STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 14, 2008

MEMORANDUM TO: Mr. Terry R Gibson, PE
Division Six Engineer

FROM: Philip S. Harris, III, P.E., Unit Head
Natural Environment Unit
Project Development and Environmental Analysis Branch

SUBJECT: Cumberland, Hoke and Robeson Counties, Fayetteville Outer Loop; T.I.P. Numbers U-2519 and X-0002 B &G; Federal Aid Project No. DPR-0100(001) and DPR-0100(002); State Project No. 8.2441301

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

PSH/gyb

Attachment

Cc:

Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Jay Bennett, P.E., Roadway Design
Dr. David Chang, P.E., Hydraulics
Mr. Randy Garris, P.E. State Contract Officer
Mr. Art McMillan, P.E., Highway Design
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. John F. Sullivan, FHWA
Ms. Beth Harmon, EEP
Mr. Rob Hanson, P.E., PDEA Eastern Region Unit Head
Mr. James J. Rerko, Division Environmental Officer

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

TELEPHONE: 919-733-3141
FAX: 919-715-1501

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

PROJECT COMMITMENTS

U-2519 and X-0002 B & C Green Sheet
FAYETTEVILLE OUTER LOOP
Cumberland, Hoke, and Robeson Counties
Federal Aid No.: DPR-0100(001) and DPR-0100(002)
State Project No. 8.2441301

COMMITMENTS DEVELOPED THROUGH PROJECT DEVELOPMENT AND DESIGN

All commitments developed during the project development and design phase have been incorporated into the design and were standard commitments. Current status, changes, or additions to the project commitments as shown in the Draft Environmental Impact Statement for the project are printed in *italic* font.

PDEA/Roadway Design/Hydraulics
Impacts to watershed areas and the water quality of all receiving waters will be minimized by strict adherence to NCDOT"s "Best Management Practices for Protection of Surface Waters," March 1997. Additionally, every effort will be made to minimize natural water body impacts during final design. The proposed Fayetteville Outer Loop would cross Little Cross Creek and Cross Creek above Bonnie Doone Lake and Rose Lake. Although these waters are part of the Fayetteville public drinking water supply, the proposed outer loop would not be located within the critical watershed area of either creek. The proposed outer loop would be located approximately 3.5 miles upstream of the critical watershed areas. During the design phase of the study, hazardous spill basins will be considered to prevent stream contamination from spill runoff.

This commitment was implemented during design.

PDEA/Roadway Design
Areas containing protected species will be avoided if possible during the design phase of the project. Section 7 consultation with the US Fish and Wildlife Service will be completed prior to signing the Final Environmental Impact Statement for circulation. Additionally, habitat fragmentation mitigation will be further evaluated during the design phase of the study. Field surveys for all federally listed endangered species known to inhabit Cumberland, Hoke, and Robeson counties were performed. Measures to minimize impacts to the protected species were incorporated into the preliminary designs and coordinated with the Merger Team.

A Biological Assessment (BA) was prepared to assess impacts to federally listed plant species and a butterfly. In addition, a separate BA was prepared for impacts to the redcockaded woodpecker. The Section 7 consultation was completed April 28, 2005.

PDEA/Right of Way
NCDOT will work with the members of the North Carolina Sandhills Conservation Partnership (NCSCP), with a reasonable effort, to acquire one piece of property in accordance with NCDOT and FHWA policies and procedures for property acquisition, the area identified as the Northern Corridor (see Figure 3 on page 31 of the Biological Opinion [April 28, 2005]). The identified property will contain approximately 75 acres of habitat that does or can support a southern yellow pine-dominated overstory and can be reasonably managed to create/maintain foraging habitat for the red-cockaded woodpecker.

This commitment was implemented prior to permitting.

PDEA
NCDOT will coordinate with Fort Bragg and the US Fish and Wildlife Service to establish and implement the best strategy for minimizing direct impacts of tree clearing and highway construction to red-cockaded woodpecker (RCW) Cluster FB 65, its resident RCW group and residual foraging and nesting habitat.

This commitment was coordinated with Fort Bragg..

PDEA/Structure Design/Roadway Design/Division 6
Wetland avoidance is considered during all phases of the project. If wetlands cannot be avoided, every effort will be made to minimize the impacts through the location and design of the roadway facility within the selected corridor. Mitigation of unavoidable wetland impacts will be coordinated through the appropriate state and federal agencies.

This commitment was implemented during design.

PDEA/Roadway Design
Sound barriers corresponding to the preferred alternative will be investigated in more detail in the design study phase of the project.

This commitment was implemented during design.

Hydraulics
For floodway encroachments, the North Carolina Department of Transportation will coordinate with the community and with the Federal Emergency Management Agency during the design phase of the project. Adherence to the North Carolina Department of Transportation's "Stream Crossing Guidelines for Anadromous Fish Passage" would allow movement of anadromous fish.

North Carolina Department of Transportation will comply with a moratorium for anadromous fish of "no in-water work" from February 15 to June 30 on Rockfish Creek. This commitment will be implemented during construction.

Geotechnical Design
When the final proposed centerline is established and right of way determined, a hazardous materials site assessment will be performed to the degree necessary to determine levels of contamination at any potential hazardous materials sites along the preferred alternate. The assessment will be made prior to right of way acquisition. Resolution of problems associated with contamination will be coordinated with appropriate agencies.

This commitment was implemented prior to Right of Way.

Roadside Environmental/Roadway Design
Measures to minimize visual impacts will be taken into consideration during design of the roadway. Overall, visual impacts may be mitigated through a variety of actions such as alignment modifications during design, landscaping, screening, embankments, and selective clearing of natural materials.

The commitment was implemented during design.

PDEA
If a build alternate is selected as the Preferred Alternative, a detailed archaeological survey of the preferred corridor will be conducted. This survey will be coordinated with the State Historic Preservation Office.

*In coordination with the State Historic Preservation Office (HPO), detailed archaeological studies of the preferred corridor were conducted from 2001 to 2004. The specific findings of the initial survey are documented in "Dimensions of Fall Line Site Function: Surveying and Testing the West Fayetteville North Carolina Outer Loop," Technical Report #992 by New South Associates (2002). In coordination with the HPO and the Fort Bragg Cultural Resources Program (FBCRP), three additional intensive archaeological surveys were prepared for expanded coverage of the Preferred Alternative. The specific findings of these surveys are documented in three separate addenda: 1) "Cultural Resources Survey of 284 Acres South of Cliffdale Road, West Fayetteville Outer Loop, Cumberland and Hoke Counties, North Carolina," 2) "Cultural Resources Survey of 534 Acres North of Cliffdale Road, West Fayetteville Outer Loop, Cumberland County, North Carolina," and 3) "Cultural Resources Survey of 31 Additional Land Parcels of the Proposed West Fayetteville Outer Loop, Cumberland and Robeson Counties, North Carolina," all of which will be integrated into one appendix to be attached to the original 2002 survey report by New South Associates. A summary of the findings and impacts can be found in Section 6 of this document. These reports conclude that the Preferred Alternative will impact ten archaeological sites within the area of potential effects, eight of which are considered eligible for the National Register of Historic Places (31CD64, 31CD65, 31CD871, 31CD874, 31CD882, 31CD962, 31CD965, and 31RB485). The remaining two sites are cemeteries (31CD967/967** and 31CD976**). Therefore, the NCDOT will prepare a Memorandum of Agreement for the recovery or relocation efforts on these ten sites and will implement a satisfactory data recovery program. A Memorandum of Agreement regarding the implementation of mitigation efforts for all ten archaeological sites was signed in March 2005. One cemetery (31CD976**) will need to be relocated per applicable State statutes (i.e. NC GS 65 or NC GS 70.3) after consultation with the Office of State Archaeology. The prehistoric archaeological component of 31CD967/967** will not be impacted by the proposed project, but its historic cemetery component requires a GPR survey in order to determine the locations of unmarked burials that may or may not be impacted by the proposed project. If burials associated with 31CD967/967** are to be impacted by the proposed project, then such burials will be relocated per applicable State statutes (i.e. NC GS 65 or NC GS 70.3) after consultation with the Office of State Archaeology. Since Sites 31CD64, 31CD65, and 31CD871, all of which will be affected by the subject project, are located within the Fort Bragg Military Reservation, the NCDOT will develop mitigation plans in consultation with both the HPO and the Fort Bragg Cultura Resources Program.*

Roadside Environmental/Division 6
Borrow and solid waste operations would be managed through the North Carolina Department of Transportation's, "Best Management Practices for Protection of Surface Waters," March 1997. Additionally, any solid waste generated during construction would be temporary and would either be hauled away to landfills or disposed of on-site by controlled burning, in compliance with all local, state, and federal regulations.

This commitment will be implemented during construction of the project.

PDEA/Roadway Design/Roadside Environmental
A retaining wall and vegetative screening will be provided adjacent to the Keithville Rental Units to avoid right-of-way acquisition and minimize visual impacts. These will be located at the northwest corner of the property adjacent to the Bragg Boulevard/Fayetteville Outer Loop interchange (quadrant D).

This commitment was implemented during design.

PDEA/Roadway Design
To minimize harm to the Shaw-Gillis Historic District, Raeford Road will be closed and landscaping will be provided adjacent to the roadway. In addition, access to the property from US 401 will be maintained, and the exterior of the Shaw-Gillis house will be painted following construction.

This commitment was negotiated during design and will be implemented during construction.

PDEA/Roadway Design/Right of Way
NCDOT will provide funds or construct and replace Fort Bragg's perimeter fence impacted by the proposed project. NCDOT will coordinate with Fort Bragg to provide perimeter roads and tank trails along the proposed project. The criteria and construction of visual screening to eliminate the line of sight to facilities located along the project will be coordinated with Fort Bragg. NCDOT will provide resources and/or construct new Access Check Point facilities in coordination with Fort Bragg at Reilly Road, Canopy Road, and Bragg Boulevard. The design of the Yadkin Road overpass will be coordinated with Fort Bragg to incorporate the new roadway grade into the Access Check Point facilities. Smith Lake Access Road off Murchison Road will be closed and relocated off Honeycutt Road in coordination with Fort Bragg. The new access will incorporate the current facilities and minimize harm to existing pine trees.

These commitments were addressed during design and will be negotiated as part of the Right of Way settlement with Fort Bragg.

PDEA/Roadway Design/Hydraulics
NCDOT will provide a bridge or box culvert at the existing wetland at the rear of Pine Forest High School to allow for a pedestrian crossing in coordination with a proposed Cumberland County greenway.

The commitment was implemented during design.

PDEA
Several systematic surveys of all potentially-suitable habitats for American chaffseed, Michaux's sumac, pondberry, rough-leaved loosestrife, and the Saint Francis' Satyr butterfly were conducted by biologists from May 2001 through August 2004. No individuals of any of the species were observed during the surveys. A re-survey will be conducted one year prior to construction, during the appropriate survey window, within the project limits to determine if any members of these species are present.

This commitment was implemented within the year prior to awarding to the contract of the final design projects. Surveys will continue to be conducted within the year prior to construction of the remaining preliminary design sections.

Roadway Design
A capacity analysis for an updated design year using 2030 traffic volumes will be prepared and utilized in the design of the Final Plans.

This commitment will be implemented prior to the completion of Final Plans.

COMMITMENTS DEVELOPED THROUGH PERMITTING

PDEA & Division 6 Construction
The permittee shall abide by the conservation measures identified in the Biological Assessment prepared for the Red-cockaded Woodpecker, *Piocoides borealis*, dated 9 September 2004 and the conservation measures identified by the US Fish and Wildlife Service in the Biological Opinion dated 28 April 2005.

The commitment was implemented during design and will continue to be followed during construction.

PDEA
The 404 permit does not authorize you to take an endangered species, in particular the Red Cockaded Woodpecker. In order to legally take a listed species, you must have separate authorization under the ESA. (e.g., an ESA Section 10 permit, or a BO under the ESA Section 7, with "incidental take" provisions with which you must comply). The USFWS Biological Opinion, dated 28 April 2005, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and the ESA.

The commitment was implemented during design and will continue to be followed during construction.

PDEA
TERMS AND CONDITIONS FROM BO
In order to be exempt from prohibitions of section 9 of the Act, the NCDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

(1) [RPM (1)] Upon acquisition of the conservation property, NCDOT will identify the entity or entities responsible for owning and managing the property and secure an agreement from the entity (or entities) that the property will be managed in accordance with a RCW conservation plan approved by the Service and the NCSCP. (NCDOT's obligations will not extend beyond the acquisition of the property, NCDOT's receipt of assurances from the responsible third party that the property will be managed in accordance with standards set by the NCSCP for RCW conservation, and subsequent transferal to the third party; it is not anticipated that the cost of NCDOT's obligation would exceed $ 1.0 million).

The NCDOT purchased the 113 acre Marshbanks Property to help establish the Northern Connector to encourage movement of existing RCW populations.

(2) [RPM (1)] If the property is not acquired and transferred to a responsible third party at least six months prior to initiation of construction, then NCDOT, NCSCP and the Service will meet to determine an appropriate alternative that reasonably supports the objective of establishing the Northern Corridor as a demographic linkage between RCW subpopulations in the Sandhills East primary core population (Overhills HMU) and NEA. In any case, conservation actions to fulfill this reasonable and prudent measure must occur prior to construction.

The NCDOT purchased the 113 acre Marshbanks Property to help establish the Northern Connector to encourage movement of existing RCW populations.

(3) [RPM (2)] Where NCDOT is able to program the timing of tree clearing and highway construction within the project area, NCDOT will, in the early stages of the planning process, schedule meetings with Fort Bragg's Directorate of Public Works and the Service to determine:

A. The best time to conduct tree clearing and/or construction activities in a manner that minimizes impacts to cluster 65 and its associated RCW group.

B. Determine the time and location where artificial cavities will be created to minimize the loss of RCWs associated with project activities.

C. Establish protective measures for trees selected and/or used to provision cavities for conserving RCWs associated with the Fayetteville Outer Loop project.

NCDOT Coordinated with Fort Bragg on tree clearing plans prior to construction

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Clemson Field Office. Additional notification must be made to the Raleigh, North Carolina Fish and Wildlife Ecological Services Field Office. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury. All procedural and reporting requirements as outlined in the Service's region-wide biological opinion on monitoring and management (Service 2003b) will be followed.

These reasonable and prudent measures, together with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than one RCW group will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking, and review with the Service the need for possible modification of the reasonable and prudent measures.

PDEA

The permittee shall continue coordination of design for U-2519 Sections AA, AB, BA, BB, CA and CB through the NEPA/Section 404 Merger 01 Process – Concurrence points 2A, 4B and 4C. The final design shall incorporate appropriate avoidance, minimization and mitigation of aquatic resource impacts to the fullest extent practicable. The applicant shall not commence any work within waters of the United States within U-2519 Sections AA, AB, BA, BB, CA and CB until after the submittal of a modified

All section of the project (U-2519 AA, AB, BA, BB, CA, CB, DA, X-0002 B and X-0002 C) have been through the NEPA/Section 404 Merger 01 Process as follows:

- *Concurrence Point 1* *Signed – July 13, 2000*
- *Concurrence Point 2* *Signed – July 31, 2000*
- *Concurrence Point 3* *Signed – October 5, 2000*
- *Concurrence Point 2A and 4A* *Signed – March 16, 2004*

The following sections have been through the NEPA/Section 404 Merger 01 Process for Concurrence points 4B and 4C as follows:

X-0002C	*Concurrence Point 4B and 4C*	*February 22, 2006 & June 13, 2007*
X-0002B	*Concurrence Point 4B and 4C*	*December 14, 2005 & June 13, 2007*
U-2519E	*Concurrence Point 4B and 4C*	*N/A* & June 13, 2007*
U-2519DA	*Concurrence Point 4B and 4C*	*December 14, 2005 & June 13, 2007*
U-2519CB	*Concurrence Point 4B*	*March 16, 2005*
U-2519CA	*Concurrence Point 4B*	*April 12, 2006*

** received Concurrence Point 4B as U-2519DA*

PDEA

Compensatory mitigation for the unavoidable impacts to 34.84 acres of riparian wetlands and 13.59 acres of non-riparian wetlands associated with the proposed project shall be provided by debiting 104.52 acres of riparian wetlands and 40.77 acres of non-riparian wetlands from the Privateer Farms Mitigation Site. Compensatory mitigation for the unavoidable impacts to 12,346 linear feet of important stream reach associated with the proposed project shall be provided by debiting 18,519 linear feet of stream reach from the Privateer Farms Mitigation Site. The permittee shall maintain the Privateer Farms Mitigation Site in its natural condition, as altered by the mitigation plan, in perpetuity. Except as authorized or required by the mitigation plan, prohibited activities on the mitigation property include, but are not limited to, filling; grading; excavating; earth moving of any kind; construction of roads, walkways, buildings signs, or any other structure; any activity that may alter the drainage patterns on the property; destruction, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage trash, or other waste material. In addition, the permittee shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands on the mitigation property. This condition above runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the mitigation property without subjecting the property to legally enforceable restrictions on the use of the property, to ensure its preservation, approved in writing by the Wilmington District Corps of Engineers.

Division 6 Construction

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 remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond.

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

November 4, 2008

REPLY TO
ATTENTION OF:

Regulatory Division

Action ID SAW-200801413

Dr. Gregory J. Thorpe, PhD, Manager
Project Development and Environmental Analysis Branch
N.C. Department of Transportation
Division of Highways
1589 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

Enclosed is a Department of the Army permit to directly discharge dredged and/or fill material into jurisdictional wetlands to facilitate the construction of Fayetteville Outer Loop, Transportation Improvements Project X-0002B & C and U-2159, State Project Number 8.2441301 and 8.T441302, Cumberland, Hoke and Robeson Counties, North Carolina. The proposed 27.8 mile controlled-access freeway is located beginning at an interchange with I-95 just south of SR 1718 (Green Spring Road) in Robeson County, continues north through Cumberland County, turns eastward along the southern boundary of the Fort Bragg Military Reservation, and ends just west of US 401 (Ramsey Street).

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, 2011.

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 Richard K. Spencer, Wilmington Regulatory Field Office at (910) 251-4172.

Sincerely,

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**

RECEIVED
NOV 0 3 2008
REGULATORY
WILM.FLD.OFC.

Permit No. **2008-01413**

Issuing Office **USAED, Wilmington**

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

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

Project Description: **Directly discharge dredged or fill material into waters of the United States associated with construction of the Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24/87 in Cumberland and Robeson Counties, North Carolina.**

Project Location: **In the Lumber River, Hydrologic Cataloging Unit 03040203 and the Cape Fear River, Hydrologic Cataloging Unit 03030004. The project is more specifically located starting at Latitude 34.89727 N, Longitude 78.95899 W and ending at Latitude 35.11051, Longitude 78.97456.**

a. Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2011.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

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

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

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

Special Conditions:

SEE 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.

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

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

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

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

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

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

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

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

E. L. Lupk for Dr. Gregory J. Thorpe, PhD 10-29-08

(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.

G. Bennett Jolly 11-4-08

(DISTRICT ENGINEER) **JEFFERSON M. RYSCAVAGE, COLONEL** *(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
2008-01413

SPECIAL CONDITIONS (Action ID. 2008-01413, Fayetteville Outer Loop, Transportation Improvements Project . X-0002B & C and U-2519, State Project Number 8.2441301 and 8.T441302

1. Failure to institute and carry out the details of the following special conditions below will result in a directive to cease all ongoing and permitted work within waters of the United States, including wetlands, associated with the permitted project, or such other remedies and/or fines as the U.S. Army Corps of Engineers District Commander or his authorized representatives may seek.

2. All work authorized by this permit must be preformed in strict compliance with the attached plans, which are a part of this permit.

3. The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall notify the Corps of Engineers Project Manager a minimum of thirty (30) days in advance of the scheduled meetings in order to provide that individual with ample opportunity to schedule and participate in the required meetings. One copy of the final half-size construction drawings shall be furnished to the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to the pre-construction meeting.

4. The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. Any deviation in the construction design plans will be brought to the attention of the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.

5. 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 and any authorized modifications. Copies of this permit and any modifications authorized by the USACE shall be available for review at the construction site at all times. All violations, including non-compliance of these conditions, of the authorized permit shall be reported to the District Engineer within 24 hours of the violation.

6. Compensatory mitigation for the unavoidable impacts to 34.84 acres of riparian wetlands and 13.59 acres of non-riparian wetlands associated with the proposed project shall be provided by

debiting 104.52 acres of riparian wetlands and 40.77 acres of non-riparian wetlands from the Privateer Farms Mitigation Site. Compensatory mitigation for the unavoidable impacts to 12,346 linear feet of important stream reach associated with the proposed project shall be provided by debiting 18,519 linear feet of stream reach from the Privateer Farms Mitigation Site. The permittee shall maintain the Privateer Farms Mitigation Site in its natural condition, as altered by the mitigation plan, in perpetuity. Except as authorized or required by the mitigation plan, prohibited activities on the mitigation property include, but are not limited to, filling; grading; excavating; earth moving of any kind; construction of roads, walkways, buildings signs, or any other structure; any activity that may alter the drainage patterns on the property; destruction, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage trash, or other waste material. In addition, the permittee shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands on the mitigation property. This condition above, runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the mitigation property without subjecting the property to legally enforceable restrictions on the use of the property, to ensure its preservation, approved in writing by the Wilmington District Corps of Engineers.

7. 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, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project. In addition, 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, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

8. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area.

9. To ensure that all borrow and waste activities occur on high ground and do not result in loss or the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall ensure that all such areas comply with the preceding condition (#7) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition (#7). All information will be available to the Corps of Engineers upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

10. The permittee shall comply with the conditions specified in the water quality certification, No. 3758, issued by the North Carolina Division of Water Quality on 6 October 2008.

11. The permittee shall abide by the conservation measures identified in the Biological Assessment prepared for the Red-cockaded Woodpecker, *Piocoides borealis*, dated 9 September 2004 and the conservation measures identified by the US Fish and Wildlife Service in the Biological Opinion dated 28 April 2005.

12. This Corps permit does not authorize you to take an endangered species, in particular the Red Cockaded Woodpecker. In order to legally take a listed species, you must have separate authorization under the ESA. (e.g., an ESA Section 10 permit, or a BO under the ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed USFWS Biological Opinion, dated 28 April 2005, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and the ESA.

13. The permittee shall continue coordination of design for U-2519 Sections AA, AB, BA, BB, CA and CB through the NEPA/Section 404 Merger 01 Process – Concurrence points 2A, 4B and 4C. The final design shall incorporate appropriate avoidance, minimization and mitigation of aquatic resource impacts to the fullest extent practicable. The applicant shall not commence any work within waters of the United States within U-2519 Sections AA, AB, BA, BB, CA and CB until after the submittal of a modified application with final design plans reflecting the appropriate avoidance, minimization and mitigation within these sections and has received final approval from Wilmington District Corps of Engineers

14. 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. Riprap armoring of streams at culvert 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.

15. The permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to assure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such

Best Management Practices in order to assure compliance with the appropriate turbidity water quality standards. 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). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

16. The permittee shall take appropriate measure to control any bottom sediment that may be sluiced by the draining of impacted ponds on the project site. Sediment sluicing from ponds is not authorized by this permit.

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

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

19. The permittee shall install barrier fencing or other acceptable forms of barrier around all wetlands that are not to be disturbed to make them readily visible and prevent construction equipment from inadvertently entering and disturbing the wetland areas that are to remain undisturbed.

20. 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. No equipment staging or storage of construction material will occur in wetlands. Hydro-seeding equipment will not be discharged or washed out into any surface waters or wetlands. 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 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

21. The permittee shall abide by all project commitments identified in the FHWA/NCDOT EIS and ROD.

22. The permittee shall abide by all stipulations identified in the Memorandum of Agreement between the North Carolina Department of Transportation and the North Carolina State Historic Preservation Officer, executed 12 April 2005, and the stipulations identified in the Concurrence Form for Assessment of Effects, executed 11 January 2005.

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

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

25. 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.

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

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

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

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

c. Damages to other permitted or un-permitted activities or structures caused by the authorized activity.

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

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

William G Ross Jr , Secretary
North Carolina Department of Environment and Natural Resources

Coleen Sullins, Director
Division of Water Quality

October 6, 2008

RECEIVED
OCT - 8 2008
REGULATORY
WILM.FLD.OFC.

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

Subject 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for Proposed Fayetteville Outer Loop in Cumberland, Hoke and Robeson Counties, Federal Aid Project No NHF-DPR-0100(001), State Project No 8 2441301, TIP Nos X-002 B&C and U-2519
DWQ Project No 20080737

Dear Dr Thorpe

Attached hereto is a copy of Certification No 3758 issued to The North Carolina Department of Transportation dated October 6, 2008

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

Sincerely,

Coleen Sullins,
Director

Attachments

cc Richard Spencer, US Army Corps of Engineers, Wilmington Field Office
Tyler Stanton, NCDOT NEU
Jim Rerko, DOT Division 6 Environmental Officer
Kathy Matthews, Environmental Protection Agency
Travis Wilson, NC Wildlife Resources Commission
Beth Harmon, Ecosystem Enhancement Program
Ken Averitte, DWQ Fayetteville Regional Office
File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250 Raleigh, North Carolina 27604
Phone 919-733-1786 / FAX 919-733-6893 / Internet http //h2o enr state nc us/ncwetlands

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401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act 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 (DWQ) Regulations in 15 NCAC 2H 0500 This certification authorizes the NCDOT to impact 57 08 acres of jurisdictional wetlands and 13,232 linear feet of jurisdictional streams in Cumberland, Hoke and Robeson Counties The project shall be constructed pursuant to the application dated received April 25, 2008 The authorized impacts are as described below

Section X-0002 B Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	0	0	213	0	213	213
Total	**0**	**0**	**213**	**0**	**213**	**213**

Total Stream Impact for Section X-0002 B 213 linear feet

Section X-0002 C Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	0	0	279	0	279	279
3	0	0	775	0	775	775
5	0	0	361	0	361	361
6	0	0	479	0	479	479
7	0	0	213	0	213	213
8	0	0	509	0	509	509
9	0	0	98	0	98	98
Total	**0**	**0**	**2714**	**0**	**2714**	**2714**

Total Stream Impact for Section X-0002 C : 2,714 linear feet

Section U-2519 E Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	886	0	0	0	886	0
Total	**886**	**0**	**0**	**0**	**886**	**0**

Total Stream Impact for Section U-2519 E: 886 linear feet

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This approval is only valid for the purpose and design that you submitted in your application dated received April 25, 2008 Should your project change, you are required to notify the DWQ 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) 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

Conditions of Certification

1 This Water Quality Certification authorizes impacts to wetlands, streams and open waters to sections X-0002 B and C, and U-2519 DA and E only When final design plans are completed for U-2519 Sections AA, AB, BA, BB, CA, and CB, modifications to the 401 Water Quality Certification shall be submitted with four 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, or surface waters, located in U-2519 Sections AA, AB, BA, BB, CA or CB shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification from the NC Division of Water Quality

2 Compensatory mitigation for 12,346 linear feet of impact to streams is required We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank This certification gives approval to the debiting of 12,346 linear feet of stream mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project

3 Compensatory mitigation for 48 4 acres of wetlands is required at a 2 5 1 ratio We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank This certification gives approval to the debiting of 121 0 acres of wetland mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project

4 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 remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond

5 The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations The impacted areas shall be revegetated with appropriate native species

6 Strict adherence to the most recent version of NCDOT's Best Management Practices For Bridge Demolition and Removal approved by the US Army Corps of Engineers is a condition of the 401 Water Quality Certification

7 Bridge deck drains shall not discharge directly into the stream Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc) before entering the stream Please refer to the most current version of *Stormwater Best Management Practices*

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

9 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 DWQ If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NC DWQ for guidance on how to proceed and to determine whether or not a permit modification will be required

10 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

11 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

12 One copy of the final construction drawings shall be furnished to NCDWQ Central Office, and one copy to the NCDWQ Fayetteville Regional 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 April 25, 2008 Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality

13 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

14 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

15 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

16 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

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

18 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

19 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

20 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

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

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

23 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 DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification

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

25 A copy of this Water Quality Certification shall be maintained on site at 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

26 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

27 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

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

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

30 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

31 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

32 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*

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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

33 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

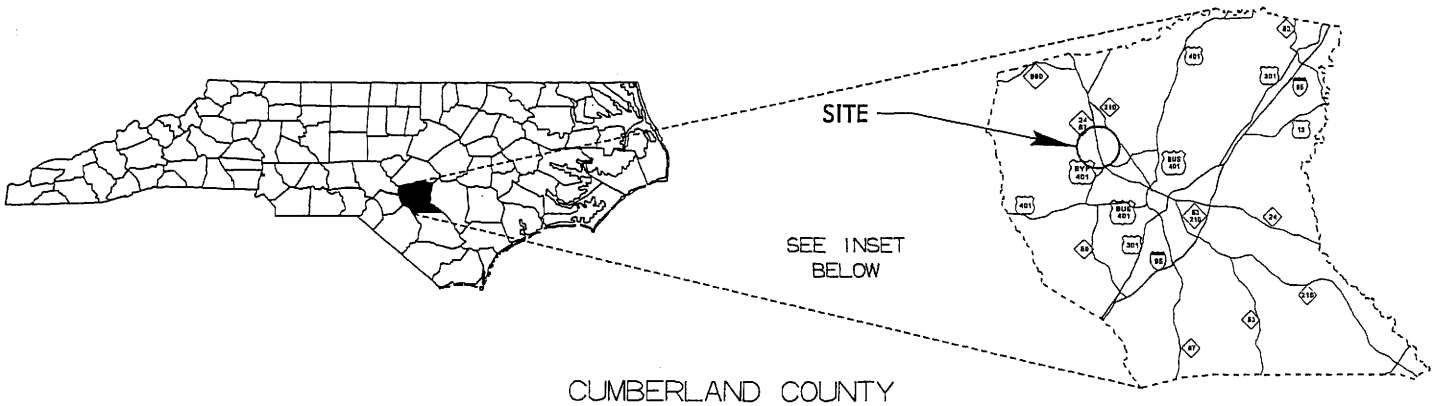
If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed 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

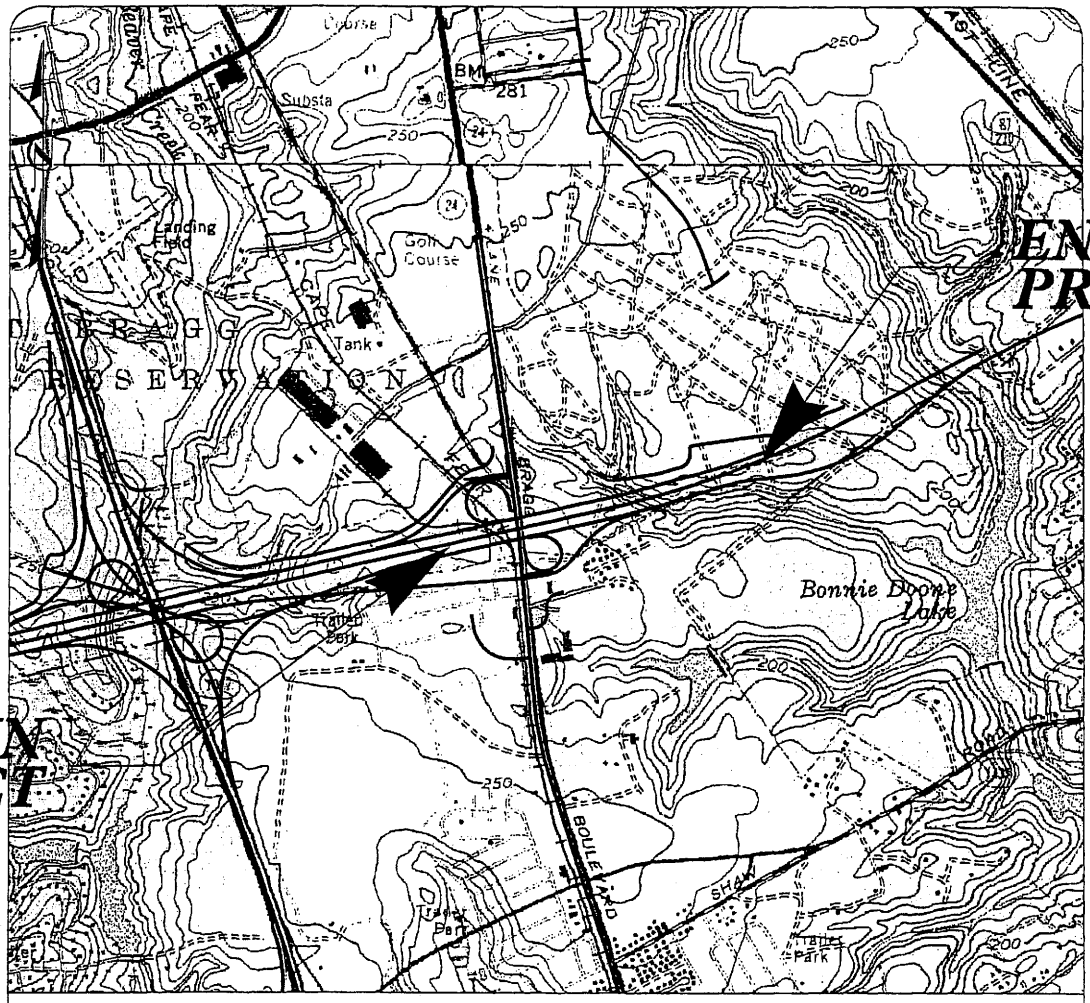
This the 6th day of October 2008

DIVISION OF WATER QUALITY

Coleen Sullins
Director

WQC No 3758





VICINITY MAP NTS

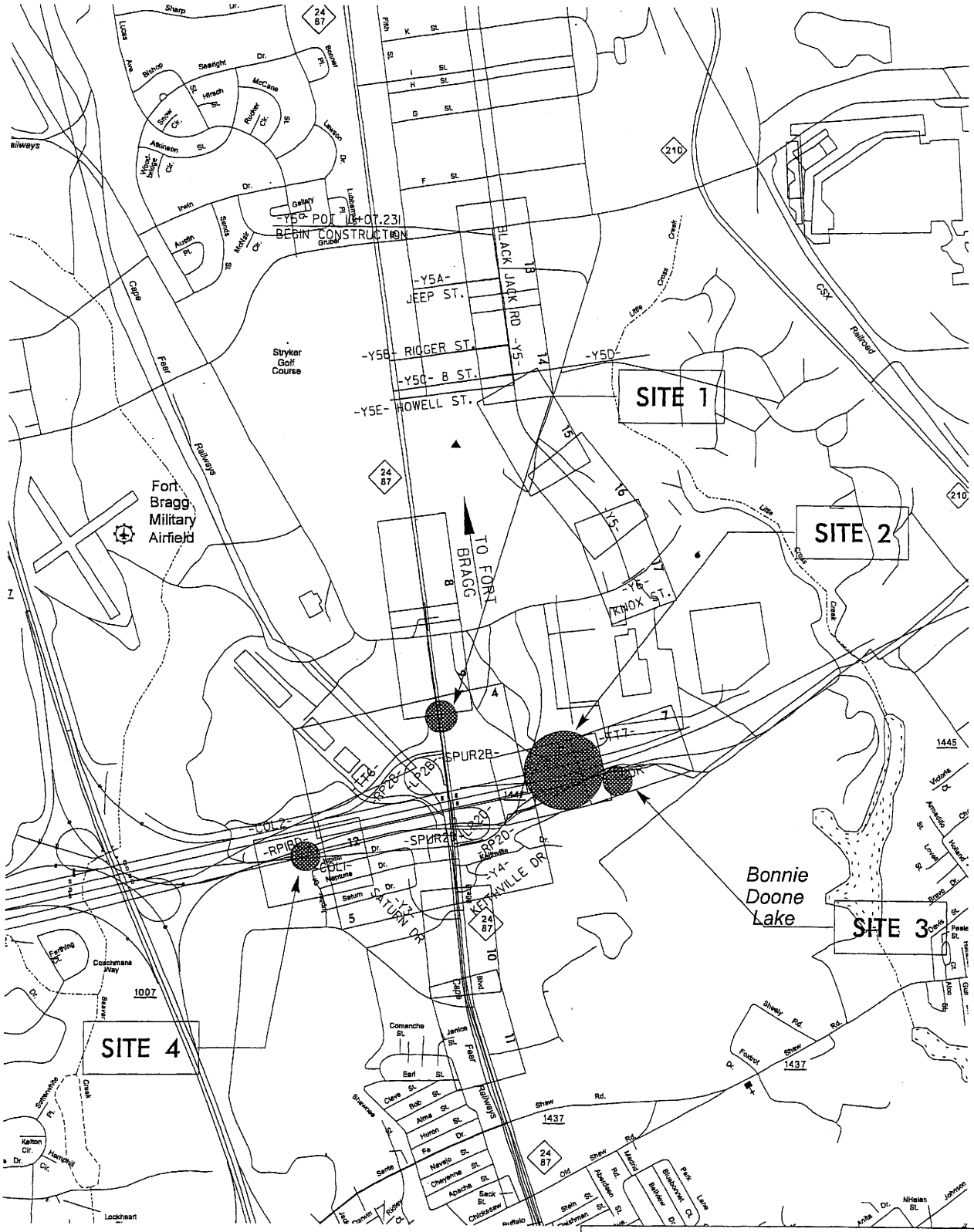
WETLAND IMPACT

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
PROJECT: 34817.1.2 (U-2519E)
FAYETTEVILLE OUTER LOOP
FROM WEST OF NC 24
TO EAST OF NC 24 (BRAGG BLVD)

SHEET ____ OF ____ 12/7/07

Permit Drawing
Sheet 1 of 29



PLAN VIEW

WETLAND/STREAM IMPACTS

Permit Drawing
Sheet 2 of 29

NCDOT

DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 34817.1.2 (U-2519E)
FAYETTEVILLE OUTER LOOP
FROM EST OF NC 24
TO EAST OF NC 24 (BRAGG BLVD)

SHEET OF 12/7/07

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	FORT BRAGG MILITARY RESERVATION	
9A	DON BROADWELL	P.O. BOX 53587 FAYETTEVILLE, NC 28305
911	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	

NCDOT

DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

PROJECT: 34817.1.2 (U-2519E)

FAYETTEVILLE OUTER LOOP

FROM WEST OF NC 24

TO EAST OF NC 24

SHEET OF 12/7/07

Permit Drawing
Sheet 3 of 29

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS			
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Natural Stream Design (ft)
1	13+80 -Y1-	24" RCP	0.07			0.03					
2	45+20-47+40-L-	1 @ 8' x 7' RCBC	0.95		0.02	0.11		0.27		886	
3	48+00 -CDR- RT	NA	0.20			0.05					
4	35+60 -COL1-	NA	0.28			0.01					
TOTALS:			1.49		0.02	0.19		0.27		886	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
WBS - 34817.1.2 (U-2519E)

SHEET 12/7/2007

JMD Revised 2/03/05

Permit Drawing
Sheet 4 of 20

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS			
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Natural Stream Design (m)
1	13+80 -Y2-	600 RCP	0.028			0.011					
2	45+20-47+40-L-	2.4m x 2.1m RCBC	0.384		0.013	0.043		0.108		270	
3	48+00 -CDR- RT	NA	0.079			0.019					
4	35+60 -COL1-	NA	0.113			0.003					
TOTALS:			0.604		0.013	0.075		0.108		270	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

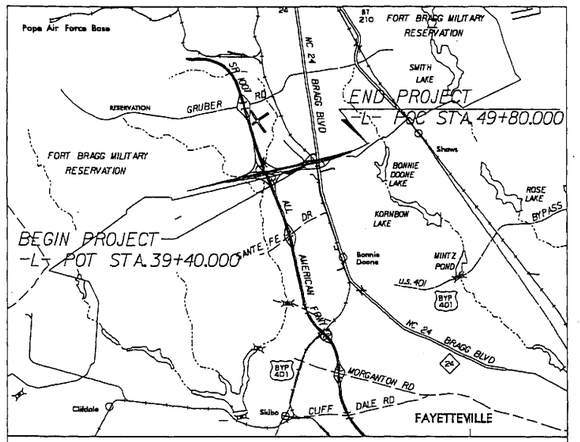
CUMBERLAND COUNTY
WBS - 34817.1.2 (U-2519E)

SHEET 12/7/2007

JMD Revised 2/03/05

Permit Drawing
Sheet 5 of 29

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: FAYETTEVILLE OUTER LOOP FROM WEST OF NC 24 TO EAST OF NC 24 (BRAGG BOULEVARD)

TYPE OF WORK: GRADING, DRAINAGE, STRUCTURES, CULVERTS, PAVING, TRAFFIC SIGNALS, & SIGNING

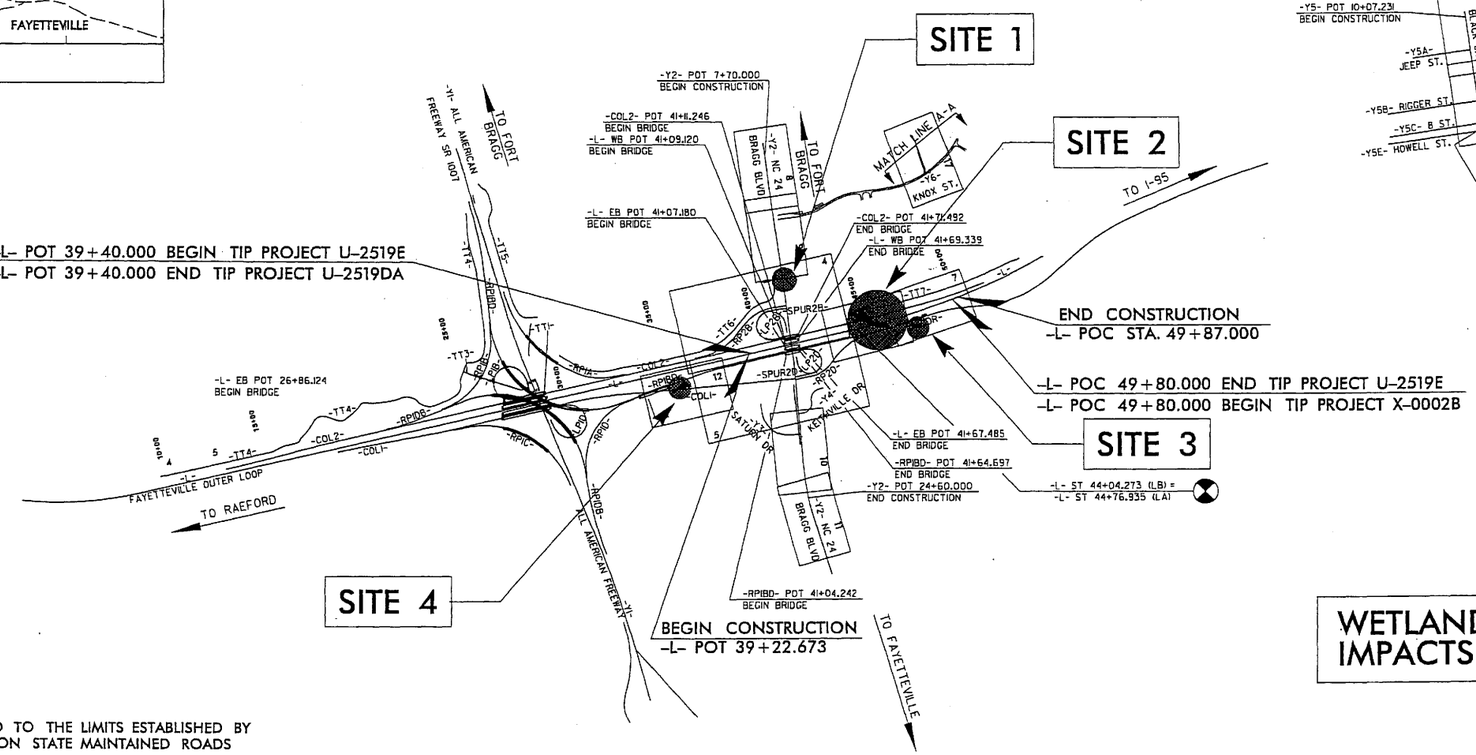
METRIC

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.	U-2519E	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.1.2	NHF-DPR-0100(001)	P.E.
34817.2.4	NHF-100(9)	R/W and Utilities

Permit Drawing
Sheet 6 of 29



WETLAND/STREAM IMPACTS

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II ON FORT BRAGG ROADS, METHOD III ON STATE MAINTAINED ROADS

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT: 34817.2.4

TIP PROJECT: U-2519E

FILE: $FILE$ DATE: $DATE$ $TIME$

GRAPHIC SCALE

5 0 10
PLANS

5 0 10
PROFILE (HORIZONTAL)

1 0 2
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 27300
ADT 2030 = 66200
DHV = 9 %
D = 55 %
T = 12 %
(DUALS 8 %, TTST 4 %)
V = 110 km/h

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519E	0.980	KM.
LENGTH STRUCTURES TIP PROJECT U-2519E	0.060	KM.
TOTAL LENGTH TIP PROJECT U-2519E	1.040	KM.

NOTE: EB LANE BRIDGE STATIONING USED TO DETERMINE LENGTH OF STRUCTURES

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607
PREPARED FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 26, 2006

LETTING DATE: NOV 18, 2008

NCDOT CONTACT:

DENNIS J. MORY, P.E.
PROJECT ENGINEER

HENRY W. BARE
PROJECT DESIGN ENGINEER

CATHY S. HOUSER, P.E.
DESIGN SERVICES - PROJECT ENGINEER

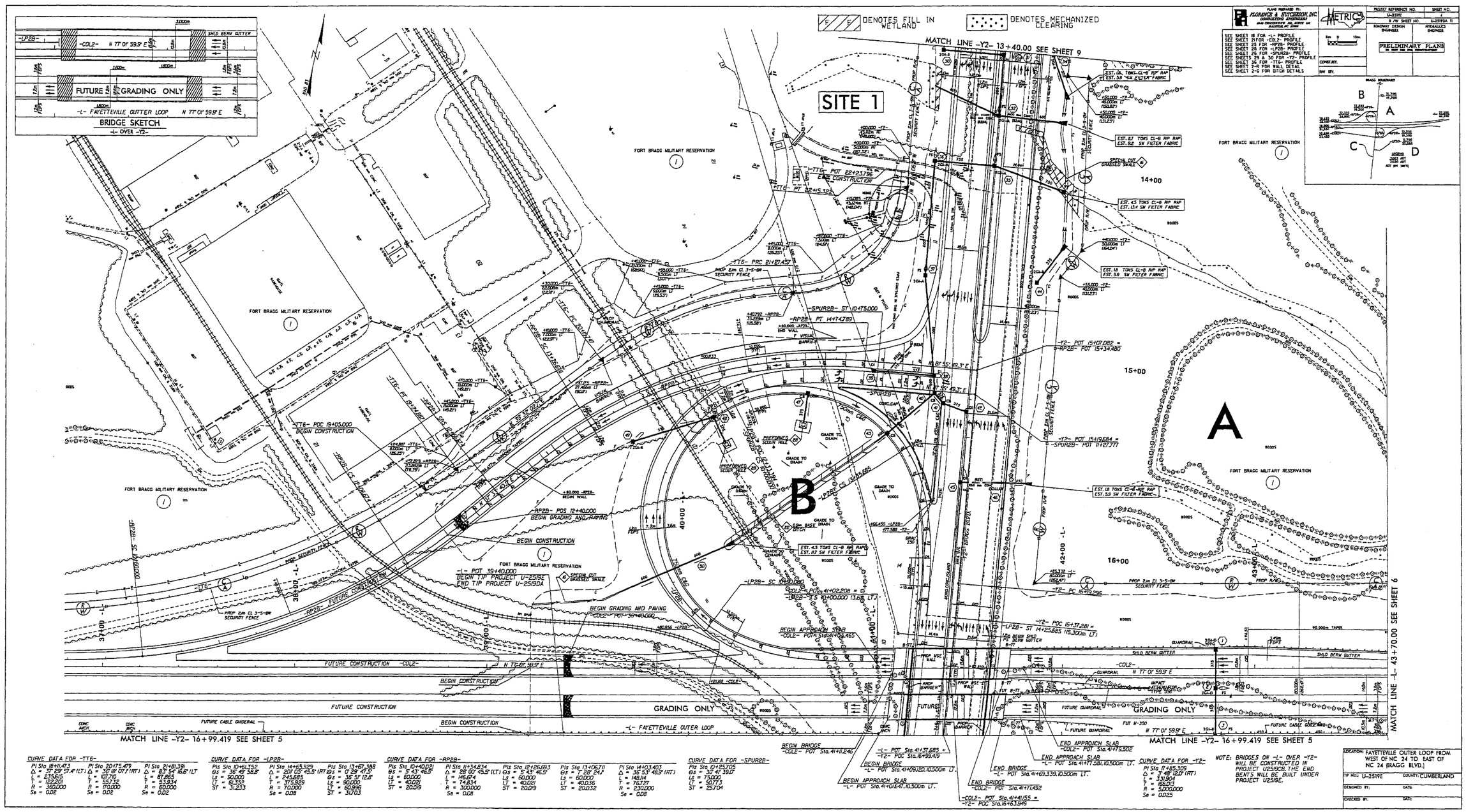
HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN
SIGNATURE: P.E.

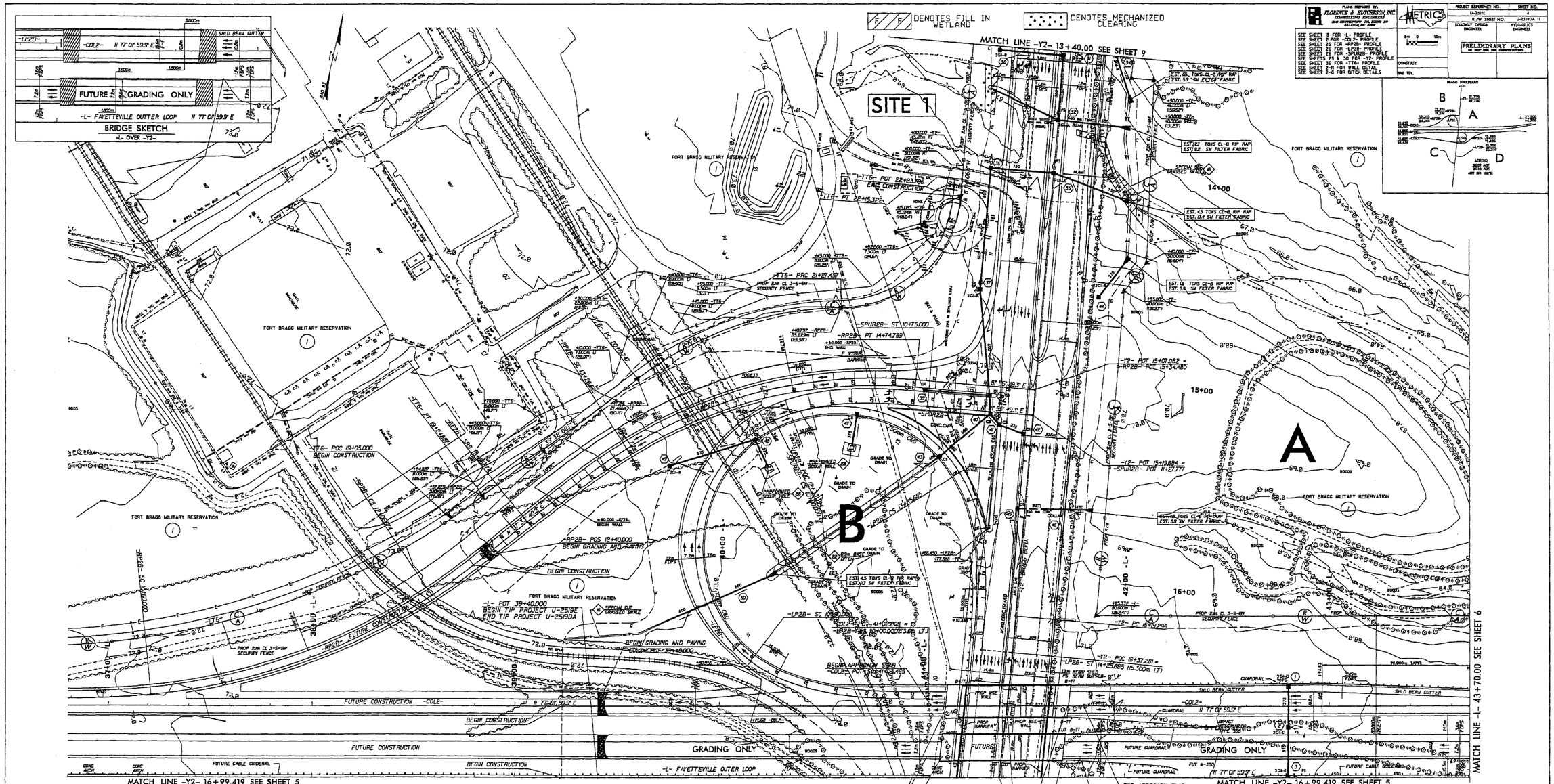
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

Permit Drawing
Sheet 7 of 29



Permit Drawing
Sheet 8 of 29



CURVE DATA FOR -TT6-

PI Sta 18+14.413	PI Sta 20+75.479	PI Sta 21+81.391
Δ = 37° 29' 57.4" (LT)	Δ = 36° 18' 07.1" (RT)	Δ = 83° 54' 16.6" (LT)
L = 235.615	L = 197.70	L = 87.665
T = 122.200	L = 557.32	T = 53.934
R = 360.000	R = 170.000	R = 60.000
Se = 0.02	Se = 0.02	Se = 0.02

CURVE DATA FOR -LP2B-

PI Sta (D46)+35.2	PI Sta 14+65.929	PI Sta 13+67.388
Δ = 36° 49' 58.8"	Δ = 201° 05' 45.5" (LT)	Δ = 0° 29' 41.5"
L = 60.552	L = 245.685	Θs = 36° 37' 12.8"
T = 31.233	T = 377.929	Ls = 90.000
ST = 31.233	R = 70.000	LT = 60.996
	Se = 0.08	ST = 31.703

CURVE DATA FOR -RP2B-

Pis Sta 10+40.021	PI Sta 11+34.834	PI Sta 12+26.693	PI Sta 13+06.711	PI Sta 14+03.403
Θs = 5° 43' 46.5"	Δ = 28° 00' 45.5" (LT)	Θs = 5° 43' 46.5"	Θs = 7° 28' 24.7"	Δ = 36° 53' 48.3" (RT)
Ls = 60.000	L = 146.614	Ls = 60.000	Ls = 60.000	L = 148.164
LT = 40.021	T = 74.834	LT = 40.021	LT = 40.036	T = 76.197
ST = 20.019	R = 300.000	ST = 20.019	ST = 20.032	R = 230.000
	Se = 0.08			Se = 0.08

CURVE DATA FOR -SPUR2B-

Pis Sta 10+25.705
Θs = 30° 41' 39.1"
Ls = 75.000
LT = 50.773
ST = 25.704

CURVE DATA FOR -Y2-

Pi Sta (7)+85.309
Δ = 3° 48' 12.0" (RT)
L = 331.904
T = 166.03
R = 5,000.000
Sp = 0.025

NOTE: BRIDGES ON -L- OVER -Y2- WILL BE CONSTRUCTED IN PROJECT U2519CB. THE END BENT'S WILL BE BUILT UNDER PROJECT U2519E.

LOCATION: FAYETTEVILLE OUTER LOOP FROM WEST OF NC 24 TO EAST OF NC 24 (BRAGG BLVD.)
TIP NO.: U-2519E
COUNTY: CUMBERLAND
DESIGNED BY: DATE:
CHECKED BY: DATE:

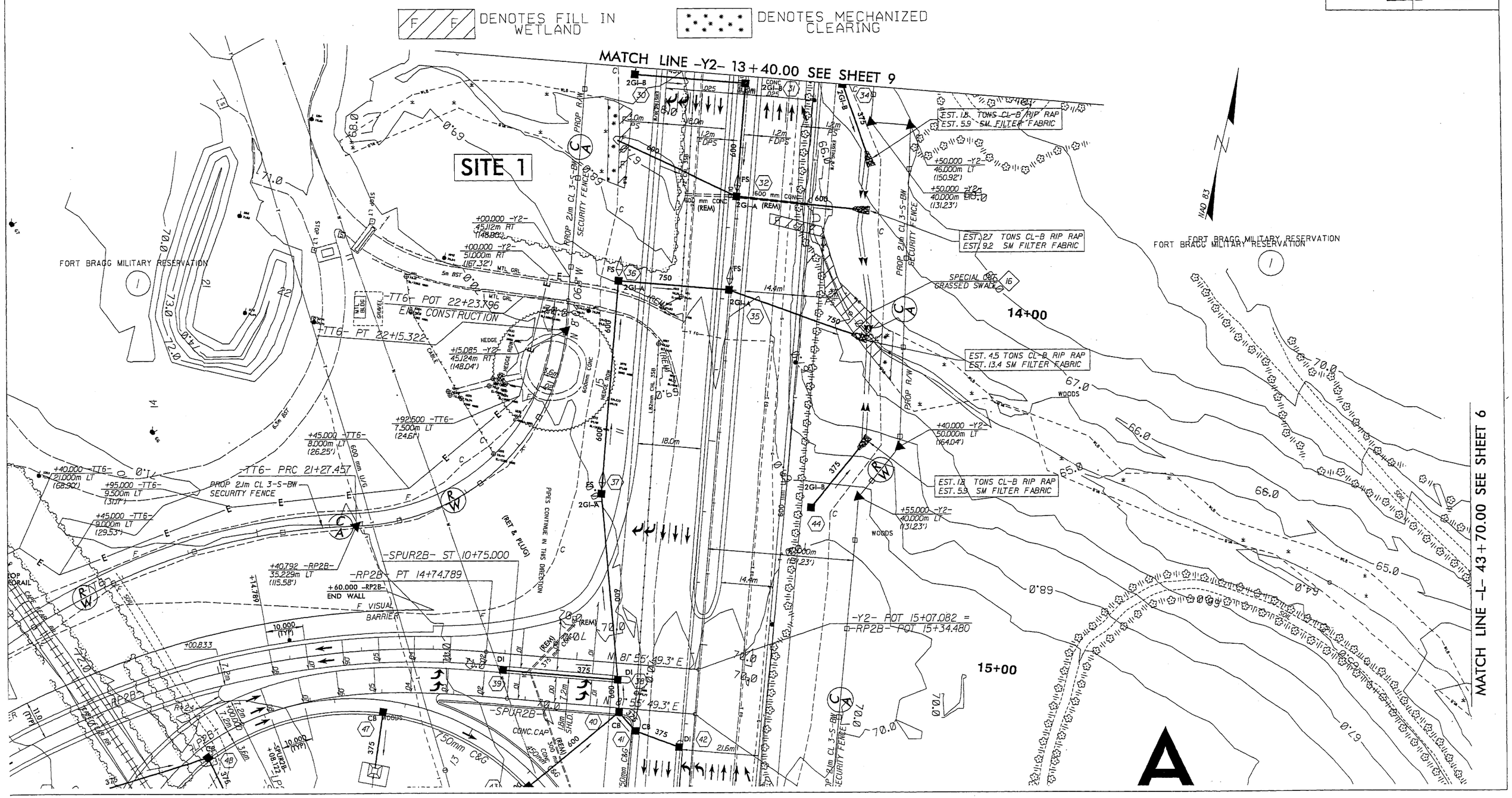
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	
R /W SHEET NO.	U-2519DA
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 9 of 29



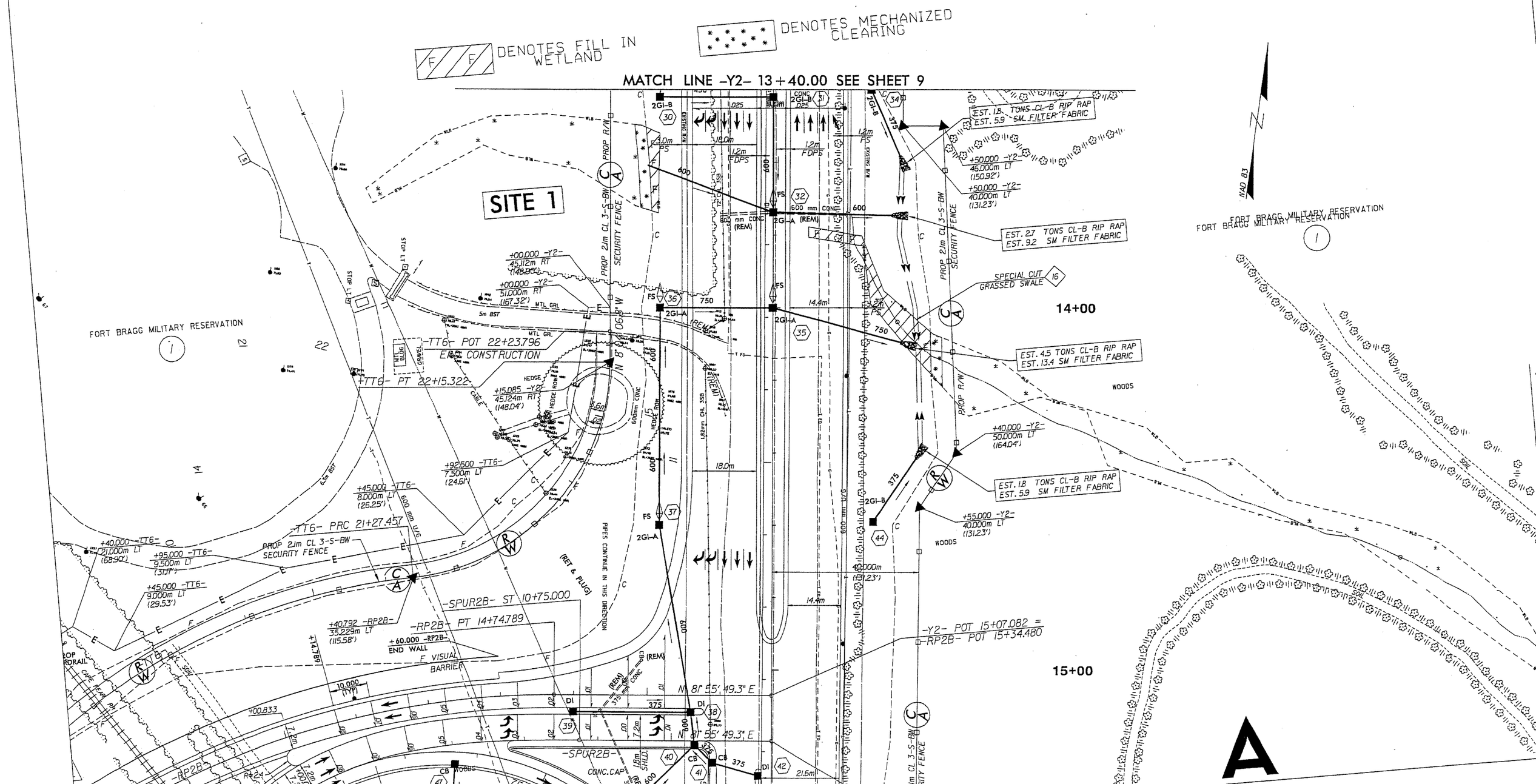
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
6540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	U-2519DA
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 10 of 29

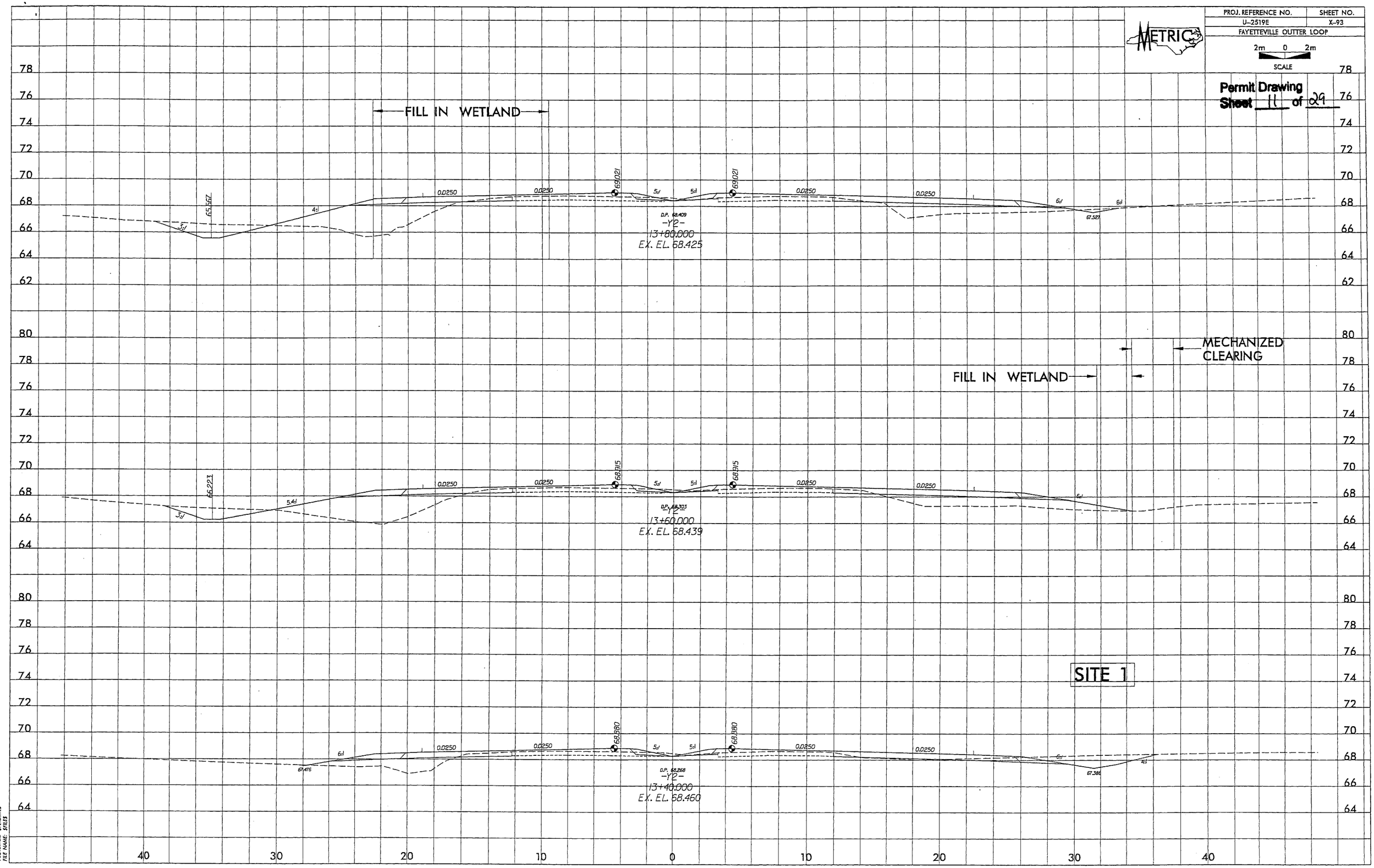


PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-93
FAYETTEVILLE OUTTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 11 of 29



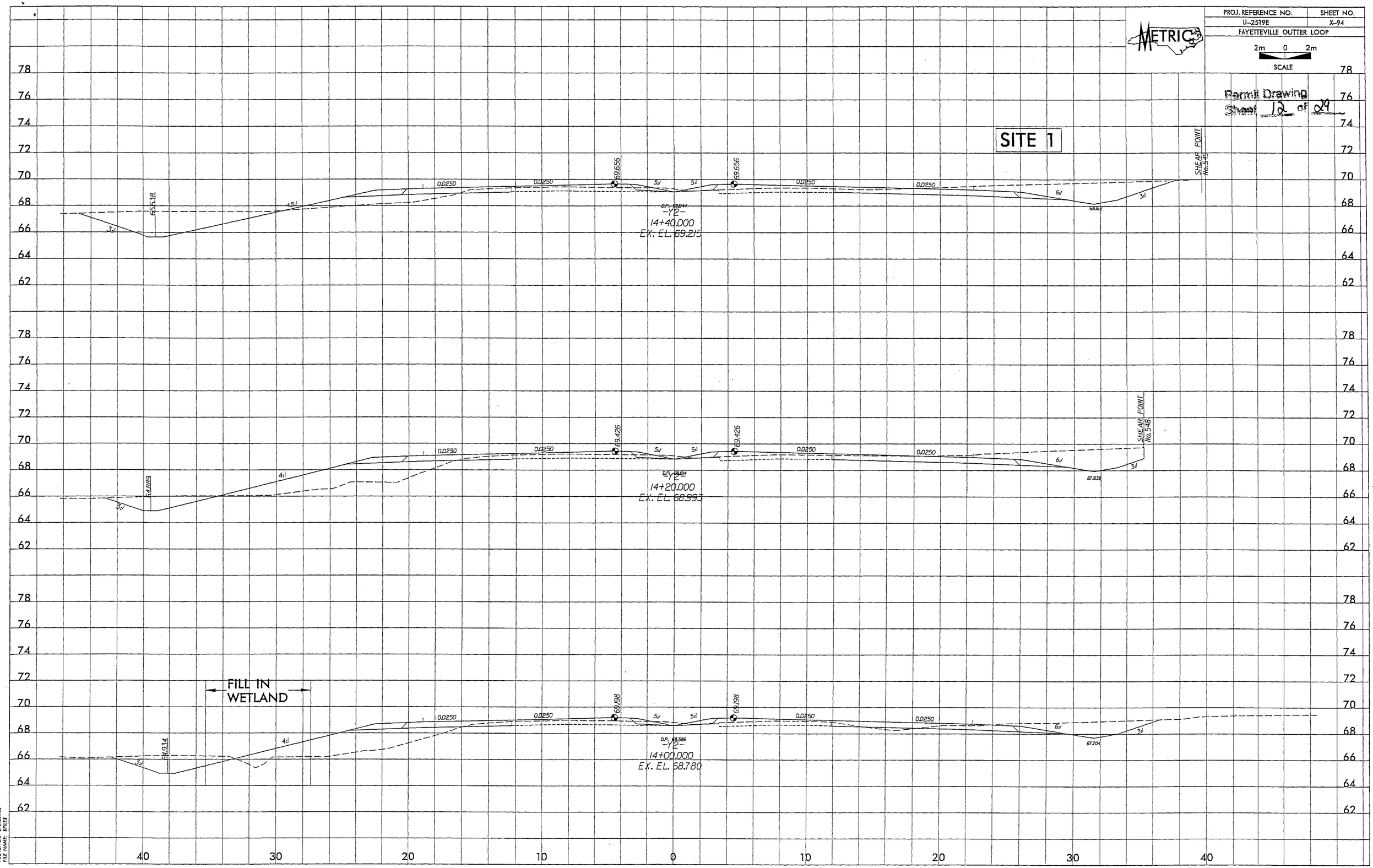
FENIABLE: SPENTBELS
PLOTDVER: SPLITDRYLS
FILE NAME: SFILES

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-94
FAYETTEVILLE OUTTER LOOP	

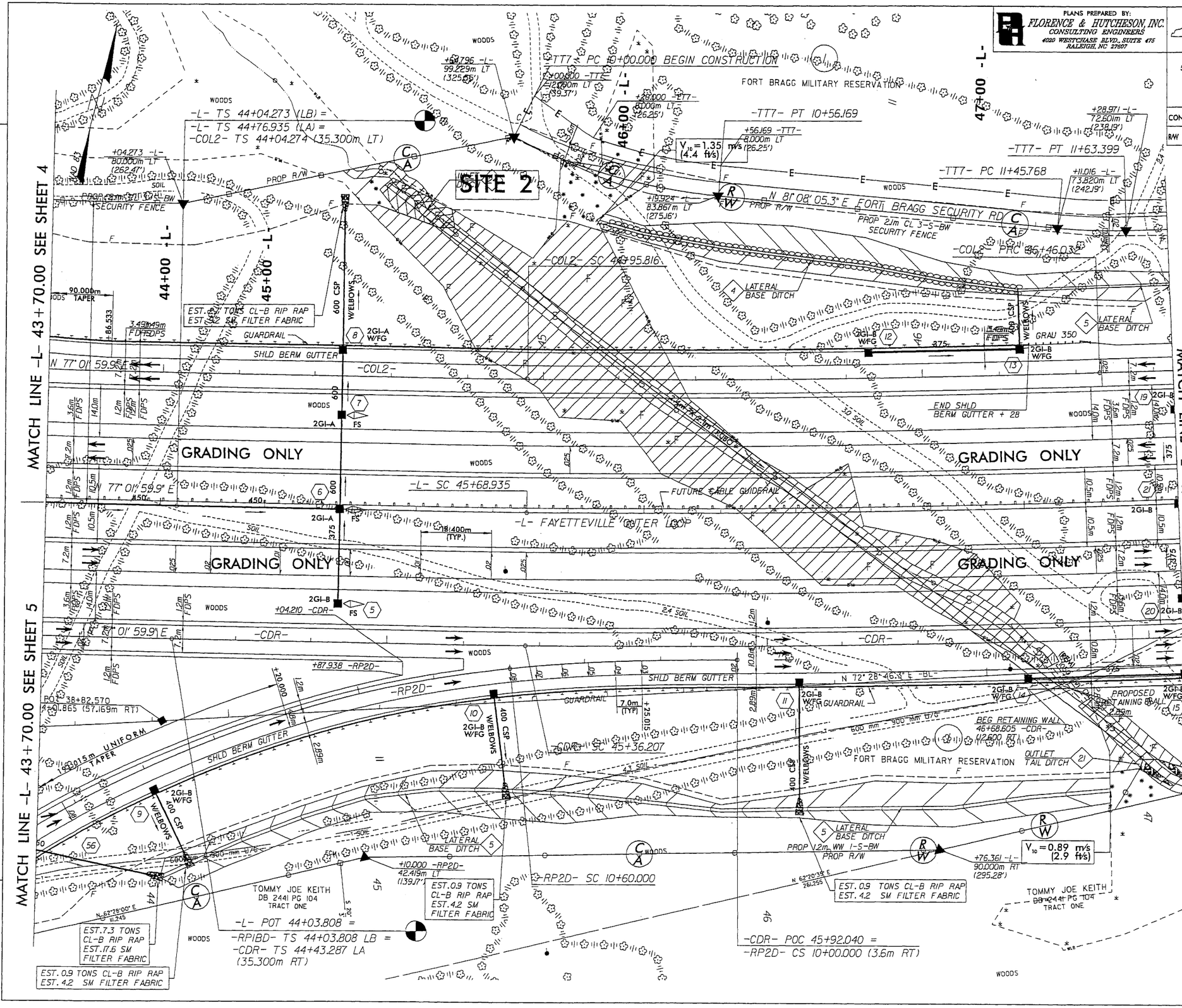
METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 12 of 29



USER: SMALES
PENTABLE: PENWIDE
PLOTDRIVER: $PLTDRV3
FILE NAME: $FILE3



PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	6
R/W SHEET NO.	U-2519DA 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 13 of 29

CONST. REV.
R/W REV.

REVISIONS

CURVE DATA FOR -L-

PIs Sta 45+38.269	PI Sta 50+03.492
Θs = 0° 45' 14.8"	Δ = 14° 10' 30.7" (LT)
Ls = 92.000	L = 864.676
LT = 61.334	T = 434.557
ST = 30.667	R = 3,495.000
	Se = 0.025

CURVE DATA FOR -L-

PIs Sta 54+64.278
Θs = 0° 45' 14.8"
Ls = 92.000
LT = 61.334
ST = 30.667

CURVE DATA FOR -CDR-

PIs Sta 45+05.234	PI Sta 46+72.075
Θs = 0° 45' 14.5"	Δ = 4° 24' 28.9" (LT)
Ls = 92.920	L = 271.603
LT = 61.947	T = 135.868
ST = 30.974	R = 3,530.300
	Se = 0.02

CURVE DATA FOR -COL2-

PIs Sta 44+65.302	PI Sta 45+70.936
Θs = 0° 45' 28.8"	Δ = 2° 29' 15.8" (LT)
Ls = 91.542	L = 150.216
LT = 61.029	T = 75.120
ST = 30.515	R = 3,459.700
	Se = 0.025

CURVE DATA FOR -COL2-

PI Sta 47+06.710	PI Sta 49+21.674
Δ = 1° 44' 17.4" (RT)	Δ = 8° 49' 22.8" (LT)
L = 121.347	L = 307.981
T = 60.678	T = 154.295
R = 4,000.000	R = 2,000.000
Se = 0.025	Se = 0.025

CURVE DATA FOR -RP2D-

PIs Sta 10+40.021	PI Sta 11+30.322
Θs = 5° 43' 46.5"	Δ = 26° 23' 05.0" (LT)
Ls = 60.000	L = 138.150
LT = 40.021	T = 70.322
ST = 20.019	R = 300.000
	Se = 0.08

CURVE DATA FOR -TT7-

PI Sta 10+28.417	PI Sta 11+54.594
Δ = 21° 27' 17.4" (LT)	Δ = 6° 44' 05.1" (LT)
L = 56.169	L = 17.632
T = 28.417	T = 8.826
R = 150.000	R = 150.000
Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

SEE SHEET 18 & 19 FOR -L- PROFILE
SEE SHEETS 21 & 22 FOR -COL2- PROFILE
SEE SHEET 24 FOR -CDR-&-RPIBD- PROFILE
SEE SHEET 27 FOR -RP2D- PROFILE
SEE SHEET 37 FOR -TT7- PROFILE
SEE SHEET 2-Q FOR WALL DETAIL
SEE SHEET 2-G FOR DITCH DETAILS

FILE: $FILEL$
DATE: $DATE$
PLOT TIME: $TIME$
PLOT DRIVER: $PLOTDRIVER$
PEN TABLE: $PENTABLE$

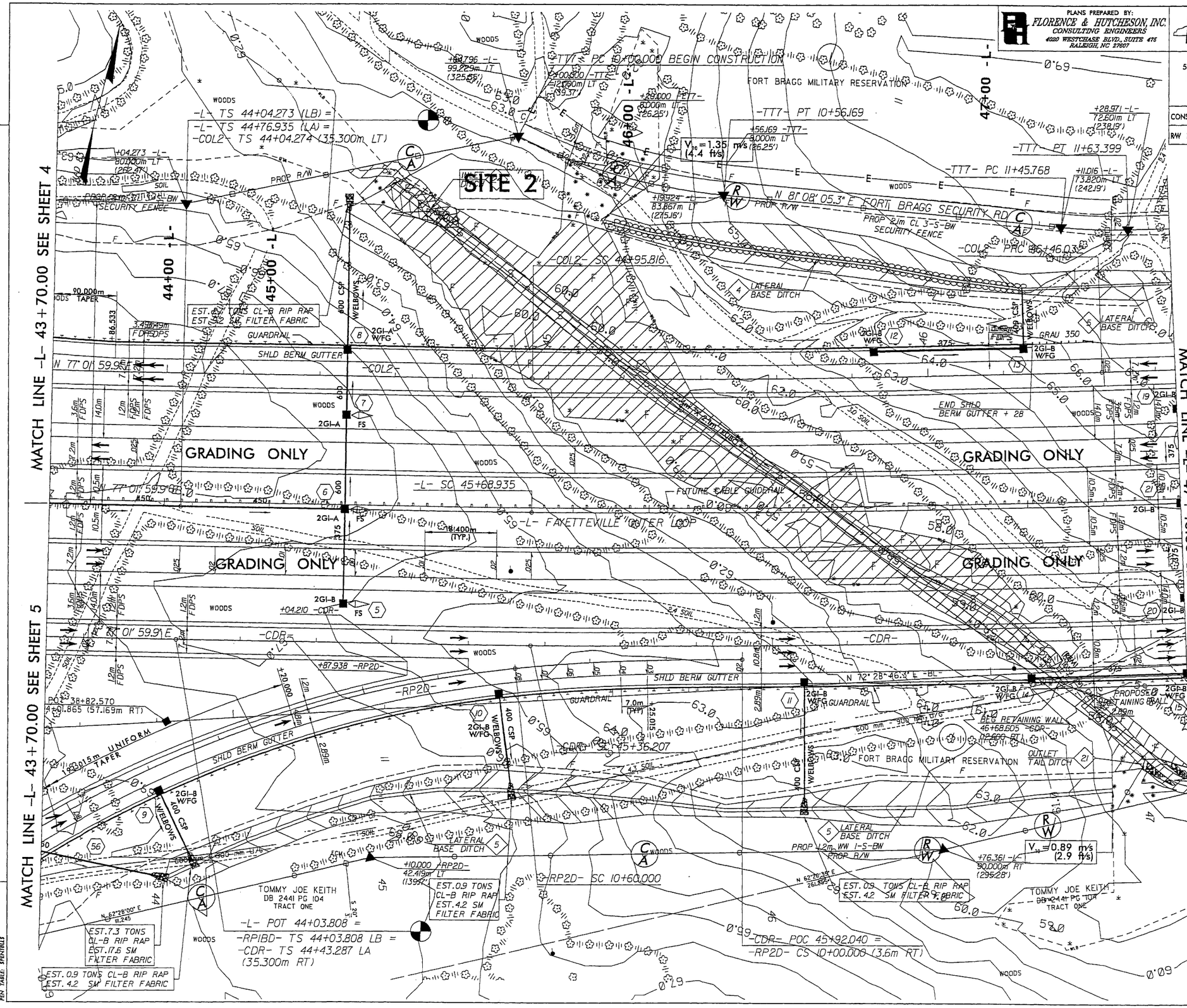
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	6
R/W SHEET NO.	U-2519DA 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 14 of 29

CONST.REV.
R/W REV.



CURVE DATA FOR -L-

PIs Sta 45+38.269	PI Sta 50+03.492
Θs = 0° 45' 14.8"	Δ = 14° 10' 30.7" (LT)
Ls = 92.000	L = 864.676
LT = 61.334	T = 434.557
ST = 30.667	R = 3,495.000
	Se = 0.025

CURVE DATA FOR -L-

PIs Sta 54+64.278
Θs = 0° 45' 14.8"
Ls = 92.000
LT = 61.334
ST = 30.667

CURVE DATA FOR -CDR-

PIs Sta 45+05.234	PI Sta 46+72.075
Θs = 0° 45' 14.5"	Δ = 4° 24' 28.9" (LT)
Ls = 92.920	L = 271.603
LT = 61.947	T = 135.868
ST = 30.974	R = 3,530.300
	Se = 0.02

CURVE DATA FOR -COL2-

PIs Sta 44+65.302	PI Sta 45+70.936
Θs = 0° 45' 28.8"	Δ = 2° 29' 15.8" (LT)
Ls = 91.542	L = 150.216
LT = 61.029	T = 75.120
ST = 30.515	R = 3,459.700
	Se = 0.025

CURVE DATA FOR -COL2-

PI Sta 47+06.710	PI Sta 49+21.674
Δ = 1° 44' 17.4" (RT)	Δ = 8° 49' 22.8" (LT)
L = 121.347	L = 307.981
T = 60.678	T = 154.295
R = 4,000.000	R = 2,000.000
Se = 0.025	Se = 0.025

CURVE DATA FOR -RP2D-

PIs Sta 10+40.021	PI Sta 11+30.322
Θs = 5° 43' 46.5"	Δ = 26° 23' 05.0" (LT)
Ls = 60.000	L = 138.150
LT = 40.021	T = 70.322
ST = 20.019	R = 300.000
	Se = 0.08

CURVE DATA FOR -TT7-

PI Sta 10+28.417	PI Sta 11+54.594
Δ = 21° 27' 17.4" (LT)	Δ = 6° 44' 05.1" (LT)
L = 56.169	L = 17.632
T = 28.417	T = 8.826
R = 150.000	R = 150.000
Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

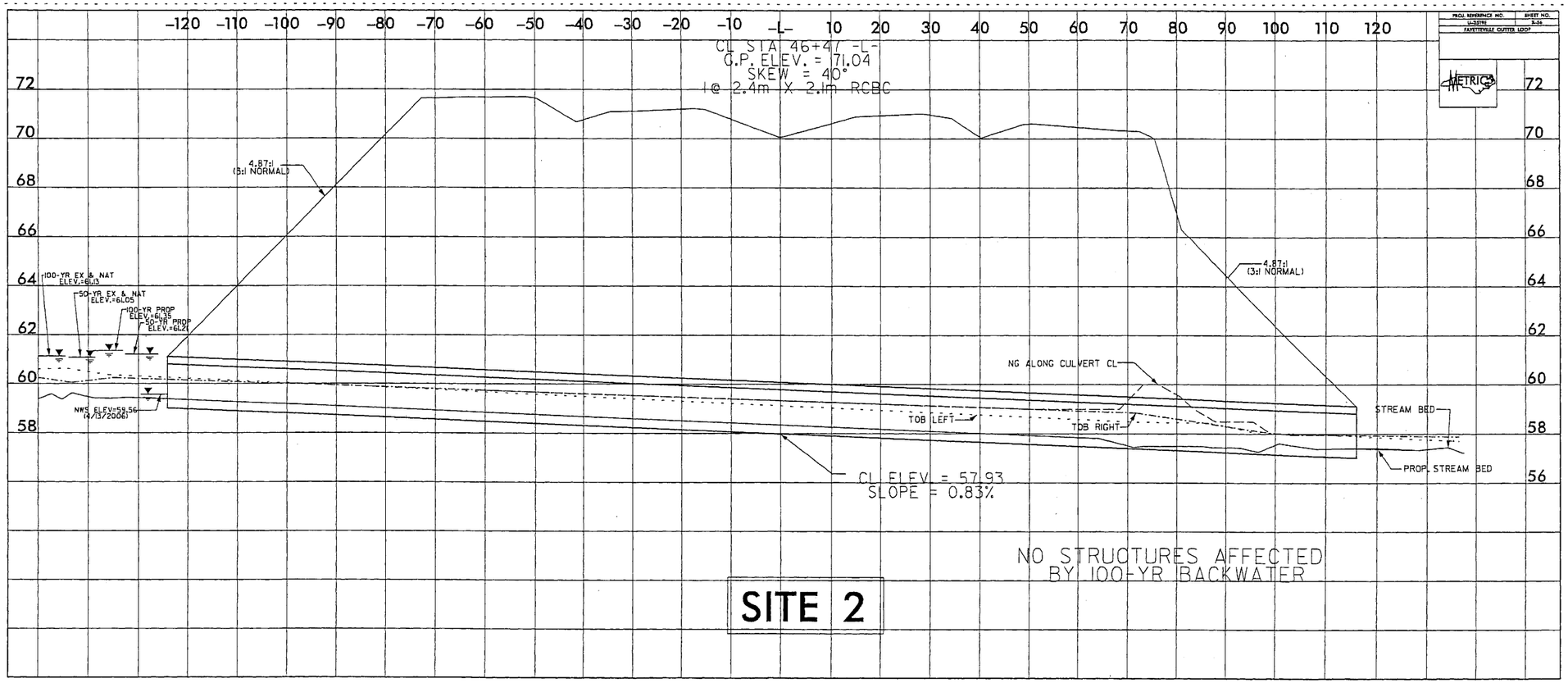
DENOTES MECHANIZED CLEARING

SEE SHEET 18 & 19 FOR -L- PROFILE
SEE SHEETS 21 & 22 FOR -COL2- PROFILE
SEE SHEET 24 FOR -CDR-&-RPIBD- PROFILE
SEE SHEET 27 FOR -RP2D- PROFILE
SEE SHEET 37 FOR -TT7- PROFILE
SEE SHEET 2-Q FOR WALL DETAIL
SEE SHEET 2-G FOR DITCH DETAILS

REVISIONS

FILE: $FILEL
DATE: $DATE$
PLOT DRIVER: $PLOTDRVR
PLOT TABLE: $PENTABLE

Permit Drawing
Sheet 15 of 29



CULVERT DATA SUMMARY		
DESIGN DISCHARGE	=	10.19 CMS
DESIGN FREQUENCY	=	50 YRS
DESIGN HIGH WATER	=	61.40 m
100 YR DISCHARGE	=	11.33 CMS
100 YR FREQUENCY	=	100 YRS
100 YR HIGH WATER	=	61.54 m
OVERTOPPING FLOOD ELEV	=	67.40 m
FREQUENCY	=	500+ YRS
DISCHARGE	=	>1813 CMS

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

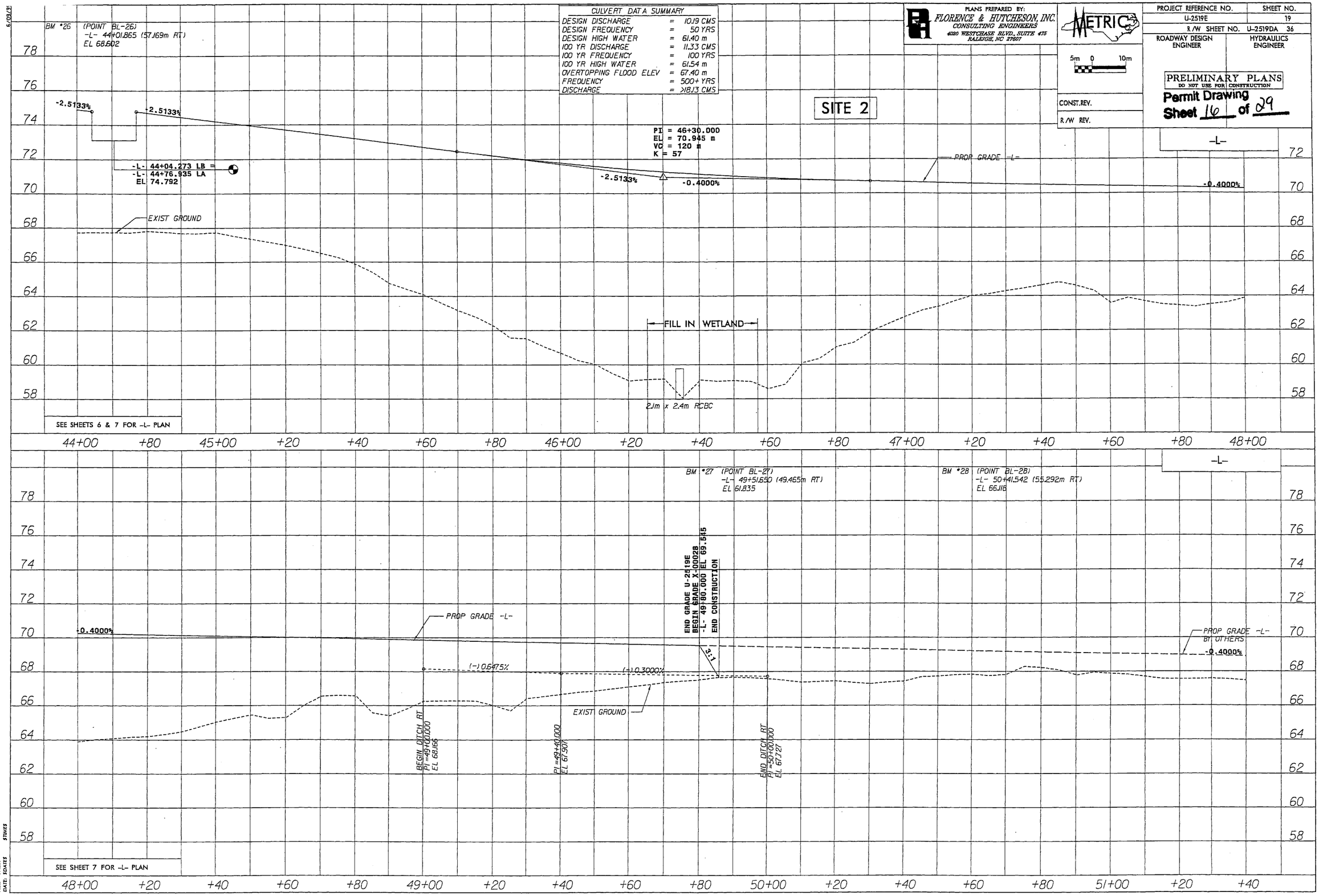
METRIC
5m 0 10m

CONST.REV.
R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	19
R/W SHEET NO.	U-2519DA 36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 16 of 29

SITE 2



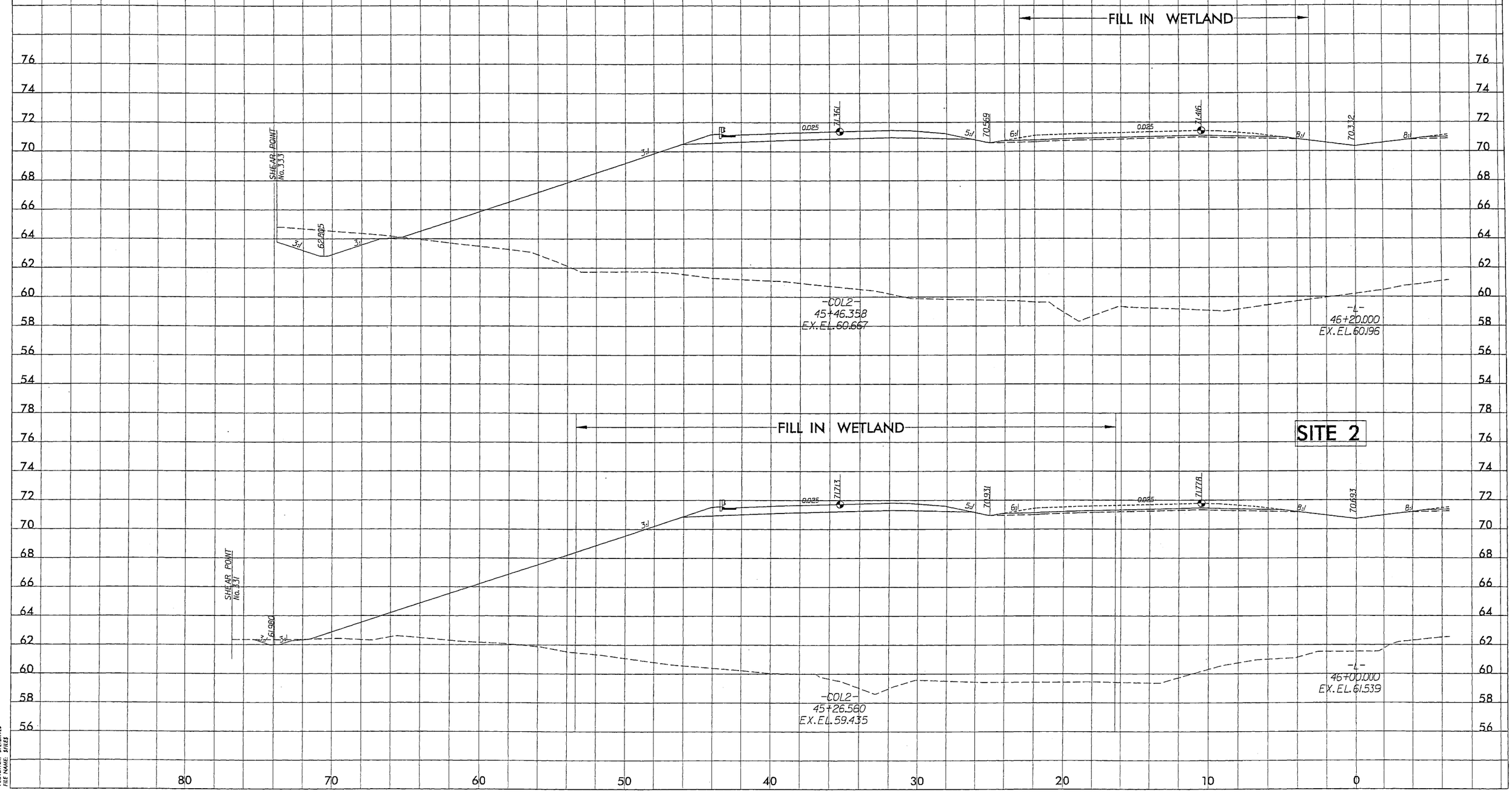
FILE: STILES
DATE: SDATES
STIMES

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-25
FAYETTEVILLE OUTTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 17 **of** 29



PENTABLE: SPRYBILLS
PLOTDRIVER: SPLTDRV15
FILE NAME: SP1.DGN

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-26

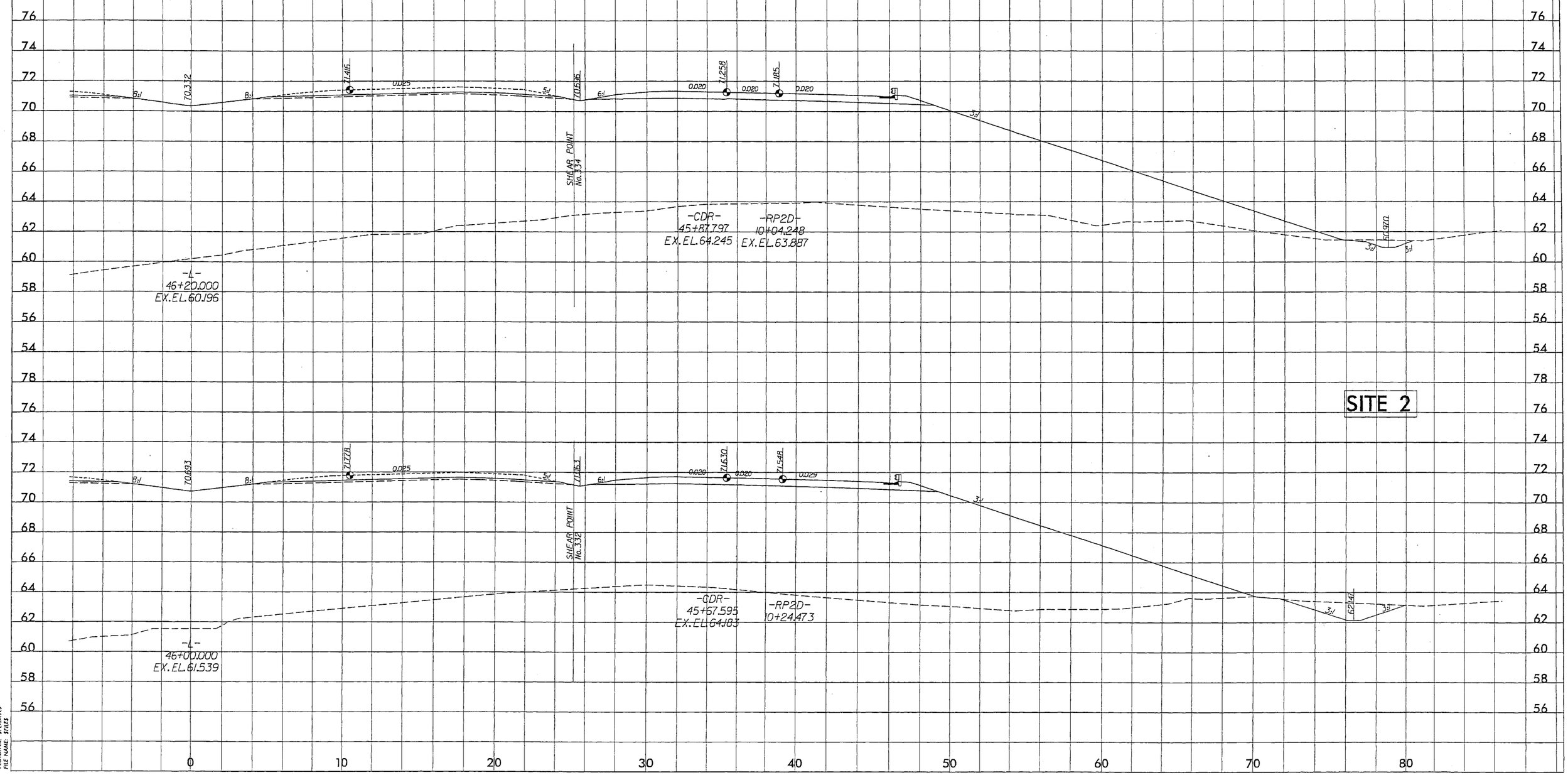
FAYETTEVILLE OUTTER LOOP

METRIC

2m 0 2m

SCALE

Permit Drawing
Sheet 18 of 29



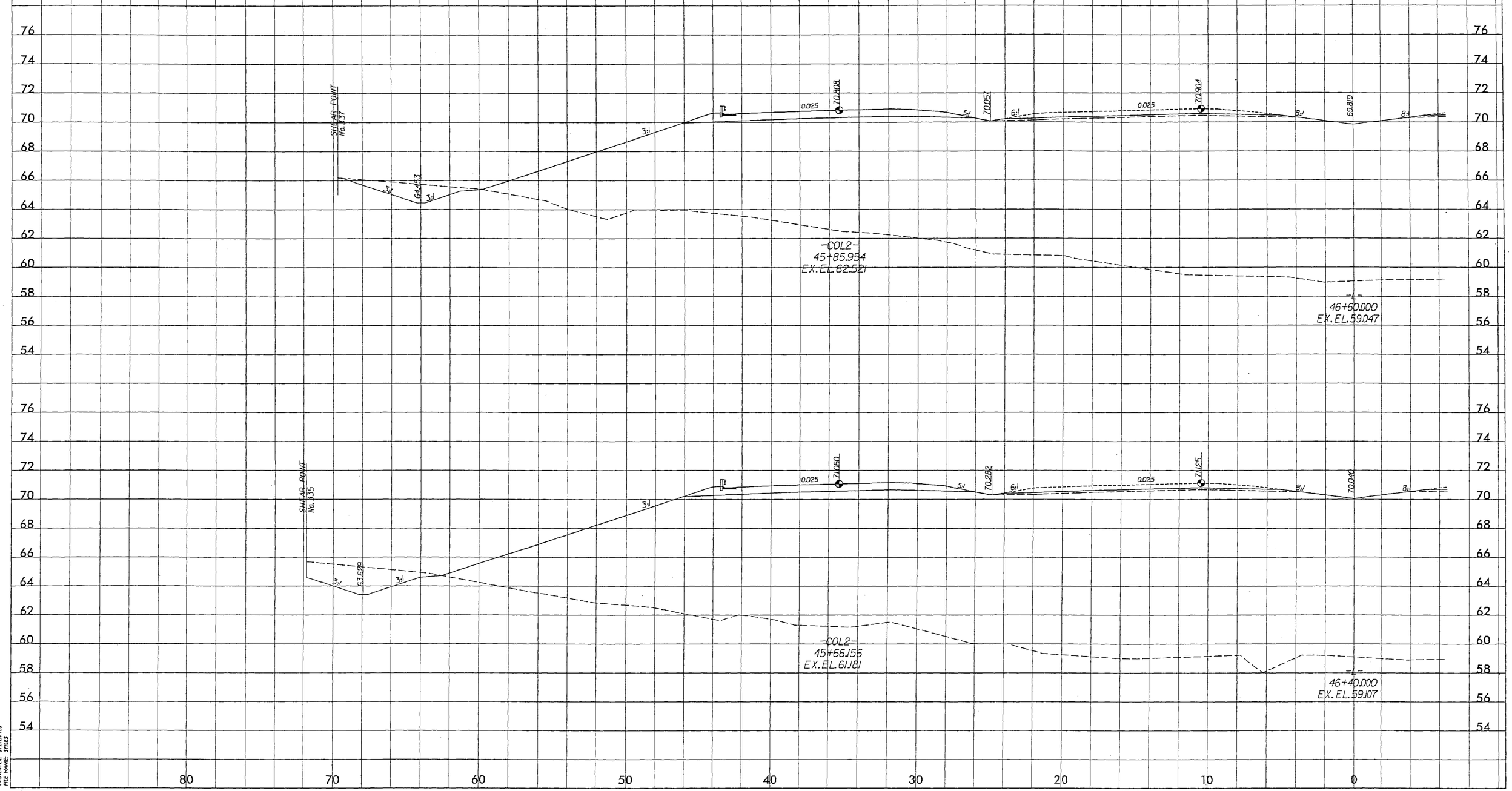
-L-

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-27
FAYETTEVILLE OUTTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 19 of 29



DATE: $DATE$
PENTABLE: $PENTABLE$
PLOTDRIVER: $PLOTDRVR$
FILE NAME: $FILES$

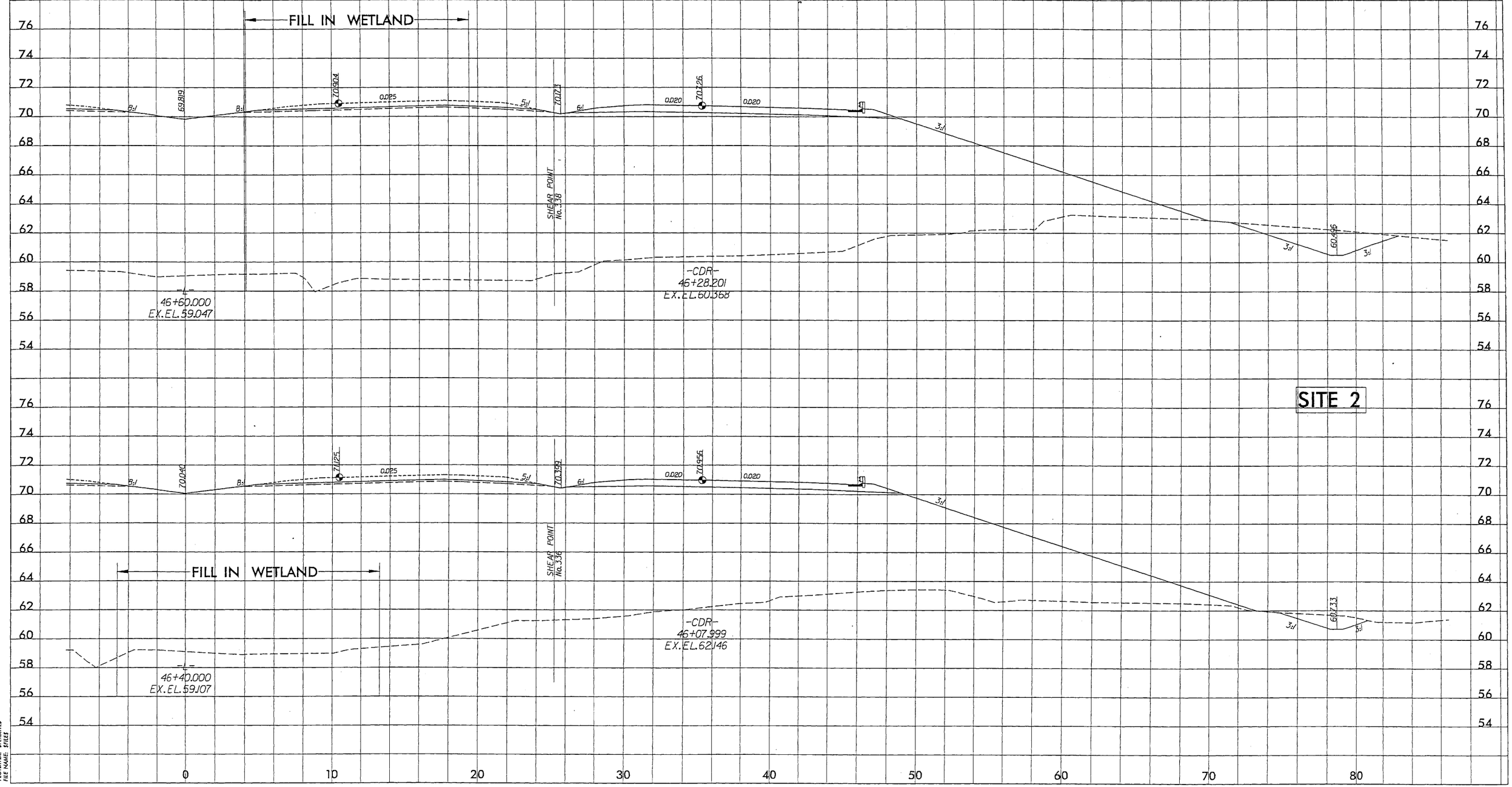
-L-

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-28
FAYETTEVILLE OUTER LOOP	

METRIC

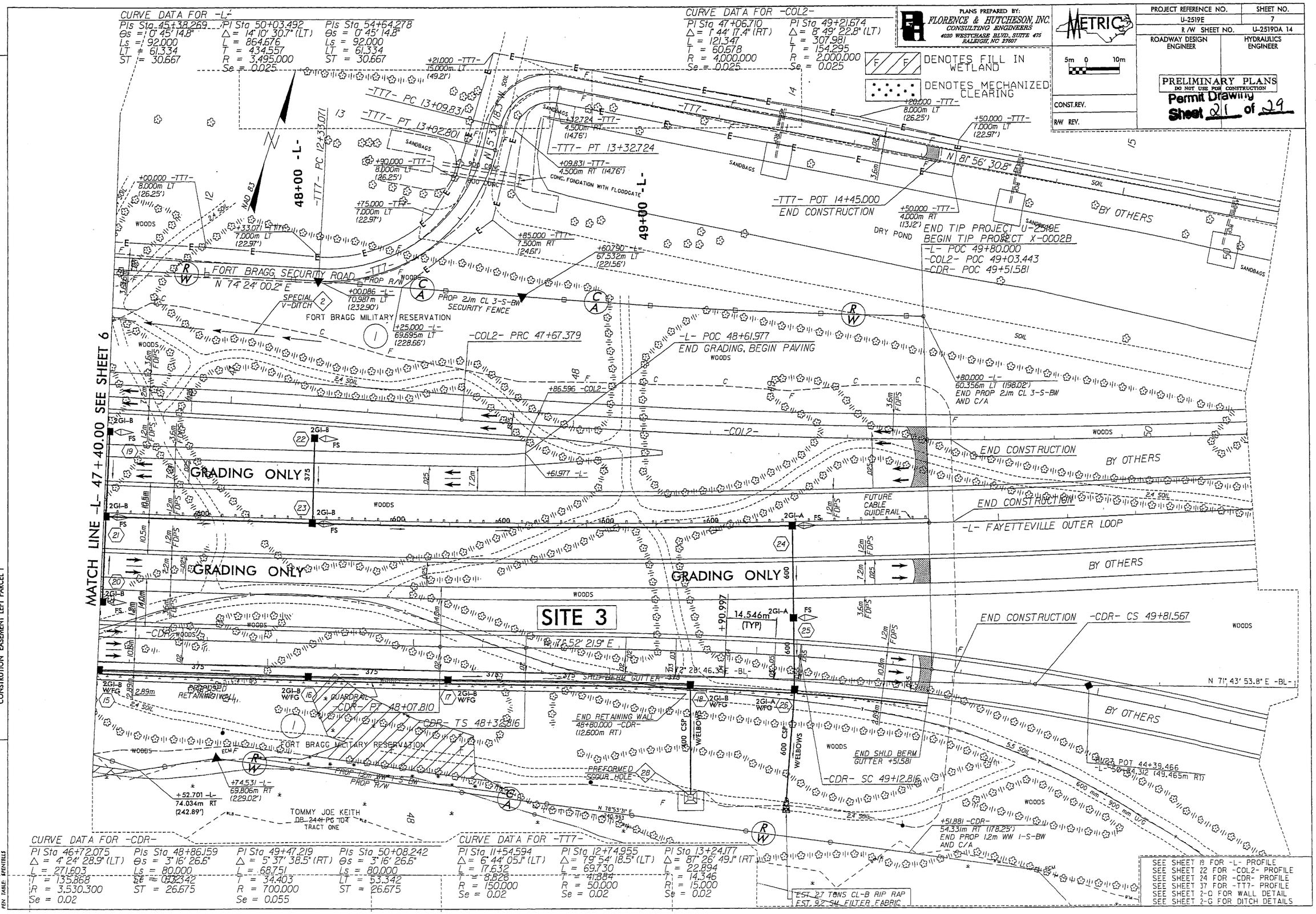
2m 0 2m
SCALE

Permit Drawing
Sheet 20 of 29



DATE: 5/24/15
PROJECT: SPENCER
PLOTDATE: 11/17/15
FILE NAME: SFILES

-L-


CURVE DATA FOR -L-
PIs Sta 45+38.269 Θs = 1° 45' 14.8" Ls = 92.000 LT = 61.334 ST = 30.667
PI Sta 50+03.492 Δ = 14° 10' 30.7" (LT) L = 864.676 T = 434.557 R = 3,495.000 Se = 0.025
PIs Sta 54+64.278 Θs = 0° 45' 14.8" Ls = 92.000 LT = 61.334 ST = 30.667
CURVE DATA FOR -COL2-
PI Sta 47+06.710 Δ = 1° 44' 17.4" (RT) L = 121.347 T = 60.678 R = 4,000.000 Se = 0.025
PI Sta 49+21.674 Δ = 8° 49' 22.8" (LT) L = 307.981 T = 154.295 R = 2,000.000 Se = 0.025
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607
METRIC
PROJECT REFERENCE NO. U-2519E
SHEET NO. 7
R/W SHEET NO. U-2519DA 14
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 21 of 29
CONST. REV.
R/W REV.
REVISIONS
110606 - REVISED RIGHT OF WAY (LEFT AND RIGHT) PARCEL 1 TO TIE TO ADJACENT PROJECT
22807 - REALIGNED -TT7-, REVISED RIGHT OF WAY LEFT & CONSTRUTION EASEMENT LEFT PARCEL 1
-TT7- PC 13+09.831
-TT7- PT 13+02.801
-TT7- PT 13+32.724
-TT7- POT 14+45.000
END CONSTRUCTION
N 81° 56' 30.8" E
BY OTHERS
END TIP PROJECT U-2519E
BEGIN TIP PROJECT X-0002B
-L- POC 49+80.000
-COL2- POC 49+03.443
-CDR- POC 49+51.581
FORT BRAGG SECURITY ROAD
N 74° 24' 00.2" E
FORT BRAGG MILITARY RESERVATION
PROP 2.1m CL 3-S-BW SECURITY FENCE
SPECIAL V-DITCH
-COL2- PRC 47+67.379
-L- POC 48+61.977
END GRADING, BEGIN PAVING
END PROP 2.1m CL 3-S-BW AND C/A
MATCH LINE -L- 47+40.00 SEE SHEET 6
GRADING ONLY
FUTURE CABLE GUIDERAIL
-L- FAYETTEVILLE OUTER LOOP
SITE 3
-CDR- CS 49+81.567
N 71° 43' 53.8" E -BL-
-CDR- PT 48+07.810
-CDR- TS 48+32.816
END RETAINING WALL 48+80.000 -CDR- (12.600m RT)
PREFORMED SCOUR HOLE
END SHLD BERM GUTTER +51.581
-CDR- SC 49+12.816
TOMMY JOE KEITH
DB 2441 PG 704
TRACT ONE
CURVE DATA FOR -CDR-
PI Sta 46+72.075 Δ = 4° 24' 28.9" (LT) L = 271.603 T = 135.868 R = 3,530.300 Se = 0.02
PIs Sta 48+86.159 Θs = 3° 16' 26.6" Ls = 80.000 LT = 53.342 ST = 26.675
PI Sta 49+47.219 Δ = 5° 37' 38.5" (RT) L = 68.751 T = 34.403 R = 700.000 Se = 0.055
PIs Sta 50+08.242 Θs = 3° 16' 26.6" Ls = 80.000 LT = 53.342 ST = 26.675
CURVE DATA FOR -TT7-
PI Sta 11+54.594 Δ = 6° 44' 05.1" (LT) L = 17.632 T = 8.826 R = 150.000 Se = 0.02
PI Sta 12+74.955 Δ = 79° 54' 18.5" (LT) L = 69.730 T = 41.884 R = 50.000 Se = 0.02
PI Sta 13+24.177 Δ = 87° 26' 49.1" (RT) L = 22.894 T = 14.346 R = 15.000 Se = 0.02
EST. 2.7 TONS CL-B RIP RAP
EST. 9.2 SY FILTER FABRIC
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 22 FOR -COL2- PROFILE
SEE SHEET 24 FOR -CDR- PROFILE
SEE SHEET 37 FOR -TT7- PROFILE
SEE SHEET 2-Q FOR WALL DETAIL
SEE SHEET 2-G FOR DITCH DETAILS
FILE: SFILES STIMES
DATE: SDATES
PLOT DRIVER: SPLTDRVRS
PEN TABLE: SPENTBLLS

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD. SUITE 475
RALEIGH, NC 27607

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	7
R/W SHEET NO.	U-2519DA 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 22 of 29

CONST.REV.
R/W REV.

5m 0 10m

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

CURVE DATA FOR -L-
PIs Sta 45+38.269
Θs = 1° 0' 45.8"
Ls = 92.000
LT = 61.334
ST = 30.667

PI Sta 50+03.498
Δ = 14° 18' 30.7" (LT)
L = 864.678
T = 434.557
R = 3,495.000
Se = 0.025

PIs Sta 54+64.278
Θs = 0° 45' 14.8"
Ls = 92.000
LT = 61.334
ST = 30.667

CURVE DATA FOR -COL2-
PI Sta 47+06.710
Δ = 1° 44' 17.4" (RT)
L = 121.347
T = 60.678
R = 4,000.000
Se = 0.025

PI Sta 49+21.674
Δ = 8° 49' 22.8" (LT)
L = 307.981
T = 154.295
R = 2,000.000
Se = 0.025

MATCH LINE -L- 47+40.00 SEE SHEET 6

SITE 3

-TT7- PC 13+09.83
-TT7- PT 13+02.801
-TT7- PT 13+32.724
-TT7- POT 14+45.000
END CONSTRUCTION
BEGIN TIP PROJECT X-0002B
END TIP PROJECT U-2519E
-L- POC 49+80.000
-COL2- POC 49+03.443
-CDR- POC 49+51.581
-COL2- PRC 47+67.379
-L- POC 48+61.977
END GRADING, BEGIN PAVING
END PROP 2Jm CL 3-S-BW AND C/A
END PROP 1.2m WW CL 3-S-BW AND C/A
FORT BRAGG SECURITY ROAD
N 74° 24' 00.2" E
FORT BRAGG MILITARY RESERVATION
SECURITY FENCE
SPECIAL V-DITCH
DRY POND
CONC. FONDATION WITH FLOODGATE
SANDBAGS
WOODS
SOIL
BY OTHERS
GRADING ONLY
FUTURE CABLE GUIDERAIL
-L- FAYETTEVILLE OUTER LOOP
END CONSTRUCTION -CDR- TS 49+81.567
END RETAINING WALL
48+86.000 -CDR-
(12.600m RT)
END SHLD BERM GUTTER +51.581
-CDR- SC 49+12.815
-CDR- PT 48+37.810
-CDR- TS 48+32.815
PROPOSED BERM WITH GUARDRAIL
PREFORMED SCOUR HOLE
TOMMY JOE KEITH
DB 2441 PG 104
TRACT ONE
N 71° 43' 53.8" E -BL-
N 78° 53' 31" E
S 71° 52' 21.9" E
S 28° 46' 35" E
14.546m (TYP)
+90.997
+51.881 -CDR-
54.331m RT (178.35')
END PROP 1.2m WW CL 3-S-BW AND C/A
POT 44+39.466
-50+84.312 (49.465m RT)
600 mm - 900 mm U/G
EST. 27 TONS CL-B RIP RAP
EST. 32 SY FILTER FABRIC

CURVE DATA FOR -CDR-
PI Sta 46+72.075
Δ = 4° 24' 28.9" (LT)
L = 271.603
T = 135.868
R = 3,530.300
Se = 0.02

PIs Sta 48+86.159
Θs = 3° 16' 26.6"
Ls = 80.000
LT = 133.342
ST = 26.675

PI Sta 49+47.219
Δ = 5° 37' 38.5" (RT)
L = 68.751
T = 34.403
R = 700.000
Se = 0.055

PIs Sta 50+08.242
Θs = 3° 16' 26.6"
Ls = 80.000
LT = 53.342
ST = 26.675

CURVE DATA FOR -TT7-
PI Sta 11+54.594
Δ = 6° 44' 05.1" (LT)
L = 17.632
T = 8.826
R = 150.000
Se = 0.02

PI Sta 12+74.955
Δ = 79° 54' 18.5" (LT)
L = 69.730
T = 41.884
R = 50.000
Se = 0.02

PI Sta 13+24.177
Δ = 87° 26' 49.1" (RT)
L = 22.894
T = 14.346
R = 15.000
Se = 0.02

SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 22 FOR -COL2- PROFILE
SEE SHEET 24 FOR -CDR- PROFILE
SEE SHEET 37 FOR -TT7- PROFILE
SEE SHEET 2-Q FOR WALL DETAIL
SEE SHEET 2-G FOR DITCH DETAILS

REVISIONS
110606 - REVISED RIGHT OF WAY (LEFT AND RIGHT) PARCEL 1 TO TIE TO ADJACENT PROJECT
212807 - REALIGNED -TT7- REVISED RIGHT OF WAY LEFT & CONSTRUTION EASEMENT LEFT PARCEL 1

FILE: $FILES $TIMES
DATE: $DATES
PLOT DRIVER: $PLOTDRVR
PEN TABLE: $PENTBLS

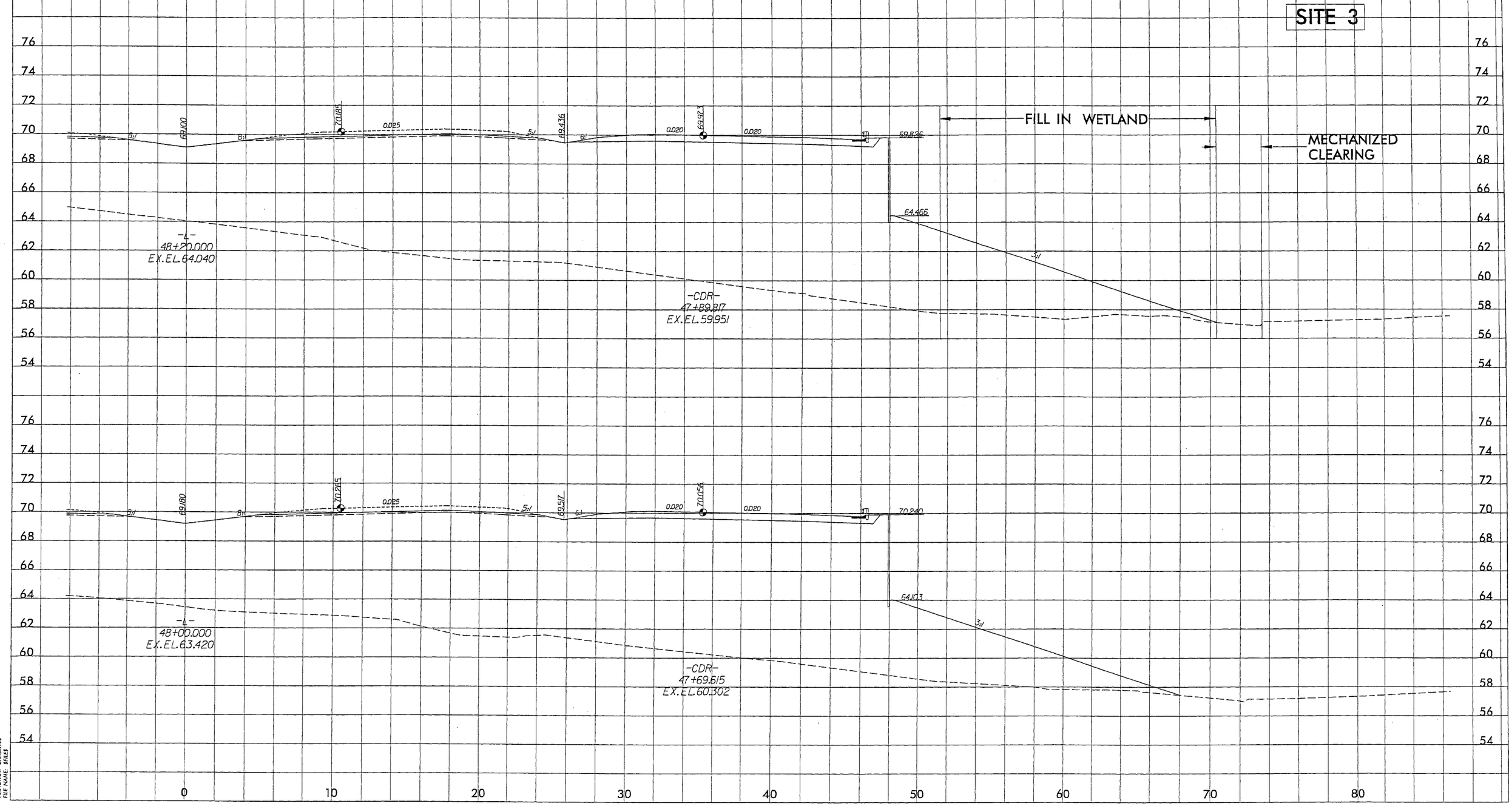
PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-36
FAYETTEVILLE OUTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 23 of 29

SITE 3



PENTABLE: STDTABLE
PLOTDRIVER: STDDRIVES
FILE NAME: STILES

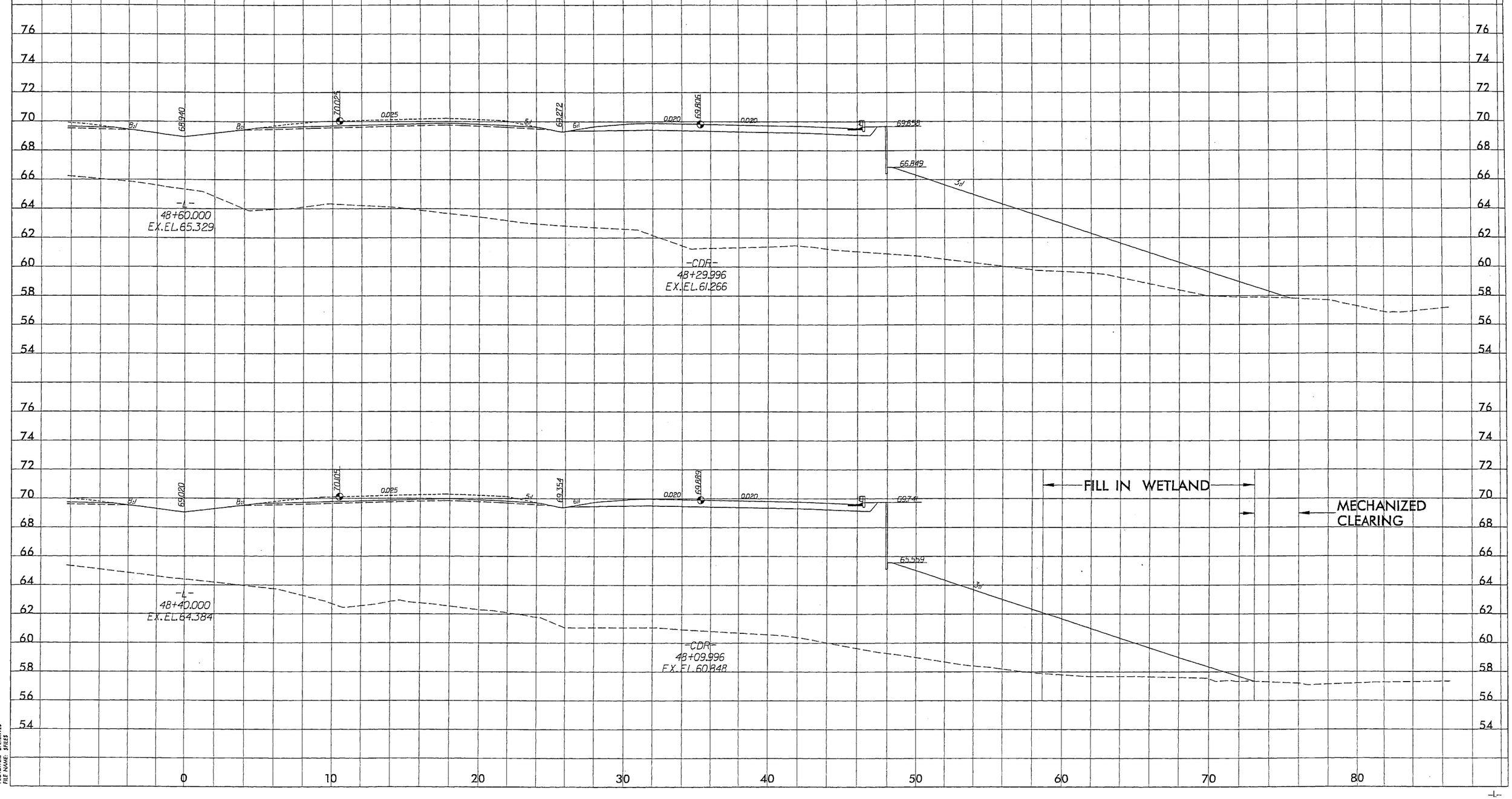
PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-38
FAYETTEVILLE OUTTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 24 of 29

SITE 3



PENDAME: $PENTBLS
PLOTTER: PT_TYPE
FILE NAME: $FILES

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	12
R/W SHEET NO.	U-2519DA 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

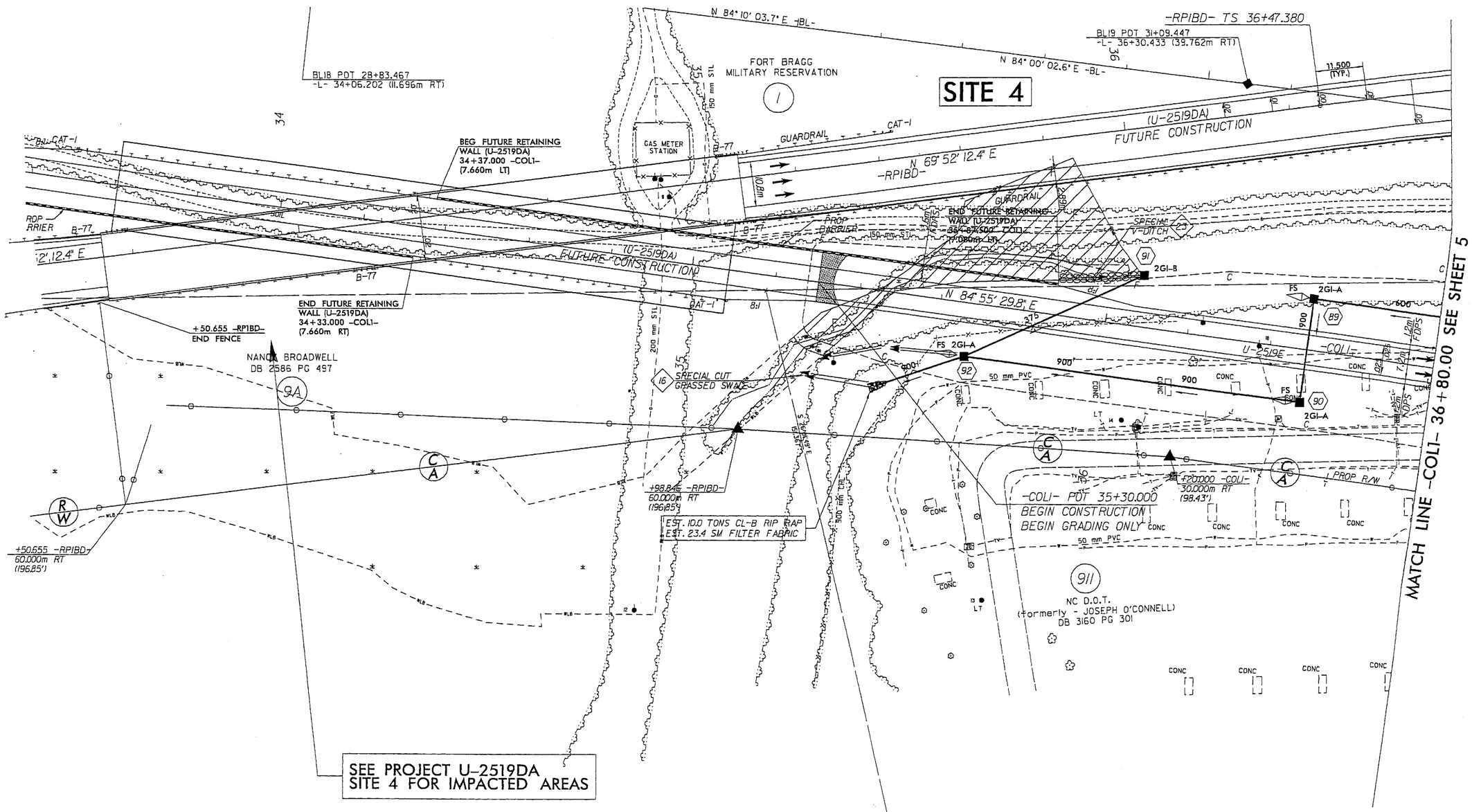
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 25 of 29

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



SEE SHEET 23 FOR -RPIBD- PROFILE
SEE SHEET 2-G FOR DITCH DETAILS

FILE: STIKES
DATE: SDATES STIMES
PLOT DRIVER: SPLITDRVLS
PEN TABLE: SPENTBLLS

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	12
R/W SHEET NO.	U-2519DA 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

CONST.REV.

R/W REV.

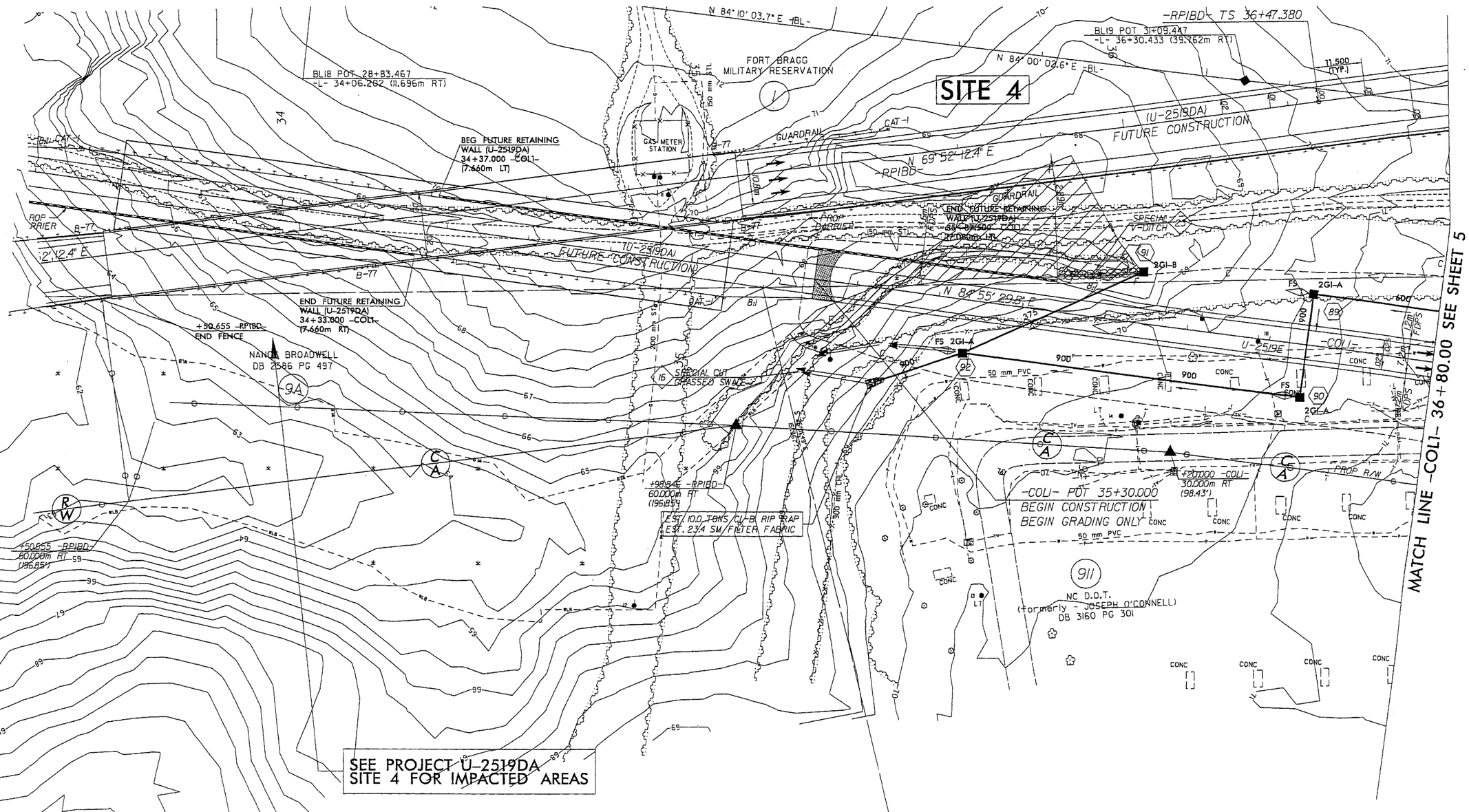
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 26 of 29

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83



SEE SHEET 23 FOR -RPIBD- PROFILE
SEE SHEET 2-G FOR DITCH DETAILS

FILE: $FILES
DATE: $DATE$ $TIME$
PLOT DRIVER: $PLTDRVR
PEN TABLE: $PENTBLS

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

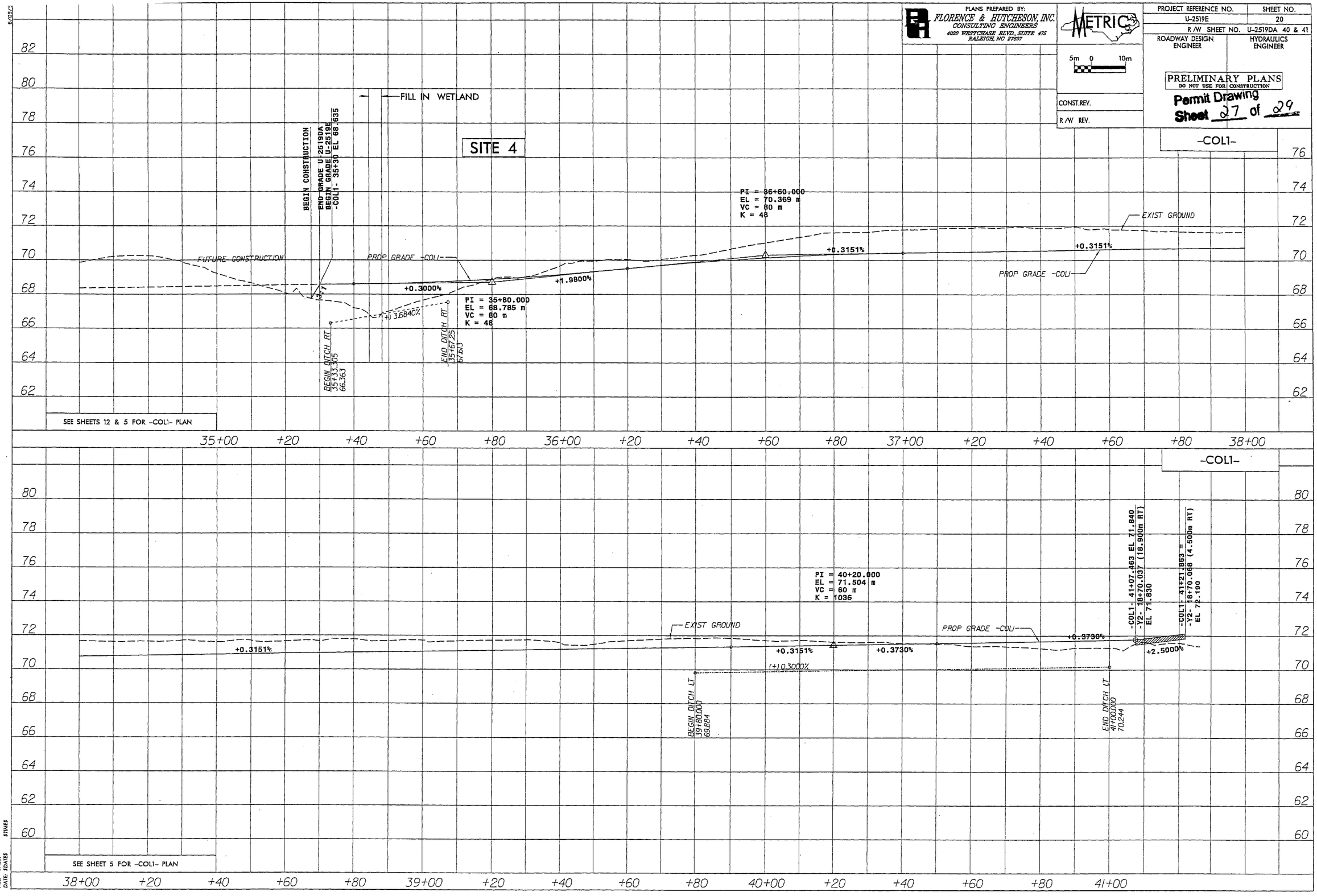
METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519E	20
R/W SHEET NO.	U-2519DA 40 & 41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 27 of 29

CONST.REV.
R/W REV.



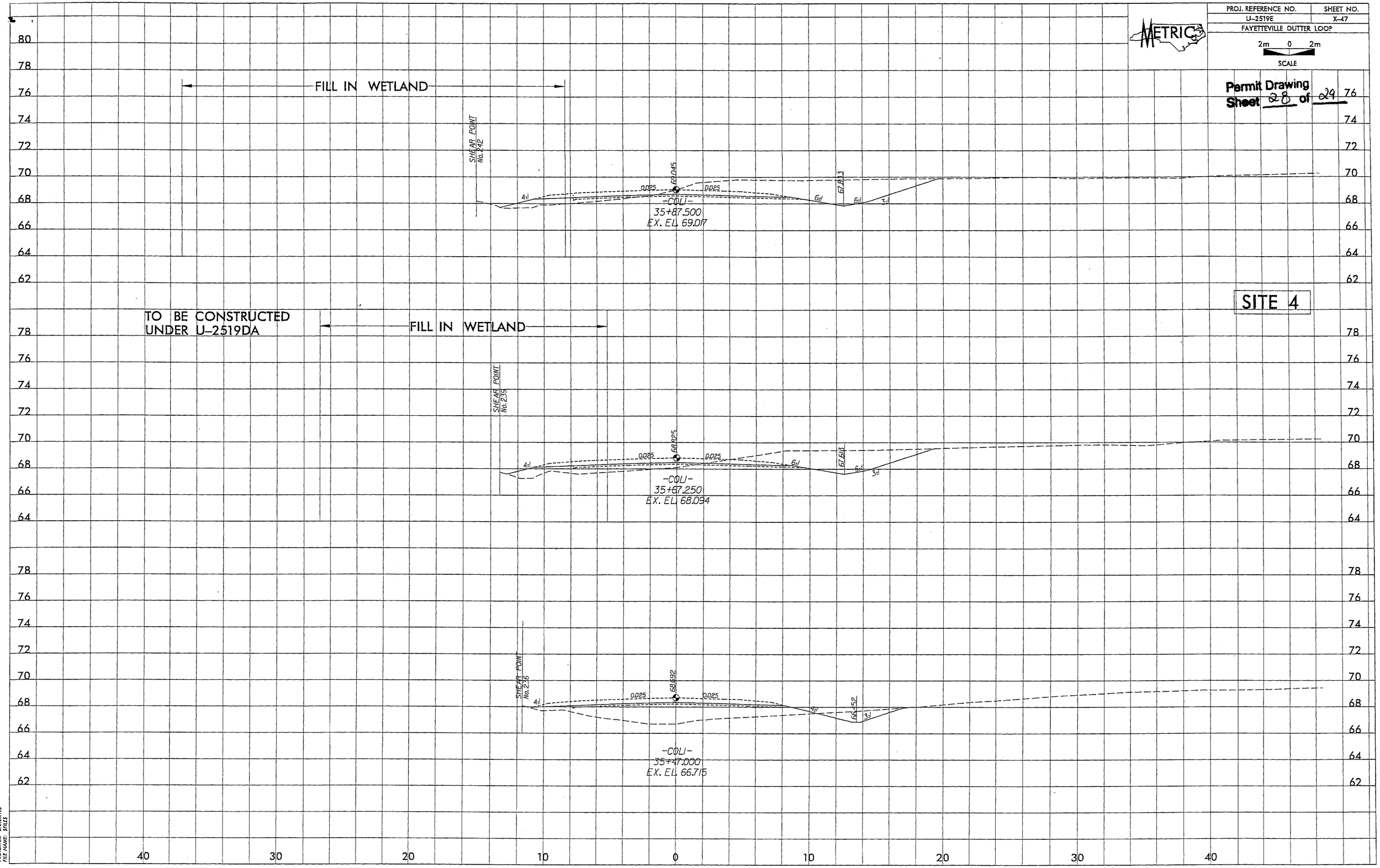
FILE: $FILES $TIMES
DATE: $DATES

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-47
FAYETTEVILLE OUTTER LOOP	

METRIC

2m 0 2m
SCALE

Permit Drawing
Sheet 28 of 29



FEATNAME: SPENTBLLS
PLOTDRIVER: SPEIDRVLS
FILE NAME: SPFLES

-COLI-

PROJ. REFERENCE NO.	SHEET NO.
U-2519E	X-48

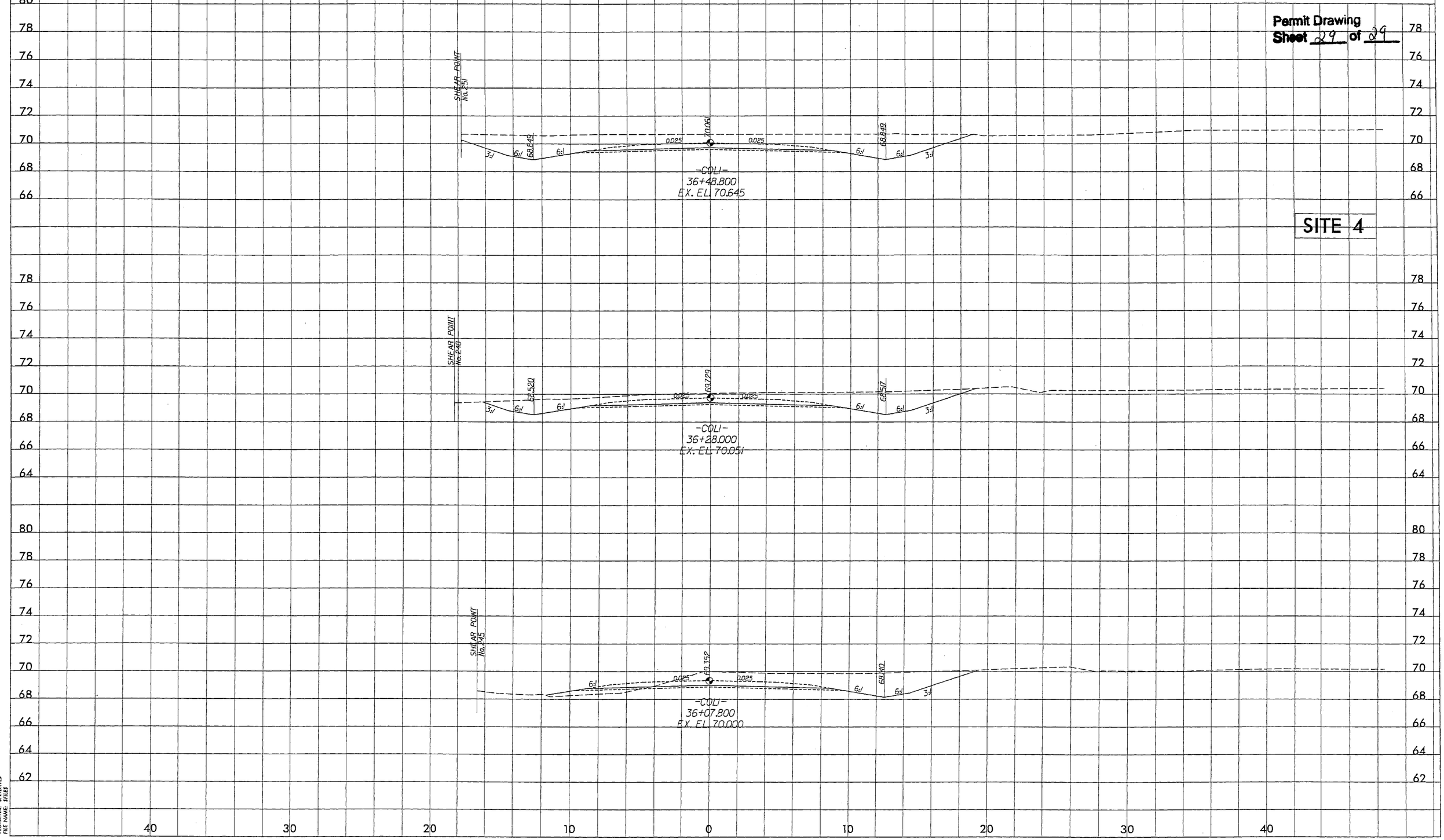
FAYETTEVILLE OUTTER LOOP

METRIC

2m 0 2m

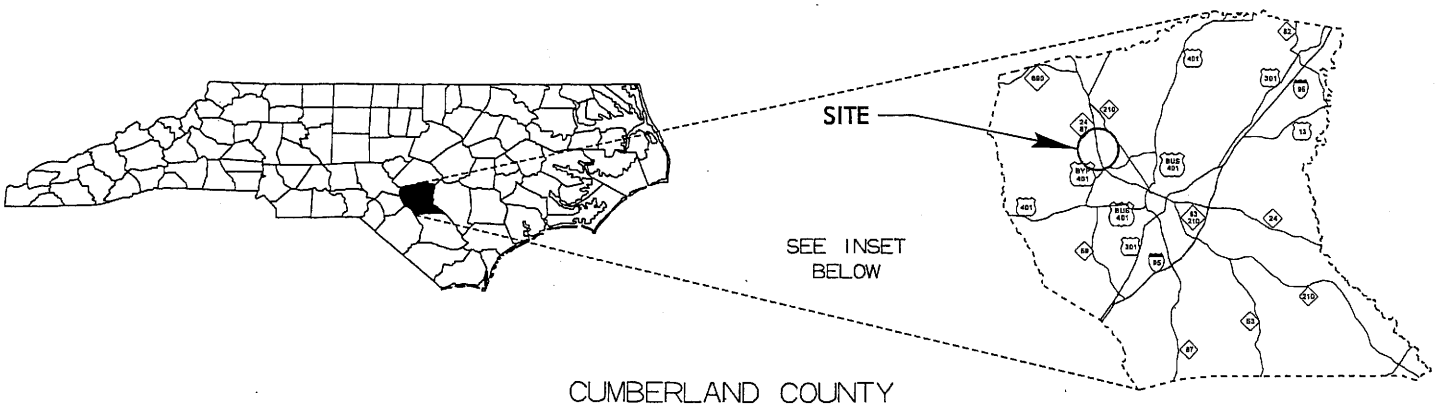
SCALE

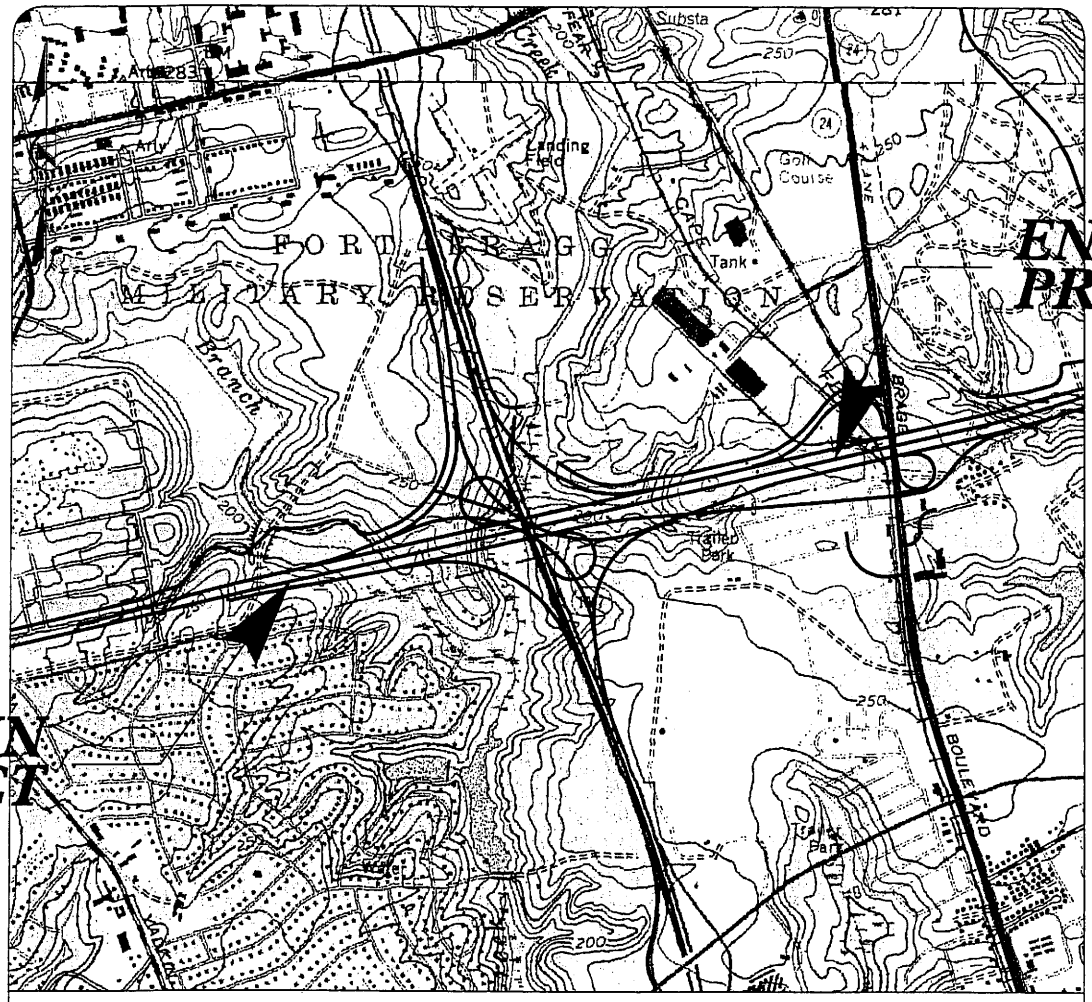
Permit Drawing
Sheet 29 **of** 29



DATE: 5/4/13
PENWIDTH: BYWIDTH
PLOTDRIVER: STD.DRV15
FILE NAME: SFILE5

-COL1-





VICINITY MAP NTS

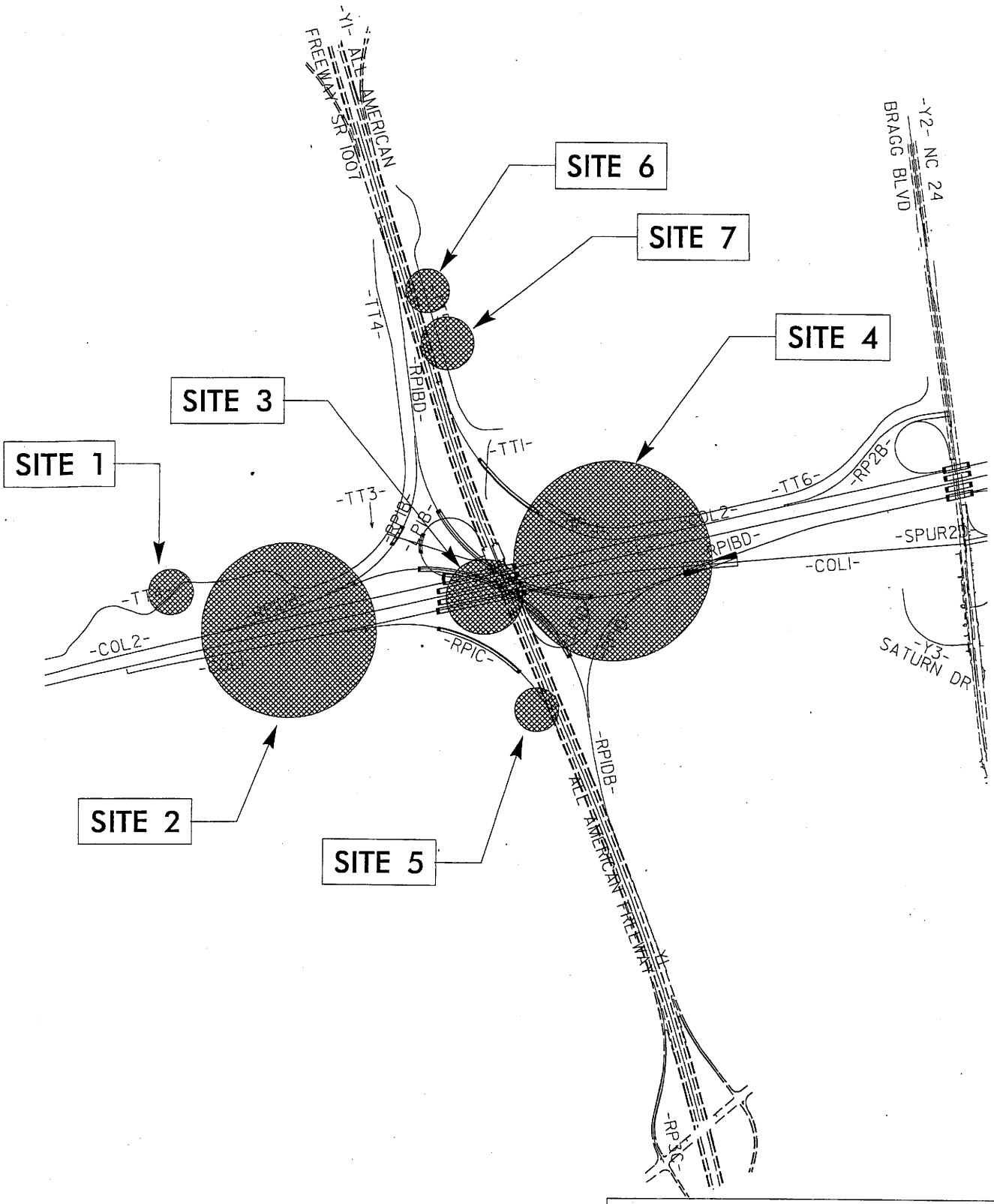
WETLAND IMPACT

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
PROJECT: 34817.1.2 (U-2519DA)
FAYETTEVILLE OUTER LOOP
FROM WEST OF NC 24
TO EAST OF NC 24 (BRAGG BLVD)

SHEET ____ OF ____ 12/7/07

Permit Drawing
Sheet 1 of 30



PLAN VIEW

NCDOT

DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 34817.1.2 (U-2519DA)
FAYETTEVILLE OUTER LOOP
FROM EAST OF SR 1415
TO WEST OF NC 24 (BRAGG BLVD)

Permit Drawing
Sheet 2 of 30

SHEET OF 12/7/07

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	FORT BRAGG MILITARY RESERVATION	
7	JOHN KOENIG	6432 YADKIN ROAD FAYETTEVILLE, NC 28303
9A	DON BROADWELL	P.O. BOX 53587 FAYETTEVILLE, NC 28305

Permit Drawing
Sheet 3 of 30

NCDOT

DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 34817.1.2 (U-2519E)
FAYETTEVILLE OUTER LOOP
FROM WEST OF NC 24
TO EAST OF NC 24

SHEET OF 12/7/07

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS			
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Natural Stream Design (ft)
1	20+80 -TT4-	NA	0.06			0.04					
2	20+60-25+00 -L-	2 @ 12' X 6' RCBC	5.52		0.28	1.06					
3 *	26+00-28+60 -L-	BRIDGES	0.44			0.20	3.94				
4	29+00-33+80 -L-	2 @ 48" RCP	5.45		0.10	0.26					
5	23+60 -Y1-	36" RCP	0.03			0.01					
6	13+40 -TT5-	EXISTING 18" RCP	0.02			0.04					
7	14+60 -TT5-	EXISTING 36" RCP	0.01			0.01					
TOTALS:			11.53		0.37	1.62	3.94				

* Impacts due to pier footing in wetland = 0.0007 ac

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
WBS - 34817.1.2 (U-2519DA)

SHEET 12/7/2007

JMD Revised 2/03/05

Permit Drawing
Sheet 4 of 30

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	SURFACE WATER IMPACTS: Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Natural Stream Design (m)
1	20+80 -TT4-	NA	0.026			0.017					
2	20+60-25+00 -L-	2 @ 3.6m x 1.8m RCBC	2.233		0.112	0.427					
3 *	26+00-28+60 -L-	BRIDGES	0.179			0.082	1.593				
4	29+00-33+80 -L-	2 @ 1200mm RCP	2.205		0.039	0.104					
5	23+60 -Y1-	900mm RCP	0.013			0.002					
6	13+40 -TT5-	EXISTING 450mm RCP	0.008			0.018					
7	14+60 -TT5-	EXISTING 900mm RCP	0.001			0.005					
TOTALS:			4.665		0.151	0.655					

* Impacts due to peir footing in wetland = 0.0003 ha

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
WBS - 34817.1.2 (U-2519DA)

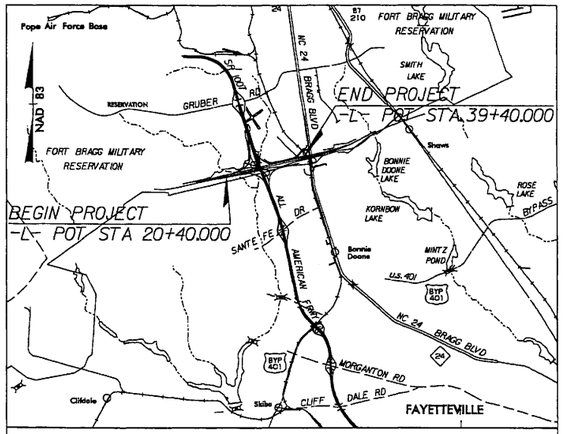
SHEET 12/7/2007

JMD Revised 2/03/05

Permit Drawing
Sheet 5 of 30

PROJECT: 34817.2.4 TIP PROJECT: U-2519DA

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BOULEVARD)

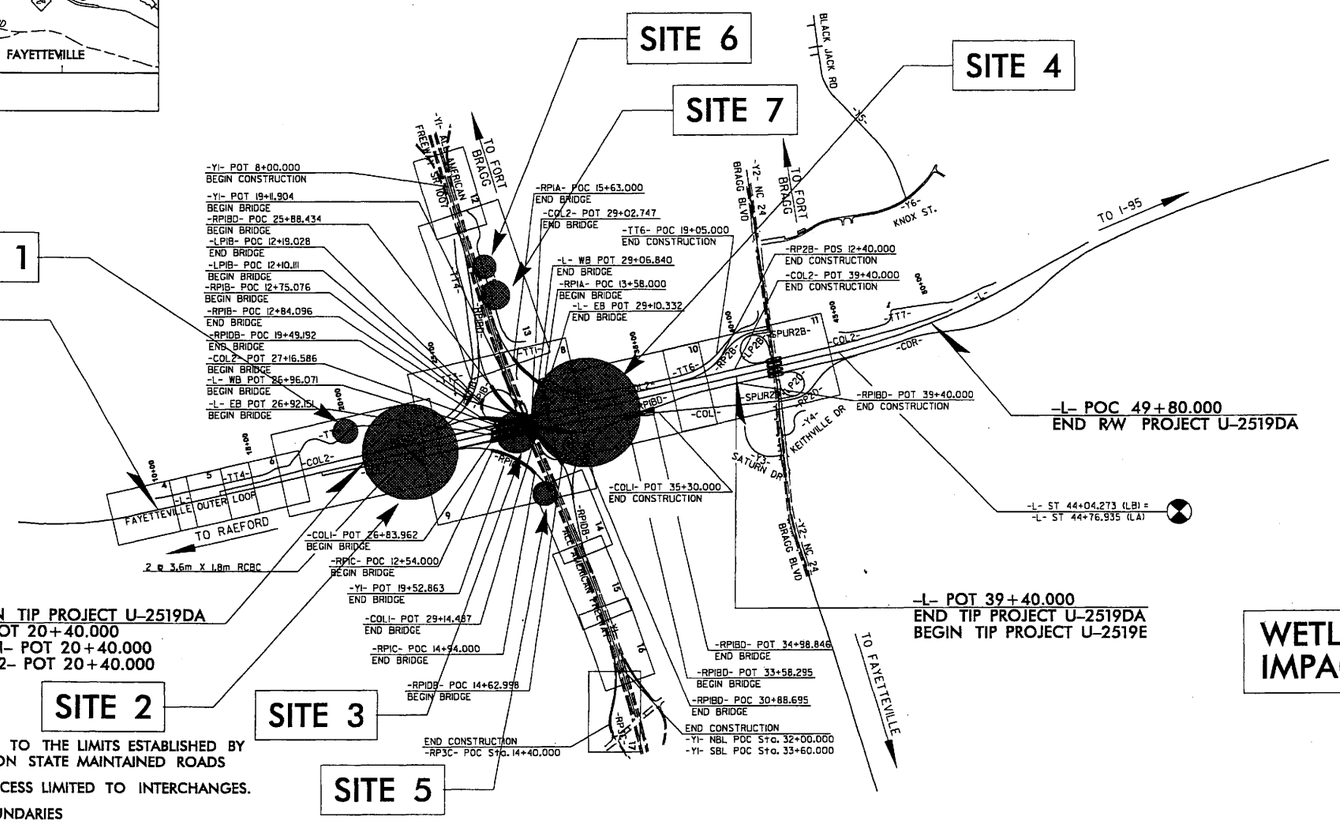
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, & SIGNING

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.	U-2519DA	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.1.2	NHF-DPR-0100(001)	P.E.
34817.2.4	NHF-100(9)	R/W and Utilities

Permit Drawing
Sheet 6 of 30



WETLAND/STREAM IMPACTS

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II ON FORT BRAGG ROADS, METHOD III ON STATE MAINTAINED ROADS

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALE

PLANS: 5 0 10

PROFILE (HORIZONTAL): 5 0 10

PROFILE (VERTICAL): 1 0 2

DESIGN DATA

ADT 2007 = 27300
ADT 2030 = 66200
DHV = 9 %
D = 55 %
T = 12 %
(DUALS 8 %, TTST 4 %)
V = 110 km/h

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519DA	1.667	KM.
LENGTH STRUCTURES TIP PROJECT U-2519DA	0.233	KM.
TOTAL LENGTH TIP PROJECT U-2519DA	1.900	KM.

NOTE: EB LANE BRIDGE STATIONING USED TO DETERMINE LENGTH OF STRUCTURES

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607
PREPARED FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 19, 2006

LETTING DATE: MAY 19, 2009

NCDOT CONTACT:

DENNIS J. MORY, P.E. — *PROJECT ENGINEER*
HENRY W. BARE — *PROJECT DESIGN ENGINEER*
CATHY S. HOUSER, P.E. — *ROADWAY DESIGN - PROJECT ENGINEER*

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR *DATE*

FILE: $FILE$ DATE: $DATE$ $TIME$

Permit Drawing
Sheet 7 of 30

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
1616 CONFERENCE DR., SUITE 3H
RALEIGH, N.C. 27603

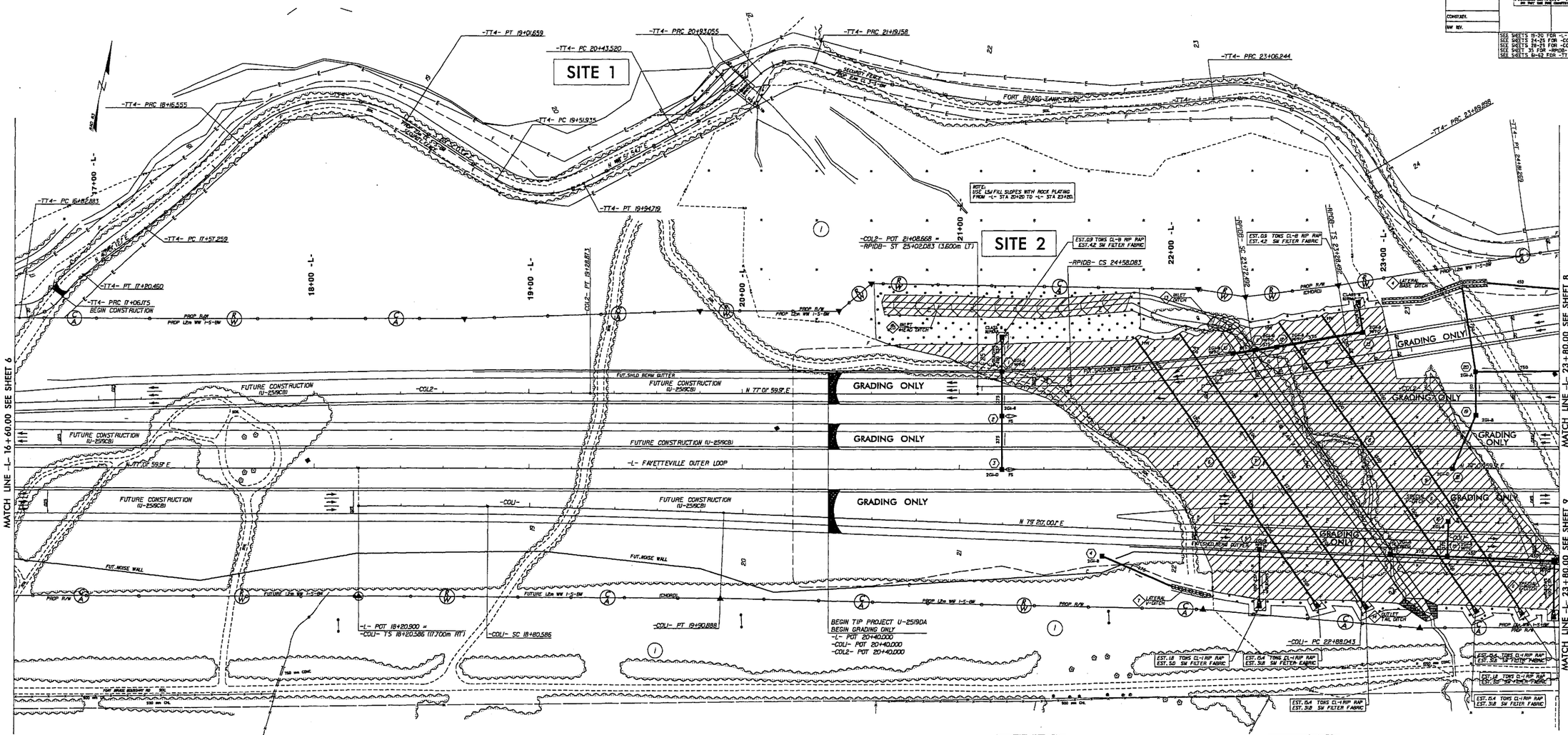
METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	7
R/W SHEET NO.	
7	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONSULT:
R/W REV.

SEE SHEETS 19-20 FOR -L- PROFILE
SEE SHEETS 24-25 FOR -COL1- PROFILE
SEE SHEETS 28-29 FOR -COL2- PROFILE
SEE SHEET 35 FOR -RPIDB- PROFILE
SEE SHEETS 6&13 FOR -TT4- PROFILE



CURVE DATA FOR -COL2-

PI Sta 14+39.815	PI Sta 17+88.513
Δ = 2° 18' 01.2" (LT)	Δ = 2° 18' 01.2" (RT)
L = 286.639	L = 286.639
T = 143.338	T = 143.338
R = 6,990.000	R = 6,990.000
Se = 0.025	Se = 0.025

CURVE DATA FOR -COL1-

PIs Sta 18+60.586	PI Sta 19+35.741	PI Sta 23+58.204	PIs Sta 30+38.640
Gs = 0° 55' 30.5"	Δ = 1° 48' 29.7" (RT)	Δ = 2° 18' 00.2" (LT)	Gs = 0° 45' 10.9"
Ls = 60.000	L = 110.302	L = 140.302	Ls = 46.000
LT = 40.000	T = 55.155	T = 70.152	LT = 30.667
ST = 20.000	R = 3,495.000	R = 3,495.000	ST = 15.334
	Se = 0.025	Se = 0.025	

CURVE DATA FOR -RPIDB-

PIs Sta 23+57.827	PI Sta 24+16.326	PIs Sta 24+72.751
Gs = 1° 57' 40.4"	Δ = 5° 36' 39.2" (RT)	Gs = 1° 57' 40.4"
Ls = 44.000	L = 88.599	Ls = 44.000
LT = 29.334	T = 44.344	LT = 29.334
ST = 14.668	R = 895.000	ST = 14.668
	Se = 0.04	

CURVE DATA FOR -TT4-

PI Sta 10+20.536	PI Sta 15+69.636	PI Sta 16+15.270	PI Sta 16+95.429	PI Sta 17+13.365	PI Sta 17+87.000
Δ = 44° 02' 27" (RT)	Δ = 18° 11' 41.5" (RT)	Δ = 18° 11' 41.5" (RT)	Δ = 33° 55' 56.5" (LT)	Δ = 15° 22' 08.8" (RT)	Δ = 11° 06' 00.8" (LT)
L = 201.448	L = 47.234	L = 47.234	L = 53.925	L = 14.365	L = 39.596
T = 107.139	T = 24.069	T = 24.069	T = 17.755	T = 7.186	T = 19.842
R = 150.000	R = 150.000	R = 150.000	R = 85.000	R = 50.000	R = 305.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

PI Sta 18+68.744	PI Sta 19+75.530	PI Sta 20+98.403	PI Sta 21+07.437	PI Sta 22+14.439	PI Sta 23+53.880	PI Sta 23++42.621
Δ = 91° 15' 05.3" (RT)	Δ = 51° 11' 03.9" (LT)	Δ = 13° 53' 53.3" (LT)	Δ = 55° 49' 30.0" (RT)	Δ = 55° 49' 46.0" (LT)	Δ = 68° 58' 15.9" (RT)	Δ = 67° 46' 06.7" (LT)
L = 85.614	L = 42.784	L = 49.335	L = 26.404	L = 181.066	L = 83.605	L = 91.970
T = 54.968	T = 23.895	T = 24.863	T = 14.363	T = 90.160	T = 47.536	T = 53.323
R = 60.000	R = 40.000	R = 200.000	R = 25.000	R = 415.000	R = 70.000	R = 75.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)

TIP NO.: U-2519DA COUNTY: CUMBERLAND

DESIGNED BY: DATE:

CHECKED BY: DATE:

Permit Drawing
Sheet 8 of 30

PLANS PREPARED BY:
FLORENCE & BUTCHERSON, INC.
CONSULTING ENGINEERS
8241 CHAPERRETT DR., SUITE 240
RALEIGH, NC 27616

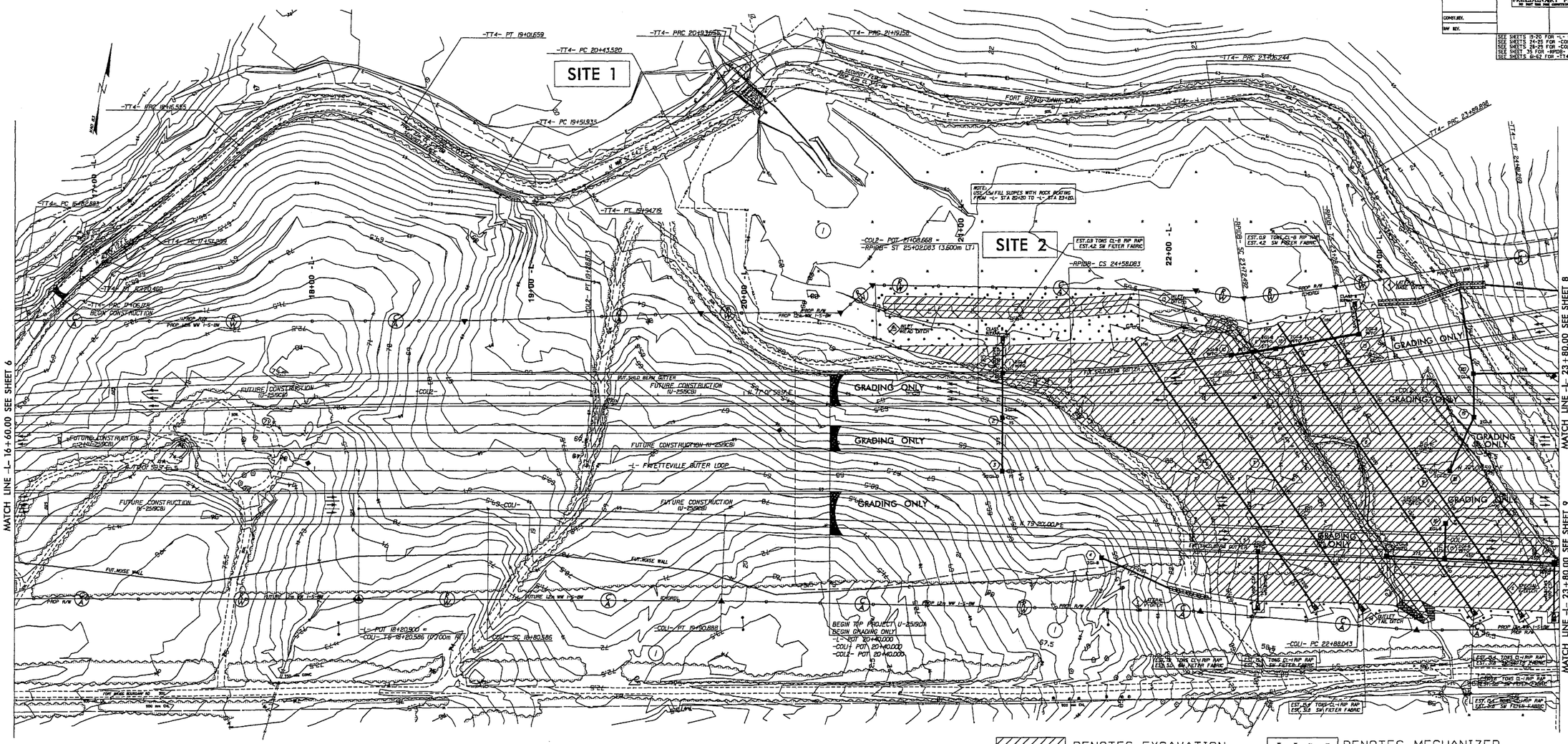
METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	7
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
SAF REV.

SEE SHEETS 19-20 FOR -L- PROFILE
SEE SHEETS 24-25 FOR -COL1- PROFILE
SEE SHEETS 26-27 FOR -COL2- PROFILE
SEE SHEET 35 FOR -RPI08- PROFILE
SEE SHEETS 61-62 FOR -TT4- PROFILE


SITE 1
SITE 2
MATCH LINE -L- 16+60.00 SEE SHEET 6
MATCH LINE -L- 23+80.00 SEE SHEET 8
MATCH LINE -L- 23+80.00 SEE SHEET 9
GRADING ONLY
FUTURE CONSTRUCTION (U-2519CB)
-L- FAYETTEVILLE OUTER LOOP
FORT BRAGG-LAKE ROAD
BEGIN TIP PROJECT U-2519DA
BEGIN GRADING ONLY
-L- POT 20+40.000
-COL1- POT 20+40.000
-COL2- POT 20+40.000
-COL1- PC 22+88.043
-COL2- POT 21+08.668 =
-RPI08- ST 25+02.083 (3.600m LT)
-RPI08- CS 24+58.083
-COL1- POT 18+20.904 =
-COL1- TS 18+20.586 (17.00m RT)
-COL1- SC 18+80.586
-COL1- PT 19+20.888
-TT4- PT 19+01.659
-TT4- PC 20+43.520
-TT4- PC 19+51.935
-TT4- PT 19+94.719
-TT4- PRC 21+19.156
-TT4- PRC 23+06.244
-TT4- PRC 23+89.898
-TT4- PT 24+49.269
-TT4- PC 15+97.893
-TT4- PC 17+57.995
-TT4- PT 17+20.462
-TT4- PRC 21+06.178
BEGIN CONSTRUCTION
NOTE:
USE ALL FILL SLOPES WITH ROCK FACING
FROM -L- STA 22+20 TO -L- STA 23+20.
EST. 0.9 TONS CL-B RIP RAP
EST. 42 SY FILTER FABRIC
EST. 0.9 TONS CL-B RIP RAP
EST. 42 SY FABRIC FABRIC
EST. 0.4 TONS CL-A RIP RAP
EST. 3.0 SY NON-WOVEN FABRIC
EST. 0.4 TONS CL-A RIP RAP
EST. 3.0 SY FILTER

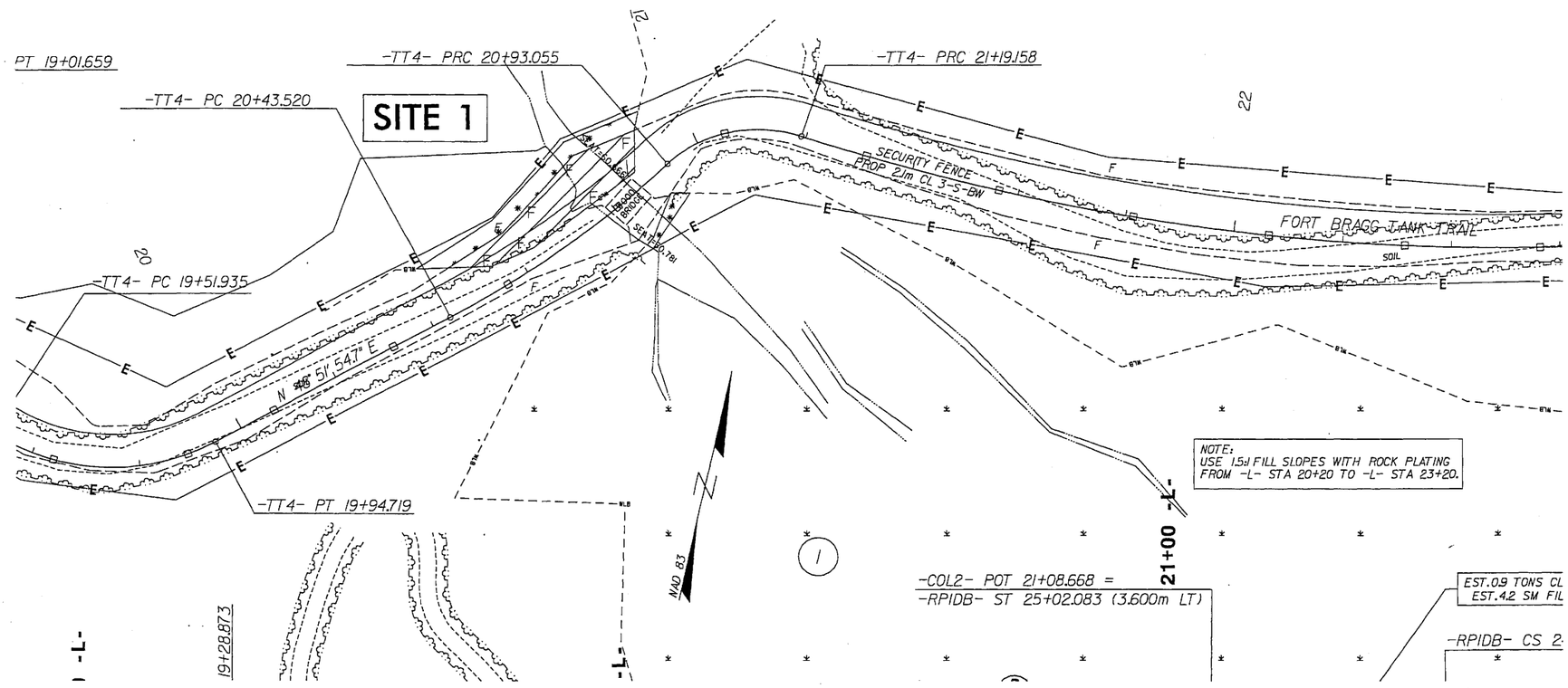
Permit Drawing
Sheet 9 of 30

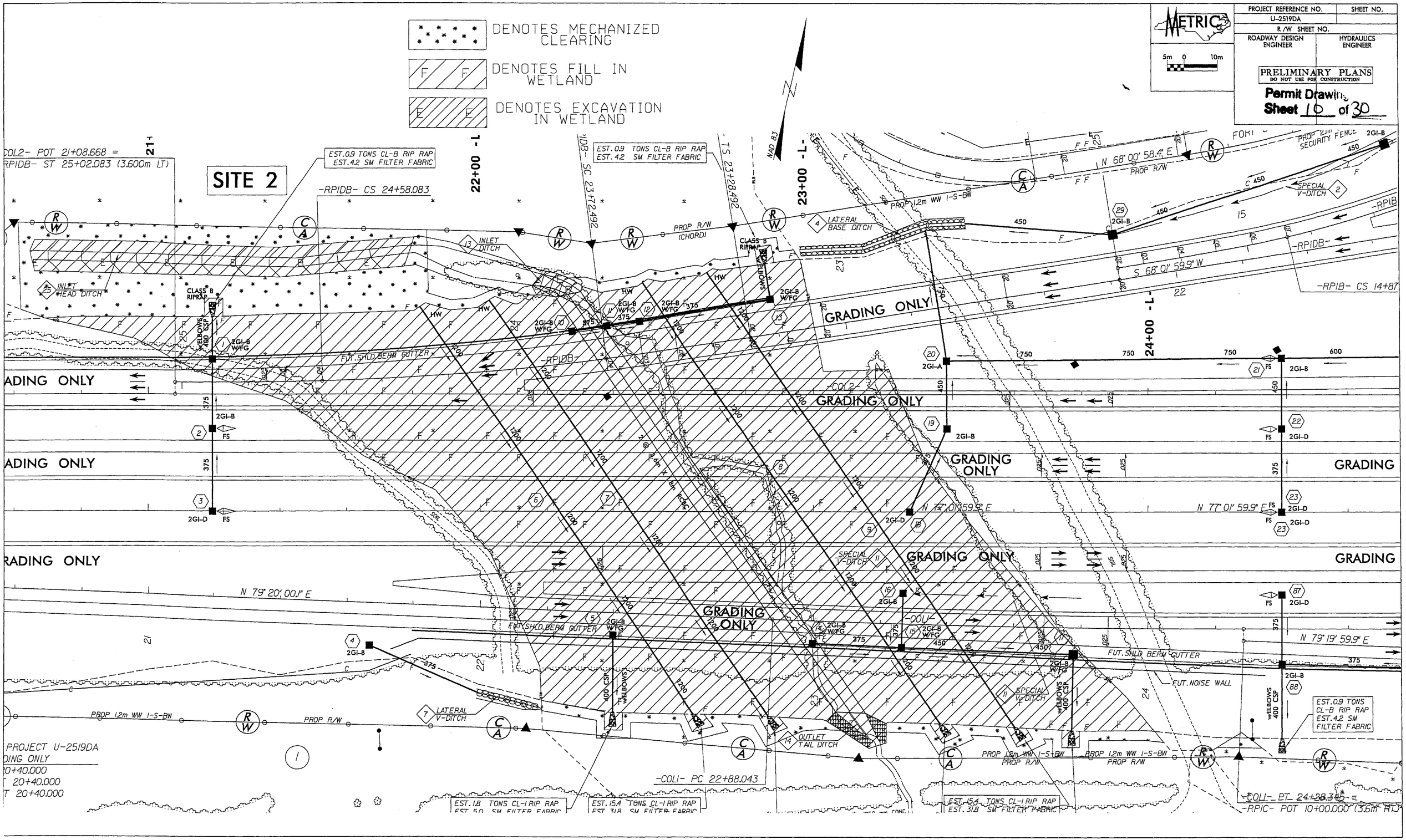
PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

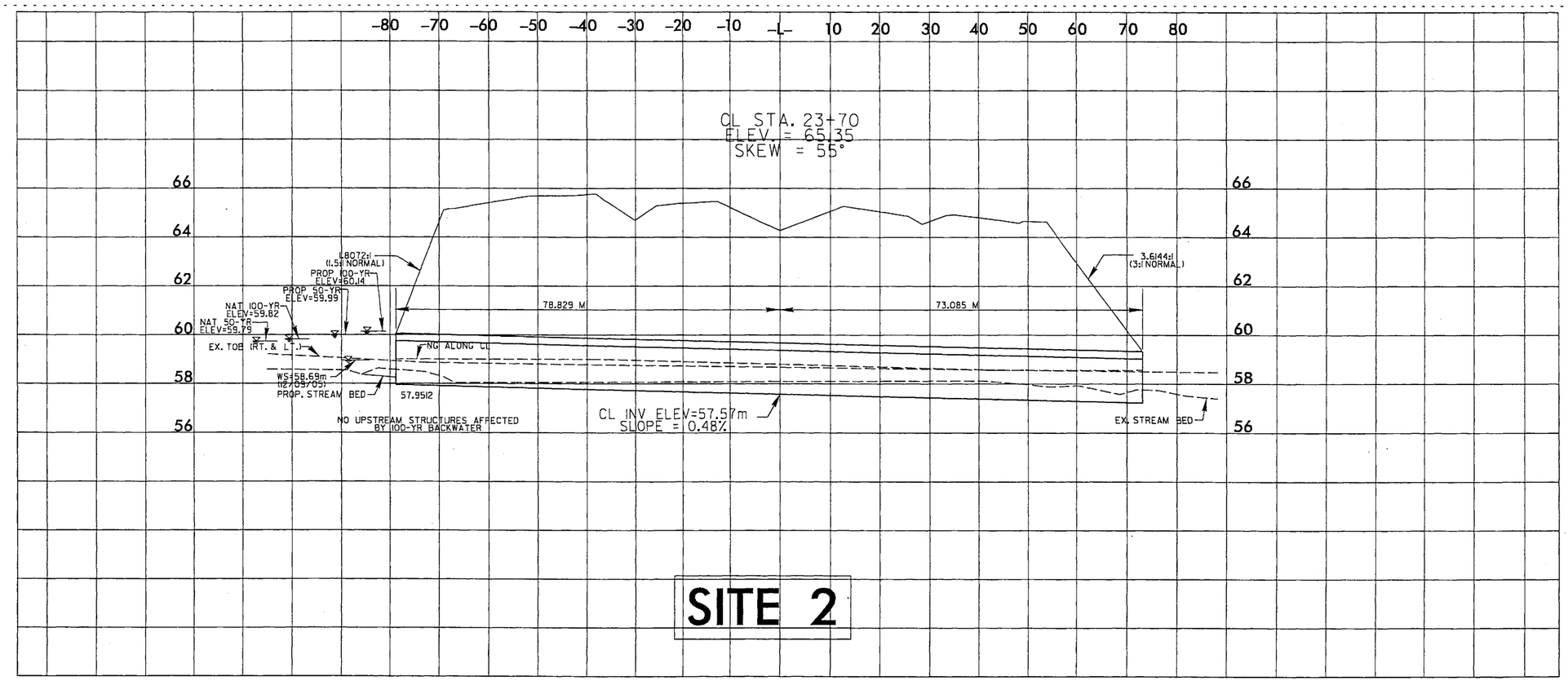
5m 0 10m

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION




DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
METRIC
5m 0 10m
PROJECT REFERENCE NO.
U-2519DA
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 10 of 30
SITE 2
-COL2- POT 21+08.668 =
-RPIDB- ST 25+02.083 (3.600m LT)
EST.0.9 TONS CL-B RIP RAP
EST.4.2 SM FILTER FABRIC
-RPIDB- CS 24+58.083
22+00 -L-
-IDB- SC 23+72.492
-TS 23+28.492
23+00 -L-
NAD 83
N 68° 00' 58.4" E
PROP R/W
PROP 2m SECURITY FENCE
SPECIAL V-DITCH
PROP 1.2m WW I-S-BW
LATERAL BASE DITCH
INLET DITCH
INLET HEAD DITCH
CLASS B RIPRAP
ELBOWS AND CSP
PROP R/W (CHORD)
S 68° 01' 59.9" W
-RPIB- CS 14+87
-RPIDB-
GRADING ONLY
FUT. SHLD. BERM GUTTER
24+00 -L-
-COL2-
N 77° 01' 59.9" E
N 79° 20' 00.1" E
N 79° 19' 59.9" E
FUT. NOISE WALL
LATERAL V-DITCH
OUTLET TAIL DITCH
-COLI- PC 22+88.043
-COLI- PT 24+28.345
-RPIC- POT 10+00.000 (3.6m RT)
EST.0.9 TONS CL-B RIP RAP
EST.4.2 SM FILTER FABRIC
EST. 1.8 TONS CL-I RIP RAP
EST. 15.4 TONS CL-I RIP RAP
PROJECT U-2519DA
GRADING ONLY
20+40.000
20+40.000
20+40.000

Permit Drawing
Sheet 11 of 30



SITE 2

6/09/99

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTGATE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	20
R /W SHEET NO.	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

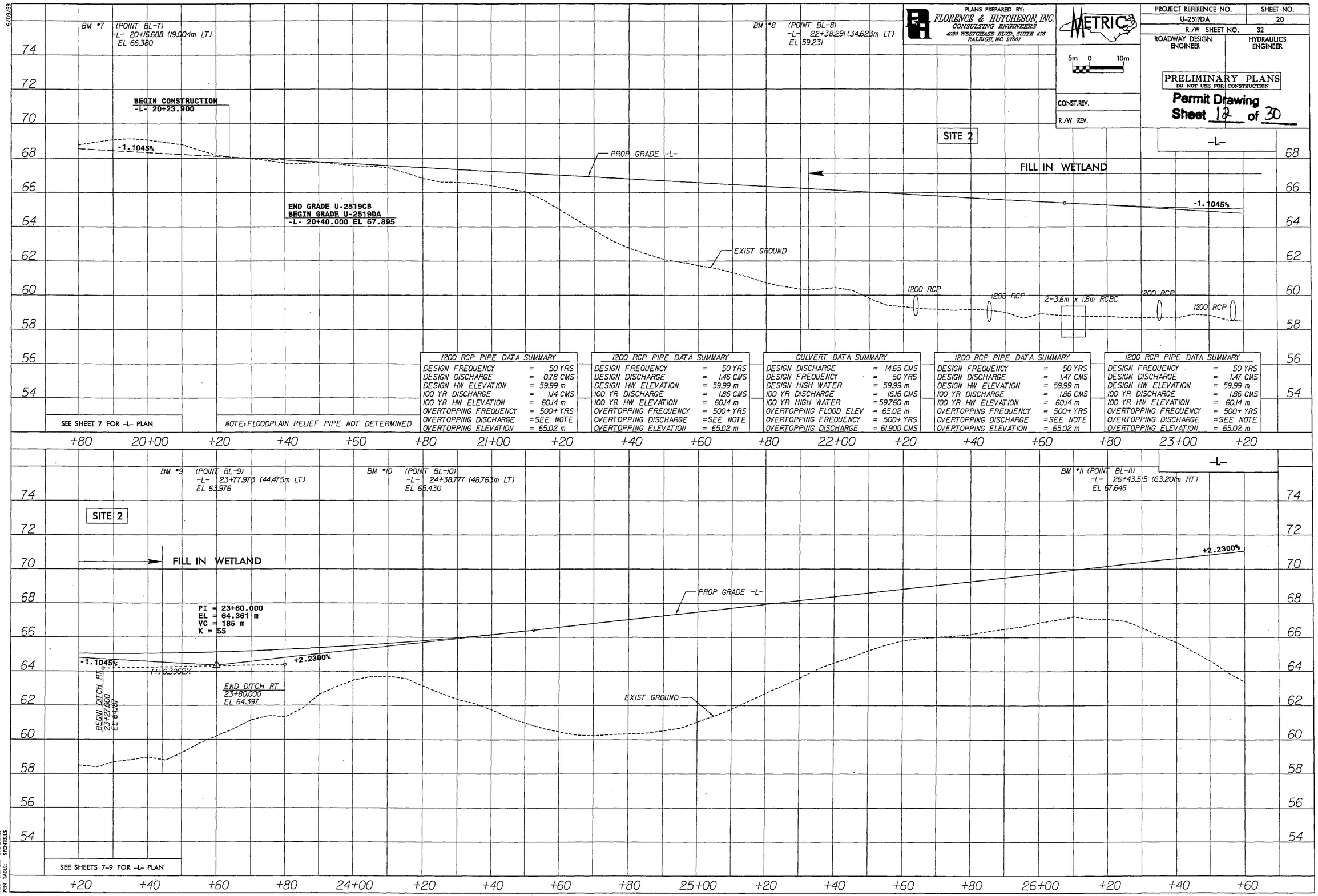
5m 0 10m

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 12 of 30

CONST.REV.

R /W REV.



FILE: $FILES
DATE: $DATES
PLOT DRIVER: $STYLES $TIMES
PEN TABLE: $PENTBLS

Permit Drawing
Sheet 13 of 30

020607 – PARCEL #1 REVISED PROPOSED FENCING (QUADRANT A)

CURVE DATA FOR -RPIDB-		
PI Sta 13+17.446	PI Sta 18+29.996	PI Sta 20+56.923
Gs = 2°59'42.0"	Δ = 96°59'15.7" (LT)	Gs = 2°59'42.0"
Ls = 46.000	t = 744.811	Ls = 46.000
Lt = 92.001	L = 497.290	Lt = 92.001
ST = 15.337	R = 440.000	ST = 15.337
	Se = 0.06	

CURVE DATA FOR -LPIB-		
PI Sta 10+89.492	PI Sta 28+29.924	PI Sta 14+09.742
Gs = 4°58'18.0"	Δ = 96°17'56.4" (RT)	Gs = 3°13'44.0"
Ls = 100.000	t = 964.806	Ls = 90.000
Lt = 199.027	L = 1726.977	Lt = 180.000
ST = 16.275	R = 90.000	ST = 16.934
	Se = 0.08	

CURVE DATA FOR -RPIA-			
PI Sta 10+94.277	PI Sta 11+68.917	PI Sta 12+30.371	PI Sta 15+21.889	PI Sta 17+77.439
Gs = 7°32'20.0"	Δ = 13°35'00.0" (RT)	Gs = 1°25'56.4"	Δ = 49°12'25.0" (RT)	Gs = 2°08'54.5"
Ls = 75.000	t = 97.411	Ls = 150.000	t = 515.294	Ls = 45.000
Lt = 50.045	T = 49.185	Lt = 30.000	T = 274.745	Lt = 30.002
ST = 25.041	R = 295.000	ST = 16.787	R = 600.000	ST = 15.002
	Se = 0.06	ST = 13.228	Se = 0.05	

CURVE DATA FOR -RPIB-		
PI Sta 10+76.539	PI Sta 13+14.332	PI Sta 15+04.692
Gs = 1°15'22.3"	Δ = 64°24'53.1" (RT)	Gs = 1°15'22.3"
Ls = 52.000	t = 334.489	Ls = 52.000
Lt = 104.011	L = 660.470	Lt = 104.011
ST = 17.342	R = 500.000	ST = 17.342
	Se = 0.07	

CURVE DATA FOR -RPIBD-		
PI Sta 24+05.380	PI Sta 25+55.024	PI Sta 32+34.434
Gs = 4°48'13.8"	Δ = 94°19'41.8" (LT)	Gs = 4°48'13.8"
Ls = 60.001	t = 798.388	Ls = 60.001
Lt = 120.021	L = 1414.976	Lt = 120.021
ST = 15.337	R = 90.000	ST = 15.337
	Se = 0.08	

CURVE DATA FOR -Y1-
PI Sta 17+10.778
Δ = 5°14'22.5" (LT)
t = 3.677
L = 7.329
R = 5,500.000
Se = 0.025

CURVE DATA FOR -TT3-		
PI Sta 10+18.319	PI Sta 12+69.433	
Δ = 5°52'13.2" (RT)	Δ = 52°15'40.3" (LT)	
t = 16.947	t = 22.800	
L = 33.380	L = 118.601	
R = 325.000	R = 250.000	
Se = 0.02	Se = 0.02	

CURVE DATA FOR -TT6-
PI Sta 11+85.864
Δ = 47°09'30.0" (LT)
t = 205.767
L = 409.914
R = 250.000
Se = 0.02

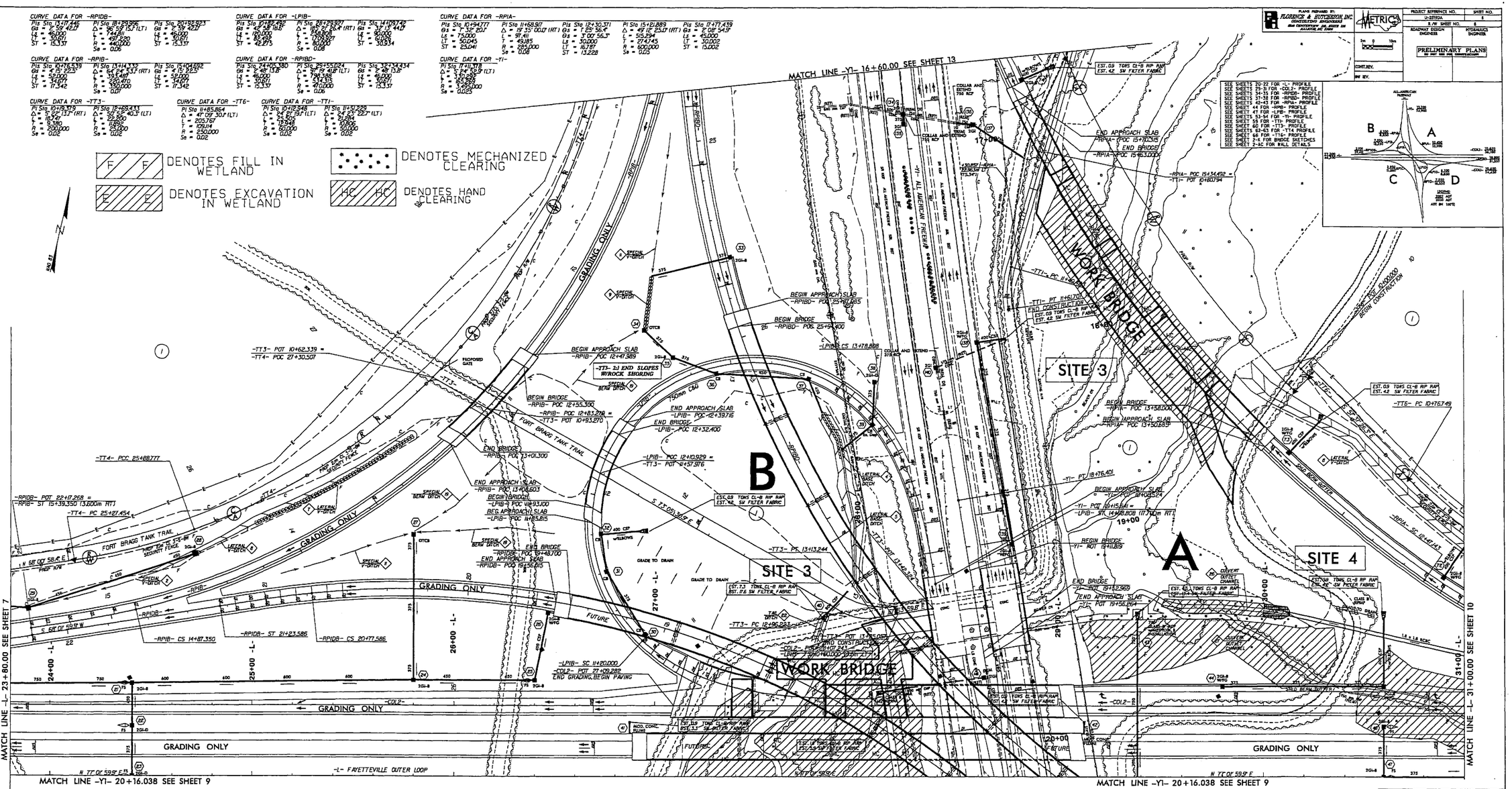
CURVE DATA FOR -TT1-	
PI Sta 10+12.348	PI Sta 11+51.298
Δ = 14°01'39.1" (LT)	Δ = 34°23'22.7" (LT)
t = 24.844	t = 51.864
L = 49.341	L = 100.604
R = 200.000	R = 300.000
Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC DENOTES HAND CLEARING


MATCH LINE -Y1- 16+60.00 SEE SHEET 13
MATCH LINE -Y1- 20+16.038 SEE SHEET 9
MATCH LINE -L- 23+80.00 SEE SHEET 7
MATCH LINE -L- 31+00.00 SEE SHEET 10
WORK BRIDGE
SITE 3
SITE 4
A
B
GRADING ONLY
FORT BRAGG TANK TRAIL
-L- FAYETTEVILLE OUTER LOOP
-Y1- ALL AMERICAN FREEWAY
-TT3- POT 10+62.339 = -TT4- POC 27+30.507
-TT4- PCC 25+08.777
-TT4- PC 25+27.454
-RPIDB- POT 22+17.268 = -RPIB- ST 15+39.350 (3.200m RT)
-RPIB- CS 14+87.350
-RPIDB- ST 21+23.586
-RPIDB- CS 20+77.586
-LPIB- SC 11+20.000
-COL2- POT 27+09.288 END GRADING, BEGIN PAVING
-TT3- PC 12+95.223
-TT3- PT 13+13.244
-TT3- PC 13+13.244
-TT6- PC 10+76.749
-Y1- PT 18+76.401
-Y1- POT 19+15.641 = -LPIB- ST 14+28.808 (17.7m RT)
-Y1- POT 19+56.204
-RPIA- POC 15+70.516
-RPIA- POC 15+63.000
-RPIA- POC 15+34.492 = -Y1- POT 10+80.594
-RPIA- SC 12+47.143
-RPIB- POC 13+58.000
-RPIB- POC 13+50.889
-RPIB- POC 12+83.278 = -TT3- POT 10+93.270
-RPIB- POC 12+55.300
-RPIB- POC 13+01.300
-RPIB- POC 13+08.603
-RPIB- POC 14+83.300
-LPIB- POC 14+25.815
-RPIBD- POC 19+48.700
-RPIBD- POC 19+56.015
-RPIBD- POC 12+47.389
-RPIBD- POC 25+47.285
-LPIB- CS 13+78.808
-LPIB- POC 12+39.716
-LPIB- POC 12+32.400
-LPIB- POC 12+13.929 = -TT3- POT 11+57.976
-LPIB- POC 12+13.929 = -TT3- POT 11+61.700
BEGIN APPROACH SLAB -RPIBD- POC 25+47.285
BEGIN BRIDGE -RPIBD- POC 25+49.400
BEGIN APPROACH SLAB -RPIB- POC 12+47.389
BEGIN BRIDGE -RPIB- POC 12+55.300
END APPROACH SLAB -LPIB- POC 12+39.716
END BRIDGE -LPIB- POC 12+32.400
END BRIDGE -RPIB- POC 13+01.300
END APPROACH SLAB -RPIB- POC 13+08.603
BEGIN BRIDGE -LPIB- POC 14+83.300
BEG APPROACH SLAB -LPIB- POC 14+25.815
END BRIDGE -RPIBD- POC 19+48.700
END APPROACH SLAB -RPIBD- POC 19+56.015
BEGIN BRIDGE -RPIB- POC 13+58.000
BEGIN APPROACH SLAB -RPIB- POC 13+50.889
END APPROACH SLAB -Y1- POC 19+08.524
BEGIN BRIDGE -Y1- POT 19+11.819
END BRIDGE -RPIA- POC 15+63.000
END APPROACH SLAB -Y1- POT 19+56.204
END CONSTRUCTION EST. 09 TONS CL-B RIP RAP EST. 42 SW FILTER FABRIC
BEGIN CONSTRUCTION
EST. 09 TONS CL-B RIP RAP EST. 42 SW FILTER FABRIC
EST. 73 TONS CL-B RIP RAP EST. 176 SW FILTER FABRIC
EST. 60 TONS CL-B RIP RAP EST. 134 SW FILTER FABRIC
EST. 09 TONS CL-B RIP RAP EST. 42

Permit Drawing
Sheet 14 of 30

0206607 – PARCEL #1 REVISED PROPOSED FENCING (QUADRANT A)

CURVE DATA FOR -RPIDB-

PI Sta 13+11.446	PI Sta 18+29.996	PI Sta 20+92.923
Gs = 2°59'40.2"	Δ = 96°59'15.7" (LT)	Gs = 2°59'40.2"
Ls = 46.000	L = 144.811	Ls = 46.000
LT = 30.671	T = 97.220	LT = 30.671
ST = 15.337	R = 140.000	ST = 15.337
	Se = 0.06	

CURVE DATA FOR -LPIB-

PI Sta 10+92.492	PI Sta 28+29.927	PI Sta 14+09.742
Gs = 4°58'18.8"	Δ = 85°01'26.4" (RT)	Gs = 3°13'44.0"
Ls = 120.000	L = 258.868	Ls = 50.000
LT = 82.493	T = 159.927	LT = 61.006
ST = 42.273	R = 180.000	ST = 30.934
	Se = 0.08	

CURVE DATA FOR -RPIA-

PI Sta 10+94.177	PI Sta 11+68.917	PI Sta 12+30.371	PI Sta 15+21.889	PI Sta 17+77.439
Gs = 7°32'20.1"	Δ = 19°33'00.0" (RT)	Gs = 1°25'56.4"	Δ = 49°12'25.0" (RT)	Gs = 2°08'54.3"
Ls = 75.000	L = 97.411	Gs = 1°00'56.3"	L = 515.254	Ls = 45.000
LT = 50.045	T = 49.185	Ls = 30.000	T = 274.745	LT = 30.002
ST = 25.041	R = 285.000	LT = 16.787	R = 600.000	ST = 15.002
	Se = 0.08	ST = 13.228	Se = 0.05	

CURVE DATA FOR -Y1-

PI Sta 11+11.376
Δ = 3°24'58.9" (LT)
L = 3.910.265
T = 163.269
R = 3,485.000
Se = 0.025

CURVE DATA FOR -RPIB-

PI Sta 10+16.339	PI Sta 13+14.337	PI Sta 15+04.692	
Gs = 4°15'22.5"	Δ = 84°24'33.7" (RT)	Gs = 4°15'22.5"	
Ls = 92.000	L = 193.467	Ls = 92.000	
LT = 34.671	T = 120.470	LT = 34.671	
ST = 17.342	R = 130.000	ST = 17.342	
	Se = 0.07		

CURVE DATA FOR -RPIBD-

PI Sta 24+05.180	PI Sta 29+55.024	PI Sta 32+34.434
Gs = 2°46'13.8"	Δ = 91°51'41.8" (LT)	Gs = 2°46'13.8"
Ls = 46.000	L = 198.398	Ls = 46.000
LT = 30.671	T = 134.315	LT = 30.671
ST = 15.337	R = 110.000	ST = 15.337
	Se = 0.06	

CURVE DATA FOR -TT3-

PI Sta 10+16.339	PI Sta 12+68.433
Δ = 5°22'13.7" (RT)	Δ = 30°52'40.3" (LT)
L = 157.42	L = 222.800
T = 93.180	T = 113.892
R = 1,700.000	R = 257.000
Se = 0.02	Se = 0.02

CURVE DATA FOR -TT6-

PI Sta 11+85.864
Δ = 47°09'30.1" (LT)
L = 205.757
T = 109.114
R = 250.000
Se = 0.02

CURVE DATA FOR -TT1-

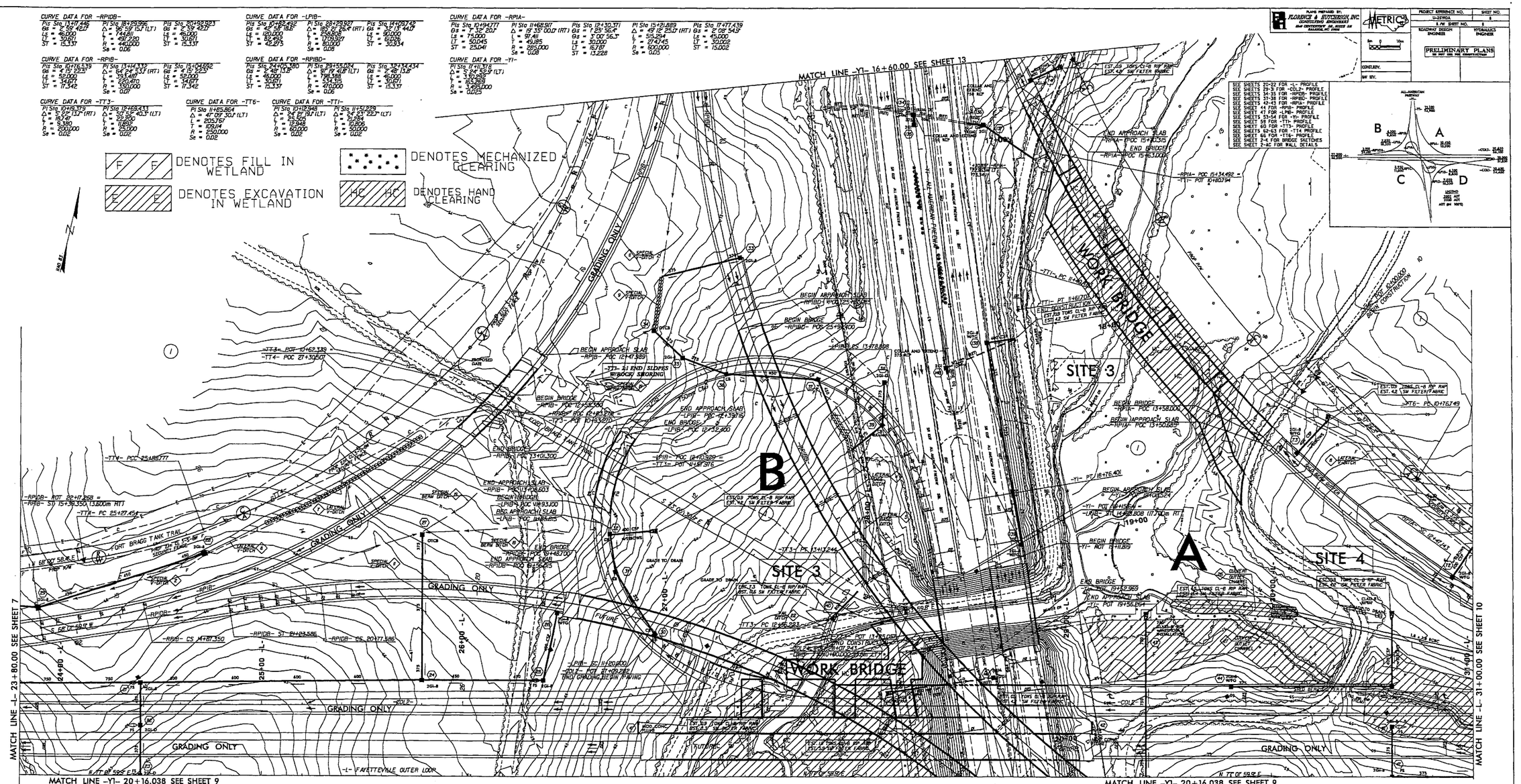
PI Sta 10+12.948	PI Sta 11+51.228
Δ = 24°21'18.7" (LT)	Δ = 24°33'29.7" (LT)
L = 215.506	L = 211.264
T = 109.948	T = 107.806
R = 510.000	R = 500.000
Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC DENOTES HAND CLEARING


MATCH LINE -Y1- 16+60.00 SEE SHEET 13
MATCH LINE -L- 23+80.00 SEE SHEET 7
MATCH LINE -Y1- 20+16.038 SEE SHEET 9
MATCH LINE -L- 31+00.00 SEE SHEET 10
WORK BRIDGE
SITE 3
SITE 4
A
B
GRADING ONLY
FORT BRAGG TANK TRAIL
-L- FAYETTEVILLE OUTER LOOP
END APPROACH SLAB
-RPIA- POC 15+03.15
END BRIDGE
-RPIA- POC 15+65.100
BEGIN APPROACH SLAB
-RPIB- POC 12+47.389
BEGIN BRIDGE
-RPIB- POC 12+58.500
END BRIDGE
-RPIB- POC 13+01.300
END APPROACH SLAB
-RPIB- POC 13+18.603
BEGIN APPROACH SLAB
-LPIB- POC 10+93.100
BEGIN APPROACH SLAB
-LPIB- POC 11+86.615
END APPROACH SLAB
-LPIB- POC 12+32.300
END APPROACH SLAB
-LPIB- POC 12+39.716
BEGIN BRIDGE
-RPIB- POC 13+58.500
BEGIN APPROACH SLAB
-RPIA- POC 13+50.289
END BRIDGE
-RPIA- POC 13+78.808
BEGIN BRIDGE
-RPIBD- POC 25+95.100
BEGIN APPROACH SLAB
-RPIBD- POC 25+95.100
END BRIDGE
-RPIBD- POC 24+85.700
END APPROACH SLAB
-RPIBD- POC 24+85.615
-RPIB- ST 24+23.585
-RPIBD- CS 20+77.585
-RPIB- CS M+87.350
-RPIB- SC 11+20.000
-COL2- POT 21+49.282
END GRADING BEGIN PAVING
-COL2-
-Y1- PT 18+76.401
-Y1- POT 19+56.204
-Y1- PC 19+52.969
-TT3- PC 12+95.281
-TT3- PT 13+13.244
-TT3- POT 10+69.339
-TT4- POC 27+39.507
-TTX- PCC 25+86.777
-TTX- PC 25+27.454
-TT1- POT 10+80.794
-TT1- PC 11+61.70
END CONSTRUCTION
-TT1- POT 11+51.916
-TT1- POT 11+51.228
-TT6- PC 10+76.749
-TT6- POT 11+85.864
-TT6- PT 13+13.244
-TT6- POT 13+13.244
-TT6- POT 13+13.244
-TT6- PO

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

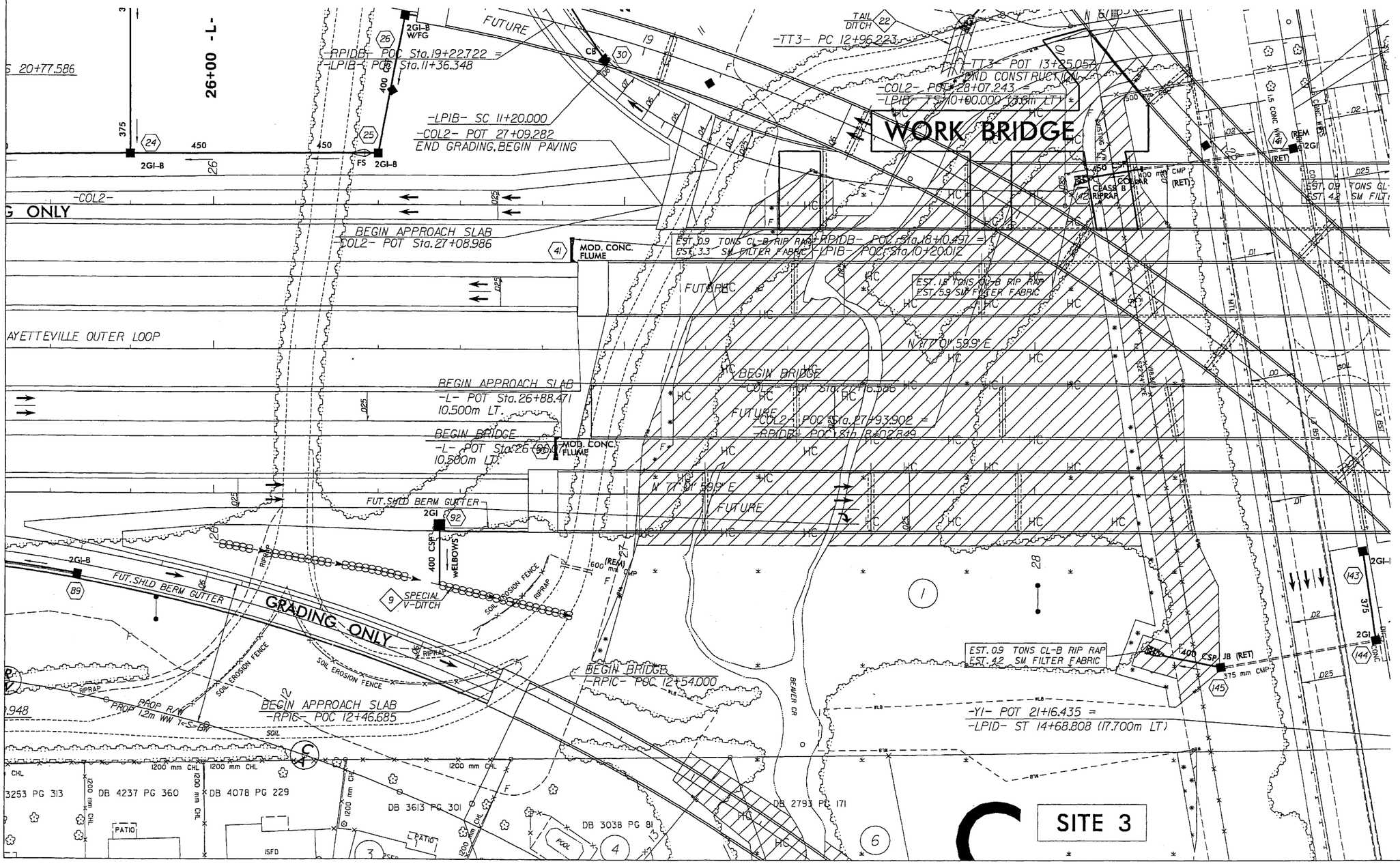
R/W REV.

Permit Drawing
Sheet 15 of 30

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC/HC DENOTES HAND CLEARING



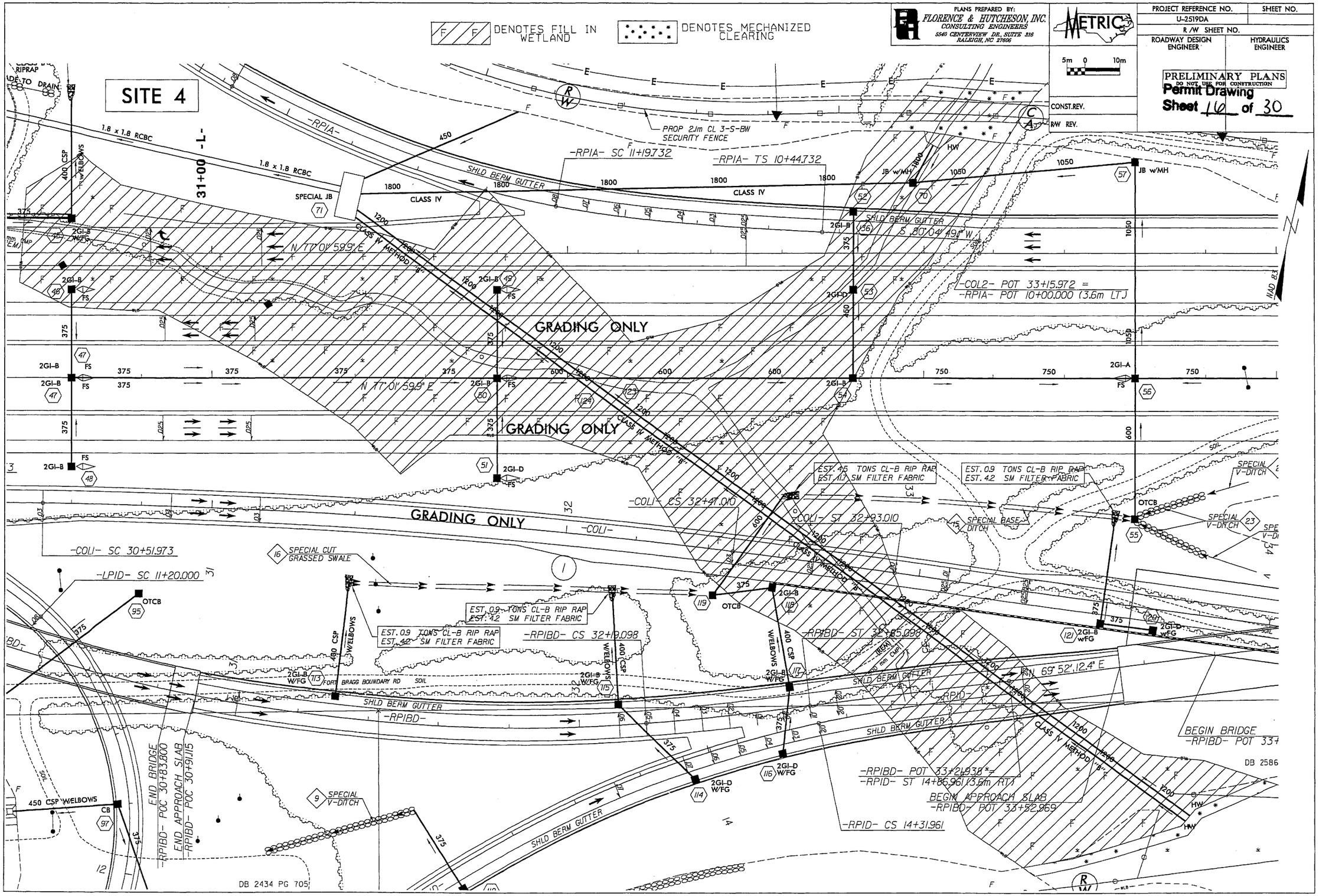
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 216
RALEIGH, NC 27606

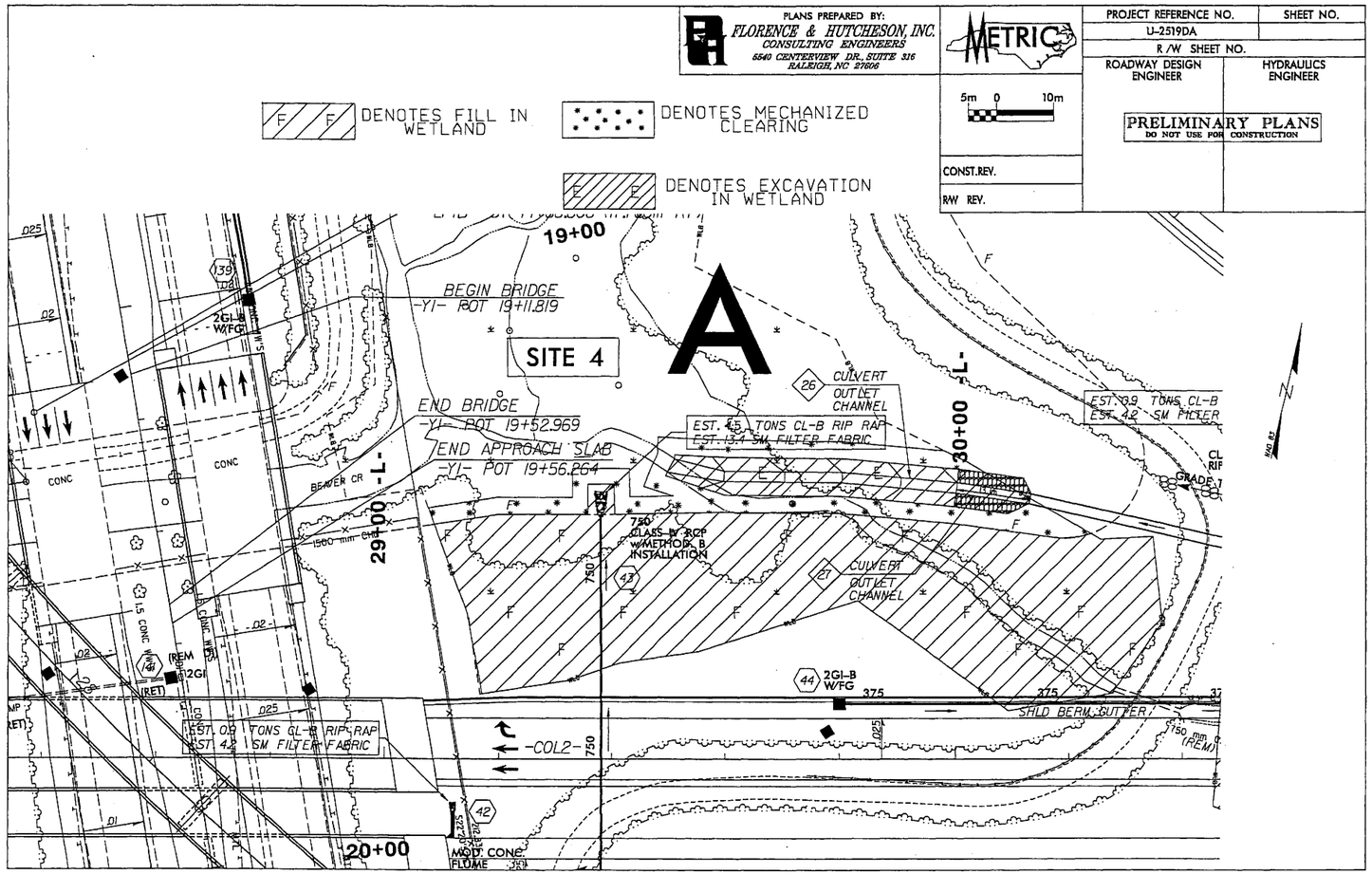
METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 16 of 30

CONST.REV.
R/W REV.




PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606
METRIC
PROJECT REFERENCE NO.
U-2519DA
SHEET NO.
R /W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
RW REV.
5m 0 10m
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
19+00
BEGIN BRIDGE
-Y1- POT 19+11.819
SITE 4
A
END BRIDGE
-Y1- POT 19+52.969
END APPROACH SLAB
-Y1- POT 19+56.264
CULVERT OUTLET CHANNEL
EST. 45 TONS CL-B RIP RAP
EST. 13.4 SM FILTER FABRIC
EST. 0.9 TONS CL-B
EST. 4.2 SM FILTER
29+00 -L-
30+00 -L-
750 CLASS IV RCP w/METHOD B INSTALLATION
CULVERT OUTLET CHANNEL
2GI-B W/FG
SHLD BERM GUTTER
EST. 0.9 TONS CL-B RIP RAP
EST. 4.2 SM FILTER FABRIC
-COL2-
20+00
MOD. CONC FLUME
BEAVER CR
1500 mm CMP
CONC
1.5 CONC
2GI-B W/FG
(REM)
(RET)
GRADE
N

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

METRIC

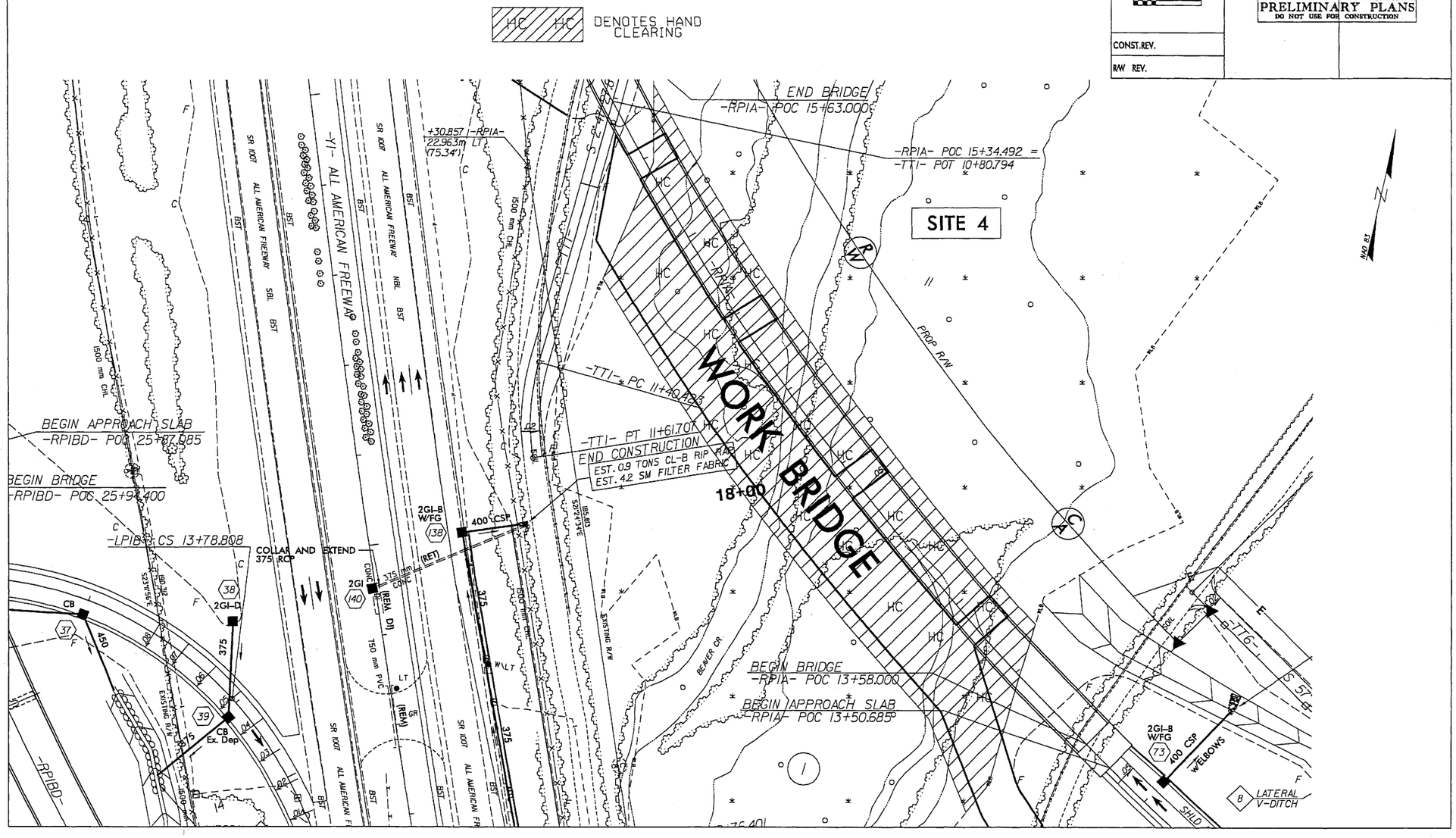
5m 0 10m

CONST.REV.

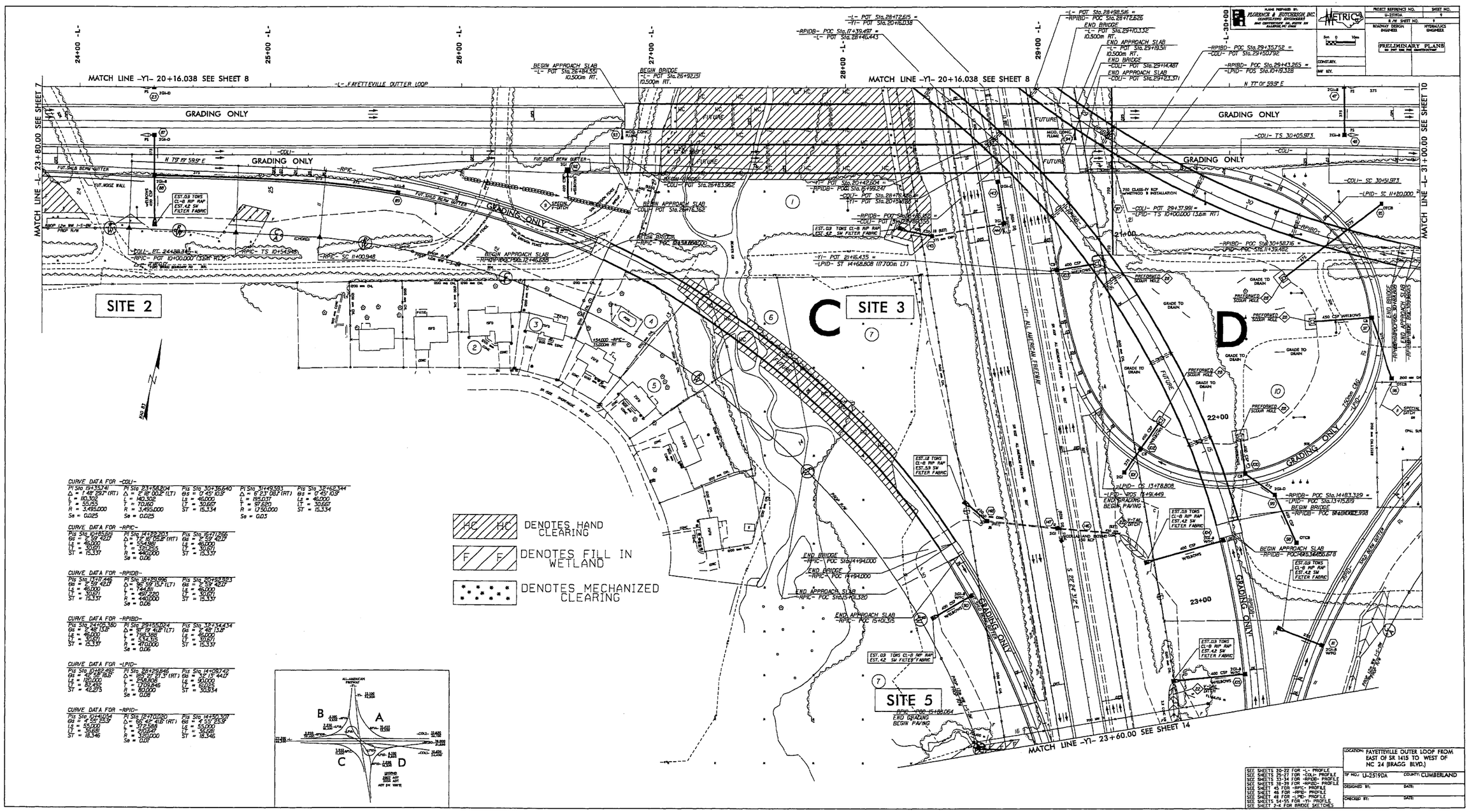
R/W REV.

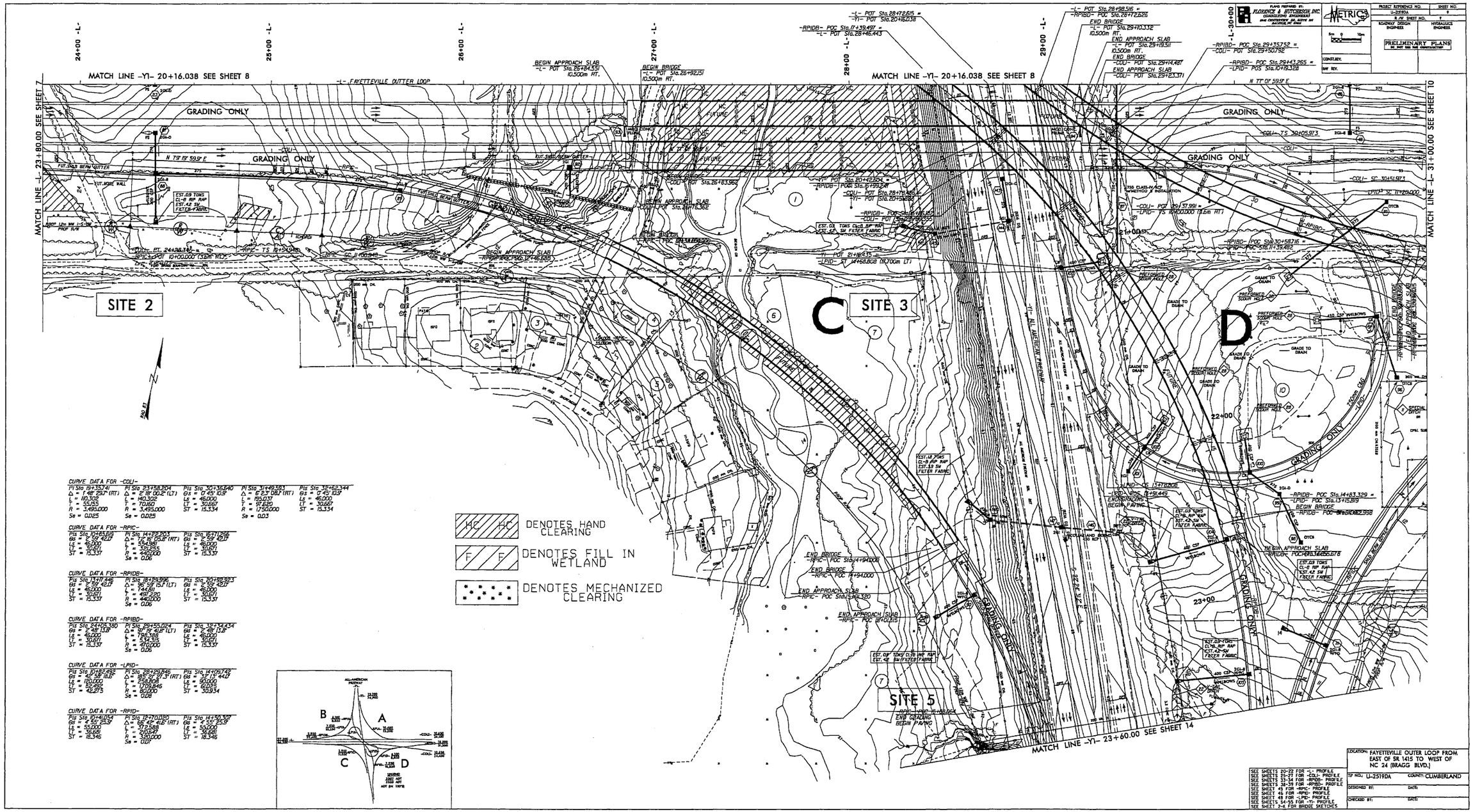
PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 19 of 30




PLANS PREPARED BY
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
PROJECT REFERENCE NO.
U-2519A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
MATCH LINE -Y1- 20+16.038 SEE SHEET 8
MATCH LINE -L- 23+80.00 SEE SHEET 7
MATCH LINE -L- 31+00.00 SEE SHEET 10
MATCH LINE -Y1- 23+60.00 SEE SHEET 14
-L- FAYETTEVILLE OUTER LOOP
GRADING ONLY
SITE 2
SITE 3
SITE 5
C
D
HC HC DENOTES HAND CLEARING
F F DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
CURVE DATA FOR -COU-
CURVE DATA FOR -RPIC-
CURVE DATA FOR -RPIDB-
CURVE DATA FOR -RPIBD-
CURVE DATA FOR -LPID-
CURVE DATA FOR -RPID-
LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)
TIP NO.: U-2519DA
COUNTY: CUMBERLAND
DESIGNED BY:
DATE:
CHECKED BY:
DATE:

6/09/99

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

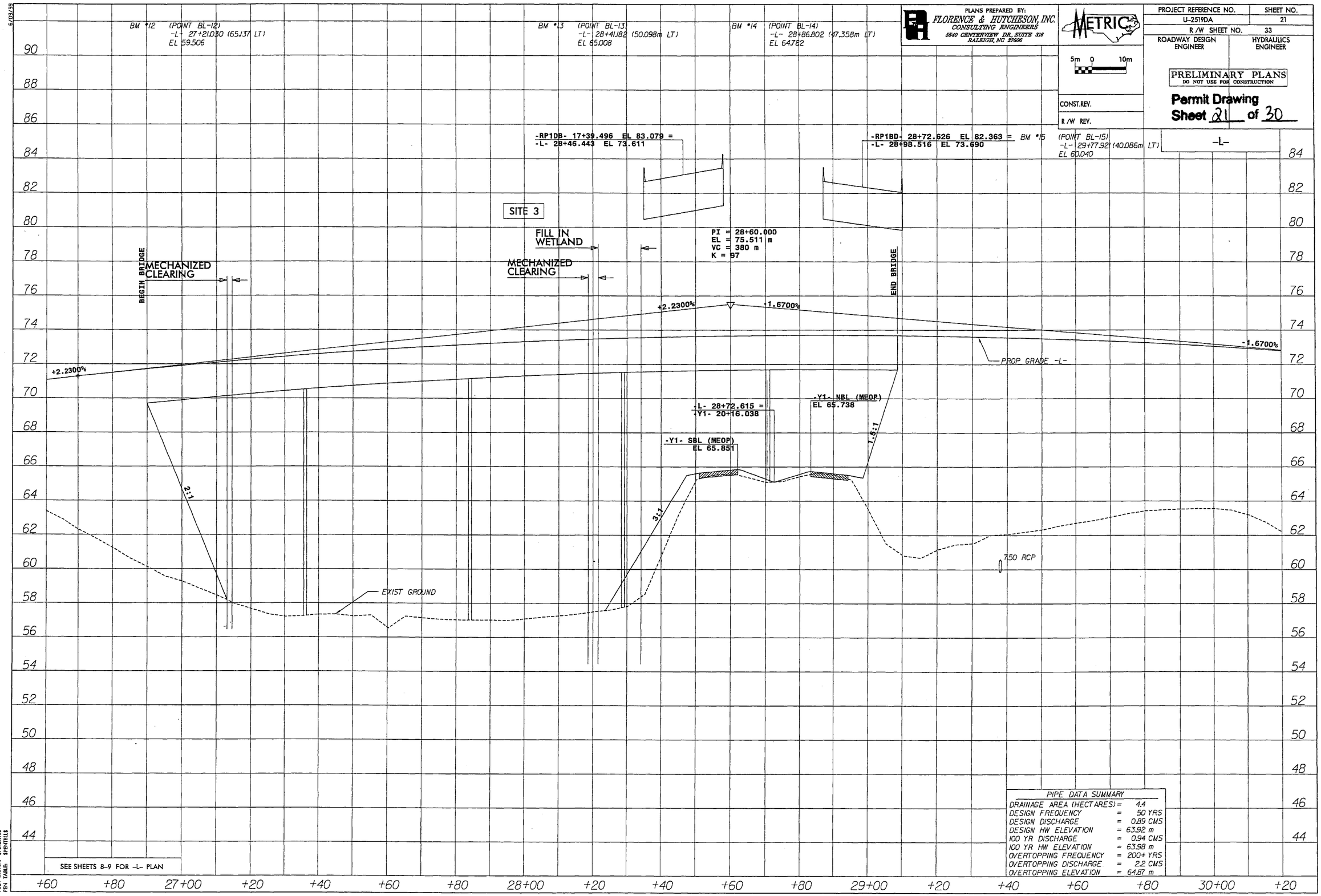
METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	21
R/W SHEET NO.	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 30

CONST. REV.
R/W REV.



PIPE DATA SUMMARY		
DRAINAGE AREA (HECTARES)	=	4.4
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	0.89 CMS
DESIGN HW ELEVATION	=	63.92 m
100 YR DISCHARGE	=	0.94 CMS
100 YR HW ELEVATION	=	63.98 m
OVERTOPPING FREQUENCY	=	200+ YRS
OVERTOPPING DISCHARGE	=	2.2 CMS
OVERTOPPING ELEVATION	=	64.87 m

SEE SHEETS 8-9 FOR -L- PLAN

FILE: $FILES $TIMES
DATE: $DATES
PLOT DRIVER: $PLTDRVR
PEN TABLE: $PENTBLS

Permit Drawing
Sheet 22 of 30

PLANS PREPARED BY: FLORENCE & HUTCHESON, INC. CONSULTING ENGINEERS 4944 CHAMPIONSHIP PARKWAY SW ALBANIA, NC 28001

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	18
R/W SHEET NO.	15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NO RIGHT OF WAY NOR CONSTRUCTION

CONCURRENCE:

R/W REV.

SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 27 FOR -COU- PROFILE
SEE SHEET 31 FOR -COU2- PROFILE
SEE SHEETS 39-41 FOR -RPIBD- PROFILE
SEE SHEET 42 FOR -RPIA- PROFILE
SEE SHEET 46 FOR -RPID- PROFILE
SEE SHEET 49 FOR -RPIB- PROFILE
SEE SHEETS 66-67 FOR -TT6- PROFILE
SEE SHEET 2-4 FOR BRIDGE SKETCHES
SEE SHEET 2-40 FOR WALL DETAILS

CURVE DATA FOR -RPIA-

Pi Sta	Pi Sta	Pi Sta
10+94.777	11+68.917	12+30.371
GS = 7° 32' 20.1"	Δ = 19° 39' 00.0" (RT)	GS = 1° 35' 56.4"
Ls = 75.000	L = 97.411	Ls = 3° 00' 56.3"
LT = 50.045	T = 49.185	Ls = 30.000
ST = 25.041	R = 295.000	LT = 167.187
	Se = 0.08	ST = 13.228

CURVE DATA FOR -COU-

Pi Sta	Pi Sta	Pi Sta	Pi Sta
23+58.204	30+36.640	31+49.593	32+62.344
Δ = 2° 18' 00.2" (LT)	GS = 0° 45' 10.9"	Δ = 6° 23' 08.7" (RT)	GS = 0° 45' 10.9"
L = 140.302	Ls = 46.000	L = 195.037	Ls = 46.000
T = 70.160	LT = 30.667	T = 97.520	LT = 30.667
R = 3,495.000	ST = 15.334	R = 1,750.000	ST = 15.334
Se = 0.025		Se = 0.03	

CURVE DATA FOR -RPIBD-

Pi Sta	Pi Sta	Pi Sta	Pi Sta	Pi Sta	Pi Sta
24+06.380	25+55.024	32+34.434	36+16.048	37+25.051	37+77.608
GS = 2° 48' 13.8"	Δ = 10° 19' 41.8" (LT)	GS = 2° 48' 13.8"	GS = 1° 30' 21.2"	Δ = 4° 09' 03.5" (RT)	GS = 1° 30' 21.2"
Ls = 46.000	L = 798.388	Ls = 46.000	Ls = 46.000	L = 63.194	Ls = 46.000
LT = 30.667	T = 399.315	LT = 30.667	LT = 30.667	T = 31.611	LT = 30.667
ST = 15.337	R = 4,770.000	ST = 15.337	ST = 15.334	R = 870.000	ST = 15.334
	Se = 0.06			Se = 0.04	

CURVE DATA FOR -RPID-

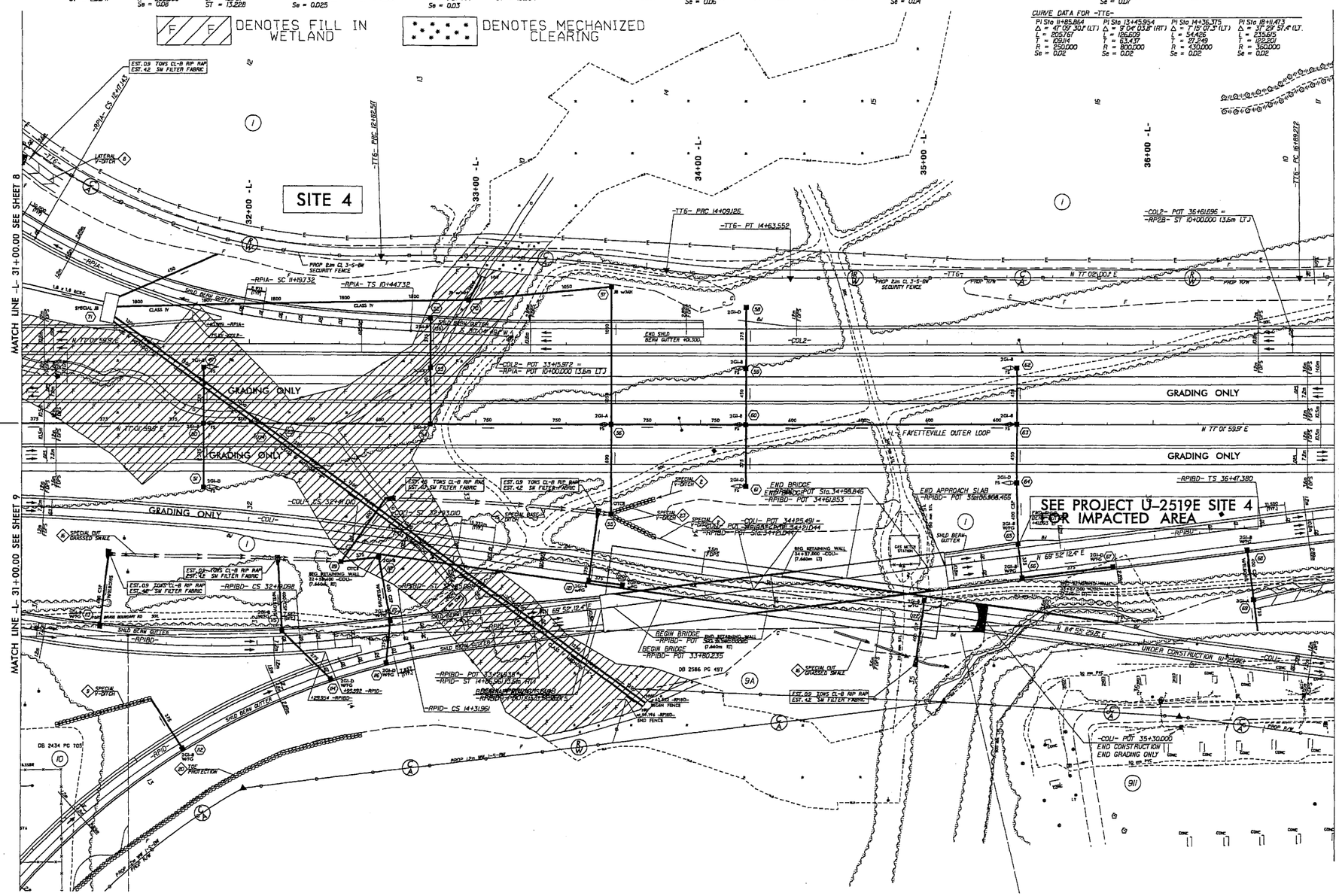
Pi Sta	Pi Sta	Pi Sta
10+41.054	12+01.020	14+30.307
GS = 4° 55' 23.5"	Δ = 65° 42' 41.6" (RT)	GS = 4° 55' 23.5"
Ls = 55.000	L = 137.588	Ls = 55.000
LT = 36.661	T = 75.047	LT = 36.661
ST = 18.346	R = 120.000	ST = 18.346
	Se = 0.07	

CURVE DATA FOR -TT6-

Pi Sta	Pi Sta	Pi Sta	Pi Sta
11+85.864	13+45.954	14+36.375	18+11.473
Δ = 47° 09' 30.1" (LT)	Δ = 9° 04' 03.8" (RT)	Δ = 7° 15' 07.3" (LT)	Δ = 37° 29' 57.4" (LT)
L = 205.767	L = 126.609	L = 54.426	L = 235.615
T = 109.14	T = 63.437	T = 27.249	T = 122.251
R = 250.000	R = 800.000	R = 430.000	R = 360.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)

TIP NO.: U-2519DA COUNTY: CUMBERLAND

DESIGNED BY: DATE:

CHECKED BY: DATE:

Permit Drawing
Sheet 23 of 30

CURVE DATA FOR -RPIA-

PIs Sta. 10+94.777	PI Sta. 11+68.917	PIs Sta. 12+30.771
GB = 7° 32' 20.7"	Δ = 19° 35' 00.0" (RT)	GB = 7° 29' 56.4"
Ls = 75.000	L = 97.411	GB = 3° 00' 56.5"
LT = 50.045	T = 49.185	Ls = 30.000
ST = 25.041	R = 285.000	LT = 16.741
	Se = 0.08	ST = 13.228

CURVE DATA FOR -COU-

PI Sta. 23+58.204	PIs Sta. 30+36.640	PI Sta. 31+49.591	PIs Sta. 32+60.344
Δ = 2° 18' 00.2" (LT)	Δ = 12° 45' 10.5"	Δ = 6° 23' 08.2" (RT)	GB = 12° 45' 10.5"
L = 140.302	Ls = 46.000	Ls = 46.000	Ls = 46.000
T = 70.160	LT = 30.667	LT = 30.667	LT = 30.667
R = 3,495.000	ST = 15.334	ST = 15.334	ST = 15.334
Se = 0.025		R = 1,750.000	
		Se = 0.03	

CURVE DATA FOR -RPIBD-

PIs Sta. 24+07.380	PI Sta. 29+55.094	PIs Sta. 31+14.434	PIs Sta. 36+18.048	PI Sta. 37+25.091	PIs Sta. 37+77.408
GB = 2° 48' 13.9"	Δ = 19° 19' 41.8" (LT)	GB = 2° 48' 13.9"	GB = 1° 30' 21.8"	Δ = 6° 09' 03.5" (RT)	GB = 1° 30' 21.8"
Ls = 46.000	L = 296.308	Ls = 46.000	Ls = 46.000	L = 64.364	Ls = 46.000
LT = 30.667	T = 149.575	LT = 30.667	LT = 30.667	T = 32.219	LT = 30.667
ST = 15.337	R = 870.000	ST = 15.337	ST = 15.334	R = 875.000	ST = 15.334
	Se = 0.06			Se = 0.04	

CURVE DATA FOR -RPID-

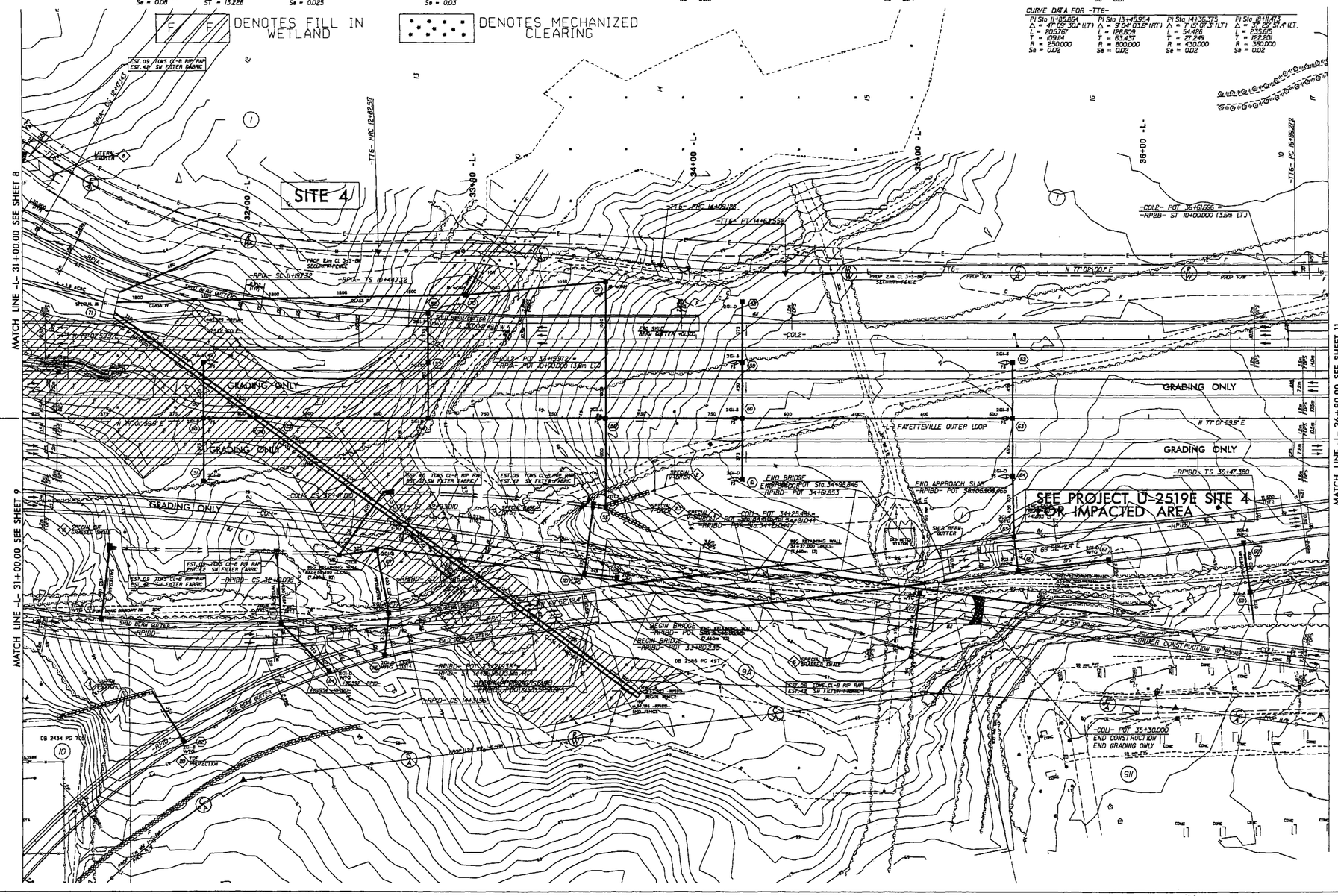
PIs Sta. 10+41.054	PI Sta. 12+17.020	PIs Sta. 14+50.101
GB = 2° 55' 29.5"	Δ = 55° 42' 41.0" (RT)	GB = 2° 55' 29.5"
Ls = 55.000	L = 172.688	Ls = 55.000
LT = 36.598	T = 93.247	LT = 36.598
ST = 18.346	R = 200.000	ST = 18.346
	Se = 0.07	

CURVE DATA FOR -TT6-

PI Sta. 11+85.864	PI Sta. 13+45.954	PI Sta. 14+35.375	PI Sta. 18+11.473
Δ = 41° 09' 30.0" (LT)	Δ = 9° 04' 03.8" (RT)	Δ = 7° 12' 01.3" (LT)	Δ = 37° 29' 51.4" (LT)
L = 205.767	L = 126.609	L = 54.426	L = 235.615
T = 109.14	T = 63.437	T = 27.249	T = 122.201
R = 250.000	R = 800.000	R = 430.000	R = 360.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



PLANS PREPARED BY: FLORENCE & HUTCHESON, INC. CONSULTING ENGINEERS 4944 PARKWAY PLAZA BLVD. CHARLOTTE, N.C. 28217

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	10
R/W SHEET NO.	16

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS

NO RIGHT OF WAY OR CONSTRUCTION

CONTRACT:

SUP REV.

SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 27 FOR -COL- PROFILE
SEE SHEET 31 FOR -COL2- PROFILE
SEE SHEETS 38-40 FOR -RPBD- PROFILE
SEE SHEET 42 FOR -RPIA- PROFILE
SEE SHEET 46 FOR -RPID- PROFILE
SEE SHEET 49 FOR -RPZB- PROFILE
SEE SHEETS 66-67 FOR -TT6- PROFILE
SEE SHEET 2-K FOR BRIDGE SKETCHES
SEE SHEET 2-AO FOR WALL DETAILS

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)

TIP NO.: U-2519DA COUNTY: CUMBERLAND

DESIGNED BY: DATE:

CHECKED BY: DATE:

6/03/99

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC

5m 0 10m

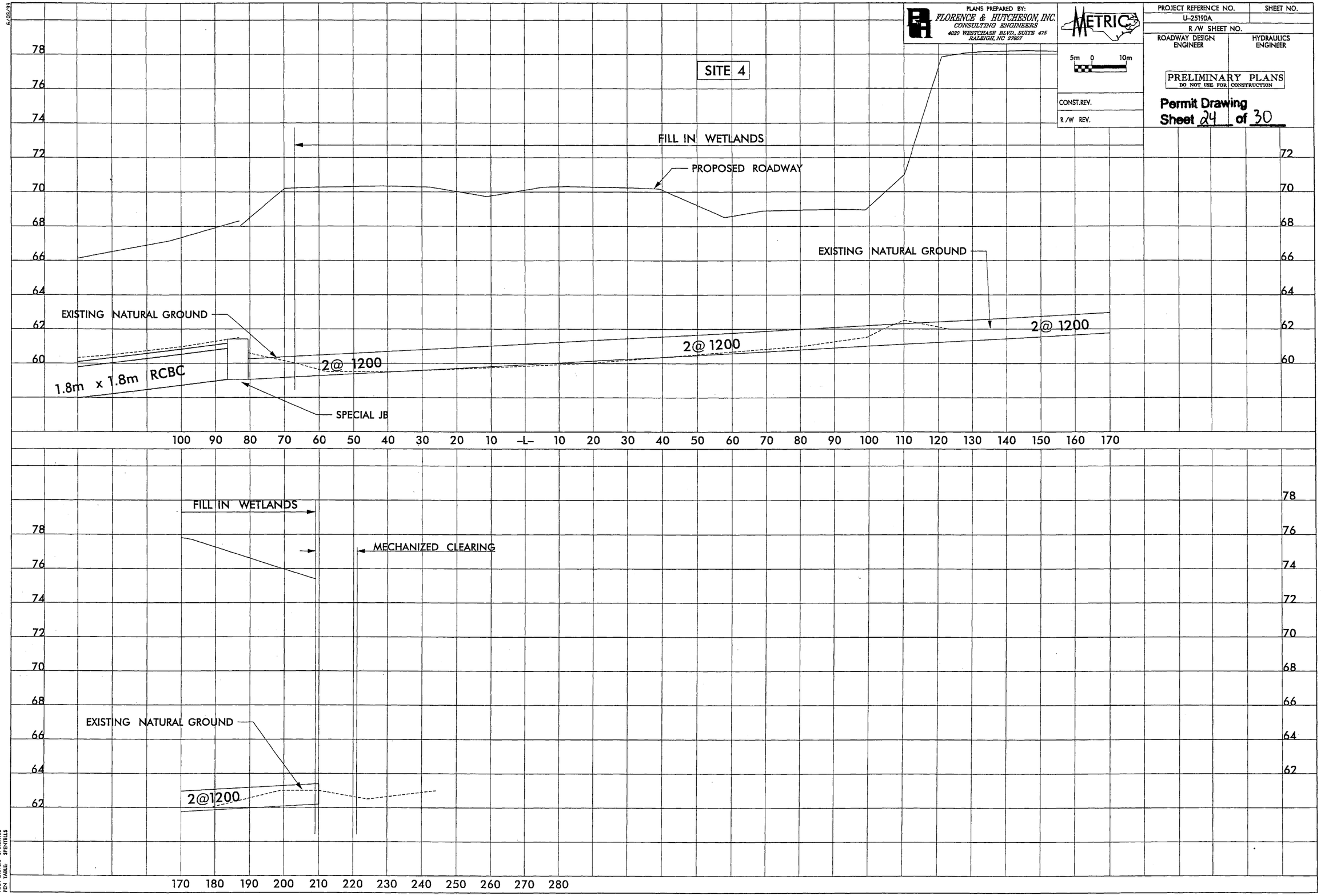
CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 24 of 30



FILE: $FILE$ $TIME$
DATE: $DATE$
PLOT DRIVER: $PLTDRV$
PEN TABLE: $PENTBL$

6/05/99

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 476
RALEIGH, NC 27607

METRIC

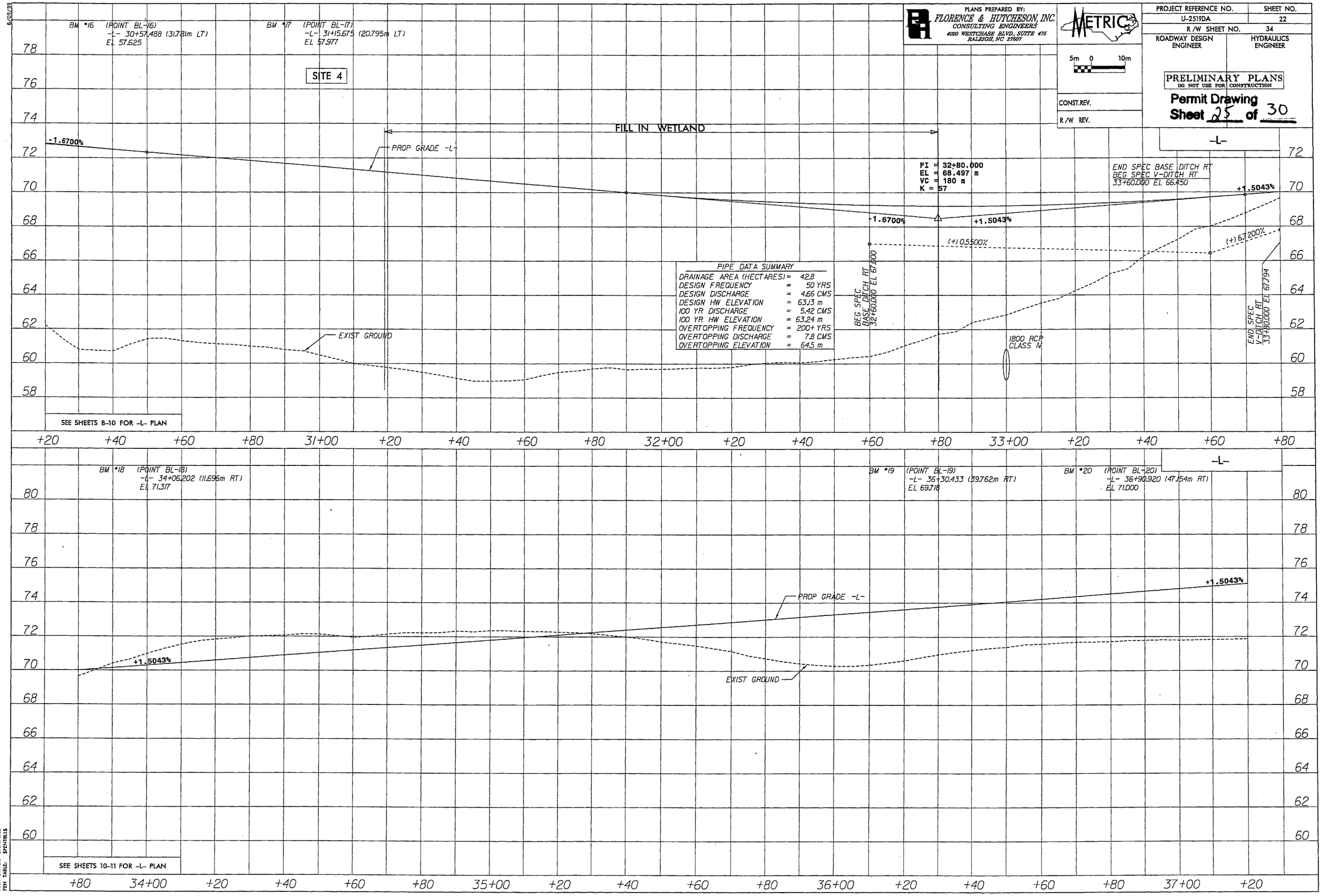
PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	22
R /W SHEET NO.	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 25 of 30

CONST.REV.

R /W REV.



FILE: $FILE$ $TIME$
DATE: $DATE$
PLOT DRIVER: $PLTDRV$
PEN TABLE: $PENTBL$

Permit Drawing
Sheet 26 of 30

PLANS PREPARED BY: FLORENCE & HUTCHISON, INC. CONSULTING ENGINEERS 2008 CONTINENTAL DR. NORTH 100 RALEIGH, N.C. 27609

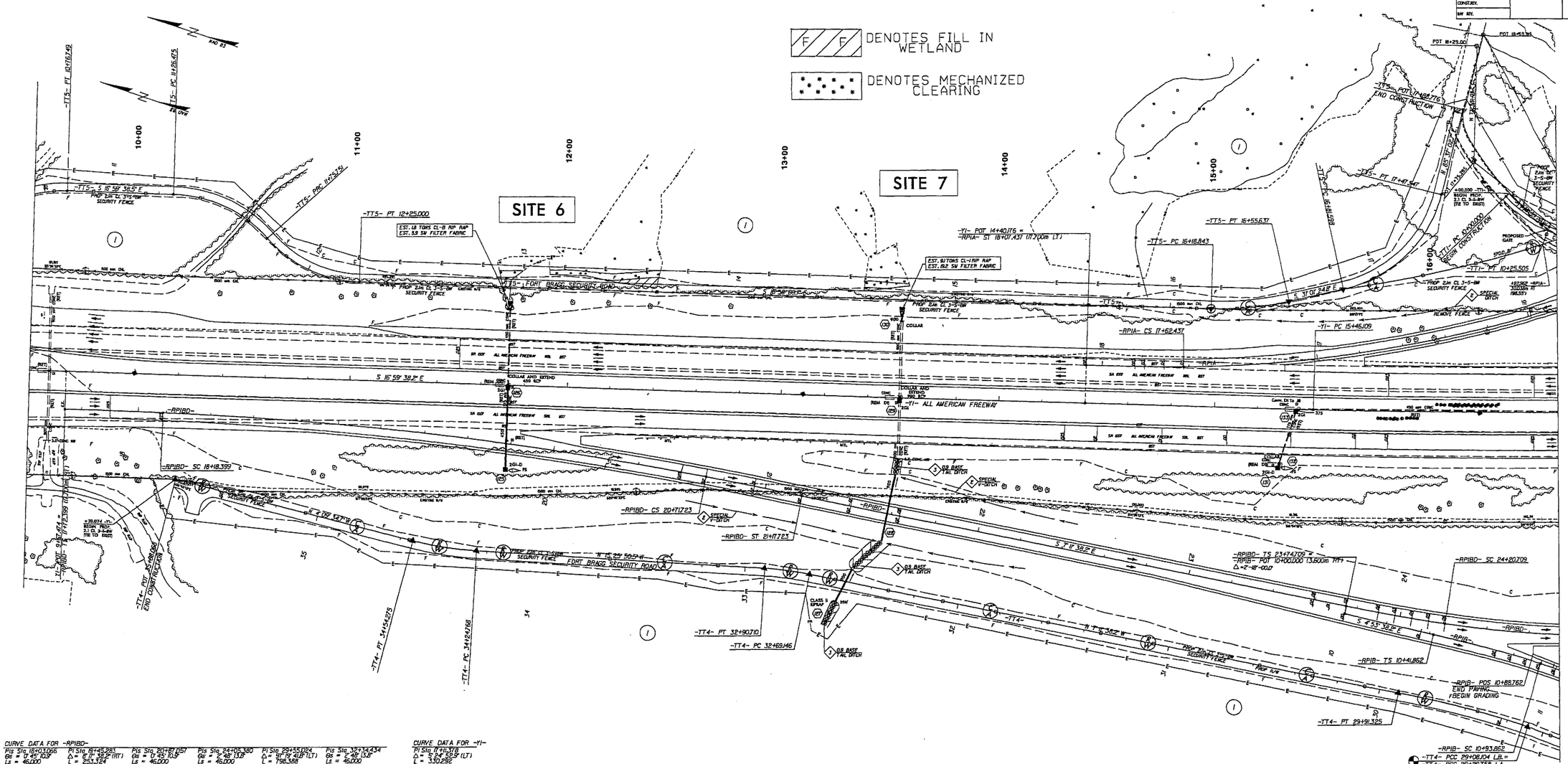
METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	13
R/W SHEET NO.	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

PRELIMINARY PLANS
NO RIGHT OF WAY OR CONSTRUCTION

CONST.REV.
RW REV.



CURVE DATA FOR -RPIBD-

PIs Sta. 18+01.386	PI Sta. 19+45.281	PIs Sta. 20+81.057	PIs Sta. 24+05.380	PIs Sta. 29+55.024	PIs Sta. 32+14.434
Gs = 0° 95' 10.9"	Δ = 6° 11' 38.2" (RT)	Gs = 0° 95' 10.9"	Gs = 2° 48' 13.2"	Δ = 91° 19' 41.8" (LT)	Gs = 2° 48' 13.2"
Ls = 46.000	Ls = 46.000	Ls = 46.000	Ls = 46.000	L = 798.588	Ls = 46.000
Lt = 30.667	L = 122.884	Lt = 30.667	Lt = 30.667	L = 574.316	Lt = 30.667
ST = 15.334	R = 1,500.000	ST = 15.334	ST = 15.337	R = 400.000	ST = 15.337
	Se = 0.025			Se = 0.025	

CURVE DATA FOR -Y1-

PI Sta. 17+41.378
Δ = 5° 54' 55.5" (LT)
L = 330.892
R = 3,000.000
Se = 0.025

CURVE DATA FOR -RPIA-

PI Sta. 15+21.889	PI Sta. 17+77.439
Δ = 49° 12' 25.1" (RT)	Gs = 2° 08' 54.9"
L = 515.294	Ls = 45.000
T = 271.745	Lt = 30.002
R = 600.000	ST = 15.002
Se = 0.05	

CURVE DATA FOR -RPIB-

Pis Sta. 10+76.539	PI Sta. 13+14.332	PI Sta. 15+04.892	
Gs = 4° 18' 29.3"	Δ = 54° 24' 53.7" (RT)	Gs = 4° 18' 29.3"	
Ls = 50.000	L = 393.487	Ls = 50.000	
Lt = 34.671	R = 420.410	Lt = 34.671	
ST = 17.342	Se = 0.07	ST = 17.342	

CURVE DATA FOR -TT1-

PI Sta. 10+12.948
Δ = 54° 57' 13.1" (LT)
L = 94.804
T = 51.348
R = 60.000
Se = 0.02

CURVE DATA FOR -TT4-

PI Sta. 29+60.580	PI Sta. 32+19.347	PI Sta. 34+35.569
Δ = 0° 03' 18.4" (LT)	Δ = 6° 52' 12.3" (LT)	Δ = 11° 15' 13.3" (RT)
L = 6.792	L = 91.564	L = 29.248
T = 3.396	L = 10.800	L = 14.800
R = 500.000	R = 150.000	R = 150.000
Se = 0.02	Se = 0.02	Se = 0.02

CURVE DATA FOR -TT5-

PI Sta. 10+12.376	PI Sta. 10+56.030	PI Sta. 11+52.592	PI Sta. 12+01.858	PI Sta. 16+31.333	PI Sta. 17+18.825
Δ = 15° 49' 14.5" (LT)	Δ = 40° 24' 56.8" (RT)	Δ = 41° 01' 16.7" (RT)	Δ = 47° 24' 47.2" (LT)	Δ = 14° 05' 15.7" (LT)	Δ = 5° 11' 32.3" (LT)
L = 15.338	L = 43.440	L = 49.275	L = 49.250	L = 36.194	L = 66.149
T = 9.716	L = 25.170	L = 26.102	L = 26.101	T = 18.195	T = 33.100
R = 110.000	R = 60.000	R = 60.000	R = 60.000	R = 150.000	R = 60.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

SEE SHEETS 36-37 FOR -RPIBD- PROFILE	
SEE SHEET 43 FOR -RPIA- PROFILE	
SEE SHEET 44 FOR -RPIB- PROFILE	
SEE SHEETS 51-53 FOR -Y1- PROFILE	
SEE SHEET 59 FOR -TT1- PROFILE	
SEE SHEETS 63-64 FOR -TT4- PROFILE	
SEE SHEETS 64-65 FOR -TT5- PROFILE	

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)

TIP NO.: U-2519DA COUNTY: CUMBERLAND

DESIGNED BY: DATE:

CHECKED BY: DATE:

Permit Drawing
Sheet 27 of 30

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
800 CROTOTHERY RD., SUITE 30
ALLENDALE, NC 29810

METRIC

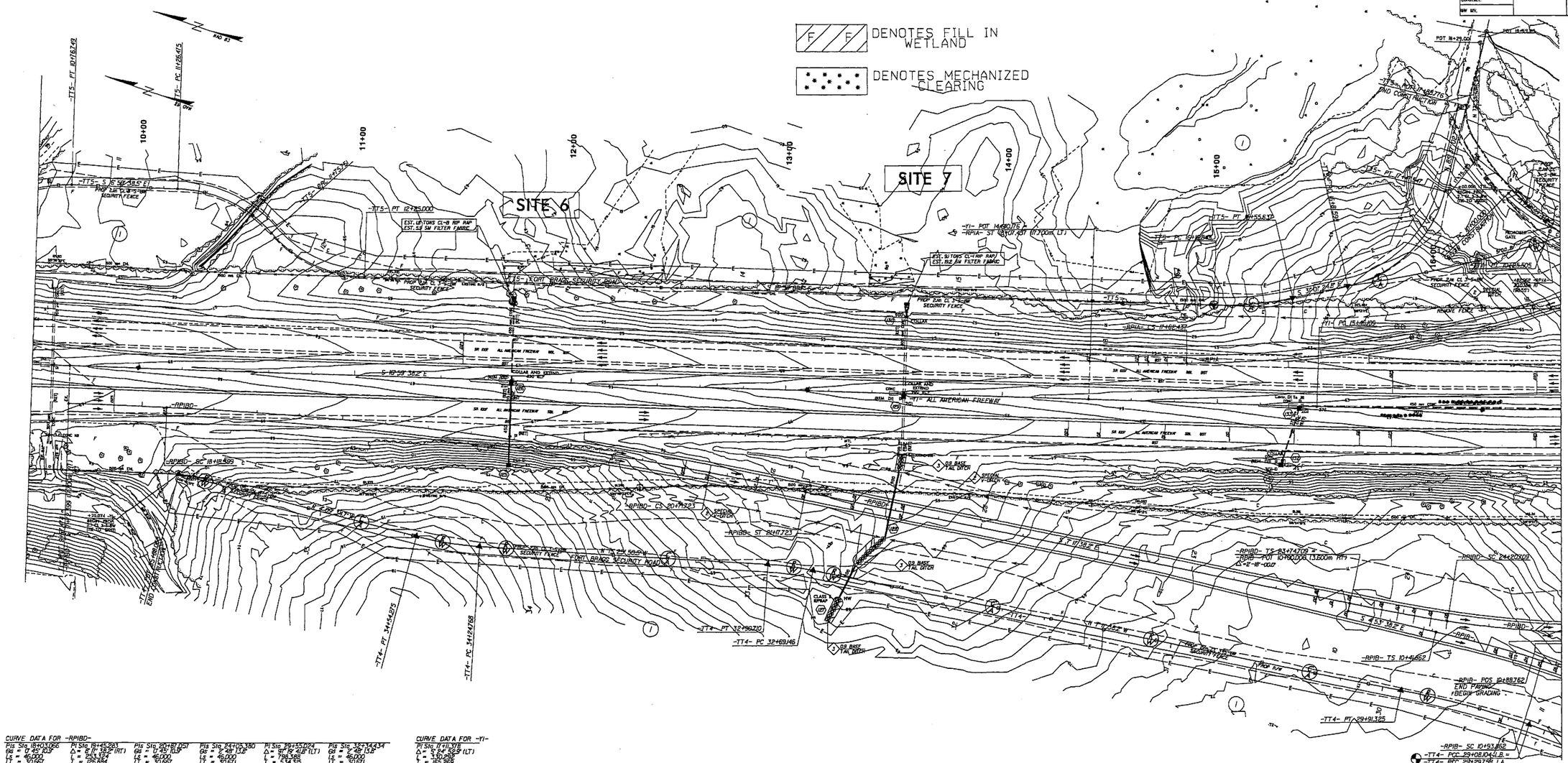
PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	13
R/W SHEET NO.	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

R/W SIV.



CURVE DATA FOR -RPIBD-

PIs Sta	PIs Sta	PIs Sta	PIs Sta	PIs Sta	PIs Sta
18+03.966	18+45.283	20+87.057	23+05.380	29+55.024	32+34.434
GS = 0°-40'-03"	GS = 6°-11'-38.2" (RT)	GS = 1°-45'-15.9"	GS = 2°-48'-13.2"	GS = 9°-15'-41.8" (LT)	GS = 2°-48'-13.2"
Δ = 40°-12'-25.0" (RT)	Δ = 6°-11'-38.2" (RT)	Δ = 40°-12'-25.0" (RT)	Δ = 40°-12'-25.0" (RT)	Δ = 79°-15'-41.8" (LT)	Δ = 40°-12'-25.0" (RT)
L = 515.294	L = 126.884	L = 30.860	L = 30.860	L = 554.316	L = 30.860
R = 600.000	R = 1,000.000	R = 1,000.000	R = 1,000.000	R = 400.000	R = 1,000.000
ST = 15.334	ST = 15.337	ST = 15.334	ST = 15.337	ST = 15.337	ST = 15.337
Se = 0.025	Se = 0.025			Se = 0.025	

CURVE DATA FOR -Y1-

PI Sta
11+41.978
Δ = 9°-24'-22.9" (LT)
L = 165.526
R = 1,000.000
Se = 0.025

CURVE DATA FOR -RPIA-

PI Sta	PI Sta
15+21.889	17+77.439
Δ = 49°-12'-25.0" (RT)	GS = 2°-08'-54.9"
L = 515.294	Ls = 45.000
T = 274.745	LT = 30.002
R = 600.000	ST = 15.002
Se = 0.025	

CURVE DATA FOR -RPIB-

PIs Sta	PI Sta	PI Sta	PIs Sta
10+76.539	13+14.332	13+47.947	15+04.692
GS = 4°-15'-22.5"	GS = 6°-24'-53.7" (RT)	GS = 4°-15'-22.5"	GS = 4°-15'-22.5"
Ls = 50.000	L = 193.468	Ls = 50.000	Ls = 50.000
LT = 34.577	T = 96.810	LT = 34.577	LT = 34.577
ST = 17.342	R = 1,500.000	ST = 17.342	ST = 17.342
	Se = 0.021		

CURVE DATA FOR -TT1-

PI Sta
10+19.948
Δ = 24°-21'-19.7" (LT)
L = 215.505
T = 109.346
R = 600.000
Se = 0.02

CURVE DATA FOR -TT4-

PI Sta	PI Sta	PI Sta	PI Sta
29+60.580	32+79.947	32+79.947	34+39.569
Δ = 7°-01'-18.4" (LT)	Δ = 8°-16'-12.3" (LT)	Δ = 11°-16'-15.8" (RT)	Δ = 11°-16'-15.8" (RT)
L = 60.567	L = 201.564	L = 159.508	L = 159.508
T = 30.321	T = 101.800	T = 79.802	T = 79.802
R = 500.000	R = 1,500.000	R = 1,500.000	R = 1,500.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

CURVE DATA FOR -TT5-

PI Sta	PI Sta	PI Sta	PI Sta	PI Sta	PI Sta
10+92.176	10+56.030	11+52.598	12+01.858	16+37.333	17+18.625
Δ = 15°-48'-14.5" (LT)	Δ = 41°-28'-56.8" (RT)	Δ = 41°-03'-16.7" (RT)	Δ = 41°-01'-47.3" (LT)	Δ = 14°-03'-15.7" (LT)	Δ = 63°-51'-32.5" (LT)
L = 193.109	L = 43.440	L = 49.275	L = 49.250	L = 16.794	L = 66.145
T = 97.16	T = 22.701	T = 26.123	T = 26.101	T = 16.490	T = 37.021
R = 70.000	R = 60.000	R = 60.000	R = 60.000	R = 150.000	R = 60.000
Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02	Se = 0.02

SEE SHEETS 36-37 FOR -RPIBD- PROFILE
SEE SHEET 43 FOR -RPIA- PROFILE
SEE SHEET 44 FOR -RPIB- PROFILE
SEE SHEETS 51-53 FOR -Y1- PROFILE
SEE SHEET 55 FOR -TT1- PROFILE
SEE SHEETS 63-64 FOR -TT4- PROFILE
SEE SHEETS 64-65 FOR -TT5- PROFILE

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF SR 1415 TO WEST OF NC 24 (BRAGG BLVD.)

TIP NO.: U-2519DA COUNTY: CUMBERLAND

DESIGNED BY: DATE:

CHECKED BY: DATE:

Permit Drawing
Sheet 28 of 30

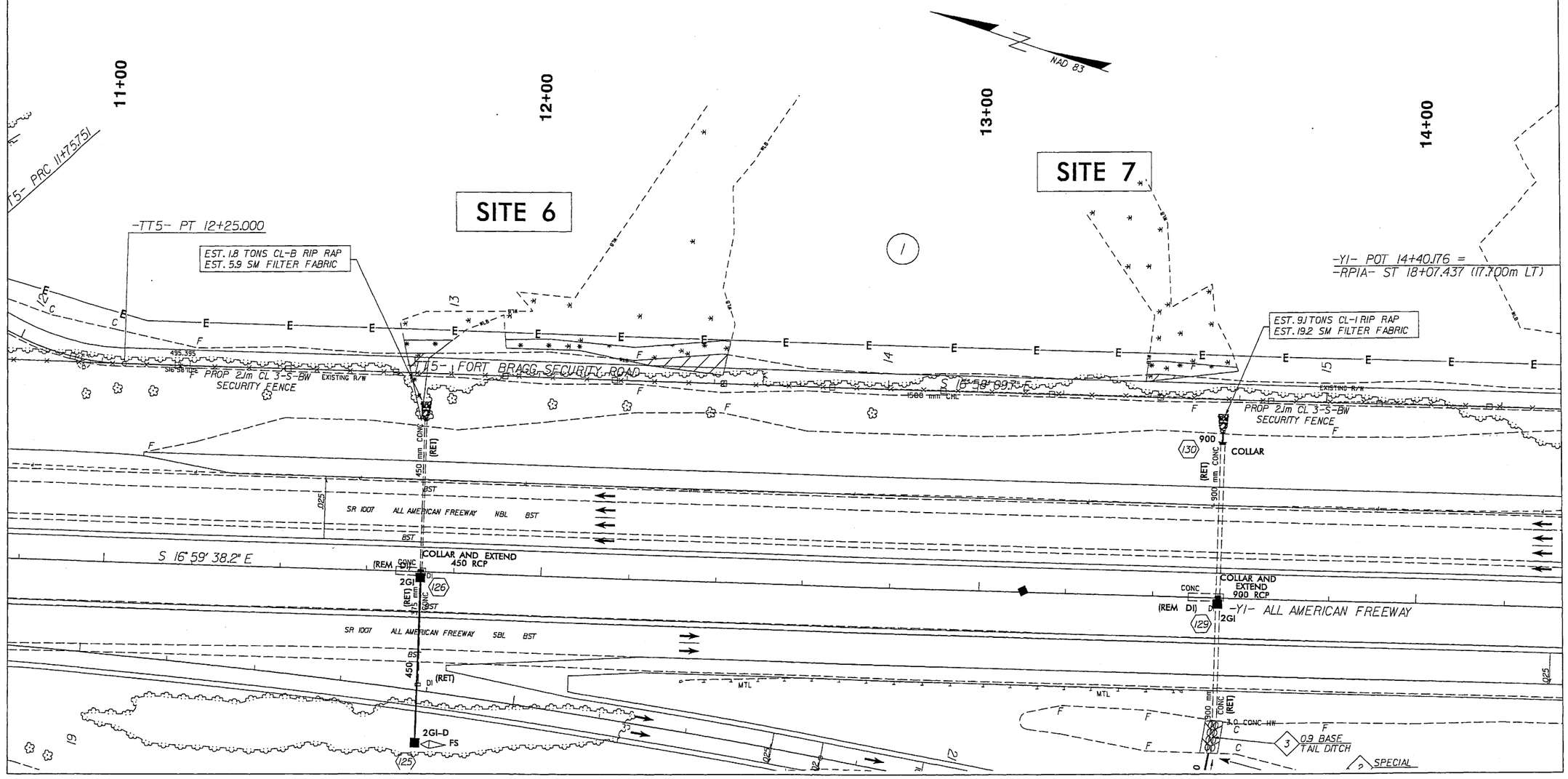
PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
5540 CENTERVIEW DR., SUITE 316
RALEIGH, NC 27606

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.



PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	14
R /W SHEET NO.	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 29 of 30

SEE SHEET 33 FOR -RPIDB- PROFILE
SEE SHEET 45 FOR -RPIC- PROFILE
SEE SHEET 46 FOR -RPID- PROFILE
SEE SHEETS 55-56 FOR -Y1- PROFILE

CURVE DATA FOR -RPIDB-

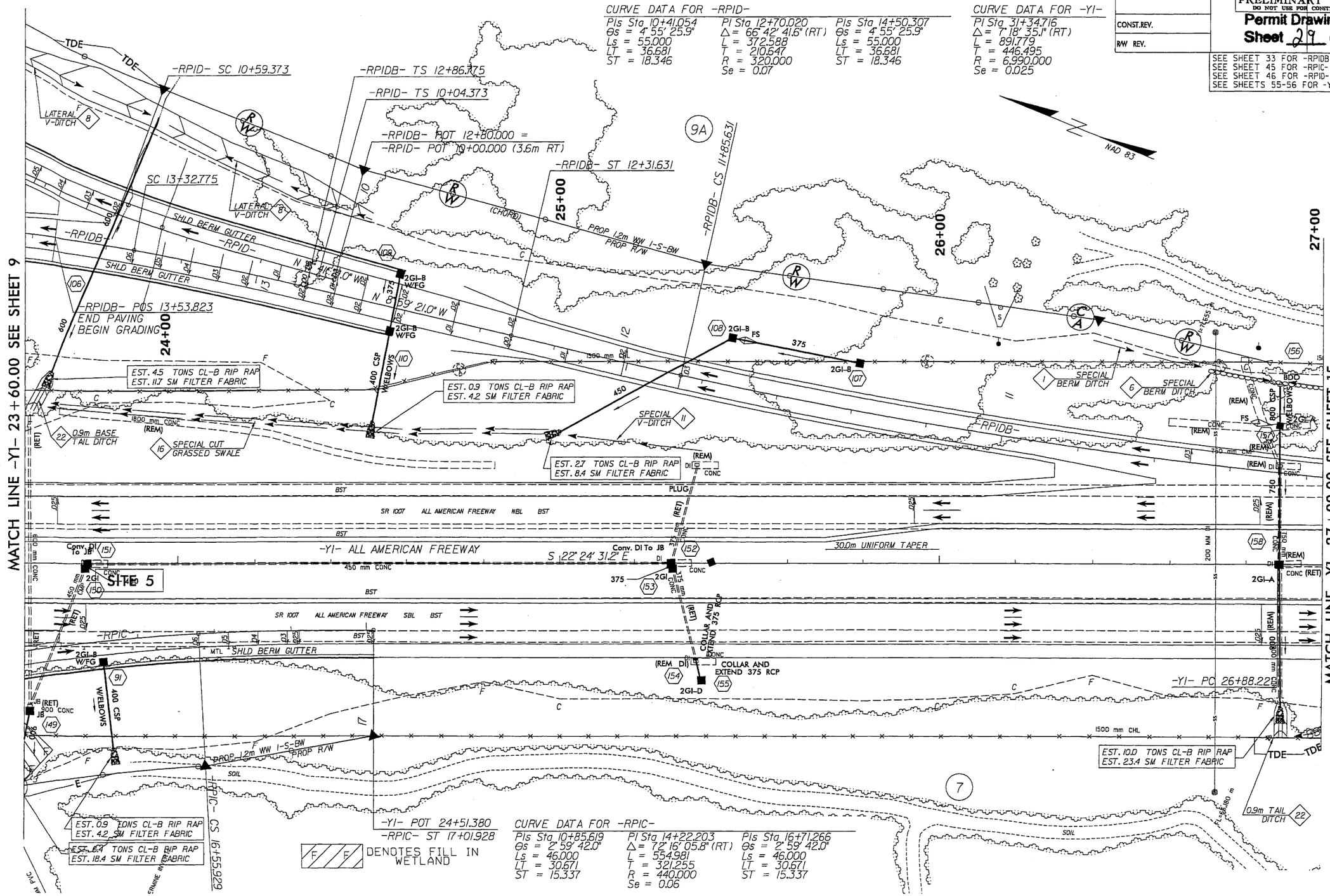
PIs Sta 9+16.794	PI Sta 10+59.226	PIs Sta 12+00.964	PIs Sta 13+17.446	PI Sta 18+29.996	PIs Sta 20+92.923
Θs = 0° 56' 28.6"	Δ = 10° 22' 29.2" (RT)	Θs = 0° 56' 28.6"	Θs = 2° 59' 42.0"	Δ = 96° 59' 15.1" (LT)	Θs = 2° 59' 42.0"
Ls = 46.000	L = 253.504	Ls = 46.000	Ls = 46.000	L = 744.811	Ls = 46.000
LT = 30.667	T = 127.099	LT = 30.667	LT = 30.671	T = 497.220	LT = 30.671
ST = 15.334	R = 1,400.000	ST = 15.334	ST = 15.337	R = 440.000	ST = 15.337
	Se = 0.03			Se = 0.06	

CURVE DATA FOR -RPID-

PIs Sta 10+41.054	PI Sta 12+70.020	PIs Sta 14+50.307
Θs = 4° 55' 25.9"	Δ = 66° 42' 41.6" (RT)	Θs = 4° 55' 25.9"
Ls = 55.000	L = 372.588	Ls = 55.000
LT = 36.681	T = 210.647	LT = 36.681
ST = 18.346	R = 320.000	ST = 18.346
	Se = 0.07	

CURVE DATA FOR -Y1-

PI Sta 31+34.716
Δ = 7° 18' 35.1" (RT)
L = 891.779
T = 446.495
R = 6,990.000
Se = 0.025



PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
4020 WESTCHASE BLVD., SUITE 475
RALEIGH, NC 27607

METRIC
5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
U-2519DA	14
R/W SHEET NO.	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 30 of 30

SEE SHEET 33 FOR -RPIDB- PROFILE
SEE SHEET 45 FOR -RPIC- PROFILE
SEE SHEET 46 FOR -RPID- PROFILE
SEE SHEETS 55-56 FOR -Y1- PROFILE

CURVE DATA FOR -RPIDB-

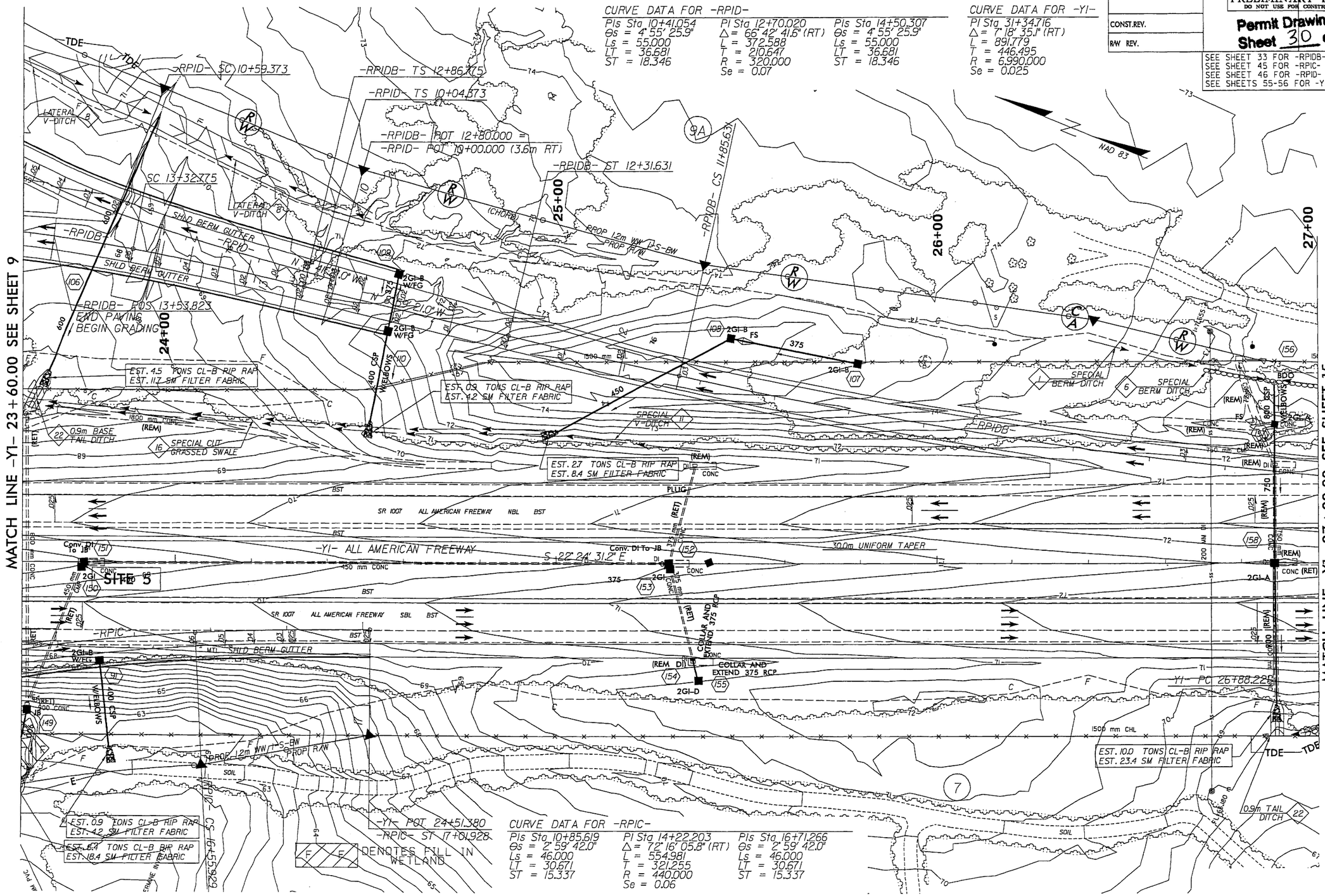
PIs Sta 9+16.794	PI Sta 10+59.226	PIs Sta 12+00.964	PIs Sta 13+17.446	PI Sta 18+29.996	PIs Sta 20+92.923
Θs = 0° 56' 28.6"	Δ = 10° 22' 29.2" (RT)	Θs = 0° 56' 28.6"	Θs = 2° 59' 42.0"	Δ = 96° 59' 15.1" (LT)	Θs = 2° 59' 42.0"
Ls = 46.000	L = 253.504	Ls = 46.000	Ls = 46.000	L = 744.811	Ls = 46.000
LT = 30.667	T = 127.099	LT = 30.667	LT = 30.671	T = 497.220	LT = 30.671
ST = 15.334	R = 1,400.000	ST = 15.334	ST = 15.337	R = 440.000	ST = 15.337
	Se = 0.03			Se = 0.06	

CURVE DATA FOR -RPID-

PIs Sta 10+41.054	PI Sta 12+70.020	PIs Sta 14+50.307
Θs = 4° 55' 25.9"	Δ = 66° 42' 41.6" (RT)	Θs = 4° 55' 25.9"
Ls = 55.000	L = 372.588	Ls = 55.000
LT = 36.681	T = 210.647	LT = 36.681
ST = 18.346	R = 320.000	ST = 18.346
	Se = 0.07	

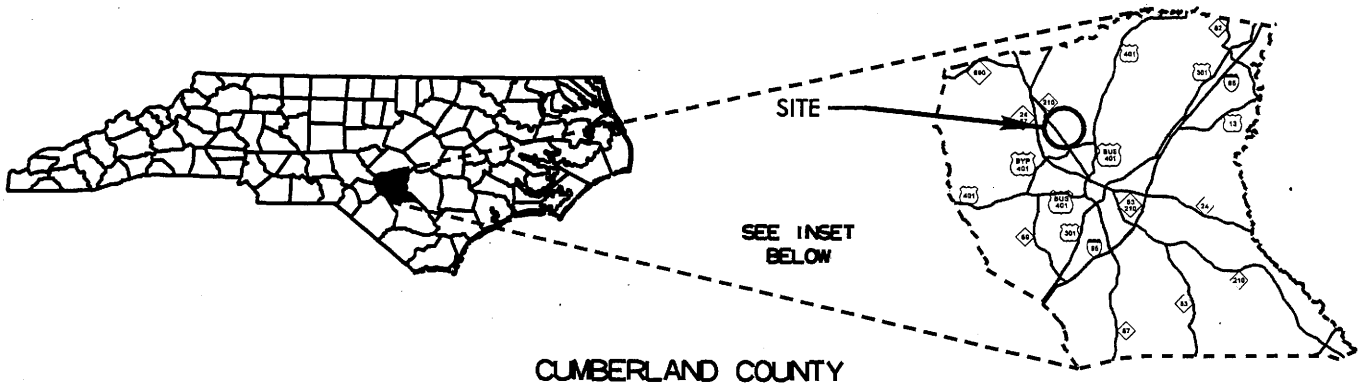
CURVE DATA FOR -Y1-

PI Sta 31+34.716
Δ = 7° 18' 35.1" (RT)
L = 891.779
T = 446.495
R = 6,990.000
Se = 0.025

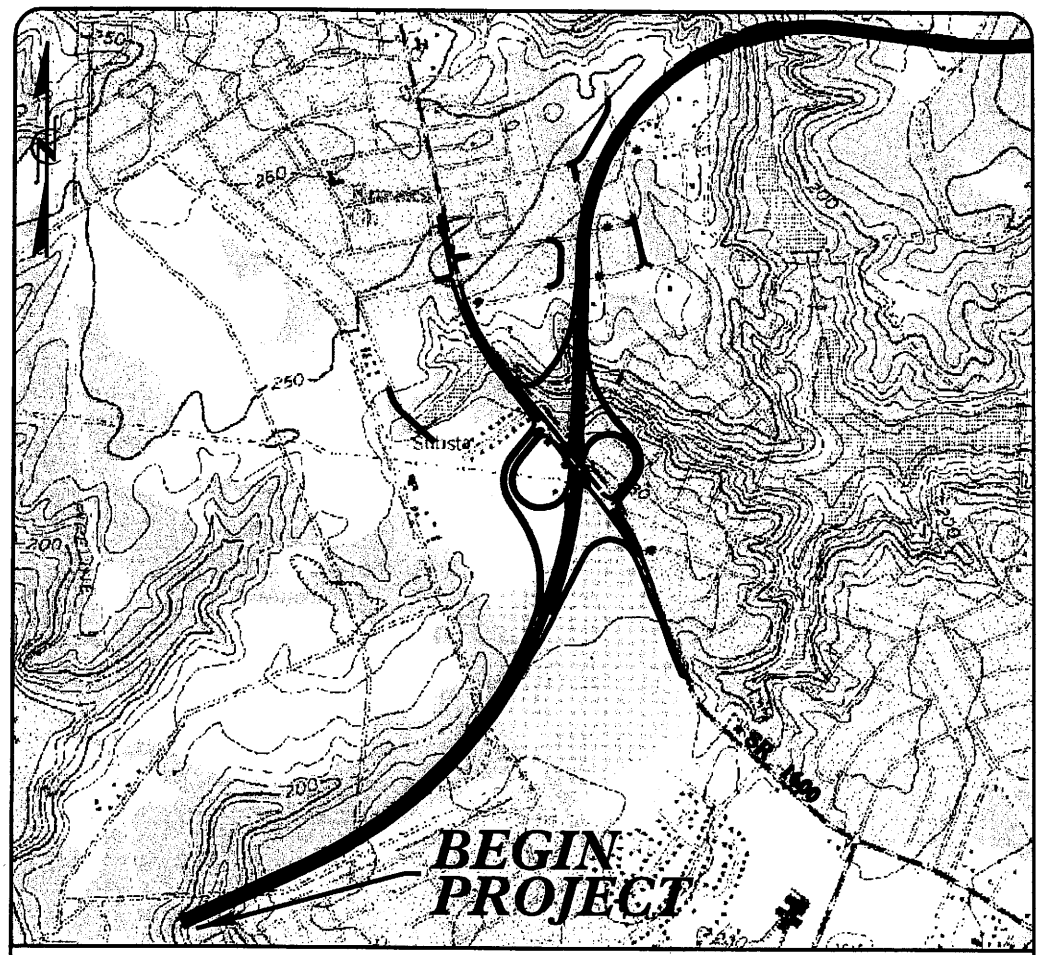


CURVE DATA FOR -RPIC-

PIs Sta 10+85.619	PI Sta 14+22.203	PIs Sta 16+71.266
Θs = 2° 59' 42.0"	Δ = 72° 16' 05.8" (RT)	Θs = 2° 59' 42.0"
Ls = 46.000	L = 554.981	Ls = 46.000
LT = 30.671	T = 321.255	LT = 30.671
ST = 15.337	R = 440.000	ST = 15.337
	Se = 0.06	



CUMBERLAND COUNTY



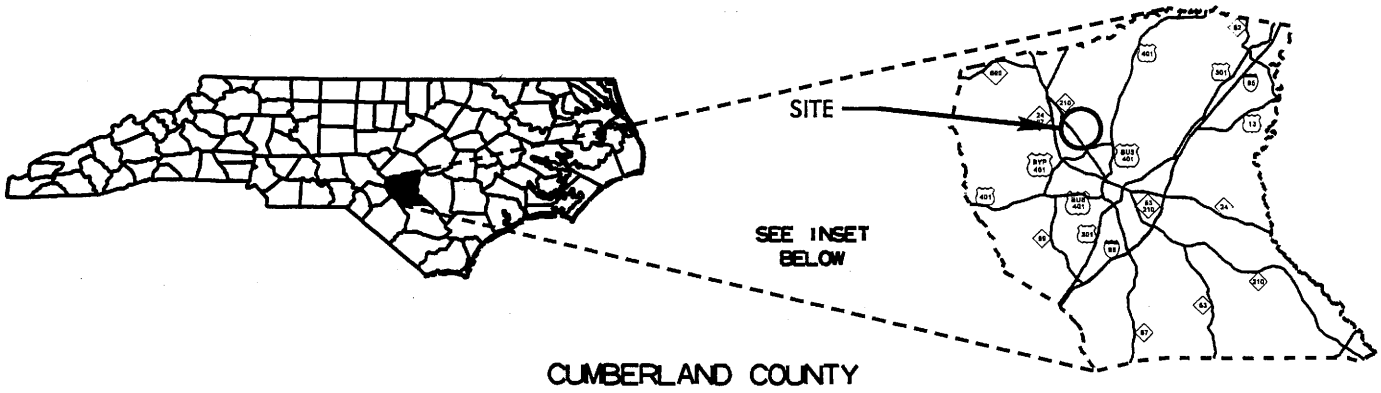
VICINITY MAP NTS

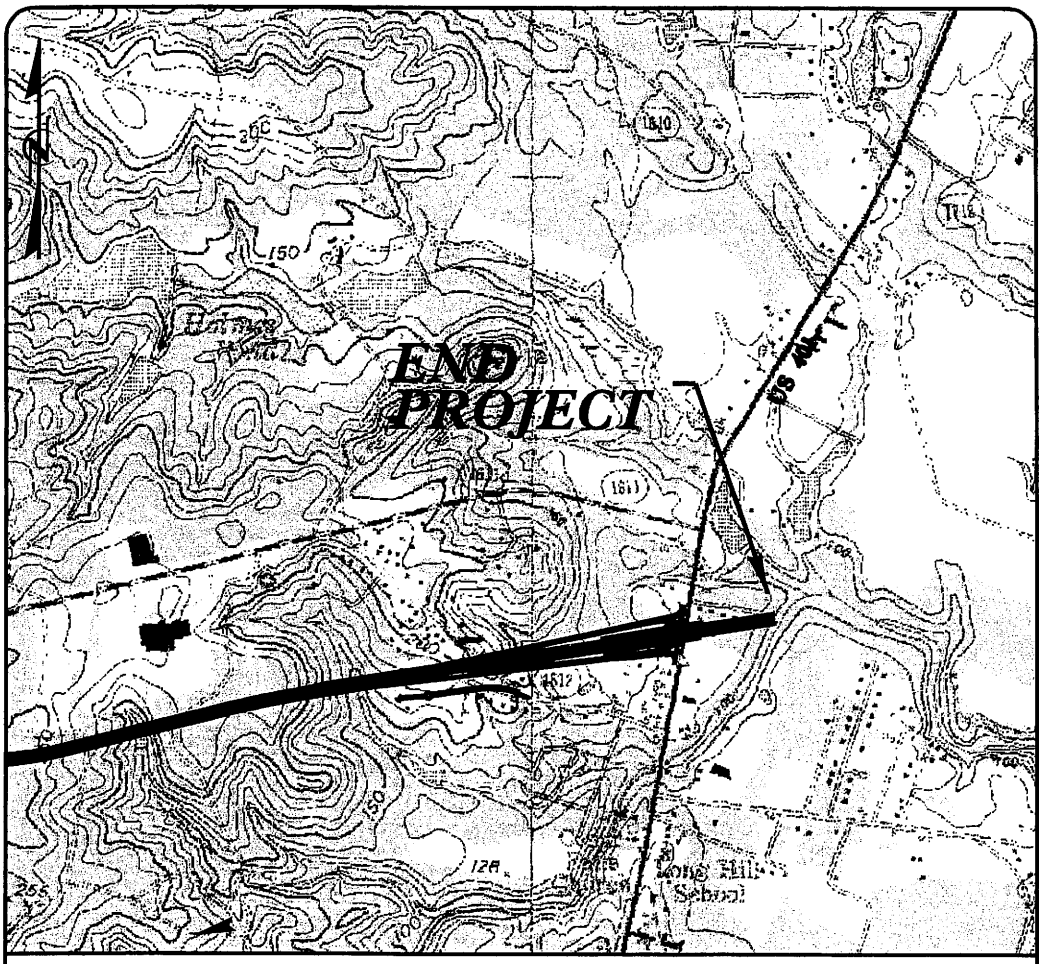
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
PROJECT: 35196.1.2 (X-0002C)
FAYETTEVILLE OUTER LOOP
FROM 2.09km EAST OF
NC 87-NC 210 TO US 401

SHEET 1 OF 2 **12/7/07**

Permit Drawing
Sheet 1 of 64





VICINITY MAP NTS

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
PROJECT: 35196.1.2 (X-0002C)
FAYETTEVILLE OUTER LOOP
FROM 2.09km EAST OF
NC 87-NC 210 TO US 401

SHEET 2 OF 2 **12/7/07**

Permit Drawing
Sheet 2 of 64

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Natural Stream Design (ft)
1	83+50-85+00 -L-	72" RCP	1.11		0.03	0.10		0.04		279	
2	92+90-93+80 -L-	42" RCP	0.50		0.02	0.08					
3	105+15-105+70 -L-	2 @ 6' x 7' RCBC	0.76			0.05		0.72		775	
4	117+95-118+70 -L-	325' Bridge	0.36			0.08	0.55				
5	129+60-130+20 -L-	54" RCP	0.69			0.06		0.02		361	
6	135+55-137+00 -L-	60" RCP	1.68			0.09		0.04		479	
7	141+30-142+30 -L-	36" RCP	1.55			0.05		0.01		213	
8	144+45-144+90 -L-	48" RCP	0.09			0.04	0.21	0.06		509	
9	14+20 -Y-Rev	2 @ 6' x 7' RCBC						0.01		98	
TOTALS:			6.73		0.05	0.57	0.76	0.91		2715	

FILL IN SURFACE WATERS (POND)
SITE 3: 0.60 ac
SITE 9: Unknown Impact at this time.

Permit Drawing
Sheet 3 of 64

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
WBS - 35196.1.2 (X-0002C)

SHEET 4/23/2008

JMD Revised 2/03/05

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS			
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Natural Stream Design (m)
1	83+50-85+00 -L-	1800 mm RCP	0.448		0.013	0.040		0.015		85	
2	92+90-93+80 -L-	1050 mm RCP	0.203		0.007	0.033					
3	105+15-105+70 -L-	2 @ 1.8m x 2.1m RCBC	0.306			0.022		0.292		236	
4	117+95-118+70 -L-	99m Bridge	0.145			0.034	0.223				
5	129+60-130+20 -L-	1350 mm RCP	0.280			0.025		0.008		110	
6	135+55-137+00 -L-	1500 mm RCP	0.680			0.038		0.018		146	
7	141+30-142+30 -L-	900 mm RCP	0.626			0.021		0.004		65	
8	144+45-144+90 -L-	1200 mm RCP	0.037			0.018	0.084	0.026		155	
9	14+20 -Y-Rev	2 @ 1.8m x 2.1m RCBC						0.004		30	
TOTALS:			2.725		0.020	0.231	0.307	0.367		827	

FILL IN SURFACE WATERS (POND)
SITE 3: 0.243 ha
SITE 9: Unknown Impact at this time.

Permit Drawing
Sheet 4 of 64

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
WBS - 35196.1.2 (X-0002C)

SHEET 4/23/2008

JMD Revised 2/03/05

List of Property Owners:

Parcel No.	
53	McKinnie, Nellie E. Evans 1324 McArthur Road Fayetteville, NC 28311-1203
89	Andrews Road Company PO Box 58329 Fayetteville, NC 28305
128	Coleman, W. C. 1041 Bragg Boulevard Fayetteville, NC 28301-4511

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY
PROJECT 35196.1.2 x-0002C

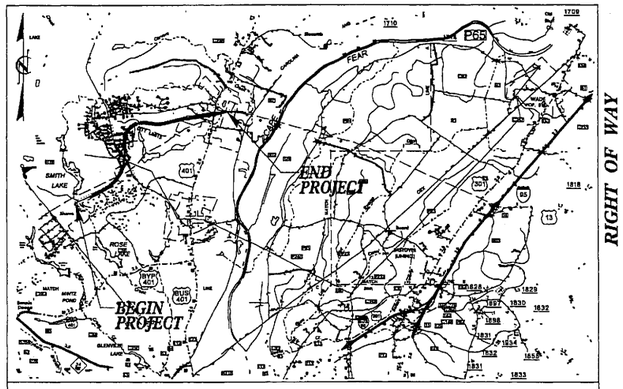
Sheet of 12/7/2007

Permit Drawing
Sheet 5 of 64

9/09/99

TIP PROJECT: X-0002C

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: FAYETTEVILLE OUTER LOOP FROM 2.09km EAST OF NC87–NC210 TO US401

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS AND STRUCTURES

METRIC
ALL DIMENSIONS IN THESE PLANS ARE IN METERS

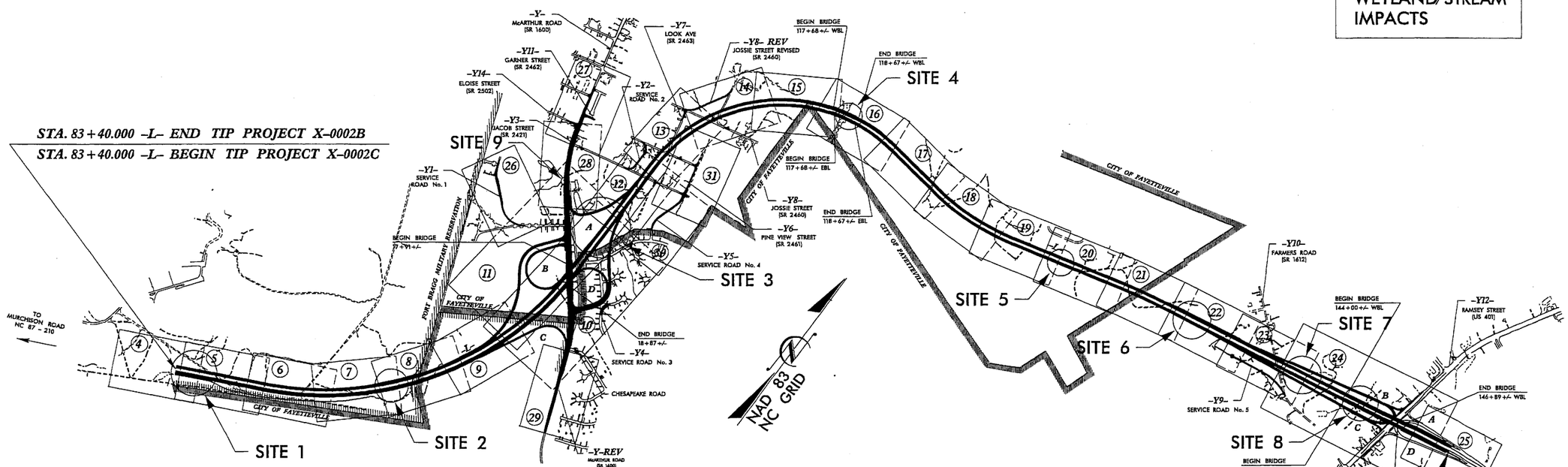
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	X-0002C	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35196.1.2	NHF-DPR-0100(002)	P.E.

Permit Drawing
Sheet 16 of 64

WETLAND/STREAM IMPACTS

STA. 83+40.000 -L- END TIP PROJECT X-0002B
STA. 83+40.000 -L- BEGIN TIP PROJECT X-0002C



STA. 149+10.035 -L- END TIP PROJECT X-0002C
STA. 149+10.035 -L- BEGIN TIP PROJECT X-0002DA

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

A PORTION OF THE PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE.

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES

CONTRACT:

GRAPHIC SCALES

5 0 10 PLANS

5 0 10 PROFILE (HORIZONTAL)

1 0 2 PROFILE (VERTICAL)

DESIGN DATA

ADT 2008	=	34,700
ADT 2030	=	59,600
DHV	=	9 %
D	=	55 %
T	=	10 % *
V	=	11 km/h

* (TTST 4 % DUAL 6 %)
FUNC. CLASS = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT X-0002C	=	6.385 km
LENGTH STRUCTURES TIP PROJECT X-0002C	=	0.185 km*
TOTAL LENGTH OF TIP PROJECT X-0002C	=	6.570 km

* NOTE: LENGTH BASED ON WBL BRIDGES

Prepared In the Office of:
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 31, 2006

LETTING DATE: NOVEMBER 2008

T.R. REID, P.E.
PROJECT ENGINEER

T.E. HUFFMAN, P.E.
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.

$$$$SYSTIME$$$$
$$$$USER$$$$
$$$$DGN$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

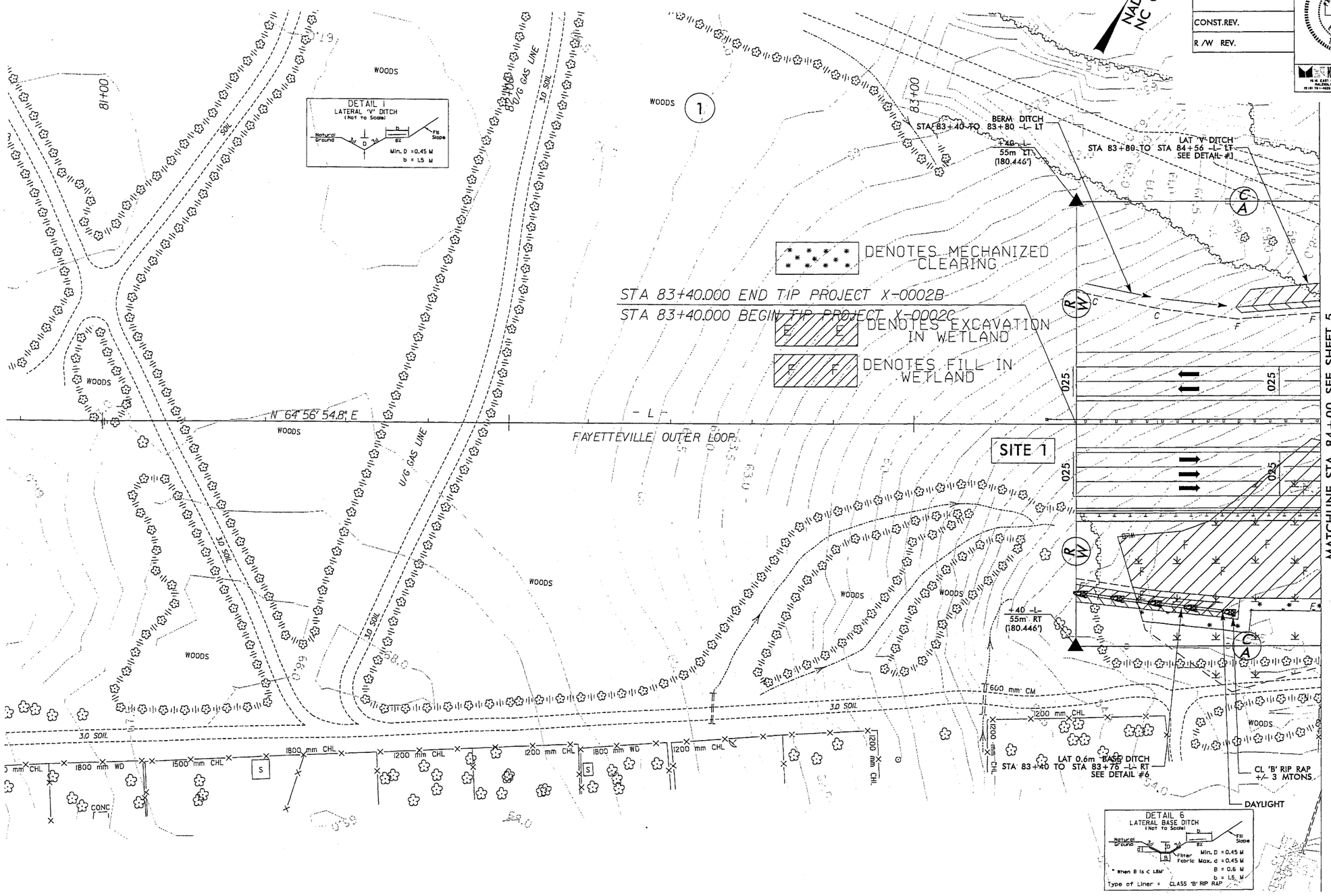
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS, JR.

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4685 FAX

SDG Sungate Design Group, P.A.
Engineers • Planners • Surveyors • Landscape Architects
516-A Jones Franklin Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 7 of 64



FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 32

REVISIONS

8/17/99

x0002c_rdy_psh01.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. KEID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

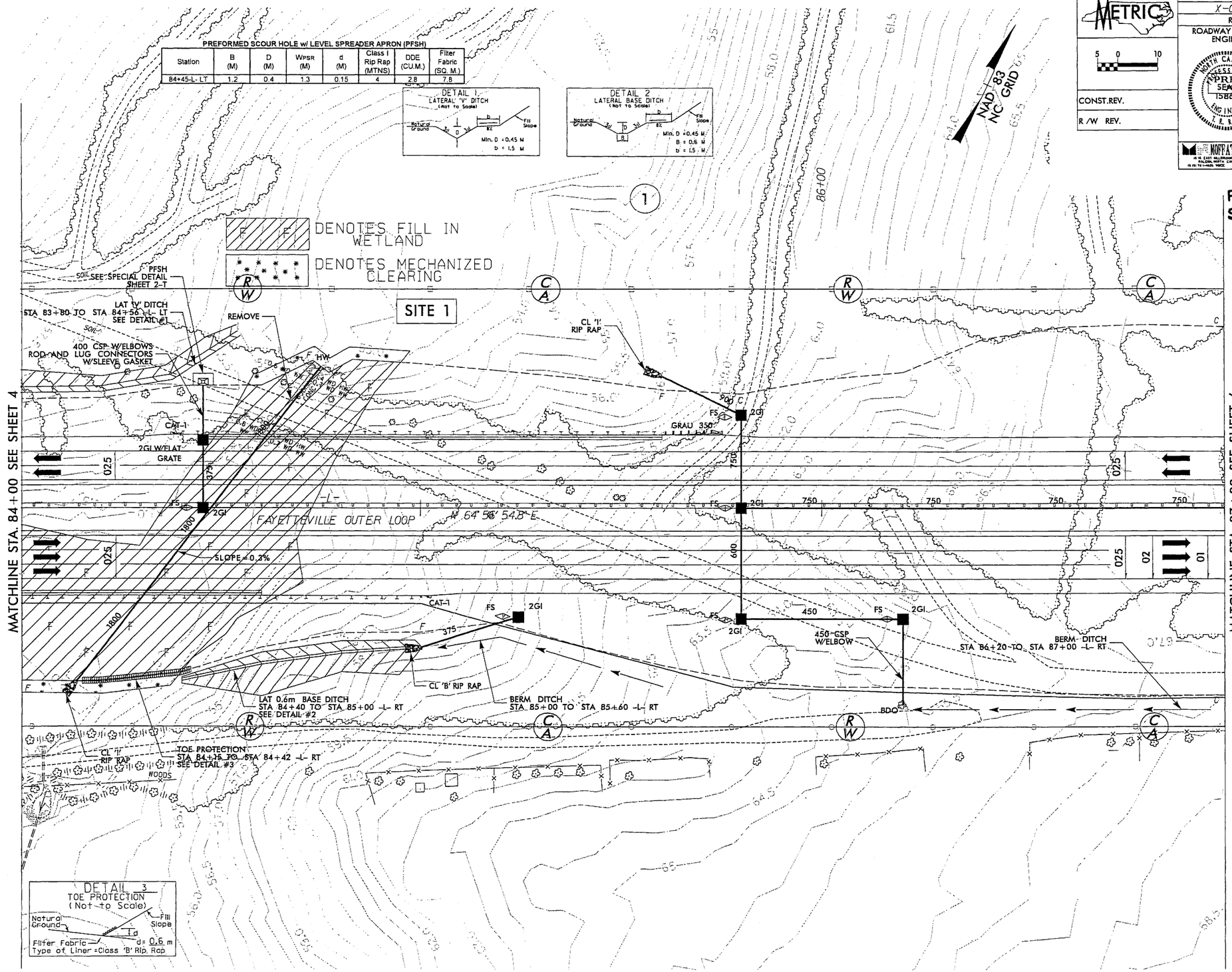
MOFFATT & NICHOL
4516 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
TEL (919) 781-1445 FAX (919) 781-1486

SDG Sungate Design Group, P.A.
Consulting Engineers
Planners
Landscape Architects
1505-C Jones Franklin Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 8 of 64

PREFORMED SCOUR HOLE w/ LEVEL SPREADER APRON (PFSH)

Station	B (M)	D (M)	WPSR (M)	d (M)	Class I Rip Rap (MTNS)	DDE (CU.M.)	Filter Fabric (SQ. M.)
84+45-L- LT	1.2	0.4	1.3	0.15	4	2.8	7.8



FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 32

REVISIONS

8/17/99

x0002c_rdy_psh05.dgn

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

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

MOFFATT & NICHOL
4700 EAST MILBROOK ROAD, SUITE 102
RALEIGH, NORTH CAROLINA 27609
919 781-1449, 10MCL 919 781-1498 FAX

SDG Sungate Design Group, P.A.
119-F Jones Franklin Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 9 of 64

-L- (FAYETTEVILLE OUTER LOOP)

STA 83+40.000 -L- END TIP PROJECT X-0002B
STA 83+40.000 -L- BEGIN TIP PROJECT X-0002C

BEGIN GRADE -L-
STA 83+40.000
EL 56.999

DENOTES FILL IN WETLAND

SITE 1

PROPOSED GRADE -L- X-0002B
UNDER SEPARATE CONTRACT

PROPOSED GRADE -L- X-0002C

EXISTING GRADE

-0.5775%

-5.00%

-2.55%

-1.50%

(-) 4.3750%

(-) 0.5625%

(-) 2.5833%

+80 LT 57.050

+00 LT 56.050

+20 LT 55.540

+40 RT 53.00

+40 RT 52.750

+48 RT 52.410

+60 RT 52.090

+76 RT 52.000

DITCH LEGEND
LEFT DITCH

+80 82 +20 +40 +60 +80 83 +20 +40 +60 +80 84 +20 +40

-L- (FAYETTEVILLE OUTER LOOP)

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO.		
DRAINAGE AREA	= 87.8	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 6.28	CMS
DESIGN HW ELEVATION	= 54.60	M
100 YEAR DISCHARGE	= 7.38	CMS
100 YEAR HW ELEVATION	= 54.87	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +12.12	CMS
OVERTOPPING ELEVATION	= 57.88	M

EXISTING GRADE

PROPOSED GRADE -L- X-0002C

+0.5775%

+1.5000%

PI = 86+00.000
EL = 60.500 m
VC = 100 m
K = 108
DS = 120 kph

+00 RT 56.900

+56 LT 55.000

-1.50%

+6.33%

+40 RT 53.000

1800mm

DITCH LEGEND
RIGHT DITCH

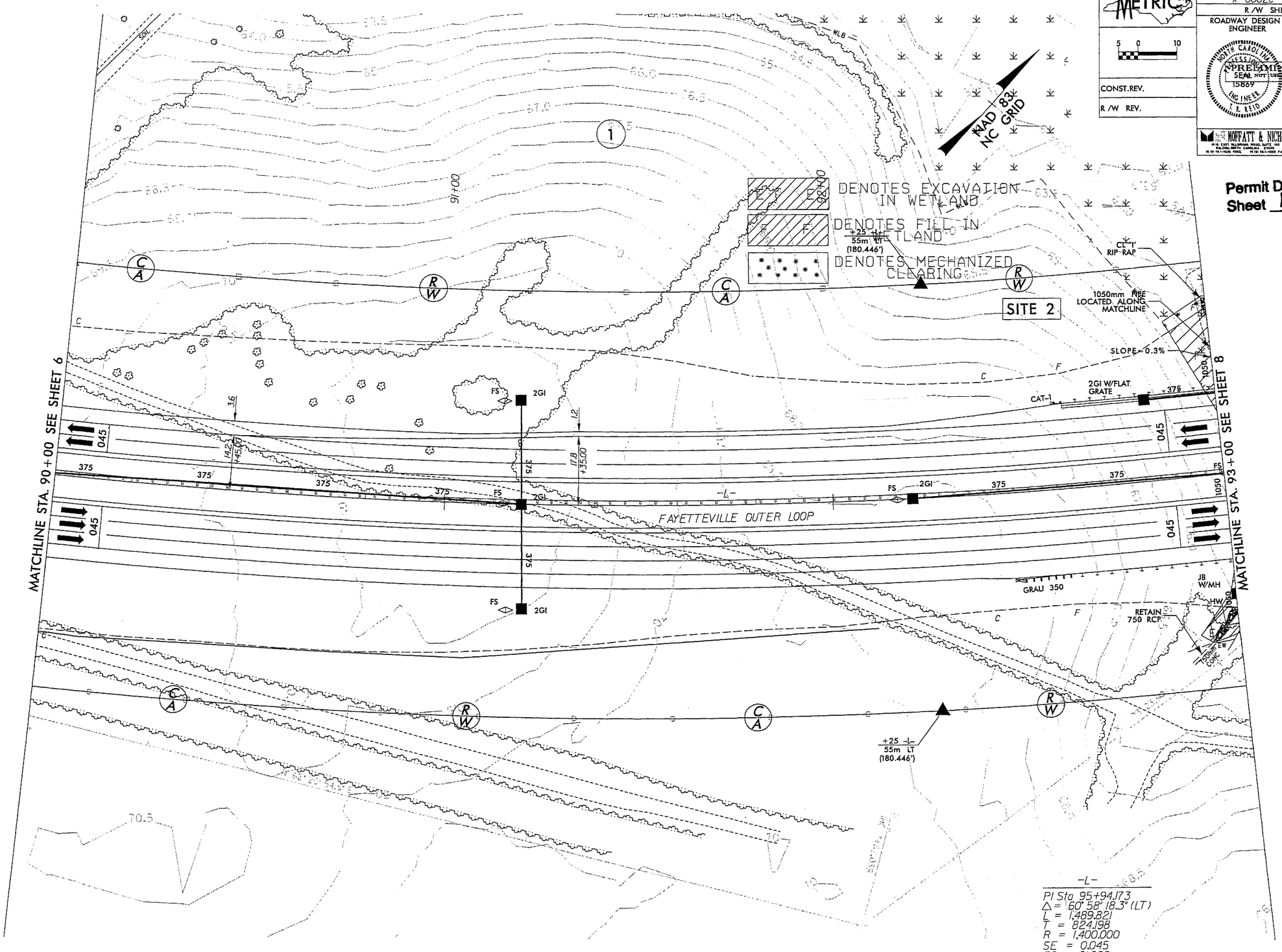
+40 +60 +80 85 +20 +40 +60 +80 86 +20 +40 +60 +80 87

x0002c_rdy_pfl_1.dgn

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	X-0002C	7
	R/W SHEET NO.	
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID	NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, III
	MOFFATT & NICHOL	SDG Sungate Design Group, P.A.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

Permit Drawing
Sheet 10 of 64



-L-
PI Sta 95+94.173
Δ = 60° 58' 18.3" (LT)
L = 1,489.821
T = 824.198
R = 1,400.000
SE = 0.045
R0 = 61.000
DS = 110 kph

FOR -L- PROFILE SEE SHEET 33

REVISIONS

8/17/99

x2002c-dg_psh07.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

CONST.REV.

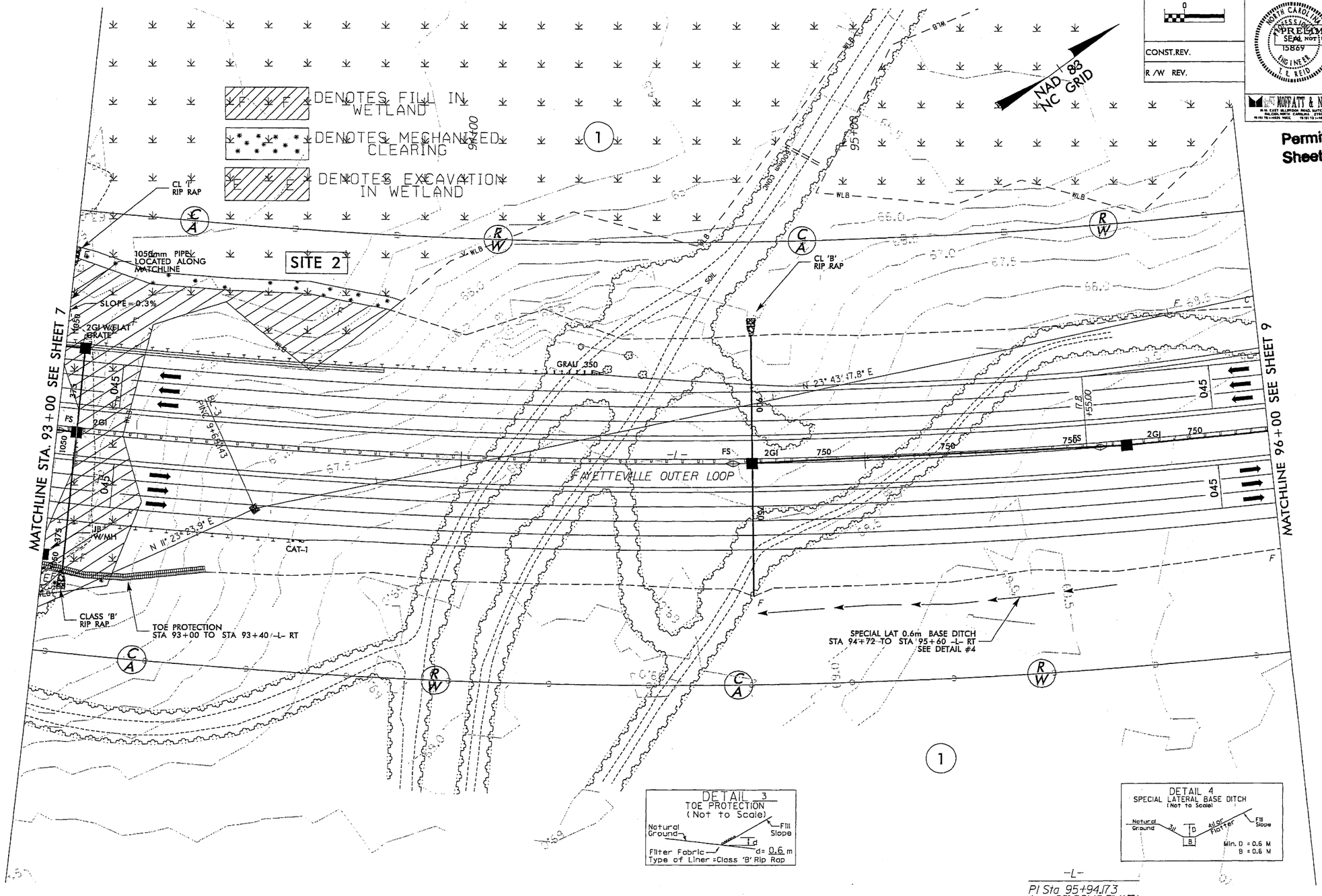
R/W REV.

PRELIMINARY PLANS NOT FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 11 of 64



-L-

PI Sta 95+94.173
Δ = 60° 58' 18.3" (LT)
L = 1,489.821
T = 824.198
R = 1,400.000
SE = 0.045
RO = 61.000
DS = 110 kph

FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 34

REVISIONS

8/01/99

x0002c_rdy_psh08.dgn

6/09/99

-L- (FAYETTEVILLE OUTER LOOP)

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION
INCOMPLETE PLANS
NOT FOR USE FOR R/W DETERMINATIONS

MORFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 12 of 64

DENOTES FILL IN WETLAND

SITE 2

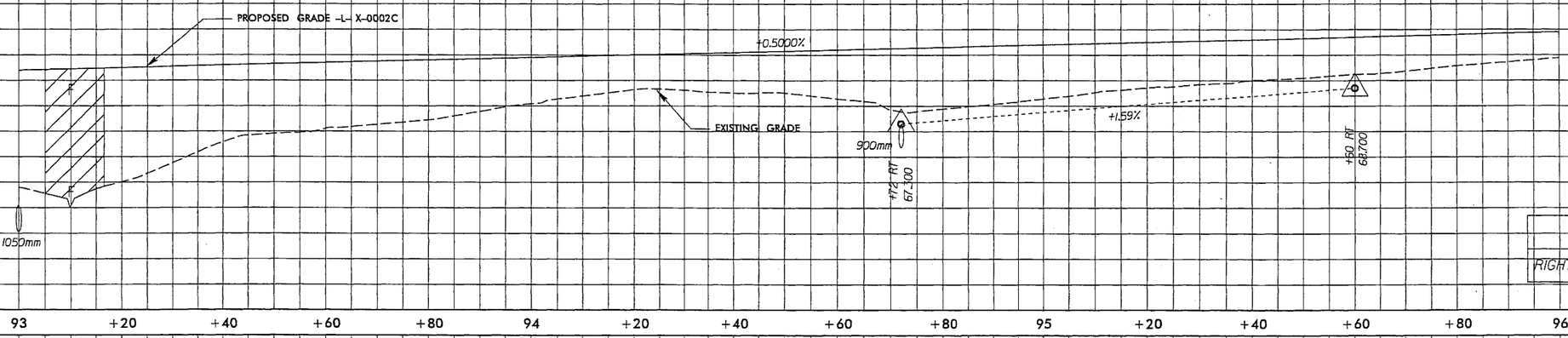
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	10.4	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	1.20	CMS
DESIGN HW ELEVATION	=	65.95	M
100 YEAR DISCHARGE	=	1.40	CMS
100 YEAR HW ELEVATION	=	66.10	M
OVERTOPPING FREQUENCY	=	+500	YRS
OVERTOPPING DISCHARGE	=	+2.38	CMS
OVERTOPPING ELEVATION	=	68.5	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

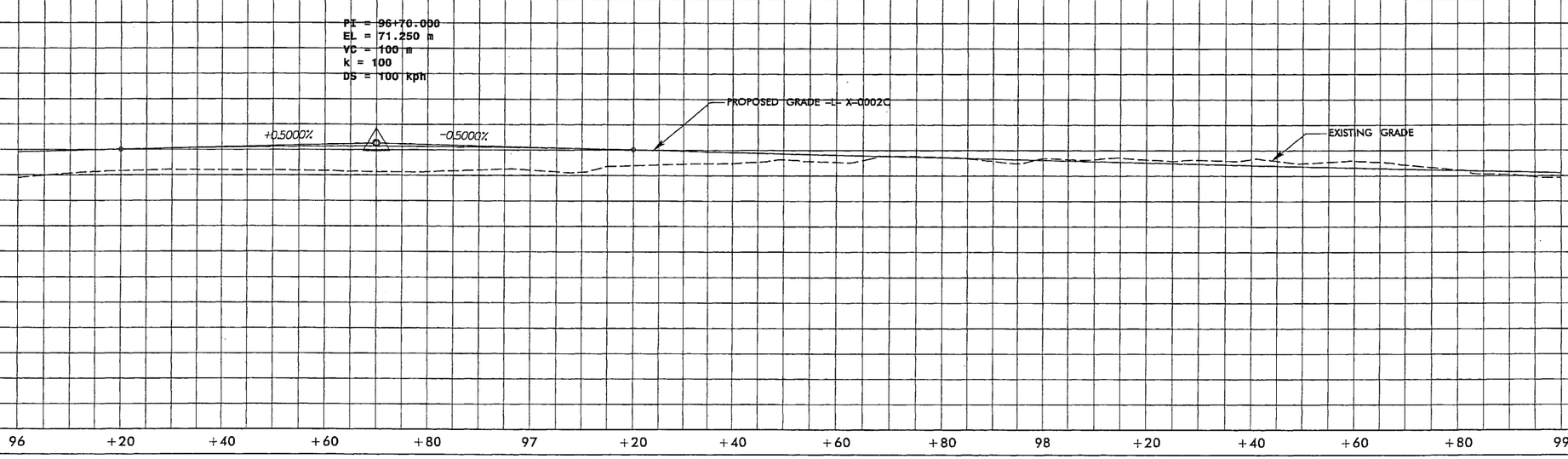
DRAINAGE AREA	=	5.3	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	0.65	CMS
DESIGN HW ELEVATION	=	68.03	M
100 YEAR DISCHARGE	=	0.75	CMS
100 YEAR HW ELEVATION	=	68.11	M
OVERTOPPING FREQUENCY	=	+100	YRS
OVERTOPPING DISCHARGE	=	+1.12	CMS
OVERTOPPING ELEVATION	=	69.0	M

BM #101 – RR SPIKE IN BASE OF 450mm PINE TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-3 & BL-4
N 153533.299 E 617892.407
-L- STA 95+58.029 OFFSET: 31.484 (LT)



DITCH LEGEND
RIGHT DITCH

-L- (FAYETTEVILLE OUTER LOOP)



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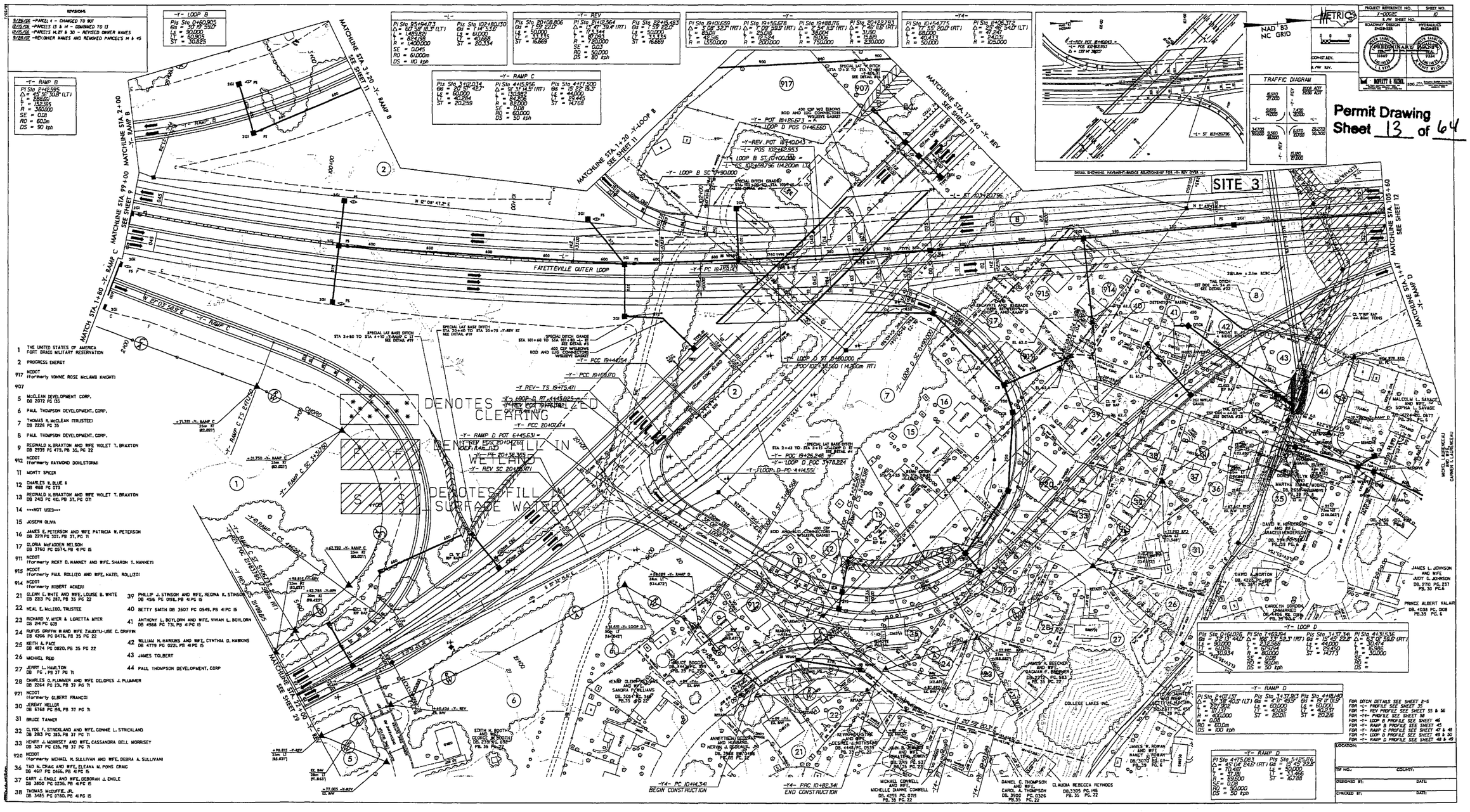
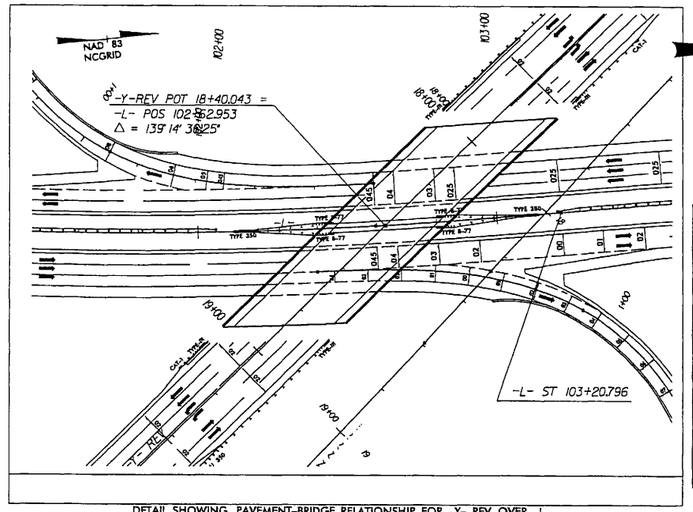


Permit Drawing
Sheet 13 of 64

Permit Drawing
Sheet 14 of 64

-Y4-	
PI Sta 10+54.775	PI Sta 11+06.372
Δ = 77° 55' 20.0" (RT)	Δ = 25° 46' 54.0" (LT)
L = 68.000	L = 47.247
T = 40.433	T = 24.031
R = 50.000	R = 105.000



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y- REV OVER -L-

NAD 83
NC GRID

METRIC

5 0 10

CONST.REV.	
R/W REV.	

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

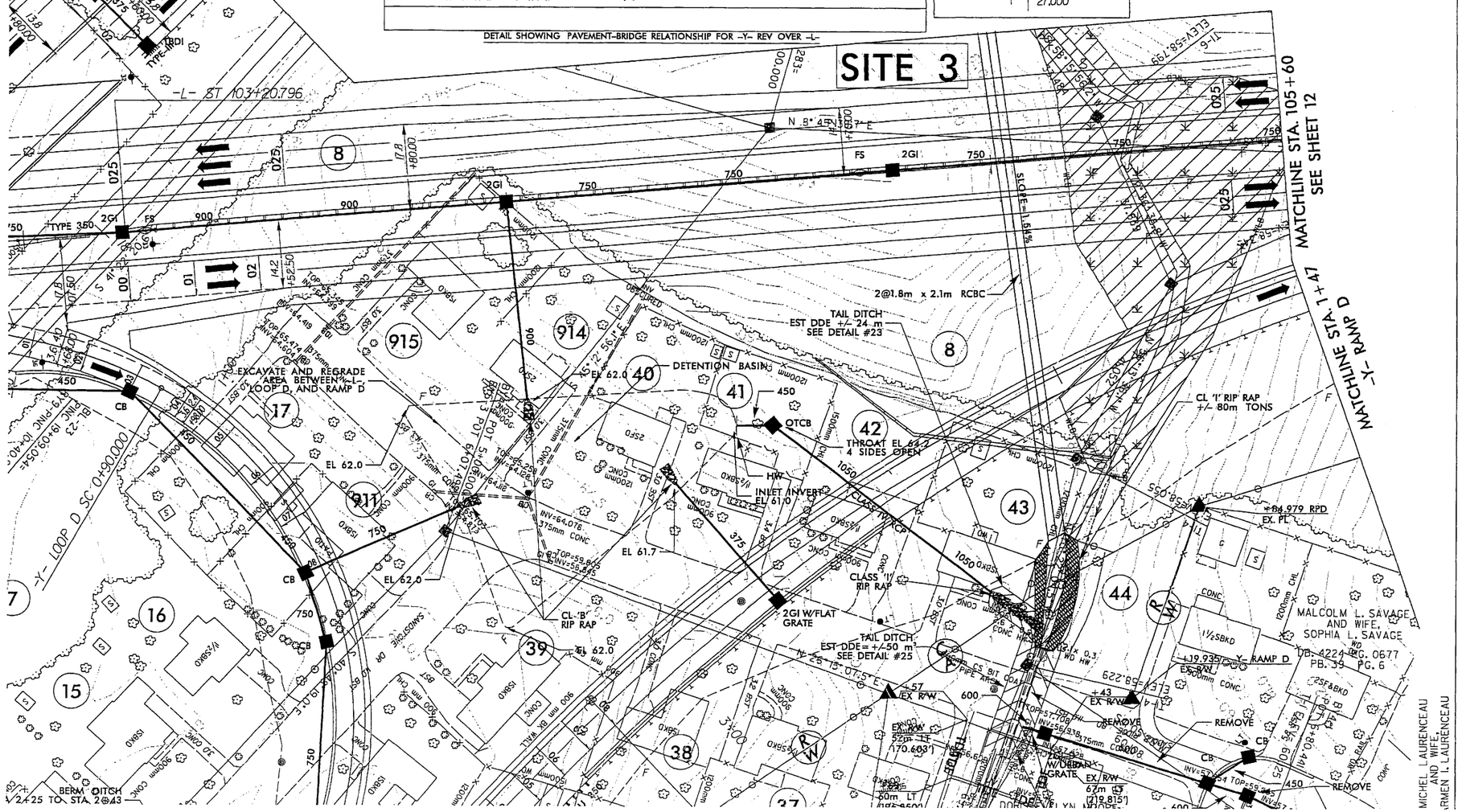
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, IV

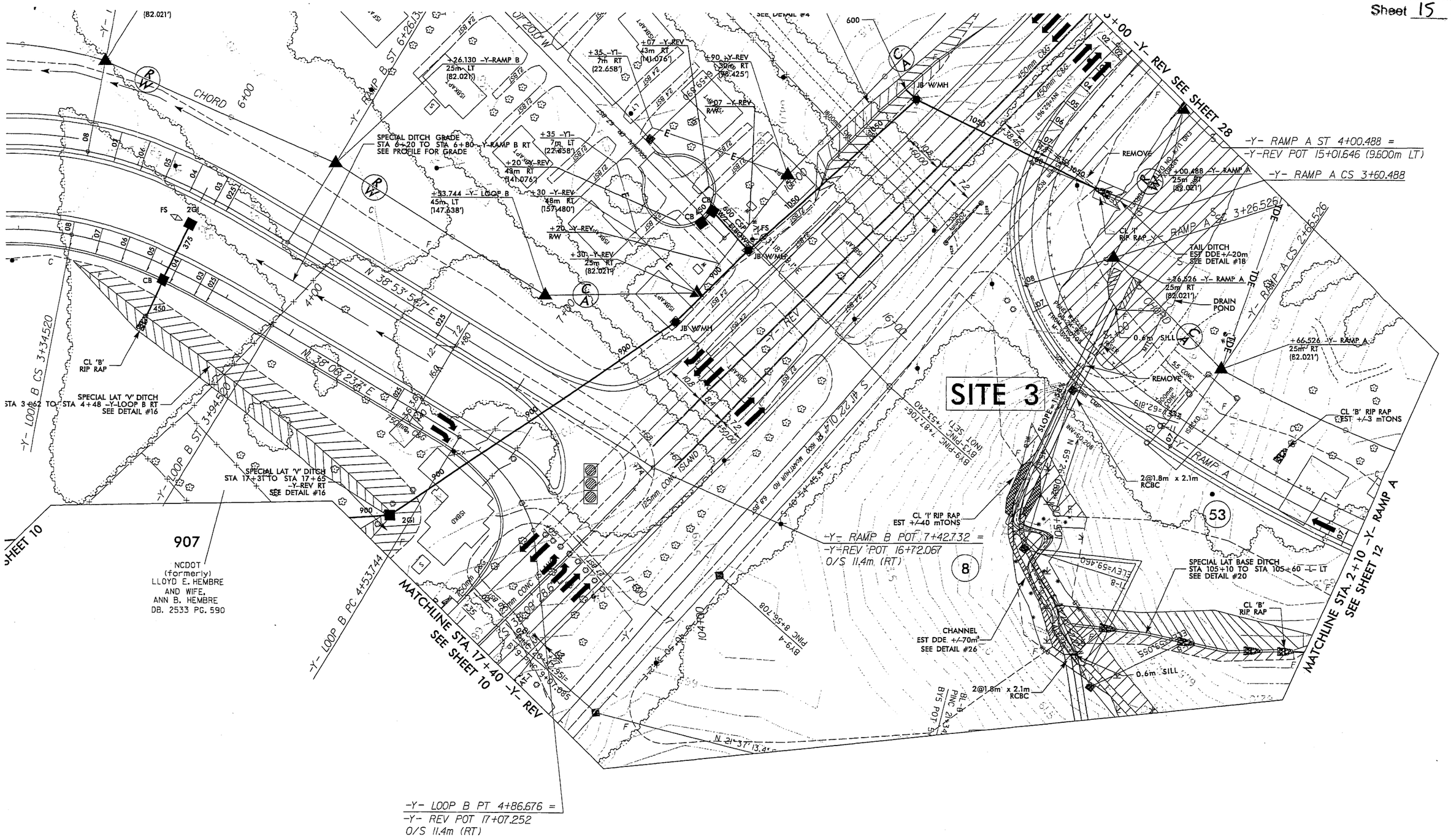
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
PH 919 781-4626 FAX 919 781-4865

SDG Sungate Design Group, P.A.
Roadway / Hydraulic / Structures / Transportation
9 Jim Jones Freeway NW
Raleigh, N.C. 27603

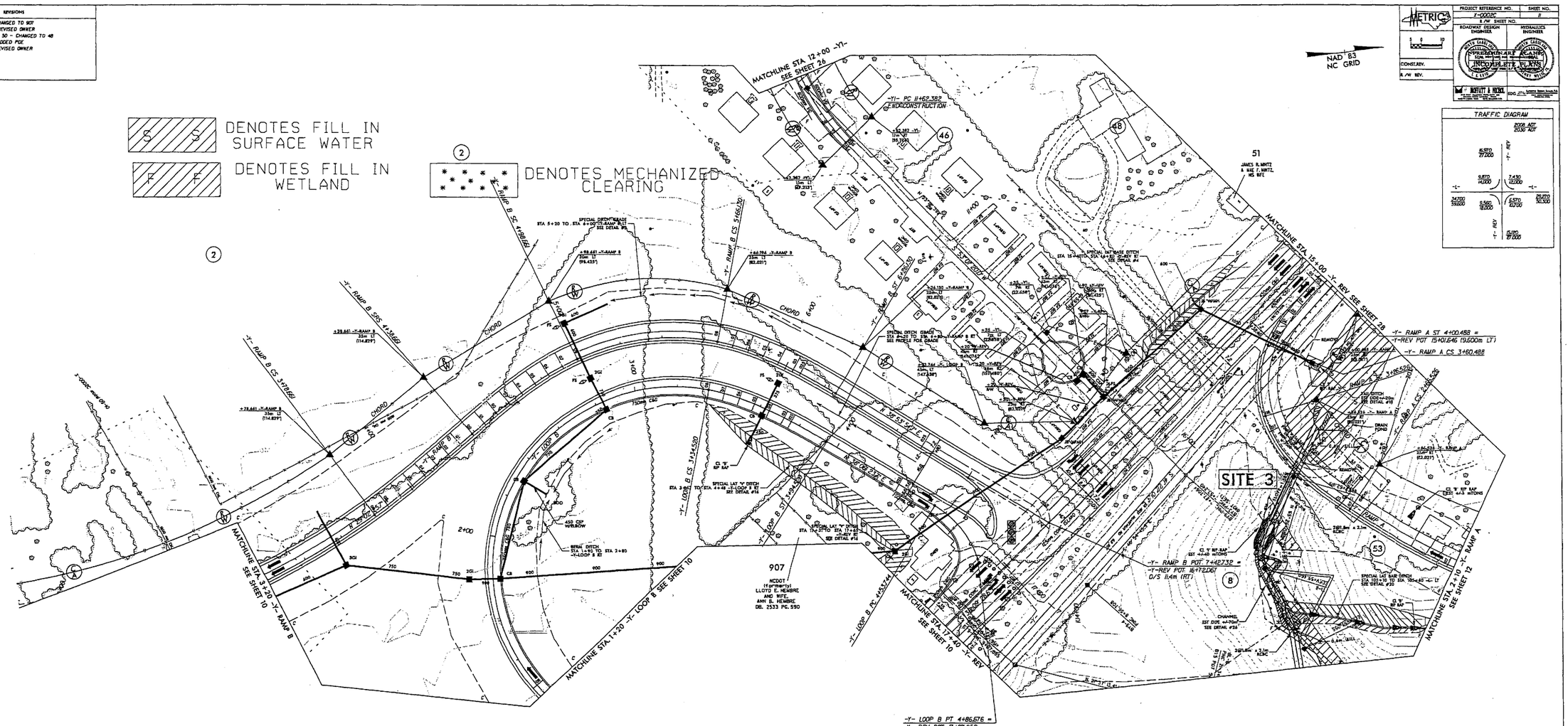
TRAFFIC DIAGRAM

	-Y- REV	
	16,970 / 27,000	2008 ADT / 2030 ADT
-L-	9,870 / 14,000	7,430 / 12,000 -L-
	34,700 / 59,600	9,560 / 18,000 -Y- REV
	6,570 / 10,700	29,270 / 50,300
	15,120 / 27,000	




SITE 3
-Y- REV SEE SHEET 28
-Y- RAMP A ST 4+00.488 =
-Y-REV POT 15+01.646 (9.600m LT)
-Y- RAMP A CS 3+60.488
-Y- RAMP A CS 3+26.526
-Y- RAMP A CS 2+66.526
+00.488 -Y- RAMP A
25m RT
(82.021')
+26.526 -Y- RAMP A
25m RT
(82.021')
+66.526 -Y- RAMP A
25m RT
(82.021')
TAIL DITCH
EST DDE+/-20m
SEE DETAIL #18
DRAIN POND
CL 'B' RIP RAP
EST +/-3 mTONS
CL 'I' RIP RAP
EST +/-40 mTONS
SPECIAL LAT BASE DITCH
STA 105+10 TO STA 105+60 -L- LT
SEE DETAIL #20
CHANNEL
EST DDE. +/-70m³
SEE DETAIL #26
2@1.8m x 2.1m
RCBC
0.6m SILL
REMOVE
-Y- RAMP B POT 7+42.732 =
-Y-REV POT 16+72.067
O/S 11.4m (RT)
-Y- LOOP B PT 4+86.676 =
-Y- REV POT 17+07.252
O/S 11.4m (RT)
MATCHLINE STA. 17+40 -Y- REV
SEE SHEET 10
MATCHLINE STA. 2+10 -Y- RAMP A
SEE SHEET 12
SHEET 10
907
NCDOT
(formerly)
LLOYD E. HEMBRE
AND WIFE,
ANN B. HEMBRE
DB. 2533 PG. 590
-Y- LOOP B PC 4+53.744
-Y- LOOP B CS 3+34.520
-Y- LOOP B ST 3+94.520
SPECIAL LAT 'V' DITCH
STA 3+62 TO STA 4+48 -Y-LOOP B RT
SEE DETAIL #16
SPECIAL LAT 'V' DITCH
STA 17+31 TO STA 17+65
-Y-REV RT
SEE DETAIL #16
SPECIAL DITCH GRADE
STA 6+20 TO STA 6+80 -Y-RAMP B RT
SEE PROFILE FOR GRADE
CL 'B'
RIP RAP
CHORD 6+00
-Y- RAMP B ST 6+26.13
N 38°53'54.7" E
N 38°08'23.6" E
S 47°22'01.4" E
N 65°32'08.2" E
N 21°37'13.4"
125mm CONC ISLAND
150mm CONC
450mm C&G
2@1.8m x 2.1m
RCBC
53
8

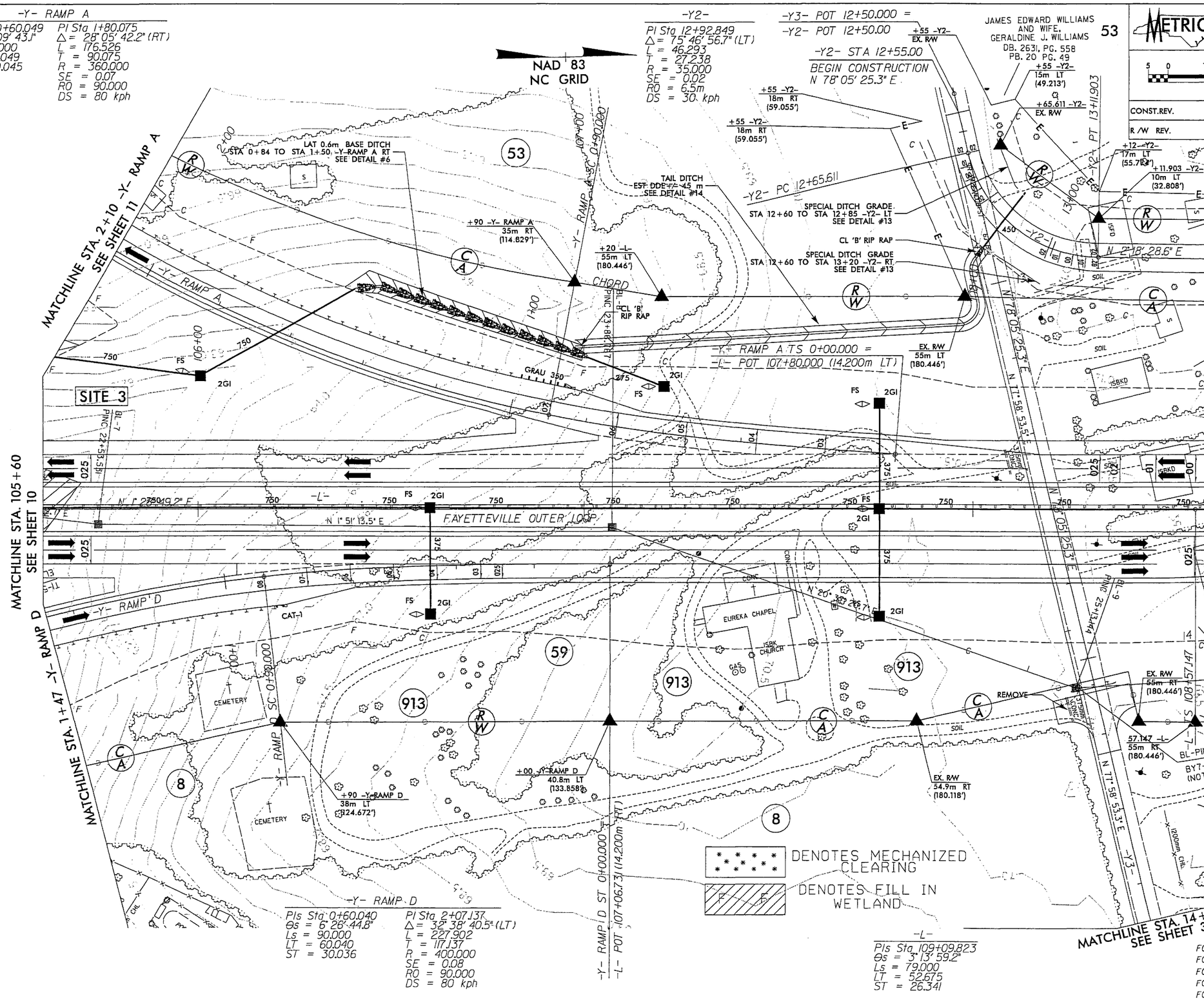
REVISIONS
9/28/06 -PARCEL 4 - CHANGED TO 907
10/25/06 -PARCEL 46 - REVISED OWNER
12/15/06 -PARCELS 49 & 50 - CHANGED TO 48
12/15/06 -PARCEL 46 - ADDED PDE
5/23/07 -PARCEL 2 - REVISED OWNER


DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83
NC GRID
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2002C
B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
INCOMPLETE PLANS
HOBBS, UPCHURCH & ASSOC. P.A.
HOBBS, UPCHURCH & ASSOC. P.A.
CONST.REV.
R/W REV.
TRAFFIC DIAGRAM
ADDT. ATT 2030 TDT
-Y- REV
-Y-
MATCHLINE STA 12+00 -Y1- SEE SHEET 26
-Y1- PC 11+62.382
(UNDERCONSTRUCTION)
MATCHLINE STA 15+00 -Y- REV SEE SHEET 28
-Y- RAMP A ST 4+00.488 =
-Y-REV POT 15+01.646 (9.500m LT)
-Y- RAMP A CS 3+60.488
-Y- RAMP B SCS 4+39.68
-Y- RAMP B CS 3+79.68
-Y- RAMP B CS 5+65.70
-Y- RAMP B ST 6+00.00
-Y- LOOP B CS 3+34.590
-Y- LOOP B ST 3+94.590
-Y- LOOP B PC 4+53.744
-Y- LOOP B PT 4+86.676 =
-Y- REV POT 17+01.252
O/S 11.4m (RT)
-Y- RAMP B POT 7+42.732 =
-Y-REV POT 16+72.067
O/S 11.4m (RT)
MATCHLINE STA 3+20 -Y- RAMP B SEE SHEET 10
MATCHLINE STA 1+20 -Y- LOOP B SEE SHEET 10
MATCHLINE STA 17+40 -Y- REV SEE SHEET 10
MATCHLINE STA 2+10 -Y- RAMP A SEE SHEET 12
SITE 3
907
NCDOT
(Formerly)
LLOYD E. HEMBRE
AND WIFE,
ANN B. HEMBRE
DBL 2533 PG. 590
51
JAMES R. WINTZ
& MAE F. WINTZ,
HS RPT
48
46
53
8
2
CHORD
3100
6100
2+00
SPECIAL DITCH
STA 2+85 TO STA 3+20
-Y-LOOP B ST
SPECIAL LAT 'Y' DITCH
STA 3+85 TO STA 4+48 -Y-LOOP B ST
SEE DETAIL #14
SPECIAL LAT DITCH
STA 15+40 TO STA 16+40
SEE DETAIL #14
SPECIAL LAT DITCH
STA 16+40 TO STA 17+40
SEE DETAIL #14
SPECIAL LAT DITCH
STA 103+70 TO STA 105+85 -L- LT
SEE DETAIL #20
SPECIAL DITCH
STA 5+30 TO STA 6+00 -Y-RAMP B LT
SEE DETAIL #14
SPECIAL DITCH GENERIC
STA 4+25 TO STA 4+80 -Y-RAMP B RT
SEE PROFILE FOR GRADE
SPECIAL DITCH
STA 15+00 TO STA 16+00
SEE DETAIL #14
DRAIN POND
CHANNEL
EST DIM 4x1.70m
SEE DETAIL #22
450 CSP W/BLOW
BERMS DITCH
STA 1+95 TO STA 2+85
-Y-LOOP B ST
CB
2GI
3GI
750
900
1100
1200
1500
1800
2100
2400
2700
3000
3300
3600
3900
4200
4500
4800
5100
5400
5700
6000
6300
6600
6900
7200
7500
7800
8100
8400
8700
9000
9300
9600
9900
10200
10500
10800
11100
11400
11700
12000
12300
12600
12900

REVISIONS

06/26/06 -PARCEL'S 58 & 60 -CHANGED TO 913; PARCEL 913 -CHANGED OWNER TO EUREKA CHAPEL BAPTIST CHURCH; PARCEL 59 -CHANGED OWNER TO BENJAMIN J.EVANS HEIRS
09/28/07 -ADDED PB & PG TO EASEMENT AND ADDED CEMETERY TO PARCEL 913

8/17/99



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PROJECT REFERENCE NO.	SHEET NO.
X-0002C	35

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

METRIC

HORIZONTAL

VERTICAL

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

PRELIMINARY PLANS NOT FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Supporte Design Group, P.A.

-L- (FAYETTEVILLE OUTER LOOP)

BM #102 - RR SPIKE IN BASE OF 375mm PINE TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-5 & X0002C-3 (GPS)
N 154100.029 E 618256.540
-L- STA 101+92.263 OFFSET: 138.688 (RT)

Permit Drawing
Sheet 18 of 64

PROPOSED GRADE -L- X-0002C

EXISTING GRADE

+0.5000%

+60 RT 58.250

+80 RT 58.450

+1.00%

-1.00%

+0.30%

+100 LT 56.840

+120 LT 56.640

DITCH LEGEND
RIGHT DITCH
LEFT DITCH

-L- (FAYETTEVILLE OUTER LOOP)

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

SITE 3

STRUCTURE HYDRAULIC DATA		
DESIGN DISCHARGE	= 15.29	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 60.98	M
BASE DISCHARGE	= 17.66	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 61.15	M
OVERTOPPING DISCHARGE	= +27.52	CMS
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING ELEVATION	= 67.27	M

FILL IN SURFACE WATER

EXISTING GRADE

PROPOSED GRADE -L- X-0002C

-0.5000%

+0.5000%

PI = 104+00.000
EL = 67.600 m
VC = 100 m
k = 100
DS = 120 kph

+0.30%

+60 LT 65.760

+6.20%

+60 LT 62.500

2 @ 2.1m x 1.8m RCBC

+101 LT 55.500

0.6m SILL

DITCH LEGEND
LEFT DITCH

6/09/99

x0002c_rdy_pfl_1.dgn

6/09/99

-L- (FAYETTEVILLE OUTER LOOP)

DENOTES FILL IN WETLAND

BM #103 - RR SPIKE IN BASE OF 250mm CHERRY TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-8 & BL-9
N 154692.186 E 618200.297
-L- STA 107+73.146 OFFSET: 63.285 (RT)

SITE 3

FILL IN WETLANDS

PROPOSED GRADE -L- X-0002C

+0.5000%

EXISTING GRADE

+60 LT
62.300

DITCH LEGEND
LEFT DITCH ----------

METRIC
HORIZONTAL
VERTICAL

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER L. R. REID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MOFFATT & NICHOL
3616 EAST MILBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27610
(919) 755-1505 (919) 755-1508 FAX

SDG Sungate Design Group, P.A.
Engineering • Surveying • Planning • Environmental
110-E James Drive West
Raleigh, N.C. 27603

Permit Drawing
Sheet 19 of 64

-L- (FAYETTEVILLE OUTER LOOP)

EXISTING GRADE

+0.5000%

-0.5000%

+0.30%

PROPOSED GRADE -L- K-0002C

+90 RT
66.340

+40 RT
68.490

PI = 111+10.000
EL = 71.150 m
VC = 100 m
k = 100
DS = 100 kph

DITCH LEGEND
RIGHT DITCH ----------

x0002c_rdy_pfl_1.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

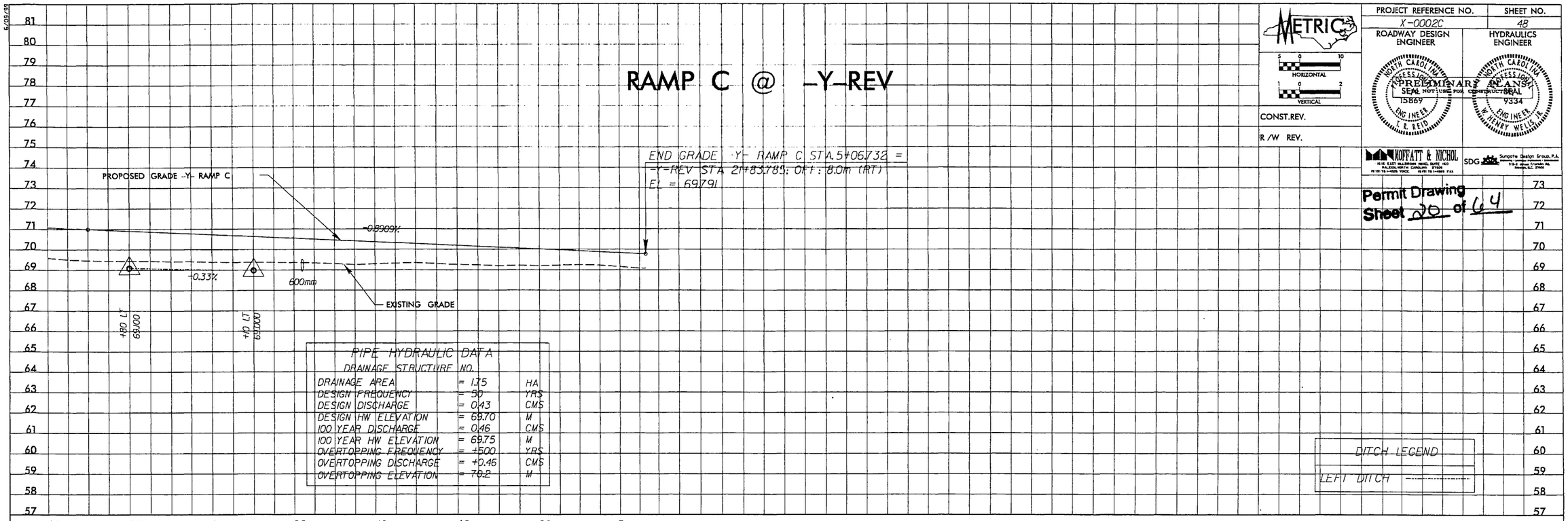
PRELIMINARY PLANS NOT FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Surgeote Design Group, P.A.

Permit Drawing Sheet 20 of 64

RAMP C @ -Y-REV



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

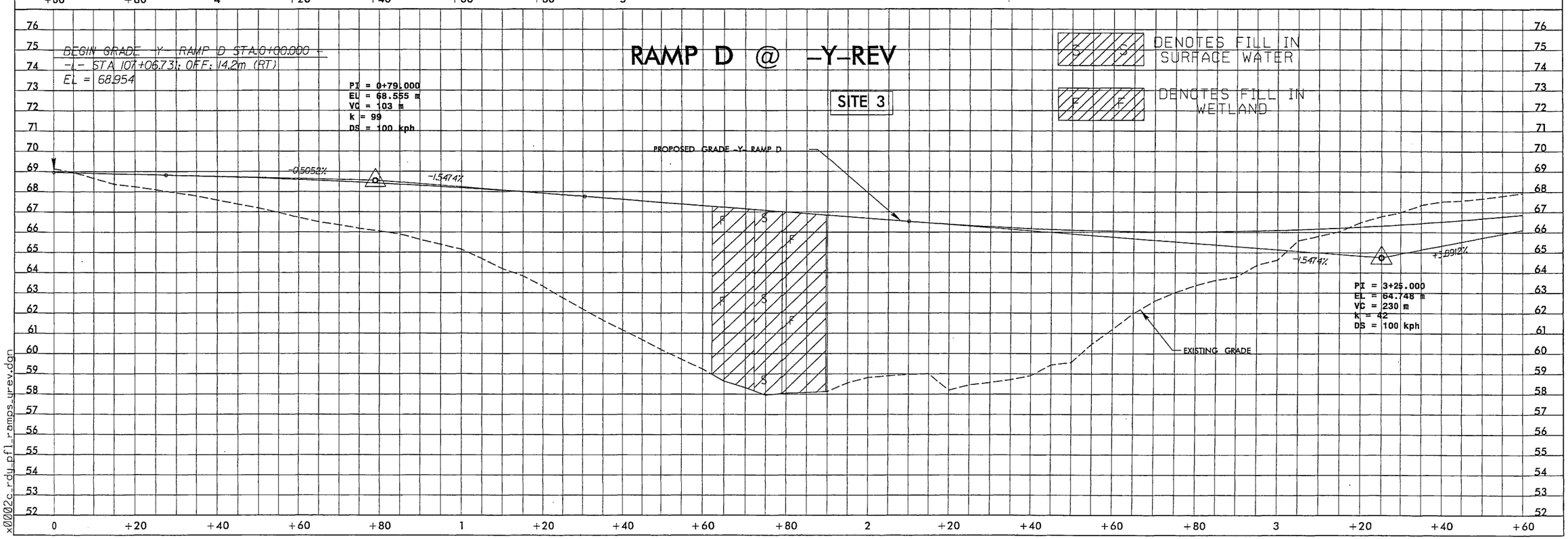
DRAINAGE AREA	= 1.75	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.43	CMS
DESIGN HW ELEVATION	= 69.70	M
100 YEAR DISCHARGE	= 0.46	CMS
100 YEAR HW ELEVATION	= 69.75	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +0.46	CMS
OVERTOPPING ELEVATION	= 70.2	M

RAMP D @ -Y-REV

SITE 3

S S DENOTES FILL IN SURFACE WATER

F F DENOTES FILL IN WETLAND



6/05/99

x0002c_rdy_pfl_r-amps_ur-ev.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS — NOT FOR CONSTRUCTION

MORFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing Sheet 21 of 64

-L-

PI Sta 116+37.531
Δ = 90° 06' 47.2" (RT)
L = 1,100.939
T = 701.383
R = 700.000
SE = 0.08
RO = 79.000
DS = 110 kph

PIs Sta 120+63.428
θs = 3° 13' 59.2"
Ls = 79.000
LT = 52.675
ST = 26.341

ENERGY DISSIPATOR									
STATION	L_u (M)	W_b (M)	L_d (M)	T (M)	D_d (M)	CLASS B RIP RAP (M)	DOE (M³)	FILTER FABRIC (M²)
119+75 -L- LT	9.0	6.0	1.5	0.80	1.10	1.65	1.50	16.0

+60 -L- R/W LT

+75 -L- 82m LT (269.028')

LAT 1.2m BASE DITCH STA 116+68 TO STA 117+70 -L- LT SEE DETAIL #8

TDE

+90 -L- R/W LT

WORK BRIDGE

ENERGY DISSIPATOR SEE SPECIAL DETAIL SHEET 2-T

DETAIL 3
+50 -L- 75m LT (246.061') TOE PROTECTION (Not to Scale)
Natural Ground, Fill Slope, Filter Fabric, Type of Liner = Class 'B' Rip Rap, d = 0.6 m

DETAIL 4
SPECIAL LATERAL BASE DITCH (Not to Scale)
Natural Ground, Fill Slope, Min. B = 0.6 M, Max. B = 0.6 M

NAD 83 NC GRID

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

+90 -L- 55m LT (180.446')

TOE PROTECTION END BRIDGE TO STA 120+34 -L- RT SEE DETAIL #3

+37.087 -L- 55m LT (180.446')

LAT 0.6m BASE DITCH STA 120+35 TO STA 120+80 -L- LT SEE DETAIL #4

SITE 4

MATCHLINE STA. 117+40 SEE SHEET 15

MATCHLINE STA. 120+60 SEE SHEET 17

TYPE-III

GRAU 350

BL-14 PINC 34+78.825

BL-16 PINC 36+78.828

BL-17 PINC 37+78.828

TYPE M350 375

2GI

FAYETTEVILLE OUTER LOOP

N 69° 28' 14.2" E

N 69° 10'

N 81° 58' 45.5" E

S 85° 12' 27.6"

TYPE-III 2GI W/ FLAT GRATE

2GI W/ FLAT GRATE

CL 'II' RIP RAP EST +/- 2800 mTONS

400 CSP W/ELBOW ROD AND LUG CONNECTORS W/SLEEVE GASKET

PFSH SEE SPECIAL DETAIL SHEET 2-T

-L- CS 120+37.087

+90 -L- 55m RT (180.448')

+37.087 -L- 55m RT (180.445')

CL 'I' RIP RAP

CHORD

TOE PROTECTION STA 117+49 TO BEGIN BRIDGE -L- RT SEE DETAIL #3

INV=55.259

INV=55.545

200mm PVC

DETAIL 8
LATERAL BASE DITCH (Not to Scale)
Natural Ground, Fill Slope, Filter Fabric, Min. D = 0.75 M, Max. d = 0.75 M, B = 1.2 M, b = 1.5 M
* When B is < 1.8M
Type of Liner = CLASS 'I' RIP RAP

PREFORMED SCOUR HOLE (PFSH)						
STATION	B (M)	D (M)	W_{PSR} (M)	d (M)	CLASS I RIP RAP (MTONS)	DOE (M³)	FILTER FABRIC (M²)
119+10 -L- RT	1.2	0.4	4.3	0.15	4.0	2.8	7.8

PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER WETLANDS (SEE SHEET 2K FOR A LARGER DETAIL VEIW)

FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 3B

REVISIONS

8/17/99

x0002c_rdy_pah16.dgn

6/20/99

-L- (FAYETTEVILLE OUTER LOOP)

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION
NOT FOR RECORDING OR RIGHT OF WAY
INCOMPLETE PLANS

MOFFATT & NICHOL
15-16 EAST WILMINGTON ROAD, SUITE 200
PITTSBURGH, PENNSYLVANIA 15219
(412) 781-1822 VOICE (412) 781-1689 FAX

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Urban Design
119-2 James Kennedy Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 22 of 64

SITE 4

BEGIN BRIDGE -L- STA 117+68 (+/-)
WEST BOUND LANES

END BRIDGE -L- STA 118+67 (+/-)
WEST BOUND LANES

PROPOSED GRADE -L- X-0002C

+1.33%

750mm

+35 LT
70.800

FILL IN WETLANDS

MECHANIZED CLEARING

HAND CLEARING

EXISTING GRADE

+68 LT
56.250

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO.		
DRAINAGE AREA	= 2.6	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.71	CMS
DESIGN HW ELEVATION	= 71.58	M
100 YEAR DISCHARGE	= 0.77	CMS
100 YEAR HW ELEVATION	= 71.63	M
OVERTOPPING FREQUENCY	= +200	YRS
OVERTOPPING DISCHARGE	= 1.0	CMS
OVERTOPPING ELEVATION	= 71.9	M

STRUCTURE HYDRAULIC DATA		
DESIGN DISCHARGE	= 21.7	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 56.59	M
BASE DISCHARGE	= 25.0	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 56.65	M
OVERTOPPING DISCHARGE	= +39.0	CMS
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING ELEVATION	= 70.30	M

DITCH LEGEND

LEFT DITCH

+40 +60 +80 118 +20 +40 +60 +80 119 +20 +40 +60 +80 120 +20 +40 +60

$$$$$$$$SYSTIME$$$$
$$$$$$$$PROJECT$$$$
$$$$$$$$DGN$$$$
$$$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

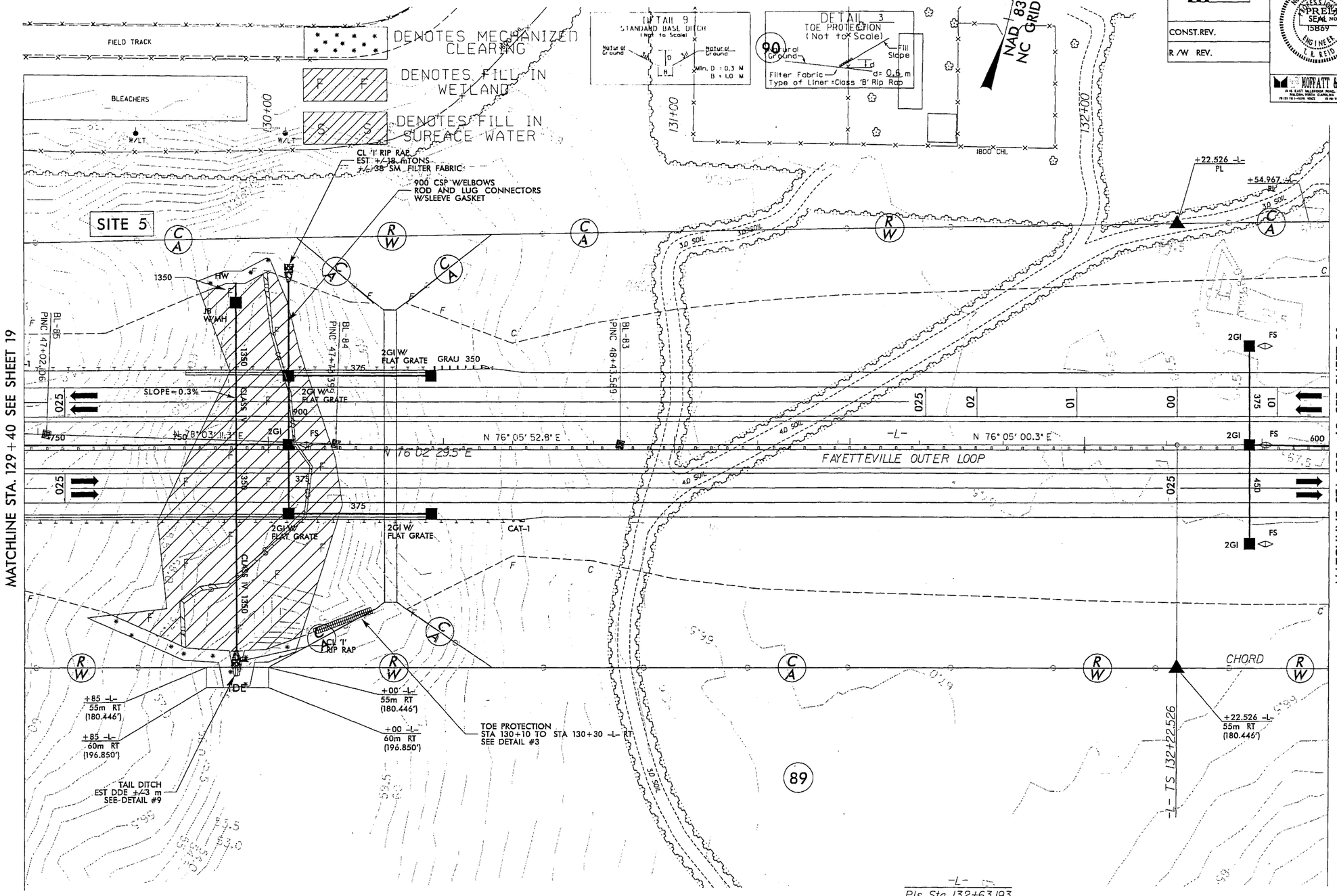
R/W REV.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MORFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 23 of 64



-L-
Pls Sta 132+63.193
Θs = 0° 30' 00.0"
Ls = 61.000
LT = 40.667
ST = 20.333

FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 40

REVISIONS

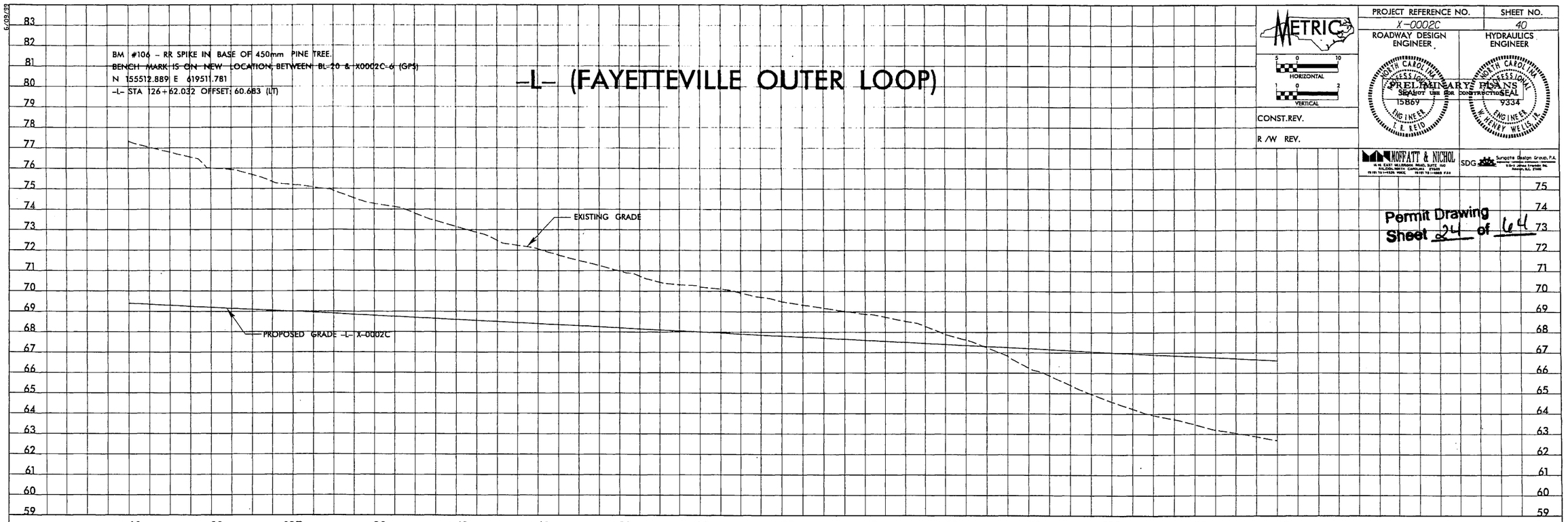
8/1/99

x2002c_rdy_psh28.dgn

6/09/99

BM #106 - RR SPIKE IN BASE OF 450mm PINE TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-20 & X0002C-6 (GPS)
N 155512.889 E 619511.781
-L- STA 126+62.032 OFFSET: 60.683 (LT)

-L- (FAYETTEVILLE OUTER LOOP)



METRIC
HORIZONTAL 5 0 10
VERTICAL 1 0 2

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	40

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. E. REID

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

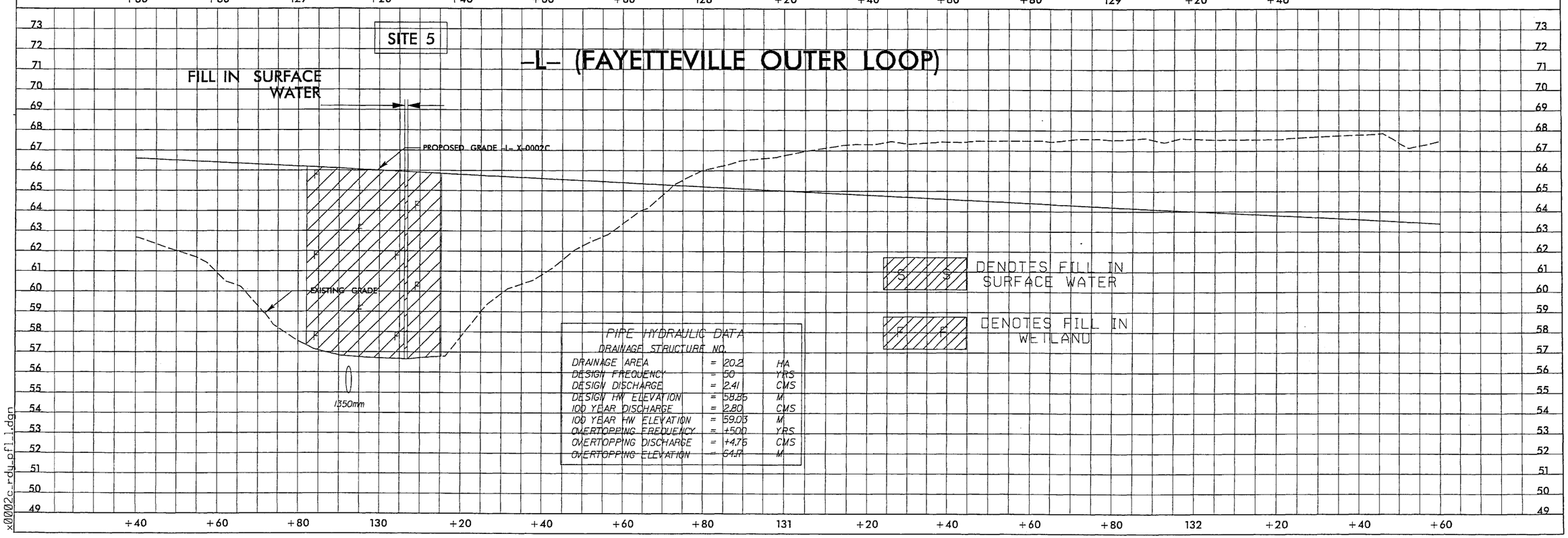
PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MOFFATT & NICHOL
4700 EAST MILBROOK ROAD, SUITE 140
RALEIGH, NORTH CAROLINA 27609
919 781-1440 FAX: 919 781-1448

SDG Sungate Design Group, P.A.
5-0-2 Jones Franklin Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 24 of 64

-L- (FAYETTEVILLE OUTER LOOP)



DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	20.2	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	2.41	CMS
DESIGN HW ELEVATION	=	58.86	M
100 YEAR DISCHARGE	=	2.80	CMS
100 YEAR HW ELEVATION	=	59.03	M
OVERTOPPING FREQUENCY	=	+500	YRS
OVERTOPPING DISCHARGE	=	+4.76	CMS
OVERTOPPING ELEVATION	=	64.18	M

x0002c_rdy_pfil.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	21
R/W SHEET NO.	

METRIC

5 0 10

CONST. REV.

R/W REV.

ROADWAY DESIGN ENGINEER

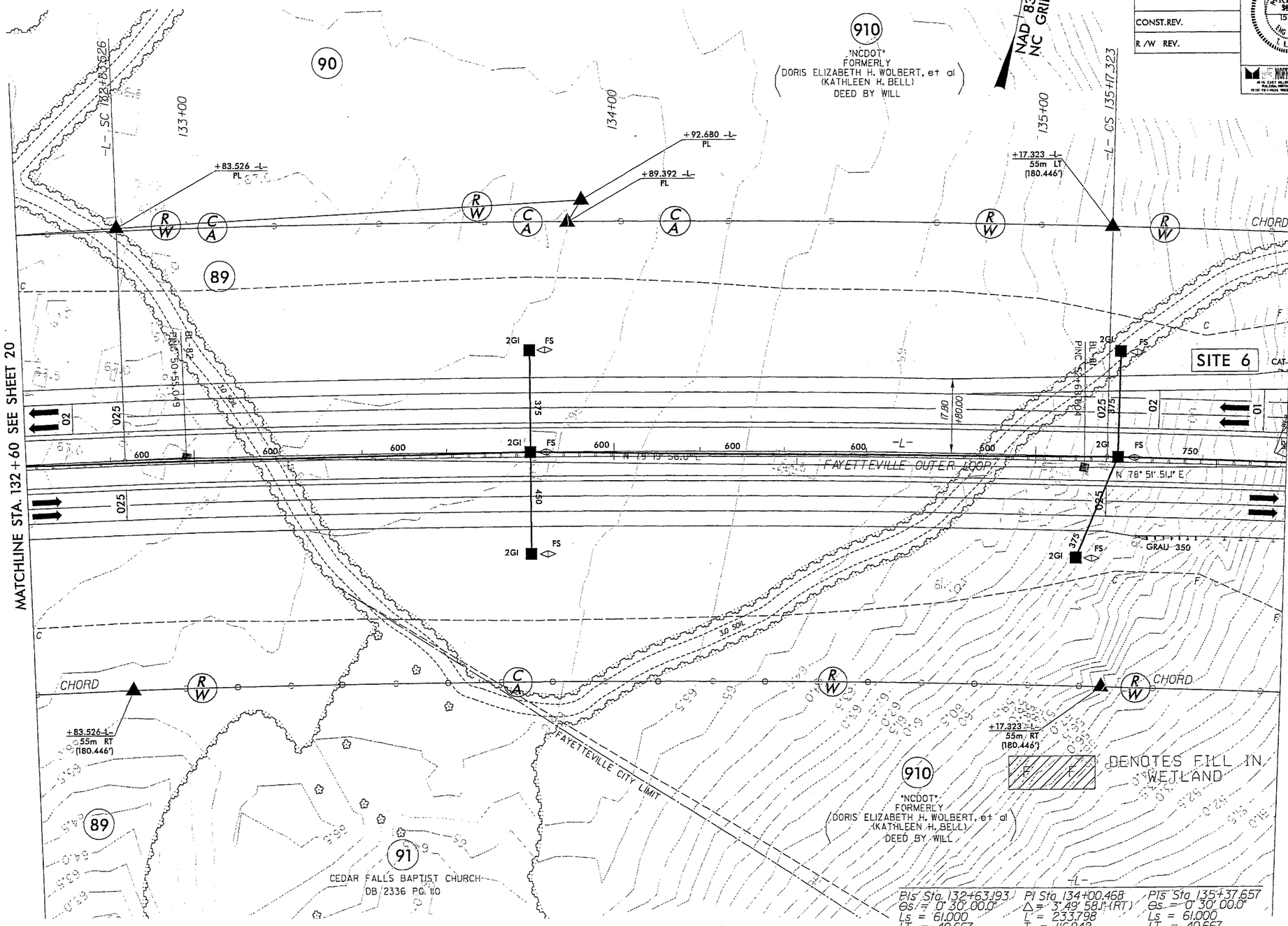
HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 25 of 64



Pls Sta. 132+63.193	Pl Sta. 134+00.468	Pls Sta. 135+37.657
Θs = 0° 30' 00.0"	Δ = 3° 49' 58.1" (RT)	Θs = 0° 30' 00.0"
Ls = 61.000	L = 233.798	Ls = 61.000
LT = 40.667	T = 116.942	LT = 40.667
ST = 20.333	R = 3,495.000	ST = 20.333
	SE = 0.025	
	RO = 61.000	
	DS = 110 kph	

FOR -L- PROFILE SEE SHEET 41

REVISIONS

12/15/06 - PARCEL 910 - ADDED NCDOT TO OWNER

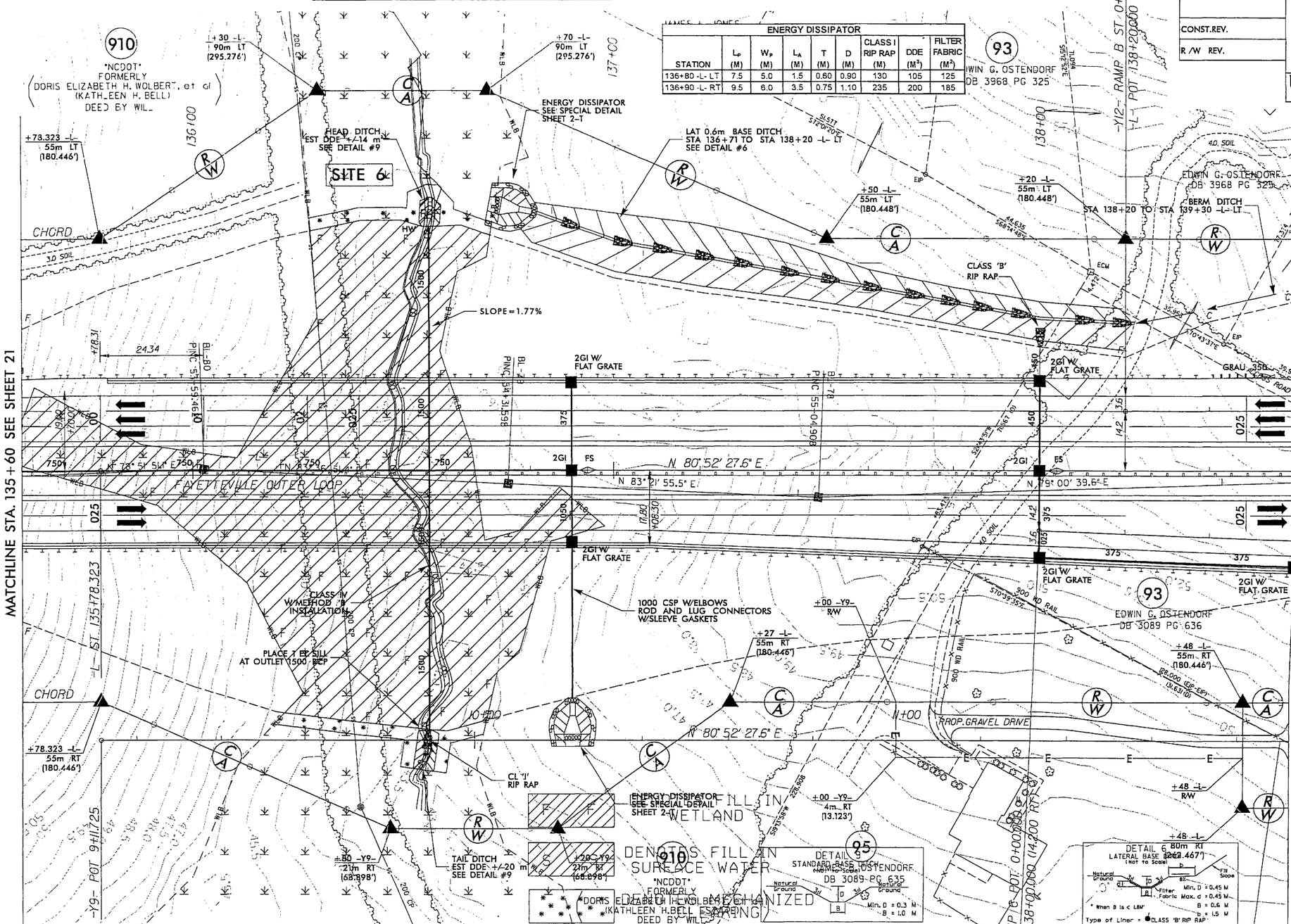
8/17/99

x0002c_rdy_psh21.dgn

ENERGY DISSIPATOR								
STATION	L_P (M)	W_P (M)	L_A (M)	T (M)	D (M)	CLASS I RIP RAP (M)	DDE (M^3)	FILTER FABRIC (M^2)
136+80 -L- LT	7.5	5.0	1.5	0.60	0.90	130	105	125
136+90 -L- RT	9.5	6.0	3.5	0.75	1.10	235	200	185

-Y12- RAMP B
PIs Sta 0+40.001
Θs = 0° 58' 56.0"
Ls = 60.000
LT = 40.001
ST = 20.001

ENERGY DISSIPATOR								
STATION	L_P (M)	W_P (M)	L_A (M)	T (M)	D (M)	CLASS I RIP RAP (M)	DDE (M^3)	FILTER FABRIC (M^2)
136+80 -L- LT	7.5	5.0	1.5	0.60	0.90	130	105	125
136+90 -L- RT	9.5	6.0	3.5	0.75	1.10	235	200	185



-L-
PIs Sta 135+37.657
Θs = 0° 30' 00.0"
Ls = 61.000
LT = 40.667
ST = 20.333

FOR DITCH DETAILS SEE SHEET 2-S
FOR -L- PROFILE SEE SHEET 41
FOR -Y9- PROFILE SEE SHEET 59
FOR -12- RAMP B PROFILE SEE SHEET 51
FOR -Y12- RAMP C PROFILE SEE SHEET 52

METRIC

5 0 10

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION
INCOMPLETE PLANS

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 26 of 64

94

8/17/99

REVISIONS

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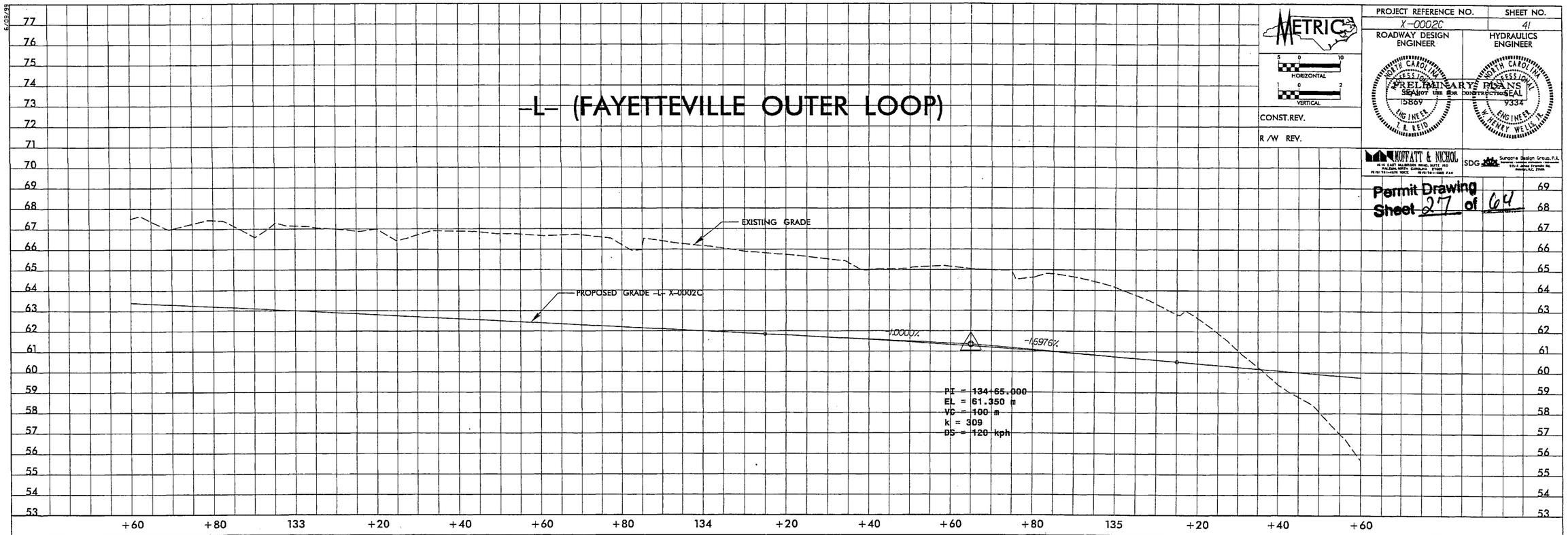
6/29/99



METRIC

HORIZONTAL

VERTICAL

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

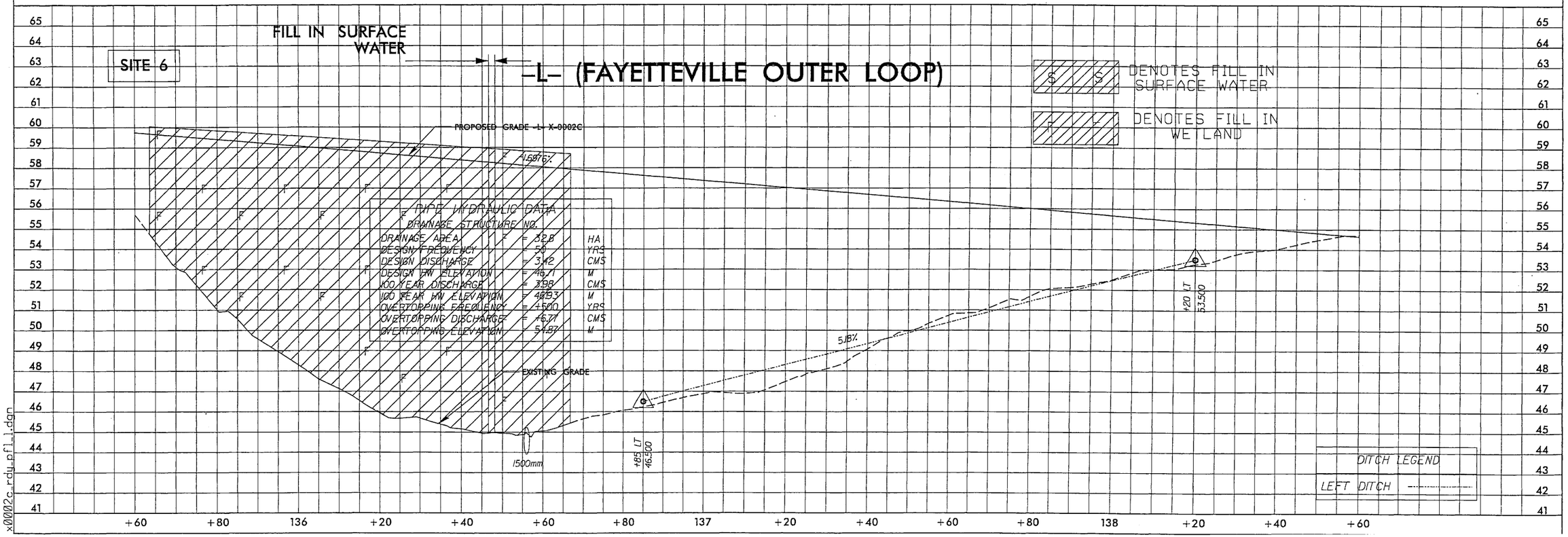
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

PRELIMINARY PLANS NOT FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing Sheet 27 of 64



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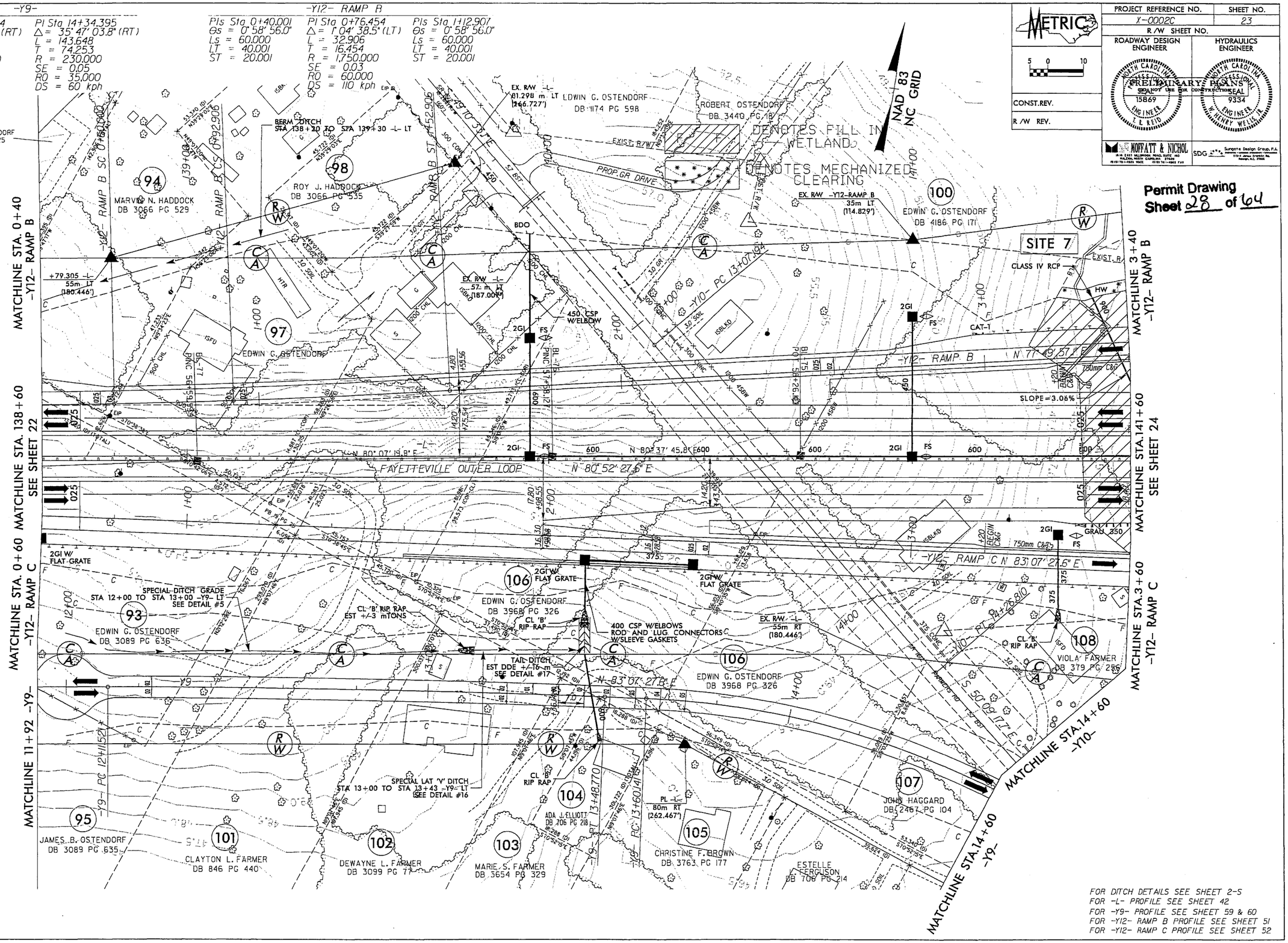


REVISIONS

12/15/06 -PARCEL 96 - CHANGED TO 93
09/28/07 -PARCEL 97 REVISED OWNER NAME

8/17/99

x0002c_rdy_sht23.dgn

REVISIONS

12/15/06 -PARCEL 111- CHANGED TO 110

-Y9-
PI Sta 14+34.395
Δ = 35° 47' 03.2" (RT)
L = 143.646
T = 74.251
R = 230.000
SE = 0.05
RD = 30.000
DS = 60 kph

-Y10-
PI Sta 15+26.099
Δ = 35° 01' 15.5" (LT)
L = 104.021
T = 53.804
R = 165.000

PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER -Y12-
(SEE SHEET 2L FOR A LARGER DETAIL VIEW)

-Y12- RAMP A
PI Sta 3+91.552
Δ = 12° 43' 55.6"
L = 60.000
LT = 40.04
ST = 20.095

-Y12- RAMP AI
PI Sta 4+24.352
Δ = 54° 06' 26.8" (LT)
L = 118.693
T = 63.905
R = 135.000

-Y12- RAMP B
PI Sta 6+76.918
Δ = 34° 55' 15.2" (RT)
L = 27.034
T = 13.939
R = 45.000

-Y12- RAMP BI
PI Sta 8+33.929
Δ = 86° 33' 58.8" (RT)
L = 77.338
T = 48.685
R = 55.000
SE = 0.05
RD = 60.000
DS = 40 kph

-Y12- RAMP BI
PI Sta 8+26.433
Δ = 98° 16' 53.7" (LT)
L = 53.590
T = 30.451
R = 45.000
SE = 0.05
RD = 24.000
DS = 30 kph

-Y12- RAMP C
PI Sta 7+41.150
Δ = 15° 43' 58.2"
L = 60.000
LT = 40.04
ST = 20.095

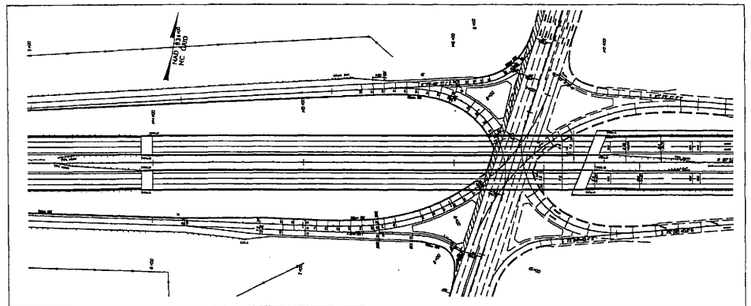
PI Sta 8+40.756
Δ = 50° 44' 26.5" (LT)
L = 143.117
T = 75.10
R = 155.000
SE = 0.05
RD = 60.000
DS = 60 kph

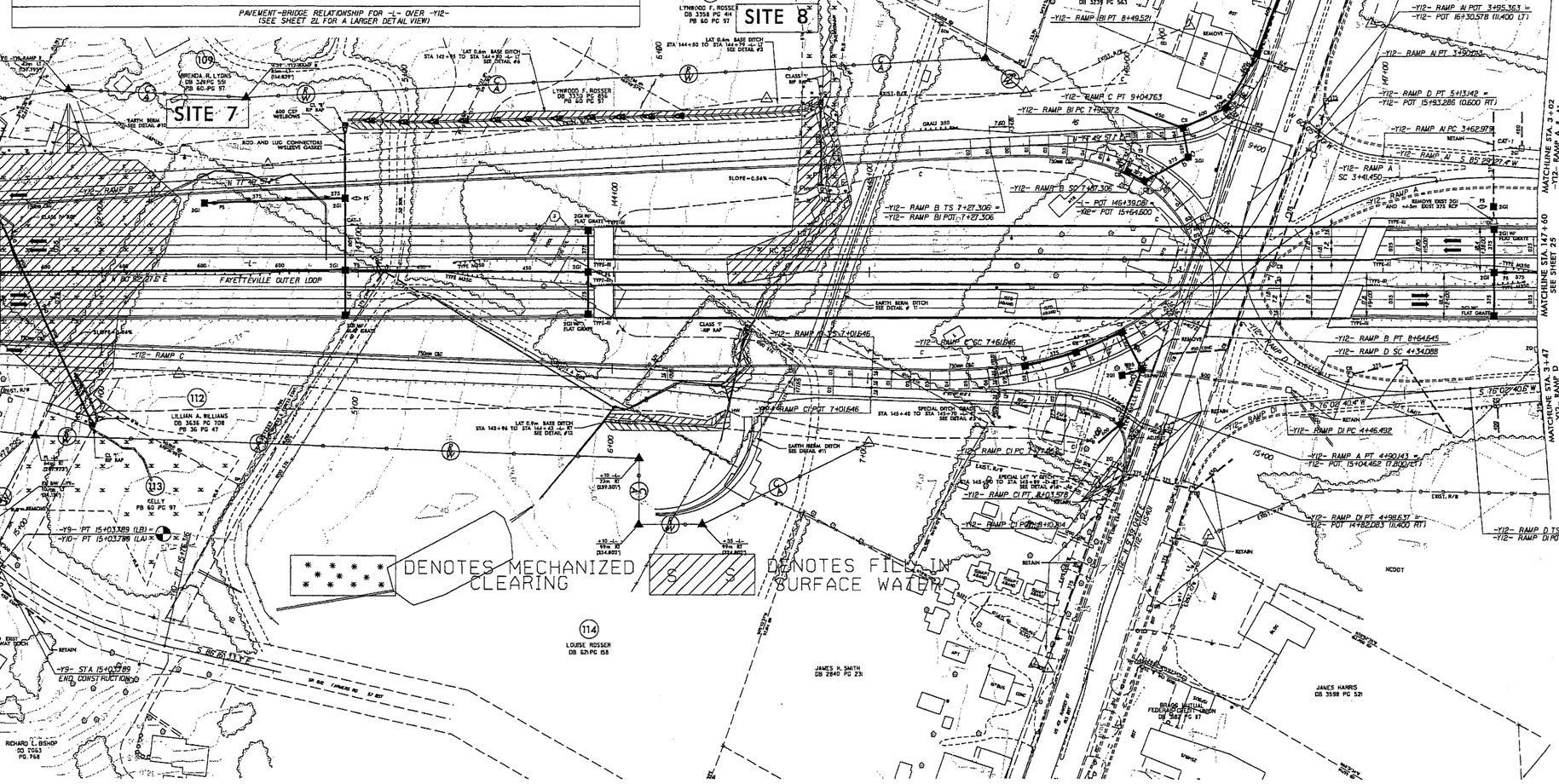
-Y12- RAMP CI
PI Sta 7+60.713
Δ = 33° 46' 25.2" (RT)
L = 26.526
T = 13.681
R = 45.000
SE = 0.05
RD = 24.000
DS = 30 kph

-Y12- RAMP D
PI Sta 4+14.729
Δ = 37° 15' 08.1"
L = 60.000
LT = 40.440
ST = 20.595

PI Sta 4+82.198
Δ = 82° 27' 16.3" (RT)
L = 79.754
T = 48.80
R = 55.000

-Y12- RAMP DI
PI Sta 4+75.935
Δ = 56° 17' 36.4" (LT)
L = 89.195
T = 49.441
R = 45.000





TRAFFIC DIAGRAM

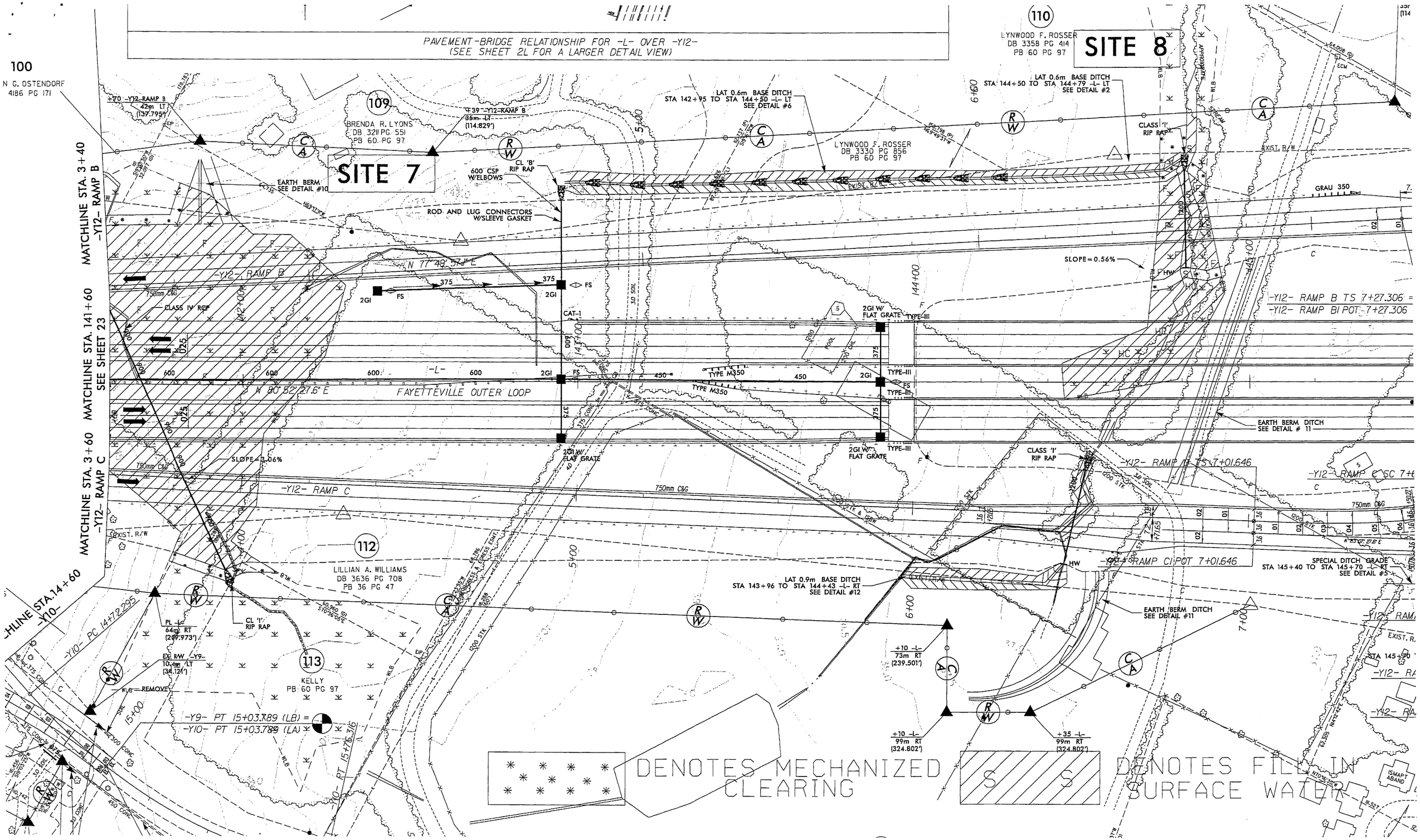
-Y12-	26,600 / 38,800	2008 ADT / 2030 ADT
-L-	8,920 / 13,400	10,040 / 13,200
-L-	23,270 / 50,300	12,500 / 17,200
-Y12-	11,020 / 16,300	28,810 / 49,400
-Y12-	33,350 / 46,500	

FOR DITCH DETAILS SEE SHEET 8-S
FOR -L- PROFILE SEE SHEET 42 AND 43
FOR -Y9- PROFILE SEE SHEET 50
FOR -Y12- RAMP B PROFILE SEE SHEET 51 & 52
FOR -Y12- RAMP BI PROFILE SEE SHEET 52
FOR -Y12- RAMP C PROFILE SEE SHEET 53
FOR -Y12- RAMP CI PROFILE SEE SHEET 53

PROJECT REFERENCE NO.	SHEET NO.
I-0002C	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
CONST REV.	
R/W REV.	

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY: DATE:
CHECKED BY: DATE:

Permit Drawing
Sheet 30 of 64



PROJECT REFERENCE NO.	SHEET NO.
X-0002C	42

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION — COMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION — PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION — ENGINEER — J. R. REID

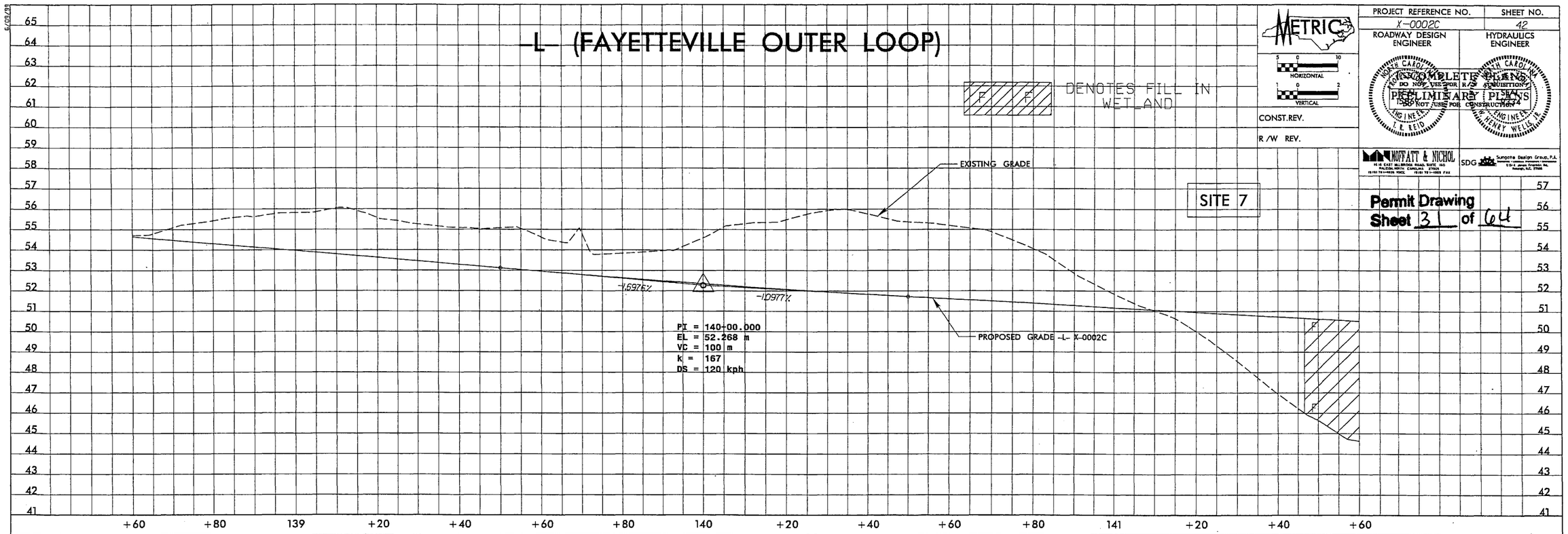
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION — ENGINEER — HENRY WELLS JR.

MOFFATT & NICHOL — 1616 EAST MILBROOK ROAD, SUITE 160, RALEIGH, NORTH CAROLINA 27609 — (919) 781-1400 VOICE, (919) 781-1409 FAX

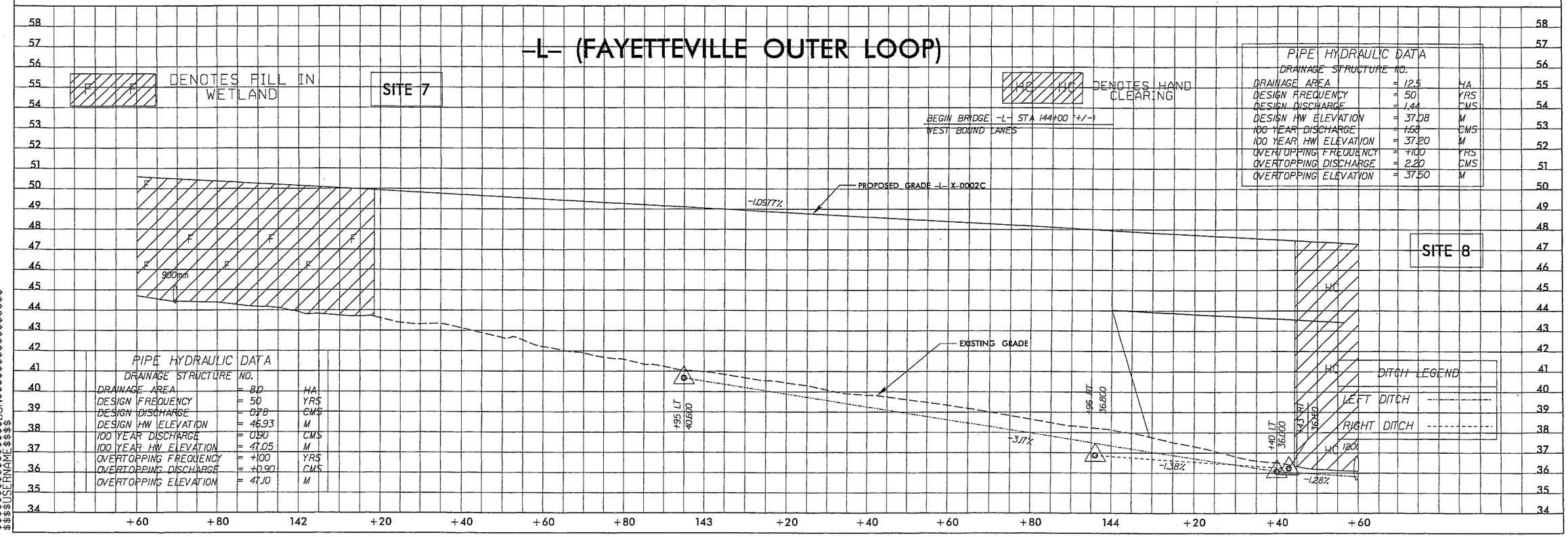
SDG Sungate Design Group, P.A. — 919-L Jones Franklin Rd., Raleigh, N.C. 27606

Permit Drawing
Sheet 31 of 64

-L- (FAYETTEVILLE OUTER LOOP)



-L- (FAYETTEVILLE OUTER LOOP)



$$$$SYSTIME$$$$DGN$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

NORTH CAROLINA DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION T. R. REID ENGINEER

NORTH CAROLINA COMPLETE PLANS HENRY WELLS JR. ENGINEER

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 32 of 64

HC DENOTES HAND CLEARING

SITE 8

-L- (FAYETTEVILLE OUTER LOOP)

PROPOSED GRADE -L- X-0002C

END BRIDGE -L- STA 146+89 (+/-)
WEST BOUND LANES

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	12.5	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	1.44	CMS
DESIGN HW ELEVATION	=	37.08	M
100 YEAR DISCHARGE	=	1.68	CMS
100 YEAR HW ELEVATION	=	37.20	M
OVERTOPPING FREQUENCY	=	+100	YRS
OVERTOPPING DISCHARGE	=	2.20	CMS
OVERTOPPING ELEVATION	=	37.50	M

-1.0977%

PI = 147+48.000
EL = 44.057 m
VC = 125 m
k = 94
DS = 100 kph

EXISTING GRADE

-1.28%

(-) 0.6939%

179 LT 35.500

+40 RT 35.030

+89 RT 34.690

DITCH LEGEND	
LEFT DITCH	
RIGHT DITCH	

+60 +80 145 +20 +40 +60 +80 146 +20 +40 +60 +80 147 +20 +40 +60

-L- (FAYETTEVILLE OUTER LOOP)

STA 149+10.035 -L- END TIP PROJECT X-0002C

STA 149+10.035 -L- BEGIN TIP PROJECT X-0002DA

-2.4257%

PROPOSED GRADE -L- X-0002C

-2.4257%

PI = 149+87.000
EL = 38.260 m
VC = 121 m

-2.4257%

-3.2326%

PROPOSED GRADE -L- X-0002DA
UNDER SEPARATE CONTRACT

EXISTING GRADE

END GRADE
-L- STA 149+10.035
EL 40.12

+60 +80 148 +20 +40 +60 +80 149 +20 +40 +60 +80 150 +20 +40 +60 +80

$$$$SYSTIME
$$$$USERNAME
$$$$DGN

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	28
R/W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15869 T. R. REID

HYDRAULICS ENGINEER

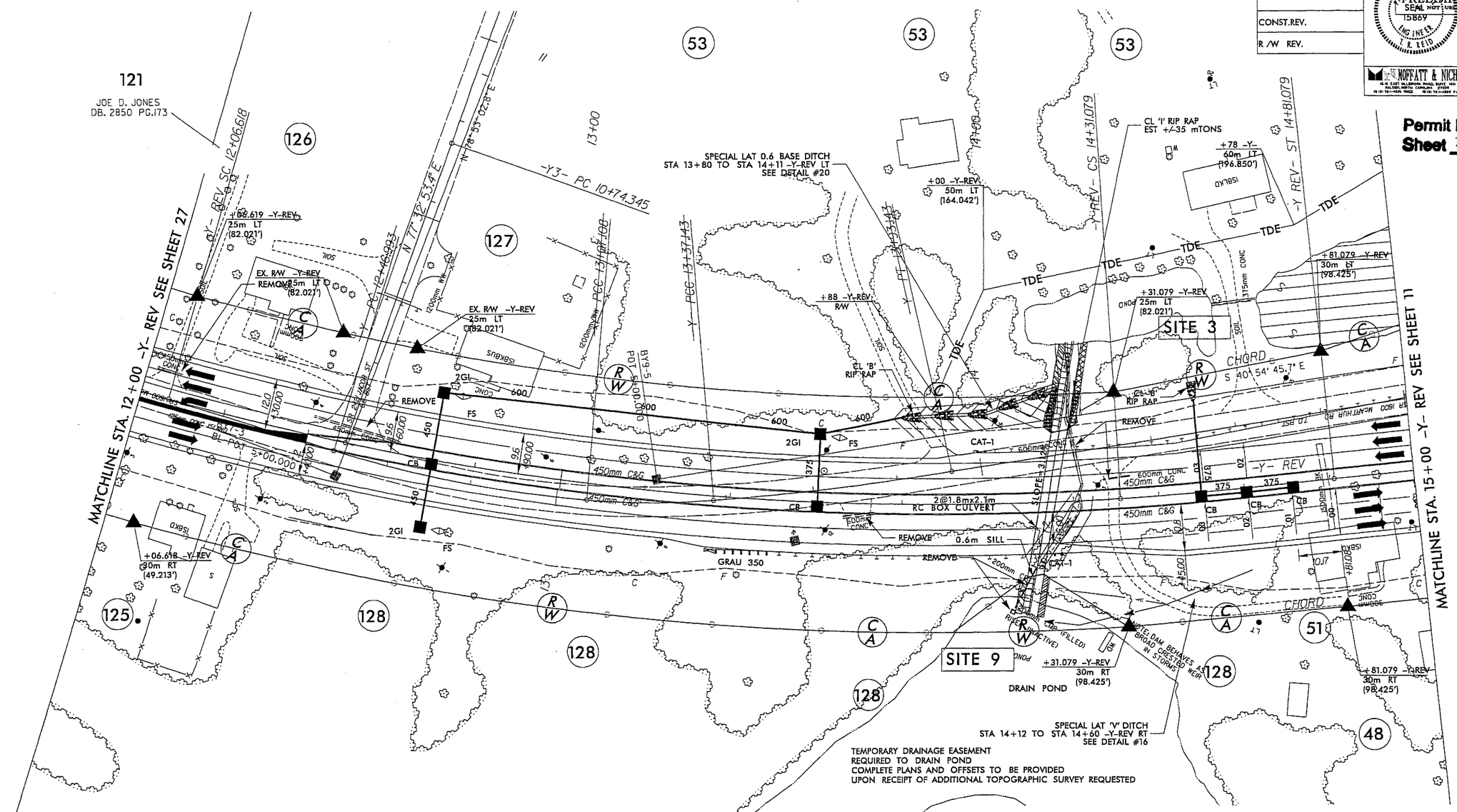
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9334 W. HENRY WELLS, JR.

PRELIMINARY PLANS NOT FOR CONSTRUCTION

MORFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 33 of 64



-Y-

~~PI Sta 12+77.166~~	~~PI Sta 13+22.160~~	~~PI Sta 13+65.157~~
~~Δ = 12° 18' 04.6" (LT)~~	~~Δ = 9° 33' 37.4" (LT)~~	~~Δ = 4° 31' 45.4" (LT)~~
~~L = 60.115~~	~~L = 30.935~~	~~L = 56.000~~
~~T = 30.174~~	~~T = 15.052~~	~~T = 28.015~~
~~R = 280.000~~	~~R = 180.000~~	~~R = 708.405~~

-Y3-

PI Sta 11+16.055
Δ = 0° 30' 40.3" (RT)
L = 83.419
T = 41.710
R = 9,350.000

-Y- REV

PIs Sta 11+89.954	PI Sta 13+19.943	PIs Sta 14+47.748
Θs = 2° 10' 13.1"	Δ = 19° 29' 09.1" (LT)	Θs = 2° 10' 13.1"
Ls = 50.000	L = 224.461	Ls = 50.000
LT = 33.336	T = 113.325	LT = 33.336
ST = 16.669	R = 660.000	ST = 16.669
	SE = 0.003	
	RO = 50.000	
	DS = 80 kph	

FOR DITCH DETAILS SEE SHEET 2-S
FOR -Y- REV PROFILE SEE SHEET 54 & 55

REVISIONS

12/15/06 -PARCEL 116 - CHANGED TO 48

8/07/09

x0002c_rdy_psh28.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10 HORIZONTAL

1 0 2 VERTICAL

CONST. REV.

R/W REV.

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

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing
Sheet 34 of 64

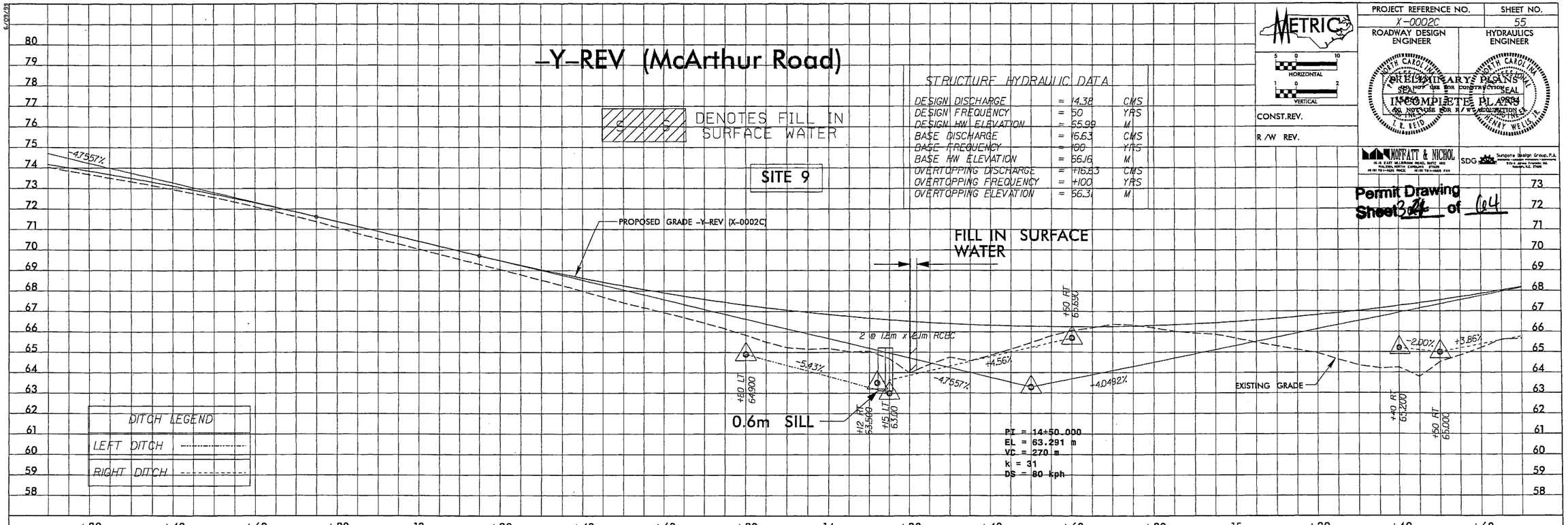
-Y-REV (McArthur Road)

DENOTES FILL IN SURFACE WATER

SITE 9

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	=	14.38	CMS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	65.99	M
BASE DISCHARGE	=	16.63	CMS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	66.16	M
OVERTOPPING DISCHARGE	=	116.83	CMS
OVERTOPPING FREQUENCY	=	100	YRS
OVERTOPPING ELEVATION	=	66.31	M



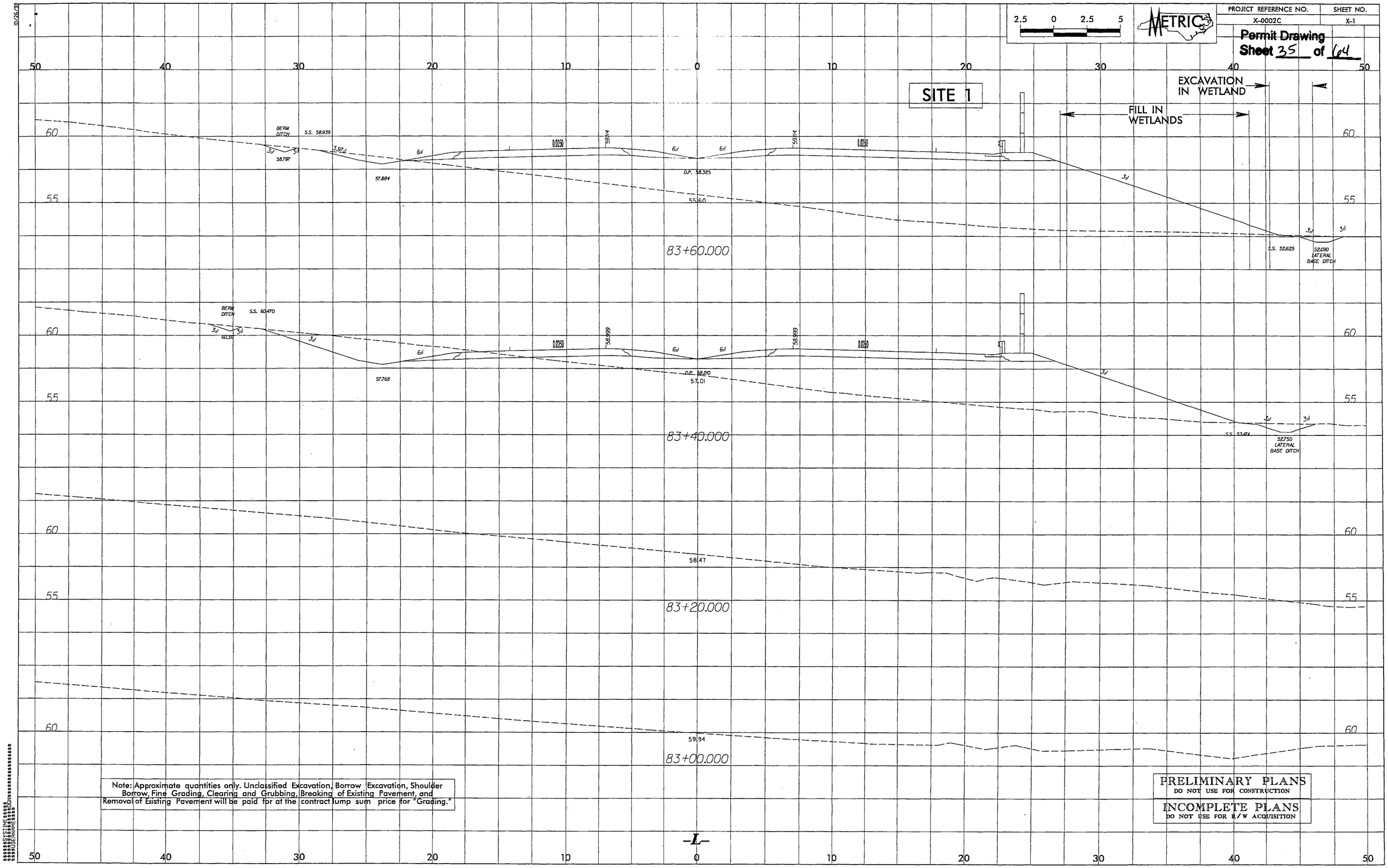
6/09/99

x0002c_rdy_pfl_y_lines.dgn

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-1

Permit Drawing
Sheet 35 of 64

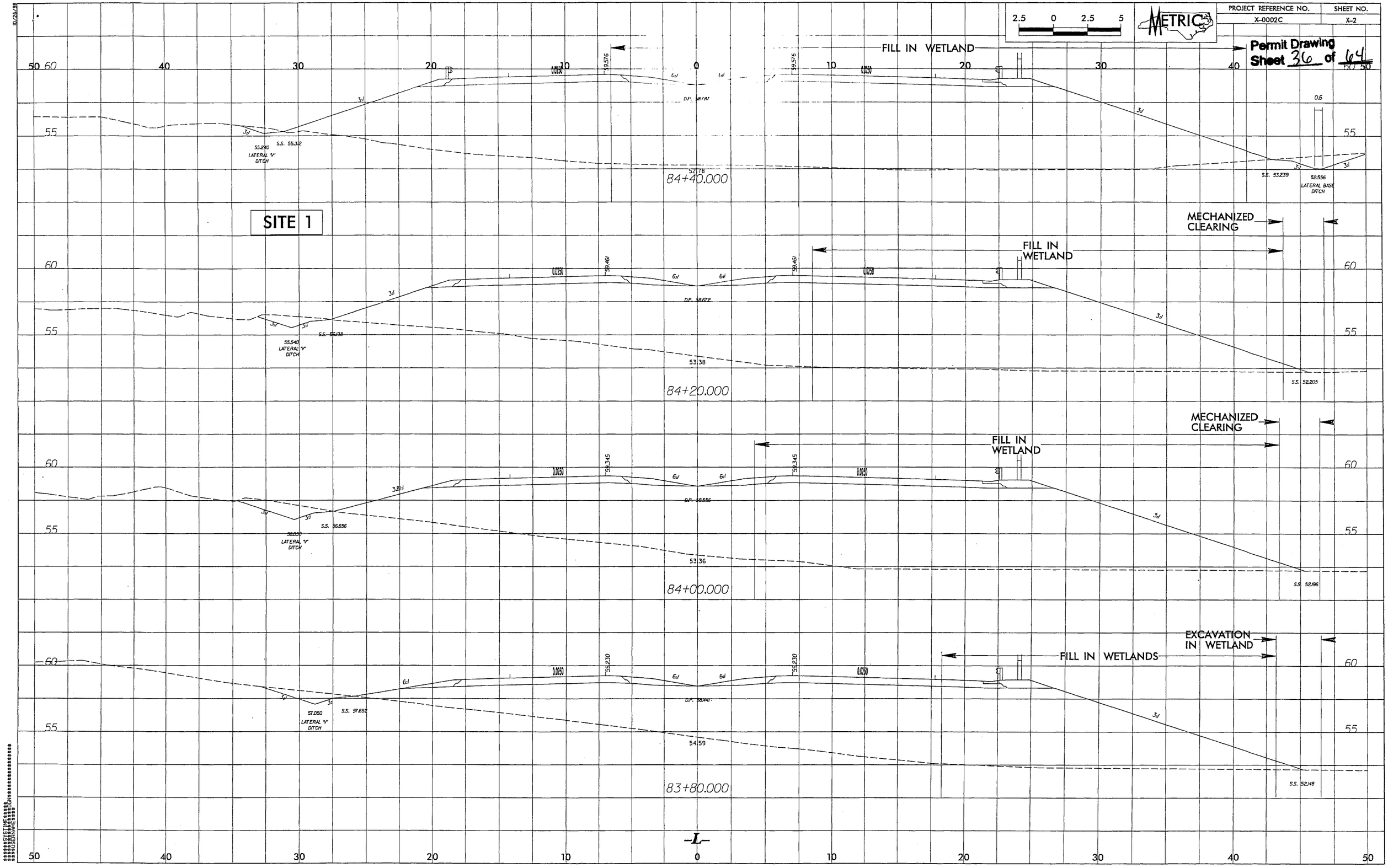


Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

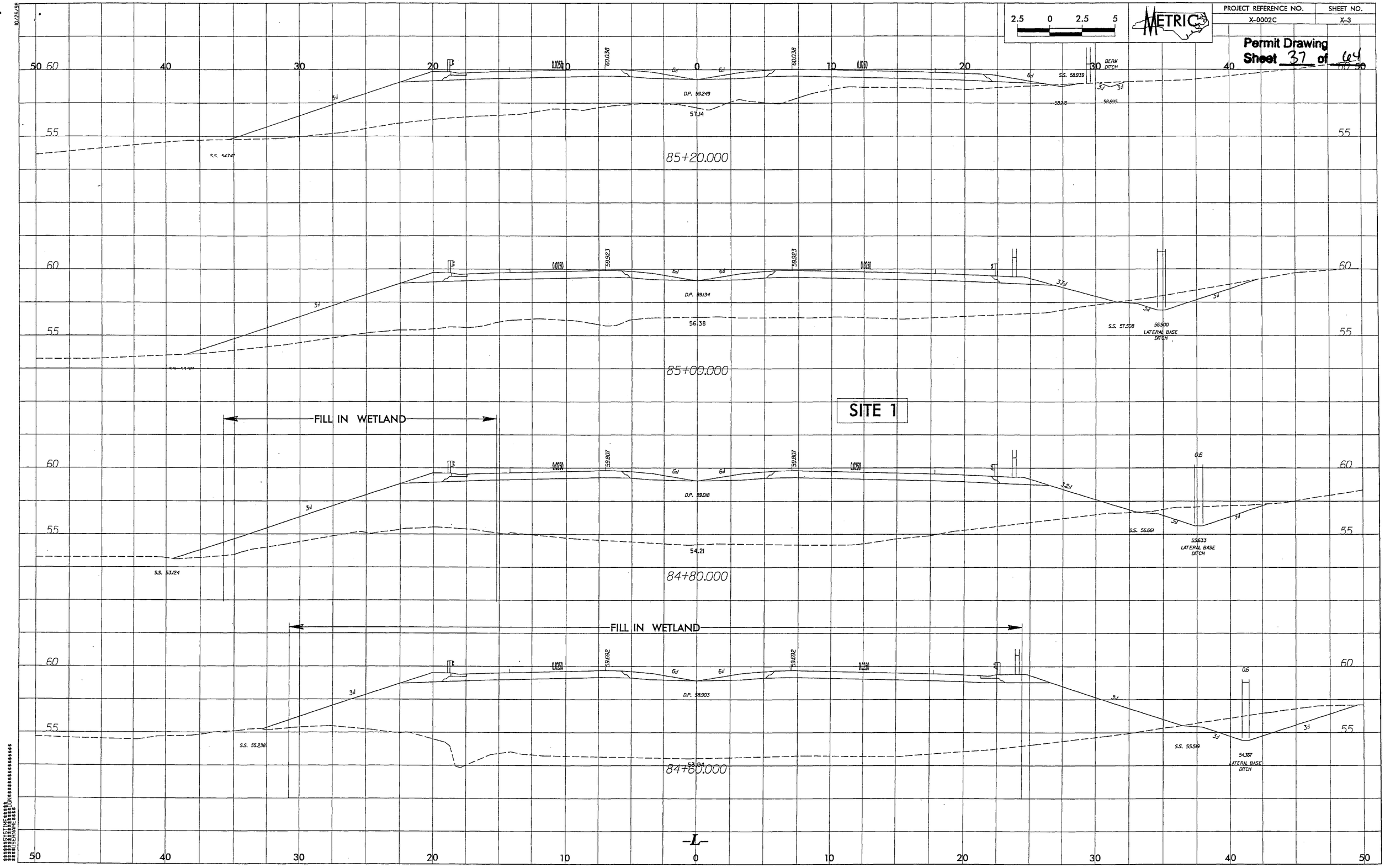
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

$$$$$$SYSTIME$$$$$$
$$$$$$DATE$$$$$$
$$$$$$USERNAME$$$$$$


PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-2
METRIC
2.5 0 2.5 5
Permit Drawing
Sheet 36 of 64
FILL IN WETLAND
59.576
0.0250
6:1
D.P. 54.787
3:1
55.240
S.S. 55.312
LATERAL "V" DITCH
52.178
84+40.000
0.6
S.S. 53.239
52.556
LATERAL BASE DITCH
SITE 1
MECHANIZED CLEARING
FILL IN WETLAND
59.461
D.P. 58.672
55.540
LATERAL "V" DITCH
S.S. 55.638
53.38
84+20.000
S.S. 52.205
MECHANIZED CLEARING
FILL IN WETLAND
59.345
D.P. 58.556
3.8:1
56.050
LATERAL "V" DITCH
S.S. 56.656
53.36
84+00.000
S.S. 52.196
EXCAVATION IN WETLAND
FILL IN WETLANDS
58.230
D.P. 58.441
57.050
LATERAL "V" DITCH
S.S. 57.652
54.59
83+80.000
S.S. 52.148
-L-
50 40 30 20 10 0 10 20 30 40 50
55
60

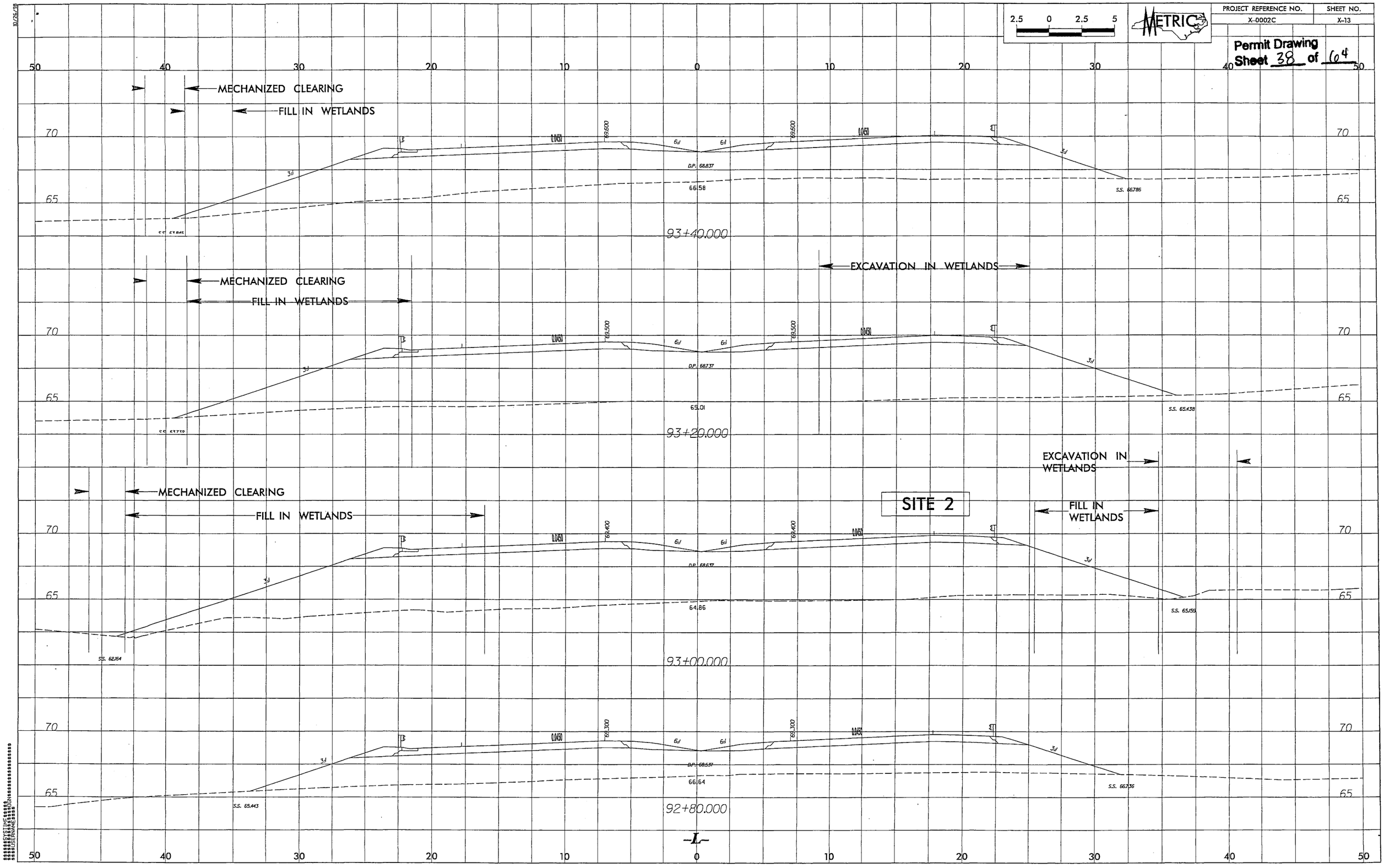
PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-3

Permit Drawing
Sheet 37 of 64



PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-13

Permit Drawing
Sheet 38 of 64

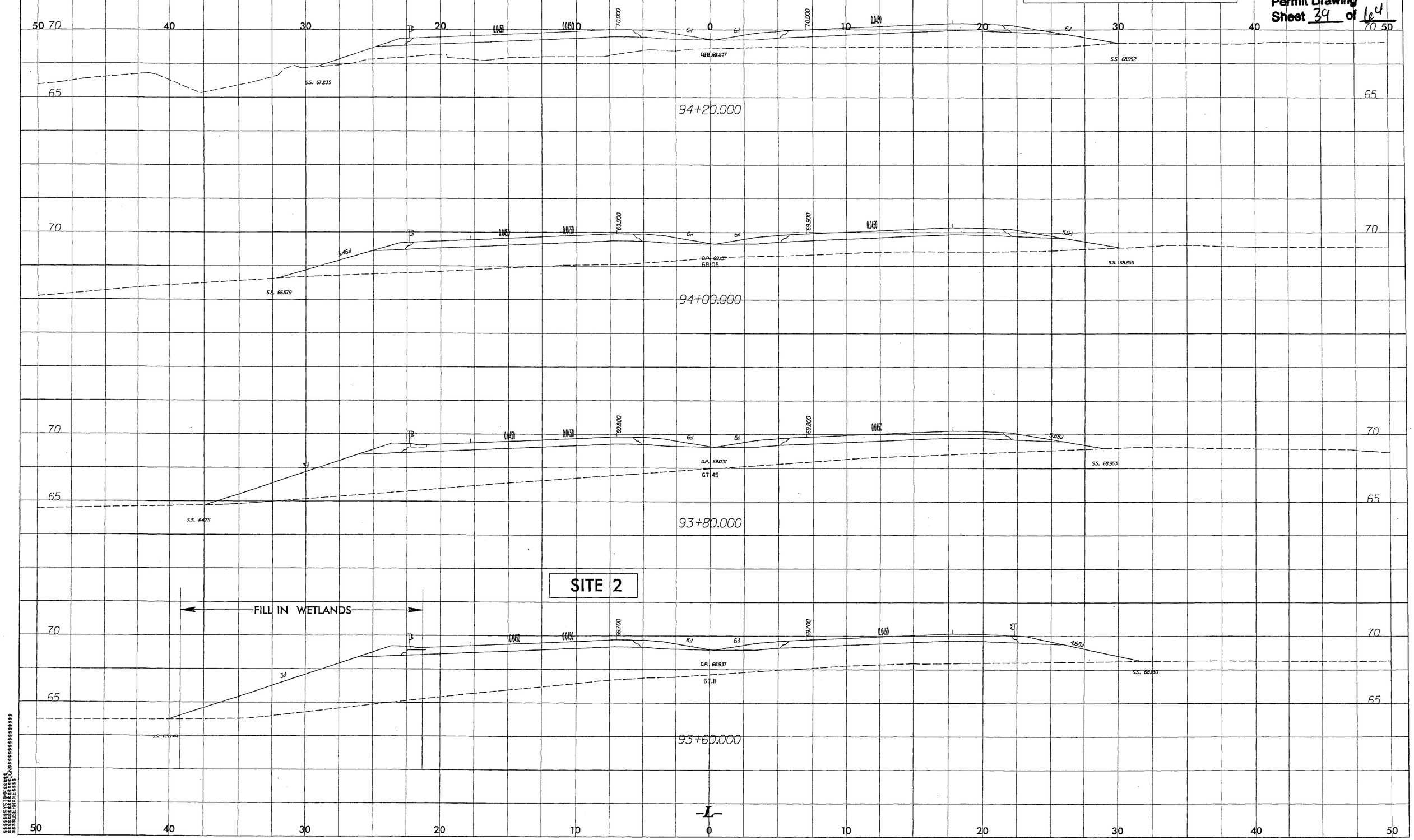


PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-14

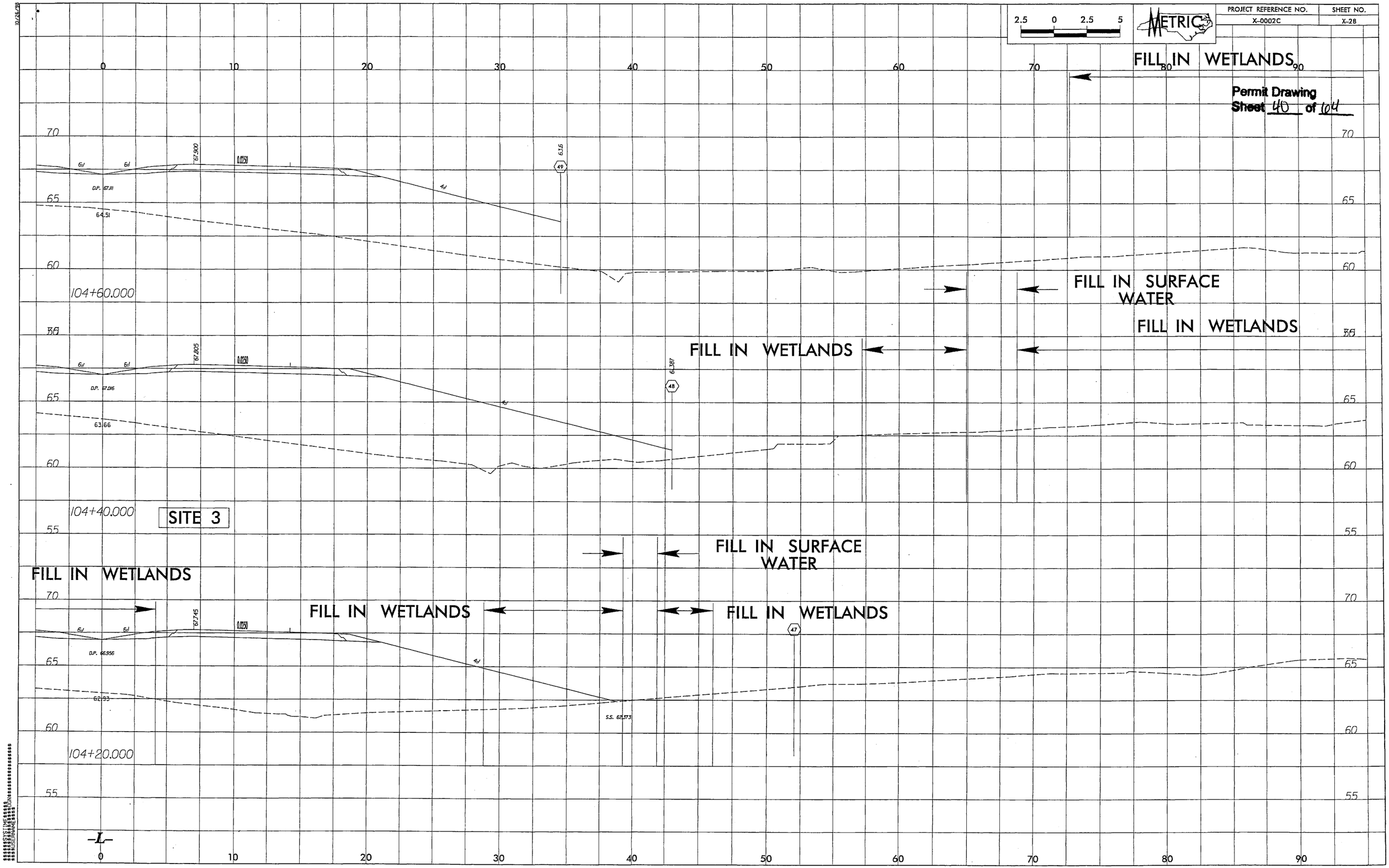
Permit Drawing
Sheet 39 of 64

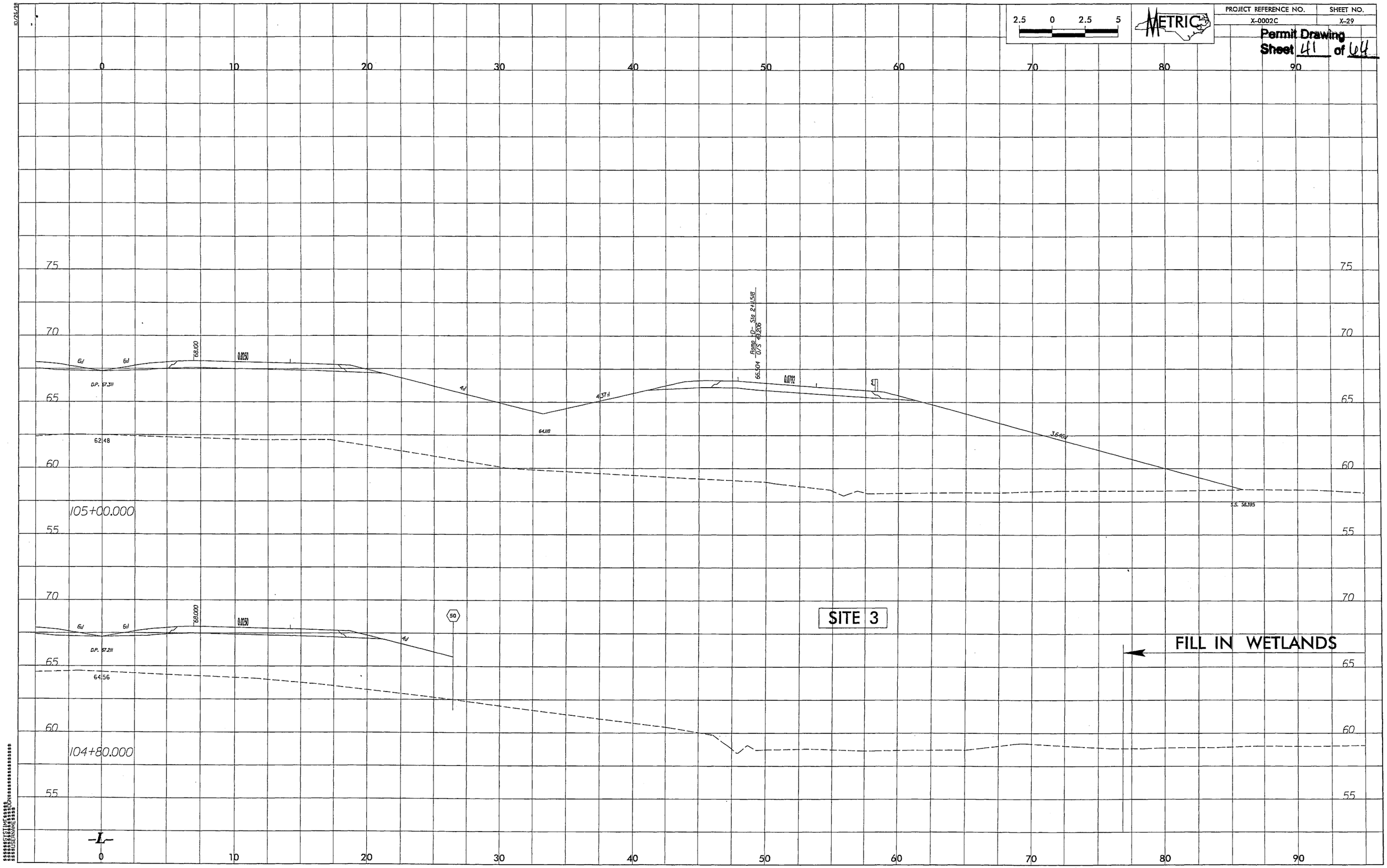
2.5 0 2.5 5

METRIC



$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$DATE$$$$$$$$
$$$$$$$$DGNFILENAME$$$$$$$$
$$$$$$$$USERNAME$$$$$$$$


2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-28
FILL IN WETLANDS
Permit Drawing
Sheet 40 of 104
FILL IN SURFACE WATER
FILL IN WETLANDS
FILL IN WETLANDS
104+60.000
67.500
0.0250
6:1
6:1
D.P. 67.111
64.51
4:1
6.56
49
67.805
0.0250
D.P. 67.016
63.66
6.387
48
104+40.000
SITE 3
FILL IN SURFACE WATER
FILL IN WETLANDS
FILL IN WETLANDS
FILL IN WETLANDS
67.745
0.0250
D.P. 66.956
62.93
S.S. 62.373
47
104+20.000
-L-
0 10 20 30 40 50 60 70 80 90
70 65 60 55


2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-29
Permit Drawing
Sheet 41 of 64
0 10 20 30 40 50 60 70 80 90
75
70
65
60
55
6:1
6:1
68.00
0.0250
D.P. 67.311
4:1
4.37:1
64.18
66.504
Ramp "D" Sta 241.518
O/S 48.206
0.0792
4:1
3.64:1
62.48
S.S. 58.395
105+00.000
68.000
0.0250
6:1
6:1
D.P. 67.211
4:1
50
64.56
104+80.000
SITE 3
FILL IN WETLANDS
-L-

2.5 0 2.5 5

METRIC

SITE 3

FILL IN WETLANDS

Ramp -D- Sta 1+68.712
O/S 4.022

67.355

0.0770

6:1

6:1

64.300

0.0250

D.P. 67.511

4:1

4.20:1

66.421

3.89:1

S.S. 59.700

58.55

105+20.000

FILL IN SURFACE WATER

FILL IN WETLANDS

FILL IN WETLANDS

Ramp -D- Sta 1+89.898
O/S 4.002

64.839

0.0001

6:1

6:1

58.200

0.0250

D.P. 67.411

4:1

4.28:1

65.290

3.34:1

S.S. 57.747

58.66

105+20.000

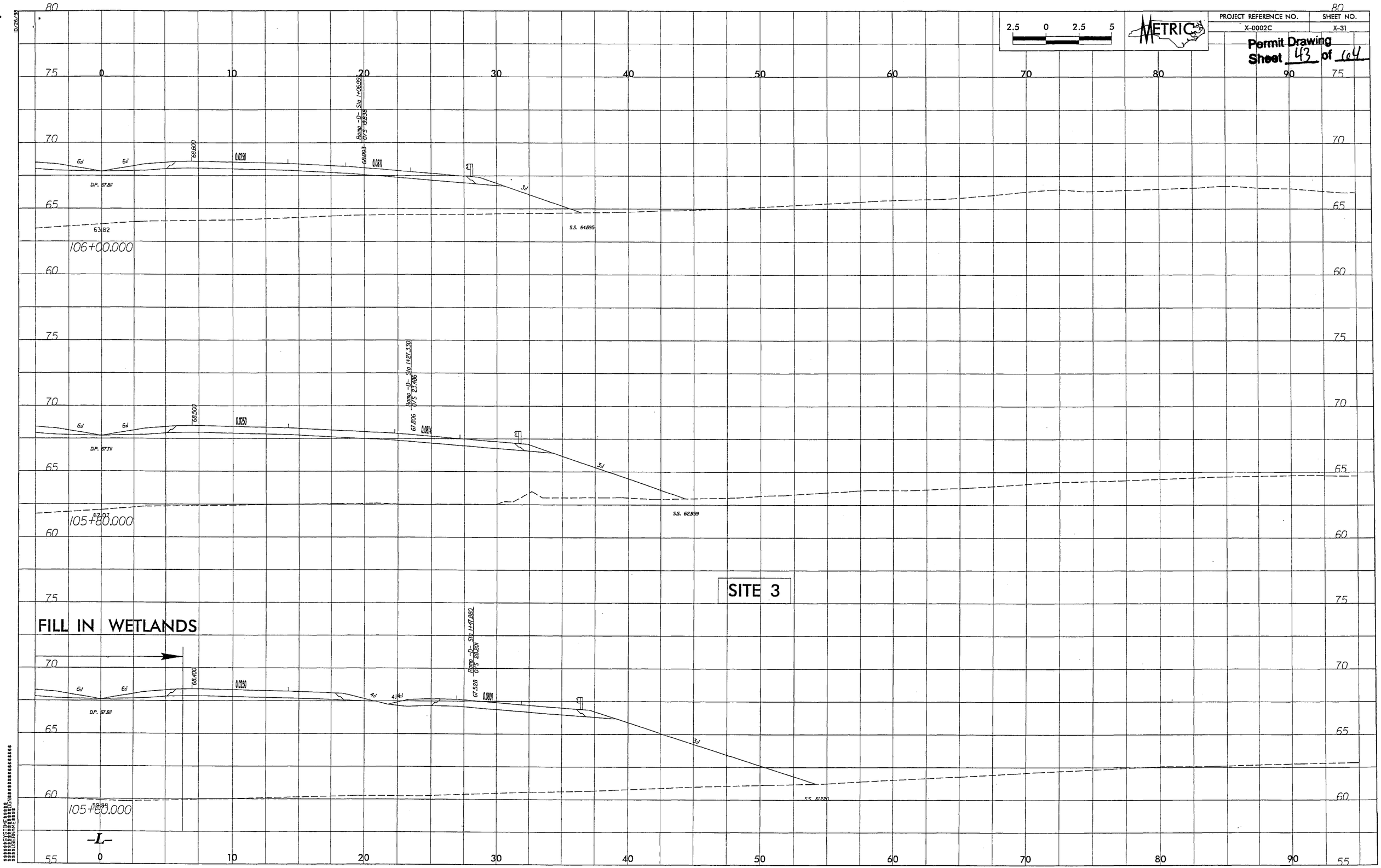
-L-

0 10 20 30 40 50 60 70 80 90

75 70 65 60 55

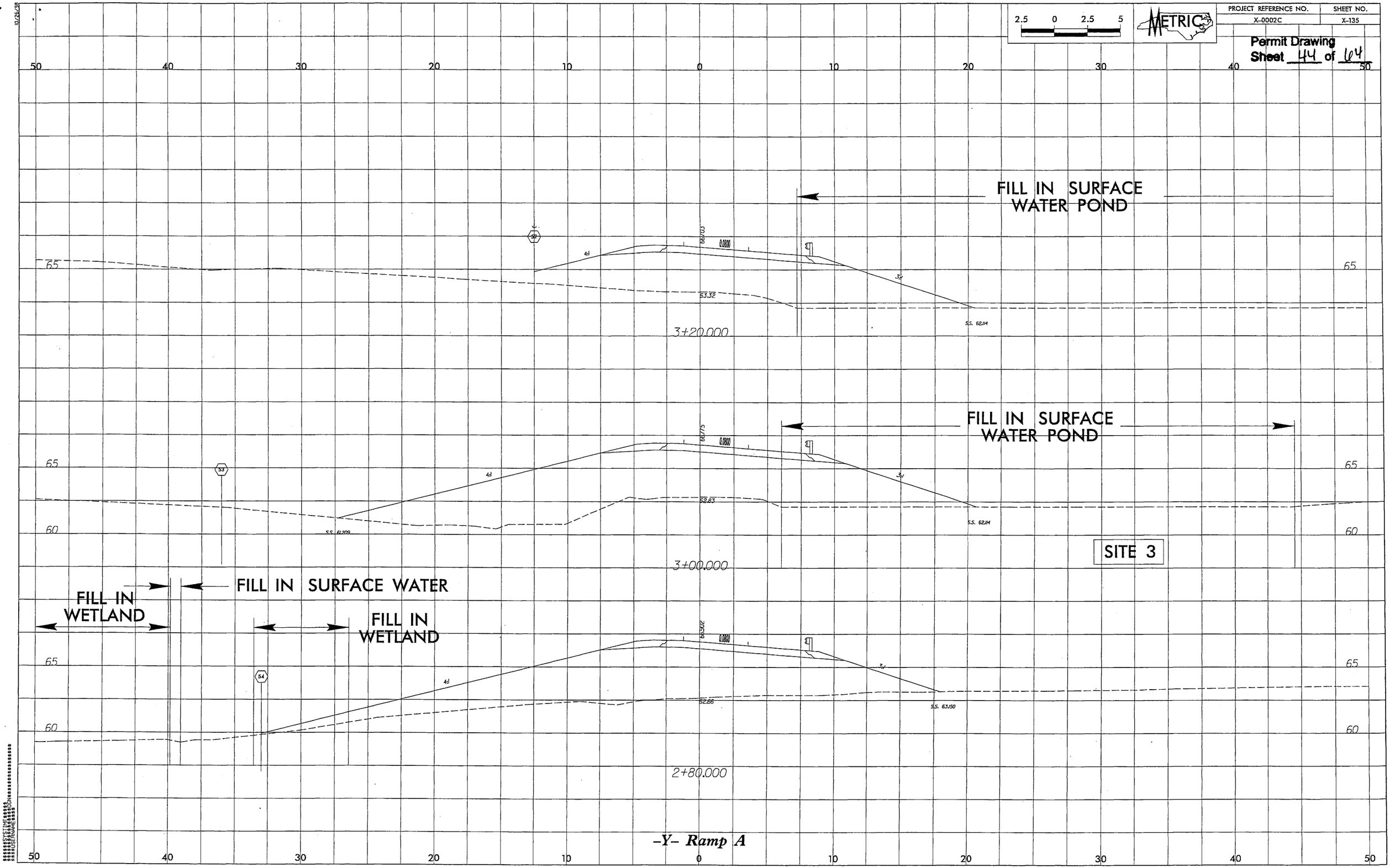
10/26/98

$$$$$SYSTIME$$$$$
$$$$$PLOTDRIVER$$$$$
$$$$$USERNAME$$$$$


10/26/98
2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-31
Permit Drawing
Sheet 43 of 64
Ramp -D- Sta 1+06.659
O/S 19.926
66.093
0.0211
66.600
0.0250
6:1
6:1
D.P. 67.811
3:1
S.S. 64.695
63.82
106+00.000
Ramp -D- Sta 1+27.330
O/S 23.486
67.806
0.0014
68.500
0.0250
6:1
6:1
D.P. 67.711
3:1
S.S. 62.959
62.97
105+80.000
SITE 3
FILL IN WETLANDS
Ramp -D- Sta 1+47.880
O/S 28.200
67.528
0.0001
68.400
0.0250
6:1
6:1
4:1
4:1
D.P. 67.611
3:1
S.S. 61.220
62.885
105+60.000
-L-
80
75
70
65
60
55
0
10
20
30
40
50
60
70
80
90

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-135

Permit Drawing
Sheet 44 of 64



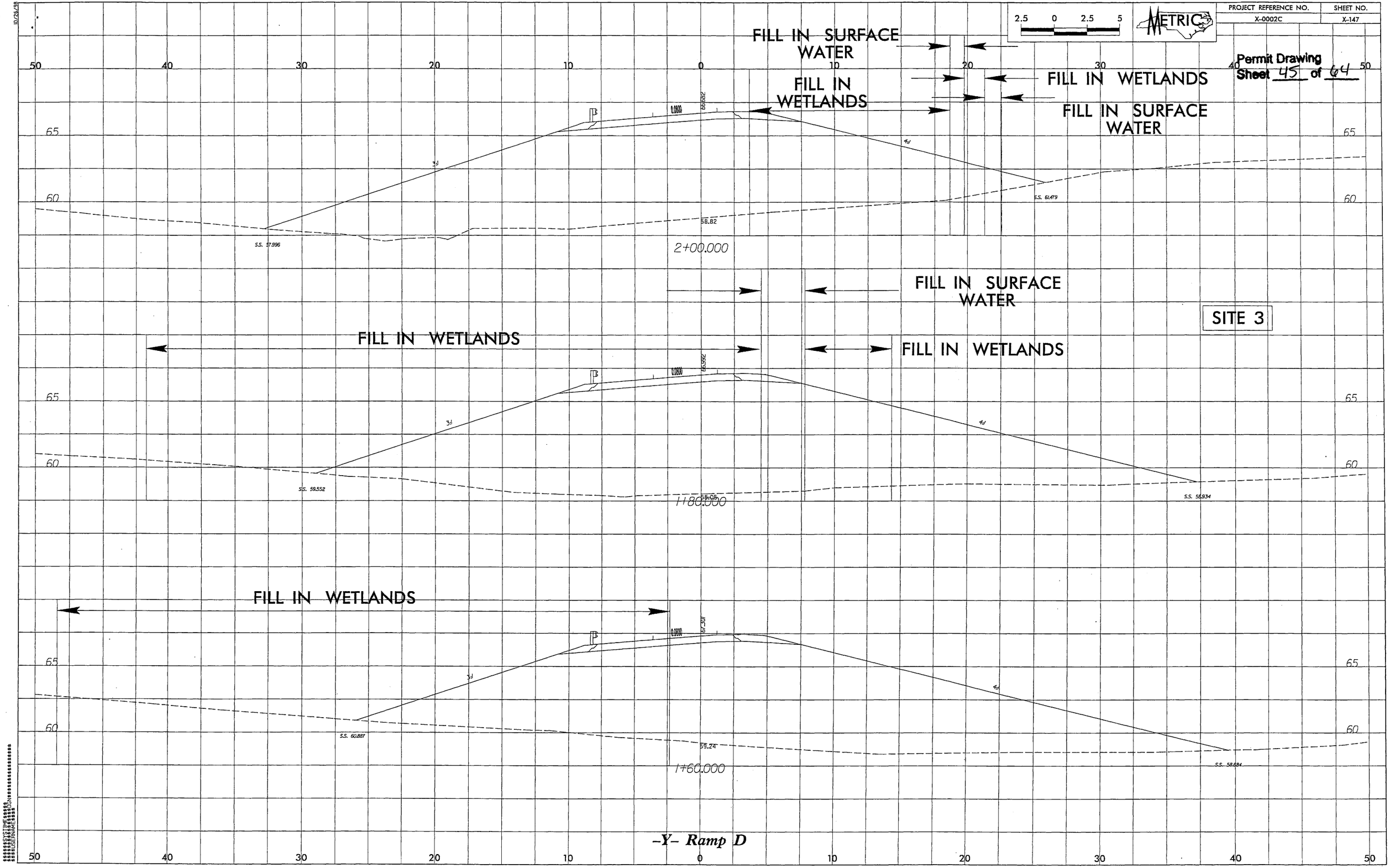
10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-147

2.5 0 2.5 5

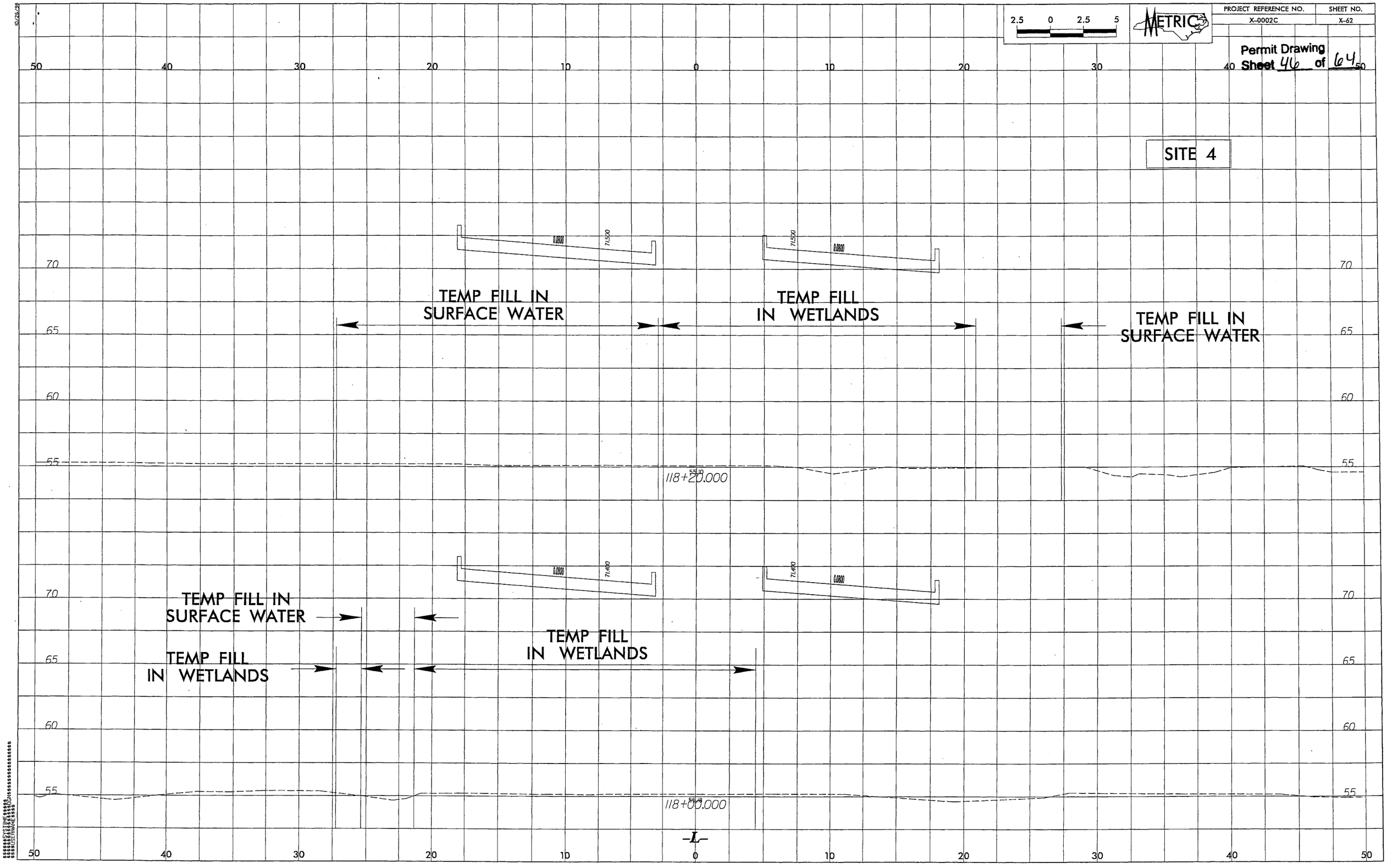
METRIC

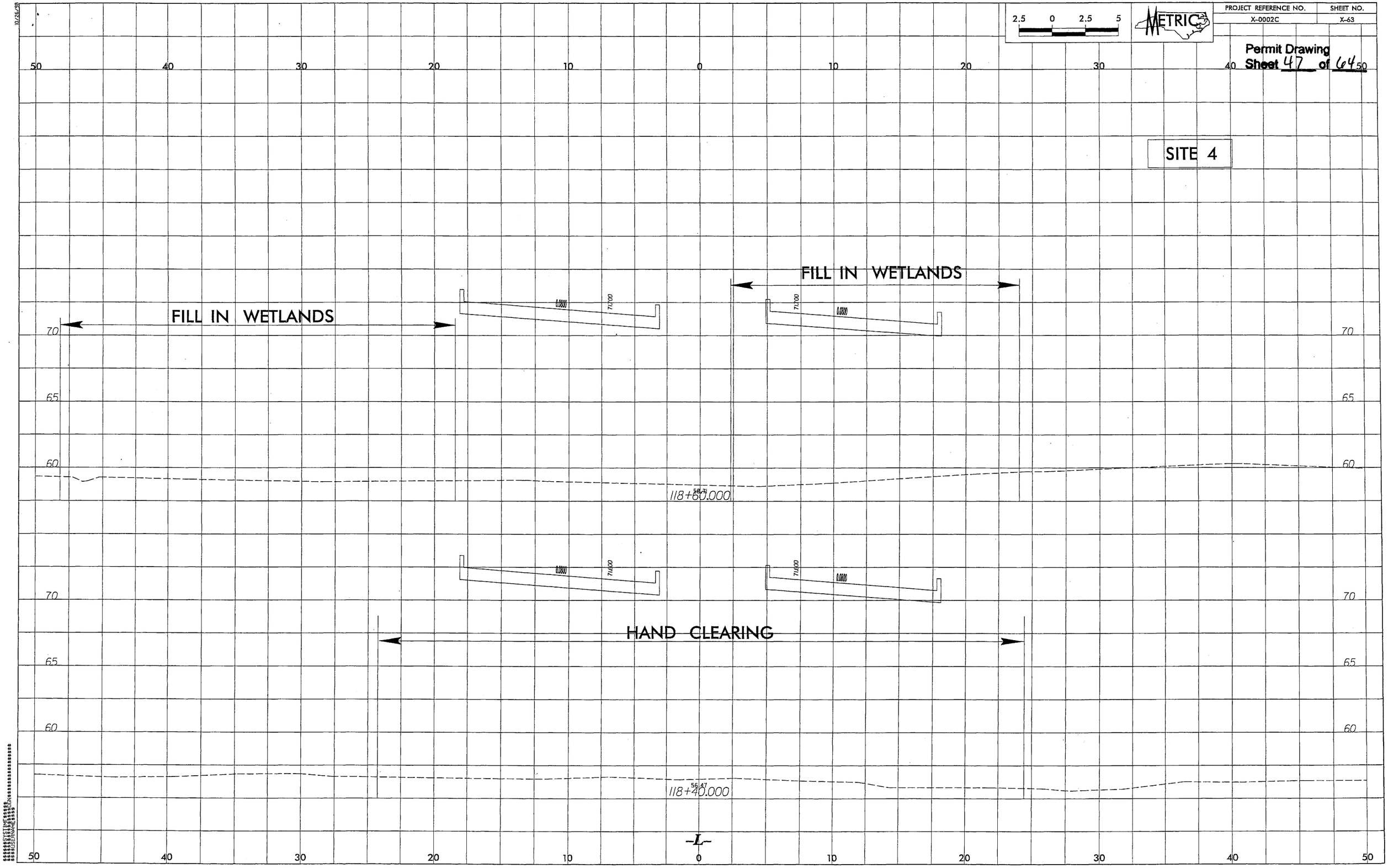
Permit Drawing
Sheet 45 of 64

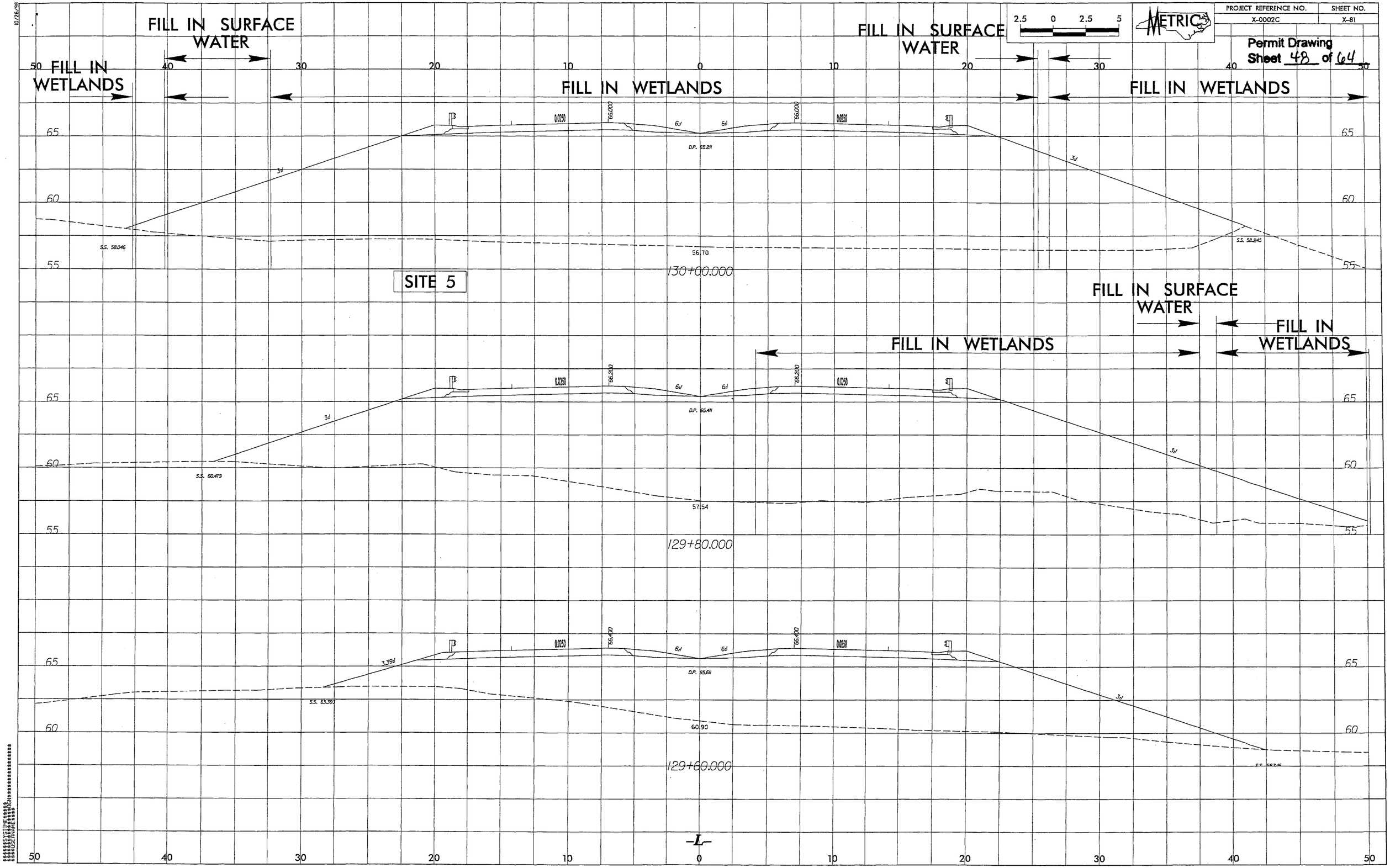


-Y- Ramp D

SYSTIME$$$$$$
USERNAME$$$$$$CONVERT


PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-62
2.5 0 2.5 5
METRIC
Permit Drawing
Sheet 46 of 64
SITE 4
0.0800
71.500
TEMP FILL IN
SURFACE WATER
TEMP FILL
IN WETLANDS
TEMP FILL IN
SURFACE WATER
55.10
118+20.000
0.0800
71.400
TEMP FILL IN
SURFACE WATER
TEMP FILL
IN WETLANDS
TEMP FILL
IN WETLANDS
55.18
118+00.000
-L-
50 40 30 20 10 0 10 20 30 40 50
70 65 60 55


PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-63
2.5 0 2.5 5
METRIC
Permit Drawing
Sheet 47 of 64
SITE 4
FILL IN WETLANDS
FILL IN WETLANDS
0.0800
71.00
0.0800
71.00
70
65
60
118+60.000
56.71
0.0800
71.00
0.0800
71.00
70
HAND CLEARING
65
60
118+40.000
56.47
-L-
50
40
30
20
10
0
10
20
30
40
50


PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-81
Permit Drawing
Sheet 48 of 64
METRIC
2.5 0 2.5 5
FILL IN SURFACE WATER
FILL IN WETLANDS
FILL IN WETLANDS
FILL IN SURFACE WATER
FILL IN WETLANDS
SITE 5
S.S. 58.046
56.70
130+00.000
S.S. 58.245
FILL IN SURFACE WATER
FILL IN WETLANDS
FILL IN WETLANDS
S.S. 60.479
57.54
129+80.000
S.S. 63.393
60.90
129+60.000
-L-

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-88

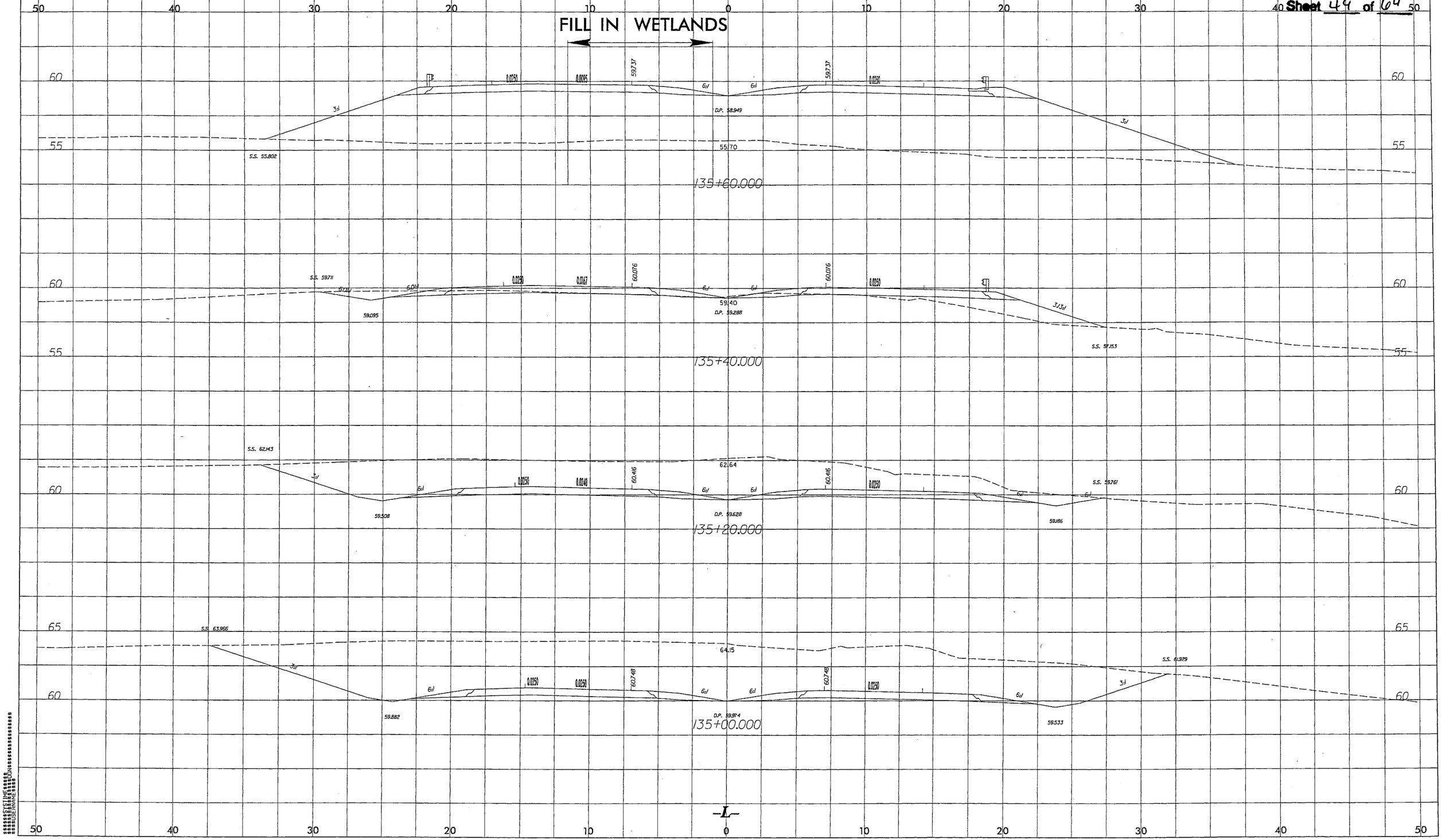
Permit Drawing
Sheet 49 of 64

SITE 6

2.5 0 2.5 5

METRIC

FILL IN WETLANDS



$$$$$$$SYSTIME$$$$$$$
$$$$$$$

10/26/98

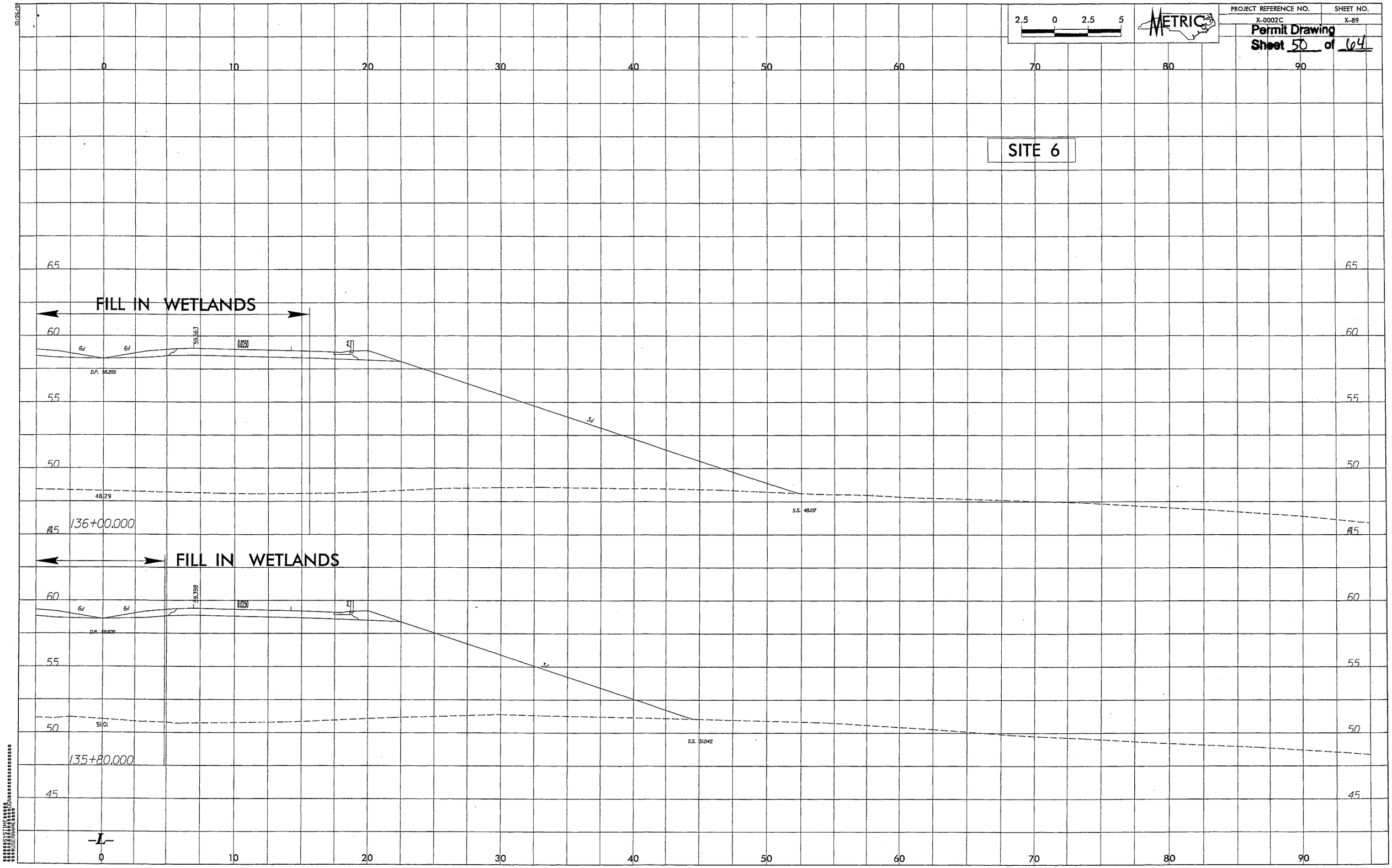
PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-89

Permit Drawing
Sheet 50 of 64

2.5 0 2.5 5

METRIC

SITE 6



$$$$$$$$SYSTIME$$$$$$
$$$$$$$$CHRISTIAN$$$$$$
$$$$$$$$USERNAME$$$$

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-90

Permit Drawing
Sheet 51 of 64

2.5 0 2.5 5

METRIC

SITE 6

FILL IN WETLANDS

59.379

0.0250

6:1 6:1

D.P. 57.591

3:1

45.15

136+40.000

FILL IN WETLANDS

58.218

0.0250

6:1 6:1

D.P. 57.930

3:1

45.97

136+20.000

-L-

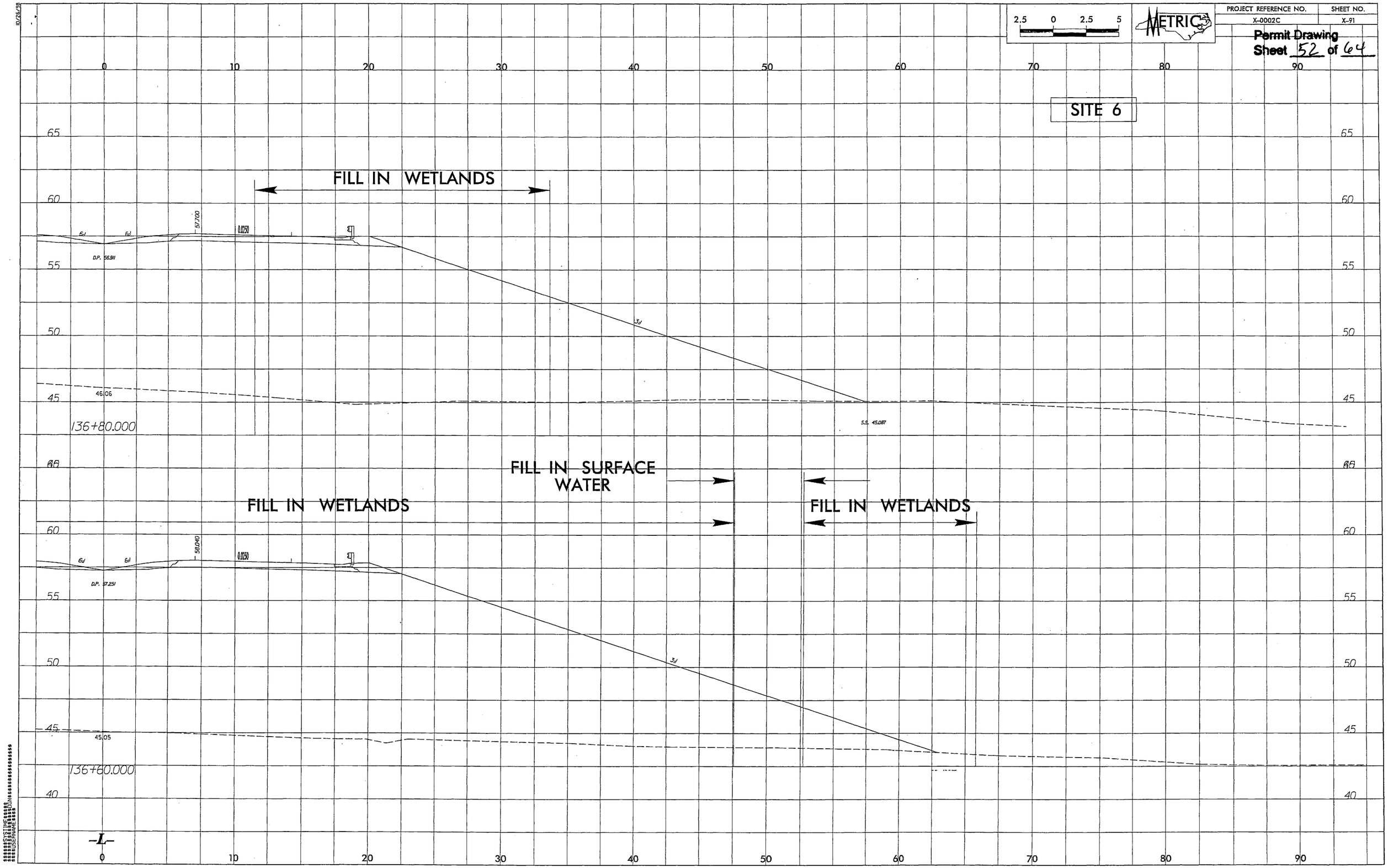
$$$$$$$SYTINESS$$$$$
$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-91

Permit Drawing
Sheet 52 of 64

2.5 0 2.5 5

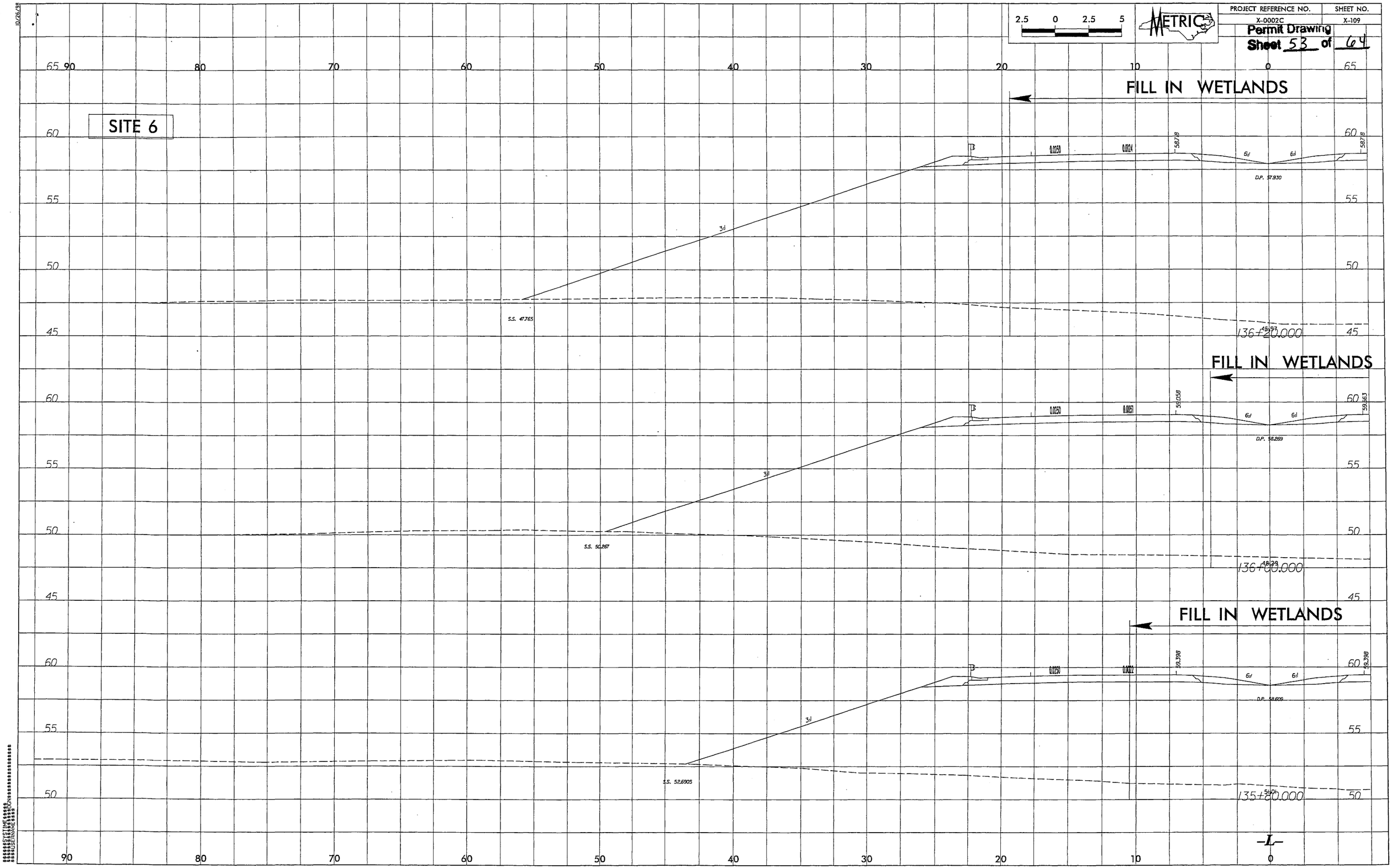
METRIC



10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-109

Permit Drawing
Sheet 53 of 64



\$\$\$

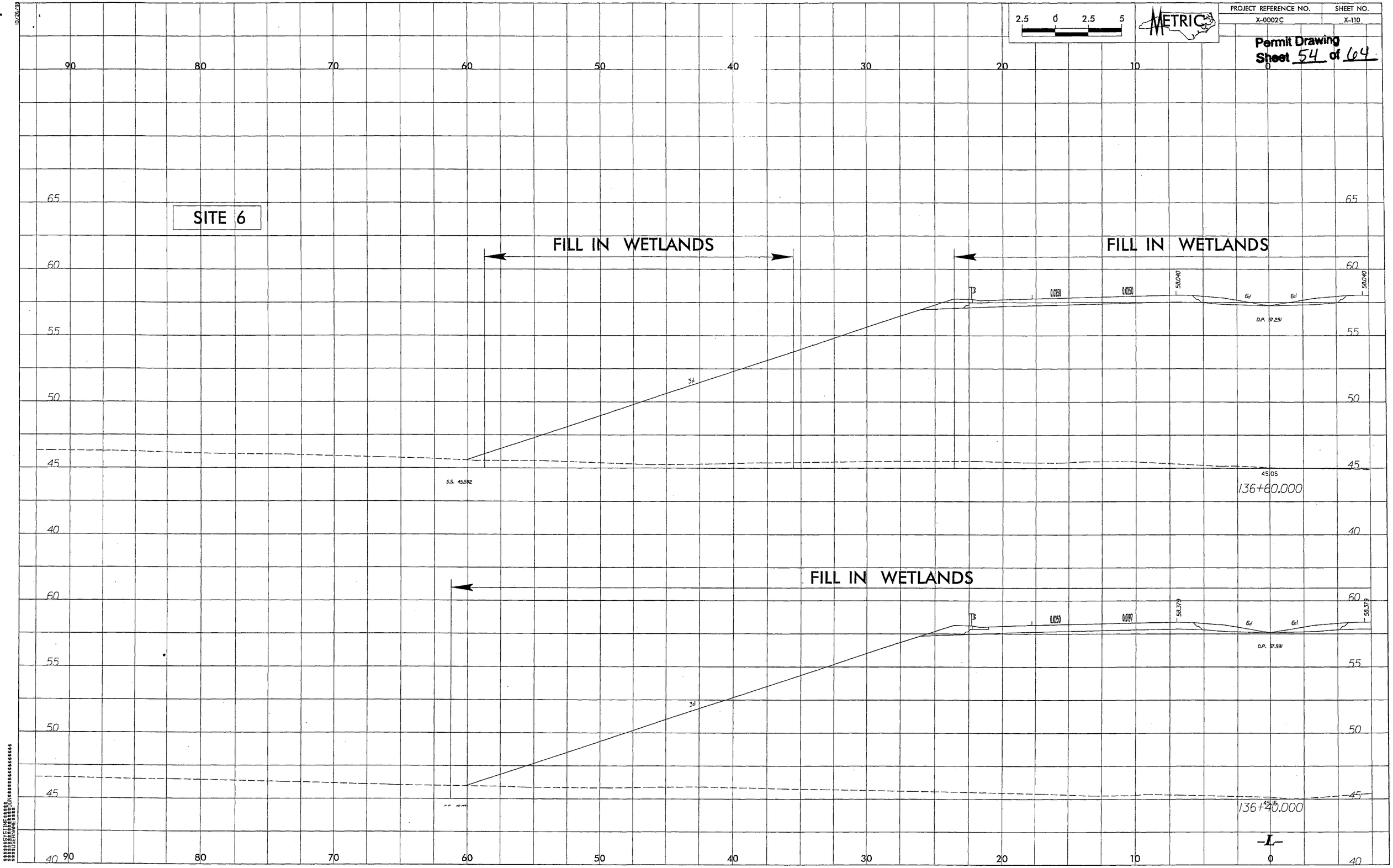
10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-110

2.5 0 2.5 5

METRIC

Permit Drawing
Sheet 54 of 64



$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-100

Permit Drawing
Sheet 55 of 64

2.5 0 2.5 5

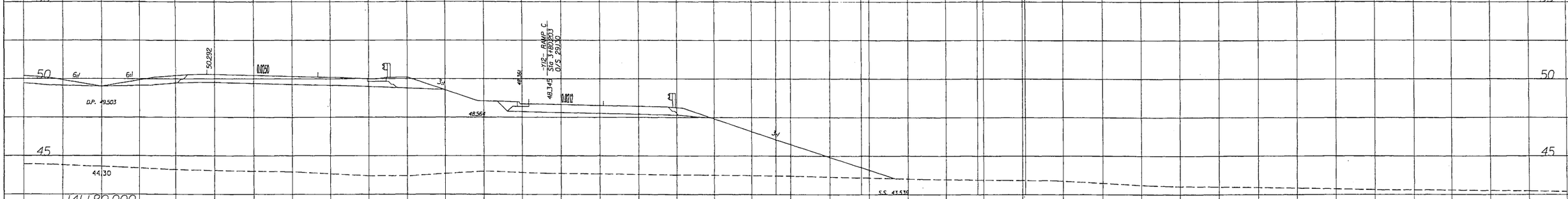
METRIC

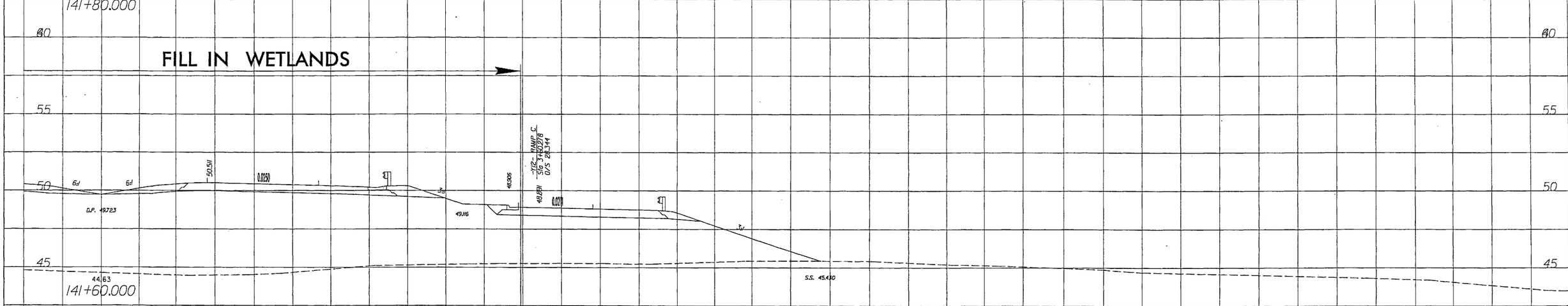
SITE 7

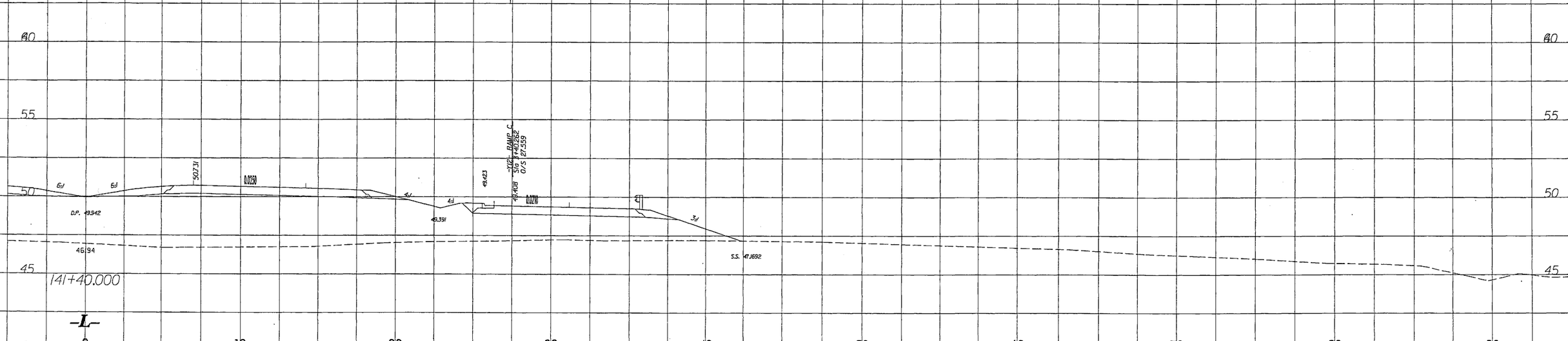
FILL IN WETLANDS

FILL IN WETLANDS

MECHANIZED CLEARING







-L-

$$$$$$SYSTIME$$$$$$
$$$$$$DGNFILE$$$$$$
$$$$$$USERNAME$$$$$$

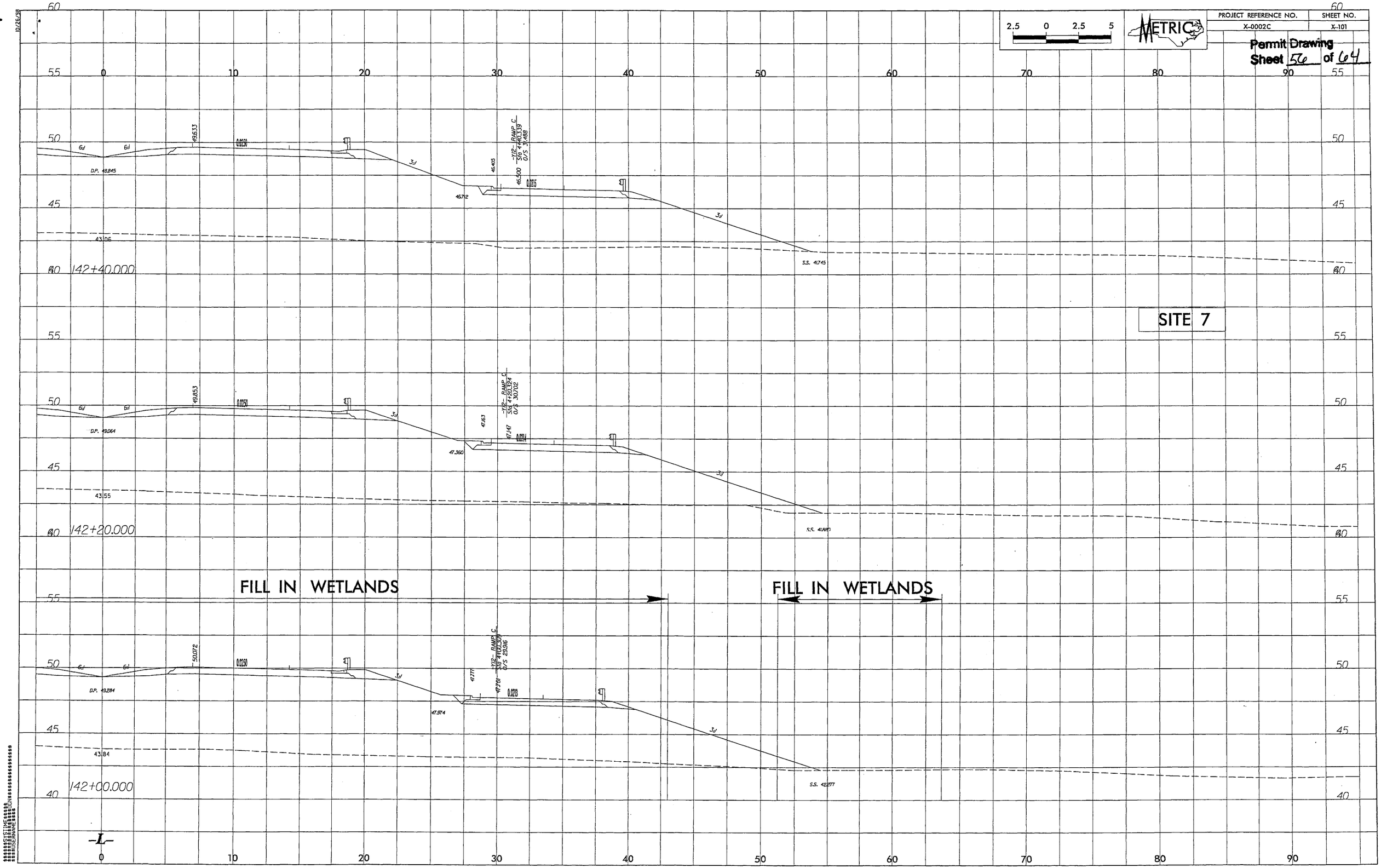
10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-101

Permit Drawing
Sheet 56 of 64

2.5 0 2.5 5

METRIC



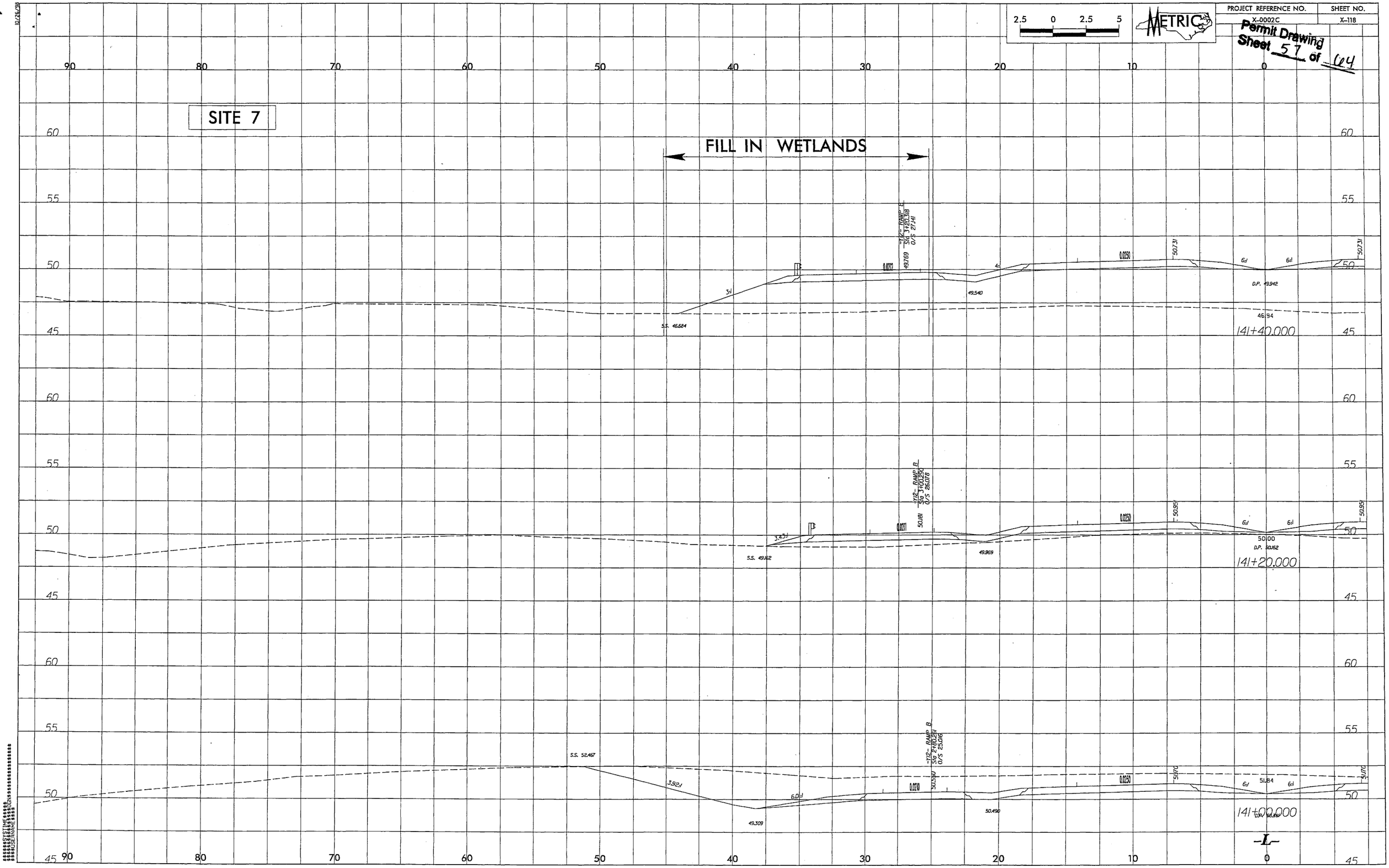
10/26/98

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-118

Permit Drawing
Sheet 57 of 64

2.5 0 2.5 5

METRIC



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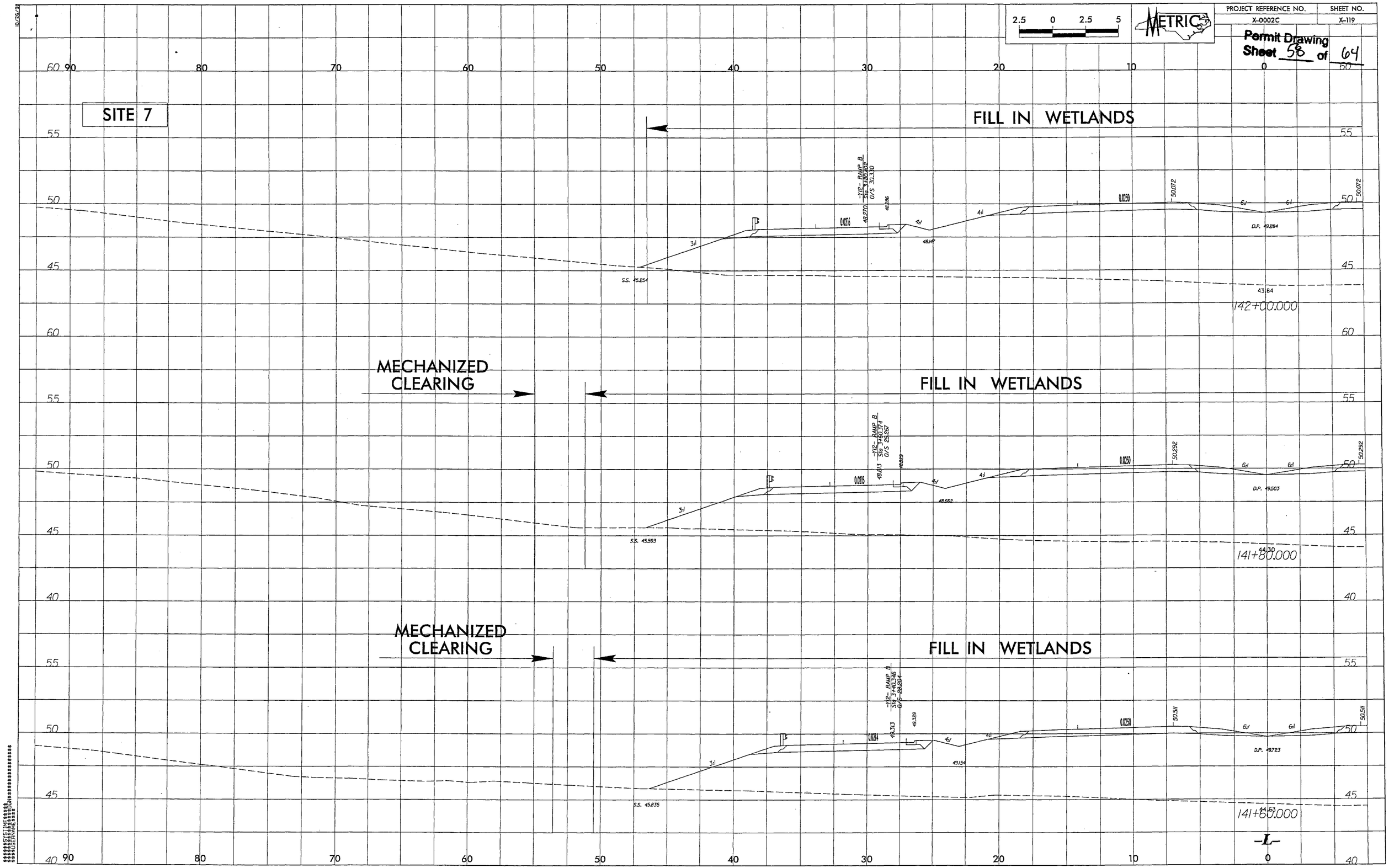
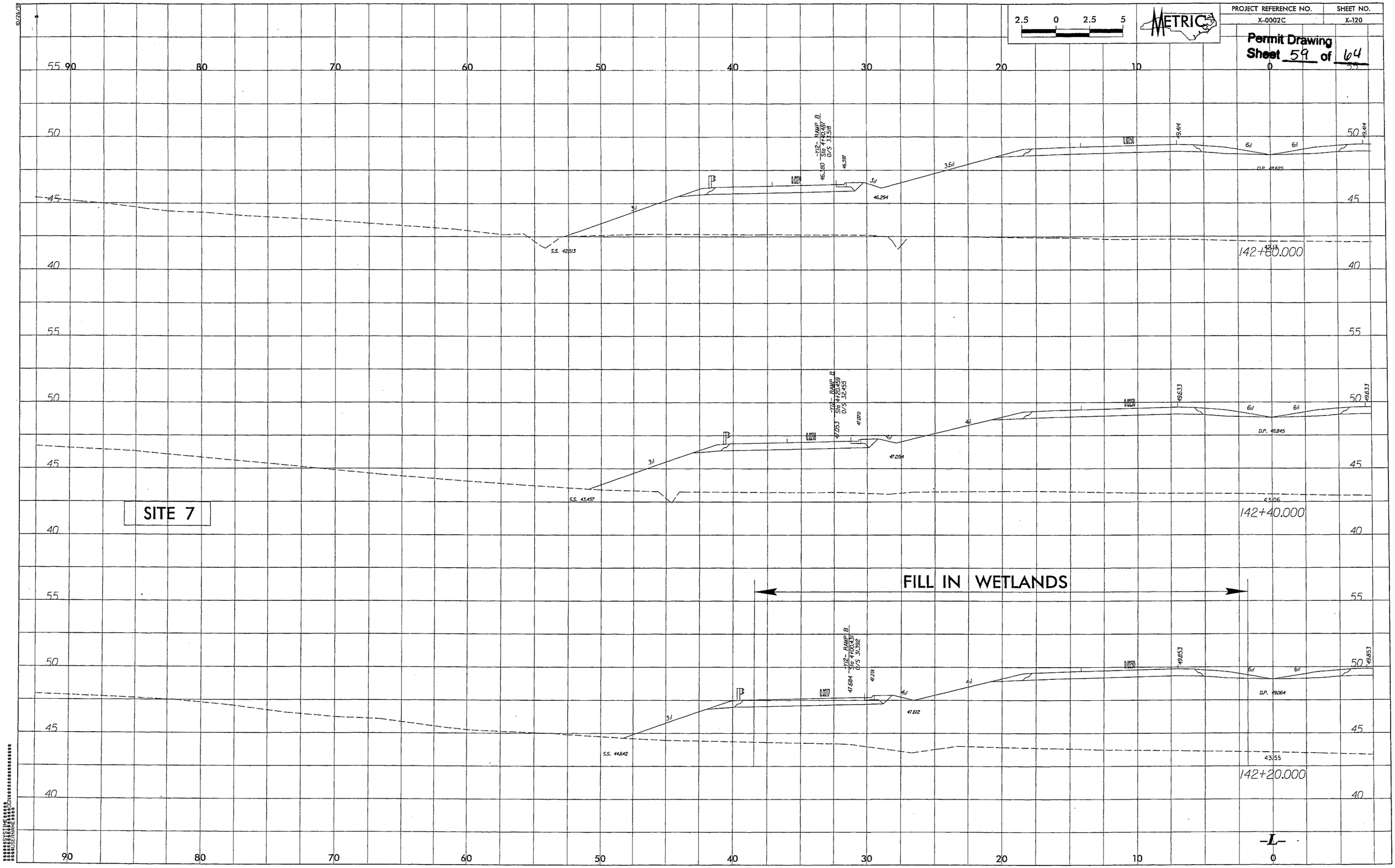
PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-119

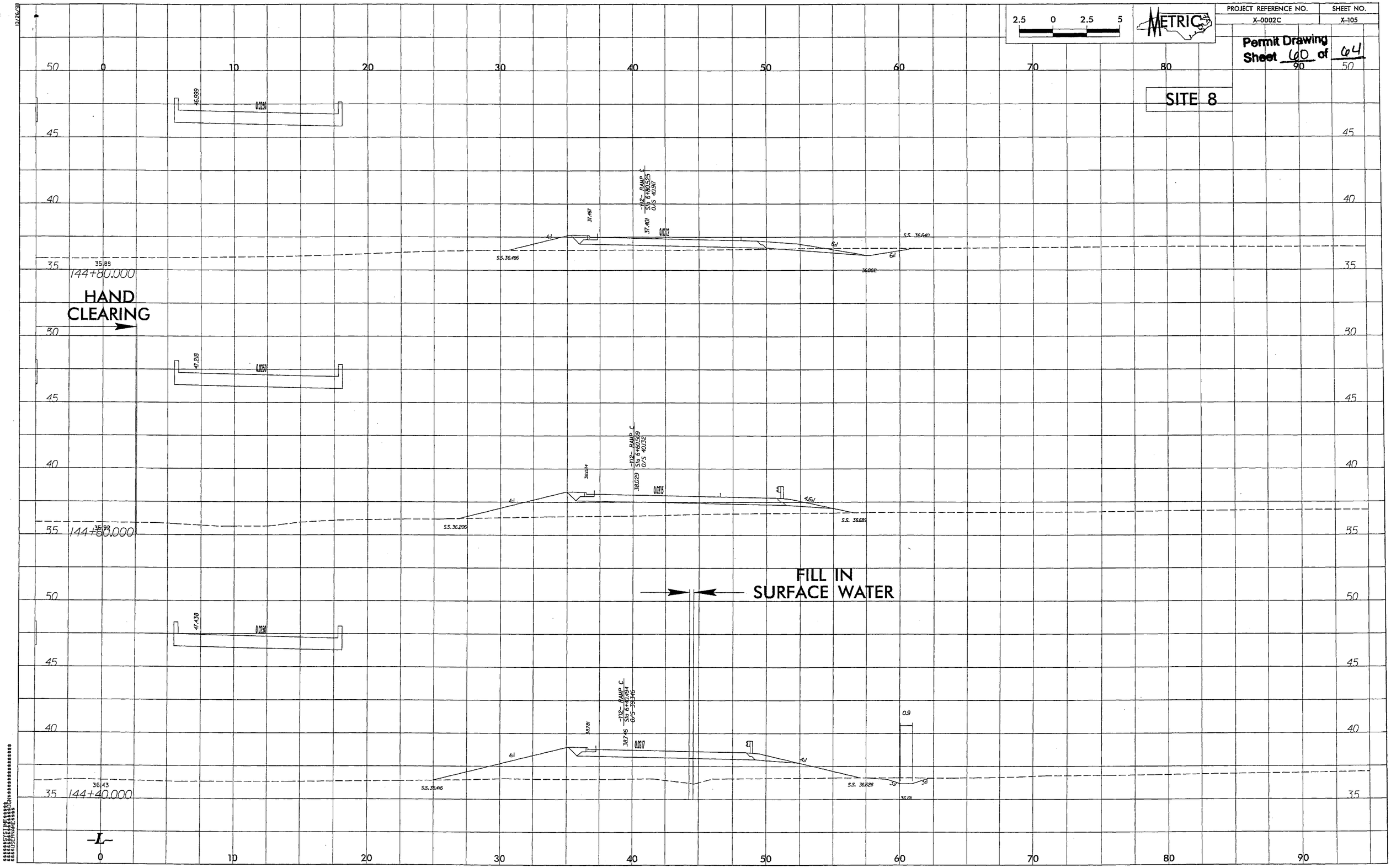
Permit Drawing
Sheet 58 of 64



PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-120

Permit Drawing
Sheet 59 of 64




2.5 0 2.5 5
METRIC
SITE 8
46.999
0.0250
37.467
-Y12- RAMP C
SIG 6+60.525
O/S 40.917
37.401
0.0012
4:1
S.S. 36.496
6:1
S.S. 36.640
36.082
35.89
144+80.000
HAND CLEARING
47.218
0.0250
38.014
-Y12- RAMP C
SIG 6+60.569
O/S 40.132
38.029
0.0015
4:1
S.S. 36.206
4.5:1
S.S. 36.685
35.99
144+60.000
FILL IN SURFACE WATER
47.438
0.0250
38.781
-Y12- RAMP C
SIG 6+40.934
O/S 39.346
38.746
0.0017
4:1
S.S. 35.416
4:1
0.9
S.S. 36.828
3:1
3:1
36.181
36.43
144+40.000
-L-
50 0 10 20 30 40 50 60 70 80 90
45 40 35

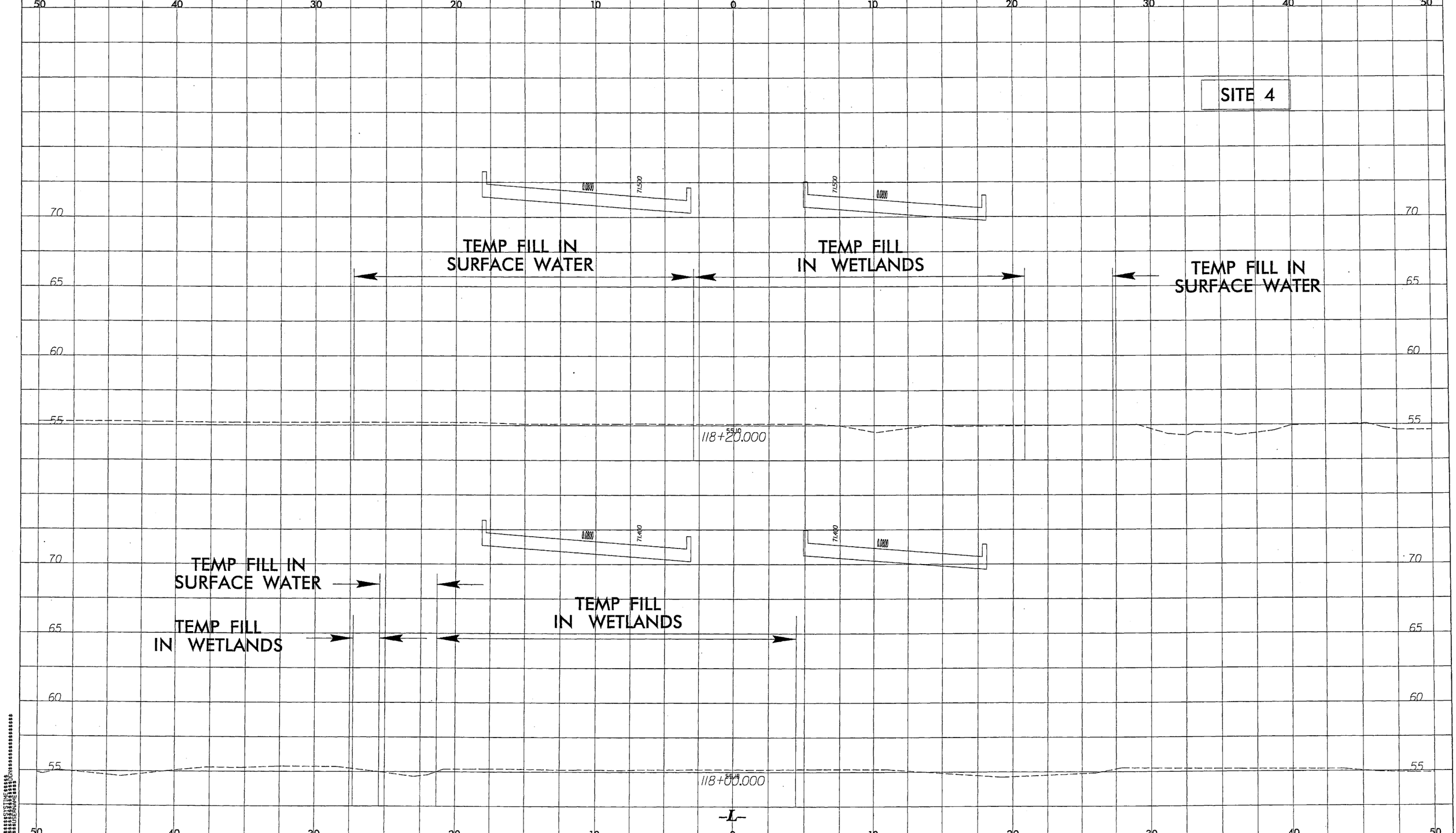
PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-62

2.5 0 2.5 5

METRIC

Permit Drawing
Sheet 61 of 64

SITE 4



PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-63

Permit Drawing
Sheet 62 of 64

2.5 0 2.5 5

METRIC

SITE 4

FILL IN WETLANDS

FILL IN WETLANDS

0.0800 71+00

0.0800 71+00

0.0800 71+00

0.0800 71+00

HAND CLEARING

118+60.000 (58+87)

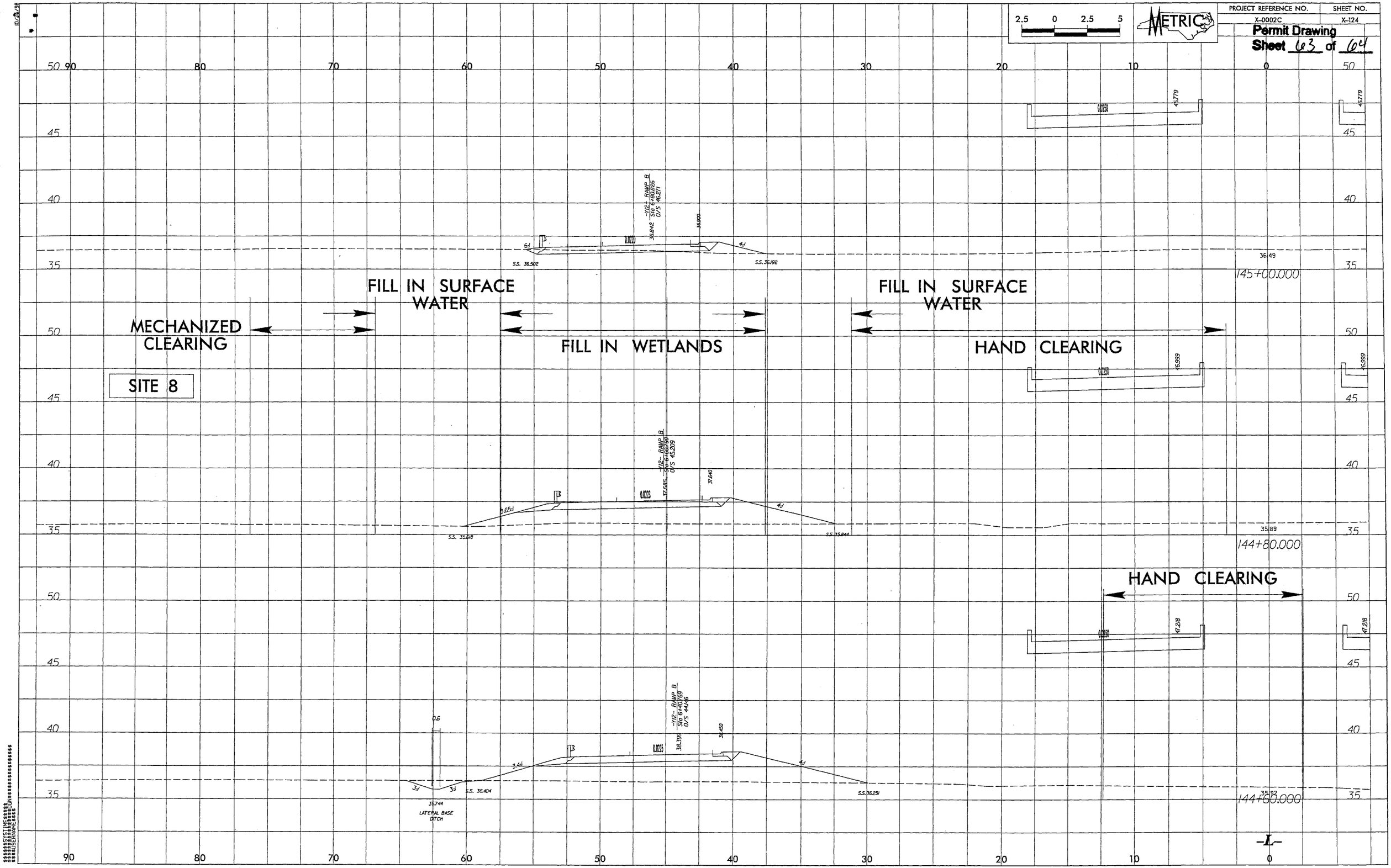
118+40.000 (56+47)

-L-

50 40 30 20 10 0 10 20 30 40 50

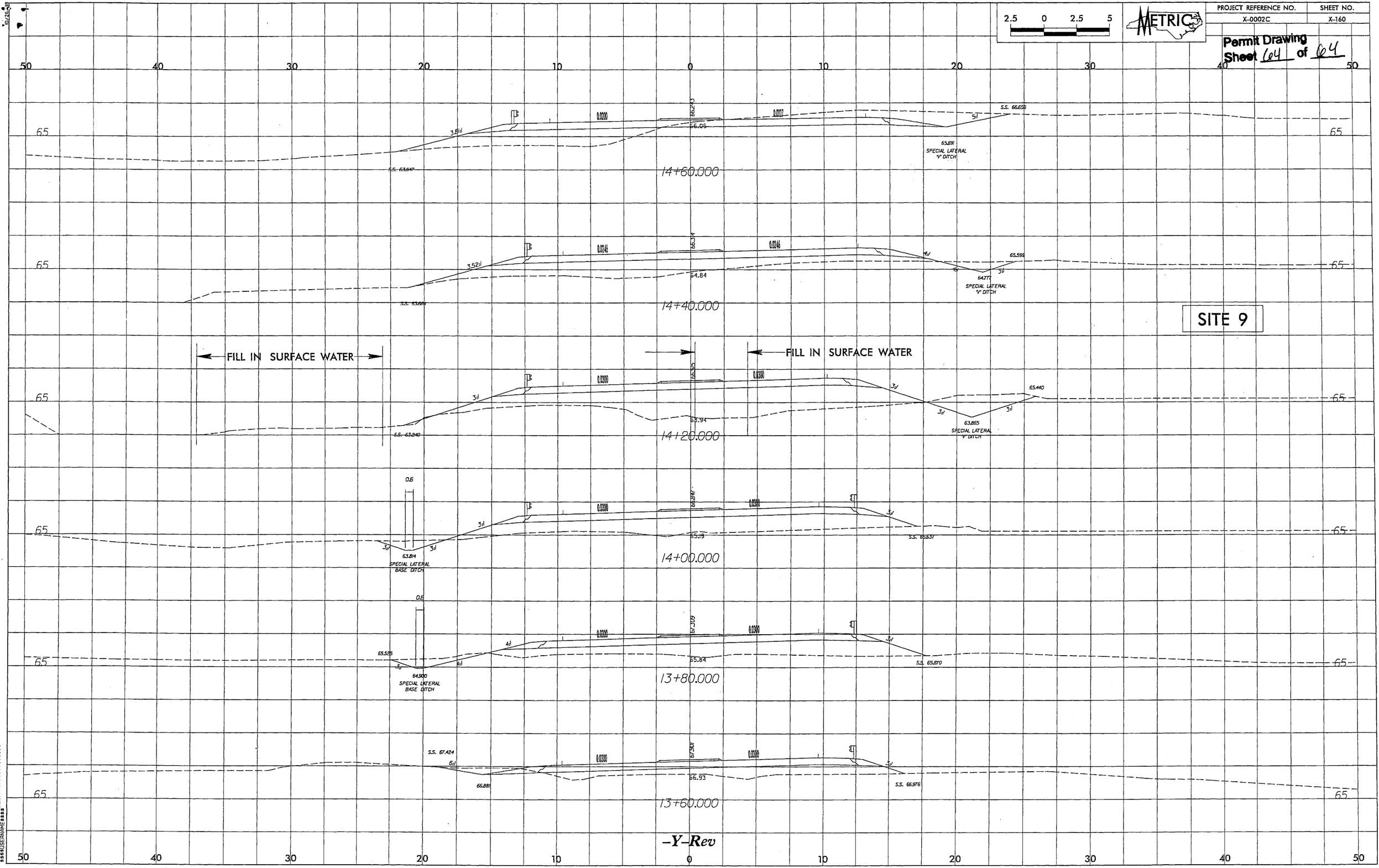
70 65 60

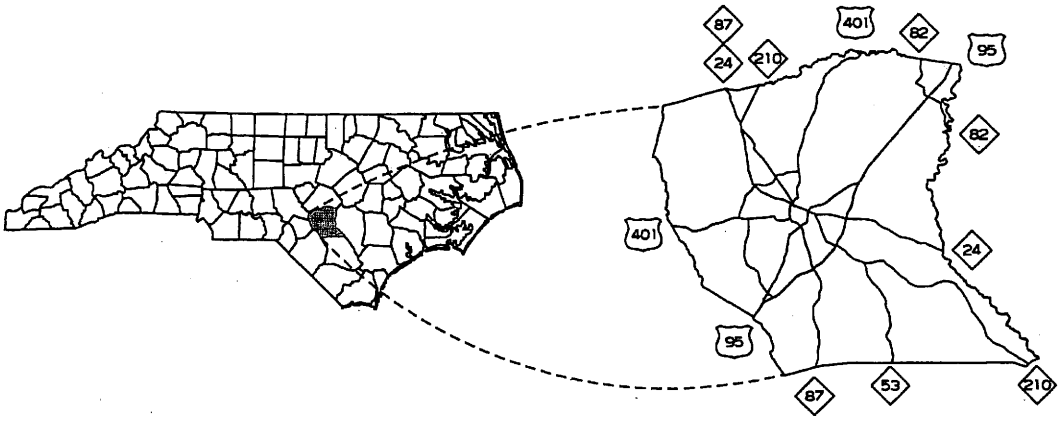
$$$$$$$SYSTIME$$$$$$$
$$$$$$$USERNAME$$$$$$$

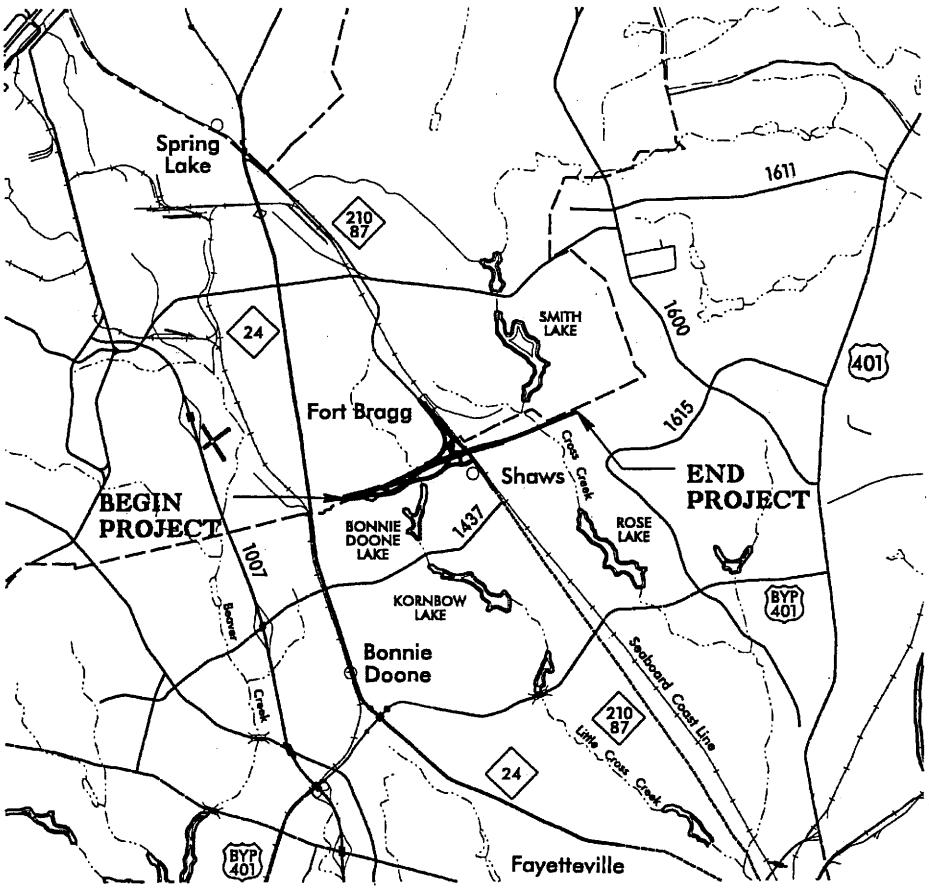

METRIC
2.5 0 2.5 5
PROJECT REFERENCE NO.
X-0002C
SHEET NO.
X-124
Permit Drawing
Sheet 63 of 64
FILL IN SURFACE WATER
MECHANIZED CLEARING
FILL IN WETLANDS
FILL IN SURFACE WATER
HAND CLEARING
SITE 8
HAND CLEARING
-Y12- RAMP B
Sta 6+80.326
O/S 46.271
36.842
36.900
S.S. 36.502
S.S. 36.192
36.49
145+00.000
-Y12- RAMP B
Sta 6+60.98
O/S 45.209
37.585
37.640
S.S. 35.618
S.S. 35.844
35.89
144+80.000
-Y12- RAMP B
Sta 6+40.69
O/S 44.46
38.399
38.450
S.S. 36.404
S.S. 36.251
35.744
LATERAL BASE DITCH
35.92
144+60.000
46.779
46.999
47.218
-L-

PROJECT REFERENCE NO.	SHEET NO.
X-0002C	X-160

Permit Drawing
Sheet 64 of 64







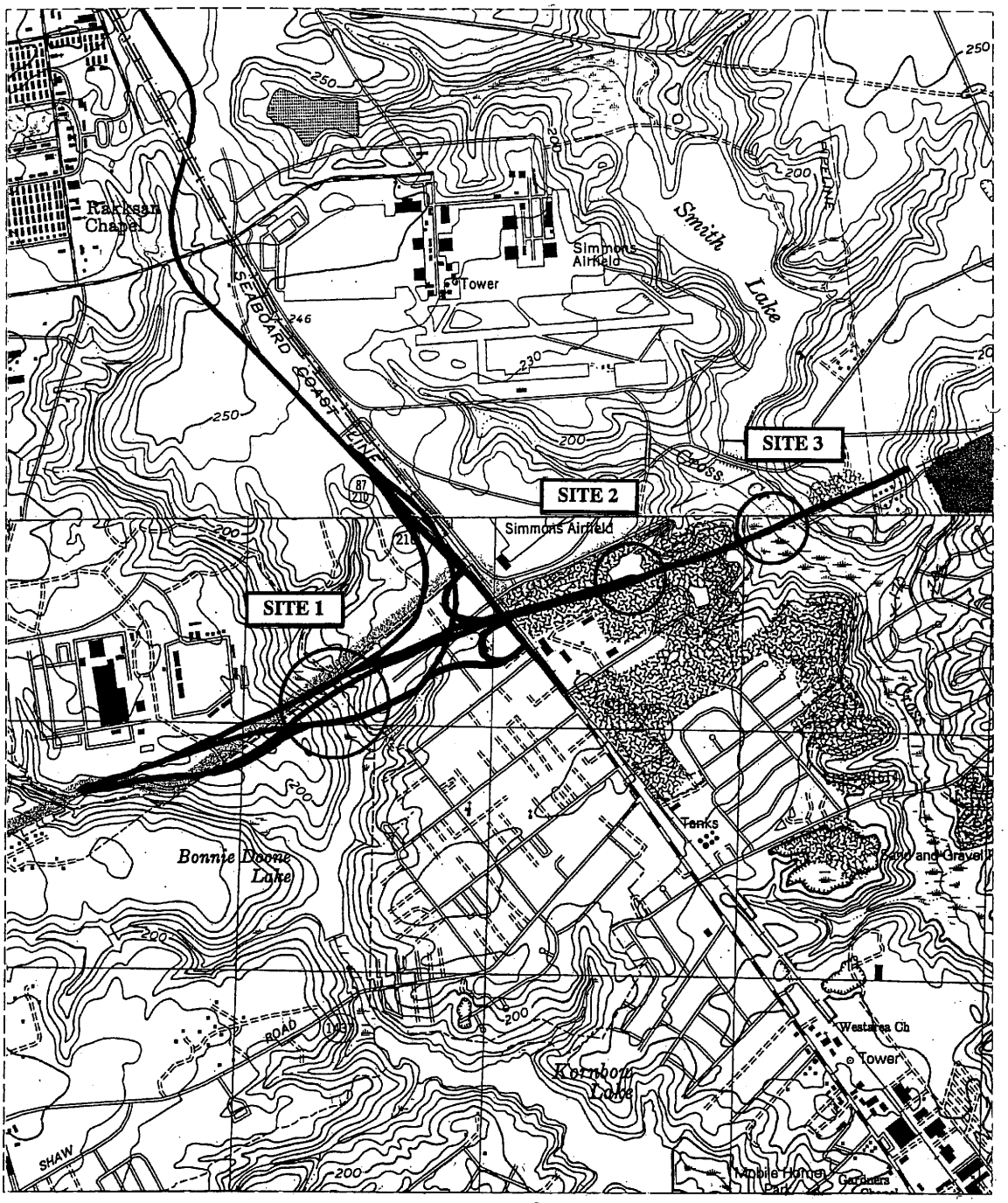
1000 0 2000

METERS

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 35196.1.3 (X-0002B)
FAYETTEVILLE OUTER LOOP
FROM EAST OF NC 24 (BRAGG BLVD.)
TO 1.74 km EAST OF
NC87 / NC 210 (MURCHINSON RD.)

SHEET ____ OF ____ 04 / 11 / 07

Permit Drawing
Sheet 1 of 29



1000 0 2000

FEET

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 35196.1.3 (X-0002B)
FAYETTEVILLE OUTER LOOP
FROM EAST OF NC 24 (BRAGG BLVD.)
TO 1.74 km EAST OF
NC87 / NC 210 (MURCHINSON RD.)

SHEET ____ OF ____ 04 / 11 / 07

Permit Drawing
Sheet 2 of 29

LEGEND

---WLB--- WETLAND BOUNDARY

WLB WLB WETLAND

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

P P DENOTES FILL IN SURFACE WATER (POND)

T T DENOTES TEMPORARY FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

TS TS DENOTES TEMPORARY FILL IN SURFACE WATER

HC HC DENOTES HAND CLEARING

DENOTES MECHANIZED CLEARING

—BZ— RIPARIAN BUFFER ZONE

FLOW DIRECTION

TB TOP OF BANK

WE EDGE OF WATER

—C— PROP. LIMIT OF CUT

—F— PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

—NG— NATURAL GROUND

—PL— PROPERTY LINE

—TDE— TEMP. DRAINAGE EASEMENT

—PDE— PERMANENT DRAINAGE EASEMENT

—EAB— EXIST. ENDANGERED ANIMAL BOUNDARY

—EPB— EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

X X X LIVE STAKES

BOULDER

COIR FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

RIP RAP ENERGY DISSIPATOR BASIN

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 35196.1.3 (X-0002B)
FAYETTEVILLE OUTER LOOP
FROM EAST OF NC 24 (BRAGG BLVD.)
TO 1.74 km EAST OF
NC87/NC 210 (MURCHINSON RD.)

SHEET ____ OF ____ 04/11/07

Permit Drawing
Sheet 3 of 29

Project No. 35196.1.3 (X-0002B)

Property Owner List

Parcel Number	Name	Address
1	United States of America Fort Bragg Military Reservation	Fort Bragg, Fayetteville
2	City of Fayetteville	433 Hay St. Fayetteville, NC 28301
31	Crowell Constructors, Inc.	6050 Murchison Rd. Fayetteville, NC 28311

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT: 35196.1.3 (X-0002B)
FAYETTEVILLE OUTER LOOP
FROM EAST OF NC 24 (BRAGG BLVD.)
TO 1.74 km EAST OF
NC87 / NC 210 (MURCHINSON RD.)

SHEET ____ OF ____ 04 / 11 / 07

Permit Drawing
Sheet 4 of 29

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1a	-TT7- 21+44 / 22+24	-	-	-	-	-	0.22	-	-	-	-	-
1b	-L- 57+45 / 58+84	Work Bridge	-	-	-	-	1.42	-	-	-	-	-
1c	-FLYOVER- 16+28 / 17+04	Work Bridge	-	-	-	-	0.59	-	-	-	-	-
2	-L- 71+53 / 73+84	Roadway Fill	-	-	-	-	-	0.11	-	-	213.3	-
3	-L- 76+32 / 78+57	Work Bridge	-	-	-	-	1.59	-	-	-	-	-
TOTALS:			0.00	0.00	0.00	0.00	3.82	0.11	0.00	0	213	0

The work bridge from Site 1a was removed. The proposed bridge will be built using top down construction.

A Total Impact of 0.01 acres is anticipated due to bridge peir construction.

The permanent surface water impact due to the pond at Site 2 is 2.58 Acres.

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT 35196.1.3 (X-0002B)

SHEET OF 4/10/2008

Permit Drawing
Sheet 5a of 29

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacts Temp. (m)	Natural Stream Design (m)
1a	-TT7- 21+44 / 22+24	-	-	-	-	-	0.09	-	-	-	-	-
1b	-L- 57+45 / 58+84	Work Bridge	-	-	-	-	0.57	-	-	-	-	-
1c	-FLYOVER- 16+28 / 17+04	Work Bridge	-	-	-	-	0.24	-	-	-	-	-
2	-L- 71+53 / 73+84	Roadway Fill	-	-	-	-	-	0.04	-	-	65.0	-
3	-L- 76+32 / 78+57	Work Bridge	-	-	-	-	0.64	-	-	-	-	-
TOTALS:			0.00	0.00	0.00	0.00	1.54	0.04	0.00	0	65	0

The work bridge from Site 1a was removed. The proposed bridge will be built using top down construction.

A Total Impact of < 0.01 ha is anticipated due to bridge peir construction.

The permanent surface water impact due to the pond at Site 2 is 1.04 ha.

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CUMBERLAND COUNTY
PROJECT 35196.1.3 (X-0002B)

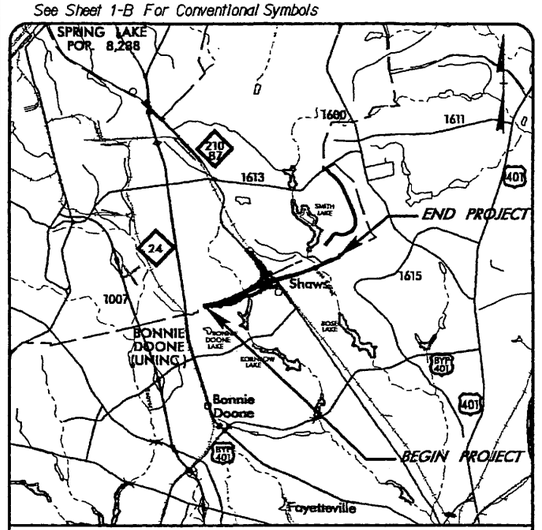
SHEET OF 4/10/2008

Permit Drawing
Sheet 5b of 29

TIP PROJECT: X-0002B

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

CUMBERLAND COUNTY

LOCATION: FAYETTEVILLE OUTER LOOP FROM EAST OF NC 24 (BRAGG BLVD.) TO 1.74 km EAST OF NC 87 /NC 210 (MURCHISON RD.)

TYPE OF WORK: GRADING, STRUCTURES, PAVING, GUARDRAIL, CURB AND GUTTER, DRAINAGE, SIGNALS, AND SIGNING

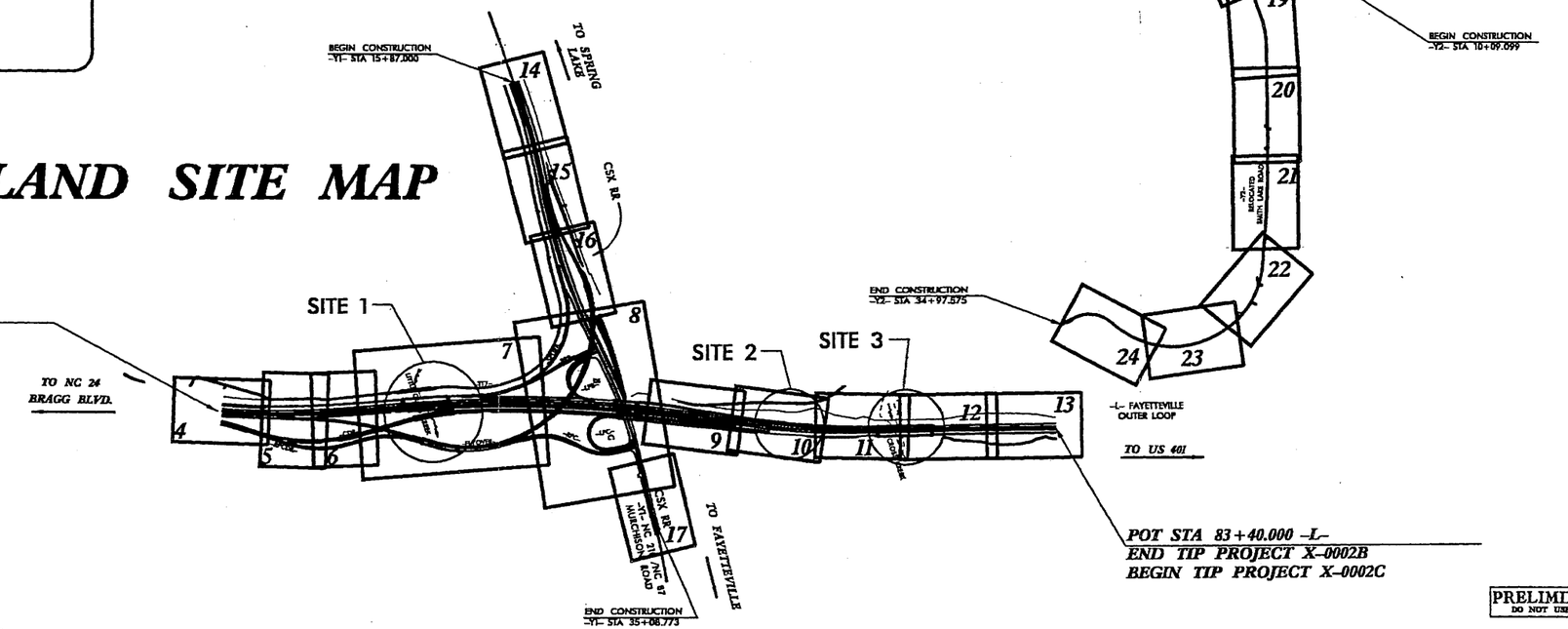
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	X-0002B	1	

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
35196.1.3	NHF-DPR-0100(002)	PE
35196.2.3		ROW; Util

Permit Drawing
Sheet 6 of 29

X-0002B: WETLAND SITE MAP



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III EXCEPT ON ALONG THE TANK TRAIL WHERE METHOD II WILL BE USED

NOTE: THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALE

5 0 10 PLANS

5 0 10 PROFILE (HORIZONTAL)

1 0 2 PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 57,500
ADT 2030 = 74,300
DHV = 9 %
D = 55 %
T = 12 % *
V = 110 km/h
* TTST 4% + DUAL 8%
FUNC. CLASS = INTERSTATE

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE

PROJECT LENGTH

LENGTH OF ROADWAY, TIP PROJECT X-0002B = 2.879 km

LENGTH OF STRUCTURES, TIP PROJECT X-0002B = 0.481 km

TOTAL LENGTH, TIP PROJECT X-0002B = 3.360 km

*NOTE: LENGTH BASED ON WBL BRIDGES

Prepared In the Office of:
Ralph Whitehead Associates, Inc.
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: May 31, 2006

LETTING DATE: June 17, 2008

JOHN JOHNSON, P.E. — PROJECT ENGINEER

JOSEPH FREEMAN, P.E. — PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

10/18/2007
n:\proj\2800\roadway\proj\permit drawings\X0002B_Permit_TSH.dgn

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	7
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

10 0 20

CONST.REV.

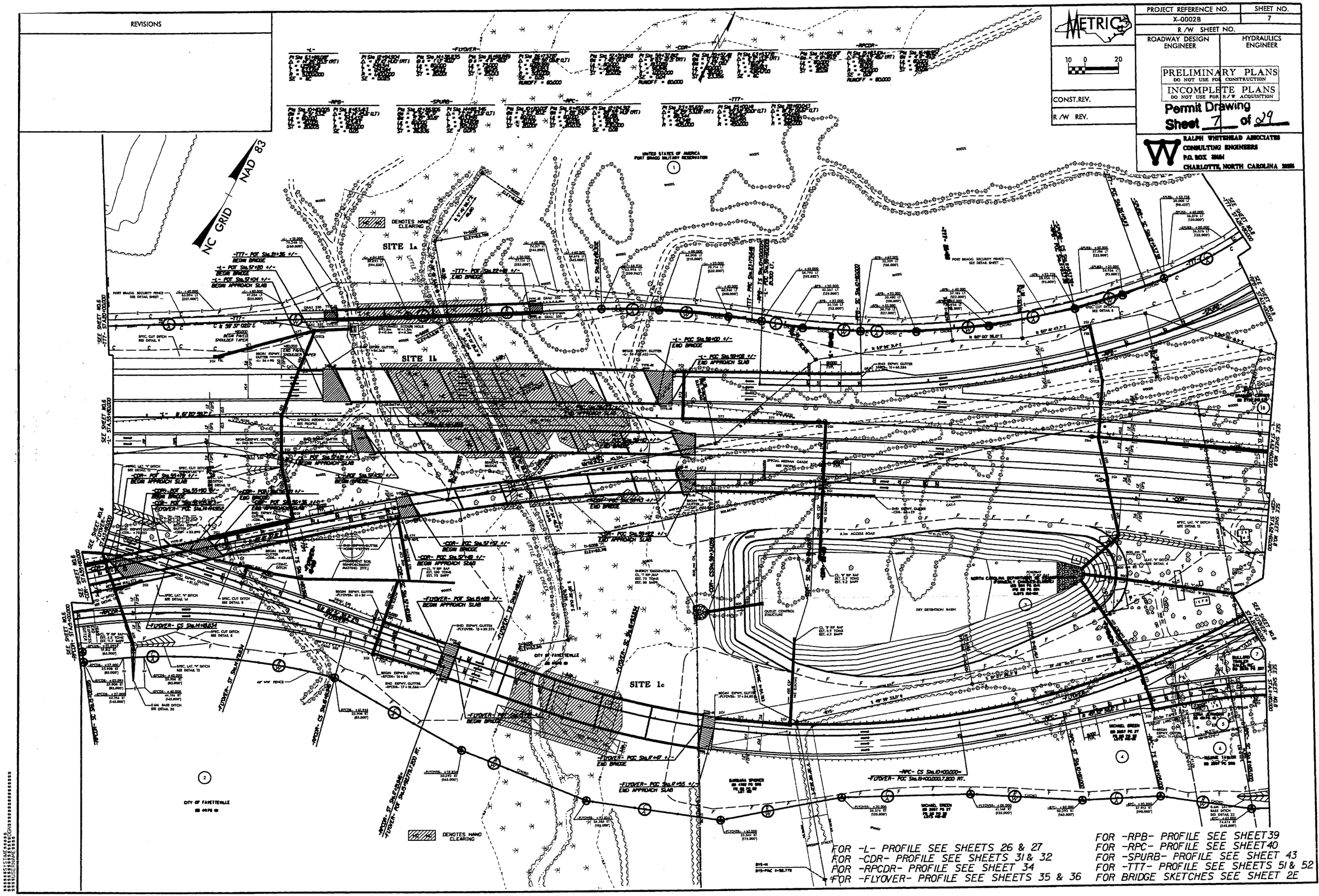
R /W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Permit Drawing
Sheet 7 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX 35664
CHARLOTTE, NORTH CAROLINA 28235



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	7
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

10 0 20

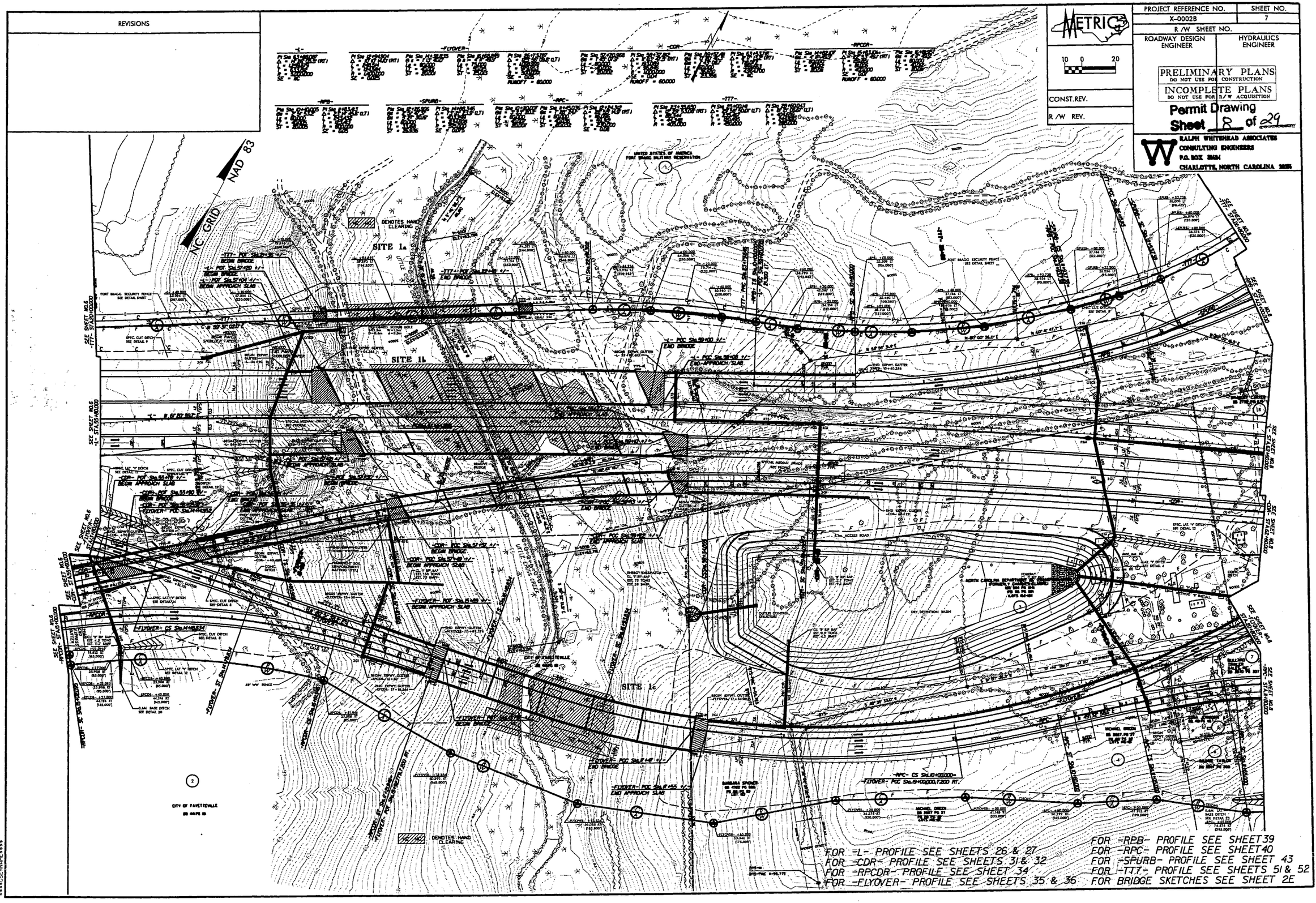
CONST.REV.

R /W REV.

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

Permit Drawing
Sheet 8 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX 26161
CHARLOTTE, NORTH CAROLINA 28226



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

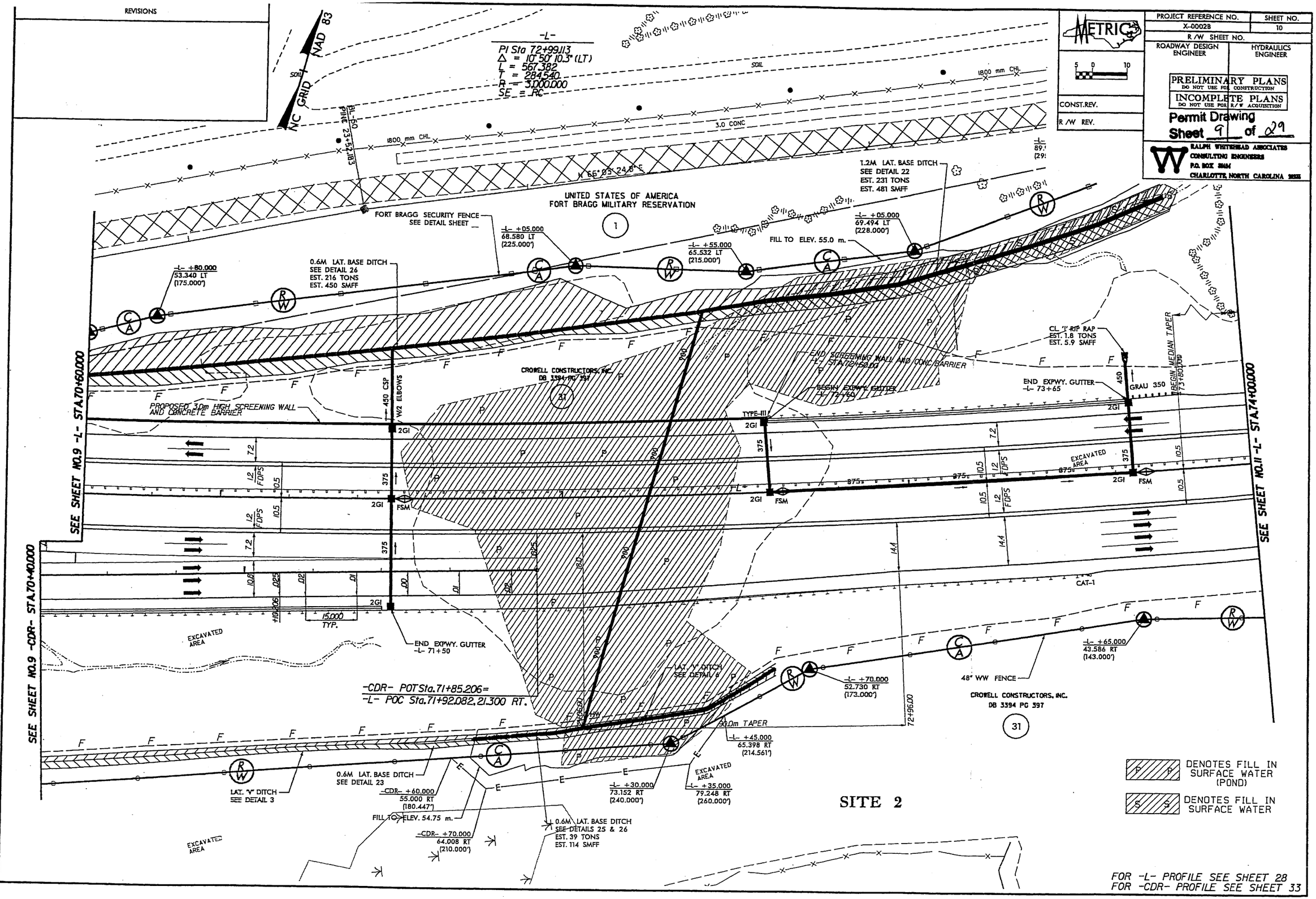
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Permit Drawing
Sheet 9 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX 2664
CHARLOTTE, NORTH CAROLINA 28233

METRIC
5 0 10

CONST.REV.
R/W REV.



FOR -L- PROFILE SEE SHEET 28
FOR -CDR- PROFILE SEE SHEET 33

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

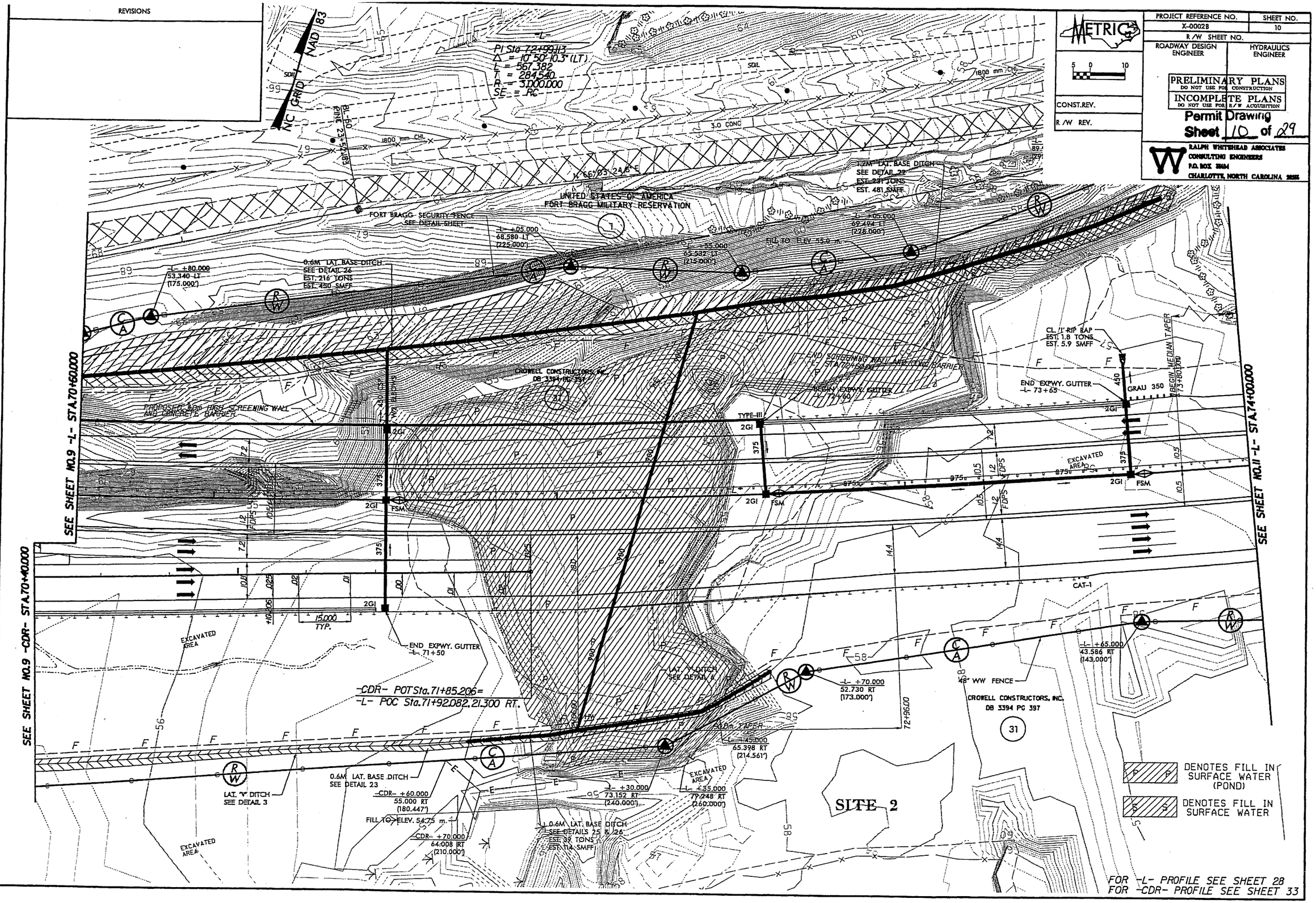
METRIC 5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
Permit Drawing
Sheet 10 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX [illegible]
CHARLOTTE, NORTH CAROLINA [illegible]



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

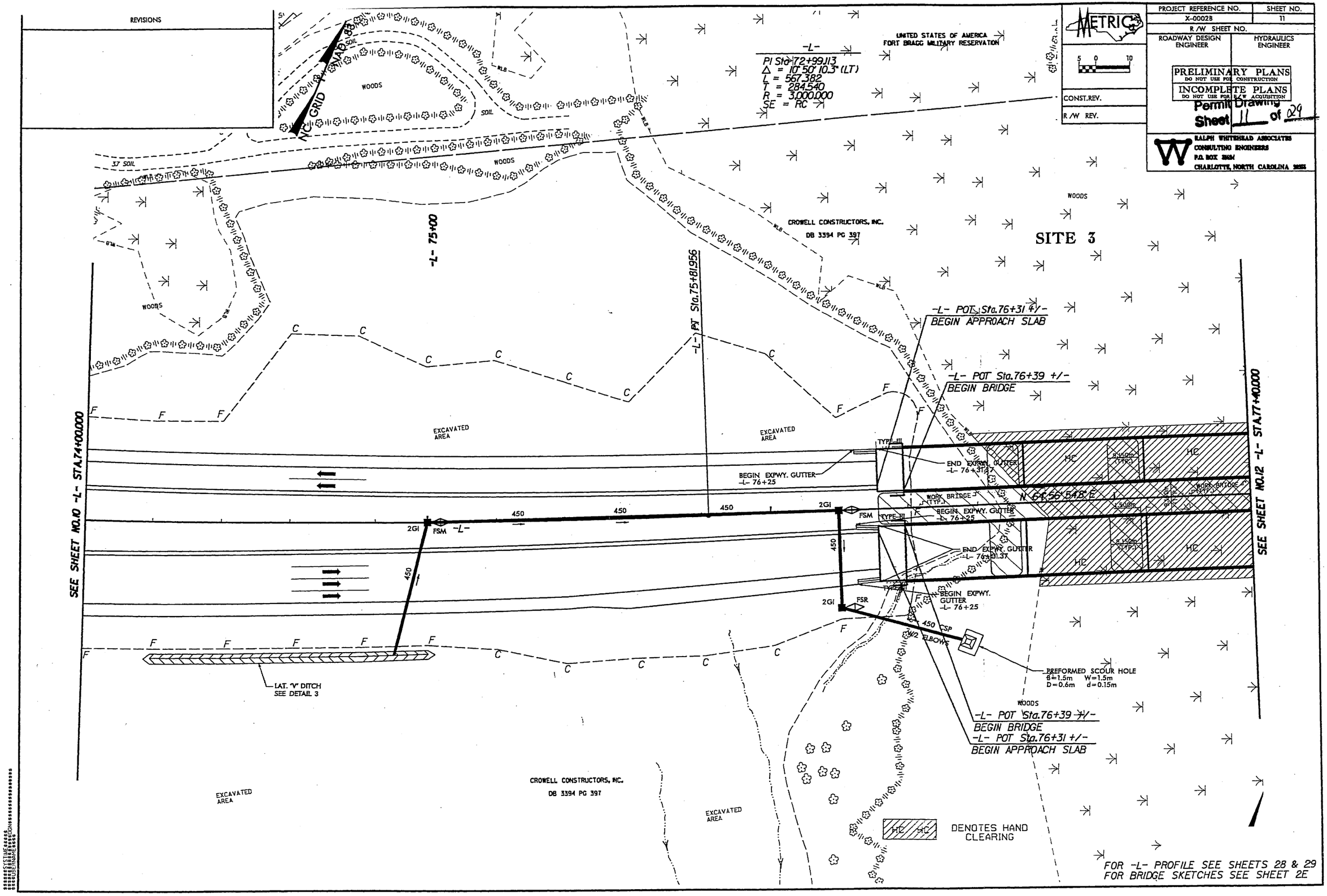
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Permit Drawing
Sheet 11 of 29

CONST.REV.

R/W REV.

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX [illegible]
CHARLOTTE, NORTH CAROLINA [illegible]



FOR -L- PROFILE SEE SHEETS 28 & 29
FOR BRIDGE SKETCHES SEE SHEET 2E

REVISIONS

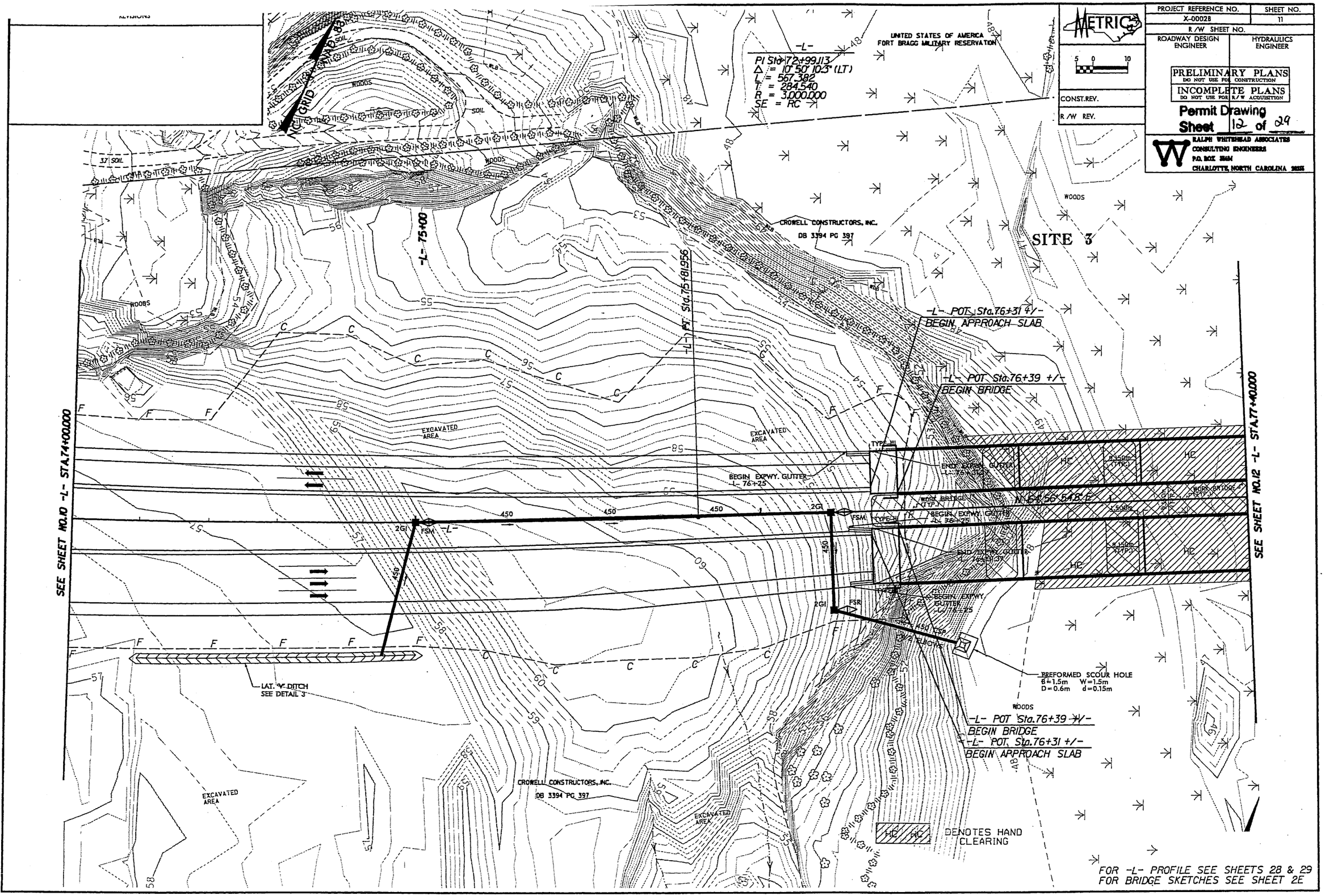
PROJECT REFERENCE NO.	SHEET NO.
X-00028	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

Permit Drawing
Sheet 12 of 29

CONST.REV.
R/W REV.

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX [illegible]
CHARLOTTE, NORTH CAROLINA [illegible]



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

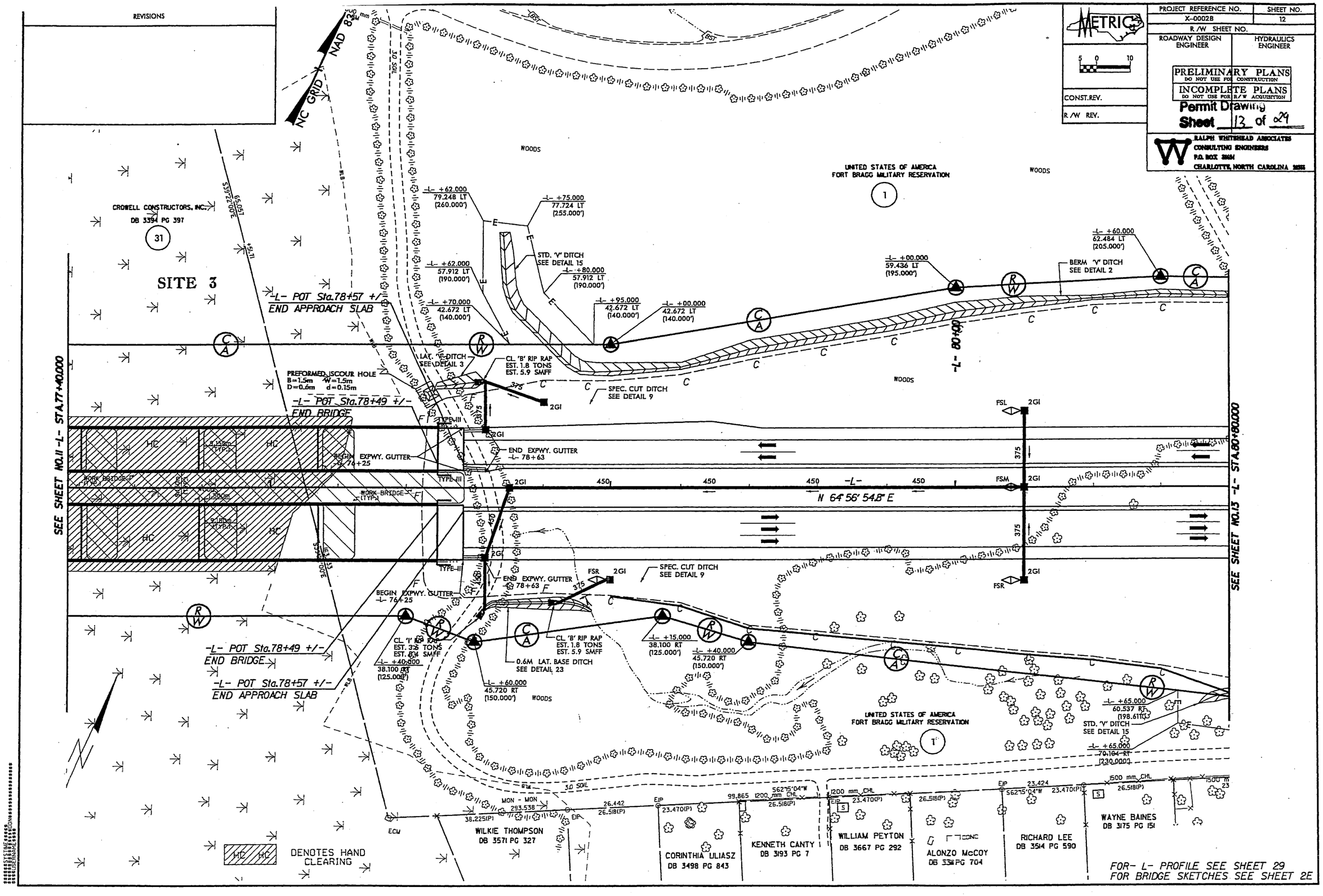
5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
Permit Drawing
Sheet 13 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX 26161
CHARLOTTE, NORTH CAROLINA 28213



PROJECT REFERENCE NO.	SHEET NO.
X-0002B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

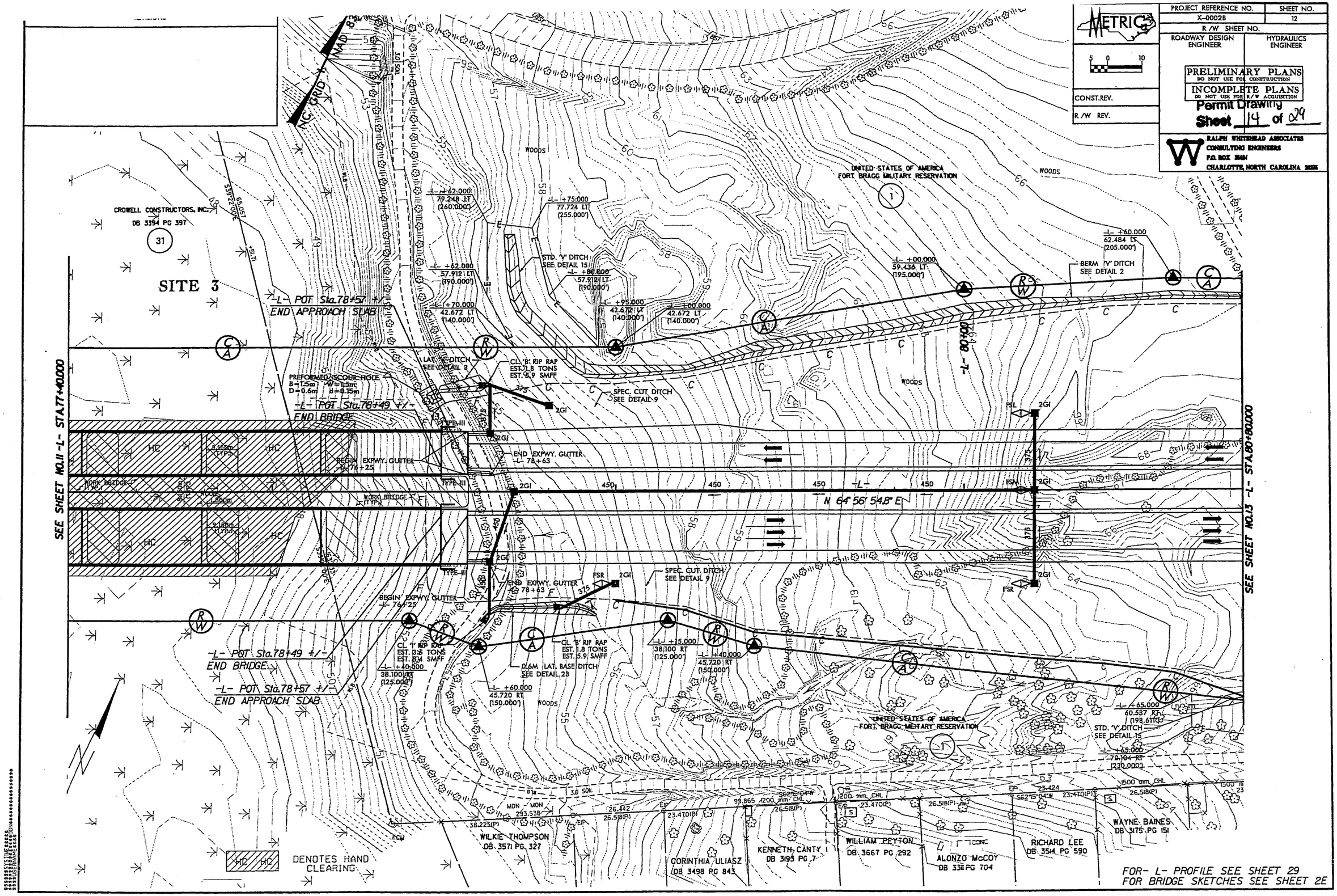
5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
Permit Drawing
Sheet 14 of 29

RALPH WHITEHEAD ASSOCIATES
CONSULTING ENGINEERS
P.O. BOX 2424
CHARLOTTE, NORTH CAROLINA 28234



BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 21.4	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 54.62	M
BASE DISCHARGE	= 24.0	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 54.69	M
OVERTOPPING DISCHARGE	= *	CMS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 66.280	M
DATE OF SURVEY	= 4-4-05	
W.S. ELEVATION AT DATE OF SURVEY	= 53.34 M	

* OVERTOPPING IS GREATER THAN 500+ YR EVENT

METRIC

5 0 10 HORIZ.

1 0 2 VERT.

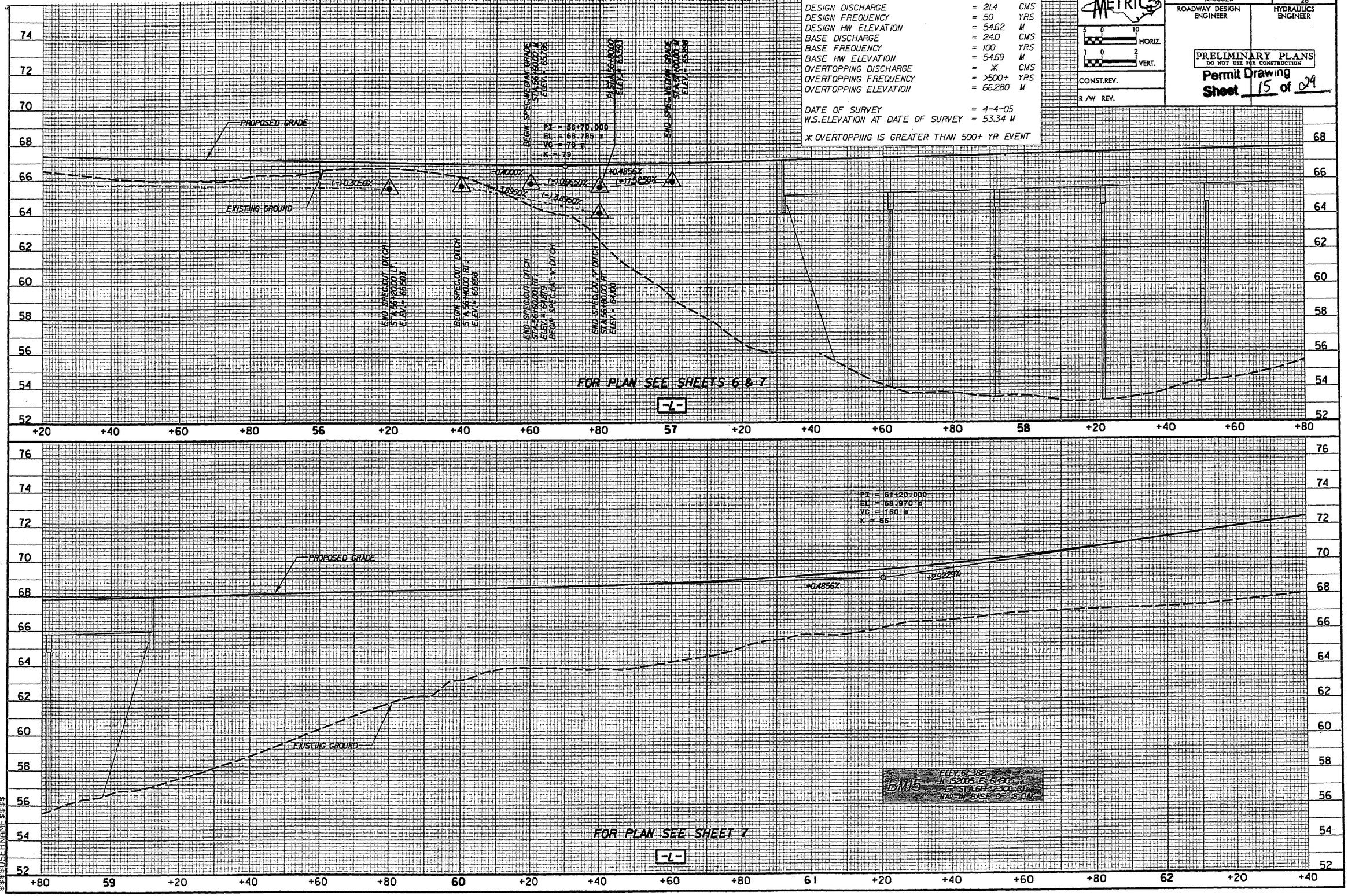
CONST. REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 15 of 24



$$$$SYSTIME$$$$
$$$$DGN$$$$

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10 HORIZ.

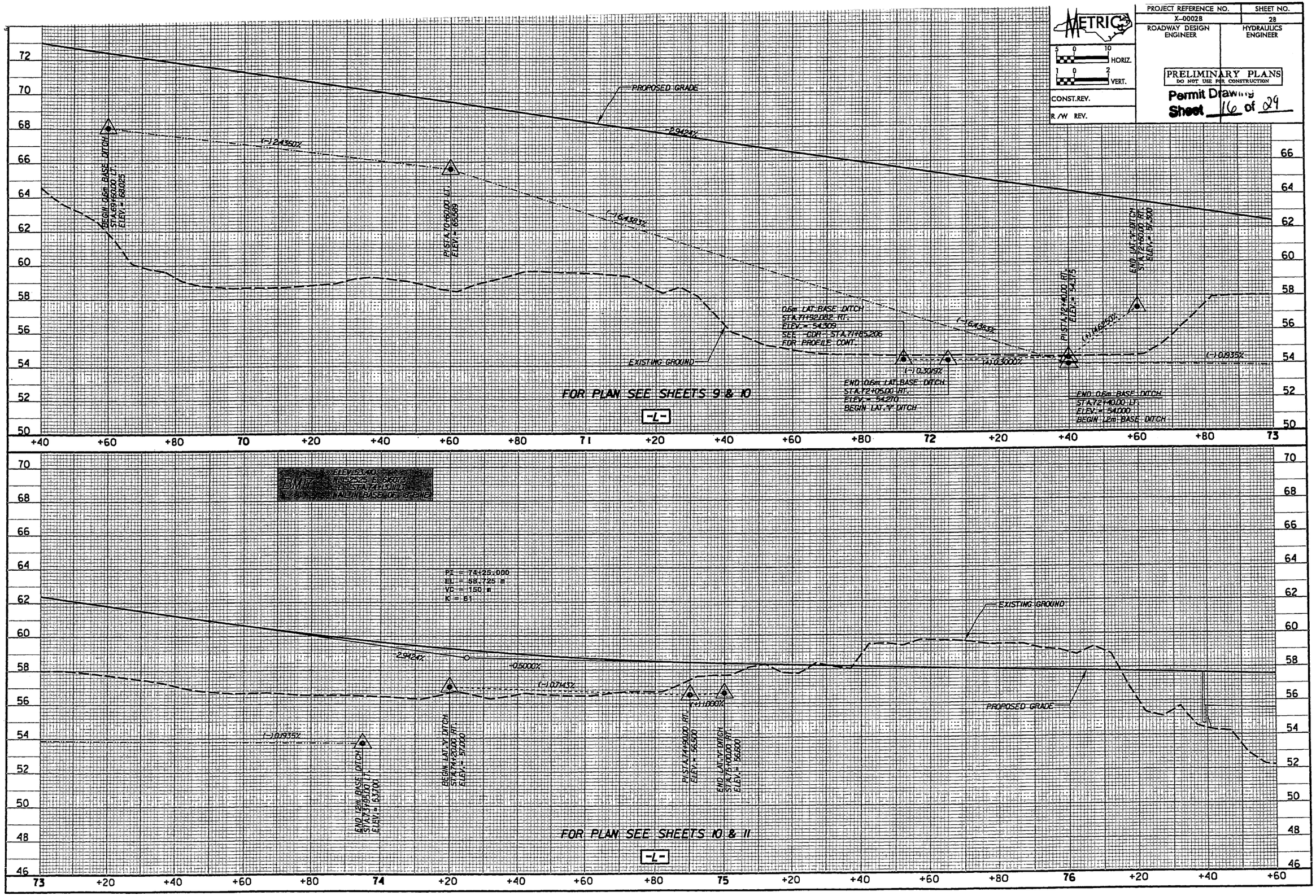
1 0 2 VERT.

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 16 of 29



X-0002B	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC
5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

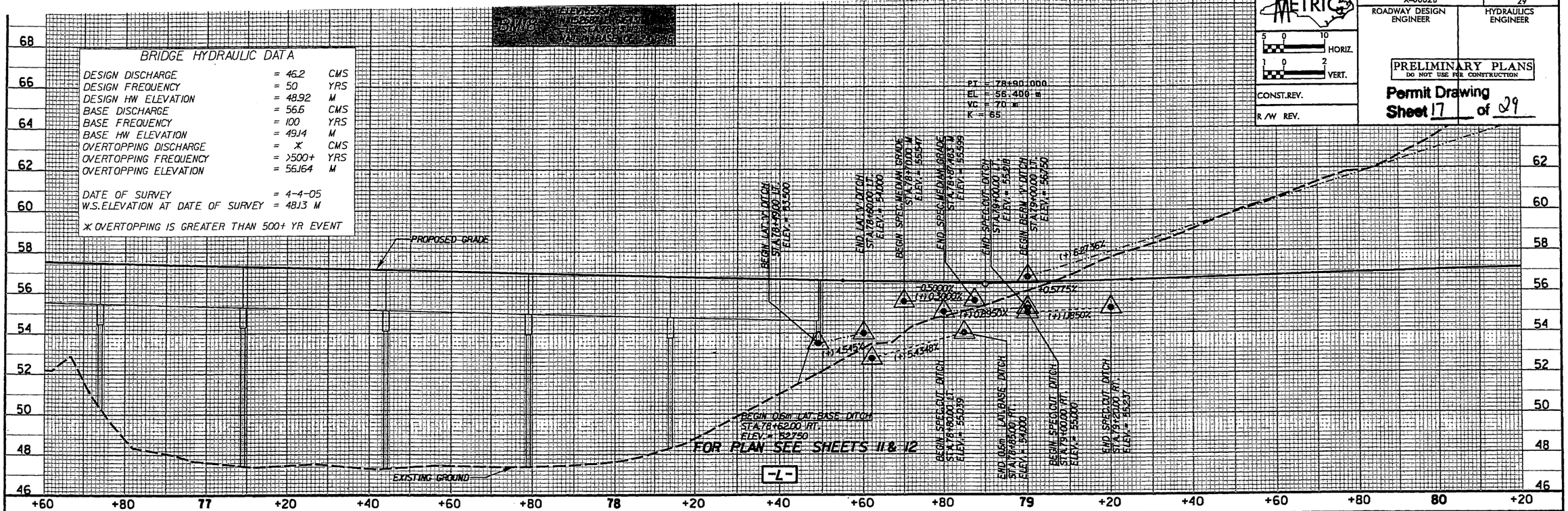
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 17 of 29

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 46.2	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 48.92	M
BASE DISCHARGE	= 56.6	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 49.14	M
OVERTOPPING DISCHARGE	= *	CMS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 56.164	M
DATE OF SURVEY	= 4-4-05	
W.S.ELEVATION AT DATE OF SURVEY	= 48.13 M	

* OVERTOPPING IS GREATER THAN 500+ YR EVENT



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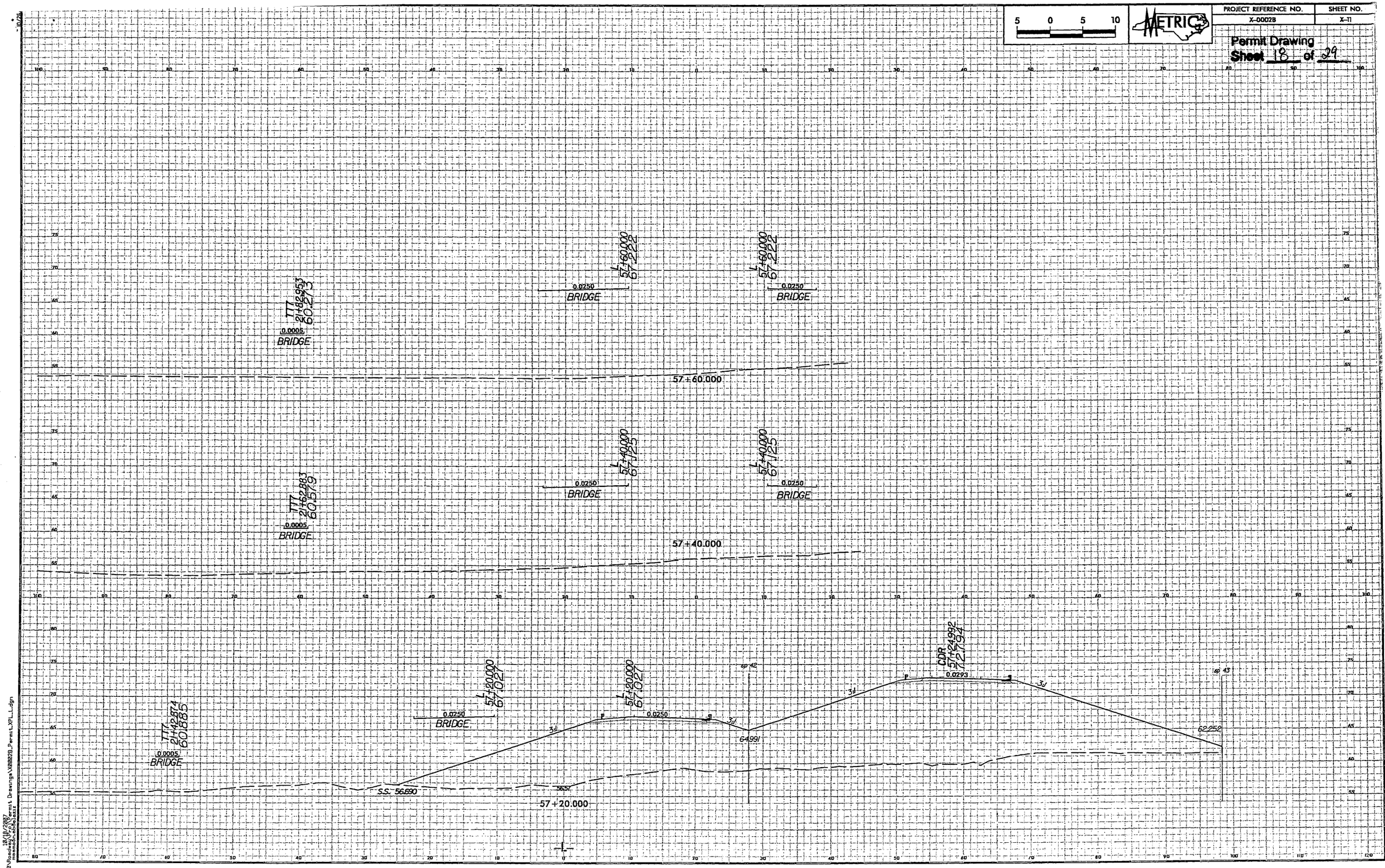

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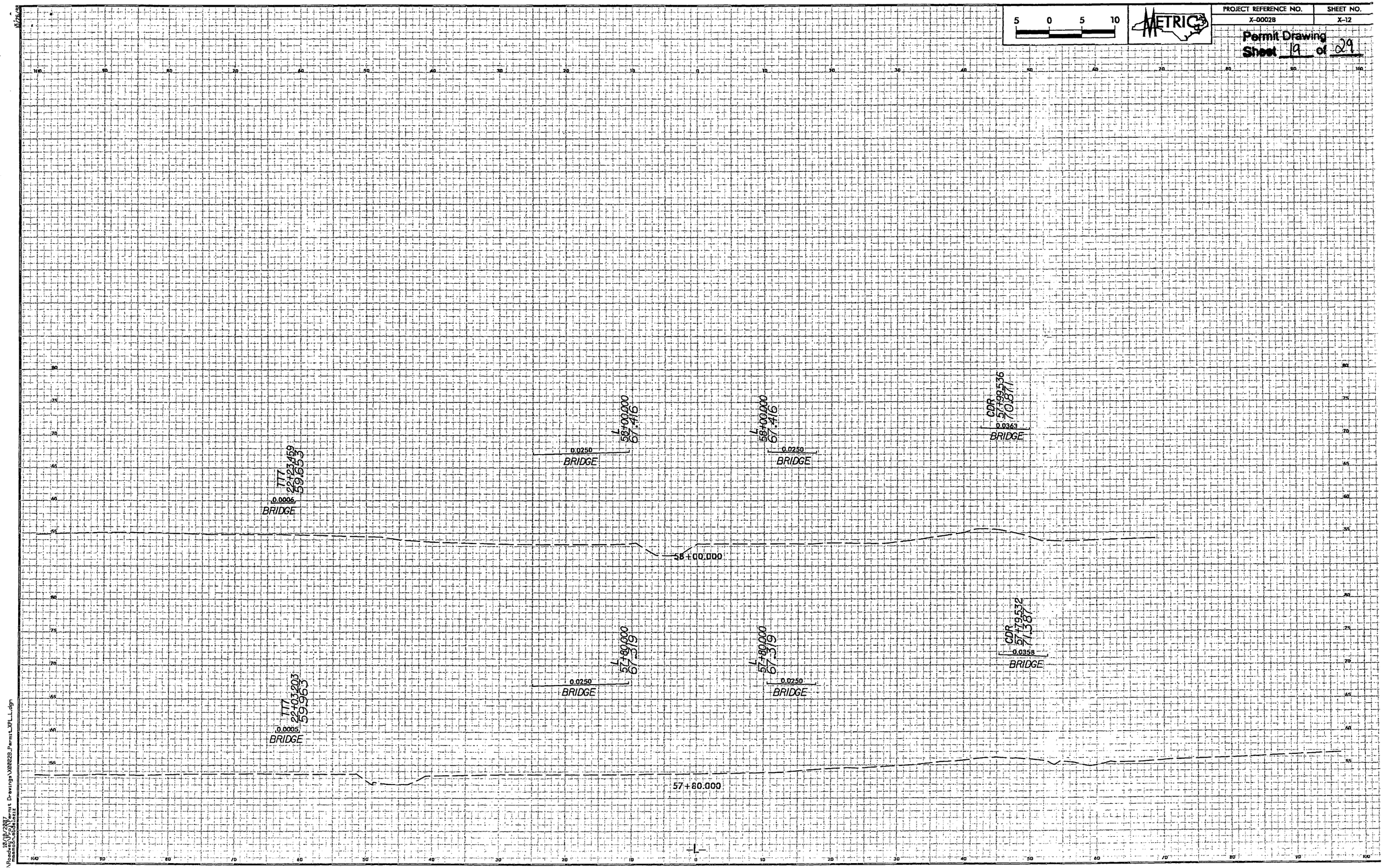
mcanadon.ad.dot.state



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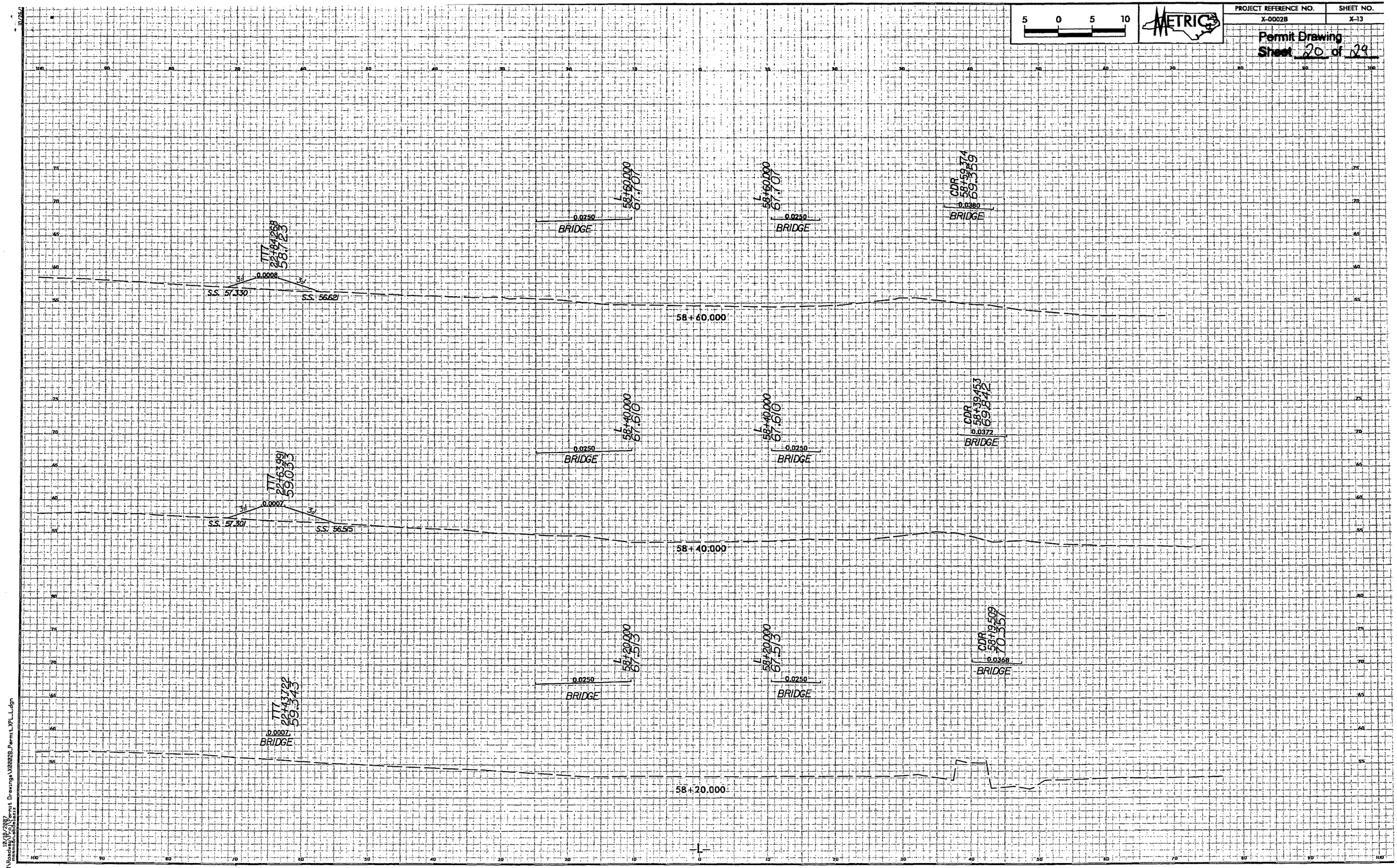

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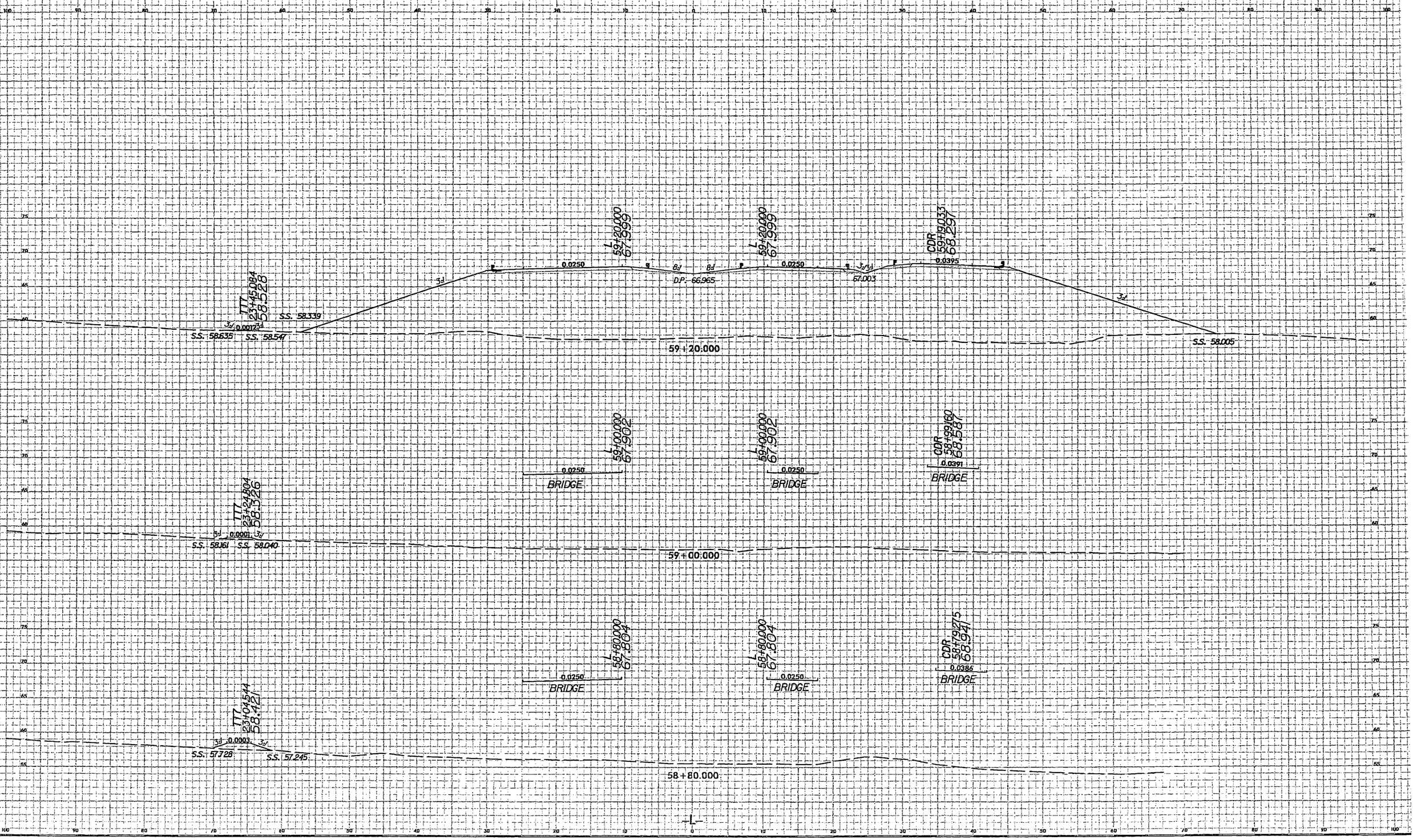
PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-14

Permit Drawing
Sheet 21 of 29

5 0 5 10

METRIC



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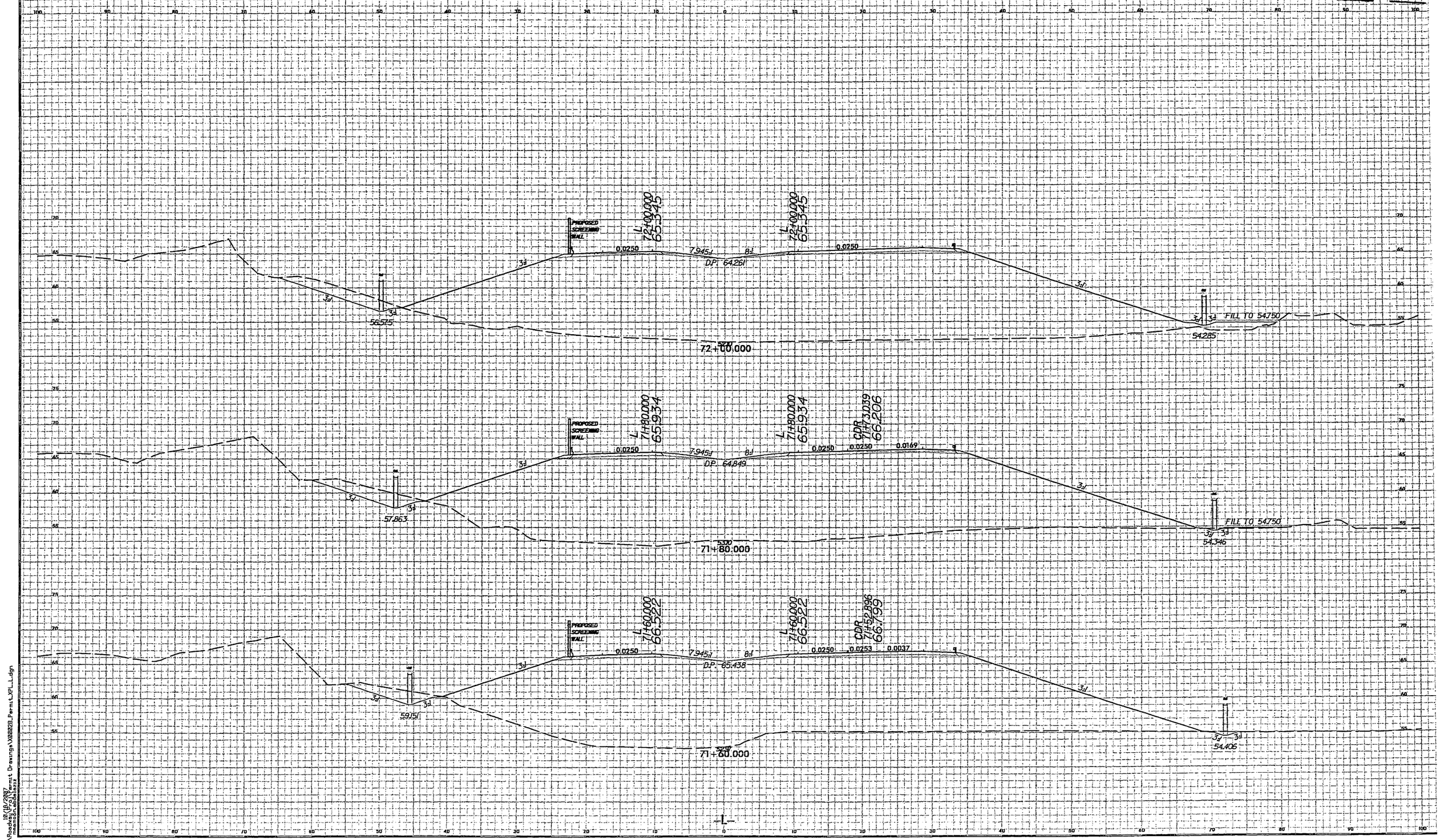
PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-34

5 0 5 10

METRIC

Permit Drawing
Sheet 22 of 24



10/26/99

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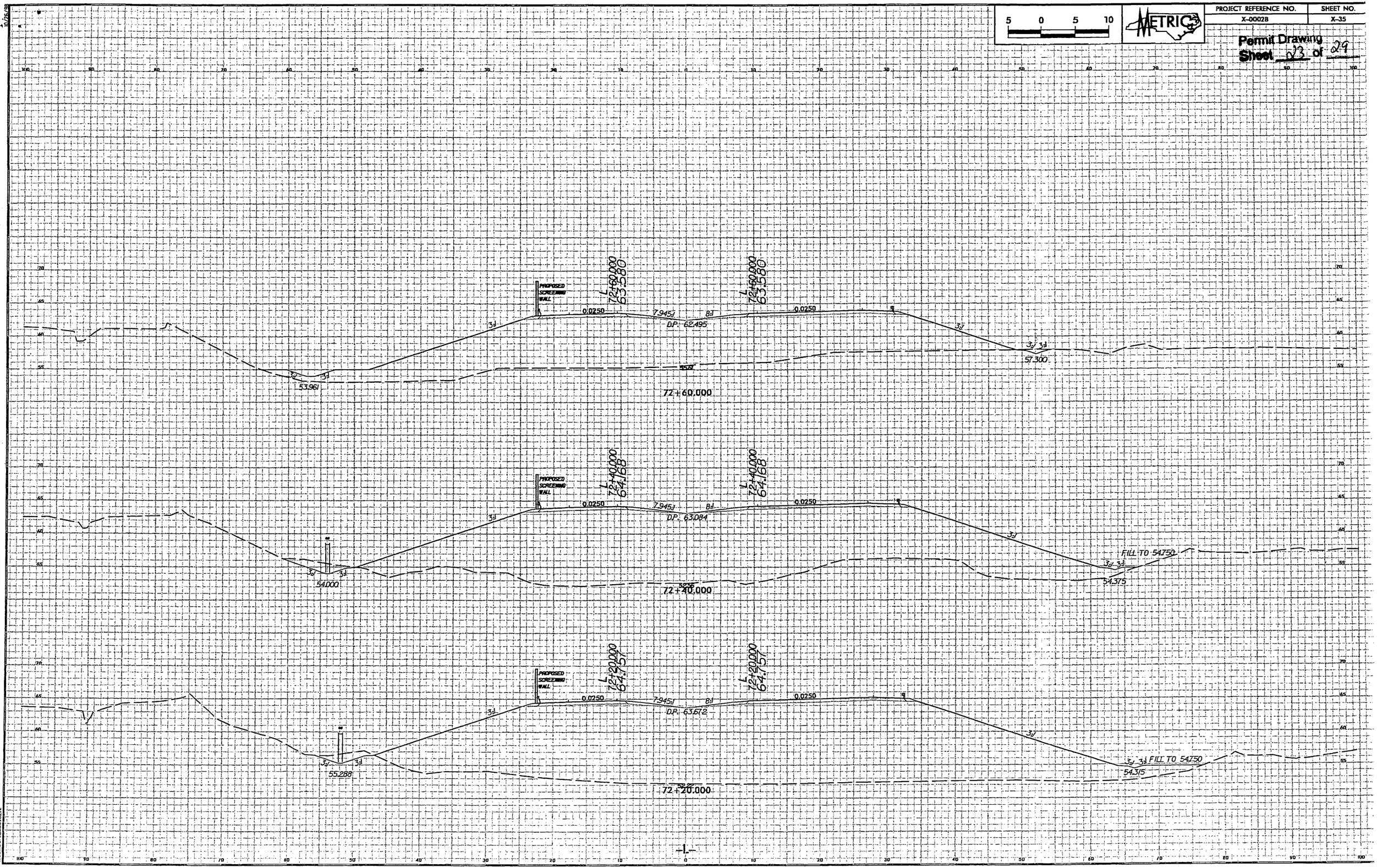
PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-35

Permit Drawing
Sheet 23 of 29



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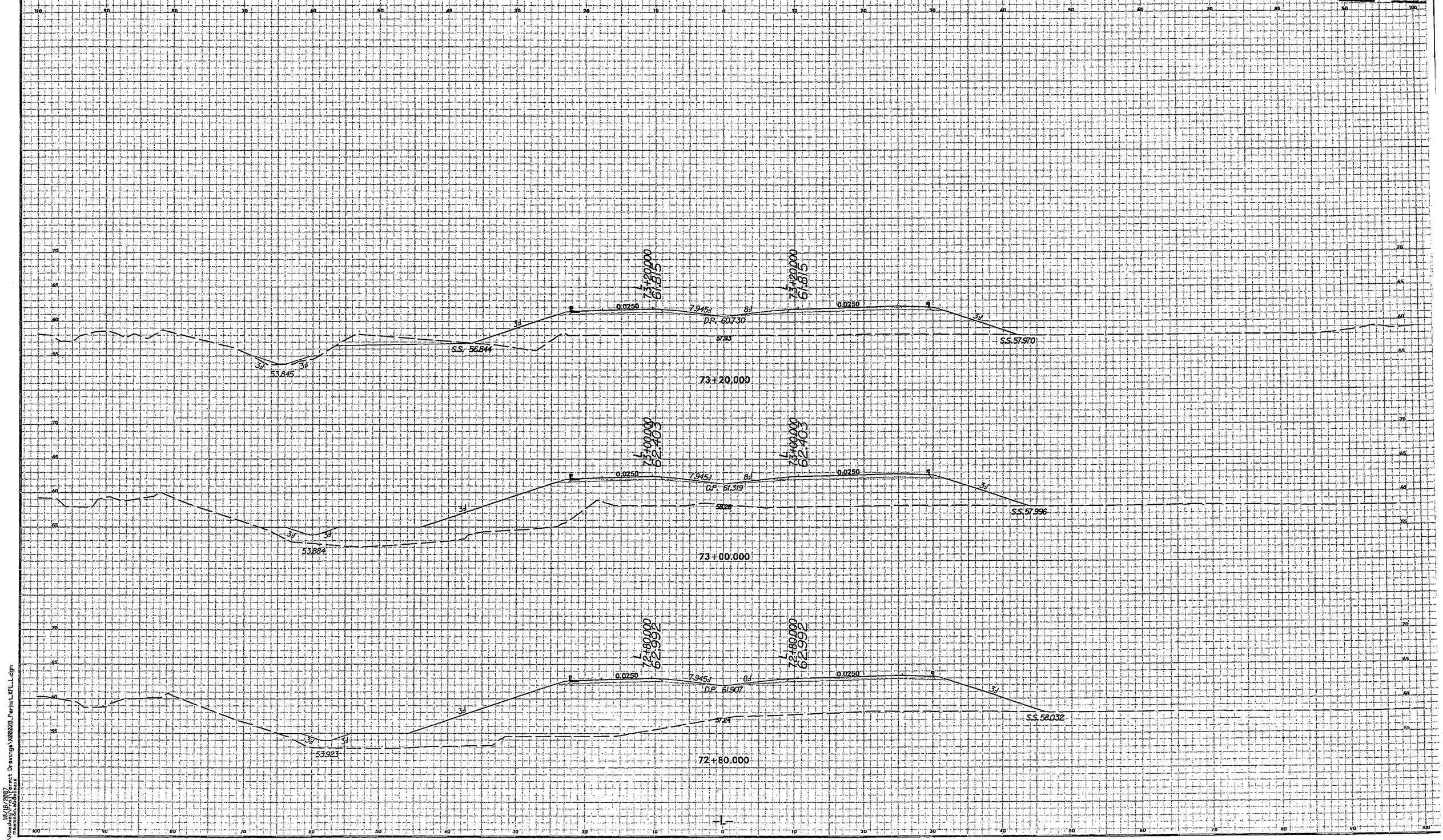
PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-36

Permit Drawing
Sheet 24 of 29



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3650\Roadway\Permit Drawings\X0002B_Permit_XPL_L.dgn
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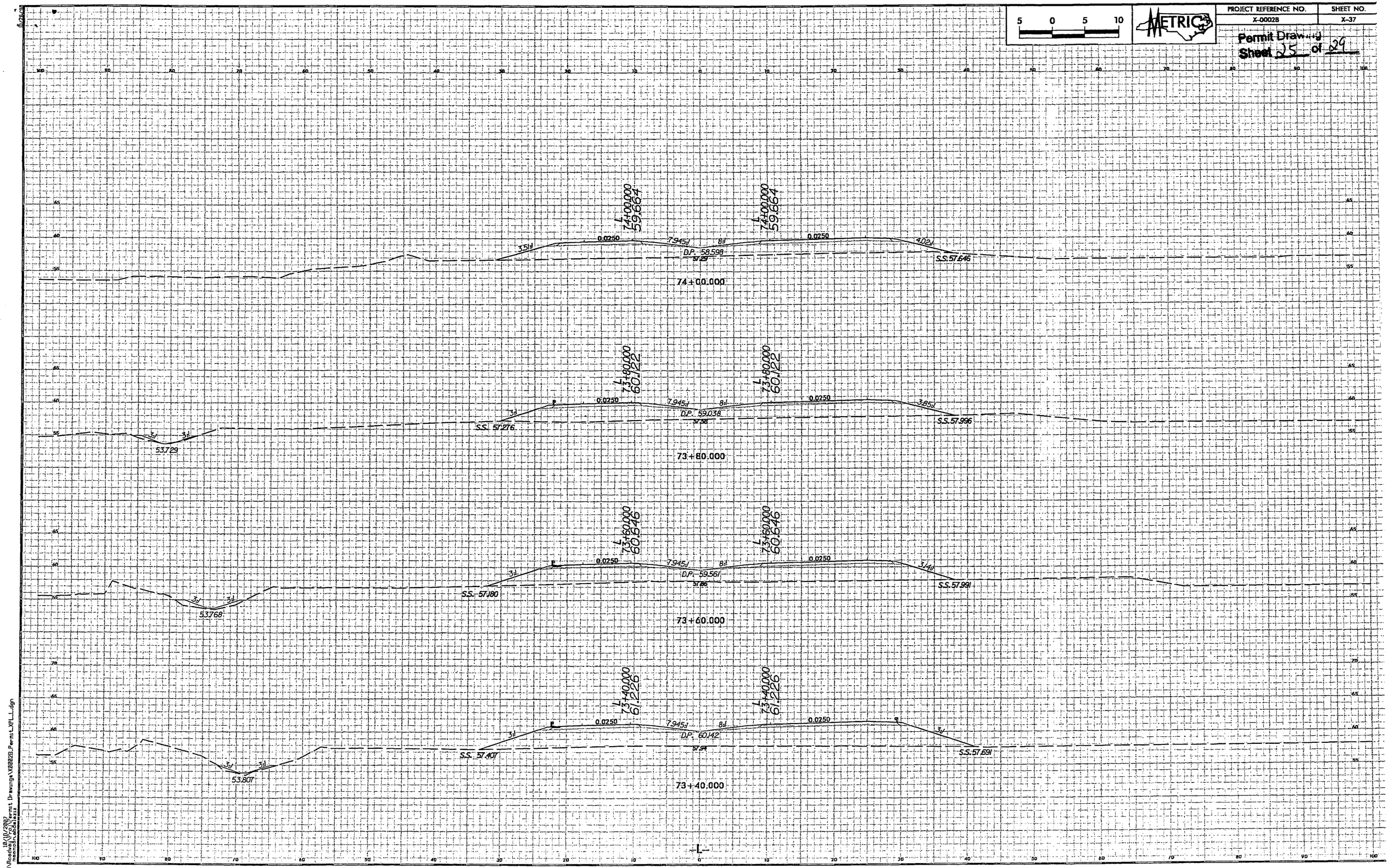
PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-37

Permit Drawing
Sheet 25 of 29



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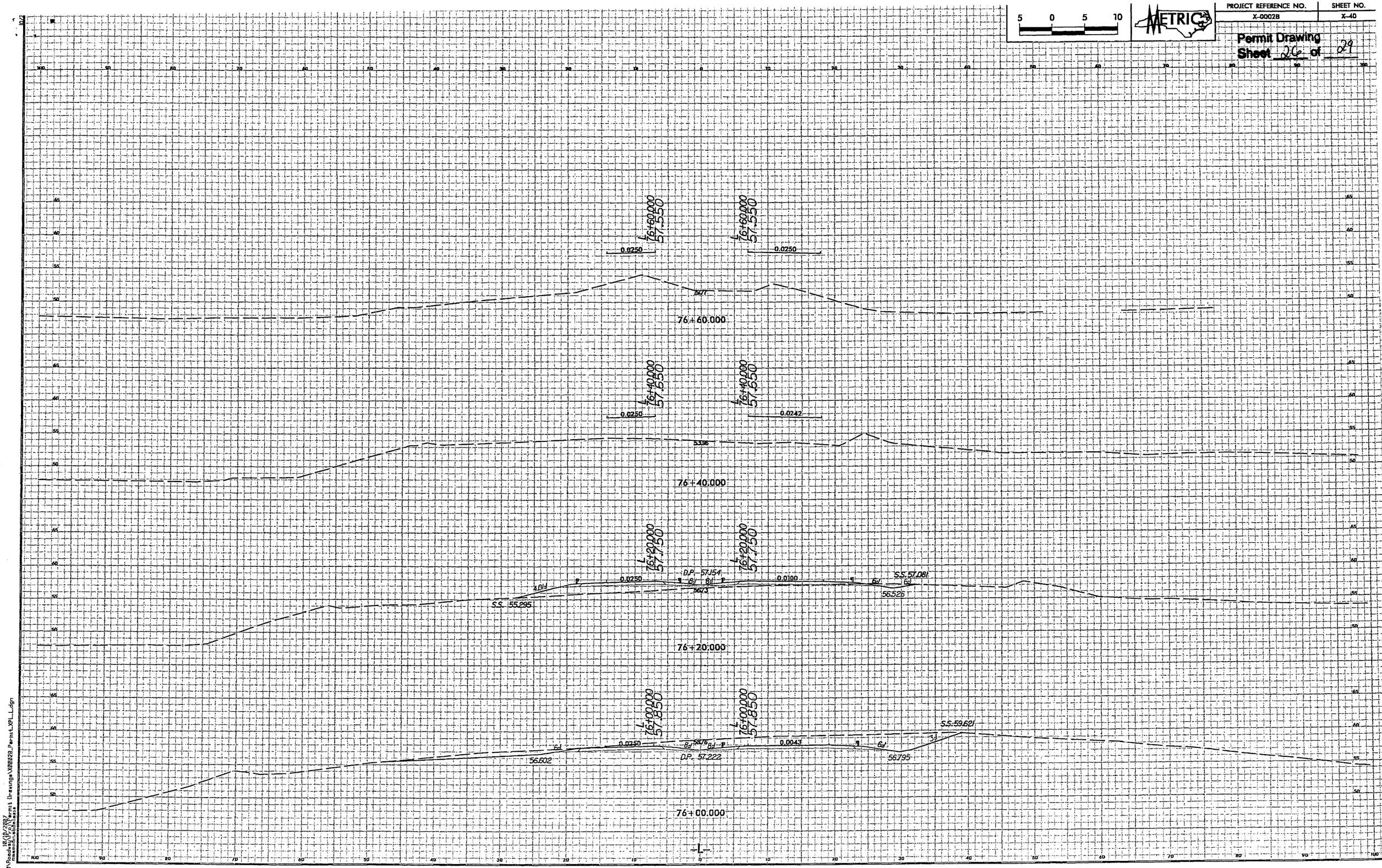

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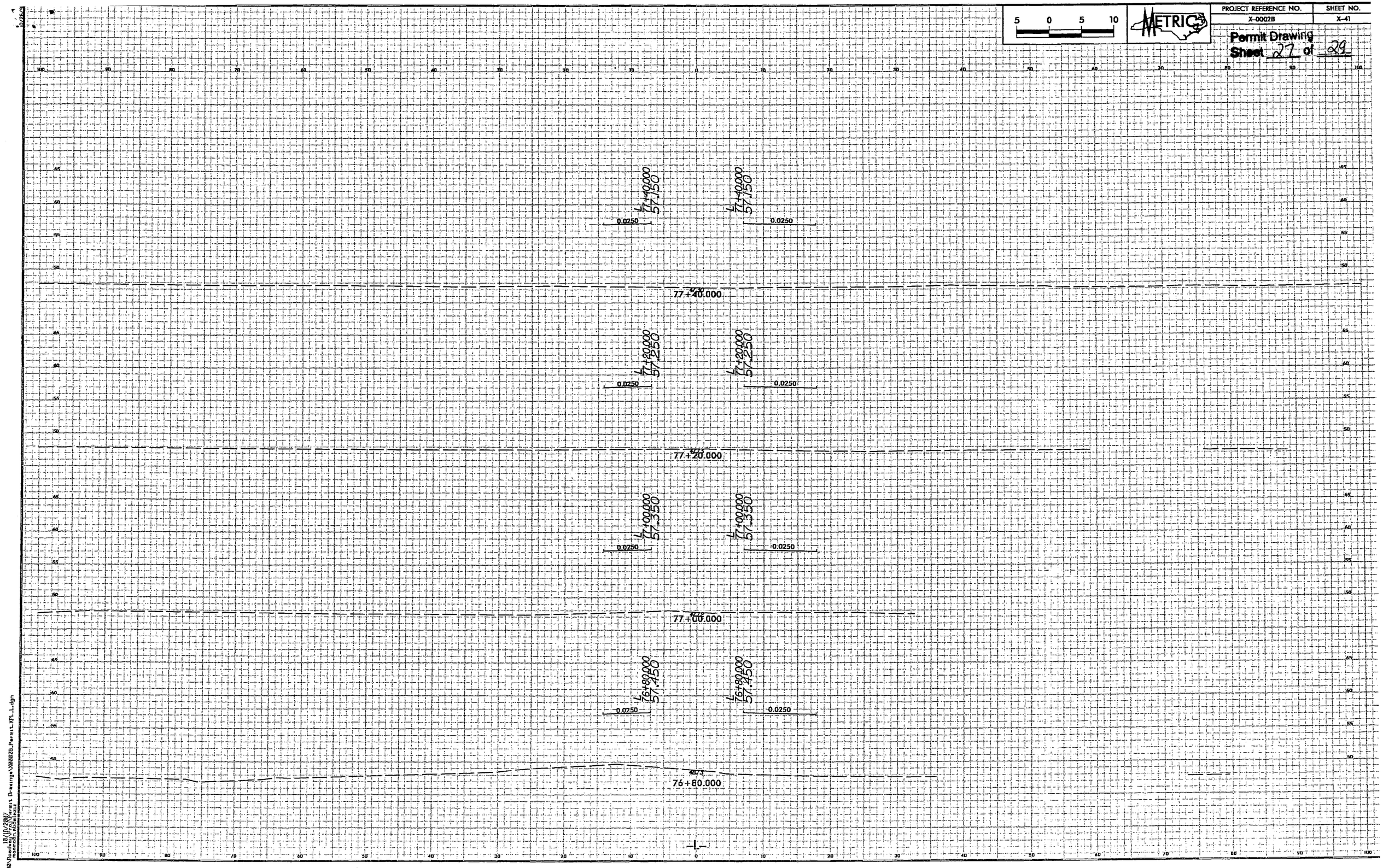

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mesmith
B93\Roadway\Proj\Permit Drawings\X0002B_Permit_XPL_L.dgn
mesmith.bentley.com

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-42

Permit Drawing
Sheet 28 of 29

5 0 5 10

METRIC

78+20.000
56.750
0.0250

78+00.000
56.850
0.0250

77+80.000
56.950
0.0250

77+60.000
57.050
0.0250

-L-

10/18/2007
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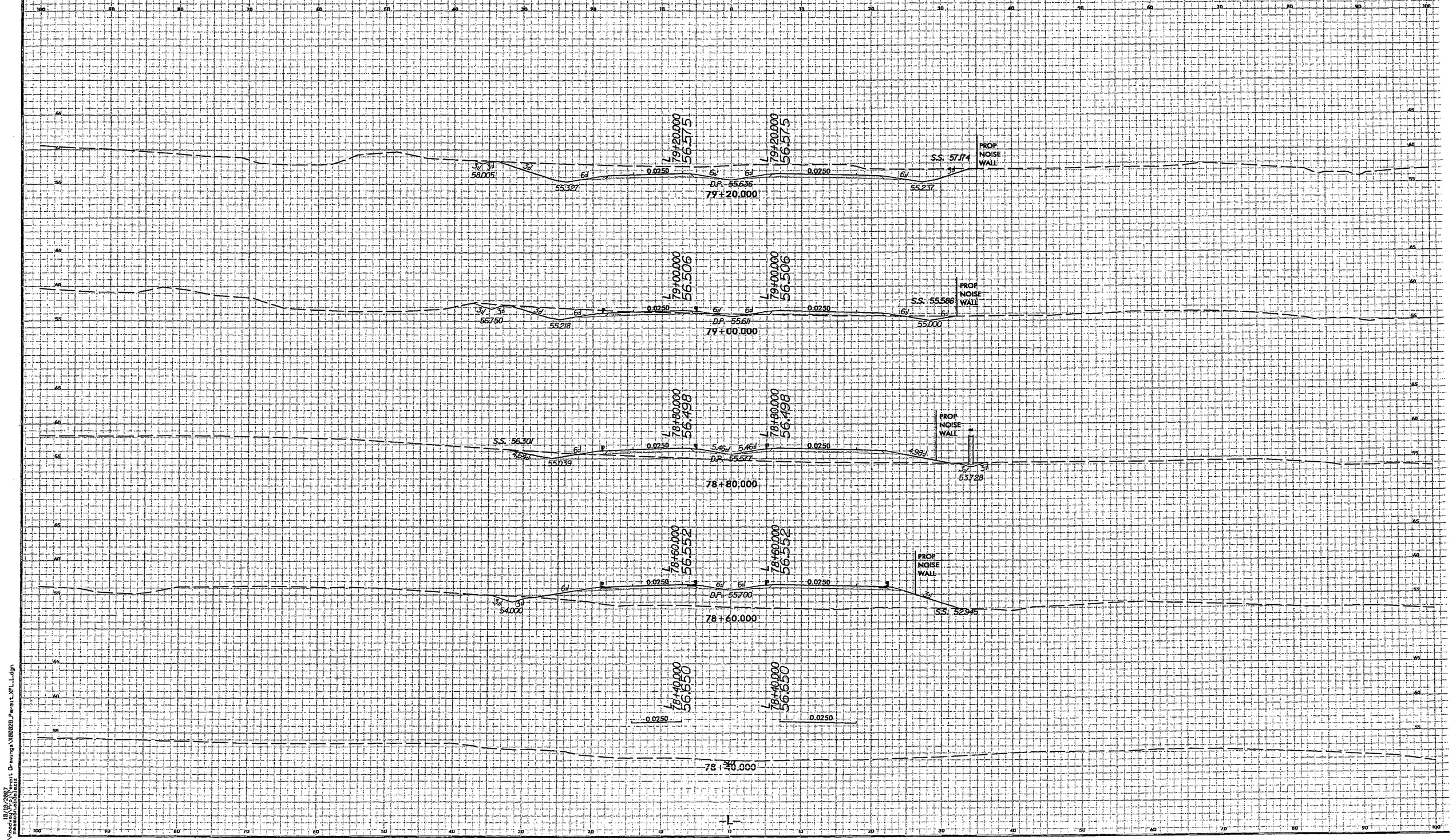
mamolin,abdelaziz

PROJECT REFERENCE NO.	SHEET NO.
X-0002B	X-43

Permit Drawing
Sheet 29 of 29



10/18/2007
meandrosdelacruz
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