**	**17844**	**124346**	**186519**

* n/a = Total for road crossing site is less than 1/3 acre and 150 linear feet of impact, no mitigation required

Total Preliminary Section B Buffer Impact for Project: 383,028 square feet.

**Phased Project: impacts for this section are preliminary and will be modified (including possible temporary impacts) in future certifications prior to construction of this section.*

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

This approval is only valid for the purpose and design that you submitted in your application dated received February 2, 2009. Should your project change, you are required to notify the NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 02B.0233(6). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit. <u>This certification replaces the one issued on April 23, 2009</u>.

* **Conditions of Certification:**

1. When final design plans are completed for R-2814 Section B, and any future sections, a modification to the 401 Water Quality Certification and the Neuse River Riparian Buffer Certification shall be submitted with five copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-2814 Section B, or any future sections, shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification and the Neuse River Riparian Buffer Authorization from the NC Division of Water Quality.

* 2. Compensatory mitigation for 1,911 linear feet of impact to perennial streams is required. We understand that you have chosen to debit mitigation from the Marks Creek Mitigation Bank. This certification gives approval to the debiting of 1,911 linear feet of stream mitigation from the Marks Creek Mitigation Site in order to satisfy the stream mitigation requirements of R-2814 A and B.

* 3. Compensatory mitigation for impacts to jurisdictional and isolated wetlands is required. The mitigation requirement includes 3.56 acres of jurisdictional wetlands and 1.58 acres of isolated wetlands. We understand that you have chosen to debit mitigation from the Jefferey's Warehouse Mitigation Bank. This certification gives approval to debiting following wetland acres from the Jefferey's Warehouse Mitigation Site in order to satisfy the wetland mitigation requirements of R-2814 A and B:

Riverine Wetland Restoration: 2.62 acres
Non-Riverine Wetland Restoration: 1.77 acres
Riverine Wetland Preservation: 3.75 acres (0.75 acres times 5:1 preservation ratio)

* 4. Compensatory mitigation for impacts to Neuse Riparian Buffers is required. The mitigation requirement includes 752,085 square feet of Zone 1 Buffers and 233,240 square feet of Zone 2 Buffers. We understand that you have chosen to debit mitigation from the Wiggins Mill Mitigation Bank. This certification gives approval to the debiting of 985,325 square feet of Neuse Buffer from the Wiggins Mill Mitigation Site in order to satisfy the wetland mitigation requirements of R-2814 A and B.

* 5. A copy of the final construction drawings shall be furnished to NCDWQ Central Office prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated received February 2, 2009. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality.

6. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species. The permittee shall observe any natural channel re-establishment, or utilize natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the dramed pond remains stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond.

7. Placement of culverts and other structures in waters, streams, and wetlands shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.

8. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

9. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

10. For all streams being impacted due to site dewatering activties, the site shall be graded to its preconstruction contours and revegetated with appropriate native species.

11. For project sites impacting waters classified by the NC Environmental Management Commission as High Quality Waters (HQW), or Water Supply I or II (WSI, WSII), (i.e., Cedar Fork Creek, Perry Creek, and their tributaries in Section B), stormwater shall be directed to vegetated buffer areas, grass-lined ditches or other means appropriate to the site for the purpose of pre-treating storm water runoff prior to discharging directly into streams. Mowing of existing vegetated buffers is strongly discouraged.

12. The permittee shall use */Design Standards in Sensitive Watersheds/* [15A NCAC 4B.0124(a)-(e)] in areas draining to WS-II HQW waters (i.e., Cedar Fork Creek, Perry Creek and their tributaries in Section B). Temporary cover (wheat, millet, or similar annual grain) or permanent herbaceous cover shall be planted on all bare soil within 15 business days of ground disturbing activities to provide erosion control. Coir fiber matting shall be used in conjunction with appropriate seeding on disturbed soils involving steep slopes in riparian areas, and should be secured in place with staples and wherever possible include installation of live stakes of native trees.

Straw mulch and tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian zones. Coir fiber matting shall be used in conjunction with appropriate seeding for the establishment of permanent herbaceous cover on disturbed soils within the riparian area. Hydro seeding along with wood or cellulose based hydro mulch applied from a fertilizer and limestone free tank is allowable at the appropriate rate for the establishment of temporary groundcover within riparian zones. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters is prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

13. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

14. Pursuant to NCAC15A 2B.0233(6), sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by NCDWQ. At this time, NCDWQ has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

15. All stormwater runoff shall be directed as sheetflow through stream buffers at nonerosive velocities, unless otherwise approved by this certification.

16. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.

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

18. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.

19. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.

* 20. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.

21. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.

22. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.

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

24. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.

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

26. The permittee 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 and Federal law. If NCDWQ 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, NCDWQ may reevaluate and modify this certification.

27. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification..

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

29. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.

30. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

31. The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery.

* 32. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWQ when all work included in the 401 Certification has been completed.

33. Native woody riparian vegetation (i.e., trees and shrubs native to your geographic region) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

34. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

35. 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 waters standards:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with 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.

36. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

4.0 CONSERVATION MEASURES

The potential direct effects that could result from the construction of the US 401 Widening/Rolesville Bypass will likely be averted by NCDOT by implementing several conservation measures. Conservation measures include those measures that are taken to avoid and or minimize effects to the DWM as a result of project construction.

The following measures were discussed and agreed upon by NCDOT and USFWS on May 4, 2005. Construction-related Environmental Commitments that will minimize the likelihood of direct effects to the DWM will be implemented regardless of the conservation option chosen. These include:

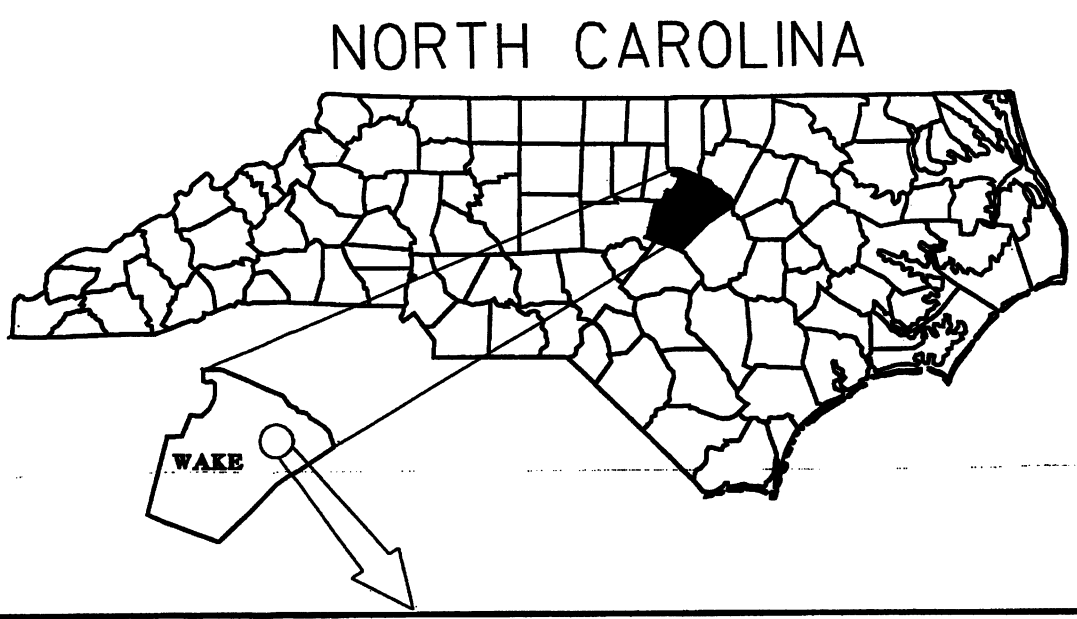
- Clearing of riparian areas will be minimized to the fullest extent practical to reduce direct effects to the species.
- The use of HQW erosion control standards or other erosion control standards approved by USFWS throughout the construction process in all areas within the project right-of-way that are located in the Little River, Crooked Creek and Cedar Creek watersheds.
- As project design information becomes available for Section C and Section D of R-2814, NCDOT will provide written notice of this information to the USFWS (Raleigh Field Office) and the NCWRC non-game and protected species program.
- NCDOT will schedule meetings and/or field meetings to discuss these design plans in order to develop specific methods to avoid/minimize direct effects to Little River, Crooked Creek, and Cedar Creek.
- NCDOT will conduct an interim mussel survey/instream habitat evaluation at the Crooked Creek and Little River survey locations (Section C), and at the Cedar Creek survey location (Section D) after Let Dates have been established for each of these sections.
- The final pre-construction mussel surveys/instream habitat evaluations will be conducted in the project footprint and immediately downstream for Crooked Creek and Little River (Section C) and Cedar Creek (Section D) before these sections are let for construction.

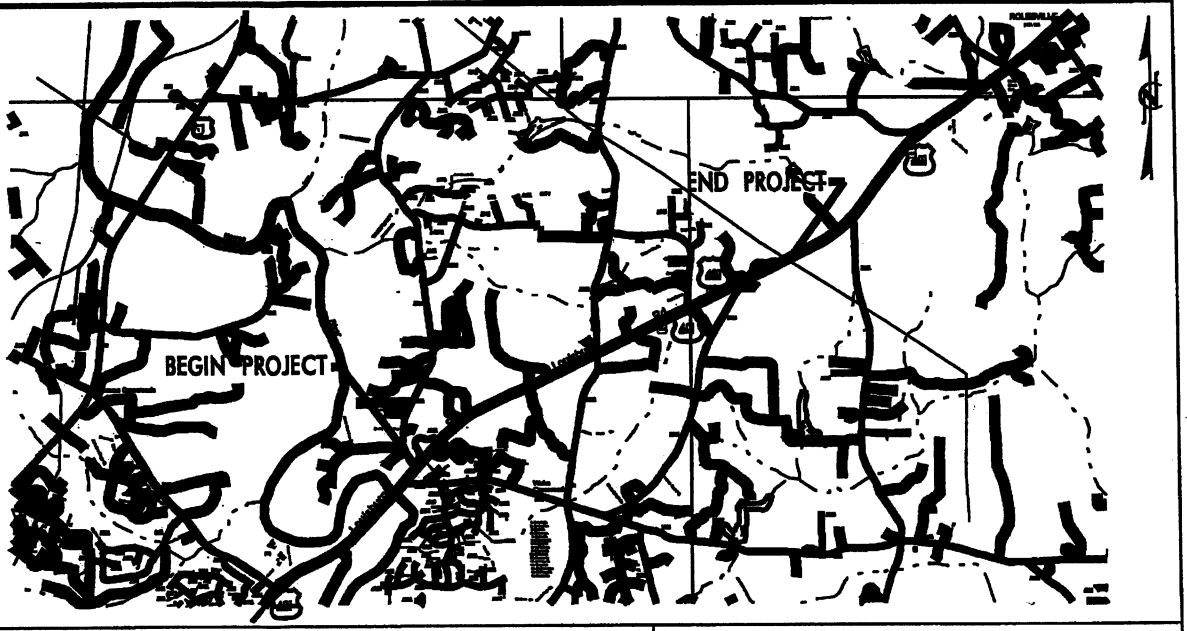
Summary of Sediment and Erosion Control Measures used to protect DWM

- The NCDOT recognizes the importance of minimizing the effects to the endangered species located downstream in the streams crossed by this project. The Department will implement BMP's that meet or exceed the current practices and regulations that mandate environmental protection (NCDOT 2003).

- The North Carolina Sedimentation Pollution Control Act of 1973 requires 15 working days or 30 calendar days to stabilize erodible areas once grading has been completed. The Department will strictly adhere to these guidelines.

- Sections of this project are located in the Neuse River Basin and others in the Tar-Pamlico River Basin. Both of these river basins have buffer rules that were designed to restrict activities occurring in and near riparian areas of the streams within these two basins. Adherence to these regulations will further insure sediment and erosion control during the construction of this project.





WETLAND VICINITY MAP

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814A)
US 401
LOUISBURG ROAD FROM SR 2044 TO SR 2226

SHEET 1 OF 15 11/20/08

PROPERTY OWNER

NAME AND ADDRESS

OWNER'S NAME	ADDRESS
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION	4948 WINDY HILL DRIVE RALEIGH, NC 27609
ALDRED LEE PERRY	4105 LOUISBURY ROAD WAKE FOREST, NC 27587
BRIGHTON COMMUNITY ASSOCIATION	1100 NAVAHO DRIVE, SUITE GL3 RALEIGH, NC 27609
VBBSS GROUP, LLC	4960 ROYAL ADELAIDE WAY RALEIGH, NC 27604
PERRY FARM, LLC	404 EMERSON DRIVE RALEIGH, NC 27609
HT FORESTVILLE, LLC	135 SOUTH MAIN STREET, SUITE 105 GREENVILLE, SC 29601

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814A)
US 401
LOUISBURG ROAD FROM
SR 2044 TO SR 2226
SHEET 2 OF 15 04/07/08

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No	Station (From/To)	Structure Size / Type	Fill In Wetlands (ha)	Temp Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Hand Clearing in Wetlands (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (m)	Existing Channel Impacted (m)	Natural Stream Design (m)
1	-L- 12+35 RT	450 mm RCP	0.004	0.029				0.007			23	
2	-L- 12+80 RT	1.0 m Lateral Base Ditch	0.018		0.003	0.017						
3	-L- 15+90 RT to	900 mm RCP	0.010					0.182		7.140	49	
	-L- 16+05 RT											
4	-L-19+10 LT	1200 mm RCP	0.002					0.018		9.900	119	
5	-L- 19+10	900 mm RCP						0.005			37	
6	-L-32+60	900 mm RCP outfall pipe	0.033					0.004	0.004	9.500	29	
	to -L- 33+90	and Pond *										
7	-L-35+80	1050 mm RCP						0.016		4.000	61	
	to -L- 36+50											
TOTALS:			0.068	0.029	0.003	0.017		0.234	0.004	30.540	317.510	0.000

* Temporarily Draining Pond to Install rock fill

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT 34506.1.1 R-2814A

Sheet 3 of 15 11/20/2008

Form Revised 3/22/01

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Hand Clearing In Wetlands (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp Fill In SW (ft)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	-L- 12+35 RT	18" RCP	0.01	0.01				0.02			69	
1	-L- 12+35 RT	Stream Bank Stablization									6	
2	-L- 12+80 RT	3 ft Lateral Base Ditch	<0.01		0.01	<0.01						
3	-L- 15+90 RT to	36" RCP	0.03					0.04			148	
	-L- 16+05 RT											
3	-L- 15+90 RT to	Stream Bank Stablization									12	
	-L- 16+05 RT											
4	-L-19+10 LT	48" RCP	0.01					0.05		32	376	
4	-L 19+10 LT	Stream Bank Stablization									16	
5	-L- 19+10	Pavement						0.01			111	
6	-L-32+60	36" mm RCP outfall pipe	0.08					0.01	0.01	31	95	
	to -L- 33+90	and Pond										
7	-L-35+80	42" RCP						0.04		13	185	
	to -L- 36+50											
7	-L-35+80	Stream Bank Stablization									14	
	to -L- 36+50											
TOTALS:			<0.13	0.01	0.01	<0.01	0.00	0.16	0.01	76	1032	

Form Revised 3/22/01

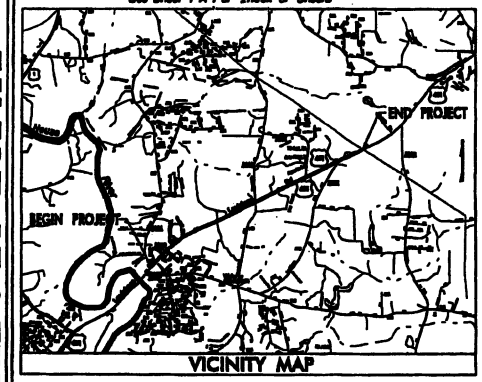
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT 34506.1.1 R-2814A

Sheet 4 of 15 11/20/2008

CONTRACT:

TIP: R-2814A



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

RECEIVED
JAN 30 2009
Regulatory Branch

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814A	1	
34604.1.1	STP-401(4)	P.E.	

LOCATION: US 401 FROM SR 2044 (LIGON MILL ROAD) TO SOUTH OF SR 2226 (JONESVILLE ROAD)

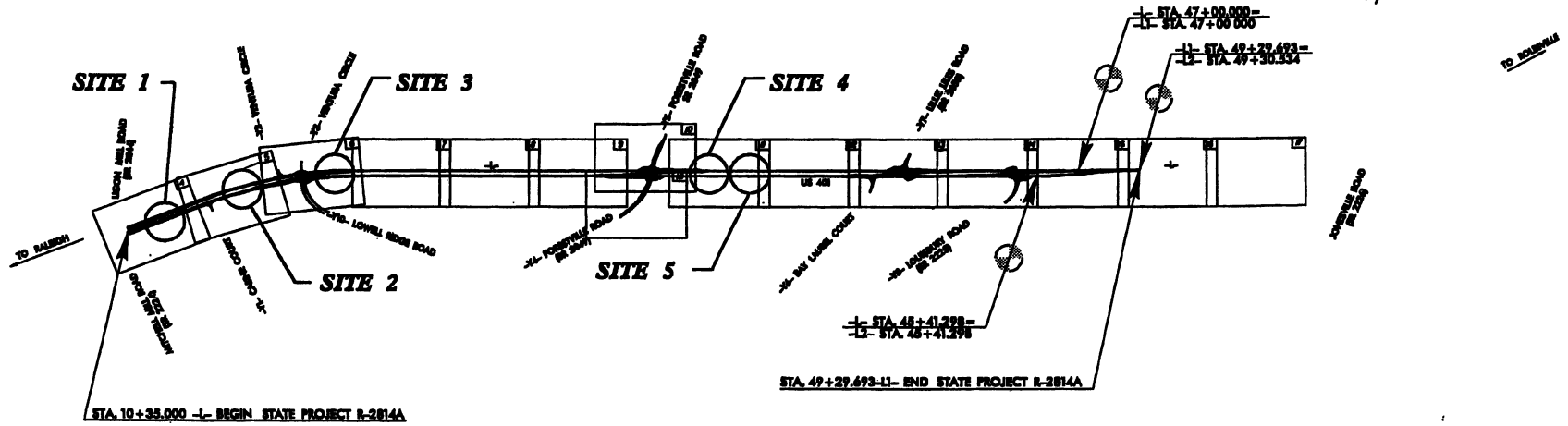
2008-0136

Permit Drawing Sheet 5 of 15

TYPE OF WORK: GRADING, DRAINAGE AND PAVING

R-2814A: STREAM & WETLAND SITE MAP

NAD 83



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___

NOTE: THIS IS A PARTIALLY CONTROLLED ACCESS PROJECT WITH ACCESS POINTS SHOWN ON THE PLANS

NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

GRAPHIC SCALES

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2005 = 16,200
ADT 2030 = 28,100
DHV = 13 %
D = 55 %
T = 7 % *
V = 100 km/h

* TTST 2 % DUAL 5 %

PROJECT LENGTH

LENGTH ROADWAY F. A. PROJECT STP-401(4) = 3.895km

TOTAL LENGTH TIP PROJECT R-2814A = 3.895km

Prepared in the Office of:
[redacted]
for the North Carolina Department of Transportation

RIGHT OF WAY DATE: July 21, 2006

LETTING DATE: March 17, 2009

J. S. GOODNIGHT, P.E.
Project Engineer

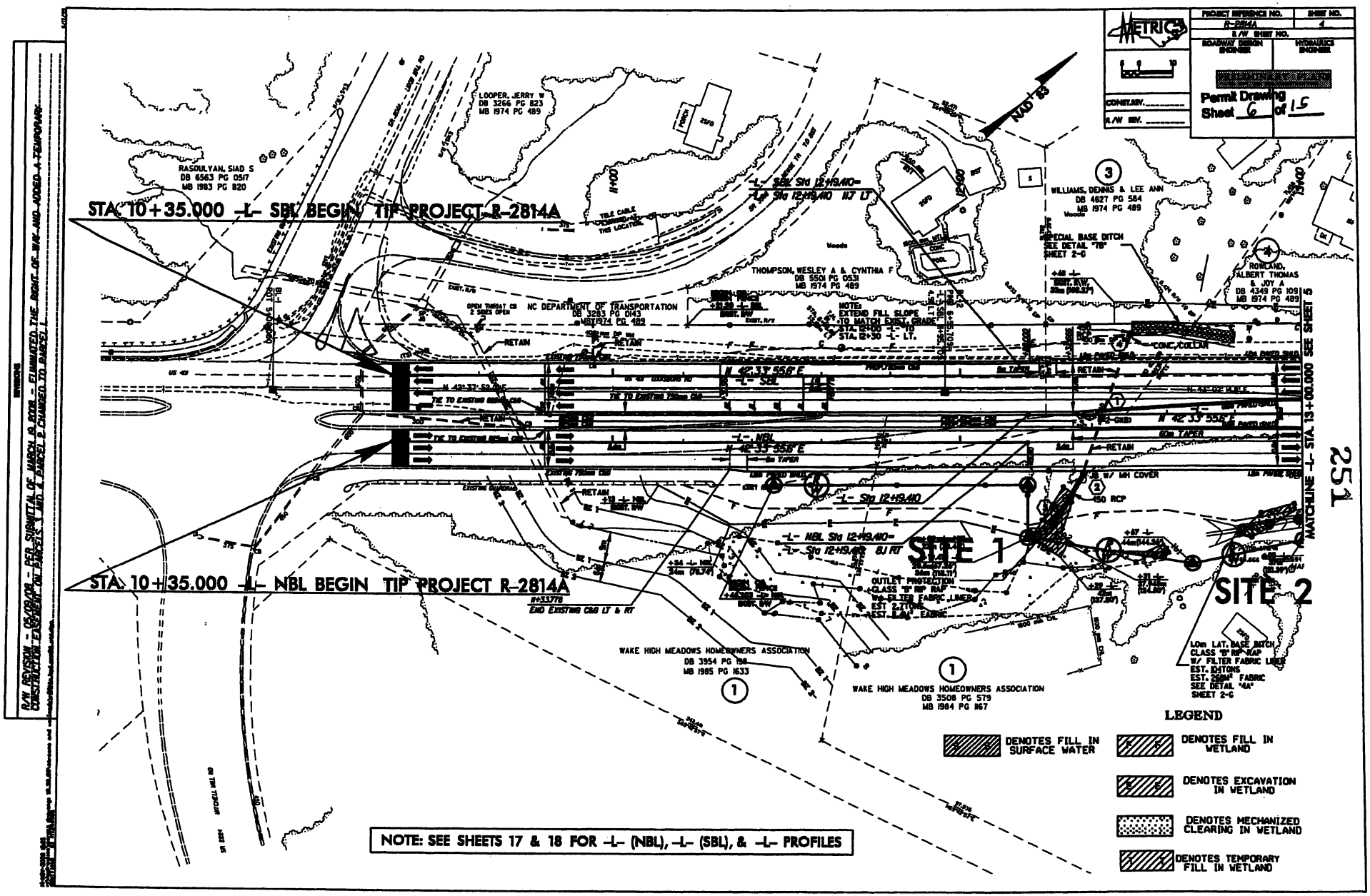
MARK HUSSEY
Project Design Engineer

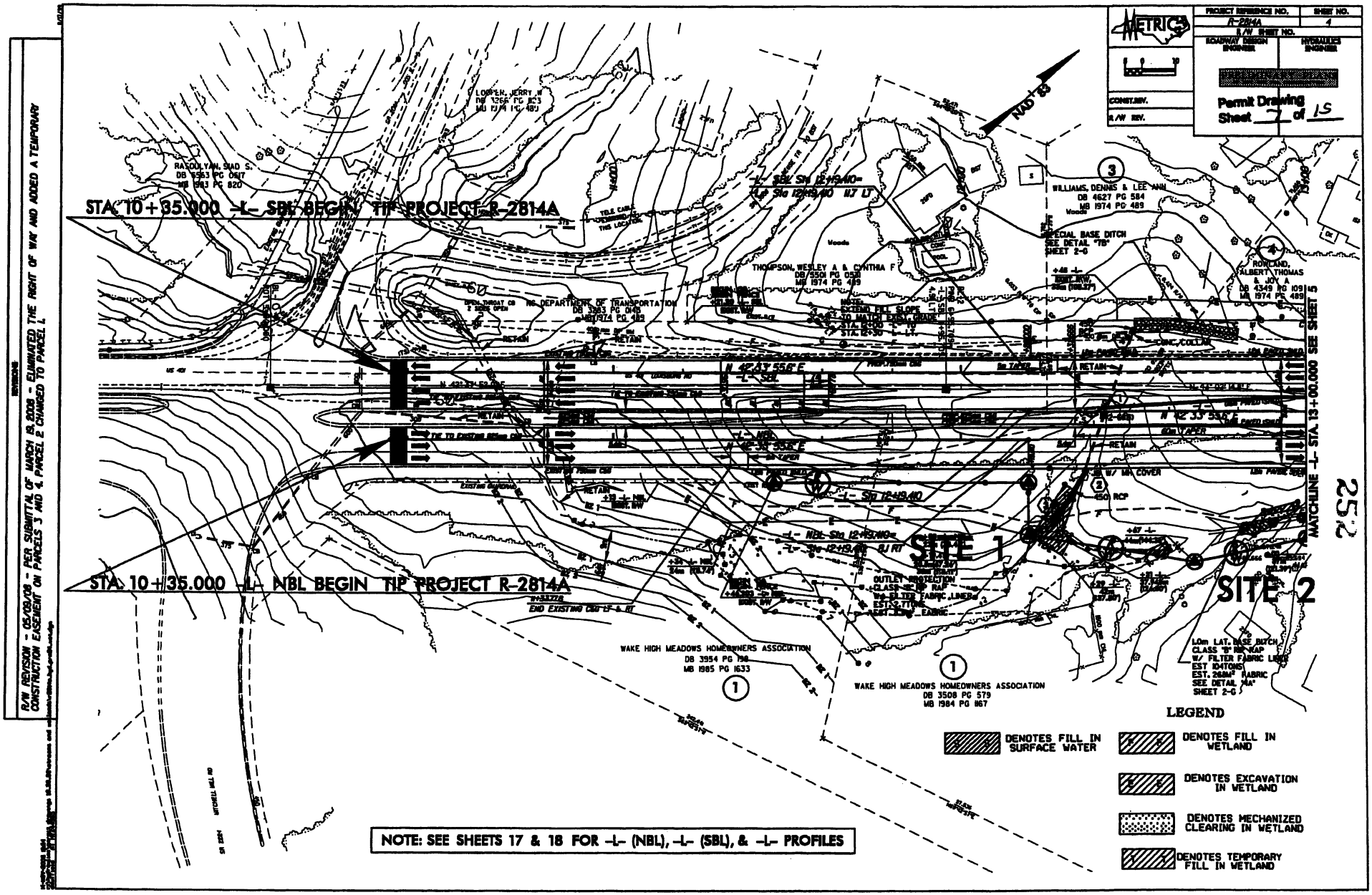
HYDRAULICS ENGINEER
P.E.

ROADWAY DESIGN ENGINEER
P.E.

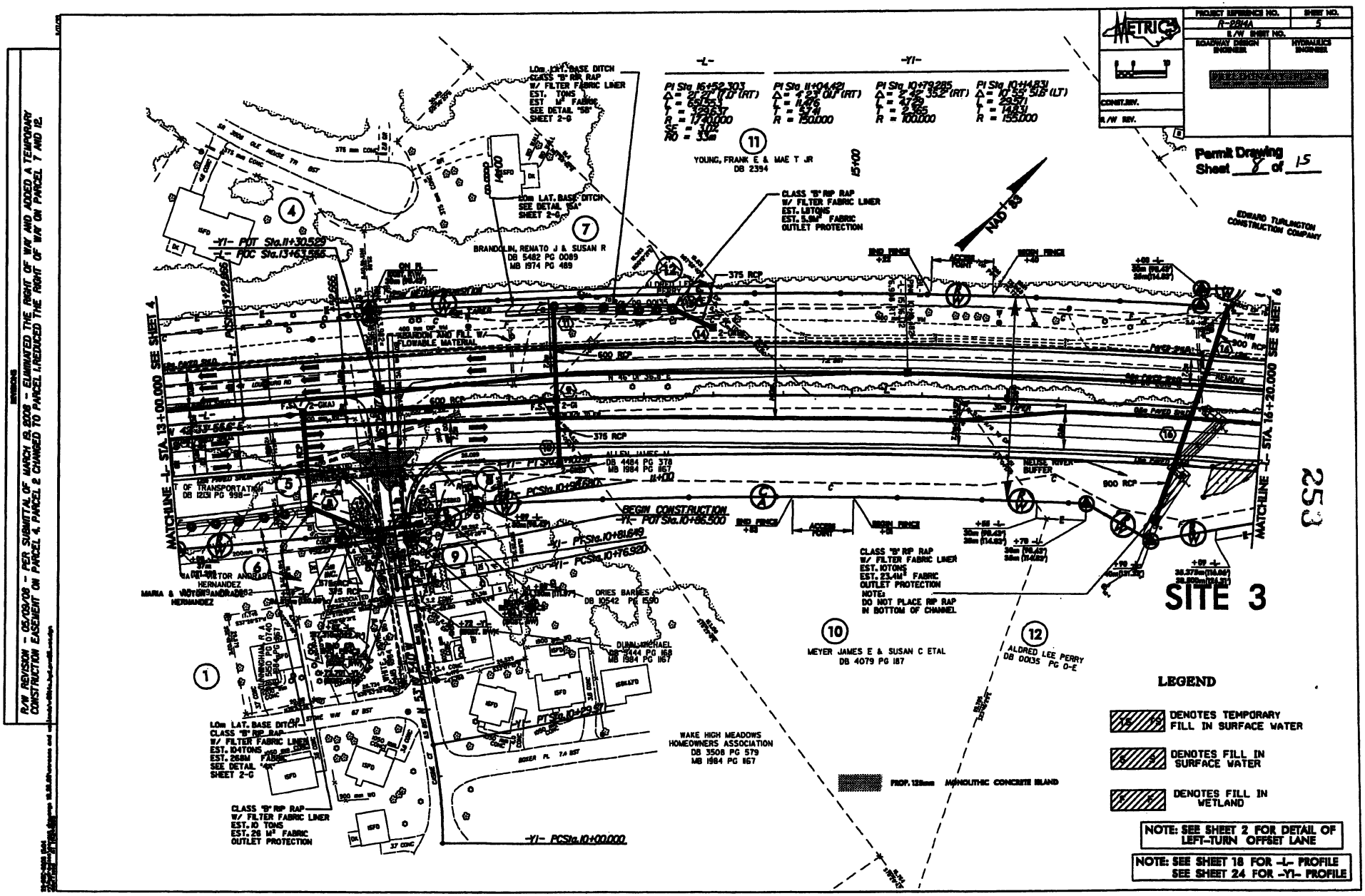
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
P.E.
State Highway Design Engineer

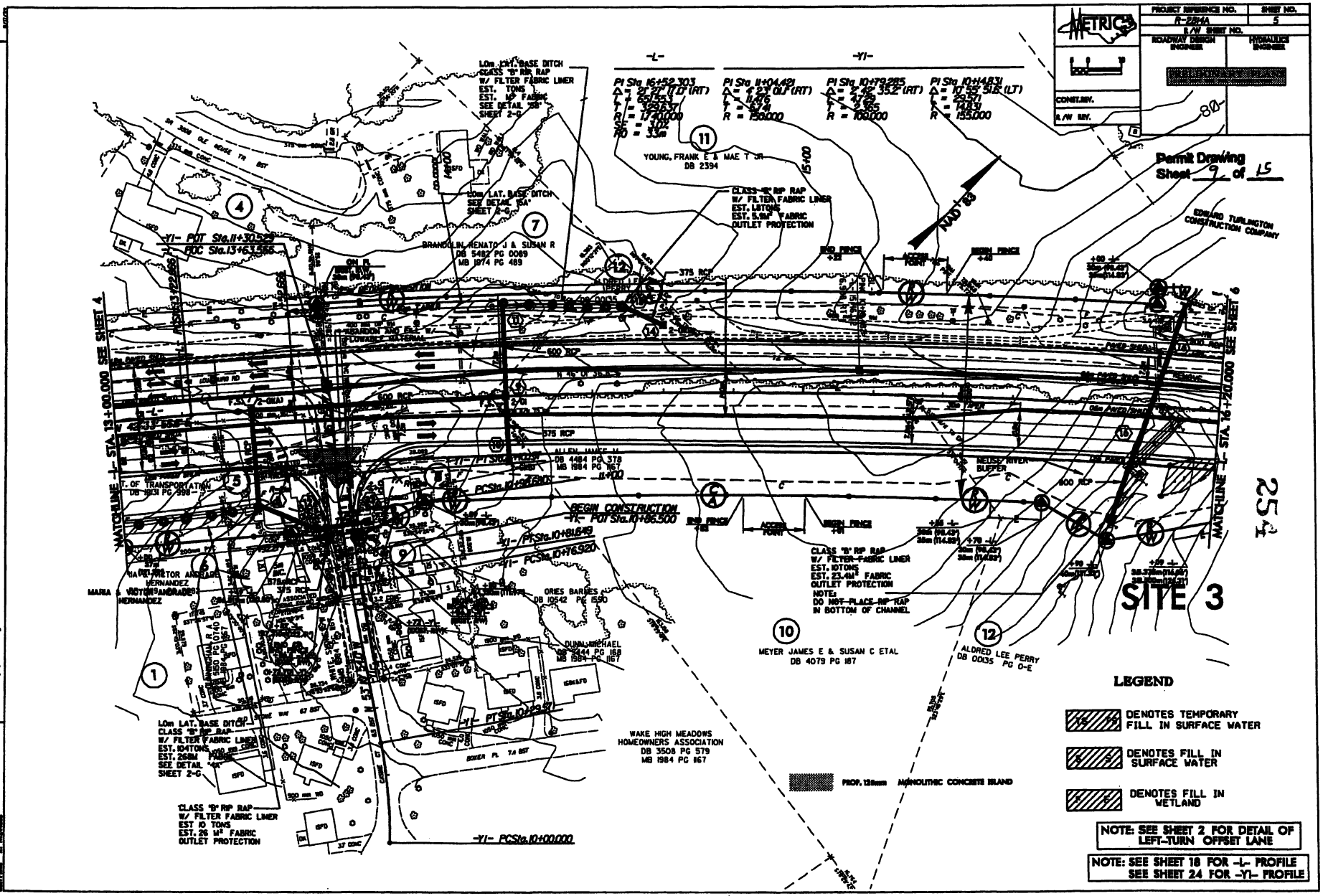
[redacted]


STA. 10+35.000 -L- SBL BEGIN TIP PROJECT R-2814A
STA. 10+35.000 -L- NBL BEGIN TIP PROJECT R-2814A
SITE 1
SITE 2
LOOPER, JERRY W
DB 3266 PG 823
MB 1974 PG 489
RASOULYAN, SIAD S
DB 6563 PG 0517
MB 1983 PG 820
THOMPSON, WESLEY A & CYNTHIA F
DB 5504 PG 0631
MB 1974 PG 489
NC DEPARTMENT OF TRANSPORTATION
DB 3283 PG 0143
MB1/1974 PG 489
WILLIAMS, DENNIS & LEE ANN
DB 4627 PG 584
MB 1974 PG 489
ROWLAND, ALBERT THOMAS & JOY A
DB 4349 PG 109
MB 1974 PG 489
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION
DB 3954 PG 198
MB 1985 PG 1633
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION
DB 3508 PG 579
MB 1984 PG 167
-L- SBL Sta 12+19.410= -L- Sta 12+19.410 117 LT
-L- NBL Sta 12+19.410= -L- Sta 12+19.410 83 RT
NOTE: EXTEND FILL SLOPE TO MATCH EXIST. GRADE STA. 12+00 -L- LT. STA. 12+30 -L- LT.
SPECIAL BASE DITCH SEE DETAIL "7B" SHEET 2-G
OUTLET PROTECTION CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 2 TONS EST. 25m² FABRIC
10m LAT. BASE DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 1 TONS EST. 25m² FABRIC SEE DETAIL "4A" SHEET 2-G
MATCHLINE -L- STA. 13+00.000 SEE SHEET 5
NAD 83
LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND
NOTE: SEE SHEETS 17 & 18 FOR -L- (NBL), -L- (SBL), & -L- PROFILES
METRIC
PROJECT REFERENCE NO. R-2814A
SHEET NO. 1
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
Permit Drawing Sheet 6 of 15
R/W REVISION - 05/30/08 - PER SUBMITTAL OF MARCH 19, 2008 - ELIMINATED THE RIGHT-OF-WAY ADDED A TEMPORARY CONSTRUCTION EASEMENT ON SHEET 1 AND 2, PARCEL 2 CHANGED TO PARCEL 1
REVISIONS

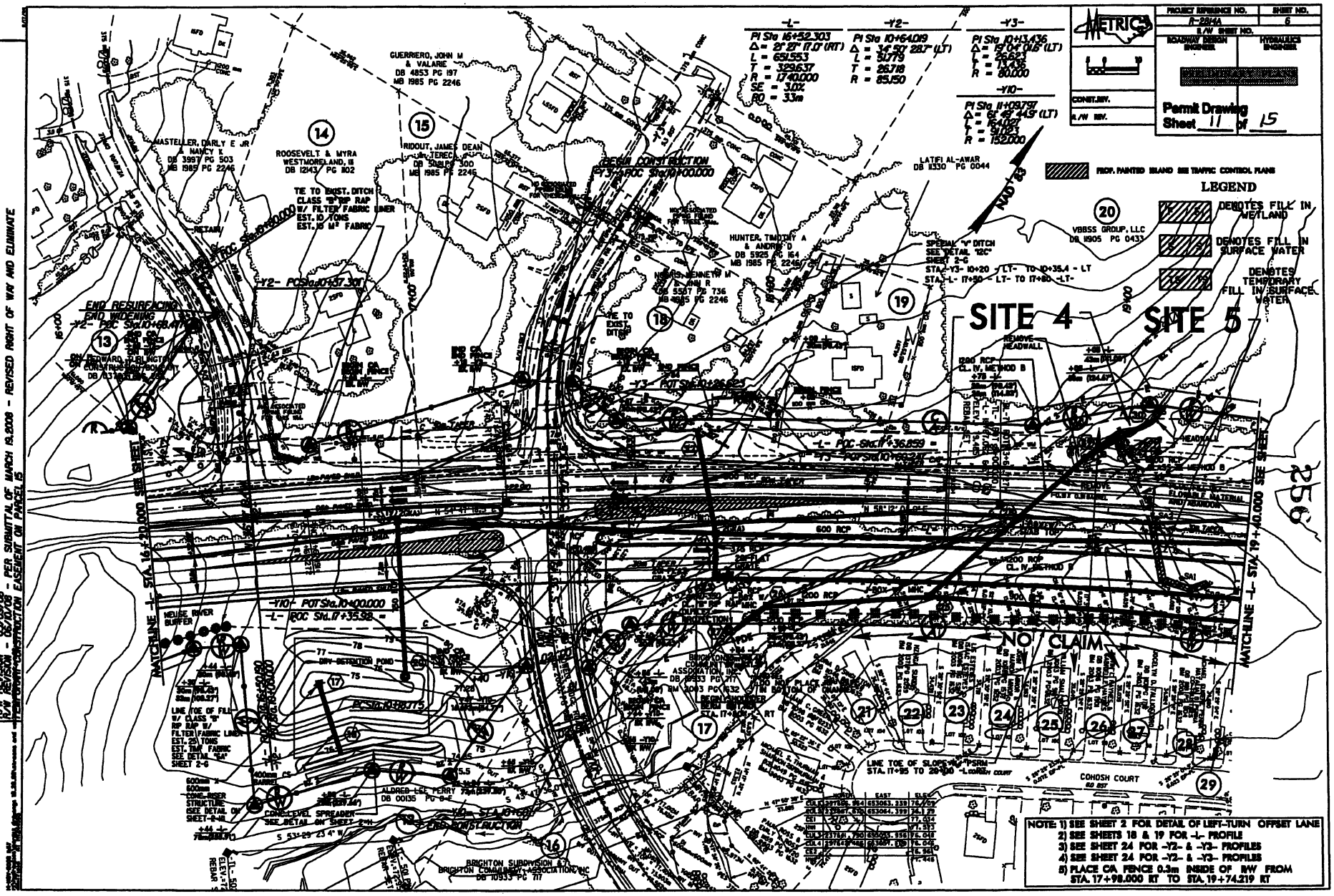

STA. 10+35.000 -L- SBL BEGIN TIP PROJECT R-2814A
STA. 10+35.000 -L- NBL BEGIN TIP PROJECT R-2814A
SITE 1
SITE 2
NAD '83
PROJECT REFERENCE NO. R-2814A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
Permit Drawing
Sheet 2 of 15
R/W REVISION - 05/09/08 - PER SUBMITTAL OF MARCH 19, 2008 - ELIMINATED THE RIGHT OF WAY AND ADDED A TEMPORARY CONSTRUCTION EASEMENT ON PARCELS 3 AND 4, PARCEL 2 CHANGED TO PARCEL L
REVISIONS
WILLIAMS, DENNIS & LEE ANN
DB 4627 PG 584
MB 1974 PG 489
ROWLAND, ALBERT THOMAS & JOY A
DB 4349 PG 109
MB 1974 PG 489
THOMPSON, WESLEY A & CYNTHIA F
DB 9501 PG 052
MB 1974 PG 489
N.C. DEPARTMENT OF TRANSPORTATION
DB 3983 PG 0145
MB 1974 PG 489
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION
DB 3954 PG 198
MB 1985 PG 1633
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION
DB 3508 PG 579
MB 1984 PG 867
SPECIAL BASE DITCH SEE DETAIL "7B" SHEET 2-G
10m LAT. BASE DITCH CLASS "B" RIP-RAP W/ FILTER FABRIC LINER EST. 104TONS, EST. 26Sm² FABRIC SEE DETAIL "AA" SHEET 2-G
OUTLET PROTECTION CLASS "B" RIP-RAP W/ FILTER FABRIC LINER EST. 17TONS, EST. 5Sm² FABRIC
450 RCP
W/ MIN. COVER
SEE SHEET 5
LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND
NOTE: SEE SHEETS 17 & 18 FOR -L- (NBL), -L- (SBL), & -L- PROFILES

252

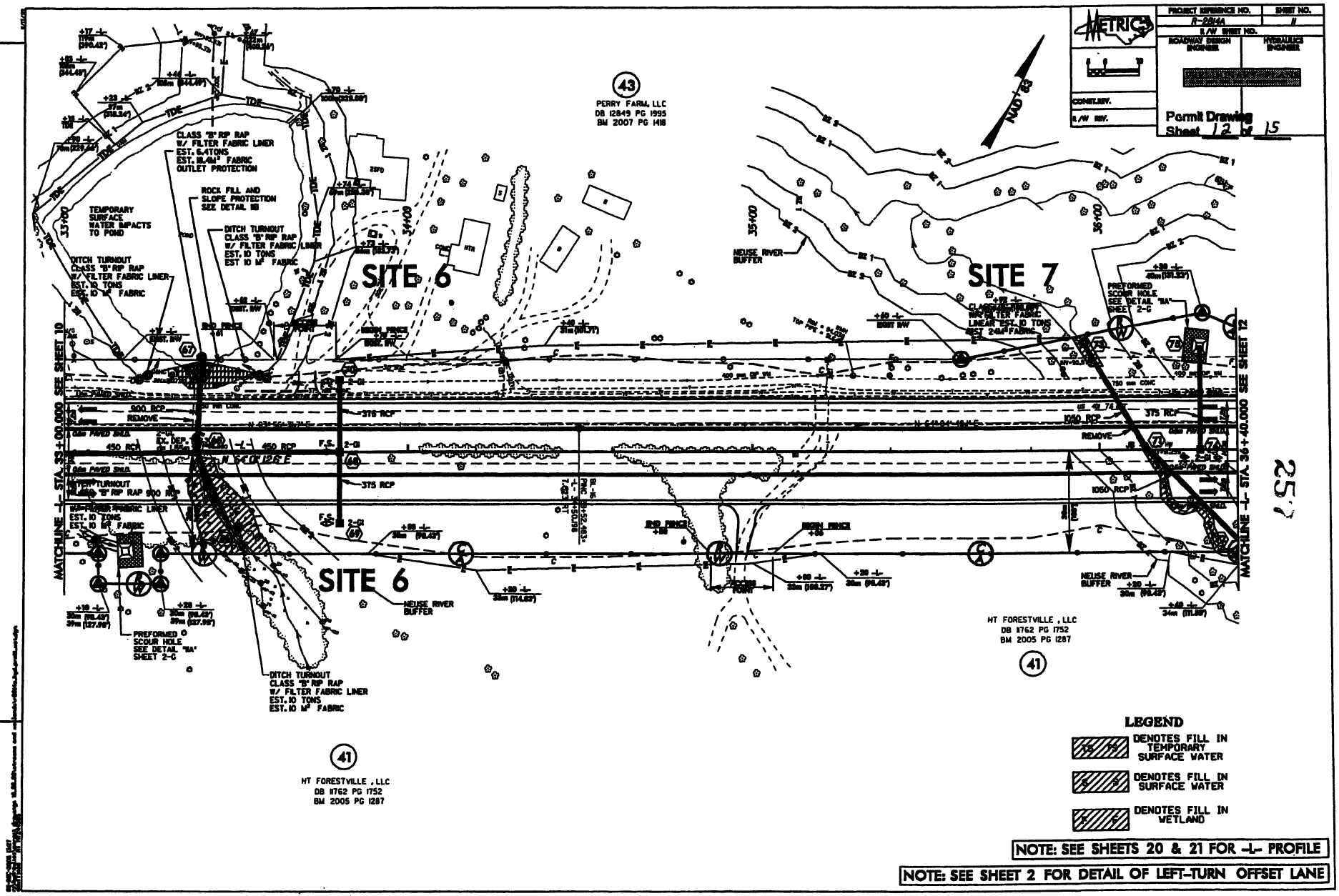

METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
Permit Drawing Sheet 8 of 15
EDWARD TURLINGTON CONSTRUCTION COMPANY
NAD '83
R/W REVISION - 05/09/08 - PER SUBMITTAL OF MARCH 19, 2008 - ELIMINATED THE RIGHT OF WAY AND ADDED A TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 4, PARCEL 2 CHANGED TO PARCEL 1, REDUCED THE RIGHT OF WAY ON PARCEL 7 AND 12.
-L- PI Sta.16+52.303 Δ = 2°57'11" (LT) RT D = 6°15'24" L = 652.54 T = 326.37 R = 1740.000 SC = 302 TS = 33m
-Y1- PI Sta.11+04.421 Δ = 4°23'01" (RT) L = 1.426 T = 5.71 R = 150.000
PI Sta.10+79.285 Δ = 2°42'352" (RT) L = 47.29 T = 23.65 R = 100.000
PI Sta.10+48.31 Δ = 10°35'518" (LT) L = 29.57 T = 14.84 R = 155.000
-L- POT Sta.11+30.529
-L- POC Sta.13+61.566
-Y1- POT Sta.11+30.529
-Y1- POC Sta.13+61.566
MATCHLINE -L- STA 13+00.000 SEE SHEET 4
MATCHLINE -L- STA 16+20.000 SEE SHEET 6
-Y1- PCSta.10+98.500
-Y1- PTSta.10+81.649
-Y1- PCSta.10+76.920
-Y1- PTSta.10+29.97
-Y1- PCSta.10+00.000
BEGIN CONSTRUCTION
1 VICTOR ANDRADE HERNANDEZ AND MARIA & VICTOR ANDRADE HERNANDEZ
2 DEPT. OF TRANSPORTATION DB 12131 PG 998
3 ALLEN JAMES H DB 4484 PG 378 MB 1984 PG 1167
4 BRANDOLIN, RENATO J & SUSAN R DB 5482 PG 0089 MB 1974 PG 489
5 DUNN, MICHAEL MB 10444 PG 188 MB 1984 PG 1167
6 ORIES BARNES DB 10542 PG 1590
7 YOUNG, FRANK E & MAE T JR DB 2394
8 WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION DB 3508 PG 579 MB 1984 PG 1167
9 MEYER JAMES E & SUSAN C ETAL DB 4079 PG 187
10 ALDRED LEE PERRY DB 00135 PG 0-E
11 NEUSE RIVER BUFFER
12 CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10TONS EST. 23.4M² FABRIC OUTLET PROTECTION NOTE: DO NOT PLACE RIP RAP IN BOTTOM OF CHANNEL
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 28 M² FABRIC OUTLET PROTECTION
L0m LAT. BASE DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. TONS EST. M² FABRIC SEE DETAIL "5B" SHEET 2-B
L0m LAT. BASE DITCH SEE DETAIL "5A" SHEET 2-C
L0m LAT. BASE DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 101TONS EST. 268M² FABRIC SEE DETAIL "5A" SHEET 2-C
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10TONS EST. 23.4M² FABRIC OUTLET PROTECTION
"RANDOM" FILL W/ FLOWABLE MATERIAL
375 RCP
600 RCP
900 RCP
IND. FENCE
ACCESS POINT
BEGIN FENCE
PROP. 125mm MONOLITHIC CONCRETE ISLAND
SITE 3
LEGEND
DENOTES TEMPORARY FILL IN SURFACE WATER
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 18 FOR -L- PROFILE SEE SHEET 24 FOR -Y1- PROFILE
253

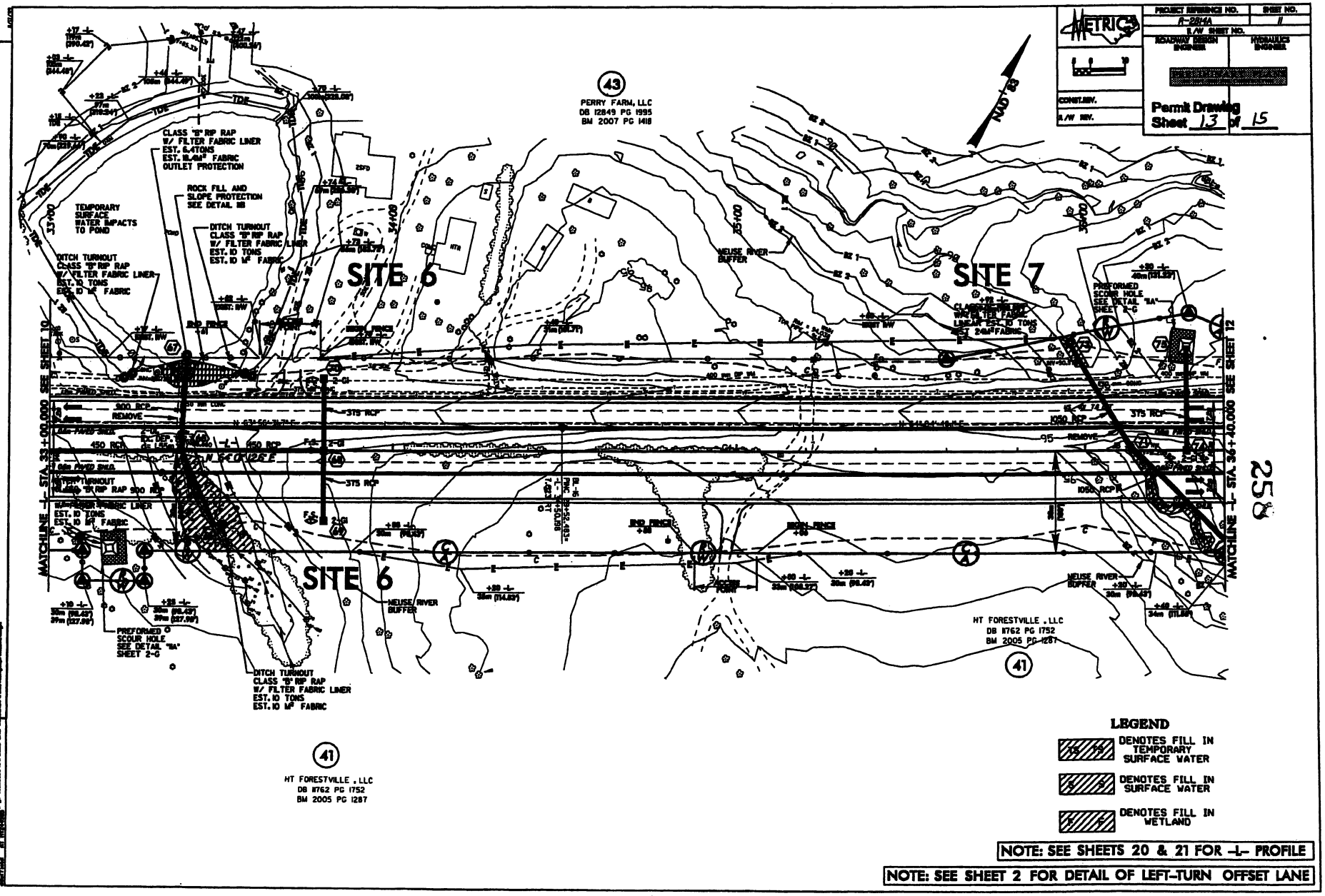

R/W REVISION - 05/09/08 - PER SUBMITTAL OF MARCH 19, 2008 - ELIMINATED THE RIGHT OF W/W AND ADDED A TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 4, PARCEL 2 CHANGED TO PARCEL 1, REDUCED THE RIGHT OF W/W ON PARCEL 7 AND 12.
REVISIONS
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.ISV.
R/W ISV.
Permit Drawing Sheet 9 of 15
-L-
-Y1-
PI Sta 16+52.703
Δ = 21°27'01.0" (RT)
D = 6°15'33"
T = 1,328.67'
R = 1,790.000'
SE = 0.02'
e0 = 3.0%
PI Sta 11+04.42
Δ = 4°27'01.0"(RT)
D = 11°46'
T = 347.9'
R = 490.000'
PI Sta 10+79.285
Δ = 2°42'35.2" (RT)
D = 4°30'
T = 237.85'
R = 1,100.000'
PI Sta 10+14.83
Δ = 10°55'51.8" (LT)
D = 4°30'
T = 1,423.71'
R = 1,550.000'
-Y1- POT Sta.11+30.529
POC Sta.13+63.586
-Y1- PCSta.10+92.680
-Y1- PTSta.10+81.849
-Y1- PCSta.10+76.520
-Y1- PTSta.10+29.197
-Y1- PCSta.10+00.000
BEGIN CONSTRUCTION
-Y1- POT Sta.10+86.500
MATCHLINE -L- STA. 13+00.000 SEE SHEET 4
MATCHLINE -L- STA. 16+20.000 SEE SHEET 6
NAD 83
YOUNG, FRANK E & MAE T JR
DB 2394
BRANDOLIN, RENATO J & SUSAN R
DB 5482 PG 0089
MB 1974 PG 489
ALLEN, JAMES H
DB 4484 PG 378
MB 1984 PG 167
DEPT. OF TRANSPORTATION
DB 1913 PG 339
HERNANDEZ, VICTOR ANDRADES & MARIA
DB 10542 PG 1590
ORES BARBIES
DB 10542 PG 1590
DUNN, MICHAEL
DB 9444 PG 169
MB 1984 PG 167
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION
DB 3508 PG 579
MB 1984 PG 167
MEYER JAMES E & SUSAN C ETAL
DB 4079 PG 187
ALORED LEE PERRY
DB 00135 PG 0-E
EDWARD TURLINGTON CONSTRUCTION COMPANY
NEUSE RIVER BUFFER
375 RCP
600 RCP
LOm LAT. BASE DITCH
CLASS "B" RIP RAP
W/ FILTER FABRIC LINER
EST. TONS
EST. M² FABRIC
SEE DETAIL "B"
SHEET 2-G
CLASS "B" RIP RAP
W/ FILTER FABRIC LINER
EST. 10 TONS
EST. 26 M² FABRIC
OUTLET PROTECTION
CLASS "B" RIP RAP
W/ FILTER FABRIC LINER
EST. 10TONS
EST. 23.4M² FABRIC
OUTLET PROTECTION
NOTE:
DO NOT PLACE RIP RAP
IN BOTTOM OF CHANNEL
PROP. 125mm MONOLITHIC CONCRETE ISLAND
SITE 3
LEGEND
DENOTES TEMPORARY FILL IN SURFACE WATER
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 24 FOR -Y1- PROFILE
254

SITE 4
SITE 5
NO CLAIM
LEGEND
DENOTES FILL IN WETLAND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY FILL IN SURFACE WATER
MATCHLINE -L- STA 19+40.000 SEE SHEET 7
MATCHLINE -L- STA 16+20.000 SEE SHEET 5
NOTE 1) SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
2) SEE SHEETS 18 & 19 FOR -L- PROFILE.
3) SEE SHEET 24 FOR -Y2- & -Y3- PROFILES
4) SEE SHEET 24 FOR -Y2- & -Y3- PROFILES
6) PLACE CA. FENCE 0.3m INSIDE OF R/W FROM STA. 17+98.000 RT TO STA. 19+74.219 RT
Permit Drawing Sheet 10 of 15
PROJECT REFERENCE NO. R-2924
R/W SHEET NO. 6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONVEYANCE
R/W REVISION -09/13/07-
R/W REVISION - 05/09/08
R/W REVISION - 06/10/08 - PER SUBMITTAL OF MARCH 18,2008 - REVISED RIGHT OF WAY AND ELIMINATE TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 15


-L-
PI Sta 16+32.303
Δ = 21° 27' 17.1" (RT)
L = 651.553
T = 329.637
R = 1740.000
SE = 3.0%
RO = 33m
-Y2-
PI Sta 10+64.019
Δ = 34° 57' 28.7" (LT)
L = 307.79
T = 157.78
R = 85.150
-Y3-
PI Sta 10+13.436
Δ = 19° 04' 08" (LT)
L = 266.63
T = 134.46
R = 80.000
-Y10-
PI Sta 11+09.797
Δ = 61° 45' 44.9" (LT)
L = 64.087
T = 34.981
R = 152.000
METRIC
PROJECT REFERENCE NO.
A-2844
SHEET NO.
6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.R/W.
R/W REV.
Permit Drawing
Sheet 11 of 15
PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
LEGEND
DENOTES FILL IN WETLAND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY FILL IN SURFACE WATER
SITE 4
SITE 5
NO CLAIM
MATCHLINE -L- STA. 16+20.000 SEE SHEET 5
MATCHLINE -L- STA. 19+40.000 SEE SHEET 7
GUERRIERO, JOHN M & VALARIE DB 4853 PG 197 MB 1985 PG 2246
MASTELLER, DARLY E JR & NANCY K DB 3997 PG 503 MB 1985 PG 2246
ROOSEVELT & MYRA WESTMORELAND, III DB 1243 PG 102
RIDOUT, JAMES DEAN & TERESA DB 5088 PG 300 MB 1985 PG 2245
LATIFI AL-AWAR DB 11330 PG 0044
VBBSS GROUP, LLC DB 11905 PG 0433
HUNTER, TIMOTHY A & ANDREA D DB 5925 PG 164 MB 1985 PG 2246
ALDRED-LEE PERRY DB 00135 PG 0-E
BRIGHTON SUBDIVISION & 2 BRIGHTON COMMUNITY ASSOCIATION INC DB 10933 PG 717
COHOSH COURT
TIE TO EXIST. DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 15 M² FABRIC
END RESURFACING END WIDENING
BEGIN CONSTRUCTION -Y3- POC Sta 10+00.000
-Y2- POC Sta 10+37.301
-Y2- POT Sta 10+64.019
-Y3- POT Sta 10+26.621
-L- POC Sta 17+36.859
-Y5- POT Sta 10+62.241
-Y10- POT Sta 10+00.000
-L- POC Sta 17+35.98
-L- POT Sta 16+98.775
END CONSTRUCTION
RETAIN
REMOVE HEADWALL
REMOVE PIPE CULVERT
REMOVE BLOWN LE MATERIAL FROM REVETMENT
1200 RCP CL. IV, METHOD B
600 RCP
LINE TOE OF SLOPE -L- STA. 17+95 TO 20+00
SPECIAL "V" DITCH SEE DETAIL 12C" SHEET 2-G
STA -Y3- 10+20 LT TO 10+35.4 LT
STA -L- 17+50 LT TO 17+80 LT
NOTE: 1) SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
2) SEE SHEETS 18 & 19 FOR -L- PROFILE
3) SEE SHEET 24 FOR -Y2- & -Y3- PROFILES
4) SEE SHEET 24 FOR -Y2- & -Y3- PROFILES
5) PLACE CA FENCE 0.3m INSIDE OF RW FROM STA. 17+98.000 RT TO STA. 19+74.219 RT
R/W REVISION - 01/10/08 - PER SUBMITTAL OF MARCH 19,2008 - REVISED RIGHT OF WAY AND ELIMINATE CONSTRUCTION EASEMENT ON PARCEL 15
R/W REVISION - 02/20/08
R/W REVISION - 03/04/08
R/W REVISION - 03/10/08

256


SITE 6
SITE 7
SITE 6
MATCHLINE -L- STA. 33+00.000 SEE SHEET 10
MATCHLINE -L- STA. 36+40.000 SEE SHEET 12
NAD '83
NEUSE RIVER BUFFER
TEMPORARY SURFACE WATER IMPACTS TO POND
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 6.4 TONS EST. 18.4 M² FABRIC OUTLET PROTECTION
ROCK FILL AND SLOPE PROTECTION SEE DETAIL 18
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST 10 M² FABRIC
PREFORMED SCOUR HOLE SEE DETAIL "9A" SHEET 2-G
REMOVE
375 RCP
450 RCP
900 RCP
1050 RCP
PERRY FARM, LLC DB 12849 PG 1995 BM 2007 PG 1418
HT FORESTVILLE, LLC DB 11762 PG 1752 BM 2005 PG 1287
HT FORESTVILLE, LLC DB 11762 PG 1752 BM 2005 PG 1287
LEGEND
DENOTES FILL IN TEMPORARY SURFACE WATER
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
NOTE: SEE SHEETS 20 & 21 FOR -L- PROFILE
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
Permit Drawing Sheet 12 of 15
25.1


SITE 6
SITE 7
SITE 6
PERRY FARM, LLC
DB 12849 PG 1995
BM 2007 PG 1418
HT FORESTVILLE , LLC
DB 11762 PG 1752
BM 2005 PG 1287
HT FORESTVILLE , LLC
DB 11762 PG 1752
BM 2005 PG 1287
NEUSE RIVER BUFFER
NEUSE RIVER BUFFER
NEUSE RIVER BUFFER
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 6.4 TONS EST. 15.4 M² FABRIC OUTLET PROTECTION
ROCK FILL AND SLOPE PROTECTION SEE DETAIL
TEMPORARY SURFACE WATER IMPACTS TO POND
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
PREFORMED SCOUR HOLE SEE DETAIL "IIA" SHEET 2-G
PREFORMED SCOUR HOLE SEE DETAIL "IIA" SHEET 2-G
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 2.4 M² FABRIC
MATCHLINE -L- STA. 33+00.000 SEE SHEET 10
MATCHLINE -L- STA. 34+40.000 SEE SHEET 12
450 RCP
REMOVE
375 RCP
1050 RCP
N 63°56'39"E
N 63°56'39"E
N 63°56'39"E
N 63°56'39"E
NAD '83
METRIC
PROJECT REFERENCE NO.
R-2614A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
11
CONST. R/W
R/W
Permit Drawing Sheet 13 of 15
LEGEND
DENOTES FILL IN TEMPORARY SURFACE WATER
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
NOTE: SEE SHEETS 20 & 21 FOR -L- PROFILE
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE

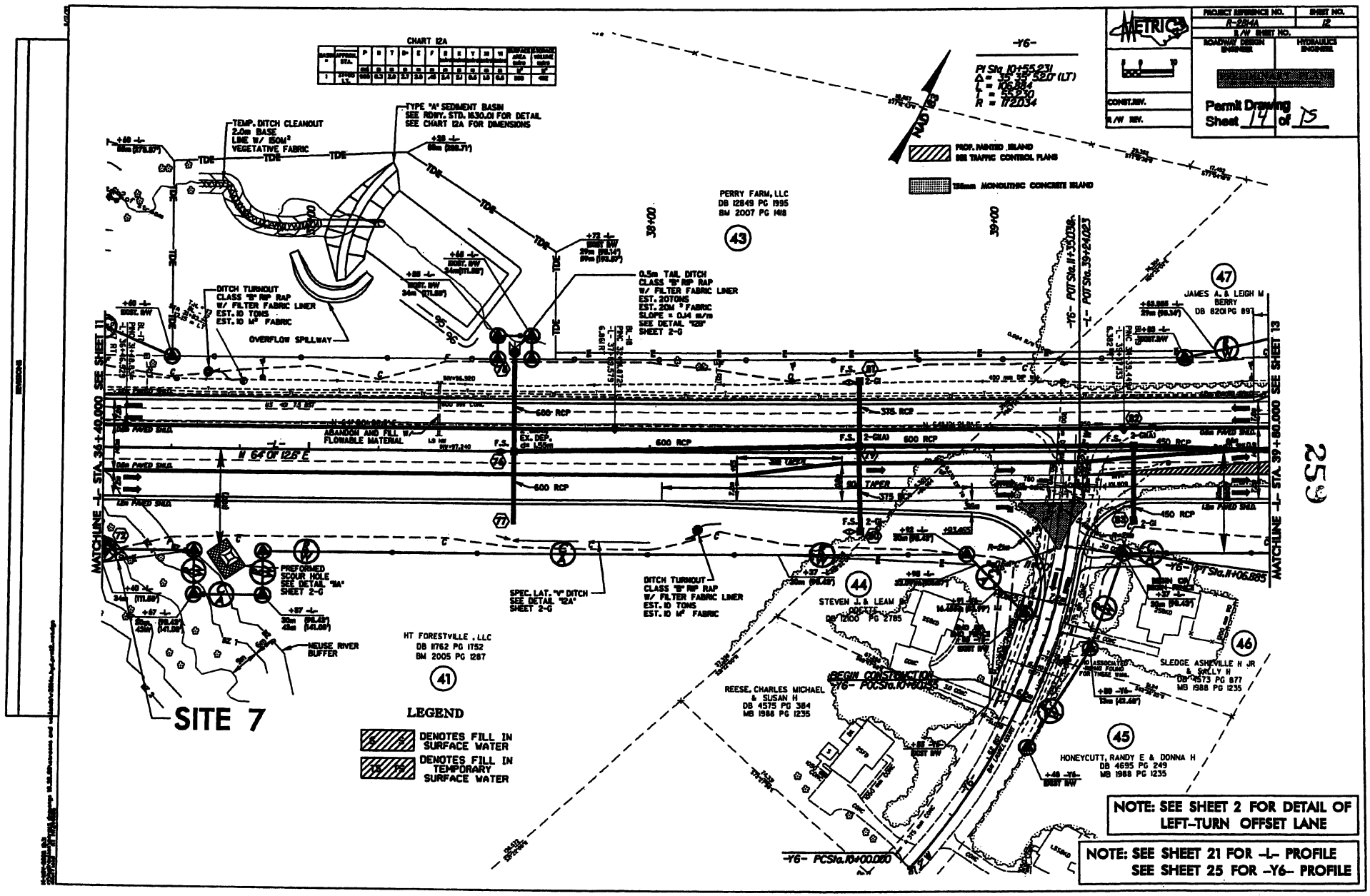
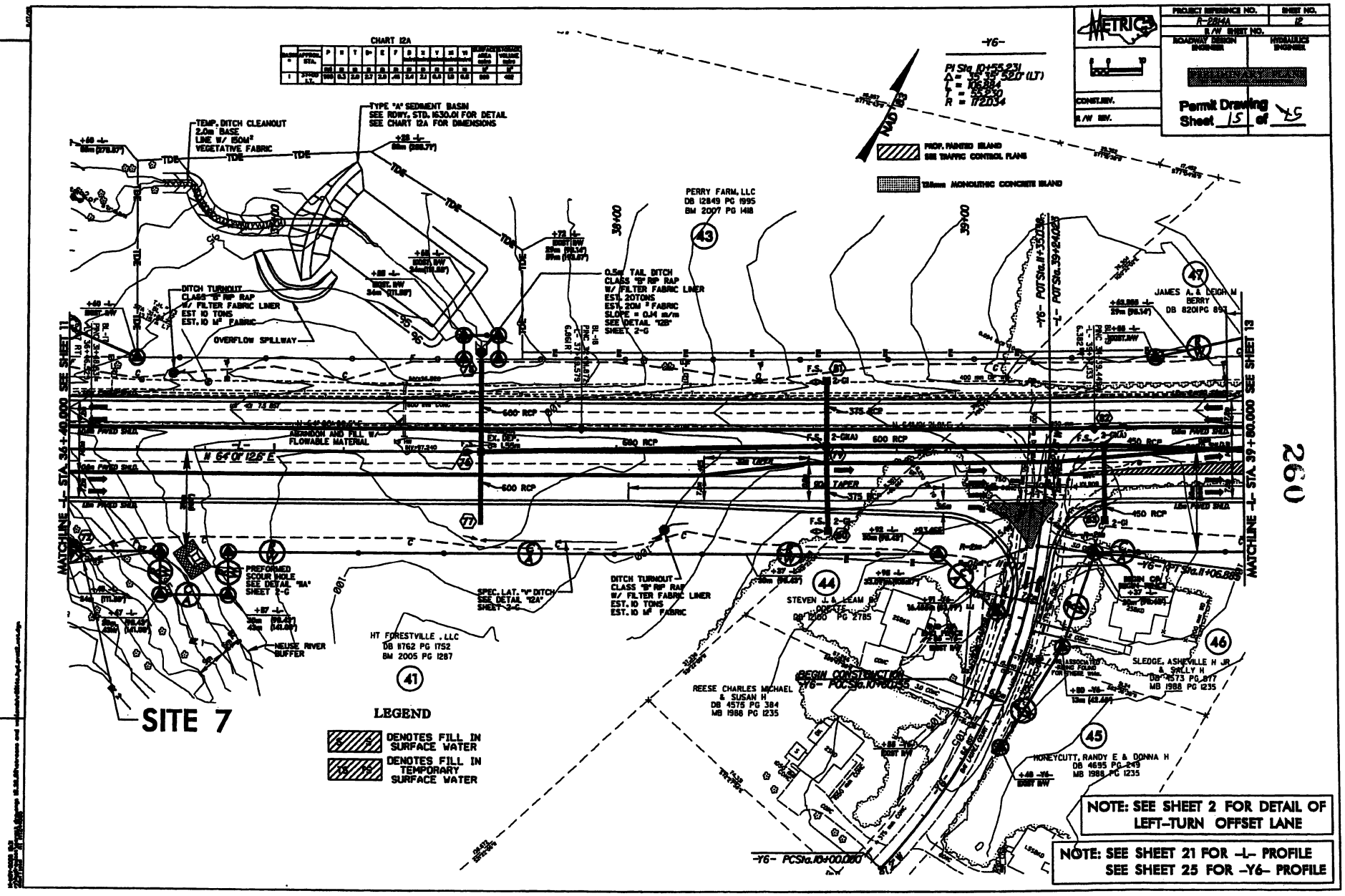
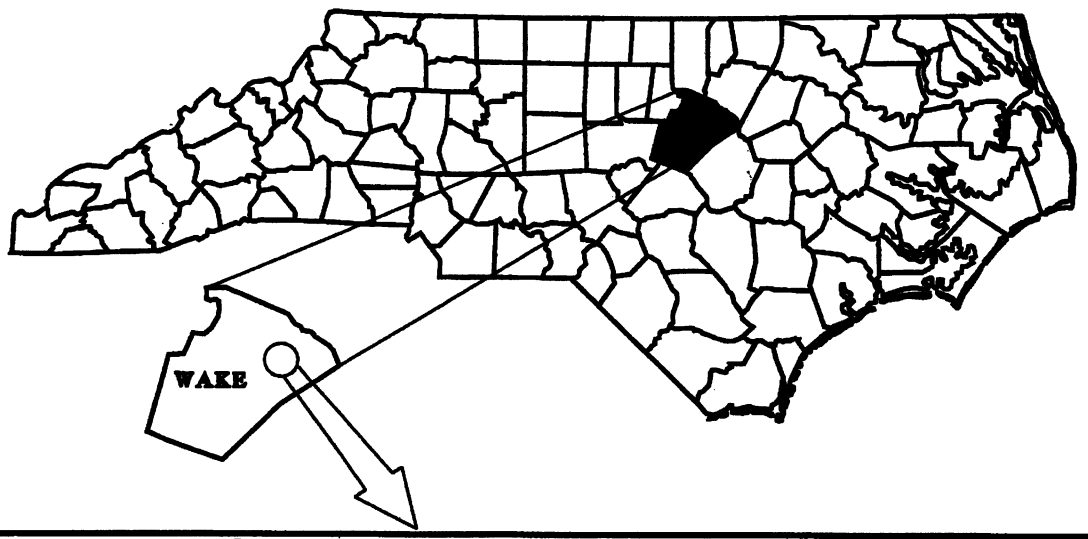
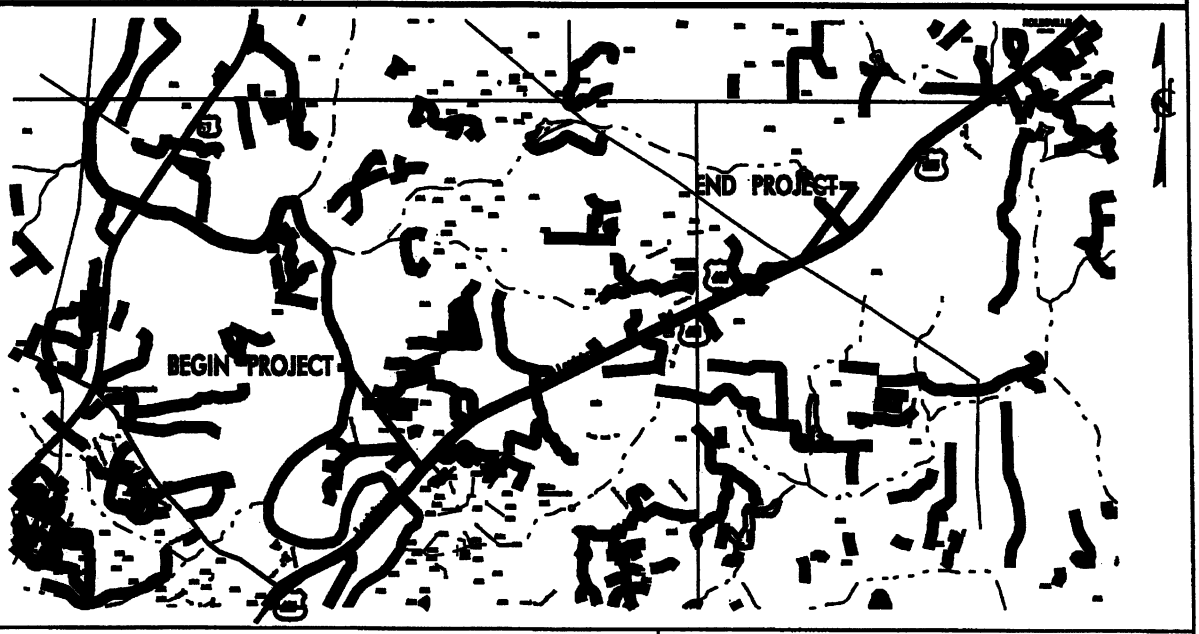


CHART 12A
TEMP. DITCH CLEANOUT 2.0m BASE LINE W/ 150M² VEGETATIVE FABRIC
TYPE "A" SEDIMENT BASIN SEE RDWY. STD. 1630.01 FOR DETAIL SEE CHART 12A FOR DIMENSIONS
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
OVERFLOW SPILLWAY
0.5m TAIL DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 20TONS EST. 20M² FABRIC SLOPE = 0.14 m/m SEE DETAIL "12B" SHEET 2-G
PERRY FARM, LLC DB 12849 PG 1995 BM 2007 PG 1418
43
-Y6-
PI Sta. 10+55.231
Δ = 26° 18' 52.0" (LT)
D = 16.364
T = 55.230
R = 172.034
PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
150mm MONOLITHIC CONCRETE ISLAND
-Y6- POT Sta. 11+35.000
-Y6- POT Sta. 39+24.023
47
JAMES A. & LEIGH M BERRY DB 8201 PG 897
MATCHLINE -L- STA. 36+40.000 SEE SHEET 11
MATCHLINE -L- STA. 39+80.000 SEE SHEET 13
600 RCP
375 RCP
450 RCP
ABANDON AND FILL W/ FLOWABLE MATERIAL
TAPER
PREFORMED SCOUR HOLE SEE DETAIL "9A" SHEET 2-G
NEUSE RIVER BUFFER
SPEC. LAT. "V" DITCH SEE DETAIL "12A" SHEET 2-G
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
HT FORESTVILLE, LLC DB 11762 PG 1752 BM 2005 PG 1287
41
44
STEVEN J. & LEAM ODETTE DB 12100 PG 2785
46
SLEDGE ASHEVILLE H JR & SALLY H DB 4573 PG 877 MB 1988 PG 1235
REESE, CHARLES MICHAEL & SUSAN H DB 4575 PG 384 MB 1988 PG 1235
BEGIN CONSTRUCTION -Y6- POC Sta. 10+00.000
45
HONEYCUTT, RANDY E & DONNA H DB 4695 PG 249 MB 1988 PG 1235
-Y6- PCS Sta. 10+00.000
-Y6- PT Sta. 11+06.885
SITE 7
LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN TEMPORARY SURFACE WATER
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 25 FOR -Y6- PROFILE
METRIC
PROJECT REFERENCE NO. R-2514A
SHEET NO. 12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
Permit Drawing Sheet 14 of 15

259


METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.ENG.
R/W ENG.
Permit Drawing Sheet 15 of 25
CHART 12A
-Y6-
PI Sta. 10+55.271
Δ = 35°15'520" (LT)
D = 10.584
L = 105.892
T = 54.230
R = 172.034
NAD 83
PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
150mm MONOLITHIC CONCRETE ISLAND
TEMP. DITCH CLEANOUT 2.0m BASE LINE W/ 150M² VEGETATIVE FABRIC
TYPE "A" SEDIMENT BASIN SEE RDWY. STD. 1630.01 FOR DETAIL SEE CHART 12A FOR DIMENSIONS
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
OVERFLOW SPILLWAY
0.5m TAIL DITCH CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 20TONS EST. 20M ² FABRIC SLOPE = 0.04 m/m SEE DETAIL "12B" SHEET 2-C
PERRY FARM, LLC DB 12849 PG 1995 BM 2007 PG 1418
JAMES A. & LEIGH M BERRY DB 8201PG 857
ABANDON AND FILL W/ FLOWABLE MATERIAL
PREFORMED SCOUR HOLE SEE DETAIL "11A" SHEET 2-C
NEUSE RIVER BUFFER
SPEC. LAT. "V" DITCH SEE DETAIL "12A" SHEET 2-C
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 10 TONS EST. 10 M² FABRIC
HT FORESTVILLE , LLC DB 11762 PG 1752 BM 2005 PG 1287
STEVEN J. & LEAM DOOLITTLE DB 12060 PG 2785
REESE CHARLES MICHAEL & SUSAN H DB 4575 PG 384 MB 1988 PG 1235
SLEDGE, ASHEVILLE H JR & SALLY H DB 4673 PG 817 MB 1988 PG 1235
HONEYCUTT, RANDY E & DONNA H DB 4695 PG 245 MB 1988 PG 1235
BEGIN CONSTRUCTION -Y6- PCSta.10+00.000
-Y6- PCSta.10+00.000
-L- POT Sta.11+35.000
-L- POT Sta.39+24.023
MATCHLINE -L- STA. 36+40.000 SEE SHEET 11
MATCHLINE -L- STA. 39+80.000 SEE SHEET 13
SITE 7
LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN TEMPORARY SURFACE WATER
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 25 FOR -Y6- PROFILE





BUFFER VICINITY MAP

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34806.1.1 (R-2814A)
US 401
LOUISBURG ROAD FROM
SR 2044 TO SR 2226

SHEET 1 OF 9 11/20/08

PROPERTY OWNER

NAME AND ADDRESS

OWNER'S NAME	ADDRESS
WAKE HIGH MEADOWS HOMEOWNERS ASSOCIATION	4948 WINDY HILL DRIVE RALEIGH, NC 27609
ALDRED LEE PERRY	4105 LOUISBURY ROAD WAKE FOREST, NC 27587
BRIGHTON COMMUNITY ASSOCIATION	1100 NAVAHO DRIVE, SUITE GL3 RALEIGH, NC 27609
VBBSS GROUP, LLC	4960 ROYAL ADELAIDE WAY RALEIGH, NC 27604
PERRY FARM, LLC	404 EMERSON DRIVE RALEIGH, NC 27609
HT FORESTVILLE, LLC	135 SOUTH MAIN STREET, SUITE 105 GREENVILLE, SC 29601

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814A)
US 401
LOUISBURG ROAD FROM
SR 2044 TO SR 2226
SHEET 2 OF 9 04/07/08

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	Outfall Pipe	-L- Sta 17+70	X					23783	13504	37287		
		to 19+25		X					1389	1389		
2	Roadway Fill	-L- Sta 19+00 Rt	X		6809	6357	13166					
		to 19+45 Rt										
3	Outfall Pipe	-L- Sta 32+80	X					28137	10592	38729		
	and Pond	to 33+90										
4	Cross Pipe	-L- Sta 35+80	X					8999	5662	14660		
		to 36+50										
		(Impacts > 150')										
TOTAL:					6809	6357	13166	60919	31146	92065		

NC DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 34506 1 1 (R-2814A)

11/17/2008
SHEET 3 OF 9

BUFFER IMPACTS SUMMARY

			WETLANDS IN BUFFERS		
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ZONE 1 (sq..ft)	ZONE 2 (sq ft)	COMMENTS
1	48" RCP	-L- Sta 17+70	174		
		to 19+25			
2	Outfall pipe	-L- Sta 33+40 Rt	2918		
TOTAL:			3092	0 0	

N.C DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

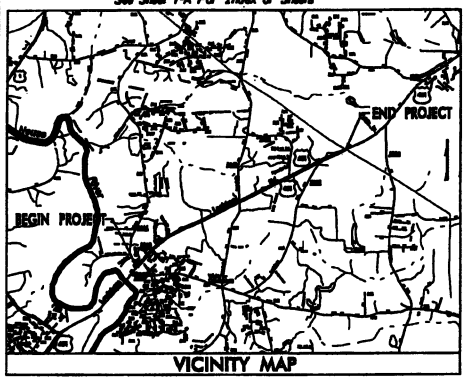
WAKE COUNTY
PROJECT: 34506 1 1 (R-2814A)

9/15/2008
SHEET 4 OF 9

CONTRACT:

TIP: R-2814A

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814A	1	
STATE PROJECT	F.A. PROJECT	DESCRIPTION	
34806.1.1	STP-401(4)	P.E.	

METRIC

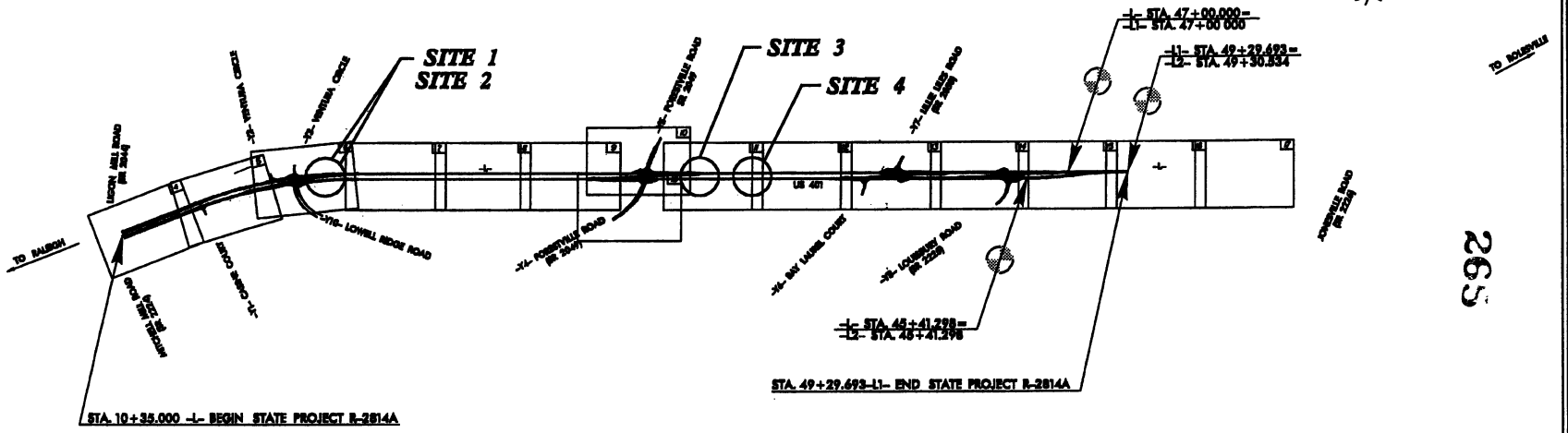
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

LOCATION: US 401 FROM SR 2044 (LIGON MILL ROAD) TO SOUTH OF SR 2226 (JONESVILLE ROAD).

TYPE OF WORK: GRADING, DRAINAGE AND PAVING

Buffer Drawing Sheet 5 of 9

R-2814A: BUFFER SITE MAP



265

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___

NOTE: THIS IS A PARTIALLY CONTROLLED ACCESS PROJECT WITH ACCESS POINTS SHOWN ON THE PLANS

NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

GRAPHIC SCALES

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2005 = 16,200
ADT 2030 = 28,100
DHV = 13 %
D = 55 %
T = 7 % *
V = 100 km/h

* TTST 2 % DUAL 5 %

PROJECT LENGTH

LENGTH ROADWAY F A. PROJECT STP-401(4) = 3.895km

TOTAL LENGTH TIP PROJECT R-2814A = 3.895km

Prepared In the Office of:
[illegible]
for the North Carolina Department of Transportation

THE STANDARD SPECIFICATIONS	DOT CONTACT
RIGHT OF WAY DATE: July 21, 2006	J. S. GOODNIGHT, P.E. PROJECT ENGINEER
LETTING DATE: March 17, 2009	MARK HUSSEY PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE

ROADWAY DESIGN ENGINEER

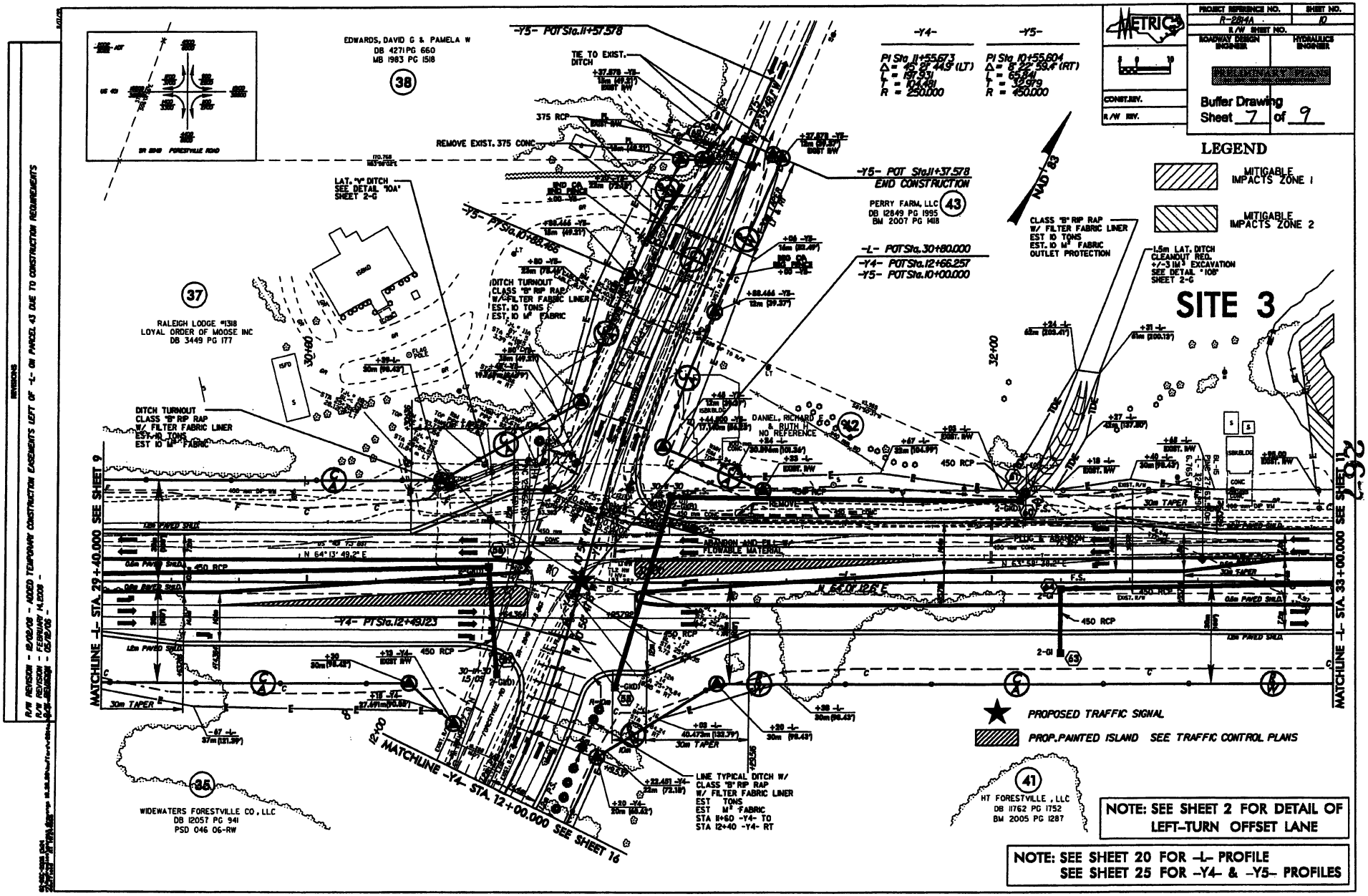
P.E.
SIGNATURE

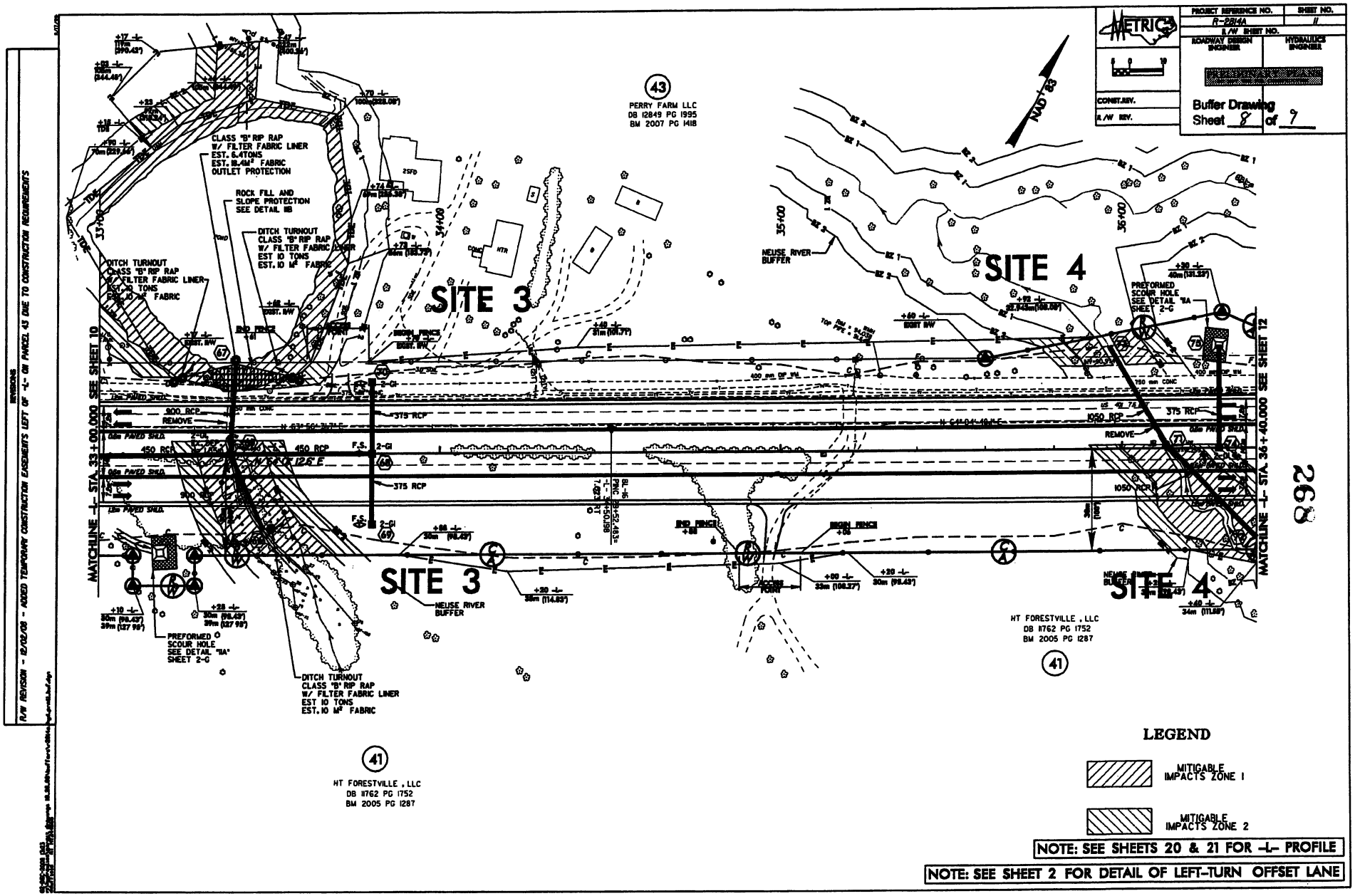
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

REVISIONS

R/W REVISION-09/13/07-
R/W REVISION - 05/09/08
R/W REVISION - 06/10/08 - PER SUBMITTAL OF MARCH 18,2008 - REVISED RIGHT OF WAY AND ELIMINATE PERMANENT CONSTRUCTION EASEMENT ON PARCEL 15


-Y5- POT Sta.11+57.578
TIE TO EXIST. DITCH
EDWARDS, DAVID G & PAMELA W
DB 4271 PG 660
MB 1983 PG 1518
38
375 RCP
REMOVE EXIST. 375 CONC
-Y4-
PI Sta 11+55.673
Δ = 45° 21' 44.3" (LT)
L = 197.93
T = 104.48
R = 250.000
-Y5-
PI Sta 10+55.604
Δ = 8° 22' 59.4" (RT)
L = 65.84
T = 32.979
R = 450.000
METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
Buffer Drawing
Sheet 7 of 9
LEGEND
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
-Y5- POT Sta.11+37.578
END CONSTRUCTION
PERRY FARM, LLC
DB 12849 PG 1995
BM 2007 PG 1418
43
NAD '83
CLASS "B" RIP RAP W/ FILTER FABRIC LINER
EST 10 TONS
EST. 10 M² FABRIC
OUTLET PROTECTION
-L- POT Sta.30+80.000
-Y4- POT Sta.12+66.257
-Y5- POT Sta.10+00.000
1.5m LAT. DITCH CLEANOUT REQ.
+/-3 M³ EXCAVATION
SEE DETAIL "10B"
SHEET 2-C
SITE 3
LAT. "V" DITCH
SEE DETAIL "10A"
SHEET 2-C
-Y5- PI Sta.10+88.465
DITCH TURNOUT
CLASS "B" RIP RAP
W/ FILTER FABRIC LINER
EST. 10 TONS
EST. 10 M² FABRIC
37
RALEIGH LODGE #1318
LOYAL ORDER OF MOOSE INC
DB 3449 PG 177
30+00
32+00
DITCH TURNOUT
CLASS "B" RIP RAP
W/ FILTER FABRIC LINER
EST. 10 TONS
EST 10 M² FABRIC
DANIEL, RICHARD E & RUTH H
NO REFERENCE
42
450 RCP
REMOVE
N 64° 13' 49.2" E
N 64° 58' 38.2" E
-Y4- PI Sta.12+49.123
450 RCP
2-GI(D)
63
PROPOSED TRAFFIC SIGNAL
PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
MATCHLINE -L- STA. 29+40.000 SEE SHEET 9
MATCHLINE -L- STA. 33+00.000 SEE SHEET 11
MATCHLINE -Y4- STA. 12+00.000 SEE SHEET 16
LINE TYPICAL DITCH W/ CLASS "B" RIP RAP W/ FILTER FABRIC LINER
EST TONS
EST M² FABRIC
STA 11+60 -Y4- TO
STA 12+40 -Y4- RT
35
WIDEWATERS FORESTVILLE CO., LLC
DB 12057 PG 941
PSD 046 06-RW
41
HT FORESTVILLE, LLC
DB 11762 PG 1752
BM 2005 PG 1287
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 25 FOR -Y4- & -Y5- PROFILES
REVISIONS
R/W REVISION - 12/02/09 - ADDED TEMPORARY CONSTRUCTION EASEMENTS LEFT OF -L- ON PARCEL 43 DUE TO CONSTRUCTION REQUIREMENTS
R/W REVISION - FEBRUARY 14,2008 -
R/W REVISION - 05/15/06 -


METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
Buffer Drawing
Sheet 8 of 9
NAD '83
SITE 3
SITE 4
PERRY FARM LLC
DB 12849 PG 1995
BM 2007 PG 1418
HT FORESTVILLE, LLC
DB 11762 PG 1752
BM 2005 PG 1287
NEUSE RIVER BUFFER
MATCHLINE -L- STA. 33+00.000 SEE SHEET 10
MATCHLINE -L- STA. 36+40.000 SEE SHEET 12
CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST. 6.4 TONS EST. 18.4 M² FABRIC OUTLET PROTECTION
ROCK FILL AND SLOPE PROTECTION SEE DETAIL 18B
DITCH TURNOUT CLASS "B" RIP RAP W/ FILTER FABRIC LINER EST 10 TONS EST. 10 M² FABRIC
PREFORMED SCOUR HOLE SEE DETAIL "IIA" SHEET 2-G
900 RCP
450 RCP
375 RCP
1050 RCP
REMOVE
LEGEND
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
NOTE: SEE SHEETS 20 & 21 FOR -L- PROFILE
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
REVISIONS
R/W REVISION - 12/12/08 - ADDED TEMPORARY CONSTRUCTION EASEMENTS LEFT OF -L- ON PARCEL 43 DUE TO CONSTRUCTION REQUIREMENTS

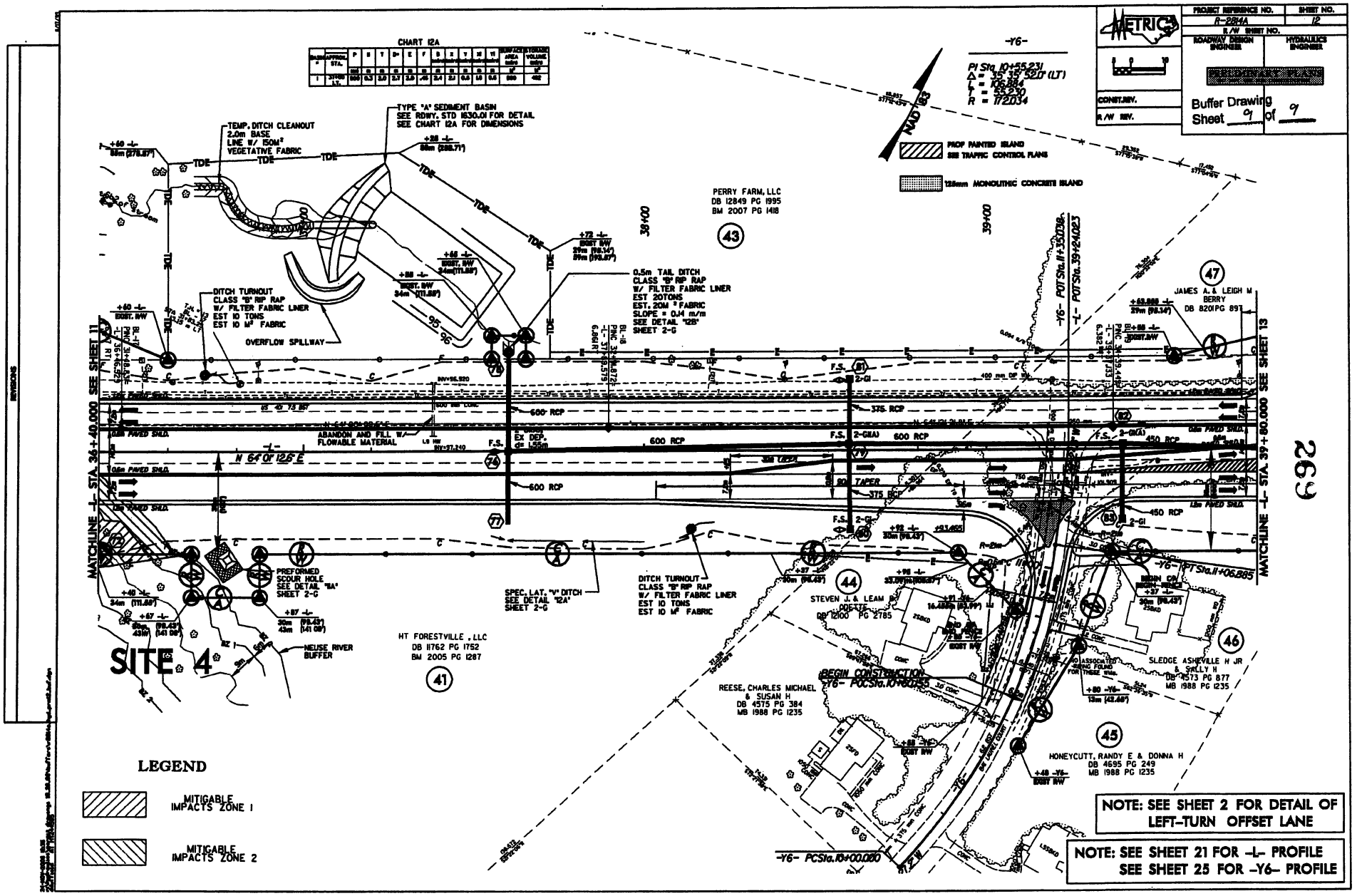


CHART 12A
TEMP. DITCH CLEANOUT 2.0m BASE LINE W/ 150M² VEGETATIVE FABRIC
TYPE 'A' SEDIMENT BASIN SEE RDWY. STD 1630.01 FOR DETAIL SEE CHART 12A FOR DIMENSIONS
DITCH TURNOUT CLASS 'B' RIP RAP W/ FILTER FABRIC LINER EST 10 TONS EST 10 M² FABRIC
OVERFLOW SPILLWAY
0.5m TAIL DITCH CLASS 'B' RIP RAP W/ FILTER FABRIC LINER EST 20TONS EST. 20M ² FABRIC SLOPE = 0.4 m/m SEE DETAIL '12B' SHEET 2-G
PERRY FARM, LLC DB 12849 PG 1995 BM 2007 PG 1418
43
38+00
39+00
PROP PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
125mm MONOLITHIC CONCRETE ISLAND
PI Sta 10+55.231
Δ = 35° 15' 52.0" (LT)
D = 10.884
L = 55.290
R = 172.034
-Y6-
-L- POT Sta.11+35.038
-Y6- POT Sta.39+24.023
JAMES A. & LEIGH M BERRY DB 8201PG 89
47
MATCHLINE -L- STA. 36+40.000 SEE SHEET 11
MATCHLINE -L- STA. 39+80.000 SEE SHEET 13
ABANDON AND FILL W/ FLOWABLE MATERIAL
N 64° 01' 12.5" E
600 RCP
375 RCP
450 RCP
TAPER
PREFORMED SCOUR HOLE SEE DETAIL '11A' SHEET 2-G
NEUSE RIVER BUFFER
SITE 4
SPEC. LAT. 'V' DITCH SEE DETAIL '12A' SHEET 2-G
DITCH TURNOUT CLASS 'B' RIP RAP W/ FILTER FABRIC LINER EST 10 TONS EST 10 M² FABRIC
HT FORESTVILLE , LLC DB 11762 PG 1752 BM 2005 PG 1287
41
STEVEN J. & LEAM B POETTE DB 12100 PG 2785
44
REESE, CHARLES MICHAEL & SUSAN H DB 4575 PG 384 MB 1988 PG 1235
SLEDGE ASHEVILLE H JR & SALLY H DB 4573 PG 877 MB 1988 PG 1235
46
HONEYCUTT, RANDY E & DONNA H DB 4695 PG 249 MB 1988 PG 1235
45
BEGIN CONSTRUCTION -Y6- PCSta.10+00.000
-Y6- PCSta.10+00.000
LEGEND
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 25 FOR -Y6- PROFILE
METRIC
PROJECT REFERENCE NO. R-2814A
SHEET NO. 12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
Buffer Drawing Sheet 9 of 9
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DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

June 25, 2010

Regulatory Division

SUBJECT: Action ID 2008-01316; TIP No. R-2814

Gregory J. Thorpe, Ph.D
North Carolina Department of Transportation
Division of Highways
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

Reference the Department of the Army permit issued to the North Carolina Department of Transportation on July 14, 2009, to authorize the discharge of fill material into waters of the United States, for construction of the Sections A, B, C and D of the US 401 Widening and Rolesville Bypass (TIP R-2814). The project location is an 18.5 mile corridor along and to the east of existing US 401, from SR 2044 (Ligon Mill Road) southeast of Rolesville, in Wake County, to SR 1700 (Fox Park Road) southeast of Louisburg, in Franklin County, North Carolina. Authorization for Section B was based on preliminary design. Also, please reference your May 14, 2010 letter, requesting modification of the permit to reflect the final design for Section B of this project.

The final design results in relatively minor changes in permanent impacts to streams and wetlands, some decreases and some increases, with a net decrease of 0.14 acres of wetlands, and 268 linear feet of stream. The increased impacts are necessary because of several factors related to the final design, including required bank stabilization, and a required sewer line relocation.

We have reviewed the requested modification, and determined that it is appropriate and reasonable, and that no public notice is required for this modification. Therefore, the permit is hereby modified to include the changes listed and shown in the modified drawings in the May 14, 2010 modification request, for a net decrease in permanent wetland impacts of 0.14 acres, and net decrease in permanent stream impacts of 268 linear feet in Section B. Total impacts for all four sections will now be 5.96 acres of permanent impacts to 404 wetlands, 4,768 linear feet of permanent impact to streams, 0.03 acre of temporary impact to wetlands, and 204 linear feet of temporary impact to streams. There is a net reduction of 0.12 acres of mitigable impacts to 404 wetlands, and a net decrease of 268 linear feet of impacts to streams requiring mitigation; therefore, special conditions k) and l) are modified as follows:

l m

k) NCDOT shall provide compensatory mitigation for the unavoidable impacts to 4.25 acres of wetlands, associated with Sections A and B of TIP R-2814, by debiting 2.48 acres of riverine and 1.77 acres of non-riverine wetland restoration, and 3.05 acres of riverine wetland

preservation, from the Jeffreys Warehouse Mitigation Site (aka JALO), described in the September 17, 2004 "Jeffreys Warehouse Conceptual Mitigation Plan, Wayne County, North Carolina".

m) NCDOT shall provide compensatory mitigation for the unavoidable impacts to 2,873 linear feet of warm-water streams with more than minimal aquatic function, associated with Sections A and B of TIP R-2814, as follows:

1. By debiting 2,873 linear feet of stream restoration from the Marks Creek, Phase II, Mitigation Site (AID 2008-02072), described in the September 2001 "Stream and Wetland Mitigation Plan, Marks Creek, Phase II, Wake County, North Carolina".

2. Compensatory mitigation shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated May 27, 2009 from William D. Gilmore, EEP Manager. Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003, the EEP will provide 2,538 linear feet of restoration equivalent warm water stream channel in the Upper Neuse River basin (Hydrologic Cataloging Unit 03020201) in accordance with Section X of the MOA. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

All other conditions of the permit, including the permit expiration date of December 31, 2014, remain applicable.

Should you have any questions, please call Mr. Eric Alsmeyer at (919) 554-4884, extension 23.

Sincerely,

Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Copies Furnished:

Mr. Brian Wrenn
Division of Water Quality
North Carolina Department of
Environment and Natural Resources
1650 Mail Service Center
Raleigh, NC 27699-1650

Mr. Clarence Coleman
Federal Highway Administration
310 New Bern Ave., Rm 410
Raleigh, North Carolina 27601-1442

NC-EEP
1652 Mail Service Center
Raleigh, NC 27699-1652

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NCDENR

North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

Beauregard

August 30, 2010

Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject: CORRECTION to Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS for Proposed improvements to US 401in Wake County, Federal Aid Project No. STP-401(4), State Project No. 81403001, TIP No. R-2814 (B). NCDWQ Project No. 20090104 ver.2.

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3790 issued to The North Carolina Department of Transportation (NCDOT) originally dated June 16, 2009.

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

Sincerely,

Coleen H. Sullins
Director

Attachments

cc: Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
Chris Murray, Division 5 Environmental Officer
Ecosystem Enhancement Program
Rachelle Beauregard, NCDOT NEU
File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: http://h2o.enr.state.nc.us/ncwetlands/

Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS

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 (NCDWQ) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B.0233 and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 This certification authorized the NCDOT to impact 2.68 acres of jurisdictional wetlands, 1.58 acres of isolated wetlands, 3,824 linear feet of jurisdictional streams and 496,980 square feet of protected riparian buffers in Wake County. The project shall be constructed pursuant to the modification dated received May 19, 2010. The corrected revised authorized impacts are as described below:

Revised Final Section B Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Bank Stabilization to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	243	18	0	0	0	0	261	0
4	0	0	0	95	10	20	125	0
6	0	0	0	0	25	14	39	0
7	0	0	0	321	66	47	434	368
7-Utiliy	0	0	0	0	3	0	3	0
8	0	0	0	355	18	153	526	508
9	0	0	0	610	20	0	630	610
11	0	0	0	0	10	0	10	0
12	258	0	0	0	0	0	258	0
16	0	0	0	189	23	135	347	324
18	36	14	33	0	0	0	83	0
Total	**537**	**32**	**33**	**1570**	**175**	**369**	**2716**	**1810**

Total Revised Section B Stream Impact: 2716 linear feet.

Revised Final Section B Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)	Mitigation Ratio	Wetland Mitigation Required (ac)
2	0.17	<0.01	0.02	0.19	1.1	0.19
3	0.22	0	<0.01	0.22	1.1	0.22
4	0.24	<0.01	0.01	0.25	1.1	0.25
5	0	0.01	0	0.01	2:1	0.02
7	0.65	0.10	0.09	0.84	1:1	0.84
7-Utility	<0.01	0	0.02	0.02	1.1	0.02
13	0.19	0	0	0.19	2:1	0.38
14	0.36	<0.01	0.06	0.42	2:1	0.84
17	0.38	0	0	0.38	1.1	0.38
Total	**2.21**	**0.11**	**0.20**	**2.52**		**3.14**

Total Revised Section B Wetland Impact: 2.52 acres.

Final Section B Isolated Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Total Wetland Impact (ac)	Mitigation Ratio	Wetland Mitigation Required (ac)
15	1.58	1.58	1.1	1.58
Total	**1.58**	**1.58**		**1.58**

Total Section B Isolated Wetland Impact: 1.58 acres.

Final Section B Open Water (Ponds) Impacts in the Neuse River Basin

Site	Fill in Open Waters (ac)
5	1.53
9	1.31
11	7.29
Total	**10.13**

Total Revised Section B Open Water Impact: 10.13 acres.

Final Section B Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)	Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
1	13743	0	13743	41229	9262	0	9262	13893
2	0	0	0	0	6	6	0	0
5	24086	3937	20149	60447	16852	1399	15453	23180
6	856	0	856	N/A	0	0	0	N/A
7	31468	26830	4638	13914	16685	8158	8527	12790
7-Utility	208	0	208	N/A	835	0	835	N/A
8	28702	0	28702	86106	15200	0	15200	22800
9	53503	0	53503	160509	31621	0	31621	47432
10	2133	0	2133	6399	4772	0	4772	7158
11	25288	0	25288	75864	14205	0	14205	21307
12	17088	0	17088	51264	15041	0	15041	22562
15	19154	16637	2517	7551	15890	8113	7777	11665
16	19724	0	19724	59172	10366	0	10366	15549
18	3475	0	3475	N/A	1585	0	1585	N/A
Totals	**239428**	**47404**	**192024**	**562455**	**152320**	**17676**	**134644**	**198336**

* n/a = Total for road crossing site is less than 1/3 acre and 150 linear feet of impact, no mitigation required

Total Revised Section B Buffer Impact: 391,748 square feet.

Note: ***Revised impact tables for Section B replace the preliminary section B impacts in the original Water Quality Certification. No changes have been made for Section A in this modification.***

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

This approval is only valid for the purpose and design that you submitted in your modified application dated received May 19, 2010. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated June 16, 2009 still apply except where superceded by this certification. Should your project change, you are required to notify NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC.0242. For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit. **This corrected approval replaces the one issued May 26, 2010.**

Conditions of Certification:

* 1. When final design plans are completed for R-2814 Sections C & D, a modification to the 401 Water Quality Certification and the Neuse River Riparian Buffer Certification shall be submitted with five copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-2814 Section C and D shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification and the Neuse River Riparian Buffer Authorization from the NC Division of Water Quality.

* 2. Compensatory mitigation for 2,371 linear feet of impact to perennial streams is required. We understand that you have chosen to debit mitigation from the Marks Creek Mitigation Bank. This certification gives approval to the debiting of 2,371 linear feet of stream mitigation from the Marks Creek Mitigation Site in order to satisfy the stream mitigation requirements of R-2814 A and B.

* 3. Compensatory mitigation for impacts to jurisdictional and isolated wetlands is required. The mitigation requirement includes 3.37 acres of jurisdictional wetlands and 1.58 acres of isolated wetlands. We understand that you have chosen to debit mitigation from the Jefferey's Warehouse Mitigation Bank. This certification gives approval to debiting following wetland acres from the Jefferey's Warehouse Mitigation Site in order to satisfy the wetland mitigation requirements of R-2814 A and B:

Riverine Wetland Restoration: 2.49 acres
Non-Riverine Wetland Restoration: 1.96 acres
Riverine Wetland Preservation: 3.05 acres

* 4. Compensatory mitigation for impacts to Neuse Riparian Buffers is required. The mitigation requirement includes 744,690 square feet of Zone 1 Buffers and 245,057square feet of Zone 2 Buffers.

(a) We understand that you have chosen to debit mitigation from the Wiggins Mill Mitigation Bank. This certification gives approval to the debiting of 985,325 square feet of Neuse Buffer from the Wiggins Mill Mitigation Site in order to partially satisfy the riparian buffer mitigation requirements of R-2814 A and B.

(b) We understand that you have chosen to perform the 4,422 square feet of remaining compensatory mitigation for impacts to protected buffers through use of the North Carolina Ecosystem Enhancement Program (EEP). Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided in the Neuse River Basin and done in accordance with 15A NCAC 2B.0233. EEP has indicated in a letter dated May 11, 2010 that they will assume responsibility for satisfying the remaining compensatory mitigation requirements of 4,422 square feet for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.

5. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species. The permittee shall observe any natural channel re-establishment, or utilize natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the drained pond remains stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond.

* 6. Prior to the pre-construction meeting, the permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated received May 19, 2010. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality

7 Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.

8. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

9. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

10. For all streams being impacted due to site dewatering activties, the site shall be graded to its preconstruction contours and revegetated with appropriate native species.

11. For project sites impacting waters classified by the NC Environmental Management Commission as High Quality Waters (HQW), or Water Supply I or II (WSI, WSII), (i.e., Cedar Fork Creek, Perry Creek, and their tributaries in Section B), stormwater shall be directed to vegetated buffer areas, grass-lined ditches or other means appropriate to the site for the purpose of pre-treating storm water runoff prior to discharging directly into streams. Mowing of existing vegetated buffers is strongly discouraged.

12. The permittee shall use /Design Standards in Sensitive Watersheds/[15A NCAC 4B.0124(a)-(e)] in areas draining to WS-II, HQW waters (i.e., Cedar Fork Creek, Perry Creek and their tributaries). However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres. Temporary cover (wheat, millet, or similar annual grain) or permanent herbaceous cover shall be planted on all bare soil within 15 business days of ground disturbing activities to provide erosion control.

13. Tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with appropriate seeding on disturbed soils within the riparian area and on disturbed steep slopes with the following exception. Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain a nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied from a fertilizer- and limestone-free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters in prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

14. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

15. All stormwater runoff shall be directed as sheetflow through stream buffers at nonerosive velocities, unless otherwise approved by this certification.

16. Pursuant to NCAC15A 2B.0233(6), sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by NCDWQ. At this time, NCDWQ has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

17 If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.

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

19 The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.

20. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.

21. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.

22. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.

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

24. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.

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

26. The permittee 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 and Federal law. If NCDWQ 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, NCDWQ may reevaluate and modify this certification.

27 All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification..

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

29. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.

30. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

31. The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery.

* 32. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWQ when all work included in the 401 Certification has been completed.

33. Native woody riparian vegetation (i.e., trees and shrubs native to your geographic region) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

34. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

35. 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 waters standards:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with 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.

36. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by 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 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

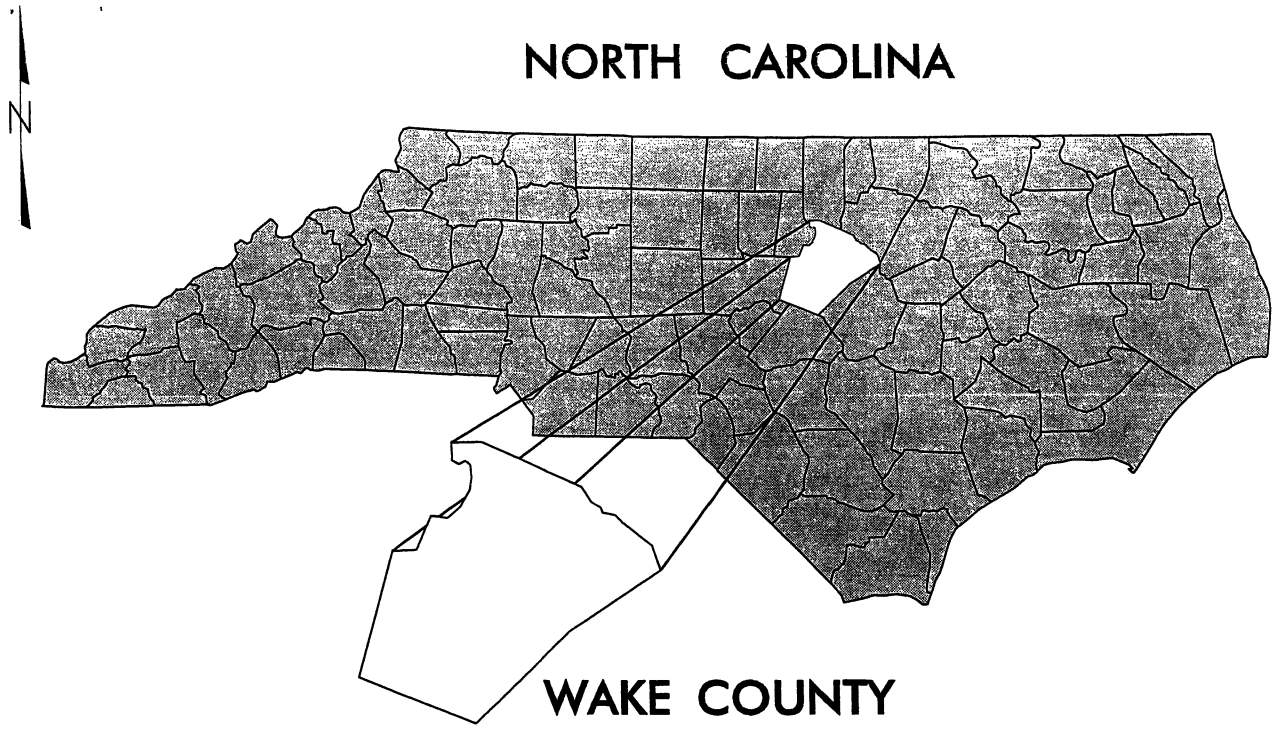
If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

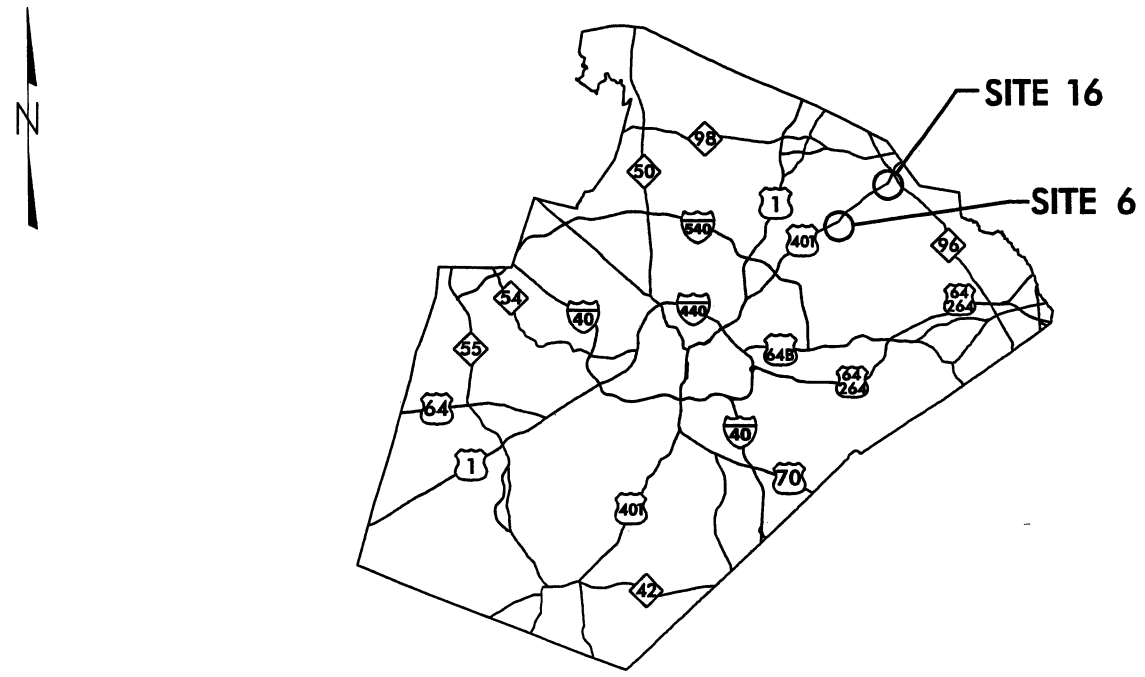
This the 30th day of August 2010

DIVISION OF WATER QUALITY

Coleen H. Sullins
Director

WQC No. 3790





POWER
BUFFER VICINITY MAP

Buffer Drawing
Sheet 1 of 6

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

PROP. NO.	PROPERTY OWNER NAME	PROP. OWNER ADDRESS
9	Scarboro , E Walter and Claire P	9412 Louisburg Rd , Wake Forest, NC 27587
55	Stell, Meith & Mary Sue Et Al.	1132 Louisburg Rd , Wake Forest, NC 27587
57	Sylvania Frazier & Lula Barnes McGhee	2725 Wait Ave , Wake Forest, NC 27857

N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT 34506.1.1 (R-2814B)

9/28/2010

Buffer Drawing
Sheet 2 of 6

UTILITY BUFFER IMPACTS SUMMARY
POWER

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
6	Aerial Power	Y2: 16+66 - 18+28	X			1180	1419	2599					
16	Aerial Power	L: 274+36 - 275+56	X			2447	1887	4334					
TOTAL:						3627	3306	6933					

N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 34506 1 1 (R-2814B)

10/13/2010
SHEET 1 OF 1

Buffer Drawing
Sheet 3 of 6

Rev May 2006

282

CONTRACT:

TIP PROJECT: R-2814B

DIVISION OF HIGHWAYS

R-2814B	U-1

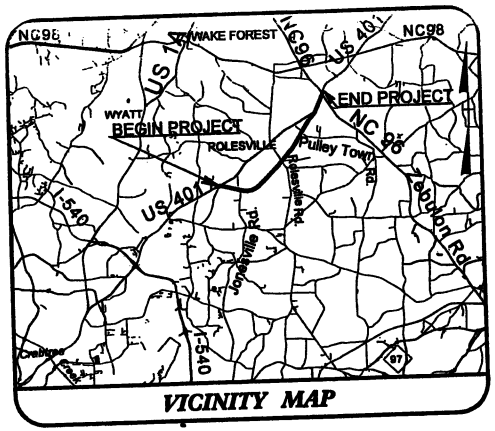
PRELIMINARY PLANS

Buffer Drawing Sheet 4 of 6

UTILITY BUFFER IMPACT PLAN
WAKE COUNTY

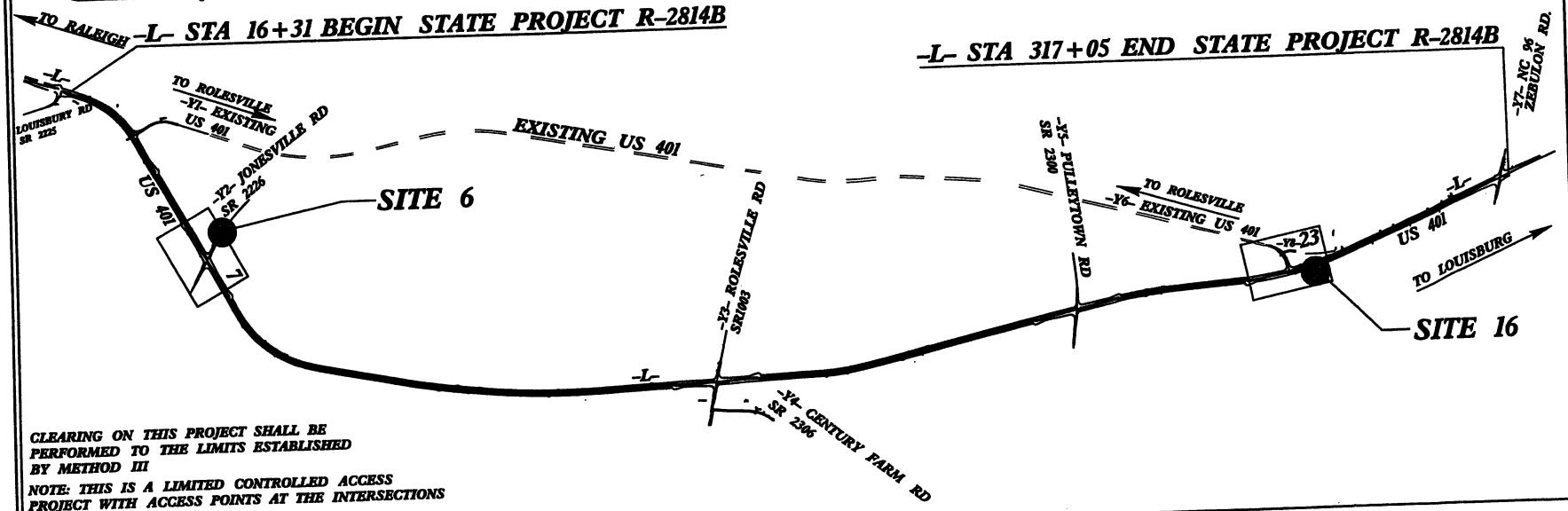
LOCATION: US 401 ROLESVILLE BYPASS FROM SR 2225, LOUISBURY ROAD TO NC 96, ZEBULON ROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERTS, AND SIGNALS



VICINITY MAP

NAD 83/2001

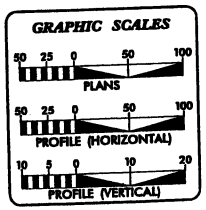


CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

NOTE: THIS IS A LIMITED CONTROLLED ACCESS PROJECT WITH ACCESS POINTS AT THE INTERSECTIONS

NOTE: THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF ROLESVILLE

GRAPHIC SCALES

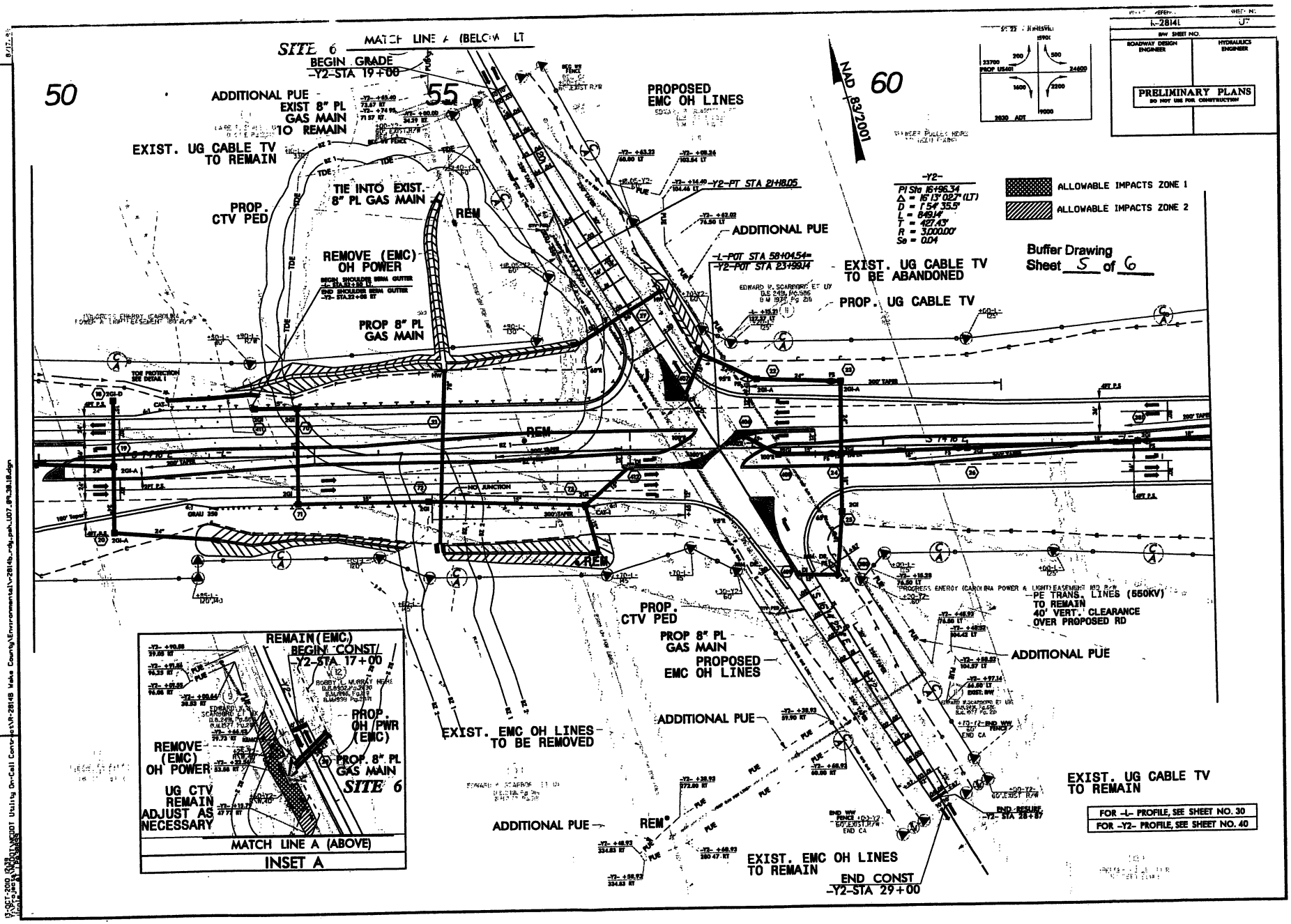


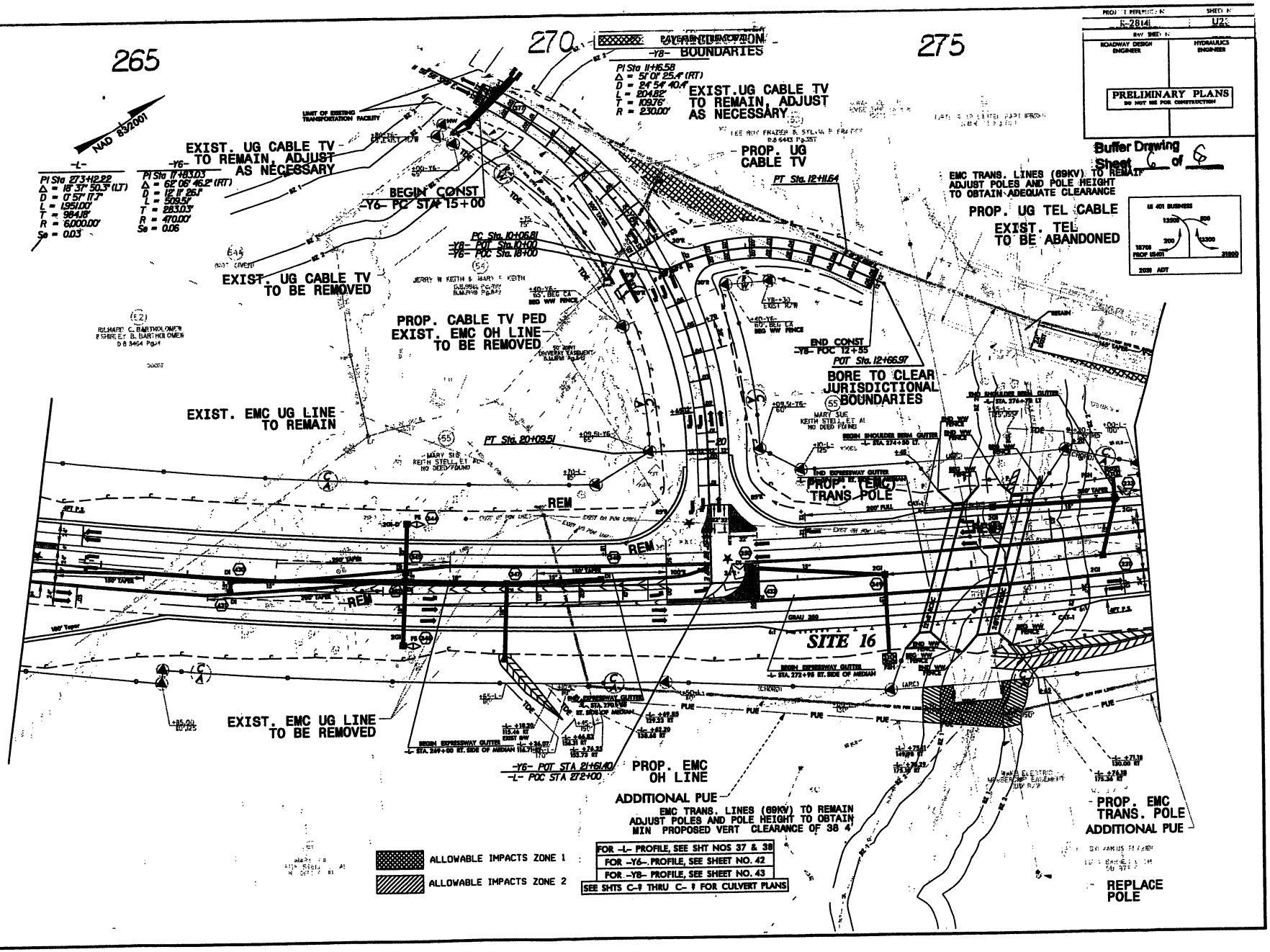
UTILITY OWNERS ON PROJECT

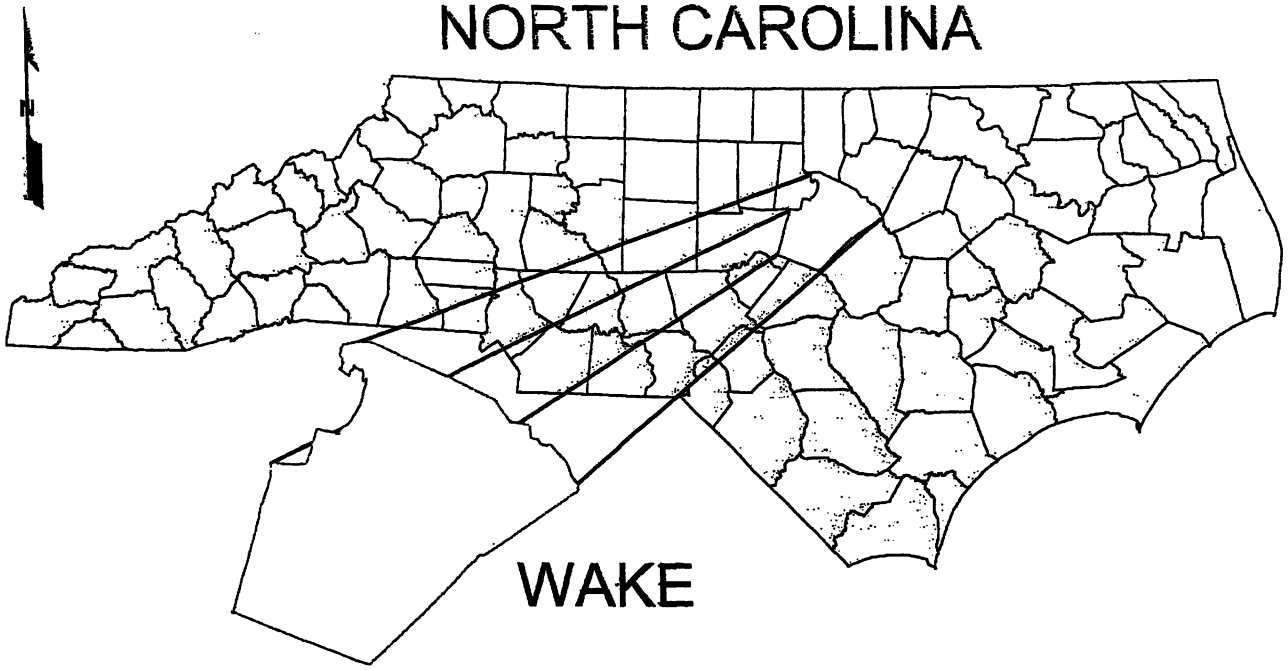
(1) Progress Energy (Power Distribution /Transmission)
(2) Wake EMC (Power Distribution /Transmission)
(3) Century Link (Telecommunications)
(4) AT&T (Telecommunications)
(5) Windstream (Telecommunications)
(6) Time Warner Cable (Cable Television)
(7) PSNC (Distribution Gas)
(8) City of Raleigh (Water, Sewer)

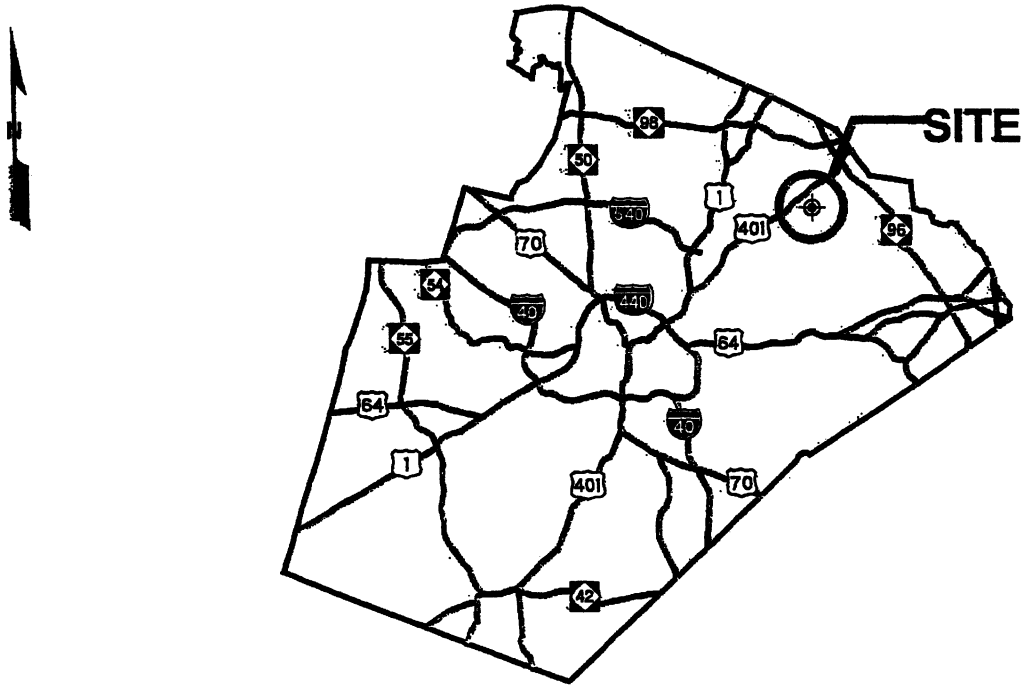
PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES ENGINEERING SECTION
1591 MAIL SERVICES CENTER
RALEIGH NC 27699-1591
PHONE (919) 250-4128
FAX (919) 250-4119

Roger Worthington, P.E. — UTILITIES SECTION ENGINEER
Steve McKee, P.E. — UTILITIES SQUAD LEADER PROJECT ENGINEER
Brandy Crouch — UTILITIES COORDINATION CONSULTANT


SITE 6
MATCH LINE A (BELOW LT
BEGIN GRADE
-Y2-STA 19+00
50
55
60
NAD 83/2001
ADDITIONAL PUE
EXIST 8" PL GAS MAIN TO REMAIN
EXIST. UG CABLE TV TO REMAIN
TIE INTO EXIST. 8" PL GAS MAIN
PROP. CTV PED
REMOVE (EMC) OH POWER
PROP 8" PL GAS MAIN
REM
PROPOSED EMC OH LINES
-Y2-PT STA 21+18.05
ADDITIONAL PUE
-L-POT STA 58+04.54=
-Y2-POT STA 23+99.14
EXIST. UG CABLE TV TO BE ABANDONED
PROP. UG CABLE TV
-Y2-
PI Sta 16+96.34
Δ = 16° 13' 02.7" (LT)
D = 1° 54' 35.5"
L = 849.14'
T = 427.43'
R = 3,000.00'
Se = 0.04
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
Buffer Drawing Sheet 5 of 6
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PE TRANS. LINES (550KV) TO REMAIN 40' VERT. CLEARANCE OVER PROPOSED RD
EXIST. EMC OH LINES TO BE REMOVED
EXIST. EMC OH LINES TO REMAIN
EXIST. UG CABLE TV TO REMAIN
END CONST -Y2-STA 29+00
FOR -L- PROFILE, SEE SHEET NO. 30
FOR -Y2- PROFILE, SEE SHEET NO. 40
REMAIN (EMC) BEGIN CONST/ -Y2-STA 17+00
PROP. OH PWR (EMC)
REMOVE (EMC) OH POWER
UG CTV REMAIN ADJUST AS NECESSARY
MATCH LINE A (ABOVE)
INSET A


265
270
275
NAD 83/2001
EXIST. UG CABLE TV TO REMAIN, ADJUST AS NECESSARY
BEGIN CONST -Y6- PC STA 15+00
EXIST. UG CABLE TV TO BE REMOVED
PROP. CABLE TV PED
EXIST. EMC OH LINE TO BE REMOVED
EXIST. EMC UG LINE TO REMAIN
EXIST. EMC UG LINE TO BE REMOVED
-Y6- POT STA 21+61.40
-L- POC STA 272+00
PROP. EMC OH LINE
ADDITIONAL PUE
EMC TRANS. LINES (69KV) TO REMAIN ADJUST POLES AND POLE HEIGHT TO OBTAIN MIN PROPOSED VERT CLEARANCE OF 38 4'
PROP. UG CABLE TV
EXIST. UG CABLE TV TO REMAIN, ADJUST AS NECESSARY
PT Sta 12+11.64
EMC TRANS. LINES (69KV) TO REMAIN ADJUST POLES AND POLE HEIGHT TO OBTAIN ADEQUATE CLEARANCE
PROP. UG TEL CABLE
EXIST. TEL TO BE ABANDONED
END CONST -Y6- POC 12+55
POT Sta. 12+66.97
BORE TO CLEAR JURISDICTIONAL BOUNDARIES
PROP. EMC TRANS. POLE
SITE 16
PROP. EMC TRANS. POLE ADDITIONAL PUE
REPLACE POLE
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
FOR -L- PROFILE, SEE SHT NOS 37 & 38
FOR -Y6- PROFILE, SEE SHEET NO. 42
FOR -Y8- PROFILE, SEE SHEET NO. 43
SEE SHTS C-1 THRU C- 1 FOR CULVERT PLANS
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing
Sheet 6 of 6
R-2814B
U23
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
REVISIONS
285





WETLAND AND STREAM
UTILITY

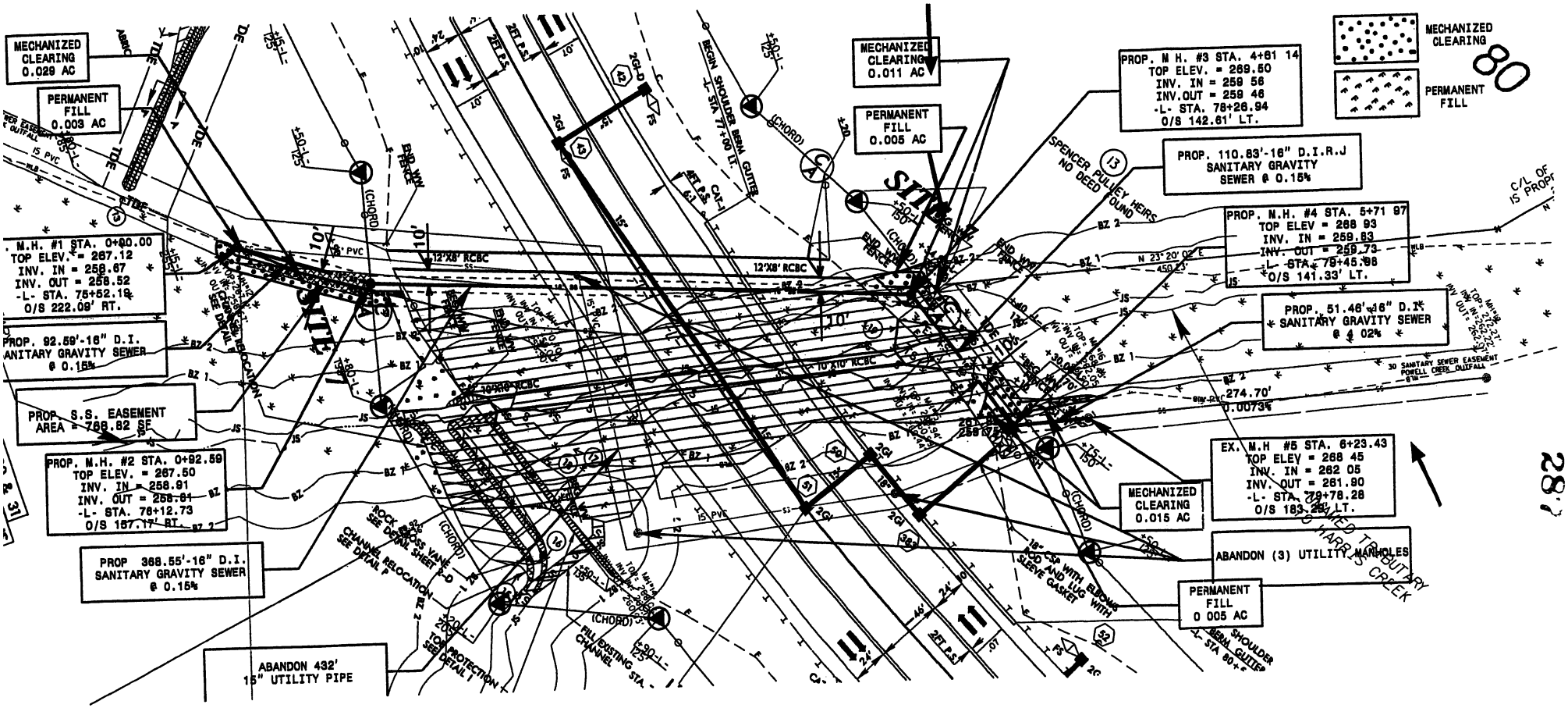
VICINITY MAP

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

NOVEMBER 2009

Permit Drawing
Sheet 1 of 6

Wetland + Stream Utility Impacts
Ste 7 revised 10/21/10

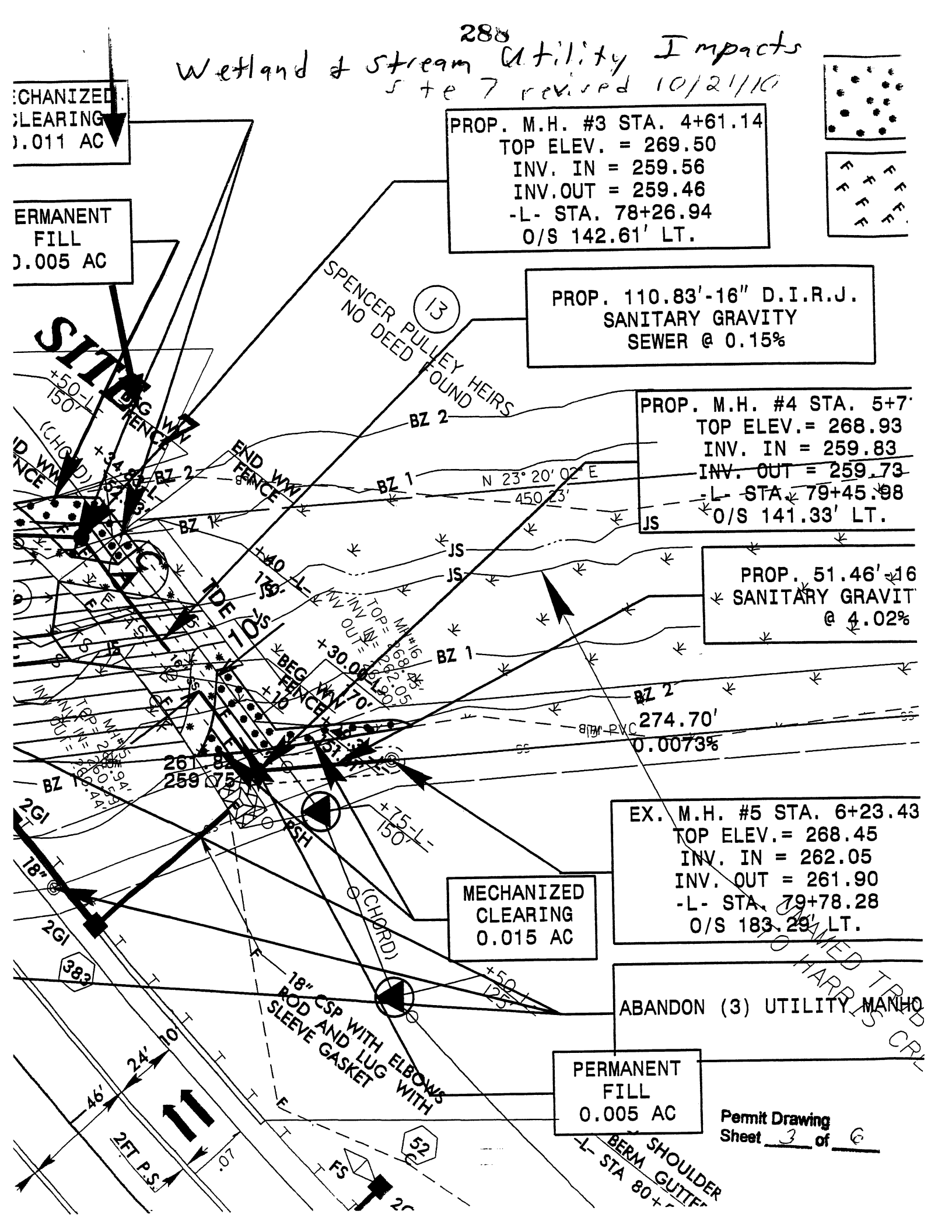


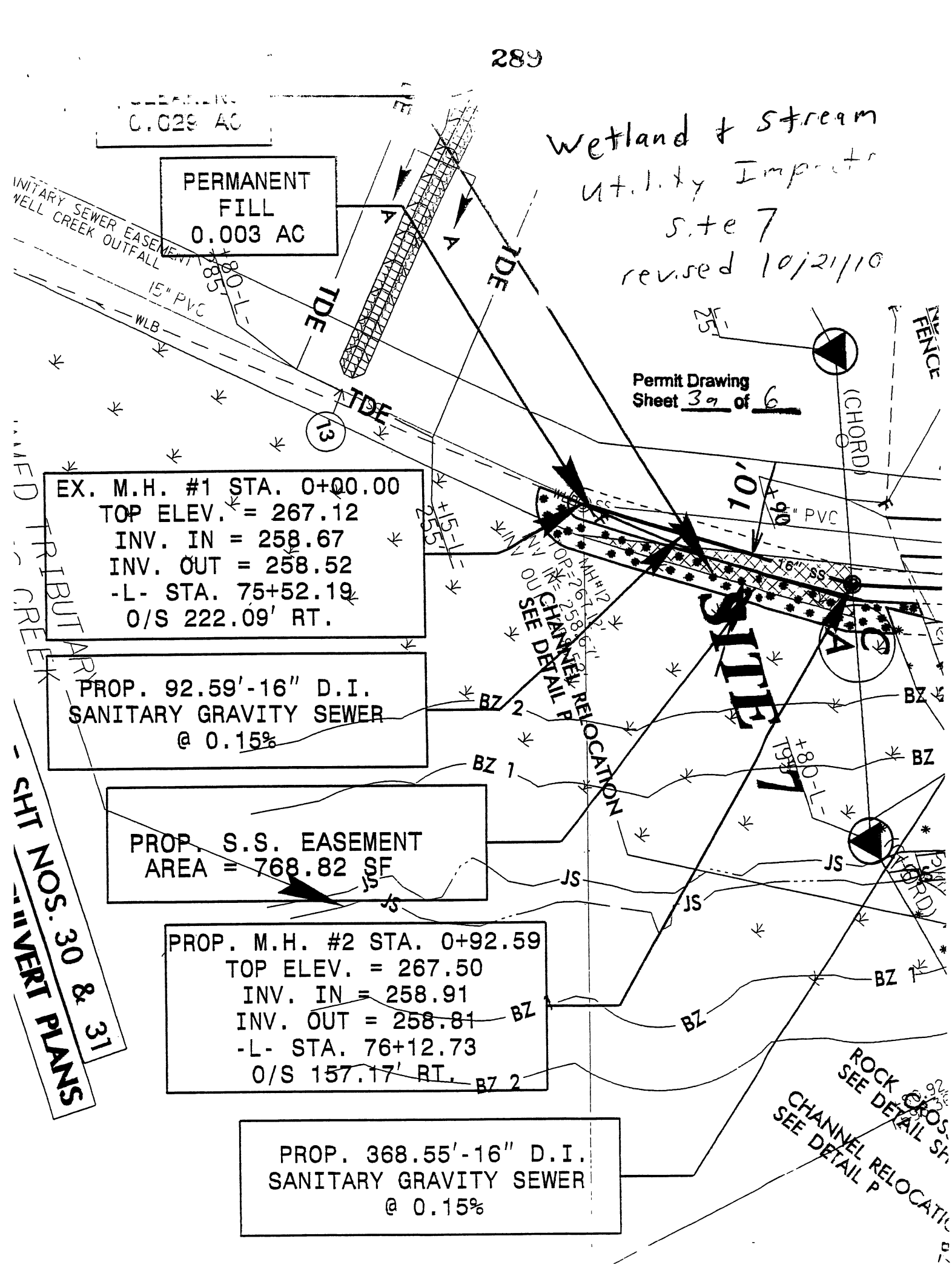
28.2

Permit Drawing
Sheet 2 of 6

288

Wetland & Stream Utility Impacts
Site 7 revised 10/21/10

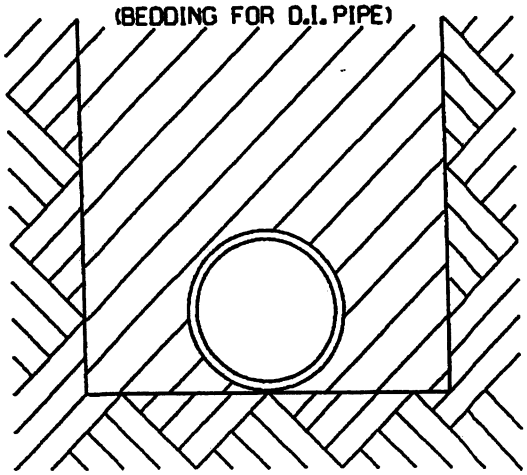



0.029 AC
PERMANENT FILL 0.003 AC
Wetland & Stream Utility Impacts Site 7 revised 10/21/10
SANITARY SEWER EASEMENT
WELL CREEK OUTFALL
15" PVC
WLB
TDE
TDE
TDE
A
A
13
Permit Drawing Sheet 3a of 6
FENCE
(CHORD)
10'
16" SS
EX. M.H. #1 STA. 0+00.00
TOP ELEV. = 267.12
INV. IN = 258.67
INV. OUT = 258.52
-L- STA. 75+52.19
O/S 222.09' RT.
PROP. 92.59'-16" D.I. SANITARY GRAVITY SEWER @ 0.15%
PROP. S.S. EASEMENT AREA = 768.82 SF
PROP. M.H. #2 STA. 0+92.59
TOP ELEV. = 267.50
INV. IN = 258.91
INV. OUT = 258.81
-L- STA. 76+12.73
O/S 157.17' RT.
PROP. 368.55'-16" D.I. SANITARY GRAVITY SEWER @ 0.15%
CHANNEL RELOCATION
SEE DETAIL P
SITE 7
BZ 1
BZ 2
JS
ROCK CROSS
SEE DETAIL SH
CHANNEL RELOCATIO
SEE DETAIL P
TRIBUTARY
CREEK
SHT NOS. 30 & 31
CULVERT PLANS

MAXIMUM TRENCH WIDTH
AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

TYPE "2"
(BEDDING FOR D.I. PIPE)



PIPE BEDDED IN FLAT-BOTTOM TRENCH. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

Permit Drawing
Sheet 4 of 8

PROP. NO	PROPERTY OWNER NAME	PROP. OWNER ADDRESS
13	Spencer, Pulley Heirs	9412 Louisburg Rd , Wake Forest, NC 27587
14	Scarboro , E. Walter and Claire P.	9412 Louisburg Rd , Wake Forest, NC 27587

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)

4/5/2010

Permit Drawing
Sheet 5 of 6

UTILITY WETLAND PERMIT IMPACT SUMMARY

Site No	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
7	See Drawing	Sanitary Sewer	0.013			0.055				3		
TOTALS.			0.013			0.055				3		

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
WBS - 34506 3 GV3 (R-2814B) KCV.
10/21/2010
SHT 1 OF 1

ATN Revised 3/31/05

Permit Drawing
Sheet 6 of 6

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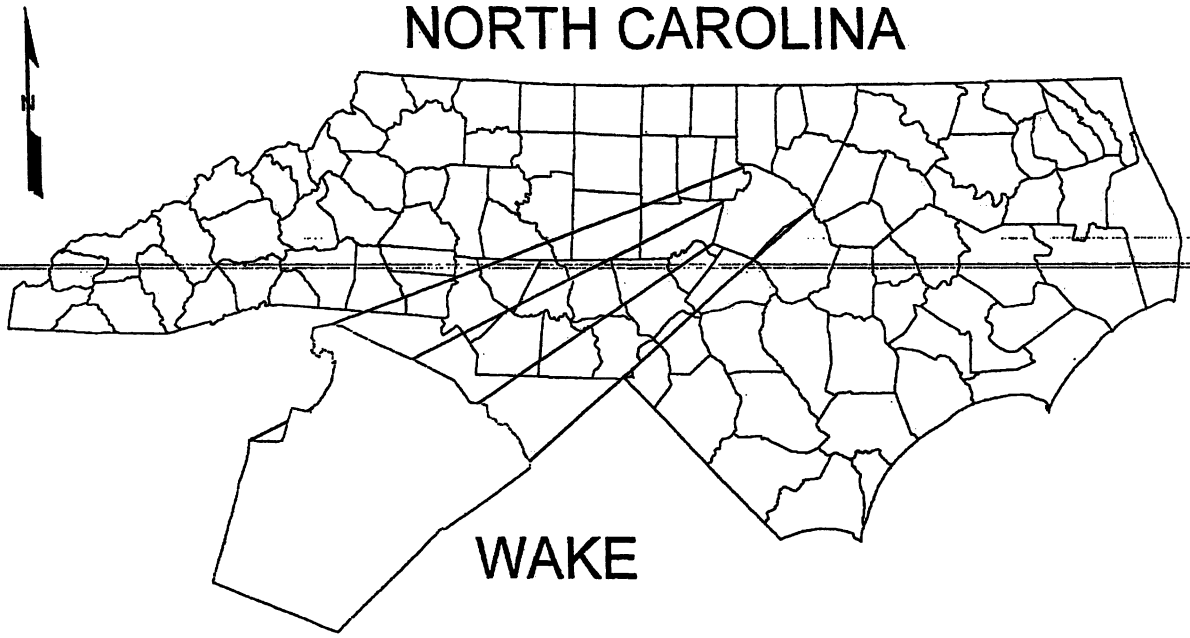
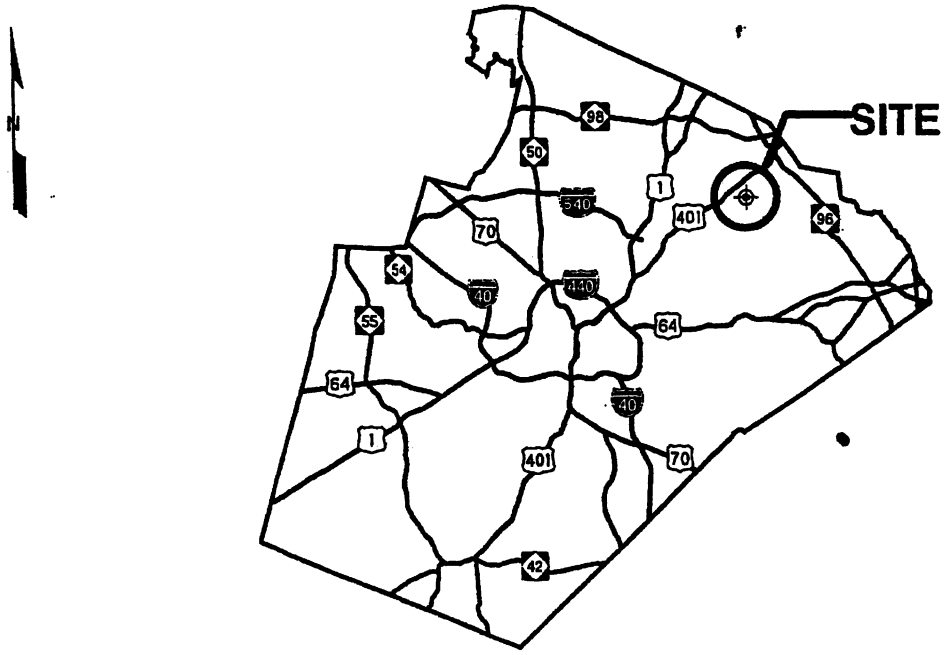




UTILITY

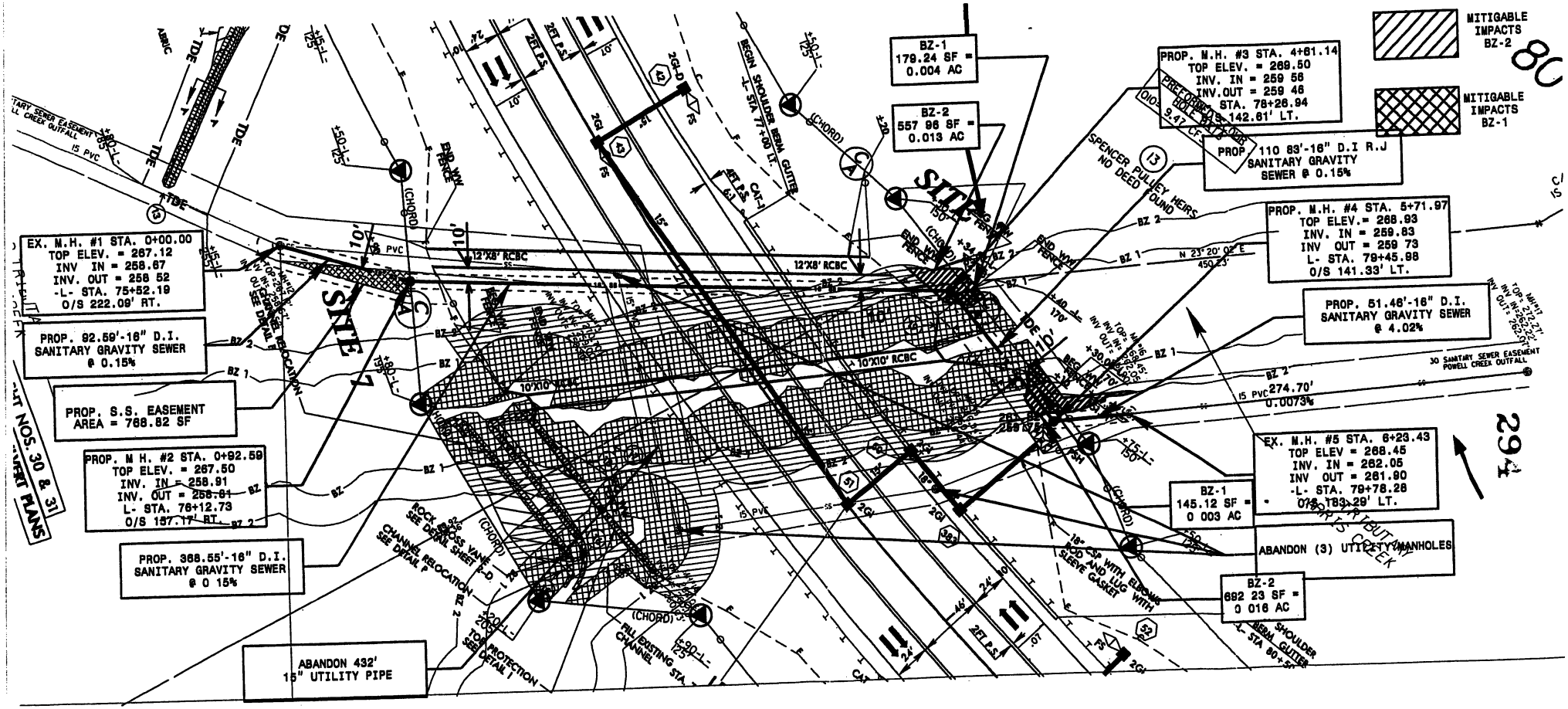
BUFFER VICINITY MAP

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

4|5|2010

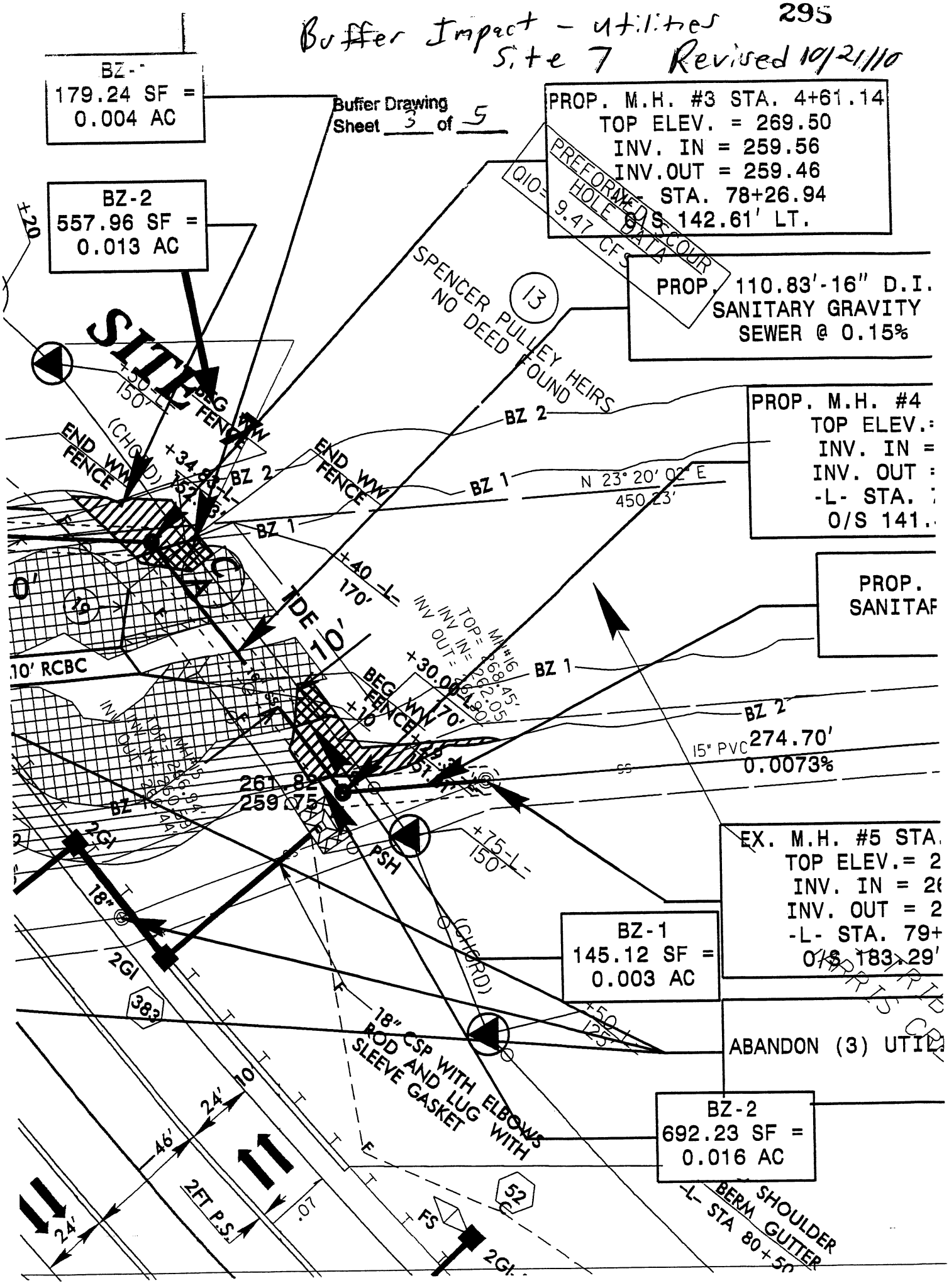
Buffer Drawing Sheet 1 of 5

Buffer Impacts - utilities
Site 7 Revised 10/21/10



Buffer Drawing
Sheet 2 of 5

Buffer Impact - utilities
Site 7 Revised 10/21/10



PROP. NO.	PROPERTY OWNER NAME	PROP. OWNER ADDRESS
13	Spencer, Pulley Heirs	9412 Louisburg Rd , Wake Forest, NC 27587
14	Scarboro , E Walter and Claire P	9412 Louisburg Rd., Wake Forest, NC 27587

N C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT 34506.1 1 (R-2814B)

4/5/2010

Buffer Drawing
Sheet 4 of 5

UTILITY BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
7	Sanitary Sewer	See Drawing				324	1250	1575					
TOTAL:						324	1250	1575	0.0	0.0	0.0		

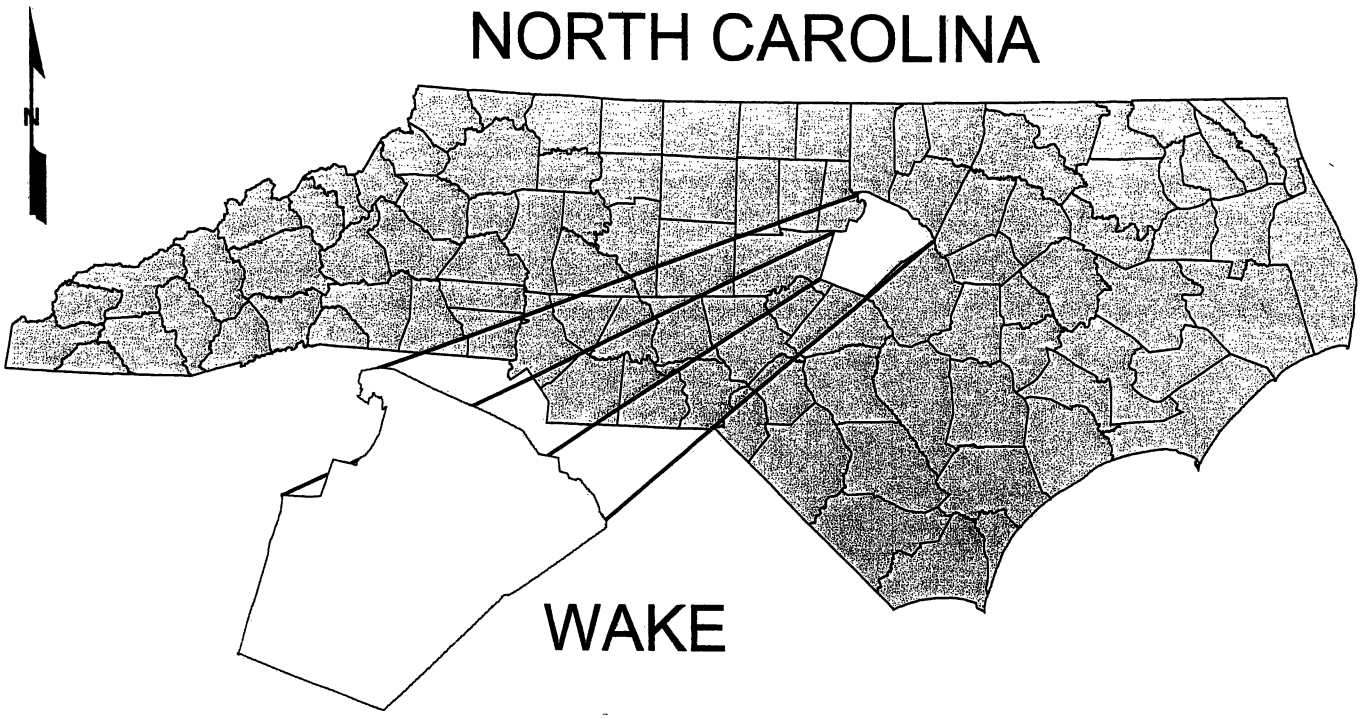
N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

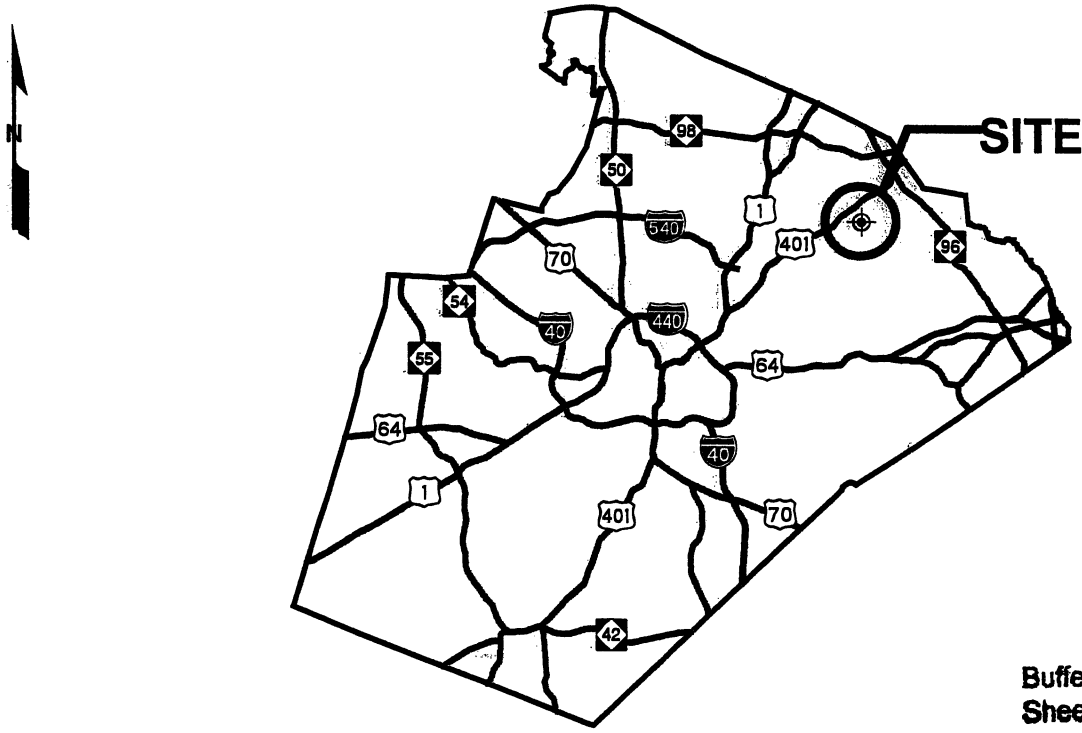
WAKE COUNTY
PROJECT: 34506 3 GV3 (R-2814B)

rev.
10/21/2010
SHEET OF

Rev May 2006

Buffer Drawing
Sheet 5 of 5





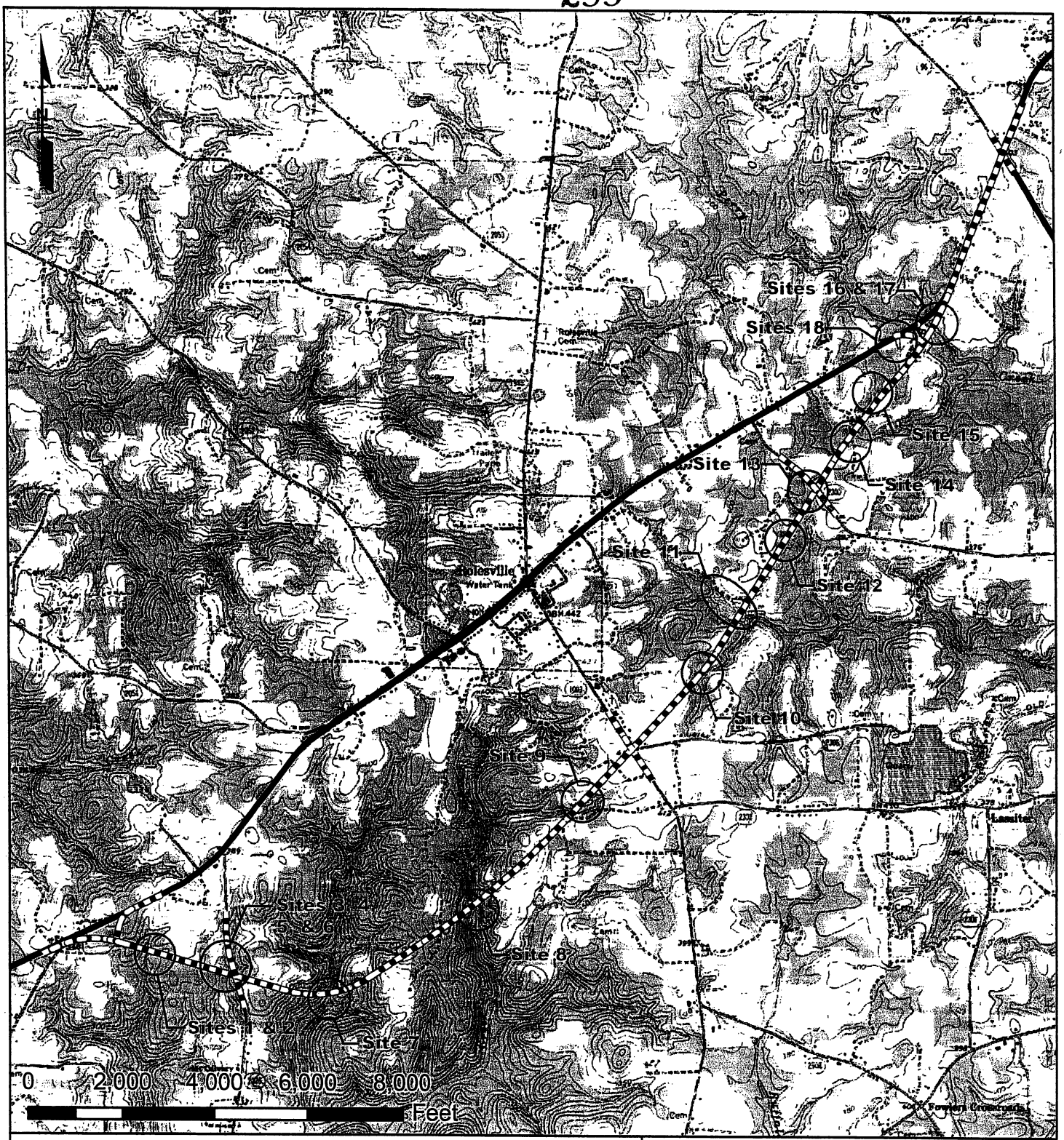
Buffer Drawing
Sheet 1 of 20

BUFFER VICINITY MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

NOVEMBER 2009



1 inch = 3,000 feet

BUFFER LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

NOVEMBER 2009

Source: USGS 7.5 Minute Quadrangle, Rolesville, NC

Buffer Drawing
Sheet 2 of 20

PROP. NO.	PROPERTY OWNER NAME	PROP. OWNER ADDRESS
7	Neuse Baptist Church	8700 Capital Blvd , Raleigh, NC 27587
8	Alexander Family investments, LLC	906 Washington St , Cary, NC 27511
9	Scarboro , E Walter and Claire P	9412 Louisburg Rd , Wake Forest, NC 27587
12	Bobby L Murray Heirs (J Brent King Exec)	PO Box 40639, Raleigh, NC 27629
13	Spencer, Pulley Heirs	9412 Louisburg Rd , Wake Forest, NC 27587
14	Scarboro , E Walter and Claire P	9412 Louisburg Rd , Wake Forest, NC 27587
20	Shearon, Cameron E & Beverly W	4325 Galax Dr , Raleigh, NC 27612
21	Mitchell F Rabil Family Irrevocable Trust	3321 Gondola Dr , Lexington KY, 40513
22	Shearon, Cameron E & Beverly W	4325 Galax Dr , Raleigh, NC 27612
34	Scarboro Family Limited Partnership	PO Box 84, Rolesville, NC 27571
35	Wall, Joe	7317 Pulley Town Rd , Wake Forest, NC 27587
36	Wall, Joe	7318 Pulley Town Rd , Wake Forest, NC 27587
38	Bobie Joe Wall & Vickie D Wall	7309 Pulley Town Rd Wake Forest, NC 27587
39	The SBJ Growth, L P	PO Box 19067, Raleigh, NC
51	Bartholomew, Michael	PO BOX 573, Rolesville, NC 27571
52	Bartholomew, Richard C & Shirley B	PO BOX 6, Rolesville, NC 27571
54	Keith, Jerry W and Mary P	1124 Louisburg Rd , Wake Forest, NC 27587
54A	Bartholomew, Richard C & Shirley B	PO BOX 6, Rolesville, NC 27571
55	Stell, Meith & Mary Sue Et Al	1132 Louisburg Rd , Wake Forest, NC 27587
57	Sylvania Frazier & Lula Barnes McGhee	2725 Wait Ave , Wake Forest, NC 27857

N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT 34506 1 1 (R-2814B)

2/22/2010

Buffer Drawing
Sheet 3 of 20

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
2	-L- 41+07 RT			6
5	-L- 55+00		3937	1399
7	-L- 77+89		26830	8158
15 [1]	-L- 255+00		16637	8113
TOTAL:			47404	17676

[1] ALL IN ISOLATED WETLANDS

N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 34506 1 1 (R-2814B)

2/22/2010
SHEET OF

Rev Jan 2009

Buffer Drawing
Sheet 4 of 20

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	60" RCP	-L- 38+11	X						13743	9262	23005		
2	30" RCP	-L- 41+07 RT			X					6	6		
5	78" RCP	-L- 55+00	X						24665	16852	41517		
6	2@42" RCP	-Y2- 17+31	X			856		856					
7	10'X10' RCBC	-L- 77+89	X						31468	16685	48153		
8	10'X10' RCBC	-L- 115+74	X						28702	15200	43902		
9	72" RCP	-L- 147+00	X						53503	31621	85124		
10	N\A	-L- 187+00 RT			X				2133	4772	6905		
11	10'X9' RCBC	-L- 200+04	X						25288	14205	39493		
12	42" RCP	-L- 219+03	X						17088	15041	32129		
15	N\A	-L- 255+00	X						19154	15890	35044		
16	2@12'X12' RCBC	-L- 275+39	X						19724	10366	30090		
18	2@36" RCP	-Y6- 15+17	X			3475	1585	5060					
TOTAL:						4331	1585	5916	235468	149900	385368		

N C DEPT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 34506 1 1 (R-2814B)

Rev
10/14/2010
SHEET OF

Rev May 2006

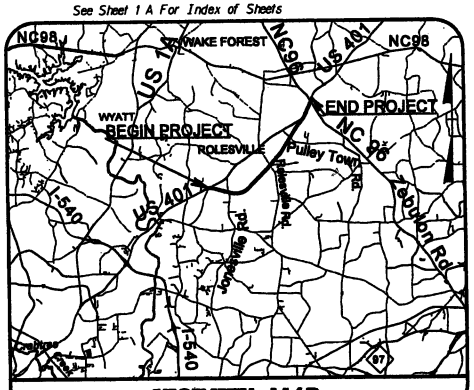
Buffer Drawing
Sheet 5 of 20

302

TIP PROJECT: R-2814B

CONTRACT:

See Sheet 1 A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

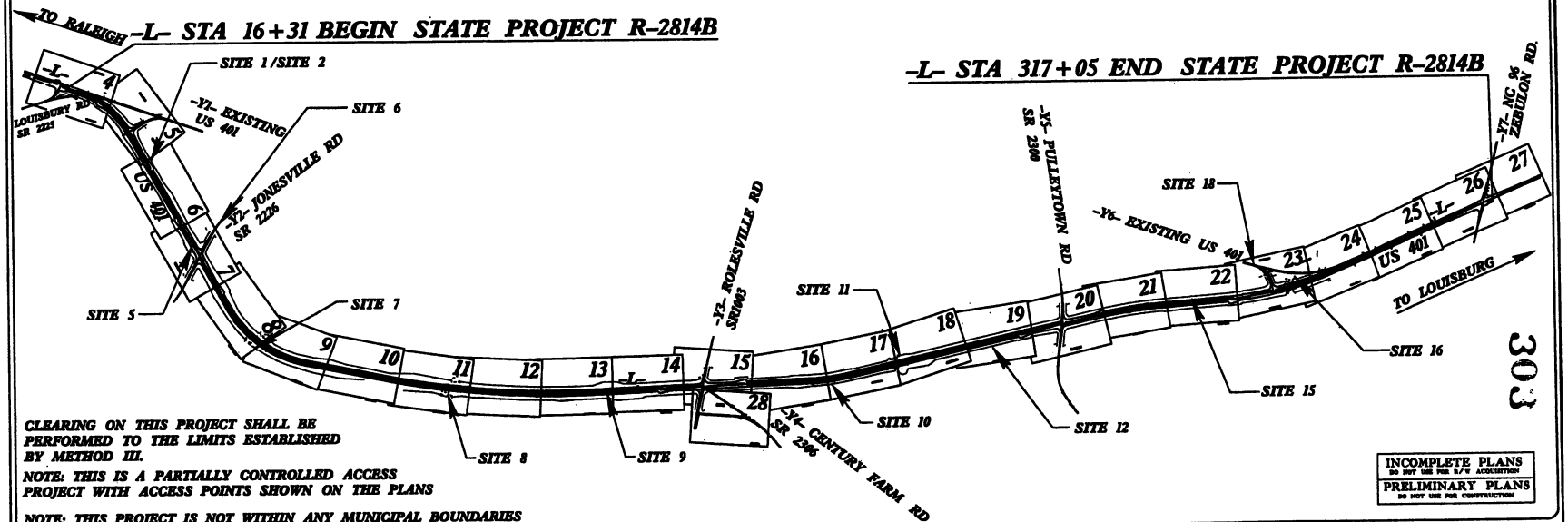
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34506.1.1	STP-401(4)	PE	

Buffer Drawing Sheet 6 of 20

LOCATION: US 401 ROLESVILLE BYPASS FROM SR 2225, LOUISBURY ROAD TO NC 96, ZEBULON ROAD

BUFFER IMPACTS

NAD 83



303

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

NOTE: THIS IS A PARTIALLY CONTROLLED ACCESS PROJECT WITH ACCESS POINTS SHOWN ON THE PLANS

NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 5 0 5 10

DESIGN DATA

ADT 2030 = 24600
ADT =
DHV = 55 %
D = 13 %
T = 7 % *
V = 60 MPH

* TTST 2 DUAL 5

PROJECT LENGTH

LENGTH ROADWAY F.A PROJECT STP-401(4) = 5.696 MILES
TOTAL LENGTH TIP PROJECT R-2814B = 5.696 MILES

PERMIT DRAWINGS PREPARED BY :
RK&K
FOR THE DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 17, 2009

LETTING DATE: APRIL 19, 2011

JS GOODNIGHT
PROJECT ENGINEER

TD GOINS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE P.E.

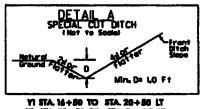
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

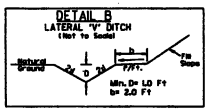
Buffer Drawing
Sheet 7 of 20

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



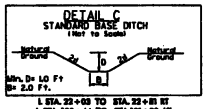
Y1 STA. 16+80 TO STA. 20+80 LT
Y2 STA. 23+80 TO STA. 24+35 LT
Y4 STA. 10+45 TO STA. 13+05 RT
Y4 STA. 20+80 TO STA. 22+20 LT
Y4 STA. 30+80 TO STA. 32+20 RT
Y5 STA. 21+17 TO STA. 24+90 LT
Y6 STA. 15+88 TO STA. 17+86 RT
Y6 STA. 18+25 TO STA. 20+79 LT
Y8 STA. 10+52 TO STA. 12+65 RT

DETAIL B
LATERAL "V" DITCH
(Not to Scale)



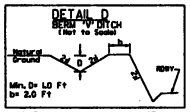
L STA. 22+40 TO STA. 23+80 LT
L STA. 97+50 TO STA. 98+80 RT
L STA. 139+50 TO STA. 143+00 RT
L STA. 190+78 TO STA. 191+25 LT
L STA. 237+00 TO STA. 239+00 RT
L STA. 257+25 TO STA. 258+23 RT
L STA. 261+80 TO STA. 263+80 RT
L STA. 279+80 TO STA. 281+25 RT
L STA. 285+00 TO STA. 286+80 RT
L STA. 295+70 TO STA. 298+80 LT
L STA. 319+35 TO STA. 321+00 RT
L STA. 339+75 TO STA. 338+80 LT
Y5 STA. 16+56 TO STA. 19+68 LT
Y5 STA. 18+97 TO STA. 19+28 LT
Y5 STA. 25+40 TO STA. 26+00 RT

DETAIL C
STANDARD BASE DITCH
(Not to Scale)



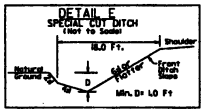
L STA. 22+03 TO STA. 22+81 RT
L STA. 100+44 TO STA.101+00 LT
Y6 STA. 14+94 TO STA.15+05 RT

DETAIL D
BERM "V" DITCH
(Not to Scale)



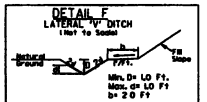
L STA. 26+00 TO STA. 26+35 LT
L STA. 33+80 TO STA. 34+50 LT
L STA. 39+80 TO STA. 41+80 LT
L STA. 43+00 TO STA. 51+80 LT
L STA. 70+80 TO STA. 73+40 LT
L STA. 95+00 TO STA. 97+80 RT
L STA. 99+80 TO STA. 106+00 RT
L STA. 109+80 TO STA. 113+50 LT
L STA. 119+80 TO STA. 123+00 RT
L STA. 180+00 TO STA. 190+00 LT
L STA. 205+00 TO STA. 217+50 LT
L STA. 233+00 TO STA. 237+00 RT
Y6 STA. 14+95 TO STA. 17+85 RT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



L STA. 34+80 TO STA. 35+80 RT
L STA. 39+00 TO STA. 39+80 RT
L LT STA. 39+70 TO STA. 41+80 RT
L STA. 41+00 TO STA. 41+80 LT
L STA. 196+00 TO STA. 196+80 LT
L STA. 198+00 TO STA. 197+80 RT
L STA. 225+00 TO STA. 227+80 RT
L STA. 239+80 TO STA. 240+00 LT
L STA. 291+00 TO STA. 291+80 RT
L STA. 320+80 TO STA. 323+80 LT
L STA. 321+00 TO STA. 323+80 RT

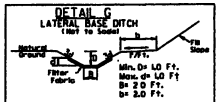
DETAIL F
LATERAL "V" DITCH
(Not to Scale)



Type of Liner= PSRM

L STA. 23+00 TO STA. 25+80 LT
L STA. 32+00 TO STA. 33+40 LT
L STA. 41+80 TO STA. 43+80 LT
L STA. 98+80 TO STA. 99+80 RT
L STA. 133+80 TO STA. 135+80 RT
L STA. 190+80 TO STA. 190+75 LT
L STA. 262+80 TO STA. 265+00 LT
L STA. 280+80 TO STA. 282+00 LT
L STA. 284+80 TO STA. 287+80 LT
L STA. 298+01 TO STA. 300+30 LT
Y2 STA. 21+80 TO STA. 22+85 LT
Y2 STA. 21+30 TO STA. 22+20 RT

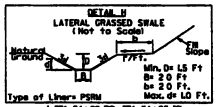
DETAIL G
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

L STA. 52+00 TO STA. 54+00 RT
L STA. 145+00 TO STA. 147+00 RT
L STA. 144+50 TO STA. 148+00 LT
L STA. 149+00 TO STA. 150+50 LT
L STA. 201+50 TO STA. 203+45 LT

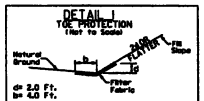
DETAIL H
LATERAL GRASSED SWALE
(Not to Scale)



Type of Liner= PSRM

L STA. 84+88 TO STA. 84+98 RT
L STA. 114+18 TO STA. 115+82 RT

DETAIL I
TOE PROTECTION
(Not to Scale)

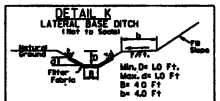


d= 2.0 Ft.
B= 4.0 Ft.

Type of Liner= Class B Rip-Rap

L STA. 51+88 TO STA. 52+68 LT
L STA. 77+27 TO STA. 78+68 RT
L STA. 113+73 TO STA. 115+52 LT
L STA. 115+28 TO STA. 117+88 RT
L STA. 135+80 TO STA. 142+88 LT
L STA. 147+28 TO STA. 151+88 RT
L STA. 184+88 TO STA. 186+88 RT
L STA. 244+75 TO STA. 247+88 LT
L STA. 229+88 LT TO STA. Y5 19+88 RT

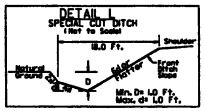
DETAIL K
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

L STA. 52+21 TO STA. 54+88 LT
L STA. 279+15 TO STA. 276+88 RT

DETAIL L
SPECIAL CUT DITCH
(Not to Scale)



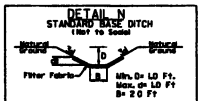
L STA. 21+88 TO STA. 22+08 LT
L STA. 47+88 TO STA. 41+80 LT
L STA. 99+88 TO STA. 99+80 RT
L STA. 189+80 TO STA. 190+88 LT
L STA. 249+88 TO STA. 250+88 LT
L STA. 288+88 TO STA. 288+80 RT

DETAIL M
LATERAL "V" DITCH
(Not to Scale)

Type of Liner= Class B Rip-Rap

Y2 STA. 22+85 TO STA. 22+95 LT

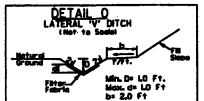
DETAIL N
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

L STA. 84+80 TO STA. 85+43 LT

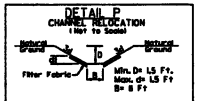
DETAIL O
LATERAL "V" DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

L STA. 22+81 TO STA. 24+00 RT
L STA. 41+00 TO STA. 41+80 LT
L STA. 82+80 TO STA. 85+80 LT
L STA. 284+80 TO STA. 287+00 RT
L STA. 298+80 TO STA. 299+80 RT

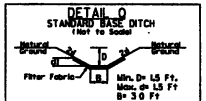
DETAIL P
CHANNEL RELOCATION
(Not to Scale)



Type of Liner= Class Rip Rap

L STA. 76+97 TO STA. 78+27 RT

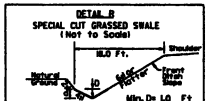
DETAIL Q
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class Rip-Rap

L STA. 72+67 TO STA. 74+88 LT

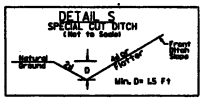
DETAIL R
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Type of Liner= PSRM

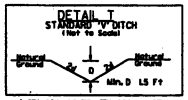
L STA. 108+88 TO STA. 111+88 RT
L STA. 134+88 TO STA. 138+88 LT
L STA. 134+88 TO STA. 138+88 RT

DETAIL S
SPECIAL CUT DITCH
(Not to Scale)



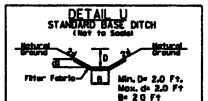
Y3 STA. 21+88 TO STA. 22+38 LT
Y4 STA. 10+46 TO STA. 12+88 LT

DETAIL T
STANDARD "V" DITCH
(Not to Scale)



L STA. 164+88 TO STA. 164+38 RT
L STA. 164+88 TO STA. 164+97 RT
L STA. 269+65 TO STA. 270+38 RT
Y3 STA. 28+85 TO STA. 26+50 LT

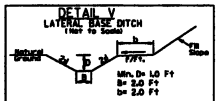
DETAIL U
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

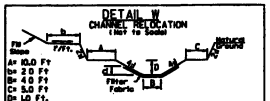
Y3 STA. 22+20 TO STA. 23+48 RT

DETAIL V
LATERAL BASE DITCH
(Not to Scale)



L STA. 38+88 TO STA. 39+33 RT
L STA. 134+88 TO STA. 136+88 LT
L STA. 137+88 TO STA. 138+88 RT
L STA. 217+88 TO STA. 221+88 LT
L STA. 224+88 TO STA. 227+88 LT
L STA. 229+88 TO STA. 246+18 RT
L STA. 281+88 TO STA. 287+28 RT
L STA. 276+88 TO STA. 278+88 RT
Y5 STA. 17+88 TO STA. 18+75 RT
Y7 STA. 17+88 TO STA. 19+38 RT

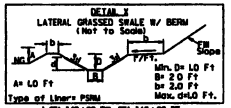
DETAIL W
CHANNEL RELOCATION
(Not to Scale)



Type of Liner= Class B Rip Rap

L STA. 147+88 TO STA. 150+83 RT

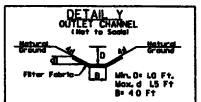
DETAIL X
LATERAL GRASSED SWALE W/ BERM
(Not to Scale)



Type of Liner= PSRM

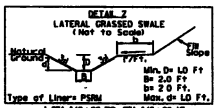
L STA. 143+88 TO STA. 146+88 RT
L STA. 148+88 TO STA. 149+88 LT
L STA. 182+88 TO STA. 184+88 LT

DETAIL Y
OUTLET CHANNEL
(Not to Scale)



L STA. 30+48 TO STA. 30+48 RT, LINER= CLASS I RIP RAP (BANKS ONLY)
L STA. 84+72 RT, LINER= CLASS I RIP RAP (BANKS ONLY)
L STA. 144+24 TO STA. 144+86 LT, LINER= CLASS I RIP RAP (BANKS ONLY)
Y2 STA. 17+48 RT, LINER= CLASS I RIP RAP (BANKS ONLY), B VARIES 2'-9"
Y5 STA. 25+40 TO STA. 25+40 RT, LINER= CLASS B RIP RAP

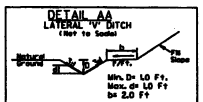
DETAIL Z
LATERAL GRASSED SWALE
(Not to Scale)



Type of Liner= PSRM

L STA. 148+88 TO STA. 149+88 LT
L STA. 150+88 TO STA. 154+88 LT
L STA. 199+88 TO STA. 201+88 LT
L STA. 281+28 TO STA. 283+88 RT (B=0.0')

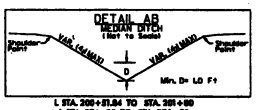
DETAIL AA
LATERAL "V" DITCH
(Not to Scale)



Type of Liner= PSRM

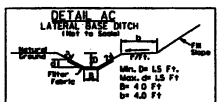
L STA. 198+88 TO STA. 200+30 RT

DETAIL AB
MEDIAN DITCH
(Not to Scale)



L STA. 268+81.84 TO STA. 269+88
L STA. 274+88 TO STA. 276+38

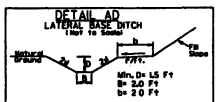
DETAIL AC
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

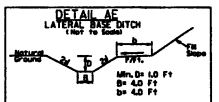
L STA. 280+41 TO STA. 283+88 RT

DETAIL AD
LATERAL BASE DITCH
(Not to Scale)



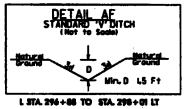
L STA. 221+88 TO STA. 224+88 LT
L STA. 252+88 TO STA. 257+25 LT
Y7 STA. 11+50 TO STA. 15+27 RT

DETAIL AE
LATERAL BASE DITCH
(Not to Scale)



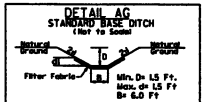
Y5 STA. 15+45 TO STA. 15+97 LT

DETAIL AF
STANDARD "V" DITCH
(Not to Scale)



L STA. 296+88 TO STA. 298+01 LT

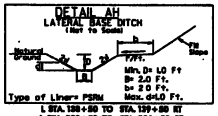
DETAIL AG
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class IRip-Rap

L STA. 84+88 TO STA. 84+81 LT

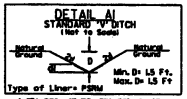
DETAIL AH
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= PSRM

L STA. 138+88 TO STA. 139+88 RT
L STA. 262+88 TO STA. 264+88 RT
L STA. 280+88 TO STA. 281+88 RT
L STA. 278+88 TO STA. 279+88 RT

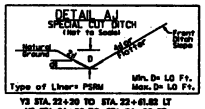
DETAIL AI
STANDARD "V" DITCH
(Not to Scale)



Type of Liner= PSRM

L STA. 290+47 TO STA. 291+88 LT

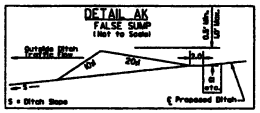
DETAIL AJ
SPECIAL CUT DITCH
(Not to Scale)



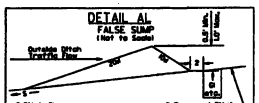
Type of Liner= PSRM

Y3 STA. 22+20 TO STA. 22+61.82 LT
Y5 STA. 25+88 TO STA. 26+98 RT

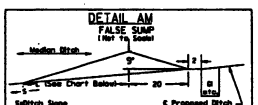
DETAIL AK
FALSE SUMP
(Not to Scale)



DETAIL AL
FALSE SUMP
(Not to Scale)



DETAIL AM
FALSE SUMP
(Not to Scale)



Use Chart Below

Ditch Grade	L	Ditch Grade	L
0.00 to 2.00	20'	Over 4.00 to 6.00	40'
Over 2.00 to 4.00	30'	Over 6.00	50'

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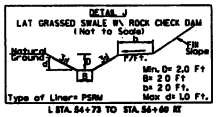
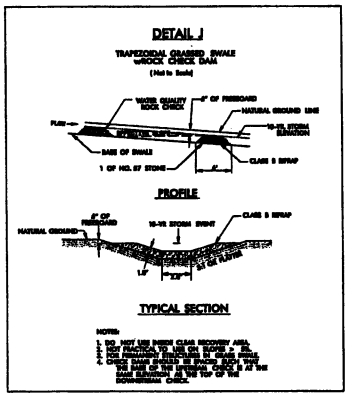
PROJECT REFERENCE NO.	SHEET NO.
R-2814B	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

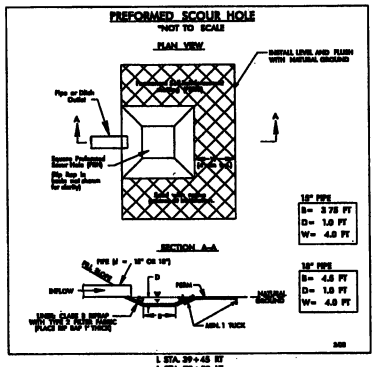
Buffer Drawing Sheet 8 of 20



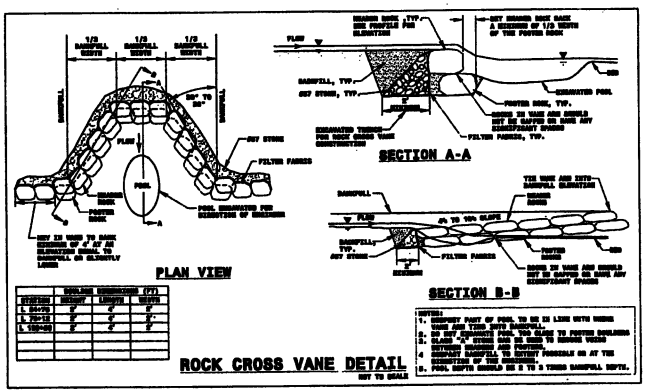
L STA. 84+73 TO STA. 84+60 RT

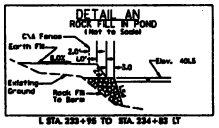


L STA. 84+73 TO STA. 84+60 RT



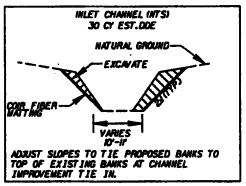
L STA. 39+45 RT
L STA. 79+86 LT
L STA. 347+64 RT
L STA. 374+08 RT
L STA. 376+79 LT
L STA. 378+60 LT

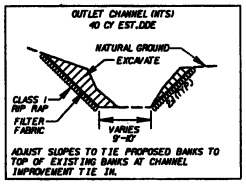




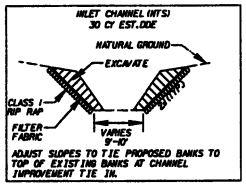
L STA. 233+95 TO STA. 234+83 LT

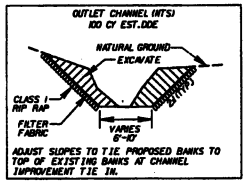
CULVERT INLET\OUTLET DETAILS
HARRIS CREEK TRIBUTARY
-L- STA 77+89



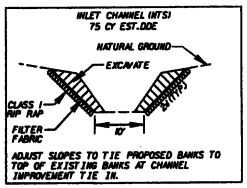


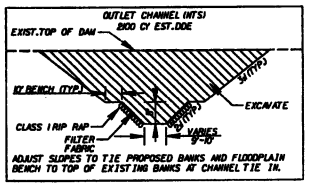
CULVERT INLET\OUTLET DETAILS
HARRIS CREEK
-L- STA 115+74



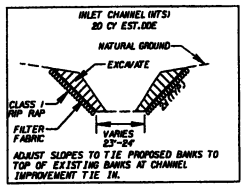


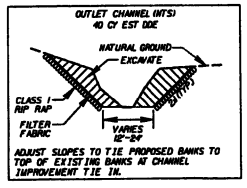
CULVERT INLET\OUTLET DETAILS
CEDAR FORK
-L- STA 200+04

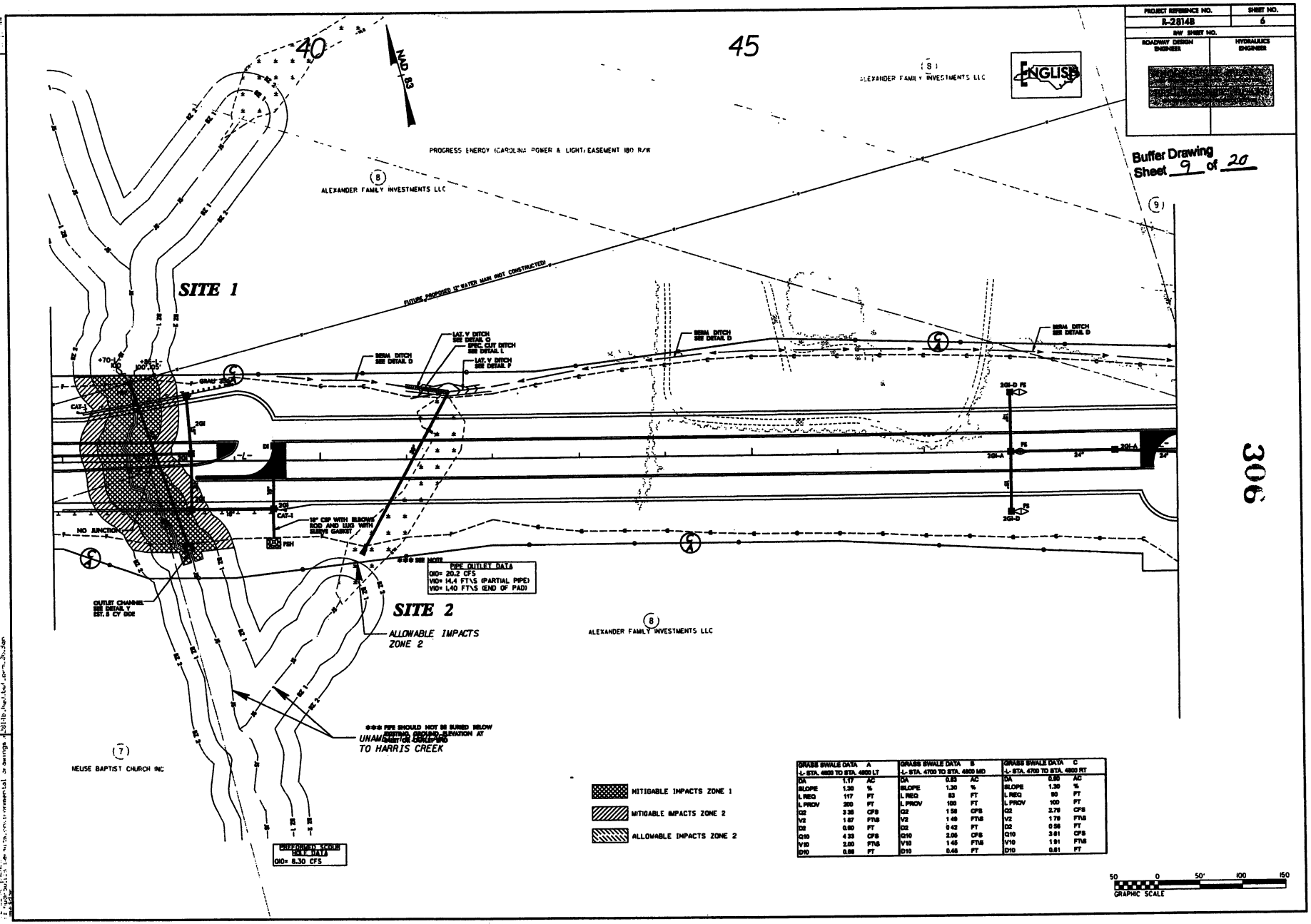




CULVERT INLET\OUTLET DETAILS
PERRY CREEK
-L- STA 275+39







GRASS SWALE DATA A -L- STA. 4600 TO STA. 4600 LT		
DA	1.17	AC
SLOPE	1.30	%
L REQ	117	FT
L PROV	200	FT
Q2	3.36	CFS
V2	1.87	FT/S
D2	0.60	FT
Q10	4.33	CFS
V10	2.00	FT/S
D10	0.66	FT

GRASS SWALE DATA B -L- STA. 4700 TO STA. 4800 MD		
DA	0.83	AC
SLOPE	1.30	%
L REQ	83	FT
L PROV	100	FT
Q2	1.58	CFS
V2	1.49	FT/S
D2	0.42	FT
Q10	2.05	CFS
V10	1.45	FT/S
D10	0.46	FT

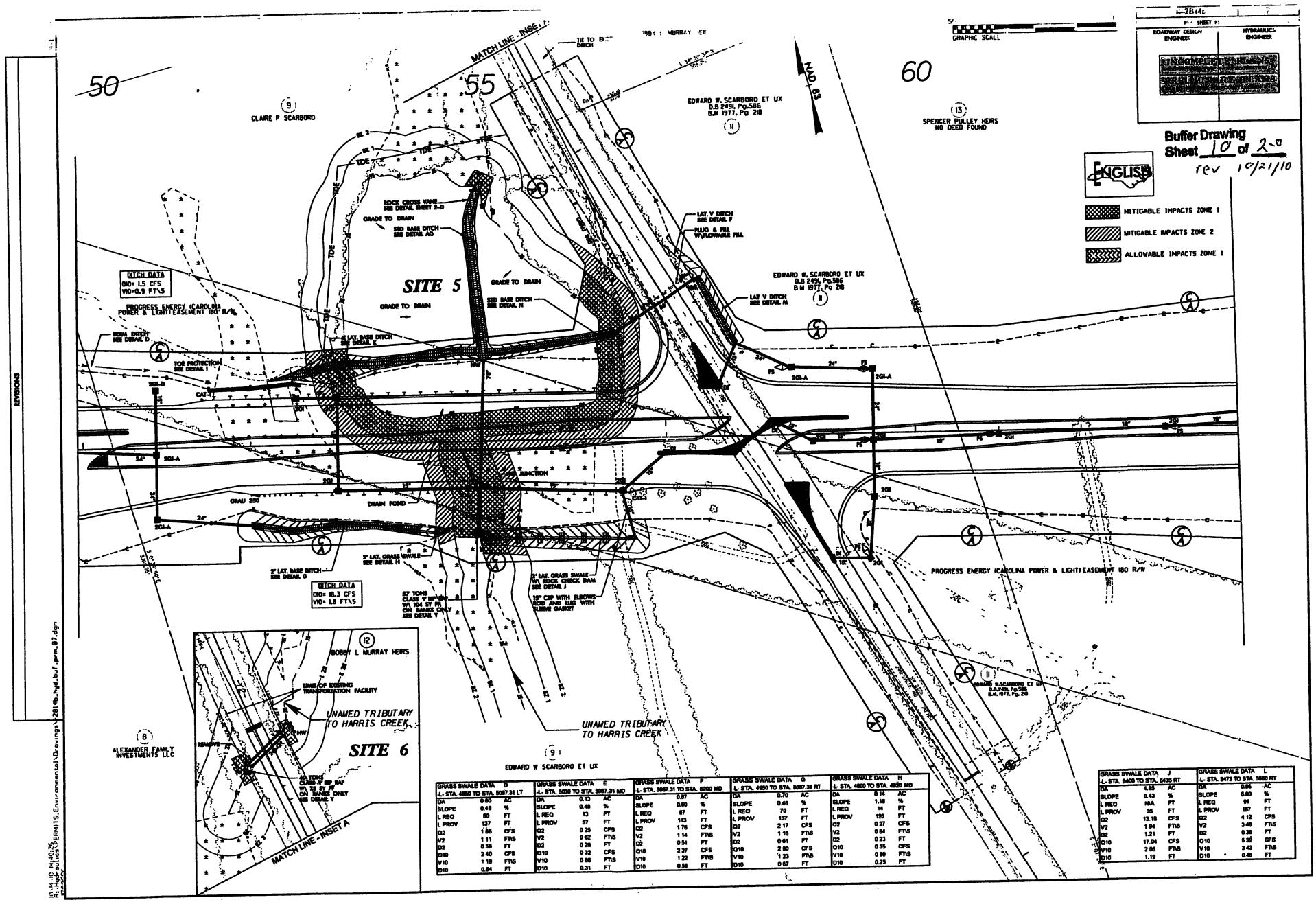
GRASS SWALE DATA C -L- STA. 4700 TO STA. 4800 RT		
DA	0.80	AC
SLOPE	1.30	%
L REQ	80	FT
L PROV	100	FT
Q2	2.78	CFS
V2	1.79	FT/S
D2	0.56	FT
Q10	3.91	CFS
V10	1.91	FT/S
D10	0.81	FT

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 9 of 20

306

REVISIONS



GRASS SWALE DATA D -L- STA. 4980 TO STA. 5067.31 LT		
DA	0.80	AC
SLOPE	0.48	%
L REQ	80	FT
L PROV	137	FT
Q2	1.86	CFS
V2	1.11	FT/S
D2	0.58	FT
Q10	2.40	CFS
V10	1.19	FT/S
D10	0.64	FT

GRASS SWALE DATA E -L- STA. 5030 TO STA. 5067.31 MD		
DA	0.13	AC
SLOPE	0.48	%
L REQ	13	FT
L PROV	57	FT
Q2	0.25	CFS
V2	0.62	FT/S
D2	0.28	FT
Q10	0.32	CFS
V10	0.66	FT/S
D10	0.31	FT

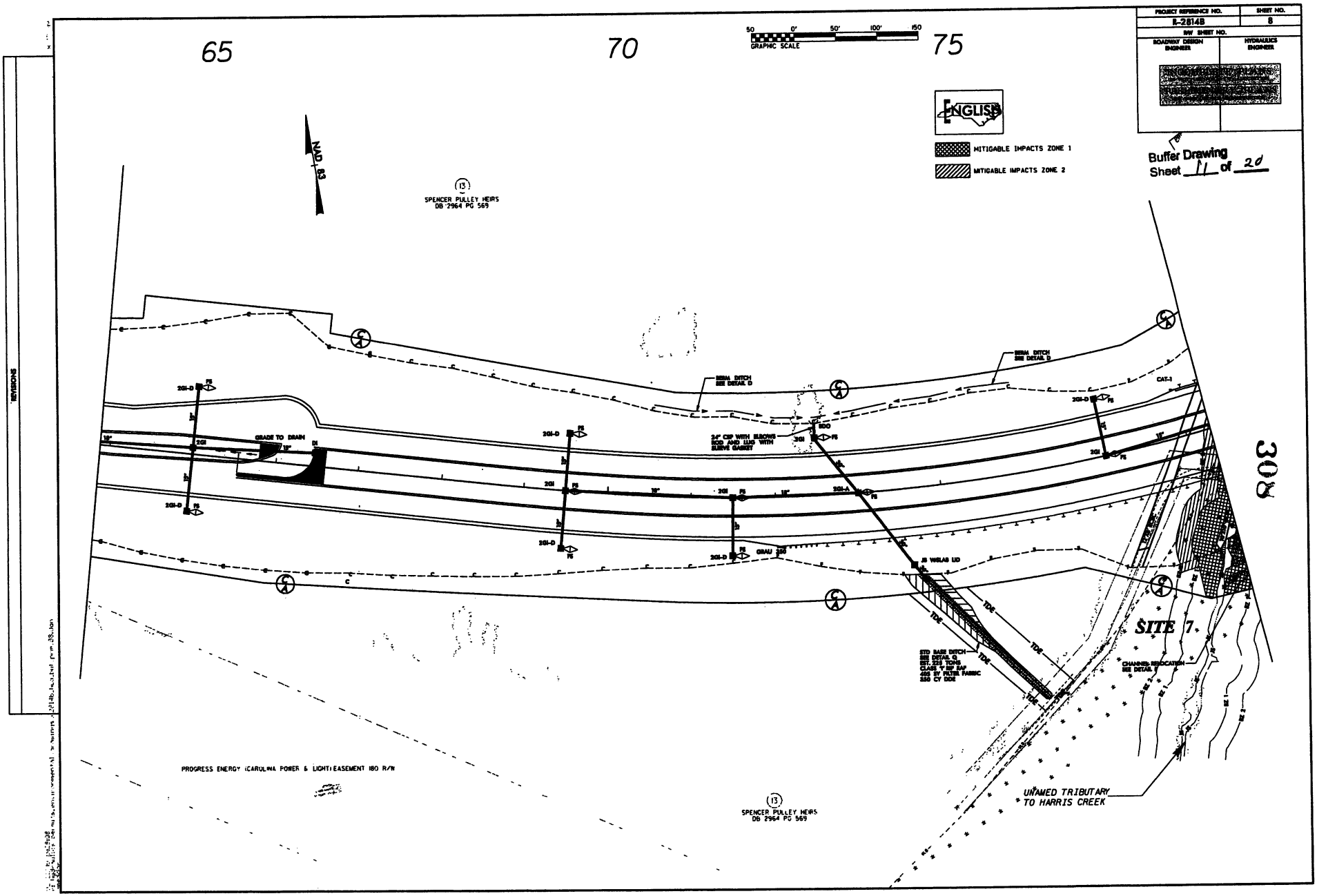
GRASS SWALE DATA F -L- STA. 5067.31 TO STA. 5200 MD		
DA	0.87	AC
SLOPE	0.60	%
L REQ	67	FT
L PROV	113	FT
Q2	1.76	CFS
V2	1.14	FT/S
D2	0.51	FT
Q10	2.27	CFS
V10	1.22	FT/S
D10	0.56	FT

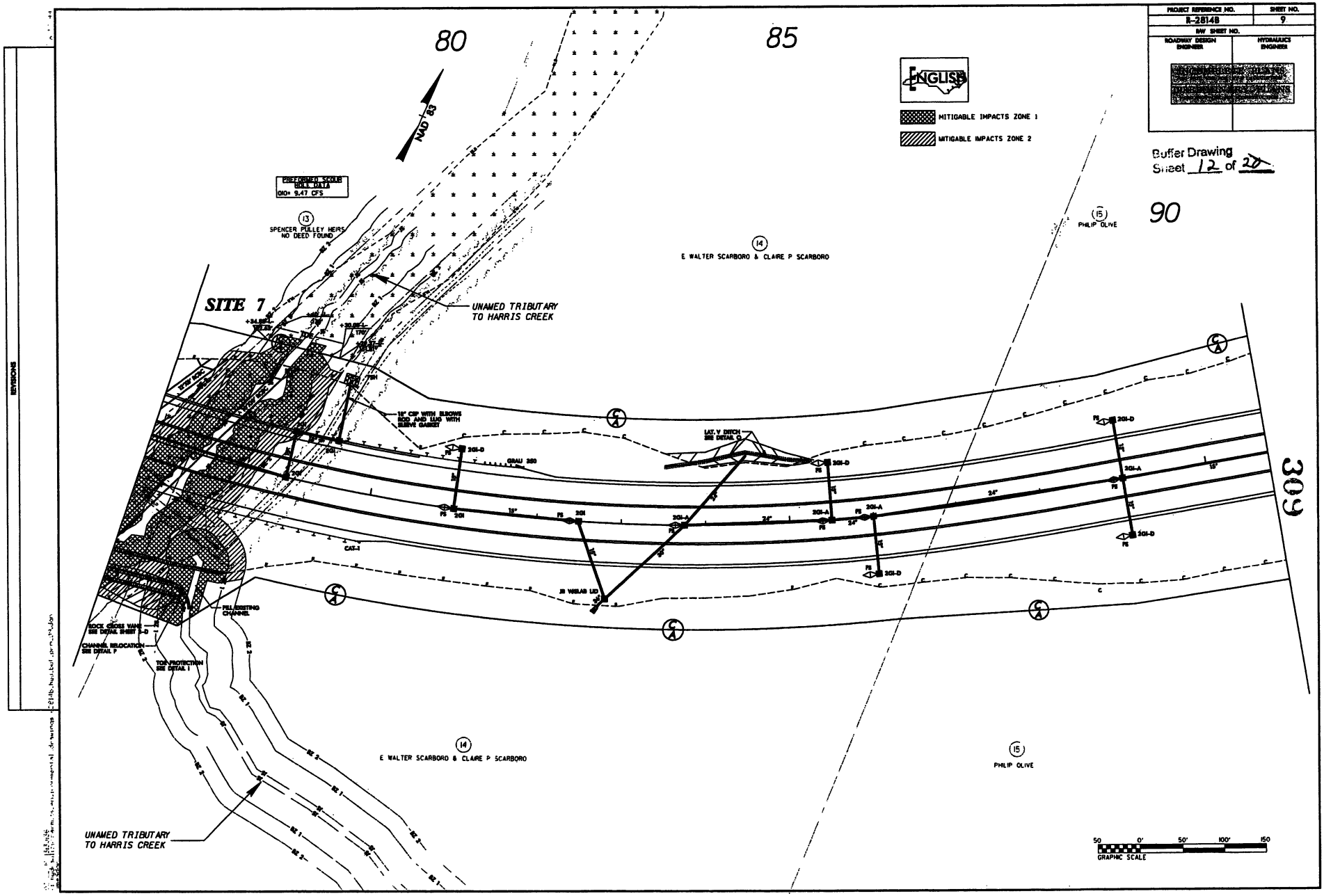
GRASS SWALE DATA G -L- STA. 4980 TO STA. 5067.31 RT		
DA	0.70	AC
SLOPE	0.48	%
L REQ	79	FT
L PROV	137	FT
Q2	2.17	CFS
V2	1.18	FT/S
D2	0.61	FT
Q10	2.80	CFS
V10	1.23	FT/S
D10	0.67	FT

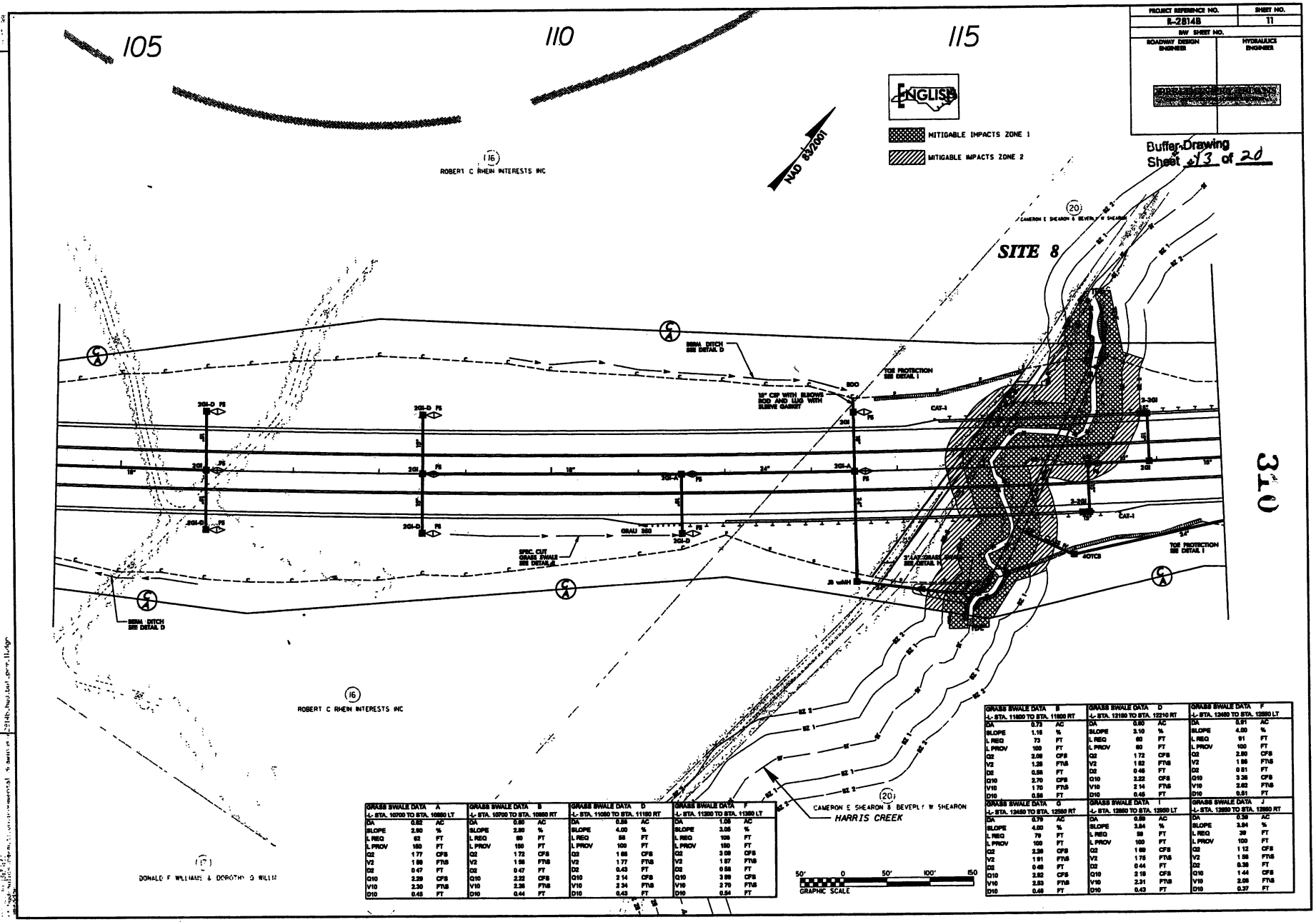
GRASS SWALE DATA H -L- STA. 4980 TO STA. 4936 MD		
DA	0.14	AC
SLOPE	1.16	%
L REQ	14	FT
L PROV	120	FT
Q2	0.27	CFS
V2	0.94	FT/S
D2	0.23	FT
Q10	0.35	CFS
V10	0.89	FT/S
D10	0.25	FT

GRASS SWALE DATA J -L- STA. 5400 TO STA. 5435 RT		
DA	4.83	AC
SLOPE	0.43	%
L REQ	N/A	FT
L PROV	35	FT
Q2	13.18	CFS
V2	1.94	FT/S
D2	1.21	FT
Q10	17.04	CFS
V10	2.05	FT/S
D10	1.19	FT

GRASS SWALE DATA L -L- STA. 5473 TO STA. 5580 RT		
DA	0.86	AC
SLOPE	6.00	%
L REQ	99	FT
L PROV	187	FT
Q2	4.12	CFS
V2	3.46	FT/S
D2	0.28	FT
Q10	5.32	CFS
V10	3.43	FT/S
D10	0.46	FT


65
70
75
GRAPHIC SCALE
50 0' 50' 100' 150
ENGLISH
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing Sheet 11 of 20
NAD 83
SPENCER PULLEY HEIRS
DB 2964 PG 569
SIDEW. DITCH SEE DETAIL D
GRADE TO DRAIN
24" CMP WITH FLARED END AND LUG WITH SLEEVE GASKET
JB W/LAS LID
STD BARR DITCH SEE DETAIL G
CHANNEL RELOCATION SEE DETAIL F
SITE 7
UNAMED TRIBUTARY TO HARRIS CREEK
PROGRESS ENERGY (CAROLINA POWER & LIGHT) EASEMENT 180 R/W
SPENCER PULLEY HEIRS
DB 2964 PG 569
308
REVISIONS


80
85
90
NAD '83
SITE 7
UNAMED TRIBUTARY TO HARRIS CREEK
UNAMED TRIBUTARY TO HARRIS CREEK
PREDOMINATE SOILS: CuB, DaB
Q10= 9.47 CFS
(13) SPENCER PULLEY HEIRS NO DEED FOUND
(14) E WALTER SCARBORO & CLAIRE P SCARBORO
(15) PHILIP OLIVE
(14) E WALTER SCARBORO & CLAIRE P SCARBORO
(15) PHILIP OLIVE
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
PROJECT REFERENCE NO. R-2814B
SHEET NO. 9
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing Sheet 12 of 20
309
REVISIONS
GRAPHIC SCALE
50 0' 50' 100' 150



PROJECT REFERENCE NO.	SHEET NO.
R-2814B	11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet #13 of 20

310

REVISIONS

06/16/09: Added TDE upstream and downstream around the culvert on parcel 20.

GRASS SWALE DATA A		
-L- STA. 10700 TO STA. 10880 LT		
DA	0.02	AC
SLOPE	2.90	%
L REQ	62	FT
L PROV	150	FT
Q2	1.77	CFS
V2	1.55	FTS
D2	0.47	FT
Q10	2.39	CFS
V10	2.30	FTS
D10	0.48	FT

GRASS SWALE DATA B		
-L- STA. 10700 TO STA. 10880 RT		
DA	0.00	AC
SLOPE	2.90	%
L REQ	58	FT
L PROV	150	FT
Q2	1.72	CFS
V2	1.56	FTS
D2	0.47	FT
Q10	2.22	CFS
V10	2.26	FTS
D10	0.44	FT

GRASS SWALE DATA D		
-L- STA. 11080 TO STA. 11180 RT		
DA	0.05	AC
SLOPE	4.00	%
L REQ	58	FT
L PROV	100	FT
Q2	1.66	CFS
V2	1.77	FTS
D2	0.43	FT
Q10	2.14	CFS
V10	2.34	FTS
D10	0.43	FT

GRASS SWALE DATA F		
-L- STA. 11300 TO STA. 11360 LT		
DA	1.09	AC
SLOPE	3.05	%
L REQ	109	FT
L PROV	150	FT
Q2	3.08	CFS
V2	1.97	FTS
D2	0.58	FT
Q10	3.99	CFS
V10	2.70	FTS
D10	0.54	FT

GRASS SWALE DATA B		
-L- STA. 11880 TO STA. 11958 RT		
DA	0.73	AC
SLOPE	1.15	%
L REQ	73	FT
L PROV	100	FT
Q2	2.08	CFS
V2	1.28	FTS
D2	0.58	FT
Q10	2.70	CFS
V10	1.70	FTS
D10	0.56	FT

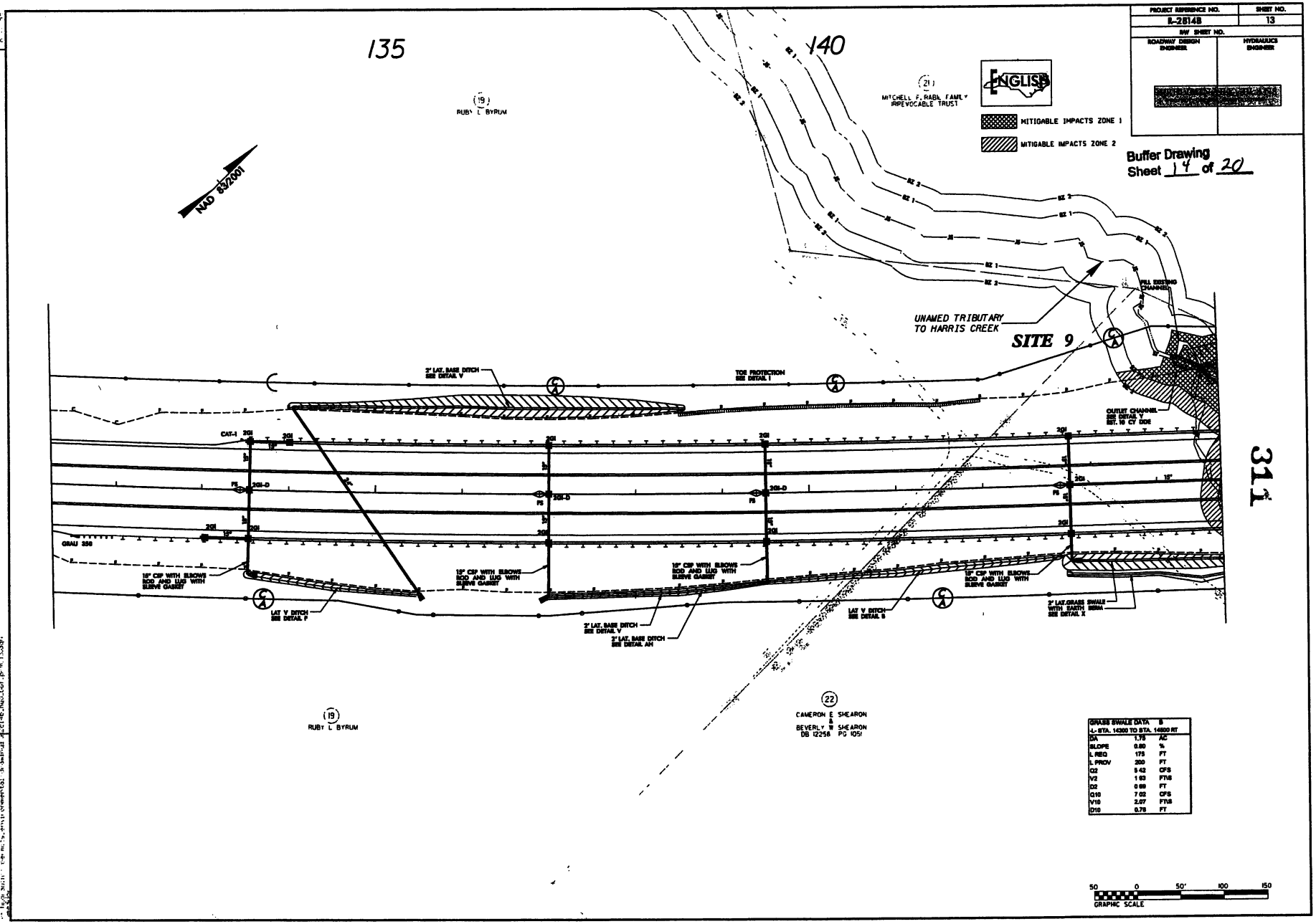
GRASS SWALE DATA D		
-L- STA. 12180 TO STA. 12210 RT		
DA	0.60	AC
SLOPE	3.10	%
L REQ	60	FT
L PROV	60	FT
Q2	1.72	CFS
V2	1.62	FTS
D2	0.46	FT
Q10	2.22	CFS
V10	2.14	FTS
D10	0.45	FT

GRASS SWALE DATA F		
-L- STA. 12460 TO STA. 12550 LT		
DA	0.91	AC
SLOPE	4.00	%
L REQ	91	FT
L PROV	100	FT
Q2	2.60	CFS
V2	1.98	FTS
D2	0.61	FT
Q10	3.36	CFS
V10	2.62	FTS
D10	0.61	FT

GRASS SWALE DATA G		
-L- STA. 12450 TO STA. 12550 RT		
DA	0.79	AC
SLOPE	4.00	%
L REQ	79	FT
L PROV	100	FT
Q2	2.26	CFS
V2	1.91	FTS
D2	0.49	FT
Q10	2.82	CFS
V10	2.83	FTS
D10	0.48	FT

GRASS SWALE DATA I		
-L- STA. 12660 TO STA. 12660 LT		
DA	0.69	AC
SLOPE	3.84	%
L REQ	69	FT
L PROV	100	FT
Q2	1.69	CFS
V2	1.75	FTS
D2	0.44	FT
Q10	2.18	CFS
V10	2.31	FTS
D10	0.43	FT

GRASS SWALE DATA J		
-L- STA. 12660 TO STA. 12660 RT		
DA	0.39	AC
SLOPE	3.84	%
L REQ	39	FT
L PROV	100	FT
Q2	1.12	CFS
V2	1.58	FTS
D2	0.38	FT
Q10	1.44	CFS
V10	2.08	FTS
D10	0.37	FT



PROJECT REFERENCE NO. R-2514B | SHEET NO. 13
RW SHEET NO.
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

Buffer Drawing Sheet 14 of 20

311

REVISIONS
REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	14
SW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet 15 of 20

145 150 155

NAD 83/2001

ENGLISH

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

(21) MITCHELL F. RABIL FAMILY IRREVOCABLE TRUST

REVISIONS

REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09

SITE 9

3' LAT. BASE DITCH SEE DETAIL G

DRAIN POND

3' LAT GRASS SWALE SEE DETAIL Z

3' LAT GRASS SWALE WITH EARTH BERM SEE DETAIL X

15" CPP WITH BROWN BOOT AND LUG WITH SLEEVE GASKET

GRAU 300

TOE PROTECTION SEE DETAIL I

CHANNEL RELOCATION SEE DETAIL W

FILL EXISTING CHANNEL

CAT-1

UNAMED TRIBUTARY TO HARRIS CREEK

(22) CAMERON E SHEARON & BEVERLY W SHEARON DB 12258 PG 1051

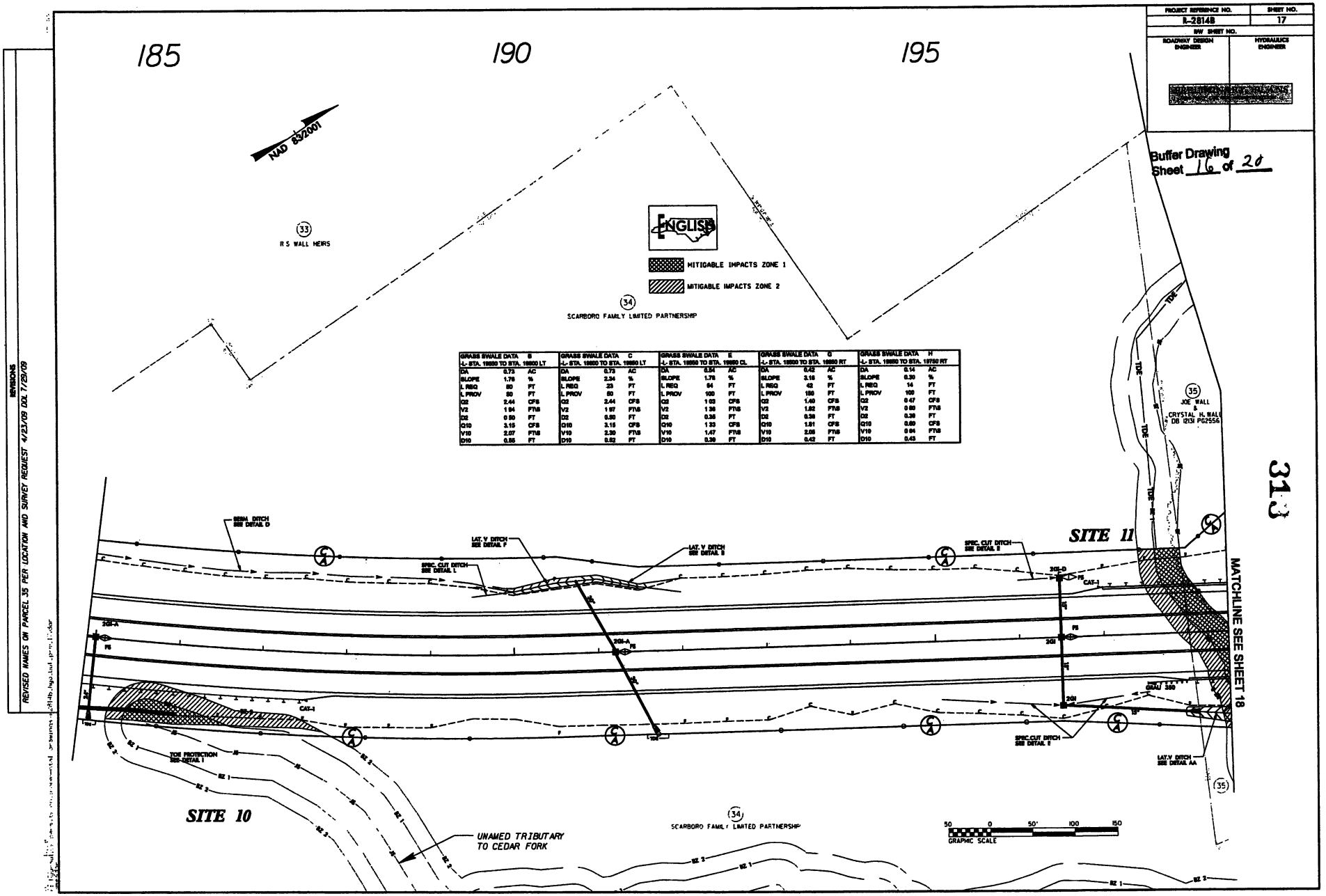
(21) MITCHELL F. RABIL FAMILY IRREVOCABLE TRUST

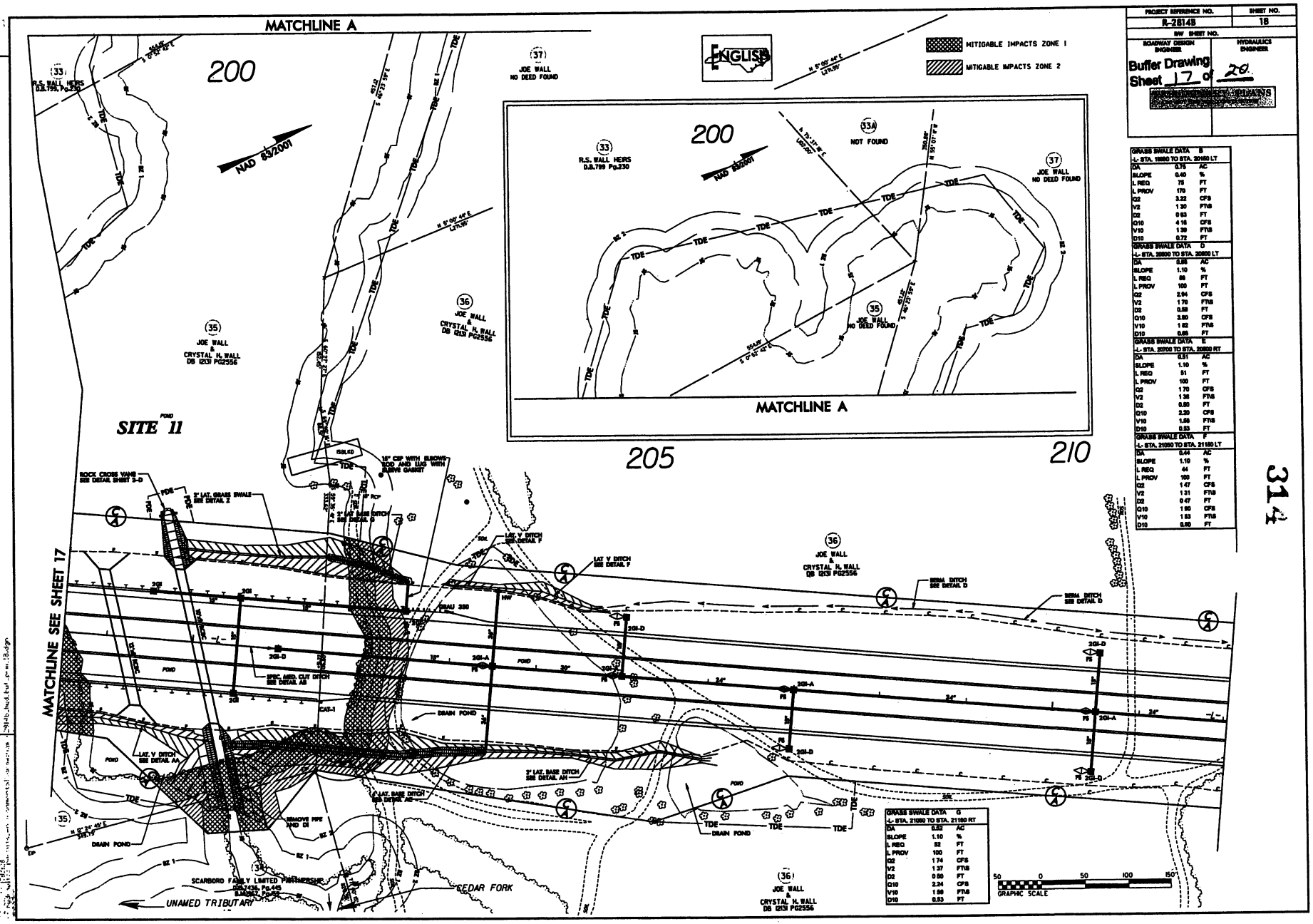
GRASS SWALE DATA D -L- STA. 14600 TO STA. 14800 LT		
DA	1.00	AC
SLOPE	2.20	%
L REQ	100	FT
L PROV	100	FT
Q2	2.88	CFS
V2	1.75	FTS
D2	0.48	FT
Q10	3.70	CFS
V10	2.20	FTS
D10	0.54	FT

GRASS SWALE DATA F -L- STA. 15200 TO STA. 15400 LT		
DA	1.41	AC
SLOPE	0.50	%
L REQ	141	FT
L PROV	150	FT
Q2	3.57	CFS
V2	1.45	FTS
D2	0.63	FT
Q10	4.63	CFS
V10	1.55	FTS
D10	0.72	FT

50 0 50 100 150
GRAPHIC SCALE

312


185
190
195
NAD 83/2001
(33)
R S WALL HEIRS
(34)
SCARBORO FAMILY LIMITED PARTNERSHIP
ENGLISH
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
17
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing Sheet 16 of 20
313
REVISIONS
REVISED NAMES ON PARCEL 35 PER LOCATION AND SURVEY REQUEST 4/23/09 DJL 7/29/09
GRASS SWALE DATA B
-L- STA. 19550 TO STA. 19600 LT
DA 0.73 AC
SLOPE 1.78 %
L REQ 50 FT
L PROV 50 FT
Q2 2.44 CFS
V2 1.94 FTPS
D2 0.50 FT
Q10 3.15 CFS
V10 2.57 FTPS
D10 0.56 FT
GRASS SWALE DATA C
-L- STA. 19550 TO STA. 19600 LT
DA 0.73 AC
SLOPE 2.34 %
L REQ 23 FT
L PROV 50 FT
Q2 2.44 CFS
V2 1.97 FTPS
D2 0.50 FT
Q10 3.15 CFS
V10 2.39 FTPS
D10 0.52 FT
GRASS SWALE DATA E
-L- STA. 19550 TO STA. 19600 CL
DA 0.54 AC
SLOPE 1.78 %
L REQ 64 FT
L PROV 100 FT
Q2 1.03 CFS
V2 1.38 FTPS
D2 0.35 FT
Q10 1.33 CFS
V10 1.47 FTPS
D10 0.38 FT
GRASS SWALE DATA G
-L- STA. 19550 TO STA. 19550 RT
DA 0.42 AC
SLOPE 3.16 %
L REQ 43 FT
L PROV 100 FT
Q2 1.40 CFS
V2 1.82 FTPS
D2 0.38 FT
Q10 1.81 CFS
V10 2.66 FTPS
D10 0.42 FT
GRASS SWALE DATA H
-L- STA. 19550 TO STA. 19750 RT
DA 0.14 AC
SLOPE 0.30 %
L REQ 14 FT
L PROV 100 FT
Q2 0.47 CFS
V2 0.89 FTPS
D2 0.38 FT
Q10 0.60 CFS
V10 0.94 FTPS
D10 0.43 FT
SITE 11
SITE 10
(35)
JOE WALL
&
CRYSTAL H. WALL
DB 12131 PG2556
BERM DITCH SEE DETAIL D
LAT.V DITCH SEE DETAIL F
LAT.V DITCH SEE DETAIL B
SPEC. CUT DITCH SEE DETAIL L
SPEC. CUT DITCH SEE DETAIL E
SPEC.CUT DITCH SEE DETAIL E
LAT.V DITCH SEE DETAIL AA
TOE PROTECTION SEE DETAIL I
CAT-I
FS
GRAU 380
UNAMED TRIBUTARY TO CEDAR FORK
MATCHLINE SEE SHEET 18
50 0 50' 100 150
GRAPHIC SCALE



PROJECT REFERENCE NO.	SHEET NO.
R-2814B	18
SW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 17 of 20

GRASS SWALE DATA B		
-L- STA. 19980 TO STA. 20160 LT		
DA	0.15	AC
SLOPE	0.40	%
L REQ	75	FT
L PROV	176	FT
Q2	3.22	CFS
V2	1.30	FTS
D2	0.53	FT
Q10	4.16	CFS
V10	1.39	FTS
D10	0.72	FT

GRASS SWALE DATA D		
-L- STA. 20800 TO STA. 20880 LT		
DA	0.05	AC
SLOPE	1.10	%
L REQ	66	FT
L PROV	100	FT
Q2	2.94	CFS
V2	1.76	FTS
D2	0.58	FT
Q10	3.80	CFS
V10	1.82	FTS
D10	0.85	FT

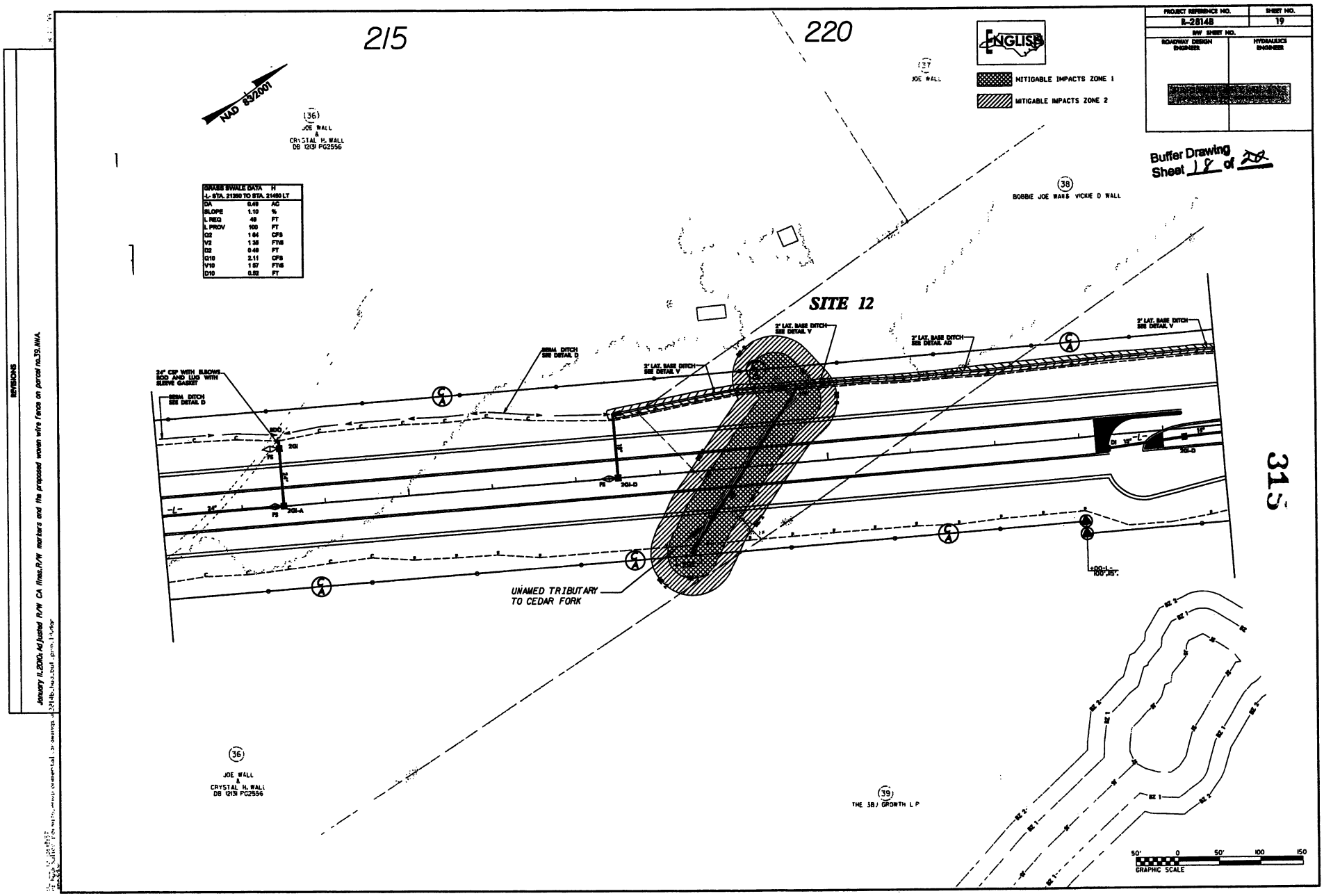
GRASS SWALE DATA E		
-L- STA. 20700 TO STA. 20800 RT		
DA	0.01	AC
SLOPE	1.10	%
L REQ	51	FT
L PROV	100	FT
Q2	1.73	CFS
V2	1.38	FTS
D2	0.50	FT
Q10	2.30	CFS
V10	1.55	FTS
D10	0.83	FT

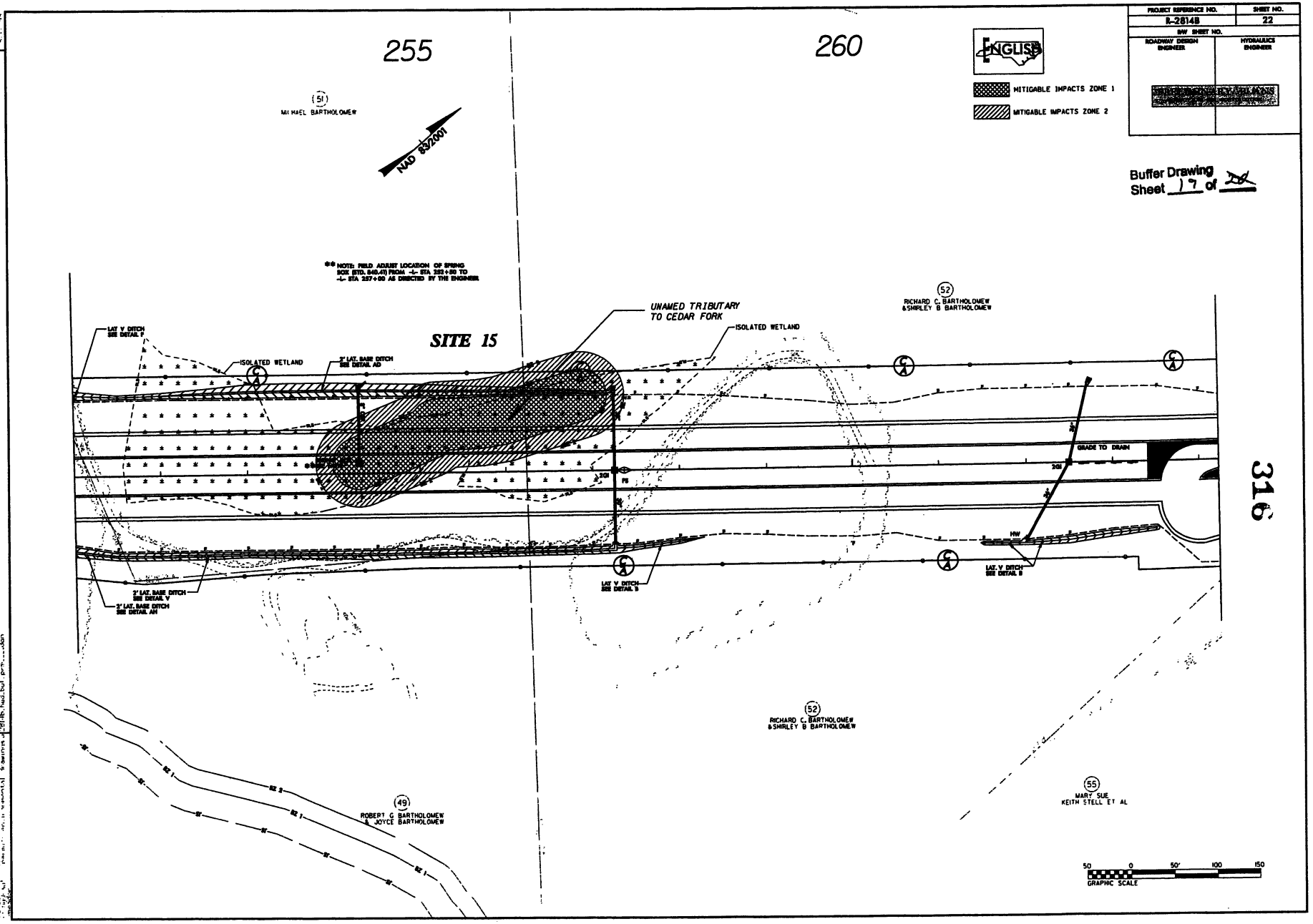
GRASS SWALE DATA F		
-L- STA. 21000 TO STA. 21160 LT		
DA	0.44	AC
SLOPE	1.10	%
L REQ	44	FT
L PROV	100	FT
Q2	1.47	CFS
V2	1.31	FTS
D2	0.47	FT
Q10	1.95	CFS
V10	1.53	FTS
D10	0.80	FT

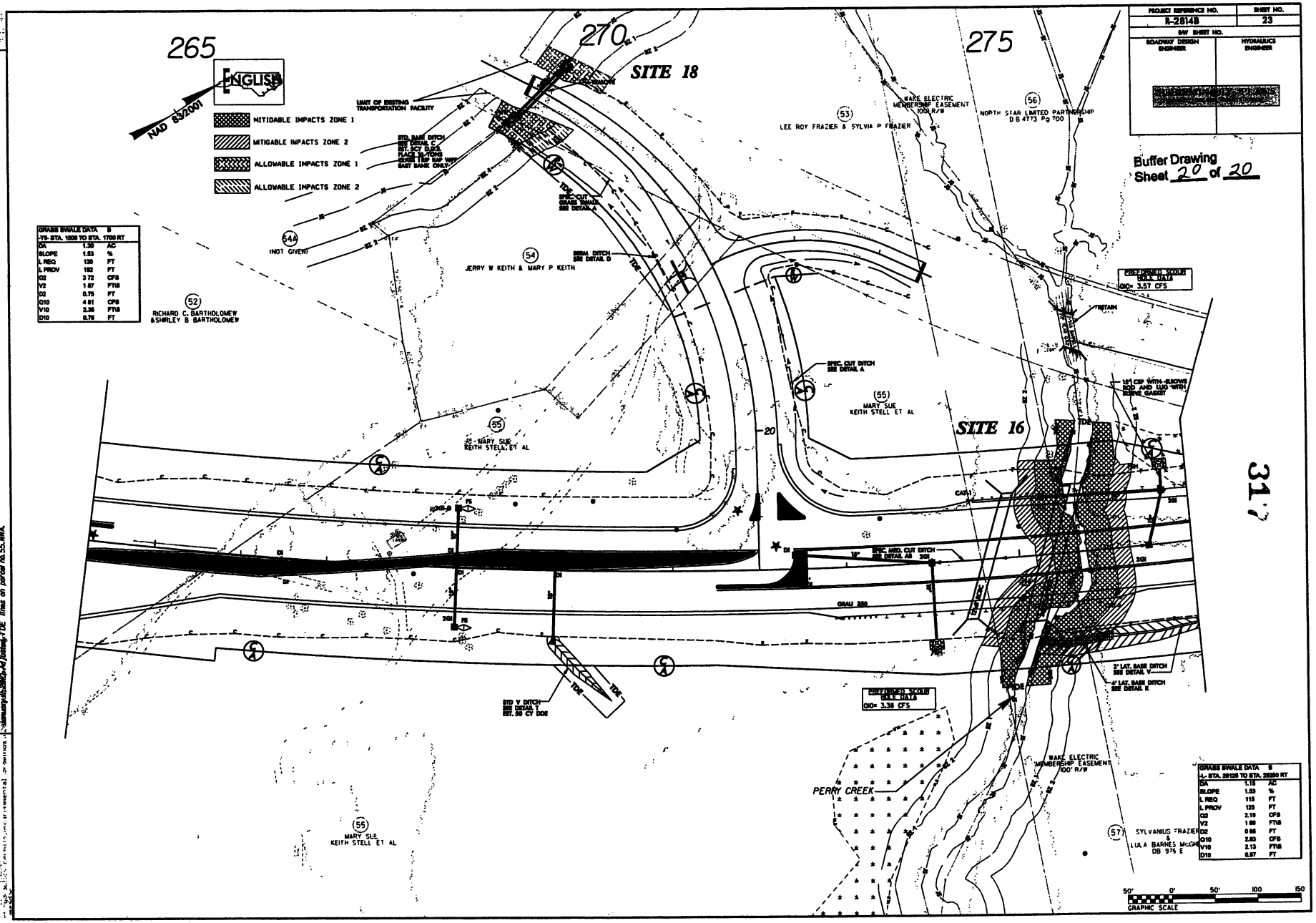
GRASS SWALE DATA G		
-L- STA. 21000 TO STA. 21160 RT		
DA	0.52	AC
SLOPE	1.10	%
L REQ	82	FT
L PROV	100	FT
Q2	1.74	CFS
V2	1.37	FTS
D2	0.59	FT
Q10	2.24	CFS
V10	1.88	FTS
D10	0.93	FT

REVISIONS

REVISED NAMES ON PARCELS 35 AND 36 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09


215
220
NAD 83/2001
ENGLISH
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
PROJECT REFERENCE NO.
B-28148
SHEET NO.
19
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing Sheet 12 of 28
(36) JOE WALL & CRYSTAL H. WALL DB 1213 PG2556
(37) JOE WALL
(38) BOBBIE JOE WALL & VICKIE D WALL
(39) THE 3BJ GROWTH L P
GRASS SWALE DATA -L- STA. 21350 TO STA. 21480 LT
DA 0.49 AC
SLOPE 1.10 %
L REQ 48 FT
L PROV 100 FT
Q2 1.64 CFS
V2 1.35 FPS
D2 0.49 FT
Q10 2.11 CFS
V10 1.57 FPS
D10 0.62 FT
SITE 12
24" CMP WITH BENDS, RCD AND LUO WITH SLOPE GABBET
SEDIMENT DITCH SEE DETAIL D
2' LAT. BASE DITCH SEE DETAIL V
2' LAT. BASE DITCH SEE DETAIL AD
2' LAT. BASE DITCH SEE DETAIL V
SEDIMENT DITCH SEE DETAIL D
RCD
FS
24"
201
201-A
201-B
201-D
UNAMED TRIBUTARY TO CEDAR FORK
+00-L-
100.25'
BZ 1
BZ 2
50' 0 50' 100 150
GRAPHIC SCALE
315
REVISIONS
January 11,2010: Adjusted R/W CA lines,R/W markers and the proposed woven wire fence on parcel no.39,HHA.


255
260
(51)
MICHAEL BARTHOLOMEW
NAD 83/2001
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
PROJECT REFERENCE NO.
R-2614B
SHEET NO.
22
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing Sheet 17 of
** NOTE: FIELD ADJUST LOCATION OF SPRING BOX (STD. 840.41) FROM -L- STA 253+80 TO -L- STA 257+00 AS DIRECTED BY THE ENGINEER
SITE 15
UNAMED TRIBUTARY TO CEDAR FORK
ISOLATED WETLAND
ISOLATED WETLAND
(52)
RICHARD C. BARTHOLOMEW & SHIRLEY B BARTHOLOMEW
LAT V DITCH SEE DETAIL P
3' LAT. BASE DITCH SEE DETAIL AD
GRADE TO DRAIN
HW
LAT. V DITCH SEE DETAIL B
LAT V DITCH SEE DETAIL B
2' LAT. BASE DITCH SEE DETAIL V
3' LAT. BASE DITCH SEE DETAIL AM
(52)
RICHARD C. BARTHOLOMEW & SHIRLEY B BARTHOLOMEW
(49)
ROBERT G BARTHOLOMEW & JOYCE BARTHOLOMEW
(55)
MARY SUE KEITH STELL ET AL
50 0 50' 100 150
GRAPHIC SCALE
REVISIONS
January 11, 2001: Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no. 52 NWA.
316

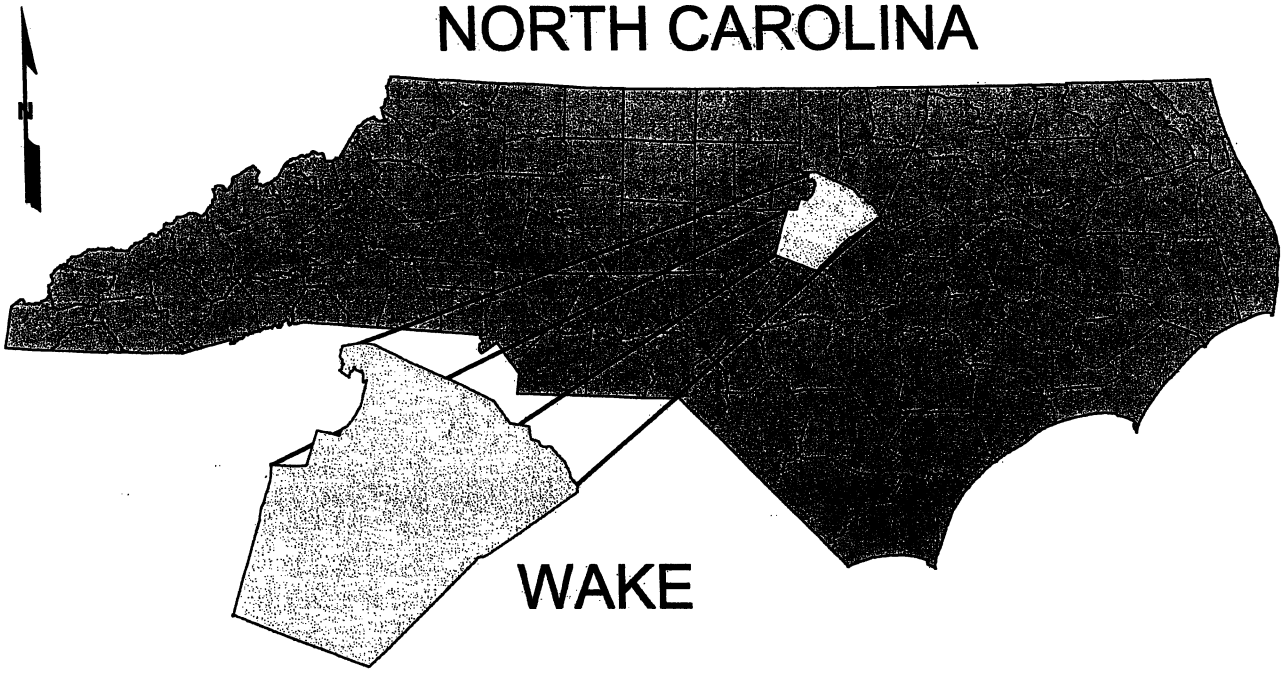


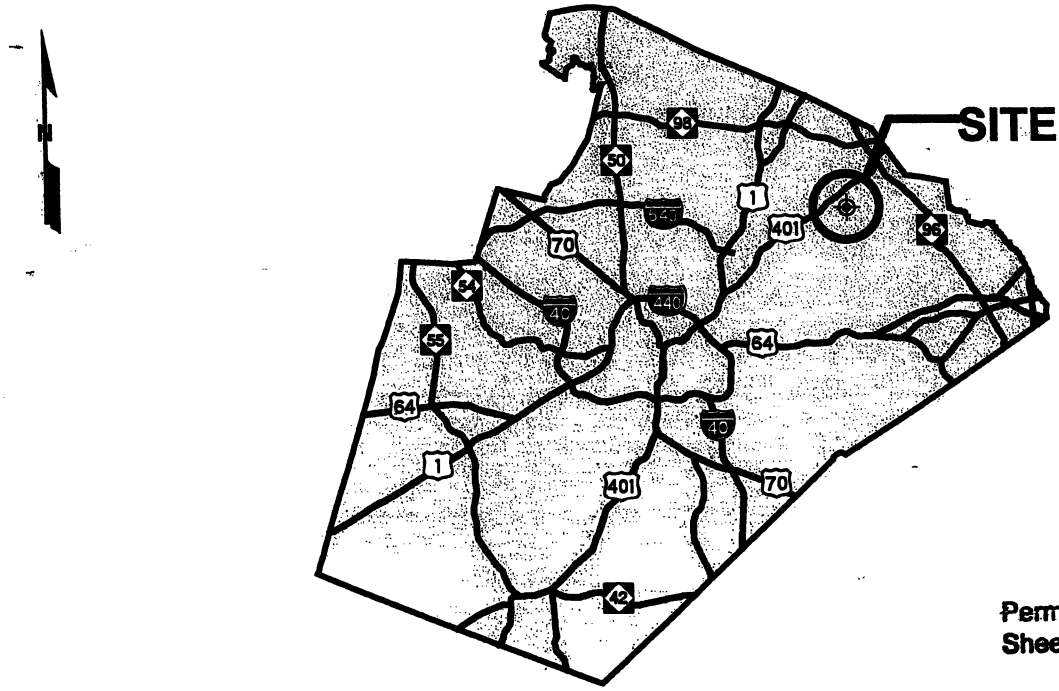
REVISIONS

January 11,2006: Adjusted R/W CA lines,R/W markers and the proposed woven wire fence on parcel nos.52 and 55.HNA.

C:\Documents and Settings\...\Desktop\...\Buffer Drawing Sheet 20 of 20.dgn

317





Permit Drawing
Sheet 1 of 64

STREAM AND WETLAND VICINITY MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

NOVEMBER 2009

1 inch = 3,000 feet

STREAM AND WETLAND LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 34506.1.1 (R-2814B)
US 401 ROLESVILLE BYPASS
FROM SR 2225, LOUISBURY ROAD
TO NC 96, ZEBULON ROAD

NOVEMBER 2009

Source: USGS 7.5 Minute Quadrangle, Rolesville, NC

Permit Drawing
Sheet 2 of 64

PROP. NO.	PROPERTY OWNER NAME	PROP. OWNER ADDRESS
7	Neuse Baptist Church	8700 Capital Blvd , Raleigh, NC 27587
8	Alexander Family investments, LLC	906 Washington St , Cary, NC 27511
9	Scarboro , E Walter and Claire P	9412 Louisburg Rd , Wake Forest, NC 27587
12	Bobby L Murray Heirs (J Brent King Exec)	PO Box 40639, Raleigh, NC 27629
13	Spencer, Pulley Heirs	9412 Louisburg Rd., Wake Forest, NC 27587
14	Scarboro , E Walter and Claire P.	9412 Louisburg Rd , Wake Forest, NC 27587
20	Shearon, Cameron E & Beverly W	4325 Galax Dr , Raleigh, NC 27612
21	Mitchell F Rabil Family Irrevocable Trust	3321 Gondola Dr , Lexington KY, 40513
22	Shearon, Cameron E & Beverly W	4325 Galax Dr , Raleigh, NC 27612
33	R S Wall Heirs	1608 Falls Ct , Raleigh, NC 27615
33A	Wall, Alice W	405 N Main St , Rolesville, NC 27571
34	Scarboro Family Limited Partnership	PO Box 84, Rolesville, NC 27571
35	Wall, Joe & Crystal H	7317 Pulley Town Rd , Wake Forest, NC 27587
36	Wall, Joe & Crystal H	7318 Pulley Town Rd , Wake Forest, NC 27587
37	Wall, Joe	7318 Pulley Town Rd , Wake Forest, NC 27587
38	Bobie Joe Wall & Vickie D Wall	7309 Pulley Town Rd Wake Forest, NC 27587
39	The SBJ Growth, L P	PO Box 19067, Raleigh, NC
49	Bartholomew, Robert G & Joyce C	No Known Address
50	Bartholomew, Richard C & Shirley B.	PO BOX 6, Rolesville, NC 27571
51	Bartholomew, Michael	PO BOX 573, Rolesville, NC 27571
52	Bartholomew, Richard C & Shirley B	PO BOX 6, Rolesville, NC 27571
54	Keith, Jerry W and Mary P	1124 Louisburg Rd , Wake Forest, NC 27587
54A	Bartholomew, Richard C & Shirley B	PO BOX 6, Rolesville, NC 27571
55	Stell, Meith & Mary Sue Et Al	1132 Louisburg Rd , Wake Forest, NC 27587
57	Sylvania Frazier & Lula Barnes McGhee	2725 Wait Ave., Wake Forest, NC 27857

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
WBS - 34506.1.1 (R-2814B)

2/22/2010

Permit Drawing
Sheet 3 of 64

WETLAND PERMIT IMPACT SUMMARY

Site No	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
1	-L- 38+11	60" RCP						0.02	<0.01	243	18	
2	-L- 41+07	30" RCP	0.17		<0.01	0.02						
3	-L- 52+50 LT	N\A	0.22			<0.01						
4	-L- 55+00 RT	78" RCP	0.24		<0.01	0.01		<0.01	<0.01	95	10	
4	-L- 55+00 RT	BANK STABILIZATION						<0.01		20		
5	-L- 55+00 LT [1]	78" RCP			0.01			1.51				
6	-Y2- 17+31 LT	2@42" RCP							<0.01		17	
6	-Y2- 17+31 RT	2@42" RCP							<0.01		8	
6	-Y2- 17+31 RT	BANK STABILIZATION						<0.01		14		
7	-L- 77+89	10'X10' RCBC	0.65		0.10	0.09		0.12	0.02	321	66	
7	-L- 77+89	BANK STABILIZATION						<0.01		47		
8	-L- 115+74	10'X10' RCBC						0.05	<0.01	355	18	
8	-L- 115+74	BANK STABILIZATION						0.03		153		
9	-L- 147+00 [2]	72" RCP						1.31	<0.01	610	20	
11	-L- 200+04 [3]	10'X9' RCBC						7.29	<0.01	0	10	
12	-L- 219+03	42" RCP						0.02		258		
13	-L- 229+75	36" RCP	0.19									
14	-L- 246+87	48" RCP	0.36		<0.01	0.06						
15	-L- 255+00 [4]	30" RCP	1.58									
16	-L- 275+39	2@12'X12' RCBC						0.05	<0.01	189	23	
16	-L- 275+39	BANK STABILIZATION						0.06		135		
17	-L- 277+50 LT	N\A	0.38									
18	-Y6- 15+17	2@36" RCP						<0.01	<0.01	36	14	
18	-Y6- 15+17	BANK STABILIZATION								33		
TOTALS:			3.79	0.00	0.12	0.19	0.00	10.47	0.04	2509	205	

[1] ENTIRE AREA IS IMPACT IN SURFACE WATER (POND)
[2] IMPACT IN SURFACE WATER (POND) IS 1 25 AC
[3] ENTIRE PERMANENT IMPACT AREA IS SURFACE WATER (POND)
[4] ISOLATED WETLAND TOTAL TAKE (1 58 AC)

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
WBS - 34506 1 1 (R-2814B)

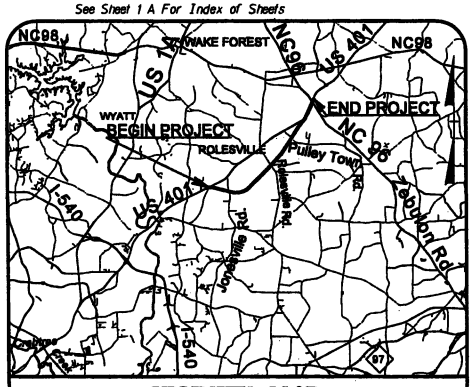
SHEET 2/22/2010

ATN Revised 3/31/05

Permit Drawing
Sheet 4 of 64

CONTRACT: TIP PROJECT: R-2814B

See Sheet 1 A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

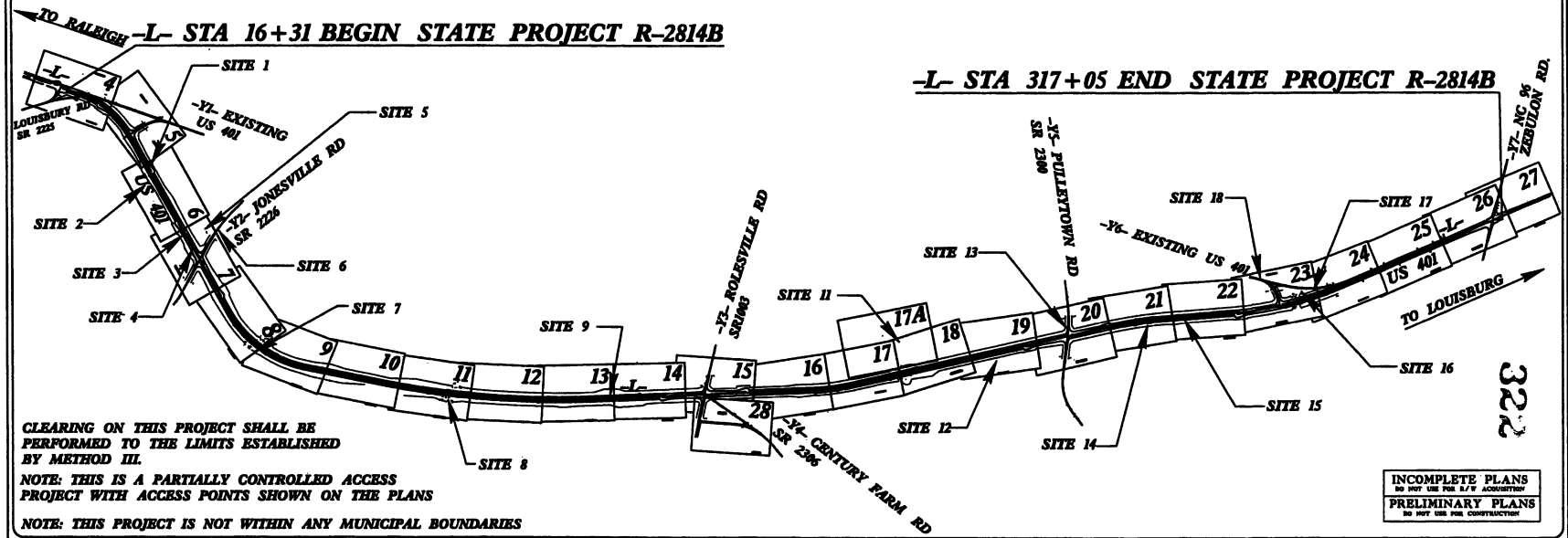
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	R-2814B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34506.1.1	STP-401(4)	PE	

LOCATION: US 401 ROLESVILLE BYPASS FROM SR 2225, LOUISBURY ROAD TO NC 96, ZEBULON ROAD

WETLAND AND STREAM IMPACTS

Permit Drawing Sheet 5 of 64

NAD 83



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

NOTE: THIS IS A PARTIALLY CONTROLLED ACCESS PROJECT WITH ACCESS POINTS SHOWN ON THE PLANS

NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

322

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

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

DESIGN DATA

ADT 2030 = 24600
ADT =
DHV = 55 %
D = 13 %
T = 7 % *
V = 60 MPH

* TTST 2 DUAL 5

PROJECT LENGTH

LENGTH ROADWAY F.A PROJECT STP-401(4) = 5.696 MILES
TOTAL LENGTH TIP PROJECT R-2814B = 5.696 MILES

PERMIT DRAWINGS PREPARED BY :

RK&K
FOR THE DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 17, 2009

LETTING DATE: APRIL 19, 2011

JS GOODNIGHT
PROJECT ENGINEER

TD GOINS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE P.E.

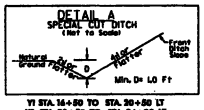
DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

Permit Drawing
Sheet 6 of 64

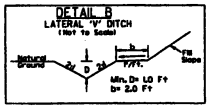
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



Min. D= LO Ft

Y1 STA. 16+80 TO STA. 30+80 LT
Y3 STA. 23+80 TO STA. 24+35 LT
Y4 STA. 10+45 TO STA. 13+00 RT
Y4 STA. 25+00 TO STA. 22+29 LT
Y4 STA. 20+80 TO STA. 22+20 RT
Y5 STA. 21+17 TO STA. 26+90 LT
Y6 STA. 15+88 TO STA. 17+00 RT
Y6 STA. 18+28 TO STA. 20+79 LT
Y8 STA. 10+82 TO STA. 12+55 RT

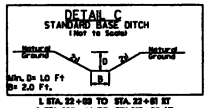
DETAIL B
LATERAL "V" DITCH
(Not to Scale)



Min. D= LO Ft
b= 2.0 Ft

L STA. 22+40 TO STA. 23+00 LT
L STA. 97+50 TO STA. 98+50 RT
L STA. 139+50 TO STA. 143+00 RT
L STA. 190+75 TO STA. 191+00 LT
L STA. 237+00 TO STA. 239+00 RT
L STA. 257+25 TO STA. 258+25 RT
L STA. 261+50 TO STA. 263+50 RT
L STA. 279+50 TO STA. 281+25 RT
L STA. 288+50 TO STA. 296+50 RT
L STA. 305+70 TO STA. 308+50 LT
L STA. 319+25 TO STA. 321+00 RT
L STA. 329+75 TO STA. 330+50 LT
Y5 STA. 16+85 TO STA. 18+65 LT
Y5 STA. 18+97 TO STA. 19+25 LT
Y5 STA. 25+40 TO STA. 26+00 RT

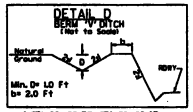
DETAIL C
STANDARD BASE DITCH
(Not to Scale)



Min. D= LO Ft
B= 2.0 Ft.

L STA. 22+88 TO STA. 22+81 RT
L STA. 188+44 TO STA.185+00 LT
Y6 STA. 14+94 TO STA.15+85 RT

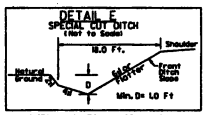
DETAIL D
BERM "V" DITCH
(Not to Scale)



Min. D= LO Ft
b= 2.0 Ft

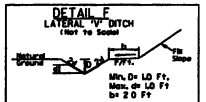
L STA. 28+00 TO STA. 28+35 LT
L STA. 23+00 TO STA. 24+30 LT
L STA. 39+50 TO STA. 41+00 LT
L STA. 42+00 TO STA. 81+50 LT
L STA. 70+50 TO STA. 75+00 LT
L STA. 95+00 TO STA. 97+50 RT
L STA. 99+00 TO STA. 106+00 RT
L STA. 109+00 TO STA. 113+50 LT
L STA. 119+50 TO STA. 123+00 RT
L STA. 180+00 TO STA. 190+00 LT
L STA. 208+00 TO STA. 217+50 LT
L STA. 233+00 TO STA. 237+00 RT
Y6 STA. 14+95 TO STA. 17+85 RT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



L STA. 24+88 TO STA. 28+88 RT
L STA. 29+00 TO STA. 29+88 RT
L LT STA. 29+78 TO STA. 91 23+80 RT
L STA. 41+88 TO STA. 41+88 LT
L STA. 196+88 TO STA. 196+88 LT
L STA. 198+88 TO STA. 197+50 RT
L STA. 225+88 TO STA. 227+88 RT
L STA. 229+88 TO STA. 248+88 LT
L STA. 291+88 TO STA. 291+50 RT
L STA. 320+50 TO STA. 323+50 LT
L STA. 321+88 TO STA. 323+88 RT

DETAIL F
LATERAL "V" DITCH
(Not to Scale)

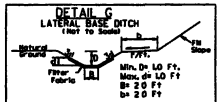


Min. D= LO Ft,
Max. d= LO Ft
b= 2.0 Ft

Type of Liner= PSRM

L STA. 23+00 TO STA. 25+00 LT
L STA. 32+00 TO STA. 32+40 LT
L STA. 41+88 TO STA. 42+00 LT
L STA. 98+00 TO STA. 99+00 RT
L STA. 133+88 TO STA. 135+50 RT
L STA. 198+88 TO STA. 190+75 LT
L STA. 202+88 TO STA. 205+00 LT
L STA. 288+88 TO STA. 283+00 LT
L STA. 284+58 TO STA. 287+50 LT
L STA. 298+91 TO STA. 300+50 LT
Y2 STA. 21+50 TO STA. 22+05 LT
Y3 STA. 21+20 TO STA. 22+20 RT

DETAIL G
LATERAL BASE DITCH
(Not to Scale)

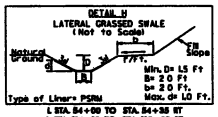


Min. D= LO Ft,
Max. d= LO Ft
B= 2.0 Ft
b= 2.0 Ft

Type of Liner= Class B Rip-Rap

L STA. 82+00 TO STA. 84+00 RT
L STA. 145+00 TO STA. 147+00 RT
L STA. 144+55 TO STA. 148+00 LT
L STA. 149+00 TO STA. 150+00 LT
L STA. 201+50 TO STA. 202+45 LT

DETAIL H
LATERAL GRASSED SWALE
(Not to Scale)

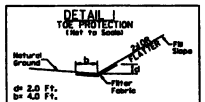


Min. D= LS Ft
B= 2.0 Ft
b= 2.0 Ft,
Max. d= LO Ft.

Type of Liner= PSRM

L STA. 84+00 TO STA. 84+55 RT
L STA. 114+18 TO STA. 115+02 RT

DETAIL I
TOE PROTECTION
(Not to Scale)

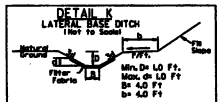


d= 2.0 Ft,
b= 4.0 Ft.

Type of Liner= Class B Rip-Rap

L STA. 51+50 TO STA. 52+40 LT
L STA. 77+37 TO STA. 78+60 RT
L STA. 113+75 TO STA. 115+32 LT
L STA. 115+38 TO STA. 117+38 RT
L STA. 138+88 TO STA. 142+00 LT
L STA. 147+38 TO STA. 151+00 RT
L STA. 184+80 TO STA. 186+00 RT
L STA. 244+75 TO STA. 247+00 LT
L STA. 229+00 LT TO STA. Y5 19+00 RT

DETAIL K
LATERAL BASE DITCH
(Not to Scale)

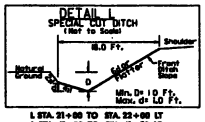


Min. D= LO Ft,
Max. d= LO Ft
B= 4.0 Ft
b= 4.0 Ft

Type of Liner= Class B Rip-Rap

L STA. 82+21 TO STA. 84+80 LT
L STA. 278+19 TO STA. 276+00 RT

DETAIL L
SPECIAL CUT DITCH
(Not to Scale)



L STA. 21+88 TO STA. 22+88 LT
L STA. 41+88 TO STA. 41+88 LT
L STA. 99+88 TO STA. 99+88 RT
L STA. 189+88 TO STA. 190+88 LT
L STA. 249+88 TO STA. 250+88 LT
L STA. 280+88 TO STA. 288+88 RT

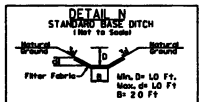
DETAIL M
LATERAL "V" DITCH
(Not to Scale)

Min. D= LS Ft,
Max. d= LS Ft
b= 2 OFt

Type of Liner= Class B Rip-Rap

Y2 STA. 22+88 TO STA. 22+95 LT

DETAIL N
STANDARD BASE DITCH
(Not to Scale)



Min. D= LO Ft,
Max. d= LO Ft
B= 2.0 Ft

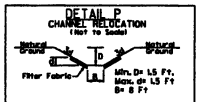
L STA. 84+88 TO STA. 86+41 LT

DETAIL O
LATERAL "V" DITCH
(Not to Scale)

Min. D= LO Ft,
Max. d= LO Ft
B= 2.0 Ft

L STA. 81+50 TO STA. 82+50 LT
L STA. 82+81 TO STA. 84+00 RT
L STA. 41+88 TO STA. 41+50 LT
L STA. 83+88 TO STA. 85+50 LT
L STA. 286+50 TO STA. 287+00 RT
L STA. 298+88 TO STA. 299+50 RT

DETAIL P
CHANNEL RELOCATION
(Not to Scale)

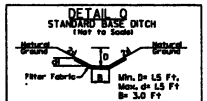


Min. D= LS Ft,
Max. d= LS Ft
B= 8 Ft

Type of Liner= Class IRip Rap

L STA. 76+97 TO STA. 78+27 RT

DETAIL Q
STANDARD BASE DITCH
(Not to Scale)

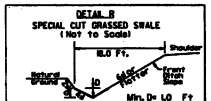


Min. D= LS Ft,
Max. d= LS Ft
B= 3.0 Ft

Type of Liner= Class IRip-Rap

L STA. 72+67 TO STA. 74+86 LT

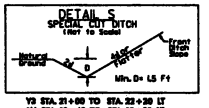
DETAIL R
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Type of Liner= PSRM

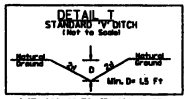
L STA. 108+88 TO STA. 111+88 RT
L STA. 124+88 TO STA. 128+88 LT
L STA. 134+88 TO STA. 138+88 RT

DETAIL S
SPECIAL CUT DITCH
(Not to Scale)



Y3 STA. 21+88 TO STA. 22+38 LT
Y4 STA. 10+45 TO STA. 12+50 LT

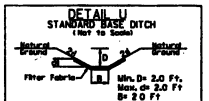
DETAIL T
STANDARD "V" DITCH
(Not to Scale)



Min. D= LS Ft

L STA. 164+88 TO STA. 164+38 RT
L STA. 164+88 TO STA. 164+97 RT
L STA. 269+45 TO STA. 270+30 RT
Y3 STA. 28+85 TO STA. 26+88 LT

DETAIL U
STANDARD BASE DITCH
(Not to Scale)

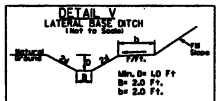


Min. D= 2.0 Ft,
Max. d= 2.0 Ft
B= 2.0 Ft

Type of Liner= Class B Rip-Rap

Y3 STA. 22+38 TO STA. 22+48 RT

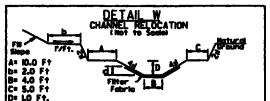
DETAIL V
LATERAL BASE DITCH
(Not to Scale)



Min. D= LO Ft
B= 2.0 Ft
b= 2.0 Ft.

L STA. 28+88 TO STA. 30+32 RT
L STA. 134+88 TO STA. 138+88 LT
L STA. 137+88 TO STA. 138+88 RT
L STA. 217+88 TO STA. 221+88 LT
L STA. 234+88 TO STA. 237+88 LT
L STA. 239+88 TO STA. 244+15 RT
L STA. 281+88 TO STA. 287+25 RT
L STA. 276+88 TO STA. 278+88 RT
Y5 STA. 17+88 TO STA. 18+75 RT
Y7 STA. 17+88 TO STA. 19+38 RT

DETAIL W
CHANNEL RELOCATION
(Not to Scale)

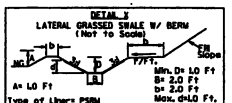


A= 20.0 Ft
b= 2.0 Ft
B= 4.0 Ft
C= 5.0 Ft
D= LO Ft.
d= LO Max.
Notes b=0.0 L Sta. 147+50 to 148+50 Rt

Type of Liner= Class B Rip Rap

L STA. 147+88 TO STA. 188+83 RT

DETAIL X
LATERAL GRASSED SWALE W/ BERM
(Not to Scale)



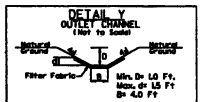
Min. D= LO Ft
B= 2.0 Ft
b= 2.0 Ft
Max. d=LO Ft.

A= LO Ft

Type of Liner= PSRM

L STA. 143+88 TO STA. 145+88 RT
L STA. 148+88 TO STA. 149+88 LT
L STA. 183+38 TO STA. 184+88 LT

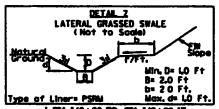
DETAIL Y
OUTLET CHANNEL
(Not to Scale)



Min. D= LO Ft,
Max. d= LS Ft
B= 4.0 Ft

L STA. 36+48 TO STA. 38+48 RT, LINER=CLASS I RIP RAP (BANKS ONLY)
L STA. 84+72 RT, LINER=CLASS I RIP RAP (BANKS ONLY)
L STA. 144+34 TO STA. 144+86 LT, LINER=CLASS I RIP RAP (BANKS ONLY)
Y2 STA. 17+48 RT, LINER=CLASS I RIP RAP (BANKS ONLY), B VARIES 2'-9"
Y5 STA. 25+40 TO STA. 25+48 RT, LINER=CLASS B RIP RAP

DETAIL Z
LATERAL GRASSED SWALE
(Not to Scale)

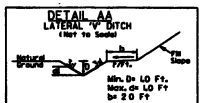


Min. D= LO Ft
B= 2.0 Ft
b= 2.0 Ft,
Max. d= LO Ft.

Type of Liner= PSRM

L STA. 148+88 TO STA. 149+88 LT
L STA. 150+88 TO STA. 154+88 LT
L STA. 199+88 TO STA. 201+88 LT
L STA. 281+25 TO STA. 283+88 RT (B=0.0')

DETAIL AA
LATERAL "V" DITCH
(Not to Scale)

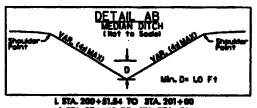


Min. D= LO Ft,
Max. d= LO Ft
b= 2.0 Ft

Type of Liner= PSRM

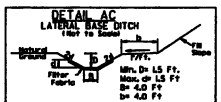
L STA. 198+88 TO STA. 200+38 RT

DETAIL AB
MEDIAN DITCH
(Not to Scale)



L STA. 200+81.84 TO STA. 201+88
L STA. 274+88 TO STA. 276+88

DETAIL AC
LATERAL BASE DITCH
(Not to Scale)

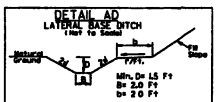


Min. D= LS Ft,
Max. d= LS Ft
B= 4.0 Ft
b= 4.0 Ft

Type of Liner= Class B Rip-Rap

L STA. 200+41 TO STA. 203+88 RT

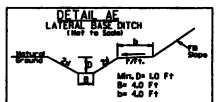
DETAIL AD
LATERAL BASE DITCH
(Not to Scale)



Min. D= LS Ft
B= 2.0 Ft
b= 2.0 Ft

L STA. 221+88 TO STA. 224+88 LT
L STA. 252+88 TO STA. 257+25 LT
Y7 STA. 11+50 TO STA. 18+27 RT

DETAIL AE
LATERAL BASE DITCH
(Not to Scale)



Min. D= LO Ft
B= 4.0 Ft
b= 4.0 Ft

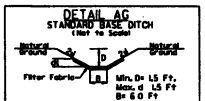
Y5 STA. 18+48 TO STA. 18+97 LT

DETAIL AF
STANDARD "V" DITCH
(Not to Scale)

Min. D= LS Ft

L STA. 296+88 TO STA. 298+81 LT

DETAIL AG
STANDARD BASE DITCH
(Not to Scale)

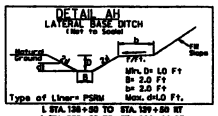


Min. D= LS Ft,
Max. d LS Ft
B= 6.0 Ft

Type of Liner= Class IRip-Rap

L STA. 84+88 TO STA. 84+81 LT

DETAIL AH
LATERAL BASE DITCH
(Not to Scale)

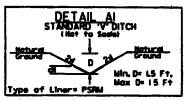


Min. D= LO Ft
B= 2.0 Ft
b= 2.0 Ft
Max. d=LO Ft.

Type of Liner= PSRM

L STA. 138+88 TO STA. 139+88 RT
L STA. 282+88 TO STA. 284+88 RT
L STA. 258+88 TO STA. 261+88 RT
L STA. 278+88 TO STA. 279+88 RT

DETAIL AI
STANDARD "V" DITCH
(Not to Scale)

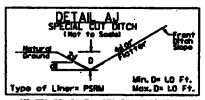


Min. D= LS Ft,
Max D= 15 Ft

Type of Liner= PSRM

L STA. 290+47 TO STA. 291+88 LT

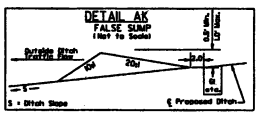
DETAIL AJ
SPECIAL CUT DITCH
(Not to Scale)



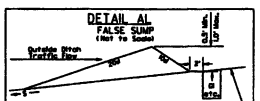
Type of Liner= PSRM

Y3 STA. 22+38 TO STA. 22+81.83 LT
Y5 STA. 26+88 TO STA. 26+98 RT

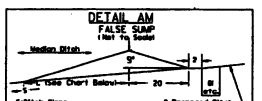
DETAIL AK
FALSE SUMP
(Not to Scale)



DETAIL AL
FALSE SUMP
(Not to Scale)



DETAIL AM
FALSE SUMP
(Not to Scale)



Use Chart Below

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

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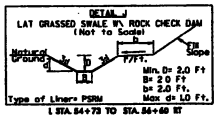
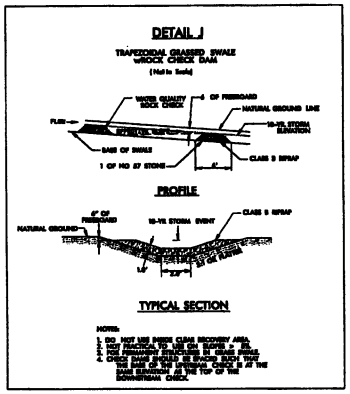
PROJECT REFERENCE NO.	SHEET NO.
R-2814B	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

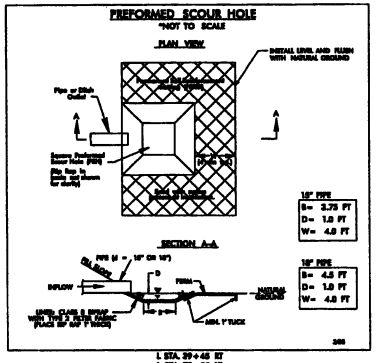
Permit Drawing
Sheet 7 of 64



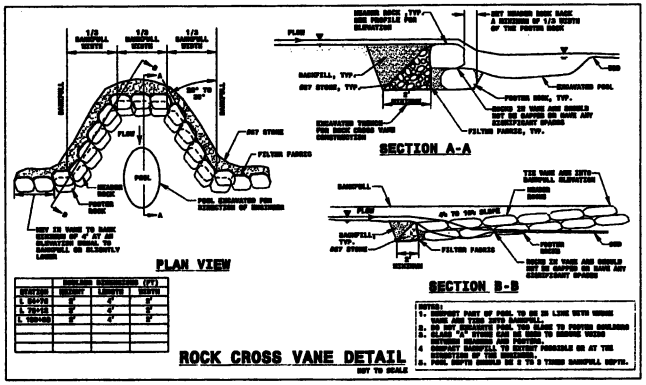
L STA. 84+73 TO STA. 86+60 RT

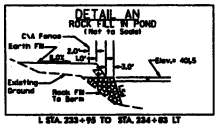


L STA. 84+73 TO STA. 86+60 RT



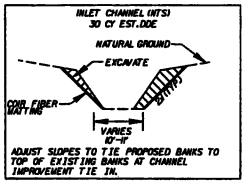
L STA. 39+45 RT
L STA. 79+50 LT
L STA. 247+64 RT
L STA. 274+90 RT
L STA. 276+70 LT
L STA. 278+65 LT

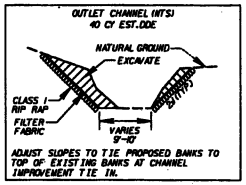




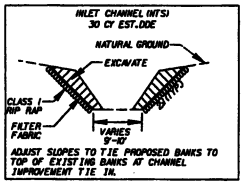
L STA. 233+95 TO STA. 234+65 LT

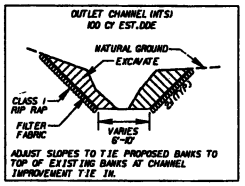
CULVERT INLET\OUTLET DETAILS
HARRIS CREEK TRIBUTARY
-L- STA 77+89



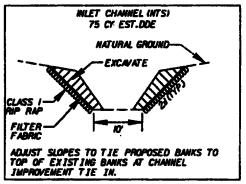


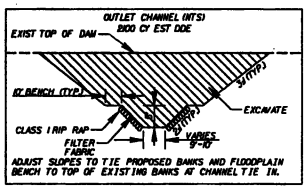
CULVERT INLET\OUTLET DETAILS
HARRIS CREEK
-L- STA 115+74



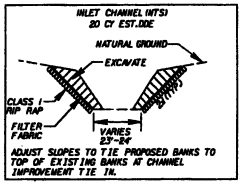


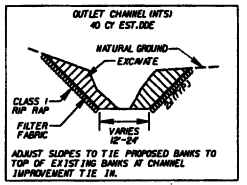
CULVERT INLET\OUTLET DETAILS
CEDAR FORK
-L- STA 200+04



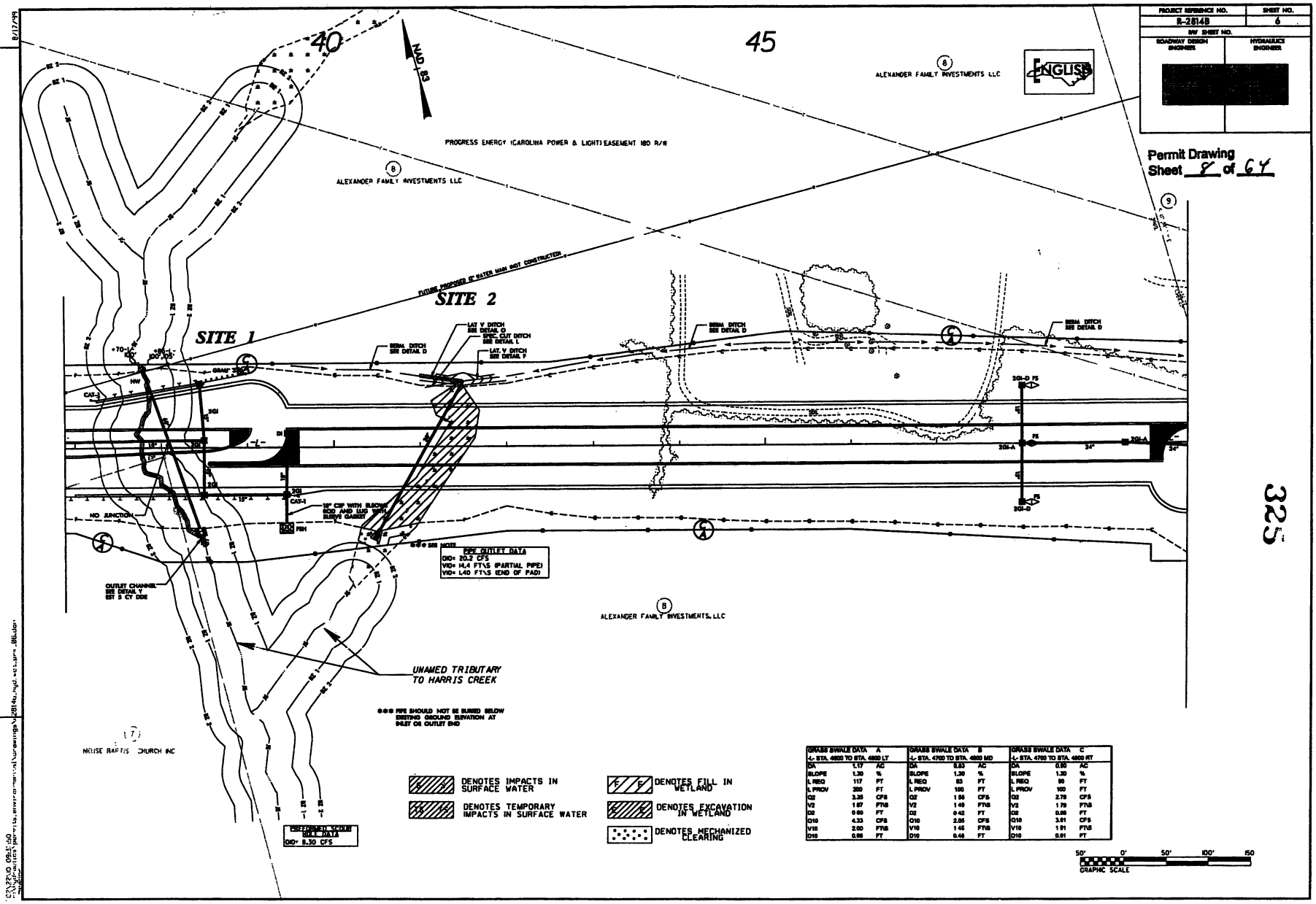


CULVERT INLET\OUTLET DETAILS
PERRY CREEK
-L- STA 275+39





324

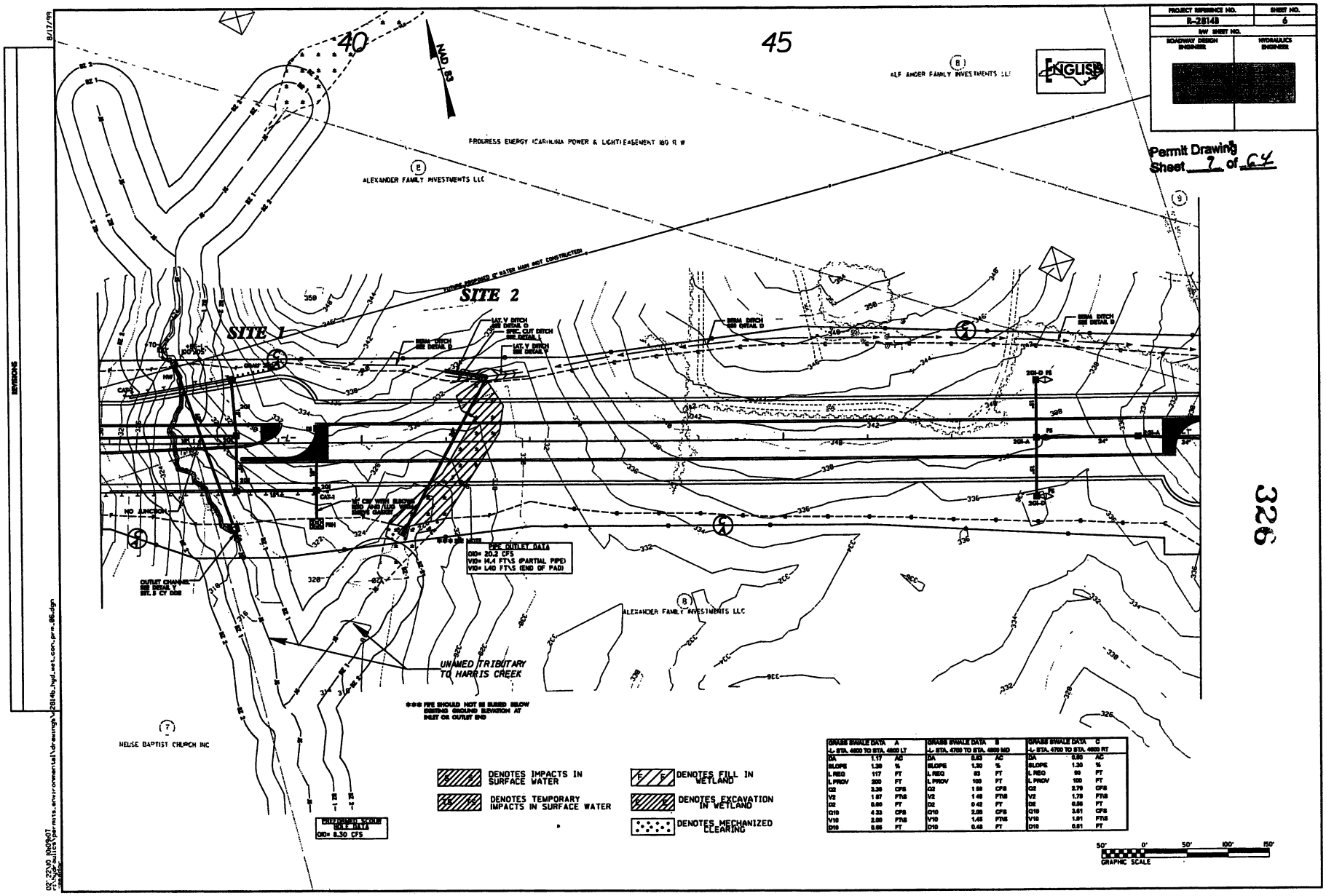


GRASS SWALE DATA A (-L- STA. 4600 TO STA. 4800 LT)		
DA	1.17	AC
SLOPE	1.30	%
L REQ	117	FT
L PROV	200	FT
Q2	3.35	CFS
V2	1.67	FT/S
D2	0.66	FT
Q10	4.53	CFS
V10	2.00	FT/S
D10	0.88	FT

GRASS SWALE DATA B (-L- STA. 4700 TO STA. 4800 MD)		
DA	0.83	AC
SLOPE	1.30	%
L REQ	83	FT
L PROV	100	FT
Q2	1.98	CFS
V2	1.49	FT/S
D2	0.43	FT
Q10	2.68	CFS
V10	1.48	FT/S
D10	0.48	FT

GRASS SWALE DATA C (-L- STA. 4700 TO STA. 4800 RT)		
DA	0.89	AC
SLOPE	1.30	%
L REQ	89	FT
L PROV	100	FT
Q2	2.78	CFS
V2	1.78	FT/S
D2	0.58	FT
Q10	3.61	CFS
V10	1.91	FT/S
D10	0.81	FT

DIFFERENCE SKIDS HOLE DATA
QID= 8.30 CFS



GRASS SWALE DATA A L- STA. 4600 TO STA. 4800 LT		
DA	1.17	AC
SLOPE	1.30	%
L REQ	117	FT
L PROV	200	FT
Q2	3.35	CFS
V2	1.67	FT/S
D2	0.80	FT
Q10	4.33	CFS
V10	2.00	FT/S
D10	0.85	FT

GRASS SWALE DATA B L- STA. 4700 TO STA. 4900 RT		
DA	0.63	AC
SLOPE	1.30	%
L REQ	63	FT
L PROV	100	FT
Q2	1.58	CFS
V2	1.46	FT/S
D2	0.42	FT
Q10	2.05	CFS
V10	1.65	FT/S
D10	0.48	FT

GRASS SWALE DATA C L- STA. 4700 TO STA. 4800 RT		
DA	0.80	AC
SLOPE	1.30	%
L REQ	80	FT
L PROV	100	FT
Q2	2.79	CFS
V2	1.79	FT/S
D2	0.58	FT
Q10	3.61	CFS
V10	1.91	FT/S
D10	0.61	FT

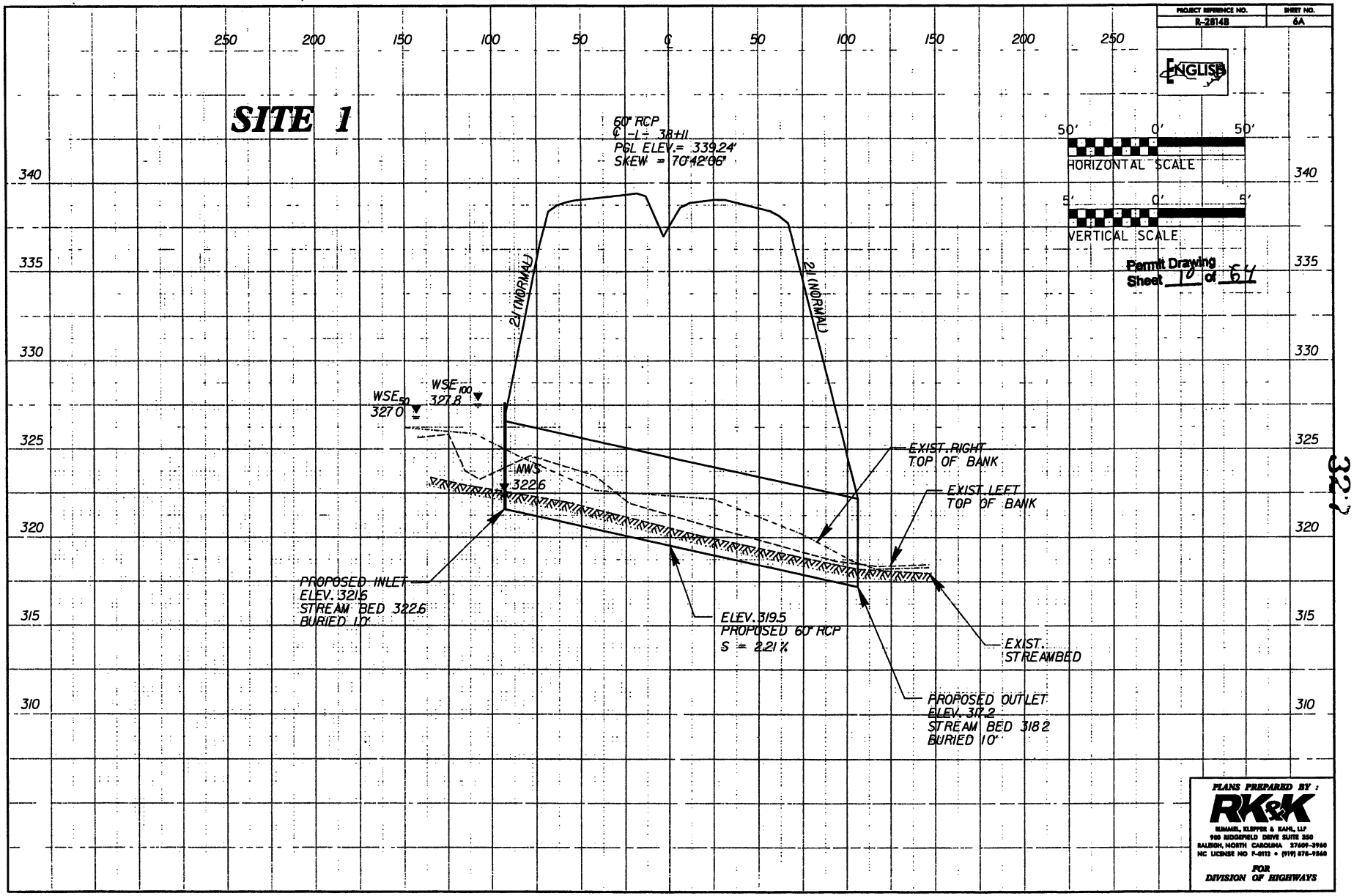
PROJECT REFERENCE NO.	SHEET NO.
R-2814B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing Sheet 7 of 64

REVISIONS

8/17/99

DGN: (DWG) (NONE)
c:\projects\environmental\drawings\2814b_hyd_wet_con_prm_86.dgn
ms.dgnlib


PROJECT REFERENCE NO.
R-2814B
SHEET NO.
6A
ENGLISH
SITE 1
60" RCP
℄ -L- 38+11
PGL ELEV.= 339.24'
SKEW = 70°42'06"
50' 0' 50'
HORIZONTAL SCALE
5' 0' 5'
VERTICAL SCALE
Permit Drawing
Sheet 1 of 64
2H (NORMAL)
2H (NORMAL)
WSE 50 327.0
WSE 100 327.8
MWS 322.6
EXIST. RIGHT TOP OF BANK
EXIST. LEFT TOP OF BANK
PROPOSED INLET
ELEV. 321.6
STREAM BED 322.6
BURIED 1.0'
ELEV. 319.5
PROPOSED 60" RCP
S = 2.21 %
EXIST. STREAMBED
PROPOSED OUTLET
ELEV. 317.2
STREAM BED 318.2
BURIED 1.0'
340
335
330
325
320
315
310
250
200
150
100
50
0
50
100
150
200
250
PLANS PREPARED BY :
RK&K
KIMMEL, KLEPPER & KAMS, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO P-0112 • (919) 878-9560
FOR
DIVISION OF HIGHWAYS

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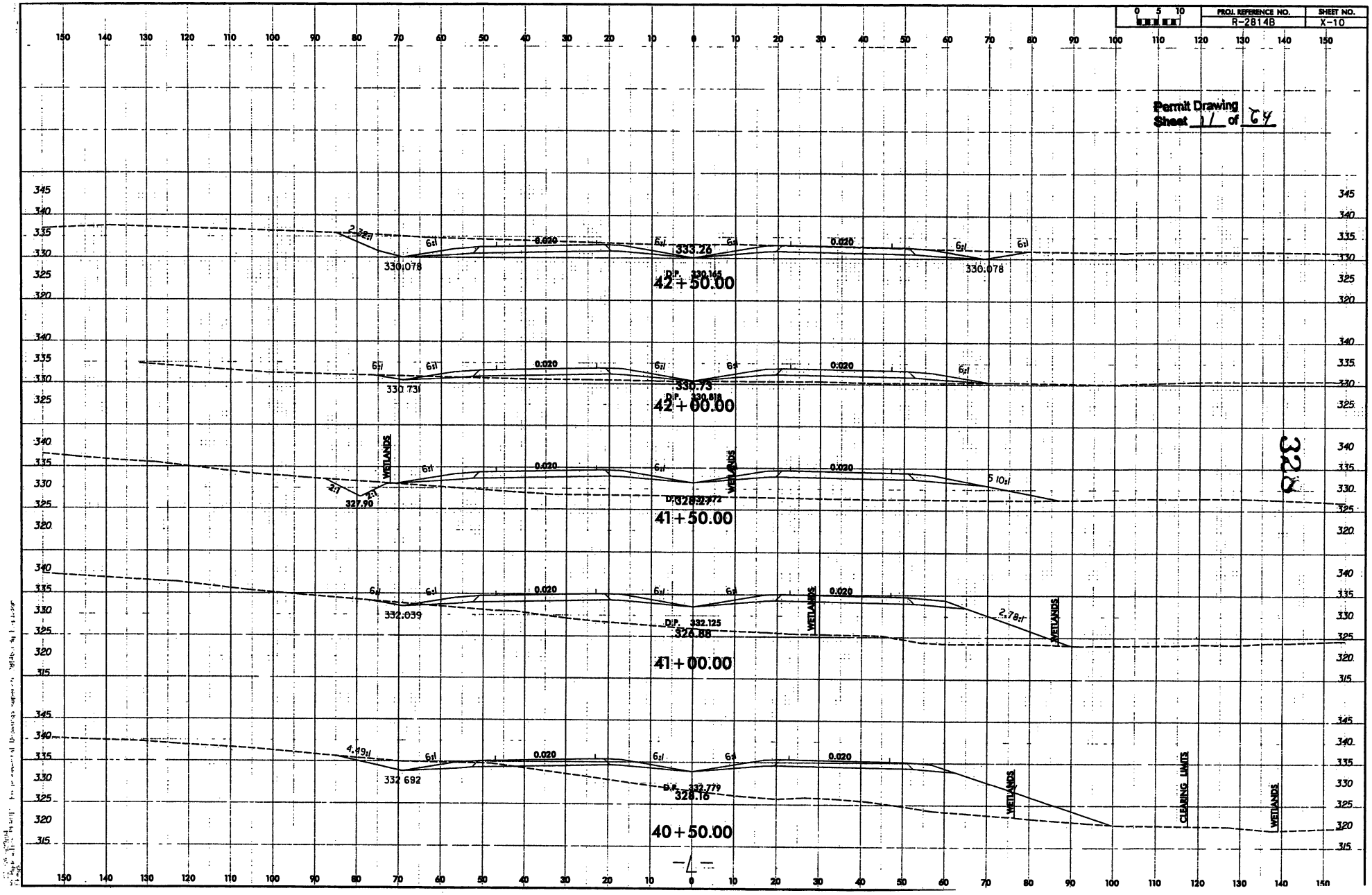
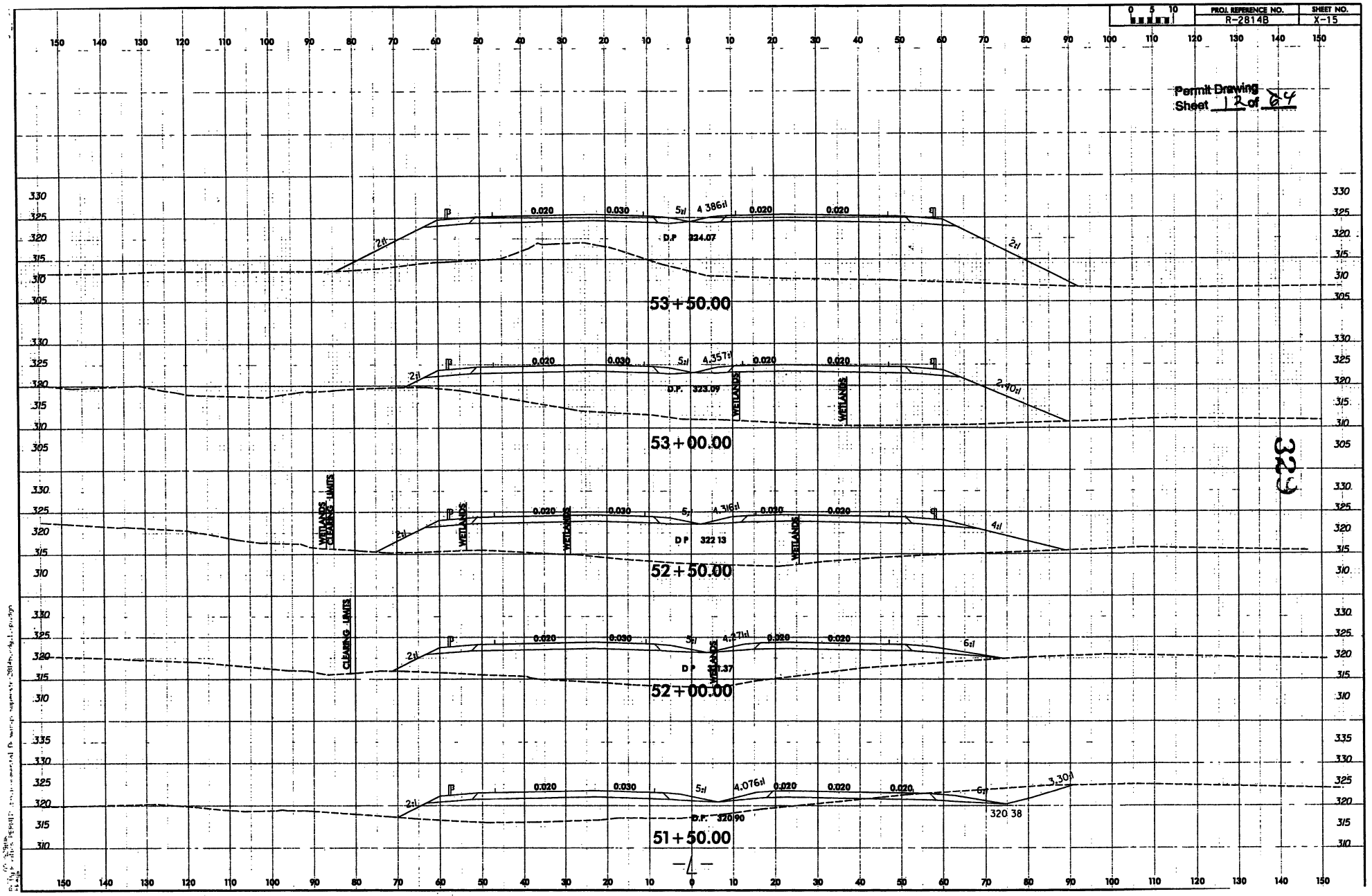
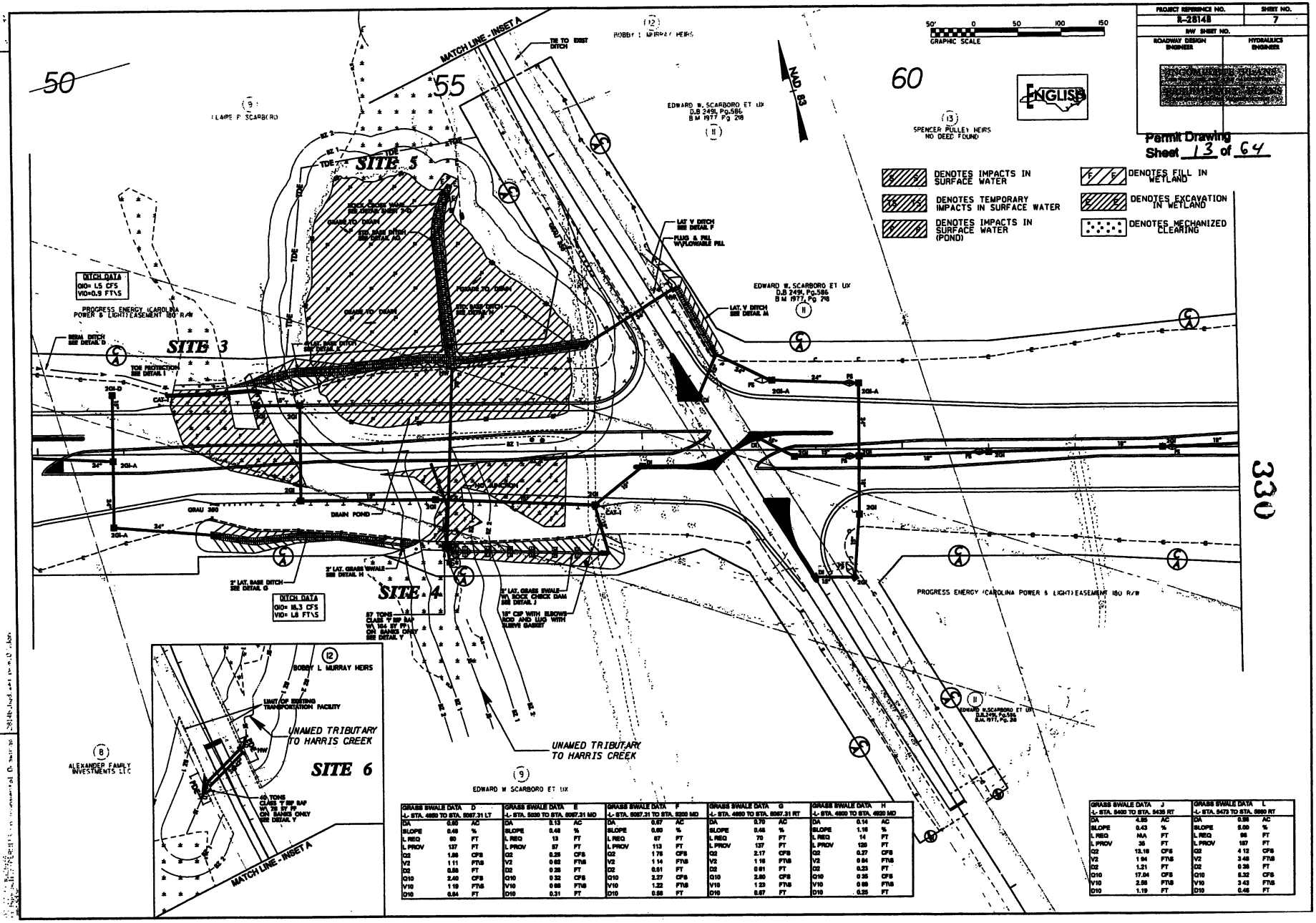
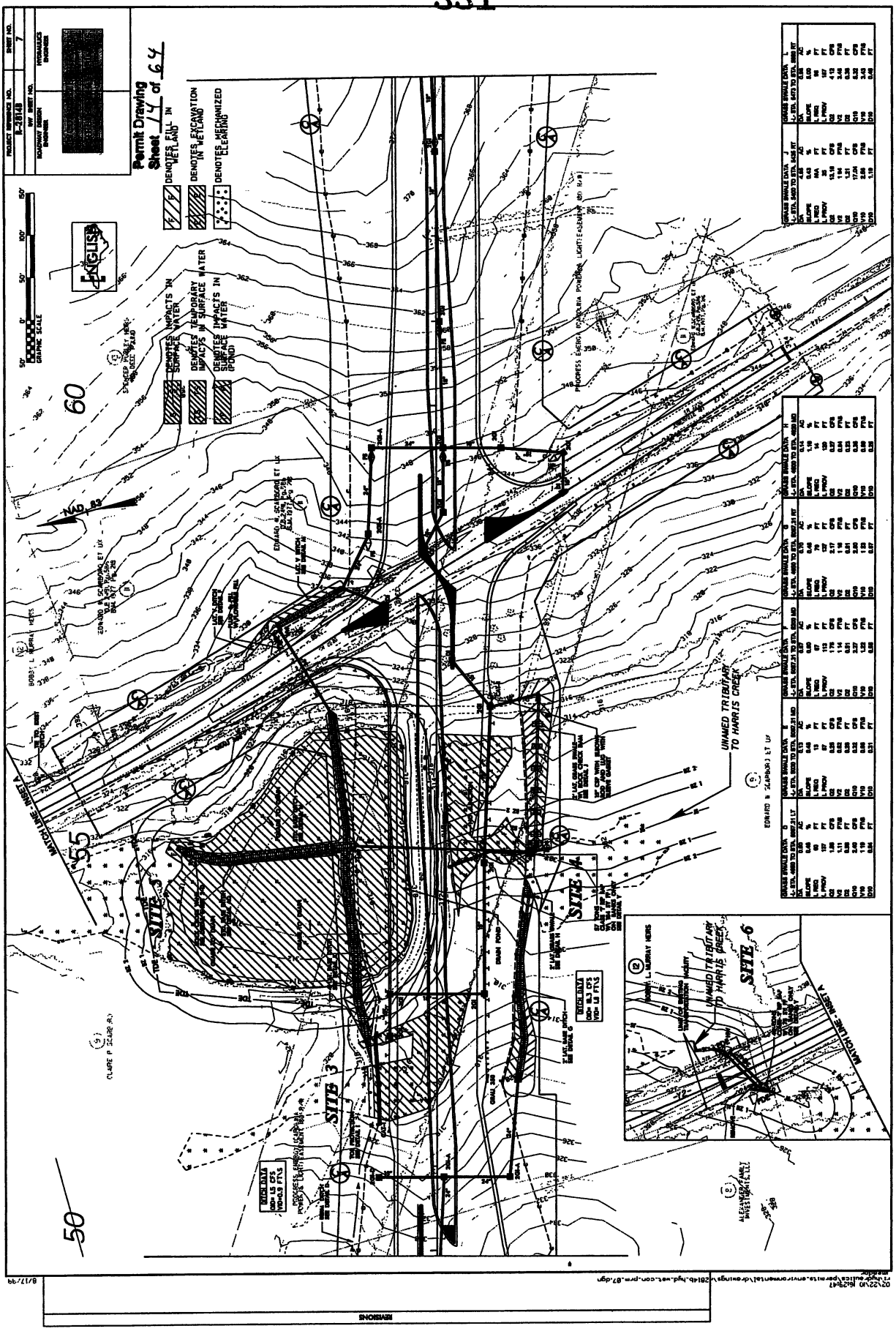
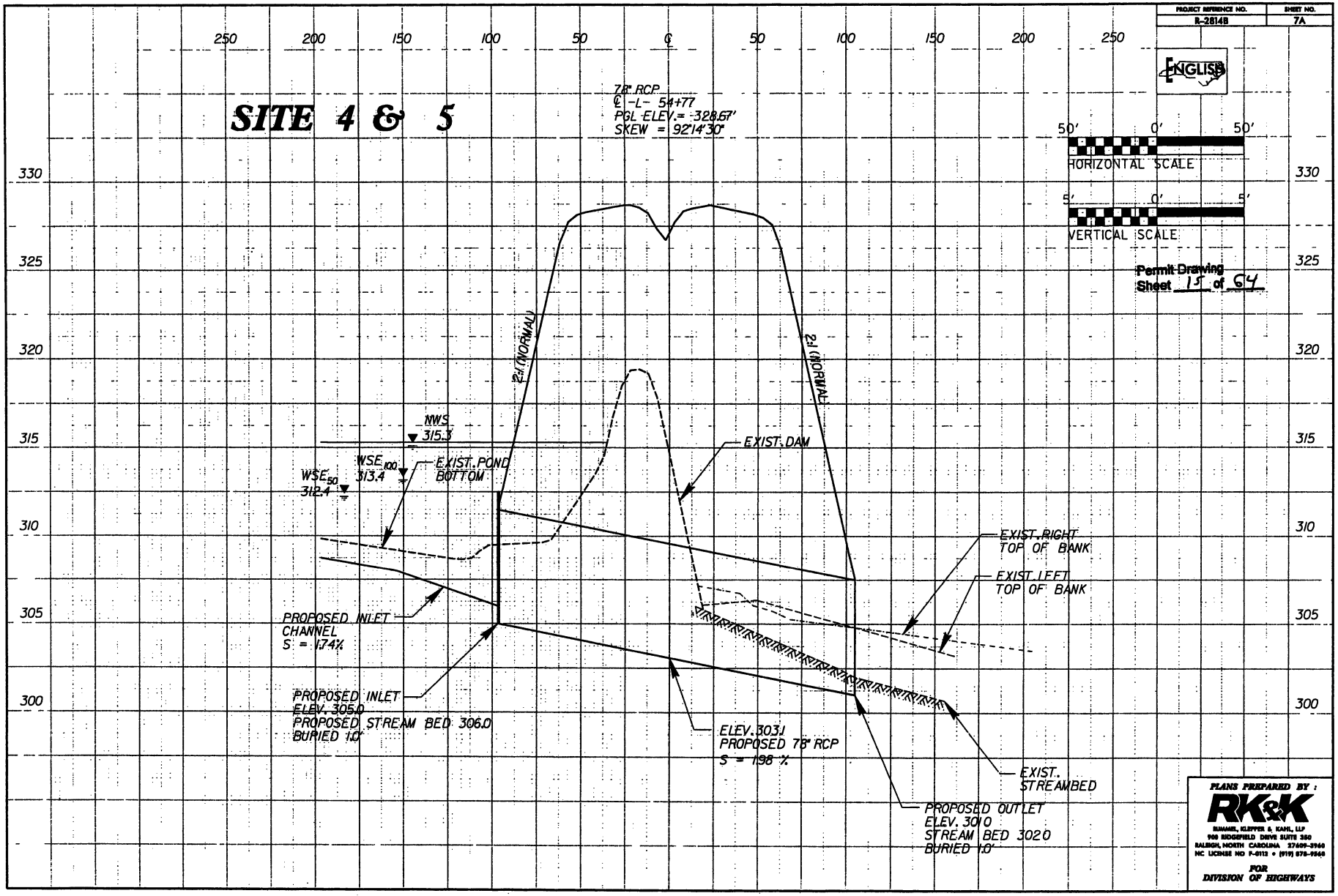
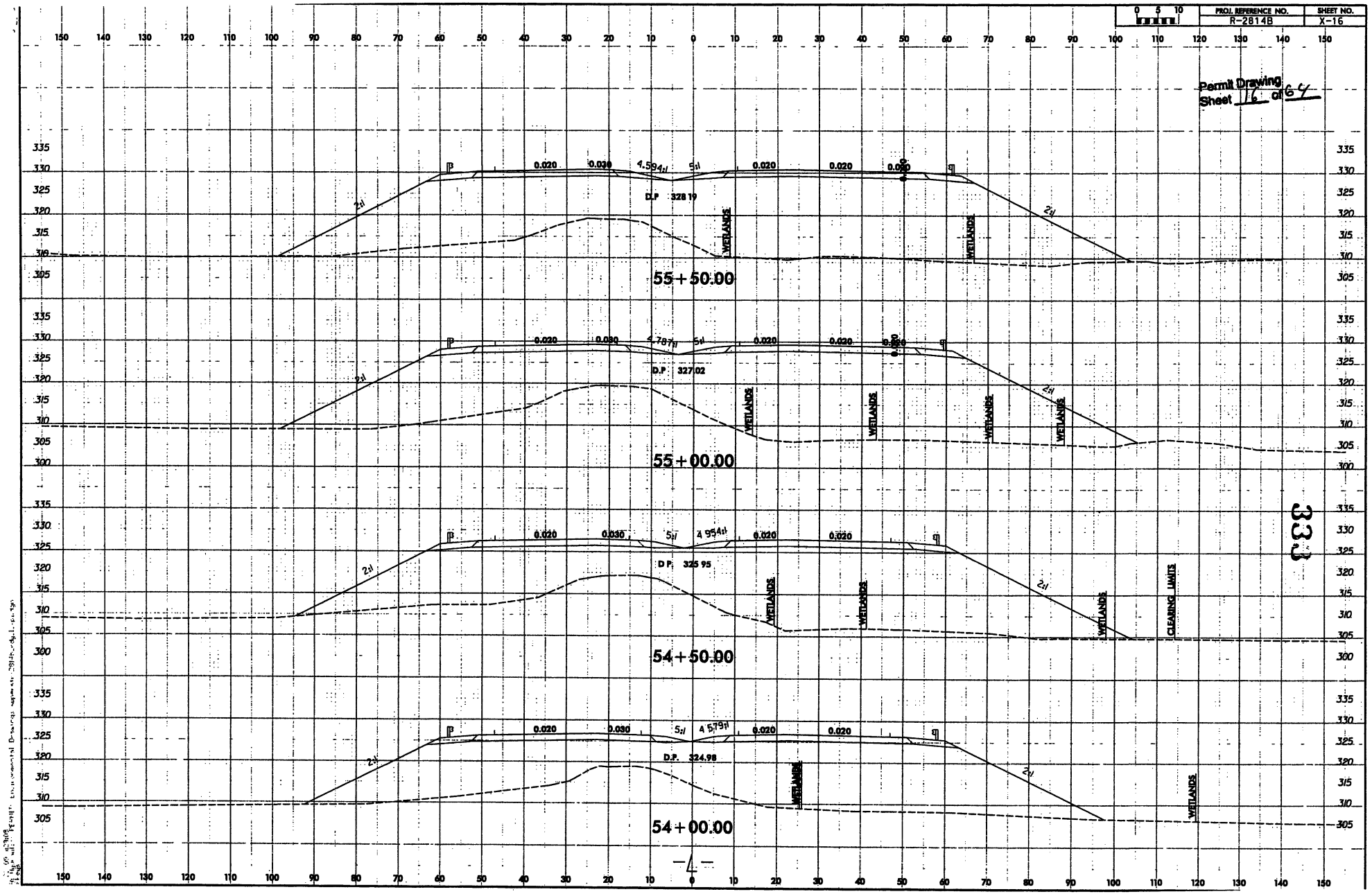

0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-10
Permit Drawing
Sheet 11 of 64
42+50.00
330.078
333.26
330.165
330.078
42+00.00
330.731
330.73
330.819
41+50.00
327.90
328.272
WETLANDS
41+00.00
332.039
326.88
332.125
WETLANDS
40+50.00
332.692
328.16
332.779
WETLANDS
CLEARING LIMITS
WETLANDS
6:1
2:1
0.020
2.32%
2.78%
4.49%
5.10%
320

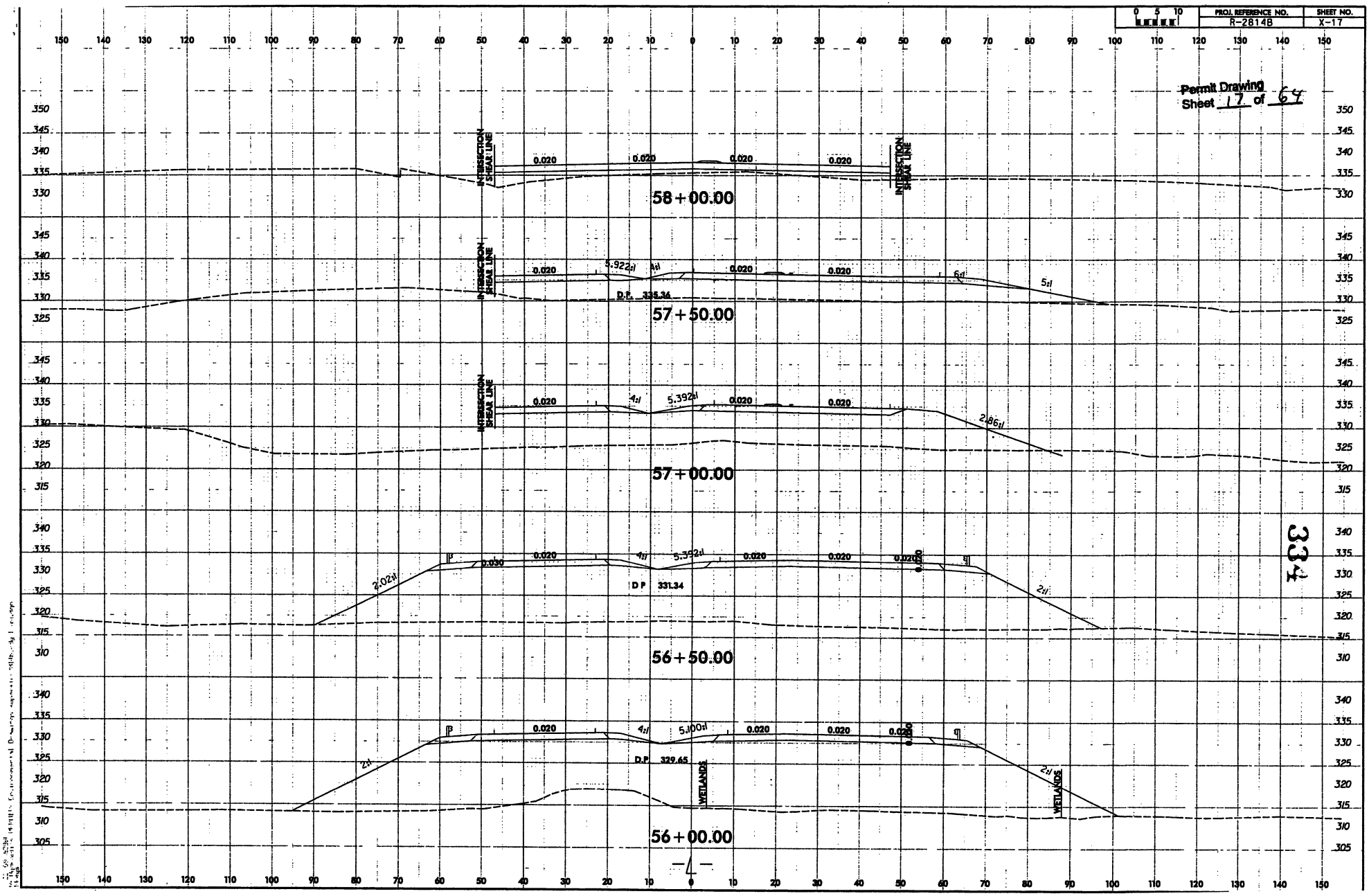

PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-15
Permit Drawing
Sheet 12 of 84
53+50.00
D.P 324.07
53+00.00
D.P. 323.09
WETLANDS
52+50.00
D P 322 13
CLEARING LIMITS
52+00.00
51+50.00
D.P. 320.90
320 38
0.020
0.030
4 386±l
4.351±l
4.316±l
4.271±l
4.076±l
3,30±
2:1
4:1
6:1
329

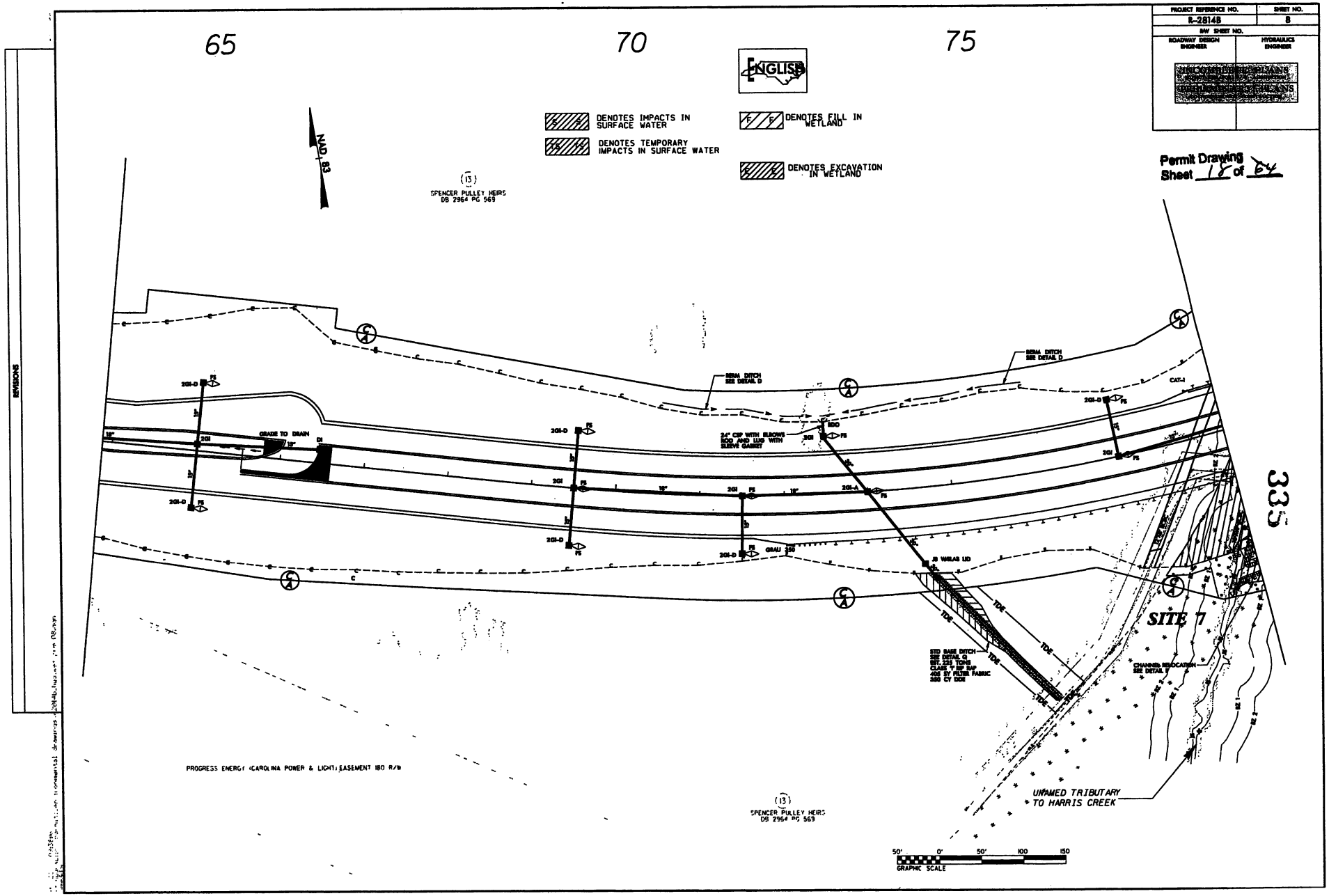

PROJECT REFERENCE NO.
R-2814B
SHEET NO.
7
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 13 of 64
GRAPHIC SCALE
50' 0 50 100 150
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
MATCH LINE - INSET A
SITE 1
SITE 2
SITE 3
SITE 4
SITE 5
SITE 6
DITCH DATA Q10= 1.5 CFS V10=0.9 FT\S
DITCH DATA Q10= 16.3 CFS V10= 1.8 FT\S
PROGRESS ENERGY (CAROLINA POWER & LIGHT) EASEMENT 150' R/W
EDWARD W. SCARBORO ET UX D.B 2491, Pg.586 B.M 1977, Pg 298
SPENCER PULLEY HEIRS NO DEED FOUND
ROBBY L MURRAY HEIRS
ALEXANDER FAMILY INVESTMENTS LLC
UNAMED TRIBUTARY TO HARRIS CREEK
LIMIT OF EXISTING TRANSPORTATION FACILITY
DRAIN POND
RIP-RAP APRON
GRASS SWALE DATA D
GRASS SWALE DATA E
GRASS SWALE DATA F
GRASS SWALE DATA G
GRASS SWALE DATA H
GRASS SWALE DATA J
GRASS SWALE DATA L
REVISIONS

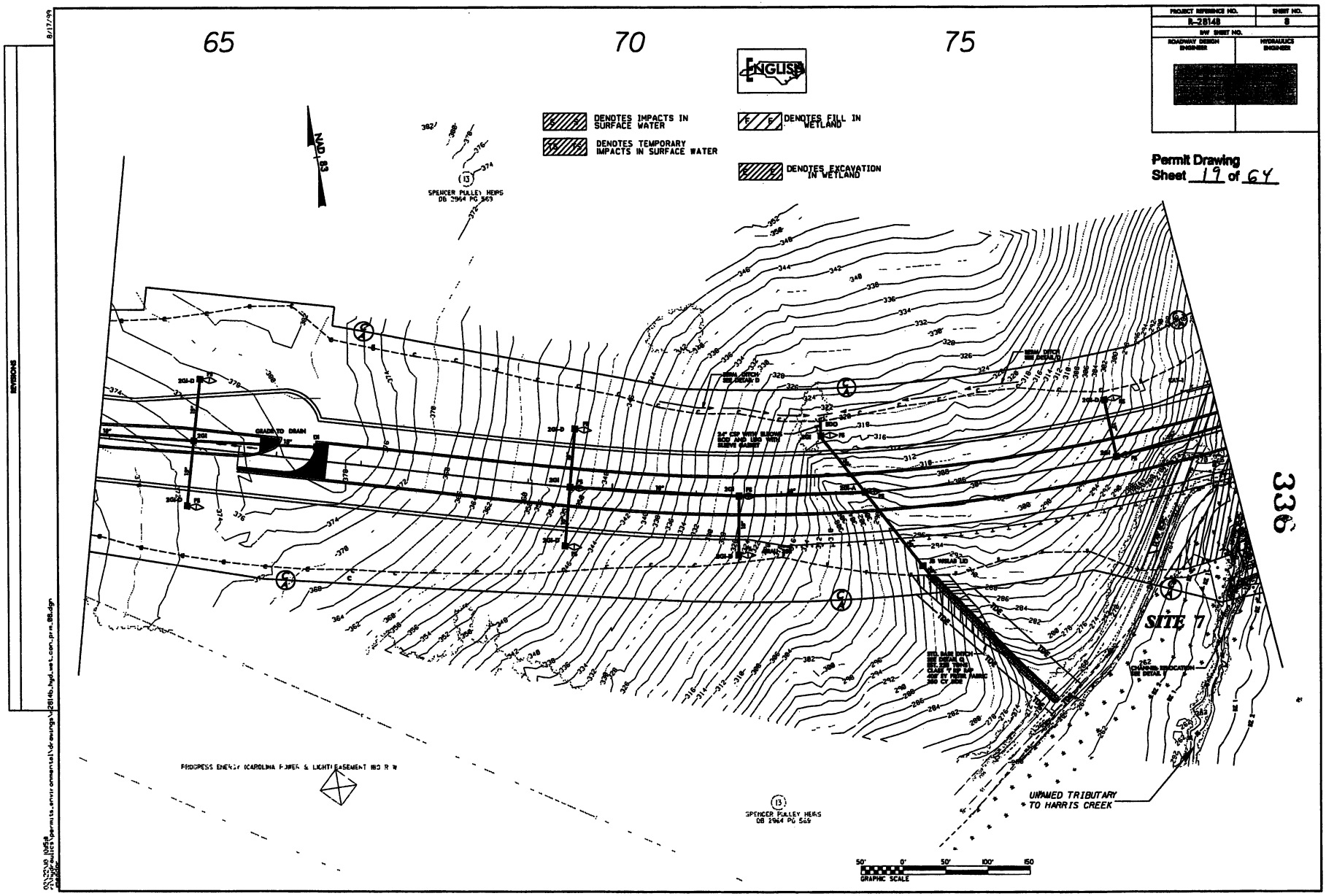

Permit Drawing
Sheet 14 of 74
PROJECT REFERENCE NO.
R-2818B
SHEET NO.
7
RW SHEET NO.
ROADWAY DESIGN
HYDRAULICS
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
ENGLISH
GRAPHIC SCALE
SITE 3
SITE 4
SITE 5
SITE 6
UNNAMED TRIBUTARY TO HARRIS CREEK
MATCH LINE - SHEET A
MATCH LINE - SHEET B
REVISIONS
8/17/99

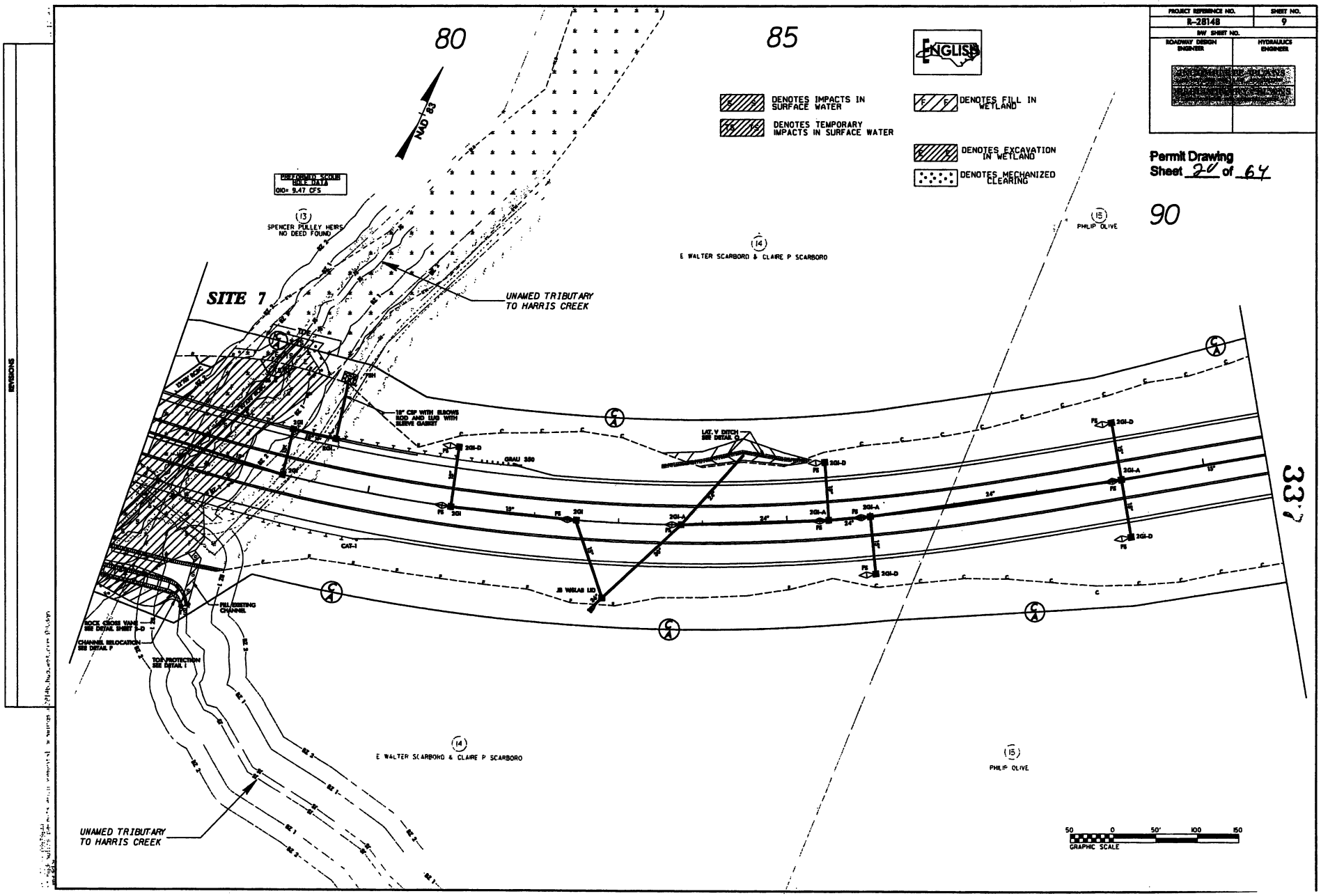

SITE 4 & 5
78" RCP
℄ -L- 54+77
PGL ELEV.= 328.67'
SKEW = 92°14'30"
250
200
150
100
50
0
50
100
150
200
250
330
325
320
315
310
305
300
2:1 (NORMAL)
2:1 (NORMAL)
NWS
315.3
WSE100
313.4
WSE50
312.4
EXIST. POND
BOTTOM
EXIST. DAM
EXIST. RIGHT
TOP OF BANK
EXIST. LEFT
TOP OF BANK
PROPOSED INLET
CHANNEL
S = 1.74%
PROPOSED INLET
ELEV. 305.0
PROPOSED STREAM BED 306.0
BURIED 1.0'
ELEV. 303.1
PROPOSED 78" RCP
S = 1.98 %
EXIST.
STREAMBED
PROPOSED OUTLET
ELEV. 301.0
STREAM BED 302.0
BURIED 1.0'
ENGLISH
50' 0' 50'
HORIZONTAL SCALE
5' 0' 5'
VERTICAL SCALE
Permit Drawing
Sheet 15 of 64
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
7A
PLANS PREPARED BY :
RK&K
BANNER, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3946
NC LICENSE NO F-0112 • (919) 878-9560
FOR
DIVISION OF HIGHWAYS

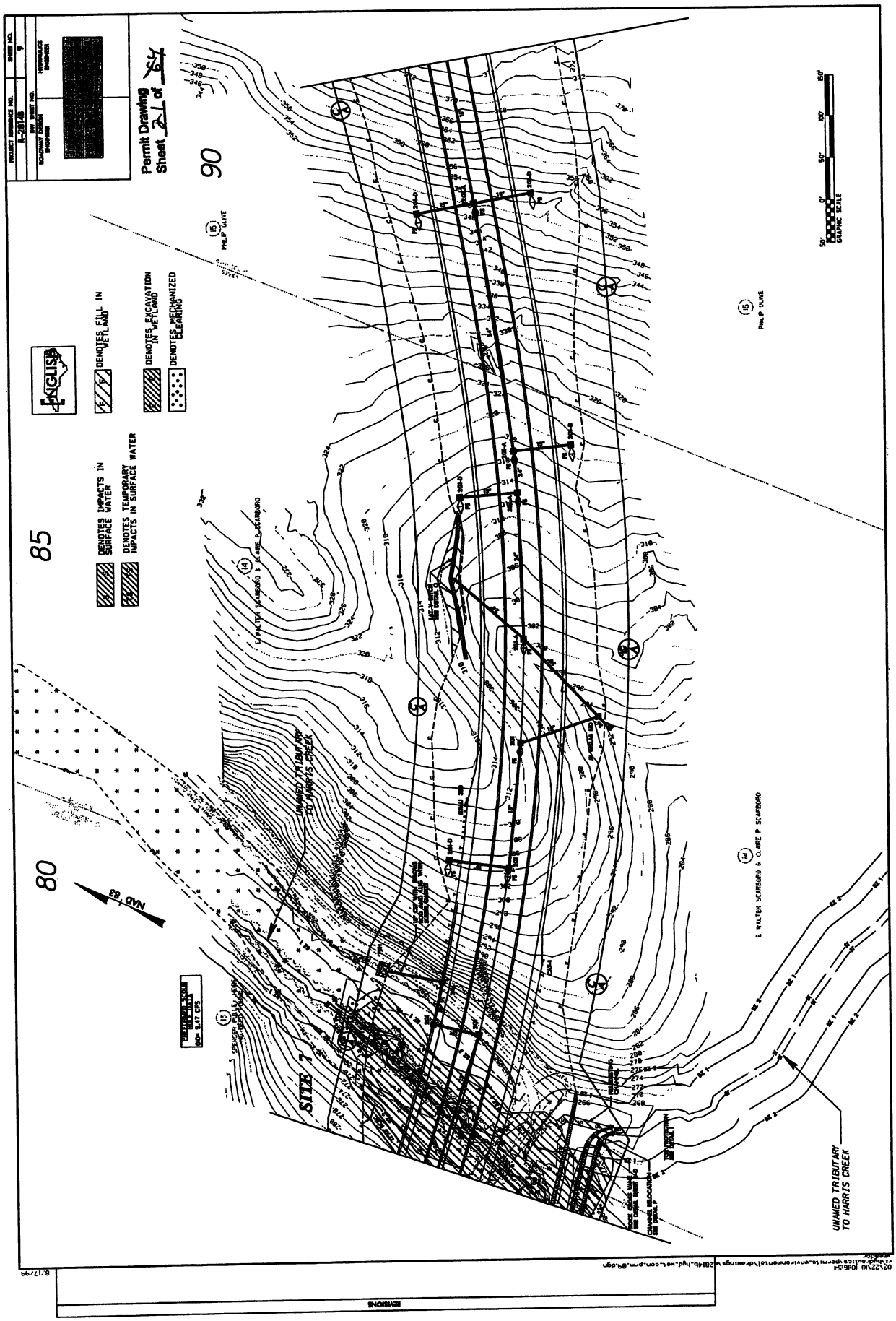

PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-16
Permit Drawing
Sheet 16 of 64
55+50.00
D.P 328.19
55+00.00
D.P 327.02
54+50.00
D.P 325.95
54+00.00
D.P. 324.98
WETLANDS
CLEARING LIMITS
0.020
0.030
2:1
5:1
333

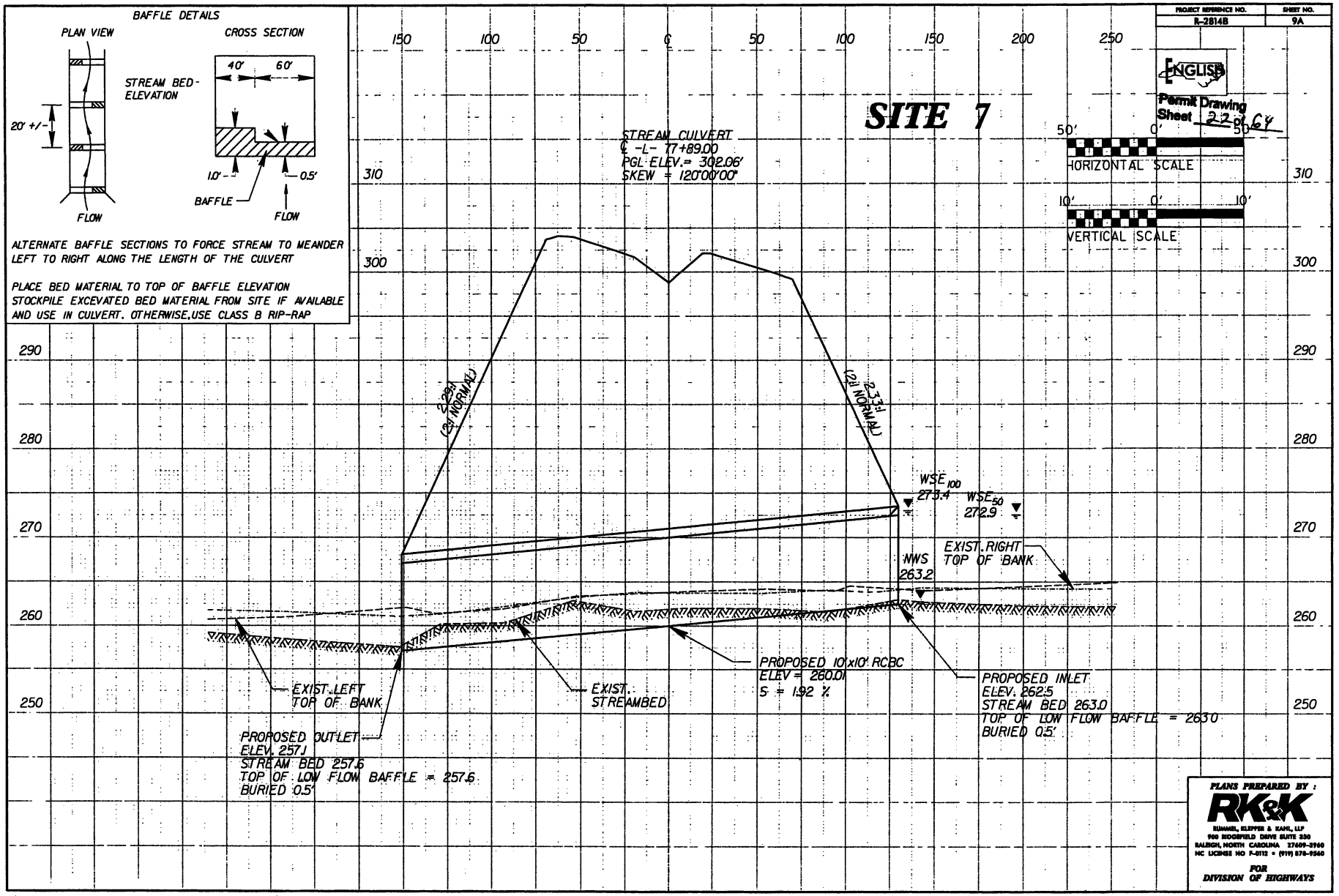

0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-17
Permit Drawing
Sheet 17 of 64
INTERSECTION SHEAR LINE
0.020
58+00.00
5.922sl
4sl
6sl
5sl
D.P. 335.36
57+50.00
5.392sl
2.86sl
57+00.00
2.02sl
0.030
DP 331.34
2sl
56+50.00
5.100sl
D.P. 329.65
WETLANDS
56+00.00
-4-
33

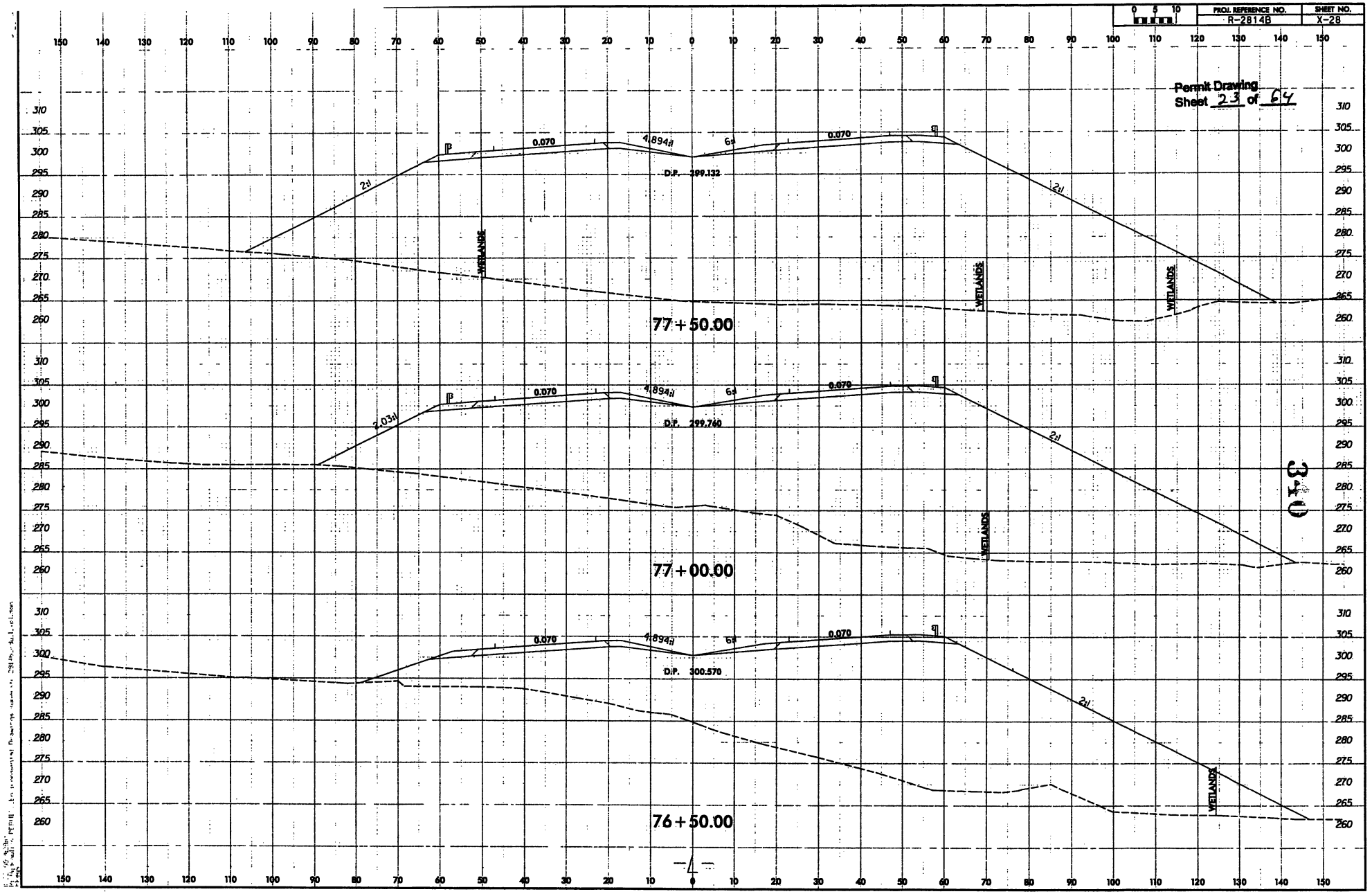

65
70
75
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 18 of 64
NAD 83
(13)
SPENCER PULLEY HEIRS
DB 2964 PG 569
REVISIONS
BERM DITCH
SEE DETAIL D
GRADE TO DRAIN
24" CMP WITH ELBOWS
SOD AND LUG WITH
SLEEVE GASKET
CAT-1
JS WELAB LID
TOE
STD SIDE DITCH
SEE DETAIL G
SEE 25:1 TOPSIL
CLASS 'I' RIP RAP
400 SY FILTER FABRIC
380 CY DIKE
CHANNEL RELOCATION
SEE DETAIL F
SITE 7
UNAMED TRIBUTARY
TO HARRIS CREEK
PROGRESS ENERGY (CAROLINA POWER & LIGHT) EASEMENT 180 R/W
(13)
SPENCER PULLEY HEIRS
DB 2964 PG 569
50' 0' 50' 100 150
GRAPHIC SCALE
335

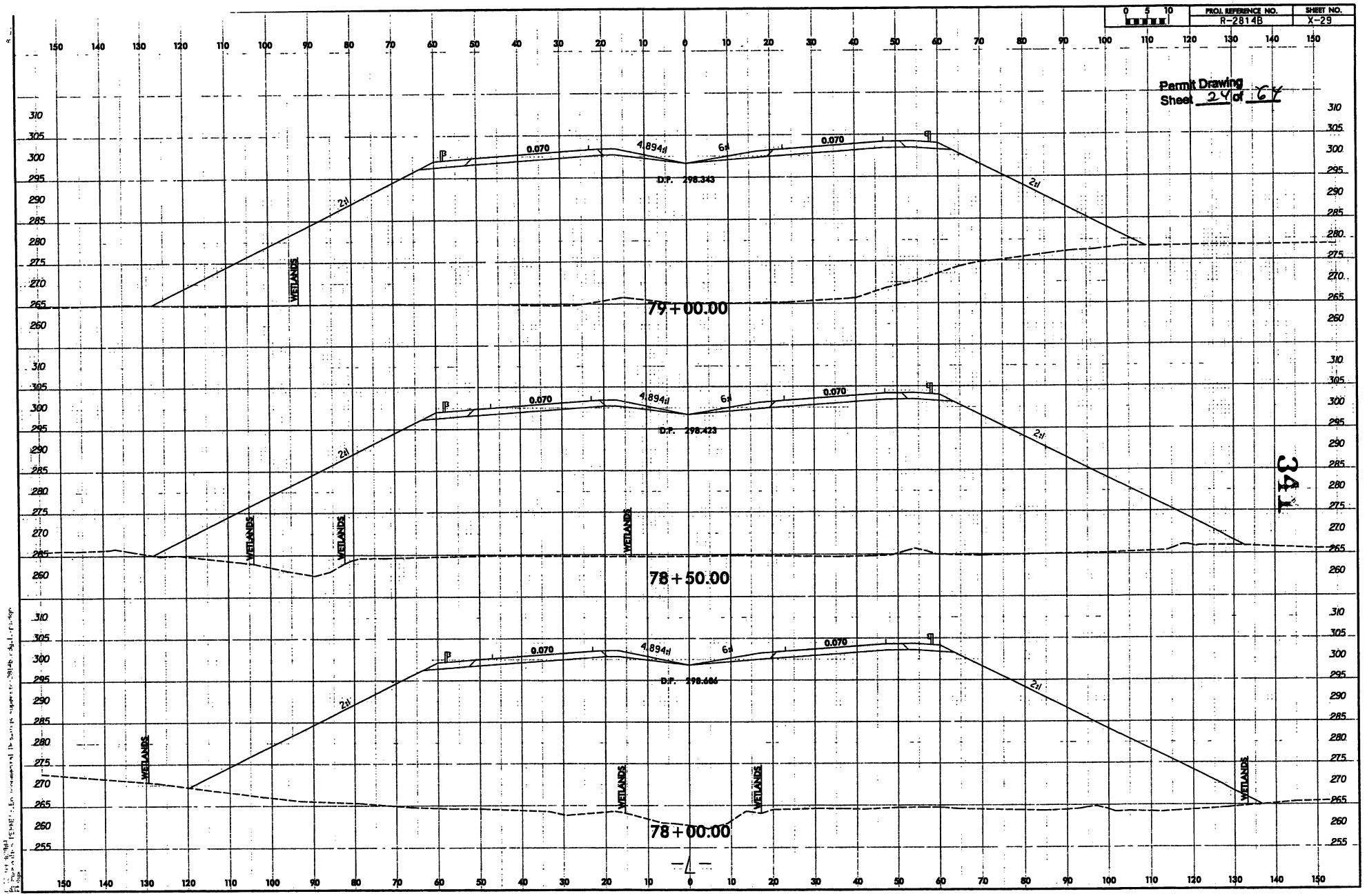

65
70
75
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
PROJECT REFERENCE NO.
B-2814B
SHEET NO.
8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 19 of 64
NAD 83
SPENCER PULLEY HEIRS
DB 2964 PG 563
SPENCER PULLEY HEIRS
DB 2964 PG 565
PROGRESS ENERGY CAROLINA POWER & LIGHT EASEMENT
GRADE TO DRAIN
SITE 7
UNNAMED TRIBUTARY
TO HARRIS CREEK
GRAPHIC SCALE
REVISIONS
8/17/99
336


80
85
90
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
ENGLISH
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
9
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 20 of 64
PREFORMED SCOUR HOLE DATA
Q10= 9.47 CFS
(13) SPENCER PULLEY HEIRS NO DEED FOUND
(14) E WALTER SCARBORO & CLAIRE P SCARBORO
(15) PHILIP OLIVE
SITE 7
UNAMED TRIBUTARY TO HARRIS CREEK
18" CSP WITH ELBOWS RCP AND FES WITH SLEEVE GASKET
LAT. V DITCH SEE DETAIL G
GRAU 350
CAT-1
JS WELAS LID
FILL EXISTING CHANNEL
BACK SLOPE WAIR SEE DETAIL SHEET 7-D
CHANNEL RELOCATION SEE DETAIL F
TOE PROTECTION SEE DETAIL I
UNAMED TRIBUTARY TO HARRIS CREEK
50 0 50' 100 150
GRAPHIC SCALE
REVISIONS
233


PROJECT REFERENCE NO.
R-2814B
SHEET NO.
9
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 21 of 54
ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
80
85
90
NAD 83
SITE 7
UNNAMED TRIBUTARY TO HARRIS CREEK
E WALTER SCARBORO & CLAIRE P SCARBORO
PHILIP OLIVE
GRAPHIC SCALE
REVISIONS
8/17/99


BAFFLE DETAILS
PLAN VIEW
CROSS SECTION
STREAM BED-ELEVATION
20' +/-
40'
60'
1.0'
0.5'
BAFFLE
FLOW
FLOW
ALTERNATE BAFFLE SECTIONS TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT
PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION
STOCKPILE EXCEVATED BED MATERIAL FROM SITE IF AVAILABLE AND USE IN CULVERT. OTHERWISE,USE CLASS B RIP-RAP
SITE 7
STREAM CULVERT
℄ -L- 77+89.00
PGL ELEV.= 302.06'
SKEW = 120°00'00"
HORIZONTAL SCALE
VERTICAL SCALE
2.25:1 (2) NORMAL
2.33:1 (2) NORMAL
WSE100 273.4
WSE50 272.9
NWS 263.2
EXIST. RIGHT TOP OF BANK
EXIST. LEFT TOP OF BANK
EXIST. STREAMBED
PROPOSED 10'x10' RCBC
ELEV = 260.0
S = 1.92 %
PROPOSED INLET
ELEV. 262.5
STREAM BED 263.0
TOP OF LOW FLOW BAFFLE = 263.0
BURIED 0.5'
PROPOSED OUTLET
ELEV. 257.1
STREAM BED 257.6
TOP OF LOW FLOW BAFFLE = 257.6
BURIED 0.5'
PROJECT REFERENCE NO. R-2814B
SHEET NO. 9A
ENGLISH
Permit Drawing Sheet 22 of 64
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 330
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO F-0112 • (919) 878-9560
FOR DIVISION OF HIGHWAYS


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-28
Permit Drawing
Sheet 23 of 64
77+50.00
77+00.00
76+50.00
D.P. 299.132
D.P. 299.760
D.P. 300.570
0.070
4.894il
6il
2il
2.03il
WETLANDS
-4-


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-29
Permit Drawing
Sheet 24 of 67
79+00.00
78+50.00
78+00.00
D.P. 298.343
D.P. 298.423
D.P. 298.686
0.070
4.894ft
6%
2:1
WETLANDS
341

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	11
SW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

105 110 115

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2001

Permit Drawing Sheet 25 of 64

REVISIONS

06/16/09: Added TDE upstream and downstream around the culvert on parcel 20.

SITE 8

342

(16) ROBERT C RHEIN INTERESTS INC

(20) CAMERON E SHEARON & BEVERLY W SHEARON

HARRIS CREEK

(17) DONALD F WILLIAMS & DOROTHY D WILLIAMS

RSRM DITCH SEE DETAIL D

TOE PROTECTION SEE DETAIL I

18" CSP WITH ELBOWS END AND LUG WITH SLEEVE GASKET

2GI-D FS

2GI FS

2GI-A FS

GRAU 250

RPRC CLP GRASS SWALE SEE DETAIL E

3' LAY GRASS SWALE SEE DETAIL H

JB w/HH

TDE

CAT-1

2-3GI

4OTCB

GRAPHIC SCALE 50' 0' 50' 100' 150

GRASS SWALE DATA A		
-L- STA. 10700 TO STA. 10850 LT		
DA	0.62	AC
SLOPE	2.80	%
L REQ	82	FT
L PROV	150	FT
Q2	1.77	CFS
V2	1.88	FTPS
D2	0.47	FT
Q10	2.29	CFS
V10	2.30	FTPS
D10	0.45	FT

GRASS SWALE DATA B		
-L- STA. 10700 TO STA. 10850 RT		
DA	0.60	AC
SLOPE	2.80	%
L REQ	80	FT
L PROV	150	FT
Q2	1.72	CFS
V2	1.86	FTPS
D2	0.47	FT
Q10	2.22	CFS
V10	2.28	FTPS
D10	0.44	FT

GRASS SWALE DATA D		
-L- STA. 11050 TO STA. 11150 RT		
DA	0.58	AC
SLOPE	4.00	%
L REQ	86	FT
L PROV	100	FT
Q2	1.66	CFS
V2	1.77	FTPS
D2	0.43	FT
Q10	2.14	CFS
V10	2.34	FTPS
D10	0.43	FT

GRASS SWALE DATA F		
-L- STA. 11200 TO STA. 11350 LT		
DA	1.06	AC
SLOPE	3.05	%
L REQ	105	FT
L PROV	150	FT
Q2	3.09	CFS
V2	1.97	FTPS
D2	0.58	FT
Q10	3.89	CFS
V10	2.70	FTPS
D10	0.84	FT

GRASS SWALE DATA B		
-L- STA. 11800 TO STA. 11900 RT		
DA	0.72	AC
SLOPE	1.16	%
L REQ	73	FT
L PROV	100	FT
Q2	2.08	CFS
V2	1.28	FTPS
D2	0.58	FT
Q10	2.70	CFS
V10	1.70	FTPS
D10	0.66	FT

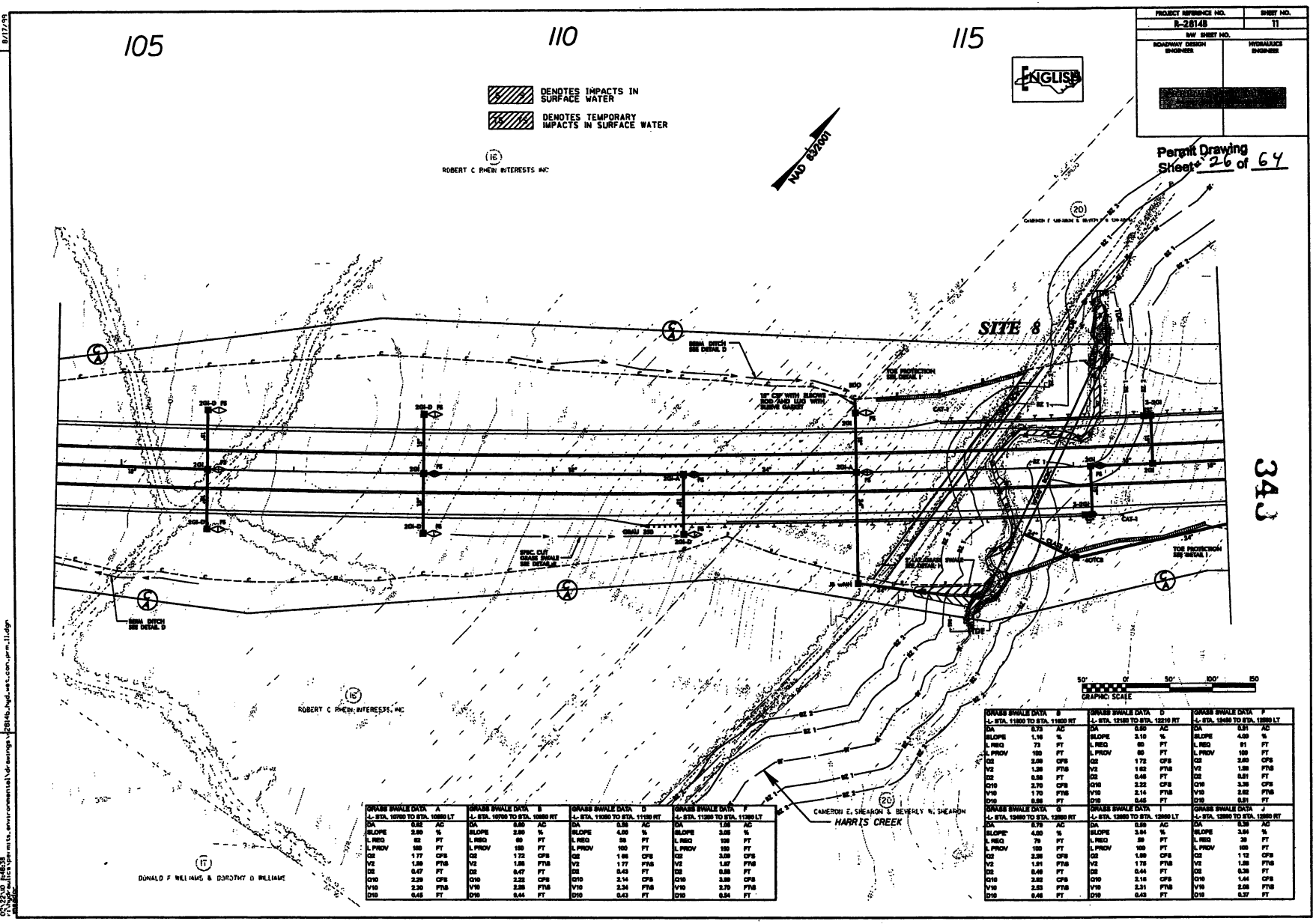
GRASS SWALE DATA D		
-L- STA. 12150 TO STA. 12210 RT		
DA	0.68	AC
SLOPE	3.10	%
L REQ	80	FT
L PROV	80	FT
Q2	1.72	CFS
V2	1.62	FTPS
D2	0.46	FT
Q10	2.22	CFS
V10	2.14	FTPS
D10	0.48	FT

GRASS SWALE DATA F		
-L- STA. 12469 TO STA. 12550 LT		
DA	0.91	AC
SLOPE	4.00	%
L REQ	91	FT
L PROV	100	FT
Q2	2.60	CFS
V2	1.98	FTPS
D2	0.51	FT
Q10	3.36	CFS
V10	2.62	FTPS
D10	0.91	FT

GRASS SWALE DATA G		
-L- STA. 12450 TO STA. 12550 RT		
DA	0.79	AC
SLOPE	4.00	%
L REQ	79	FT
L PROV	100	FT
Q2	2.28	CFS
V2	1.91	FTPS
D2	0.49	FT
Q10	2.82	CFS
V10	2.53	FTPS
D10	0.48	FT

GRASS SWALE DATA I		
-L- STA. 12850 TO STA. 12950 LT		
DA	0.89	AC
SLOPE	3.84	%
L REQ	99	FT
L PROV	100	FT
Q2	1.99	CFS
V2	1.75	FTPS
D2	0.44	FT
Q10	2.16	CFS
V10	2.21	FTPS
D10	0.43	FT

GRASS SWALE DATA J		
-L- STA. 12850 TO STA. 12950 RT		
DA	0.38	AC
SLOPE	3.84	%
L REQ	39	FT
L PROV	100	FT
Q2	1.12	CFS
V2	1.58	FTPS
D2	0.35	FT
Q10	1.44	CFS
V10	2.05	FTPS
D10	0.37	FT



GRASS SWALE DATA A -L- STA. 10700 TO STA. 10880 LT		
DA	0.62	AC
SLOPE	2.89	%
L REQ	62	FT
L PROV	100	FT
Q2	1.77	CFS
V2	1.59	FTPS
D2	0.47	FT
Q10	2.29	CFS
V10	2.35	FTPS
D10	0.45	FT

GRASS SWALE DATA B -L- STA. 10790 TO STA. 10980 RT		
DA	0.69	AC
SLOPE	2.89	%
L REQ	66	FT
L PROV	100	FT
Q2	1.72	CFS
V2	1.58	FTPS
D2	0.47	FT
Q10	2.23	CFS
V10	2.28	FTPS
D10	0.44	FT

GRASS SWALE DATA D -L- STA. 11080 TO STA. 11130 RT		
DA	0.38	AC
SLOPE	4.00	%
L REQ	58	FT
L PROV	100	FT
Q2	1.06	CFS
V2	1.77	FTPS
D2	0.43	FT
Q10	2.14	CFS
V10	2.34	FTPS
D10	0.43	FT

GRASS SWALE DATA F -L- STA. 11280 TO STA. 11380 LT		
DA	1.08	AC
SLOPE	3.05	%
L REQ	100	FT
L PROV	100	FT
Q2	3.08	CFS
V2	1.57	FTPS
D2	0.68	FT
Q10	3.68	CFS
V10	3.79	FTPS
D10	0.64	FT

GRASS SWALE DATA B -L- STA. 11680 TO STA. 11800 RT		
DA	0.73	AC
SLOPE	1.16	%
L REQ	72	FT
L PROV	100	FT
Q2	2.09	CFS
V2	1.36	FTPS
D2	0.58	FT
Q10	2.70	CFS
V10	1.70	FTPS
D10	0.66	FT

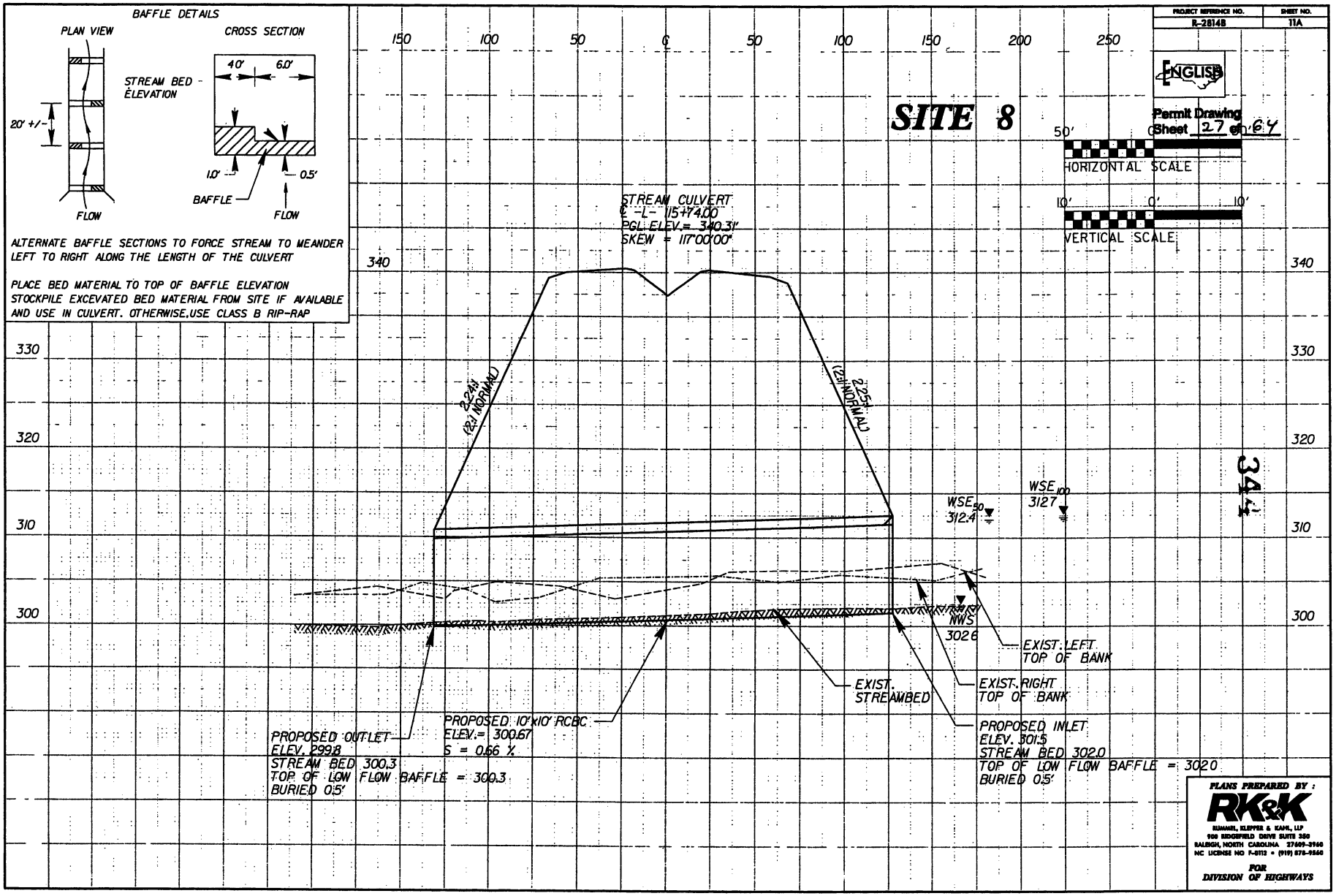
GRASS SWALE DATA D -L- STA. 12160 TO STA. 12210 RT		
DA	0.80	AC
SLOPE	3.10	%
L REQ	66	FT
L PROV	66	FT
Q2	1.72	CFS
V2	1.62	FTPS
D2	0.46	FT
Q10	2.22	CFS
V10	2.14	FTPS
D10	0.45	FT

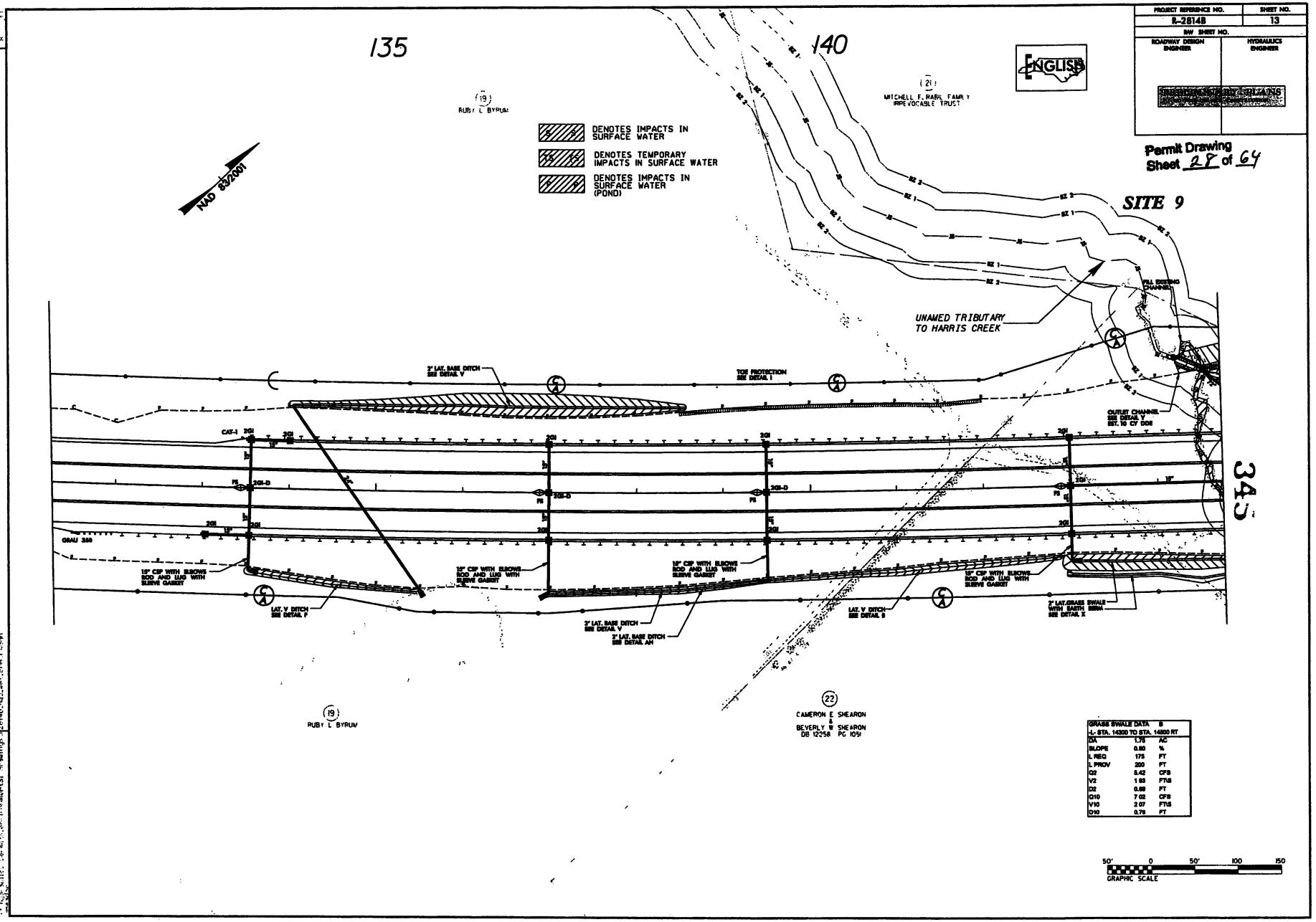
GRASS SWALE DATA F -L- STA. 12460 TO STA. 12660 LT		
DA	0.51	AC
SLOPE	4.69	%
L REQ	91	FT
L PROV	100	FT
Q2	2.69	CFS
V2	1.58	FTPS
D2	0.51	FT
Q10	3.38	CFS
V10	2.52	FTPS
D10	0.51	FT

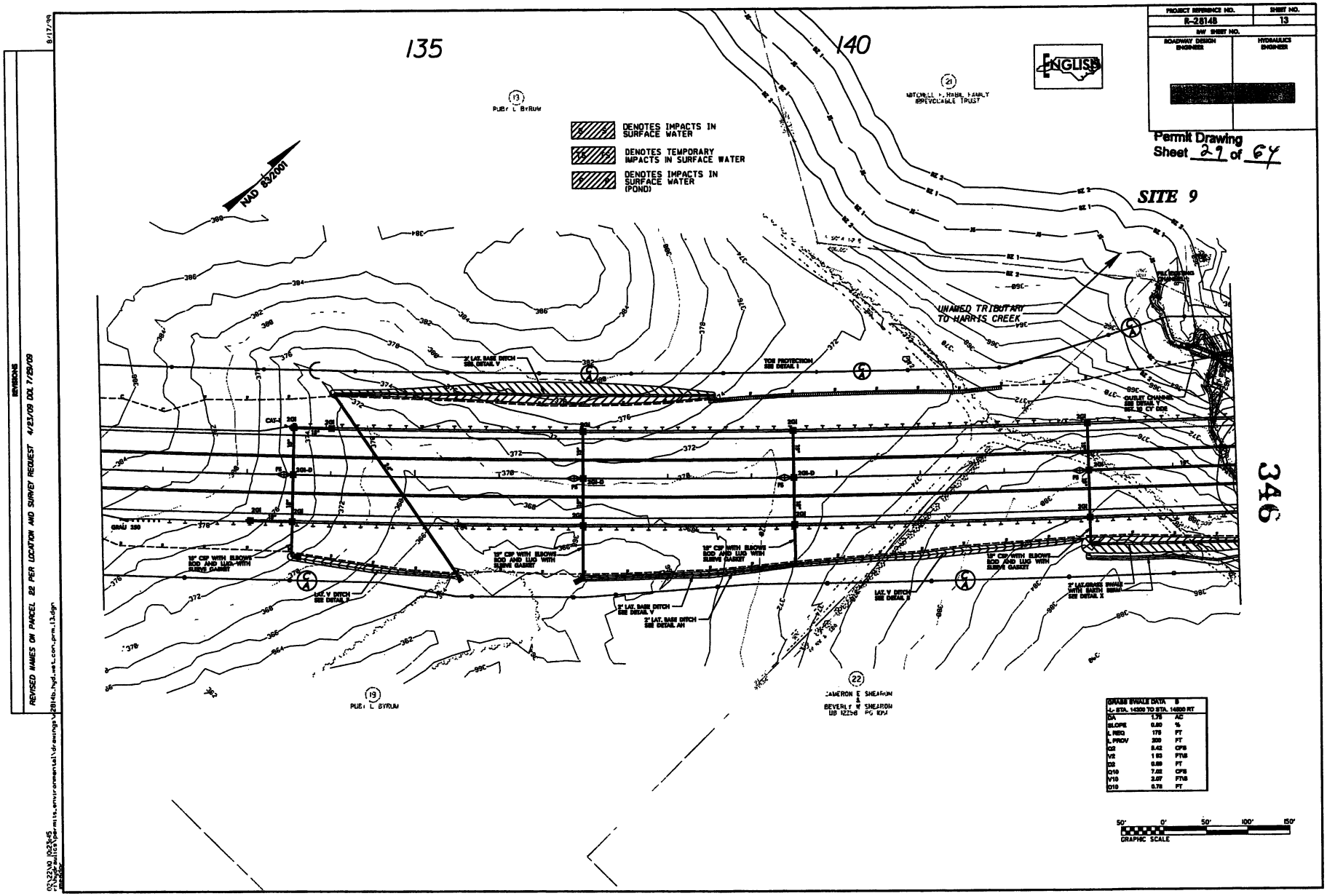
GRASS SWALE DATA G -L- STA. 12460 TO STA. 12560 RT		
DA	0.76	AC
SLOPE	4.60	%
L REQ	76	FT
L PROV	100	FT
Q2	2.38	CFS
V2	1.91	FTPS
D2	0.49	FT
Q10	2.85	CFS
V10	2.53	FTPS
D10	0.46	FT

GRASS SWALE DATA I -L- STA. 12660 TO STA. 12860 LT		
DA	0.89	AC
SLOPE	3.84	%
L REQ	89	FT
L PROV	100	FT
Q2	1.99	CFS
V2	1.75	FTPS
D2	0.64	FT
Q10	2.16	CFS
V10	2.31	FTPS
D10	0.63	FT

GRASS SWALE DATA J -L- STA. 12860 TO STA. 12960 RT		
DA	0.39	AC
SLOPE	3.61	%
L REQ	38	FT
L PROV	100	FT
Q2	1.12	CFS
V2	1.58	FTPS
D2	0.36	FT
Q10	1.44	CFS
V10	2.06	FTPS
D10	0.37	FT


BAFFLE DETAILS
PLAN VIEW
CROSS SECTION
STREAM BED ELEVATION
20' +/-
4.0'
6.0'
1.0'
0.5'
BAFFLE
FLOW
FLOW
ALTERNATE BAFFLE SECTIONS TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT
PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION
STOCKPILE EXCEVATED BED MATERIAL FROM SITE IF AVAILABLE AND USE IN CULVERT. OTHERWISE,USE CLASS B RIP-RAP
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
11A
ENGLISH
SITE 8
Permit Drawing
Sheet 27 of 64
HORIZONTAL SCALE
50'
0'
50'
VERTICAL SCALE
10'
0'
10'
STREAM CULVERT
℄ -L- 15+74.00
PGL ELEV.= 340.3'
SKEW = 117°00'00"
340
330
320
310
300
2.24% (2.1% NORMAL)
2.25% (2.1% NORMAL)
WSE50 312.4
WSE100 312.7
NWS 302.6
EXIST. LEFT TOP OF BANK
EXIST. RIGHT TOP OF BANK
EXIST. STREAMBED
PROPOSED INLET
ELEV. 301.5
STREAM BED 302.0
TOP OF LOW FLOW BAFFLE = 302.0
BURIED 0.5'
PROPOSED 10'x10' RCBC
ELEV.= 300.67
S = 0.66 %
PROPOSED OUTLET
ELEV. 299.8
STREAM BED 300.3
TOP OF LOW FLOW BAFFLE = 300.3
BURIED 0.5'
344
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO F-0113 • (919) 878-9560
FOR DIVISION OF HIGHWAYS


135
140
345
NAD 83/2001
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
SITE 9
UNAMED TRIBUTARY TO HARRIS CREEK
(19) RUBY L BYRUM
(21) MITCHELL F. PARK FAMILY IRREVOCABLE TRUST
(22) CAMERON E SHEARON & BEVERLY W SHEARON DB 12258 PG 1051
2' LAT. BASE DITCH SEE DETAIL V
TOE PROTECTION SEE DETAIL I
OUTLET CHANNEL SEE DETAIL V EST. 10 CY DOE
FILL EXISTING CHANNEL
18" CSP WITH ELBOWS ROD AND LUG WITH SLEEVE GASKET
LAT. V DITCH SEE DETAIL F
LAT. V DITCH SEE DETAIL G
2' LAT-GRASS SWALE WITH EARTH BERM SEE DETAIL X
GRADE 350
GRASS SWALE DATA -L- STA. 14300 TO STA. 14600 RT
DA 1.76 AC
SLOPE 0.80 %
L REQ 175 FT
L PROV 200 FT
Q2 5.42 CFS
V2 1.93 FTS
D2 0.69 FT
Q10 7.02 CFS
V10 2.07 FTS
D10 0.78 FT
50' 0 50' 100 150
GRAPHIC SCALE
PROJECT REFERENCE NO. R-2814B
SHEET NO. 13
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 28 of 64
REVISIONS
REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09



REVISIONS

REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/21/09 DDL 7/29/09

8/17/09

R2814b_hyd_wet_con_prm_13.dgn

03/27/09 10:23:45

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 30 of 64

REVISIONS

REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09

145 150 155

NAD 83/2001

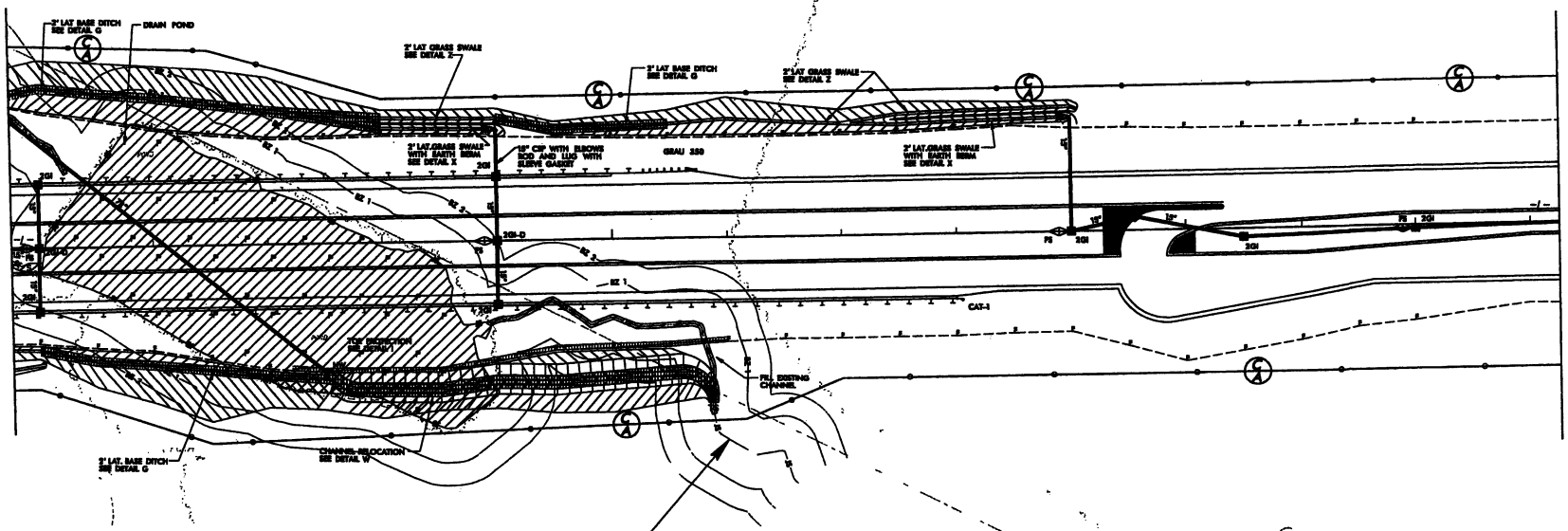
(21) MITCHELL F. RABIL FAMILY IRREVOCABLE TRUST

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

SITE 9



(22) CAMERON E SHEARON & BEVERLY W SHEARON DB 12258 PG 1051

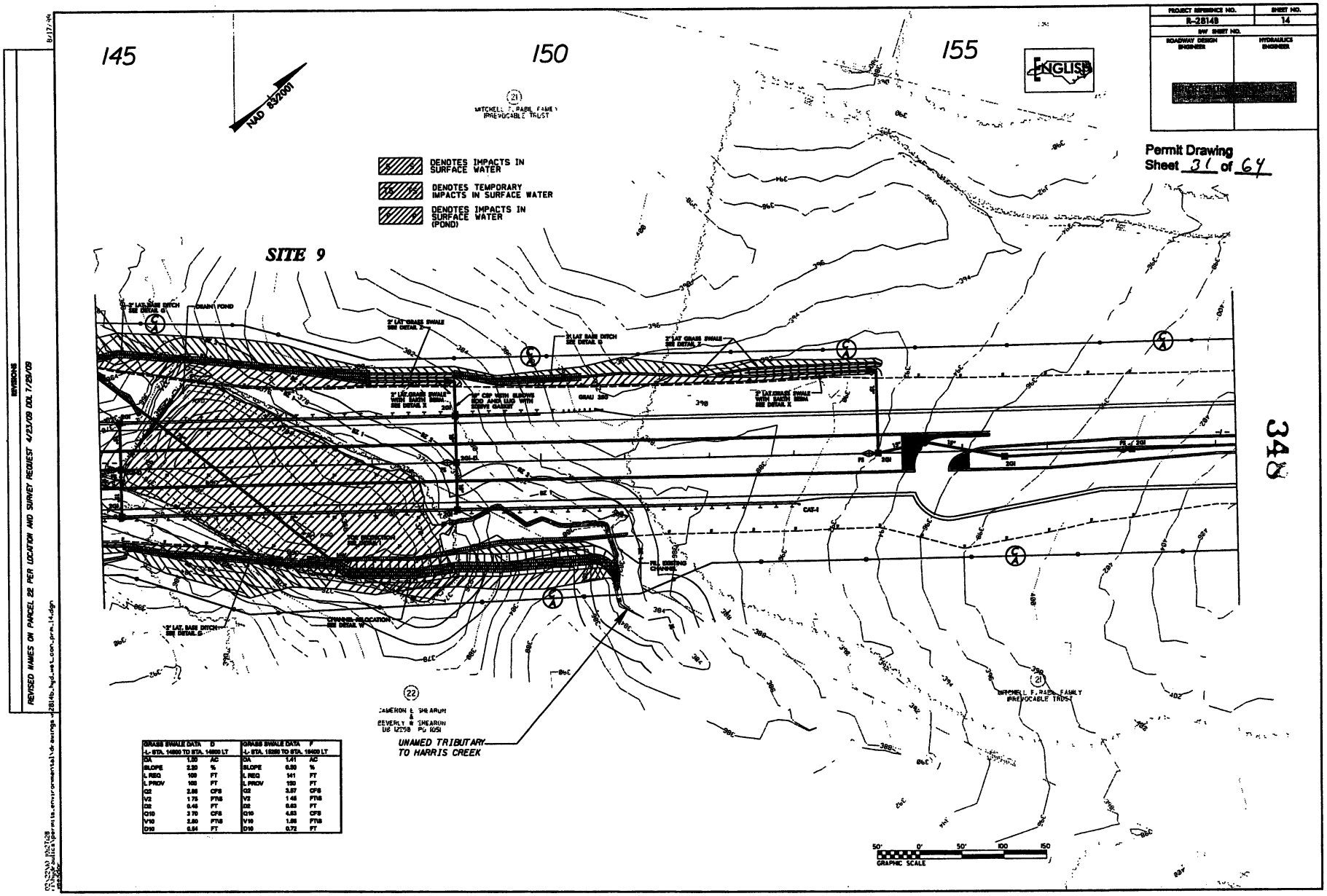
UNAMED TRIBUTARY TO HARRIS CREEK

(21) MITCHELL F. RABIL FAMILY IRREVOCABLE TRUST

GRASS SWALE DATA D			GRASS SWALE DATA F		
-L- STA. 14600 TO STA. 14600 LT			-L- STA. 15250 TO STA. 15400 LT		
DA	1.59	AC	DA	1.41	AC
SLOPE	2.20	%	SLOPE	0.60	%
L REQ	100	FT	L REQ	141	FT
L PROV	100	FT	L PROV	150	FT
Q2	2.88	CFS	Q2	3.57	CFS
V2	1.75	FTS	V2	1.45	FTS
D2	0.48	FT	D2	0.53	FT
Q10	3.70	CFS	Q10	4.53	CFS
V10	2.80	FTS	V10	1.56	FTS
D10	0.54	FT	D10	0.72	FT

50' 0' 50' 100' 150
GRAPHIC SCALE

342



GRASS SWALE DATA D			GRASS SWALE DATA F		
-L- STA. 14600 TO STA. 14620 LT			-L- STA. 15280 TO STA. 15400 LT		
DA	1.20	AC	DA	1.41	AC
SLOPE	2.50	%	SLOPE	0.50	%
L REQ	100	FT	L REQ	141	FT
L PROV	100	FT	L PROV	150	FT
Q2	2.66	CFS	Q2	3.67	CFS
V2	1.75	FTS	V2	1.46	FTS
D2	0.46	FT	D2	0.63	FT
Q10	3.70	CFS	Q10	4.83	CFS
V10	2.20	FTS	V10	1.86	FTS
D10	0.54	FT	D10	0.72	FT

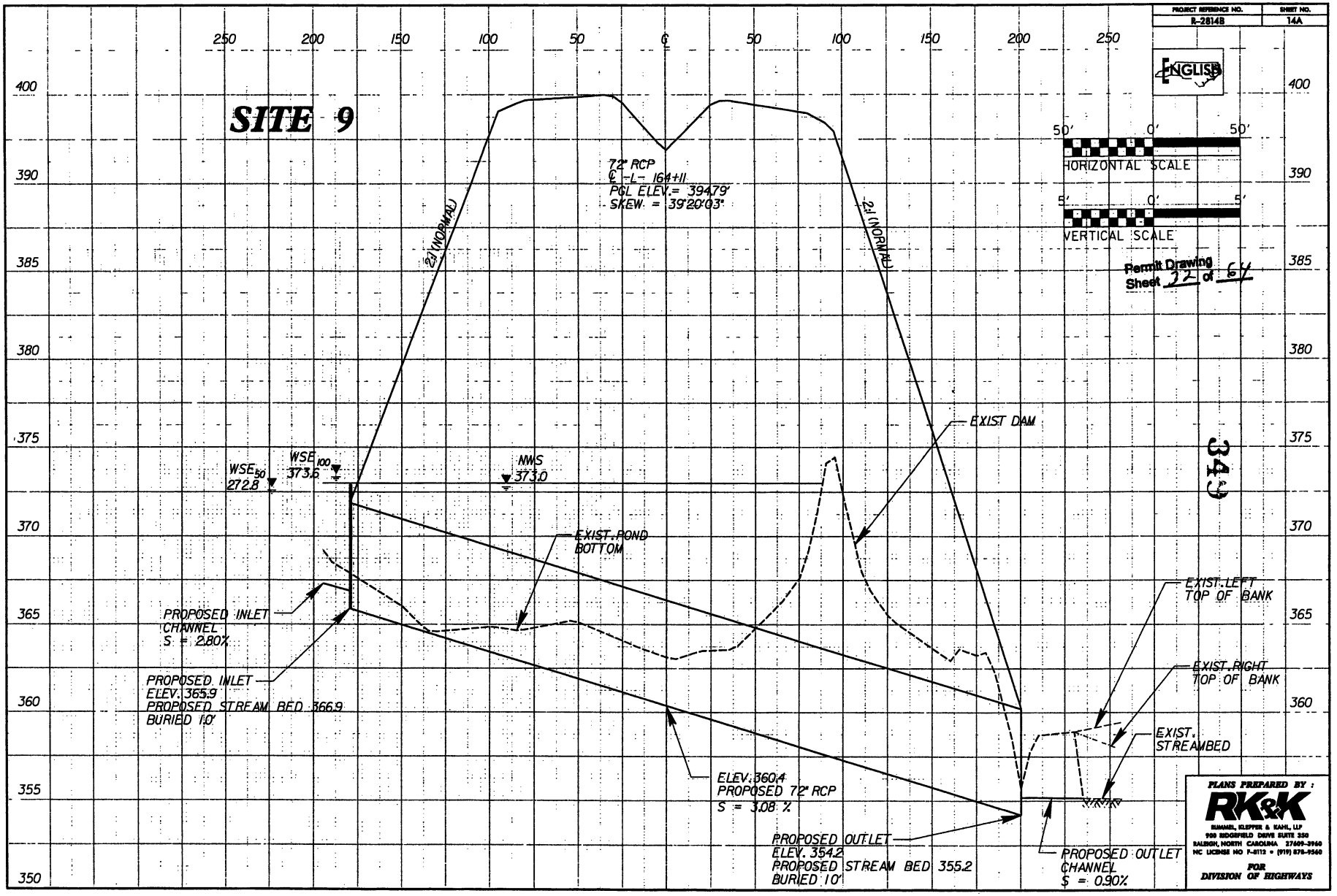
PROJECT REFERENCE NO.	SHEET NO.
R-2814B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

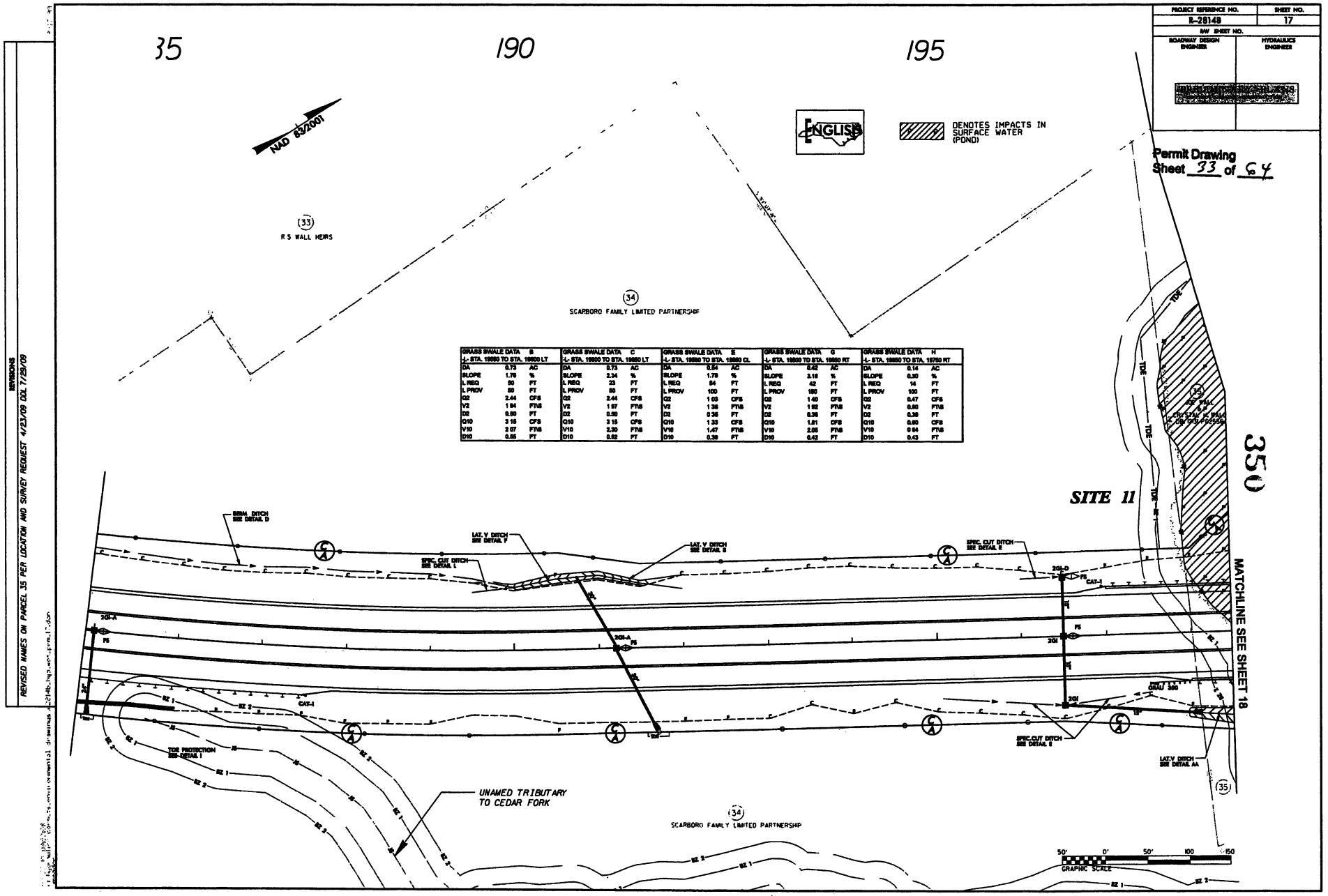
Permit Drawing
Sheet 31 of 64

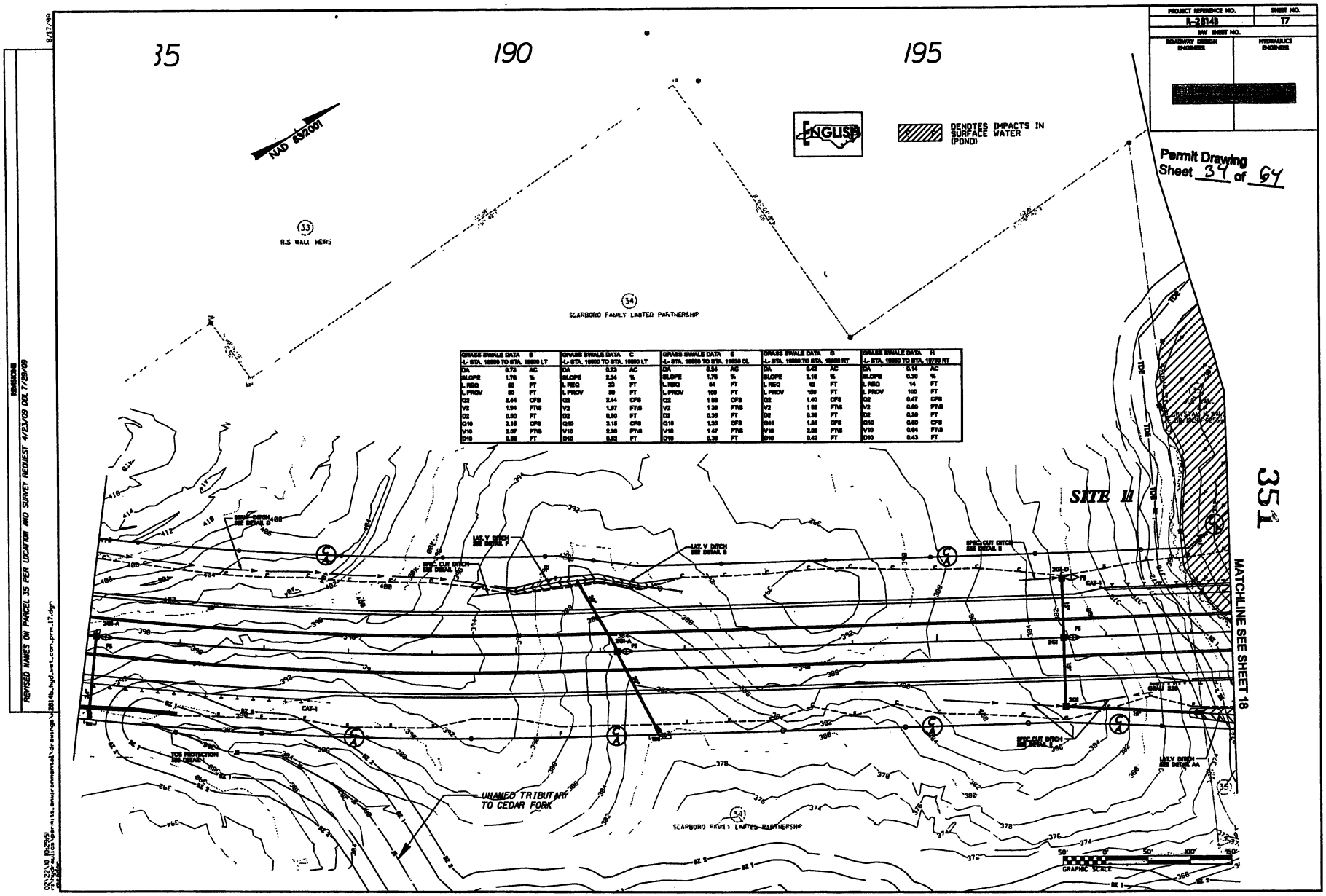
348

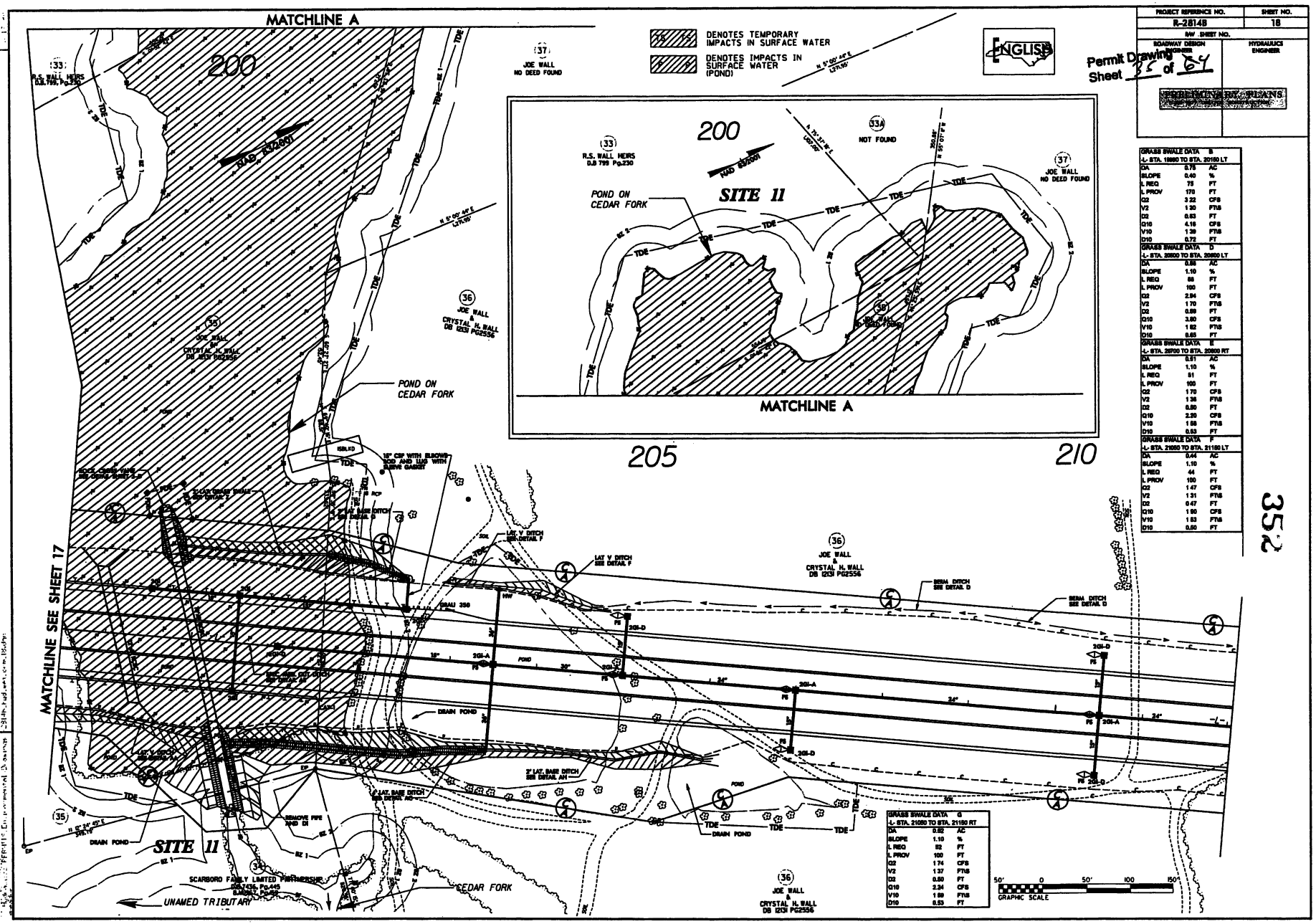
REVISIONS
REVISED NAMES ON PARCEL 22 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09

8/17/09

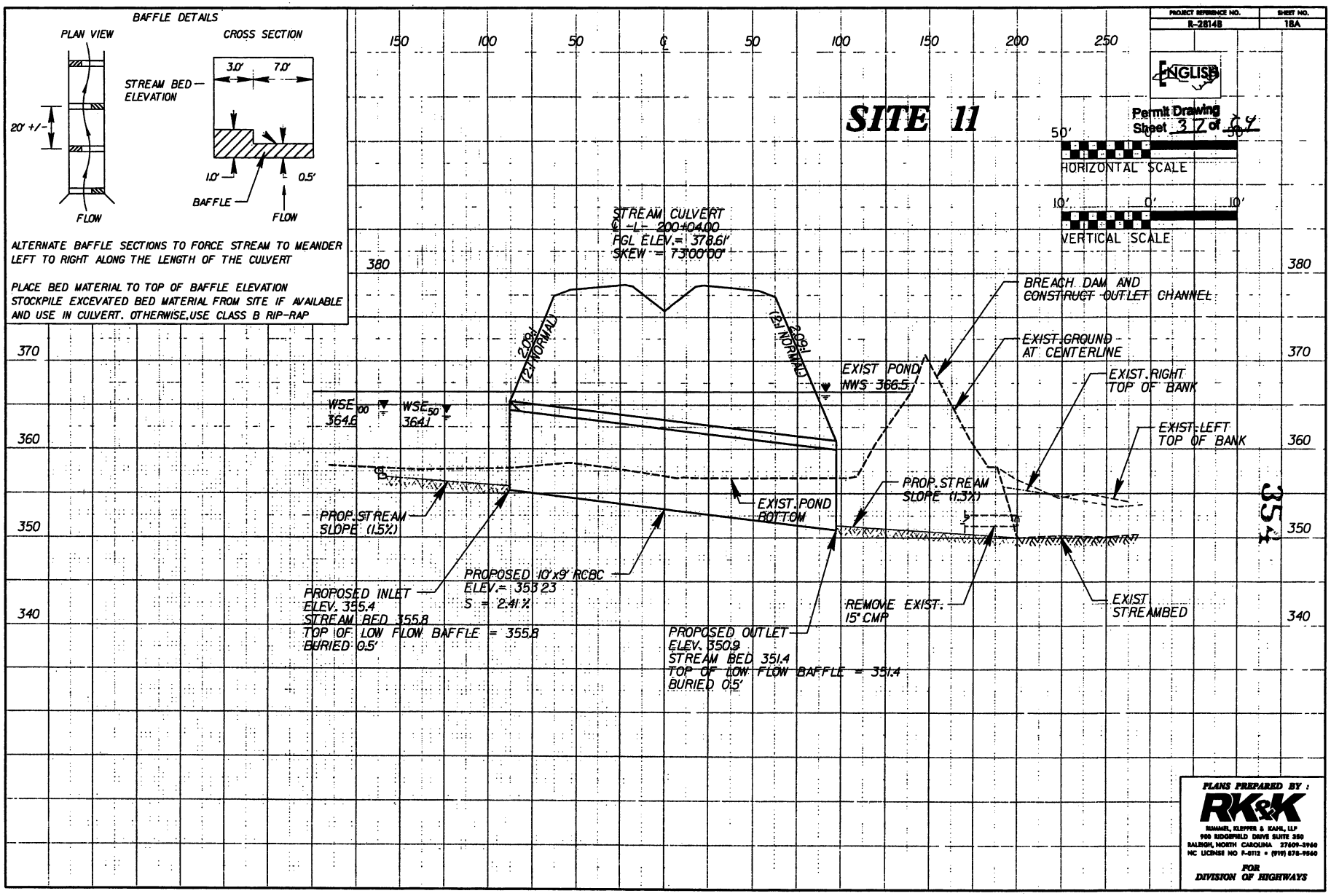

SITE 9
250
200
150
100
50
℄
50
100
150
200
250
400
390
385
380
375
370
365
360
355
350
72" RCP
℄ -L- 164+11
PGL ELEV.= 394.79'
SKEW. = 39°20'03"
2:1 (NORMAL)
2:1 (NORMAL)
EXIST DAM
WSE100 373.6
WSE50 272.8
NWS 373.0
EXIST. POND BOTTOM
PROPOSED INLET CHANNEL S = 2.80%
PROPOSED INLET ELEV. 365.9
PROPOSED STREAM BED 366.9
BURIED 1.0'
ELEV. 360.4
PROPOSED 72" RCP
S = 3.08 %
PROPOSED OUTLET ELEV. 354.2
PROPOSED STREAM BED 355.2
BURIED 1.0'
PROPOSED OUTLET CHANNEL S = 0.90%
EXIST. LEFT TOP OF BANK
EXIST. RIGHT TOP OF BANK
EXIST. STREAMBED
ENGLISH
50' 0' 50'
HORIZONTAL SCALE
5' 0' 5'
VERTICAL SCALE
Permit Drawing Sheet 22 of 64
34 of 64
PROJECT REFERENCE NO. R-2814B
SHEET NO. 14A
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO F-0113 • (919) 878-9560
FOR DIVISION OF HIGHWAYS


35
190
195
NAD 83/2001
ENGLISH
DENOTES IMPACTS IN SURFACE WATER (POND)
PROJECT REFERENCE NO. R-2814B
SHEET NO. 17
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 33 of 64
REVISIONS
REVISED NAMES ON PARCEL 35 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09
(33) R S WALL HEIRS
(34) SCARBORO FAMILY LIMITED PARTNERSHIP
GRASS SWALE DATA B -L- STA. 19550 TO STA. 19600 LT
DA 0.73 AC
SLOPE 1.76 %
L REQ 50 FT
L PROV 50 FT
Q2 2.44 CFS
V2 1.94 FTPS
D2 0.50 FT
Q10 3.15 CFS
V10 2.57 FTPS
D10 0.55 FT
GRASS SWALE DATA C -L- STA. 19600 TO STA. 19650 LT
DA 0.73 AC
SLOPE 2.34 %
L REQ 23 FT
L PROV 50 FT
Q2 2.44 CFS
V2 1.97 FTPS
D2 0.50 FT
Q10 3.15 CFS
V10 2.30 FTPS
D10 0.52 FT
GRASS SWALE DATA E -L- STA. 19650 TO STA. 19650 CL
DA 0.56 AC
SLOPE 1.79 %
L REQ 54 FT
L PROV 100 FT
Q2 1.03 CFS
V2 1.36 FTPS
D2 0.35 FT
Q10 1.33 CFS
V10 1.47 FTPS
D10 0.39 FT
GRASS SWALE DATA G -L- STA. 19650 TO STA. 19650 RT
DA 0.62 AC
SLOPE 3.16 %
L REQ 42 FT
L PROV 100 FT
Q2 1.40 CFS
V2 1.62 FTPS
D2 0.36 FT
Q10 1.81 CFS
V10 2.05 FTPS
D10 0.42 FT
GRASS SWALE DATA H -L- STA. 19650 TO STA. 19700 RT
DA 0.14 AC
SLOPE 0.30 %
L REQ 14 FT
L PROV 100 FT
Q2 0.47 CFS
V2 0.60 FTPS
D2 0.38 FT
Q10 0.60 CFS
V10 0.64 FTPS
D10 0.43 FT
SITE 11
350
MATCHLINE SEE SHEET 18
SSBM DITCH SEE DETAIL D
LAT. V DITCH SEE DETAIL F
SPEC. CUT DITCH SEE DETAIL L
LAT. V DITCH SEE DETAIL S
SPEC. CUT DITCH SEE DETAIL E
SPEC. CUT DITCH SEE DETAIL E
LAT.V DITCH SEE DETAIL AA
TOE PROTECTION SEE DETAIL I
CAT-1
UNAMED TRIBUTARY TO CEDAR FORK
(34) SCARBORO FAMILY LIMITED PARTNERSHIP
(35)
GRAPHIC SCALE
50' 0' 50' 100 150


35
190
195
NAD 83/2001
ENGLISH
DENOTES IMPACTS IN SURFACE WATER (POND)
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
17
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 34 of 64
(33) R.S WALL HEIRS
(34) SCARBORO FAMILY LIMITED PARTNERSHIP
(35) CRYSTAL ICE AND COLD STORAGE CO.
GRASS SWALE DATA B
GRASS SWALE DATA C
GRASS SWALE DATA E
GRASS SWALE DATA G
GRASS SWALE DATA H
SITE II
UNAMED TRIBUTARY TO CEDAR FORK
SCARBORO FAMILY LIMITED PARTNERSHIP
MATCHLINE SEE SHEET 18
351
GRAPHIC SCALE
REVISED NAMES ON PARCEL 35 PER LOCATION AND SURVEY REQUEST 4/23/08 DDL 7/25/08
8/17/99


MATCHLINE A
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
ENGLISH
Permit Drawing Sheet 35 of 64
PROJECT REFERENCE NO. R-2814B
SHEET NO. 18
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SUPERSEDES PREVIOUS PLANS
200
205
210
SITE 11
POND ON CEDAR FORK
MATCHLINE A
MATCHLINE SEE SHEET 17
SITE 11
POND ON CEDAR FORK
DRAIN POND
CEDAR FORK
UNAMED TRIBUTARY
JOE WALL NO DEED FOUND
R.S. WALL HEIRS DB 799 PG 230
JOE WALL & CRYSTAL H. WALL DB 1213 PG 2556
SCARBORO FAMILY LIMITED PARTNERSHIP DB 1626 PG 449 & DB 2135 PG 295
NOT FOUND
GRASS SWALE DATA B -L- STA. 19980 TO STA. 20160 LT
GRASS SWALE DATA D -L- STA. 20600 TO STA. 20800 LT
GRASS SWALE DATA E -L- STA. 20700 TO STA. 20800 RT
GRASS SWALE DATA F -L- STA. 21000 TO STA. 21160 LT
GRASS SWALE DATA G -L- STA. 21080 TO STA. 21160 RT
GRAPHIC SCALE
REVISIONS
REVISED NAMES ON PARCELS 35 AND 36 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09
352

Permit Drawing
Sheet 16 of 64
PROJECT REFERENCE NO.
R-2614B
SHEET NO.
16
ROADWAY DESIGN
HYDRAULICS
ENGINEER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
SITE 11
POND ON CEDAR FORK
MATCHLINE A
MATCHLINE SEE SHEET 17
UNNAMED TRIBUTARY
SCARBORO FARM, LIMITED PARTNERSHIP
GRAPHIC SCALE
REVISED NAMES ON PARCELS 35 AND 36 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09
REVISIONS
8/17/99


BAFFLE DETAILS
PLAN VIEW
CROSS SECTION
STREAM BED ELEVATION
20' +/-
3.0'
7.0'
1.0'
0.5'
BAFFLE
FLOW
FLOW
ALTERNATE BAFFLE SECTIONS TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT
PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION
STOCKPILE EXCEVATED BED MATERIAL FROM SITE IF AVAILABLE AND USE IN CULVERT. OTHERWISE,USE CLASS B RIP-RAP
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
18A
ENGLISH
SITE 11
Permit Drawing Sheet 37 of 64
HORIZONTAL SCALE
VERTICAL SCALE
STREAM CULVERT
℄ -L- 200+04.00
PGL ELEV.= 378.61'
SKEW = 73°00'00"
209' (2) NORMAL
209' (2) NORMAL
EXIST POND NWS 366.5
BREACH DAM AND CONSTRUCT OUTLET CHANNEL
EXIST. GROUND AT CENTERLINE
EXIST. RIGHT TOP OF BANK
EXIST. LEFT TOP OF BANK
WSE100 364.6
WSE50 364.1
PROP. STREAM SLOPE (1.5%)
EXIST. POND BOTTOM
PROP. STREAM SLOPE (1.3%)
PROPOSED 10'x9' RCBC
ELEV.= 353.23
S = 2.41%
PROPOSED INLET
ELEV. 355.4
STREAM BED 355.8
TOP OF LOW FLOW BAFFLE = 355.8
BURIED 0.5'
REMOVE EXIST. 15" CMP
EXIST STREAMBED
PROPOSED OUTLET
ELEV. 350.9
STREAM BED 351.4
TOP OF LOW FLOW BAFFLE = 351.4
BURIED 0.5'
354
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO F-0112 • (919) 878-9560
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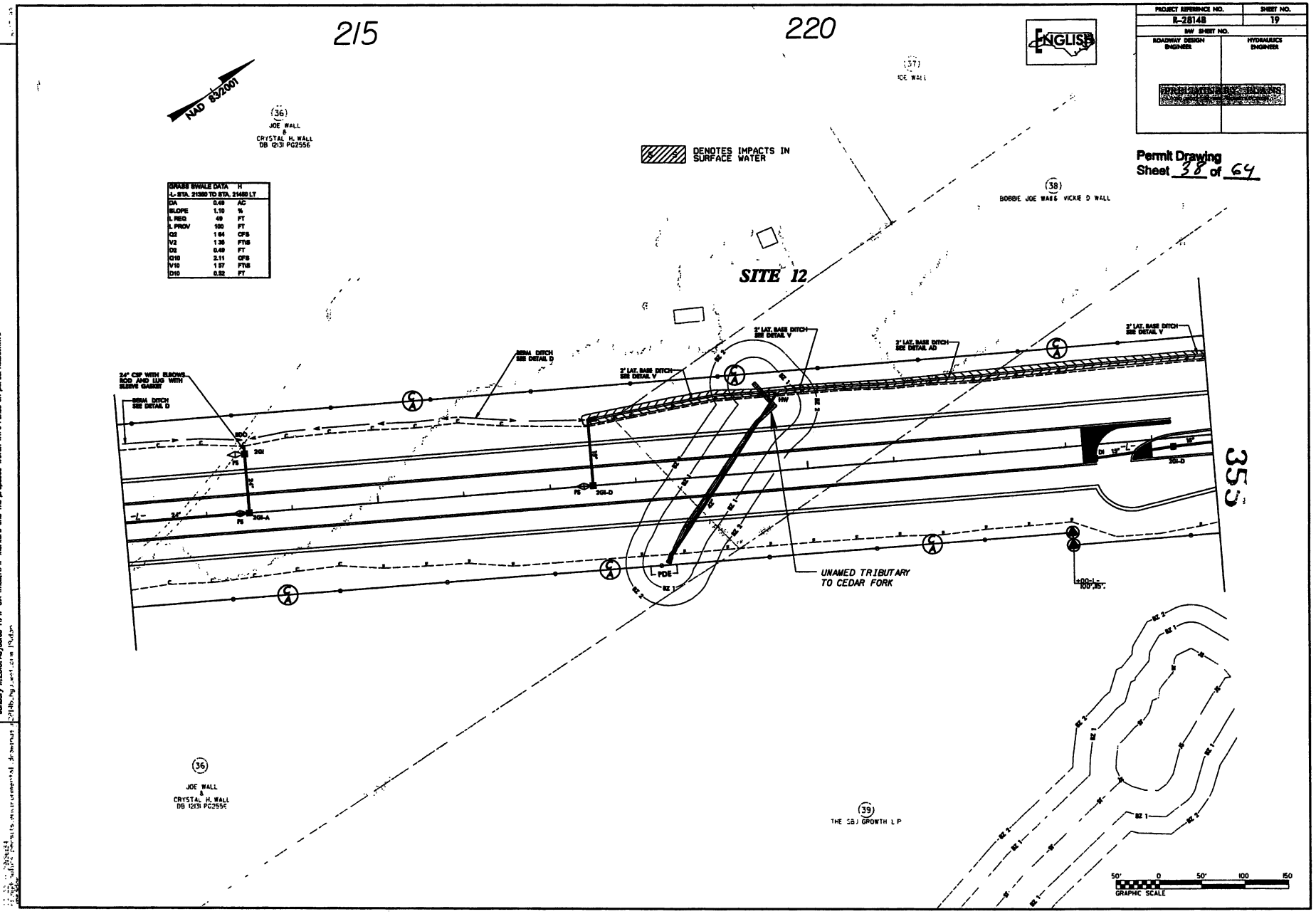
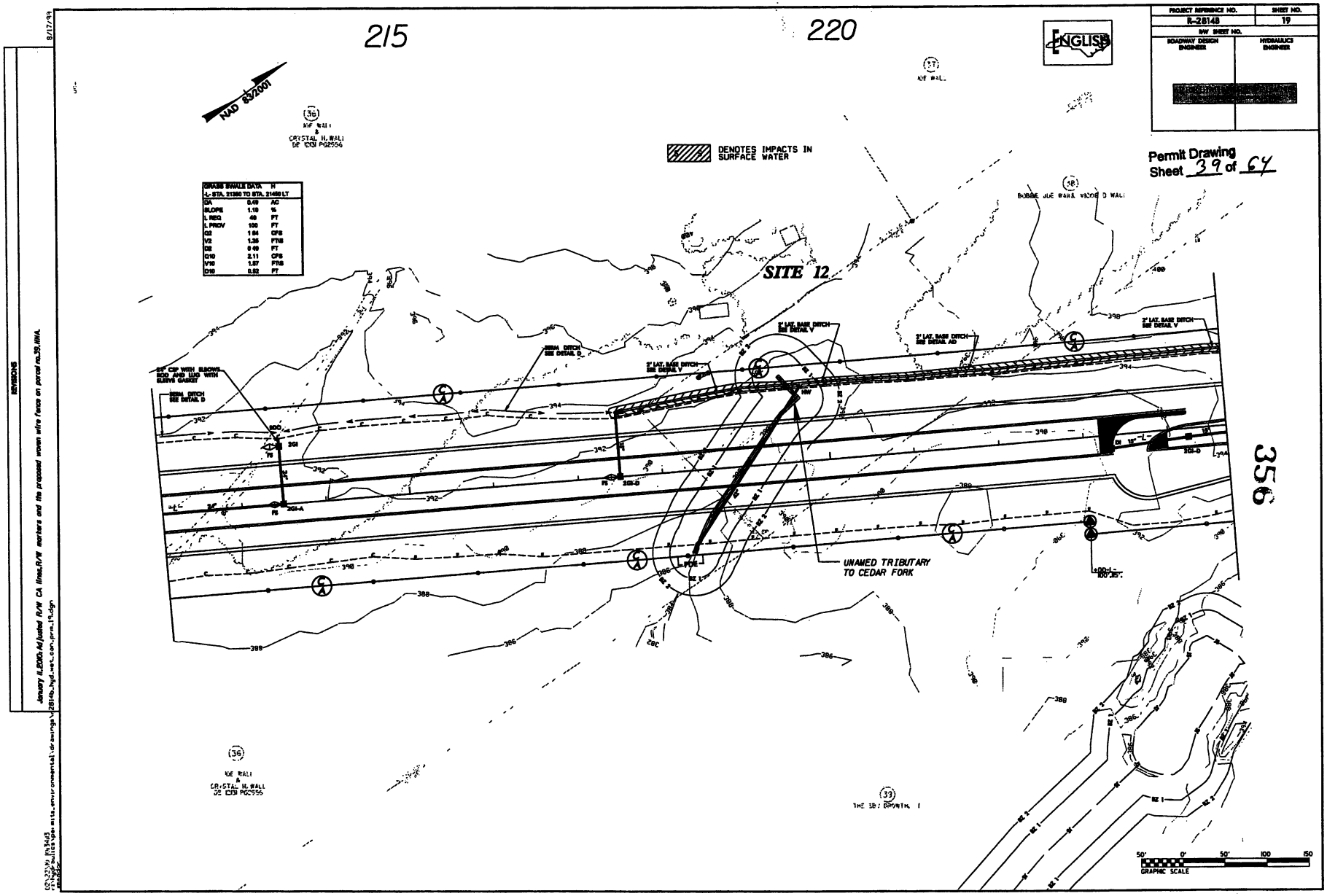
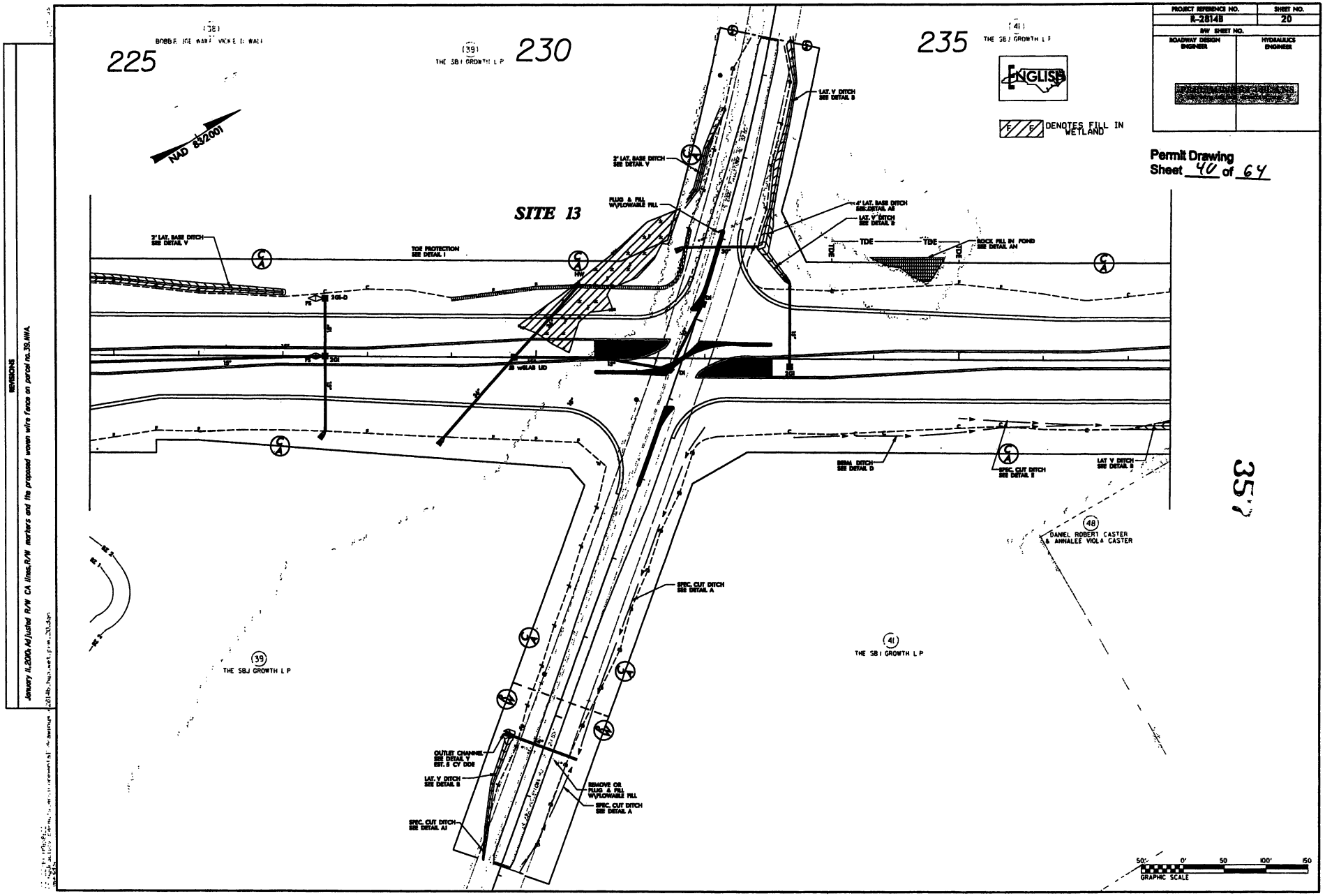
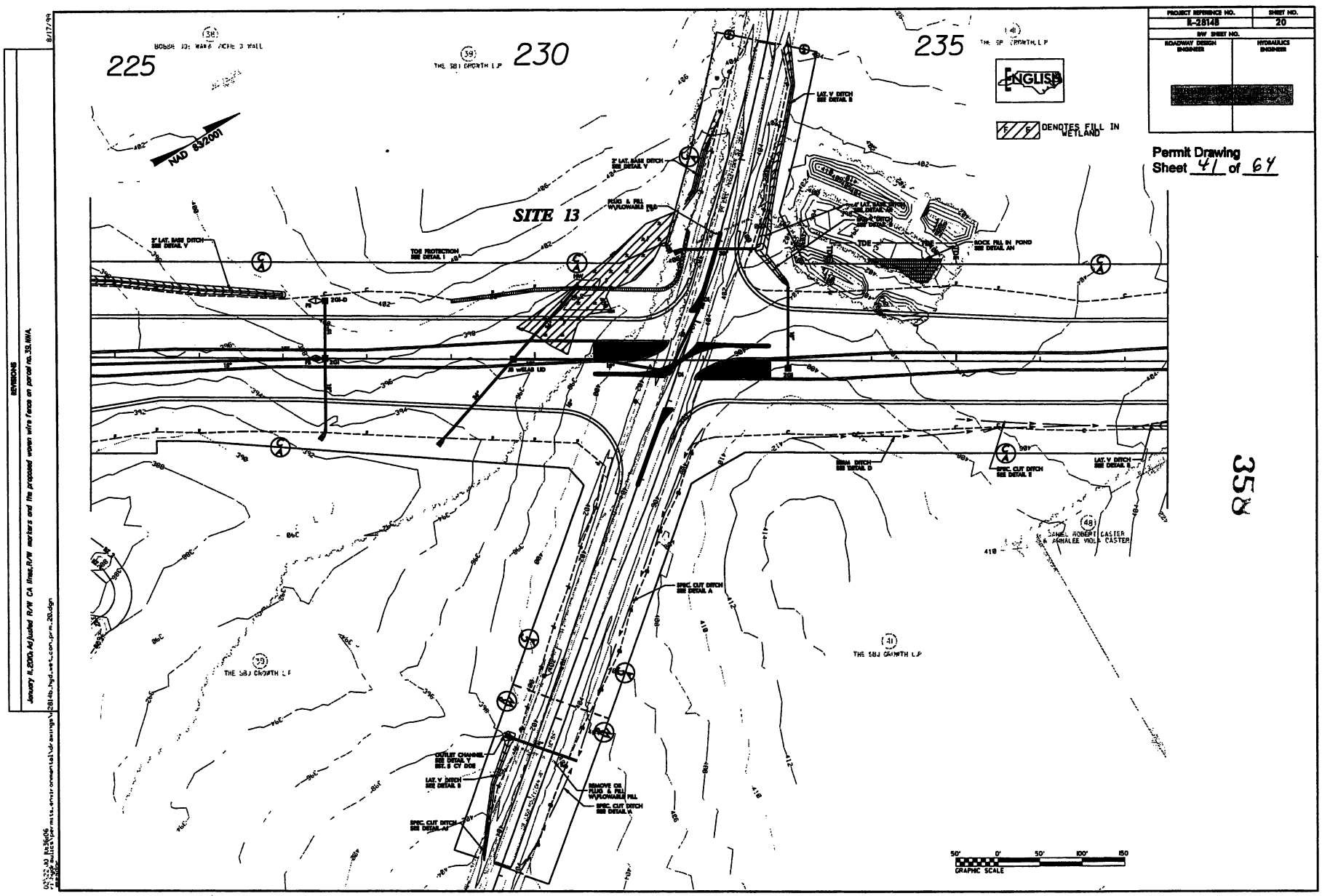
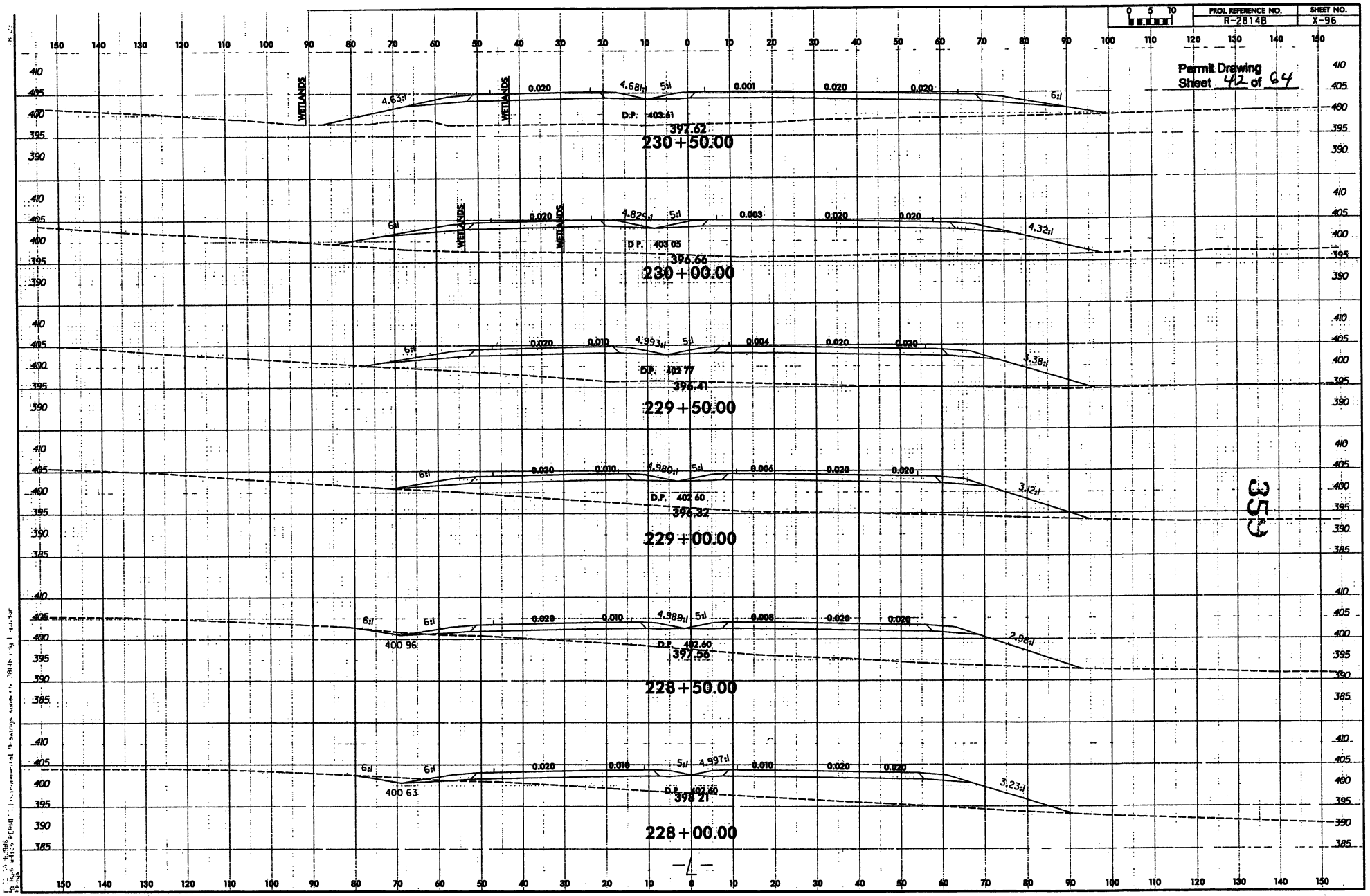
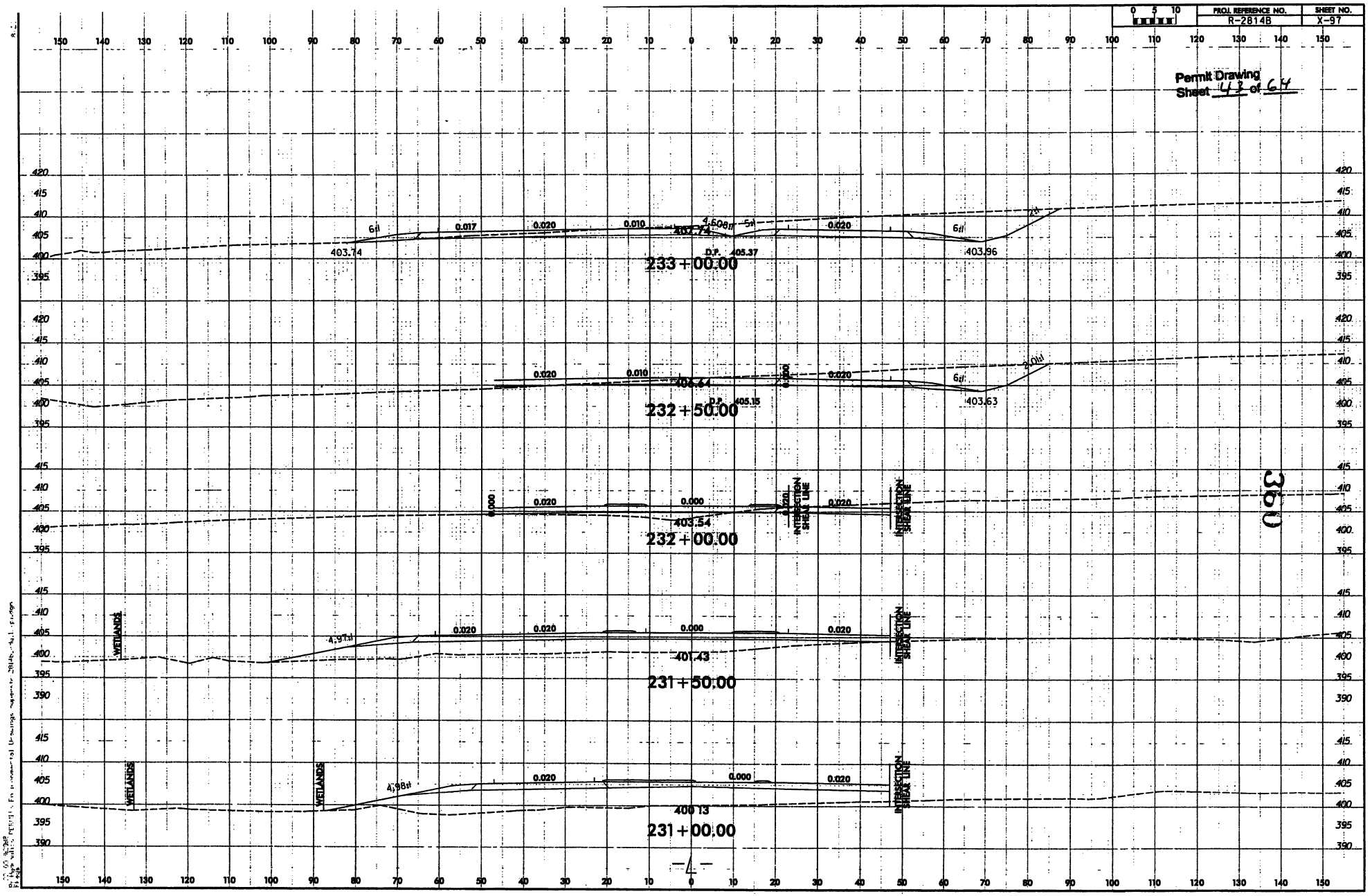

215
220
353
NAD 83/2001
(36) JOE WALL & CRYSTAL H. WALL DB 1213 PG2556
(37) JOE WALL
(38) BOBBIE JOE WALL & VICKIE D WALL
(39) THE SBJ GROWTH L P
DENOTES IMPACTS IN SURFACE WATER
SITE 12
GRASS SWALE DATA -L- STA. 21380 TO STA. 21480 LT
DA 0.48 AC
SLOPE 1.10 %
L REQ 49 FT
L PROV 100 FT
Q2 1.64 CFS
V2 1.38 FTS
D2 0.49 FT
Q10 2.11 CFS
V10 1.97 FTS
D10 0.52 FT
24" CMP WITH ELBOWS SOD AND LUG WITH SLEEVE GASKET
RIPRAP DITCH SEE DETAIL D
2' LAT. BASE DITCH SEE DETAIL V
2' LAT. BASE DITCH SEE DETAIL AD
3' LAT. BASE DITCH SEE DETAIL V
201
201-A
201-D
PDE
HW
UNAMED TRIBUTARY TO CEDAR FORK
BZ 1
BZ 2
GRAPHIC SCALE
50' 0 50' 100 150
PROJECT REFERENCE NO. R-2814B
SHEET NO. 19
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 38 of 64
REVISIONS
January 11, 2010: Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no.35.MVA.

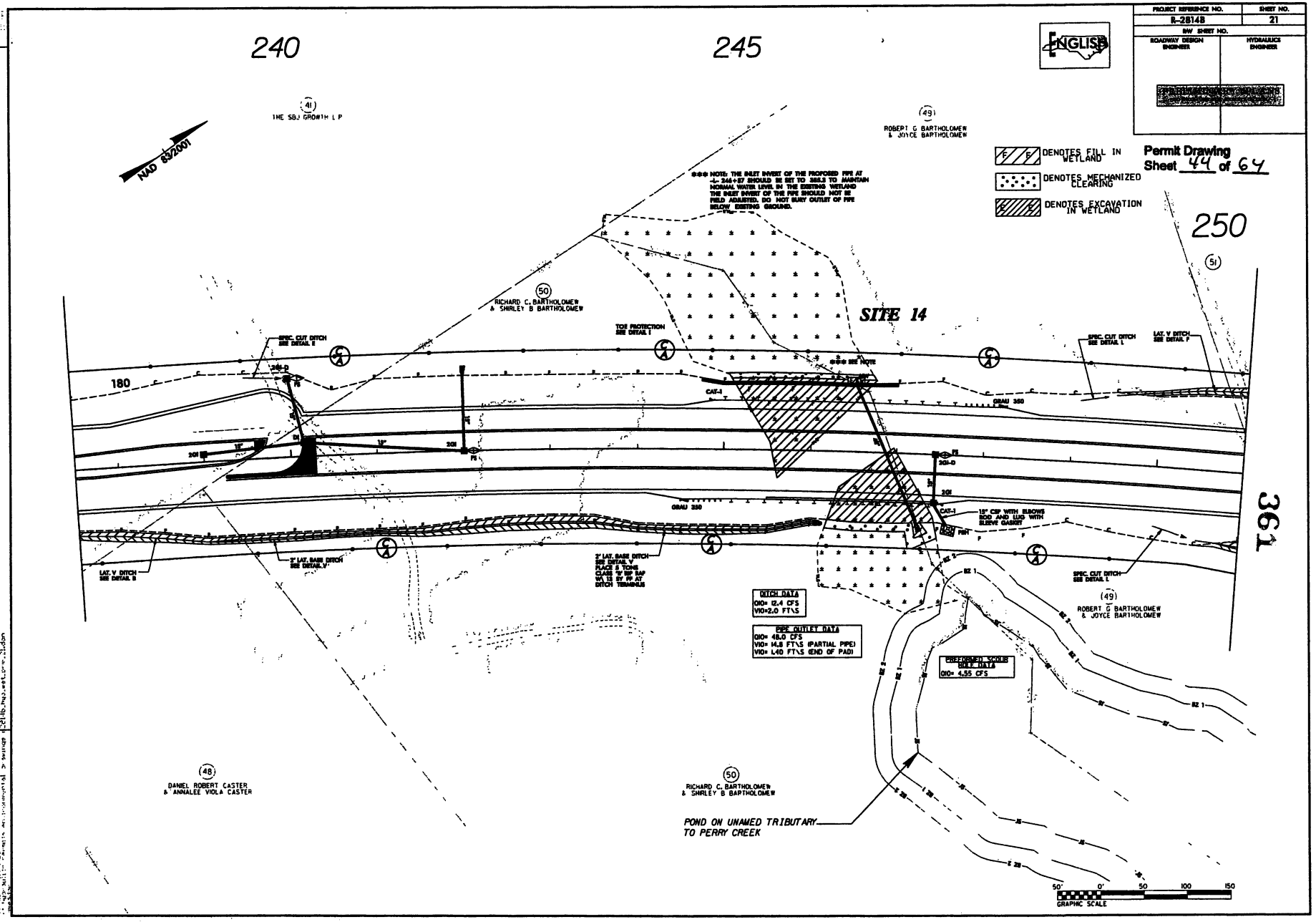

215
220
356
NAD 83/2001
DENOTES IMPACTS IN SURFACE WATER
SITE 12
UNAMED TRIBUTARY TO CEDAR FORK
GRADE SWALE DATA
-L- STA. 21380 TO STA. 21480 LT
GRAPHIC SCALE
50' 0' 50' 100 150
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
19
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 39 of 64
REVISIONS
8/17/99
January ILDOG Adjusted R/W CA lines,R/W markers and the proposed woven wire fence on parcel no.39.IWA.

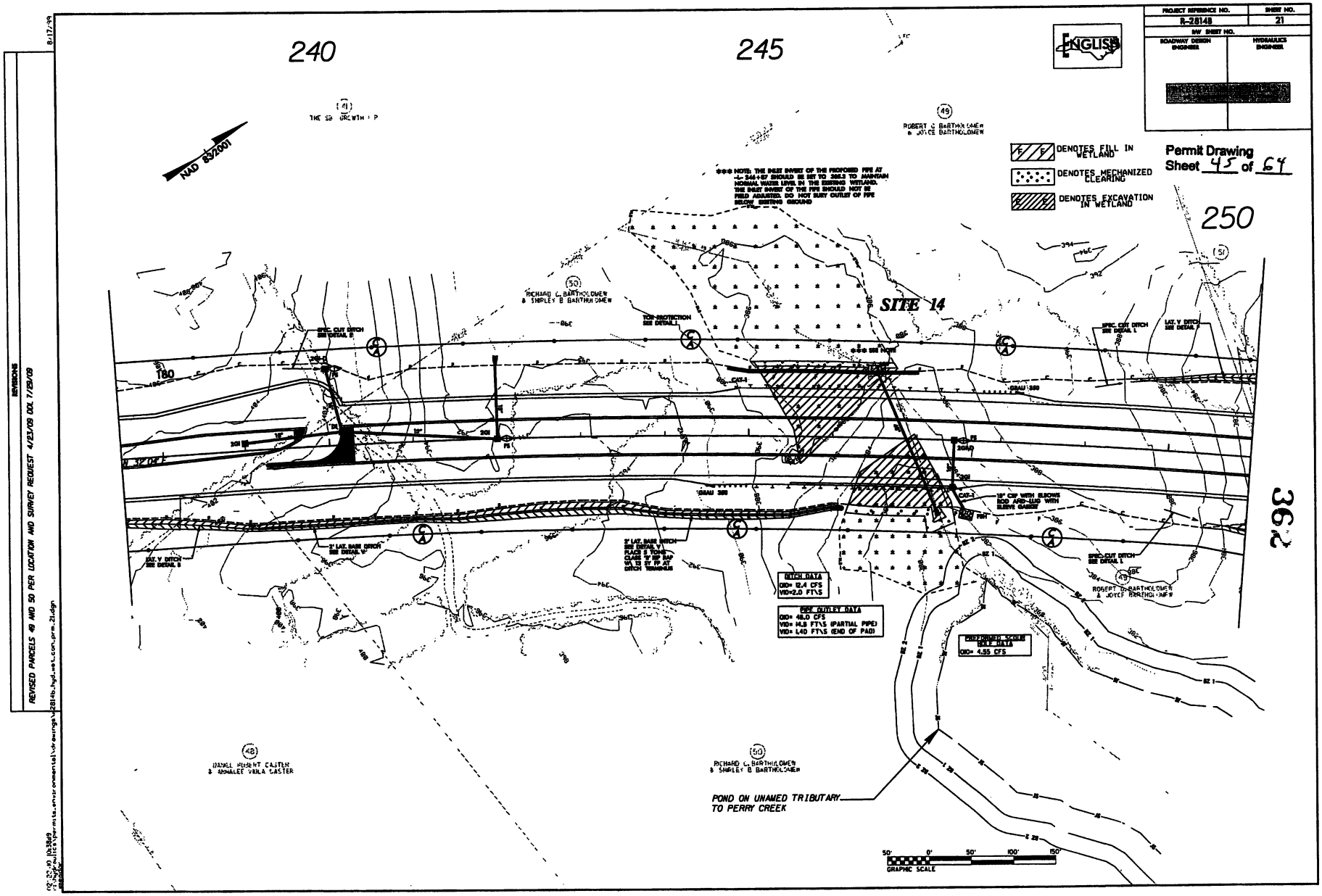

225
230
235
SITE 13
NAD 83/2001
(38) BOBBIE JOE WARD VICKERS WALL
(39) THE SBJ GROWTH L P
(41) THE SBJ GROWTH L P
ENGLISH
DENOTES FILL IN WETLAND
PROJECT REFERENCE NO. R-2814B
SHEET NO. 20
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 40 of 64
3' LAT. BASE DITCH SEE DETAIL V
LAT. V DITCH SEE DETAIL S
4' LAT. BASE DITCH SEE DETAIL AR
TOE PROTECTION SEE DETAIL I
TIDE
ROCK FILL IN POND SEE DETAIL AN
PLUG & FILL W/FLOWABLE FILL
SPEC. CUT DITCH SEE DETAIL A
SPEC. CUT DITCH SEE DETAIL A1
OUTLET CHANNEL SEE DETAIL Y EST. 5 CY DOE
REMOVE OR PLUG & FILL W/FLOWABLE FILL
BBRM DITCH SEE DETAIL D
(48) DANIEL ROBERT CASTER & ANNALEE VIOLA CASTER
GRAPHIC SCALE
REVISIONS
January 11, 2010: Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no. 39, WHA.
351

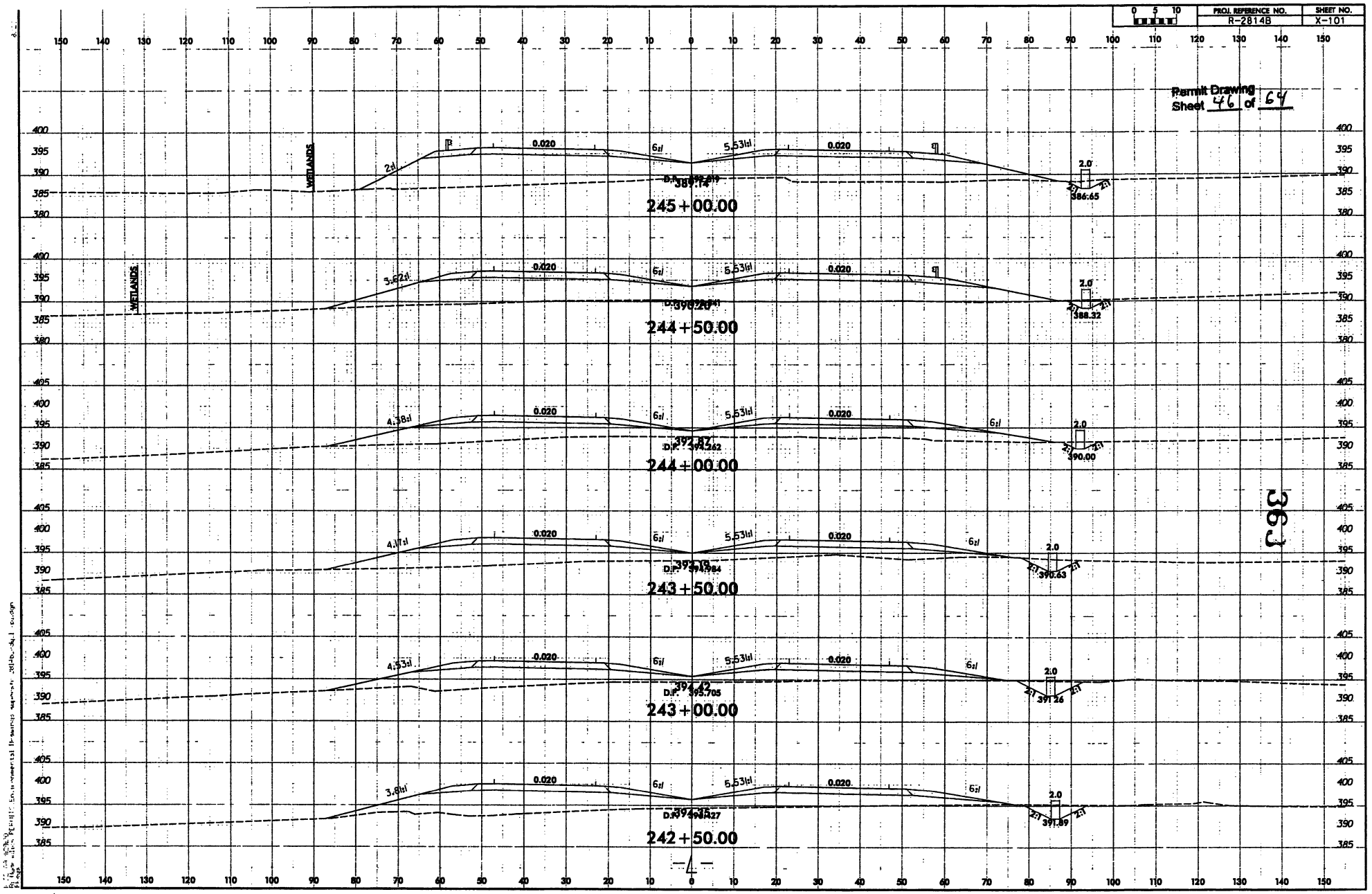

225
230
235
SITE 13
NAD 83/2001
DENOTES FILL IN WETLAND
ENGLISH
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
20
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 41 of 64
REVISIONS
January 6, 2006: Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no. 39. MWA
8/17/99
THE SBJ GROWTH L.P
SAMUEL ROBERT CASTER & ANNALEE VIOLA CASTER
GRAPHIC SCALE
358

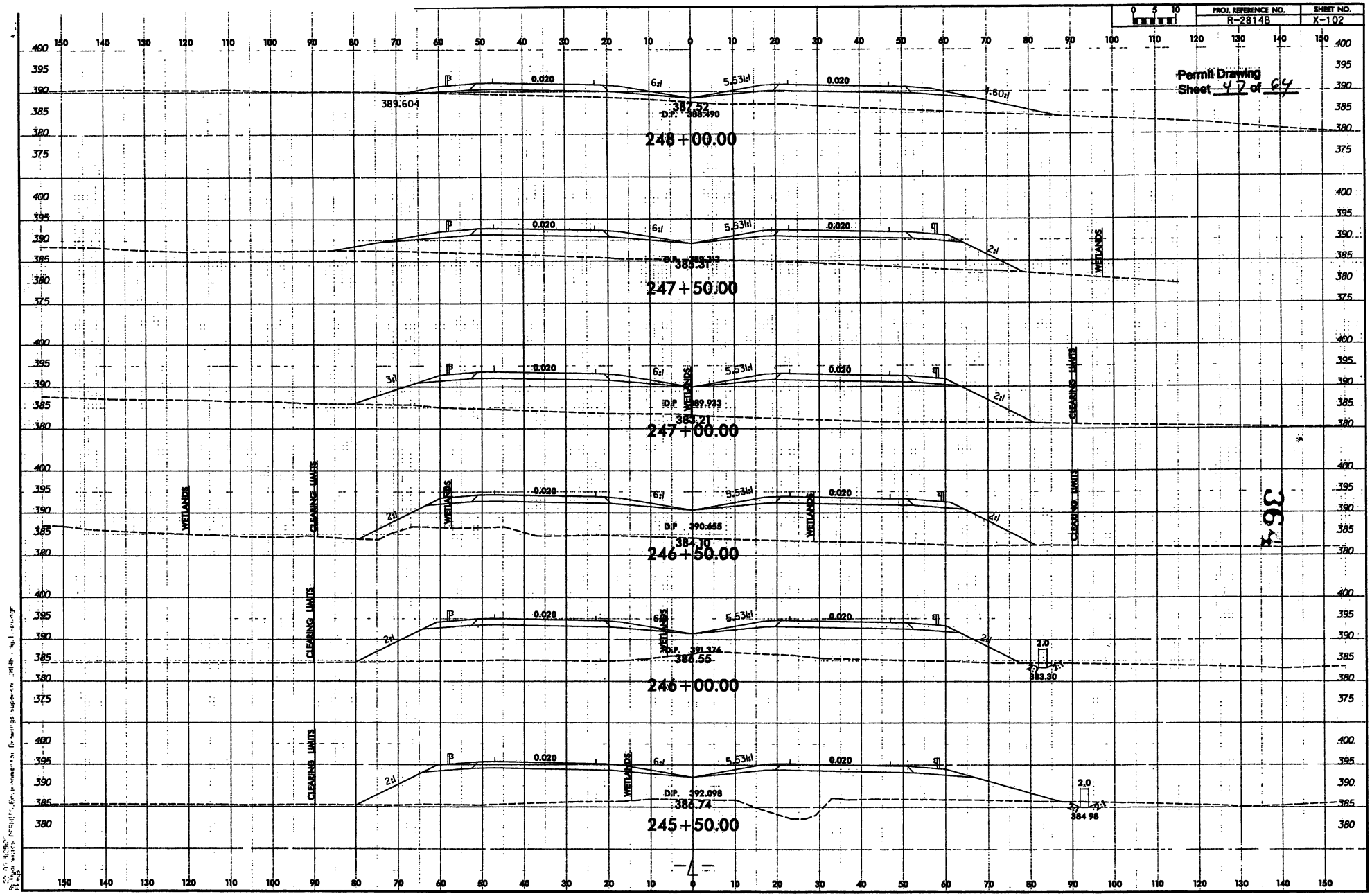

PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-96
Permit Drawing
Sheet 42 of 64
WETLANDS
WETLANDS
WETLANDS
D.P. 403.61
397.62
230+50.00
D.P. 403.05
396.66
230+00.00
D.P. 402.77
396.41
229+50.00
D.P. 402.60
396.32
229+00.00
400.96
D.P. 402.60
397.56
228+50.00
400.63
D.P. 402.60
396.21
228+00.00
35

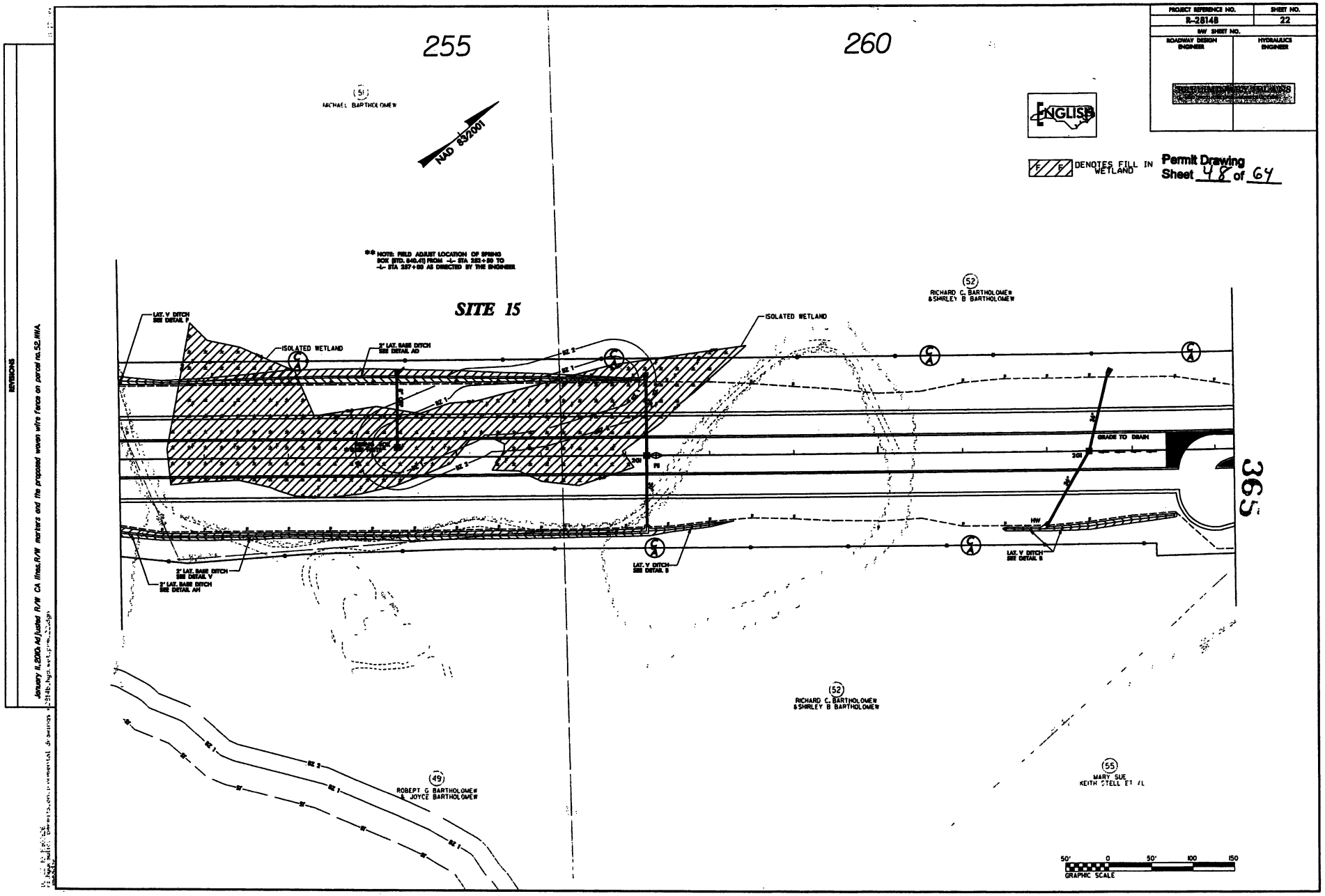

0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-97
Permit Drawing
Sheet 43 of 64
233+00.00
403.74
403.96
405.37
232+50.00
403.63
405.15
232+00.00
403.54
231+50.00
401.43
231+00.00
400.13
WETLANDS
WETLANDS
INTERSECTION SHEAR LINE
INTERSECTION SHEAR LINE
INTERSECTION SHEAR LINE
360

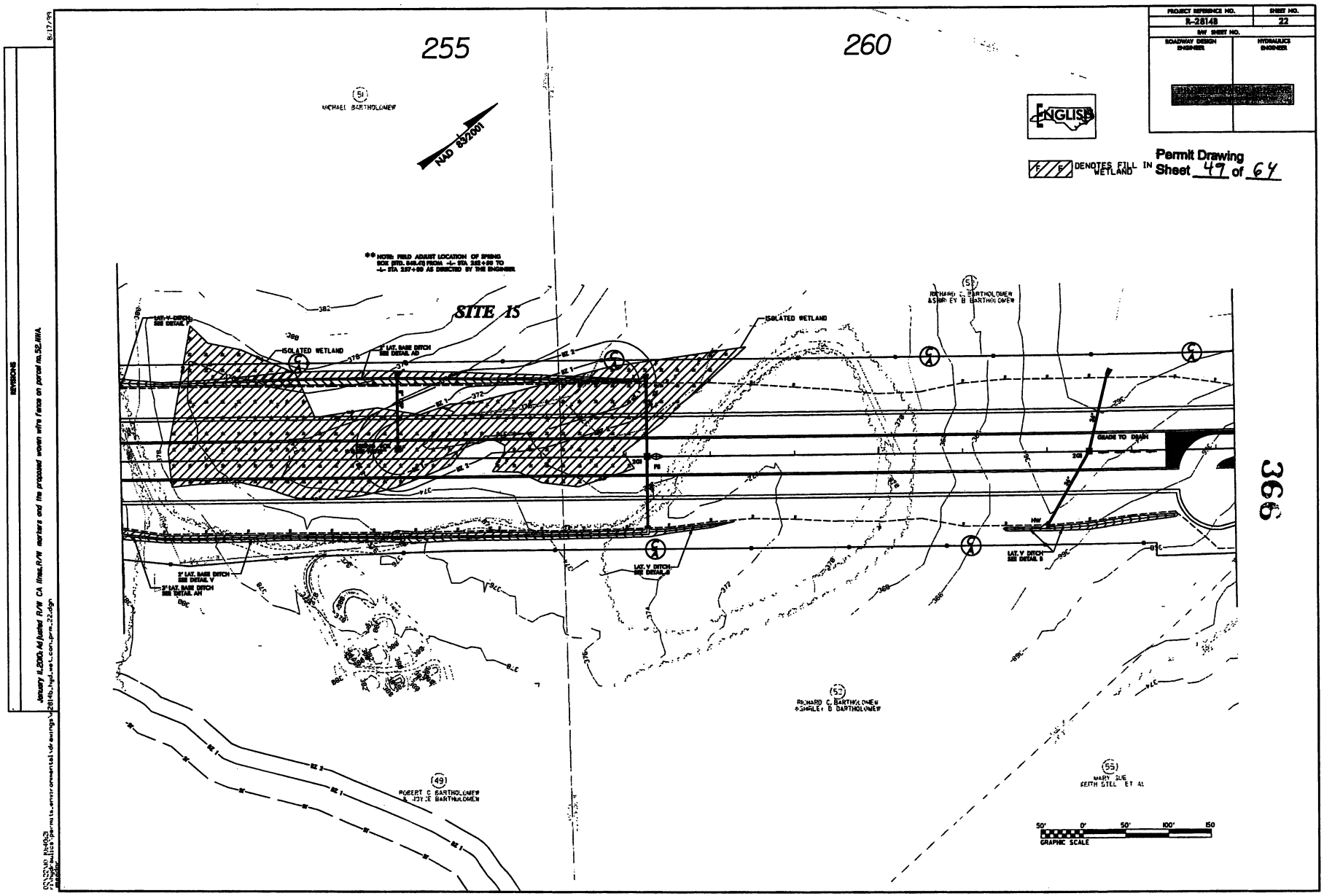

240
245
250
361
NAD 83/2001
(41) THE SBJ GROWTH L P
(49) ROBERT G BARTHOLOMEW & JOYCE BARTHOLOMEW
(50) RICHARD C. BARTHOLOMEW & SHIRLEY B BARTHOLOMEW
(51)
(48) DANIEL ROBERT CASTER & ANNALEE VIOLA CASTER
SITE 14
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
Permit Drawing Sheet 44 of 64
PROJECT REFERENCE NO. R-2814B
SHEET NO. 21
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
ENGLISH
TOE PROTECTION SEE DETAIL I
SPEC. CUT DITCH SEE DETAIL E
SPEC. CUT DITCH SEE DETAIL L
LAT. V DITCH SEE DETAIL F
LAT. V DITCH SEE DETAIL B
2' LAT. BASE DITCH SEE DETAIL V
2' LAT. BASE DITCH SEE DETAIL V PLACE 5 TONS CLASS "B" RIP RAP WI 12 ST. FT. AT DITCH TERMINUS
15" CSP WITH ELBOWS END AND LIND WITH FLERVE GASKET
DITCH DATA Q10= 12.4 CFS V10=2.0 FT/S
PIPE OUTLET DATA Q10= 48.0 CFS V10= 14.8 FT/S (PARTIAL PIPE) V10= 1.40 FT/S (END OF PAD)
CREEPER/W SCOUR HOLE DATA Q10= 4.55 CFS
POND ON UNAMED TRIBUTARY TO PERRY CREEK
GRAPHIC SCALE
50' 0' 50 100 150
REVISIONS
REVISED PARCELS 49 AND 50 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09


240
245
250
NAD 83/2001
ENGLISH
PROJECT REFERENCE NO.
R-2814B
SHEET NO.
21
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
Permit Drawing Sheet 45 of 64
SITE 14
POND ON UNAMED TRIBUTARY TO PERRY CREEK
DITCH DATA
Q10= 12.4 CFS
V10=2.0 FT\S
SDF OUTLET DATA
Q10= 48.0 CFS
V10= 14.8 FT\S (PARTIAL PIPE)
V10= 1.40 FT\S (END OF PAD)
RIPRAP/GRADE SCHOOL DATA
Q10= 4.55 CFS
GRAPHIC SCALE
50' 0' 50' 100' 150'
REVISIONS
REVISED PARCELS 49 AND 50 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09
8/17/99
362


PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-101
Permit Drawing
Sheet 46 of 64
WETLANDS
WETLANDS
245+00.00
244+50.00
244+00.00
243+50.00
243+00.00
242+50.00
386.65
388.32
390.00
390.63
391.26
391.89
-L-


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-102
Permit Drawing
Sheet 47 of 64
248+00.00
247+50.00
247+00.00
246+50.00
246+00.00
245+50.00
WETLANDS
CLEARING LIMITS
0.020
5.53[sl]
6:1
2:1
3:1
1:80[sl]
D.P.
2.0
1:1
-L-


255
260
(51)
MICHAEL BARTHOLOMEW
NAD 83/2001
ENGLISH
DENOTES FILL IN WETLAND
Permit Drawing
Sheet 48 of 64
PROJECT REFERENCE NO.
R-28148
SHEET NO.
22
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
REVISIONS
January 11, 2000. Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no. 52. WHA.
** NOTE: FIELD ADJUST LOCATION OF SPRING BOX (STD. 840.41) FROM -L- STA 253+50 TO -L- STA 257+00 AS DIRECTED BY THE ENGINEER
SITE 15
(52)
RICHARD C. BARTHOLOMEW & SHIRLEY B BARTHOLOMEW
ISOLATED WETLAND
LAT. V DITCH SEE DETAIL F
2' LAT. BASE DITCH SEE DETAIL AD
GRADE TO DRAIN
2' LAT. BASE DITCH SEE DETAIL V
2' LAT. BASE DITCH SEE DETAIL AH
LAT. V DITCH SEE DETAIL B
(49)
ROBERT G BARTHOLOMEW & JOYCE BARTHOLOMEW
(55)
MARY SUE KEITH STELL ET AL
50' 0 50' 100 150
GRAPHIC SCALE
395



ENGLISH

DENOTES FILL IN WETLAND

Permit Drawing Sheet 47 of 64

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	22
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

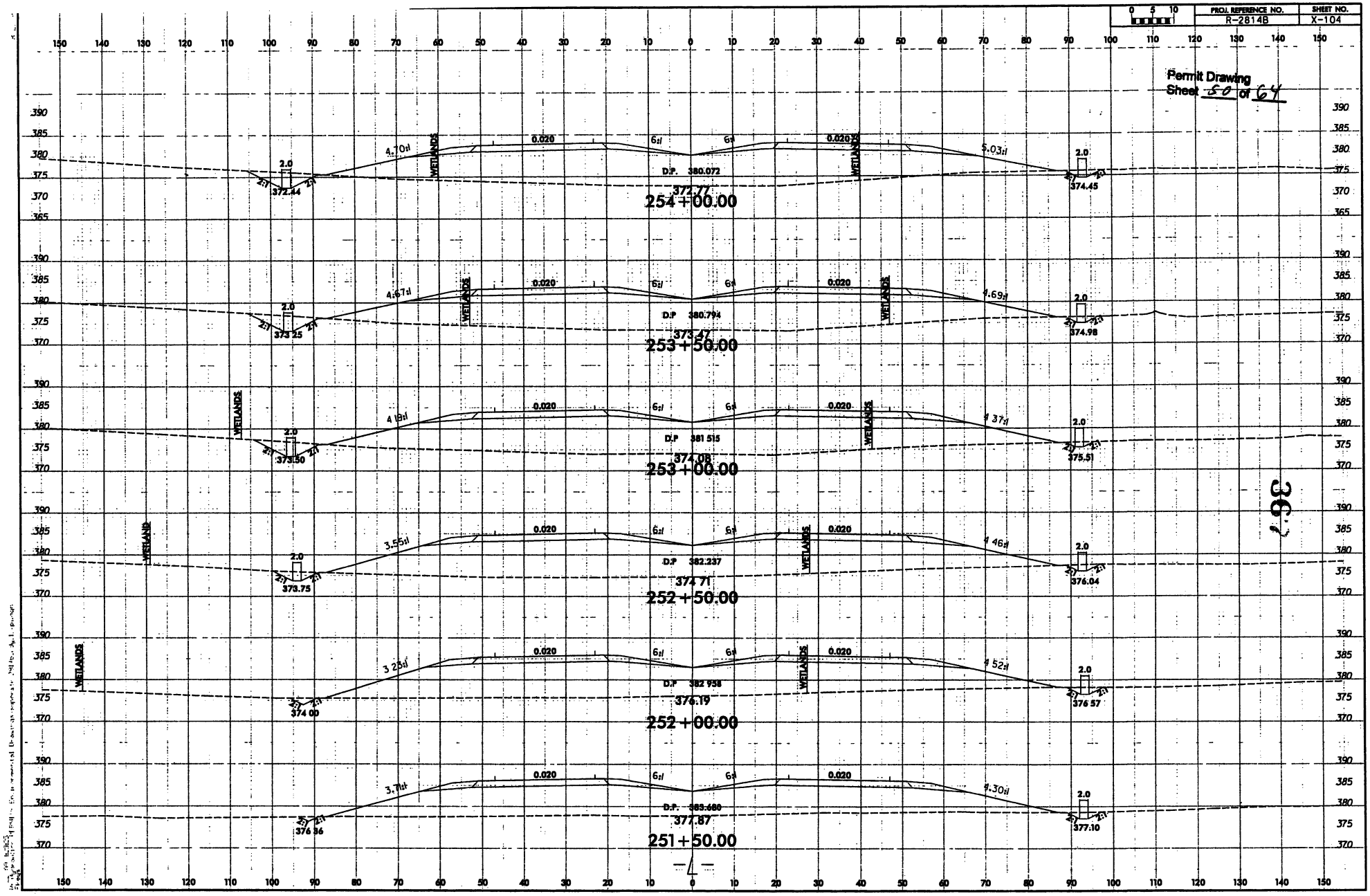
REVISIONS

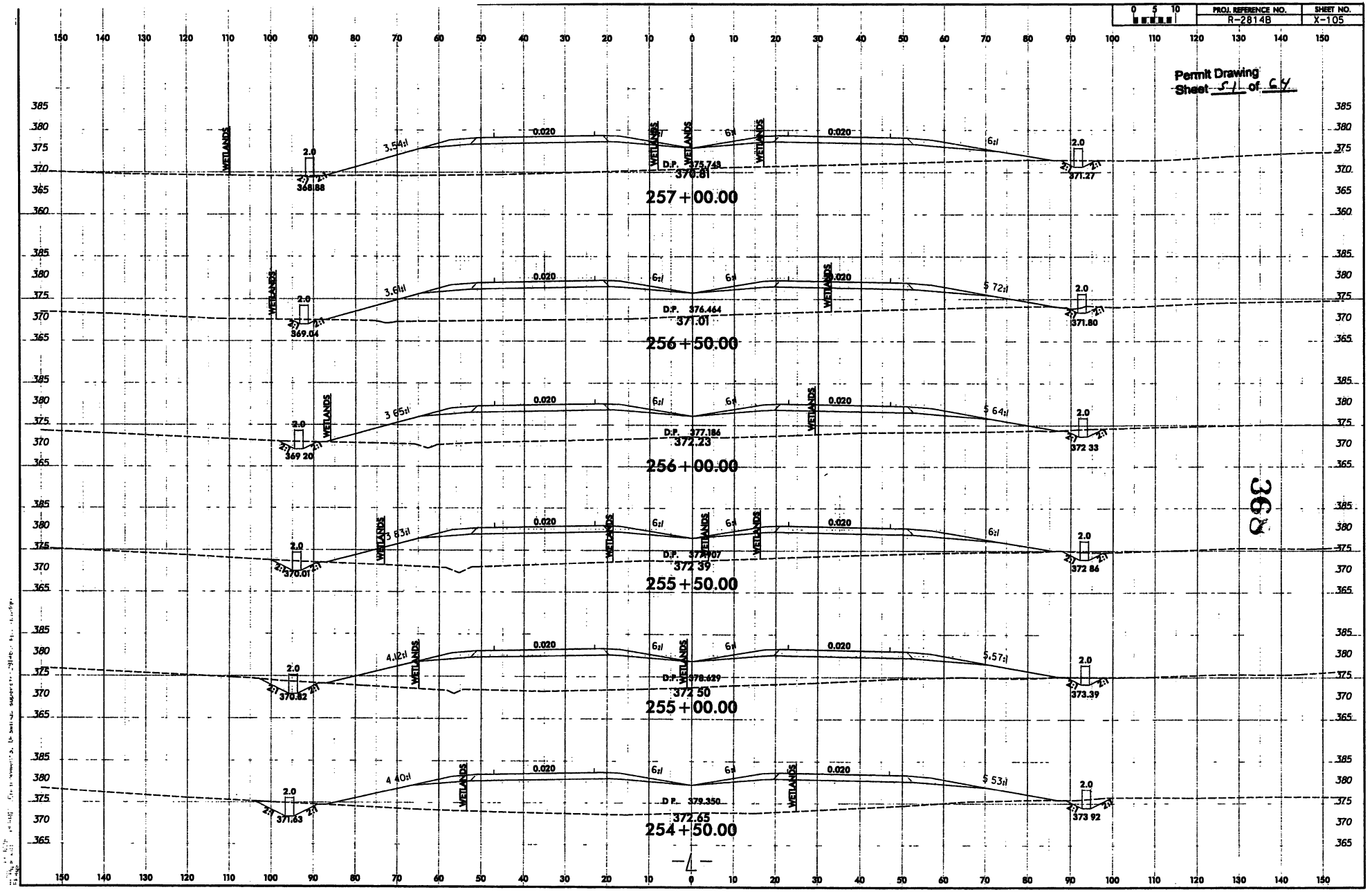
8-17-99

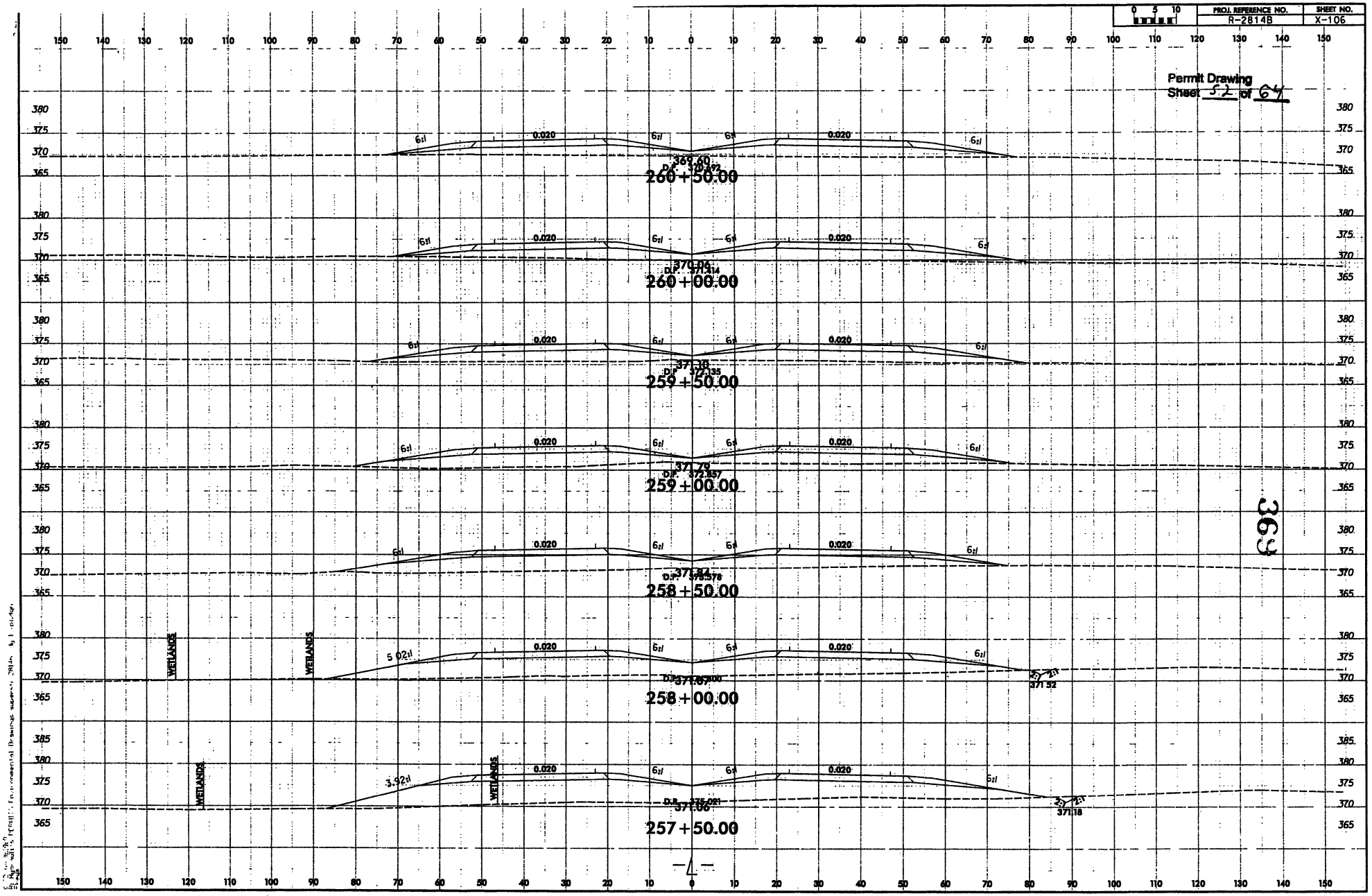
January 6, 2000, Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel no. 52. MHA.

\2814b_hyd_set_con_pm_22.dgn

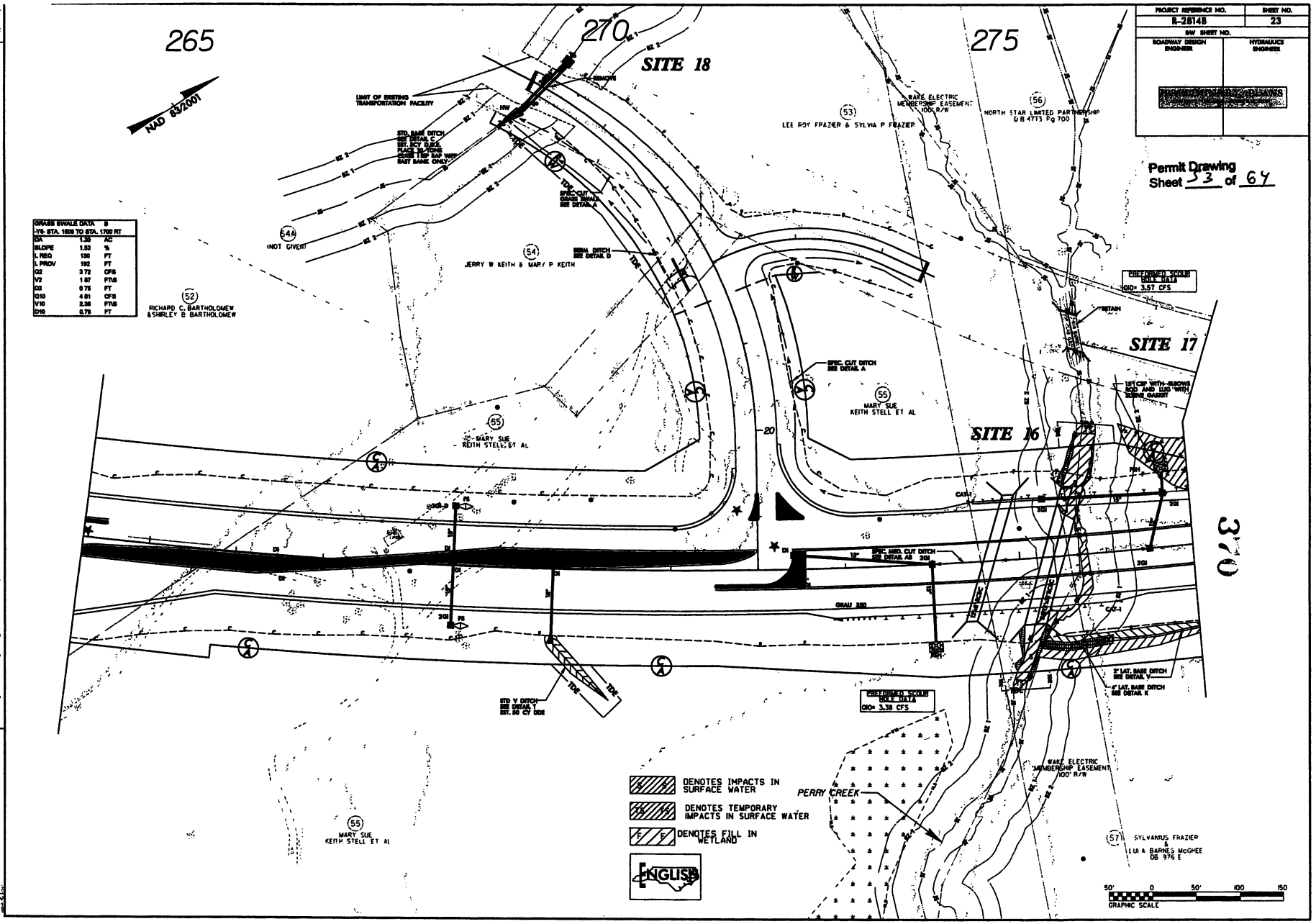
366


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-104
Permit Drawing
Sheet 50 of 64
254+00.00
D.P. 380.072
372.77
253+50.00
D.P. 380.794
373.47
253+00.00
D.P. 381.515
374.08
252+50.00
D.P. 382.237
374.71
252+00.00
D.P. 382.958
376.19
251+50.00
D.P. 383.680
377.87
WETLANDS
0.020
6:1
2.0
2:1
372.44
374.45
373.25
374.98
373.50
375.51
373.75
376.04
374.00
376.57
376.36
377.10
36


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-105
Permit Drawing
Sheet 51 of 64
WETLANDS
0.020
6:1
2.0
2:1
D.P. 375.749
370.81
257+00.00
368.88
371.27
D.P. 376.464
371.01
256+50.00
369.04
371.80
D.P. 377.186
372.23
256+00.00
369.20
372.33
D.P. 377.907
372.39
255+50.00
370.01
372.86
D.P. 378.629
372.50
255+00.00
370.82
373.39
D.P. 379.350
372.65
254+50.00
371.63
373.92
3.54:1
3.64:1
3.65:1
3.83:1
4.12:1
4.40:1
5.72:1
5.64:1
5.57:1
5.53:1
-4-
396


PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-106
Permit Drawing
Sheet 52 of 64
260+50.00
260+00.00
259+50.00
259+00.00
258+50.00
258+00.00
257+50.00
WETLANDS
WETLANDS
WETLANDS
0.020
6:1
5.02:1
3.92:1
2:1
369.60
370.06
371.10
371.79
371.84
371.87
371.52
371.18
375.021
372.492
372.135
372.557
372.576
371.00
371.00
371.00

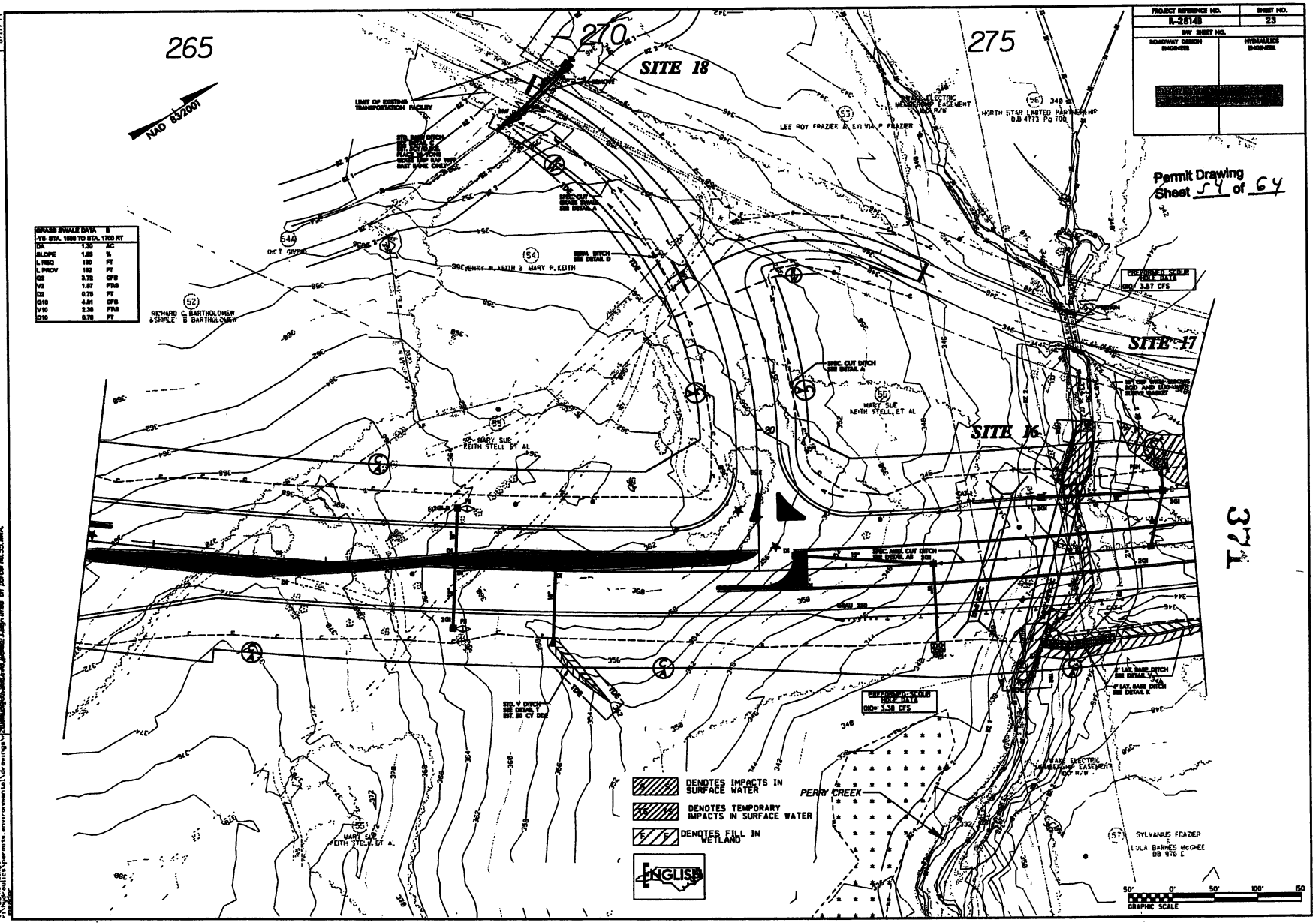
364



REVISIONS

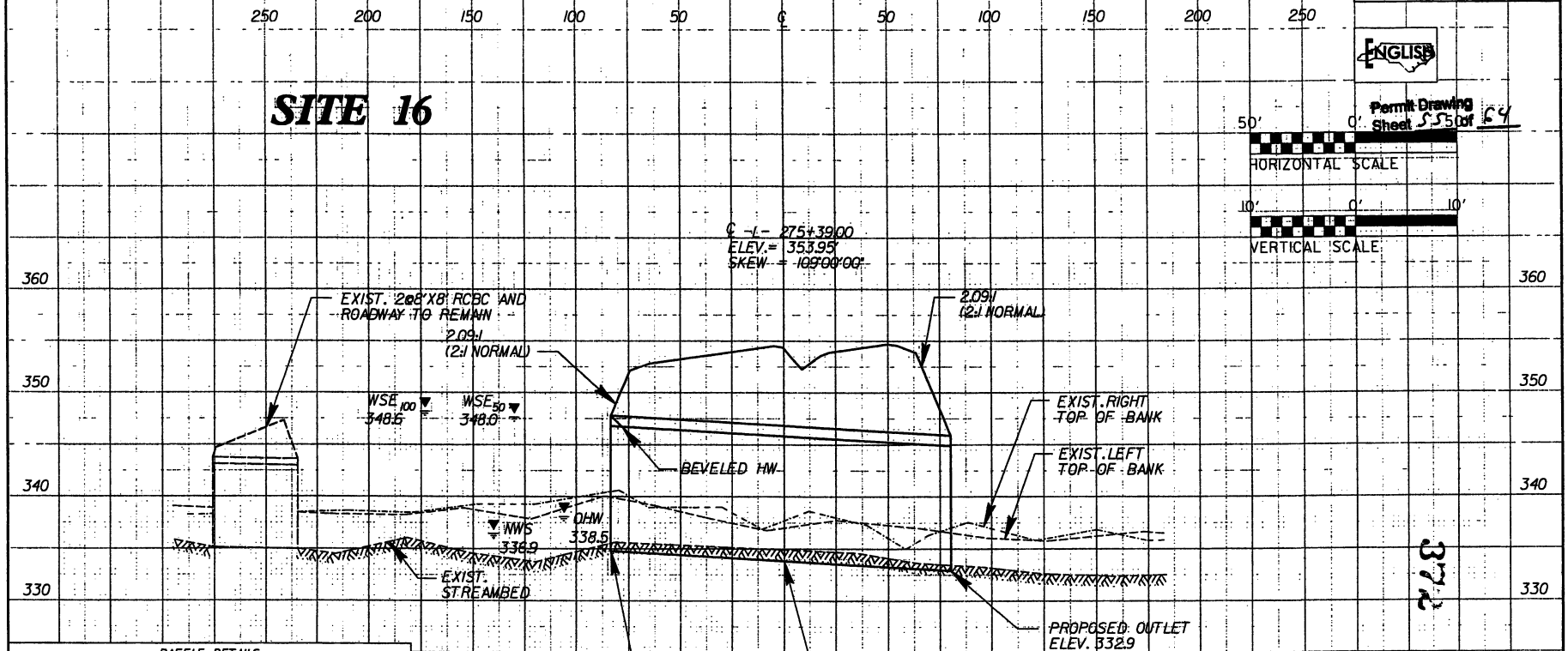
January 11, 2010, Adjusted R/W, CA, Illines, R/W markers and the proposed woven wire fence on parcel nos.52 and 55.WHA.

c:\documents and settings\...\Desktop\...\...dgn 11-Jan-10 11:...


265
270
275
SITE 18
SITE 17
SITE 16
NAD 83/2001
PROJECT REFERENCE NO. R-2814B
SHEET NO. 23
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 54 of 64
DRAINAGE BASIN DATA - B
-Y5- STA. 1998 TO STA. 1700 RT
DA 1.30 AC
SLOPE 1.88 %
L RES 139 FT
L PROV 168 FT
Q2 2.72 CFS
Q10 4.01 CFS
Q25 4.84 CFS
Q50 5.48 FT
Q100
RICHARD C. BARTHOLOMEW & SHIRLEE B BARTHOLOMEW
JERRY W. KEITH & MARY P. KEITH
MARY SUE KEITH STELL ET AL
LEE ROY FRAZER & SYLVIA P FRAZER
NORTH STAR LIMITED PARTNERSHIP D.B 4773 PG 708
DUKE POWER CO. 100' WIDE ELECTRIC TRANSMISSION EASEMENT
LIMIT OF EXISTING TRANSPORTATION FACILITY
PERMANENT SCALE DITCH DATA Q100= 3.57 CFS
PERMANENT SCALE DITCH DATA Q100= 3.38 CFS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
PERRY CREEK
SYLVANUS FRAZIER & ISLA BARNES McGHEE DB 970 E
ENGLISH
50' 0' 50' 100' 150
GRAPHIC SCALE
371
REVISIONS
8/17/99
January 6, 2000, Adjusted R/W CA lines, R/W markers and the proposed woven wire fence on parcel nos. 52 and 55, NWA.
January 6, 2000, Adjusted R/W CA lines on parcel no. 55, NWA.

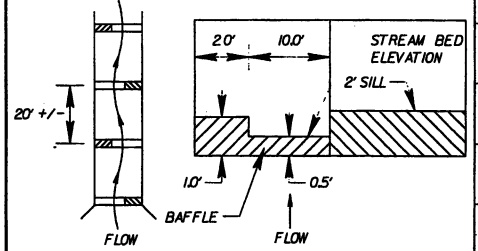
PROJECT REFERENCE NO.	SHEET NO.
R-2814B	23A

SITE 16



Permit Drawing Sheet 55 of 69

BAFFLE DETAILS



ALTERNATE BAFFLE SECTIONS TO FORCE STREAM TO MEANDER LEFT TO RIGHT ALONG THE LENGTH OF THE CULVERT SILL AT INLET END ONLY

PLACE BED MATERIAL TO TOP OF BAFFLE ELEVATION STOCKPILE EXCAVATED BED MATERIAL FROM SITE IF AVAILABLE AND USE IN CULVERT. OTHERWISE, USE CLASS B RIP-RAP

PLANS PREPARED BY :
RK&K
SUMMEL, KLEPFER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO F-0112 • (919) 878-9560
FOR DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH

Permit Drawing
Set 56 of 64

373

280

285

290

DENOTES FILL IN WETLAND

NAD 83/2001

SITE 17

PREFORMED SCOUR HOLE DATA
Q10= 4.10 CFS

(56) LAKES OF ROLESVILLE HOMEOWNERS ASSOCIATION INC
DB 12882 PG 674
BM 2005 PG 2274-2276
BM 2007 PG 655

LAKES OF ROLESVILLE HOMEOWNERS ASSOCIATION, INC.
DB 12882 PG 674
BM 2005 PG 2274
BM 2005 PG 2275
BM 2005 PG 2276
BM 2007 PG 655

(58) ARSENIO V. BUGARIN & EVELYN Y. BUGARIN
DB 12378 PG 1998

RETAIN SYSTEM

LAT V DITCH SEE DETAIL F

FILLS & FILL W/FLOWABLE FILL

15" RCP REMOVE

SRAU 5/8"

2GI-A

2GI

3' LAT. BASE DITCH SEE DETAIL V

3' LAT. BASE DITCH SEE DETAIL AH

LAT. V DITCH SEE DETAIL S

LAT. GRASS SWALE SEE DETAIL Z

LAT. V DITCH SEE DETAIL S

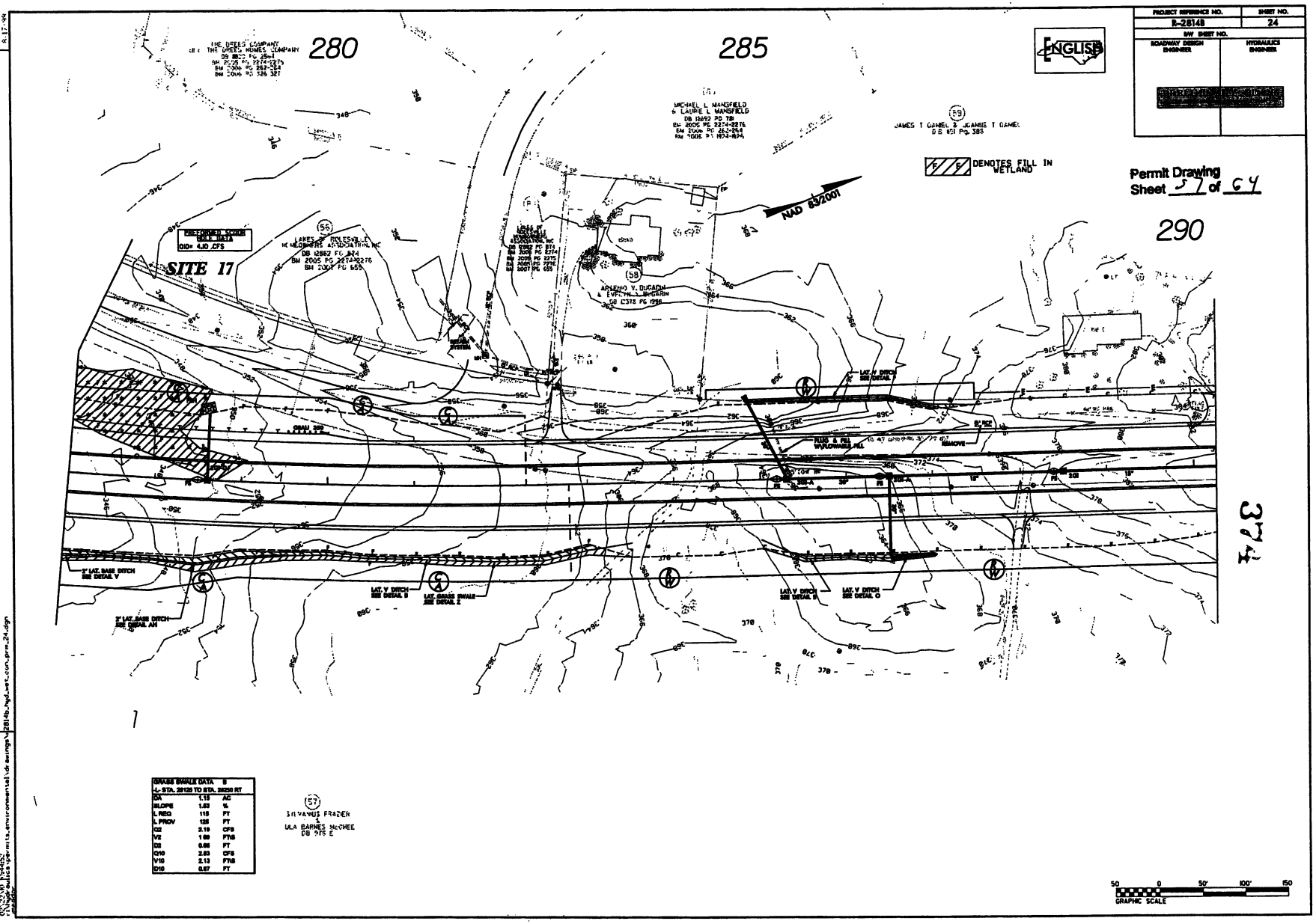
LAT V DITCH SEE DETAIL O

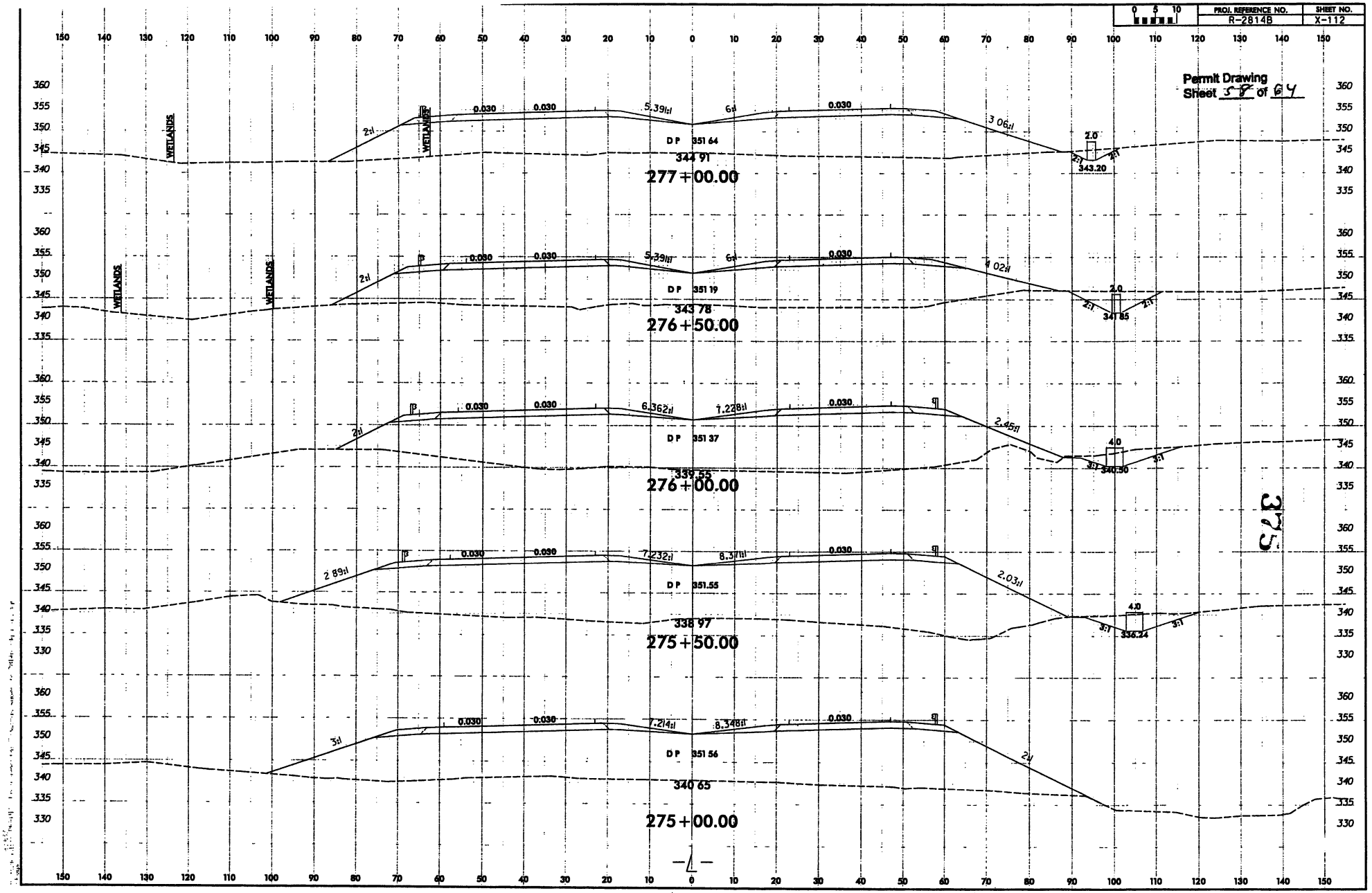
GRASS SWALE DATA B		
-L- STA. 29125 TO STA. 29259 RT		
DA	1.16	AC
SLOPE	1.53	%
L REQ	115	FT
L PROV	135	FT
Q2	2.10	CFS
V2	1.69	FTIS
D2	0.86	FT
Q10	2.83	CFS
V10	2.13	FTIS
D10	0.97	FT

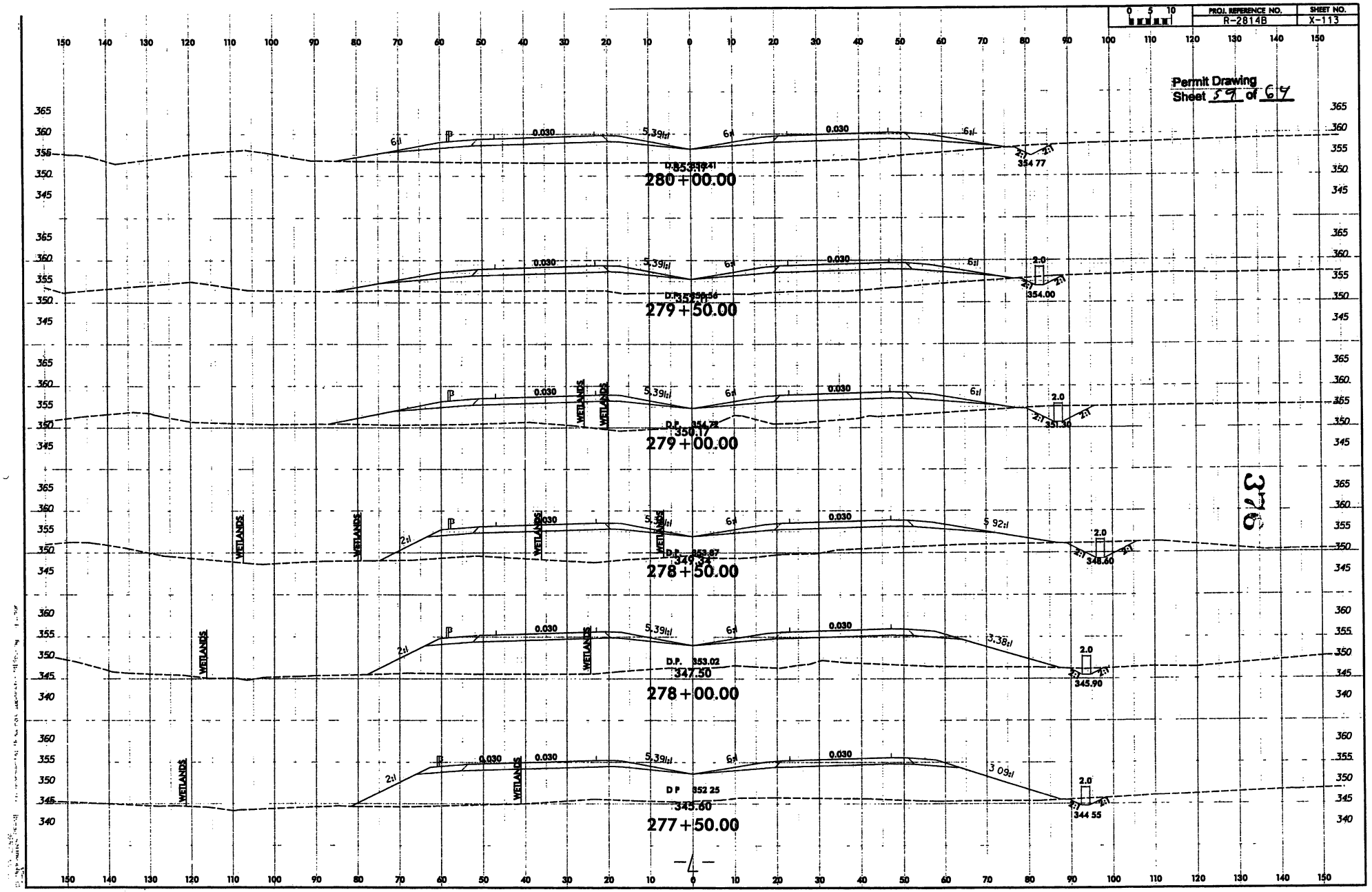
(57) SILVANUS FRAZIER & [illegible] BARNES MD MEL DB 975 P

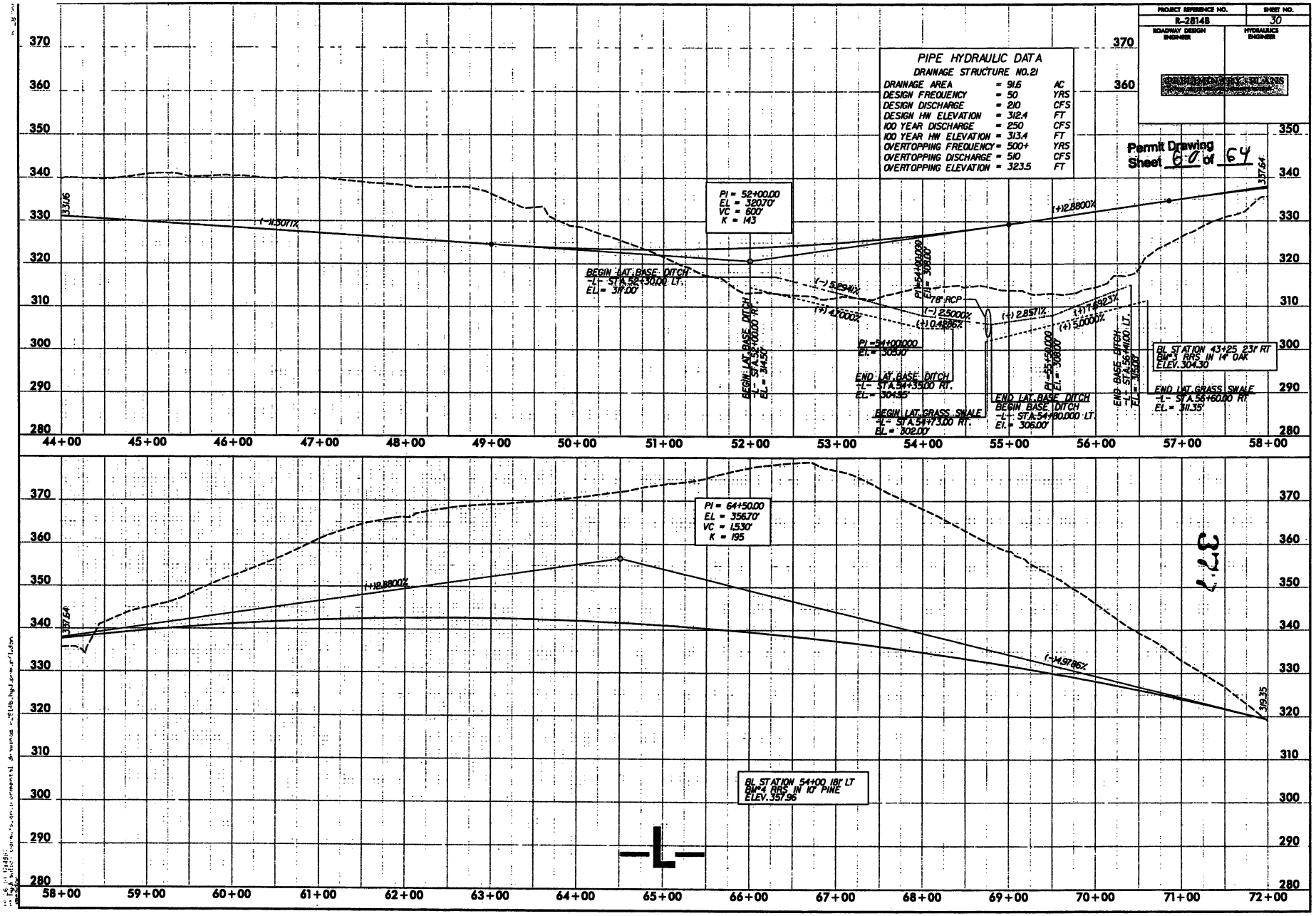
50 0' 50' 100' 150
GRAPHIC SCALE

REVISIONS
REVISED NAMES ON PARCEL 57 PER LOCATION AND SURVEY REQUEST 4/23/09 DDL 7/29/09


280
285
290
SITE 17
NAD 83/2001
DENOTES FILL IN WETLAND
Permit Drawing Sheet 57 of 64
PROJECT REFERENCE NO. R-2814B
SHEET NO. 24
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
ENGLISH
REVISIONS
REVISED NAMES ON PARCEL 57 PER LOCATION AND SURVEY REQUEST 4/23/09 DL 7/29/09
8.17.94
GRASS SWALE DATA B
-L- STA. 29125 TO STA. 29250 RT
DA 1.19 AC
SLOPE 1.00 %
L REQ 115 FT
L PROV 125 FT
Q2 2.19 CFS
V2 1.69 FTS
D2 0.68 FT
Q10 2.63 CFS
V10 2.13 FTS
D10 0.67 FT
GRAPHIC SCALE
50 0 50' 100' 150
3274


PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-112
Permit Drawing
Sheet 58 of 64
WETLANDS
WETLANDS
WETLANDS
DP 351 64
344 91
277+00.00
DP 351 19
343 78
276+50.00
DP 351 37
339 55
276+00.00
DP 351.55
338 97
275+50.00
DP 351 56
340 65
275+00.00
343.20
347.85
340.50
336.24
373


0 5 10
PROJ. REFERENCE NO.
R-2814B
SHEET NO.
X-113
Permit Drawing
Sheet 59 of 64
280+00.00
279+50.00
279+00.00
278+50.00
278+00.00
277+50.00
WETLANDS
0.030
5.39%
3.38%
3.09%
2:1
6:1
2.0
354.77
354.00
351.30
348.60
345.90
344.55
D.P. 353.41
345.50
D.P. 353.56
350.17
D.P. 354.78
346.20
D.P. 353.87
347.50
D.P. 353.02
345.60
D.P. 352.25
376


PROJECT REFERENCE NO.
R-2814B
SHEET NO.
30
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.21
DRAINAGE AREA = 91.6 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 210 CFS
DESIGN HW ELEVATION = 312.4 FT
100 YEAR DISCHARGE = 250 CFS
100 YEAR HW ELEVATION = 313.4 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 510 CFS
OVERTOPPING ELEVATION = 323.5 FT
Permit Drawing Sheet 60 of 64
PI = 52+00.00
EL = 320.70'
VC = 600'
K = 143
(-) 11.507%
(+) 12.880%
BEGIN LAT. BASE DITCH -L- STA. 52+30.00 LT. EL. = 311.00'
BEGIN LAT. BASE DITCH -L- STA. 52+40.00 RT. EL. = 314.50'
PI = 54+00.000 EL. = 308.00'
78" RCP
(-) 5.294%
(+) 4.700%
(-) 2.500%
(+) 0.488%
(+) 2.857%
(+) 11.692%
(+) 5.000%
PI = 54+00.000 EL. = 308.50'
END LAT. BASE DITCH -L- STA. 54+35.00 RT. EL. = 304.35'
BEGIN LAT. GRASS SWALE -L- STA. 54+73.00 RT. EL. = 302.00'
PI = 55+50.000 EL. = 308.00'
END LAT. BASE DITCH -L- STA. 54+90.000 LT. EL. = 306.00'
BEGIN BASE DITCH -L- STA. 54+90.000 LT. EL. = 306.00'
END BASE DITCH -L- STA. 56+44.00 LT. EL. = 315.09'
BL STATION 43+25.23' RT BM#3 RRS IN 14" OAK ELEV. 304.30
END LAT. GRASS SWALE -L- STA. 56+60.00 RT. EL. = 311.35'
337.16
357.64
319.35
PI = 64+50.00
EL = 356.70'
VC = 1530'
K = 195
(+) 12.880%
(-) 14.978%
BL STATION 54+00 181' LT BM#4 RRS IN 10" PINE ELEV. 357.96
-L-
44+00
45+00
46+00
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
55+00
56+00
57+00
58+00
59+00
60+00
61+00
62+00
63+00
64+00
65+00
66+00
67+00
68+00
69+00
70+00
71+00
72+00
370
360
350
340
330
320
310
300
290
280

PROJECT REFERENCE NO.	SHEET NO.
R-2814B	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

Permit Drawing
Sheet 61 of 64

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 272.9	FT
BASE DISCHARGE	= 1100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 273.4	FT
OVERTOPPING DISCHARGE	= 5527	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 303.4	FT

PI = 78+50.00
EL = 287.00'
VC = 1,270'
K = 137

319.35
(-)4.9786%
(+)4.2917%
(-)2.9800%
(+)10.0000%
12' X 8' RCBC
10' X 10' RCBC
BAFFLES SEE PIPE PROFILE
BL STATION 68+11 152' LT
6M#5 RRS IN 14" GUM
ELEV. 277.86
BEGIN LAT. V. DITCH
-L- STA. 83+50.00 LT.
EL = 304.68'
PI = 84+50.000
El. = 308.500
END LAT. V. DITCH
-L- STA. 85+50.00 LT.
EL = 312.86'
319.9
328

340 330 320 310 300 290 280 270 260 250
72+00 73+00 74+00 75+00 76+00 77+00 78+00 79+00 80+00 81+00 82+00 83+00 84+00 85+00 86+00

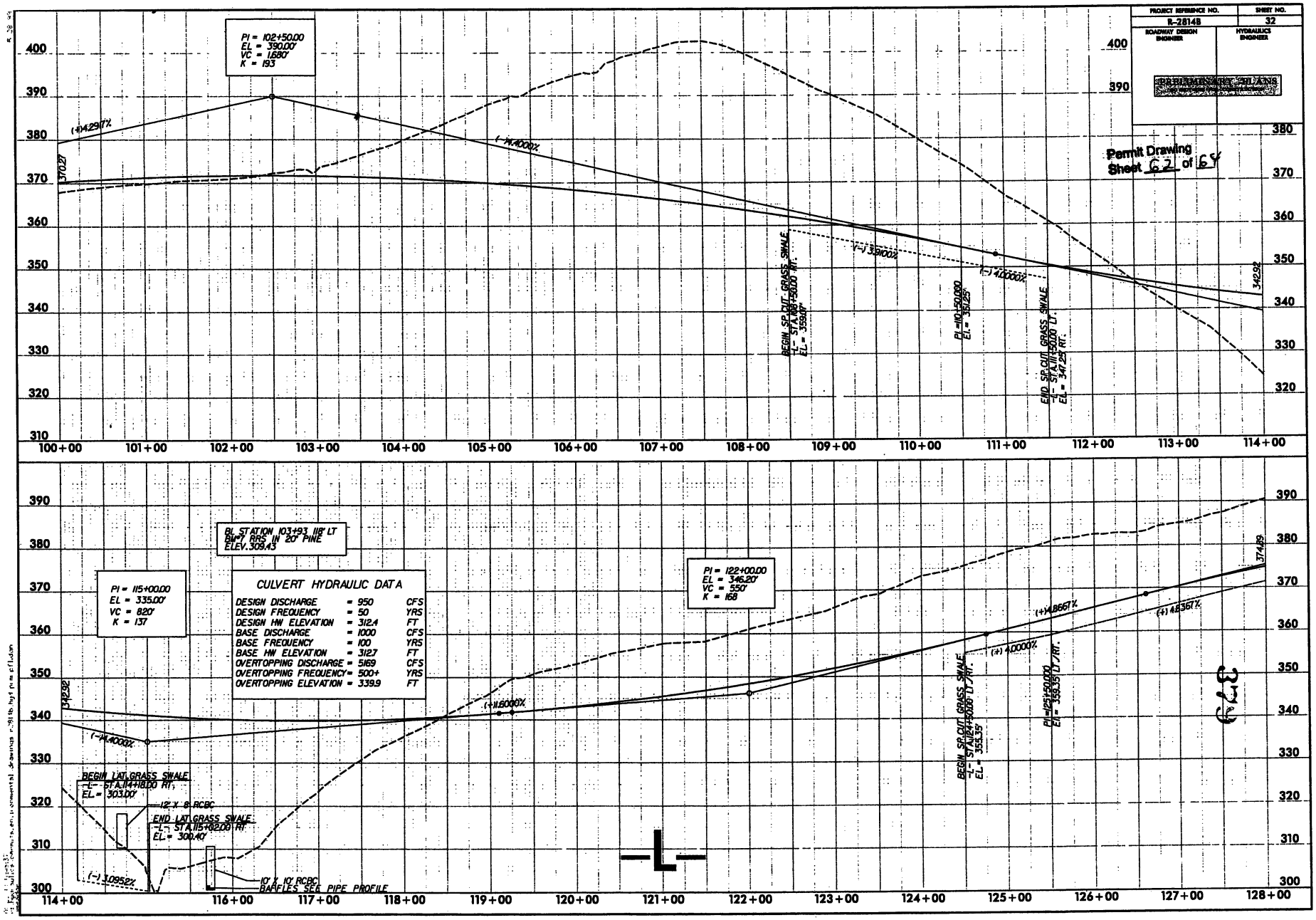
380 370 360 350 340 330 320 310 300 290
86+00 87+00 88+00 89+00 90+00 91+00 92+00 93+00 94+00 95+00 96+00 97+00 98+00 99+00 100+00

319.9
(+)4.2917%
(-)3.9000%
(+)7.0800%
(+)7.0000%
30" RCP
370.27
BEGIN LAT. V. DITCH
-LT- STA. 97+50.00 RT.
EL = 363.40'
PI = 98+50.000
El. = 359.50'
BEGIN SP. OUT DITCH
-L- STA. 99+00.00 RT.
EL = 363.00'
END LAT. V. DITCH
-L- STA. 99+50.00 RT.
EL = 366.50'
END SPLOUT DITCH
EL = 366.54'
BL STATION 83+99 141' RT.
6M#6 RRS IN 24" POPLAR
ELEV 374.82

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.71

DRAINAGE AREA	= 6.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 29	CFS
DESIGN HW ELEVATION	= 362.4	FT
100 YEAR DISCHARGE	= 31	CFS
100 YEAR HW ELEVATION	= 362.5	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 71	CFS
OVERTOPPING ELEVATION	= 367.9	FT


PROJECT REFERENCE NO.
R-2814B
SHEET NO.
32
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
Permit Drawing Sheet 62 of 69
PI = 102+50.00
EL = 390.00'
VC = 1,680'
K = 193
(+)4.297%
(-)4.4000%
(-)3.9000%
(-)4.0000%
370.27
342.92
BEGIN SP CUT GRASS SWALE
-L- STA.100+50.00 RT.
EL = 359.00'
PI =101+50.00
EL = 361.25'
END SP CUT GRASS SWALE
-L- STA.111+50.00 LT.
EL = 347.25' RT.
PI = 115+00.00
EL = 335.00'
VC = 820'
K = 137
BL STATION 103+93 118' LT
SWPT RPS IN 20" PINE
ELEV. 309.43
CULVERT HYDRAULIC DATA
DESIGN DISCHARGE = 950 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 312.4 FT
BASE DISCHARGE = 1000 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 312.7 FT
OVERTOPPING DISCHARGE = 5169 CFS
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = 339.9 FT
PI = 122+00.00
EL = 346.20'
VC = 550'
K = 168
(+)11.6000%
(+)4.8667%
(+)4.8367%
(+)4.0000%
(-)4.4000%
(-)3.0952%
374.89
BEGIN LAT GRASS SWALE
-L- STA.114+18.00 RT.
EL = 303.00'
12' X 8' RCBC
END LAT GRASS SWALE
-L- STA.115+02.09 RT.
EL = 300.40'
10' X 10' RCBC
BAFFLES SEE PIPE PROFILE
BEGIN SP CUT GRASS SWALE
-L- STA.124+50.00 LT./RT.
EL = 353.35'
PI =125+50.00
EL = 359.35' LT./RT.
END SP CUT GRASS SWALE
-L- STA.127+50.00 LT./RT.
EL = 347.35'
-L-
100+00
101+00
102+00
103+00
104+00
105+00
106+00
107+00
108+00
109+00
110+00
111+00
112+00
113+00
114+00
116+00
117+00
118+00
119+00
120+00
121+00
122+00
123+00
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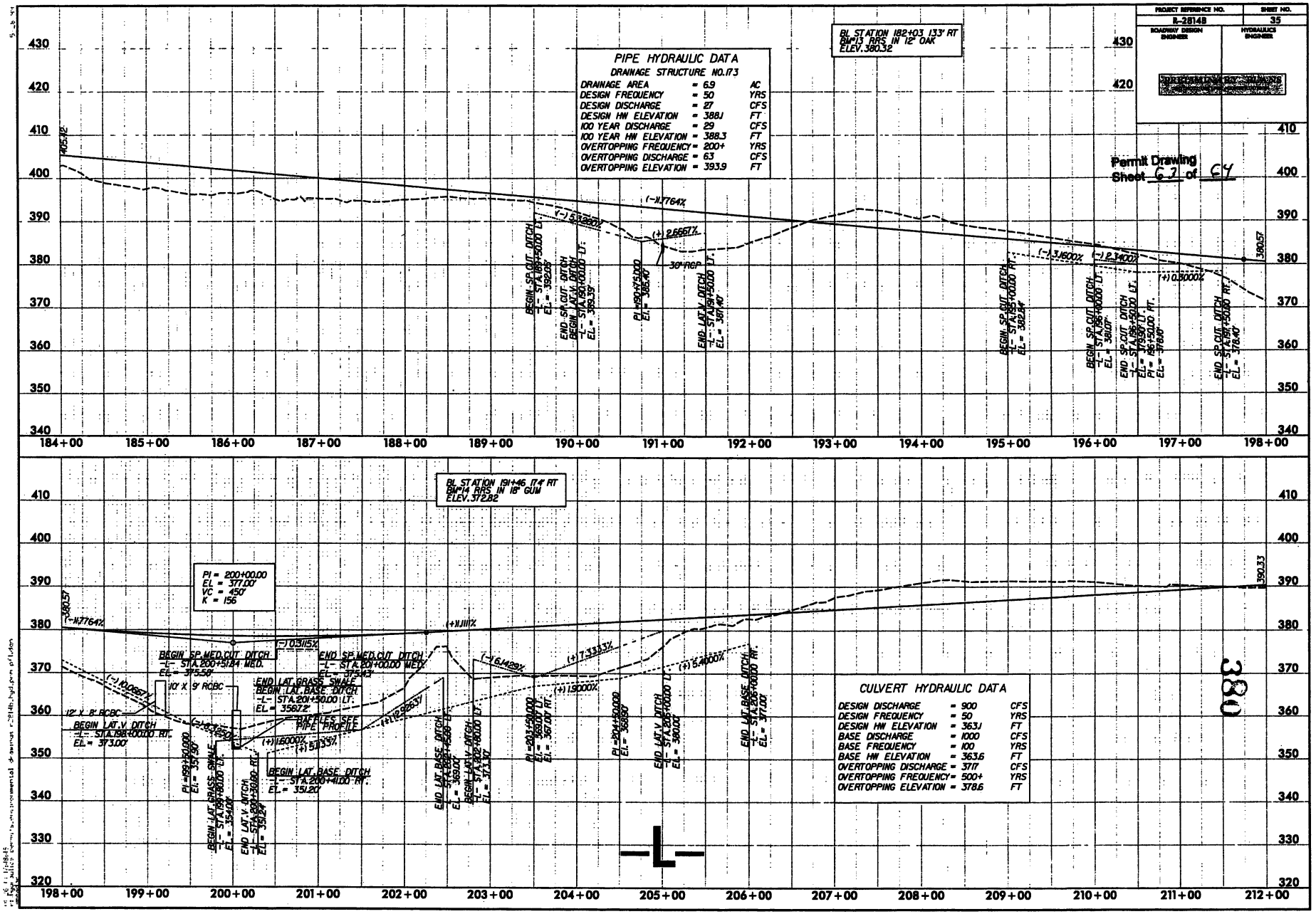
390
380
370
360
350
340
330
320
310
300


PROJECT REFERENCE NO. R-2814B
SHEET NO. 35
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 67 of 67
BL STATION 182+03 133' RT
BM#13 RRS IN 12" OAK
ELEV. 380.32
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.173
DRAINAGE AREA = 6.9 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 27 CFS
DESIGN HW ELEVATION = 388.1 FT
100 YEAR DISCHARGE = 29 CFS
100 YEAR HW ELEVATION = 388.3 FT
OVERTOPPING FREQUENCY = 200+ YRS
OVERTOPPING DISCHARGE = 63 CFS
OVERTOPPING ELEVATION = 393.9 FT
BL STATION 191+46 174' RT
BM#14 RRS IN 18" GUM
ELEV. 372.82
PI = 200+00.00
EL = 377.00'
VC = 450'
K = 156
CULVERT HYDRAULIC DATA
DESIGN DISCHARGE = 900 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 363.1 FT
BASE DISCHARGE = 1000 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 363.6 FT
OVERTOPPING DISCHARGE = 3717 CFS
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = 378.6 FT
380
184+00
185+00
186+00
187+00
188+00
189+00
190+00
191+00
192+00
193+00
194+00
195+00
196+00
197+00
198+00
199+00
200+00
201+00
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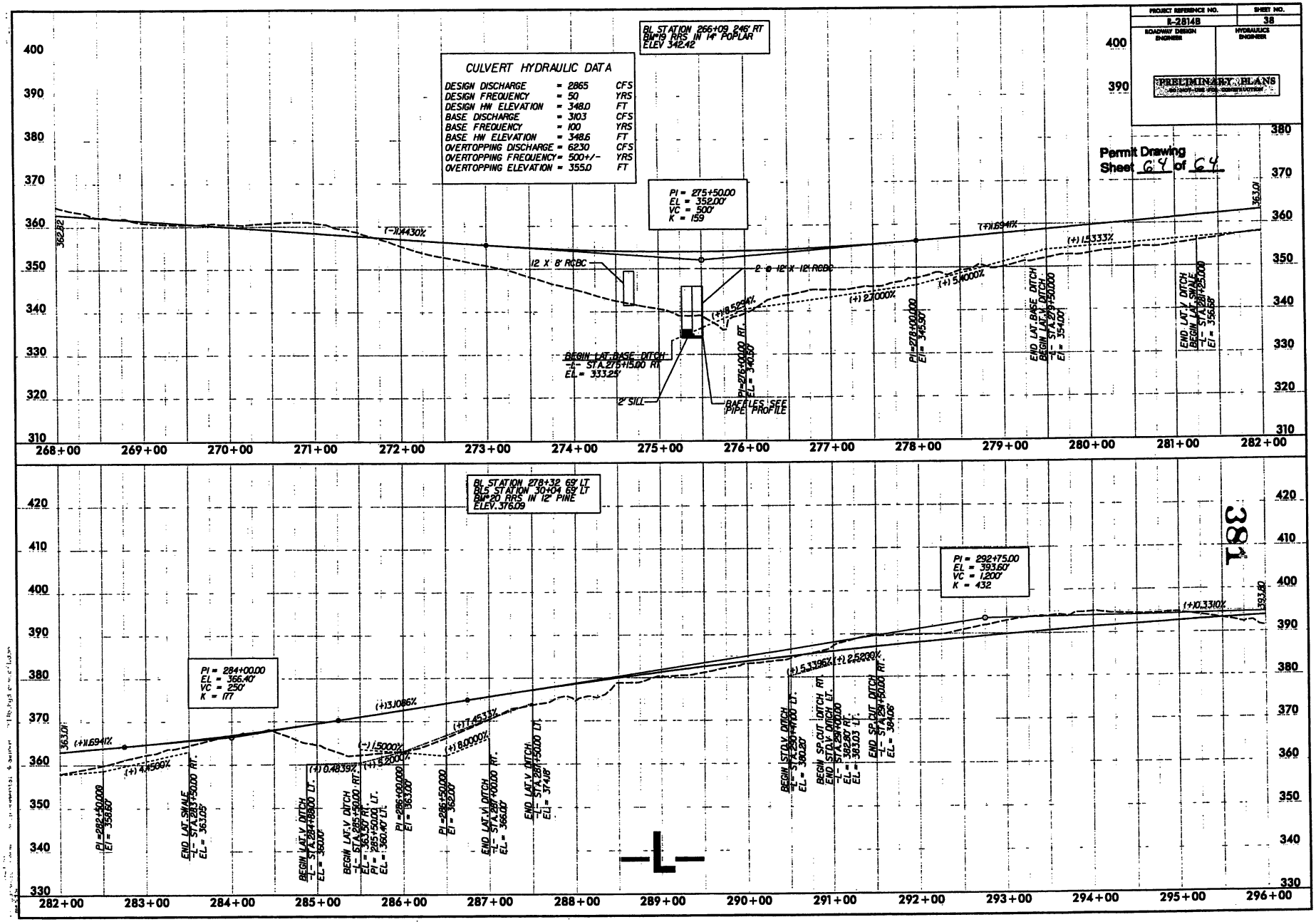
211+00
212+00


PROJECT REFERENCE NO. R-2814B
SHEET NO. 38
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
Permit Drawing Sheet 64 of 64
BL STATION 266+09 246' RT BM#19 RR'S IN 14" POPLAR ELEV 342.42
CULVERT HYDRAULIC DATA
DESIGN DISCHARGE = 2865 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 348.0 FT
BASE DISCHARGE = 3103 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 348.6 FT
OVERTOPPING DISCHARGE = 6230 CFS
OVERTOPPING FREQUENCY = 500+/- YRS
OVERTOPPING ELEVATION = 355.0 FT
PI = 275+50.00 EL = 352.00' VC = 500' K = 159
12' X 8' RCBC
2 @ 12' X 12' RCBC
2' SILL
BAFFLES SEE PIPE PROFILE
BEGIN LAT. BASE DITCH -L- STA. 275+15.00 RT. EL = 333.25'
PI = 276+00.00 RT. EL = 340.59'
PI = 278+00.00 RT. EL = 345.90'
END LAT. BASE DITCH BEGIN LAT. V DITCH -L- STA. 279+50.00 EL = 354.00'
END LAT. V DITCH BEGIN LAT. SWALE -L- STA. 281+25.00 EL = 356.68'
(-)1.1443%
(+)11.6941%
(+)8.5294%
(+)2.7000%
(+)5.4000%
(+)1.5333%
362.82
363.10
BL STATION 278+32 69' LT BL5 STATION 30+04 69' LT BM#20 RR'S IN 12" PINE ELEV. 376.09
PI = 284+00.00 EL = 366.40' VC = 250' K = 177
PI = 292+75.00 EL = 393.60' VC = 1200' K = 432
(+)11.6941%
(+)4.4500%
(+)13.0086%
(-)1.5000%
(+)8.2000%
(+)0.4839%
(+)7.4533%
(+)8.0000%
(+)1.5339%
(+)12.5209%
(+)10.3310%
363.01
393.60
PI = 282+50.000 EL = 358.80
END LAT. SWALE -L- STA. 283+50.00 RT. EL = 363.05'
BEGIN LAT. V DITCH -L- STA. 284+88.00 LT. EL = 360.00'
BEGIN LAT. V DITCH -L- STA. 285+50.00 RT. EL = 363.29'
PI = 285+50.00 LT. EL = 360.40' LT.
PI = 286+00.000 EL = 363.00'
PI = 286+50.00 EL = 362.00'
END LAT. V DITCH -L- STA. 287+00.00 RT. EL = 366.00'
END LAT. V DITCH -L- STA. 287+50.00 LT. EL = 374.18'
BEGIN ST. V DITCH -L- STA. 290+00.00 LT. EL = 380.29'
BEGIN SP. CUT DITCH RT. END ST. V DITCH LT. -L- STA. 290+00.00 EL = 382.80' RT. EL = 383.03' LT.
END SP. CUT DITCH -L- STA. 291+50.00 RT. EL = 394.06'
381
268+00 269+00 270+00 271+00 272+00 273+00 274+00 275+00 276+00 277+00 278+00 279+00 280+00 281+00 282+00
282+00 283+00 284+00 285+00 286+00 287+00 288+00 289+00 290+00 291+00 292+00 293+00 294+00 295+00 296+00
310 320 330 340 350 360 370 380 390 400
330 340 350 360 370 380 390 400 410 420