STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 29, 2008

MEMORANDUM TO: Mr. Jay Swain, Jr., PE
Division Thirteen Engineer

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

SUBJECT: Madison & Yancey Counties, From Future I-26 (existing US 19-23) to SR 1186; T.I.P. Numbers R-2518A, R-2518B and R-2519A; WBS Nos. 3445.1.1 & 35609.1.1; State Project Nos. 6.869005T & 6909001T

Attached are the U.S. Army Corps of Engineers Section 404 Individual Permit and 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
Ms. Teresa Hart, P.E., PDEA Western Region Unit Head
Mr. Roger Bryan, Division Environmental Officer
Mr. Harold Draper, TVA

MAILING ADDRESS:
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LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

PROJECT COMMITMENTS

US 19/US 19E

From Future I-26 (existing US 19-23) to SR 1186
Madison and Yancey Counties
WBS Elements 34445.1.1 and 35609.1.1
State Project Numbers 6.869005T and 6.909001T
T.I.P. Project Numbers R-2518A, R-2518B and R-2519A

COMMITMENTS DEVELOPED DURING PROJECT PLANNING

Project Development and Environmental Analysis Branch, Roadway Design, Structure Design, and the State Historic Preservation Office

- The State Historic Preservation Office (SHPO) has concurred that the project will have "no adverse effect" on the Wilkes Hensley House in Yancey County provided the following conditions are met:
  - No temporary or permanent easements using the property are allowed
  - SHPO will be afforded the opportunity to review designs for the Bald Creek bridge and guardrails located adjacent to the property

Project Development and Environmental Analysis Branch and Roadway Design

- Access will be provided to the Horton Hill Cemetery from US 19E. The historic cemetery is located on the south side of US 19E just west of Charlie Brown Road (SR 1438). *The existing access road to the cemetery is not impacted by the proposed US 19E improvements.*

- The proposed action includes accommodations for bicycles. A four-foot striped bicycle lane is included in the proposed limits of the curb and gutter typical section. A four-foot paved shoulder will provide bicycle accommodations in all other areas of the project.

- Tractor trailer turn-around areas will be provided at the following locations:
  - Charlie Brown Road (SR 1438)
  - Between Pensacola Road (SR 1429) and Clate Wheeler Road (Depot Street)
  - Lower Georges Fork Road (SR 1143)

Project Development and Environmental Analysis Branch

- The archaeological survey for the project will be completed for the final environmental document (FONSI). *The archaeological study concluded that each of the four sites is not eligible for listing on the National Register, since the quality of artifacts and the disturbed area in which they were located does not meet the requisite criteria to be considered eligible for the National Register.*

- The proposed project is located within an identified critical habitat area for the federally protected Appalachian elktoe mussel. Therefore, a Biological Assessment is being prepared through the Section 7 Consultation process to assess the impacts of the proposed project.

- Suitable habitat exists for the federally protected Spiraea virginiana (Virginia spiraea) within the water bodies along the US 19E corridor, particularly the larger streams (Crabtree Creek, Bald Creek, and Cane River). Surveys were conducted in Crabtree Creek, Bald Creek, and the Cane River at the US 19E crossings in September, 2002. Additional surveys are scheduled for the flowering season of 2005. *Surveys for Virginia spiraea were conducted on June 27, 2005 and no specimens were found.*

Roadside Environmental Unit

- The Roadside Environmental Unit will coordinate landscaping details with Yancey County and Burnsville.

Signals and Geometrics Section and Division 13

- Pedestrian signals and crosswalk striping will be included at the signalized intersection of US 19E and South Main Street in Burnsville.

Hydraulic Design Unit and Structure Design Unit

- A TVA Section 26a permit is required for all proposed obstructions involving streams or floodplains in the Tennessee River drainage basin. The TVA is a cooperating agency for this project.

Hydraulic Design Unit and Roadside Environmental Unit

- The proposed project involves sensitive trout streams and is located within a critical habitat area for the federally protected Appalachian elktoe mussel. Therefore, NCDOT will implement erosion and sedimentation control measures, as specified by NCDOT's "Design Standards in Sensitive Watersheds" (15A NCAC 04B.0024). Detailed plans for the placement of appropriate hydraulic drainage structures will be determined during the final design of the project.

Hydraulic Design Unit

- Existing flood hazards along adjacent properties at all stream crossings will be evaluated in detail in final hydraulics design to ensure measures are taken to the extent practicable to minimize flooding problems to upstream properties and to ensure that the proposed roadway widening and associated drainage accommodations will not have an adverse affect on the existing floodplain area, nor on the associated flood hazards. The Hydraulics Unit will coordinate with the Federal Emergency Management Agency and local authorities in the final design stage to ensure compliance with applicable floodplain ordinances.

Division 13

- During construction, waste material from cut sections will be used as fill in other areas of road construction or will be disposed of properly in upland areas.

- Upon completion of the proposed action, the Division will determine if a traffic control signal is warranted at the intersection of US 19E and Clate Wheeler Road (Depot Street).

COMMITMENTS DEVELOPED DURING PERMITTING

Natural Environment Unit /Hydraulic Design Unit /Roadside Environmental Unit & Division 13

R-2518A 401 Water Quality Certification Special Conditions

- The onsite stream mitigation shall be constructed in accordance with the design submitted in your June 26, 2007 application (attached). Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 5,453 linear feet of impacts. All channel relocations shall be constructed in a dry work area, shall be completed and stabilized, and must be approved on site by DWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have buffers in accordance with the Biological Assessment prepared for this project. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

Natural Environment Unit

- Compensatory mitigation for impacts to 5,453 linear feet of streams at a replacement ratio of 1:1 is required. Compensatory mitigation for impacts to jurisdictional streams shall be provided by a combination of onsite stream restoration, enhancement, and preservation. The mitigation sites shall be constructed in accordance with the mitigation plans provided in the June 26, 2007 application. The mitigation shall be provided as detailed in the table below:

Table 7 - Mitigation Credits for R-2518A.

Mitigation Method	Stream Length (lf)	Ratio	Credits
Restoration	4,078*	1:1	4,078*
Enhancement	640	2:1	320
Preservation	15,335	4:1	3,834
Total	**20,053**		**8,232**

*Prior to providing restoration credit for Site D (262 lf of restoration), NCDOT shall provide design plans showing the site is within NCDOT right-of-way or under a conservation easement.

Additional mitigation credits may be available on R-2518B and R-2519A. Final mitigation plans with design lengths shall be submitted with the modification application for R-2518B and R-2519A. *Onsite mitigation for the R-2518B Section covered the surface water impacts for that section.*

Natural Environment Unit/Division 13

- The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," (attached) dated April 2003 with the following exceptions:

  a. Pebble counts shall not be conducted.
  b. Two cross sections shall be conducted for streams less than 500 linear and five (5) cross sections shall be conducted for streams greater than 500 linear feet.
  c. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

  The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWQ in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWQ to schedule a site visit to "close out" the mitigation site.

Division 13

- NC DOT shall adhere to all appropriate in-water work moratoriums (including the use of pile driving) prescribed by the US Fish and Wildlife Service and the NC Wildlife Resources Commission as described in the table below unless prior approval from the NC Division of Water Quality, the US Fish and Wildlife Service, and the NC Wildlife Resources Commission is provided.

Table 4 – In-water Work Moratoriums

Stream	Moratorium Dates
California Creek and tributaries	January 1 to April 15

Division 13/ Roadside Environmental Unit

- For all construction activities occurring in high quality water (HQW) watersheds, NC DOT shall use *Design Standards in Sensitive Watersheds* [15A NCAC 4B .0124(a)-(e)]. However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

Natural Environment Unit/Division 13

- The onsite stream mitigation shall be constructed in accordance with the designs submitted in your June 26, 2007 application, in the revised information letter dated October 1, 2007, and in the January 25, 2008 modification request. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 3,545 linear feet of impacts. All channel relocations shall be constructed in a dry work area, shall be completed and stabilized, and must be approved on site by DWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have buffers in accordance with the Biological Assessment prepared for this project. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

Division 13

- Removal of the 4-barrel box culvert from Bald Creek at Site 20 shall not be conducted in flowing water. The box culvert removal process shall be sequenced to temporarily route Bald Creek through a diversion channel or other best management practice described in NCDOT's *Construction and Maintenance Activities* manual to prevent excavation and culvert removal in flowing water.

- The proposed extensions of the structures at Sites 3 and 12 shall be backfilled with natural bed material to reduce the risk of developing headcuts.

- NCDOT shall adhere to all appropriate in-water work moratoriums (including the use of pile driving) prescribed by the US Fish and Wildlife Service and the NC Wildlife Resources Commission as described in the table below unless prior approval from the NC Division of Water Quality, the US Fish and Wildlife Service, and the NC Wildlife Resources Commission is provided.

Table 4 – In-water Work Moratoriums

Stream	Moratorium Dates
Cane River and tributaries	April 1 to June 30
Bald Creek and tributaries	January 1 to April 15
Price Creek and tributaries	January 1 to April 15

- The Project Development and Environmental Analysis, Natural Environment Unit shall provide assistance with construction for any on-site wetland mitigation, stream mitigation, or stream relocation. Prior to construction, the Natural Environment Engineering Group shall be contacted.

Natural Environment Unit

- Compensatory mitigation for impacts to 1,336 linear feet of streams at a replacement ratio of 1:1 is required. Compensatory mitigation for impacts to jurisdictional streams shall be provided by a combination of onsite stream restoration and enhancement. The mitigation sites shall be constructed in accordance with the mitigation plans provided in the June 26, 2007 application and revised information letter dated October 1, 2007. The mitigation shall be provided as detailed in the table below:

Table 3 - Mitigation Credits for R-2518B

Mitigation Method	Stream Length (lf)	Ratio	Credits
Restoration	1,037	1:1	1,037
Enhancement	5,016	2:1	2,508
Total	**6,053**		**3,545**

R-2518A Individual 404 & Biological Opinion Special Conditions

Natural Environment Unit

- Compensatory mitigation for unavoidable impacts to 0.26 acre of riparian wetlands and 0.16 acre of non-riparian wetlands (HUC 06010105) and 0.37 acre of riparian wetlands, 0.15 acre of non-riparian wetlands, and 1,547 linear feet of cold-water stream channel (HUC 06010108) associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP) as outlined in the October 22, 2007 letter from William D. Gilmore, P.E., EEP Director. Pursuant to Section X of the EEP Memorandum of Agreement (MOA) and as revised on March 8, 2007, between the State of North Carolina and the US Army Corps of Engineers, Wilmington District, signed on July 22, 2003, the EEP will provide 0.63 acre of restoration equivalent riparian wetlands, 0.31 acre of restoration equivalent non-riparian wetlands and 1,547 linear feet of cold water stream restoration in the French Broad River Basin, Hydrologic Cataloging Units 06010105 and 06010108. For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration. The remainder of the required compensatory mitigation for the unavoidable impacts associated with the R2518 and R2519A TIP Projects will be accomplished in accordance with the two mitigation plans titled "STREAM MITIGATION PLAN, US19, R-2518A, ON-SITE MITIGATION, MADISON COUNTY, NORTH CAROLINA" dated August 2006; and "STREAM MITIGATION PLAN, US HIGHWAY 19, R-2518B, ON-SITE MITIGATION, YANCEY COUNTY, NORTH CAROLINA" dated February 2007.

Division 13

- The permittee shall implement the work moratoria for fishery resources in specific bodies of water as outlined in the attached July 19, 2007 letter from the North Carolina Wildlife Resources Commission (attached).

Natural Environment Unit/Division 13

- This Corps permit does not authorize you to take an endangered species, in particular the Appalachian elktoe mussel. 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 March 14, 2008, 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.

DEPARTMENT OF THE ARMY PERMIT

Permittee **North Carolina Department of Transportation**

Permit No. **2007-2197-357/300**

Issuing Office **CESAW-RG-A**

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

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

Project Description: **to discharge dredged or fill material into 0.94 acres of wetland, and 14,766 linear feet of stream channel within the Little Ivy Creek, Cane River, and South Toe River drainages associated with the widening of approximately 21 miles of US Highway 19/19E. (TIP No's. R-2518 A/B and R-2519A).**

Project Location: **in Madison and Yancey Counties, North Carolina**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **April 1, 2013** 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.

Reg Sitz — 4/10/08

(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.

Scott M Gendron for — 18 April 2008

(DISTRICT COMMANDER) **JOHN E. PULLIAM, JR. 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

1. All work must be performed in strict compliance with the attached plans, which are a part of this permit. Any modifications to the permit plans must be approved by the Corps of Engineers prior to implementation.

2. Failure to institute and carry out the details of the following special conditions will result in a directive to cease all ongoing and permitted work within waters and/or wetlands associated with the permitted project or such other remedies and/or fines as the District Engineer or his authorized representatives may seek.

3. The permittee will 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, Asheville Regulatory Field Office prior to any active construction in waters and wetlands.

4. The permittee shall schedule a pre-construction meeting between their representatives, the contractor and the Corps of Engineers, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager prior to any work in jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained in this DA permit. The permittee shall provide the NCDOT Regulatory Project Manager with a copy of the final plans at least two weeks prior to the pre-construction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the pre-construction meeting for a time when the Corps of Engineers and North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall notify the Corps of Engineers and NCDWQ Project Managers a minimum of thirty (30) days in advance of the meeting.

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

6. Except as authorized by this permit or any Corps of Engineers 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 nor shall any activities take place that cause the degradation of waters or wetlands. 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 and wetlands or to reduce the reach of waters and wetlands.

7. To ensure that all borrow and waste activities occur on uplands and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material or to dispose of dredged, fill or waste material. The permittee shall provide the Corps of Engineers with appropriate maps indicating the locations of proposed borrow or waste sites as soon as such information is available. The permittee will coordinate with the Corps of Engineers before approving any borrow or waste sites that are within 400 feet of any stream or wetland. All jurisdictional wetland delineations on borrow and waste areas shall be verified by the Corps of Engineers and shown on the approved reclamation plans. The permittee shall ensure that all such areas comply with the preceding condition 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 documentation will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition. All information will be available to the Corps of Engineers upon request. The permittee shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

8. 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.

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

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

11. During the clearing phase of the project, heavy equipment must not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of nonerodable materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

12. All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent head-cutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of

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

13. Unless 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.

14. All mechanized equipment operating near surface waters shall be regularly inspected to prevent contamination of streams from leakage of 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 NC 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.

15. Compensatory mitigation for unavoidable impacts to 0.26 acre of riparian wetlands and 0.16 acre of non-riparian wetlands (HUC 06010105) and 0.37 acre of riparian wetlands, 0.15 acre of non-riparian wetlands, and 1,547 linear feet of cold-water stream channel (HUC 06010108) associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP) as outlined in the October 22, 2007 letter from William D. Gilmore, P.E., EEP Director. Pursuant to Section X of the EEP Memorandum of Agreement (MOA) and as revised on March 8, 2007, between the State of North Carolina and the US Army Corps of Engineers, Wilmington District, signed on July 22, 2003, the EEP will provide 0.63 acre of restoration equivalent riparian wetlands, 0.31 acre of restoration equivalent non-riparian wetlands and 1,547 linear feet of cold water stream restoration in the French Broad River Basin, Hydrologic Cataloging Units 06010105 and 06010108. For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration. The remainder of the required compensatory mitigation for the unavoidable impacts associated with the R2518 and R2519A TIP Projects will be accomplished in accordance with the two mitigation plans titled "STREAM MITIGATION PLAN, US19, R-2518A, ON-SITE MITIGATION, MADISON COUNTY, NORTH CAROLINA" dated August 2006; and "STREAM MITIGATION PLAN, US HIGHWAY 19, R-2518B, ON-SITE MITIGATION, YANCEY COUNTY, NORTH CAROLINA" dated February 2007.

16. The permittee shall implement the work moratoria for fishery resources in specific bodies of water as outlined in the attached July 19, 2007 letter from the North Carolina Wildlife Resources Commission.

17. The permittee will report any violation of the above conditions and any violations of Section 404 of the Clean Water Act from unauthorized work in writing to the Wilmington District, US Army Corps of Engineers within 24 hours of the permittee's discovery of the violation.

18. This Corps permit does not authorize you to take an endangered species, in particular the Appalachian elktoe mussel. 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 March 14, 2008, 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.

19. All conditions of the North Carolina Division of Water Quality's Section 401 Water Quality Certification No. 3427, original dated October 11, 2007 and modification dated March 17, 2008, are hereby incorporated as special conditions of this permit.

BIOLOGICAL OPINION
CONSERVATION MEASURES
FROM TEXT OF OPINION

committed to implement erosion-control guidelines that go beyond both the standard BMPs and the Design Standards in Sensitive Watersheds, regardless of the DWQ classification. These areas are designated as "Environmentally Sensitive Areas" on the erosion-control plans.

B. Conservation Measures

Conservation measures represent actions, pledged in the project description, that the action agency will implement to minimize the effects of the proposed action and further the recovery of the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency. The beneficial effects of conservation measures are taken into consideration in the Service's determination of a jeopardy versus a nonjeopardy opinion and in the analysis of incidental take. However, such measures must minimize impacts to listed species within the action area in order to be factored into the Service's analyses.

The NCDOT proposes to offset project-related impacts by implementing a number of conservation measures. Included in the overall proposal are measures that will help aid recovery by conserving or restoring habitat and measures intended to minimize direct impacts through project design, construction practices, and monitoring and remediation.

Habitat Conservation and Restoration

1. The NCDOT has committed to providing riparian habitat protection in at least five locations within the Nolichucky basin, to provide a total of 57.6 acres (ac) and 19,005 lf of protection. Sites will be reviewed by the Service before purchase.

2. The NCDOT is using on-site stream mitigation to offset unavoidable impacts to existing streams within the project alignment. A total of 29,783 lf of on-site mitigation has been identified for the entire project. Of the total, 11,299 lf is identified and planned within the Nolichucky River basin and includes a variety of practices to restore stream pattern, dimension, and profile; correct channel instability; restore riparian buffers; and preserve stable stream reaches. These sites will be purchased as part of the NCDOT right-of-way and will be permanently protected from future development. Stream restoration and buffer preservation in the project corridor will help offset project-related impacts and will benefit downstream resources, including the Appalachian elktoe, by correcting existing problems in the watershed. Mitigation plans are developed in coordination with the U.S. Army Corps of Engineers (Corps), DWQ, and the Service.

3. The NCDOT will relocate all native mussels, including the Appalachian elktoe, from the footprints of the bridge construction projects to an appropriate relocation site as determined in coordination with the Service and the NCWRC. The procedure for relocation will be detailed in a site-specific plan developed in cooperation with the Service, NCWRC, and NCDOT. The relocation procedures will emphasize relocating freshwater mussels in such a way as to reduce stress and

minimize the risk of injury while the animals are in transit. If at any time during the relocation it is determined that these procedures are not meeting the stated objectives, more stringent methods may be developed, in cooperation with the NCWRC and the Service, to ensure that the mussels are relocated successfully. The relocation site(s) will be monitored for the survival of relocated mussels and the movement of mussels a month after they have been removed from the defined salvage areas. The relocation site(s) will then be monitored for recovery, survival (of recovered mussels), movement, and growth of the mussels once a year for 5 years after project completion. Annual reports will be provided to the Service and the NCWRC.

4. Japanese knotweed (*Fallopia japonica)*, an aggressive and invasive nonnative plant, is colonizing floodplain and stream-bank areas in the Nolichucky River basin. Japanese knotweed can quickly form dense thickets that exclude native vegetation and greatly alter the natural riparian ecosystem. The NCDOT has identified Japanese knotweed within the project limits of R-2518 and R-2519. To minimize the potential spread of this species from construction-related activities, the NCDOT proposes to attempt to suppress the knotweed within their right-of-way at the following locations: R-2518A Mitigation Site 1, R-2518B Mitigation Site 4, R-2518B Bridge at Sta. 223+50 (Cane River Bridge), and R-2519B Bridge at Sta. 121+00 (South Toe River Bridge).

5. The contract(s) for this project will stipulate that any Japanese knotweed material disturbed through construction activities at the two bridges and at the identified mitigation sites will be buried within the project boundaries in fill or waste areas below the depth of the topsoil. The NCDOT prefers on-site disposal to ensure proper disposal. Any chemical treatment will be proposed and planned in coordination with the Service and the NCDOT. The NCDOT also has initiated a research project with North Carolina State University to further investigate techniques to control Japanese knotweed. Control tests in the project area will be coordinated with the Service.

Design Measures

1. In some road sections, where streams run parallel to the current road alignment and opportunities to avoid impacts or relocate streams are limited, the NCDOT will construct retaining walls. In these cases, retaining walls replace fill slopes, thereby reducing the linear feet of stream that must be culverted and placed under fill. The NCDOT has avoided impacts to 4,704 lf of streams throughout the project, including 3,569 lf of streams in the Nolichucky River basin. Although these stream segments do not provide suitable habitat for the Appalachian elktoe, they flow into a reach of either the South Toe River or North Toe River, both of which are occupied by the Appalachian elktoe and are designated critical habitat for this species. Reducing impacts in these streams will minimize potential downstream impacts, such as sedimentation, erosion, and stream-bank instability, to the Appalachian elktoe and its designated critical habitat.

2. The existing culvert crossing of Bald Creek at Station # 175+60 –L- is being replaced with a bridge. This crossing is 0.7 mi from the confluence of Bald Creek and the Cane River, in a reach of the Cane River that is occupied by the Appalachian elktoe.

3. Deck drains will be placed at the ends of the replacement bridges. Storm water will be directed into catch basins and will then flow through a vegetated buffer so that no drainage will occur over the Cane River or South Toe River. Currently, drainage from the decks of both the existing structures flows directly into the river. Storm water coming off the approaching roadways at the bridge locations will be managed in a similar manner.

4. The design of the Cane River Bridge and the South Toe River Bridge minimized or eliminated piers in the rivers.

5. Bridge designs at Price's Creek and at Bald Creek will direct deck drainage to a vegetated buffer and will span the respective Creeks.

Construction Measures

1. In addition to relocating all mussels found in the footprint of the impact area, the NCDOT will conduct final mussel surveys in the project footprints just prior to construction and will move any additional mussels found to the appropriate relocation area.

2. For the entire 21-mi-long project within the Nolichucky River basin, the NCDOT will implement erosion-control measures that exceed the standard BMPs and incorporate the Design Standards in Sensitive Watersheds [15A NCAC 04B.0124 (b) – (e)], regardless of the DWQ stream classification.

3. The areas adjacent to jurisdictional water bodies in the watersheds of the Cane, North Toe, and South Toe Rivers will be identified as "Environmentally Sensitive Areas" on the Sedimentation and Erosion Control Plans for this project. By definition, an "Environmentally Sensitive Area" will be identified as a 50-foot buffer zone on both sides of the stream, measured from the top of the stream bank. Within the identified 50-foot Environmentally Sensitive Areas, the following shall apply:

   a. The contractor may perform clearing operations, but not grubbing operations, until immediately prior to beginning grading operations;

   b. Once grading operations begin, work shall progress in a continuous manner until complete;

c. Erosion-control devices shall be installed immediately following the clearing operation;

d. Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment; and

e. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 ft in height, measured along the slope, or greater than 2 ac in area, whichever is less.

4. All sedimentation- and erosion-control measures, throughout the project limits, must be cleaned out when half full with sediment to ensure proper function of the measures.

5. The contractor will be required to submit a bridge demolition plan to the resident engineer and the bridge construction engineer for their approval. This plan must be sealed by a registered North Carolina professional engineer and must use demolition techniques that minimize the amount of debris that will enter the river. The plan should be reviewed by the Service prior to the approval and initiation of bridge removal.

6. In order to avoid and minimize environmental impacts associated with this project, all standard procedures and measures, including the NCDOT's BMPs for construction and maintenance activities and TVA's Water Management Standard Conditions, will be strictly enforced during the project. Provisions to preclude contamination by toxic substances during the project will also be strictly enforced.

7. The NCDOT's Project Development and Environmental Analysis Branch and the Service will be invited to the preconstruction conference to discuss with the contractor the provisions of this Opinion. Prior to construction the contractor will be required to give notification of the construction initiation date to the Service, NCWRC, and TVA.

Monitoring

1. The NCDOT will monitor fish and benthic macroinvertebrates at nine locations along the project corridor. These data will help detect differences in the two fauna communities above and below the project and will provide information on possible effects on the communities due to project construction. Baseline data have been gathered and will be compared to data collected after project completion (Table 4).

2. A DWQ Assessment Field Data Sheet will be completed at each biological monitoring site. This assessment tool provides an evaluation of physical stream-habitat parameters, such as bank stability, substrate embeddedness, sediment loads, and habitat complexity. These factors are important in determining the overall

Table 4. The NCDOT's Fish Community and Benthic Macroinvertebrate Sample Locations.

Stream	Location	Project Section	Collection Date(s)
California Creek	above US 19 at SR 1608	R-2518A	5/06, 5/07*
	below US 19 at SR 1541		5/06, 5/07*
Bald Creek	near SR 1134	R-2518B	5/06
Price Creek	above US 19 at SR 1126	R-2518B	5/06
	below US 19 at SR 1454		5/06
Bald Creek	above and Below US 19E near SR 1128	R-2518B	Not sampled yet
Cane River	below US 19	R-2518B	5/06
Little Crabtree Creek	above and below US 19 at NC 80 (Micaville)	R-2519A	5/06, 5/07*
Long Branch	below US 19 at SR 1424	R-2519B	5/07
Big Crabtree Creek	below US 19	R-2519B	5/06
Brushy Creek	above and below US 19 at SR 1235	R-2519B	5/06

*A subset of sites was sampled more than once in order to evaluate between year variations in the fish communities.

stability and health of a stream and its ability to support aquatic life. See Appendix D for data sheets and location maps.

3. The NCDOT will monitor the river channel and banks at the Cane River Bridge and the South Toe River Bridge sites upstream, at the construction sites, and downstream to determine changes in habitat resulting from activities at these sites. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will correct the problems. This monitoring also will help evaluate the impacts of construction on habitat in the rivers.

4. Stream stability at culvert replacement and extension sites will be monitored visually during construction, through the assessment described previously at the biological monitoring sites, and at a final field inspection by the NCDOT and agency representatives before close out of the contract for a particular segment.

BIOLOGICAL OPINION
CONDITIONS

In addition to the subsequent measures listed in the "Reasonable and Prudent Measures" and "Terms and Conditions" sections of this Opinion, the measures listed in the "Conservation Measures" section of this opinion must be implemented. The conservation measures are project minimization measures for the construction of the projects that were described by the NCDOT in the BA. The conservation measures include, but are not limited to, the following:

1. The NCDOT will provide, or contract with biologists who have experience in mussel relocation techniques, for the removal of Appalachian elktoe mussels from the impact sites at the Cane and South Toe River bridge crossings and relocate them to approved relocation sites. Detailed procedures will be developed in coordination with the Service and will be approved by the Service. Procedures will include appropriate collection methods; tagging and recapture; handling and transportation of individuals; and monitoring protocols, which includes the monitoring of the relocation sites for recovery, survival (of recovered mussels), movement, and growth of mussels for a period of 5 years.

2. In coordination with the Service, the NCDOT will develop plans for monitoring the river channel and banks at upstream sites, at the bridge construction sites, and downstream to determine changes in habitat resulting from activities at these sites. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will, in cooperation with the Service, develop a plan to address the problems.

3. As committed to by the NCDOT in the BA, the NCDOT will protect and/or restore riparian buffers for 19,000 lf of stream within the action area. Given that the conservation areas have not been determined or obtained by the NCDOT at the time of the issuance of this Opinion, the Service will continue to review sites that the NCDOT is considering and approve sites that are ultimately acquired.

4. To minimize the potential spread of Japanese knotweed from construction-related activities, the NCDOT has identified Japanese knotweed within the project limits of R-2518 and R-2519. The NCDOT proposes to attempt to suppress Japanese knotweed within their right-of-way, via mechanical means, at the following locations: R-2518A Mitigation Site 1, R-2518B Mitigation Site 4, R-2518B Bridge at Sta. 223+50 (Cane River Bridge), and R-2519B Bridge at Sta. 121+00 (South Toe River Bridge). Application of a glyphosate herbicide will require further planning and consultation with the Service.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Appalachian elktoe. These nondiscretionary measures include, but are not limited to, the commitments in the BA addendum and the terms and conditions outlined in this Opinion.

1. This multiphase project will receive one Clean Water Act Section 404 permit from the Corps' Wilmington District. Individual sections of the highway project will be reviewed as impact numbers are refined, and the NCDOT will request a permit modification before proceeding with work on a new section. The Corps will coordinate with the Service to review permit modifications and monitoring results to determine if the project is meeting the terms and conditions set forth in this Opinion.

2. The NCDOT will ensure that contractors understand and follow the measures listed in the "Conservation Measures," "Reasonable and Prudent Measures," and "Terms and Conditions" sections of this Opinion.

3. The NCDOT will send copies of all monitoring reports to the Service's Asheville Field Office at specified times over the life of the project.

4. The NCDOT will notify the Service and the Corps immediately if monitoring reveals any significant problems so that remediation can occur as quickly as possible.

5. New or extended culverts on tributaries will be constructed in a manner that will not contribute to channel instability and downstream habitat changes.

6. The NCDOT will employ construction methods and mitigation actions that will minimize/prevent the spread of Japanese knotweed.

7. The NCDOT will minimize aquatic habitat fragmentation in the Nolichucky River basin by replacing perched culverts or other aquatic passage barriers and, where possible, enhancing aquatic life passage and stream habitat.

8. Containment systems will be developed for particular stages of the demolition and construction of the bridges in order to minimize impacts to the Appalachian elktoe and its habitat.

9. Bridge demolition activities and the relocation of mussels will be conducted during time periods that will result in fewer impacts to the Appalachian elktoe.

10. During the relocation of mussels, the Service may alter, if needed, methods and plans for moving the mussels.

11. All appropriate NCDOT BMPs for erosion control; storm-water management; and bridge maintenance, construction, and demolition will be followed or exceeded for the project, and any additional BMPs listed in the "Terms and Conditions" section of this Opinion will be followed.

Terms and Conditions

In order to be exempt from the 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 previously and outline required reporting and/or monitoring requirements. These terms and conditions are nondiscretionary and apply to the Toe and Cane Rivers and their affected tributaries.

1. The Corps will notify the Service of requests for permit modifications from the NCDOT and, if necessary, have a meeting to review the changes and status of the project before issuing the modified permit.

2. A Service biologist will be present at the preconstruction meeting(s) to cover permit conditions and discuss any questions the contractor has regarding implementation of the project. After the contractor submits plans for various stages of the project, a Service biologist will review and provide comments on the plans and will attend any meetings to discuss implementation of the plans.

3. The NCDOT will use special provisions that exceed the standard BMPs for erosion control. These erosion-control measures incorporate the Design Standards in Sensitive Watersheds (15A NCAC 04B.0124(b)-(e)).

4. The NCDOT will provide three levels of oversight for the control of erosion and sediment on the project.

5. The NCDOT will perform compliance inspections of the erosion-control devices weekly or within 24 hours of a $\geq$0.5-in rainfall event during construction of the project.

6. The NCDOT will submit a proposal through their internal research group to study the effectiveness of storm-water-treatment and -control measures specific to this project.

7. During construction, culvert inlets and outlets will be evaluated by the engineer with regard to stream stability immediately following installation and quarterly for a period of 1 year at each location. Indicators of instability, such as headcutting, scour, aggradation, or degradation, will be used to determine the need for any corrective actions.

8. A final field inspection will be held with the contractor to evaluate culvert placement and stream stability before the project is considered complete. If instability is detected during any of these reviews, corrective actions will be performed when deemed necessary by the engineer or by the conditions of any federal and state permits required by Section 404/401 of the Clean Water Act.

9. In order to minimize effects to the Appalachian elktoe and it designated critical habitat, the NCDOT will replace the four-barrel box culvert at the crossing of US 19 and Big Crabtree Creek with a bridge. Replacing this culvert with a bridge will reduce aquatic fragmentation, correct downstream scour and upstream overwidening, reestablish a connection to the floodplain in this reach, and restore habitat in this important tributary to the North Toe.

10. The NCDOT will conduct the benthic macroinvertebrate monitoring proposed in the "Conservation Measures" section to provide a habitat assessment, including (but not limited to) parameters such as existing habitat structure and sediment load at each of the nine sites.

Measures Specific to Bridge Construction

1. The NCDOT will ensure that a qualified aquatic biologist is present at critical times to monitor certain phases of construction, including, but not limited to, initial clearing for construction, when the causeways are installed, when demolition begins, and when the causeways are removed. This individual will be present to ensure that the procedures listed in the "Conservation Measures," "Reasonable and Prudent Measures," and "Terms and Conditions" sections of this Opinion are being implemented and that all project plans are being implemented in a manner to ensure that the conditions of the Opinion are met.

2. A containment system will be developed and installed prior to the removal of the bridge deck and piers. The system should be of sufficient strength to capture material that may enter the river.

3. When constructing drilled shafts, a containment system will be developed so that material does not enter the river. Any material by-product will be pumped out of the shaft to an upland disposal area and treated through a proper stilling basin or silt bag.

4. The NCDOT will not relocate mussels between May 1 and June 30, the time at which the Appalachian elktoe releases glochidia. The NCDOT will relocate the mussels during low flow, low turbidity, and relatively cool weather; the most appropriate time to accomplish this would be in the fall.

5. In the BA, the NCDOT proposed to relocate all native mussels, including the Appalachian elktoe, from the project "footprints," extending downstream and upstream of the two bridge replacements. Representatives of the Service's Asheville Field Office may determine during relocation of the mussels that the area the mussels are moved from should be reduced.

6. A Service biologist will review and provide comments on plans proposed to correct problems that may be revealed in the monitoring of the river channel and banks within the project area.

7. The erosion-control plan will be in place prior to any ground disturbance. When needed, combinations of erosion-control measures (such as silt bags in combination with a stilling basin) will be used to ensure that the most protective measures are being implemented.

8. Activities in the floodplain will be limited to those needed to construct the proposed bridges and remove the existing bridge.

9. Work pads will be used when equipment must be staged in the floodplain to complete the project construction. The work pads will be constructed by placing fabric matting down prior to placing the stone work pad. All of the stone and matting will be removed and disposed of off-site, or the stone can be used in areas that require permanent stone protection after project completion.

10. Access roads and construction staging areas will be minimized to the maximum extent practicable. The access roads and construction staging areas should be established from the start of the project and designed with erosion-control measures. The placement of the access roads and staging areas will be discussed with the Service and determined at the preconstruction meetings.

11. Riparian vegetation, especially large trees, will be maintained wherever possible. If riparian areas are disturbed, they will be revegetated with native species as soon as possible after construction.

12. Upon completion of the project the existing approach fills will be removed to natural grade, and the area will be planted with native grasses and tree species.

13. Erosion-control measures will remain in place until riparian vegetation is successfully reestablished at each of the bridge sites.

14. Construction will be accomplished in a manner that prevents wet concrete from coming into contact with water entering or flowing in the river.

15. Unconsolidated material (such as sand and dirt) will not be placed directly on the causeways since the material could be washed off of the causeways or settle into the causeways and enter the river. Any equipment that is placed on the causeways will be removed anytime throughout a work day when the water level rises, or is expected to rise overnight, to a point where the equipment could be flooded or during periods of inactivity (two or more consecutive days). The only exception to this measure is that the drill rig may be left in place for periods of inactivity; however, it must also be removed if the water rises, or is expected to rise, to a point where the drill rig could be flooded.

16. All construction equipment should be refueled outside the 100-year floodplain or at least 200 ft from all water bodies (whichever distance is greater) and be protected with secondary containment. During crucial periods of construction and demolition, when the drill rig and crane cannot be moved, the drill rig and crane can be refueled while inside the 100-year floodplain provided that spill response materials (such as spill blankets and fueling diapers) are used during the refueling. Hazardous materials, fuel, lubricating oils, or other chemicals will be stored outside the 100-year floodplain or at least 200 ft from all water bodies (whichever distance is greater), preferably at an upland site. Areas used for borrow or construction by-products will not be located in wetlands or in the 100-year floodplain.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The following conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Where opportunities exist, work with landowners, the general public, and other agencies to promote education and information about the Appalachian elktoe and its conservation.

2. In order to address sources of impairment in the Nolichucky River basin and work toward removing habitat occupied by the Appalachian elktoe from the 303(d) list of impaired waters, consider funding a position with a conservation organization to help identify and pursue additional buffers and conservation opportunities along the main stem of the Cane River, North Toe River, and Toe Rivers and their tributaries, either individually or in concert with other conservation programs.

3. Establish an escrow account to provide funding for land acquisition and/or conservation easements/agreements to better take advantage of conservation opportunities as they arise.

4. Explore opportunities to work with local and state water quality officials in order to minimize or eliminate wastewater and storm-water discharges into the Cane River, North Toe River, and Toe River.

5. Work with Yancey and Mitchell Counties to develop tools such as land-use plans, ordinances, and incentives to protect the Appalachian elktoe and its designated critical habitat from the effects of development activities.

6. Consult with the Service on projects affecting aquatic habitat in the Nolichucky River basin, regardless of funding source, to ensure compliance with all provisions of the Act.

7. Work with partners to assess and prioritize structures that fragment aquatic habitat and create barriers to fish passage in the Nolichucky River basin and begin replacing those structures with more appropriate structures when opportunities arise.

In order for the Service to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

TO: Jeff Hemphill, Natural Environment Unit
N. C. Department of Transportation

FROM: Marla Chambers, Western NCDOT Permit Coordinator Marla Chambers
Habitat Conservation Program, NCWRC

DATE: July 19, 2007

SUBJECT: Moratoria for the US 19E widening project from I-26 in Madison County to the existing multilane section west of Spruce Pine in Mitchell County. TIP Nos. R-2518, R-2519A, and R-2519B.

As requested, this is to provide a list of moratoria recommended for the portion of the US 19 E widening project from Madison County to Mitchell County, specifically TIP Nos. R-2518, R-2519A, and R-2519B. These recommendations were originally made in our comment letters and communications at earlier stages of the project planning process for specific segments of the project. Recent fish sampling by NCDOT (May 2006 and May 2007) and NCWRC (August 2006) has provided information that allows the appropriate moratoria to be determined for specific bodies of water. They are provided below for your convenience.

Our comments dated May 23, 2003 and November 21, 2005 for R-2519B and February 24, 2005 for R-2518 and R-2519A, as well as email comments dated February 6, 2007, which referred to all three project segments, provided moratoria recommendations. A clarification should be noted regarding the two comment letters for R-2519B, Big Crabtree Creek was erroneously referred to as Cranberry Creek in both letters. This correction was also announced at a recent Concurrence meeting (April 17, 2007).

On the western end, we are not requesting a moratorium for Middle Fork Creek or its unnamed tributaries. An in-water work moratorium from April 1 to June 30 will apply to Cane River and South Toe River to protect federal and state listed species, including the federally Endangered Appalachian elktoe (*Alasmidonta raveneliana*). Smallmouth bass, an important game fish, will also receive some reproduction protection with this moratorium.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

The remaining perennial streams within the project will need to adhere to a trout moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer from October 15 to April 15 for streams containing brook or brown trout or from January 1 to April 15 for streams in which the only trout species occurring is rainbow trout. Current data lead us to recommend the October 15 to April 15 trout moratorium for Big Crabtree Creek and the January 1 to April 15 trout moratorium for California Creek, Bald Creek, Little Crabtree Creek, Prices Creek, Brushy Creek, and Long Branch. Unnamed tributaries should use the moratorium appropriate for the named stream they flow to, unless survey data indicate otherwise.

To summarize, we recommend the following work moratoria for waters within the R-2518, R-2519A, and R-2519B projects:

April 1 to June 30 in-water work moratorium: Cane River and South Toe River

October 15 to April 15 trout moratorium: Big Crabtree Creek

January 1 to April 15 trout moratorium: California Creek, Bald Creek, Little Crabtree Creek, Prices Creek, Brushy Creek, and Long Branch

We hope this information clarifies the moratoria needed for the subject project segments. These recommendations are subject to change if new information is presented. If you have any questions, please contact me at (704) 984-1070.

cc: David Baker, USACE
Brian Wrenn, NCDWQ
Marella Buncick, USFWS
Christopher Militscher, USEPA

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

Coleen H. Sullins, Director
Division of Water Quality

Hemphill

R-2518A
401

October 11, 2007

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 Act with ADDITIONAL CONDITIONS Proposed Improvements of US 19/US 19E from future I-26 (existing US 19-23) to SR 1186 in Madison and Yancey Counties, State Project Nos. 6.869005T and 6.909001T, TIP Project Nos. R-2518A, R-2518B and R-2519A.
DWQ Project No. 20071134, Individual Certification No. 3706

Dear Dr. Thorpe:

Attached hereto is a copy of Certification No. 3706 issued to The North Carolina Department of Transportation dated October 11, 2007.

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

Sincerely,

John E. Hennessy

Coleen H. Sullins,
Director

Attachments

cc: David Baker, US Army Corps of Engineers, Asheville Field Office
Chris Militscher, Environmental Protection Agency
Kathy Matthews, Environmental Protection Agency
Marla Chambers, NC Wildlife Resources Commission
Marella Buncick, US Fish and Wildlife Service
Mike Parker, 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

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

Coleen H. Sullins, Director
Division of Water Quality

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 0.42 acres of jurisdictional wetlands and 7,059 linear feet of jurisdictional streams in Madison and Yancey Counties. The project shall be constructed pursuant to the application dated received June 26, 2007. The authorized impacts are as described below:

Table 1 - Stream Impacts for R-2518A in the French Broad River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
R-2518A						
1	0	0	13	10	23	0
1A	0	0	144	0	144	0
2	0	0	213	20	233	213
3	0	0	148	20	168	148
3A	0	0	0	36	36	0
4	0	0	85	10	95	85
5	0	0	171	10	181	171
6	0	0	148	20	168	148
7	0	0	1,168	20	1,188	1,168
7A	0	0	151	10	161	151
8	0	0	154	10	164	154
9	0	0	89	10	99	0
10	0	0	39	20	59	0
11	0	0	1,071	10	1,081	1,071
13	0	0	79	20	99	0
13A	194	0	0	0	0	0
14	0	0	171	10	181	171
15	0	0	476	20	496	476
16	0	0	95	10	105	0
17	0	0	305	20	325	305
18	0	0	637	20	657	637
19	0	0	128	20	148	0
20	0	0	111	20	131	0
21	0	0	325	62	387	325
22	0	0	148	20	168	0
23	0	0	98	20	118	0
24	0	0	230	20	250	230
Total	**194**	**0**	**6,397**	**468**	**7,059**	**5,453**

Total Stream Impact for R-2518A: 7,059 linear feet

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

Table 2 - Estimated Stream Impacts for R-2518B in the French Broad River Basin*

Site	Permanent Fill (linear ft)	Temporary Fill (linear ft)	Total Stream Impact (linear ft)
R-2518B			
1	43	10	53
2	102	20	122
3	49	10	59
4	56	49	105
5	76	20	96
6	79	30	109
7	496	20	516
8	118	13	131
9	204	16	220
10	69	10	79
11	36	0	36
12	76	10	86
13	95	16	111
14	135	36	171
14A	10	0	10
15	82	10	92
16	112	10	122
17	66	10	76
18	66	10	76
20	16	233	249
20A	36	10	46
21	33	0	33
22	154	10	164
23	36	56	92
24	16	10	26
25	135	20	155
26	39	10	49
27	302	56	358
28		82	82
2A	131	20	151
Total	**2,868**	**807**	**3,675**

Total Stream Impact for R-2518B: 3,675 linear feet*

*Estimates based on preliminary information at time of application. Impact numbers will be based on final hydraulic designs submitted with required modification.

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Table 3 - Estimated Stream Impacts for R-2519A in the French Broad River Basin*

Site	Permanent Fill (linear ft)	Temporary Fill (linear ft)	Total Stream Impact (linear ft)
R-2519A			
1	68	16	84
2	85	18	103
3	54	8	62
4	46	12	58
5	94	13	107
6	81	11	92
8	19	9	28
9	35	19	54
9A	25	0	25
10	714	47	761
11	32	10	42
12	132	20	152
13	82	15	97
14	129	153	282
15	82	64	146
16	41	10	51
18	69	40	109
21	66	35	101
22	251	19	270
23	132	9	141
24	535	0	535
25	186	34	220
26	583	11	594
27	143	11	154
28	175	58	233
29	294	14	308
30	200	7	207
31	50	24	74
32	217	10	227
33	325	26	351
34	208	20	228
35	73	20	93
36	24	12	36
37	59	10	69
Total	**5,309**	**785**	**6,092**

Total Stream Impact for R-2519A: 6,092 linear feet*

*Estimates based on preliminary information at time of application. Impact numbers will be based on final hydraulic designs submitted with required modification.

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Table 4 - Wetland Impacts for R-2518A in the French Broad River Basin

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Area under Bridge (ac)	Total Wetland Impact (ac)
R-2518A							
7A	0.01	0	0	0	0	0	**0.01**
9	0.17	0	0	0.02	0	0	**0.19**
12	0.16	0	0	0	0	0	**0.16**
19	0.06	0	0	0	0	0	**0.06**
Total	**0.40**	**0**	**0**	**0.02**	**0**	**0**	**0.42**

Total Wetland Impact for R-2518A: 0.42 acres.

Table 5 - Estimated Wetland Impacts for R-2518B in the French Broad River Basin*

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
R-2518B						
1A	0.07	0	0	0.04	0	**0.11**
2A	0.11	0	0.01	0	0	**0.12**
Total	**0.18**	**0**	**0.01**	**0.04**	**0**	**0.23**

Total Wetland Impact for R-2518B: 0.23 acres.*

Table 6 - Estimated Wetland Impacts for R-2519A in the French Broad River Basin*

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
R-2519A						
17	0.02	0	0	0.02	0	0
19	0.15	0	0	0.08	0	0
20	0.01	0	0	0.01	0	0
Total	**0.18**	**0**	**0**	**0.11**	**0**	**0.29**

Total Wetland Impact for R-2519A: 0.29 acres.*

*Estimates based on preliminary information at the time of application. Impact numbers will be based on final hydraulic designs submitted with required modification.

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

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This approval is only valid for the purpose and design that you submitted in your application dated received June 26, 2007. 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 US Army Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Condition(s)

1. This certification authorizes impacts to streams and wetlands for Section R-2518A from Station No. 8+00.000 –L- to Station No. 115+06.547 –L- only. When final design plans are completed for R-2518B and R-2519A, a modification to the 401 Water Quality Certification shall be submitted with five copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters. No construction activities that impact any wetlands, streams, or surface waters located in R-2518B and R-2519A 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 impacts to 5,453 linear feet of streams at a replacement ratio of 1:1 is required. Compensatory mitigation for impacts to jurisdictional streams shall be provided by a combination of onsite stream restoration, enhancement, and preservation. The mitigation sites shall be constructed in accordance with the mitigation plans provided in the June 26, 2007 application. The mitigation shall be provided as detailed in the table below:

Table 7 - Mitigation Credits for R-2518A.

Mitigation Method	Stream Length (lf)	Ratio	Credits
Restoration	4,078*	1:1	4,078*
Enhancement	640	2:1	320
Preservation	15,335	4:1	3,834
Total	**20,053**		**8,232**

*Prior to providing restoration credit for Site D (262 lf of restoration), NCDOT shall provide design plans showing the site is within NCDOT right-of-way or under a conservation easement.

Additional mitigation credits may be available on R-2518B and R-2519A. Final mitigation plans with design lengths shall be submitted with the modification application for R-2518A and R-2519A.

3. The onsite stream mitigation shall be constructed in accordance with the design submitted in your June 26, 2007 application. Please be reminded that as-builts for the completed streams

shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 5,453 linear feet of impacts. All channel relocations shall be constructed in a dry work area, shall be completed and stabilized, and must be approved on site by DWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have buffers in accordance with the Biological Assessment prepared for this project. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

4. The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," dated April 2003 with the following exceptions:

    1. Pebble counts shall not be conducted.

    2. Two cross sections shall be conducted for streams less than 500 linear and five (5) cross sections shall be conducted for streams greater than 500 linear feet.

    3. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

    The permittee shall monitor the preservation sites by visual inspection. Photos will be taken and comments noted on plant survival. The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWQ in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWQ to schedule a site visit to "close out" the mitigation site.

5. NC DOT shall adhere to all appropriate in-water work moratoriums (including the use of pile driving) prescribed by the US Fish and Wildlife Service and the NC Wildlife Resources Commission. No in-water work is permitted on Bald Creek between January 1 and April 15 of any year, without prior approval from the NC Division of Water Quality and the NC Wildlife Resources Commission.

6. For projects impacting waters classified by the NC Environmental Management Commission as High Quality Waters (HQW), or Water Supply I or II (WSI, WSII) stormwater shall be directed to vegetated buffer areas, grass-lined ditches or other means appropriate to the site for the purpose of pre-treating storm water runoff prior to discharging directly into streams. Mowing of existing vegetated buffers is strongly discouraged.

7. For all construction activities occurring in high quality water (HQW) watersheds, NC DOT shall use *Design Standards in Sensitive Watersheds* [15A NCAC 4B .0124(a)-(e)]. However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

8. 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 re-vegetated with appropriate native species.

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9. Bridge deck drains shall not discharge directly into streams. Stormwater should 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*. Stormwater shall be managed in accordance with your State Stormwater Permit issued by DWQ.

10. 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.

11. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage.

General Condition(s)

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

13. 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.

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

15. 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.

16. 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.

17. 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.

18. Heavy equipment may be operated within the stream channels however, its usage shall be minimized.

19. 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.

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

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

22. 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.

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

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

25. 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.

26. Upon completion of the project, 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.

27. Native riparian vegetation (ex., river birch, green ash, water tupelo, blackgum, redbay, sycamore, swamp chestnut oak, tag alder, common pawpaw, ironwood, sweet pepperbush, titi, Virginai willow, doghobble) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

28. 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 be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

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29. 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.

30. 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.*
    a. 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.
    b. 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.*
    c. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

31. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored upon completion of the project.

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 11th day of October 2007

DIVISION OF WATER QUALITY

John E. Hennessy

Coleen H. Sullins
Director

WQC No. 3706

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

Coleen Sullins, Director
Division of Water Quality

R-2518B
401

March 17, 2008

Hemphill

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PDEA-OFFICE OF NATURAL ENVIRONMENT

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

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for Proposed improvements to US 19/US 19E from future I-26 (existing US 19-23) to SR 1186 in Yancey County, State Project Nos. 6.869005T and 6.909001T, TIP Project Nos. R-2518A, R-2518B and R-2519A. DWQ Project No. 20071134v.2, Individual Certification No. 3706

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3706 issued to The North Carolina Department of Transportation dated October 11, 2007.

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

Sincerely,

Coleen Sullins
Director

Attachments

cc: David Baker, US Army Corps of Engineers, Asheville Field Office
Roger Bryan, Division 13 Environmental Officer
Kathy Matthews, Environmental Protection Agency
Marla Chambers, NC Wildlife Resources Commission
Mike Parker, DWQ Asheville Regional Office
File Copy

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

Coleen Sullins, Director
Division of Water Quality

Modification to the 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 authorized the NCDOT to permanently impact 0.23 acres of jurisdictional wetlands and 2,737 linear feet of jurisdictional streams in Yancey County. The project shall be constructed pursuant to the modification dated received January 25, 2008 and the revised information dated received March 6, 2008. The authorized impacts are as described below:

Table 1 - Stream Impacts in the French Broad River Basin for R-2518B

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1			43	10	53	
2			102	20	122	
2A	131	20	0	0	151	
3			49	10	59	
4			56	49	105	
5			76	20	96	
6			79	30	109	
7			496	20	516	496
8			118	13	131	118
9			204	16	220	204
10			69	10	79	
11			36	0	36	
12			76	10	86	
13			95	16	111	
14			135	36	171	
14A			10	0	10	10
15			82	10	92	
16			112	10	122	
17			66	10	76	
18			66	10	76	
20			16	233	249	16
20A			36	10	46	36
21			33	0	33	
22			154	10	164	154
23			36	56	92	
24			16	10	26	
25			135	20	155	
26			39	10	49	
27			302	56	358	302
28			0	118	118	
Total	**131**	**20**	**2,737**	**823**	**3,711**	**1,336**

Total Stream Impact for R-2518B: 3,711 linear feet

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Table 2 - Wetland Impacts in the French Broad River Basin for R-2518B

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Area under Bridge (ac)	Total Wetland Impact (ac)
1A	0.07	0	0	0.04	0	0	0.11
22A	0.11	0	0.01	0	0	0	0.12
Total	**0.18**	**0**	**0.01**	**0.04**	**0**	**0**	**0.23**

Total Wetland Impact for R-2518B: 0.23 acres.

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

This approval is only valid for the purpose and design that you submitted in your modified application dated received January 25, 2008 and the revised information dated received March 6, 2008. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 11, 2007 still apply except where superceded by this certification. 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.

Condition(s) of Certification:

Project Specific Conditions:

1. This modification is applicable only to the additional proposed activities for R-2518B. All the authorized activities and conditions of the certification associated with the original Water Quality Certification dated October 11, 2007 still apply except where superceded by this certification.

2. Removal of the 4-barrel box culvert from Bald Creek at Site 20 shall not be conducted in flowing water. The box culvert removal process shall be sequenced to temporarily route Bald Creek through a diversion channel or other best management practice described in NCDOT's *Construction and Maintenance Activities* manual to prevent excavation and culvert removal in flowing water.

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3. The proposed extensions of the structures at Sites 3 and 12 shall be backfilled with natural bed material to reduce the risk of developing headcuts.

4. Compensatory mitigation for impacts to 1,336 linear feet of streams at a replacement ratio of 1:1 is required. Compensatory mitigation for impacts to jurisdictional streams shall be provided by a combination of onsite stream restoration and enhancement. The mitigation sites shall be constructed in accordance with the mitigation plans provided in the June 26, 2007 application and revised information letter dated October 1, 2007. The mitigation shall be provided as detailed in the table below:

Table 3 - Mitigation Credits for R-2518B

Mitigation Method	Stream Length (lf)	Ratio	Credits
Restoration	1,037	1:1	1,037
Enhancement	5,016	2:1	2,508
Total	**6,053**		**3,545**

5. The onsite stream mitigation shall be constructed in accordance with the designs submitted in your June 26, 2007 application, in the revised information letter dated October 1, 2007, and in the January 25, 2008 modification request. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 3,545 linear feet of impacts. All channel relocations shall be constructed in a dry work area, shall be completed and stabilized, and must be approved on site by DWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have buffers in accordance with the Biological Assessment prepared for this project. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

6. The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," dated April 2003 with the following exceptions:

    a. Pebble counts shall not be conducted.

    b. Two cross sections shall be conducted for streams less than 500 linear and five (5) cross sections shall be conducted for streams greater than 500 linear feet.

    c. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

    The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWQ in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWQ to schedule a site visit to "close out" the mitigation site.

7. NC DOT shall adhere to all appropriate in-water work moratoriums (including the use of pile driving) prescribed by the US Fish and Wildlife Service and the NC Wildlife Resources Commission as described in the table below unless prior approval from the NC Division of Water Quality, the US Fish and Wildlife Service, and the NC Wildlife Resources Commission is provided.

Table 4 – In-water Work Moratoriums

Stream	Moratorium Dates
Cane River and tributaries	April 1 to June 30
Bald Creek and tributaries	January 1 to April 15
Price Creek and tributaries	January 1 to April 15

8. 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 re-vegetated with appropriate native species.

9. Bridge deck drains shall not discharge directly into streams. Stormwater should 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*. Stormwater shall be managed in accordance with your State Stormwater Permit issued by DWQ.

10. 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.

11. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage.

General Conditions:

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

13. If concrete is used during construction, a dry work area should be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete should 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 should not be modified. Disturbed floodplains and streams should 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. 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.

18. 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.

19. 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.

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

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

22. 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.

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

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

25. 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.

26. Upon completion of the project, 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.

27. Native riparian vegetation (ex., river birch, green ash, water tupelo, blackgum, redbay, sycamore, swamp chestnut oak, tag alder, common pawpaw, ironwood, sweet pepperbush, titi, Virginai willow, doghobble) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

28. 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 be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

29. 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.

30. 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.*
    a. 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.
    b. 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.*
    c. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

31. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored upon completion of the project.

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.

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

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 17th day of March 2008

DIVISION OF WATER QUALITY

Coleen Sullins
Director

WQC No. 3706

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

Coleen H. Sullins, Director
Division of Water Quality

DWQ Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401/Wetlands Unit, North Carolina Division of Water Quality, 1621 Mail Service Center, Raleigh, NC, 27699-1621. This form may be returned to DWQ by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

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

Signature: _____ Date: _____

Agent's Certification

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

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

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

Signature _____ Registration No. _____

Date _____

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

STREAM MITIGATION GUIDELINES
APRIL 2003

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1. INTRODUCTION

This guidance has been prepared by a workgroup consisting of representatives from U.S. Army Corps of Engineers, Wilmington District (District), North Carolina Division of Water Quality (DWQ), U.S. Environmental Protection Agency, Region IV (EPA), Natural Resources Conservation Service (NRCS) and the North Carolina Wildlife Resources Commission (WRC). This document is intended to provide the regulated community of North Carolina with joint and consistent, District and DWQ stream mitigation guidance.

Historically, compensatory mitigation for impacts to all aquatic systems was in the form of wetland mitigation. However, wetland mitigation does not provide appropriate replacement of aquatic functions lost due to impacts to fluvial systems. Because of this, the District and DWQ now generally require that compensatory mitigation for impacts to stream resources should be in the form of restoration and/or enhancement of degraded stream channels utilizing natural channel design and bio-engineering techniques. Channel preservation of unique or otherwise ecologically important stream segments may also play an important role in mitigating stream impacts.

Mitigation decisions are made during the permit review process. Mitigation requirements are generally determined through site evaluations that document aquatic resource losses. These site evaluations take into account the resources being impacted and the potential for compensating the public for their loss. This document provides general guidance to be applied when evaluating permit applications and proposed mitigation.

Topics addressed in this document include requirements for stream mitigation, definitions of stream mitigation terms and activities, crediting for mitigation activities and monitoring requirements. This guidance will generally apply to **non-tidal** waters. These guidelines should not be construed as affecting the applicability of the CWA 404 (b)(1) Guidelines, found at 40 CFR Part 230, the Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines, or the review process outlined in DWQ's rules (15A NCAC 2H.0506). These guidelines require consideration and the selection of practicable alternatives to proposed project impacts that would avoid or minimize impacts to waters of the United States (including streams) prior to considering compensatory mitigation.

Primary Guidance Objectives:

a. Restore and enhance aquatic habitat.
b. Maintain and improve water quality functions.
c. Promote natural channel design and bio-engineering.

d. Maintain and restore public use of stream resources.

This document is intended to be fair and flexible and is subject to periodic revision and update as new procedures and stream mitigation monitoring data support changes. Comments and suggestions are welcomed at any time, especially during the initial 12-month period of this document's use from the publication date. Comments should be addressed to Mr. Scott McLendon (scott.c.mclendon @usace.army.mil), Ms. Becky Fox (fox.rebecca@epa.gov), or Mr. Todd St. John (todd.st.john@ncmail.net).

2. REGULATORY AUTHORITIES & GUIDELINES

A. **Section 10 of the River and Harbor Act of 1899**: In accordance with Section 10 of the River and Harbor Act, the Corps of Engineers is responsible for regulating all work in navigable waters of the United States.

B. **Section 404 of the Clean Water Act**: In accordance with Section 404 of the Clean Water Act as amended in 1977, the Corps of Engineers is responsible for regulating the discharge of dredged or fill material in waters of the United States, including wetlands. **The purpose of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the nation's waters**. Under both of the above programs, the Corps of Engineers is responsible for receiving and evaluating permit applications affecting waters of the United States. Frequently, the required public interest review of applications results in a finding that the public must be compensated for unavoidable aquatic resource losses, including stream resources.

C. **Section 404(b)(1) Guidelines of the Clean Water Act:** Section 230.10 (d) of the Section 404 (b)(1) Guidelines states that "... no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem."

D. **EPA/Army Mitigation Memorandum of Agreement (MOA), February 6, 1990**: The MOA interprets Section 230.10 (d) of the Guidelines to require the use of mitigation in order to be in compliance with this section of the Guidelines. As clarified in the MOA, compliance with the Section 404 (b)(1) Guidelines requires application of a sequence of mitigation -- avoidance, minimization and compensation. In other words, mitigation consists of the set of modifications necessary to avoid adverse impacts altogether, minimize the adverse impacts that are unavoidable and compensate for the unavoidable adverse impacts. Compensatory mitigation is required for unavoidable adverse impacts, which remain after all appropriate and practicable avoidance and minimization has been achieved. The Guidelines identify a number of "Special Aquatic Sites," including riffle pool complexes, which require a higher level of regulatory review and protection. This stream guidance document addresses only compensatory mitigation and should only be used after adequate

avoidance and minimization of impacts associated with the proposed project has occurred

E. **401 Water Quality Certification Program:** Section 401 of the Clean Water Act provides that no Federal permit, including 404 permits, will be issued unless a 401 Water Quality Certification has been issued or waived. In North Carolina, DWQ administers the 401 program. The "401" is essentially a verification by DWQ that a given project will not degrade waters of the State or otherwise violate water quality standards (15A NCAC 2B .0200).

F. **The Fish and Wildlife Coordination Act of 1956:** The FWCA expresses the will of Congress to protect the quality of the aquatic environment as it affects the conservation, improvement and enjoyment of fish and wildlife resources. The Act requires the Corps of Engineers to coordinate its regulatory programs with the U.S. Fish And Wildlife Service and the Nation Marine Fisheries Service.

G. **Endangered Species Act:** The Endangered Species Act declares the intention of Congress to conserve threatened and endangered species and ecosystems in which those species depend. The Act requires consultation with the U.S. Fish and Wildlife Service to insure the regulated activities are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of designated critical habitats. The Act also requires the Federal agencies to utilize their authorities in furtherance of the Act by carrying out programs for the conservation of endangered and threatened species.

3. TYPES OF PERMITS THAT MAY REQUIRE STREAM MITIGATION

A. **Individual Permits:** Individual permits are typically required where the level of project activities exceeds work thresholds authorized by General Permits. Individual permits require the submission of a permit application by the applicant followed by the Corps placement of the project on public notice for agency and public review.

B. **Nationwide Permits:** Nationwide Permits (NWPs) are issued by the Chief of Engineers (Headquarters) through publication in the *Federal Register* and are applicable throughout the nation. NWPs authorize a number of commonly occurring nationwide activities that typically have minimal impact on the aquatic environment. Where a proposed activity is expected to exceed minimal impact on the aquatic environment, mitigation may be required to reduce aquatic resource impacts to an acceptable, minimal level. Certain conditions attached to specific NWPs require pre-construction notification prior to starting work. The Corps generally responds to such notices within 45 days.

C. **Regional General Permits:** Regional General Permits (GPs) are developed and issued by the District or the South Atlantic Division on a regional basis. GPs typically authorize commonly occurring activities that are specific to the District/Region and that do not have NWP coverage. Certain GPs require notification prior to starting work. As

with NWPs, GP activities typically cause minimal impact on the aquatic environment. Where authorized work exceeds the minimal impact threshold, mitigation may be necessary to lessen effects on aquatic resources.

D. **Letters of Permission:** Letters of Permission (LOPs) are a type of permit issued through an abbreviated processing procedure. LOPs include coordination with federal and state fish and wildlife agencies as required by the FWCA and a public interest evaluation. They do not require the publishing of an individual public notice. LOPs apply only to Section 10 authorization in North Carolina.

E. **401 Water Quality Certification:** When the District determines that a 404 Permit is required, a 401Water Quality Certification is also required. The District determines which type of permit is applicable for the project: an Individual Permit, Nationwide, or Regional General Permit. An Individual 401 Water Quality Certification is necessary if an Individual 404 Permit is required. For each Nationwide or Regional General Permit, DWQ must either issue a matching General Certification, or it must issue or waive an individual 401 Certification in order for the permit to be utilized. Once the District has determined which type of GP is needed, the matching General Certification can be reviewed on the DWQ Wetlands Unit web page http://h2o.ehnr.state.nc.us/ncwetlands/certs.html . If written concurrence is required, then a formal application and payment of the appropriate fee is needed for the 401 Water Quality Certification.

4. TERMINOLOGY

- **Compensatory Stream Mitigation** - The restoration, enhancement, or, for streams of national or state significance because of the resources they support, preservation of streams and their associated floodplains for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. Compensatory stream mitigation may be required for impacts to perennial and intermittent streams and should be designed to restore, enhance, and maintain stream uses that are adversely impacted by authorized activities.

- **Perennial Stream** - A perennial stream has flowing water year-round during a typical year. The water table is located above the streambed for most of the year. Groundwater is the primary source of water for stream flow.. Runoff from precipitation is a supplemental source of water for stream flow. (65 FR 12898).. Perennial streams support a diverse aquatic community of organisms year round and are typically the streams that support major fisheries.

- **Intermittent Stream** – An intermittent stream has flowing water during certain times of the year, when ground water provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from precipitation is a supplemental source of water for stream flow. (65 FR 12898). The biological community of intermittent streams is composed of species that are aquatic during a

part of their life history or move to perennial water sources. For the purpose of mitigation, intermittent streams will be treated as 1st order streams.

- **Ephemeral Stream** – An ephemeral stream has flowing water only during and for a short duration after precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from precipitation is the primary source of water for stream flow. (65 FR 12897). Ephemeral streams typically support few aquatic organisms. When aquatic organisms are found they typically have a very short aquatic life stage.

- **Stable Stream** – A stream which, over time (in the present climate), transports the sediments and flows produced by its watershed in such a manner that the dimension, pattern and profile are maintained without either aggrading or degrading (Rosgen, 1996).

- **Channelized Stream** – Stream that has been degraded (straightened) by human activities. A channelized stream will generally have increased depth, increased width, and a steeper profile, be disconnected from its floodplain and have a decreased pattern or sinuosity.

- **Ditches Acting as Streams** – Ditches that intercept enough groundwater to have either intermittent or perennial flow. These channels have enough flow to support aquatic life and would be considered waters of US.

- **Natural Channel Design** – A geomorphologic approach to stream restoration based on an understanding of the valley type, general watershed conditions dimension, pattern, profile, hydrology and sediment transport of natural, stable channels (reference condition) and applying this understanding to the reconstruction of an unstable channel.

- **Stream Classification** – Ordering or arranging fluvial systems into groups or sets based on their similarities or relationships. A morphological classification system categorizes a stream based on its physical and geomorphic characteristics. Rosgen (1994) proposed a geomorphic classification system that is widely used in stream restoration and mitigation. Classification allows for predicting the behavior of these systems, extrapolating knowledge of one system to another, and provides a consistent and reproducible frame of reference for communication among those interested in these systems. Alternatively, for North Carolina streams, DWQ has a classification system that is based on water quality standards. This system is a regulatory convention for establishing water quality standards based on a stream's "best use". (Use-support ratings are a method to analyze water quality information and to determine whether the quality is sufficient to support the uses for which the waterbody has been classified by DWQ. The word "use" refers to such activities as swimming, fishing and water supply. All surface waters in the state have been assigned this type of classification.)

- **Stream Order** - A method for classifying, or ordering, the hierarchy of natural channels within a catchment. One of the most popular methods for assigning stream orders was proposed by Strahler (1957). The uppermost channels in a catchment with no upstream tributaries are first order downstream to their first confluence. A second order stream is formed below the confluence of two first order streams. A third order stream is formed by the confluence of 2 second-order streams and so on. The confluence of a channel with another channel of lower order does not raise the order of the stream below the confluence.

- **Reference Reach/Condition** – A stable stream reach or, in some instances, condition, generally located in the same physiographic region (see Appendix III), climatic region, and valley type as the project and serves as the blueprint for the dimension, pattern, and profile of the channel to be restored.

- **Bankfull stage** – The point at which water begins to overflow onto its floodplain. This may or may not be at the top of the stream bank on entrenched streams. Typically, the bankfull discharge recurrence interval is between one and two years. It is this discharge that is most effective at moving sediment, forming and removing bars, shaping meanders and generally doing work that results in the morphological characteristics of channels. (Dunne and Leopold, 1978)

- **Channel Dimension** – The two-dimensional, cross sectional profile of a channel taken at selected points on a reach, usually taken at riffle locations. Variables that are commonly measured include width, depth, cross-sectional area, floodprone area and entrenchment ratio. These variables are usually measured relative to the bankfull stage.

- **Channel Pattern** – The sinuosity or meander geometry of a stream. Variables commonly measured include sinuosity, meander wavelength, belt width, meander width ratio and radius of curvature.

- **Channel Profile** –The longitudinal slope of a channel. Variables commonly measured include water surface slope, pool-to-pool spacing, pool slope and riffle slope.

- **Flood-Prone Area** – Floodplain width measured at an elevation corresponding to twice the maximum bankfull depth. This area often correlates to an approximate 50-year flood or less (Rosgen, 1994)

- **Stream Restoration** - The process of converting an unstable, altered, or degraded stream corridor, including adjacent riparian zone (buffers) and flood-prone areas, to its natural stable condition considering recent and future watershed conditions. This process should be based on a reference condition/reach for the valley type and includes restoring the appropriate geomorphic dimension (cross-section), pattern (sinuosity), and profile (channel slopes), as well as reestablishing the biological and

chemical integrity, including transport of the water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium[1].

- **Stream Enhancement** - Stream rehabilitation activities undertaken to improve water quality or ecological function of a fluvial system. Enhancement activities generally will include some activities that would be required for restoration. These activities may include in-stream or stream-bank activities, but in total fall short of restoring one or more of the geomorphic variables: dimension, pattern and profile. Any proposed stream enhancement activity must demonstrate long-term stability.

- **Enhancement Level I** – Mitigation category that generally includes improvements to the stream channel and riparian zone that restore dimension and profile. This category may also include other appropriate practices that provide improved channel stability, water quality and stream ecology. Work will be based on reference reach information.

- **Enhancement Level II** – Mitigation category for activities that augment channel stability, water quality and stream ecology in accordance with a reference condition but fall short of restoring both dimension and profile. Examples of enhancement level II activities may include stabilization of streambanks through sloping to restore the appropriate dimension and vegetating a riparian zone that is protected from livestock by fencing, construction of structures for the primary purpose of stream bank stabilization and, when appropriate, reattaching a channel to an adjacent floodplain.

- **Streambank Stabilization** – The in-place stabilization of an eroding streambank. Stabilization techniques, which include primarily natural materials, like root wads and log crib structures, as well as sloping stream banks and revegetating the riparian zone may be considered for mitigation. When streambank stabilization is proposed for mitigation, the completed condition should be based on a reference condition. Stream stabilization techniques that consist primarily of "hard" engineering, such as concrete lined channels, rip rap, or gabions, while providing bank stabilization, will not be considered for mitigation. An exception to this may be considered for short reaches when mitigating for urban stream impacts.

- **Stream Relocation** – Movement of a stream to a new location to allow an authorized project to be constructed in the stream's former location. In general, relocated streams must reflect the dimension, pattern and profile indicated by a natural reference reach/condition in order to be adequate compensation for the authorized stream impact. Relocated streams will generally require wooded protected buffers of sufficient width (see buffer section). Relocations resulting in a reduced channel length will generally require mitigation.

[1]This definition of stream restoration describes a category of mitigation for use with this guidance, rather than a generic definition of stream restoration.
slope according to a reference reach and, when appropriate, reattaching to an adjacent floodplain.

- **Stream Preservation** – Protection of ecologically important streams, generally, in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include the protection of upland buffer areas adjacent to streams as necessary to ensure protection or enhancement of the overall stream. Preservation must protect both sides of the channel. Generally, stream preservation should be in combination with restoration or enhancement activities. Under exceptional circumstances, preservation may stand-alone where high value waters will be protected or ecologically important waters may be subject to development pressure (Refer to Section 6 regarding preservation criteria). Stand-alone preservation may generally be most acceptable in mitigating impacts associated with nationwide and regional general permits. Preservation may be utilized for relatively undisturbed areas that require little or no enhancement activities other than protective measures. Although minimal streambank revegetation may be required in some cases, if mitigation requires extensive streambank revegetation, the mitigation will be considered to be Enhancement Level II.

- **Vegetated Buffer** – An upland or wetland area vegetated with native trees and shrubs next to rivers, streams, lakes, or other open waters that separate aquatic habitats from developed areas, including agricultural land.

- **Stream Riparian Zone** – A riparian zone is the area of vegetated land along each side of a stream or river that includes, but is not limited to, the floodplain. The quality of this terrestrial or wetland habitat varies depending on width and vegetation growing there. As with vegetated buffers, functions of the riparian zone include reducing floodwater velocity, filtering pollutants such as sediment, providing wildlife cover and food, and shading the stream. The ability of the riparian zones to filter pollutants that move to the stream from higher elevations results in this area being referred to as a buffer zone. The riparian zone should be measured landward from the bankfull elevation on each side of a stream or river.

- **Biological Integrity** – A measure of the state of health in aquatic communities. A healthy aquatic community is a balanced community of organisms having a species composition, diversity and functional organization comparable to that found in natural (unimpaired) habitats in the region (Karr, et al. 1986).

- **Best Management Practices (BMPs)** – Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development and other land disturbing activities. BMPs are categorized as structural or non-structural. (See Section 10 for further BMP discussion.)

- **Conservation Easement** – A legally binding, recorded instrument approved by the District and DWQ offices of counsel to protect and preserve mitigation sites.

- **303 (d) Listed Waters** – Section 303(d)(1) of the Clean Water Act, requires states/tribes to provide a list of impaired waters to EPA every two years. Waterbodies are designated as impaired by a state or tribe when existing pollution controls are not stringent enough to attain and maintain the water quality standards the state/tribe has set for them.

- **Mountain Counties** – Counties in which the WRC has Designated Public Mountain Trout Waters and consists of the following: Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Stokes, Surry, Swain, Transylvania, Watauga, Wilkes and Yancey.

5. MITIGATION REQUIREMENTS

Final compensatory mitigation requirements of Department of the Army permits will be commensurate with the type and amount of impact associated with the permitted activity. Proposed compensatory mitigation will be coordinated with the appropriate review agencies and final mitigation requirements will be determined on a project-by-project basis. DWQ may also require stream mitigation for its 401 Certification. For the purposes of defining compensatory stream mitigation options, this guidance establishes four levels or types of mitigation (Restoration, Enhancement Level I, Enhancement Level II and Preservation) that may be used to compensate for unavoidable impacts to intermittent and perennial streams. These mitigation categories are defined in the Terminology Section (Section 4) and do not directly relate to the Rosgen Priority Levels of Stream Restoration.

A. General mitigation requirements associated with direct impacts to stream channels including culvert/pipe installations. This section provides the basic compensatory mitigation requirements (ratios) based solely on the quality of the stream being impacted and are intended to ensure that impacts to higher quality streams are adequately compensated. Stream quality determinations will be made on a case-by-case basis and site-specific conditions may warrant the adjustment of these ratios up or down.

Table 1. Basic Compensatory Mitigation Requirements Associated with Impacts to Poor to Fair, Good, and Excellent Quality Streams.

Existing Channel Quality/Conditions* (Aquatic habitat/water quality)	Proposed Unavoidable Stream impacts** (Linear feet)	Compensatory Mitigation Ratio	Basic Compensatory Mitigation Requirement
Poor to Fair	100	1:1	100 lf
Good	100	2:1	200 lf
Excellent	100	3:1	300 lf

***Refer to section "C" for a discussion of stream quality determinations**

****100 linear feet of proposed channel impacts in column 2 was selected for demonstration purposes only.**

B. Mitigation requirements based on mitigation type.

Table 2 provides guidance on the amount of Restoration, Enhancement I, Enhancement II, and Preservation that would satisfy a requirement of 100 lf of mitigation based on the basic compensation ratios provided in Table 1. Ranges have been established within the Enhancement and Preservation categories to allow flexibility during the evaluation of plans to account for the wide range of potential enhancement, and preservation opportunities that may be available at a particular mitigation site. In addition, for a given impact, compensatory mitigation requirements will generally increase from restoration to preservation to account for the decrease in functional improvements in aquatic habitat and water quality that is expected to occur with enhancement and preservation level projects compared to restoration.

Note: Factors influencing the adjustment of preservation ratios may include the presence of Federally threatened or endangered species, presence of critical habitat, other Federal or state species of concern, outstanding resource waters and other high quality waters, high quality aquatic habitat potentially subject to development impacts, streams with high quality adjacent wetlands and water supply streams. (See Section 6 for preservation site selection criteria and criteria that may enhance stream preservation crediting.)

Table 2. General Mitigation Requirements Based on Restoration, Enhancement I, Enhancement II, and Preservation.

Mitigation Type	Mitigation Activity Multiplier*	Linear Feet of Mitigation Required (from Table 1)	Linear Feet of Mitigation Work Required (by type)
Restoration	1.0	100	100 lf
Enhancement I	1.0 to 1.5	100	100 lf to 150 lf
Enhancement II	1.5 to 2.5	100	150 lf to 250 lf
Preservation	2.5 to 5.0	100	250 lf to 500 lf

***The Mitigation Activity Multiplier is applied to each mitigation type to recognize, that for a given reach, the functional improvement associated with mitigation projects increase along the continuum from preservation to enhancement to restoration.**

Impacts due to impounding stream channels will generally require stream mitigation by the US Army Corps of Engineers. Mitigation requirements will be determined on a case-by-case basis for these impacts.

Table 3 provides a summary of the range of compensatory mitigation requirements based on the quality of the stream being impacted and the type of mitigation (Restoration, Enhancement I, Enhancement II, Preservation) that is proposed to compensate for the authorized impacts.

Table 3. Mitigation Requirements for 100 lf of Impact to Poor to Fair, Good, and Excellent Quality Streams.

Stream Quality	Restoration	Enhancement I	Enhancement II	Preservation
Poor to Fair	100 lf	100 to 150 lf	150 to 250 lf	250 to 500 lf
Good	200 lf	200 to 300 lf	300 to 500 lf	500 to 1000 lf
Excellent	300 lf	300 to 450 lf	450 to 750 lf	750 to 1500 lf

Combinations of mitigation types in one project are acceptable provided these ratios are generally followed. In all cases, the goal of a mitigation project should be to provide for the

replacement of those aquatic functions being lost or adversely impacted by the authorized activity.

Channel relocations, where a stable channel is re-established on the project site and is designed and implemented according to natural stream channel design criteria, will generally result in a 1:1 restoration ratio provided the channel satisfies all success criteria.

B. Stream Quality Determinations

1. Channel Quality/Conditions for large streams and rivers (wet width of 4 meters or more).

Bioclassification criteria and rating protocols have been successfully developed for three major ecoregion types over the past several decades by DWQ. These criteria are based on the community composition of benthic macroinvertebrates and include taxa richness (primarily EPT, or Ephemeroptera, Plecoptera, and Trichoptera) and biotic index values. Habitat quality and fish community conditions are also metrics that are commonly used to assess channel quality for large streams and rivers in NC. These criteria are discussed in the Standard Operating Procedures manual for the Biological Assessment Unit of the Environmental Sciences Branch and can be downloaded from the following website (http://www.esb.enr.state.nc.us/BAU.html). These criteria are used to define 5 stream quality conditions as Excellent, Good, Good-Fair, Fair, and Poor.

DWQ and the Corps believe that these rankings can be used to determine stream quality conditions with respect to both impact and mitigation sites. However, the time intensive methodology required for these rankings will probably be prohibitive in most cases. DWQ and the Corps are committed to developing a simple yet still accurate rapid stream assessment methodology for stream quality conditions.

2. Channel Quality/Conditions for small streams (<3 meter wet width).

A. Small Perennial Streams: Research to determine water quality conditions within small streams has been conducted by DWQ and reported in a series of memos by the Biological Assessment Unit. This research has noted that number of benthic macroinvertebrate taxa decrease as streams become smaller, and this decrease in taxa richness is predictable in reference systems. Decreases in taxa richness in reference catchments is directly related to the loss of habitat diversity as streams become smaller. Biotic index values showed little relationship to stream size and therefore may be a very useful metric to determine water quality conditions in small stream systems. These data also suggest that benthic macroinvertebrate communities can be used to determine impacts from reference reaches. In addition to these data, stream functional assessment forms have been developed with the assistance of a technical advisory committee. However, these forms have not yet been field tested to determine their reliability and accuracy. DWQ and the Corps believe that these forms (or derivatives of them) will be able to be used to assess channel quality conditions

for small perennial streams. These assessment forms incorporate stream morphology, riffle material, streambank stability, and biological components.

B. Intermittent Streams: Research is currently being conducted by DWQ with assistance of an EPA Wetland Program Development Grant to define the ecological functions of intermittent streams. Work is focusing on intermittent streams in the piedmont and mountains of North Carolina. As part of this work, benthic macroinvertebrate communities are being collected and analyzed. It is anticipated that these data will help define channel quality conditions of intermittent streams.

Until an acceptable methodology is available, DWQ and the Corps will evaluate and determine stream quality on a case-by-case basis with applicants based on the best information that is available at the time of the evaluation.

6. SELECTION OF MITIGATION SITES

Stream mitigation should generally be performed on a stream system with the same habitat as the impacted stream, i.e. cold, cool, and warm water habitat. The following criteria should be used to provide general guidance for selecting streams and justifying selections to the District and DWQ. All three criteria apply to any stream being proposed for impact and do not refer to the quality of the stream. Higher mitigation ratios may be required if the mitigation project is in a different 8-digit HUC than the impact site.

Selection Criteria 1. Mitigation should be accomplished within one stream order of the impacted stream, within the same subbasin (8 digit H.U.C) and as close to the impacted stream as possible. For the purpose of mitigation, intermittent streams will be treated like 1st order streams.

Selection Criteria 2. Stream mitigation should be performed on streams with similar habitat designations (cold, cool and warm water as defined in WRC habitat guidance, see Appendix I). Mitigation will be conducted in trout waters if any trout species are found in project stream reaches.

Selection Criteria 3. Mitigation should be performed within the same Physiographic Region (Appendix III) and priority should be given to mitigation sites that have the potential to improve habitat for state or Federally threatened and endangered (T&E) species.

To qualify for stream mitigation, the project plan shall be designed to achieve the maximum level of improvement and should result in the restoration of the channel to its most probable natural state, given the individual constraints of the project location. This acknowledges that the maximum level of improvement may be constrained by water withdrawals, altered precipitation-runoff relationships, adjacent land use and other factors. It is not necessarily the goal of stream mitigation to return stream segments to some pre-impact condition. While site-specific constraints may reduce the potential of mitigation sites (and correspondingly increase the mitigation ratios), mitigation goals

should be to establish the maximum biological, chemical and physical integrity possible in the current environment. However, under no circumstances should stream restoration and enhancement projects be "over" designed in order to generate stream mitigation credit.

For preservation to be an acceptable mitigation option the channel should generally be ecologically important and in a relatively undisturbed condition. The following list of criteria may be used as a guide for selecting high value preservation sites.

Recommended priority areas for channel preservation: *

- **Streams in a watershed that are adjacent to, or within a unique wetland as identified by NC Administrative Code 15A 2B .0100.**
- **Streams in a watershed that contains Critical Habitat Areas identified by the Coastal Habitat Protection Program of the Division of Marine Fisheries.**
- **Streams in a watershed that contains a significant Natural Heritage Area as identified by the Natural Heritage Program of the Division of Parks and Recreation, provided the Natural Heritage Area contributes to the overall quality of the stream.**
- **Streams in a watershed that is known to provide habitat for state or federally listed endangered or threatened species.**
- **Streams in a watershed that contains fishery nursery areas, High Quality Waters, Outstanding Resource Waters, Trout Waters, or Water Supply Watersheds.**
- **Streams in a watershed that meets the criteria for Exceptional Significance rating under the Division of Coastal Management's NC CREWS (NC Coastal Region Evaluation of Wetland Significance).**
- **Streams in a watershed that contains unique and/or high quality habitat (stream and/or wetland) that is adjacent or within an area experiencing a rapid increase in population or development trend.**
- **Streams in a watershed that contain stream reaches designated as critical habitat by the US F&WS.**

* The above are not listed in order of selection priority.

7. MITIGATION PLANS AND SCHEDULING

Except as specifically allowed by permit conditions, authorized projects will not proceed until final mitigation plans have been reviewed and approved by the District. Under most circumstances, mitigation will be implemented either prior to or concurrent with authorized activities. DWQ requires a mitigation site that is available to the applicant and ecologically viable as well as a conceptual mitigation plan before the 401 Water Quality Certification will be issued. A final mitigation plan must then be approved before impacts occur. A review of these plans will be coordinated with state and federal review agencies. Authorized activities that will be mitigated through an approved bank program or in-lieu fee program may start work once the District receives notification that the mitigation request has been accepted and financial documentation has been provided. Use or compliance with these guidelines does not relieve the permittee of the need to obtain other federal, state or local authorizations required by law. (Appendix VIII contains relevant agency websites).

Mitigation options relative to commencing permit activities. These options are not listed in any particular order of priority or preference:

A. NC Wetland Restoration Program – Determined by WRP/District MOA (November 4, 1998)

B. Private non-bank – Prior to a permit being issued a final mitigation plan should be approved and the site secured. Plan implementation must commence either prior to or concurrent with authorized activities. A preservation mechanism will be in place before commencing authorized activities.

C. Federal/State Government – Before a permit is issued a mitigation plan must be approved. Plan implementation must commence either prior to or concurrent with authorized activities. Contractual agreements or MOAs between government bodies addressing mitigation requirements and implementation may be acceptable. Except where these agreements are signed and approved by the District and DWQ, a preservation mechanism should be in place before commencing authorized activities.

D. Approved Private Mitigation Bank - Credits must be available and payment documented prior to permit activity and in compliance with the established mitigation-banking instrument.

8. BUFFER WIDTHS & RIPARIAN RESTORATION

Buffer protection for stream mitigation is intended to enhance the recovery and protection of stream mitigation projects. In most cases, a protected buffer of a minimum of 50 feet on piedmont/coastal plain streams and 30 feet on mountain streams extending landward from the bankfull elevation on each side of the stream will be required at stream mitigation sites (See Section 4 for list of mountain counties). It is generally acknowledged that wider buffers provide increased benefits to adjacent waters and, where appropriate and practicable, the acquisition of wider buffers will be encouraged. Under certain conditions, wider buffers may be required, based on comments from reviewing agencies or due to construction requirements. Increased buffer widths may be sought to protect sensitive riparian or instream environments, threatened or endangered species, or historical or cultural resources. Consideration for reduced buffer widths will be based on issues related to construction constraints and land ownership and may result in increased mitigation ratios. Such requests will be considered on a case-by-case basis. Justification for reduced buffer widths must be provided by the permit applicant and receive approval by the District and DWQ. Where stand-alone stream preservation is proposed as mitigation, additional buffer width of at least two times the base requirement may be required. When the project applicant proposes buffers that exceed the minimum requirement, the District may, with agreement of the permit review agencies, grant additional channel mitigation credit proportionate with expected benefits. Proposed

buffers containing stable riparian wetlands are generally viewed as highly functional ecological areas that often justify enhanced crediting.

Planting the riparian zone should be done as work proceeds or at the latest, immediately upon completion of stream construction activities. Stream banks will be planted with native vegetation that represents both woody (trees and shrubs) and herbaceous species. Species selection will be based on a survey of the vegetation from the reference reach; from less degraded sections of the stream being restored or from reference literature that details native species. The result should be an appropriate vegetative community for the site. Live staking, with such species as willow or dogwood, or the application of other bioengineering methods is recommended to provide bank stability and shade soon after project completion. Survival of woody species planted at mitigation sites should be at least 320 stems/acre through year three. A ten percent mortality rate will be accepted in year four (288 stems/acre) and another ten percent in year five resulting in a required survival rate of 260 trees/acre through year five. This is consistent with Wilmington District (1993) guidance for wetland mitigation. It is critical that disking and/or ripping of the flood prone area be done prior to planting. As knowledge of other systems is published or as reference reach information is developed, it will be incorporated into updated versions of this guidance.

Herbaceous vegetation should be established through plantings of existing plants by relocating sod mats or by seeding with a native riparian seed mix. An annual cover crop (barley, millet, wheat, rye, etc.) should be sowed to stabilize the banks until the other vegetation can become established. A cover crop should be selected whose germination season matches the time of application. Evaluations of the cover crop and perennial herbaceous vegetation should be made regularly to ensure good germination and establishment of the herbaceous community. A project site vegetation plan is required as part of the mitigation proposal.

Where appropriate, stream buffers should be protected from livestock through fencing and, if necessary, the installation of livestock watering facilities and managed stream crossings. The installation of signs or other acceptable forms of demarcation will identify buffers as a protected conservation area.

Wetlands occurring within stream buffers may be used for wetland mitigation purposes.

9. EASEMENTS AND HOLDING MITIGATION SITES

Stream mitigation sites will generally be held and protected in perpetuity. Permanent conservation easements are acceptable methods of providing long-term protection. Where practicable, either the mitigation site or a conservation easement over the mitigation site must be transferred to a government entity or non-profit conservation organization capable of holding and managing the site for conservation purposes. The organization accepting the property or easement over the property must be acceptable to the District.

Long-term protection through restrictive covenant or deed restriction may be acceptable, provided the mitigation site is owned by the permit applicant and is part of the property for which the permit is issued. The applicant must show that other preservation mechanisms are not practical before the District will consider this option.

Long-term protection methods for all mitigation activities must receive approval by the District prior to implementation. A licensed attorney must draft easements, deeds, and restrictive covenants. Landowners must approve these agreements. Generally speaking, mitigation cannot be used for more than one purpose. Sites that are part of a landowner incentive program, or a federal or state ecosystem restoration program site are therefore unlikely to be acceptable as mitigation for Department of the Army permits. Except for very small sites, all mitigation sites must be surveyed, and an acceptable title opinion must be provided to the grantee of the property, with a copy to the District.

While the purpose of stream mitigation is to achieve long-term restoration, this may not always occur. In some instances, factors that are beyond the control of designers and the regulatory agencies may cause degradation. In those situations further restoration activities may reestablish stability. If the stream mitigation activities have been fully successful through 5 years and at least 2 bankfull events, the mitigation will generally be considered successful.

ACTIVITIES GENERALLY PROHIBITED WITHIN STREAM MITIGATION EASEMENTS:

- **Any change in, disturbance, alteration or impairment of the restored and natural features of the property, or any introduction of non-native plants or animals.**
- **Except as specifically authorized, construction or placement of any building, mobile home, road, trail, path, asphalt or concrete pavement, antenna, utility pole, or any other temporary or permanent structure or facility on the property.**
- **Agricultural, grazing, or horticulture use of property.**
- **Irrigation structures, dams, intakes and outfalls.**
- **Destruction, cutting, mowing, or harming any native vegetation on the easement property.**
- **Display of billboards, signs or advertisements, except the posting of no trespassing signs, or signs identifying the site as a conservation/ mitigation area.**
- **Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or hazardous substances, or toxic hazardous waste, or any placement of any underground or aboveground storage tanks on the property.**
- **Filling, excavation, dredging, mining or drilling, diking, removal of topsoil, sand, gravel, rock, peat, minerals or other materials, and any change in the topography of the land.**
- **Pollution, alteration, depletion or extraction of surface, natural watercourses or subsurface water. Any activity detrimental to water purity, or that would alter**

natural flows or water levels, drainage, increased in-stream sedimentation, or cause soil degradation or erosion.

- **Operation of motorcycles, dirt bikes, all-terrain vehicles, and any other type of motorized vehicles.**
- **Removal, relocation, modification, or general destruction of grade control, habitat, bank stabilization, or any other channel restoration and enhancement structures.**

10. FLEXIBLE STREAM MITIGATION

A. Urban Watershed Management

The District, DWQ and participating agencies fully support the implementation of stream mitigation within urban municipal areas. As a general rule, mitigation sites within urban areas will be utilized to compensate for unavoidable impacts to urban streams and such mitigation projects will generally comply with the guidance set forth by this document. In urban areas, traditional stream mitigation may not be possible due to multiple landowners, physical constraints, or hydraulic (flooding) concerns. As it is also recognized that innovative approaches to stream mitigation may provide benefits to water quality and aquatic life where traditional mitigation is not possible, these concepts are included in the category of Flexible Stream Mitigation and are described in the following sections. Where innovative approaches are approved, it will be expected that the project proponent will be required to document the benefits of the mitigation through monitoring. The specific mitigation credit that is generated from these innovative approaches will be determined by the District and DWQ on a case-by-case basis.

Watershed mitigation is essentially a program to provide long term improvement and protection of an urban watershed (usually ½ square mile or larger) with a variety of best management practices (BMPs), installation of aquatic habitat structures, and measures for improving public access and enjoyment. Watershed mitigation planning will involve a two-step process: an overall watershed assessment that evaluates existing stream channel conditions, and a watershed-level stream channel and floodplain mitigation plan. The watershed analysis should include a detailed assessment of the tributaries and adjacent upland riparian/floodplain areas. The assessment will include information concerning stream classifications, current channel conditions, stream bank erosion potential, pollutant sources, information concerning watershed build-out, existing water quality data (if any) and data on fish and invertebrate species. The watershed assessment will identify needed mitigation measures and activities necessary to achieve the restoration goals stated in the watershed mitigation plan. The assessment will enable the project sponsor to generate a detailed watershed mitigation and management plan.

The use of BMPs for mitigation credit must be validated by conducting water quality and/or ecological surveys of benthic macroinvertebrate and/or fish communities to determine if the stated goals of the project have been met. These data should be supported by reviews of scientific literature prior to assigning credits. BMPs including, but not limited to, detention and retention wetlands, ponds or basins should not be placed

in waters of the US. Stand-alone BMP activities will not be credited where other mitigation activities are needed and can be reasonably implemented. Mitigation credits will not be granted on linear areas that are not protected by an approved conservation easement or other approved legal mechanism. Watersheds containing waters on the State of North Carolina's 303(d) list or classified as a High Quality Water/Outstanding Resource Water (or group of tributaries to the same), Trout Waters or tributaries, or similar classifications should be targeted under this watershed mitigation program. Development, implementation, and coordination of watershed mitigation plans will closely follow procedures already established for mitigation banks. This generally includes requirements relative to establishing mitigation review teams, use of banking instruments, and release of mitigation credits.

Watershed assessments will evaluate current stream channel conditions and identify mitigation measures to promote stable channel geometry. The plan will employ priority levels of restoration to the maximum extent practicable. In order for channel areas to receive mitigation credit, an approved conservation easement or other preservation mechanism must be in place.

MITIGATION ACTIVITIES THAT MAY BE IMPLEMENTED IN WATERSHEDS	
CHANNEL RESTORATION	✓
ENHANCEMENT LEVEL I	✓
ENHANCEMENT LEVEL II	✓
BANK STABILIZATION	✓
CHANNEL PRESERVATION	✓
BEST MANAGEMENT PRACTICES	✓
PUBLIC ACCESS	✓

The most important consideration for BMP selection for the watershed approach is the ability of the BMP to remedy the problem(s) identified in the watershed or sub-watershed assessment. For instance, if the problem identified is excess nutrient loading, one might consider utilizing an extended detention wetland, which is considered to be one of the better BMPs for nutrient removal. Similarly, it may be inappropriate to consider a dry detention pond, which is less effective at removing nutrients than other BMPs. In any event, BMPs must be considered on a case-by-case basis. The following table is meant to provide some guidance based on current literature reviews as to appropriateness of certain BMPs for certain situations.

BMP	POLLUTANTS
Extended detention wetlands	Total Suspended Solids (TSS), nutrients, heavy metals, hydrology
Extended detention wet ponds	TSS, nutrients, hydrology
Extended dry detention basins	TSS, hydrology
Forested filter strips or forested buffers	Nutrients, TSS
Bio-retention areas or rain gardens	TSS, nutrients
Grassed swales or open channel practices	Nutrients, TSS
Infiltration basins	TSS, nutrients (only appropriate in proper soils)
Sand filters	TSS, nutrients (only appropriate in special circumstances, very high maintenance required)

Reference: NCDENR Stormwater BMP Manual, April 1999
2000 Maryland Stormwater Design Manual Volumes I & II

B. Other Approaches

Other actions that result in demonstrable stream improvements may also be eligible for stream mitigation crediting on a case-by-case basis. However, these measures (BMPs or any other activity) must not be a requirement of a NPDES permit or other regulatory requirement. These options would have to be beyond those measures required by regulations and should be part of a local watershed restoration plan. These other options can provide long-term protection for a stream segment or a watershed and therefore have a role in stream mitigation. However, the US Army Corps of Engineers and the NC Division of Water Quality may limit the use of these other options in the context of stream mitigation since these agencies need to ensure that aquatic life uses are being replaced. These options must receive case-by-case approval from the US Army Corps of Engineers and the NC Division of Water Quality and must include a provision for monitoring that will demonstrate the water quality and aquatic life benefits of the project. As such, projects that target waters with impaired water quality such as 303(d) waters, closed SA waters and Nutrient Sensitive Waters are more likely to be approved.

11. MONITORING

The purpose of monitoring is to determine the degree of success a mitigation project has achieved in meeting the objectives of providing proper channel function and increased habitat quality. Specific objectives must be included in a project design and may also be evaluated. In general, monitoring data should provide the District and DWQ with evidence that the goals of the project were met. Monitoring should be directed at evaluating primary activities accomplished through mitigation projects. Monitoring secondary benefits or accomplishments may also be appropriate for large-scale projects, when projects are done in ecologically important areas or when secondary benefits are a primary objective. Secondary benefits are those that are not directly accomplished or established during site construction. For example: a primary activity would be constructing a root wad revetment, the secondary benefit would be the enhancement of aquatic populations. Three levels of monitoring will be required based on the complexity of the mitigation project being proposed.

Upon completion of the project, an as-built channel survey shall be conducted. It is recommended that stream surveys, for both project construction and project monitoring, follow the methodology contained in the USDA Forest Service Manual, *Stream Channel Reference Sites* (Harrelson, et.al, 1994). The survey should document the dimension, pattern and profile of the restored channel. Permanent cross-sections should be established at an approximate frequency of one per 20 (bankfull-width) lengths. In general, the locations should be selected to represent approximately 50% pools and 50% riffle areas. Flexibility in the location and frequency will be allowed for

cross-sections and should be based on best professional judgment. The selection of locations should always include areas that may be predisposed for potential problems. In the case of very narrow streams, two cross-sections per 1,000 lf will generally be sufficient. The as-built survey should also include photo documentation at all cross-sections and structures, a plan view diagram, a longitudinal profile, vegetation information and a pebble count for at least six cross-sections (or all cross sections if less than six required for project). If the restored stream section is less than 3,000 lf, the longitudinal profile should include the entire 3,000 lf, if the stream section is greater than 3,000 lf, the profile should be conducted for either 30 % of the restored stream or 3,000 lf (whichever is greater). Subsequent annual surveys will be required per instructions on the monitoring forms (biannual for photo documentation). It should be noted that different levels of mitigation would require different levels of monitoring. The as-built survey described above will generally be required only for Restoration and Enhancement Level I projects. The following paragraphs describe the specific requirements for the different levels of mitigation.

Monitoring Level I: This level of monitoring will apply to Restoration and Enhancement Level I projects. Because these projects involve the greatest degree of complexity they will require a more complex monitoring protocol. The required monitoring shall be performed each year for the 5-year monitoring period and no less than two bankfull flow events must be documented through the monitoring period. If less than two bankfull events occur during the first 5 years, monitoring will continue until the second bankfull event is documented. The bankfull events must occur during separate monitoring years. In the event that the required bankfull events do not occur during the five-year monitoring period, the Corps and DWQ, in consultation with the resource agencies, may determine that further monitoring is not required. It is suggested that all bankfull occurrences be monitored and reported through the required monitoring period. Monitoring data collected at level I sites should include the following: reference photos, plant survival analysis, channel stability analysis, and biological data if specifically required by permit conditions. Biological sampling evaluates secondary impacts of restoration projects. DWQ plans to evaluate 80 projects across the state to determine the benefits of these data in a mitigation monitoring protocol (see "Interim, Internal Technical Guide Summary – Benthic Macroinvertebrate Monitoring Protocols For Compensatory Stream Restoration Projects, dated July 2002, Version 1.3) which is available on DWQ's website http://h2o.enr.state.nc.us/ncwetlands/. These data will be required for those projects that are recommended by DWQ. Biological data may be required for other projects on a case-by-case basis. Data are to be collected prior to construction and for at least 3 years following construction. A 1-year recolonization/population adjustment time of biological monitoring following construction is usually warranted. In addition, the yearly data should be collected during the same season. (Photo documentation will be required twice a year – summer and winter.) Deviations from the required monitoring protocol will generally not be acceptable. However, proposed exceptions will be evaluated on a case-by-case basis by the District and DWQ, and will be coordinated with appropriate permit review agencies.

Monitoring Level 2: This level of monitoring will apply to Enhancement Level 2 projects. Because these projects will generally be on a smaller scale and less complex a simpler protocol is required. Monitoring data at these sites should include the following: reference photos and plant survival. Channel stability should also be evaluated when the mitigation project alters the bankfull channel. Additional types of information may be required from mitigating parties if recommended and justified by project reviewers. Data must be collected each year for 5 years at the same time of year. No less than two bankfull flow events must be documented through the required 5-year monitoring period. If less than two bankfull events occur during the first 5 years, monitoring will continue until the second bankfull event is documented. The bankfull events must occur during separate monitoring years. It is suggested that all bankfull occurrences be monitored and reported through the required monitoring period. Deviations from this protocol may be acceptable when they can be justified.

Monitoring Level 3: This level of monitoring will apply to mitigation consisting only of preservation. Since the only action in this case is administrative, protecting a reach, a 5-year monitoring plan is not required. However, reference photos should be taken and provided to the District and DWQ. These should well document the reach, including the riparian zone being preserved. As for all photo reference sites, a detailed description of the location at which the photo was taken should also be provided. Additional types of information may be required from mitigating parties if recommended and justified by project reviewers.

Success Criteria: As described above, this guidance requires three forms of monitoring to evaluate the success of the project; photo documentation, ecological function, and channel stability measurements. These criteria will be used to evaluate success by considering the following:

Photo documentation
Channel aggradation or degradation
Bank erosion
Success of riparian vegetation
Effectiveness of erosion control measures
Presence or absence of developing instream bars (should be absent)

Ecological Function
Health and survival of vegetation (80% survival of planted species required after 5 years)
Restoration reach should mimic upstream conditions (or reference reach when applicable)

Channel Stability
Should be insignificant change from the as-built dimension
Do changes represent a movement in the direction of instability (e.g. increased width to depth ratio or a decreased width to depth ratio with decreased entrenchment ratio) or are changes minor and represent an increase in stability (e.g. decreased width to depth ratio without a decrease in entrenchment ratio)?
Should be little change from the as-built longitudinal profile

Pool/riffle spacing should remain fairly constant
Pools should not be filling in (aggradation) or riffles starting to change to pools (degradation)
Pebble count should show a change in the size of bed material toward a desired composition.

Annual monitoring forms require as-built plans and current data. Monitoring reports should contain a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situation. Appendix II summarizes the measures of success, failure, and required remedial actions.

Specific biological success criteria are currently a subject of applied research being coordinated by the NC Division of Water Quality. Formal development and adoption of biological success criteria (if any) will be done upon completion of that research.

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R-2518 & R-2519

E. Lusk

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
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Asheville, North Carolina 28801

March 14, 2008

Hemphill

RECEIVED
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DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

Mr. Dave Baker
Asheville Regulatory Field Office
U.S. Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, North Carolina 28801-5006

Dear Mr. Baker:

Subject: Proposed Widening of US 19 in Madison, Mitchell, and Yancey Counties, North Carolina, and Its Effects on the Federally Endangered Appalachian Elktoe and Its Designated Critical Habitat

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the Biological Assessment (BA) of the effects of the subject highway widening and associated bridge construction on the Appalachian elktoe (*Alasmidonta raveneliana*) and its designated critical habitat in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

This Opinion is based on information provided in the August 9, 2007, BA; supplemental information to the BA (received February 7, 2008); other available literature; personal communications with experts on the federally endangered Appalachian elktoe; and other sources of information. A complete administrative record of this consultation is on file at our office.

In the BA, the North Carolina Department of Transportation (NCDOT) determined that the following federally listed species would not be affected by the proposed project: Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), Eastern cougar (*Puma concolor couguar*), spruce-fir moss spider (*Microhexura montivaga*), spreading avens (*Geum radiatum*), Heller's blazing star (*Liatris helleri*), Roan Mountain bluet (*Hedyotis purpurea* var. *montana*), Blue Ridge goldenrod (*Solidago spithamaea*), spotfin chub (*Erimonax monachus*), gray bat (*Myotis grisescens*), Virginia big-eared bat *(Corynorhinus townsendii virginianus),* and rock gnome lichen (*Gymnoderma lineare*). In addition, the NCDOT determined that the project was "not likely to adversely affect" the Indiana bat (*Myotis sodalis*) or Virginia spiraea (*Spiraea virginiana*). We concur with these determinations. Therefore, we believe the requirements under section 7 of the

Act are fulfilled for these species. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action.

CONSULTATION HISTORY

A consultation history of this project is provided in Appendix A.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

As defined in the Service's section 7 regulations (50 CFR 402.02), "action" means "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas." The action area is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present federal, state, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area. This Opinion addresses only those actions from which the Service believes adverse effects may result. In their BA, the NCDOT outlined those activities involved in the widening of US 19 that would affect the Appalachian elktoe and its designated critical habitat; they include the following: adding lanes of pavement, lengthening existing culverts, adding a bridge over the Cane River, and replacing a bridge over the South Toe River. This Opinion addresses whether the widening of US 19 (and associated activities) is likely to jeopardize the continued existence of the Appalachian elktoe or adversely modify or destroy its designated critical habitat.

The NCDOT proposes to widen existing US 19 and US 19E from I-26 (US 23) in Madison County east to State Route (SR) 1336 in Yancey County (R-2518A and R-2518B) and then from SR 1336 in Yancey County to an existing multilane section west of the Town of Spruce Pine in Mitchell County (R-2519A and R-2519B). The proposed project, combined, will be 29.3 miles (mi) long, with about 21 mi occurring in the Nolichucky River basin, portions of which are occupied by the Appalachian elktoe. The elktoe has been found in the vicinity of proposed project crossings of the Cane River and South Toe River. The South Toe River crossing occurs within designated critical habitat for this species. The entire area within R-2518B, R-2519A, and R-2519B and a small portion at the eastern terminus of R-2518A eventually drain into occupied habitat and into some reaches of designated critical habitat for the Appalachian elktoe within the Cane, South Toe, or North Toe Rivers.

In order to minimize impacts to the natural and human environments, the preferred design uses a "best fit" combination of symmetric and asymmetric widening. The typical section

consists of a four-lane divided shoulder section with a 17.5-foot raised median on R-2518A, and R-2519A and a 20-foot raised median on the remaining nonurban areas. The urban sections of the road will have a right-of-way width of between 200 and 400 feet (ft), depending on terrain. The right-of-way through the town of Burnsville will be 150 ft to 230 ft wide and will consist of a curb-and-gutter section from station 252+00 –L- to station 299+76 –L-. A total of 169 stream crossings/stream-impact areas were identified in the preliminary impact summary sheets for projects R-2518A and B, and R-2519A and B. Of the 169 crossings, 108 occur in the Nolichucky River basin.

As part of this project, the NCDOT has incorporated measures that minimize impacts in the design of the roadway improvements and new bridge structures. The NCDOT also is committing to a number of protective measures that will be implemented during construction of the highway and the bridges and in postconstruction monitoring and follow-up remediation where necessary. Specific measures addressing stream stability at tributary crossings, storm-water runoff controls, and erosion and sediment controls are described in more detail below.

As individual stream crossings are evaluated and designs are determined, the NCDOT will consider a variety of measures to help ensure stream stability and fish passage at culverted stream crossings. Possible measures, alone or in combination, include:

1. The incorporation of low-flow sills with a low-flow channel in new culvert installations or retrofitting existing culverts where enough hydraulic conveyance exists.

2. On multiple-barrel culverts, the use of sills at the entrance of one or more barrels to maintain normal flow depth through the remaining barrel(s).

3. The construct of a low-flow floodplain bench at the entrance and outlet of the culvert to maintain normal channel dimensions where the existing or new culvert is larger than the stream channel.

4. Burying new culverts below the streambed to allow natural bed material to deposit in the culvert bottom. On steeper stream grades, baffles should be placed in the culvert bottom to aid retention of natural bed material.

5. The use of natural rock energy-dissipater basins at pipe outlets to lower velocities.

6. The use of rock cross vanes to maintain stream grade, alleviate stream-bank erosion, and maintain stream grade control near culvert outlets and/or inlets.

7. The use of riprap on stream banks only at pipe outlets, not in the streambed.

8. The removal of existing culverts that are perched, replacing them with new culverts that have low-flow sills and/or low-flow channels.

9. The removal of existing undersized pipe culverts, replacing them with properly sized and aligned pipe culverts.

The NCDOT has documented major stream-crossing designs and measures taken to protect stream stability and fish passage in Stormwater Management Plans (SMPs) for each section of the project. An SMP for the R-2519B section will also be prepared and document the stream-crossing designs and measures taken to protect stream stability and fish passage for that section of the project. Complete SMPs for R-2518A, R-2518B, and R-2519A are located in Appendix C.

The NCDOT will use a number of Best Management Practices (BMPs) to minimize impacts from postconstruction increases in storm-water runoff from the project. These BMPs include grass swales, preformed scour holes, hazardous spill basins, dry detention basins, and grass-lined roadway ditches and shoulders. In the first three sections of this project, the NCDOT has designed over 32,000 linear feet (lf) of grass swales, 29 preformed scour holes, and at least 1 dry detention basin. These BMPs will cover 14 mi of the total 21-mi project. The remaining 7 mi, when designed, will meet or exceed the standards in the first three sections. The current BMPs are designed to treat the amount of roadway that will be drained and are tailored for each segment of the highway. Individual designs can be found in Appendix C. The storm drainage systems for the project have been designed to avoid the direct discharge of storm drainpipes into receiving surface waters. Direct discharge was minimized to the greatest extent possible; but because of steep terrain, roadway grades, and urban development (in the Town of Burnsville area), this could not be done in all cases.

Grass swales are used extensively on this project. Grass swales are vegetated channels designed to convey and treat runoff from small drainage areas, reduce flow velocity, and promote infiltration while removing suspended solids, metals, and nutrients through sedimentation, vegetative filtration, infiltration, and biological uptake.[1] The typical roadway ditch section along existing US 19 has been enhanced. The ditches for the project are wider with flatter slopes and provide a 66% increase in vegetated flow length on the shoulders when compared to existing cross sections. In addition to grass swales, preformed scour holes will be used extensively throughout this project. Preformed scour holes are riprap-lined depressions constructed at the outlet of a point discharge to dissipate energy and promote diffuse flow.[2]

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[1]Studies have shown that vegetated roadway swales, designed as described previously, are effective in removing pollutants (Wisconsin Department of Transportation [WisDOT] 2007, NCDOT unpublished data). NCDOT research has shown that a grassed filter strip removed from 68% and 97% of Total Suspended Solids (TSS) and grassed shoulders showed a 40% removal of TSS. In a synthesis report prepared by the WisDOT, studies of grass swales and grassed shoulders from seven state departments of transportation demonstrate reductions in a number of pollutants other than TSS, including metals. Results varied by type of vegetation, time of year, and distance of treatment run available (WisDOT 2007).

[2]Preformed scour holes reduce the amount of end-of-pipe erosion by eliminating unabated scour. By inducing diffuse flow conditions, preformed scour holes promote runoff infiltration and reduce downgrade erosion. Preformed scour holes will be used throughout the length of the project. Many will be used in flat floodplain areas where the discharge will be allowed to diffuse and infiltrate in the floodplain areas.

Two hazardous spill basins will be constructed on the R-2518B project at the Cane River crossing. At least two more will be provided on the R-2519B section of the project at the South Toe River crossing.

In their SMPs, the NCDOT has documented BMPs that will be used to offset impacts due to postconstruction storm-water runoff for the R-2518A, R-2518B, and R-2519A sections of the project (Appendix C). An SMP for R-2519B will be prepared during final design for that section of the project and will incorporate the same or greater protections.

Where curb-and-gutter was used through the town of Burnsville, an effort was made to discharge the storm drain systems into grass-lined ditches, grass swales, and preformed scour holes behind the curb-and-gutter before entering into surface waters. Along this portion of the project, 1,000 ft of grass swales, eight preformed scour holes, and 550 ft of grass-lined ditches have been designed. This information is documented in the SMP for project R-2519A (Appendix C).

In addition to the control measures described previously, the NCDOT has a statewide National Pollutant Discharge Elimination System (NPDES) storm-water permit. This permit requires the NCDOT to perform 14 programs to manage storm-water runoff. While all programs have provided benefits to the Nolichucky River basin, the following are noteworthy:

1. Illicit Discharge and Detection and Elimination Program: The NCDOT facilitates a web-based system that allows their field staff to report illicit discharges to the storm-water system. The reports are then forwarded to the North Carolina Division of Water Quality (DWQ) for appropriate action. If the discharge is within the NCDOT right-of-way, the NCDOT will take appropriate action to remove the source.

2. BMPs Retrofits: This program requires the NCDOT to develop structural or nonstructural BMPs to treat storm-water runoff on existing facilities. This program can be used to retrofit existing facilities or address future storm-water runoff concerns. Although the current project design incorporates storm-water BMPs in the design, the NCDOT will investigate retrofit opportunities on other existing facilities in the Nolichucky River basin.

3. BMPs Inspection and Maintenance Program: The NPDES permit requires the NCDOT to develop an inspection and maintenance program for structural storm-water controls. A program is currently being piloted in NCDOT's Divisions 3, 4, and 5 and will be implemented across the state in the next few years. The NCDOT Hydraulics Unit and Division 13 will coordinate to determine whether projects R-2518B and R-2519 can be included in this pilot program.

4. Research and Program Assessment: The NCDOT performs research on the characterization of highway pollutants as well as the performance of structural storm-water controls. This program is currently looking at the effectiveness of

storm-water controls in North Carolina. The previously mentioned BMPs Inspection and Maintenance pilot program is for maintenance, while the research program objective would be for quantitative assessment. The NCDOT has an annual research cycle where proposals are submitted on an annual basis. The NCDOT plans to propose further research on the performance of the grass swales along the 19E project. This research will be proposed to the NCDOT Research Program in the summer of 2008, when the program annually solicits proposals.

Given the length of this project and the sensitivity of the watershed, the NCDOT has developed specific erosion-control measures for this project that are designed to protect environmentally sensitive areas. In addition, they are committed to enhanced monitoring and reporting to achieve the highest level of compliance with standards for sediment and erosion control for this project. To help ensure accountability, there are a number of inspections required at specific times (Appendix B).

The NCDOT Erosion and Sediment Control Program requires that all land-disturbing activities comply with the Sedimentation Pollution Control Act of 1973 (SPCA). Inspections will be performed by certified Level I or II erosion- and sediment-control/ storm-water professionals to ensure that all erosion- and sediment-control devices are installed and maintained according to the approved plan. Inspections will include weekly written reports or within 24 hours of a $\geq$0.5-inch (in) rainfall event that will document the progress of the project and what items need attention. All erosion- and sediment-control/storm-water BMPs will be installed by a contractor supervised by a Level I or II certified professional.

A certified Level II erosion- and sediment-control/storm-water supervisor will perform erosion- and sediment-control management for the project and will be responsible for coordinating the grading operations, with phasing and implementation of the erosion- and sediment-control plan. When corrective actions are identified, the supervisor will coordinate efforts to resolve issues and coordinate the overall inspection of the project to ensure that the necessary documentation is being completed and maintained for review by the regulatory agencies. A contractor's Level II foreman will be present on the project to ensure compliance. A certified Level III erosion- and sediment-control/storm-water designer will design reclamation plans. The designer will be responsible for ensuring that the reclamation plans comply with the SPCA and all project permit conditions.

The NCDOT's Division 13 (Division) construction staff will provide secondary oversight for erosion and sedimentation control on the project. They will perform routine inspections to see if installation, maintenance, and project documentation are occurring as required. All inspection documents completed by the Division staff will be maintained on site for review by the regulatory agencies. Division construction inspection staff will hold Level I or II certification, as applicable.

Roadside Environmental Unit's Field Operations (REUFO) will provide the third level of oversight for erosion and sedimentation control on the project. REUFO will perform reviews that will document the condition of the project's erosion- and

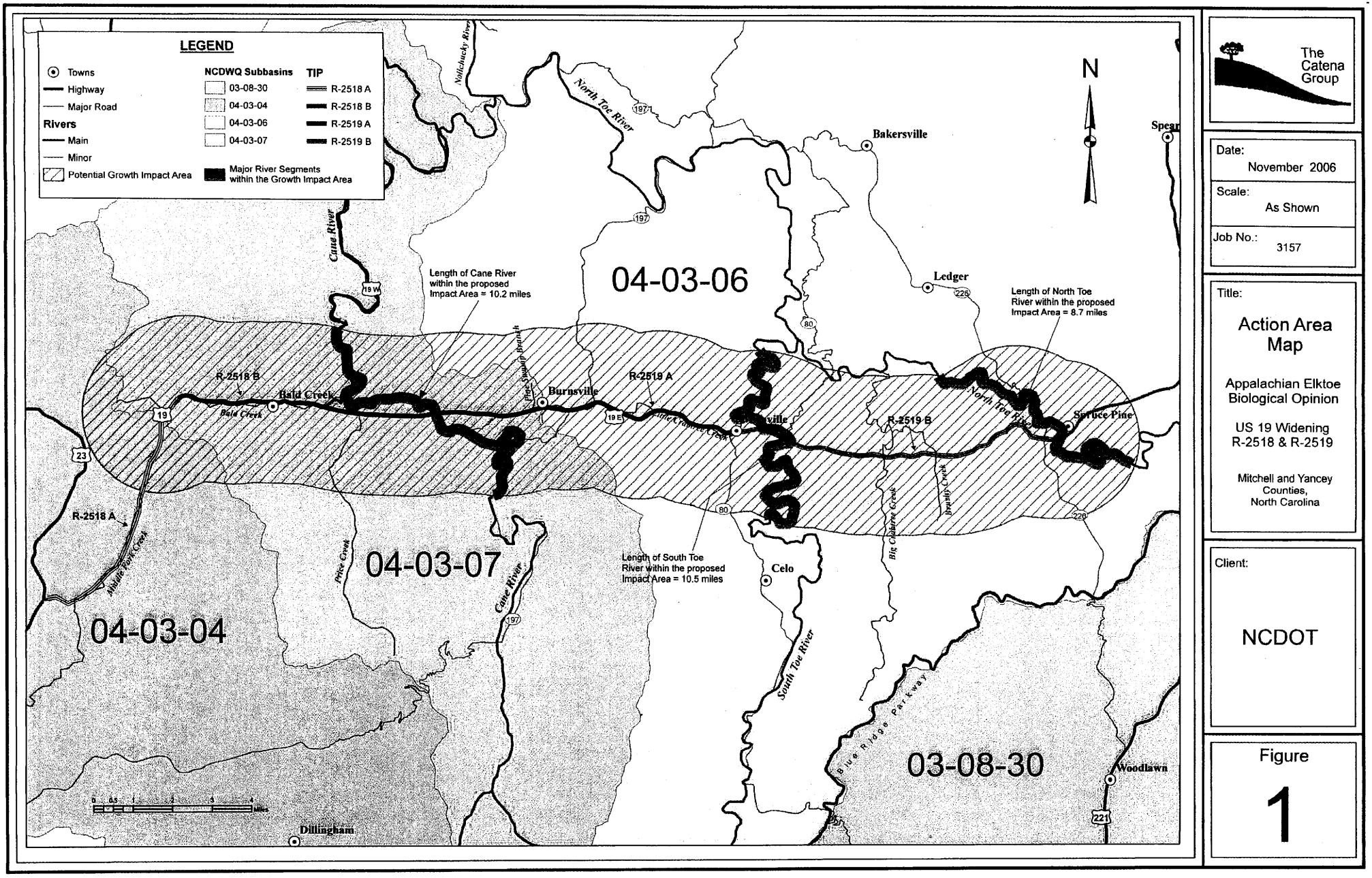
sediment-control/storm-water compliance and the progress on needed corrective actions. REUFO will also review revisions to the erosion- and sedimentation-control plan and provide advice on design modifications. REUFO's reviews will be maintained for on-site inspection by regulatory agencies or delivered electronically upon request. REUFO personnel who perform reviews will be certified professionals in erosion and sediment control and/or certified professionals in storm-water quality.

In the event a violation to the SPCA occurs, the REUFO will issue an Immediate Corrective Action that will initiate project suspension. If a violation of a permit condition occurs, the REUFO staff will issue a Permit Consultation Needed. The lead engineer and the Division's environmental officer will be notified, and the appropriate corrective actions will be taken. The Division staff may suspend work at any time they deem necessary to correct an issue, and the Division's environmental officer may review and recommend corrective actions in order to comply with permit conditions. The NCDOT will notify the Service of any violations to the SPCA.

A. Action Area

The action area ("all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action") for the proposed project includes: (1) the area directly impacted by construction activities, primarily the existing roadway and land immediately adjacent; (2) areas potentially affected by indirect impacts, defined as a 2-mi-wide "potential growth area" on either side of the existing highway; and (3) proposed conservation areas to help offset impacts to the Appalachian elktoe and its designated critical habitat. Within the action area (Figure 1) there are about 10.2 mi of the main stem of the Cane River, 10.5 mi of the main stem of the South Toe River, and 8.7 mi of the main stem of the North Toe River in Mitchell and Yancey Counties. Additional streams within the project area include Middle Fork Creek, Bald Creek, Price Creek, Pine Swamp Branch, Little Crabtree Creek, and Big Crabtree Creek. Middle Fork Creek flows to the south from Bethel to the French Broad River. Bald Creek flows to the north from the top of Ivy Gap to the Cane River. Price Creek flows north from Chestnut Mountain to the Cane River. The Cane River flows north from the Pisgah National Forest, converging with the North Toe River (also known as the Toe River downstream of its confluence with the South Toe River; in this Opinion, when we refer to the Toe River, we are speaking of that portion of the North Toe River downstream of its confluence with the South Toe River) to form the Nolichucky River. Pine Swamp Branch flows to the west from Burnsville and is a tributary to the Cane River. Little Crabtree Creek flows to the east from Burnsville and is a tributary to the South Toe River. Big Crabtree Creek flows north along the Yancey/Mitchell County line into the North Toe River. Brushy Creek is a tributary to Big Crabtree Creek.

Physical Characteristics within the Action Area - The South Toe flows into the North Toe River west of the Town of Spruce Pine. The Toe River then flows northwest and combines with the Cane River to form the Nolichucky River, a tributary to the French Broad River. The North Toe River originates in central Avery County, 5 mi northeast



The Catena Group

Date: November 2006

Scale: As Shown

Job No.: 3157

Title:

Action Area Map

Appalachian Elktoe Biological Opinion

US 19 Widening R-2518 & R-2519

Mitchell and Yancey Counties, North Carolina

Client:

NCDOT

Figure 1

of Newland. From Newland, the river flows west for 4 mi to Minneapolis. The river generally flows in a southwesterly direction from Minneapolis, through the city of Spruce Pine in Mitchell County, where it is joined by the South Toe River near Kona. The Toe River continues to flow northwest along the Mitchell/Yancey County border through Toecane and Relief until its confluence with the Cane River near Huntdale. The headwaters of the Cane River arise in Mount Mitchell State Park in Yancey County. The Cane River flows generally north for 40 mi before joining the Toe River near Huntdale to form the Nolichucky River.

The Nolichucky River watershed occupies parts of two physiographic provinces. The upstream parts of the watershed (upstream from about Dry Creek, at river mile [rm] 87.5) and the higher slopes along the eastern side of the river are in the Blue Ridge Province. The remainder of the watershed and most of the length of the Nolichucky River are located in the Valley and Ridge Province. One-third of the watershed is located in the Blue Ridge Province and is characterized by high, steep ridges with narrow valleys. The mountains in this part of the watershed rise 1,000 ft to 2,500 ft above the adjacent lowlands. The western part of the Blue Ridge Province has long and narrow individual ridges, aligned parallel to the trend of the range and similar to the more subdued ridges of the Valley and Ridge Province. The main mountain mass along the Tennessee/North Carolina state line is a tumbled confusion of peaks and valleys that appear to have no regular pattern.

Land Use – The dominant land use in the action area is forested/wetland (85%), with about 13% of the area in pasture/managed herbaceous. Urban area comprises less than 1% of the action area. Both the South Toe and the Cane Rivers originate in Mount Mitchell State Park, and two-thirds of the Cane River watershed is in the Pisgah National Forest. A significant portion of land along the alluvial areas of the middle North Toe, the South Toe, and Toe Rivers is cultivated cropland and pasture (14%), with a small portion (<1%) in residential/golf course (North Carolina Department of Environment and Natural Resources [NCDENR], DWQ, 2005). Historically, the economy of the entire Nolichucky River basin depended on natural resources. The mining of mica, feldspar, kaolin, or olivine in the Spruce Pine mining district within the North Toe and South Toe watersheds was the main source of income for the area. Feldspar, mica, and kaolin have been extensively mined in this watershed in North Carolina since the early 1900s (Muncy 1981). Nearly half of the nation's mica is produced in this region.

Ecological Significance – The Nolichucky River basin supports a number of rare fish and freshwater mussel species Table 1). The stonecat (*Noturus flavus*) is found only in North Carolina, in the Nolichucky and Little Tennessee River watersheds. The Cane River contains several rare animals, the most notable of which is almost the entire North Carolina population of the sharphead darter (*Etheostoma acuticeps*).

The lower stretches of the North Toe and Nolichucky Rivers provide habitat for the olive darter (*Percina squamata*), logperch (*Percina caprodes*), and tangerine darter (*Percina aurantiaca*), as well as the federally endangered Appalachian elktoe mussel.

Table 1. Rare Aquatic Species in the North Toe, Toe, and Cane Rivers.

Scientific Name	Common Name	North Carolina Status	Federal Status
Mussels:			
Alasmidonta raveneliana	Appalachian elktoe	Endangered	Endangered
Lampsilis fasciola	Wavy-rayed lampmussel	Special Concern	None
Amphibians:			
Cryptobranchus alleganiensis	Hellbender	Special Concern	Federal Species of Concern
Fishes:			
Etheostoma acuticeps	Sharphead darter	Threatened	Federal Species of Concern
Etheostoma vulneratum	Wounded darter	Special Concern	Federal Species of Concern
Percina squamata	Olive darter	Special Concern	Federal Species of Concern
Noturus flavus	Stonecat	Endangered	None

The wavy-rayed lampmussel (*Lampsilis fasciola*) and the hellbender (*Cryptobranchus alleganiensis*) have been found in the same reaches of the upper Nolichucky River subbasin where the Appalachian elktoe occurs. The North Carolina Natural Heritage Program (NCNHP) describes the aquatic habitat of the South Toe, a portion of the North Toe, the Toe, and the Nolichucky River as having "National Significance," and the aquatic habitat of the Cane River as having "Statewide Significance."

Water Quality Assessment and Best Usage Classification - Sedimentation from mining and agricultural practices in the basin is well-documented (Tennessee Valley Authority [TVA] 1981, Ahlstedt and Rashleigh 1996). Historically, sedimentation and pollution from mining operations throughout the Nolichucky River basin (primarily in the North Toe watershed) significantly degraded cool-warm water habitats (North Carolina Wildlife Resources Commission [NCWRC] 2005). However, the North Carolina Mining Control Act of 1971 and the Sedimentation and Pollution Control Act of 1973 have helped improve the water quality of this basin (NCDENR 2003, Ahlstedt and Rashleigh 1996). In 2002, bioassessments, including benthic macroinvertebrate and fish sampling, in the Nolichucky River basin by the DWQ indicated improving conditions in the basin (Tables 2 and 3).

Table 2. EPT Scores for Water Bodies Monitored in Nolichucky River Basin for Basinwide Assessment.

Water Body	County	Location	1997	2002
North Toe River	Mitchell	SR 1321	Good	Good
North Toe River	Avery	US 19E	Good	Good
North Toe River	Mitchell	SR 1162	Fair	Good
North Toe River	Yancey	SR 1314	Good	Good
Big Crabtree Creek	Mitchell	US 19E	Excellent	Excellent
South Toe River	Yancey	SR 1167	Excellent	Excellent
Big Rock Creek	Mitchell	NC 197	Good	Excellent
Jacks Creek	Yancey	SR 1337	Fair	Fair
Pigeonroost Creek	Mitchell	SR 1349/NC 197	Excellent	Excellent
Cane River	Yancey	US 19E	Excellent	Excellent
Bald Mountain Creek	Yancey	SR 1408	Good	Excellent
Price Creek	Yancey	SR 1126	Good/Fair	Good

Sampling conducted by the DWQ indicates overall water quality is good in the Nolichucky River basin (based on the parameters that are sampled and evaluated by the DWQ), but sediment is a growing concern. Sedimentation has been considered a significant problem in the Nolichucky River system for many years. Mining impacts are widespread, and croplands and development contribute to nonpoint-source pollution, including pesticides, fertilizers, oil, heavy metals, animal waste, and eroded sediment, that is washed from land or paved surfaces when it rains. Habitat in the North Toe River between Spruce Pine and its confluence with the South Toe River continues to be degraded, seemingly from discharges and runoff from mining operations and the town of Spruce Pine. Floodplain gravel mining in the upper Cane River watershed, both permitted and unpermitted actions, presents a potential threat to long-term channel stability and habitat quality.

In 2006, the DWQ added two river reaches in the action area to North Carolina's list of impaired streams (303(d) list). These include a reach of the lower Cane River (~3.5 rm) and a reach of the North Toe River (~11.3 rm). In addition, in 2008 the DWQ added the main stem of the Nolichucky River, throughout its entirety in North Carolina (~10.0 rm), to the draft 303(d) list. The portions of the Cane, North Toe, and Nolichucky Rivers that have been added to the state's list of impaired streams are all occupied, designated critical habitat for the Appalachian elktoe. Reasons for listing include turbidity standard violations for the Cane and Nolichucky Rivers and turbidity standard violations and impaired biological integrity in the North Toe River. The nonpoint-source runoff of silt/sediments is identified as the most likely cause of impairment of these three river reaches.

Table 3. Tennessee Valley Authority Fish Community Assessment in the Nolichucky River Basin (DWQ 2003).[3]

Water Body	County	Location	Date	Score/Rating
North Toe River	Mitchell	US 19	1999	50/Good
North Toe River	Yancey	NC 80	1997 1999	40/Good 50/Good
Toe River	Avery	SR 1314	1997 1999	40/Fair 56/Good - Excellent
Toe River	Mitchell	SR 1336	1997	48/Good
South Toe River	Mitchell	NC 80	1997	48/Good
Little Crabtree Creek	Yancey	US 19E	1997 1999	44/Fair 40/Fair
Cane Creek	Mitchell	NC 80	1997 1999	32/Poor 34/Poor
Big Rock Creek	Mitchell	NC 197	1997 2000	50/Good 50/Good
Jacks Creek	Yancey	SR 1336	2000	40/Fair
Cane River	Yancey	US 19E	1997 2000	44/Fair 50/Good
Cane River	Yancey	US 19W	1997 2000	40/Fair 48/Good
Cane River	Yancey	US 19W	1997	46/Fair - Good
Nolichucky River	Mitchell	SR 1321	1997 2002	50/Good 52/Good

The NCDENR assigns a best usage classification (15A NCAC 02B.0101 GENERAL PROCEDURES) to all the waters of North Carolina. These classifications provide for a level of water quality protection to ensure that the designated usage of that water body is maintained. The portions of the Toe, Cane, and North Toe Rivers that are occupied by the Appalachian elktoe have a "Class C, Trout," usage classification, and the Nolichucky River from its source to the North Carolina/Tennessee state line has a usage classification of "Class B."

[3]The Fish Community Assessment assigns an Index of Biotic Integrity (IBI), which is another method of assessing water quality. The IBI evaluates species richness and composition, trophic composition, and fish abundance and condition.

Point-source Pollution - Point-source pollution is defined as pollutants that enter surface waters through a pipe, ditch, or other well-defined conveyance. These include municipal (city and county) and industrial wastewater treatment facilities; small domestic discharging treatment systems (schools, commercial offices, subdivisions, and individual residences); and storm-water systems from large urban areas and industrial sites. The primary substances and compounds associated with point-source discharge include: nutrients; oxygen-demanding wastes; and toxic substances, such as chlorine, ammonia, and metals.

Under Section 301 of the Clean Water Act of 1977, the discharge of pollutants into surface waters is regulated by the Environmental Protection Agency. Section 402 of the Clean Water Act establishes the NPDES Permitting Program, which delegates permitting authority to qualifying states. In North Carolina, the DWQ is responsible for the permitting and enforcement of the NPDES Program. There were 23 NPDES permitted discharges in the Nolichucky basin in 2003 (NCDENR 2005), although additional discharges have been permitted recently (including a new wastewater treatment plant [WWTP] discharge into the South Toe River below Highway 19E). Most of these discharges are small WWTPs that serve schools or subdivisions, including the Spruce Pine WWTP, Newland WWTP, and Bakersville WWTP and multiple mining process discharges, including Unimin Mining Company's four discharges.

Nonpoint-source Pollution – Nonpoint-source pollution refers to runoff that enters surface waters through storm water or snowmelt. There are many types of land-use activities that are sources of nonpoint-source pollution, including land development; construction activity; animal waste disposal; mining, agricultural, and forestry operations; and impervious surfaces, such as roadways and parking lots. Various nonpoint-source management programs have been developed by a number of agencies to control specific types of nonpoint-source pollution (e.g., pollution related to forestry, pesticide, urban, and construction activities). Each of these management programs develops BMPs to control the specific type of nonpoint-source pollution.

The SECP applies to construction activities, such as roadway construction, and is established and authorized under the SPCA. This act delegates the responsibility for its administration and enforcement to the NCDENR's Division of Land Resources (Land Quality Section). The SECP requires, prior to construction, the submission and approval of erosion-control plans on all projects disturbing an acre or more. On-site inspections by the Division of Land Resources are conducted to determine compliance with the plan and to evaluate the effectiveness of the BMPs that are being used. The NCDOT, in cooperation with the DWQ, has developed a sedimentation-control program for highway projects using BMPs for the protection of surface waters. Additional erosion-control measures, outlined in Design Standards in Sensitive Watersheds (NCAC T15A:04B.0124), are implemented by the NCDOT for projects within WS-I or WS-II water supply watersheds, critical areas, waters designated for shellfishing, or any waters designated by the DWQ as "High Quality Waters." When crossing an aquatic resource containing a federally listed species, the NCDOT has

committed to implement erosion-control guidelines that go beyond both the standard BMPs and the Design Standards in Sensitive Watersheds, regardless of the DWQ classification. These areas are designated as "Environmentally Sensitive Areas" on the erosion-control plans.

B. Conservation Measures

Conservation measures represent actions, pledged in the project description, that the action agency will implement to minimize the effects of the proposed action and further the recovery of the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency. The beneficial effects of conservation measures are taken into consideration in the Service's determination of a jeopardy versus a nonjeopardy opinion and in the analysis of incidental take. However, such measures must minimize impacts to listed species within the action area in order to be factored into the Service's analyses.

The NCDOT proposes to offset project-related impacts by implementing a number of conservation measures. Included in the overall proposal are measures that will help aid recovery by conserving or restoring habitat and measures intended to minimize direct impacts through project design, construction practices, and monitoring and remediation.

Habitat Conservation and Restoration

1. The NCDOT has committed to providing riparian habitat protection in at least five locations within the Nolichucky basin, to provide a total of 57.6 acres (ac) and 19,005 lf of protection. Sites will be reviewed by the Service before purchase.

2. The NCDOT is using on-site stream mitigation to offset unavoidable impacts to existing streams within the project alignment. A total of 29,783 lf of on-site mitigation has been identified for the entire project. Of the total, 11,299 lf is identified and planned within the Nolichucky River basin and includes a variety of practices to restore stream pattern, dimension, and profile; correct channel instability; restore riparian buffers; and preserve stable stream reaches. These sites will be purchased as part of the NCDOT right-of-way and will be permanently protected from future development. Stream restoration and buffer preservation in the project corridor will help offset project-related impacts and will benefit downstream resources, including the Appalachian elktoe, by correcting existing problems in the watershed. Mitigation plans are developed in coordination with the U.S. Army Corps of Engineers (Corps), DWQ, and the Service.

3. The NCDOT will relocate all native mussels, including the Appalachian elktoe, from the footprints of the bridge construction projects to an appropriate relocation site as determined in coordination with the Service and the NCWRC. The procedure for relocation will be detailed in a site-specific plan developed in cooperation with the Service, NCWRC, and NCDOT. The relocation procedures will emphasize relocating freshwater mussels in such a way as to reduce stress and

minimize the risk of injury while the animals are in transit. If at any time during the relocation it is determined that these procedures are not meeting the stated objectives, more stringent methods may be developed, in cooperation with the NCWRC and the Service, to ensure that the mussels are relocated successfully. The relocation site(s) will be monitored for the survival of relocated mussels and the movement of mussels a month after they have been removed from the defined salvage areas. The relocation site(s) will then be monitored for recovery, survival (of recovered mussels), movement, and growth of the mussels once a year for 5 years after project completion. Annual reports will be provided to the Service and the NCWRC.

4. Japanese knotweed (*Fallopia japonica)*, an aggressive and invasive nonnative plant, is colonizing floodplain and stream-bank areas in the Nolichucky River basin. Japanese knotweed can quickly form dense thickets that exclude native vegetation and greatly alter the natural riparian ecosystem. The NCDOT has identified Japanese knotweed within the project limits of R-2518 and R-2519. To minimize the potential spread of this species from construction-related activities, the NCDOT proposes to attempt to suppress the knotweed within their right-of-way at the following locations: R-2518A Mitigation Site 1, R-2518B Mitigation Site 4, R-2518B Bridge at Sta. 223+50 (Cane River Bridge), and R-2519B Bridge at Sta. 121+00 (South Toe River Bridge).

5. The contract(s) for this project will stipulate that any Japanese knotweed material disturbed through construction activities at the two bridges and at the identified mitigation sites will be buried within the project boundaries in fill or waste areas below the depth of the topsoil. The NCDOT prefers on-site disposal to ensure proper disposal. Any chemical treatment will be proposed and planned in coordination with the Service and the NCDOT. The NCDOT also has initiated a research project with North Carolina State University to further investigate techniques to control Japanese knotweed. Control tests in the project area will be coordinated with the Service.

Design Measures

1. In some road sections, where streams run parallel to the current road alignment and opportunities to avoid impacts or relocate streams are limited, the NCDOT will construct retaining walls. In these cases, retaining walls replace fill slopes, thereby reducing the linear feet of stream that must be culverted and placed under fill. The NCDOT has avoided impacts to 4,704 lf of streams throughout the project, including 3,569 lf of streams in the Nolichucky River basin. Although these stream segments do not provide suitable habitat for the Appalachian elktoe, they flow into a reach of either the South Toe River or North Toe River, both of which are occupied by the Appalachian elktoe and are designated critical habitat for this species. Reducing impacts in these streams will minimize potential downstream impacts, such as sedimentation, erosion, and stream-bank instability, to the Appalachian elktoe and its designated critical habitat.

2. The existing culvert crossing of Bald Creek at Station # 175+60 –L- is being replaced with a bridge. This crossing is 0.7 mi from the confluence of Bald Creek and the Cane River, in a reach of the Cane River that is occupied by the Appalachian elktoe.

3. Deck drains will be placed at the ends of the replacement bridges. Storm water will be directed into catch basins and will then flow through a vegetated buffer so that no drainage will occur over the Cane River or South Toe River. Currently, drainage from the decks of both the existing structures flows directly into the river. Storm water coming off the approaching roadways at the bridge locations will be managed in a similar manner.

4. The design of the Cane River Bridge and the South Toe River Bridge minimized or eliminated piers in the rivers.

5. Bridge designs at Price's Creek and at Bald Creek will direct deck drainage to a vegetated buffer and will span the respective Creeks.

Construction Measures

1. In addition to relocating all mussels found in the footprint of the impact area, the NCDOT will conduct final mussel surveys in the project footprints just prior to construction and will move any additional mussels found to the appropriate relocation area.

2. For the entire 21-mi-long project within the Nolichucky River basin, the NCDOT will implement erosion-control measures that exceed the standard BMPs and incorporate the Design Standards in Sensitive Watersheds [15A NCAC 04B.0124 (b) – (e)], regardless of the DWQ stream classification.

3. The areas adjacent to jurisdictional water bodies in the watersheds of the Cane, North Toe, and South Toe Rivers will be identified as "Environmentally Sensitive Areas" on the Sedimentation and Erosion Control Plans for this project. By definition, an "Environmentally Sensitive Area" will be identified as a 50-foot buffer zone on both sides of the stream, measured from the top of the stream bank. Within the identified 50-foot Environmentally Sensitive Areas, the following shall apply:

    a. The contractor may perform clearing operations, but not grubbing operations, until immediately prior to beginning grading operations;

    b. Once grading operations begin, work shall progress in a continuous manner until complete;

c. Erosion-control devices shall be installed immediately following the clearing operation;

d. Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment; and

e. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 ft in height, measured along the slope, or greater than 2 ac in area, whichever is less.

4. All sedimentation- and erosion-control measures, throughout the project limits, must be cleaned out when half full with sediment to ensure proper function of the measures.

5. The contractor will be required to submit a bridge demolition plan to the resident engineer and the bridge construction engineer for their approval. This plan must be sealed by a registered North Carolina professional engineer and must use demolition techniques that minimize the amount of debris that will enter the river. The plan should be reviewed by the Service prior to the approval and initiation of bridge removal.

6. In order to avoid and minimize environmental impacts associated with this project, all standard procedures and measures, including the NCDOT's BMPs for construction and maintenance activities and TVA's Water Management Standard Conditions, will be strictly enforced during the project. Provisions to preclude contamination by toxic substances during the project will also be strictly enforced.

7. The NCDOT's Project Development and Environmental Analysis Branch and the Service will be invited to the preconstruction conference to discuss with the contractor the provisions of this Opinion. Prior to construction the contractor will be required to give notification of the construction initiation date to the Service, NCWRC, and TVA.

Monitoring

1. The NCDOT will monitor fish and benthic macroinvertebrates at nine locations along the project corridor. These data will help detect differences in the two fauna communities above and below the project and will provide information on possible effects on the communities due to project construction. Baseline data have been gathered and will be compared to data collected after project completion (Table 4).

2. A DWQ Assessment Field Data Sheet will be completed at each biological monitoring site. This assessment tool provides an evaluation of physical stream-habitat parameters, such as bank stability, substrate embeddedness, sediment loads, and habitat complexity. These factors are important in determining the overall

Table 4. The NCDOT's Fish Community and Benthic Macroinvertebrate Sample Locations.

Stream	Location	Project Section	Collection Date(s)
California Creek	above US 19 at SR 1608	R-2518A	5/06, 5/07*
	below US 19 at SR 1541		5/06, 5/07*
Bald Creek	near SR 1134	R-2518B	5/06
Price Creek	above US 19 at SR 1126	R-2518B	5/06
	below US 19 at SR 1454		5/06
Bald Creek	above and Below US 19E near SR 1128	R-2518B	Not sampled yet
Cane River	below US 19	R-2518B	5/06
Little Crabtree Creek	above and below US 19 at NC 80 (Micaville)	R-2519A	5/06, 5/07*
Long Branch	below US 19 at SR 1424	R-2519B	5/07
Big Crabtree Creek	below US 19	R-2519B	5/06
Brushy Creek	above and below US 19 at SR 1235	R-2519B	5/06

*A subset of sites was sampled more than once in order to evaluate between year variations in the fish communities.

stability and health of a stream and its ability to support aquatic life. See Appendix D for data sheets and location maps.

3. The NCDOT will monitor the river channel and banks at the Cane River Bridge and the South Toe River Bridge sites upstream, at the construction sites, and downstream to determine changes in habitat resulting from activities at these sites. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will correct the problems. This monitoring also will help evaluate the impacts of construction on habitat in the rivers.

4. Stream stability at culvert replacement and extension sites will be monitored visually during construction, through the assessment described previously at the biological monitoring sites, and at a final field inspection by the NCDOT and agency representatives before close out of the contract for a particular segment.

II. STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

A. Species Description, Life History, and Critical Habitat Description

The Appalachian elktoe has a thin, but not fragile, kidney-shaped shell, reaching up to about 4.0 in in length. Juveniles generally have a yellowish-brown periostracum (outer shell surface), while the periostracum of the adults is usually dark brown to greenish-black in color. Although rays are prominent on some shells, particularly in the posterior portion of the shell, many individuals have only obscure greenish rays. The shell nacre (inside shell surface) is shiny, often white to bluish-white, changing to a salmon, pinkish, or brownish color in the central and beak cavity portions of the shell; some specimens may be marked with irregular brownish blotches.

The Appalachian elktoe has been reported from relatively shallow, medium-sized creeks and rivers with cool, clean, well-oxygenated, moderate- to fast-flowing water. The species is most often found in riffles, runs, and shallow flowing pools with stable, relatively silt-free, coarse sand and gravel substrate associated with cobble, boulders, and/or bedrock (Gordon 1991; Service 1994, 1996, 2002). Stability of the substrate appears to be critical to the Appalachian elktoe, and the species is seldom found in stream reaches with accumulations of silt or shifting sand, gravel, or cobble (Service 2002). Individual specimens that have been encountered in these areas are believed to have been scoured out of upstream areas during periods of heavy rain and have not been found on subsequent surveys (Service 2002).

Like other freshwater mussels, the Appalachian elktoe feeds by filtering food particles from the water column. The specific food habits of the species are unknown, but other freshwater mussels have been documented to feed on detritus (decaying organic matter), diatoms (various minute algae) and other algae and phytoplankton (microscopic floating aquatic plants), and zooplankton (microscopic floating aquatic animals). The reproductive cycle of the Appalachian elktoe is similar to that of other native freshwater mussels. Males release sperm into the water column, and the sperm are then taken in by the females through their siphons during feeding and respiration. The females retain the fertilized eggs in their gills until the larvae (glochidia) fully develop. The mussel glochidia are released into the water and, within a few days, must attach to the appropriate species of fish, which they then parasitize for a short time while they develop into juvenile mussels. They then detach from their fish host and sink to the stream bottom where they continue to develop, provided they land in a suitable substrate with the correct water conditions. The banded sculpin (*Cottus carolinae*) was identified as a host species for glochidia of the Appalachian elktoe at the time the elktoe was listed, and the mottled sculpin (*C. bairdi*) was identified as a host species soon after the listing (Service 2002). Dr. Jim Layzer (Tennessee Technological University, unpublished data) has recently identified eight additional species of fish that successfully transformed glochidia of the Appalachian elktoe into juveniles under laboratory condition. These eight species include the wounded darter (*Etheostoma vulneratum*), greenfin darter (*E. chlorobranchium*), greenside darter (*E. blenniodes*), river chub (*Nocomis micropogon*), northern hogsucker (*Hypentilum*

nigracans), central stoneroller (*Campostoma anomalum*), longnose dace (*Rhinichthys cataractae*), and rosyside dace (*Clinostomus funduloides*). The life span and many other aspects of the Appalachian elktoe's life history are currently unknown.

Critical habitat was designated for the Appalachian elktoe in 2002 (Service 2002). The areas designated as critical habitat for the Appalachian elktoe total 144.3 mi of various segments of rivers in North Carolina and one river in Tennessee. Critical habitat identifies specific areas that are essential to the conservation of a listed species and that may require special management considerations or protection. Section 7(a)(2) of the Act requires that each federal agency shall, in consultation with the Service, ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of critical habitat.

The following constituent elements are part of the critical habitat designation and are essential to the conservation of the Appalachian elktoe:

1. Permanent, flowing, cool, clean water;

2. Geomorphically stable stream channels and banks;

3. Pool, riffle, and run sequences within the channel;

4. Stable sand, gravel, cobble, and boulder or bedrock substrates with no more than low amounts of fine sediment;

5. Moderate to high stream gradient;

6. Periodic natural flooding; and

7. Fish hosts, with adequate living, foraging, and spawning areas for them.

In the Nolichucky River basin, critical habitat is designated for the Appalachian elktoe in the main stem of the Nolichucky River, Cane River, Toe River, South Toe River, and North Toe River.

B. Status and Distribution

The Appalachian elktoe is known only from the mountain streams of western North Carolina and eastern Tennessee. Although the complete historical range of the Appalachian elktoe is unknown, available information suggests that the species once lived in the majority of the rivers and larger creeks of the upper Tennessee River system in North Carolina, with the possible exception of the Hiawassee and Watauga River systems (the species has not been recorded from either of these river systems). In Tennessee, the species is known only from its present range in the main stem of the Nolichucky River.

Currently, the Appalachian elktoe has a fragmented, relict distribution. The species survives in scattered pockets of suitable habitat in portions of the Little Tennessee River system, Pigeon River system, Mills River, and Little River in North Carolina and the Nolichucky River system in North Carolina and Tennessee.

Little Tennessee River Subbasin - In the Little Tennessee River system in North Carolina, populations survive in the reach of the main stem of the Little Tennessee River, between the city of Franklin and Fontana Reservoir, in Swain and Macon Counties (McGrath 1999; Service 1994, 1996, 2002), and in scattered reaches of the main stem of the Tuckasegee River in Jackson and Swain Counties (McGrath 1998; Tim Savidge, NCDOT, personal communication, 2001; Service 2002), from below the town of Cullowhee downstream to Bryson City. Monitoring by the NCWRC of the Appalachian elktoe population in the Little Tennessee River over the last couple of years has revealed that the population is experiencing a significant decline. A single live individual and one shell were recorded in 2000 from the Cheoah River, below Santeetlah Lake, in Graham County (Service 2002). Biologists with the NCDOT, U.S. Forest Service, and the Service have recorded up to 11 live Appalachian elktoe specimens from the Cheoah River, below the Santeetlah Dam, during surveys of portions of the river in 2002, 2003, 2004, and 2005.

French Broad River Subbasin - In the Pigeon River system in North Carolina, a small population of the Appalachian elktoe occurs in small scattered sites in the West Fork Pigeon River and in the main stem of the Pigeon River, above Canton, in Haywood County (McGrath 1999, Service 2002). The Little River (upper French Broad River system) population of the species, in Transylvania County, North Carolina (Service 2002), is restricted to small scattered pockets of suitable habitat downstream of Cascade Lake. In the Mills River, Henderson County, North Carolina, the Appalachian elktoe occurs in a short reach of the river, from just above the Highway 280 bridge (Savidge, Catena Group, personal communication, 2003) to about 1 mi below the bridge (Jeff Simmons, NCWRC, personal communication, 2004). In addition, NCWRC biologists have recently discovered a few individuals of the species at a site in the main stem of the French Broad River, below the mouth of the Little River (Steve Fraley, NCWRC, personal communication, 2005).

Nolichucky River Subbasin - In the Nolichucky River system, the Appalachian elktoe survives in scattered areas of suitable habitat in the Toe River, Yancey and Mitchell Counties, North Carolina (McGrath 1996, 1999; Service 1994, 1996); the Cane River, Yancey County, North Carolina (McGrath 1997; Service 1994, 1996); and the main stem of the Nolichucky River, Yancey and Mitchell Counties, North Carolina, extending downstream to the vicinity of Erwin, Unicoi County, Tennessee (Service 1994, 1996, 2002). A cooperative and comprehensive mussel survey effort was undertaken between 2000 and 2003 by the NCWRC, NCDOT, NCNHP, and Service throughout the upper Nolichucky River system in Yancey, Mitchell, and Avery Counties, North Carolina. Given that many areas in the Nolichucky River system had not been surveyed since the 1990s, the primary goal for these surveys was a

reassessment of the Appalachian elktoe's population status. The survey efforts indicate that suitable habitat within at least 73 mi of stream in the Nolichucky River system is presently occupied by the Appalachian elktoe, an apparent 15-mi increase from reported occupied habitat prior to 2000 (Fraley and Simmons 2004). These surveys also indicate that this population appears to be growing in numbers as well. Sites where mussels were found during 2000 and 2003 produced higher catch per unit efforts than the nearest sites sampled prior to 2000 (Fraley and Simmons 2004). However, the available habitat in the basin is a limiting factor; therefore, the Appalachian elktoe is not evenly dispersed throughout the 15-mi increase in the basin.

During August and September of 2004, significant flooding from Hurricanes Frances and Ivan occurred in the Nolichucky River drainage. The NCWRC surveyed sites in the Nolichucky River drainage for federally listed and state-listed mussels after the hurricanes and compared the results to survey results prior to the hurricanes. As stated previously, based on the results in 2000 and 2003, prior to the 2004 floods, Appalachian elktoe populations in the Nolichucky basin were found to be increasing in abundance and expanding their range. The 2004 flooding resulted in stream-bank erosion and stream-channel scour in several areas in the upper Nolichucky River system, significantly reducing the species' numbers and distribution at several sites throughout this river system (Fraley and Simmons 2006). Fraley and Simmons (2006) reported decreases in numbers of the Appalachian elktoe at nearly all of the sites they surveyed. They also reported that they failed to detect the Appalachian elktoe in the Cane and South Toe Rivers at sites that represented the upstream limit of their distribution prior to the flooding; however, they noted that only a single individual had been found at each of these sites during previous surveys and these individuals may have been lost or may have not been detected during surveys after the flooding. Currently, the Nolichucky population appears to be a relatively large (at least in terms of spatial distribution) metapopulation that is more or less contiguous, with at least the opportunity for some level of gene flow throughout the basin (Fraley and Simmons 2006).

Extirpated Sites - Historically, the Appalachian elktoe has been recorded from Tulula Creek (Tennessee River drainage), the main stem of the French Broad River at Asheville, and the Swannanoa River (French Broad River system) (Clarke 1981), but it has apparently been eliminated (except from a small section of the main stem of the French Broad River at the confluence of the Little River) from these streams (Service 1994, 1996). There is also a historical record of the Appalachian elktoe from the North Fork Holston River in Tennessee (S. S. Haldeman collection); however, this record is believed to represent a mislabeled locality (Gordon 1991). If the historical record for the species in the North Fork Holston River is accurate, the species has apparently been eliminated from this river as well.

Available information indicates that several factors have contributed to the decline and loss of populations of the Appalachian elktoe and threaten the remaining populations. These factors include pollutants in wastewater discharges (sewage treatment plants and industrial discharges); habitat loss and alteration associated with impoundments,

channelization, and dredging operations; and the runoff of silt, fertilizers, pesticides, and other pollutants from land-disturbing activities that were implemented without adequate measures to control erosion and/or storm water (Service 1994, 1996). Mussels are known to be sensitive to numerous pollutants, including, but not limited to, a wide variety of heavy metals, high concentrations of nutrients, ammonia, and chlorine—pollutants commonly found in many domestic and industrial effluents (Havlik and Marking 1987). In the early 1900s, Ortmann (1909) noted that the disappearance of unionids (mussels) is the first and most reliable indicator of stream pollution. Keller and Zam (1991) concluded that mussels are more sensitive to metals than commonly tested fish and aquatic insects. The life cycle of native mussels makes the reproductive stages especially vulnerable to pesticides and other pollutants (Fuller 1974, Gardner et al. 1976, Ingram 1957, Stein 1971). Effluent from sewage treatment facilities can be a significant source of pollution that can severely affect the diversity and abundance of aquatic mollusks. The toxicity of chlorinated sewage effluents to aquatic life is well-documented (Bellanca and Bailey 1977, Brungs 1976, Goudreau et al. 1988, Tsai 1975), and mussel glochidia (larvae) rank among the most sensitive invertebrates in their tolerance of the toxicants present in sewage effluents (Goudreau et al. 1988). Goudreau et al. (1988) found that the recovery of mussel populations may not occur for up to 2 mi below the discharge points of chlorinated sewage effluent.

Land-clearing and -disturbance activities carried out without proper sedimentation and storm-water control pose a significant threat to the Appalachian elktoe and other freshwater mussels. Mussels are sedentary and are not able to move long distances to more suitable areas in response to heavy silt loads. Natural sedimentation resulting from seasonal storm events probably does not significantly affect mussels, but human activities often create excessively heavy silt loads that can have severe effects on mussels and other aquatic organisms. Siltation has been documented to adversely affect native freshwater mussels, both directly and indirectly (Aldridge et al. 1987, Ellis 1936, Kat 1982, Marking and Bills 1979). Siltation degrades water and substrate quality, limiting the available habitat for freshwater mussels (and their fish hosts), thereby limiting their distribution and potential for the expansion and maintenance of their populations; irritates and clogs the gills of filter-feeding mussels, resulting in reduced feeding and respiration; smothers mussels if sufficient accumulation occurs; and increases the potential exposure of the mussels to other pollutants. Ellis (1936) found that less than 1 in of sediment deposition caused high mortality in most mussel species. Sediment accumulations that are less than lethal to adults may adversely affect or prevent the recruitment of juvenile mussels into the population. Also, sediment loading in rivers and streams during periods of high discharge is abrasive to mussel shells. Erosion of the outer shell allows acids to reach and corrode underlying layers that are composed primarily of calcium, which dissolves under acid conditions (Harman 1974).

The effects of impoundments on mussels are also well-documented. For the most part, lakes do not occur naturally in western North Carolina and eastern Tennessee (most of them are man-made); and the Appalachian elktoe, like the majority of our other native mussels, fish, and other aquatic species in these areas, is adapted to stream conditions

(flowing, highly oxygenated water and coarse sand and gravel bottoms). Dams change the habitat from flowing to still water. Water depth increases, flow decreases, and silt accumulates on the bottom (Williams et al. 1992), altering the quality and stability of the remaining stream reaches by affecting water flow regimes, velocities, temperature, and chemistry. Cold water released from near the bottom of reservoirs lowers the water temperature downstream, changing downstream reaches from warm- or cool-water streams to cold-water streams, affecting their suitability for many native species that historically inhabited these stream reaches (Miller et al. 1984, Layzer et al. 1993). The effects of impoundments result in changes in fish communities (fish host species may be eliminated) (Brimm 1991) and in mussel communities (species requiring clean gravel and sand substrates are eliminated) (Bates 1962). In addition, dams result in the fragmentation and isolation of populations of species and act as effective barriers to the natural upstream and downstream expansion or recruitment of mussel and fish species.

The information available demonstrates that habitat deterioration resulting from sedimentation and pollution from numerous point and nonpoint sources, when combined with the effects of other factors (including habitat destruction, alteration, and fragmentation resulting from impoundments, channelization projects, etc.), has played a significant role in the decline of the Appalachian elktoe. We believe this is particularly true of the extirpation of the Appalachian elktoe from the Swannanoa River, most of the French Broad River, and long reaches of the Pigeon, upper Little River, and upper Little Tennessee River systems. We believe these factors also have contributed to the extirpation of the species from parts of the upper Tuckasegee River, Cheoah River, and Tulula Creek, though the effects of impoundments are believed to have played an even more significant role in the loss of the species in the upper reaches of these streams.

Immediate threats to the remaining populations of the Appalachian elktoe are associated with sedimentation and other pollutants (i.e., fertilizers, pesticides, heavy metals, oil, salts, organic wastes, etc.) from point and nonpoint sources, specifically from WWTPs. Much of the Nolichucky River in North Carolina contains heavy loads of sediment, primarily from past land-disturbing activities within its watershed, and suitable habitat for the Appalachian elktoe appears to be very limited in this river system. The species has not been found in the Nolichucky River system in substrates with accumulations of silt and shifting sand; it is restricted to small scattered pockets of stable, relatively clean, and gravelly substrates. The same is true of the other surviving populations of the species.

C. Analysis of the Species and Critical Habitat Likely to be Affected

Species - During the comprehensive mussel survey efforts mentioned previously, at least 73 mi of stream in the Nolichucky River system were found to be occupied by the Appalachian elktoe. Mussels were located immediately upstream of the Cane River Bridge on US 19 and in the footprint of the existing bridge over the South Toe on US 19. The highest catch per unit effort for the Appalachian elktoe during the comprehensive surveys in the basin was 16 per hour (total of 96 individuals); this occurred at a site in the South Toe River (Fraley and Simmons 2004).

Appalachian elktoe densities vary, depending on the many factors that cause their distribution pattern to be scattered and difficult to generalize. Based on surveys for the Appalachian elktoe from other drainages, the number below the substrate surface is highly variable and dependent on the substrate. In general, mussels can be very difficult to locate in the substrate, and most mussel surveys detect only those specimens located at or on the surface of the substrate. It is likely that additional mussels were present in the survey areas but were overlooked or were not visible on the surface of the stream bottom. It is also likely that fewer mussels are currently present at the survey sites because of impacts from the 2004 hurricanes. Therefore, accurate estimates of the total number of Appalachian elktoes that will be impacted (both above and below the surface of the stream bottom) are not possible, but the numbers are likely different from those recorded during the surveys.

Critical Habitat – In the Nolichucky River basin, designated critical habitat (Unit 6) includes 3.7 mi of the main stem of the North Toe River, Yancey and Mitchell Counties, North Carolina, from the confluence with Big Crabtree Creek, downstream to the confluence of the South Toe River; 14.1 mi of the main stem of the South Toe River, Yancey County, North Carolina, from the SR 1152 crossing, downstream to its confluence with the North Toe River; 21.6 mi of the main stem of the Toe River, Yancey and Mitchell Counties, North Carolina, from the confluence of the North Toe River and South Toe River, downstream to the confluence of the Cane River; 16.5 mi of the main stem of the Cane River, Yancey County, North Carolina, from the SR 1381 crossing, downstream to its confluence with the Toe River; and 13.5 mi of the main stem of the Nolichucky River from the confluence of the Toe River and the Cane River in Yancey and Mitchell Counties, North Carolina, downstream to the US 23/19W crossing, southwest of Erwin, Unicoi County, Tennessee.

Given that the Appalachian elktoe occurs within the area of the Cane River Bridge and the South Toe River Bridge and throughout the area of the highway widening in the Nolichucky River basin, it follows that the constituent elements necessary for critical habitat are present within the project area. Following is a brief description of the status of the constituent elements within the project area:

1. Permanent, flowing, cool, clean water - There is variation in stream flow within critical habitat; however, there is always permanent flowing water. Based on the DWQ's bioassessments of benthic macroinvertebrate and fish sampling, the water appears to be cool and clean enough to sustain a population of the Appalachian elktoe.

2. Geomorphically stable stream channels and banks - Overall, the stream channels and banks are stable in the project area, although there are unstable areas on some river reaches

3. Pool, riffle, and run sequences within the channel - The Cane River, Toe River, and North Toe River have natural pool, riffle, and run sequences, varied by the local

stream gradient and bedrock influence. There is a natural pool, riffle, and run sequence at the sites of the Cane River Bridge and the South Toe River Bridge and over the total project area.

4. Stable sand, gravel, cobble, and boulder or bedrock substrates with no more than low amounts of fine sediment - The habitat within the project area at the South Toe Bridge site consists of large cobble with some exposed bedrock and small patches of gravel and course sand providing microhabitat for the Appalachian elktoe. The Cane River crossing has poor habitat, consisting primarily of fine sediments directly under the bridge. Habitat within the project area for the highway widening is patchy, with some areas having more fine sediments than others.

5. Moderate to high stream gradient - The Cane River, Toe River, and North Toe River are characterized as having a high stream gradient. Some portions of these reaches in the alluvial floodplain have some moderate stream gradient, but nowhere can the stream be characterized as having a low gradient.

6. Periodic natural flooding - Natural peak events occur throughout the Nolichucky River basin.

7. Fish hosts, with adequate living, foraging, and spawning areas for them - Recent sampling by the NCWRC and TVA identified fairly diverse fish communities, including many of the potential host fishes for the Appalachian elktoe in the Cane River, Toe River, and North Toe River.

III. ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the "effects of the action" on federally listed species, we are required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and the past and present impacts of all federal, state, or private actions and other activities in the action area (50 CFR 402.02), including federal actions in the area that have already undergone section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline for this Opinion considers all projects approved prior to the initiation of formal consultation.

A. Status of the Species within the Action Area

Surveys occurring between 2000 and 2003 indicated that suitable habitat within at least 73 mi of stream in the Nolichucky River system were occupied by the Appalachian elktoe; an apparent 15-mi increase from reported occupied habitat prior to 2000 (Fraley and Simmons 2004). These surveys also suggest that the population was growing in numbers because sites occupied during surveys in 2000 and 2003 produced higher catch per unit efforts than the nearest sites sampled prior to 2000 (Fraley and Simmons 2004). The Appalachian elktoe is not evenly dispersed throughout the 73-mi range

within the basin because contiguous suitable habitat is a limiting factor. The NCWRC's sampling efforts after the floods of 2004 indicate that the flooding had a significant negative impact on the existing population; however, though apparently fewer in number, elktoe specimens were found throughout most of the occupied range known in 2003.

In addition to the NCWRC sampling conducted after the flooding, another set of sites was surveyed in 2005 (TCG 2006) to determine the presence of the Appalachian elktoe at specific sites where flood recovery work was proposed by the Natural Resources Conservation Service (NRCS). This set of surveys located elktoe specimens at a number of sites in the Cane, North Toe, and South Toe Rivers. Although these surveys were not as comprehensive as those conducted in 2003, they do indicate that the Appalachian elktoe was present at a number of specific sites in the year after the flooding.

The constituent elements necessary for critical habitat are present within the project area and could be affected by project construction and related activities. The following is a list of the constituent elements that may be impacted by the project:

1. Permanent, flowing, cool, clean water - There could be increases in the amount of sediment and other pollutants that enter the rivers from construction activities and the demolition of the South Toe River Bridge. There also may be impacts from the project after construction, including increases in the total discharge and pollutant loading from roadway runoff and increases in sediments from destabilized tributary channels after culvert extension or replacement.

2. Geomorphically stable stream channels and banks – The river channels will be temporarily impacted during the construction process at the bridge sites.

3. Pool, riffle, and run sequences within the channel – Tributaries that are impacted from the highway widening may be destabilized and impact the rivers downstream. The flow of the rivers could change while the temporary causeways are in place.

4. Stable sand, gravel, cobble, and boulder or bedrock substrates with no more than low amounts of fine sediment – As stated previously, the amount of sediment could increase during the construction period from the highway widening, bridge construction and demolition, and culvert extensions or replacements on tributaries.

B. Factors Affecting the Species' Environment in the Action Area

Some residential development and agricultural practices have impacted the aquatic habitat in the action area, particularly the riparian habitat. Because riparian areas have been cleared of trees and other woody vegetation and rock has been placed on the riverbanks, high-water events have resulted in bank erosion and failure at several areas in the Nolichucky River basin. The deforested and fragmented riparian buffer also reduces the effectiveness of the buffer to filter sediments and chemical pollutants. In

addition, Japanese knotweed has invaded riparian areas and essentially eliminated native deeper-rooted vegetation, creating riparian instability, particularly during high flows.

Two bridges along the Toe River--B-2081 and B-3089--have been replaced within the last 10 years. No mussels were discovered within the impact area of these bridges, and critical habitat was not designated at that time. During August and September of 2004, significant flooding occurred in the Nolichucky River drainage. The NRCS proposed the implementation of the Emergency Watershed Protection (EWP) Program to restore areas impacted by the flooding. In December 2005, a biological opinion was issued to the NRCS for implementation of the EWP Program. That biological opinion assessed the direct and indirect impacts to 3,325 lf of stream within the Nolichucky River basin and any additional indirect impacts to 1,312 ft downstream of each of the 18 individual restoration project "footprints." Other federal actions include two bridge replacements on the Toe River—B-1443 and B-2848--that are currently under construction. Formal consultation was completed for these projects in 2006. The biological opinion assessed impacts from the construction and demolition of the two bridges and permanent impacts to 89 ft^2 of river habitat. Mussels were relocated out of the footprint of the two construction sites. We do not have information concerning any additional federal actions ongoing or proposed for the action area at the present time.

IV. EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. The federal agency is responsible for analyzing these effects. The effects of the proposed action are added to the environmental baseline to determine the future baseline, which serves as the basis for the determination in this Opinion. Should the effects of the federal action result in a situation that would jeopardize the continued existence of the species, we may propose reasonable and prudent alternatives that the federal agency can take to avoid a violation of section 7(a)(2). The discussion that follows is our evaluation of the anticipated direct and indirect effects of the highway widening, the addition of a new bridge over the Cane River, and the replacement of the bridge over the South Toe River. Indirect effects are those caused by the proposed action that occur later in time but are still reasonably certain to occur (50 CFR 402.02).

A. Factors to be Considered

Proximity of the Action – Based on the 2002 mussel survey conducted by the NCDOT and subsequent surveys in 2004 and 2005 by the NCWRC and others, Appalachian elktoe mussels occur throughout the Cane, North Toe, and South Toe Rivers, downstream of the highway widening and in the vicinity of the existing bridges where construction will occur. Although measures to avoid and minimize impacts to the rivers and the Appalachian elktoe are included in the project plans, implementation of

the bridge projects and the highway widening will result in unavoidable impacts to the river habitat and to individual mussels.

Nature of the Effect – Permanent impacts to 108 tributaries from culvert extensions will occur along the 21 mi of highway widening within the Nolichucky River basin, with some impacts likely reaching the main stem of the Toe and Cane Rivers. Additionally, there will be impacts to the continuity of aquatic habitat in the project area from these culvert extensions.

About 50 ft^2 of in-stream habitat will be impacted permanently at the Cane River crossing by placing one pier at the wetted perimeter of the river. Temporary impacts of 700 ft^2 and 9,600 ft^2 will occur at the Cane and South Toe river crossings, respectively. Suitable in-stream habitat at both construction sites also will be affected for the duration of the construction and demolition and likely for some period after completion of the projects. Portions of the habitat may be impacted permanently by the construction and use of the causeways. A small portion of the riparian area at both sites may be cleared for equipment access, which could result in temporary increases in water temperature at each location until reforestation can occur.

Disturbance Duration, Frequency, and Intensity – The highway widening will create disturbance to tributaries and downstream resources that will be ongoing in different segments of the project for years. With appropriate sediment- and erosion-control measures, large inputs of sediment should be avoided during construction. After the project is completed and the roadway opens to traffic, there will be increases in storm-water runoff volume and pollutants, some of which may reach areas occupied by and designated as critical habitat for the Appalachian elktoe.

Disturbance to the riverbed from bridge construction will occur over a relatively short period of time from the construction of the bridge piers at the Cane River crossing. However, the disturbance to the river's flow pattern at the piers will exist throughout the life of the bridge. The causeways for construction and demolition will be in place for the length of time needed to construct and demolish the bridges; therefore, the disturbance to the riverbed associated with the causeways will be over an extended period of time. Although there will be direct impacts to the riverbed associated with the causeways, the construction of the causeways will be phased to limit the amount of causeway in the river at any one time, and only the causeways needed for an activity will be in place during that activity and will be removed when the action is completed. The causeways will be constructed with clean stone and pipes so that the river can flow through, not just over, the causeways. However, there will be temporary impacts to the hydrology of the river both upstream and downstream of the causeways.

B. Analyses of Effects of the Action

Potential Beneficial Effects - The construction and demolition of the existing bridges and the highway widening have negative impacts but also have some long-term beneficial effects, primarily because of the opportunity to change or augment structures

and designs to correct existing problems and minimize impacts to the environment. Specifically, the NCDOT has described the following beneficial effects that could result from these projects:

1. *Reduction of direct storm-water runoff at bridge locations.* Storm water from the existing bridges enters the river directly from the bridge decks. The new bridges will collect and direct storm water to the ends of the bridges and discharge the deck drainage into vegetated buffers before entering the river. Storm water coming off the approaching roadways at the bridge locations will be managed in a similar manner. The elimination of direct roadway discharge into the Cane and South Toe Rivers should result in localized improvement of water quality and potentially have some beneficial effect on the Appalachian elktoe. Additionally, hazardous spill catch basins will be constructed at the crossings to further provide protection for the rivers from possible future hazardous spills.

2. *Elimination of bents in the main river channel.* The existing crossing of the South Toe River has three sets of double piers in the river channel that will be eliminated with a new spanning structure. The elimination of these piers in the South Toe River is expected to reduce the bridge's effects on stream-flow patterns at this bridge site.

3. *Japanese knotweed control.* The NCDOT has committed to control Japanese knotweed at the two bridge construction sites and at other identified locations throughout the highway-widening project. Soil contaminated with the plant material will be removed and buried on-site to prevent spread to other areas, and areas occupied by the plant may be treated with appropriate herbicides.

4. *Replacing the existing culvert over Bald Creek with a bridge.* An existing box culvert on Bald Creek will be replaced with a bridge. The creek will be able to follow a more natural valley course and will be able to reestablish access to its floodplain when it is removed from the current culvert. This will restore connectivity and function in this reach of Bald Creek.

5. *On-site stream restoration.* The majority of the existing highway follows valley bottoms, where tributaries to the Cane and Toe Rivers have been moved and channelized and have little or no riparian buffer. As described previously in the "Conservation Measures" section, the NCDOT identified over 11,000 lf of on-site stream preservation, enhancement, and restoration that will be implemented in the Nolichucky River basin (see Appendix E). In addition to meeting regulatory requirements to mitigate unavoidable stream impacts, on-site mitigation provides an opportunity to improve these tributaries to the Cane and Toe Rivers, thereby improving water quality and habitat stability in the watershed.

Direct Effects - Actions associated with bridge replacement that may result in direct impacts include the installation of causeways for the construction of new structures and the demolition of an existing structure, land clearing for access, potential toxic spills,

removal of causeways after construction, and demolition of the existing bridge structure at the South Toe River. Actions associated with highway widening that may result in direct impacts include the replacement or lengthening of culverts on tributaries and increases in impervious surfaces and storm-water runoff along the highway widening. All of these activities have the potential to kill or injure mussels, either by crushing them; poisoning them with the release of some toxic substance; or causing siltation, which may suffocate them and/or destroy suitable habitat or their fish hosts. These actions may result in direct harm to individuals or negative changes in currently suitable habitat.

The following impacts section is separated into two discussions--(1) the impacts from bridge construction and demolition at the occupied river sites and (2) the impacts from the highway widening.

BRIDGE CONSTRUCTION AT THE CANE AND SOUTH TOE RIVERS

Substrate Disturbance and/or Habitat Loss

The existing bridge on US 19E over the Cane River (Bridge No. 9) will be widened during project construction. Widening the bridge involves constructing an adjacent structure to the north (downstream) of the existing bridge. The piers for the new bridge line up with the existing piers to reduce scour around the piers from accumulated debris. The east interior bent is currently on the bank. For bent construction, a stone work pad would be necessary but would not be installed in the river. The west interior bent is approximately 10 ft out in the river. The distance between the bank and the new west interior bent becomes smaller downstream of the existing bridge. A small causeway will be needed to construct the west interior bent. Temporary impacts to the streambed for this causeway are approximately 500 ft^2. A total of four drilled piers with 4-foot-diameter shafts would be needed for the new adjacent structure. The total direct impact to the streambed is 50 ft^2 for the four shafts.

The current proposal is to set the new bridge girders in place from the bank. If the girders cannot be set from the bank, a work bridge will be necessary. The streambed impacts from a work bridge would be temporary. A conservative estimate of streambed impact would be 5 ft by 20 ft (100 ft^2) per bridge foundation. Two foundations would be needed for the work bridge. Total streambed impacts for the work bridge foundations would be 200 ft^2.

The proposed structure will result in 50 ft^2 of permanent impacts to the streambed as a result of bent placement in the river. Additionally, 500 ft^2 of streambed will be impacted by a causeway needed to construct the west interior bent, and 200 ft^2 of streambed will be impacted by the work bridge foundations.

The existing US 19E Bridge over the South Toe River (Bridge No. 43) is proposed to be replaced with a new dual structure on similar alignment, 40 ft south of the existing

structure. The US 19E South Toe Bridge preliminary design for R-2519B is proposed to span the river with a simple span plate girder bridge with a main span of 170 ft.

Based on current information, a total of five causeways are proposed for construction of the South Toe River Bridge. Two 40- by 60-foot causeways will be needed for placing the temporary bents in the water. Two 30- by 50-foot causeways are recommended for placing the girders. One 30- by 60-foot causeway will be needed for removing the existing bent. The total temporary impacts would be 9,600 ft^2, which is a worst-case scenario. Further details regarding removal of the existing Bridge No. 43 will be developed in coordination with the Corps, NCWRC, DWQ, and Service. It is assumed in this impact analysis that the bridge will be removed in a manner that will prevent debris from the bridge from entering the river.

Impacts from Sedimentation

Because of the topography and the erodible nature of the soils in the area adjacent to the bridge projects (fine loamy soils with moderate erodibility), project construction has the potential to result in some sedimentation in the Cane and South Toe Rivers. The amount of sedimentation will be minimized by the implementation and maintenance of specific erosion-control measures for these projects, designed to protect environmentally sensitive areas. The placement and removal of causeway stone will create some turbidity from disturbance of the channel bed, but the impacts will be negligible. The clearing of vegetation on the riverbanks will be minimized, and erosion-control measures will remain in place until vegetation is reestablished.

Impacts from Roadway Runoff

Direct highway ditch discharge will be eliminated at the two new bridges. Discharge will be routed through the spill basins or through a grass-lined ditch prior to reaching the respective rivers. This will reduce roadway runoff into the Cane River and South Toe River. The elimination/reduction of runoff to the rivers is expected to result in a decrease of daily pollutant loads in the receiving water. This may result in localized improvements to water quality and thus have a beneficial effect on the Appalachian elktoe or a reduction of the likely adverse effects. Upon completion of the combined projects, there will be a reduction in the amount of roadway runoff directly entering the Cane River and South Toe River at these respective crossings as a result of storm-water management and the elimination of direct discharge.

Impacts from Changes in Hydrology

The temporary causeways proposed at both bridge sites will narrow the channel and alter hydrology, resulting in localized changes in flow patterns at the respective sites. The change in hydrology and any associated scour could result in the loss or displacement of mussels. However, the change in hydrology will be temporary, during the life of the respective causeways, and the design of the causeways (allowing for flow through the causeways) should minimize the impacts to hydrology and associated

impacts. The NCDOT will monitor the riverbed and stream-bank stability before, during, and after construction at both bridge sites. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will correct the problems.

The NCDOT will monitor river conditions at both bridge sites before and after the construction to document any negative changes to the stream cross section because of construction. In particular, at the Cane River crossing, if there are negative changes in river geomorphology related to the new bridge, the NCDOT will take appropriate steps to protect the mussel populations near the bridge. This may include placing other structures in the water to redirect the flow. The need for any in-stream structures will be determined through monitoring but may include cross vanes or other appropriate devices.

Impacts to Fish Hosts

In addition to the potential changes in hydrology as a result of the causeways, there is the potential for the causeways to act as velocity barriers to fish movement. The disruption of fish movement could impact the Appalachian elktoe if fish hosts for the elktoe are unable to move freely in the rivers. These temporary disruptions to fish movement may cause some loss in recruitment to upstream or downstream areas for the time the causeways are in place. The following design factors should reduce the impacts to fish movement: the causeways will be temporary structures in the river, at least 50% of the channel will be unrestricted by the causeways at any given time, and the causeways are designed to allow for linear flow. Given these design features, the causeways are not expected to have a significant long-term impact on fish movement or the life cycle or distribution of the Appalachian elktoe in the Cane or South Toe Rivers.

HIGHWAY WIDENING

Impacts to Tributaries in the Nolichucky River Basin

The primary impacts to tributaries will be through culvert extension and/or increasing diameter and may include stream destabilization and fragmentation of aquatic habitat. To accommodate the highway widening, existing tributaries crossed by a culvert will have the current culvert extended by adding to the existing structure or the culvert will be removed and replaced with a new, longer culvert. Some culverts will be replaced with structures that also have greater capacity. Culverts will be extended to approximately triple their current length. For example, if the stream crosses under the road perpendicular to the road alignment, a culvert will be extended from about 50 ft to 150 ft in length. This accounts for two additional lanes, a grassed median, and paved shoulders. The additional culvert lengths will be greater in situations where they must be placed at a skew to the road. These culvert extensions and/or increased diameters could significantly impact the stability of the tributaries and cause erosion, increased sediment, and downstream habitat degradation.

Increases in storm-water inputs to tributaries from the road surface and shoulders also can concentrate and convey chemical pollutants directly into larger streams. With the increased amount of paved surface, chemical pollutants (including a variety of metals, petroleum substances, and winter deicing chemicals) will increase. Concentrations of metals in stream sediments are positively related to the volume of traffic and accumulate in proportion to the length of highway drained, suggesting that pollution will be most severe when large highways are drained by small streams (Wheeler et al. 2005). In addition to changes in sediment and chemical loads, smaller tributaries, especially those on steeper gradients, will be fragmented (for some species) by longer culvert lengths. This aquatic fragmentation can change sediment inputs over time, isolate aquatic populations, and greatly decrease downstream habitat quality.

There are 108 tributaries to the Cane, South Toe, and North Toe Rivers that will be impacted by this project. The impacts vary in length from a 10-foot tail ditch to a 750-foot-long concrete box culvert. Forty-one percent of the impact area occurs within 1 mi of either the Cane River or the South Toe River, and seventy-seven percent of the impact area occurs within 3 mi or less of the Cane, South Toe and North Toe Rivers.

Cane River -There are 42 stream-impact sites within the Cane River subbasin. Bald Creek is the major tributary west of the project crossing of the Cane River, and Pine Swamp Branch is the major tributary on the east side of the project crossing of the river. The roadway corridor follows the valley formed by these two streams and crosses the streams multiple times, including 20 tributaries to Bald Creek and 3 tributaries to Pine Swamp Branch. Price Creek, Phipps Creek, and an unnamed tributary to the Cane River also are crossed.

Of the 42 tributaries crossed, 20 of the impact sites are within a mile of the Cane River. The majority of these crossings are small unnamed tributaries to Bald and Price's Creeks. Given the size of the streams and length of the culvert extensions, it is likely that the upstream and downstream portions of these tributaries will be effectively fragmented from each other. Thirty-eight of the tributary crossings are 3 mi or less from the Cane River. The total length of culvert extension impacts to tributaries within 3 mi of the Cane River is over 5,000 lf.

South Toe River - There are 48 tributary impact sites in the R-2519A and B sections of the proposed action that occur within the South Toe River subbasin. Little Crabtree Creek is the major tributary to the South Toe River, arising approximately 7.5 mi west of the South Toe River in Burnsville. Little Crabtree Creek flows through the town of Burnsville. Roadway plans for this urban section are curb-and-gutter, currently designed without storm-water treatment. Of the 48 tributaries impacted by these sections of the project, 24 sites are within a mile of the South Toe River. Thirty-six of the tributary crossings are 3 mi or less from the South Toe. The total length of culvert extension impacts to tributaries within 3 mi of the South Toe is over 6,200 lf.

North Toe River - The North Toe River is not crossed by the proposed action; however, a total of 18 stream segments within the North Toe River subbasin will be impacted

based on the preliminary design plans for the preferred alternative for this action. Of the tributaries affected by the project, three are crossed within 3 mi of the North Toe River. There are a number of North Toe tributary crossings affected by the project, but they are farther away from the main-stem river because of the existing road position in the valley.

Of particular concern are the project's impacts to Big Crabtree Creek and its tributaries. Big Crabtree Creek is very important to the North Toe River and the Appalachian elktoe because of its excellent water quality and relative lack of disturbance from the headwaters to the North Toe. Big Crabtree Creek is eligible for "Outstanding Resource Water" designation. This large, high-quality tributary drains a large area and provides suitable habitat for the Appalachian elktoe. At its confluence with the North Toe, it is designated critical habitat for the elktoe. The North Toe is occupied by the elktoe upstream and downstream of the confluence with Big Crabtree Creek, and the occupied range of the elktoe has expanded in this river reach over the last decade. The four-barrel box culvert that carries Big Crabtree Creek under US 19 has created overwidening of the channel upstream and scour downstream of the crossing.

The majority of these tributaries currently are impacted by the existing highway. The NCDOT has committed to culvert design and installation that will maintain stream stability and fish passage and correct existing problems, such as perched culverts and barriers to aquatic passage. Even with the careful design and installation of new culverts and culvert extensions, this project will result in negative impacts to overall aquatic function and connectivity in the watershed.

Impervious Surfaces and Roadway Runoff

According to the numbers provided in the BA, the new lanes of highway will create an additional 88.6 ac of impervious surface area in the Nolichucky River basin. This is about 4 ac of additional impervious surface per mile of road widening or roughly the equivalent of building a WalMart, including the parking area, along every mile of the roadway project. Without appropriate treatment for chemical and thermal pollutants and infiltration areas to absorb the additional volume, this added impervious surface area will have a negative impact on water quality and habitat in the Nolichucky River basin and on the Appalachian elktoe and its habitat. The NCDOT has designed this project with grass swales and other BMPs proven to treat storm water and remove significant percentages of sediment and other pollutants and provide for the infiltration and attenuation of runoff. With these measures in place, significant impacts to the Appalachian elktoe and its critical habitat are not expected.

Direct Impacts - Critical Habitat - There is a projected temporary loss of habitat from construction causeways at the South Toe River crossing that occurs in designated critical habitat (Unit 6). The 9,600 ft^2 of projected temporary impacts likely will be reduced as final construction and demolition plans are made. The projected temporary impact is very small compared to the total amount of habitat occurring in the 69.4 rm

comprising Unit 6. This temporary loss of habitat is not expected to significantly impact any of the primary constituent elements from the impacted river reach.

Project-related erosion and sedimentation coming from the multiple tributary crossings could potentially impact critical habitat in the Cane, South Toe, and North Toe Rivers. The potential for this type of impact decreases with increasing distance of the tributary from the receiving river. Erosion-control standards will be strictly enforced by the NCDOT to ensure that these potential impacts are minimal. The enforcement of the stringent erosion-control measures proposed for this project will minimize the potential for these impacts to occur.

Indirect Effects - Indirect effects are defined as those that are caused by the proposed action and are later in time but are still reasonably certain to occur (50 CFR 402.02). Indirect effects to the Appalachian elktoe may include a higher potential for toxic spills; highway widening effects on tributaries that lead to aquatic fragmentation or chronic instability and sedimentation; and changes in land use, induced development, and urbanization, including increases in impervious surface area in the watershed.

Potential for Toxic Spills

The current bridges on US 19 at the Cane and South Toe River crossings discharge deck drainage directly into the rivers and have no hazardous spill basins. The construction of new bridges at these locations will eliminate the direct discharge of bridge deck drainage to the Cane and South Toe Rives, and hazardous spill basins will be constructed at both crossings. The elimination of direct discharge and the installation and proper use of hazardous spill basins in these locations will minimize the possibility of impacts from toxic spills to a level equal to or less than that which occurs with the current highway.

Tributaries

The negative effects of culverts on fish passage and stream geomorphology are well-documented (Baggett et al. 2001, Moser and Terra 1999, Carey and Wagner 1996, Formann et al. 2003). As previously described, many of the stream crossings along the project alignment are proposed to be extensions of existing structures. Although the design of the culverts incorporates measures that reduce the potential for impacts, many of these culverts will still act as barriers to some fish species, and some of the culverts will negatively impact stream geomorphology. The majority of the tributaries impacted do not support the Appalachian elktoe because they are too small, have too high a gradient, or have other habitat restrictions. However, all of the tributaries are important to overall aquatic ecosystem function. The smaller tributaries provide habitat for a number of important species not found in larger rivers and food sources and woody debris that support the larger streams and rivers. In addition, changes to the current structures in these tributaries can destabilize the streams, causing bed and bank erosion, adding to sediment in the receiving waters or over the longer term and permanently influencing sedimentation patterns and habitat quality. Appropriate design and

commitment to postconstruction monitoring and remediation will minimize future problems with stream stability. In addition, existing problems will be identified and corrected through implementation of the project.

Land Use

The 2004 Indirect and Cumulative Effects (ICE) analysis for this project (HNTB North Carolina 2004) identified a Potential Growth Impact Area (PGIA) of approximately 2.0 mi on either side of the existing roadway. Accounting for meanders and direction of flow (running parallel to the road), 10 rm of the Cane River, 6.5 rm of the South Toe River, and 3.5 rm of the North Toe River occur within the PGIA. The majority of the river reaches within the PGIA are occupied by the Appalachian elktoe. Additionally, the entire reach of the South Toe River in the PGIA is designated critical habitat, as well as 1.25 mi of the North Toe River and 0.25 mi of the Cane River.

The proposed project will improve access to future I-26 and I-40 and provide new construction and expansion opportunities for businesses. Highway-oriented commercial development is anticipated near the US 19 and future I-26 interchange (NCDOT 2001) as well as within or adjacent to Burnsville and Spruce Pine, where sewer and water services exist or are planned (NCDOT 2007). Although slight declines in the permanent population have occurred in the project study areas in recent years, additional new growth that is likely to occur may be related to second-home and retiree development and the associated tourism sectors of the economy as the number of new home starts has grown in recent years (NCDOT 2007).

Within the PGIA, areas with "High Potential for Impact" and "Medium Potential for Impact" are identified. The areas with the highest potential for impacts are at the western terminus of the project with I-26 in Madison County, within the Town of Burnsville, and at the eastern terminus of the US 19E widening in Spruce Pine. The 2007 ICE likewise recognized the western terminus of the project and the cities of Burnsville and Spruce Pine as having the highest potential for induced growth because these areas have, or are proposed to have, sewer and water service infrastructure. Development within unincorporated areas outside of these three identified areas is expected to continue at historic rates and patterns due to constraints associated with the lack of sewer and water services, steep topography, and other natural constraints (NCDOT 2007).

Yancey County experienced a 15.3% population growth from 1990 to 2000, compared to 3.2% from 1980 to 1990. Mitchell County experienced lower growth rates between these decades--0.1% from 1980 to 1990 to 8.6% from 1990 to 2000. The 16.2% growth rate of the demographic area studied in the 2004 ICE for this project is higher than the overall growth rates of the respective counties, suggesting that development patterns in these counties is largely occurring along the US 19/US 19E corridor. However, these growth rates are still less than the 21.4% statewide increase during the period from 1990 to 2000 (HNTB North Carolina 2004).

The difference in growth rate of Yancey County as compared to that of North Carolina appears to be due in part to distance from interstate highways and large metropolitan areas, the shortage of easily developable lands in the Appalachian region, and limited water and sewer services. However, development pressures do exist within this region. Tourism, an increasingly important part of the local economy, is assisting the market for second-home development. Regionally, the proposed improvements to US 19E, in combination with other area projects, will strengthen the link between the Asheville and Boone areas and will make the area more accessible to a greater number of tourists, enhance truck access to I-26 and I-40, and shorten the commute to metropolitan Asheville (NCDOT 2001).

Yancey County and the Town of Burnsville adopted a Land Development Plan in 2001. It directs intensive urban development away from environmentally sensitive areas and promotes cluster development adjacent to US 19/19E, where sewer and water services currently exist or are proposed and some development already exists (NCDOT 2007). Yancey County does not have a zoning ordinance but does implement a watershed water supply protection ordinance through its building permits and inspections office (NCDOT 2007). Despite the fact that a zoning ordinance is in place, local officials in Burnsville indicate that special permits and variances are commonly requested and granted (HNTB North Carolina 2004). There are no formal land-use plans in place for Mitchell County or the Town of Spruce Pine; however, Spruce Pine does have a zoning ordinance enforced by the Mitchell County Department of Inspections (NCDOT 2007).

Although existing land-use plans and zoning ordinances tend to discourage strip commercial development along the corridor (NCDOT 2007), some tourist-oriented businesses, which provide goods and services for through travelers, would likely locate along US 19E. The improved corridor would create better access and volume of business in addition to having water and sewer services available or proposed. This could result in linear sprawl, with its associated congestion and safety concerns. The use of medians with the proposed improvement should minimize this possibility (NCDOT 2001).

Recent development trends in Yancey County indicate that upscale residential communities of second homes and small-scale commercial uses (HNTB North Carolina 2004) are becoming more prevalent (NCDOT 2007). Additionally, the improved roadway may make commuting to areas outside the demographic area more attractive, bringing new permanent residents to the area. This effect diminishes from west to east as the distance from Asheville, the regions largest employment center, increases (NCDOT 2007). The amount of induced development will vary along the corridor but will most likely be greatest within areas that are currently, or proposed to be, serviced by water and sewer.

Substantial industrial development is not considered likely due to the steep topography of the area. Local officials, however, have stated that there are some available industrial sites and that "the communities have a desire to grow the manufacturing employment base" and are hopeful that the improved accessibility provided by the

widened roadway will encourage future development to locate in the area (HNTB North Carolina 2004). There are no known plans for any redevelopment of the closed industrial and manufacturing facilities or new plants for future manufacturing (NCDOT 2007).

Impacts from changes in land use can result in adverse impacts to the Appalachian elktoe and its designated critical habitat. The most likely induced land-use impact is small-scale residential community and commercial developments. Development activities can result in various adverse impacts to water quality, such as sedimentation/erosion while the sites are being developed, increased storm-water impacts from an overall increase in impervious surface area, and the potential for increases in point-source and nonpoint-source pollution as the population expands and the watershed is developed. Future residential developments and future businesses may propose new sites for wastewater discharge or tap into existing facilities, all of which would result in an increase in the amount of wastewater discharge into the watershed.

The land suitability development potential within the identified ICE study area was analyzed under: (1) existing conditions; (2) a No-Build scenario (R-2518/R-2519); (3) a Future-Build 1 scenario (R-2518/R-2519), along with water and sewer infrastructure improvements; and (4) a Future-Build 2 scenario (R-2518/R-2519), with a higher weighting factor for the proposed roadway improvements. The results of this model indicate that the potential for induced development in the ICE study area is primarily due to the expansion of water and sewer services, and the overall projected growth with the project build is only slightly higher than under a No-Build scenario (NCDOT 2007).

Impervious Surface Area

Impervious surface areas can result in adverse effects to water quality. Multiple studies have demonstrated that water quality and stream ecosystem degradation begins to occur when impervious surface area in a watershed begins to increase. The NCWRC recommendation for the management of protected aquatic species watersheds is to limit imperviousness to 6% of the watershed (NCWRC 2002).

Future development and associated future improvements in the respective watersheds within the project action area will result in an increase in impervious surface area in the form of rooftops, driveways, parking lots, etc. Land-development trends indicate that there was little change in the level of imperviousness, modeled at 5.1%, within the ICE study area from 1986 to 2001 (NCDOT 2007).

Further examination, using the 2001 land cover data of the three subbasins of concern to the Appalachian elktoe, was conducted by Earth Tech (Earth Tech 2007). The Earth Tech data are described, by subbasin, as follows:

> "The North Toe River has 5.5 percent imperviousness. The North Toe subbasin contains 16,810 acres, of which 918 were impervious surface

acres. In order for the subbasin to reach six percent imperviousness an additional 91 acres of impervious surface would need to be built. Because of the coefficient or multiplier, this would be equivalent to 676 acres of low intensity residential, 311 acres of high intensity residential, or 186 acres of commercial/industrial land uses, or some combination thereof. The development of 676 acres of low intensity residential would represent a 41 percent increase over 2001 development levels. Likewise the 311 acres of high intensity residential would be a 93 percent increase and the 186 acres represents a 144 percent increase in commercial/industrial land uses.

"The South Toe subbasin contains 17,708 acres, of which 929 were calculated to be impervious surface acres (5.2 percent imperviousness). In order for the subbasin to reach six percent imperviousness an additional 134 acres of impervious surface would need to be built or the equivalent of 998 acres of low intensity residential, 459 acres of high intensity residential, or 275 acres of commercial/industrial land uses. The development of 998 acres of low intensity residential would represent a 53 percent increase over 2001 development levels. The 459 acres of high intensity residential would be a 180 percent increase and the 275 acres represents a 333 percent increase in commercial/industrial land uses.

"The Cane River subbasin contains 24,943 acres, of which 1,235 were impervious surface acres (4.9 percent imperviousness). In order for the subbasin to reach six percent imperviousness, an additional 263 acres of impervious surface would need to be built or the equivalent of 1,959 acres of low intensity residential, 902 acres of high intensity residential, or 539 acres of commercial/industrial land uses. The development of 1,959 acres of low intensity residential would represent a 91 percent increase over 2001 development levels. The 902 acres of high intensity residential would be a 435 percent increase and the 539 acres represents a 726 percent increase in commercial/industrial land uses."

Based on this analysis, there will be changes in land use and a gradual increase in impervious surface area in the Nolichucky River basin over time. Growth is predicted to be in the areas already serviced by sewer and water; and while this project will induce some development, the contribution of the project is "slight" compared to the expansion of sewer and water services. Linear sprawl will be controlled somewhat by the use of medians along the corridor. Increases in impervious surface area in the watershed will occur, but the rate is expected to remain gradual.

Indirect Impacts - Critical Habitat - Indirect impacts to critical habitat for the Appalachian elktoe (Unit 6) resulting from the proposed action include possible water quality degradation from induced changes in land use in the form of residential and, to a lesser extent, commercial and industrial development projects induced by this project.

These water quality impacts may compromise the primary constituent element of "clean" water in localized areas within the Unit 6 but are not expected to be widespread.

The other primary constituent elements of the designated critical habitat within the action areas, including stable streams and the presence of fish host species, are not expected to be significantly compromised by any indirect impacts associated with the proposed project. The construction of the Cane River and South Toe River crossings is not expected to result in significant channel instability or habitat degradation over time. The careful design and installation of the various culvert and pipe crossings on tributaries will minimize the potential for channel instability, which could ultimately affect critical habitat downstream of the respective crossings in the Cane, South Toe, and North Toe Rivers. Monitoring and remediation at these sites will further reduce the likelihood of impacts to critical habitat. Likely fish host species for the Appalachian elktoe will not be eliminated from the action area as a result of project-related indirect impacts.

V. CUMULATIVE EFFECTS

Action Area

Cumulative effects include the combined effects of any future state, local, or private actions that are reasonably certain to occur within the action area covered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

We are aware of several potential private actions that may occur and produce significant cumulative impacts. A proposed 40-unit affordable housing development is proposed on the north side of US 19E in Burnsville, near Mountain Heritage High School and near the confluence of the South and North Toe Rivers. In Mitchell County, just north of Spruce Pine, 2,000 to 5,000 ac within the North Toe River drainage area (owned by Penland Bailey Corporation) was sold for development but is currently on hold. A local watershed advocacy group is recommending the conservation of forested riparian buffers in this area, but at this time there has been no commitment to provide the buffers. A golf course development (planned to be patterned after the Mountain Air Country Club in Yancey County) is proposed near Altapass in Mitchell County, within the North Toe River watershed. A 100-ac development is being planned near Huntdale, in Yancey and Mitchell Counties, with over 13,000 lf of the Cane River and over 2,000 lf of the Toe River occurring within the property boundary.

Although these various actions have been discussed or proposed, it is uncertain if they will be developed or if they will need a federal permit or federal monies to construct them. Therefore, we will not address these developments further in this Opinion. We are not aware of other future state, local, or private actions that are reasonably certain to occur within the action area that would not be subject to section 7 review. Therefore, cumulative

effects, as defined by the Act, will not occur and will not be addressed further in this Opinion.

Cumulative Impacts of Incidental Take Anticipated by the Service in Previously Issued Biological Opinions

In reaching a decision as to whether the implementation of activities outlined in the BA are likely or are not likely to jeopardize the continued existence of the Appalachian elktoe, we must factor into our analysis previous biological opinions issued involving the species, especially those opinions where the Service quantified incidental take as the area of habitat disturbed instead of the number of individual mussels. There have been five biological opinions for the Appalachian elktoe. In May of 2005 we issued a biological opinion to the Corps on the effect of their permit on the Appalachian elktoe for a sewer line crossing along the Mills River. The amount of incidental take was limited to the disturbance of habitat 20 ft in width at the construction corridor and 100 ft downstream and upstream of the construction corridor. The three other biological opinions were rendered to the NRCS in 2005 for the implementation of the EWP Program in the Nolichucky, Pigeon, and Mills River subbasins. These biological opinions limited the amount of incidental take to all Appalachian elktoes within at least 3,325 lf of stream within the Nolichucky, Pigeon, and Mills River subbasins and any additional indirect impacts to the Appalachian elktoe 1,312 ft downstream of each of the 40 individual restoration project "footprints." In July 2006 we issued a biological opinion for two bridge replacements over the Toe River. Incidental take was limited to permanent habitat impacts of 89 ft^2 for both of those projects.

Cumulative Impacts - Critical Habitat

The proposed actions will directly and indirectly result in some adverse impacts to designated critical habitat for the Appalachian elktoe. However, these impacts will not appreciably diminish the value of the designated critical habitat. Future land-use impacts and infrastructure projects, combined with the project-related actions described above, have the potential to impact the "clean water" constituent element of critical habitat for the Appalachian elktoe (Unit 6) to the point where conservation values are compromised in localized areas. These localized areas are expected to be small and will not extend into the majority of the areas contained within Unit 6.

VI. CONCLUSION

After reviewing the current status of the Appalachian elktoe; the environmental baseline for the action area; the effects of bridge construction, demolition, and highway widening; measures identified in the NCDOT's BA to help minimize the potential impacts of the proposed project and assist in the protection, management, and recovery of the species; previously issued Service nonjeopardy biological opinions that allow various levels of incidental take; any potential interrelated and interdependent actions associated with the proposed action; and any potential cumulative effects, it is the Service's biological opinion that implementing this project is not likely to jeopardize the continued existence of the

Appalachian elktoe nor will adverse impacts to critical habitat be significant enough to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulations pursuant to section 4(d) of the Act prohibit the taking of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount of Take Anticipated

The Service anticipates that incidental take of the Appalachian elktoe may occur as a result of the construction of the bridges at the Cane and South Toe Rivers. During construction, individual mussels may be crushed, harmed by siltation or other water quality degradation, or dislocated because of physical changes in their habitat.

There will be a combined permanent loss of 50.0 ft^2 of stream habitat at the two bridge project sites. There will also be a combined temporary loss of stream habitat from the construction/demolition causeways of 10,300 ft^2. Downstream impacts (sedimentation), if any, are expected to occur within 1,300 ft of the construction sites. Because there are no reliable data on the number of Appalachian elktoes buried in the substrate compared to those on the surface (and even those on the surface are difficult to detect), it is not possible to base the amount of incidental take on numbers of individual mussels. Rather, the amount of incidental take will be exceeded if the project "footprint" exceeds 700 ft^2 at the Cane River crossing and 9,600 ft^2 at the South Toe River crossing or downstream impacts are occurring more than 1,300 ft downstream from the "footprint" of each project. If incidental take is exceeded, all work should stop, and the Service should be contacted immediately.

EFFECT OF THE TAKE

In this Opinion the Service has determined that this level of take is not likely to result in jeopardy to the Appalachian elktoe or destruction or adverse modification of its critical habitat.

In addition to the subsequent measures listed in the "Reasonable and Prudent Measures" and "Terms and Conditions" sections of this Opinion, the measures listed in the "Conservation Measures" section of this opinion must be implemented. The conservation measures are project minimization measures for the construction of the projects that were described by the NCDOT in the BA. The conservation measures include, but are not limited to, the following:

1. The NCDOT will provide, or contract with biologists who have experience in mussel relocation techniques, for the removal of Appalachian elktoe mussels from the impact sites at the Cane and South Toe River bridge crossings and relocate them to approved relocation sites. Detailed procedures will be developed in coordination with the Service and will be approved by the Service. Procedures will include appropriate collection methods; tagging and recapture; handling and transportation of individuals; and monitoring protocols, which includes the monitoring of the relocation sites for recovery, survival (of recovered mussels), movement, and growth of mussels for a period of 5 years.

2. In coordination with the Service, the NCDOT will develop plans for monitoring the river channel and banks at upstream sites, at the bridge construction sites, and downstream to determine changes in habitat resulting from activities at these sites. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will, in cooperation with the Service, develop a plan to address the problems.

3. As committed to by the NCDOT in the BA, the NCDOT will protect and/or restore riparian buffers for 19,000 lf of stream within the action area. Given that the conservation areas have not been determined or obtained by the NCDOT at the time of the issuance of this Opinion, the Service will continue to review sites that the NCDOT is considering and approve sites that are ultimately acquired.

4. To minimize the potential spread of Japanese knotweed from construction-related activities, the NCDOT has identified Japanese knotweed within the project limits of R-2518 and R-2519. The NCDOT proposes to attempt to suppress Japanese knotweed within their right-of-way, via mechanical means, at the following locations: R-2518A Mitigation Site 1, R-2518B Mitigation Site 4, R-2518B Bridge at Sta. 223+50 (Cane River Bridge), and R-2519B Bridge at Sta. 121+00 (South Toe River Bridge). Application of a glyphosate herbicide will require further planning and consultation with the Service.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Appalachian elktoe. These nondiscretionary measures include, but are not limited to, the commitments in the BA addendum and the terms and conditions outlined in this Opinion.

1. This multiphase project will receive one Clean Water Act Section 404 permit from the Corps' Wilmington District. Individual sections of the highway project will be reviewed as impact numbers are refined, and the NCDOT will request a permit modification before proceeding with work on a new section. The Corps will coordinate with the Service to review permit modifications and monitoring results to determine if the project is meeting the terms and conditions set forth in this Opinion.

2. The NCDOT will ensure that contractors understand and follow the measures listed in the "Conservation Measures," "Reasonable and Prudent Measures," and "Terms and Conditions" sections of this Opinion.

3. The NCDOT will send copies of all monitoring reports to the Service's Asheville Field Office at specified times over the life of the project.

4. The NCDOT will notify the Service and the Corps immediately if monitoring reveals any significant problems so that remediation can occur as quickly as possible.

5. New or extended culverts on tributaries will be constructed in a manner that will not contribute to channel instability and downstream habitat changes.

6. The NCDOT will employ construction methods and mitigation actions that will minimize/prevent the spread of Japanese knotweed.

7. The NCDOT will minimize aquatic habitat fragmentation in the Nolichucky River basin by replacing perched culverts or other aquatic passage barriers and, where possible, enhancing aquatic life passage and stream habitat.

8. Containment systems will be developed for particular stages of the demolition and construction of the bridges in order to minimize impacts to the Appalachian elktoe and its habitat.

9. Bridge demolition activities and the relocation of mussels will be conducted during time periods that will result in fewer impacts to the Appalachian elktoe.

10. During the relocation of mussels, the Service may alter, if needed, methods and plans for moving the mussels.

11. All appropriate NCDOT BMPs for erosion control; storm-water management; and bridge maintenance, construction, and demolition will be followed or exceeded for the project, and any additional BMPs listed in the "Terms and Conditions" section of this Opinion will be followed.

Terms and Conditions

In order to be exempt from the 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 previously and outline required reporting and/or monitoring requirements. These terms and conditions are nondiscretionary and apply to the Toe and Cane Rivers and their affected tributaries.

1. The Corps will notify the Service of requests for permit modifications from the NCDOT and, if necessary, have a meeting to review the changes and status of the project before issuing the modified permit.

2. A Service biologist will be present at the preconstruction meeting(s) to cover permit conditions and discuss any questions the contractor has regarding implementation of the project. After the contractor submits plans for various stages of the project, a Service biologist will review and provide comments on the plans and will attend any meetings to discuss implementation of the plans.

3. The NCDOT will use special provisions that exceed the standard BMPs for erosion control. These erosion-control measures incorporate the Design Standards in Sensitive Watersheds (15A NCAC 04B.0124(b)-(e)).

4. The NCDOT will provide three levels of oversight for the control of erosion and sediment on the project.

5. The NCDOT will perform compliance inspections of the erosion-control devices weekly or within 24 hours of a $\geq$0.5-in rainfall event during construction of the project.

6. The NCDOT will submit a proposal through their internal research group to study the effectiveness of storm-water-treatment and -control measures specific to this project.

7. During construction, culvert inlets and outlets will be evaluated by the engineer with regard to stream stability immediately following installation and quarterly for a period of 1 year at each location. Indicators of instability, such as headcutting, scour, aggradation, or degradation, will be used to determine the need for any corrective actions.

8. A final field inspection will be held with the contractor to evaluate culvert placement and stream stability before the project is considered complete. If instability is detected during any of these reviews, corrective actions will be performed when deemed necessary by the engineer or by the conditions of any federal and state permits required by Section 404/401 of the Clean Water Act.

9. In order to minimize effects to the Appalachian elktoe and it designated critical habitat, the NCDOT will replace the four-barrel box culvert at the crossing of US 19 and Big Crabtree Creek with a bridge. Replacing this culvert with a bridge will reduce aquatic fragmentation, correct downstream scour and upstream overwidening, reestablish a connection to the floodplain in this reach, and restore habitat in this important tributary to the North Toe.

10. The NCDOT will conduct the benthic macroinvertebrate monitoring proposed in the "Conservation Measures" section to provide a habitat assessment, including (but not limited to) parameters such as existing habitat structure and sediment load at each of the nine sites.

Measures Specific to Bridge Construction

1. The NCDOT will ensure that a qualified aquatic biologist is present at critical times to monitor certain phases of construction, including, but not limited to, initial clearing for construction, when the causeways are installed, when demolition begins, and when the causeways are removed. This individual will be present to ensure that the procedures listed in the "Conservation Measures," "Reasonable and Prudent Measures," and "Terms and Conditions" sections of this Opinion are being implemented and that all project plans are being implemented in a manner to ensure that the conditions of the Opinion are met.

2. A containment system will be developed and installed prior to the removal of the bridge deck and piers. The system should be of sufficient strength to capture material that may enter the river.

3. When constructing drilled shafts, a containment system will be developed so that material does not enter the river. Any material by-product will be pumped out of the shaft to an upland disposal area and treated through a proper stilling basin or silt bag.

4. The NCDOT will not relocate mussels between May 1 and June 30, the time at which the Appalachian elktoe releases glochidia. The NCDOT will relocate the mussels during low flow, low turbidity, and relatively cool weather; the most appropriate time to accomplish this would be in the fall.

5. In the BA, the NCDOT proposed to relocate all native mussels, including the Appalachian elktoe, from the project "footprints," extending downstream and upstream of the two bridge replacements. Representatives of the Service's Asheville Field Office may determine during relocation of the mussels that the area the mussels are moved from should be reduced.

6. A Service biologist will review and provide comments on plans proposed to correct problems that may be revealed in the monitoring of the river channel and banks within the project area.

7. The erosion-control plan will be in place prior to any ground disturbance. When needed, combinations of erosion-control measures (such as silt bags in combination with a stilling basin) will be used to ensure that the most protective measures are being implemented.

8. Activities in the floodplain will be limited to those needed to construct the proposed bridges and remove the existing bridge.

9. Work pads will be used when equipment must be staged in the floodplain to complete the project construction. The work pads will be constructed by placing fabric matting down prior to placing the stone work pad. All of the stone and matting will be removed and disposed of off-site, or the stone can be used in areas that require permanent stone protection after project completion.

10. Access roads and construction staging areas will be minimized to the maximum extent practicable. The access roads and construction staging areas should be established from the start of the project and designed with erosion-control measures. The placement of the access roads and staging areas will be discussed with the Service and determined at the preconstruction meetings.

11. Riparian vegetation, especially large trees, will be maintained wherever possible. If riparian areas are disturbed, they will be revegetated with native species as soon as possible after construction.

12. Upon completion of the project the existing approach fills will be removed to natural grade, and the area will be planted with native grasses and tree species.

13. Erosion-control measures will remain in place until riparian vegetation is successfully reestablished at each of the bridge sites.

14. Construction will be accomplished in a manner that prevents wet concrete from coming into contact with water entering or flowing in the river.

15. Unconsolidated material (such as sand and dirt) will not be placed directly on the causeways since the material could be washed off of the causeways or settle into the causeways and enter the river. Any equipment that is placed on the causeways will be removed anytime throughout a work day when the water level rises, or is expected to rise overnight, to a point where the equipment could be flooded or during periods of inactivity (two or more consecutive days). The only exception to this measure is that the drill rig may be left in place for periods of inactivity; however, it must also be removed if the water rises, or is expected to rise, to a point where the drill rig could be flooded.

16. All construction equipment should be refueled outside the 100-year floodplain or at least 200 ft from all water bodies (whichever distance is greater) and be protected with secondary containment. During crucial periods of construction and demolition, when the drill rig and crane cannot be moved, the drill rig and crane can be refueled while inside the 100-year floodplain provided that spill response materials (such as spill blankets and fueling diapers) are used during the refueling. Hazardous materials, fuel, lubricating oils, or other chemicals will be stored outside the 100-year floodplain or at least 200 ft from all water bodies (whichever distance is greater), preferably at an upland site. Areas used for borrow or construction by-products will not be located in wetlands or in the 100-year floodplain.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The following conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Where opportunities exist, work with landowners, the general public, and other agencies to promote education and information about the Appalachian elktoe and its conservation.

2. In order to address sources of impairment in the Nolichucky River basin and work toward removing habitat occupied by the Appalachian elktoe from the 303(d) list of impaired waters, consider funding a position with a conservation organization to help identify and pursue additional buffers and conservation opportunities along the main stem of the Cane River, North Toe River, and Toe Rivers and their tributaries, either individually or in concert with other conservation programs.

3. Establish an escrow account to provide funding for land acquisition and/or conservation easements/agreements to better take advantage of conservation opportunities as they arise.

4. Explore opportunities to work with local and state water quality officials in order to minimize or eliminate wastewater and storm-water discharges into the Cane River, North Toe River, and Toe River.

5. Work with Yancey and Mitchell Counties to develop tools such as land-use plans, ordinances, and incentives to protect the Appalachian elktoe and its designated critical habitat from the effects of development activities.

6. Consult with the Service on projects affecting aquatic habitat in the Nolichucky River basin, regardless of funding source, to ensure compliance with all provisions of the Act.

7. Work with partners to assess and prioritize structures that fragment aquatic habitat and create barriers to fish passage in the Nolichucky River basin and begin replacing those structures with more appropriate structures when opportunities arise.

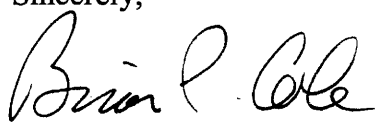
In order for the Service to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION/CLOSING STATEMENT

This concludes formal consultation on the actions outlined in the NCDOT's BA dated August 9, 2007. As provided in 50 CFR 402.16, the reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operation causing such take must cease, pending reinitiation. Consultation should also be reinitiated if new biological information comes to light that invalidates the assumptions made regarding the biology or distribution of the Appalachian elktoe within the project area of the Nolichucky River basin in North Carolina.

If you or your staff have any questions concerning this Opinion, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237, or me, Ext. 223. We have assigned our Log No. 4-2-03-063 to this project; please refer to it in any future correspondence concerning this matter.

Sincerely,



Brian P. Cole
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cc:
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Electronic copy with Appendix A (Appendices B-E available upon request):
Ms. Marla J. Chambers, Western NCDOT Permit Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129
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Mr. Chris Militscher, Environmental Protection Agency, 1313 Alderman Circle, Raleigh, NC 27603
Regional Director, FWS, Atlanta, GA (ES/TE, Attention: Mr. Ken Graham)

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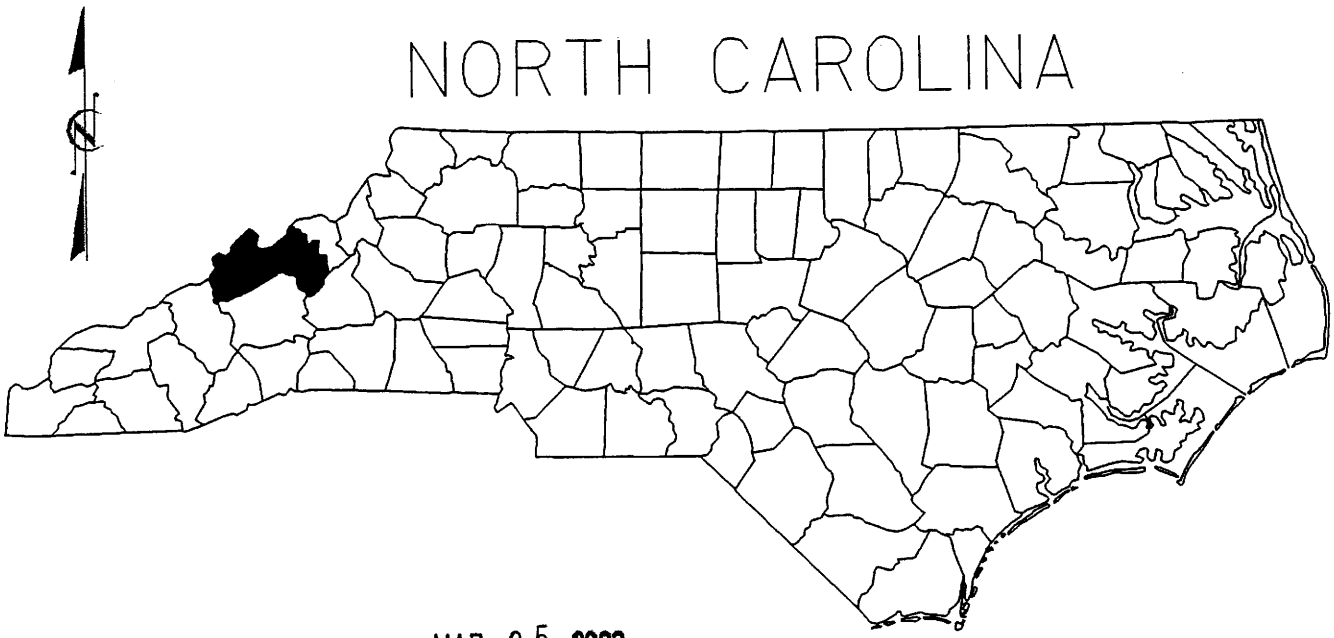
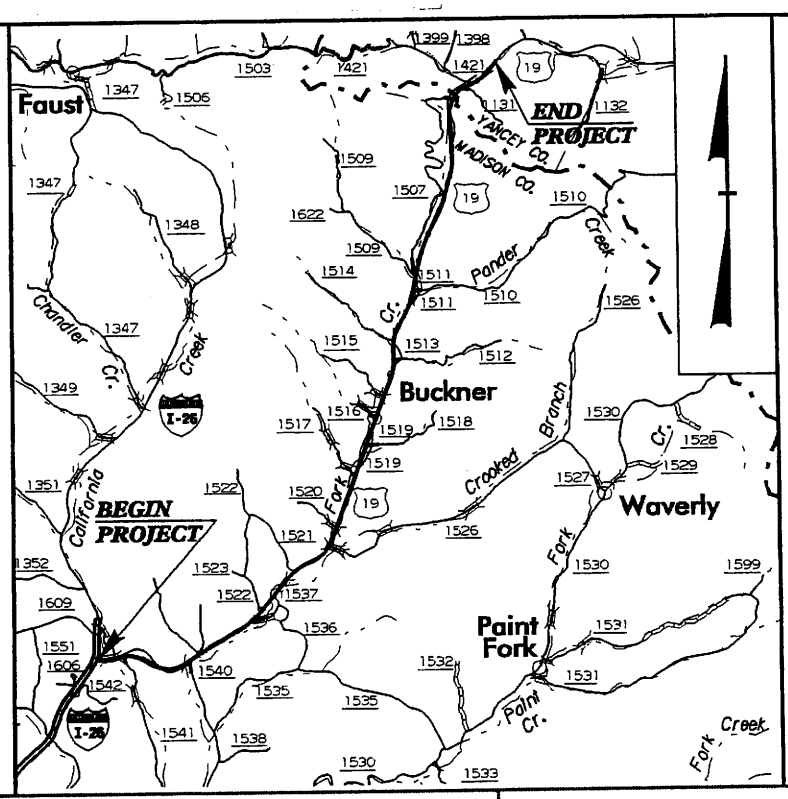


MAR 25 2008



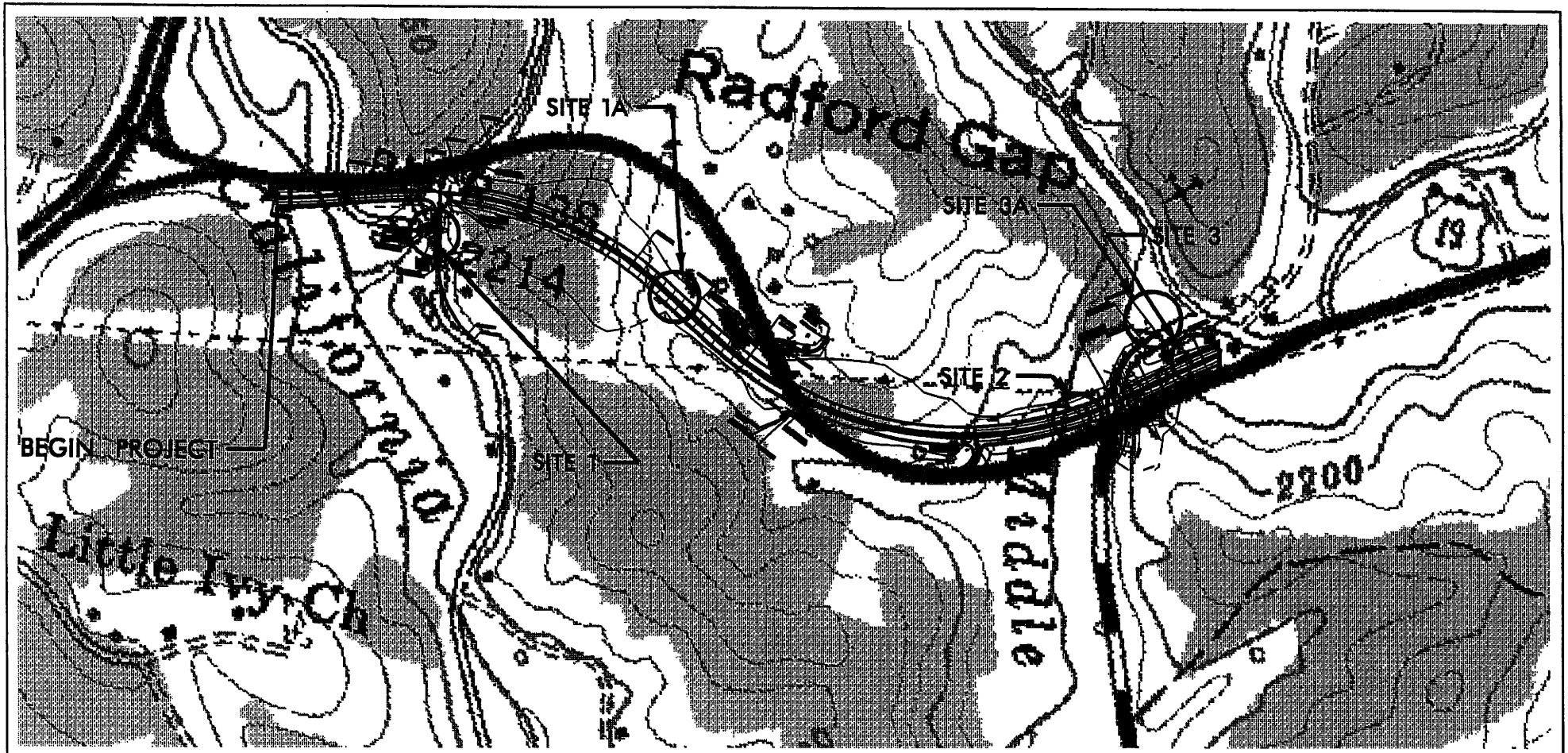
VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
MADISON / YANCEY COUNTIES
PROJECT NO.: WBS 34445.1.1 (R-2518A)

US 19 FROM I-26 TO 0.8 KM EAST OF THE YANCEY CO. LINE

Permit Drawing
Sheet 1 of 64



SITE MAP

NCDOT

DIVISION OF HIGHWAYS

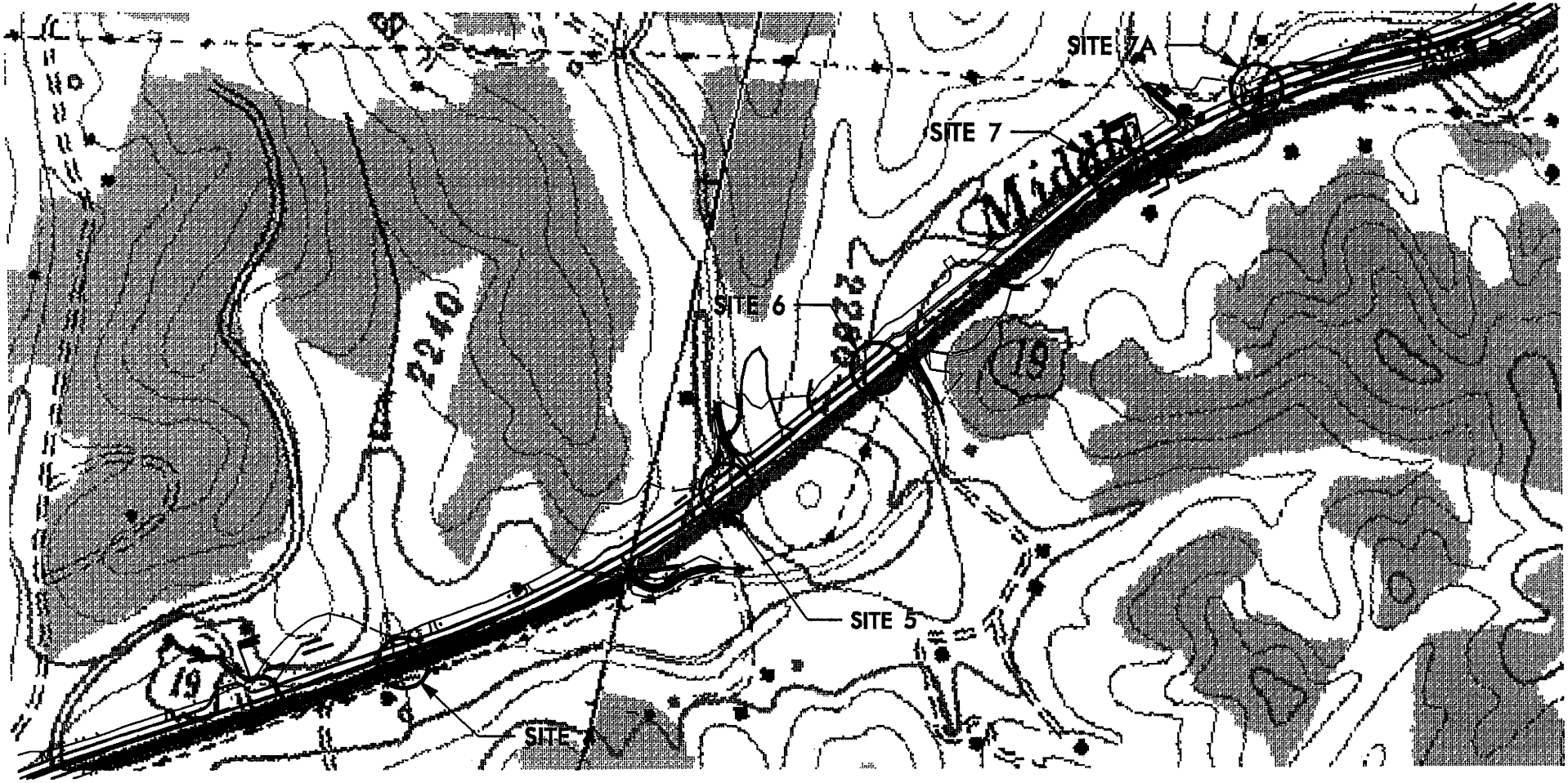
MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST

OF THE YANCEY CO. LINE

SHEET OF / /



SITE MAP

NCDOT

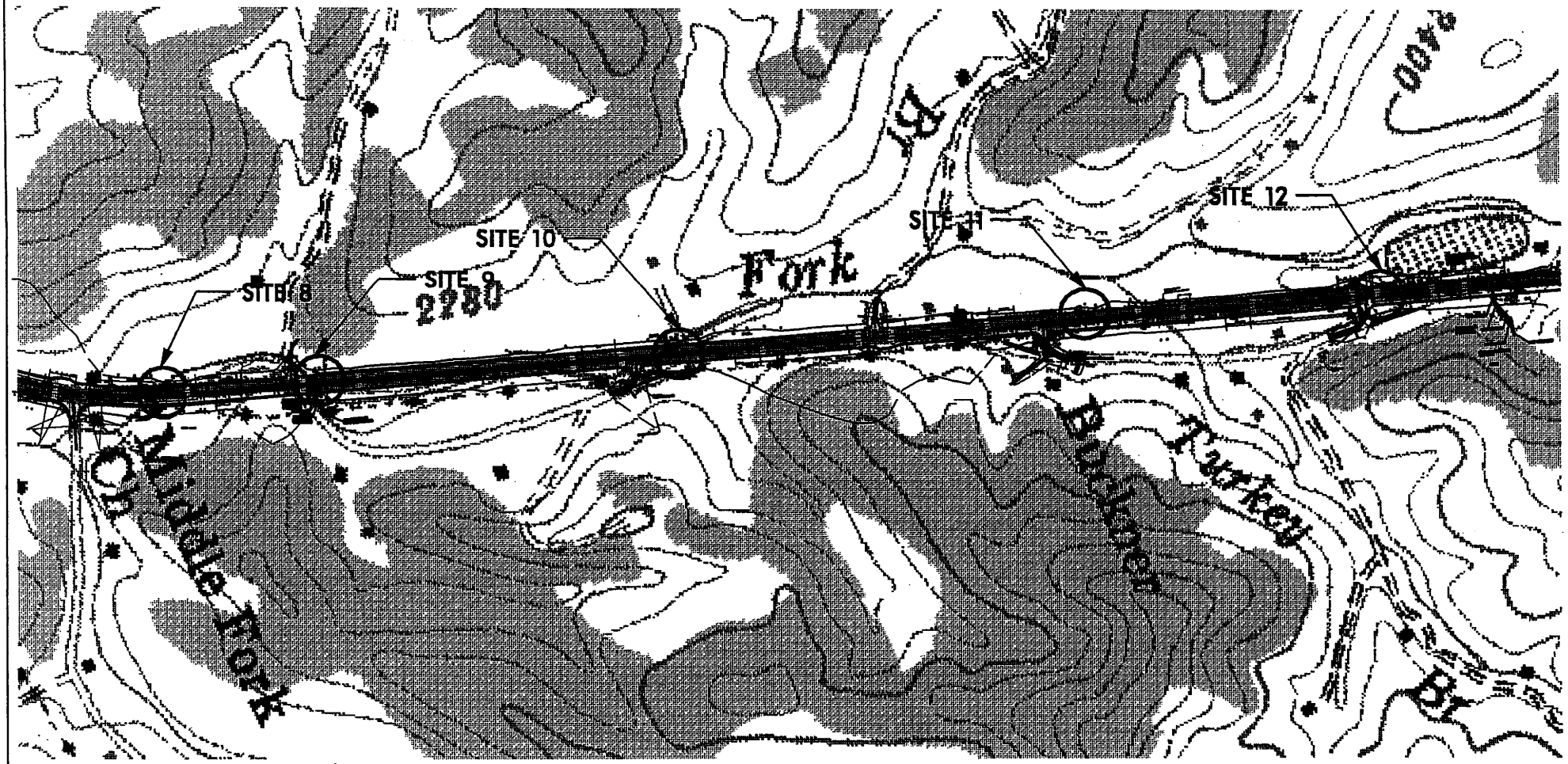
DIVISION OF HIGHWAYS

MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST OF THE YANCEY CO. LINE

SHEET OF / /



SITE MAP

NCDOT

DIVISION OF HIGHWAYS

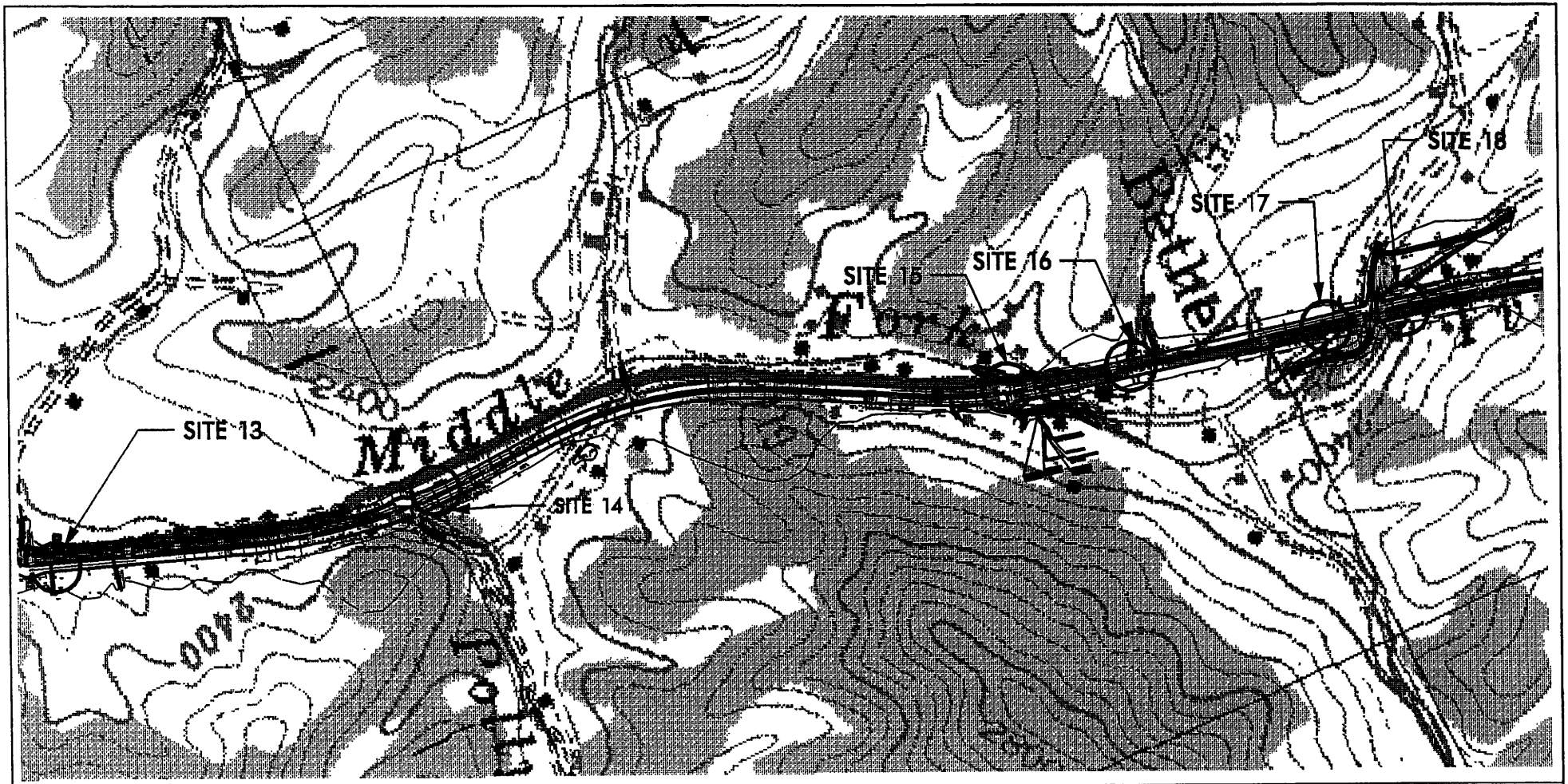
MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST OF THE YANCEY CO. LINE

SHEET OF // //

Permit Drawing



SITE MAP

NCDOT

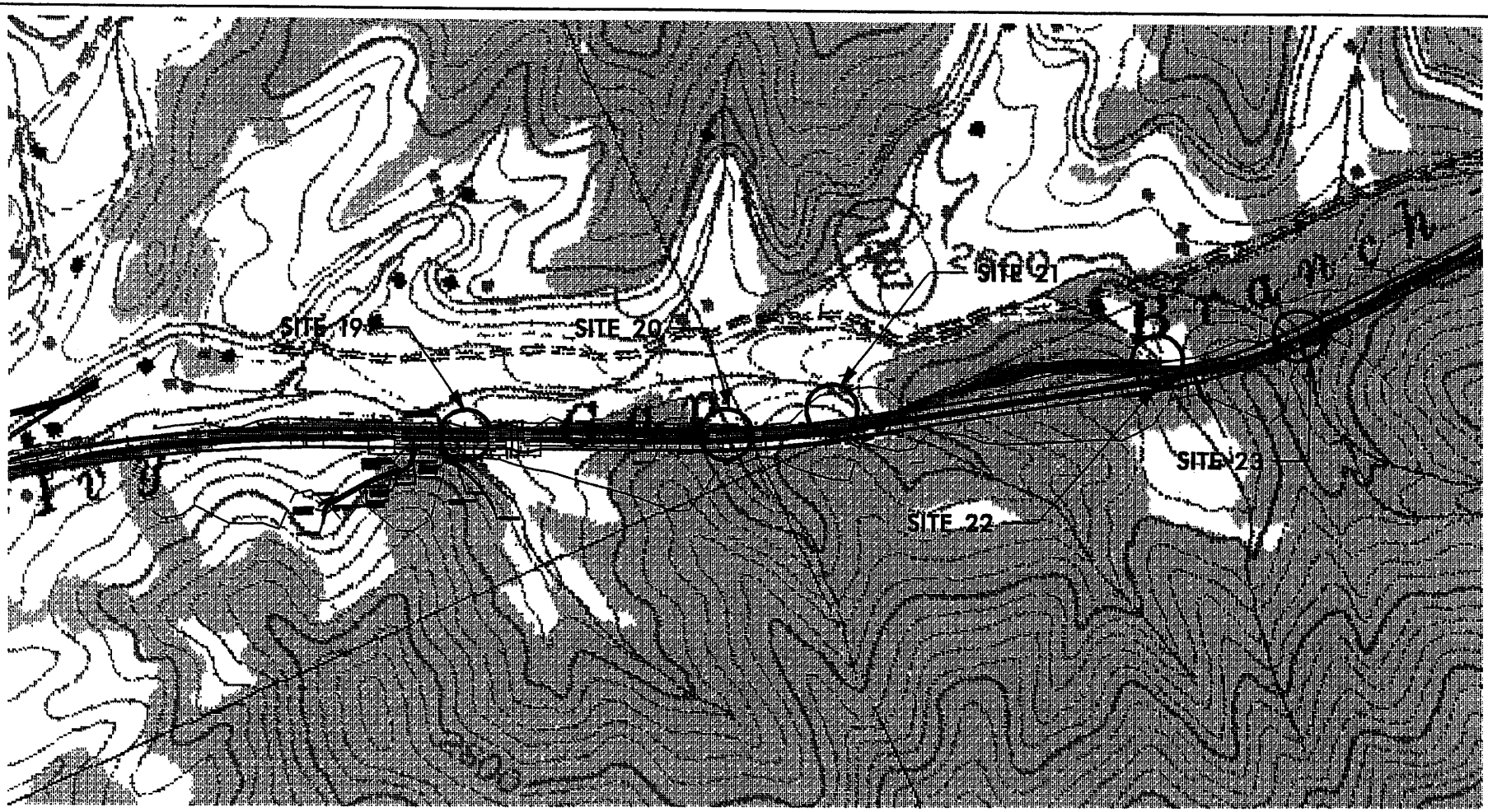
DIVISION OF HIGHWAYS

MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST OF THE YANCEY CO. LINE

SHEET OF / /



SITE MAP

NCDOT

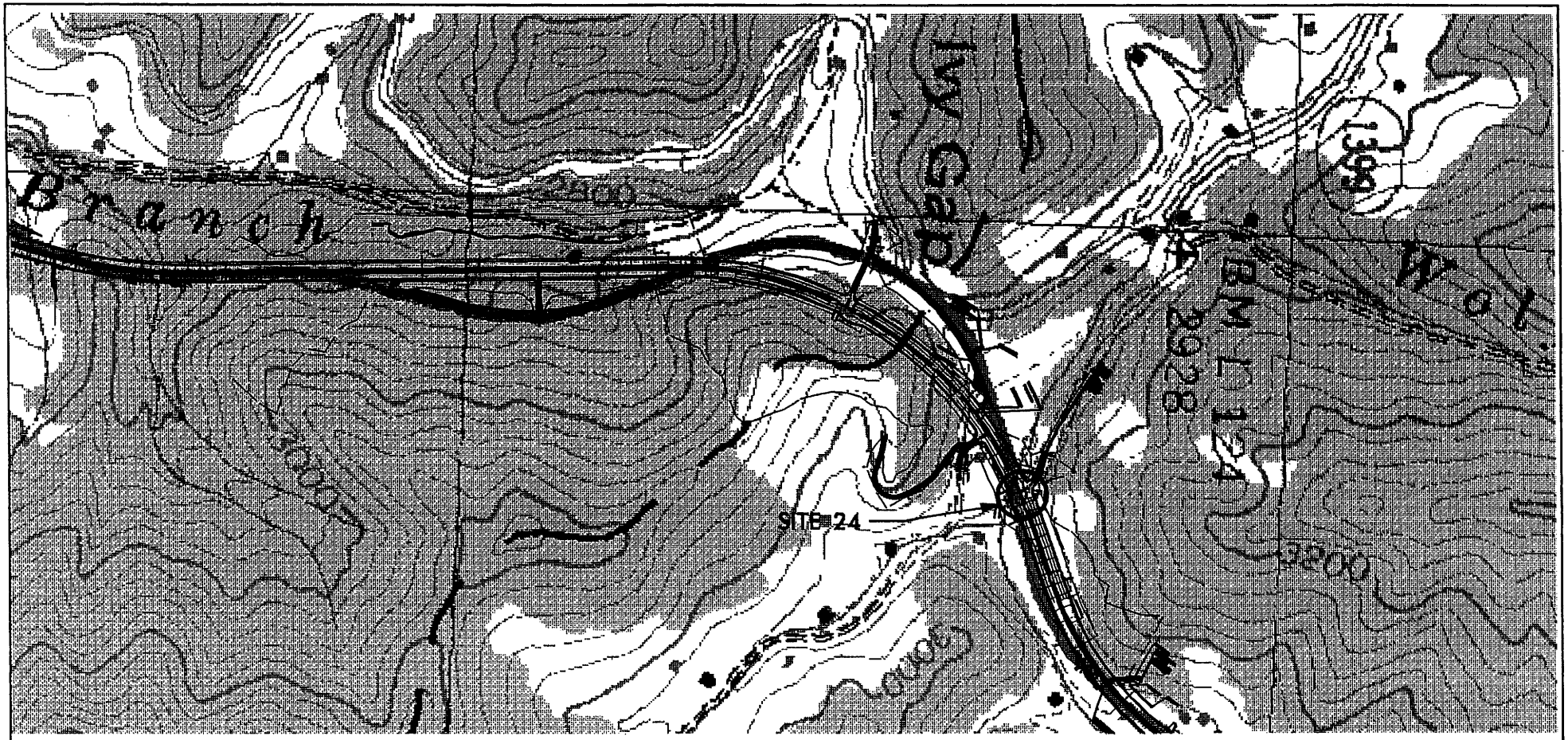
DIVISION OF HIGHWAYS

MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST OF THE YANCEY CO. LINE

SHEET OF / /



SITE MAP

NCDOT

DIVISION OF HIGHWAYS

MADISON / YANCEY COUNTIES

PROJECT: 6.869005T (R-2518A)

US 19 FROM I-26 TO 0.8KM EAST OF THE YANCEY CO. LINE

SHEET OF / /

Permit Drawing

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

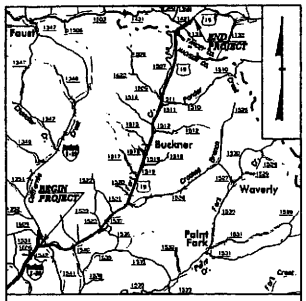
MADISON / YANCEY COUNTIES

ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2518A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34445.1.1		PE
34445.2.2		ROW, UTIL.
34445.4.1		CONST.

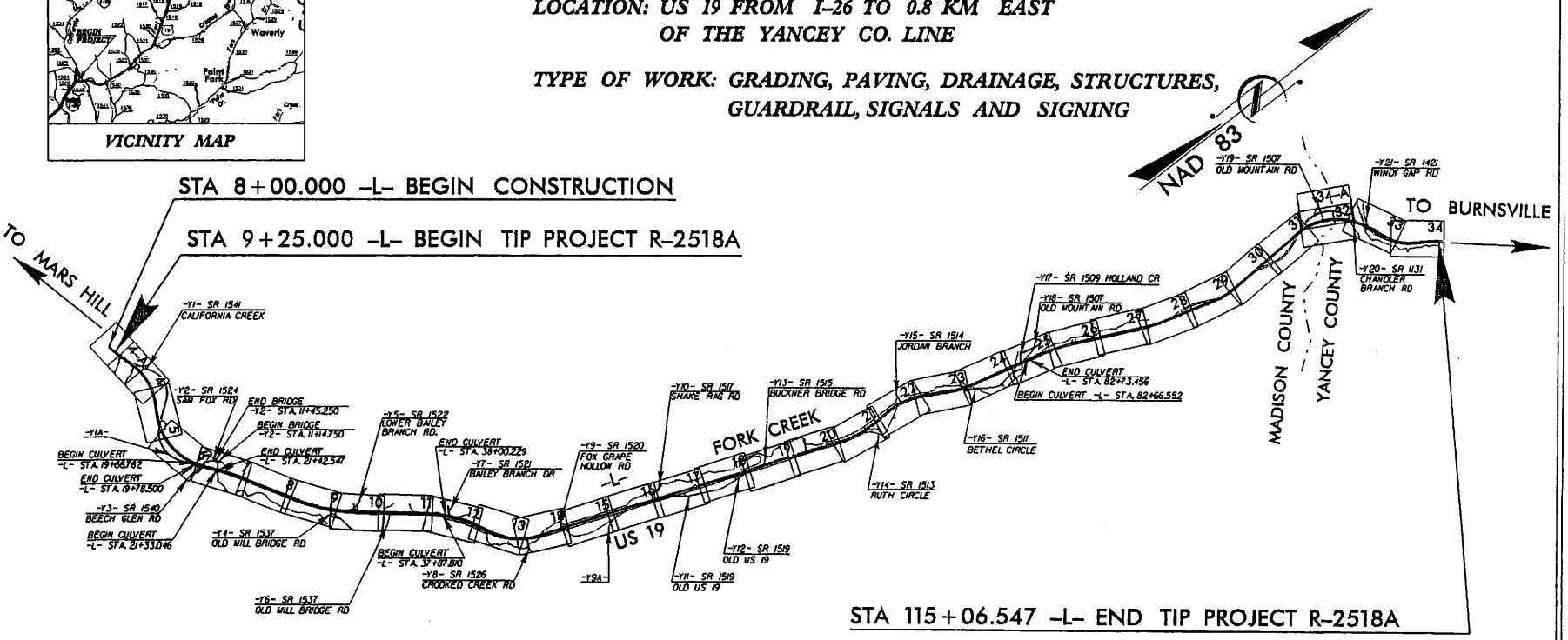
See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

LOCATION: US 19 FROM I-26 TO 0.8 KM EAST OF THE YANCEY CO. LINE

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



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

PRELIMINARY PLANS — NOT FOR CONSTRUCTION

CONTRACT: C201372 TIP PROJECT: R-2518A

GRAPHIC SCALES
PLANS 5 0 10
PROFILE (HORIZONTAL) 5 0 10
PROFILE (VERTICAL) 1 0 2

DESIGN DATA
ADT 2008 = 10,860 - 12,080
ADT 2028 = 16,440 - 18,220
DHV = 10 %
D = 65 %
T = 10 % *
V = 100 km/h
* (TTST 6% + DUAL 4%)

PROJECT LENGTH
LENGTH ROADWAY TIP PROJECT R-2518A = 10.551 KM
LENGTH STRUCTURE TIP PROJECT R-2518A = 0.031 KM
TOTAL LENGTH STATE TIP PROJECT R-2518A = 10.582 KM

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 31, 2005

LETTING DATE: DECEMBER 18, 2007

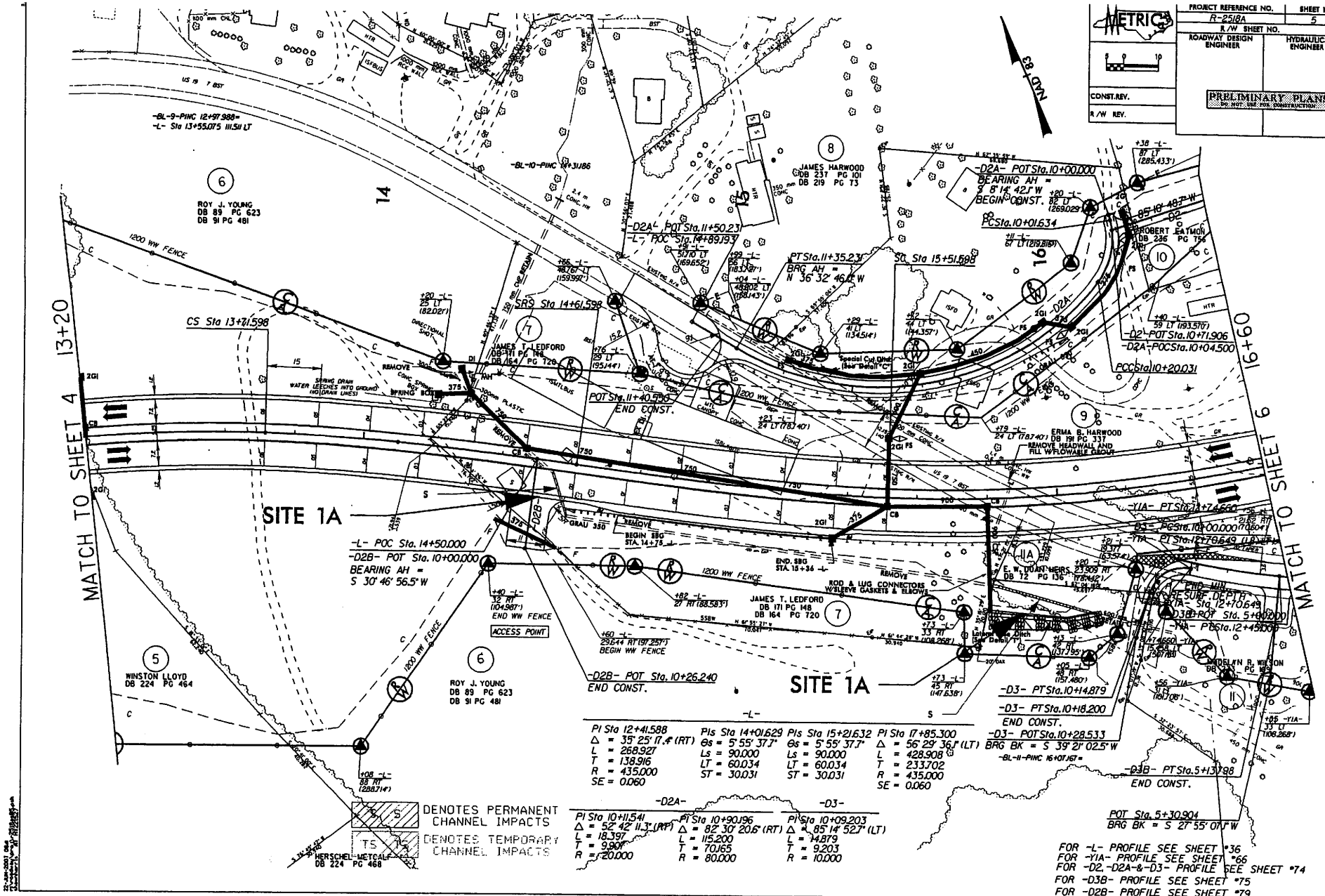
BRENDA MOORE, PE — PROJECT ENGINEER

THAD F. DUNCAN, PE — PROJECT DESIGN ENGINEER

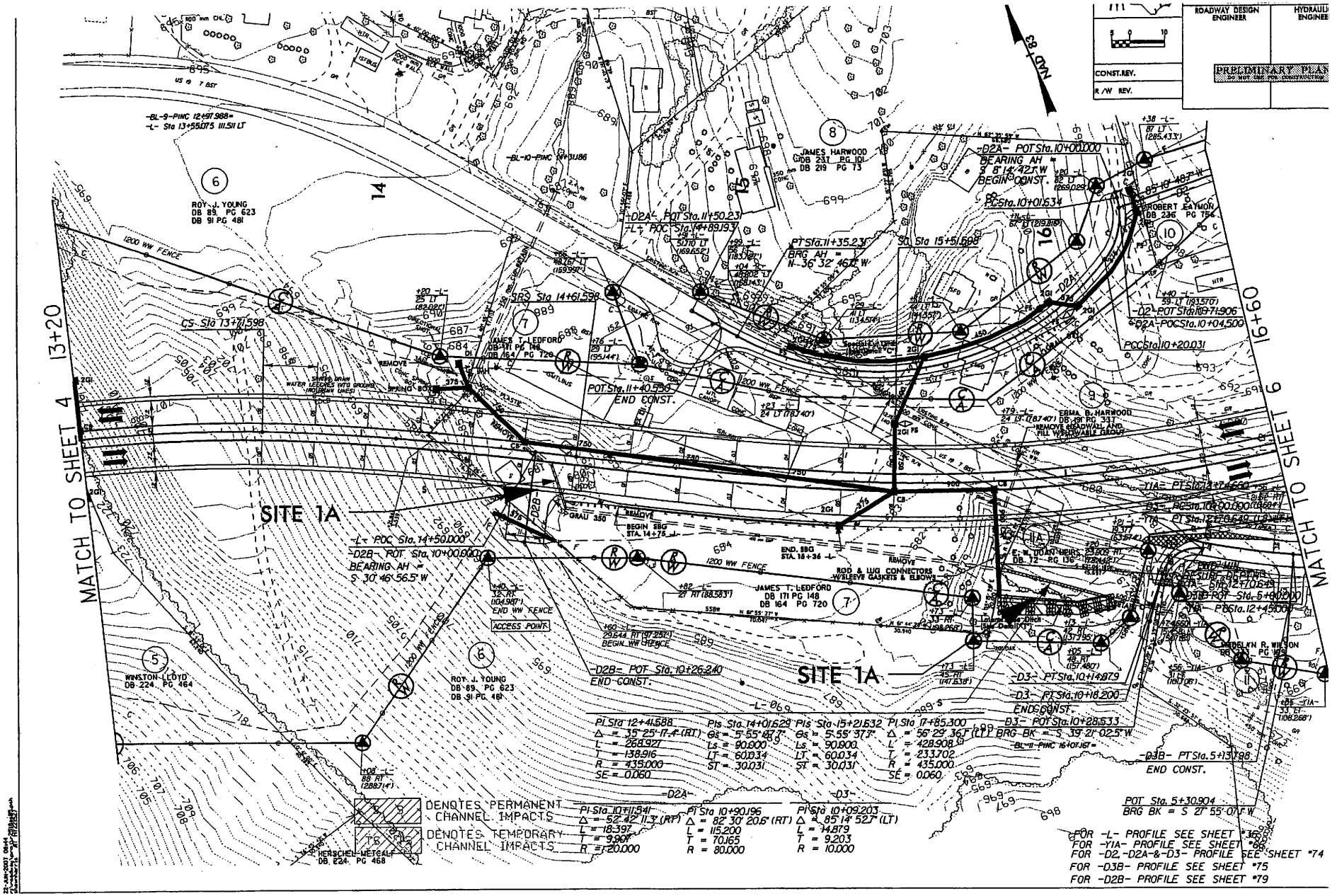
HYDRAULICS ENGINEER
SIGNATURE: P.E.
ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

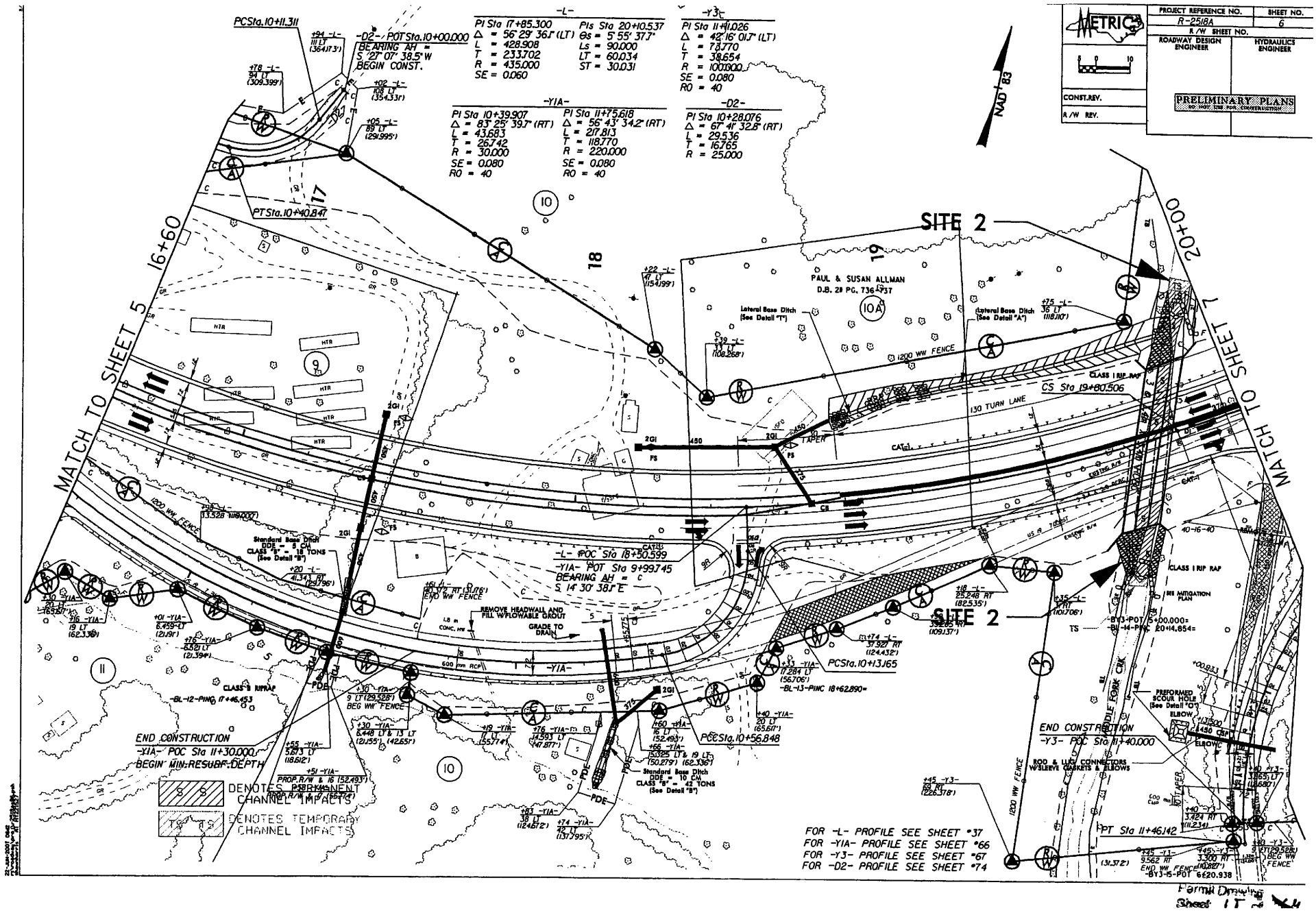
Permit Drawing
Sheet 15 of 64

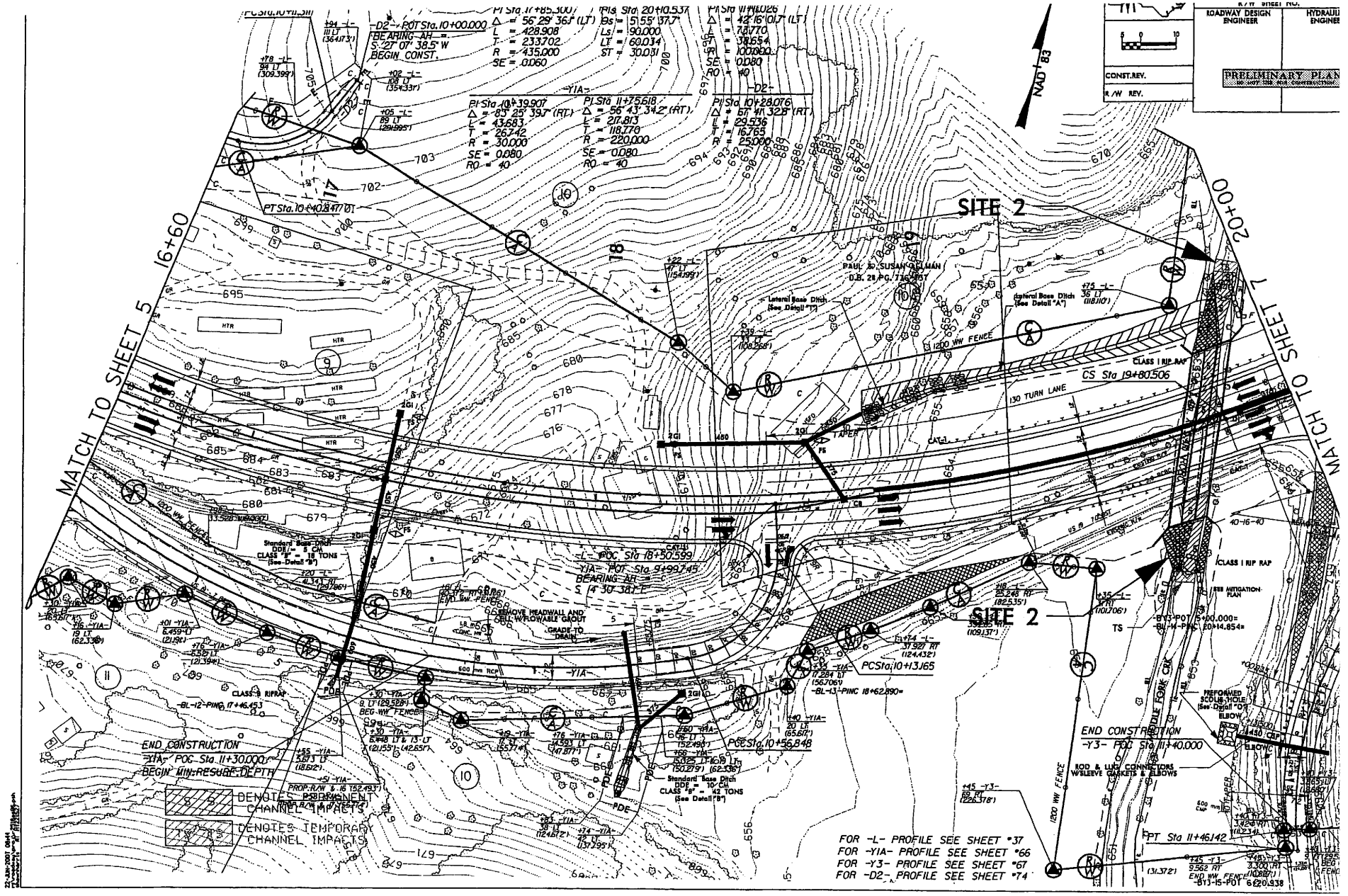


Typical Drawing
Sheet 16 of 24

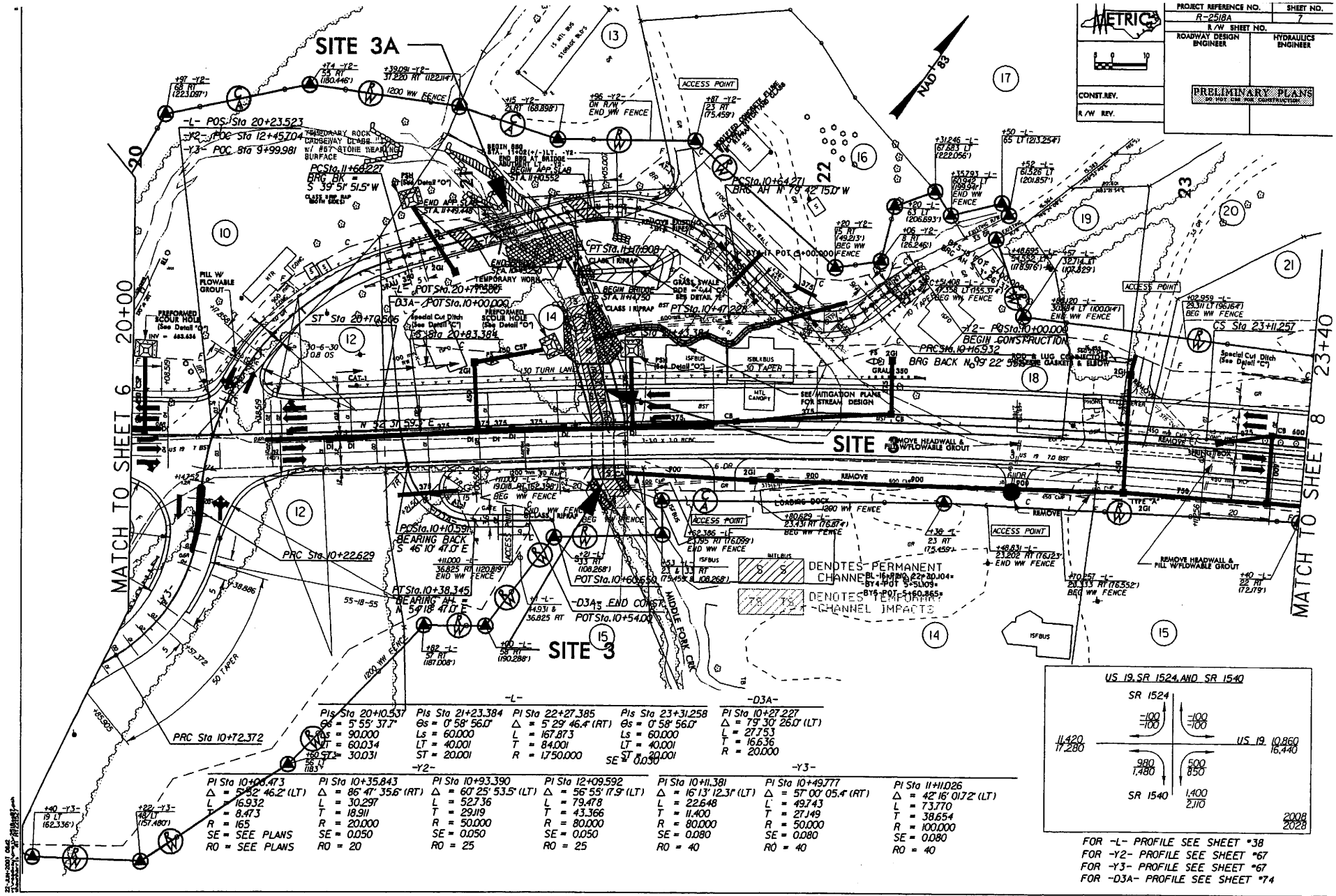


Permit Drawing
Sheet 12 of 64


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
NAD 83
-L-
PI Sta 17+85.300
Δ = 56° 29' 36.1" (LT)
L = 428.908
T = 233.702
R = 435.000
SE = 0.060
PIs Sta 20+10.537
θs = 5° 55' 37.7"
Ls = 90.000
LT = 60.034
ST = 30.031
-Y3-
PI Sta 11+41.026
Δ = 42° 16' 01.7" (LT)
L = 78.770
T = 38.654
R = 100.000
SE = 0.080
RO = 40
-Y1A-
PI Sta 10+39.907
Δ = 83° 25' 39.7" (RT)
L = 43.683
T = 26.742
R = 30.000
SE = 0.080
RO = 40
PI Sta 11+75.618
Δ = 56° 43' 34.2" (RT)
L = 217.813
T = 118.770
R = 220.000
SE = 0.080
RO = 40
-D2-
PI Sta 10+28.076
Δ = 67° 41' 32.8" (RT)
L = 29.536
T = 16.765
R = 25.000
PCSta.10+11.311
-D2- POT Sta.10+00.000
BEARING AH = S 27° 07' 38.5" W
BEGIN CONST.
PT Sta.10+40.847
MATCH TO SHEET 5 16+60
MATCH TO SHEET 7 20+00
SITE 2
SITE 2
PAUL & SUSAN ALLMAN
D.B. 28 PG. 736 & 737
CS Sta 19+80.506
130 TURN LANE
TAPER
1200 WW FENCE
Lateral Base Ditch (See Detail "T")
(Lateral Base Ditch (See Detail "A")
CLASS I RIP RAP
-L- POC Sta 18+50.599
-Y1A- POT Sta 9+99.745
BEARING AH = C S 14° 30' 38.1" E
REMOVE HEADWALL AND FILL W/FLOWABLE GROUT
GRADE TO DRAIN
Standard Base Ditch DDE = 5 CM CLASS "A" = 18 TONS (See Detail "B")
Standard Base Ditch DDE = 10 CM CLASS "B" = 42 TONS (See Detail "B")
PCSta.10+13.165
PCCSta.10+56.848
END CONSTRUCTION -Y1A- POC Sta 11+30.000 BEGIN MIN. RESUR. DEPTH
END CONSTRUCTION -Y3- POC Sta 11+40.000
PT Sta 11+46.142
CLASS B RIPRAP
PREFORMED SCOUR HOLE (See Detail "D")
BOD & LUG CONNECTORS W/SLEEVE GASKETS & ELBOWS
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
FOR -L- PROFILE SEE SHEET #37
FOR -Y1A- PROFILE SEE SHEET #66
FOR -Y3- PROFILE SEE SHEET #67
FOR -D2- PROFILE SEE SHEET #74
Permit Drawing
Sheet 17



Permit Drawing
Sheet 14 of 66



-L-					
PI Sta 20+10.537	PI Sta 21+23.384	PI Sta 22+27.385	PI Sta 23+31.258	PI Sta 10+27.227
Gs = 5° 55' 37.7"	Gs = 0° 58' 56.0"	Δ = 5° 29' 46.4" (RT)	Gs = 0° 58' 56.0"	Δ = 79° 30' 26.0" (LT)
Ls = 90.000	Ls = 60.000	L = 167.873	Ls = 60.000	L = 27.753
LT = 60.034	LT = 40.001	T = 84.001	LT = 40.001	T = 16.636
ST = 30.031	ST = 20.001	R = 1750.000	ST = 20.001	R = 20.000
			SE = 0.050	

-Y2-						
PI Sta 10+20.473	PI Sta 10+35.843	PI Sta 10+93.390	PI Sta 12+09.592	PI Sta 10+11.381	PI Sta 10+49.777	PI Sta 11+11.026
Δ = 5° 52' 46.2" (LT)	Δ = 86° 47' 35.6" (RT)	Δ = 60° 25' 53.5" (LT)	Δ = 56° 55' 17.9" (LT)	Δ = 16° 13' 12.3" (LT)	Δ = 57° 00' 05.4" (RT)	Δ = 42° 16' 01.72" (LT)
L = 16.932	L = 30.297	L = 52.736	L = 79.478	L = 22.648	L = 49.743	L = 73.770
T = 8.473	T = 18.911	T = 29.119	T = 43.366	T = 11.400	T = 27.149	T = 38.654
R = 165	R = 20.000	R = 50.000	R = 80.000	R = 80.000	R = 50.000	R = 100.000
SE = SEE PLANS	SE = 0.050	SE = 0.050	SE = 0.050	SE = 0.080	SE = 0.080	SE = 0.080
RO = SEE PLANS	RO = 20	RO = 25	RO = 25	RO = 40	RO = 40	RO = 40

US 19, SR 1524, AND SR 1540

SR 1524 -100 -100 -100 -100

11,420 11,280 — US 19 10,860 16,440

980 1,480 — 500 850

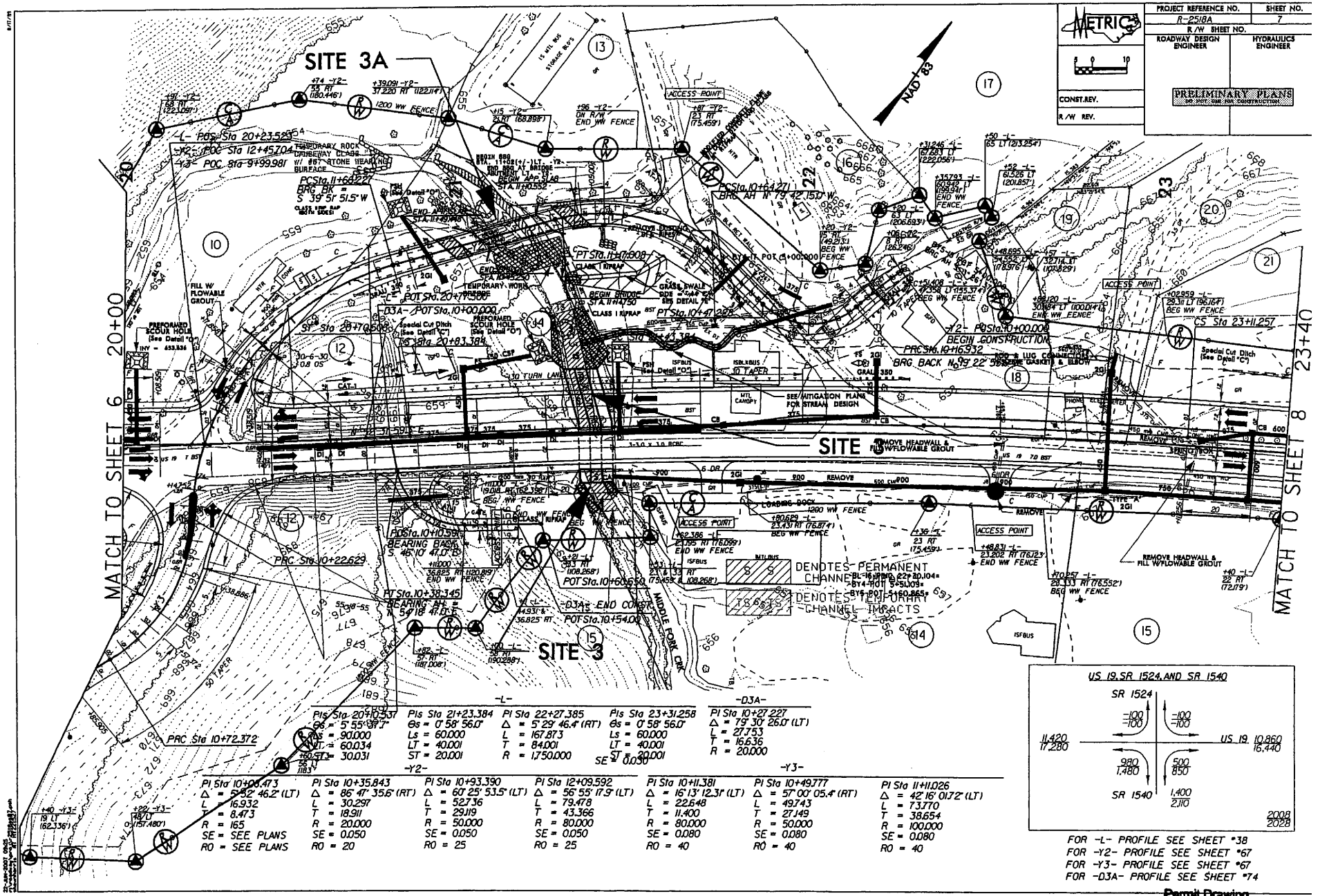
SR 1540 1,400 2,110

2008 2028

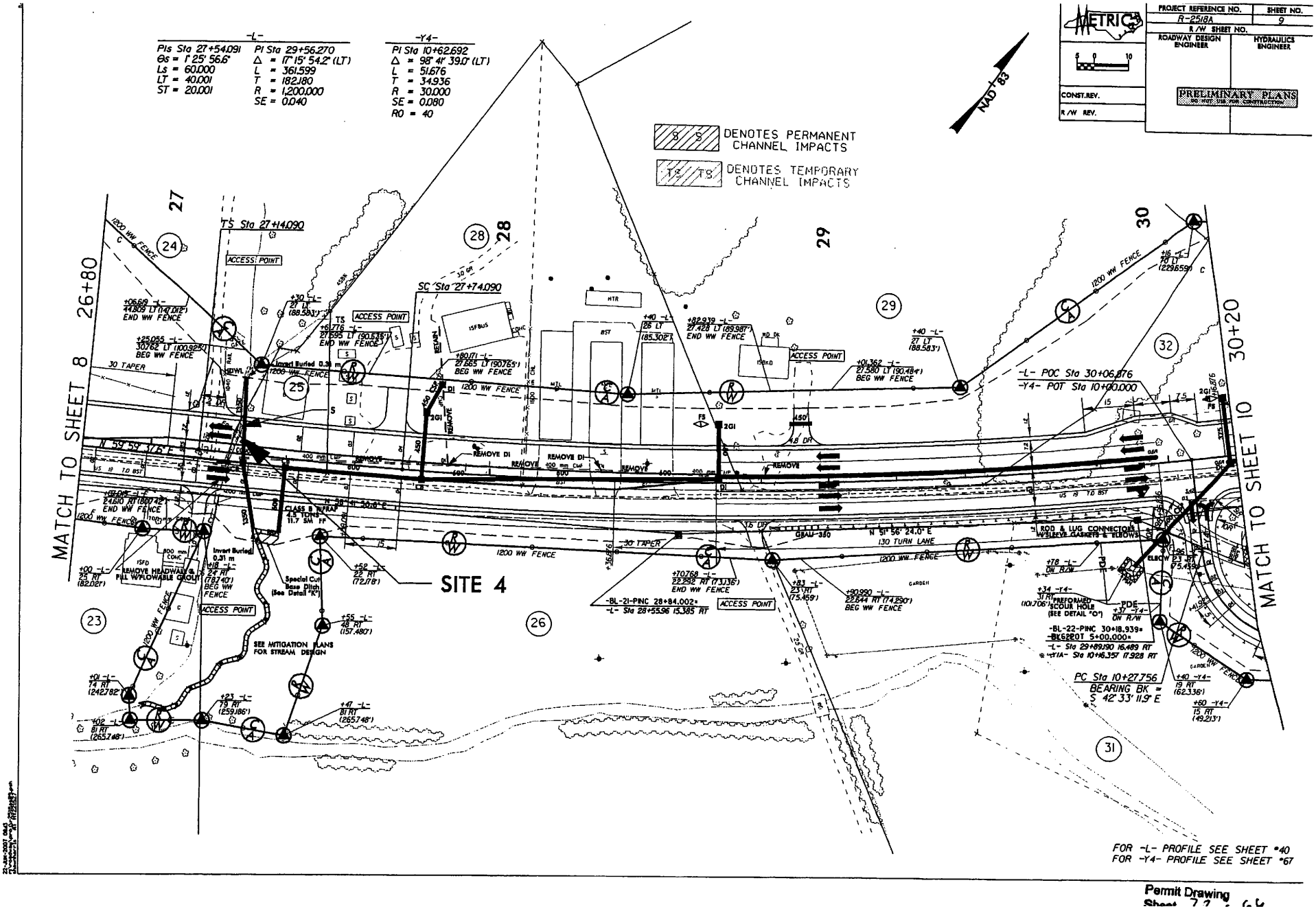
FOR -L- PROFILE SEE SHEET #38
FOR -Y2- PROFILE SEE SHEET #67
FOR -Y3- PROFILE SEE SHEET #67
FOR -D3A- PROFILE SEE SHEET #74

R/W REV. REVISING DRIVEWAY AND ACCESS POINT AND REVISING NAME AND DEED BOOK NUMBER ON PARCEL 15 (BRIAN AND JOYCE E. ANDERS REVOCABLE TRUST). 06/11/2007 NHH

Form Drawing Sheet 24 of 64



R/W REV.: REVISING DRIVEWAY AND ACCESS POINT AND REVISING NAME AND DEED BOOK NUMBER ON PARCEL 15 (BRYAN AND JOYCE E. ANDERS REVOCABLE TRUST). 06/11/2007 NHH



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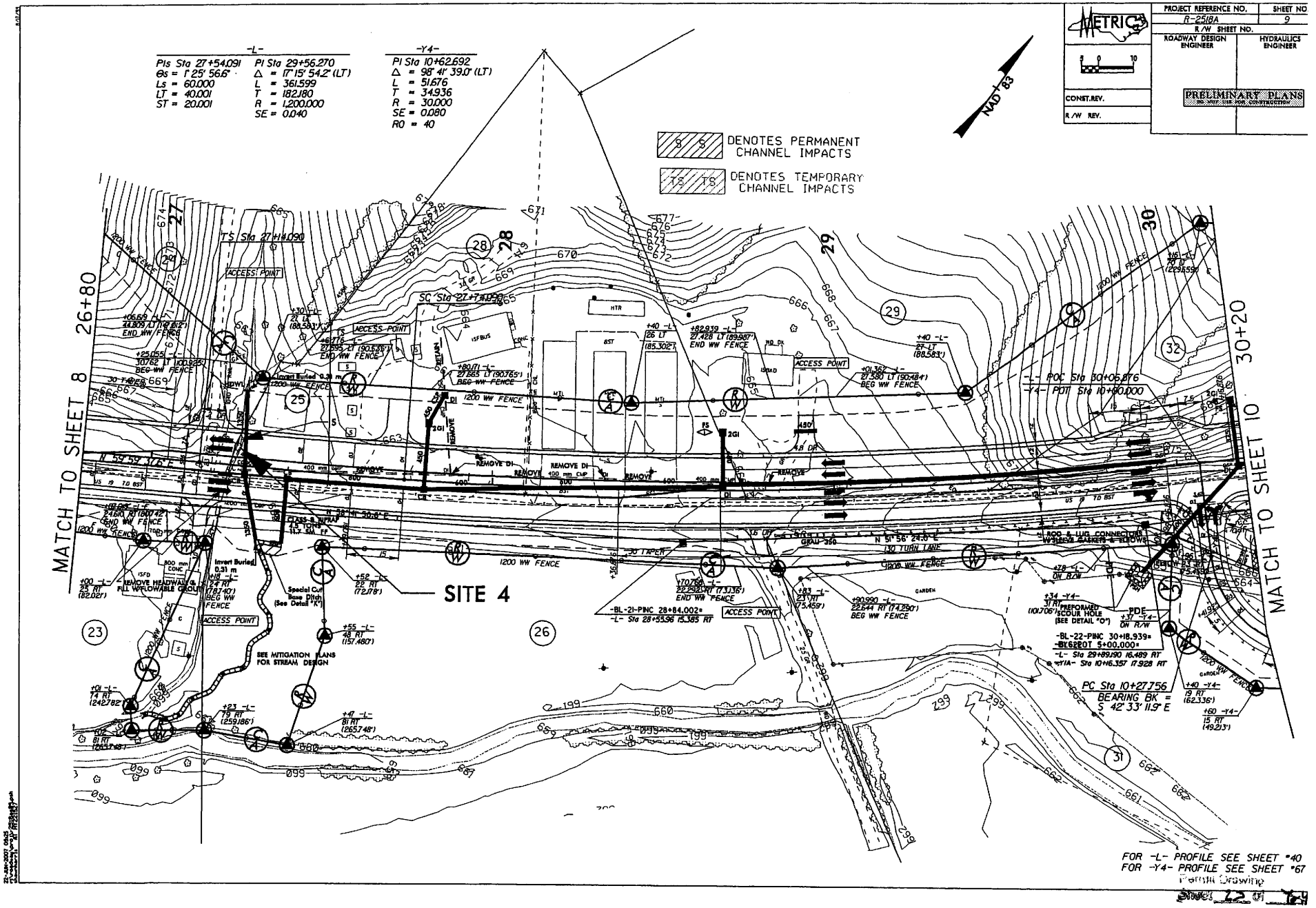
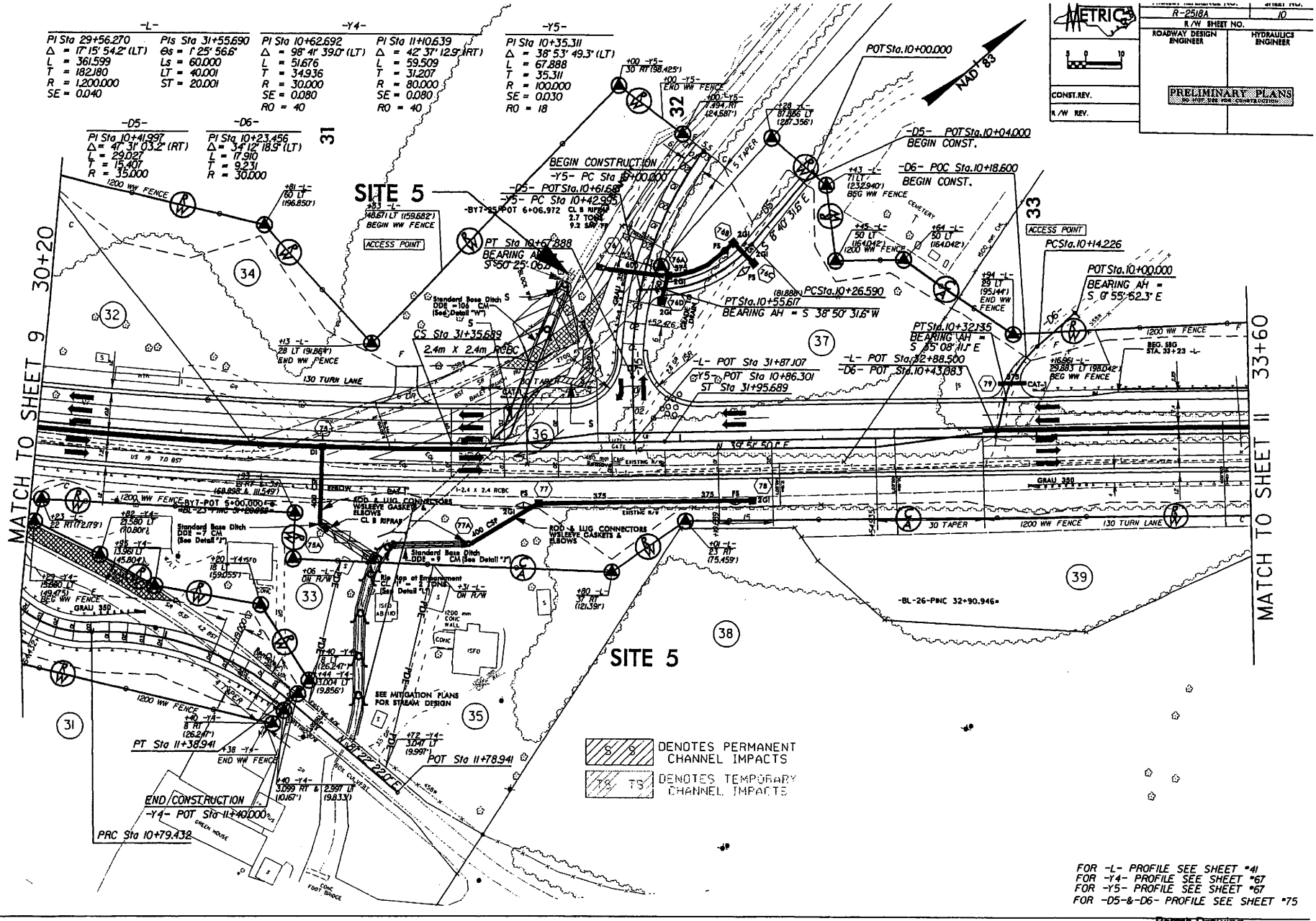
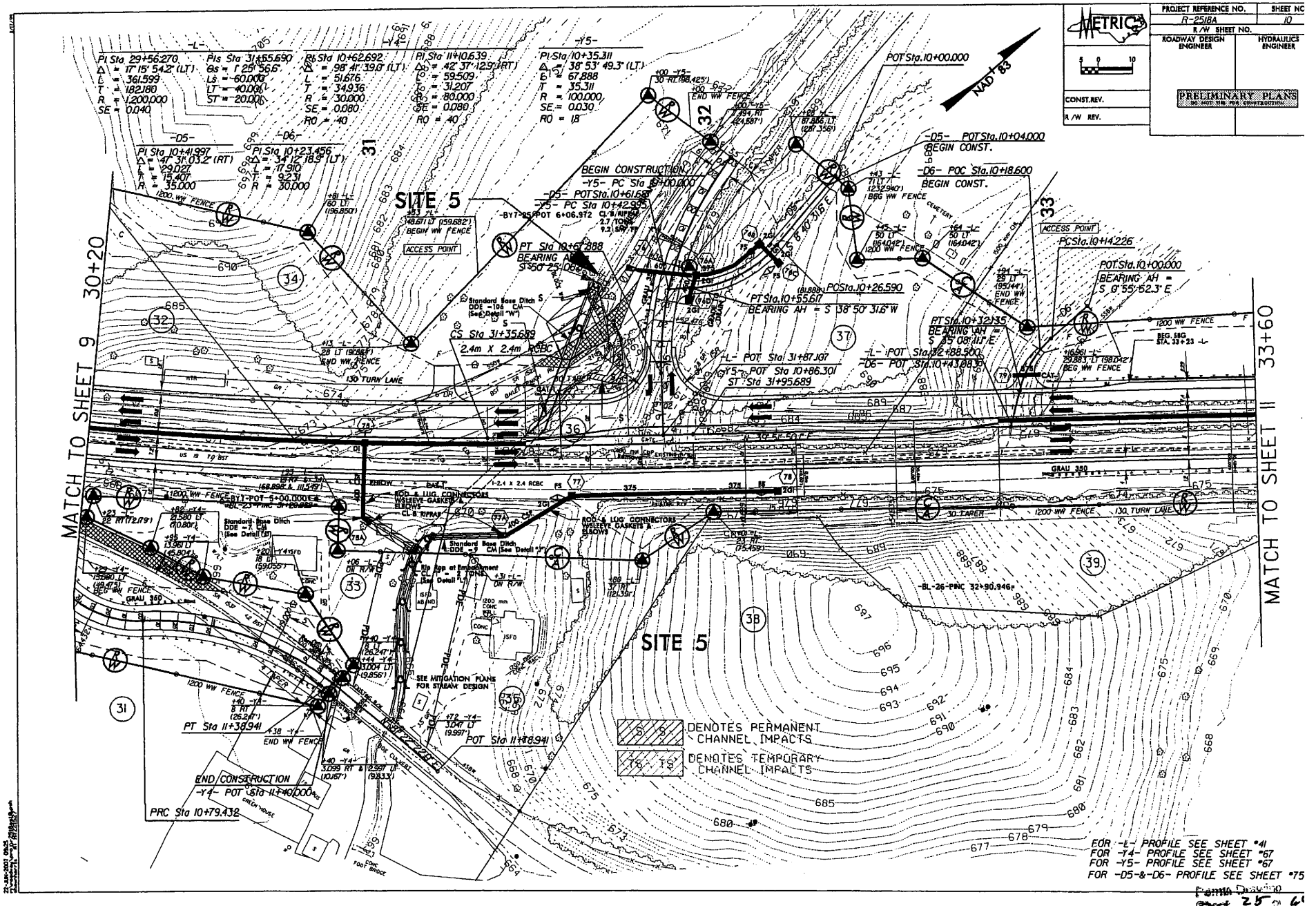
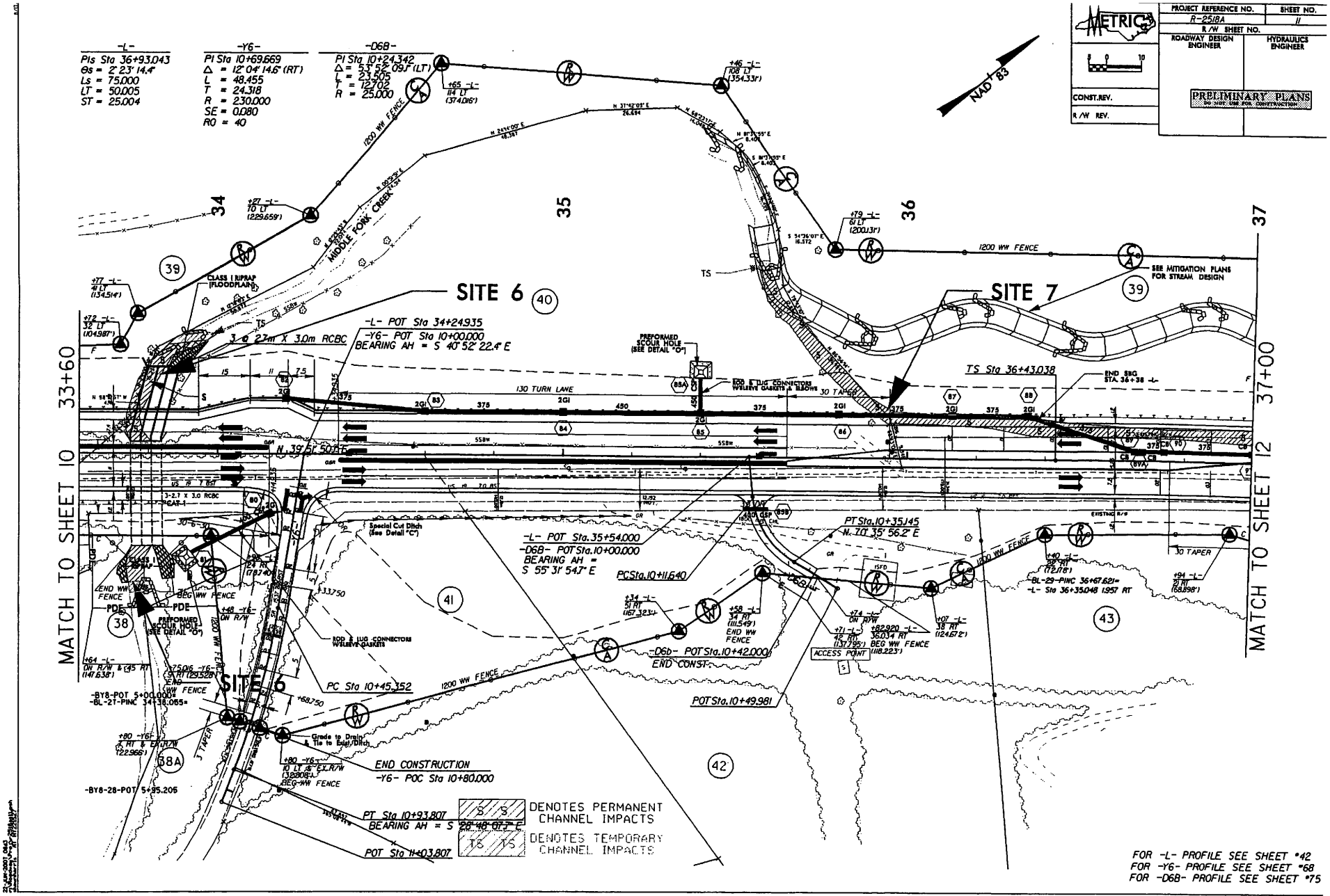
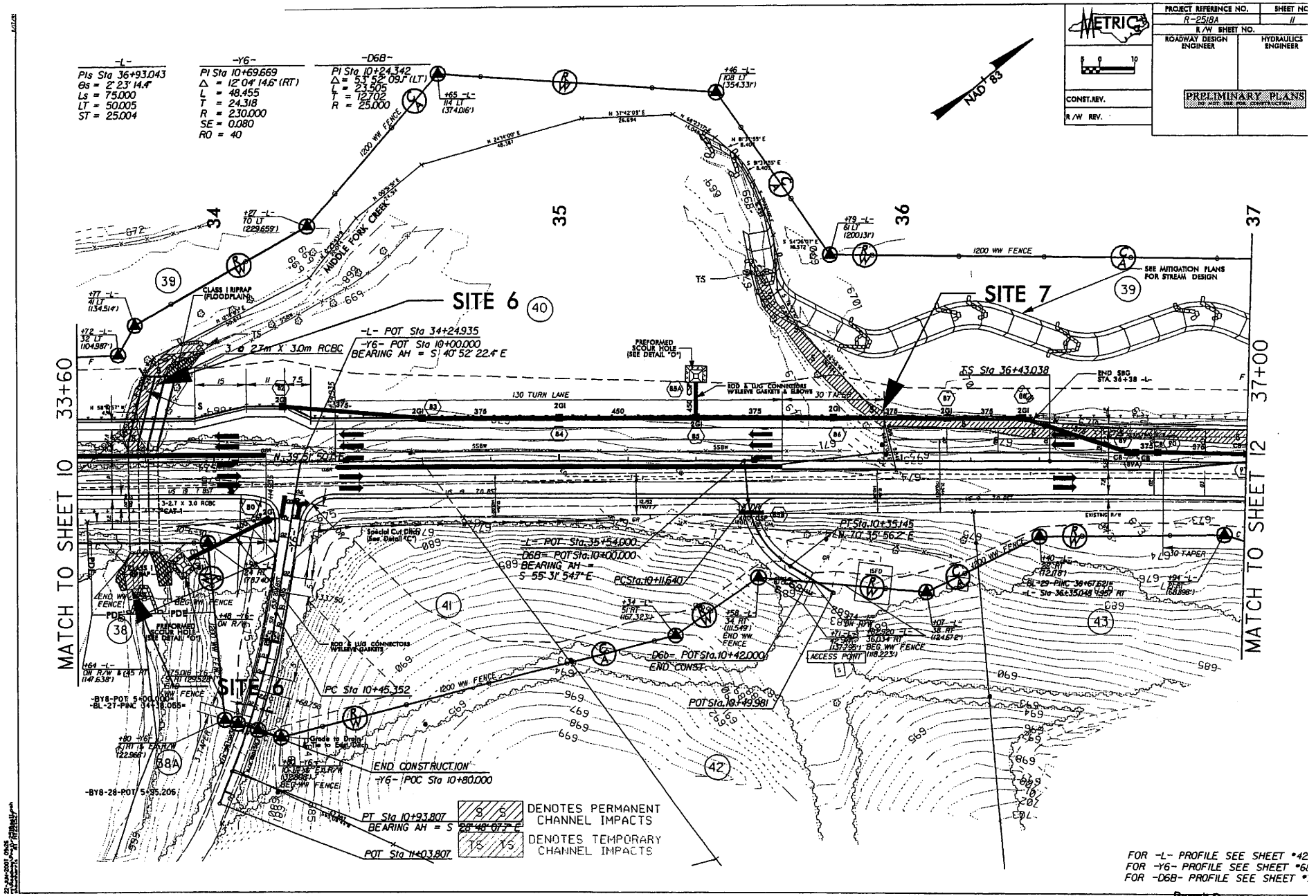

-L-
PIs Sta 27+54.091
Θs = 1° 25' 56.6"
Ls = 60.000
LT = 40.001
ST = 20.001
PI Sta 29+56.270
Δ = 17° 15' 54.2" (LT)
L = 361.599
T = 182.180
R = 1,200.000
SE = 0.040
-Y4-
PI Sta 10+62.692
Δ = 98° 41' 39.0" (LT)
L = 51.676
T = 34.936
R = 30.000
SE = 0.080
RO = 40
NAD 83
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST.REV.
R/W REV.
MATCH TO SHEET 8
MATCH TO SHEET 10
26+80
30+20
SITE 4
TS Sta 27+14.090
SC Sta 27+74.090
-L- POC Sta 30+05.876
-Y4- POTT Sta 10+80.000
-BL-21-PINC 28+84.002*
-L- Sta 28+55.96 15.385 RT
-BL-22-PINC 30+18.939*
BKGEPOT 5+00.000*
-L- Sta 29+89.190 16.489 RT
-Y1A- Sta 10+46.357 17.928 RT
PC Sta 10+27.756
BEARING BK =
S 42° 33' 11.9" E
ACCESS POINT
REMOVE HEADWALL & FILL W/FLOWABLE GROUT
SEE MITIGATION PLANS FOR STREAM DESIGN
Special Cut Base Ditch (See Detail "K")
1200 WW FENCE
END WW FENCE
BEG WW FENCE
Invert Buried 0.31 m
800 mm CONC
REMOVE DI
REMOVE
2GI
US 19 TO BST
N 52° 59' 37.6" E
N 38° 14' 50.6" E
N 51° 56' 24.0" E
30 TAPER
130 TURN LANE
CLASS A RIPRAP
1.5 TON
11.7 SM FF
BOO & LUG CONNECTORS W/SLEEVE GASKETS & ELBOWS
PREFORMED SCOUR HOLE
(SEE DETAIL "O")
PDE
ON R/W
FOR -L- PROFILE SEE SHEET #40
FOR -Y4- PROFILE SEE SHEET #67
Permit Drawing
Sheet 22 of 124



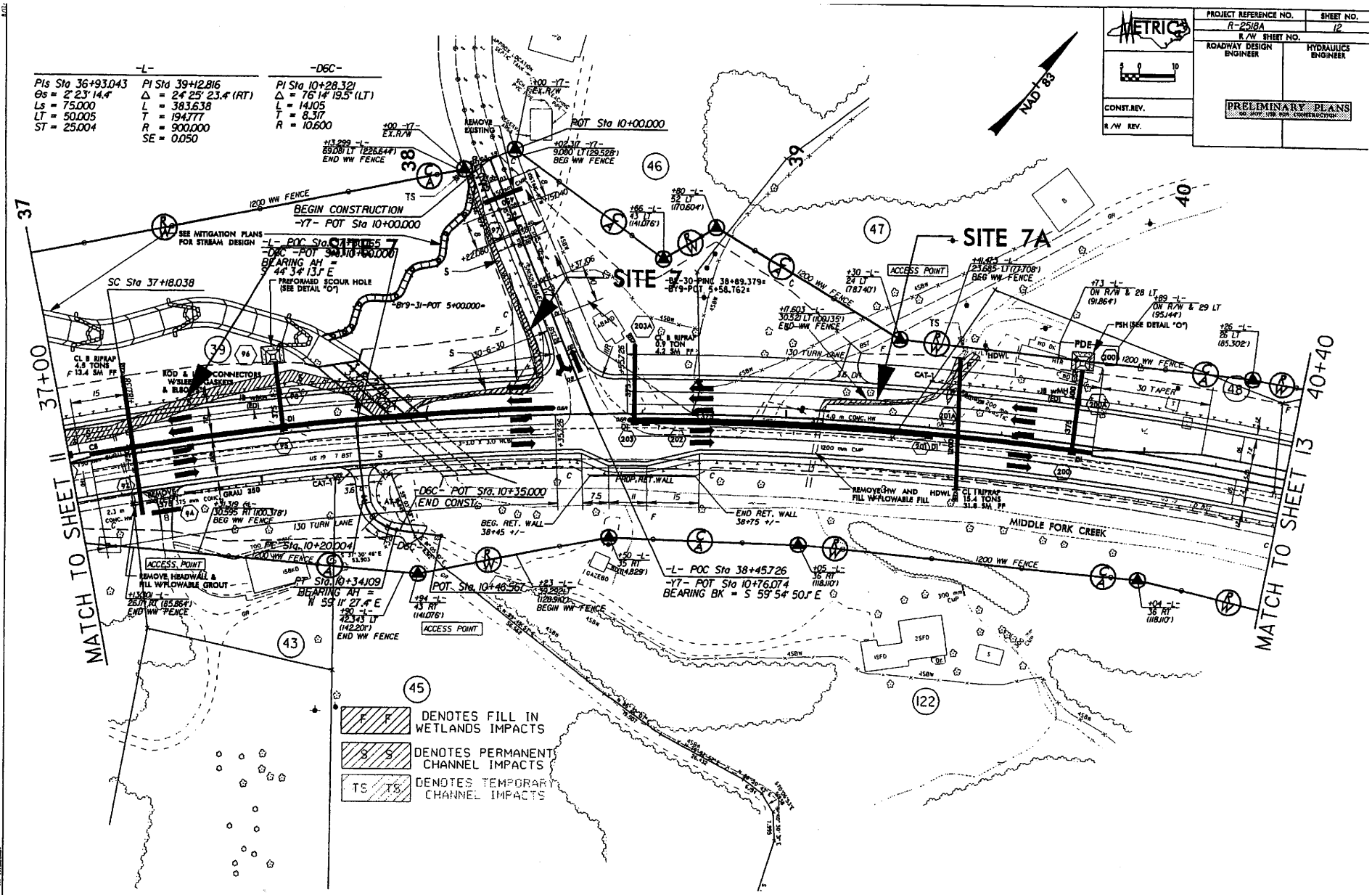
Permit Drawing Sheet 24 of 67


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
SITE 5
MATCH TO SHEET 9
MATCH TO SHEET 11
30+20
33+60
BEGIN CONSTRUCTION
-Y5- PC Sta 10+00.000
-D5- POT Sta. 10+61.687
-Y5- PC Sta 10+42.935
PT Sta 10+67.888
BEARING AH = S 50° 25' 08" E
-D5- POT Sta. 10+04.000
BEGIN CONST.
-D6- POC Sta. 10+18.600
BEGIN CONST.
PC Sta. 10+14.226
POT Sta. 10+00.000
BEARING AH = S 0° 55' 52.3" E
PC Sta. 10+26.590
PT Sta. 10+55.617
BEARING AH = S 38° 50' 31.6" W
PT Sta. 10+32.135
BEARING AH = S 35° 08' 11" E
-L- POT Sta. 31+87.107
-D6- POT Sta. 10+43.083
-Y5- POT Sta 10+86.301
ST Sta 31+95.689
POT Sta. 10+88.500
-BL-26-PNC 32+90.946
SEE MITIGATION PLANS FOR STREAM DESIGN
END CONSTRUCTION
-Y4- POT Sta 11+40.000
PRC Sta 10+79.432
PT Sta 11+38.941
POT Sta 11+38.941
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
FOR -L- PROFILE SEE SHEET *41
FOR -Y4- PROFILE SEE SHEET *67
FOR -Y5- PROFILE SEE SHEET *67
FOR -D5-&-D6- PROFILE SEE SHEET *75


-L-
PIs Sta 36+93.043
θs = 2° 23' 14.4"
Ls = 75.000
LT = 50.005
ST = 25.004
-Y6-
PI Sta 10+69.669
Δ = 12° 04' 14.6" (RT)
L = 48.455
T = 24.318
R = 230.000
SE = 0.080
R0 = 40
-D6B-
PI Sta 10+24.342
Δ = 53° 52' 09.1" (LT)
L = 23.505
T = 12.702
R = 25.000
METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
NAD 83
MATCH TO SHEET 10
MATCH TO SHEET 12
33+60
37+00
SITE 6
SITE 7
1200 WW FENCE
MIDDLE FORK CREEK
CLASS I RIPRAP (FLOODPLAIN)
3 @ 2.7m X 3.0m RCBC
-L- POT Sta 34+24.935
-Y6- POT Sta 10+00.000
BEARING AH = S 40° 52' 22.4" E
PREFORMED SCOUR HOLE (SEE DETAIL "D")
130 TURN LANE
30 TAPER
TS Sta 36+43.038
END SBG STA. 36+38 -L-
SEE MITIGATION PLANS FOR STREAM DESIGN
N 39° 51' 50" E
-L- POT Sta. 35+54.000
-D6B- POT Sta. 10+00.000
BEARING AH = S 55° 31' 54.7" E
PT Sta. 10+35.145
N. 20° 35' 56.2" E
PC Sta 10+11.640
-D6b- POT Sta. 10+42.000
END CONST.
PC Sta 10+45.352
POT Sta. 10+49.981
END CONSTRUCTION
-Y6- POC Sta 10+80.000
PT Sta 10+93.807
BEARING AH = S 28° 48' 07.7" E
POT Sta 11+03.807
-BY8-POT 5+00.000=
-BL-2T-PINC 34+38.085=
-BY8-28-POT 5+95.205
-BL-29-PINC 36+67.621=
-L- Sta 36+35.048 1.957 RT
ACCESS POINT
END WW FENCE
BEG WW FENCE
PDE
Special Cut Ditch (See Detail "C")
Grade to Drain & Tie to Exist. Ditch
3-2.7 X 3.0 RCBC PCAT-1
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
FOR -L- PROFILE SEE SHEET #42
FOR -Y6- PROFILE SEE SHEET #68
FOR -D6B- PROFILE SEE SHEET #75



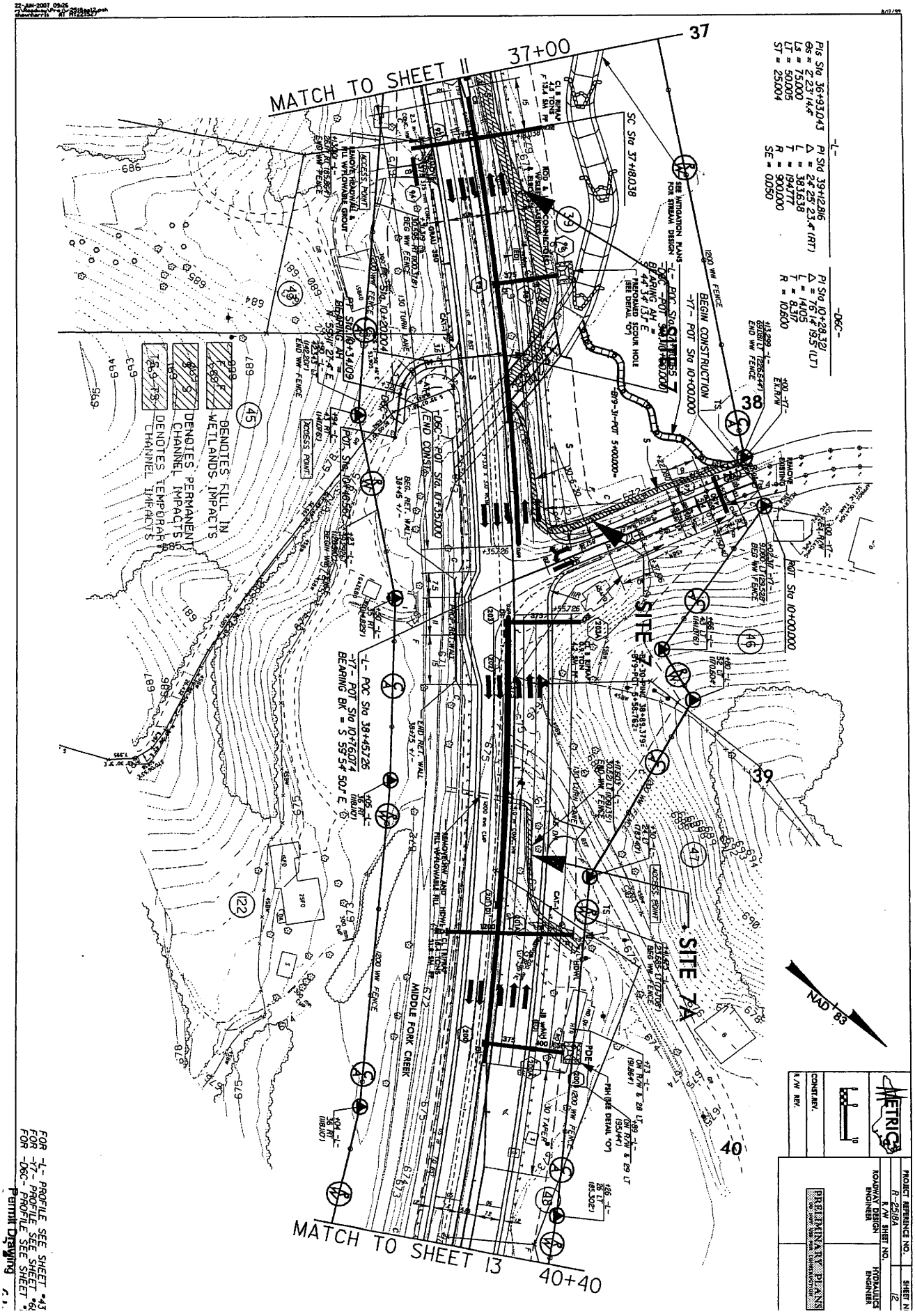
Permit Drawing
Sheet 27 of 64

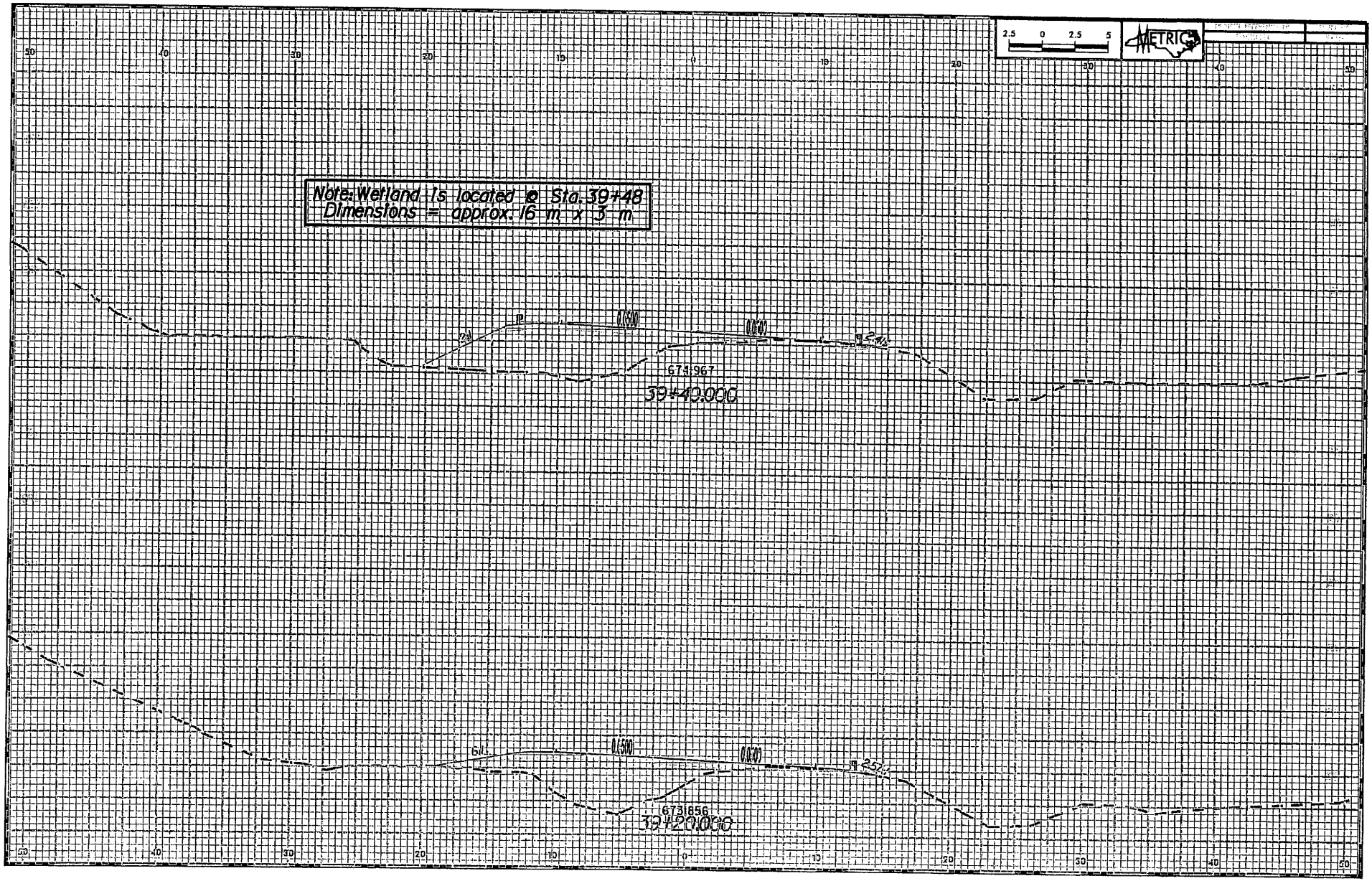


R/W REV.: REVISING PARCEL NUMBER ON PARCEL 45A. 6/11/2007 NWH

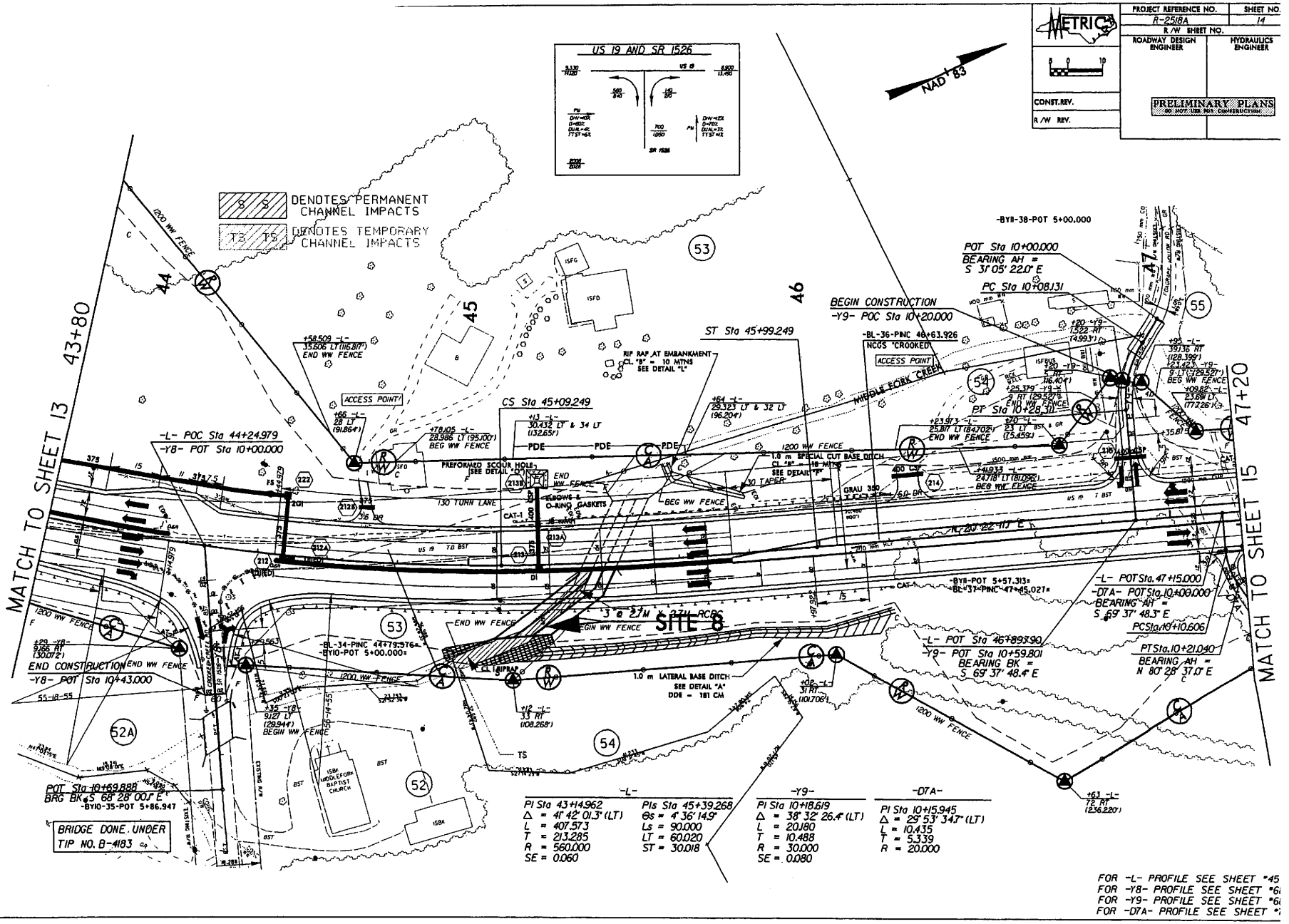
Sheet 25 of 64

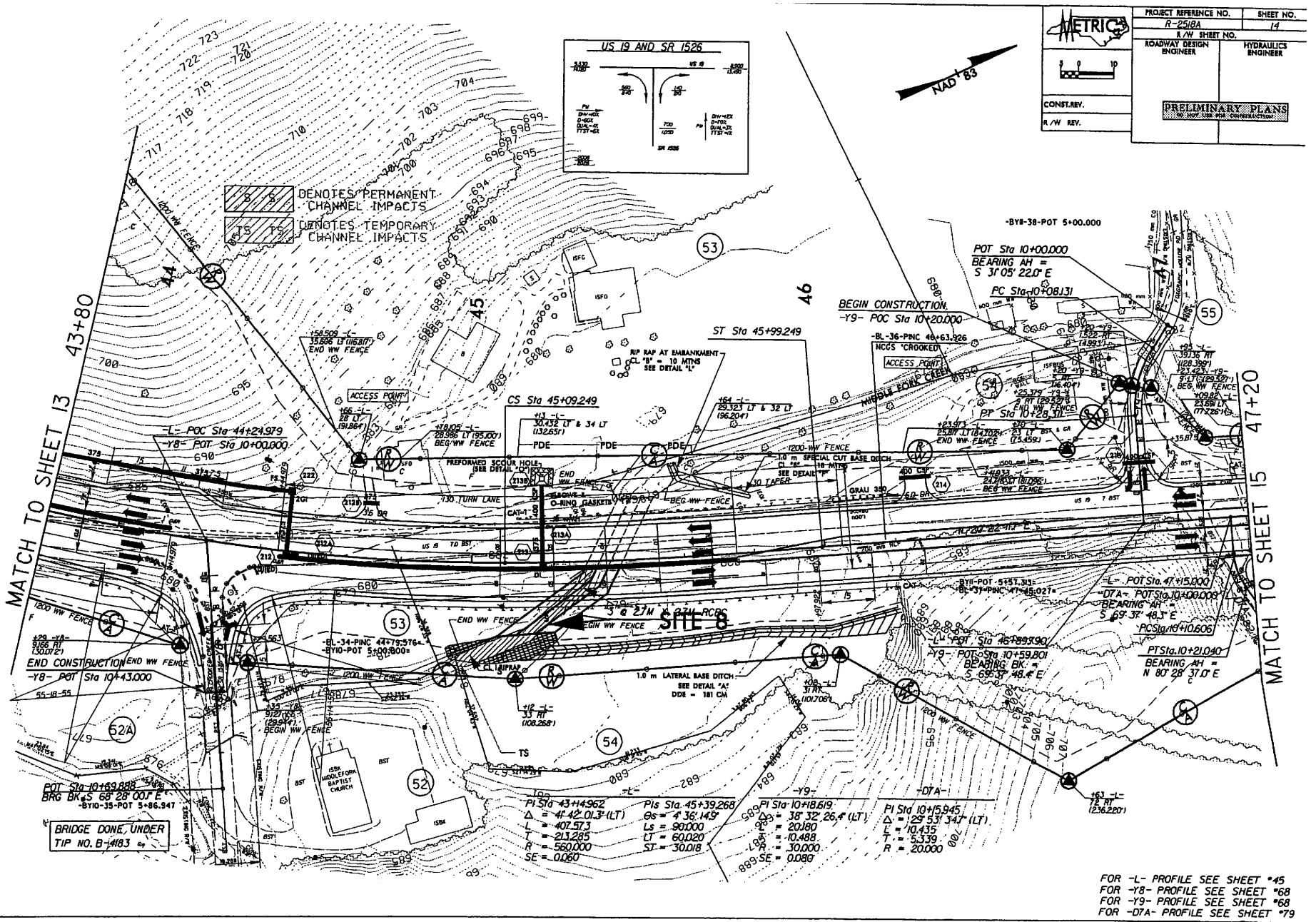
R/W REV.: REVISING PARCEL NUMBER ON PARCEL 45A. 6/11/2007 NNH





Permit Drawing
Sheet 64 of


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
US 19 AND SR 1526
NAD 83
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
MATCH TO SHEET 13
MATCH TO SHEET 15
43+80
47+20
SITE 8
-L- POC Sta 44+24.979
-Y8- POT Sta 10+00.000
-BYII-38-POT 5+00.000
POT Sta 10+00.000
BEARING AH = S 31° 05' 22.0" E
PC Sta 10+08.131
BEGIN CONSTRUCTION
-Y9- POC Sta 10+20.000
-BL-36-PINC 46+63.926
NCGS "CROOKED"
ACCESS POINT
ST Sta 45+99.249
CS Sta 45+09.249
PT Sta 10+28.511
RIP RAP AT EMBANKMENT
CL "B" = 10 MTNS
SEE DETAIL "L"
PREFORMED SCOUR HOLE
SEE DETAIL "O"
1.0 m SPECIAL CUT BASE DITCH
CL "B" = 10 MTNS
SEE DETAIL "P"
30 TAPER
GRAU 350
6.0 BR
130 TURN LANE
1200 WW FENCE
END WW FENCE
BEG WW FENCE
ELBOWS & O-RING GASKETS
CAT-1
MIDDLE FORK CREEK
N 20° 22' 11" E
-L- POT Sta. 47+15.000
-D7A- POT Sta. 10+08.000
BEARING AH = S 69° 37' 48.3" E
PC Sta. 10+10.606
PT Sta. 10+21.040
BEARING AH = N 80° 28' 37.0" E
-L- POT Sta 46+89.390
-Y9- POT Sta 10+59.801
BEARING BK = S 69° 37' 48.4" E
-BYII-POT 5+57.313=
-BL-37-PINC 47+45.027=
-BL-34-PINC 44+79.576=
-BYIO-POT 5+00.000=
-BYIO-35-POT 5+86.947
POT Sta 10+69.888
BRG BK S 68° 28' 00.1" E
BRIDGE DONE UNDER TIP NO. B-4183
END CONSTRUCTION
-Y8- POT Sta 10+43.000
ACCESS POINT
ISFD
ISFG
ISBK
ISBE
-L-
PI Sta 43+14.962
Δ = 41° 42' 01.3" (LT)
L = 407.573
T = 213.285
R = 560.000
SE = 0.060
Pls Sta 45+39.268
Es = 4° 36' 14.9"
Ls = 90.000
LT = 60.020
ST = 30.018
-Y9-
PI Sta 10+18.619
Δ = 38° 32' 26.4" (LT)
L = 20.180
T = 10.488
R = 30.000
SE = 0.080
-D7A-
PI Sta 10+15.945
Δ = 29° 53' 34.7" (LT)
L = 10.435
T = 5.339
R = 20.000
FOR -L- PROFILE SEE SHEET "45
FOR -Y8- PROFILE SEE SHEET "6
FOR -Y9- PROFILE SEE SHEET "6
FOR -D7A- PROFILE SEE SHEET "
Permit Drawing


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION
US 19 AND SR 1526
NAD 83
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
MATCH TO SHEET 13
43+80
MATCH TO SHEET 15
47+20
-L- POC Sta 44+24.979
-Y8- POT Sta 10+00.000
BEGIN CONSTRUCTION
-Y9- POC Sta 10+20.000
POT Sta 10+00.000
BEARING AH = S 31° 05' 22.0" E
PC Sta 10+08.131
ST Sta 45+99.249
CS Sta 45+09.249
PT Sta 10+28.311
-BY8-38-POT 5+00.000
-BL-36-PINC 46+63.926
NCGS "CROOKED"
ACCESS POINT
RIP RAP AT EMBANKMENT
CL "B" = 10 MTHS
SEE DETAIL "L"
PREFORMED SCOUR HOLE
SEE DETAIL "D"
1.0 m SPECIAL CUT BASE DITCH
CL "B" = 10 MTHS
SEE DETAIL "F"
1.0 m LATERAL BASE DITCH
SEE DETAIL "A"
DDE = 181 CM
30 TAPER
TURN LANE
1200 WW FENCE
END WW FENCE
BEGIN WW FENCE
O-RING GASKETS
CAT-1
3 @ 2.7M = 8.1M RCBC
SITE 8
MIDDLE FORK CREEK
BRIDGE DONE UNDER TIP NO. B-4183
-BY10-POT 5+00.000=
-BL-34-PINC 44+79.976=
-BY10-35-POT 5+86.947
POT Sta 10+69.888
BRG BK @ S 68° 28' 00.1" E
END CONSTRUCTION
-Y8- POT Sta 10+43.000
-BY11-POT 5+57.313=
-BL-37-PINC 47+45.027=
-L- POT Sta 47+15.000
-D7A- POT Sta 10+00.008
BEARING AH = S 69° 37' 48.3" E
PC Sta 10+10.606
PT Sta 10+21.040
BEARING AH = N 80° 28' 37.0" E
-L- POT Sta 46+89.390
-Y9- POT Sta 10+59.801
BEARING BK = S 69° 37' 48.4" E
PI Sta 43+14.962
Δ = 41° 42' 01.3" (LT)
L = 407.573
T = 213.285
R = 560.000
SE = 0.060
PIs Sta 45+39.268
Θs = 4° 36' 14.9"
Ls = 90.000
LT = 60.020
ST = 30.018
PI Sta 10+18.619
Δ = 38° 32' 26.4" (LT)
L = 20.180
T = 10.488
R = 30.000
SE = 0.090
PI Sta 10+15.945
Δ = 29° 53' 34.1" (LT)
L = 10.435
T = 5.339
R = 20.000
FOR -L- PROFILE SEE SHEET #45
FOR -Y8- PROFILE SEE SHEET #68
FOR -Y9- PROFILE SEE SHEET #68
FOR -D7A- PROFILE SEE SHEET #79

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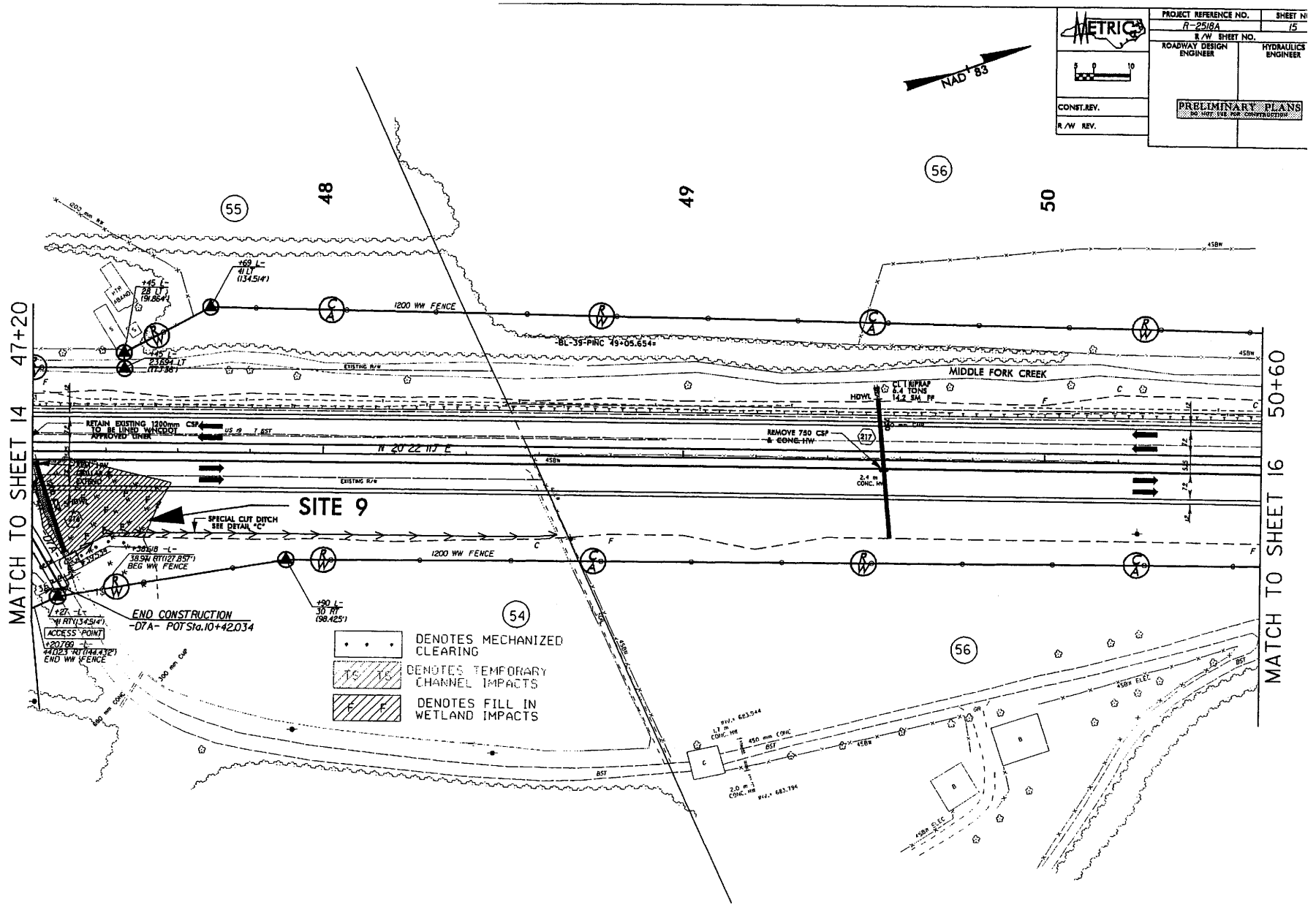
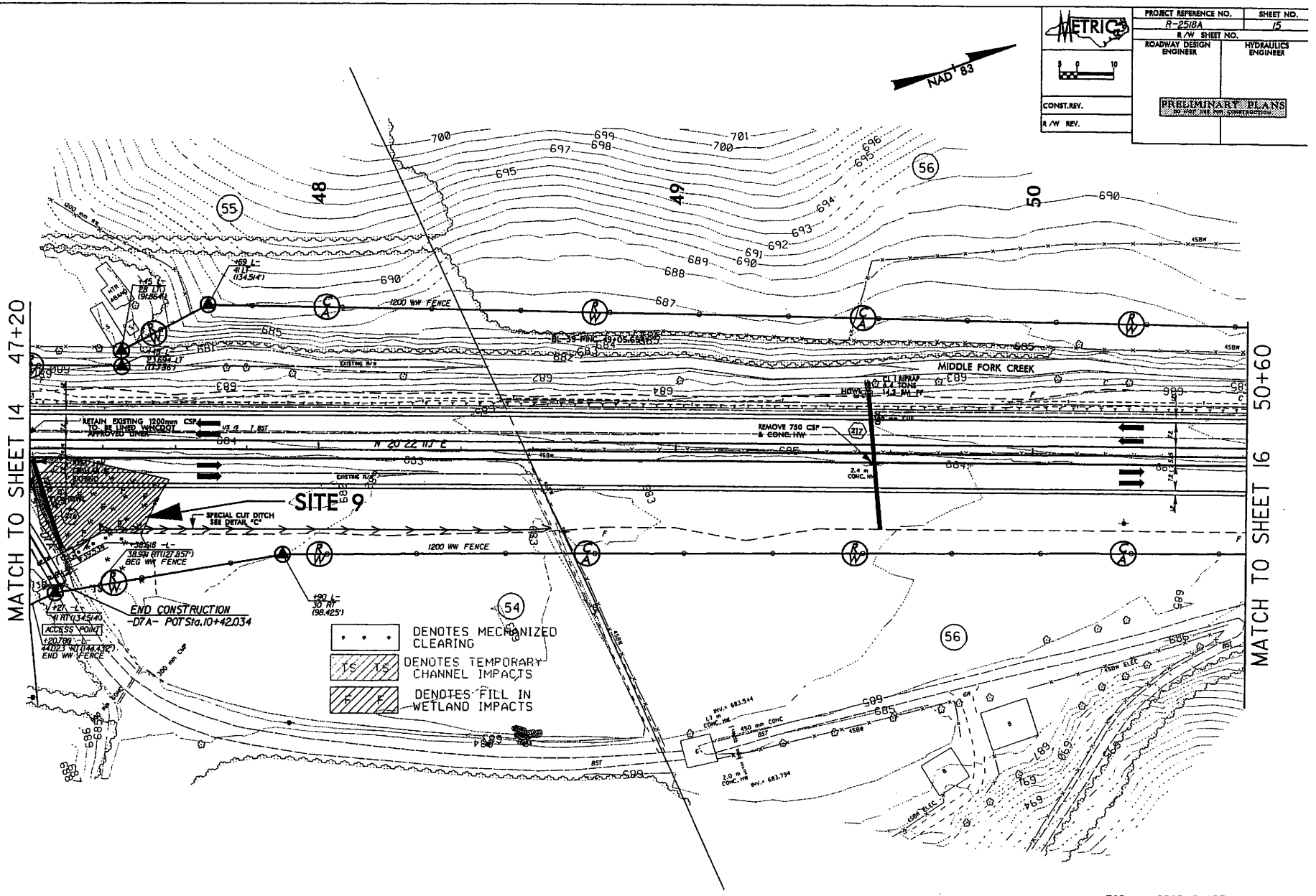
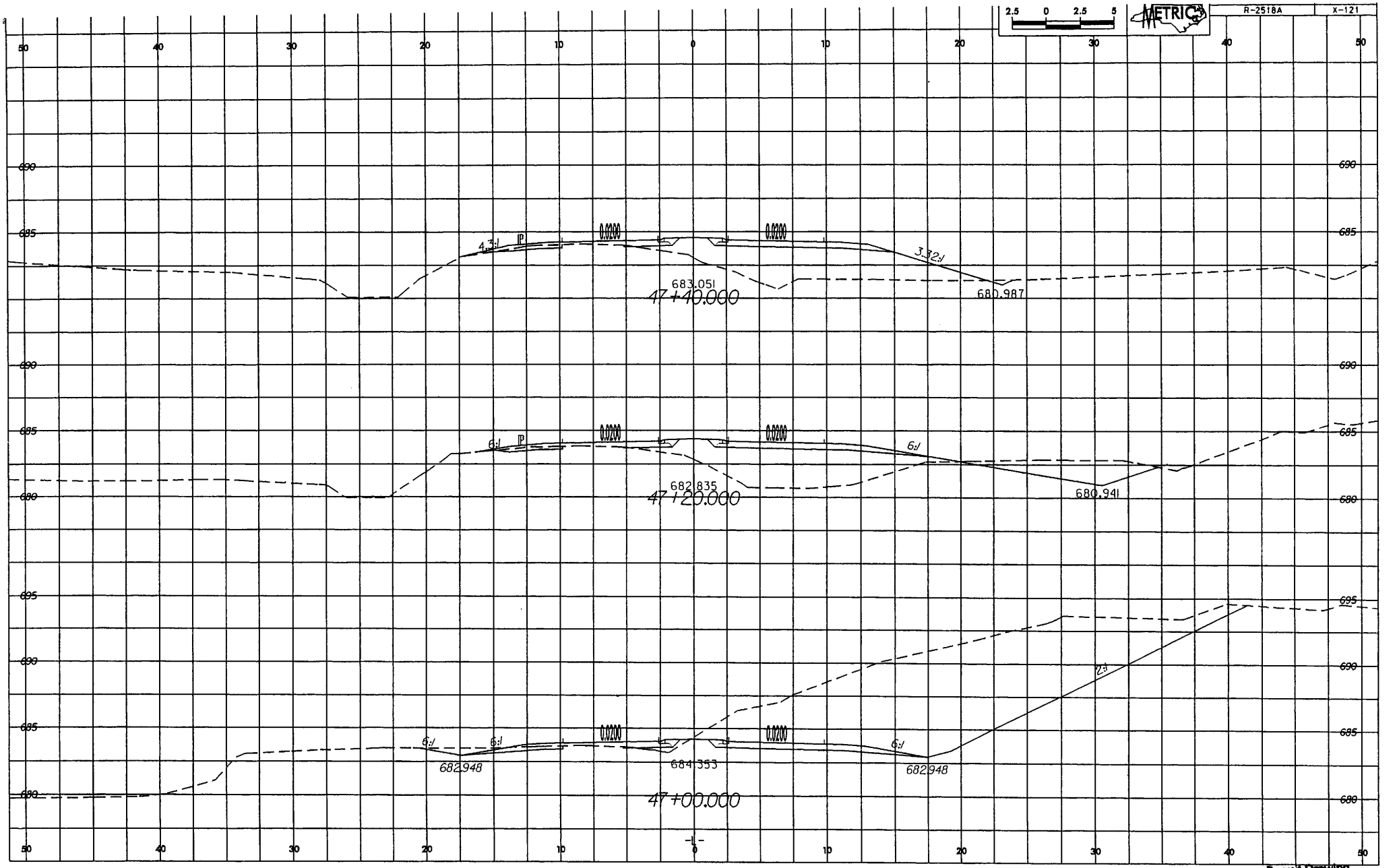
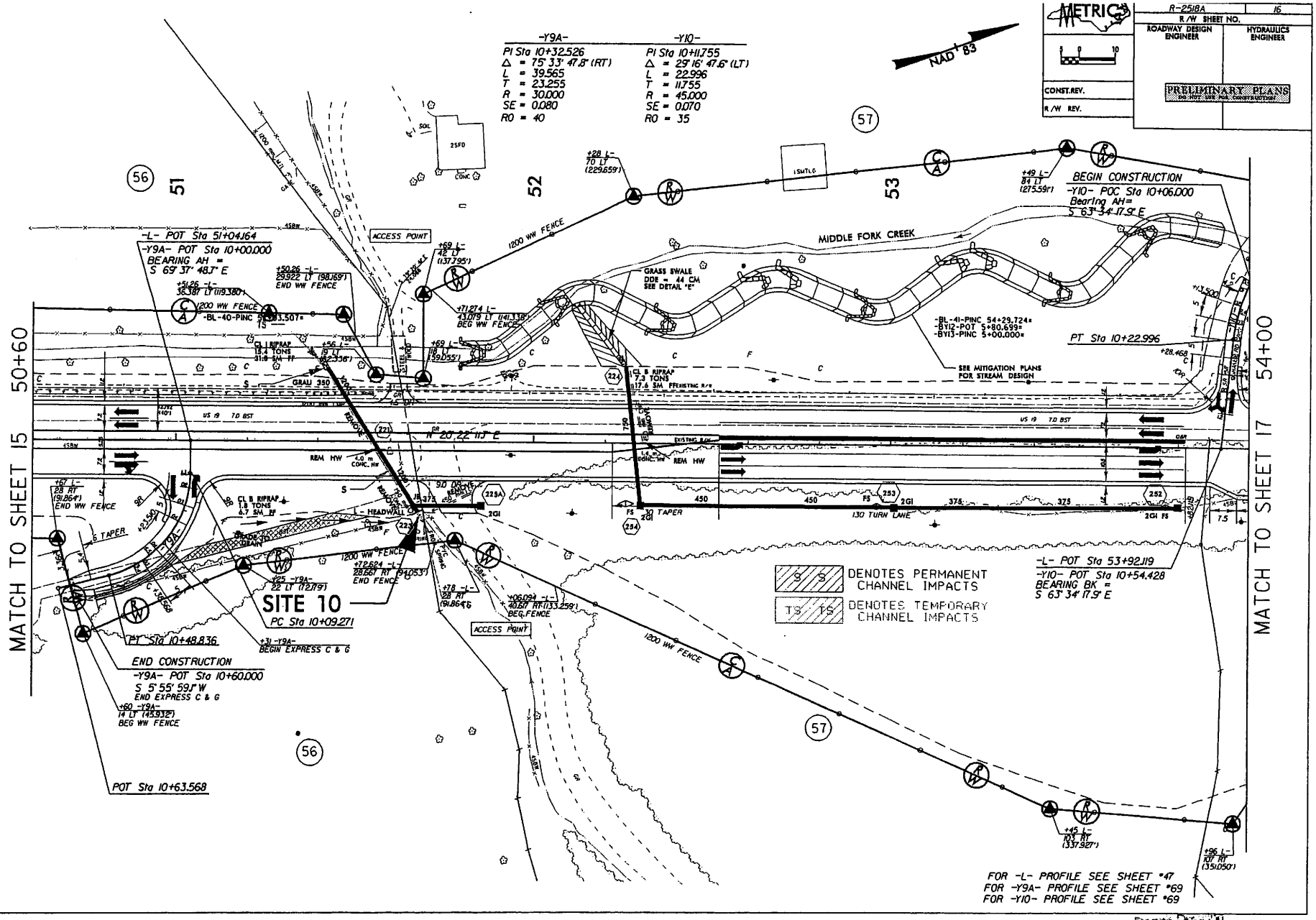


Permit Drawing
Sheet 33 of 64


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
NAD 83
MATCH TO SHEET 14 47+20
MATCH TO SHEET 16 50+60
SITE 9
MIDDLE FORK CREEK
1200 WW FENCE
END CONSTRUCTION
-D7A- POT Sta.10+42.034
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY CHANNEL IMPACTS
DENOTES FILL IN WETLAND IMPACTS
RETAIN EXISTING 1200mm CSP TO BE USED W/NCDOT APPROVED DIVER
REMOVE 750 CSP & CONC. HW
SPECIAL CUT DITCH SEE DETAIL "C"
ACCESS POINT
FOR -L- PROFILE SEE SHEET #46
FOR -D7A- PROFILE SEE SHEET #79
Permit Drawing
Sheet 74 of 44

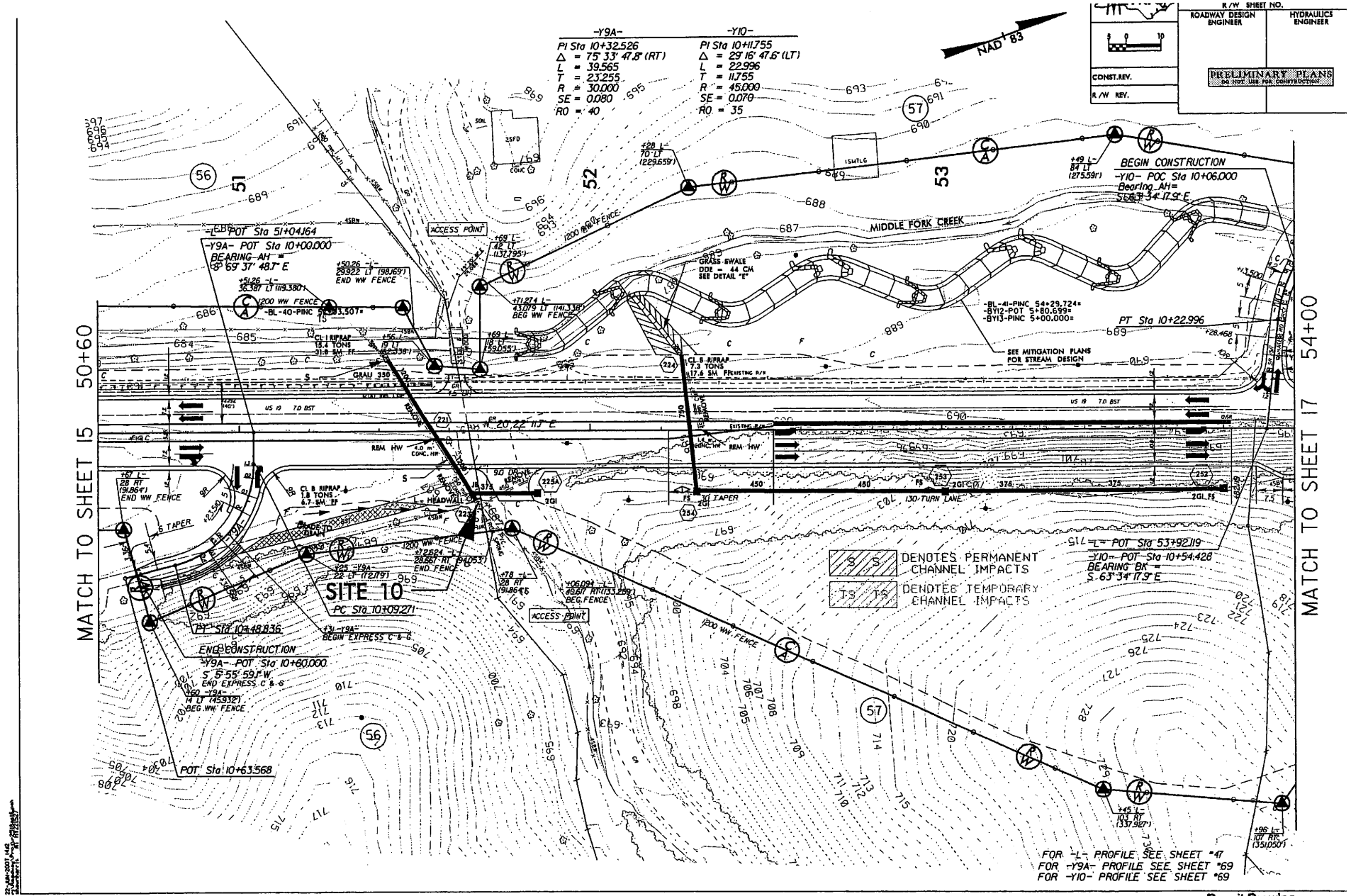


Permit Drawing
Sheet 35 of 64



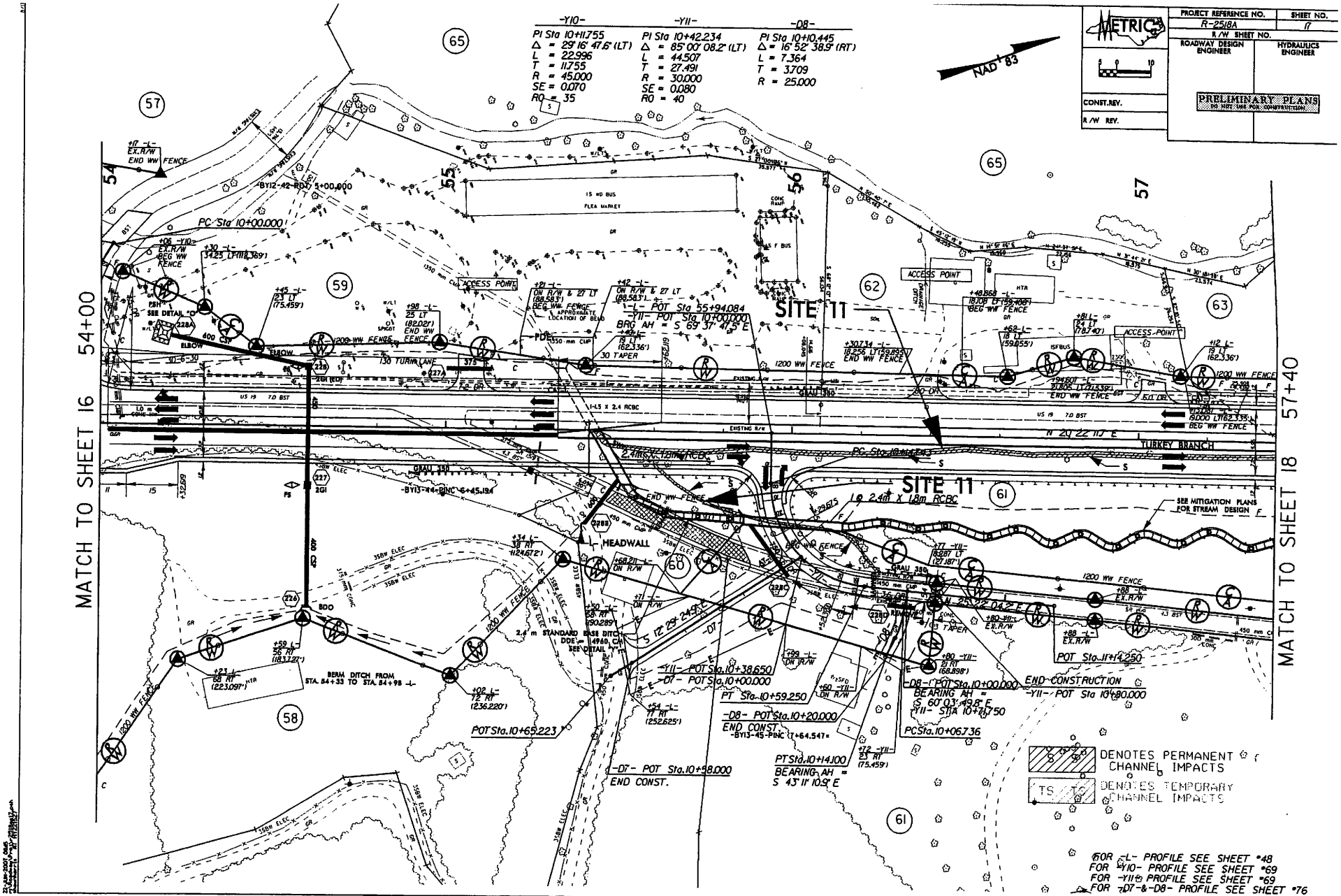
R/W REV.: REVISED PROPOSED RIGHT OF WAY ON PARCEL 56 (ROY GUS BALLARD). 06/11/2007 NNH

Penn Diamond
Sheet 26 of 64

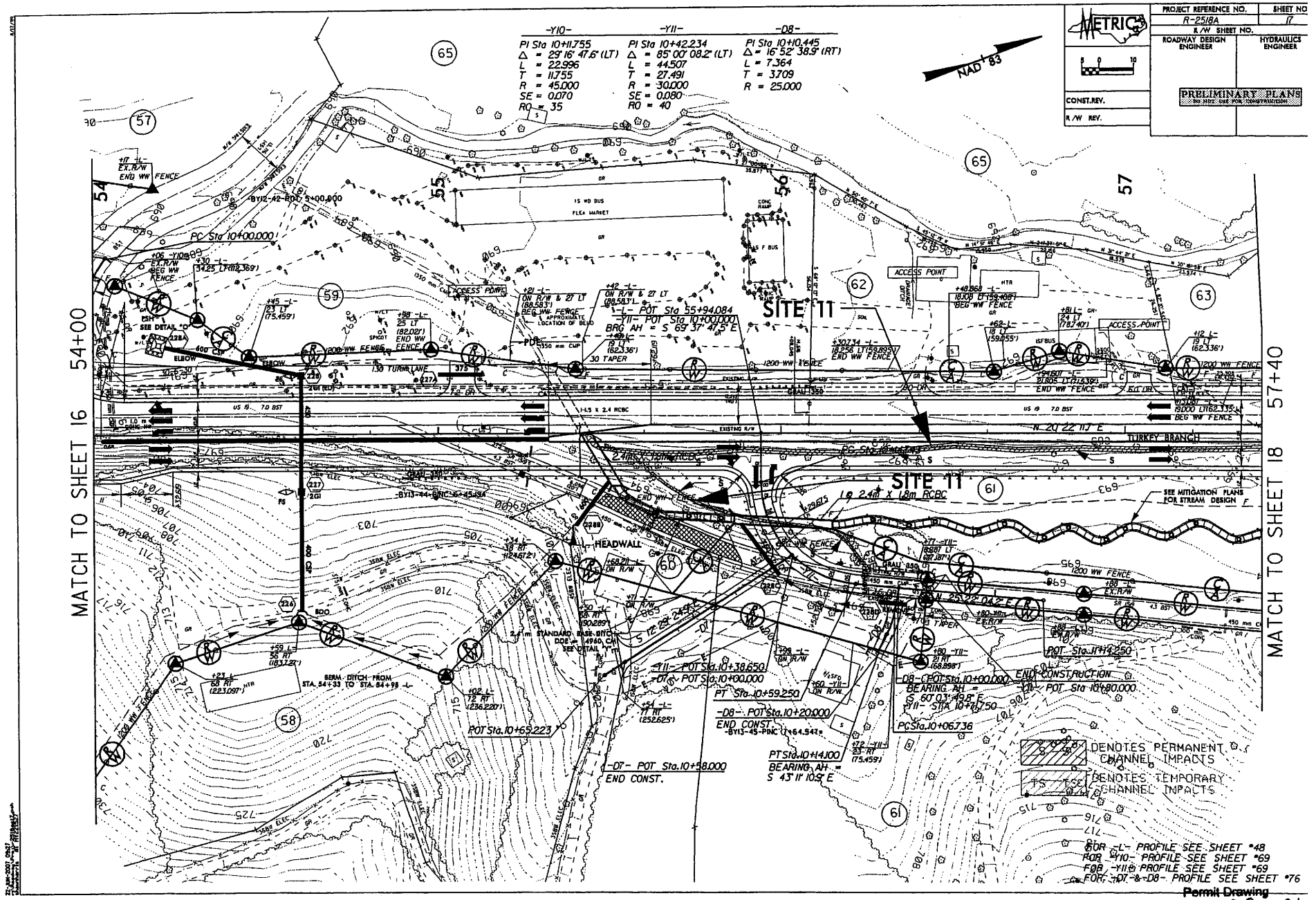


R/W REV.: REVISED PROPOSED RIGHT OF WAY ON PARCEL 56 (ROY GUS BALLARD). 06/11/2007 NHH

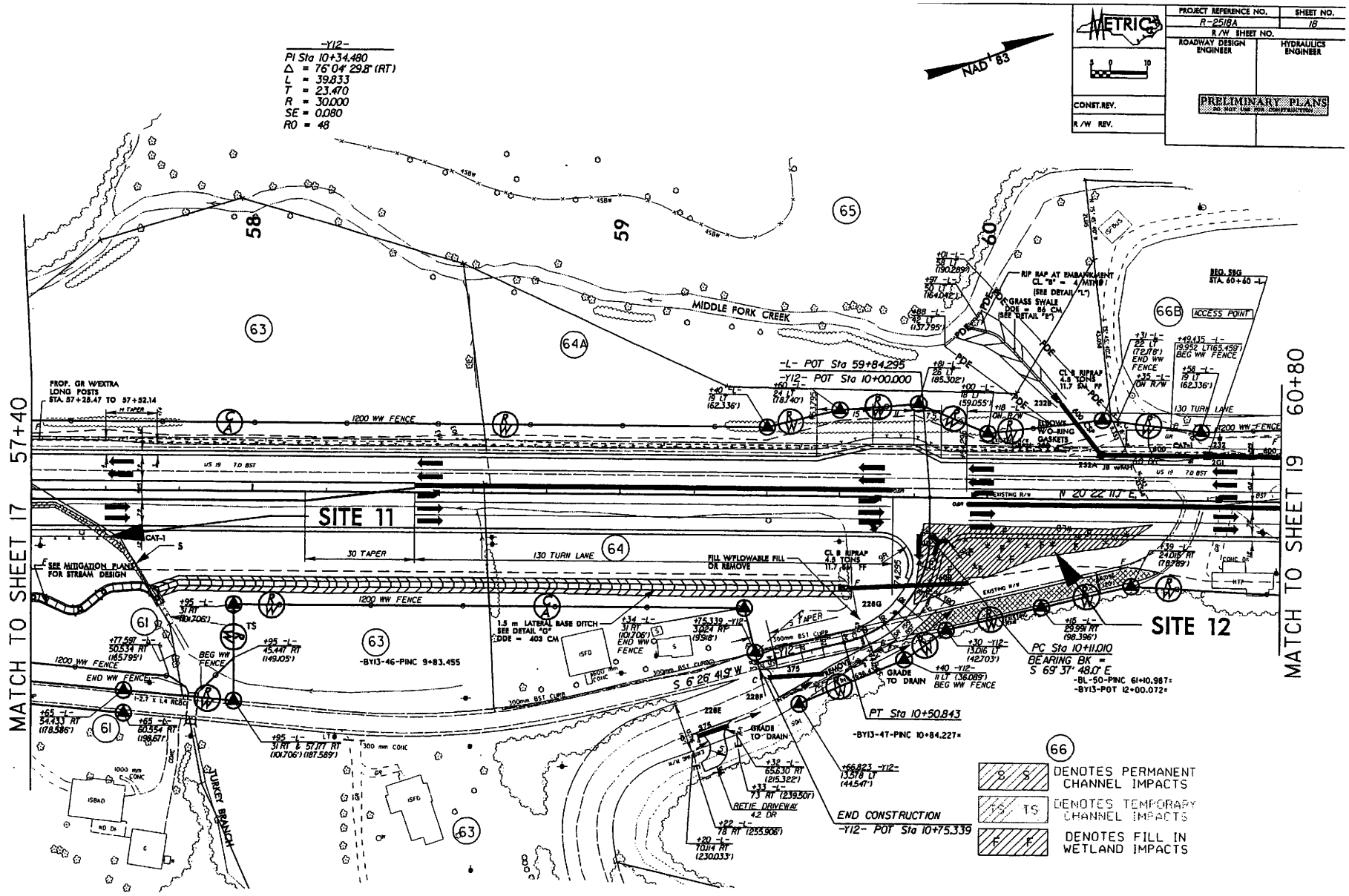
Permit Drawing
Sheet 32 of 64

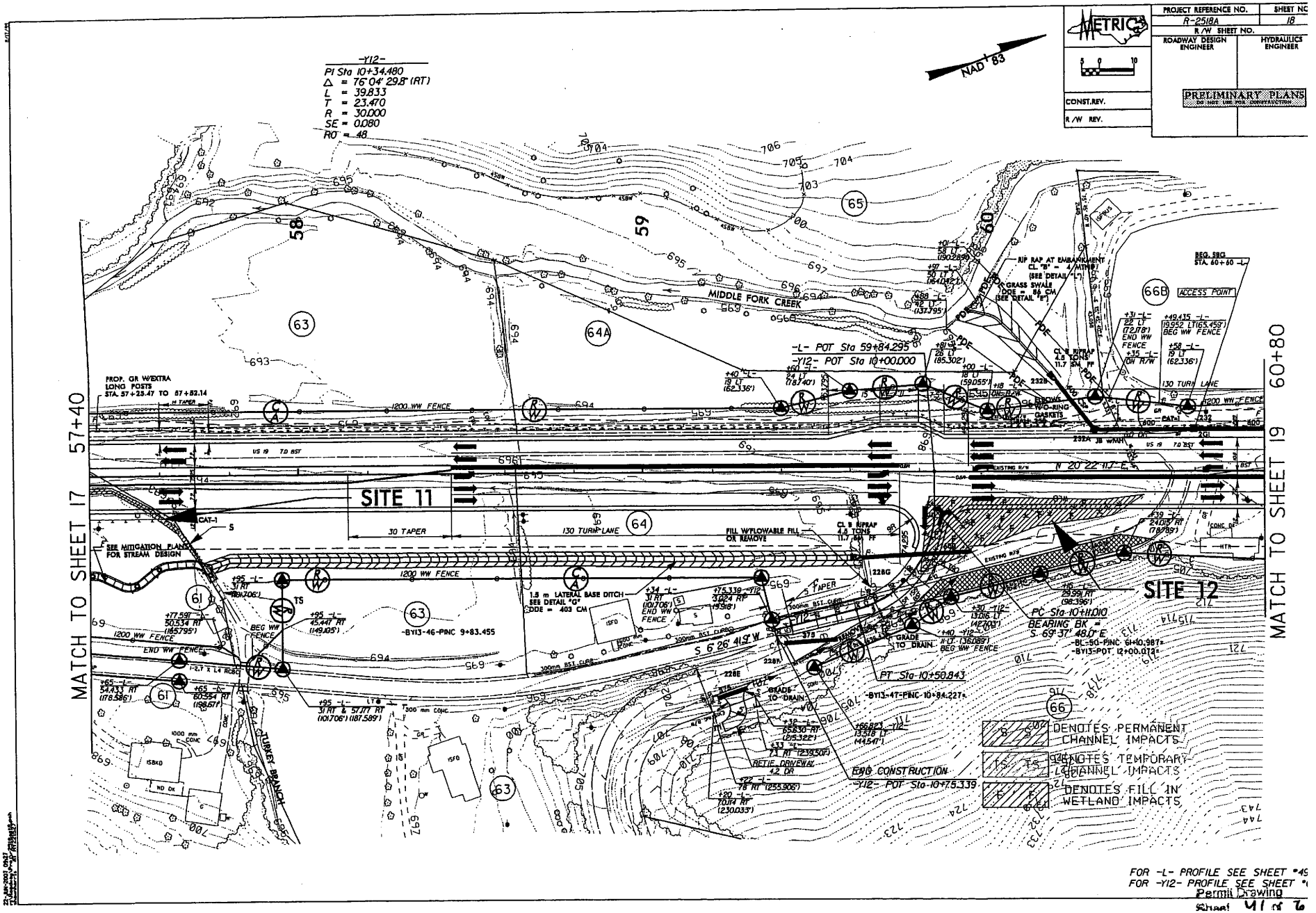


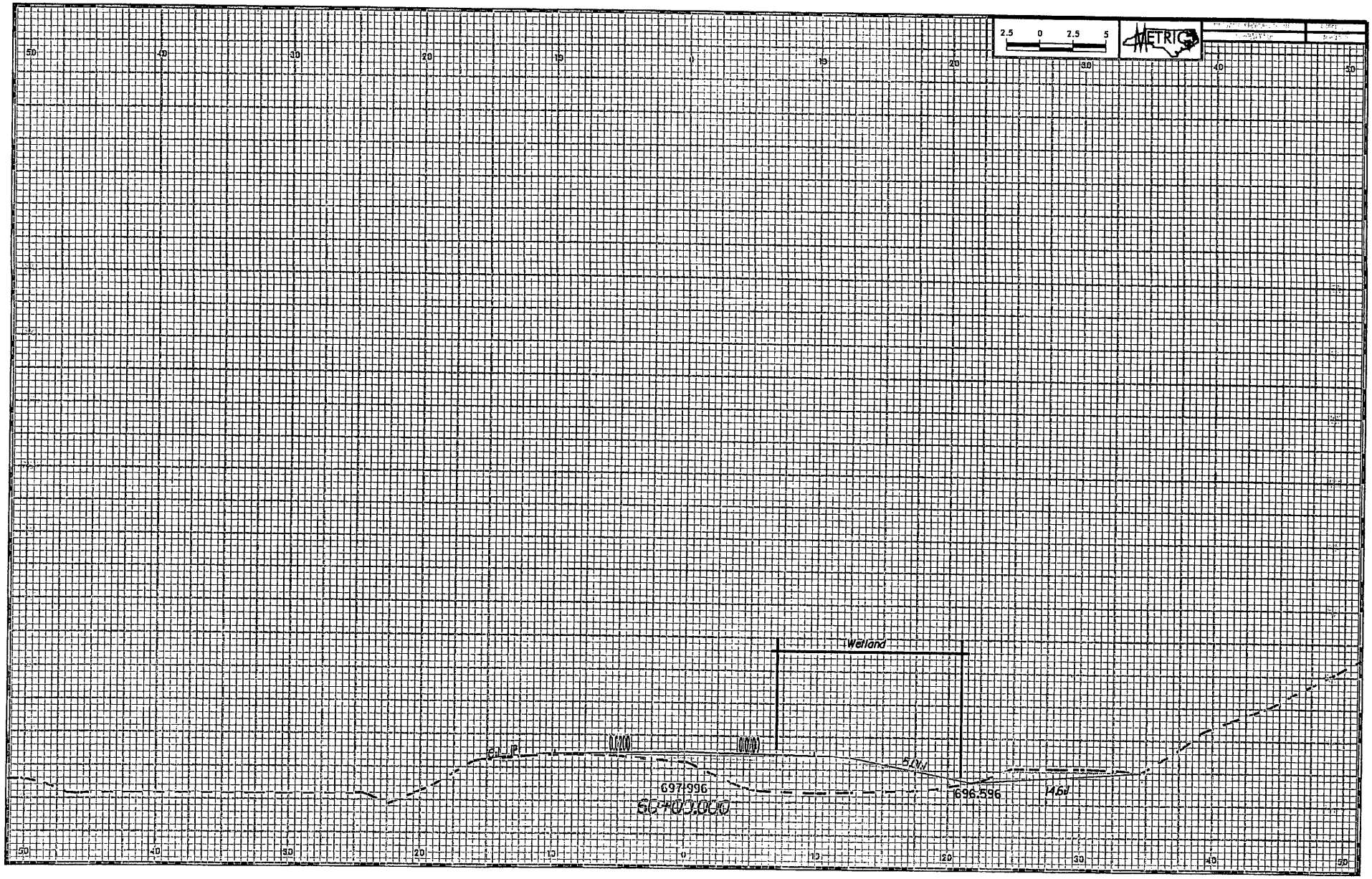
Sheet 26 of 64



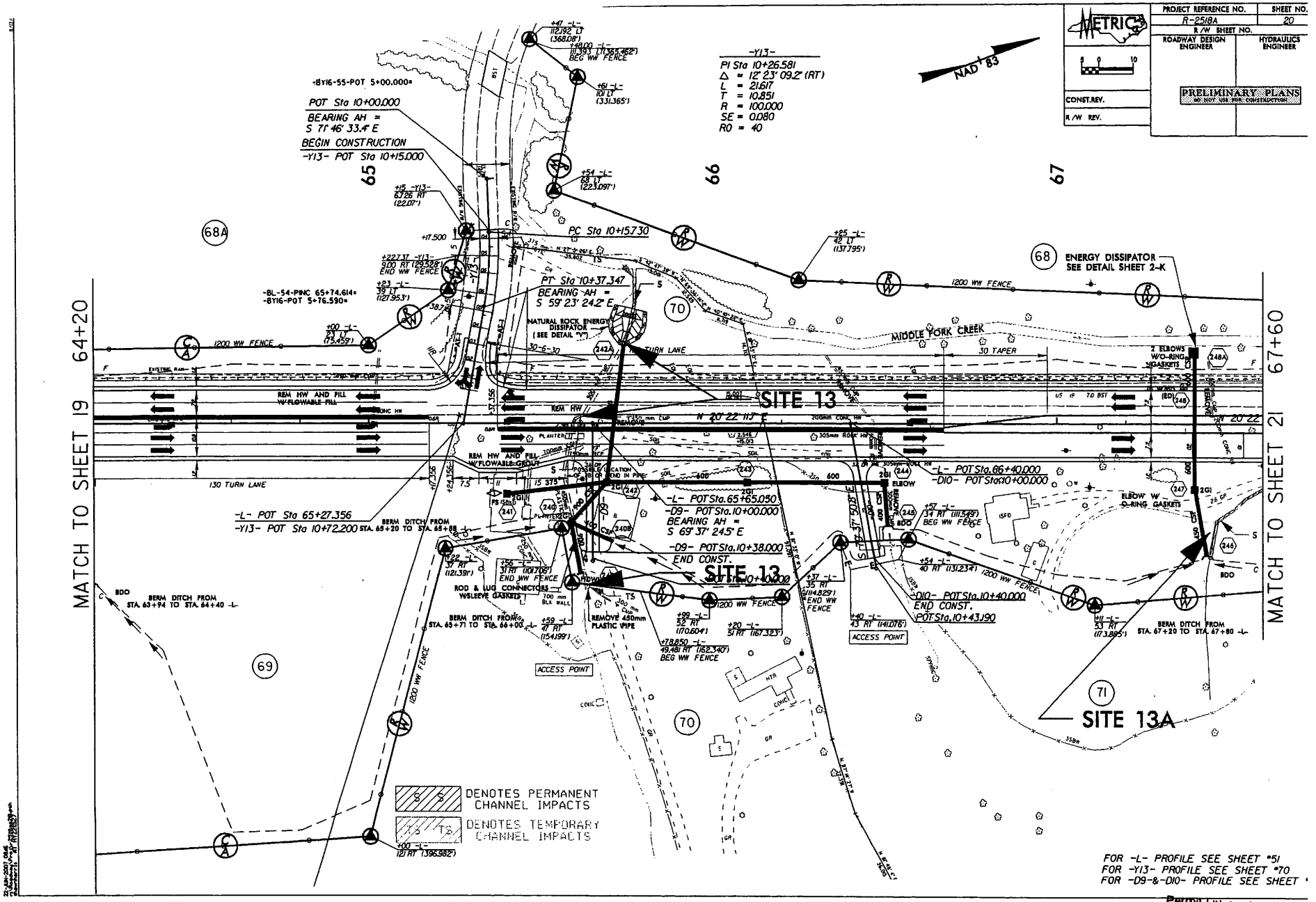
Permit Drawing
Sheet 29 of 64


METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NAD 83
-Y12-
PI Sta 10+34.480
Δ = 76°04' 29.8" (RT)
L = 39.833
T = 23.470
R = 30.000
SE = 0.080
RO = 48
MATCH TO SHEET 17 57+40
MATCH TO SHEET 19 60+80
MIDDLE FORK CREEK
SITE 11
SITE 12
ACCESS POINT
-L- POT Sta 59+84.295
-Y12- POT Sta 10+00.000
PT Sta 10+50.843
PC Sta 10+11.010
BEARING BK = S 69° 37' 48.0" E
END CONSTRUCTION
-Y12- POT Sta 10+75.339
N 20° 22' 11" E
S 6° 26' 41.5" W
TURKEY BRANCH
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
DENOTES FILL IN WETLAND IMPACTS
FOR -L- PROFILE SEE SHEET *49
FOR -Y12- PROFILE SEE SHEET *69
Permit Drawing
Sheet 48 of 64


METRIC
CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
-Y12-
PI Sta 10+34.480
Δ = 76°04'29.8" (RT)
L = 39.833
T = 23.470
R = 30.000
SE = 0.080
RO = 48
NAD 83
MATCH TO SHEET 17 57+40
MATCH TO SHEET 19 60+80
SITE 11
SITE 12
MIDDLE FORK CREEK
-L- POT Sta 59+84.295
-Y12- POT Sta 10+00.000
PROP. GR W/EXTRA LONG POSTS STA. 57+25.47 TO 57+82.14
1200 WW FENCE
30 TAPER
130 TURN LANE
SEE MITIGATION PLANS FOR STREAM DESIGN
1.5 m LATERAL BASE DITCH SEE DETAIL "G"
CDDE = 403 CM
FILL W/FLOWABLE FILL OR REMOVE
CL B RIPRAP 1.5 TONS 11.7 SQ. FT.
RIP RAP AT EMBANKMENT CL "B" - 1 (MTHD.) (SEE DETAIL "L")
GRASS SWALE DDE = 86 CM (SEE DETAIL "E")
ACCESS POINT
BEG. SBG STA. 60+60 -L-
PC Sta 10+11.010
BEARING BK = S 69°37'48.0"E
-BL-50-PINC 61+10.987
-BY13-POT 12+00.074
PT Sta 10+50.843
-BY13-47-PINC 10+94.227
END CONSTRUCTION
-Y12- POT Sta 10+75.339
-BY13-46-PINC 9+83.455
S 6°26'41.9"W
BETTIE DRIVEWAY
4.2 DR
TURKEY BRANCH
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
DENOTES FILL IN WETLAND IMPACTS
FOR -L- PROFILE SEE SHEET "49
FOR -Y12- PROFILE SEE SHEET "
Permit Drawing
Sheet 41 of 76

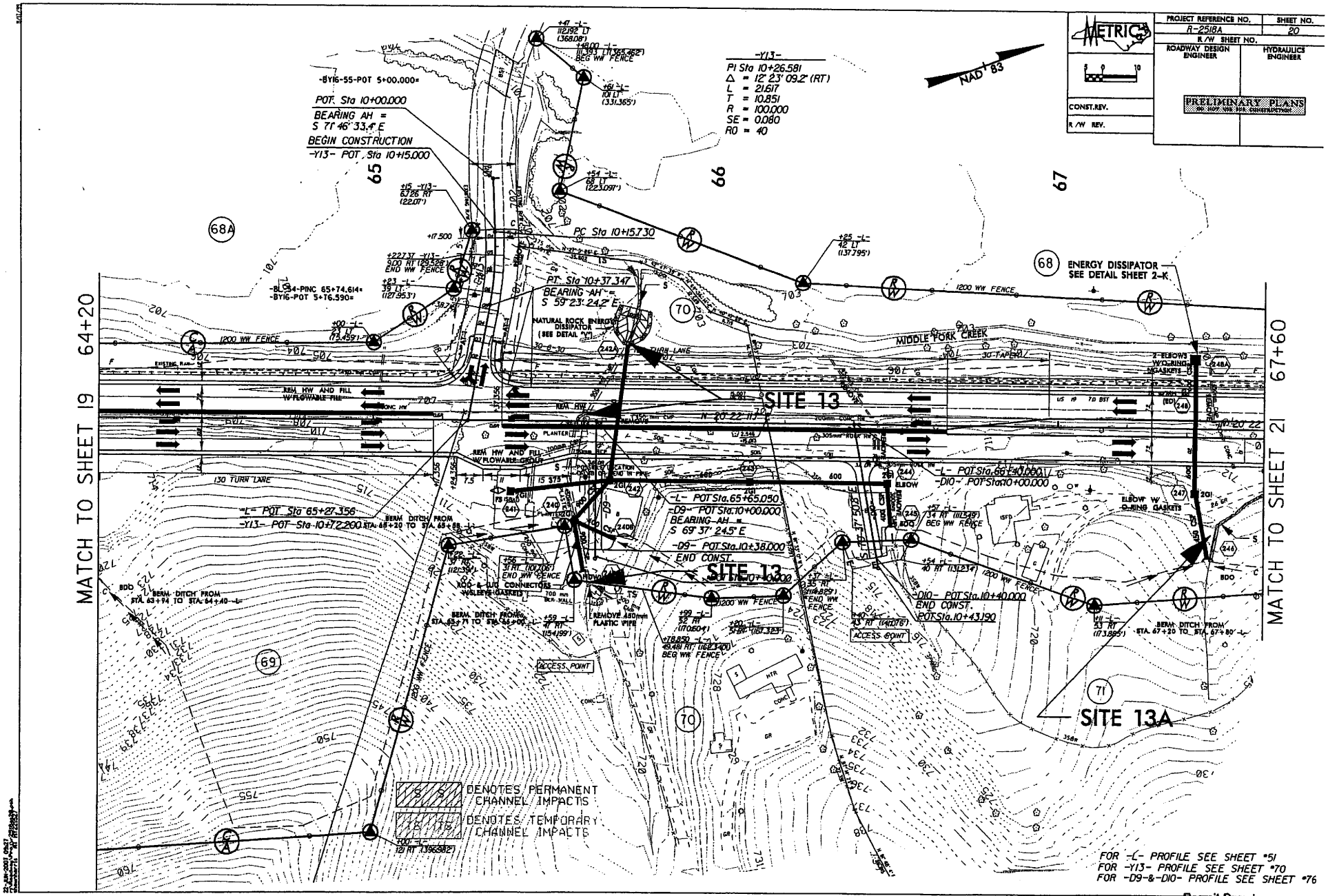


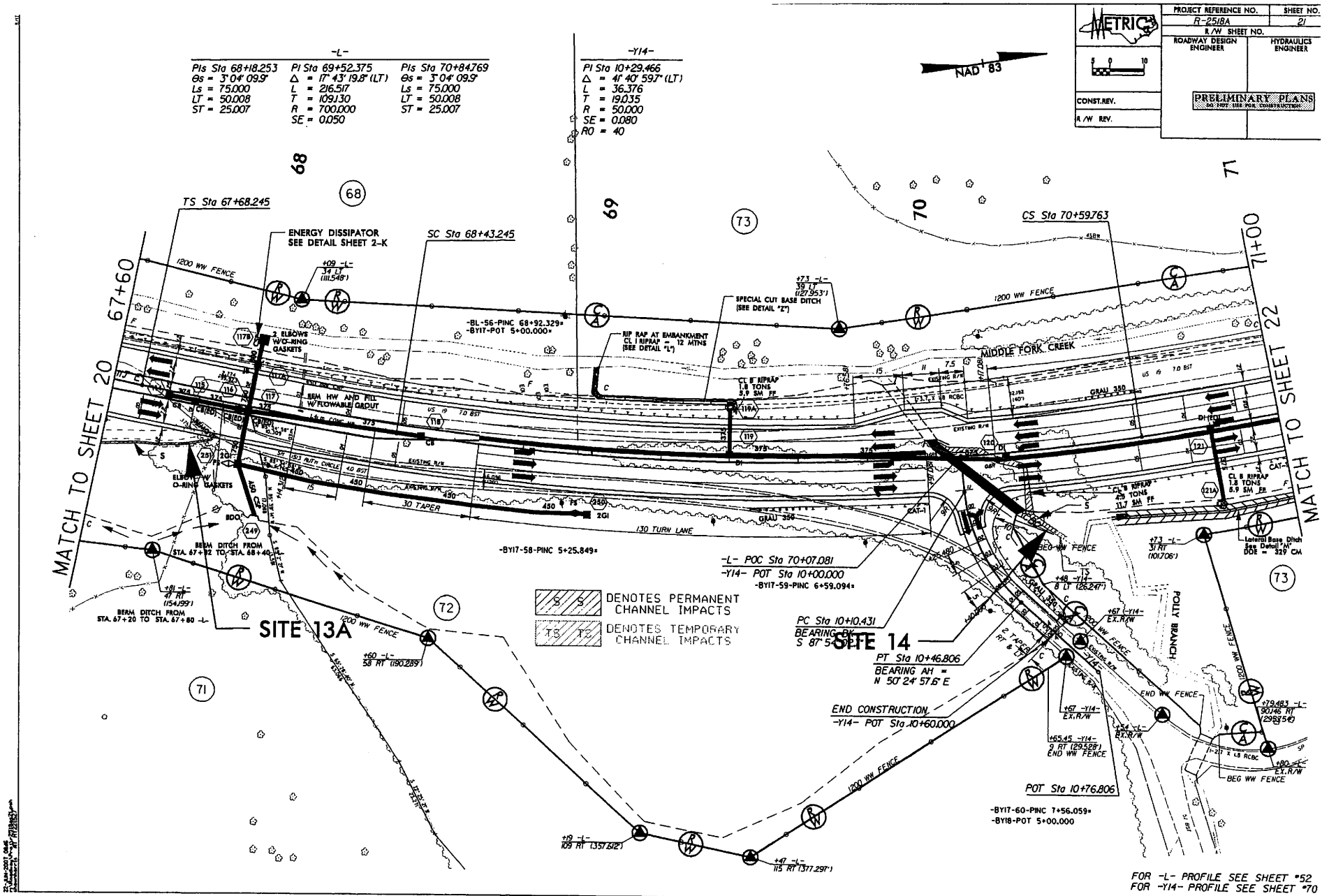
Permit Drawing
Sheet 42 of 64



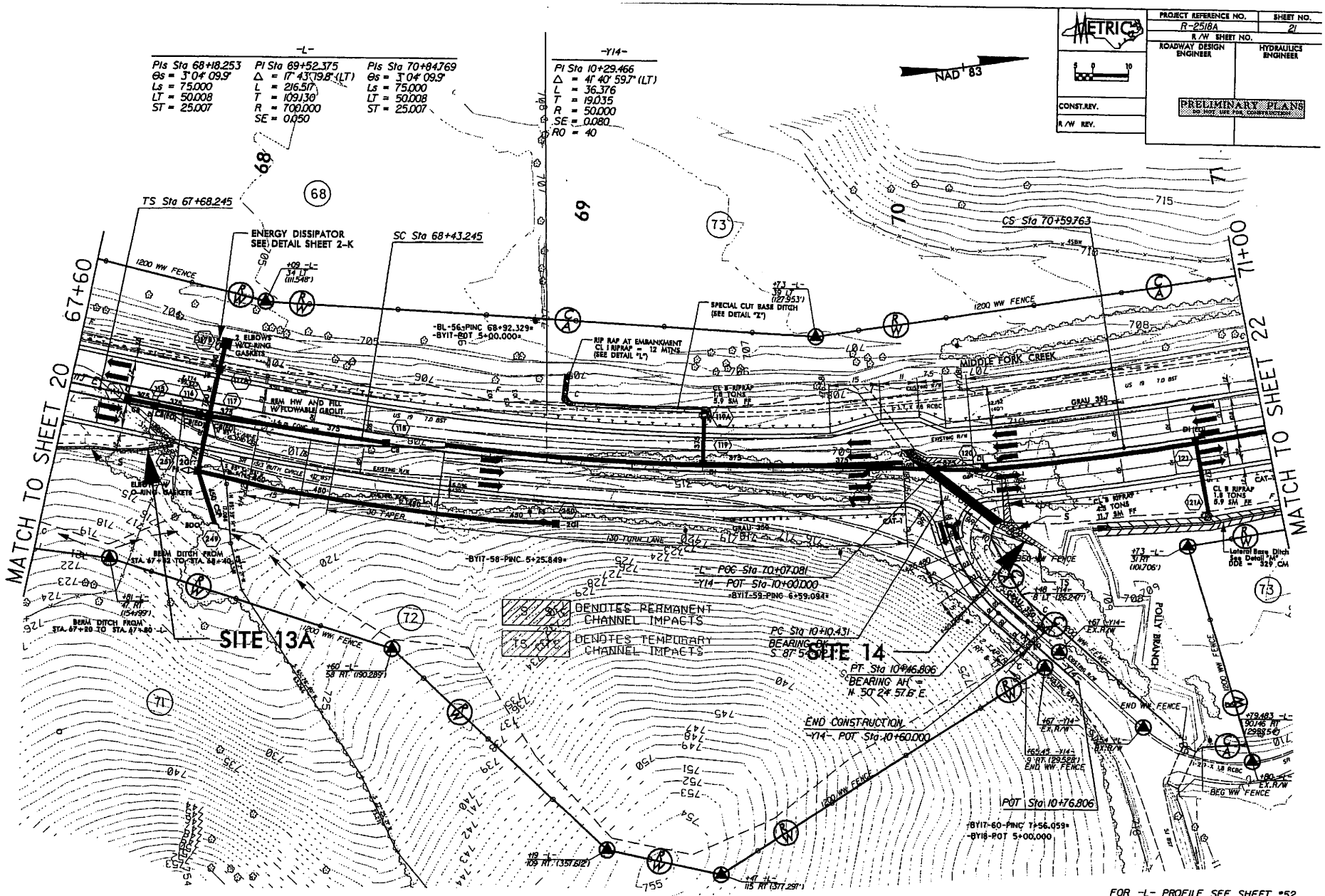
FOR -L- PROFILE SEE SHEET #51
FOR -Y13- PROFILE SEE SHEET #70
FOR -D9-&-D10- PROFILE SEE SHEET

Permit Drawing
Sheet 43 of 64

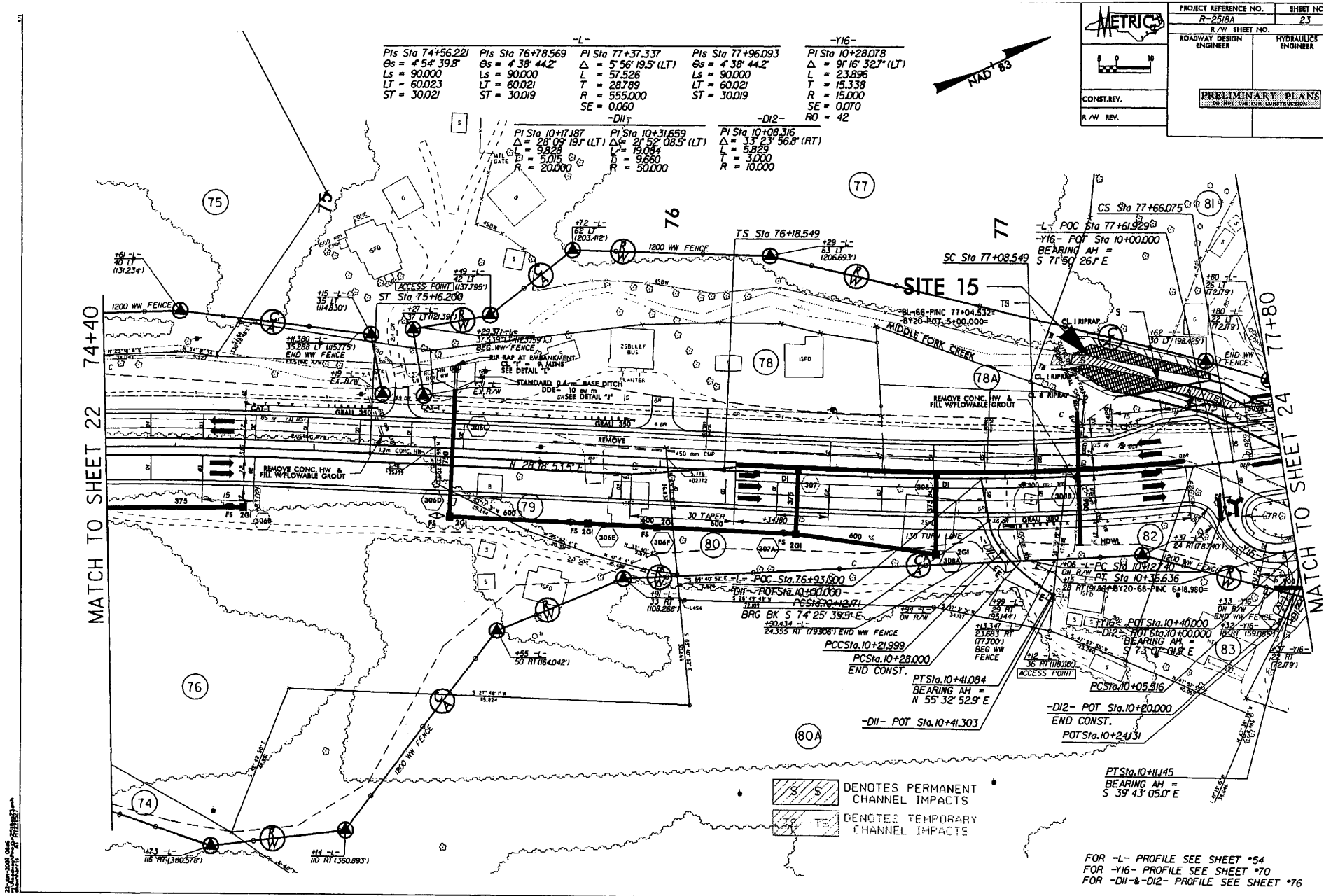

METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
PRELIMINARY PLANS
NOT FOR BID OR CONSTRUCTION
NAD 83
-Y13-
PI Sta 10+26.581
Δ = 12° 23' 09.2" (RT)
L = 216.17
T = 108.51
R = 100.000
SE = 0.080
RO = 40
-BY16-55-POT 5+00.000=
POT Sta 10+00.000
BEARING AH = S 71° 46' 33.4" E
BEGIN CONSTRUCTION
-Y13- POT Sta 10+15.000
PC Sta 10+15.730
PT Sta 10+37.347
BEARING AH = S 59° 23' 24.2" E
-BL54-PINC 65+74.614=
-BY16-POT 5+76.590=
MATCH TO SHEET 19 64+20
MATCH TO SHEET 21 67+60
SITE 13
SITE 13A
MIDDLE FORK CREEK
ENERGY DISSIPATOR SEE DETAIL SHEET 2-K
NATURAL ROCK ENBROIN DISSIPATOR (SEE DETAIL "A")
-L- POT Sta 65+27.356
-Y13- POT Sta 10+72.200
-L- POT Sta 65+65.050
-D9- POT Sta 10+00.000
BEARING AH = S 69° 37' 24.5" E
-D9- POT Sta 10+38.000
END CONST.
-L- POT Sta 66+40.000
-D10- POT Sta 10+00.000
-D10- POT Sta 10+40.000
END CONST.
POT Sta 10+43.190
1200 WW FENCE
BERM DITCH FROM STA. 63+94 TO STA. 64+40 -L-
BERM DITCH FROM STA. 65+71 TO STA. 66+00 -L-
BERM DITCH FROM STA. 67+20 TO STA. 67+80 -L-
REM HW AND FILL W/FLOWABLE FILL
REMOVE 450mm PLASTIC PIPE
ACCESS POINT
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
FOR -L- PROFILE SEE SHEET *51
FOR -Y13- PROFILE SEE SHEET *70
FOR -D9-&-D10- PROFILE SEE SHEET *76
Permit Drawing



Permit Drawing
Sheet 45 of 64

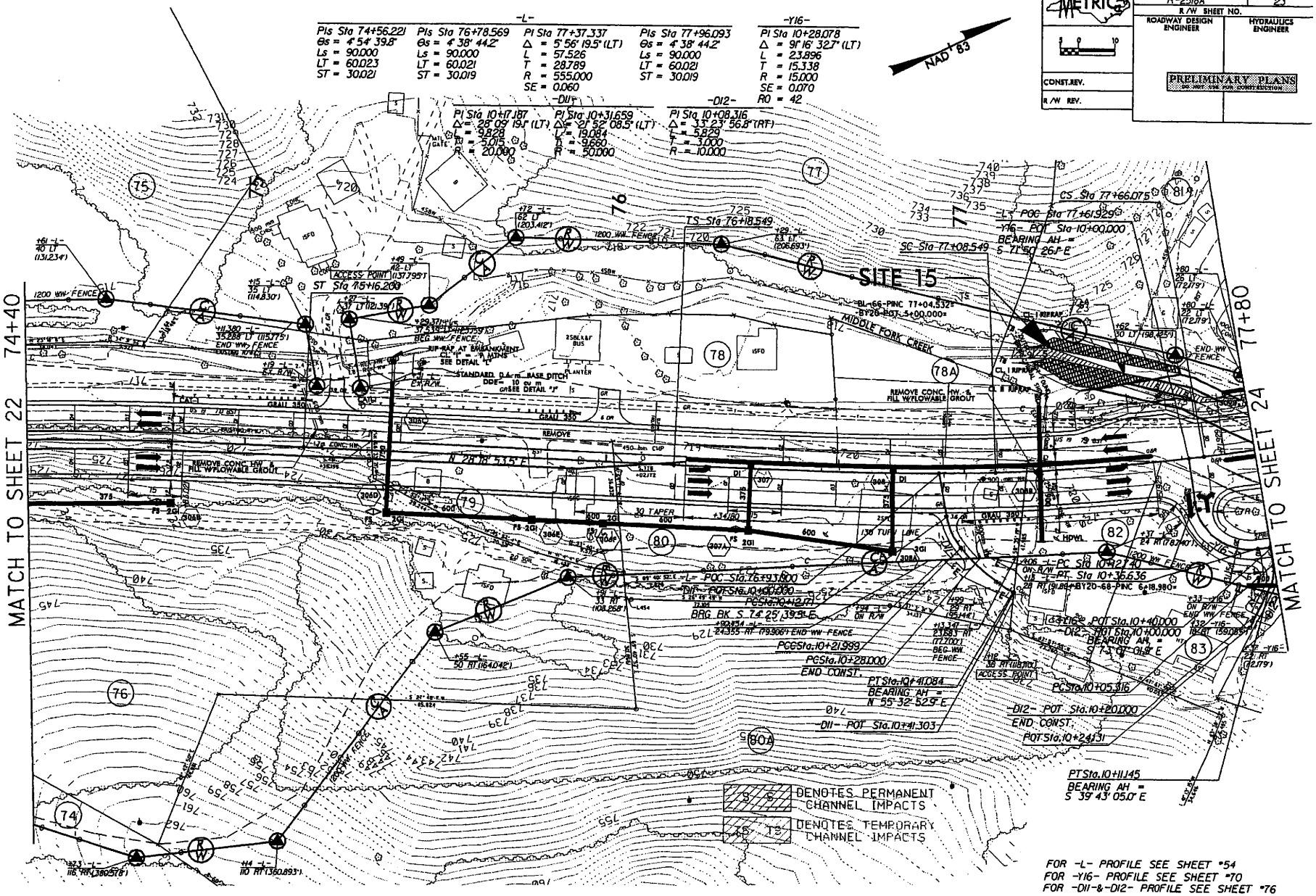


Permit Drawing
Sheet 46 of 67



R/W REV.- REVISING NAME ON PARCEL 80A (DENISE MALUCKI. 06/11/2007 MWH

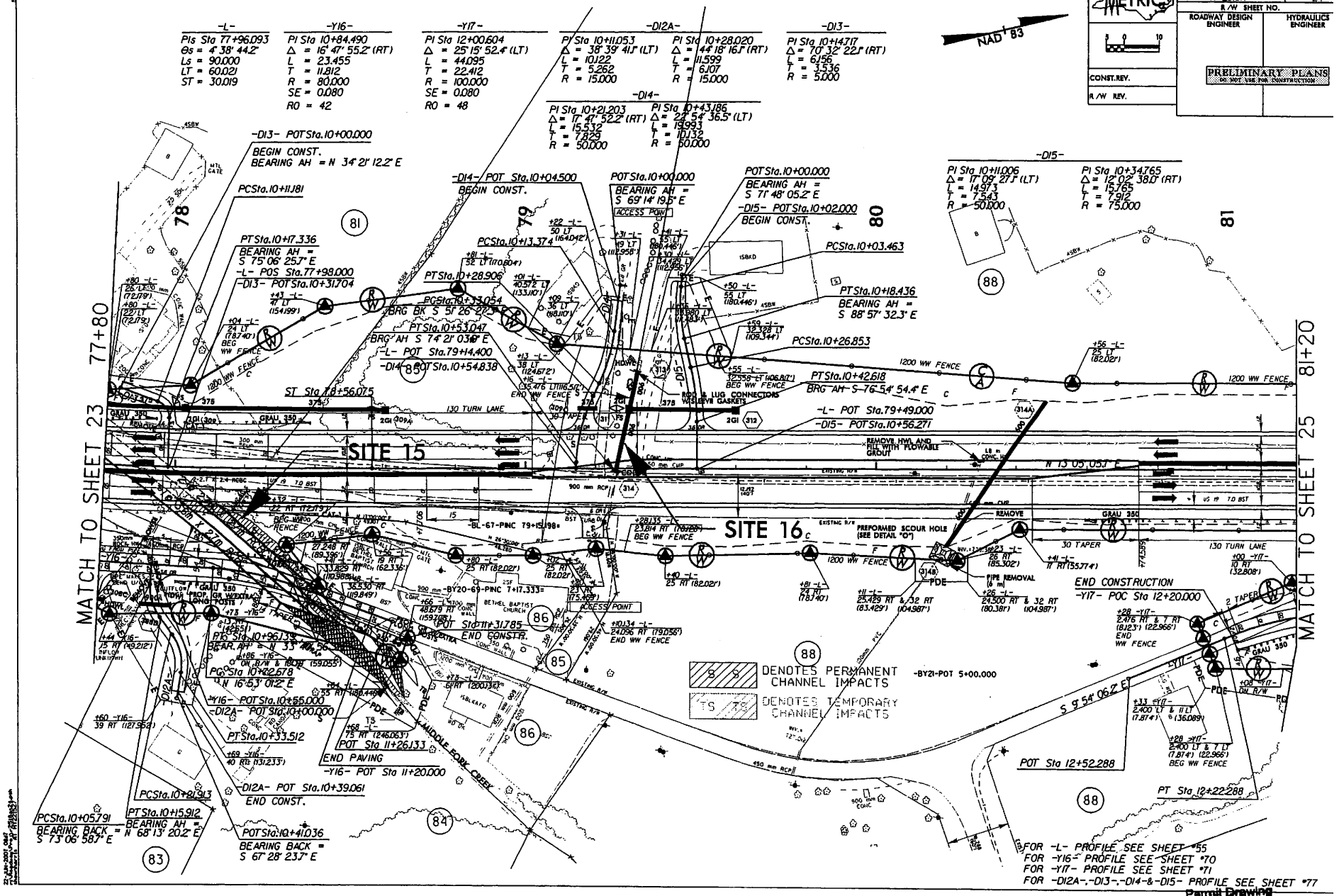
Permit Drawing
Sheet 47 of 64



R/W REV.: REVISING NAME ON PARCEL 80A (DENISE MALICK). 06/11/2007 NWH

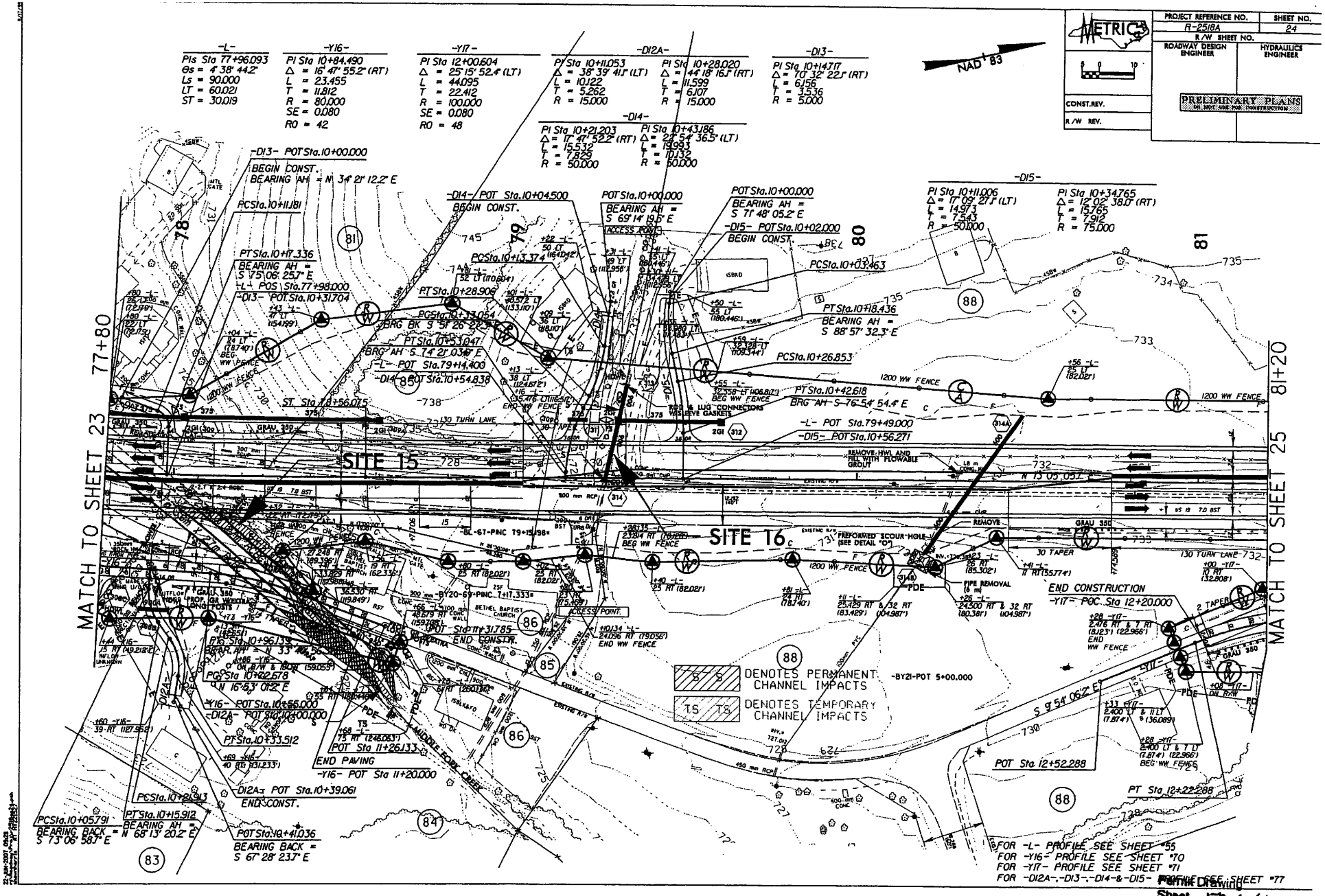
Permit Draw...

Sheet 45 of 64

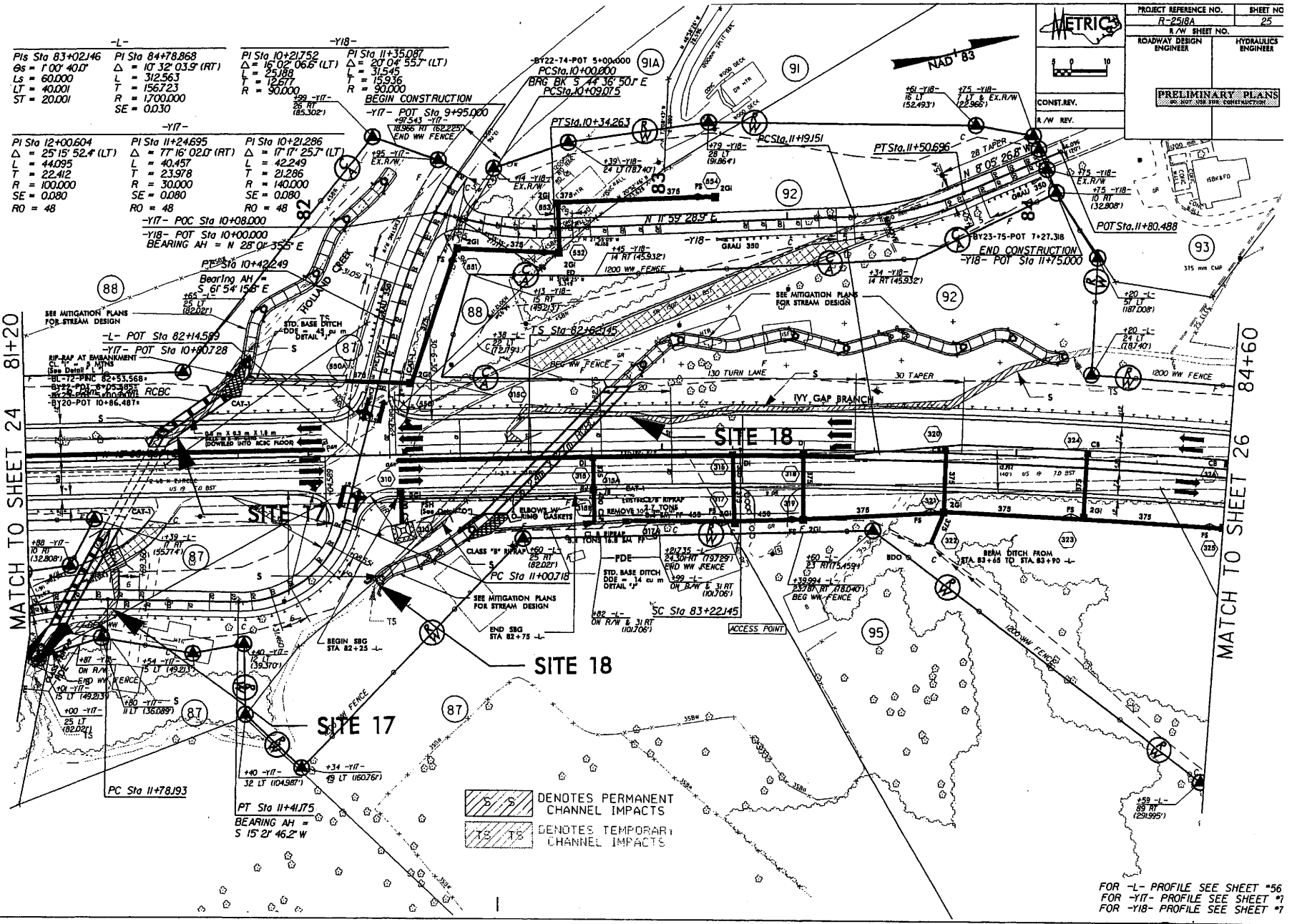


R/W REV.- REVISING NAME AND DEED BOOK NUMBER ON PARCEL 85. (SHARON PONDER BUCKNER) 06/11/2007 NNH

Permit Drawing
Sheet 49 of 64

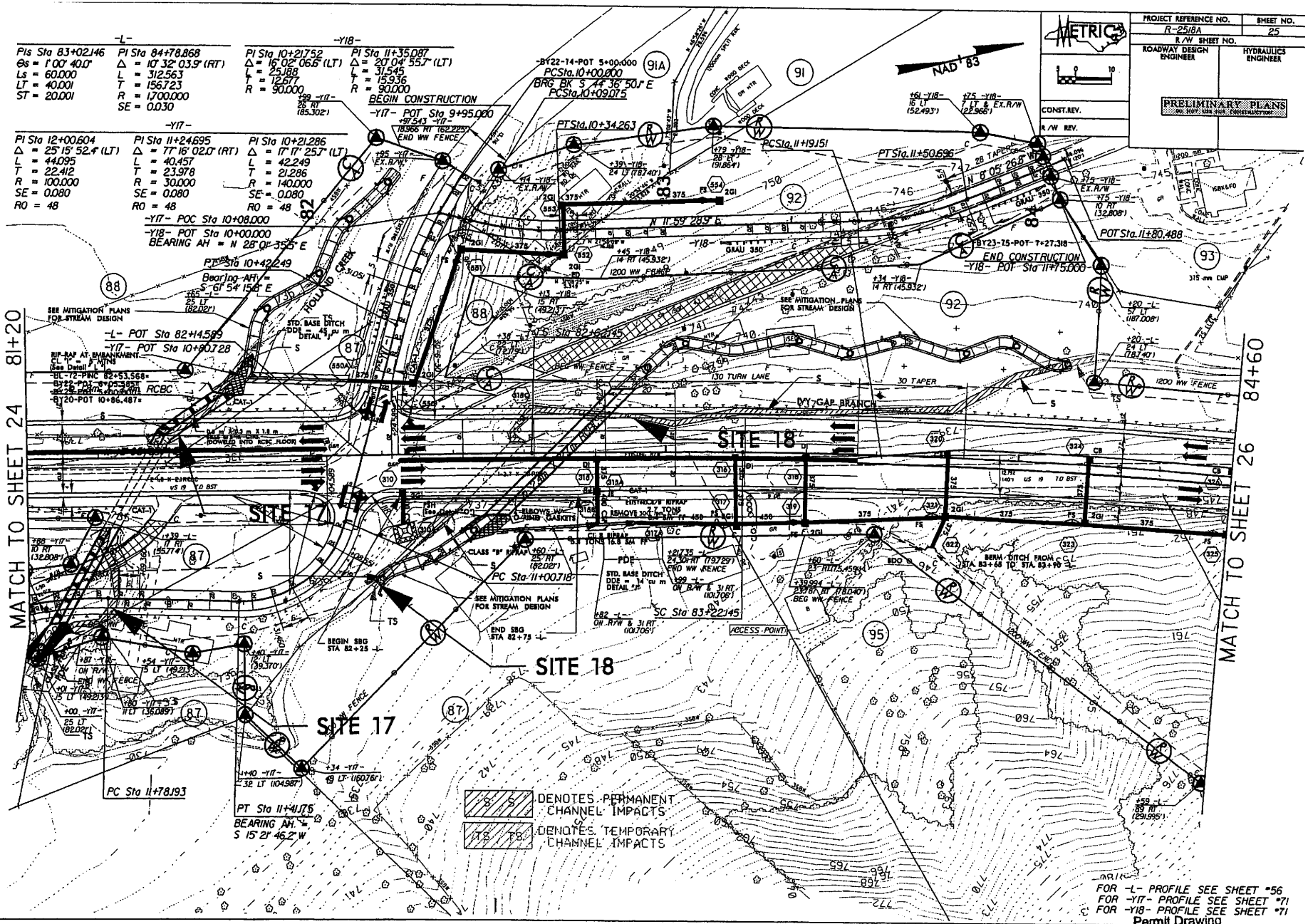


R/W REV.: REVISING NAME AND DEED BOOK NUMBER ON PARCEL 85. (SHARON POWDER BUCKNER) 06/11/2007 NWH



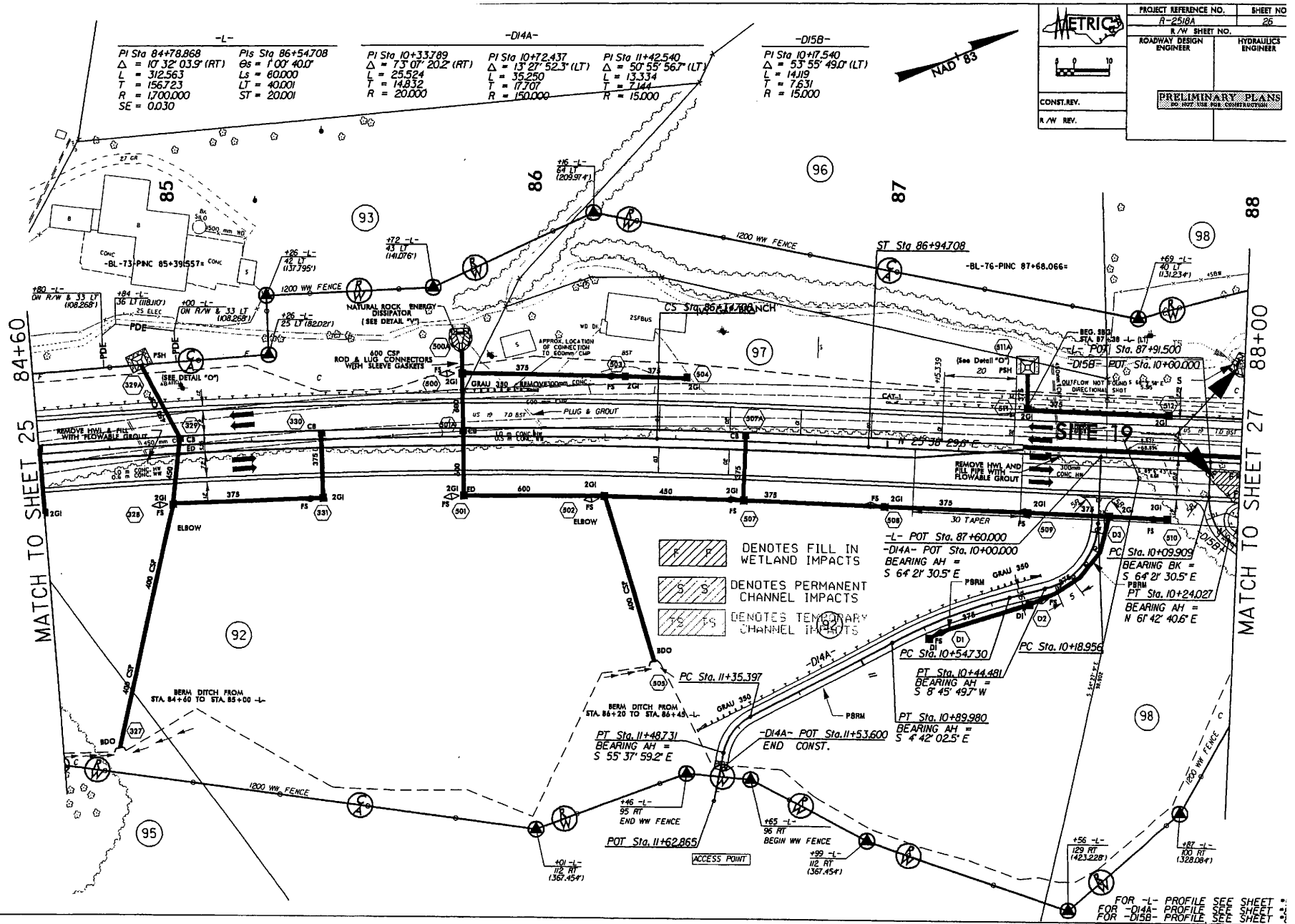
R/W REV:- REVISING NAME ON PARCEL 88 SHEET 25 ONLY. (DALLAS BUCKNER.JRJ. 06/11/2007 NWH.
R/W REV:- REVISING NAME ON PARCEL 87 SHEET 25 ONLY. (LAWRENCE AND VESSIE REAVIS HEIRS.). 06/11/2007 NWH.
R/W REV:- REVISING NAME AND DEED BOOK NUMBER ON PARCEL 87 SHEET 25 ONLY. (DALLAS BUCKNER.JRJ. 06/11/2007 NWH.
R/W REV:- CHANGING PARCEL 89 TO PARCEL 87 AND REVISING PROPERTY OWNER NAME (LAWRENCE AND VESSIE REAVIS HEIRS) 06/11/2007 NWH.

Permit Drawing
Sheet 51 of 64



R/W REV.: REVISING NAME ON PARCEL 88 SHEET 25 ONLY. (DALLAS BUCKNER,JR.) 06/11/2007 NNH.
R/W REV.: REVISING NAME ON PARCEL 87 SHEET 25 ONLY. (LAWRENCE AND VESSIE REAVIS HEIRS.) 06/11/2007 NNH.
R/W REV.: REVISING NAME AND DEED BOOK NUMBER ON PARCEL 87 SHEET 25 ONLY. (DALLAS BUCKNER,JR.) 06/11/2007 NNH.
R/W REV.: CHANGING PARCEL 89 TO PARCEL 87 AND REVISING PROPERTY OWNER NAME (LAWRENCE AND VESSIE REAVIS HEIRS) 06/11/2007 NNH.

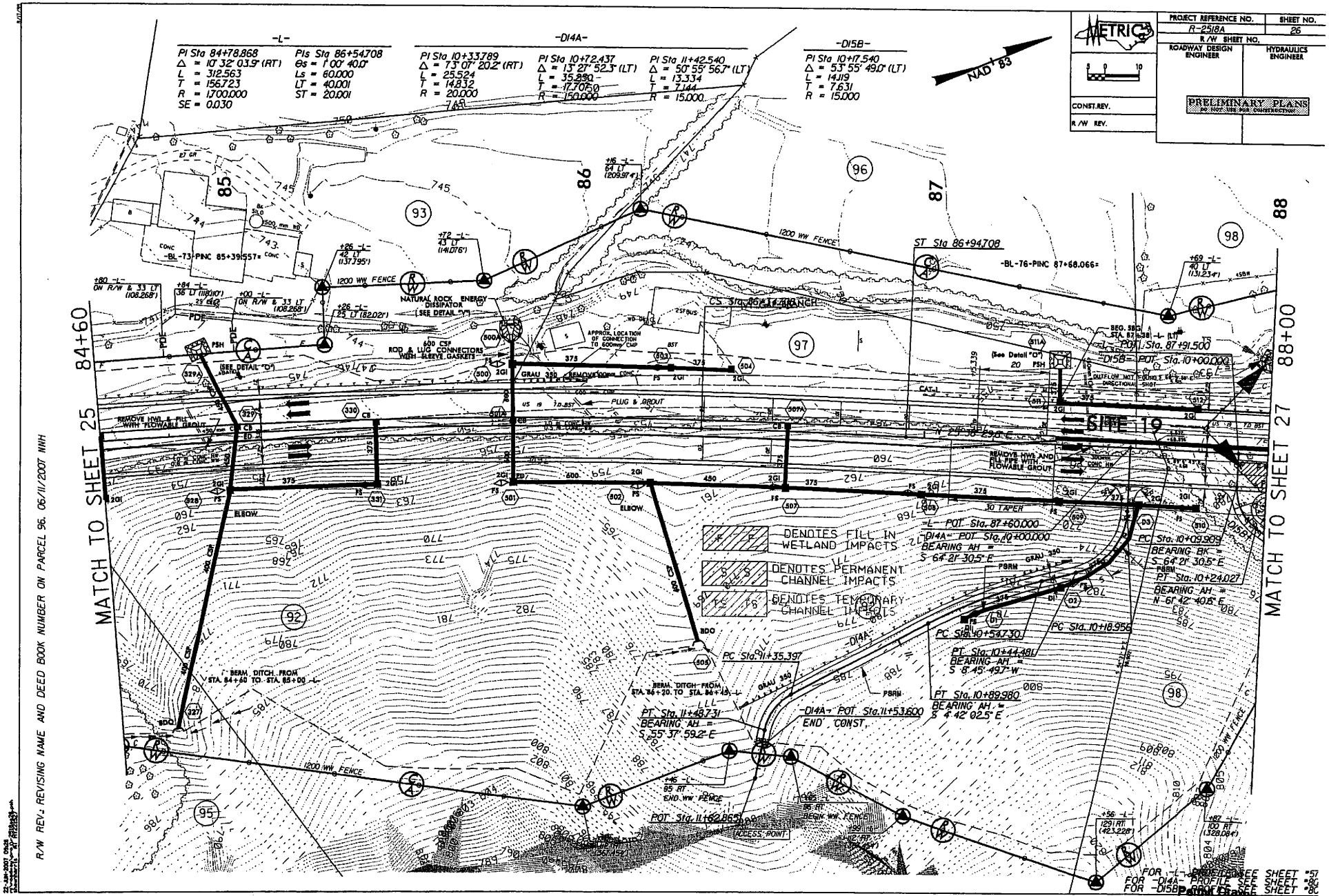
Permit Drawing
Sheet 52 of 64



R/W REV.: CHANGING PROPERTY LINES ON PARCEL 92 AND PARCEL 93, 06/11/2007 NNH

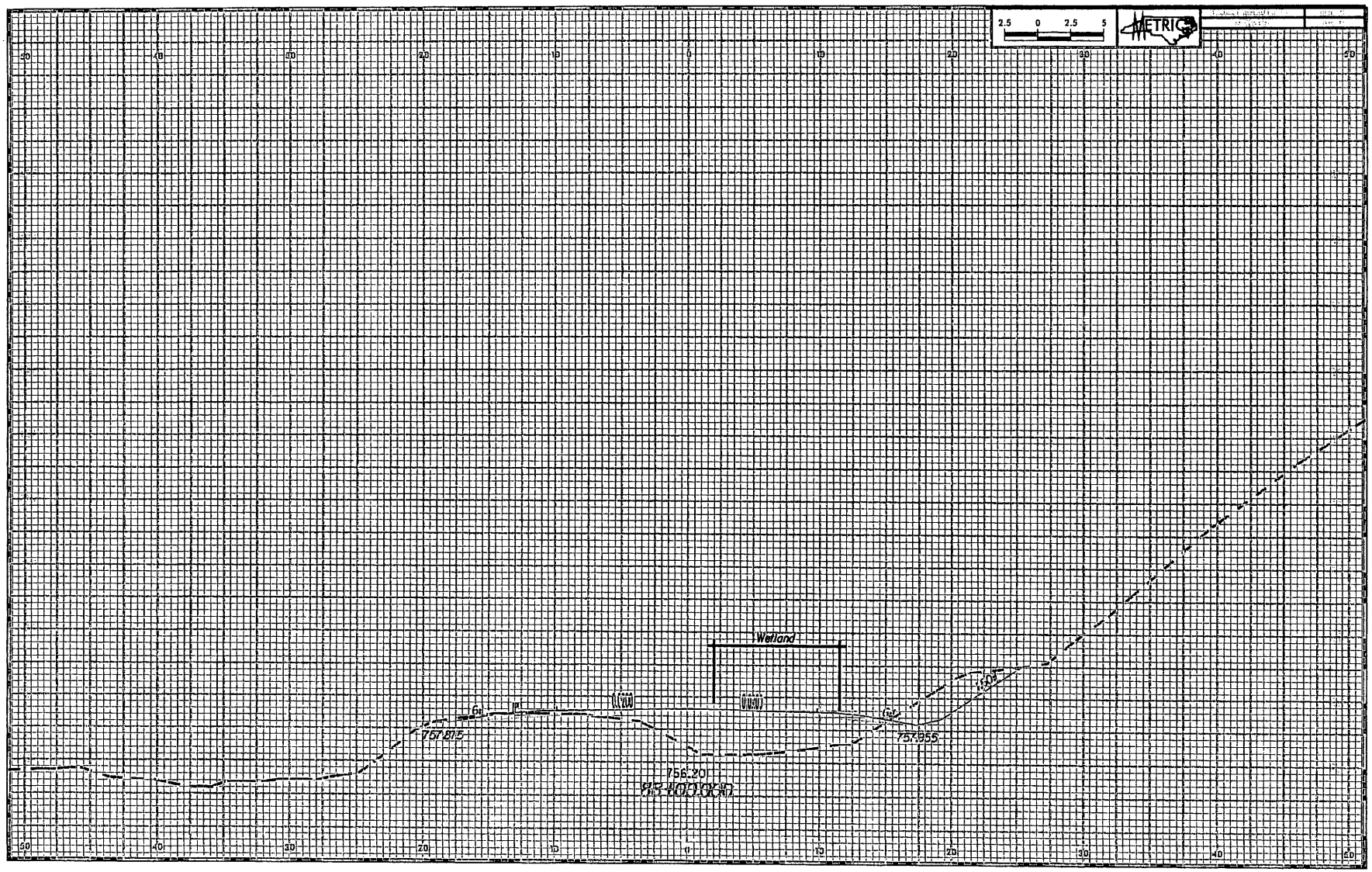
R/W REV.: REVISING NAME AND DEED BOOK NUMBER ON PARCEL 96, 06/11/2007 NNH

Permit Drawing
Sheet 53 of 64

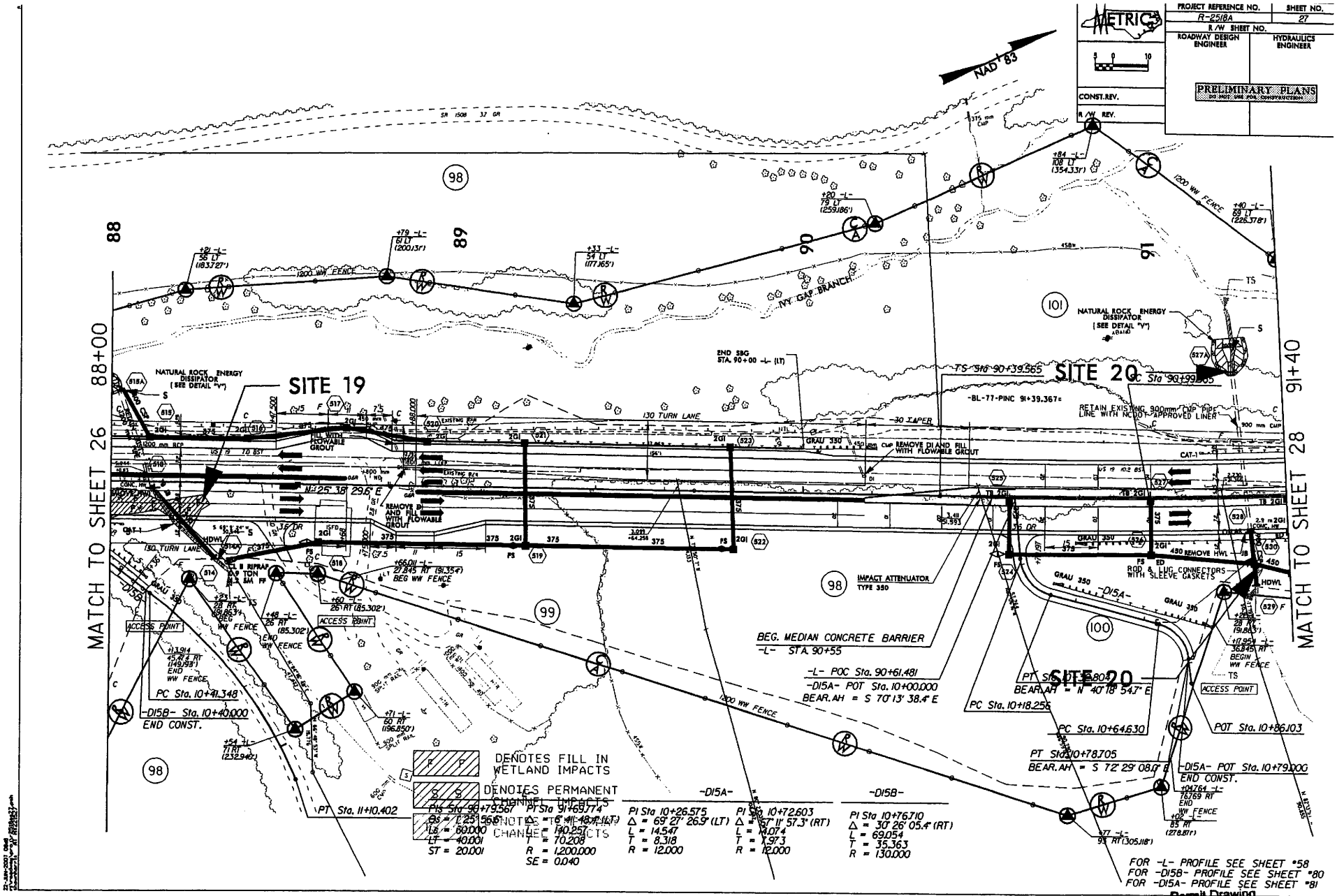


R/W REV. CHANGING PROPERTY LINES ON PARCEL 92 AND PARCEL 93. 06/11/2007 NWH

R/W REV. REVISING NAME AND DEED BOOK NUMBER ON PARCEL 96. 06/11/2007 NWH

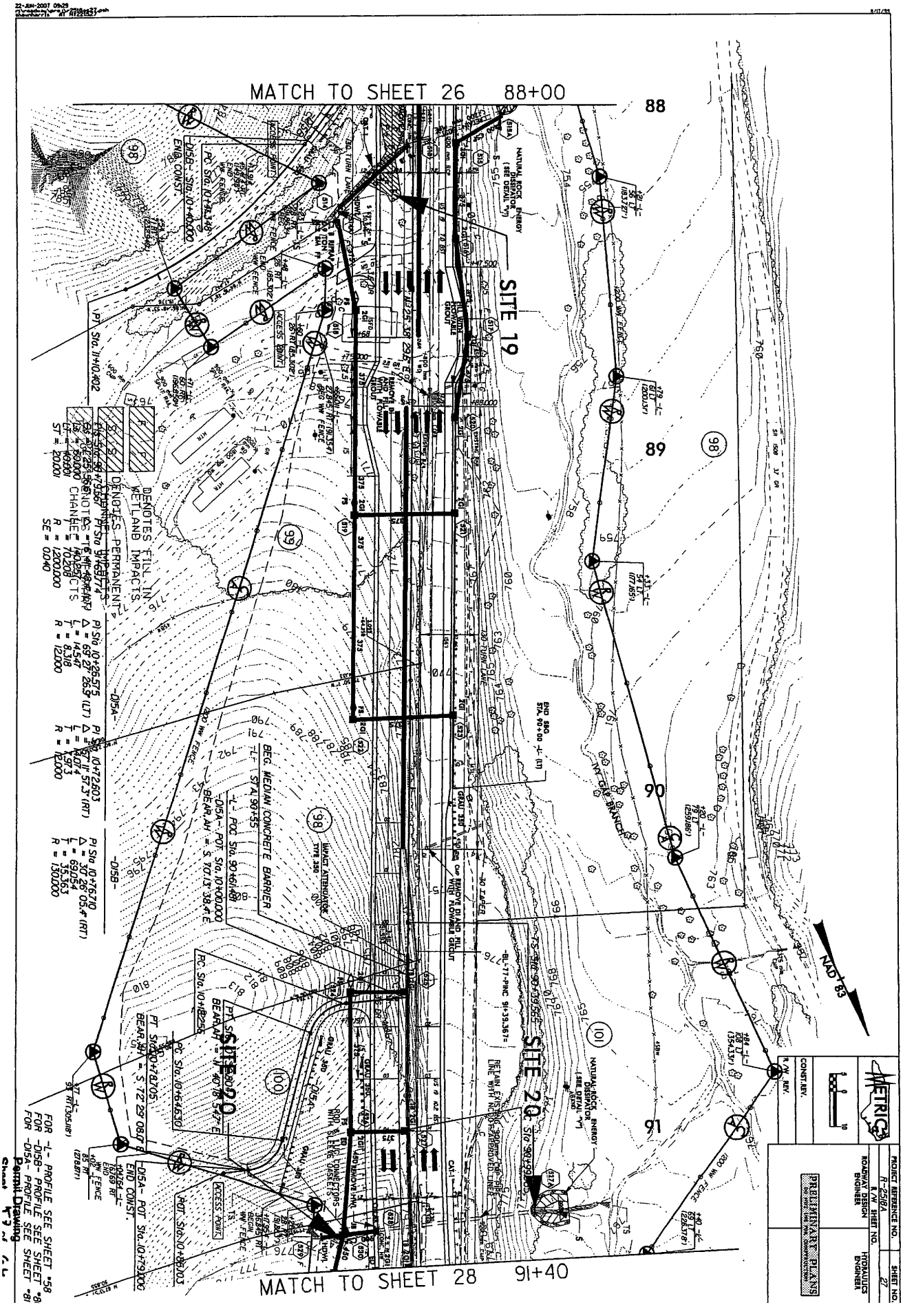


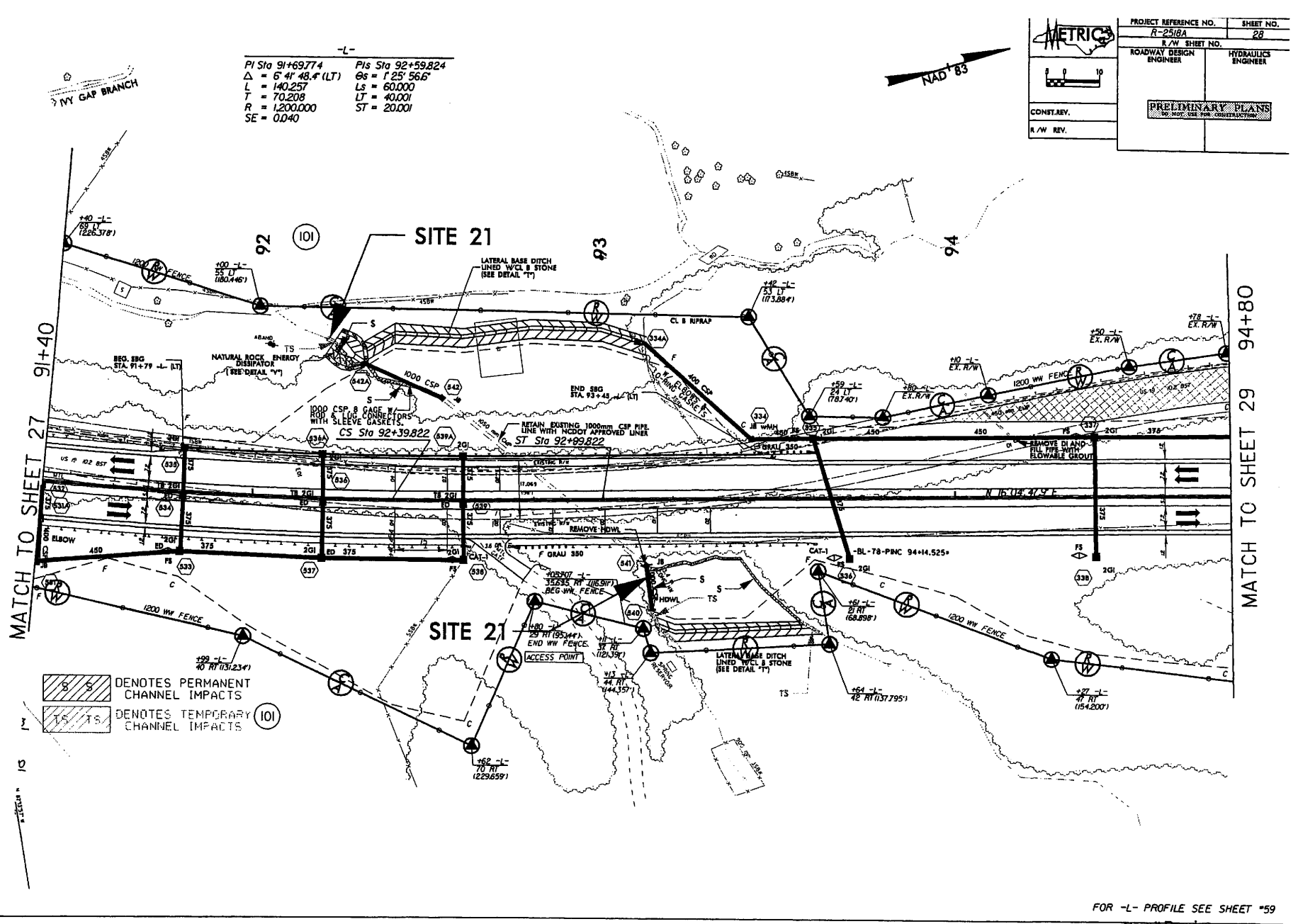
Permit Drawing 55 64



R/W REV.: REVISING PROPOSED RIGHT OF WAY AND ACCESS POINT ON PARCEL 100 (SANDRA RAY) 06/11/2007 NHH

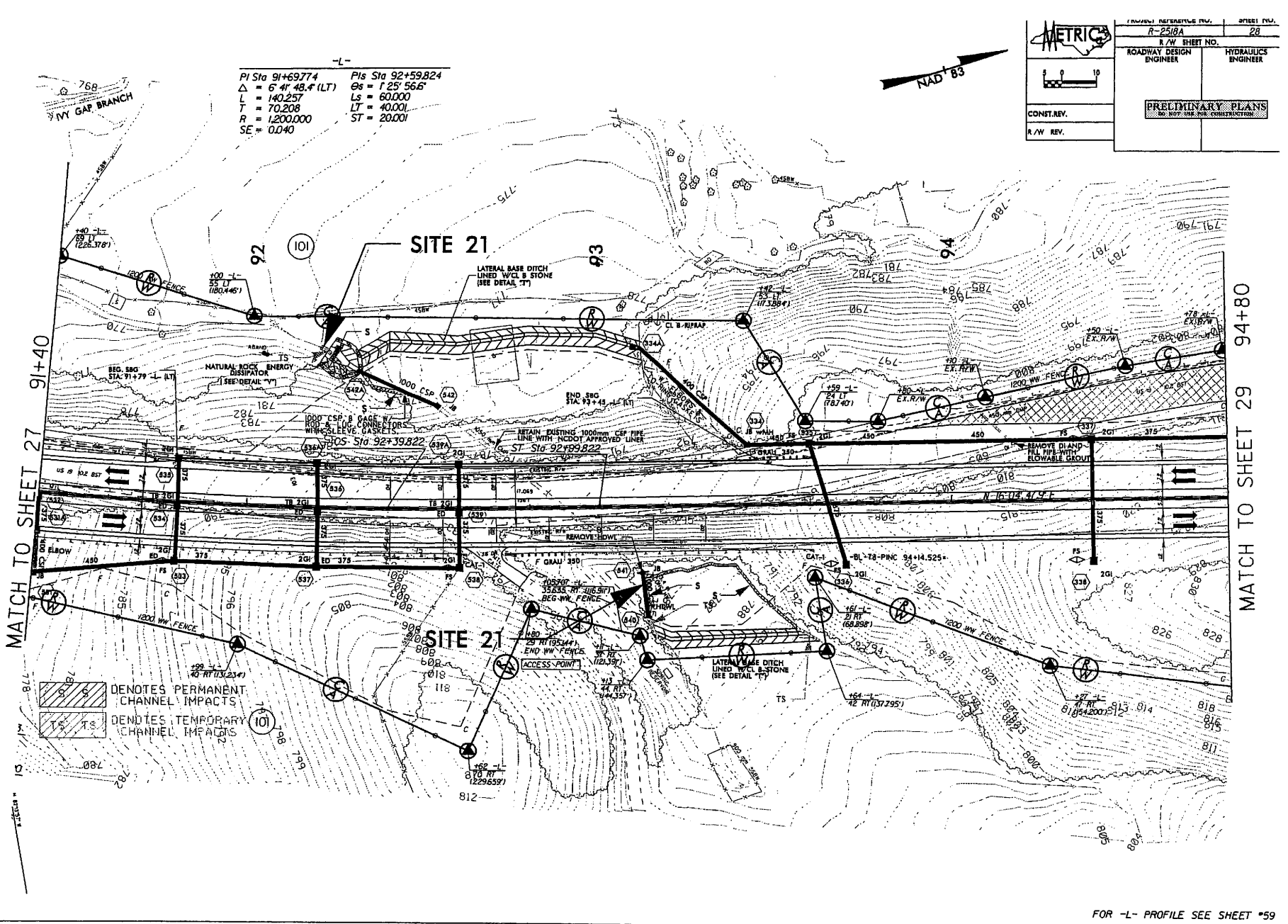
R/W REV.: REVISING PROPOSED RIGHT OF WAY AND ACCESS POINT ON PARCEL 100 (SANDRA RAY) 06/11/2007 NNH





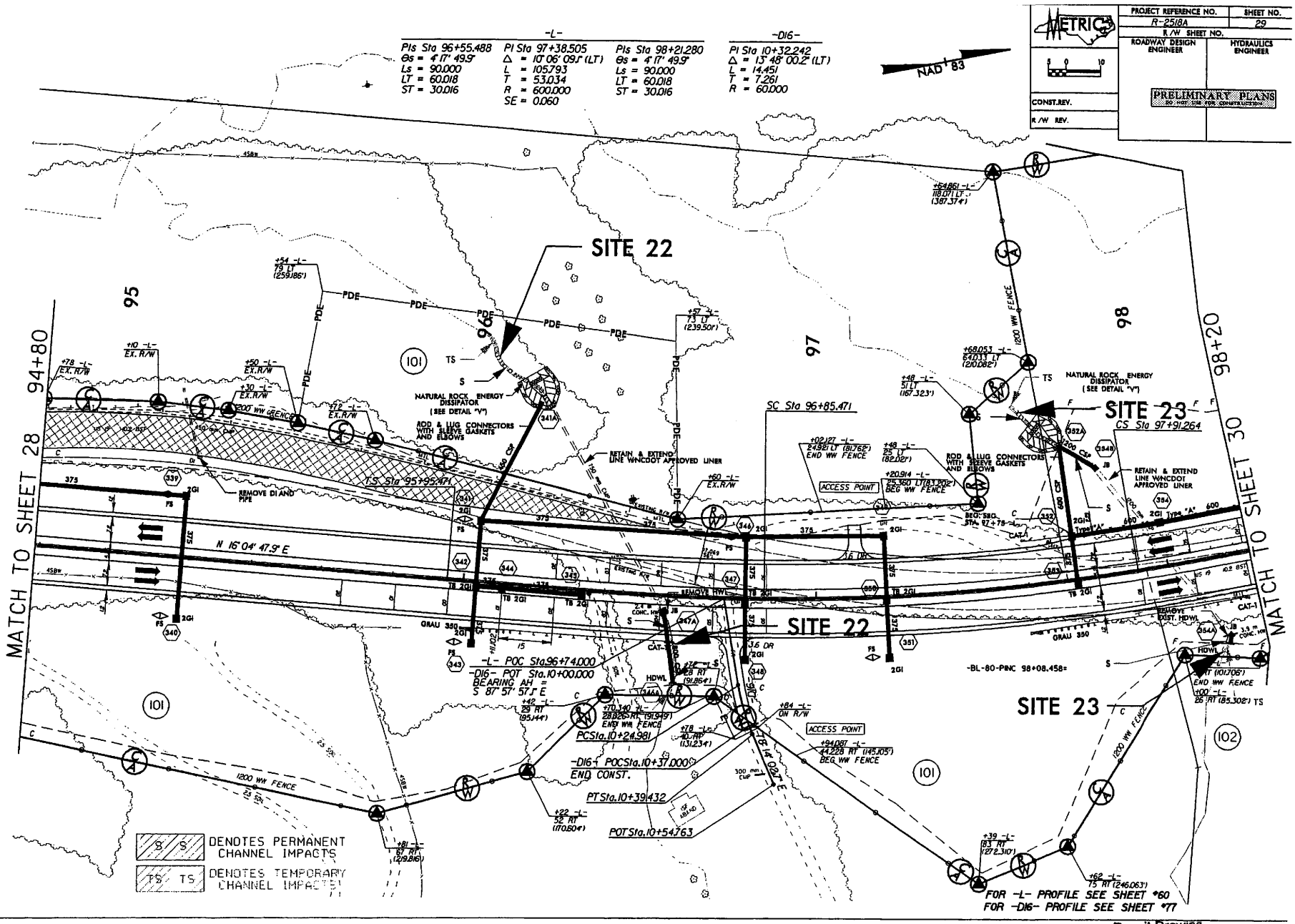
FOR -L- PROFILE SEE SHEET *59

Permit Drawing
Sheet 58 of 64

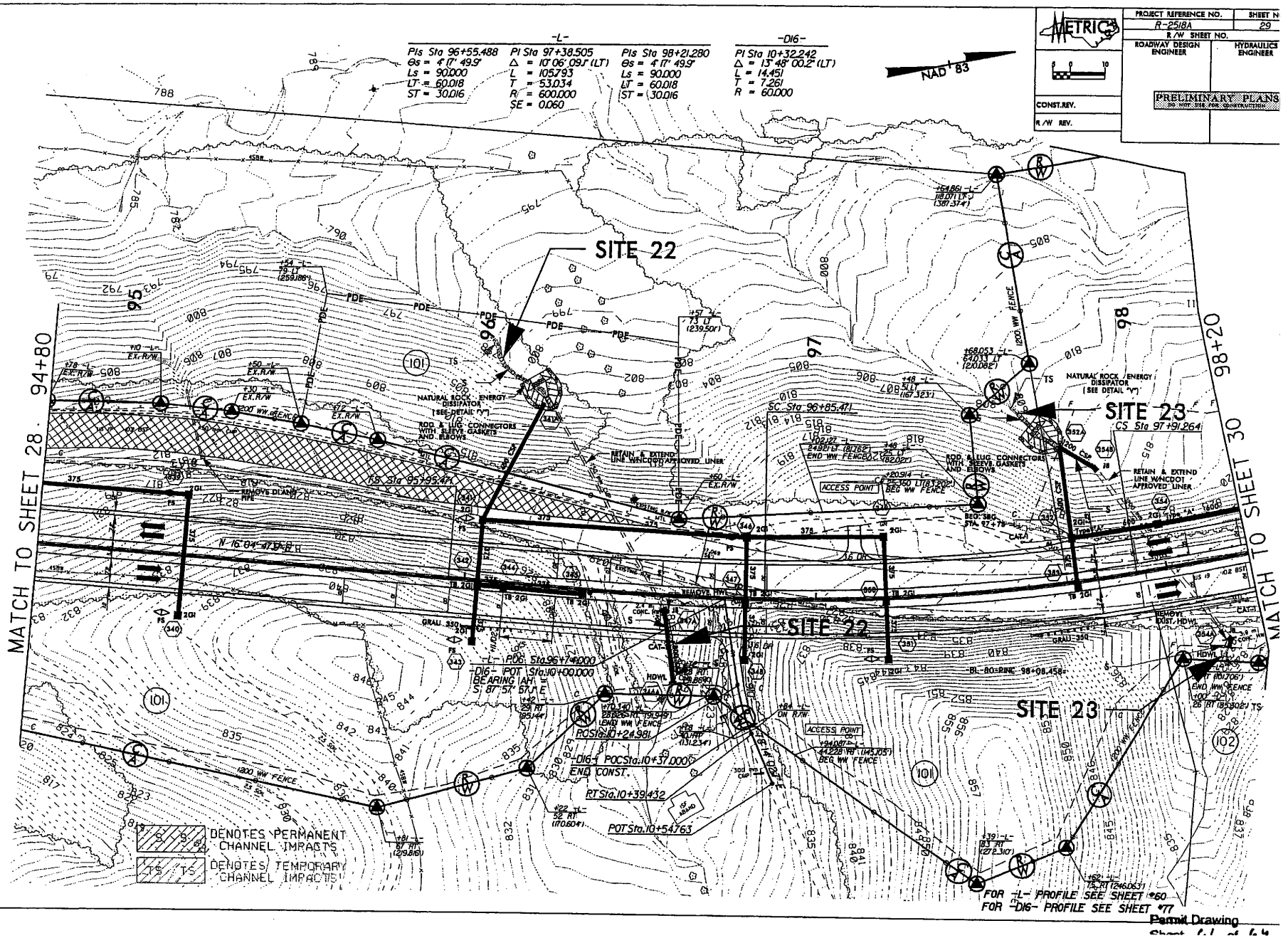


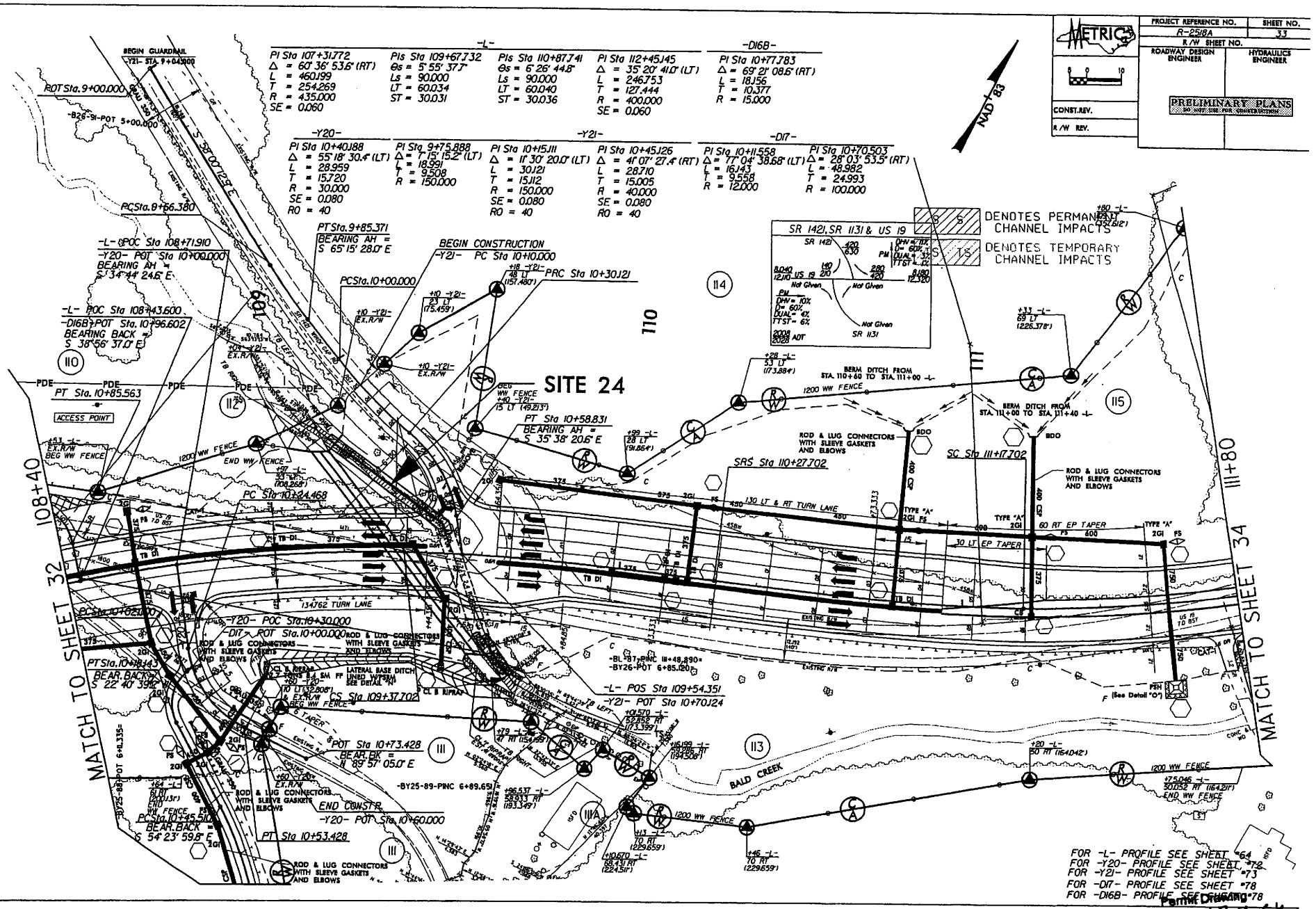
FOR -L- PROFILE SEE SHEET *59

Permit Drawing
Sheet 59 of 64

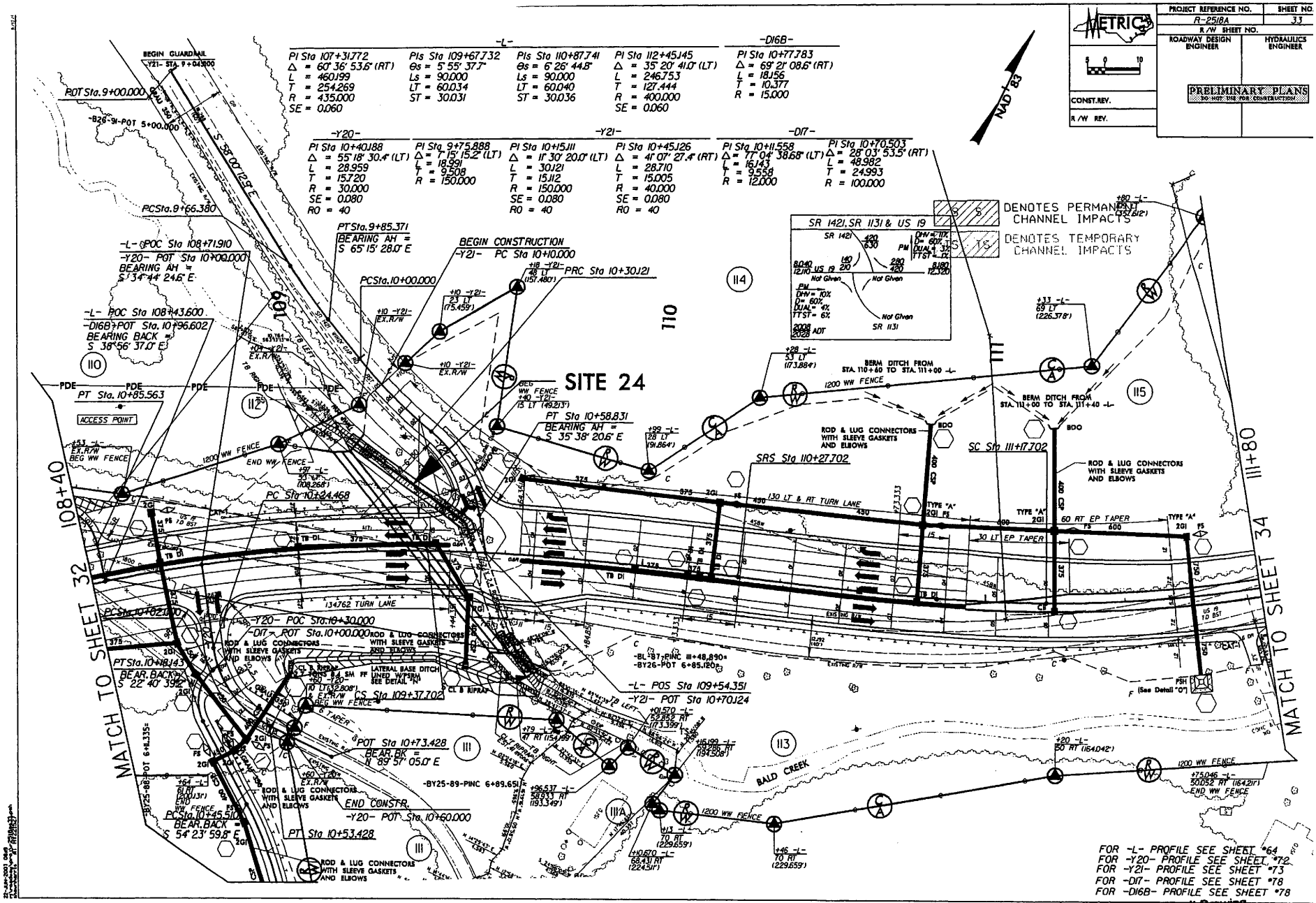


Permit Drawing
Sheet 40 of 64


-L-
Pls Sta 96+55.488
Es = 4°17' 49.9"
Ls = 90.000
LT = 60.018
ST = 30.016
PI Sta 97+38.505
Δ = 10°06' 09.1" (LT)
L = 105.793
T = 53.034
R = 600.000
SE = 0.060
Pls Sta 98+21.280
Es = 4°17' 49.9"
Ls = 90.000
LT = 60.018
ST = 30.016
-DI6-
PI Sta 10+32.242
Δ = 13°48' 00.2" (LT)
L = 14.451
T = 7.261
R = 60.000
NAD 83
METRIC
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SITE 22
SITE 23
MATCH TO SHEET 28
MATCH TO SHEET 30
94+80
98+20
DENOTES PERMANENT CHANNEL IMPACTS
DENOTES TEMPORARY CHANNEL IMPACTS
FOR -L- PROFILE SEE SHEET #60
FOR -DI6- PROFILE SEE SHEET #77
Permit Drawing



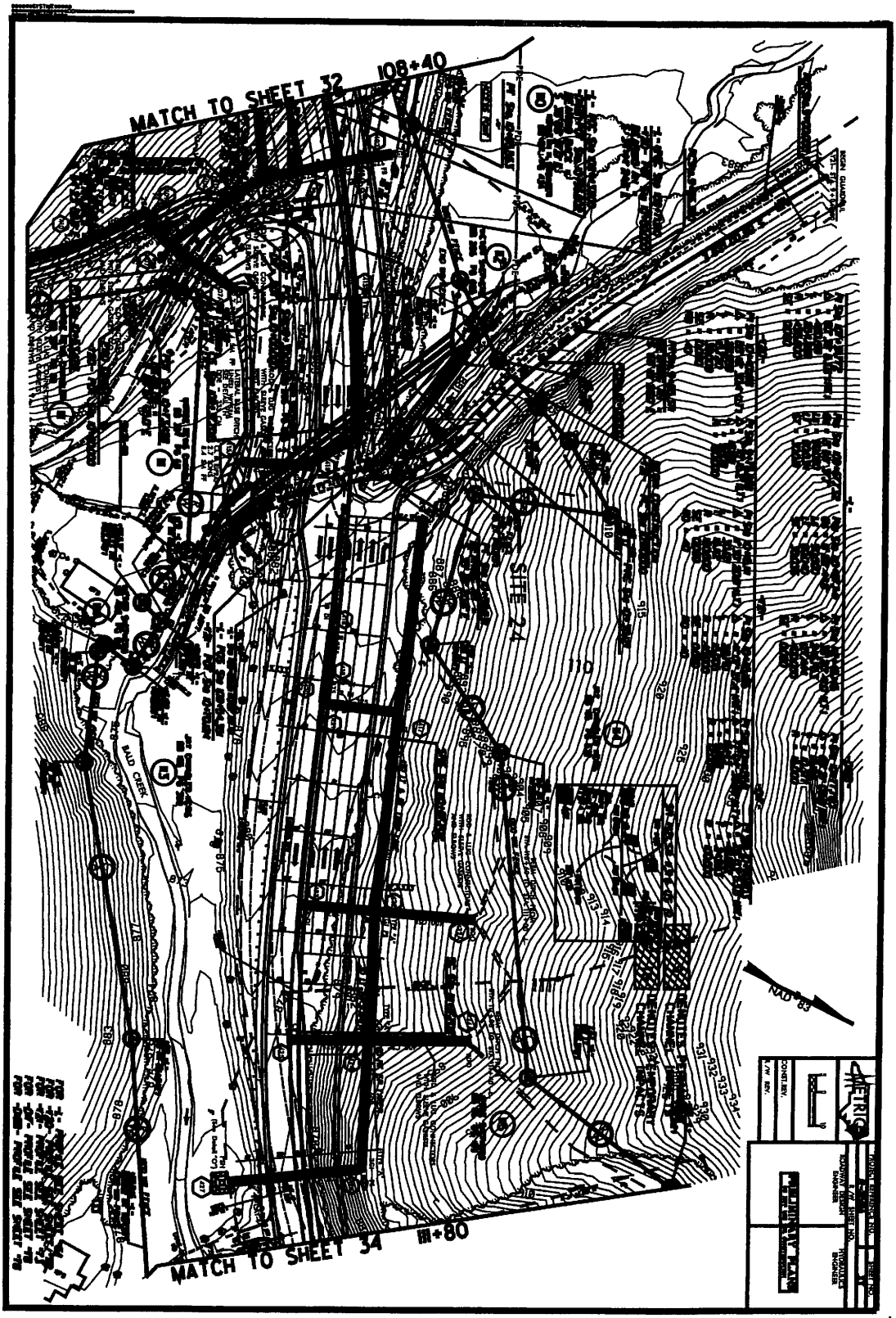
R/W REV.- REVISING PROPERTY LINE BOUNDARIES AND REVISING DEED BOOK INFORMATION ON PARCEL 111A. 06/11/2007 WWH



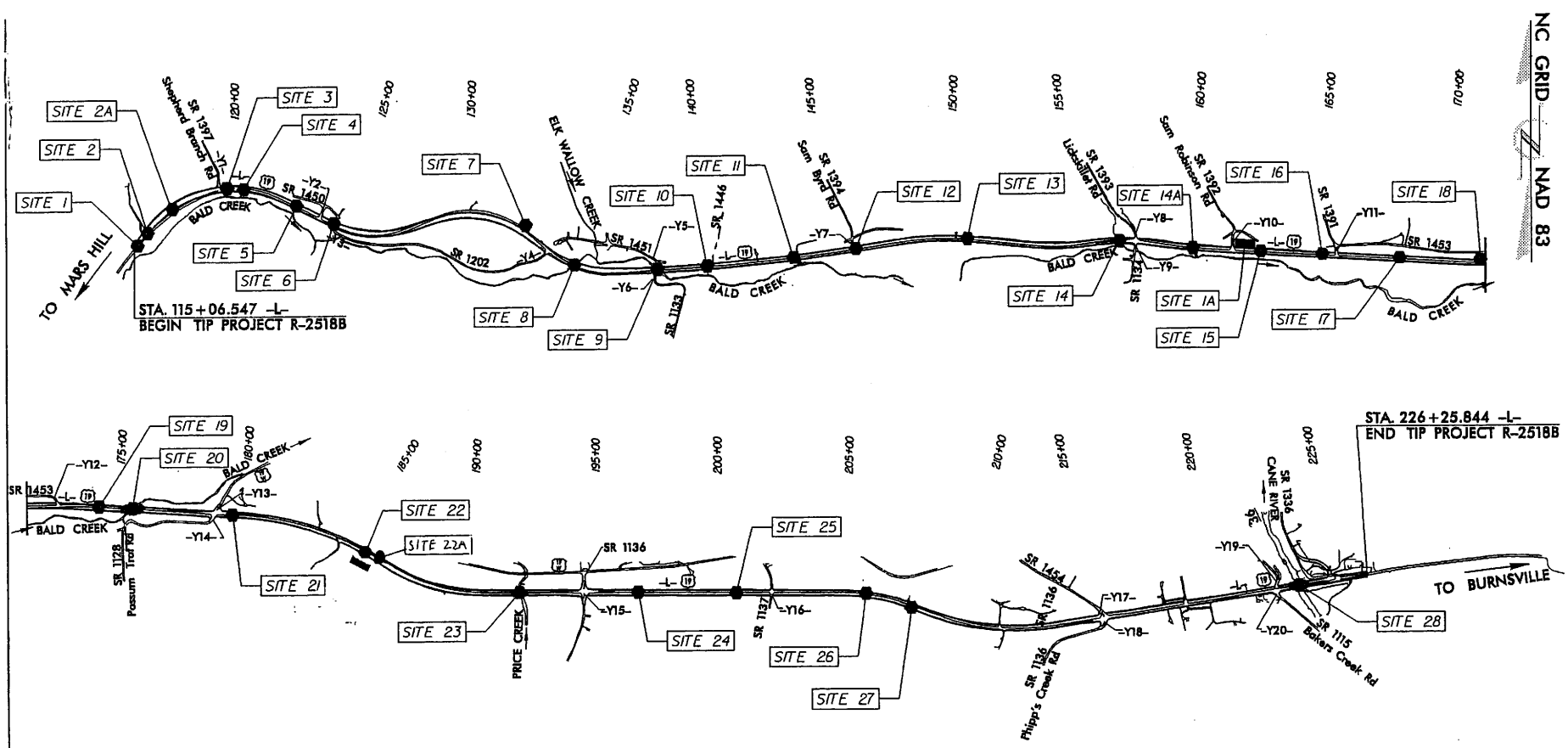
R/W REV.: REVISING PROPERTY LINE BOUNDARIES AND REVISING DEED BOOK INFORMATION ON PARCEL 111A, 06/11/2007 MWH

Permit Drawing
Sheet 63 of 64

R/W REV. REVISING PROPERTY LINE BOUNDARIES AND REVISING DEED BOOK INFORMATION ON PARCEL 16A, 05/11/2007 MM



Permit Drawing
Sheet 16 of 20



DENOTES SURFACE WATER SITES

DENOTES WETLAND SITES

SITE MAP

1000 500 0 1000

SCALE (in Meters)

NCDOT

DIVISION OF HIGHWAYS

YANCEY COUNTY

PROJECT: 3.4445.1.1 (R-2518B)

US 19

MADISON COUNTY LINE

TO CANE RIVER

IN BURNSVILLE

SHEET 2 OF 79 JUNE 2007

REVISED 11/17/08

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)	Existing Channel Impacts Temp. (m)	Natural Stream Design (m)
1	115+25	750 RCP						0.001		13	3	
2	115+72	900 RCP						0.002		31	6	
2A	117+46	900 CSP						0.002		40	6	
3	119+69	2-1700 CSP						0.002		15	3	
4	120+35	600 CSP						0.003	0.003	17	15	
5	122+60	750 RCP						0.003		23	6	
6	124+25	1400 CSP						0.002	0.001	24	9	
7	133+40	1.5m TB to TB						0.016		151	6	135
8	134+72	3-3.1m x 2.4m RCBC						0.020		36	4	
9	138+05	4-3.4m x 2.7m RCBC						0.049		62	5	
10	140+11	1780x1360 CSPA						0.006		21	3	
11	143+60	900 RCP						0.004		11		
12	146+10	2500x1830 CSPA						0.008		23	3	
13	150+63	2410x1700 CSPA						0.003		29	5	
14	156+63	3-2.1x2.1 RCBC						0.010	0.002	41	11	
14A	159+42	TAIL DITCH						0.002		3		
15	162+45	2410x1700 CSPA						0.003		25	3	
16	164+88	2-2080x1530 CSPA						0.006		34	3	
17	167+90	1830x1120 CSPA						0.004		20	3	
18	171+37	1425x950 CSPA						0.002		20	3	
19	174+19	1200 CSP										
20	175+60	Bridge (Bald Creek)						0.002	0.034	5	71	96
20A	-Y14- 10+51	1200 RCP						0.001		11	3	
21	179+58	600 RCP						0.001		10		
22	185+32	1200 CSP						0.003		47	3	
22A	185+50	1200 CSP; 600 RCP	0.046		0.005							
23	192+18	Bridge (Price Creek)	(Temp. Causeway)					0.010	0.007	11	17	
24	196+80	1000 CSP						0.001		5	3	
25	200+64	1700 CSP						0.012		41	6	
26	205+81	1400 CSP						0.002		12	3	
27	206+76	2-2300 CSP						0.016	0.003	92	17	
28	223+60	Bridge (Cane River)	(Temp. Causeway)						0.022		36	
1A	161+60		0.027			0.0155						
OTALS:			0.073		0.005	0.016		0.193	0.072	873	256	231

Mitigation Site	Mitigation Type	Length
Site 1	Enhancement	533 m
Site 3	Enhancement	301 m
Site 4	Enhancement	248 m
Site 8	Enhancement	304 m
Site 11	Restoration	85 m
Site 12	Enhancement/Restoration	178 m

Bridge Pier Impacts
Bridge at Price Creek = 2.79 sq. m
Bridge at Cane River = 3.72 sq. m

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

YANCEY COUNTY
WBS - 34445.1.1 (R-2518B)

SHEET OF ##########

levised 2/03/05

REVISED FEB 2008

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)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	115+25	30" RCP						0.00		43	10	
2	115+72	36" RCP						0.01		102	20	
2A	117+46	36" CSP						0.01		131	20	
3	119+69	2-66" CSP						0.01		49	10	
4	120+35	24" CSP						0.01	0.01	56	49	
5	122+60	30" RCP						0.01		76	20	
6	124+25	54" CSP						0.00	0.00	79	30	
7	133+40	4.5' TB to TB						0.04		496	20	443
8	134+72	3-10'x8' RCBC						0.05		118	13	
9	138+05	4-11'x9' RCBC						0.12		204	16	
10	140+11	73"x55"CSPA						0.01		69	10	
11	143+60	42" RCP						0.01		36		
12	146+10	103"x71" CSPA						0.02		76	10	
13	150+63	95"x67" CSPA						0.01		95	16	
14	156+63	3-7'x7' RCBC						0.02	0.00	135	36	
14A	159+42	TAIL DITCH						0.00		10		
15	162+45	95"x67" CSPA						0.01		82	10	
16	164+88	2-81"x59" CSPA						0.01		112	10	
17	167+90	72"x44" CSPA						0.01		66	10	
18	171+37	58"x36" CSPA						0.01		66	10	
19	174+19	48" CSP										
20	175+60	Bridge (Bald Creek)						0.01	0.08	16	233	315
20A	-Y14- 10+51	48" RCP						0.00		36	10	
21	179+58	24" RCP						0.00		33		
22	185+32	48" CSP						0.01		154	10	
22A	185+50	48" CSP; 24" RCP	0.11		0.01							
23	192+18	Bridge (Price Creek)		(Temp. Causeway)				0.03	0.02	36	56	
24	196+80	42" CSP						0.00		16	10	
25	200+64	66" CSP						0.03		135	20	
26	205+81	54" CSP						0.00		39	10	
27	206+76	2-90" CSP						0.04	0.01	302	56	
28	223+60	Bridge (Cane River)		(Temp. Causeway)					0.05		118	
1A	161+60		0.07			0.04						
TOTALS:			0.18		0.01	0.04		0.48	0.17	2866	840	758

Mitigation Site	Mitigation Type	Length
Site 1	Enhancement	1748 ft
Site 3	Enhancement	987 ft
Site 4	Enhancement	813 ft
Site 8	Enhancement	997 ft
Site 11	Restoration	279 ft
Site 12	Enhancement/Restoration	584 ft

Bridge Pier Impacts

Bridge at Price Creek = 30 sq. ft.

Bridge at Cane River = 40 sq. ft.

NOTE: All Area Qauntities of 0.00 are less than 0.01 acres

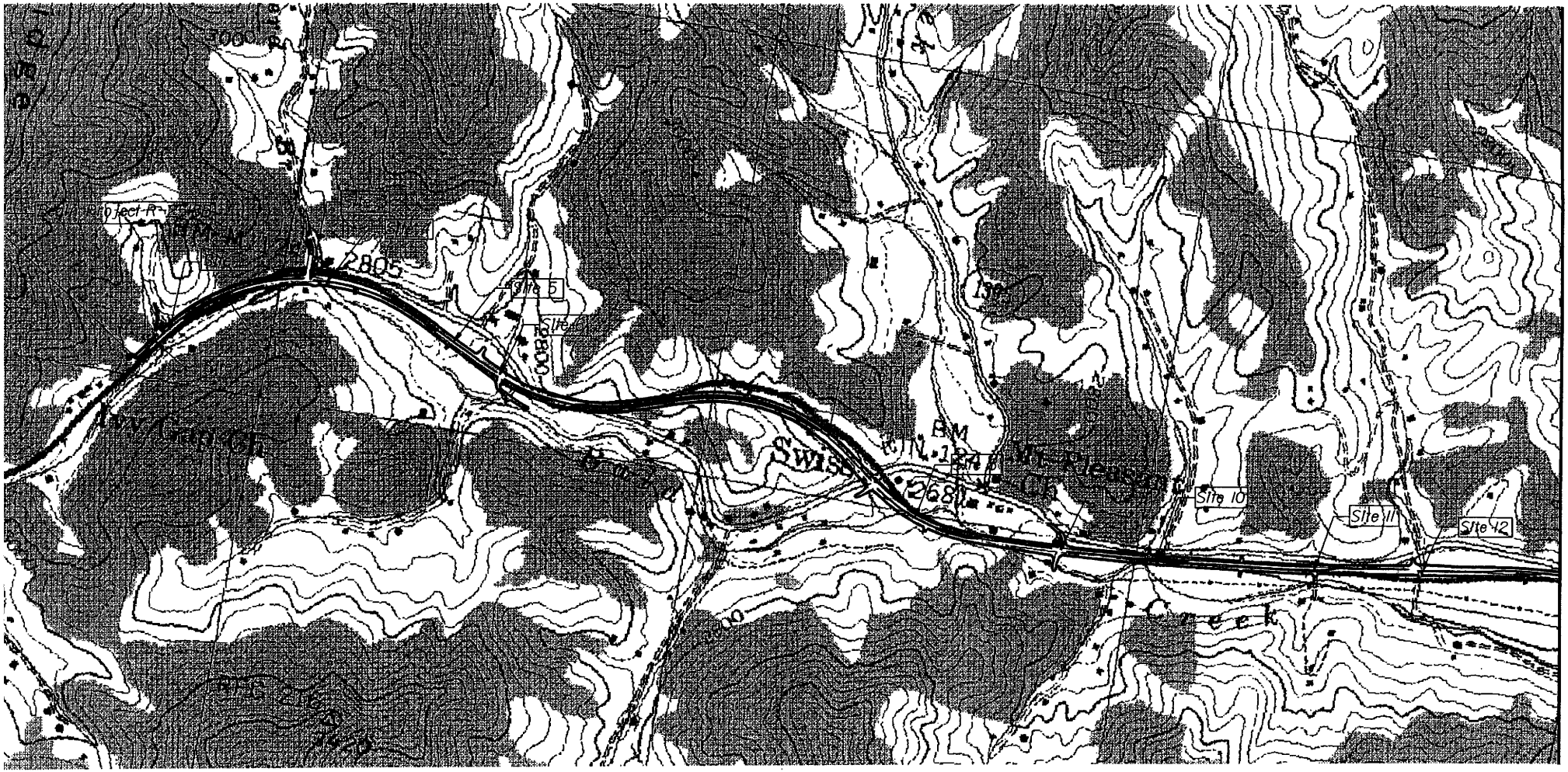
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

YANCEY COUNTY
WBS - 34445.1.1 (R-2518B)

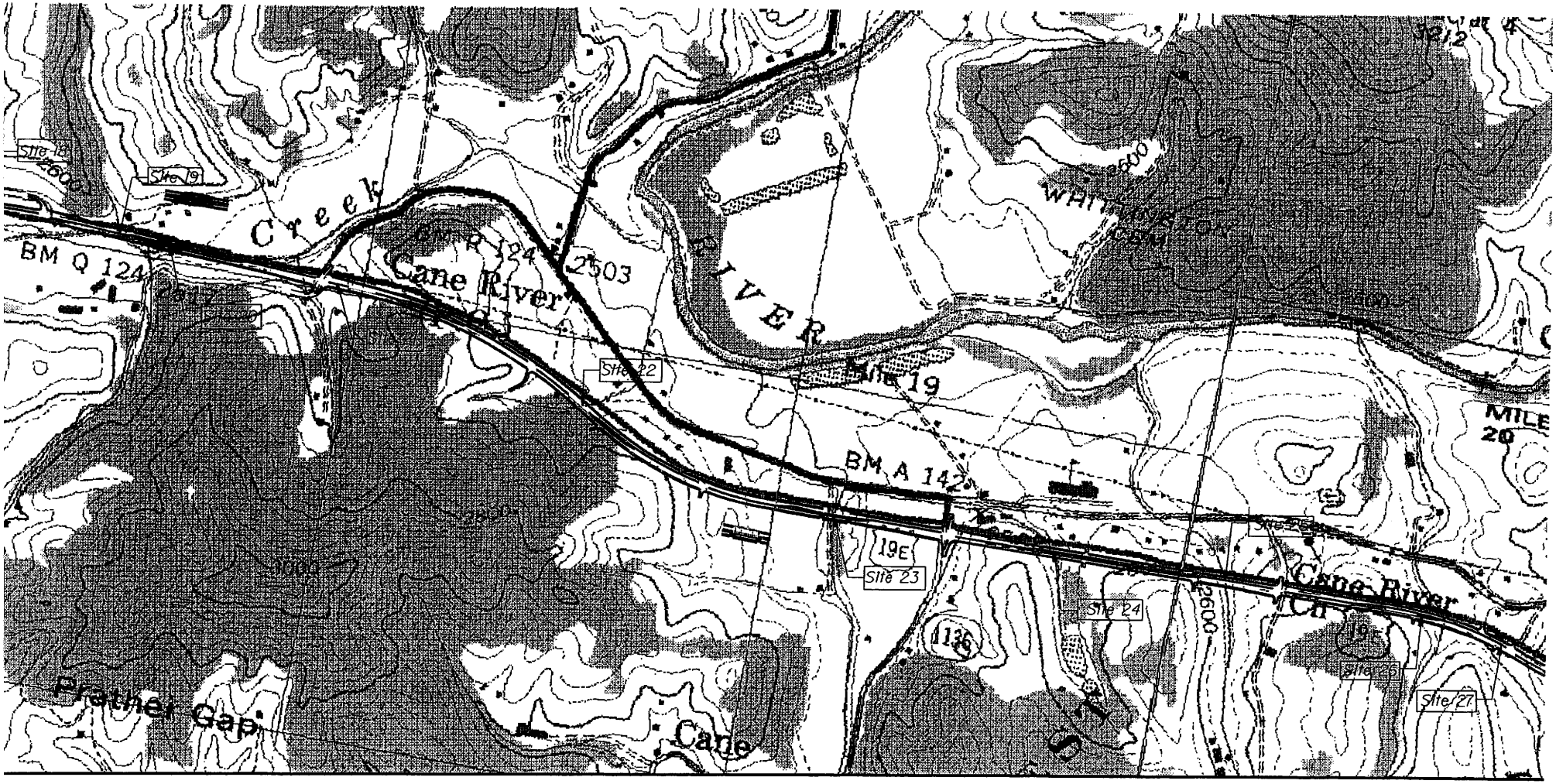
SHEET OF ############

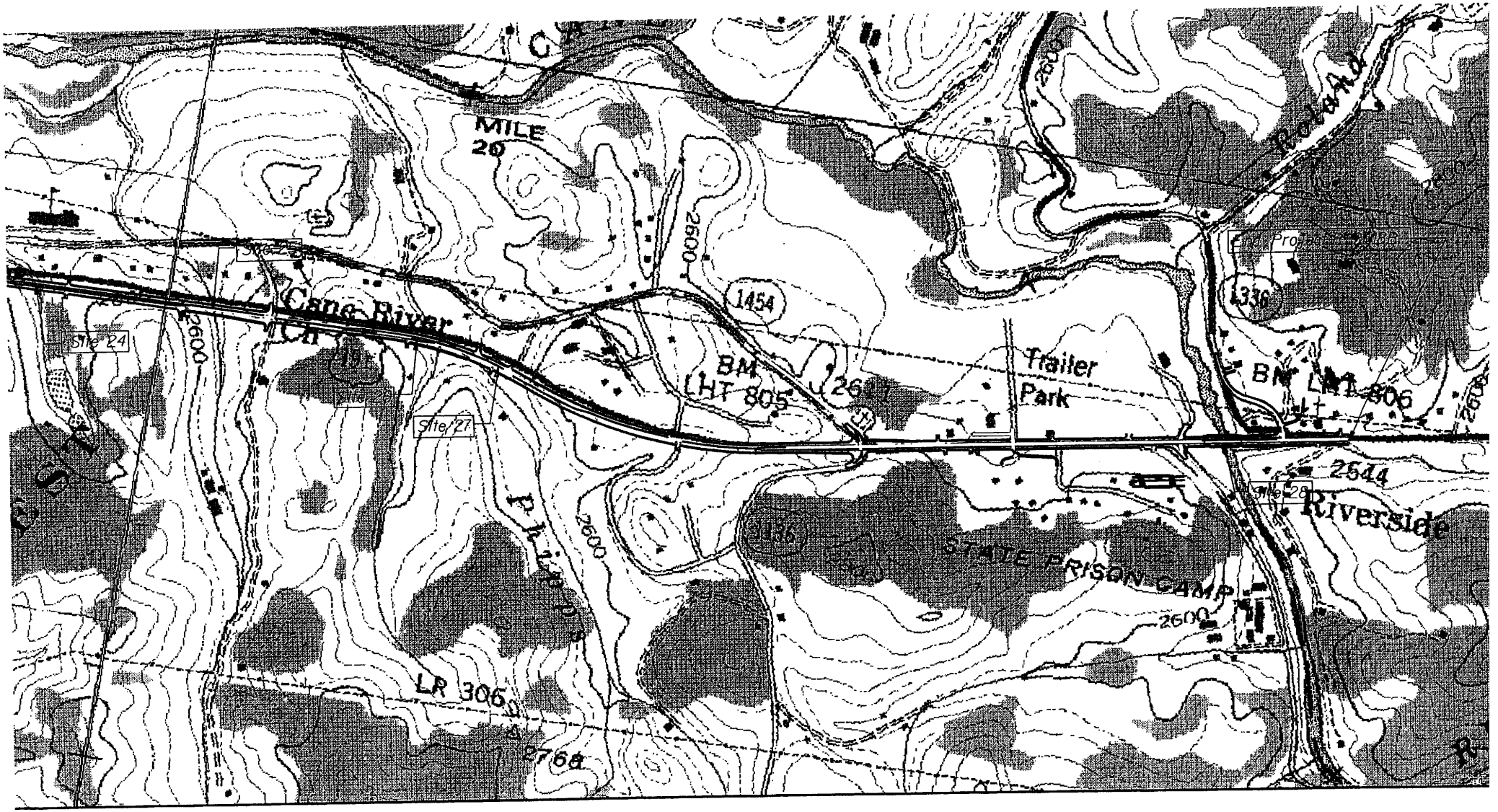
JMD Revised 2/03/05

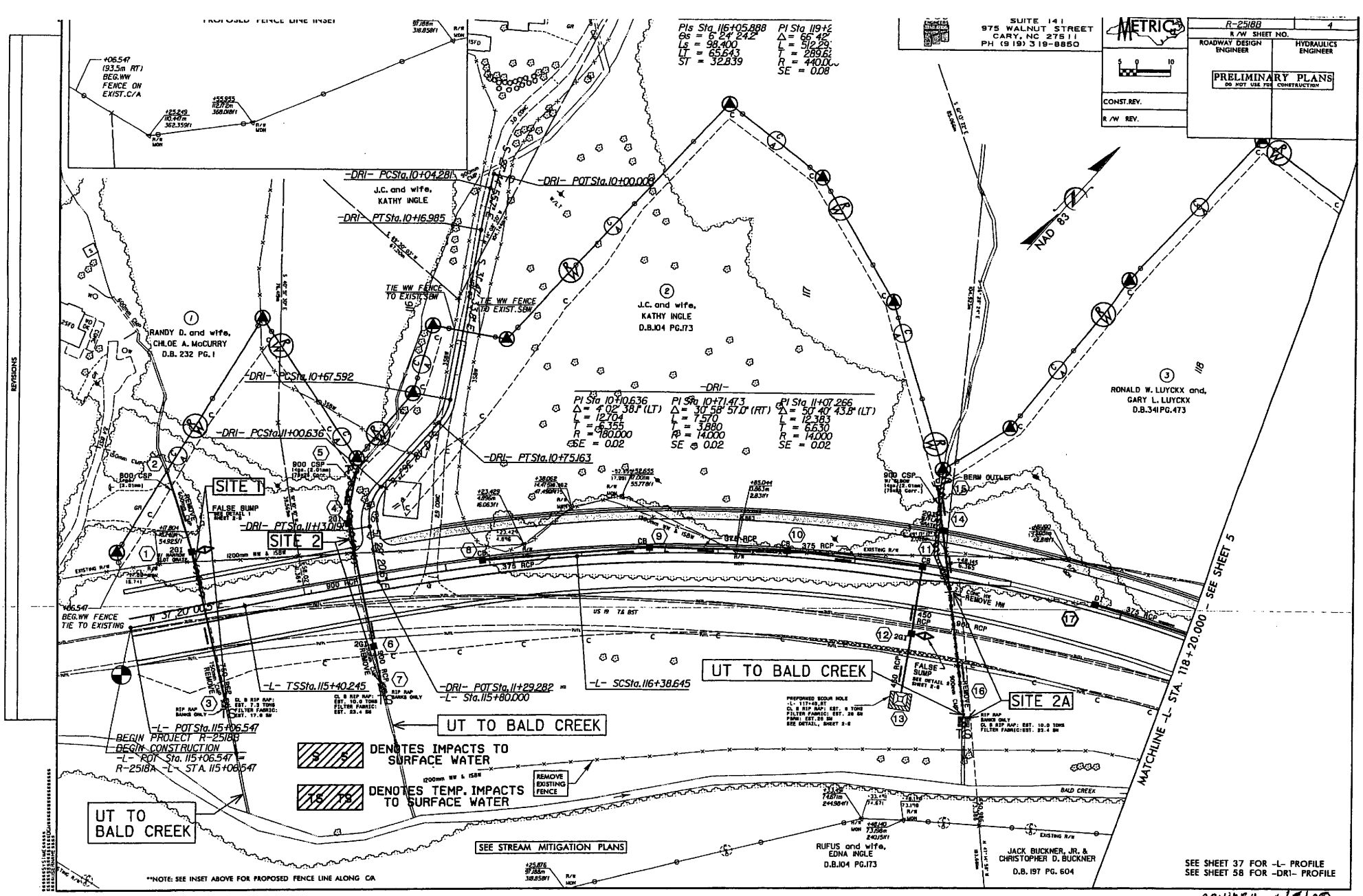
Revised FEB 2005


Site 5
Site 10
Site 11
Site 12
2805
2680
Swiss
Creek

Site 12
Site 11
Site 10
Site 9
Site 8
Site 7
Site 6
Site 5
Site 4
Site 3
Site 2
Site 1
Bald Mountain
Bald Mountain BM Q 1248
Post Mountain
Post Mountain
Bald Creek
2600
2600
2800
2800
24
24
Cemetery

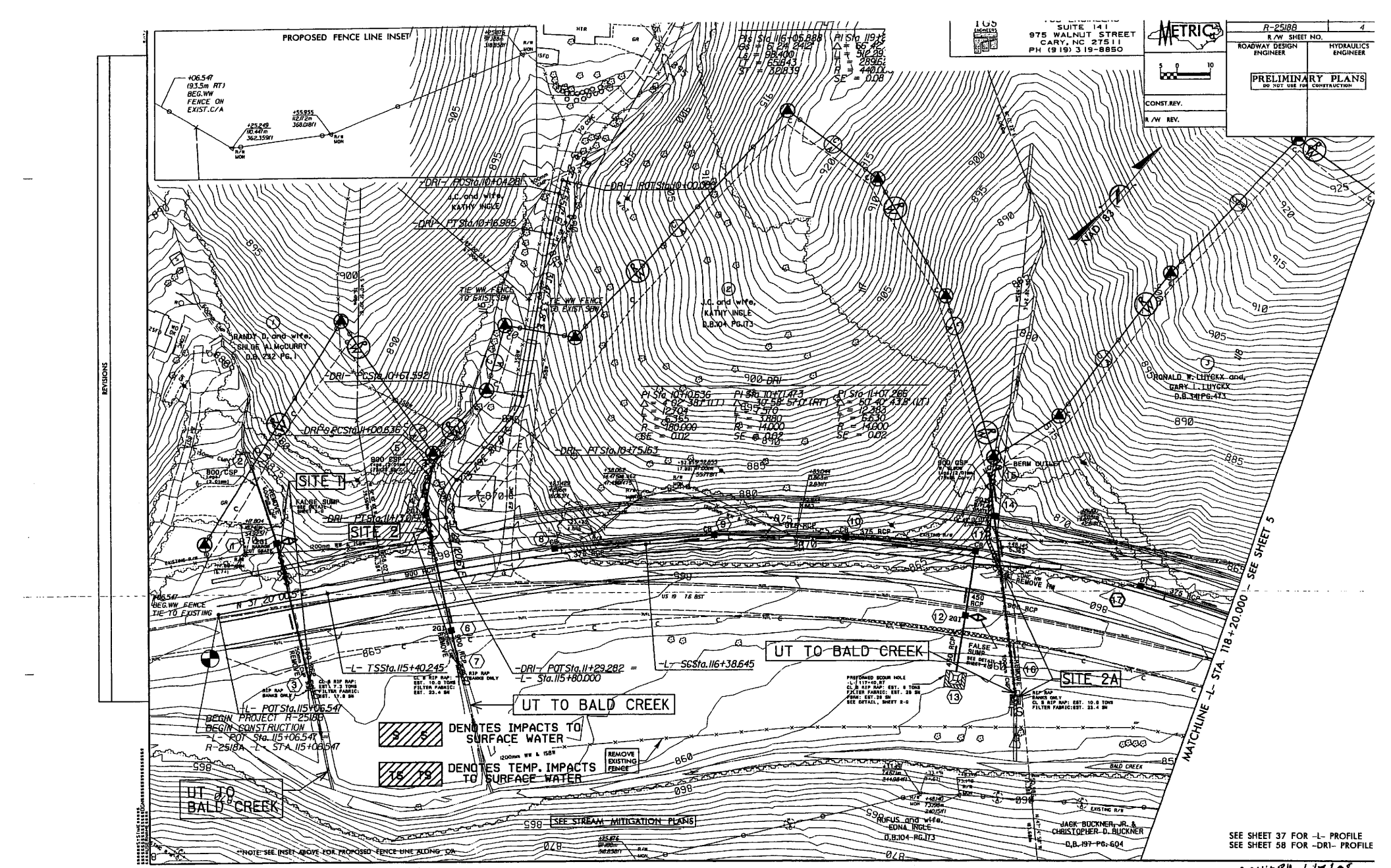

Site 18
Site 19
Creek
Cane River
BM Q 124
2503
RIVER
Site 19
WHITE OAK
Site 22
BM A 142
MILE
20
19E
Site 23
Site 24
Cane River
Site 26
Site 27
Prather Gap
Cane


MILE 20
Cane River
Site 24
Site 27
BM LHT 805
Trailer Park
1454
1336
2544
Riverside
STATE PRISON CAMP
LR 306
2600
2768

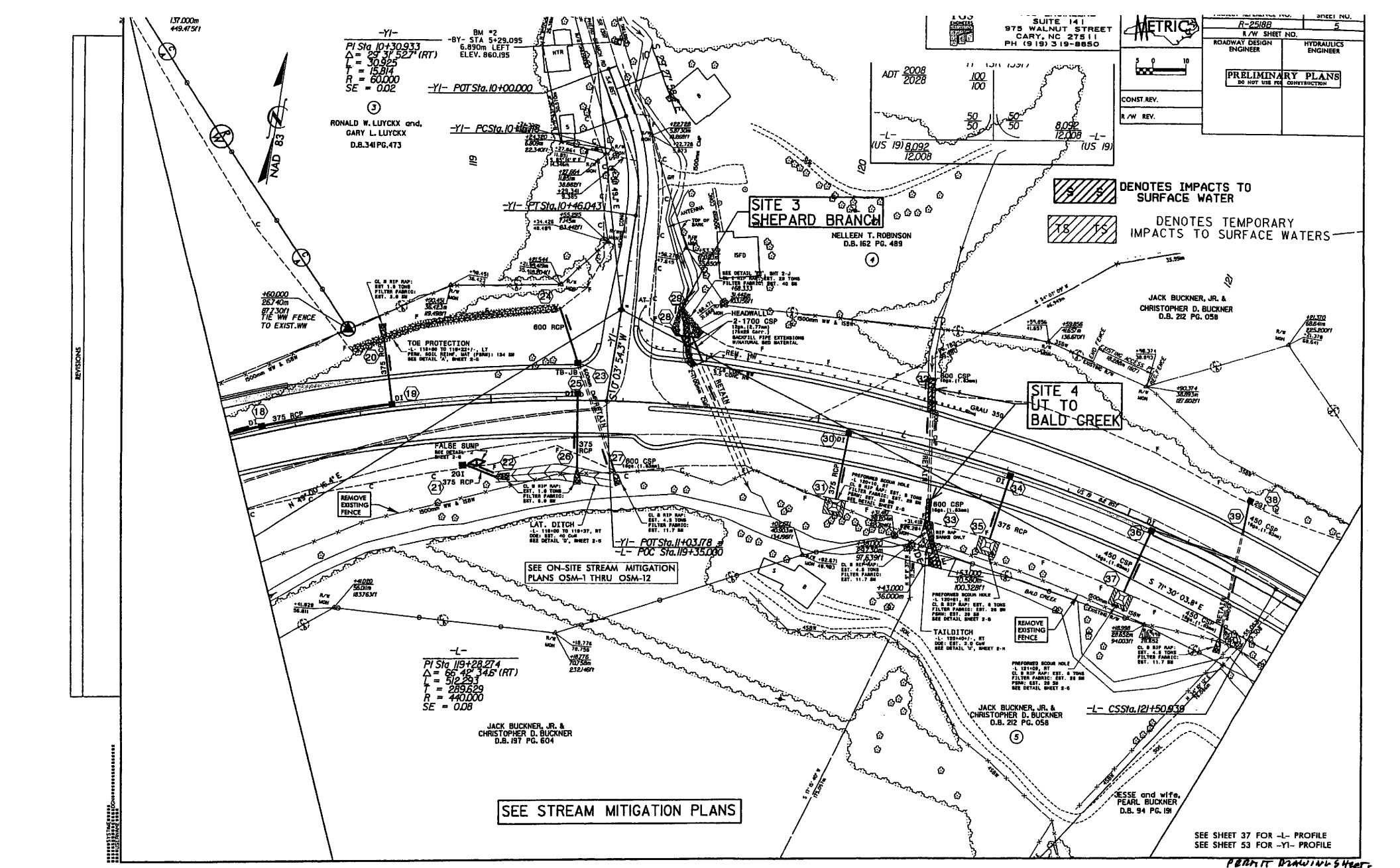


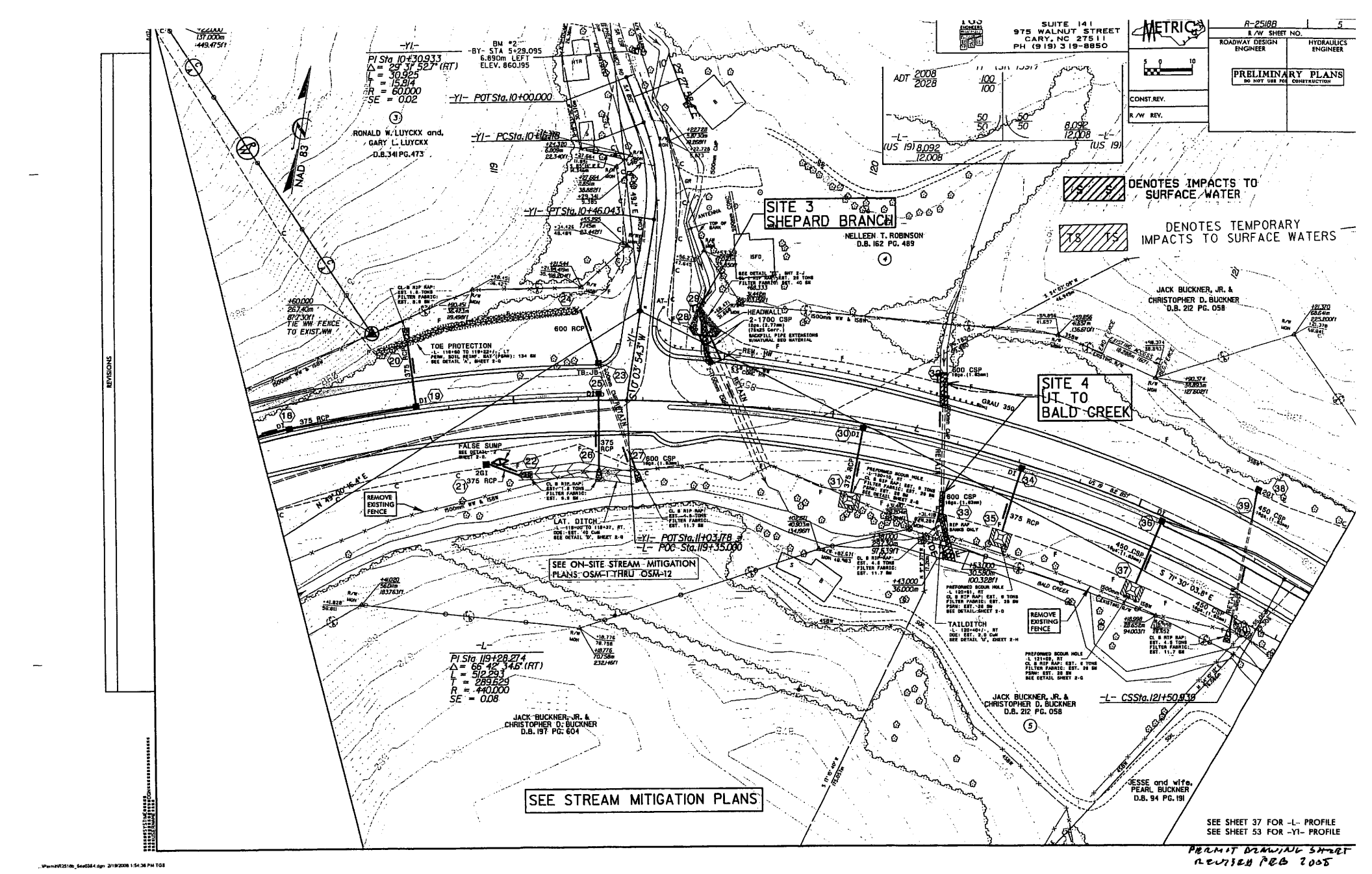
REVISED 1/18/08

518b_Sec0182.dgn 1/4/2008 9:58:41 AM TGB



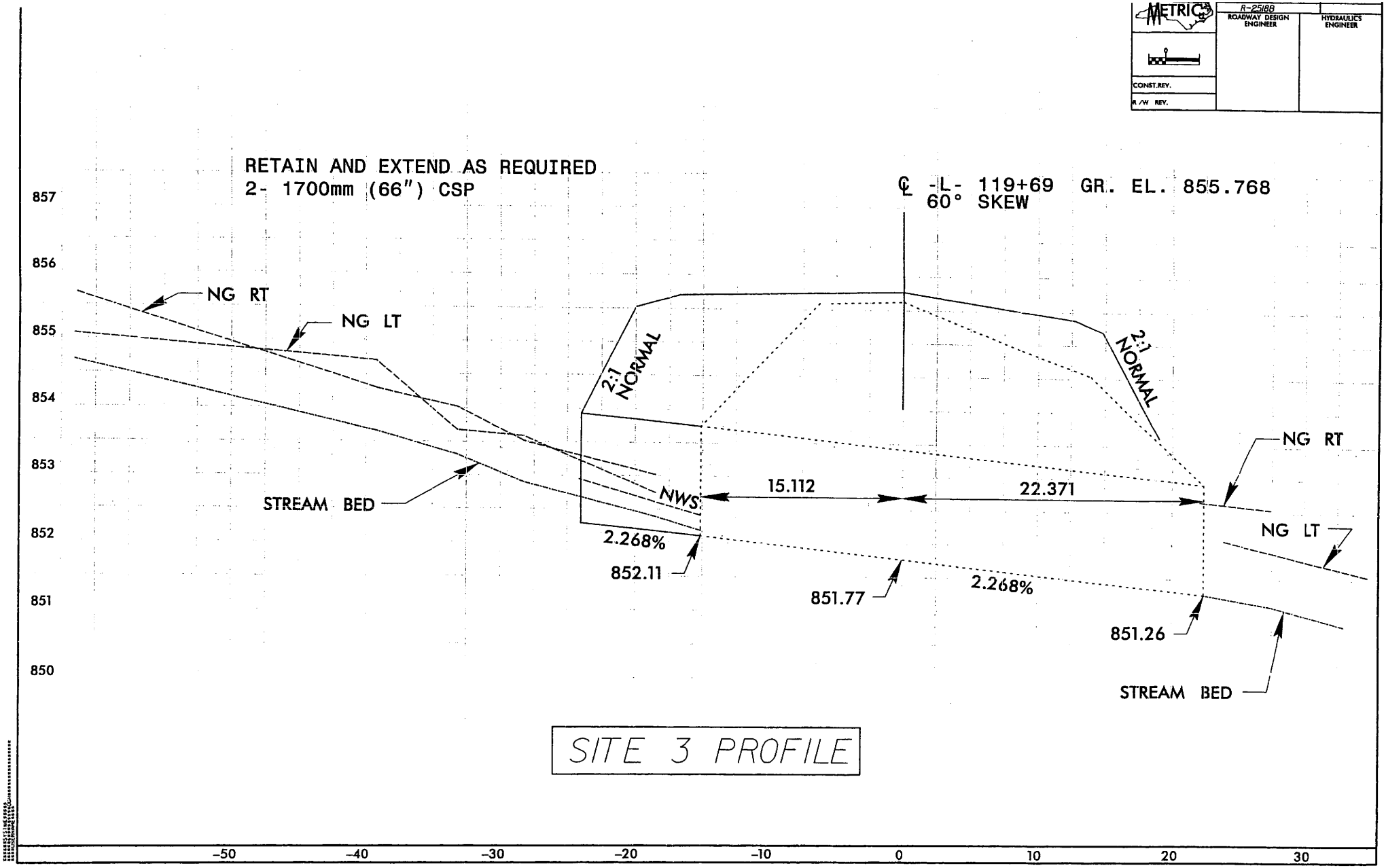
Revised 1/8/08


SITE 3
SHEPARD BRANCH
SITE 4
UT TO
BALD CREEK
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE STREAM MITIGATION PLANS
SEE ON-SITE STREAM MITIGATION PLANS OSM-1 THRU OSM-12
SEE SHEET 37 FOR -L- PROFILE
SEE SHEET 53 FOR -Y1- PROFILE
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
METRIC
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
R-2518B
R/W SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
REVISIONS
NELLEEN T. ROBINSON D.B. 162 PG. 489
RONALD W. LUYCKX and, GARY L. LUYCKX D.B. 341 PG. 473
JACK BUCKNER, JR. & CHRISTOPHER D. BUCKNER D.B. 212 PG. 058
JACK BUCKNER, JR. & CHRISTOPHER D. BUCKNER D.B. 197 PG. 604
JESSE and wife, PEARL BUCKNER D.B. 94 PG. 191
-Y1- PI Sta. 10+30.933
Δ = 29° 31' 52.7" (RT)
D = 30.925
T = 15.814
R = 60.000
SE = 0.02
-L- PI Sta. 119+28.274
Δ = 66° 42' 34.6" (RT)
L = 512.293
T = 289.529
R = 440.000
SE = 0.08
-Y1- POT Sta. 10+00.000
-Y1- PCS Sta. 10+16.398
-Y1- PT Sta. 10+46.043
-Y1- POT Sta. 11+03.178
-L- POC Sta. 119+35.000
-L- CSS Sta. 121+50.939
BM #2
-BY- STA 5+29.095
6.890m LEFT
ELEV. 860.195
ADT 2008 100
2028 100
50/50
8.092
12.008
(US 19)
HEADWALL
2-1700 CSP
TOE PROTECTION
FALSE SUMP
LAT. DITCH
TAILDITCH
REMOVE EXISTING FENCE
PERMIT DRAWINGS
REVISED FEB 2008

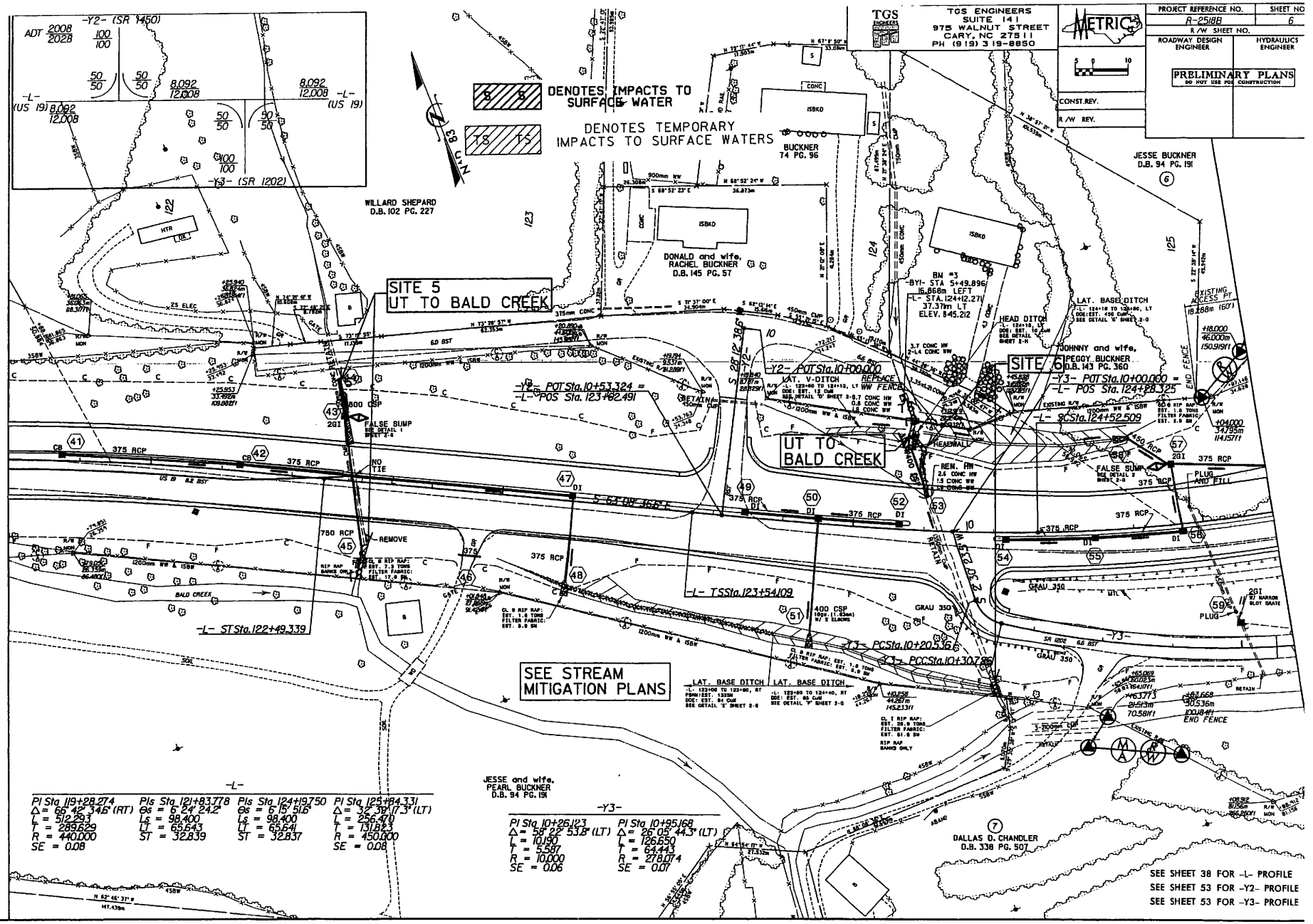

SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
R/W SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
ADT 2008 2028
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SITE 3
SHEPARD BRANCH
SITE 4
UT TO
BALD CREEK
-Y1- PI Sta 10+30.933
Δ = 29° 31' 52.7" (RT)
L = 30.925
T = 15.814
R = 60.000
SE = 0.02
-Y1- POT Sta. 10+00.000
-Y1- PC Sta. 10+16.118
-Y1- PT Sta. 10+46.043
BM #2
-BY- STA 5+29.095
6.890m LEFT
ELEV. 860.195
RONALD W. LUYCKX and,
GARY L. LUYCKX
D.B. 341 PG. 473
NELLEEN T. ROBINSON
D.B. 162 PG. 489
JACK BUCKNER, JR. &
CHRISTOPHER D. BUCKNER
D.B. 212 PG. 058
JACK BUCKNER, JR. &
CHRISTOPHER D. BUCKNER
D.B. 197 PG. 604
JESSE and wife,
PEARL BUCKNER
D.B. 94 PG. 191
-L- PI Sta 119+28.274
Δ = 66° 42' 34.6" (RT)
L = 512.293
T = 289.629
R = 440.000
SE = 0.08
-L- POT Sta. 111+03.178
-L- POC Sta. 119+35.000
-L- CS Sta. 121+50.939
HEADWALL
2-1700 CSP
TOE PROTECTION
FALSE SUMP
LAT. DITCH
TAILDITCH
REMOVE EXISTING FENCE
SEE ON-SITE STREAM MITIGATION PLANS OSM-1 THRU OSM-12
SEE STREAM MITIGATION PLANS
SEE SHEET 37 FOR -L- PROFILE
SEE SHEET 53 FOR -Y1- PROFILE
PERMIT DRAWING SHEET
REVISED FEB 2008

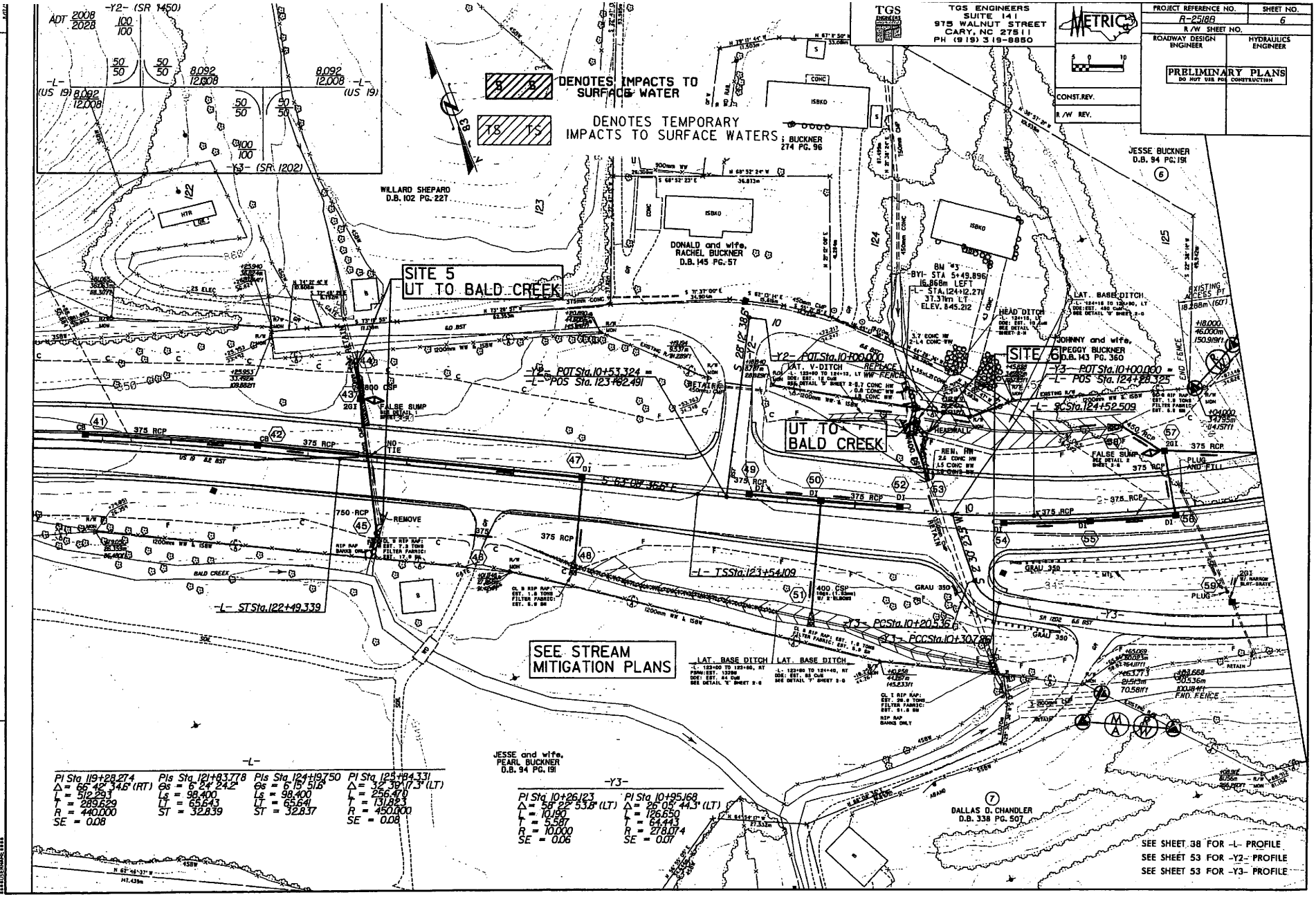
METRIC

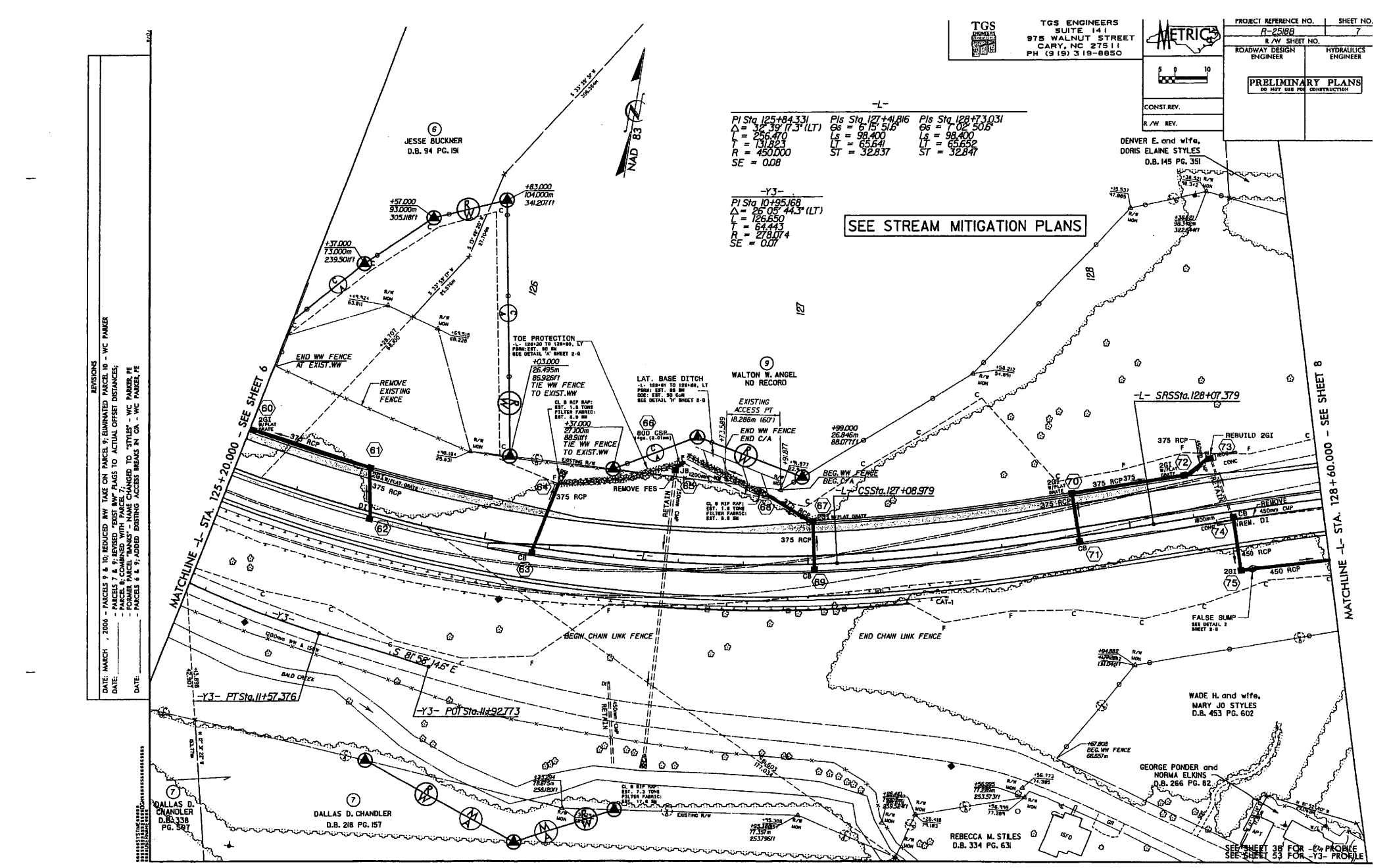
R-2518B	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

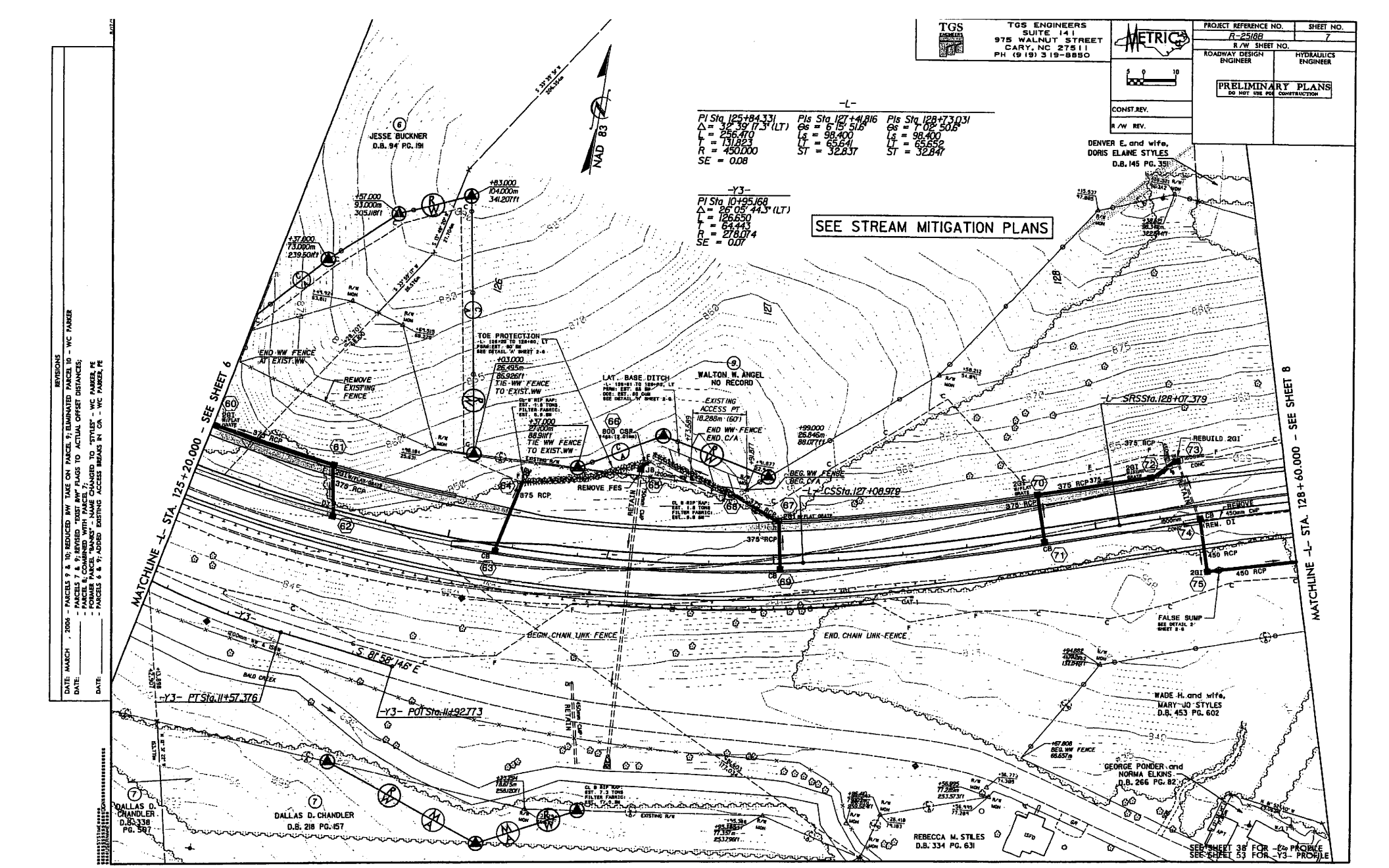


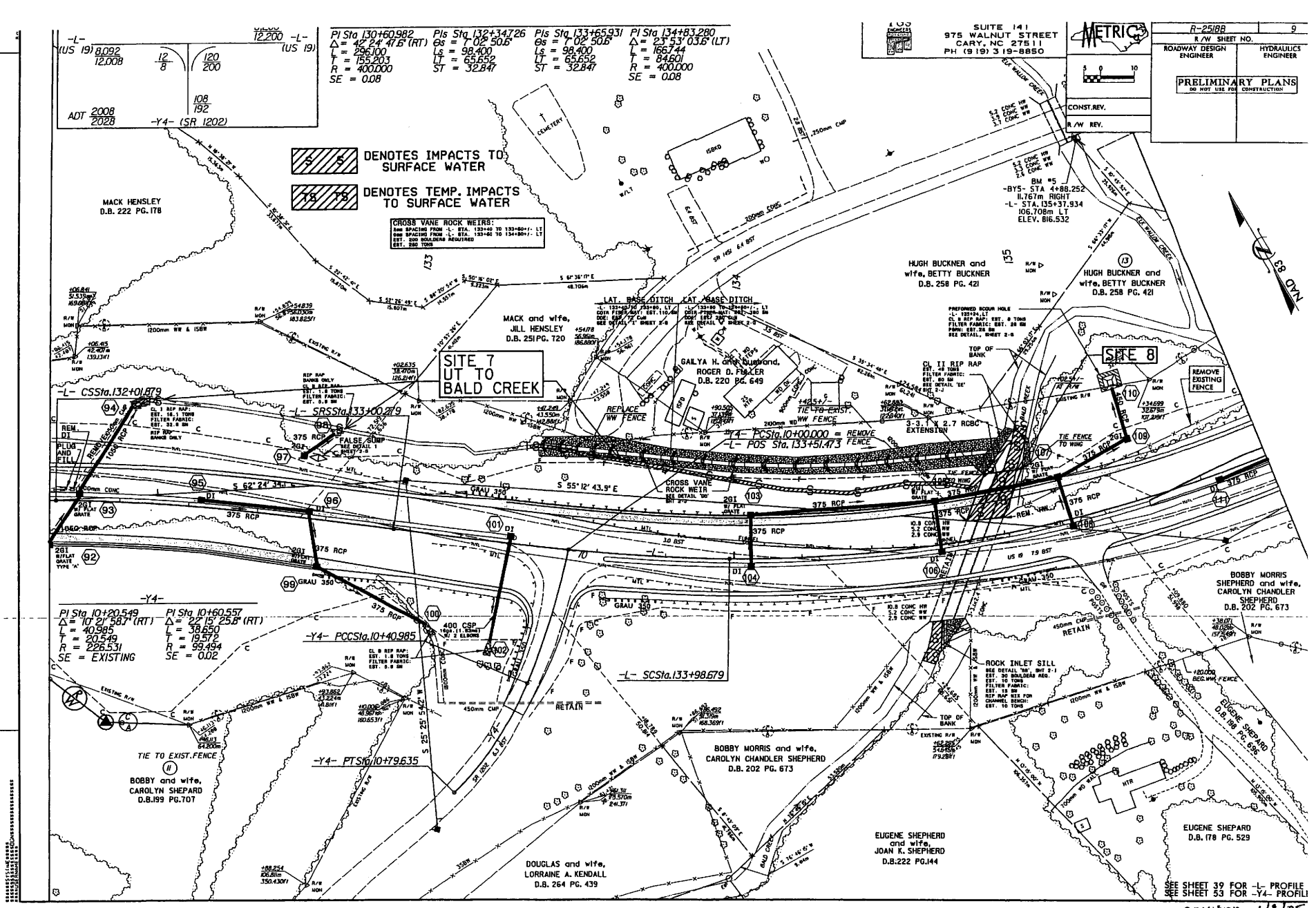
SITE 3 PROFILE

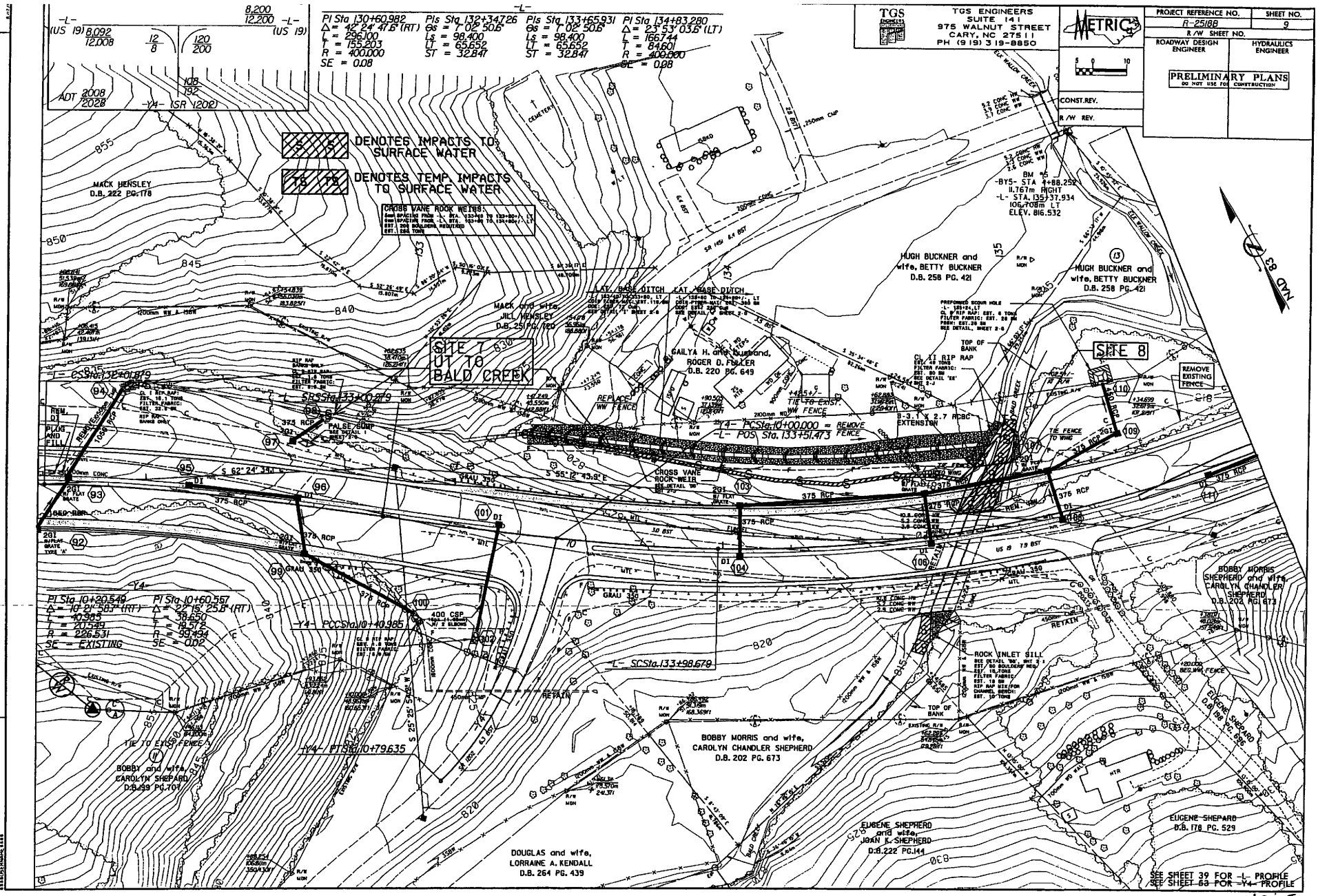

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
- PARCELS 6 & 7; REVISED "DIST RW" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
- PARCEL 6; ADDED EXISTING ACCESS BREAK IN C/L - WC PARKER, PE
DATE:
DATE:
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
-Y2- (SR 1450)
-Y3- (SR 1202)
-L- (US 19)
ADT 2008 2028
WILLARD SHEPARD D.B. 102 PG. 227
DONALD and wife, RACHEL BUCKNER D.B. 145 PG. 57
BUCKNER 74 PG. 96
JESSE BUCKNER D.B. 94 PG. 191
JOHNNY and wife, PEGGY BUCKNER D.B. 143 PG. 360
JESSE and wife, PEARL BUCKNER D.B. 94 PG. 191
DALLAS O. CHANDLER D.B. 338 PG. 507
SITE 5 UT TO BALD CREEK
SITE 6 UT TO BALD CREEK
SEE STREAM MITIGATION PLANS
-L- ST Sta. 122+49.339
-L- TS Sta. 123+54.109
-Y2- POT Sta. 10+53.324 = -L- POS Sta. 123+62.491
-Y2- POT Sta. 10+00.000 REPLACE
-Y3- POT Sta. 10+00.000 = -L- POS Sta. 124+28.325
-L- POS Sta. 124+52.509
-Y3- PCS Sta. 10+20.536
-Y3- PCC Sta. 10+30.786
S 63° 08' 36.5" E
BM #3 -BY1- STA 5+49.896 16.868m LEFT -L- STA. 124+12.271 37.37m LT ELEV. 845.212
EXISTING ACCESS PT 18.288m (60')
LAT. BASE DITCH
LAT. V-DITCH
HEAD DITCH
FALSE SUMP
PLUG AND FILL
END FENCE
SEE SHEET 38 FOR -L- PROFILE
SEE SHEET 53 FOR -Y2- PROFILE
SEE SHEET 53 FOR -Y3- PROFILE
PI Sta 119+28.274 Δ = 66° 45' 34.6" (RT) L = 512.293 T = 288.629 R = 440.000 SE = 0.08
PIs Sta 121+83.778 Θs = 6° 24' 24.2" Ls = 98.400 LT = 65.643 ST = 32.839
PIs Sta 124+19.750 Θs = 6° 15' 51.6" Ls = 98.400 LT = 65.641 ST = 32.837
PI Sta 125+84.331 Δ = 32° 39' 17.3" (LT) L = 256.479 T = 131.823 R = 450.000 SE = 0.08
PI Sta 10+26.123 Δ = 58° 22' 53.8" (LT) L = 10.190 T = 5.587 R = 10.000 SE = 0.06
PI Sta 10+95.168 Δ = 26° 05' 44.3" (LT) L = 126.650 T = 64.443 R = 278.074 SE = 0.07

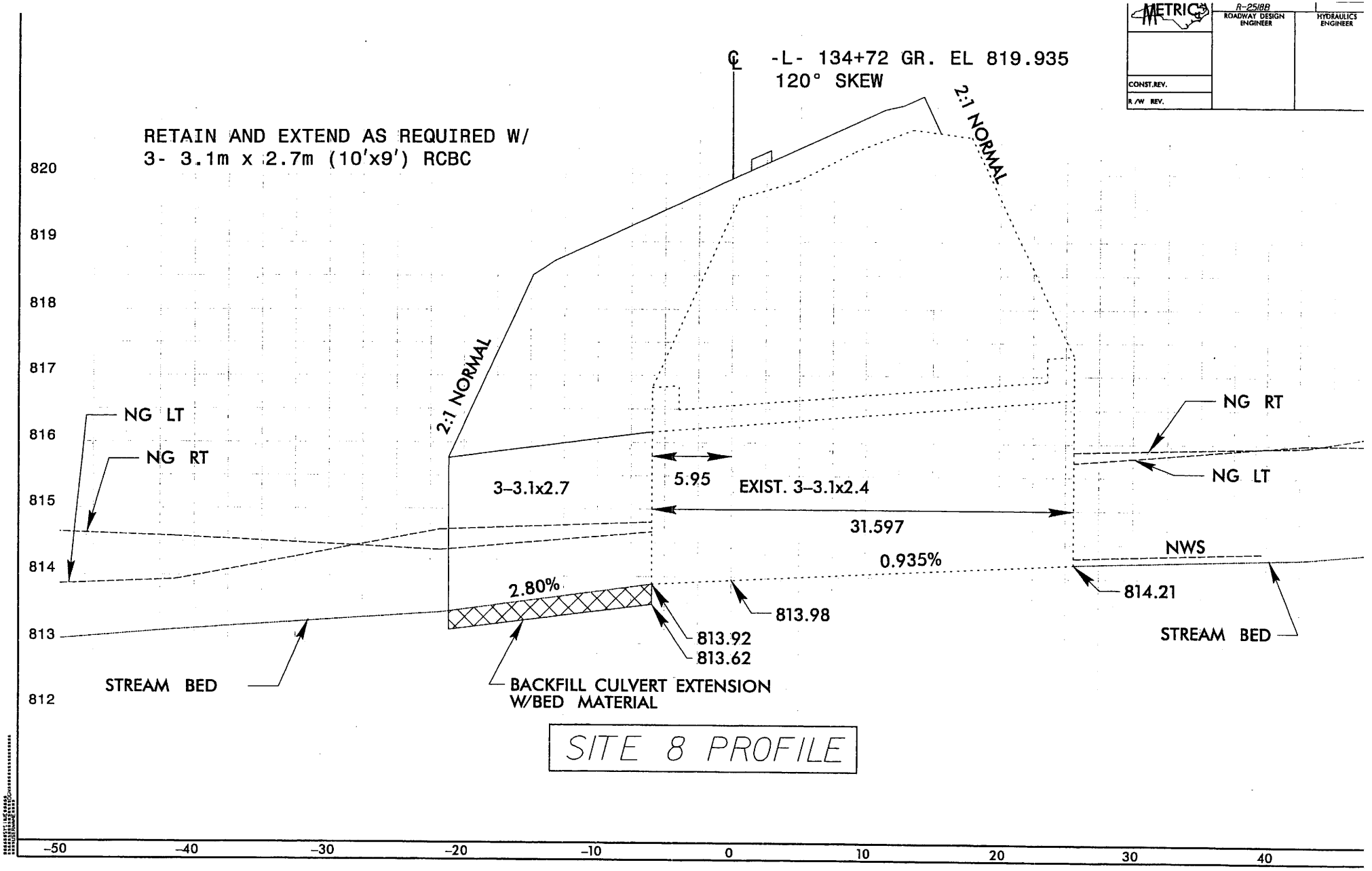

-Y2- (SR 1450)
ADT 2008 2028
-L- (US 19)
-Y3- (SR 1202)
-L- (US 19)
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
- PARCELS 6 & 7; REVISED "EXIST R/W" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
- PARCEL 6; ADDED EXISTING ACCESS BREAK IN C/L - WC PARKER, PE
DATE:
DATE:
WILLARD SHEPARD D.B. 102 PG. 227
DONALD and wife, RACHEL BUCKNER D.B. 145 PG. 57
BUCKNER 274 PG. 96
JESSE BUCKNER D.B. 94 PG. 191
JOHNNY and wife, PEGGY BUCKNER D.B. 143 PG. 360
SITE 5
UT TO BALD CREEK
SITE 6
UT TO BALD CREEK
-Y2- POT Sta. 10+53.324
-L- POS Sta. 123+82.491
-Y2- POT Sta. 10+00.000
-L- POS Sta. 124+28.325
-L- SC Sta. 124+52.509
-L- ST Sta. 122+49.339
-L- TS Sta. 123+54.109
-Y3- PC Sta. 10+20.516
-Y3- PCC Sta. 10+30.780
SEE STREAM MITIGATION PLANS
JESSE and wife, PEARL BUCKNER D.B. 94 PG. 191
DALLAS D. CHANDLER D.B. 339 PG. 507
-L-
PI Sta. 119+28.274
Δ = 66° 42' 34.6" (RT)
L = 512.293
T = 289.629
R = 440.000
SE = 0.08
Pls Sta. 121+83.778
θs = 6° 24' 24.2"
Ls = 98.400
LT = 65.643
ST = 32.839
Pls Sta. 124+19.750
θs = 6° 15' 51.8"
Ls = 98.400
LT = 65.641
ST = 32.837
PI Sta. 125+84.331
Δ = 32° 39' 17.3" (LT)
L = 256.470
T = 131.823
R = 450.000
SE = 0.08
-Y3-
PI Sta. 10+26.123
Δ = 58° 22' 53.8" (LT)
L = 10.190
T = 5.587
R = 10.000
SE = 0.06
PI Sta. 10+95.168
Δ = 26° 05' 44.3" (LT)
L = 126.650
T = 64.443
R = 278.074
SE = 0.07
SEE SHEET 38 FOR -L- PROFILE
SEE SHEET 53 FOR -Y2- PROFILE
SEE SHEET 53 FOR -Y3- PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
DATE: MARCH , 2006 - PARCELS 9 & 10; REDUCED RW TAKE ON PARCEL 9; ELIMINATED PARCEL 10 - WC PARKER
DATE: - PARCELS 7 & 9; REVISED "EXIST RW" FLAGS TO ACTUAL OFFSET DISTANCES;
- PARCEL 8; COMBINED WITH PARCEL 7; CHANGED TO "STYLES" - WC PARKER, PE
DATE: - PARCEL 7; REVISED RW TAKE; CHANGED NAME TO STYLES - WC PARKER, PE
- PARCELS 6 & 9; ADDED EXISTING ACCESS BREAKS IN GA - WC PARKER, PE
-L-
PI Sta. 125+84.331
Δ = 32° 39' 17.3" (LT)
D = 256.470
T = 131.823
R = 450.000
SE = 0.08
PIs Sta. 127+41.816
Gs = 6° 15' 51.6"
Ls = 98.400
LT = 65.641
ST = 32.837
PIs Sta. 128+73.031
Gs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
-Y3-
PI Sta. 10+95.168
Δ = 26° 05' 44.3" (LT)
D = 126.650
T = 64.443
R = 278.074
SE = 0.07
SEE STREAM MITIGATION PLANS
NAD 83
MATCHLINE -L- STA. 125+20.000 - SEE SHEET 6
MATCHLINE -L- STA. 128+60.000 - SEE SHEET 8
JESSE BUCKNER
D.B. 94 PG. 191
DENVER E. and wife,
DORIS ELAINE STYLES
D.B. 145 PG. 351
WALTON W. ANGEL
NO RECORD
DALLAS D. CHANDLER
D.B.B3338
PG. 597
DALLAS D. CHANDLER
D.B. 218 PG. 157
WADE H. and wife,
MARY JO STYLES
D.B. 453 PG. 602
GEORGE PONDER and
NORMA ELKINS
D.B. 266 PG. 82
REBECCA M. STILES
D.B. 334 PG. 631
END WW FENCE AT EXIST.WW
REMOVE EXISTING FENCE
TOE PROTECTION
TIE WW FENCE TO EXIST.WW
LAT. BASE DITCH
EXISTING ACCESS PT
END WW FENCE
END C/A
BEG. WW FENCE
BEG. C/A
-L- SRSSta. 128+07.379
-L- CSSta. 127+08.979
REMOVE FES
REBUILD 2GI
FALSE SUMP
BEGIN CHAIN LINK FENCE
END CHAIN LINK FENCE
BALD CREEK
-Y3- PTSta. 11+57.376
-Y3- POTSta. 11+92.773
S 81° 58' 14.6" E
SEE SHEET 38 FOR -L- PROFILE
SEE SHEET 53 FOR -Y3- PROFILE

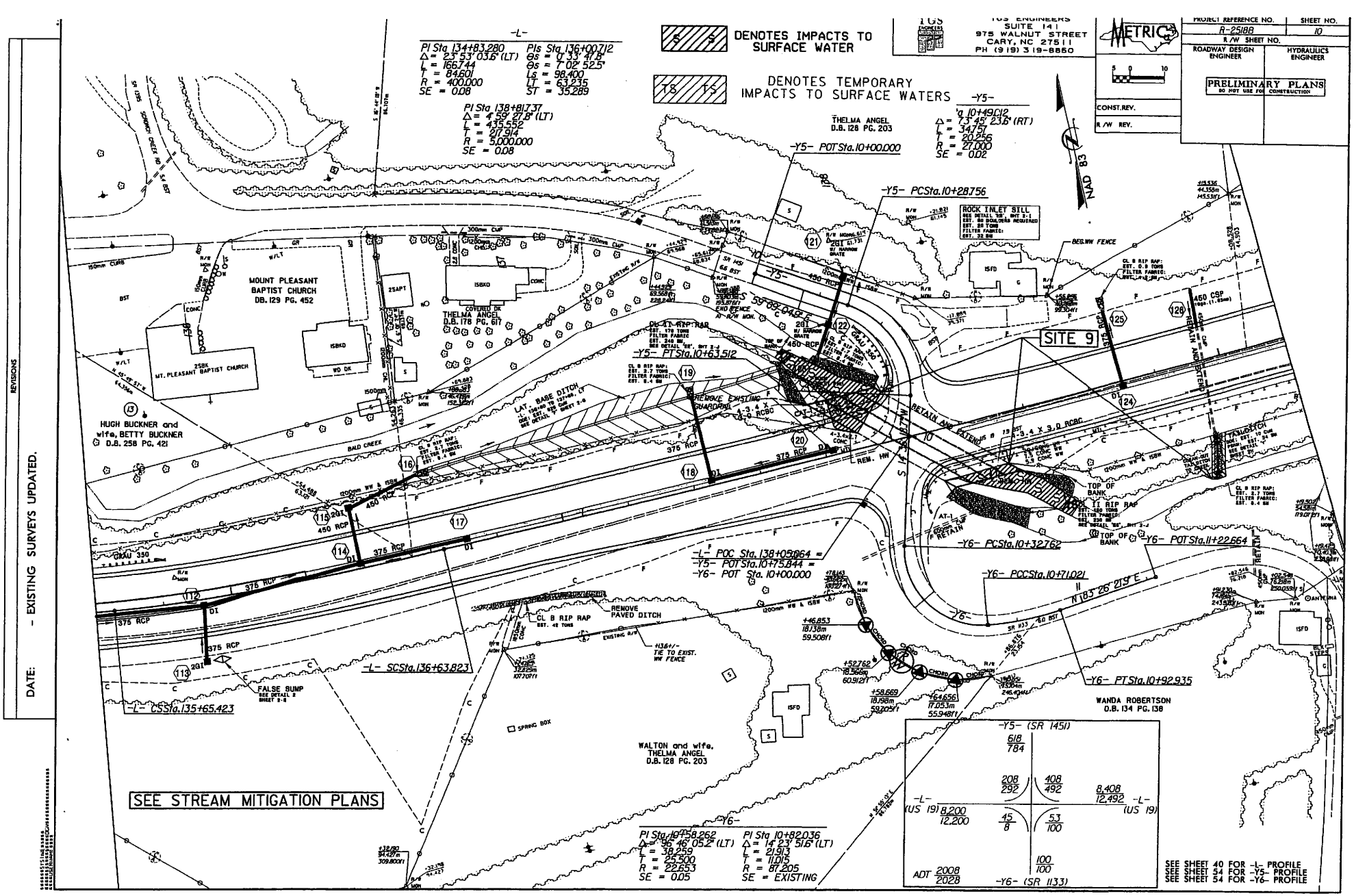

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
DATE: MARCH , 2006 - PARCELS 9 & 10; REDUCED BW TAKE ON PARCEL 9; ELIMINATED PARCEL 10 - WC PARKER
DATE: - PARCELS 7 & 9; REVISED "EXIST BW" FLAGS TO ACTUAL OFFSET DISTANCES;
- PARCEL 6 COMBINED WITH PARCEL 7;
DATE: - PARCEL 7 CHANGED TO "STYLES" - WC PARKER, PE
- PARCEL 8 ADDED "ANGEL" - WC PARKER, PE
DATE: - PARCELS 6 & 9; ADDED EXISTING ACCESS BREAKS IN CA - WC PARKER, PE
-L-
PI Sta 125+84.331
Δ = 32° 39' 17.3" (LT)
L = 256.470
T = 131.823
R = 450.000
SE = 0.08
PIs Sta 127+41.816
Θs = 6° 15' 51.6"
Ls = 98.400
LT = 65.641
ST = 32.837
PIs Sta 128+73.031
Θs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
-Y3-
PI Sta 10+95.168
Δ = 26° 05' 44.3" (LT)
L = 126.650
T = 64.443
R = 278.074
SE = 0.07
SEE STREAM MITIGATION PLANS
NAD 83
MATCHLINE -L- STA. 125+20.000 - SEE SHEET 6
MATCHLINE -L- STA. 128+60.000 - SEE SHEET 8
JESSE BUCKNER
D.B. 94 PG. 191
DENVER E. and wife, DORIS ELAINE STYLES
D.B. 145 PG. 351
WALTON W. ANGEL
NO RECORD
DALLAS D. CHANDLER
D.B. 338 PG. 587
DALLAS D. CHANDLER
D.B. 218 PG. 157
WADE H. and wife, MARY JO STYLES
D.B. 453 PG. 602
GEORGE PONDER and NORMA ELKINS
D.B. 266 PG. 82
REBECCA M. STILES
D.B. 334 PG. 631
TOE PROTECTION
END WW FENCE AT EXIST. WW
REMOVE EXISTING FENCE
TIE WW FENCE TO EXIST. WW
LAT. BASE DITCH
EXISTING ACCESS PT
END WW FENCE END C/A
BEG. WW FENCE BEG. C/A
REMOVE FES
BEGIN CHAIN LINK FENCE
END CHAIN LINK FENCE
FALSE SUMP
REBUILD 2GI
REMOVE
-L- SRS Sta. 128+07.379
-L- CSS Sta. 127+08.979
-Y3- PT Sta. 11+57.376
-Y3- POT Sta. 11+92.773
S 81° 58' 14.6" E
BALD CREEK
SEE SHEET 38 FOR -Ls PROFILE
SEE SHEET 53 FOR -Y3- PROFILE

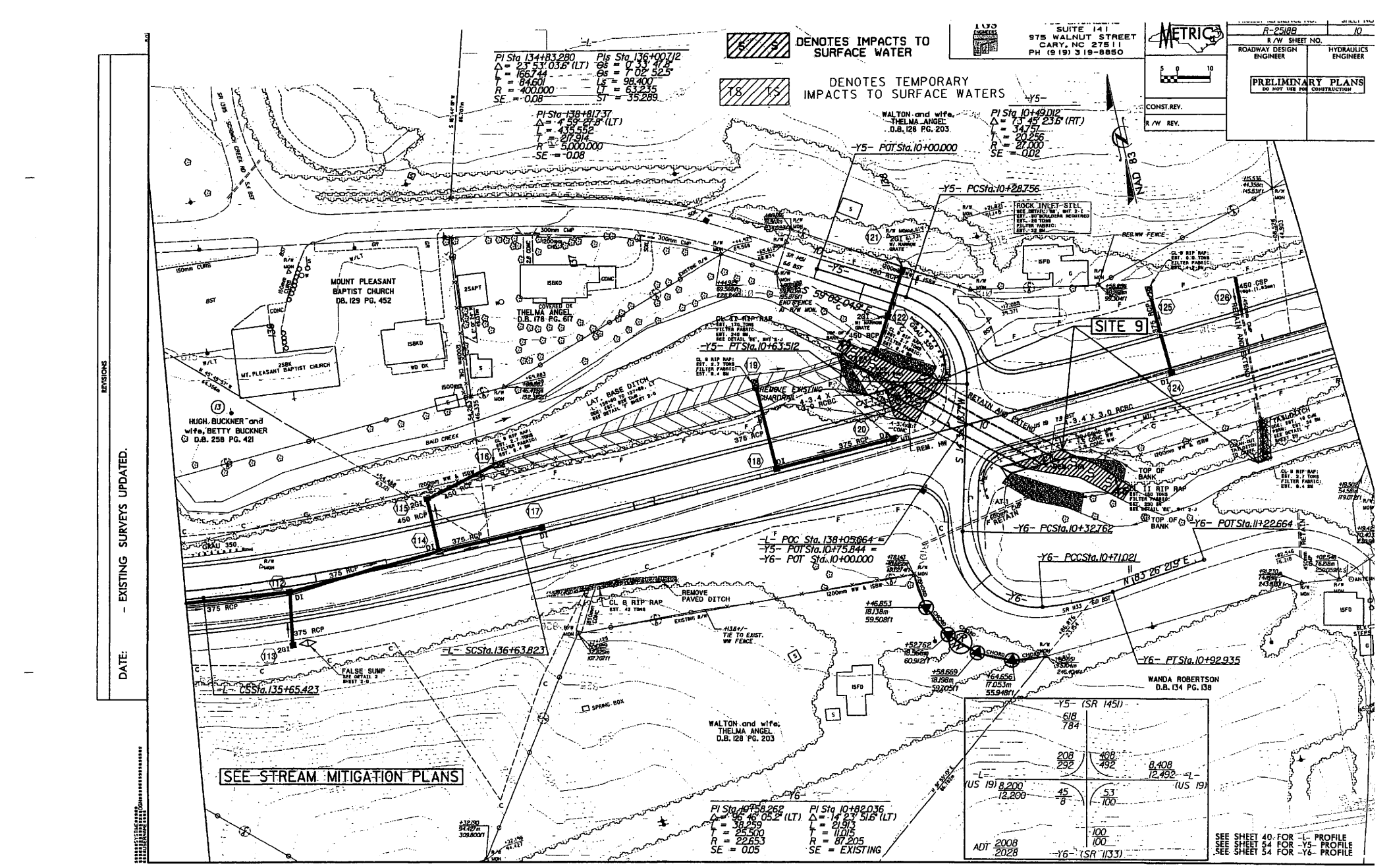

SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
PI Sta 130+60.982
Δ = 42° 24' 47.6" (RT)
L = 296.100
T = 155.203
R = 400.000
SE = 0.08
PIs Sta 132+34.726
θs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
PIs Sta 133+65.931
θs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
PI Sta 134+83.280
Δ = 23° 53' 03.6" (LT)
L = 166.744
T = 84.601
R = 400.000
SE = 0.08
ADT 2008 12,200
2028
-Y4- (SR 1202)
-L- (US 19)
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMP. IMPACTS TO SURFACE WATER
CROSS VANE ROCK WEIRS:
5mm SPACING FROM -L- STA. 133+40 TO 133+60+/- LT
0mm SPACING FROM -L- STA. 133+60 TO 134+80+/- LT
EST. 500 BOULDERS REQUIRED
EST. 280 TONS
MACK HENSLEY
D.B. 222 PG. 178
MACK and wife, JILL HENSLEY
D.B. 251PG. 120
HUGH BUCKNER and wife, BETTY BUCKNER
D.B. 258 PG. 421
GAILYA H. and husband, ROGER D. FULLER
D.B. 220 PG. 649
BOBBY MORRIS and wife, CAROLYN CHANDLER SHEPHERD
D.B. 202 PG. 673
BOBBY and wife, CAROLYN SHEPARD
D.B.199 PG.707
DOUGLAS and wife, LORRAINE A. KENDALL
D.B. 264 PG. 439
EUGENE SHEPARD and wife, JOAN K. SHEPHERD
D.B.222 PG.144
EUGENE SHEPARD
D.B. 178 PG. 529
SITE 7
UT TO BALD CREEK
SITE 8
-L- CSSta.132+01.879
-L- SRSSta.133+00.279
-Y4- PCCSta.10+00.000 = REMOVE
-L- POS Sta. 133+51.473
-Y4- PCCSta.10+40.985
-L- SCSta.133+98.679
-Y4- PTSta.10+79.635
-Y4-
PI Sta 10+20.549
Δ = 10° 21' 58.7" (RT)
L = 40.985
T = 20.549
R = 226.531
SE = EXISTING
PI Sta 10+60.557
Δ = 22° 15' 25.8" (RT)
L = 38.650
T = 19.572
R = 99.494
SE = 0.02
BM #5
-BY5- STA 4+88.252
11.767m RIGHT
-L- STA. 135+37.934
106.708m LT
ELEV. 816.532
REPLACE WW FENCE
TIE TO EXIST. WW FENCE
REMOVE EXISTING FENCE
TIE FENCE TO WING
TIE TO EXIST. FENCE
LAT. BASE DITCH
CL II RIP RAP
TOP OF BANK
RETAIN
ROCK INLET SILL
3-3.1 X 2.7 RCBC EXTENSION
SEE SHEET 39 FOR -L- PROFILE
SEE SHEET 53 FOR -Y4- PROFILE
REVISED 1/8/07


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
PROJECT REFERENCE NO. R-2518B
SHEET NO. 9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
PI Sta 130+60.982
Δ = 42° 24' 47.6" (RT)
L = 296.100
T = 155.203
R = 400.000
SE = 0.08
PIs Sta 132+34.726
θs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
PIs Sta 133+65.931
θs = 7° 02' 50.6"
Ls = 98.400
LT = 65.652
ST = 32.847
PI Sta 134+83.280
Δ = 23° 53' 03.6" (LT)
L = 166.744
T = 84.601
R = 400.000
SE = 0.08
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMP. IMPACTS TO SURFACE WATER
CROSS VANE ROCK WEIR:
SITE 7
UT TO BALD CREEK
SITE 8
-L- SS Sta. 132+01.879
-L- SR Sta. 133+00.879
-Y4- PC Sta. 10+00.000 = REMOVE -L- POS, Sta. 133+51.473 FENCE
-Y4- PCC Sta. 10+40.985
-L- SC Sta. 133+98.679
-Y4- PT Sta. 10+79.635
PI Sta 10+20.549
Δ = 10° 21' 58.3" (RT)
L = 40.565
T = 20.549
R = 226.531
SE = EXISTING
PI Sta 10+60.557
Δ = 22° 15' 25.8" (RT)
L = 38.650
T = 19.572
R = 99.434
SE = 0.02
MACK HENSLEY D.B. 222 PG. 178
MACK and wife, JILL HENSLEY D.B. 251 PG. 120
GAILYA H. and husband, ROGER D. FULLER D.B. 220 PG. 649
HUGH BUCKNER and wife, BETTY BUCKNER D.B. 258 PG. 421
BOBBY and wife, CAROLYN SHEPARD D.B. 139 PG. 701
BOBBY MORRIS and wife, CAROLYN CHANDLER SHEPHERD D.B. 202 PG. 673
EUGENE SHEPARD and wife, JOAN K. SHEPHERD D.B. 222 PG. 141
EUGENE SHEPARD D.B. 178 PG. 529
DOUGLAS and wife, LORRAINE A. KENDALL D.B. 264 PG. 439
BM #5 -BY5- STA 4+88.252 11.767m RIGHT -L- STA. 135+37.934 106.708m LT ELEV. 816.532
SEE SHEET 39 FOR -L- PROFILE
SEE SHEET 83 FOR -Y4- PROFILE
NAD 83
11/9/08

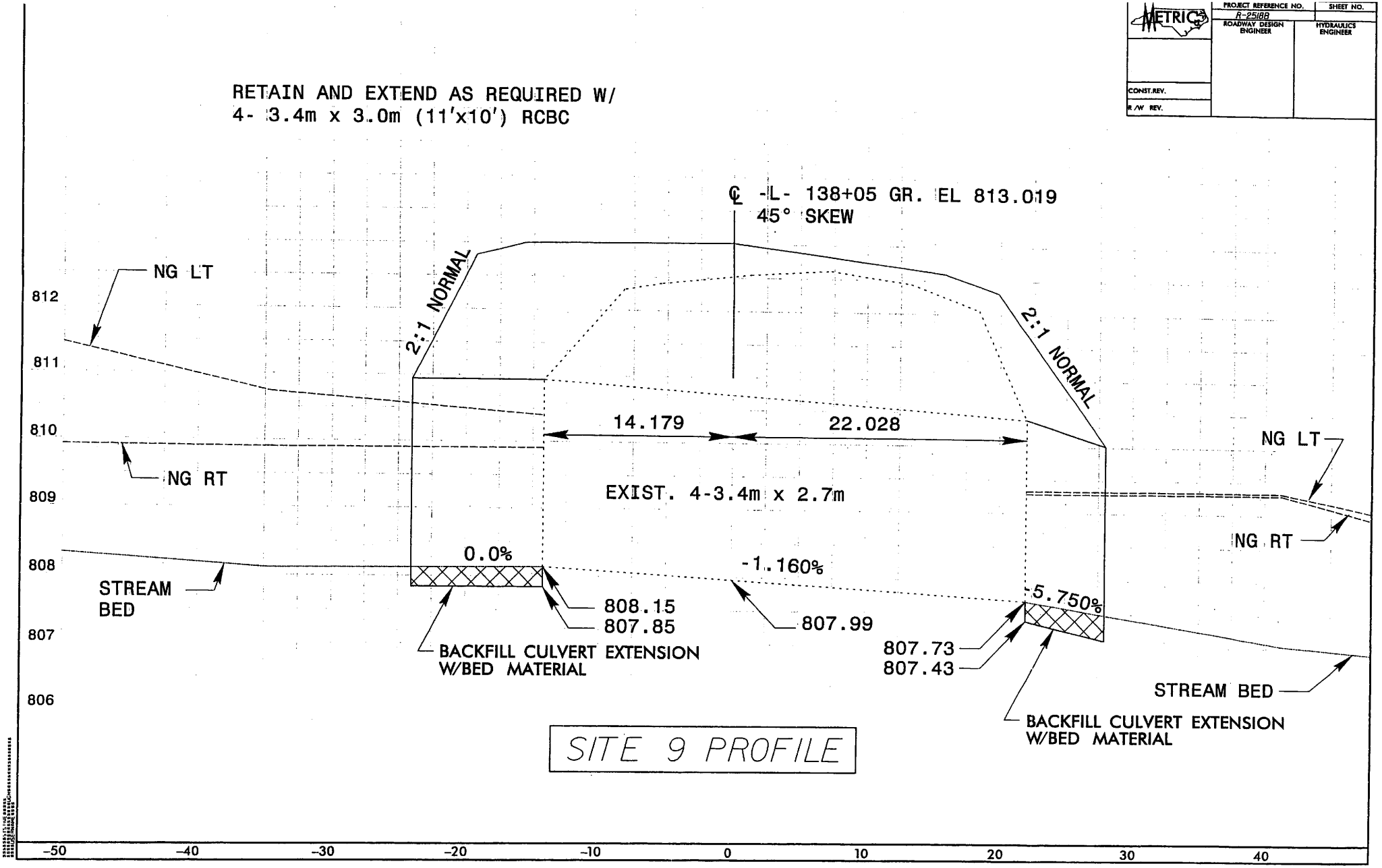


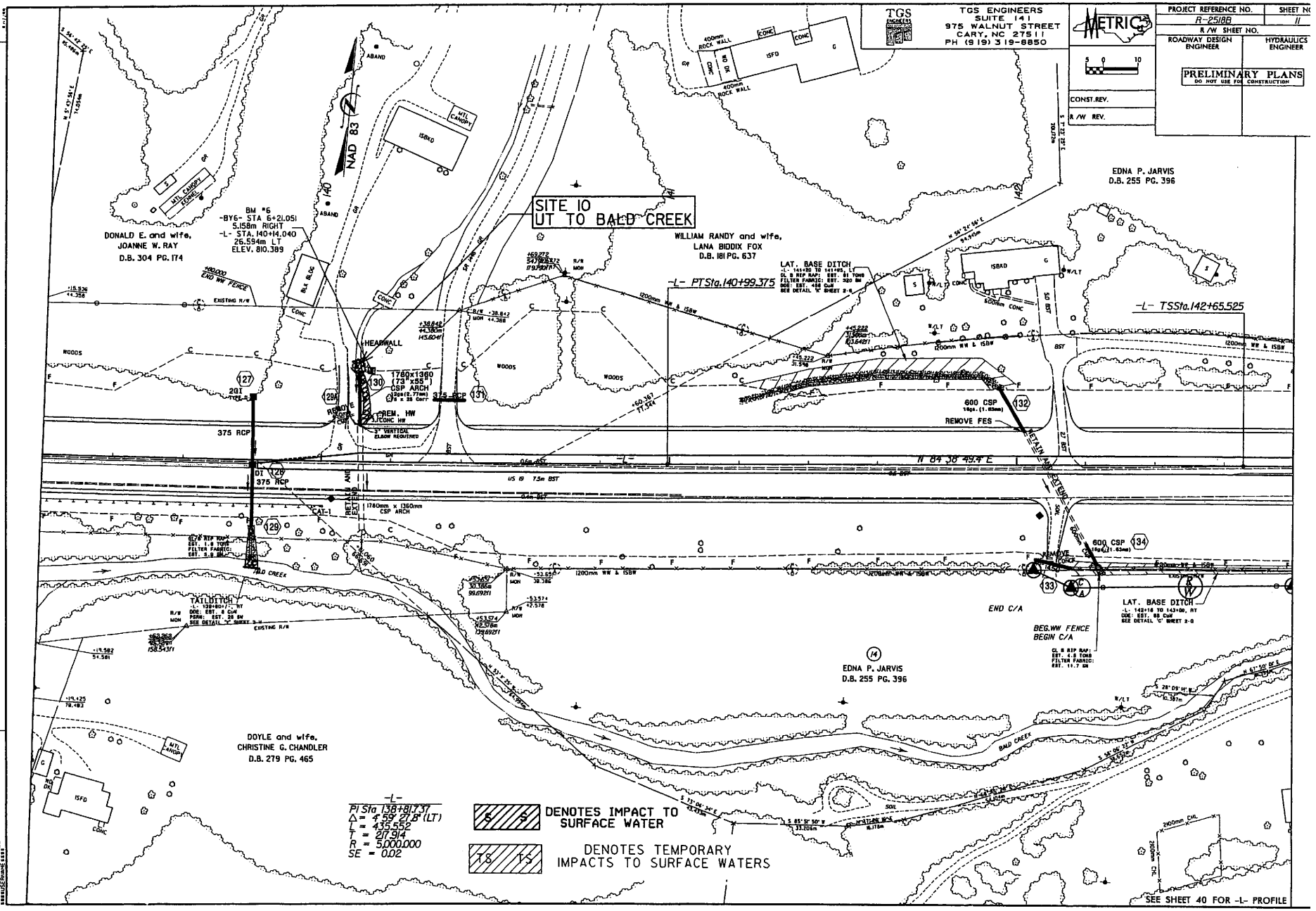
SITE 8 PROFILE

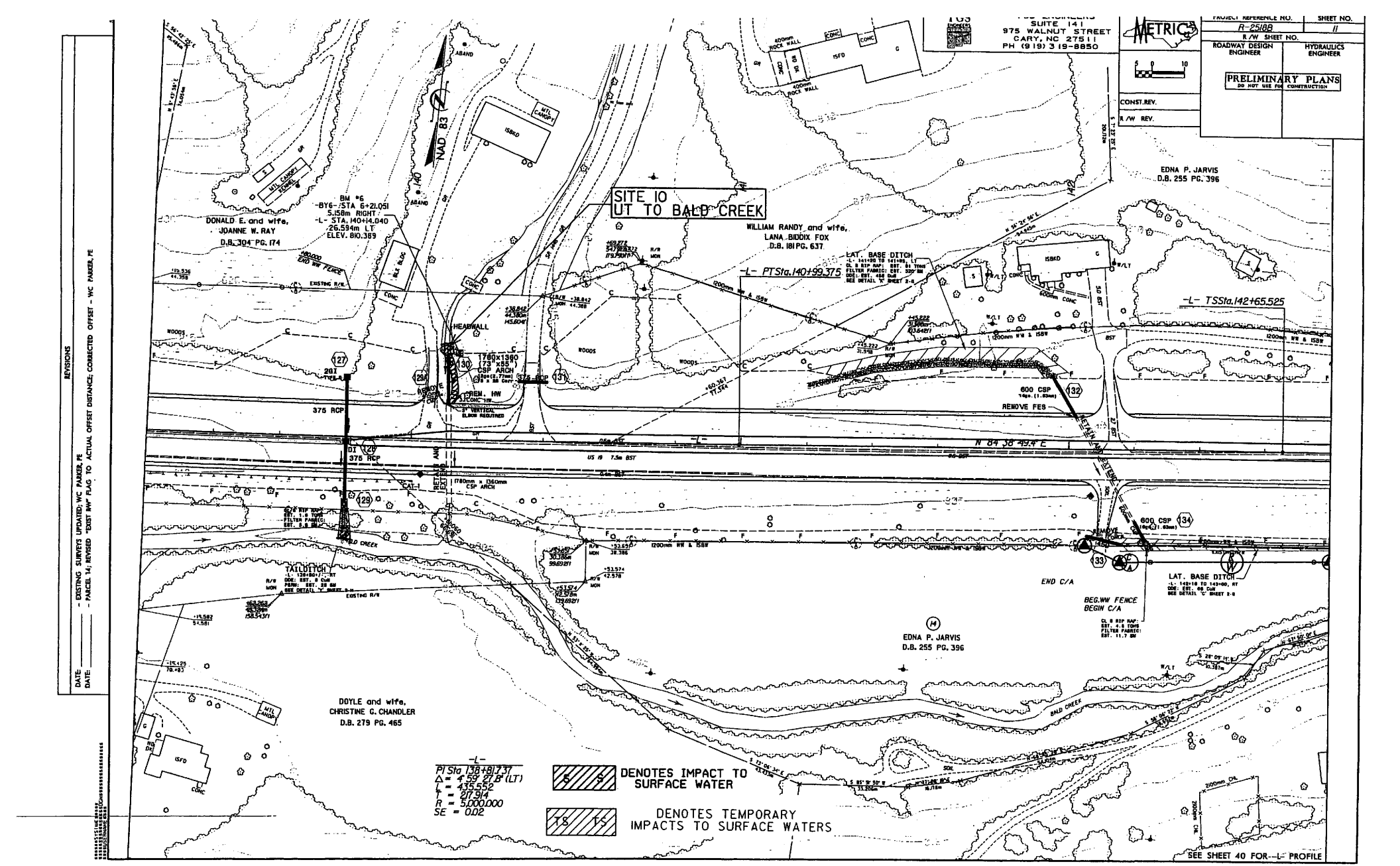

-L-
PI Sta 134+83.280
Δ = 23° 53' 03.6" (LT)
L = 166.744
T = 84.601
R = 400.000
SE = 0.08
PIs Sta 136+00.712
Θs = 0° 33' 47.8"
Θs = 7° 02' 52.5"
Ls = 98.400
LT = 63.235
ST = 35.289
PI Sta 138+81.737
Δ = 4° 59' 27.8" (LT)
L = 475.552
T = 277.914
R = 5,000.000
SE = 0.08
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
-Y5-
THELMA ANGEL
D.B. 128 PG. 203
Δ = 73° 45' 23.6" (RT)
L = 34.757
T = 20.256
R = 27.000
SE = 0.02
-Y5- POT Sta. 10+00.000
-Y5- PCS Sta. 10+28.756
ROCK INLET SILL
SEE DETAIL "SS", SHT. 2-1
EST. 60 SQ.YDS. REQ'D
EST. 28 TONS
FILTER FABRIC:
EST. 33 SM
NAD 83
SITE 9
MOUNT PLEASANT BAPTIST CHURCH
DB. 129 PG. 452
MT. PLEASANT BAPTIST CHURCH
HUGH BUCKNER and wife, BETTY BUCKNER
D.B. 258 PG. 421
THELMA ANGEL
D.B. 178 PG. 617
BALD CREEK
LAT. BASE DITCH
REMOVE EXISTING GUARDRAIL
RETAIN AND EXTEND
-Y5- PT Sta. 10+63.512
-Y6- PCS Sta. 10+32.762
-Y6- POT Sta. 11+22.664
-Y6- PCC Sta. 10+71.021
N 183° 26' 21.9" E
-L- POC Sta. 138+05.964 =
-Y5- POT Sta. 10+75.844 =
-Y6- POT Sta. 10+00.000
-L- SC Sta. 136+63.823
-L- CS Sta. 135+65.423
-Y6- PT Sta. 10+92.935
FALSE SUMP
SEE DETAIL 2 SHEET 2-8
REMOVE PAVED DITCH
CL B RIP RAP
EST. 48 TONS
+136+/- TIE TO EXIST. WW FENCE
SPRING BOX
WALTON and wife, THELMA ANGEL
D.B. 128 PG. 203
WANDA ROBERTSON
D.B. 134 PG. 138
SEE STREAM MITIGATION PLANS
-Y6-
PI Sta. 10+58.262
Δ = 36° 46' 05.2" (LT)
L = 38.259
T = 25.500
R = 22.653
SE = 0.05
PI Sta. 10+82.036
Δ = 14° 23' 51.6" (LT)
L = 21.913
T = 11.015
R = 87.205
SE = EXISTING
-Y5- (SR 1451)
618
784
208
292
408
492
8,408
12,492
-L-
(US 19)
8,200
12,200
45
8
53
100
100
100
ADT 2008
2028
-Y6- (SR 1133)
SEE SHEET 40 FOR -L- PROFILE
SEE SHEET 54 FOR -Y5- PROFILE
SEE SHEET 54 FOR -Y6- PROFILE
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
DATE: - EXISTING SURVEYS UPDATED.


DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
R/W SHEET NO.
10
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
DATE: - EXISTING SURVEYS UPDATED.
SITE 9
MOUNT PLEASANT BAPTIST CHURCH
D.B. 129 PG. 452
MT. PLEASANT BAPTIST CHURCH
HUGH, BUCKNER and wife, BETTY BUCKNER
D.B. 258 PG. 421
THELMA ANGEL
D.B. 178 PG. 617
WALTON and wife, THELMA ANGEL
D.B. 128 PG. 203
WANDA ROBERTSON
D.B. 134 PG. 138
BALD CREEK
SCORCH CREEK RD
SR 1135
SR 1133
SR 1451
SEE STREAM MITIGATION PLANS
SEE SHEET 40 FOR -L- PROFILE
SEE SHEET 54 FOR -Y5- PROFILE
SEE SHEET 54 FOR -Y6- PROFILE

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2518B	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

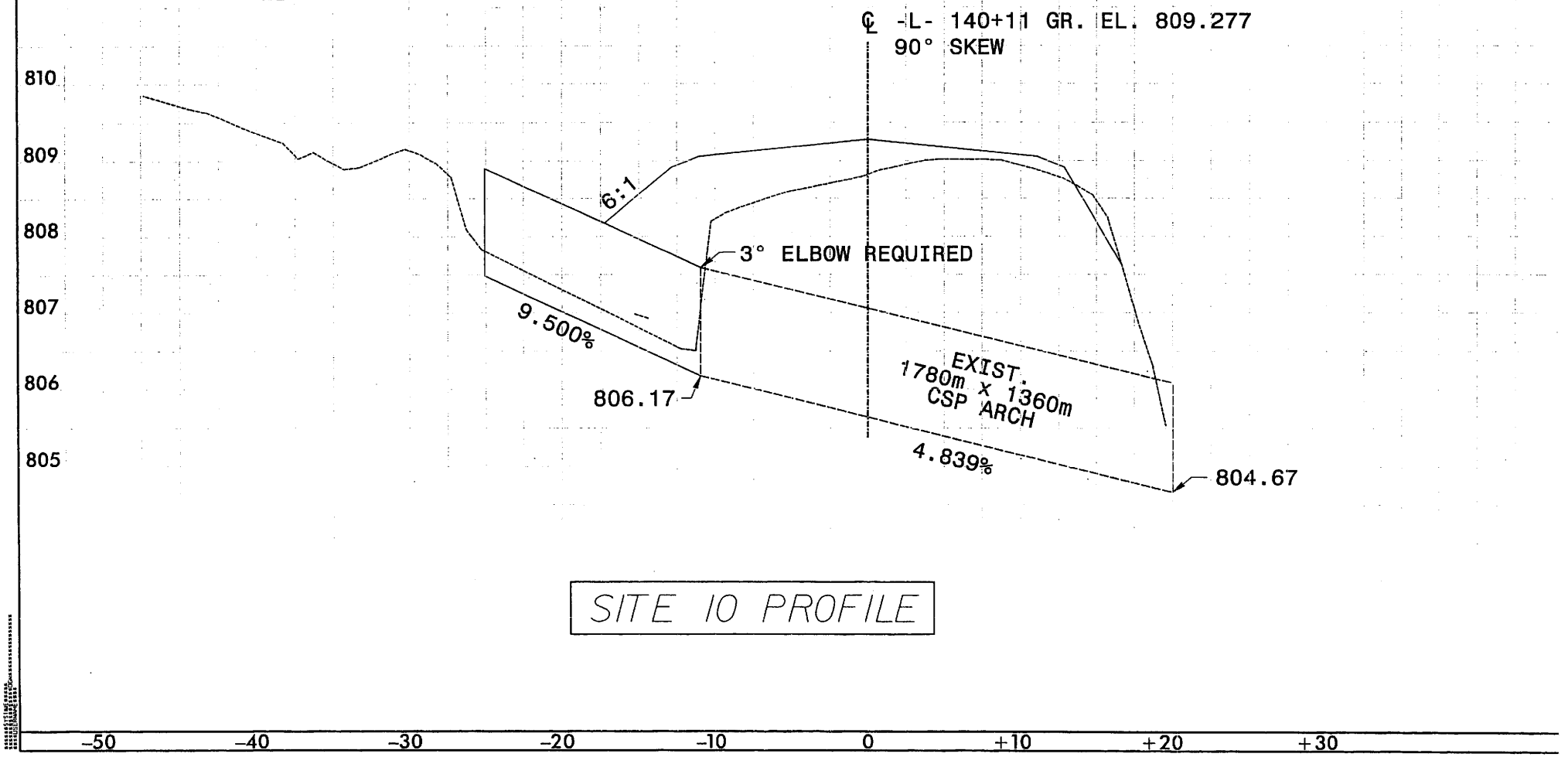



TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
- EXISTING SURVEYS UPDATED; WC PARKER, PE
DATE:
- PARCEL 14; REVISED "EXIST R/W" FLAG TO ACTUAL OFFSET DISTANCE; CORRECTED OFFSET - WC PARKER, PE
DATE:
SITE 10
UT TO BALD CREEK
NAD 83
DONALD E. and wife,
JOANNE W. RAY
D.B. 304 PG. 174
BM #6
-BY6- STA 6+21.051
5.158m RIGHT
-L- STA. 140+14.040
26.594m LT
ELEV. 810.389
WILLIAM RANDY and wife,
LANA BIDDIX FOX
D.B. 181 PG. 637
EDNA P. JARVIS
D.B. 255 PG. 396
-L- PT Sta. 140+99.375
-L- TS Sta. 142+65.525
LAT. BASE DITCH
HEADWALL
1780x1360
(73"x55")
CSP ARCH
375 RCP
600 CSP
REMOVE FES
REM. HW
375 RCP
N 84 38 49.4 E
US 19 7.5m BST
1780mm x 1360mm
CSP ARCH
CAT-1
TAILDITCH
BALD CREEK
END C/A
BEG.WW FENCE
BEGIN C/A
EDNA P. JARVIS
D.B. 255 PG. 396
DOYLE and wife,
CHRISTINE G. CHANDLER
D.B. 279 PG. 465
-L-
PI Sta 138+81.37
Δ = 4°59'21.8" (LT)
L = 435.552
T = 217.914
R = 5,000.000
SE = 0.02
DENOTES IMPACT TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 40 FOR -L- PROFILE

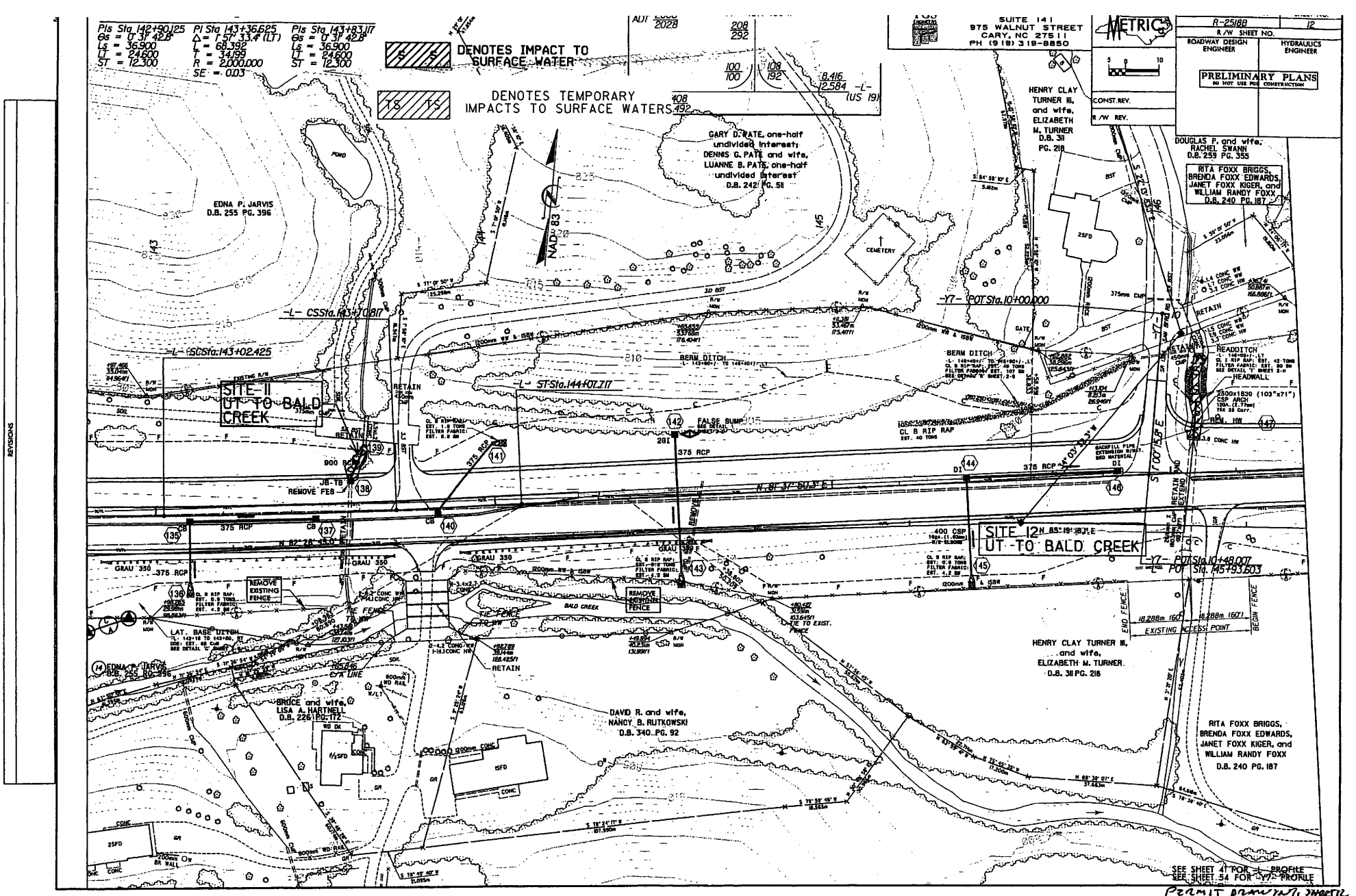

SITE 10
UT TO BALD CREEK
NAD 83
METRIC
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
REVISIONS
- EXISTING SURVEYS UPDATED; WC PARKER, PE
- PARCEL 14; REVISED "EXIST R/W" FLAG TO ACTUAL OFFSET DISTANCE; CORRECTED OFFSET - WC PARKER, PE
DATE:
DATE:
DONALD E. and wife, JOANNE W. RAY
D.B. 304 PG. 174
WILLIAM RANDY and wife, LANA BIDDIX FOX
D.B. 181 PG. 637
EDNA P. JARVIS
D.B. 255 PG. 396
DOYLE and wife, CHRISTINE G. CHANDLER
D.B. 279 PG. 465
BM #6
-BY6- STA 6+21.05l
5.158m RIGHT
-L- STA. 140+14.040
26.594m LT
ELEV. 810.389
-L- PTSta.140+99.375
-L- TSSta.142+65.525
PI Sta 138+81.737
Δ = 4°59'27.8" (LT)
D = 435.552
L = 217.914
R = 5,000.000
SE = 0.02
DENOTES IMPACT TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
TAILDITCH
LAT. BASE DITCH
END C/A
BEG.WW FENCE
BEGIN C/A
REMOVE FES
600 CSP
375 RCP
1760x1360 (73"x55") CSP ARCH
HEADWALL
BALD CREEK
SEE SHEET 40 FOR -L- PROFILE

METRIC	R-2518 ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

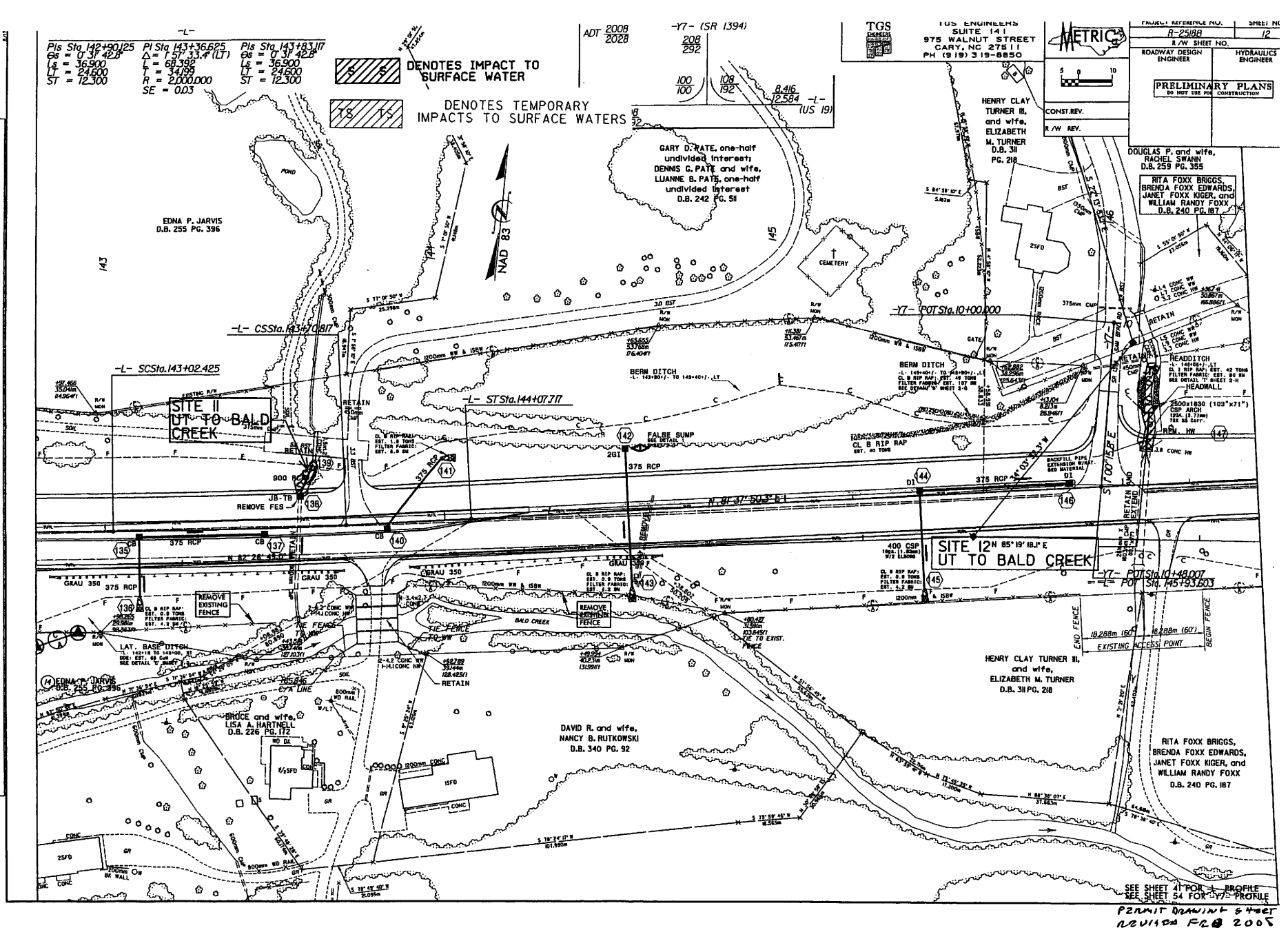
RETAIN AND EXTEND AS REQUIRED W/ 3° VERTICAL ELBOW
1780mm x 1360 mm (73"x55") CSP ARCH
#12 GA. 76.2mm x 25.4mm (3"x1") CORR.
WITH HEADWALL ON INLET END



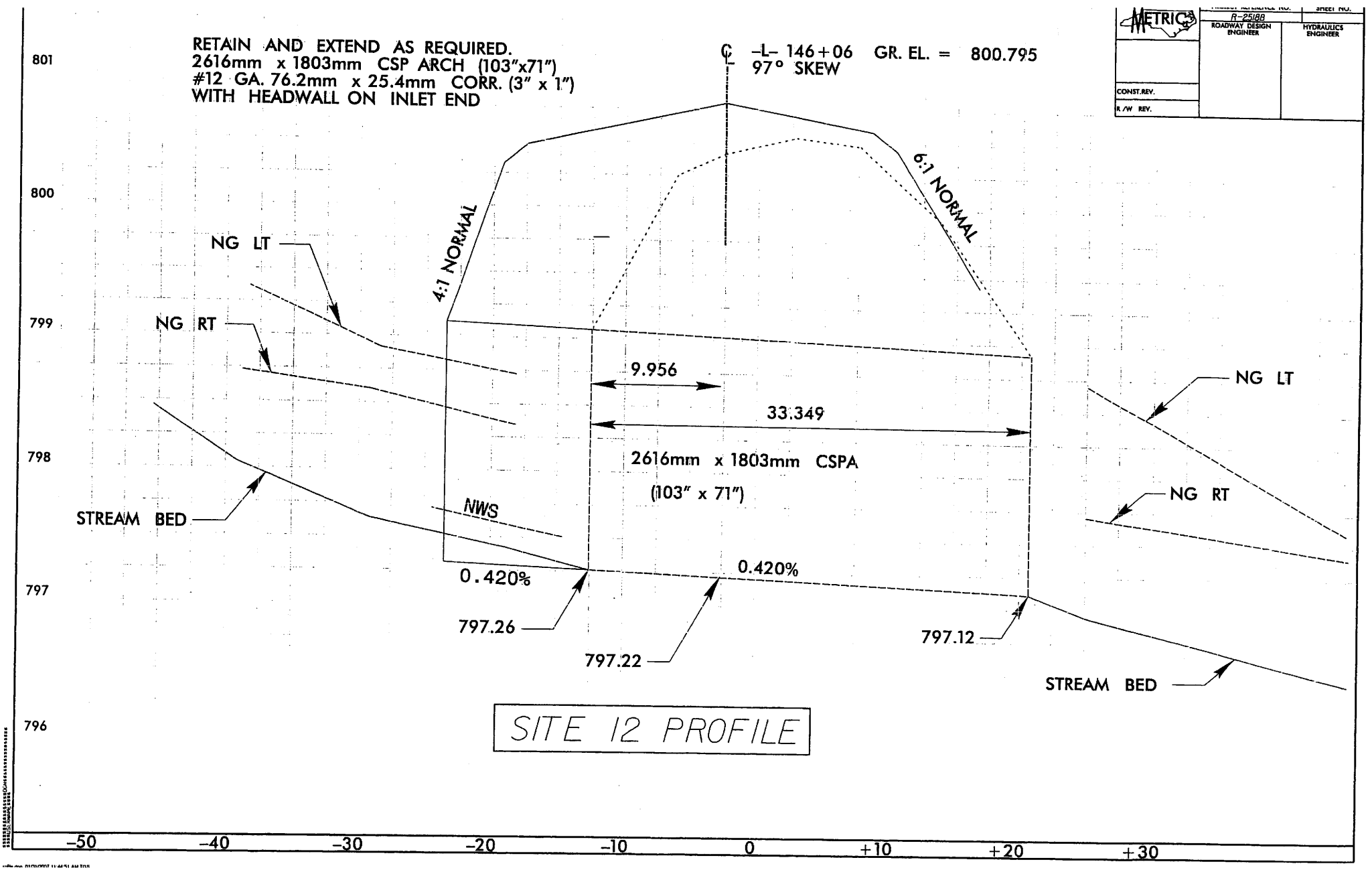
SITE 10 PROFILE



Permit drawing sheet revised Feb 2007



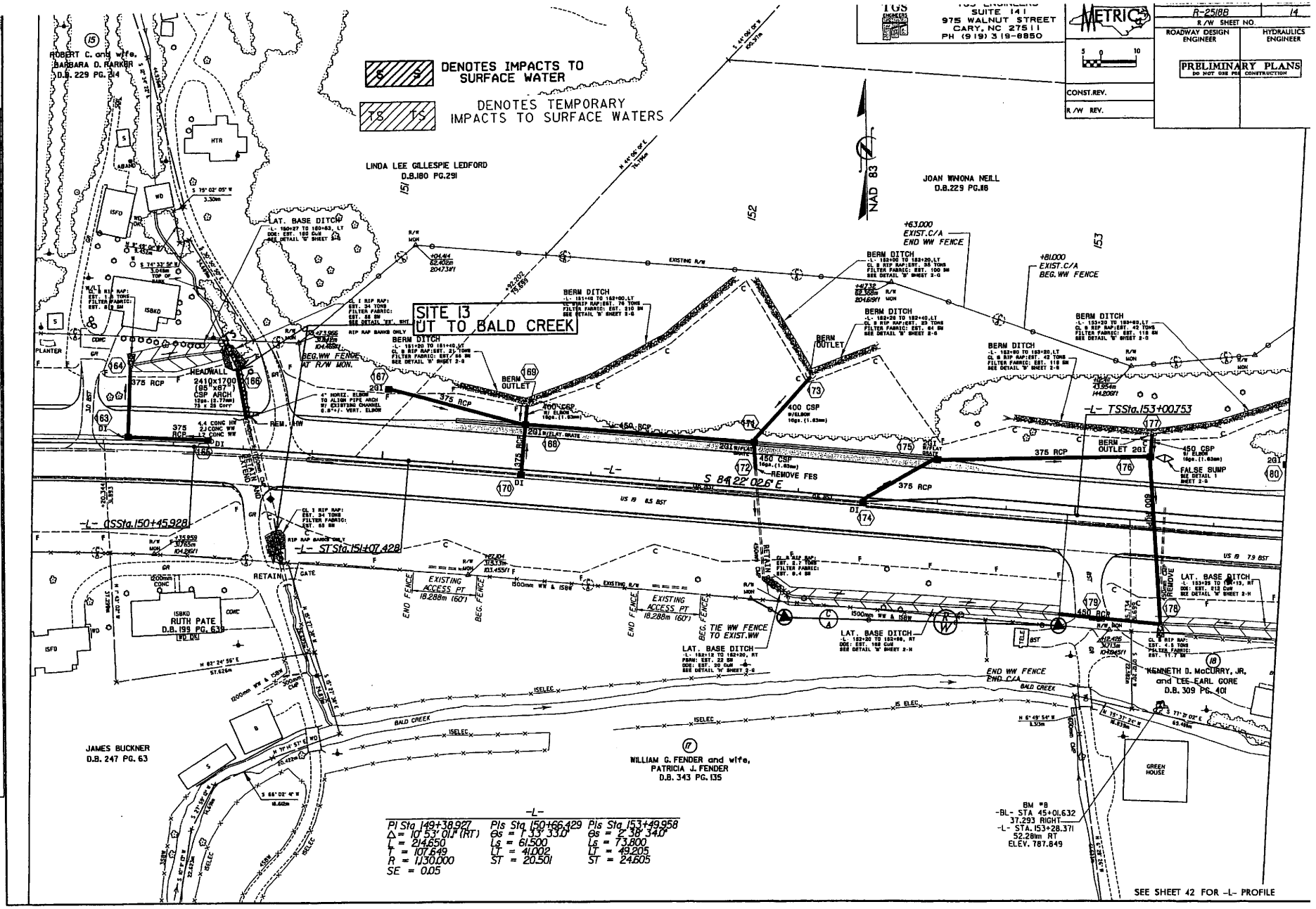
PERMIT DRAWING SHEET
REVISED FEB 2005

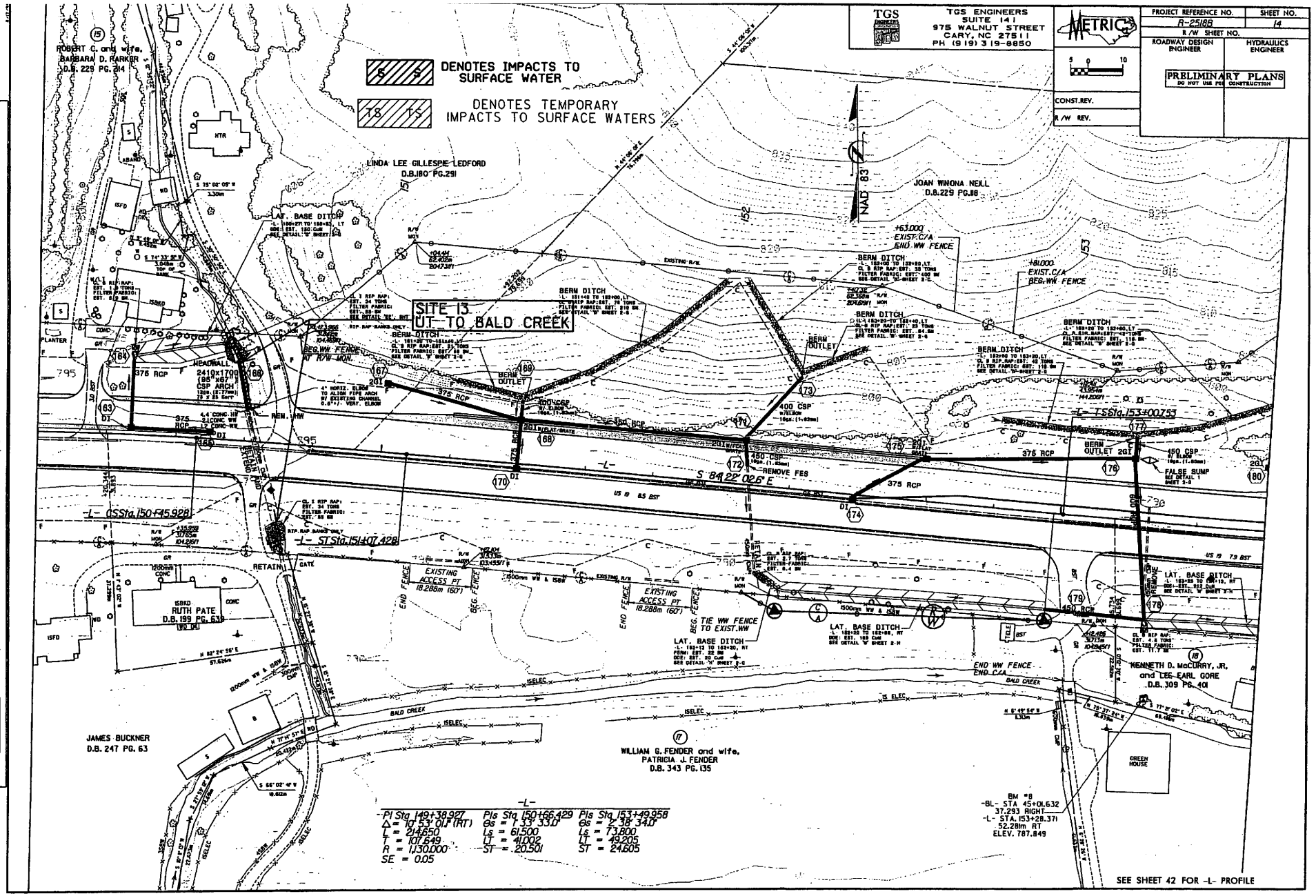


SITE 12 PROFILE

METRIC

	R-2588	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

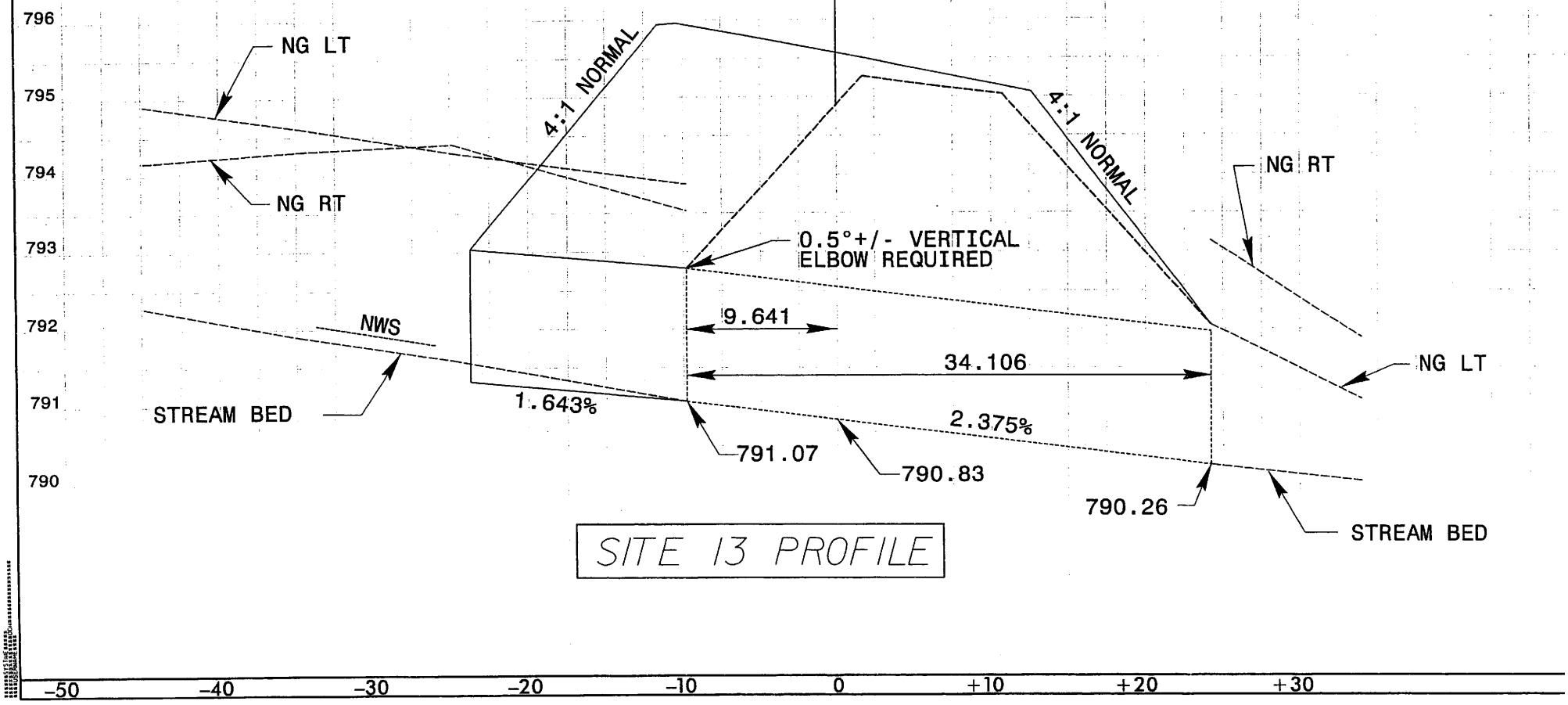

DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SITE 13
UT TO BALD CREEK
ROBERT C. and wife, BARBARA D. PARKER D.B. 229 PG. 314
LINDA LEE GILLESPIE LEDFORD D.B.180 PG.291
JOAN WINONA NEILL D.B.229 PG.18
JAMES BUCKNER D.B. 247 PG. 63
RUTH PATE D.B. 199 PG. 639
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 135
KENNETH D. McCURRY, JR. and LEE EARL GORE D.B. 309 PG. 401
-L- SSSta.150+45.928
-L- STSta.151+07.428
-L- TSSta.153+00.753
S 84° 22' 02.6" E
+63.000 EXIST.C/A END WW FENCE
+81.000 EXIST.C/A BEG. WW FENCE
BEG. WW FENCE AT R/W MON.
HEADWALL 2410x1700 (95"x67") CSP ARCH
375 RCP
450 CSP
400 CSP
FALSE SUMP
REMOVE FES
BERM OUTLET
BERM OUTLET 2GI
LAT. BASE DITCH
EXISTING ACCESS PT 18.288m (60')
END FENCE
BEG. FENCE
TIE WW FENCE TO EXIST.WW
END WW FENCE
END C/A
BALD CREEK
1500mm WW & 15BW
1200mm WW & 15BW
US 19 BUS
US 19 BYP
PI Sta 149+38.927
Δ = 10° 53' 01.1" (RT)
L = 214.650
T = 107.649
R = 1130.000
SE = 0.05
Pls Sta 150+66.429
Gs = 1° 33' 33.0"
Ls = 61.500
LT = 41.002
ST = 20.501
Pls Sta 153+49.958
Gs = 2° 38' 34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
BM #8
-BL- STA 45+01.632
37.293 RIGHT
-L- STA. 153+28.371
52.28m RT
ELEV. 787.849
NAD 83
METRIC
R-2588
R/W SHEET NO. 14
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
REVISIONS
DATE: MARCH , 2006 - PARCEL 16; ELIMINATED PARCEL 16 - WC PARKER, PE
DATE: - PARCELS 15 & 17; REVISED "EXIST R/W" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
DATE: - PARCEL 17; ADDED EXISTING ACCESS BREAKS IN CA - WC PARKER, PE
SEE SHEET 42 FOR -L- PROFILE


DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SITE 13
UT TO BALD CREEK
ROBERT C. and wife, BARBARA D. PARKER D.B. 229 PG. 314
LINDA LEE GILLESPIE LEDFORD D.B.180 PG.291
JOAN WINONA NEILL D.B.229 PG.18
RUTH PATE D.B. 199 PG. 639
JAMES BUCKNER D.B. 247 PG. 63
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 135
KENNETH D. McCURRY, JR. and LEE EARL GORE D.B. 309 PG. 401
-L- PI Sta 149+38.927 Δ = 10° 53' 01" (RT) L = 214.650 T = 107.649 R = 1130.000 SE = 0.05
Pls Sta 150+66.429 Gs = 7° 33' 30" Ls = 61.500 LT = 41.002 ST = 20.501
Pls Sta 153+49.958 Gs = 2° 38' 34" Ls = 73.800 LT = 49.205 ST = 24.605
BM #8 -BL- STA 45+01.632 37.293 RIGHT -L- STA. 153+28.371 52.28m RT ELEV. 787.849
SEE SHEET 42 FOR -L- PROFILE
TGS ENGINEERS SUITE 141 975 WALNUT STREET CARY, NC 27511 PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
DATE: MARCH , 2006 - PARCEL 16; ELIMINATED PARCEL 16 - WC PARKER, PE
DATE: _____ - PARCELS 15 & 17; REVISED "EXIST R/W" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
DATE: _____ - PARCEL 17; ADDED EXISTING ACCESS BREAKS IN GA - WC PARKER, PE

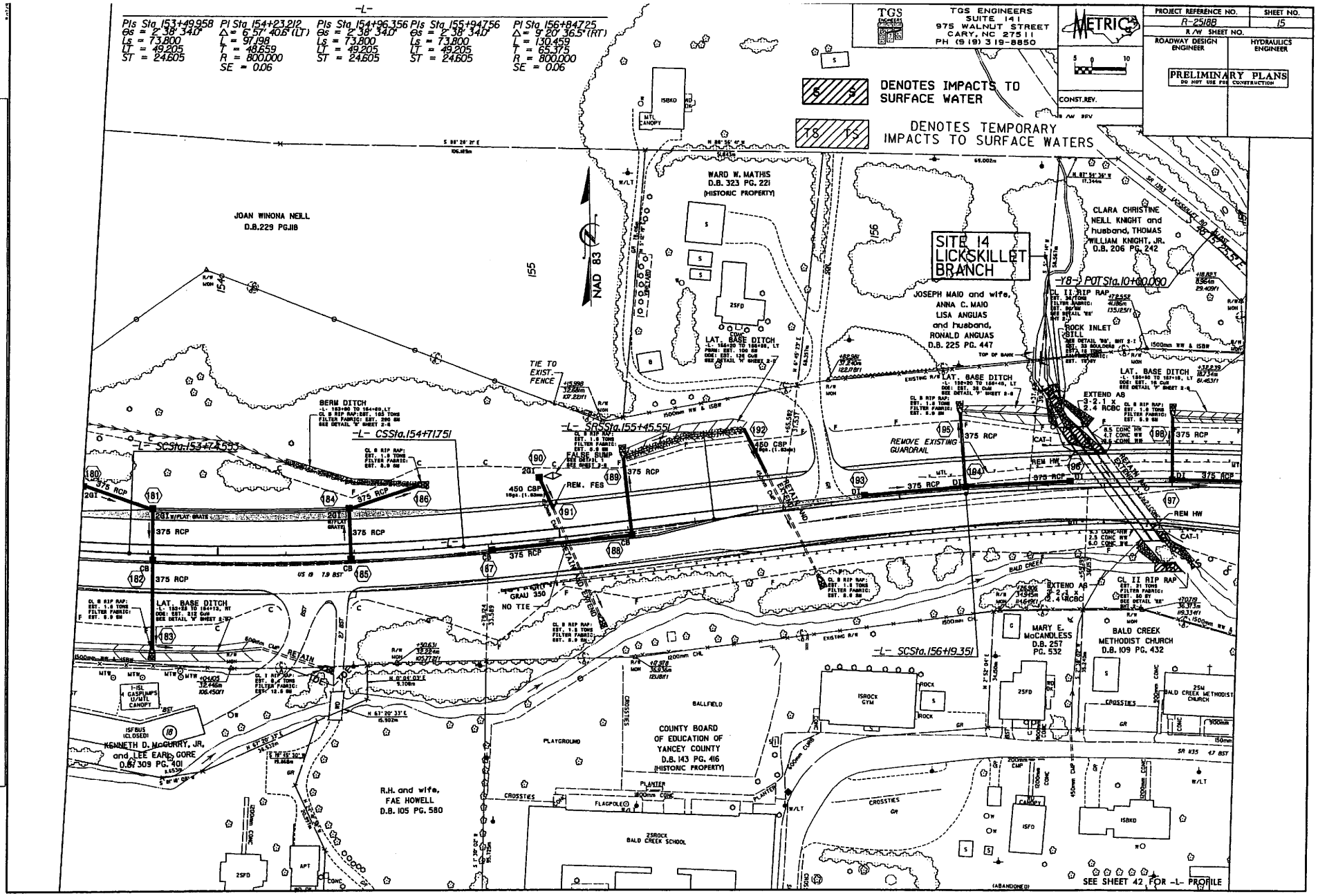
METRIC	R-2518B	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

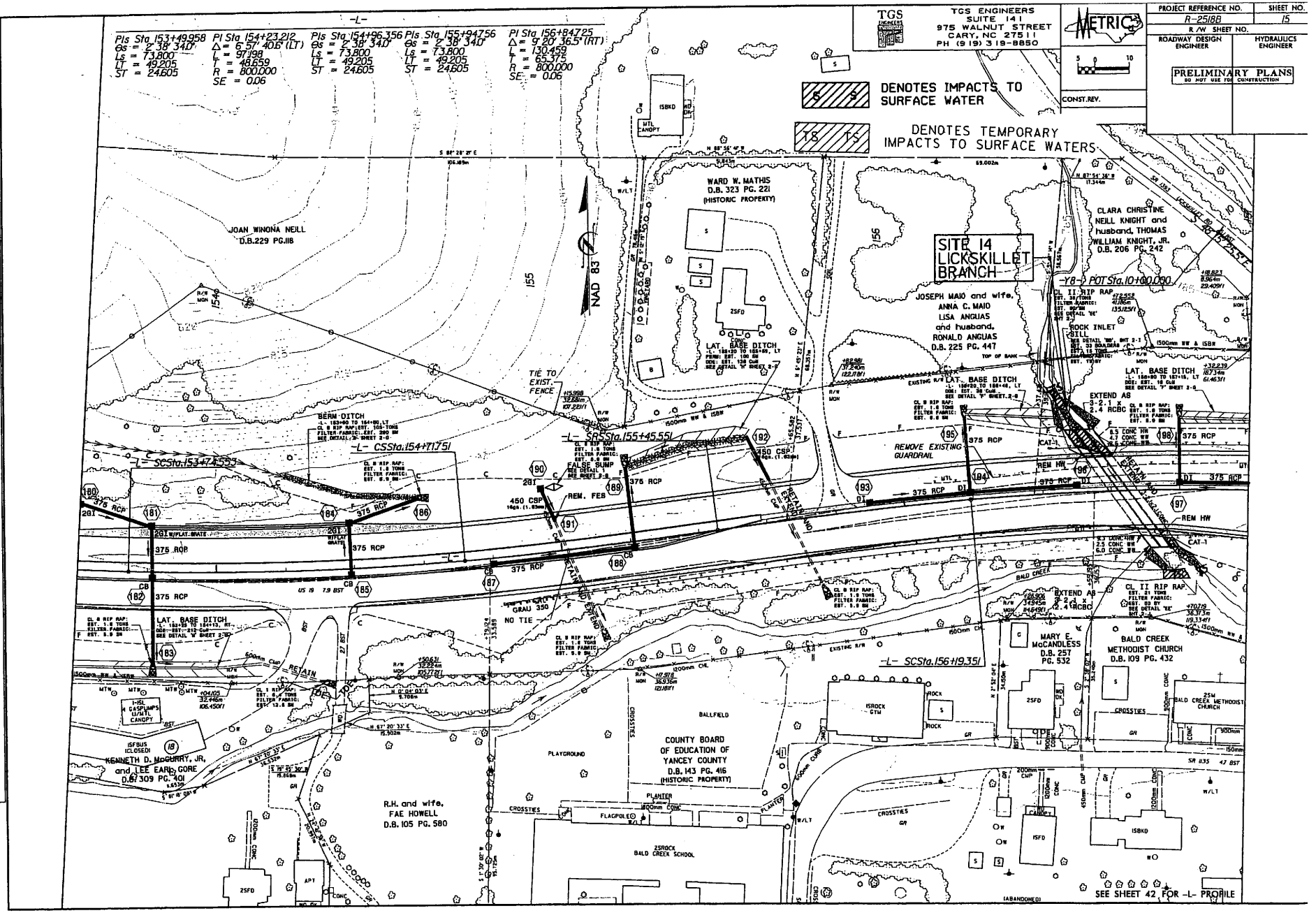
RETAIN AND EXTEND AS REQUIRED
2400mm x 1700mm CSP ARCH (95"x67")
#12 GA. 76.2mm x 25.4mm CORR. (3"x1")
WITH HEADWALL ON INLET END

℄ -L- 150+63 GR. EL. = 795.579
72° SKEW

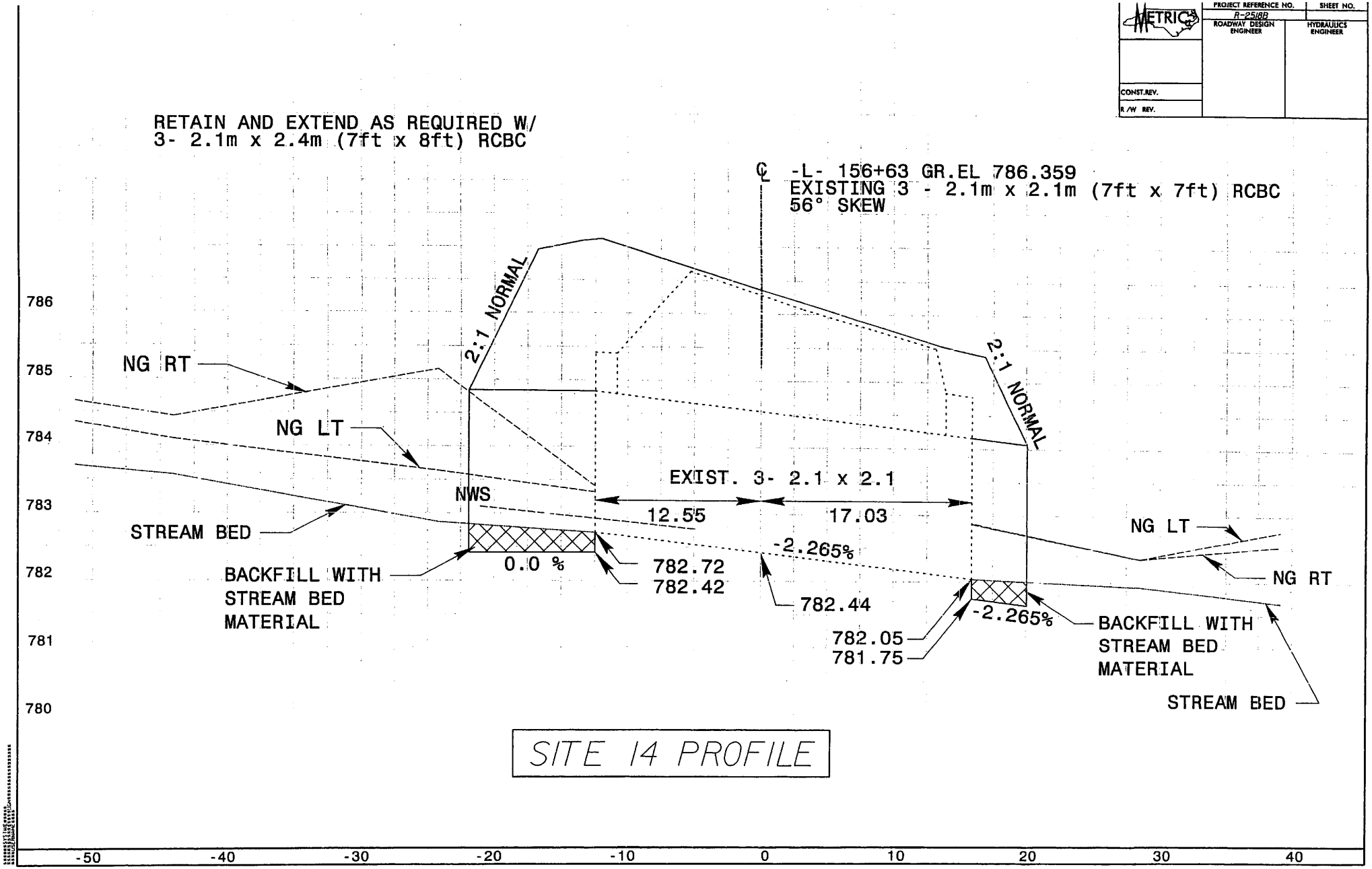


SITE 13 PROFILE

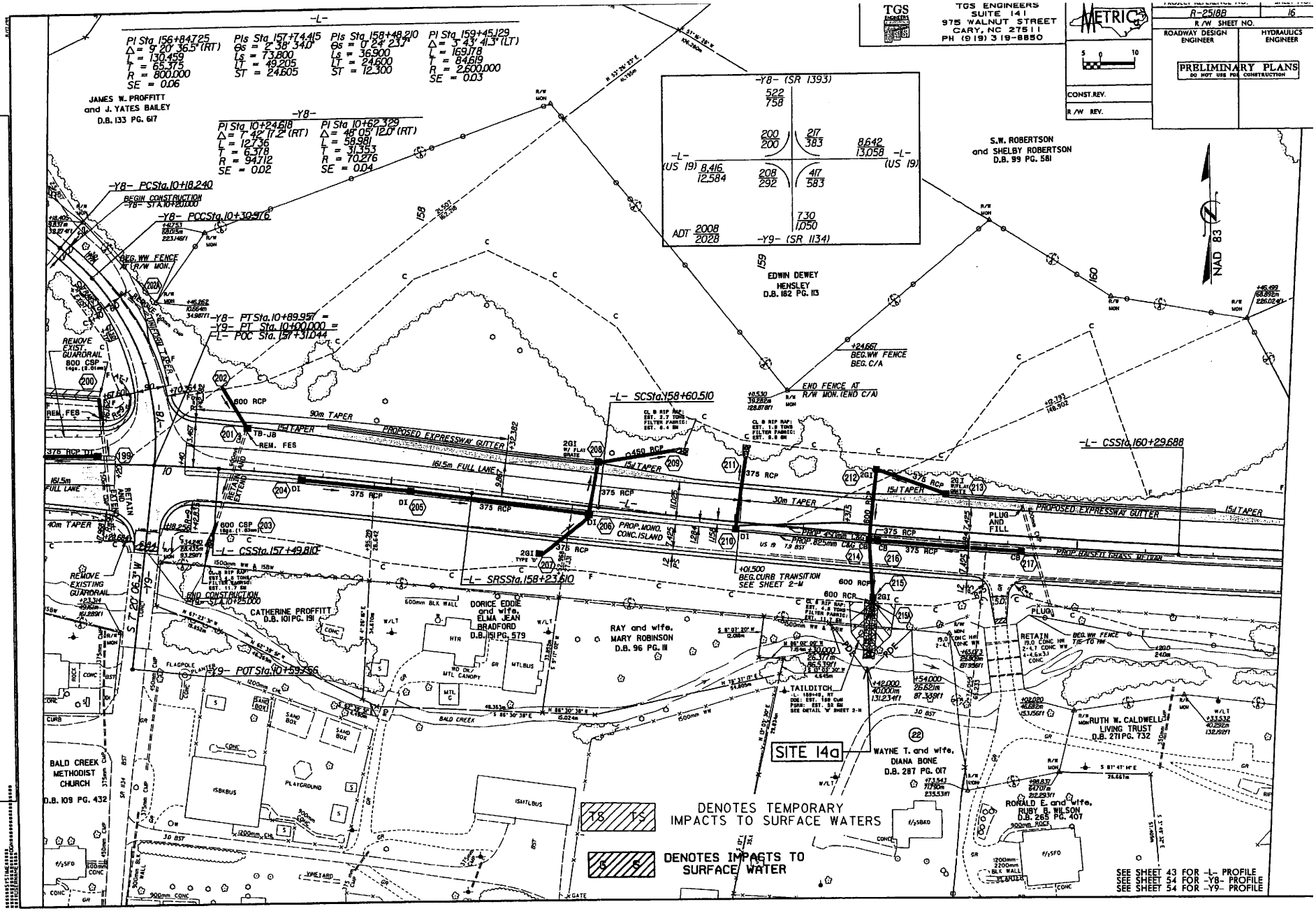

PI Sta 153+49.958
Gs = 2°38' 34.0"
Lc = 73.800
LT = 49.205
ST = 24.605
PI Sta 154+23.212
Δ = 6°57' 40.8" (LT)
L = 97.196
T = 48.659
R = 800.000
SE = 0.06
PI Sta 154+96.356
Gs = 2°38' 34.0"
Lc = 73.800
LT = 49.205
ST = 24.605
PI Sta 155+94.756
Gs = 2°38' 34.0"
Lc = 73.800
LT = 49.205
ST = 24.605
PI Sta 156+84.725
Δ = 9°20' 36.5" (RT)
L = 130.459
T = 65.375
R = 800.000
SE = 0.06
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
SITE 14
LICKSKILLET BRANCH
-Y8- POT Sta 10+00.000
JOAN WINONA NEILL
D.B.229 PG.118
WARD W. MATHIS
D.B. 323 PG. 221
(HISTORIC PROPERTY)
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR.
D.B. 206 PG. 242
JOSEPH MAIO and wife, ANNA C. MAIO
LISA ANGUAS and husband, RONALD ANGUAS
D.B. 225 PG. 447
KENNETH D. McGURRY, JR. and LEE EARL GORE
D.B. 309 PG. 401
R.H. and wife, FAE HOWELL
D.B. 105 PG. 580
COUNTY BOARD OF EDUCATION OF YANCEY COUNTY
D.B. 143 PG. 416
(HISTORIC PROPERTY)
MARY E. McCANDLESS
D.B. 257 PG. 532
BALD CREEK METHODIST CHURCH
D.B. 109 PG. 432
-L- SCSta.153+47.595
-L- CSSta.154+71.751
-L- SRSSta.155+45.551
TIE TO EXIST. FENCE
BERM DITCH
LAT. BASE DITCH
FAE BUMP
REM. FES
REMOVE EXISTING GUARDRAIL
EXTEND AS 3-2.1 x 2.4 RCBC
CL II RIP RAP
ROCK INLET SILL
NO TIE
RETAIN AND EXTEND
-L- SCSta.156+19.351
BALLFIELD
PLAYGROUND
CROSSTIES
FLAGPOLE
PLANTER
ISROCK GYM
2SROCK BALD CREEK SCHOOL
I-ISL 4 GASPUMPS U/ATL CANOPY
ISFBUS (CLOSED)
2SFD
ISRBD
APT
CONC
CANOPY
(ABANDONED)
SEE SHEET 42 FOR -L- PROFILE
REVISIONS
DATE: MARCH , 2006 - PARCEL 16; ELIMINATED PARCEL 14 - WC PARKER
DATE: _____ - PARCEL 18; REVISED "EXIST R/W" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
DATE: _____

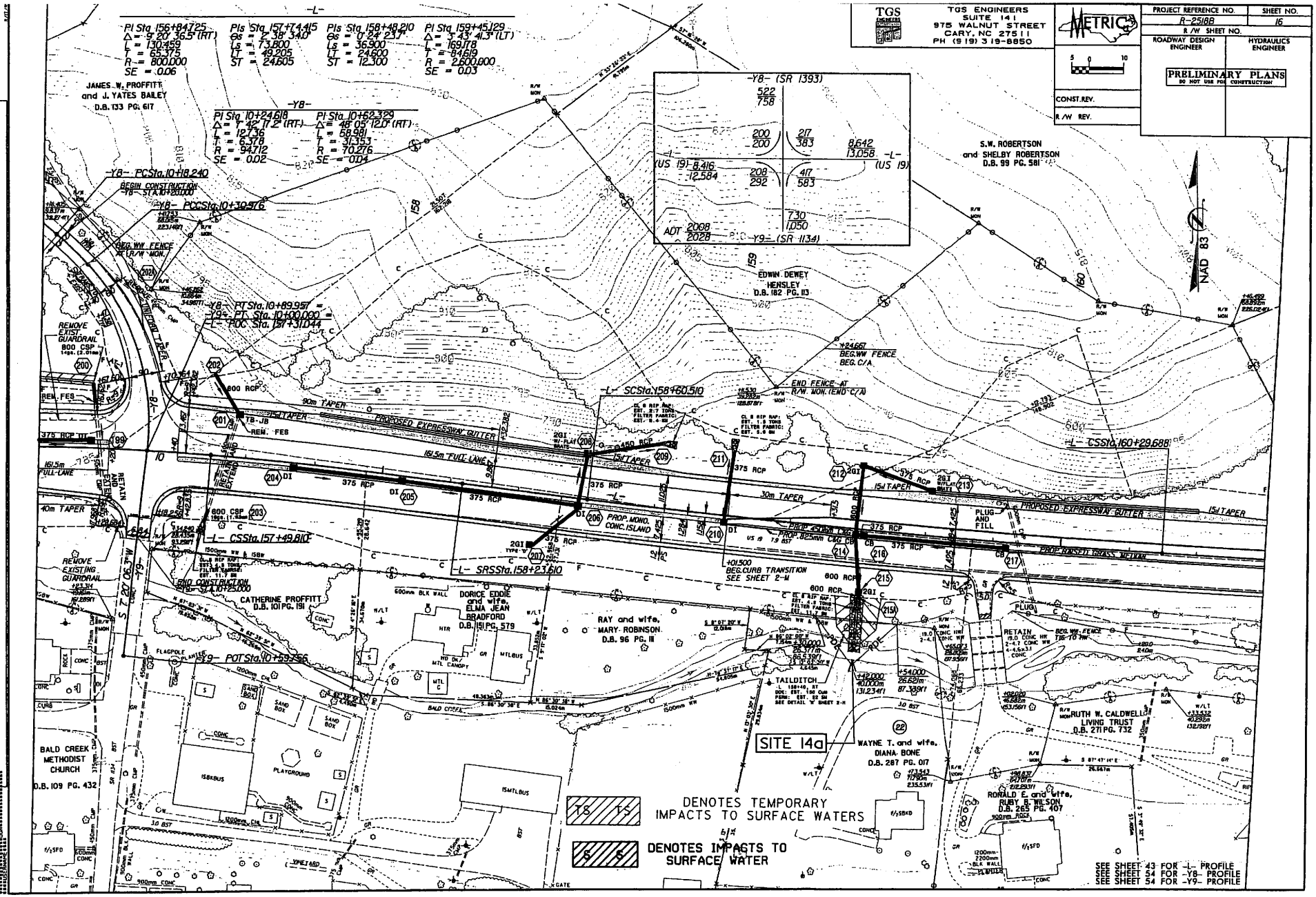

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
PROJECT REFERENCE NO. R-2518B
SHEET NO. 15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SITE 14
LICKSKILLET BRANCH
-Y8- POT Sta.10+00.000
-L- SCSta.153+47.555
-L- CSSta.154+71.751
-L- SRSSta.155+45.551
-L- SCSta.156+19.351
Pls Sta 153+49.958
Es = 2.38' 34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
Pl Sta 154+23.212
Δ = 6.57' 40.6" (LT)
L = 97.198
T = 48.659
R = 800.000
SE = 0.06
Pls Sta 154+96.356
Es = 2.38' 34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
Pls Sta 155+94.756
Es = 2.38' 34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
Pl Sta 156+84.725
Δ = 9.20' 36.5" (RT)
L = 130.459
T = 65.375
R = 800.000
SE = 0.06
NAD 83
JOAN WINONA NEILL
D.B.229 PG.118
WARD W. MATHIS
D.B. 323 PG. 221
(HISTORIC PROPERTY)
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR.
D.B. 206 PG. 242
JOSEPH MAIO and wife, ANNA C. MAIO
LISA ANGUAS and husband, RONALD ANGUAS
D.B. 225 PG. 447
KENNETH D. McGURRY, JR. and LEE EARL CORE
D.B. 309 PG. 401
R.H. and wife, FAE HOWELL
D.B. 105 PG. 580
COUNTY BOARD OF EDUCATION OF YANCEY COUNTY
D.B. 143 PG. 416
(HISTORIC PROPERTY)
MARY E. McCANDLESS
D.B. 257 PG. 532
BALD CREEK METHODIST CHURCH
D.B. 109 PG. 432
BERM DITCH
FALSE SUMP
REMOVE EXISTING GUARDRAIL
REMOVE EXISTING GUARDRAIL AND EXTEND
REM. FES
REM HW
EXTEND AS
LAT. BASE DITCH
CL II RIP RAP
ROCK INLET SILL
TIE TO EXIST. FENCE
GRAU 350
NO TIE
BALD CREEK
BALLFIELD
PLAYGROUND
CROSSTIES
FLAGPOLE
BALD CREEK SCHOOL
SEE SHEET 42 FOR -L- PROFILE
REVISIONS
DATE: MARCH , 2006 - PARCEL 15; ELIMINATED PARCEL 16 - WC PARKER
DATE: ____ - PARCEL 16; REVISED "EXIST RWP" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE

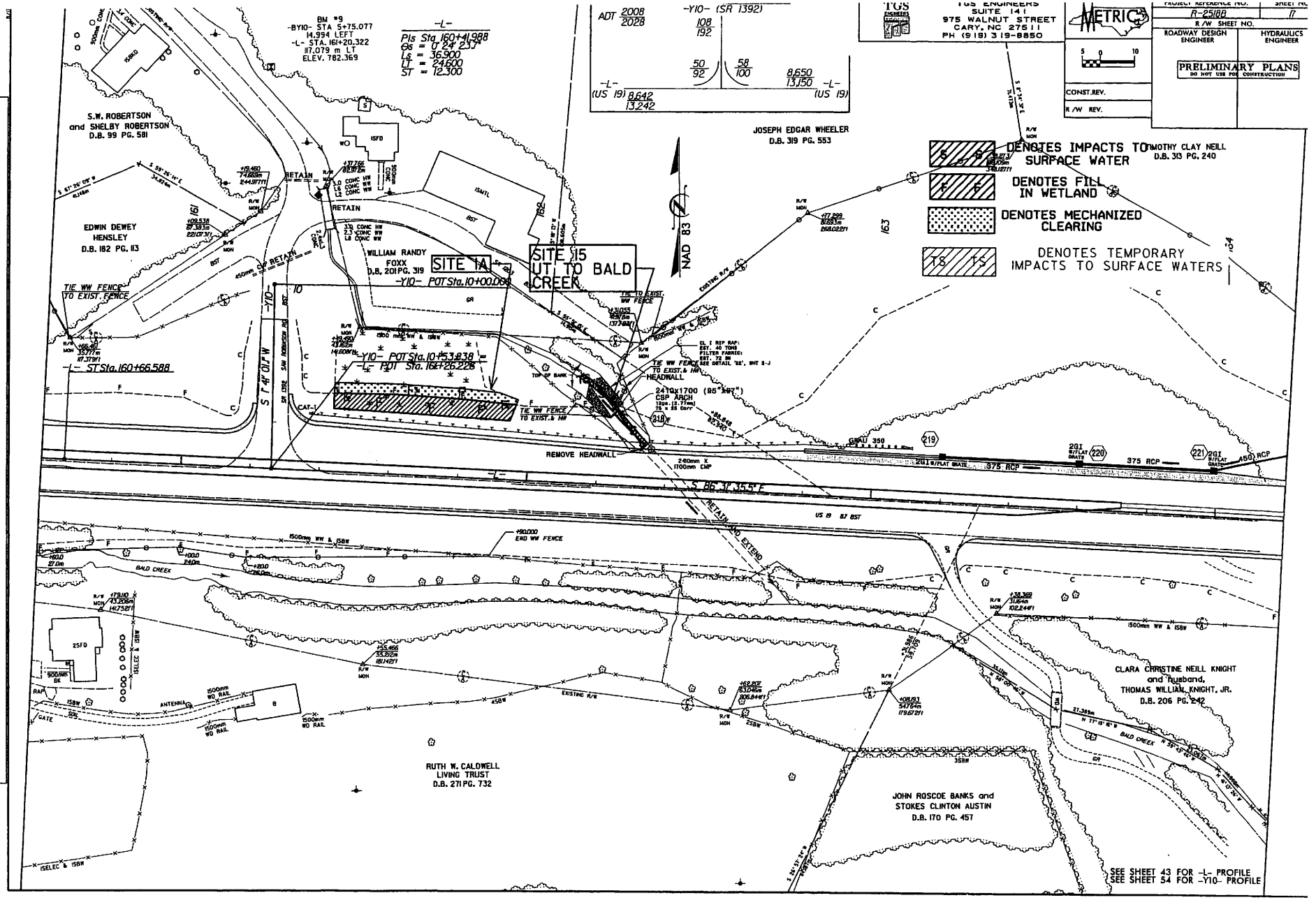
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2518B	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

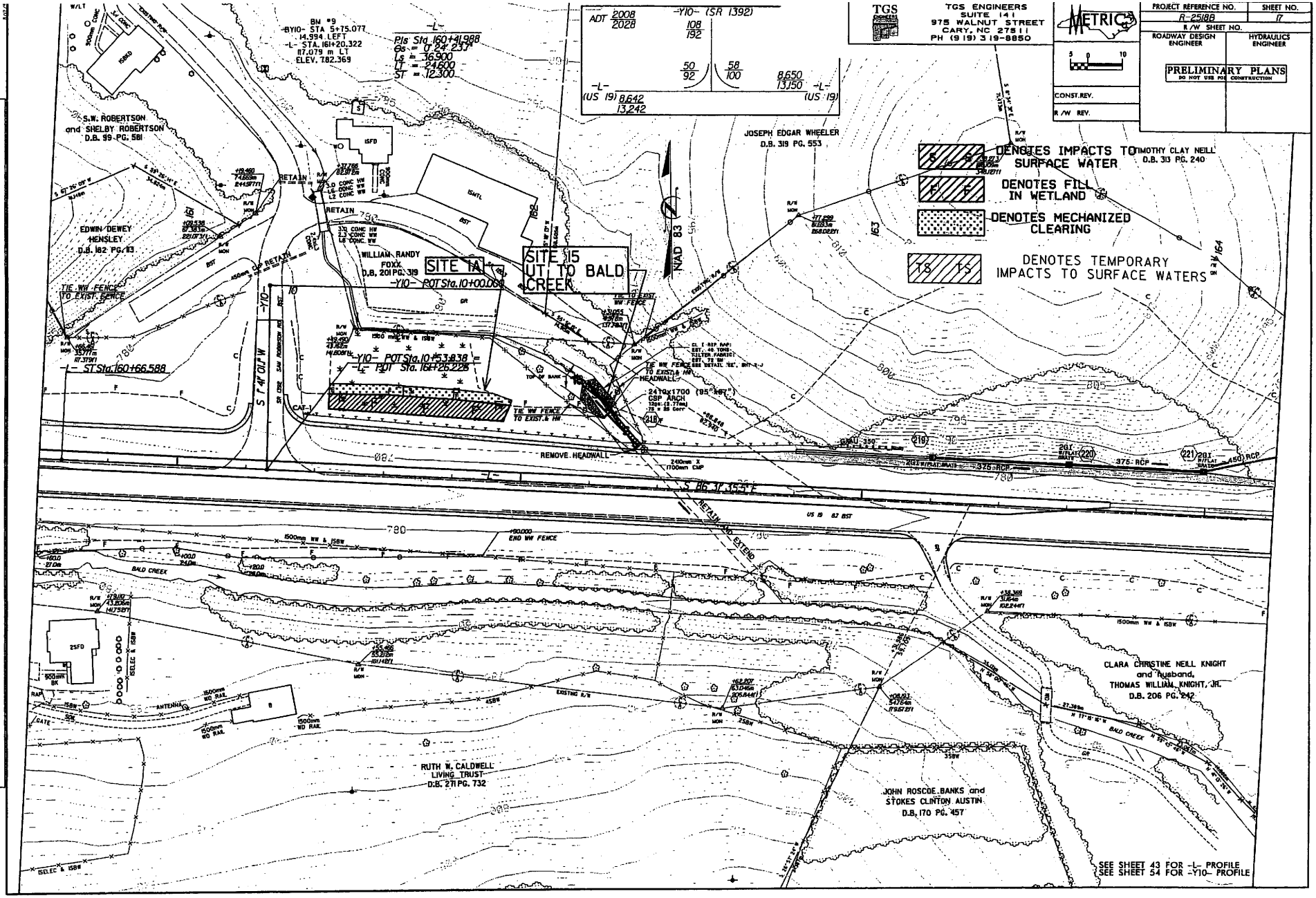


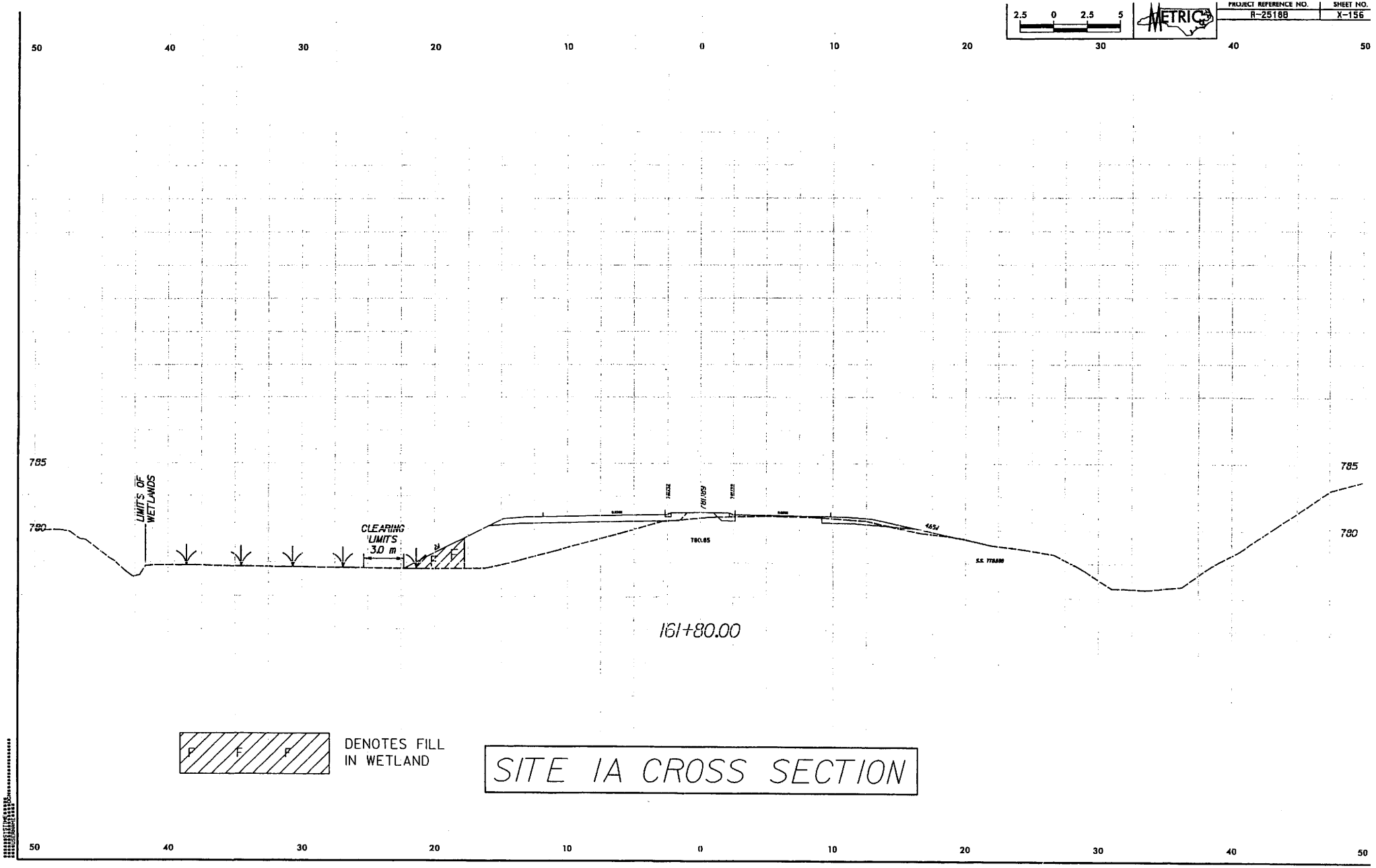
SITE 14 PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
R/W SHEET NO. 16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
-L-
PI Sta 156+84.725
Δ = 9°20'36.5" (RT)
D = 130.459
T = 65.375
R = 800.000
SE = 0.06
PIs Sta 157+74.415
θs = 2°38'34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
PIs Sta 158+48.210
θs = 0°24'23.7"
Ls = 36.900
LT = 24.600
ST = 12.300
PI Sta 159+45.129
Δ = 3°43'41.3" (LT)
L = 169.178
T = 84.619
R = 2,600.000
SE = 0.03
JAMES W. PROFFITT and J. YATES BAILEY D.B. 133 PG. 617
-Y8-
PI Sta 10+24.618
Δ = 7°42'17.2" (RT)
L = 127.36
T = 63.78
R = 947.12
SE = 0.02
PI Sta 10+62.329
Δ = 48°05'12.0" (RT)
L = 58.981
T = 31.353
R = 70.276
SE = 0.04
-Y8- (SR 1393)
522/758
200/200
217/383
8,642/13,058
-L- (US 19)
8,416/12,584
208/292
417/583
730/1,050
ADT 2008/2028
-Y9- (SR 1134)
S.W. ROBERTSON and SHELBY ROBERTSON D.B. 99 PG. 581
EDWIN DEWEY HENSLEY D.B. 182 PG. 113
NAD 83
-Y8- PCSta.10+18.240
BEGIN CONSTRUCTION -Y8- STA 10+00.000
-Y8- PCCSta.10+30.976
BEG. WW FENCE AT R/W MON.
-Y8- PTSta.10+89.957
-Y9- PT Sta. 10+00.000 =
-L- POC Sta. 157+31.044
REMOVE EXIST. GUARDRAIL
800 CSP
REM. FES
600 RCP
90m TAPER
15m TAPER
PROPOSED EXPRESSWAY GUTTER
TB-JB
375 RCP
161.5m FULL LANE
-L- SCSta.158+60.510
450 RCP
2GI W/ FLAT GRATE
-L- CSSta.160+29.688
30m TAPER
PROP. 450mm CMP
PROP. 825mm CMP
PROP. RAISED GRASS MEDIAN
PLUG AND FILL
40m TAPER
-L- CSSta.157+49.810
-L- SRSSta.158+23.610
END CONSTRUCTION -Y8- STA.10+25.000
REMOVE EXISTING GUARDRAIL
CATHERINE PROFFITT D.B. 101 PG. 191
DORICE EDDIE and wife, ELMA JEAN BRADFORD D.B. 151 PG. 579
RAY and wife, MARY ROBINSON D.B. 96 PG. 111
500mm BLK WALL
+01.500 BEG. CURB TRANSITION SEE SHEET 2-M
600 RCP
PROP. CONC. ISLAND
-Y9- POT Sta.10+59.56
FLAGPOLE
BALD CREEK
TAILDITCH
SITE 14a
WAYNE T. and wife, DIANA BONE D.B. 287 PG. 017
RETAIN
BEG. WW FENCE TIE-TO TIM
RUTH W. CALDWELL LIVING TRUST D.B. 271 PG. 732
BALD CREEK METHODIST CHURCH D.B. 109 PG. 432
RONALD E. and wife, RUBY B. WILSON D.B. 265 PG. 407
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
DENOTES IMPACTS TO SURFACE WATER
SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 54 FOR -Y8- PROFILE
SEE SHEET 54 FOR -Y9- PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 16
R /W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R /W REV.
REVISIONS
-L-
PI Sta 156+84.725
Δ = 9° 20' 36.5" (RT)
L = 130.459
T = 65.375
R = 800.000
SE = 0.06
Pls Sta 157+74.415
Θs = 2° 38' 34.0"
Ls = 73.800
LT = 49.205
ST = 24.605
Pls Sta 158+48.210
Θs = 0° 24' 23.7"
Ls = 36.900
LT = 24.600
ST = 12.300
PI Sta 159+45.129
Δ = 3° 43' 41.3" (LT)
L = 169.178
T = 84.619
R = 2,600.000
SE = 0.03
-Y8-
PI Sta 10+24.618
Δ = 7° 42' 11.2" (RT)
L = 127.36
T = 63.78
R = 947.12
SE = 0.02
PI Sta 10+62.329
Δ = 48° 05' 12.0" (RT)
L = 58.981
T = 31.353
R = 70.276
SE = 0.14
-Y8- PCSta.10+18.240
BEGIN CONSTRUCTION
-Y8- STA.10+20.000
-Y8- PCCSta.10+39.576
-Y8- PTSta.10+89.957 =
-Y9- PT Sta.10+00.000 =
-L- TOC Sta.157+31.044
-L- SCSta.158+60.510
-L- CSSta.160+29.688
-L- CSSta.157+49.810
-L- SRSSta.158+23.610
-Y9- POTSta.10+59.756
-Y8- (SR 1393)
522
758
200
200
217
383
8,642
13,058
-L- (US 19)
(US 19) 8,416
12,584
208
292
417
583
730
1,050
ADT 2008
2028
-Y9- (SR 1134)
JAMES W. PROFFITT and J. YATES BAILEY
D.B. 133 PG. 617
S.W. ROBERTSON and SHELBY ROBERTSON
D.B. 99 PG. 581
EDWIN DEWEY HENSLEY
D.B. 182 PG. 113
CATHERINE PROFFITT
D.B. 101 PG. 191
DORICE EDDIE and wife, ELNA JEAN BRADFORD
D.B. 151 PG. 579
RAY and wife, MARY ROBINSON
D.B. 96 PG. 111
WAYNE T. and wife, DIANA BONE
D.B. 287 PG. 017
RUTH W. CALDWELL LIVING TRUST
D.B. 271 PG. 732
RONALD E. and wife, RUBY B. WILSON
D.B. 265 PG. 407
BALD CREEK METHODIST CHURCH
D.B. 109 PG. 432
SITE 14a
NAD 83
REMOVE EXIST. GUARDRAIL
800 CSP
REM. FES
90m TAPER
PROPOSED EXPRESSWAY OUTER
161.5m FUL-LANE
161.5m TUC LANE
15m TAPER
30m TAPER
40m TAPER
375 RCP
600 RCP
PROP. MONO. CONC. ISLAND
PROP. 825mm CBC
PROP. 450mm CBC
PROP. 600mm CBC
PROP. RUNDELL GRASS MEDIAN
PROPOSED EXPRESSWAY OUTER
PLUG AND FILL
RETAIN
RETAINING WALL
BEG. WW FENCE
END FENCE AT R/W MON. TEND C/A
BEG. C/A
REMOVE EXISTING GUARDRAIL
END CONSTRUCTION
BEG. CURB TRANSITION SEE SHEET 2-M
TAILDITCH
FLAGPOLE
PLAYGROUND
SAND BOX
CONC
TS
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
S
DENOTES IMPACTS TO SURFACE WATER
SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 54 FOR -Y8- PROFILE
SEE SHEET 54 FOR -Y9- PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
ADT 2008 2028
-Y10- (SR 1392)
108 192
50 92
58 100
8,650 13,150
(US 19) 8,642 13,242 (US 19)
-L- Pls Sta. 160+41.988
Δs = 0° 24' 23"
Ls = 36.900
LT = 24.600
ST = 12.300
BM #9
-BY10- STA 5+75.077
14.994 LEFT
-L- STA. 161+20.322
117.079 m LT
ELEV. 782.369
DENOTES IMPACTS TO SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
NAD 83
S.W. ROBERTSON and SHELBY ROBERTSON D.B. 99 PG. 581
EDWIN DEWEY HENSLEY D.B. 182 PG. 113
WILLIAM RANDY FOXX D.B. 201PG. 319
JOSEPH EDGAR WHEELER D.B. 319 PG. 553
TIMOTHY CLAY NEILL D.B. 313 PG. 240
SITE 1A
SITE 1B
UT TO BALD CREEK
-Y10- POT Sta. 10+00.000
-Y10- POT Sta. 10+53.838
-L- POT Sta. 161+26.228
-L- ST Sta. 160+66.588
S 1° 49' 01" W
S 86° 37' 35.5" E
TIE WW FENCE TO EXIST. FENCE
TIE WW FENCE TO EXIST. HW
REMOVE HEADWALL
2410x1700 (95"x67") CSP ARCH
RETAIN
RETAIN AND EXTEND
END WW FENCE
BALD CREEK
EXISTING R/W
ANTENNA
GATE
RUTH W. CALDWELL LIVING TRUST D.B. 271 PG. 732
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN D.B. 170 PG. 457
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR. D.B. 206 PG. 242
SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 54 FOR -Y10- PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
ADT 2008 2028
-Y10- (SR 1392)
108 192
50 92
58 100
8,650 13,150
(US 19) 8,642 13,242
-L- (US 19)
DENOTES IMPACTS TO SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SITE 1A
SITE 1B
UT TO BALD CREEK
-Y10- POT Sta. 10+00.000
-Y10- POT Sta. 10+53.838
-L- POT Sta. 161+26.228
-L- ST Sta. 160+66.588
BM #9
-BYIO- STA 5+75.077
14.994 LEFT
-L- STA. 161+20.322
17.079 m LT
ELEV. 782.369
Pls Sta. 160+41.988
Δs = 0°24'23"
Ls = 36.900
LT = 24.600
ST = 12.300
NAD 83
S.W. ROBERTSON and SHELBY ROBERTSON D.B. 99 PG. 581
EDWIN DEWEY HENSLEY D.B. 182 PG. 13
WILLIAM RANDY FOXX D.B. 201 PG. 319
JOSEPH EDGAR WHEELER D.B. 319 PG. 553
TIMOTHY CLAY NEILL D.B. 313 PG. 240
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR. D.B. 206 PG. 242
RUTH W. CALDWELL LIVING TRUST D.B. 271 PG. 732
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN D.B. 170 PG. 457
TIE WW FENCE TO EXIST. FENCE
RETAIN
REMOVE HEADWALL
2410x1700 (95"x67") CSP ARCH
1500mm WW & 158W
BALD CREEK
US 19 87 BST
SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 54 FOR -Y10- PROFILE
REVISIONS



161+80.00

P F P DENOTES FILL IN WETLAND

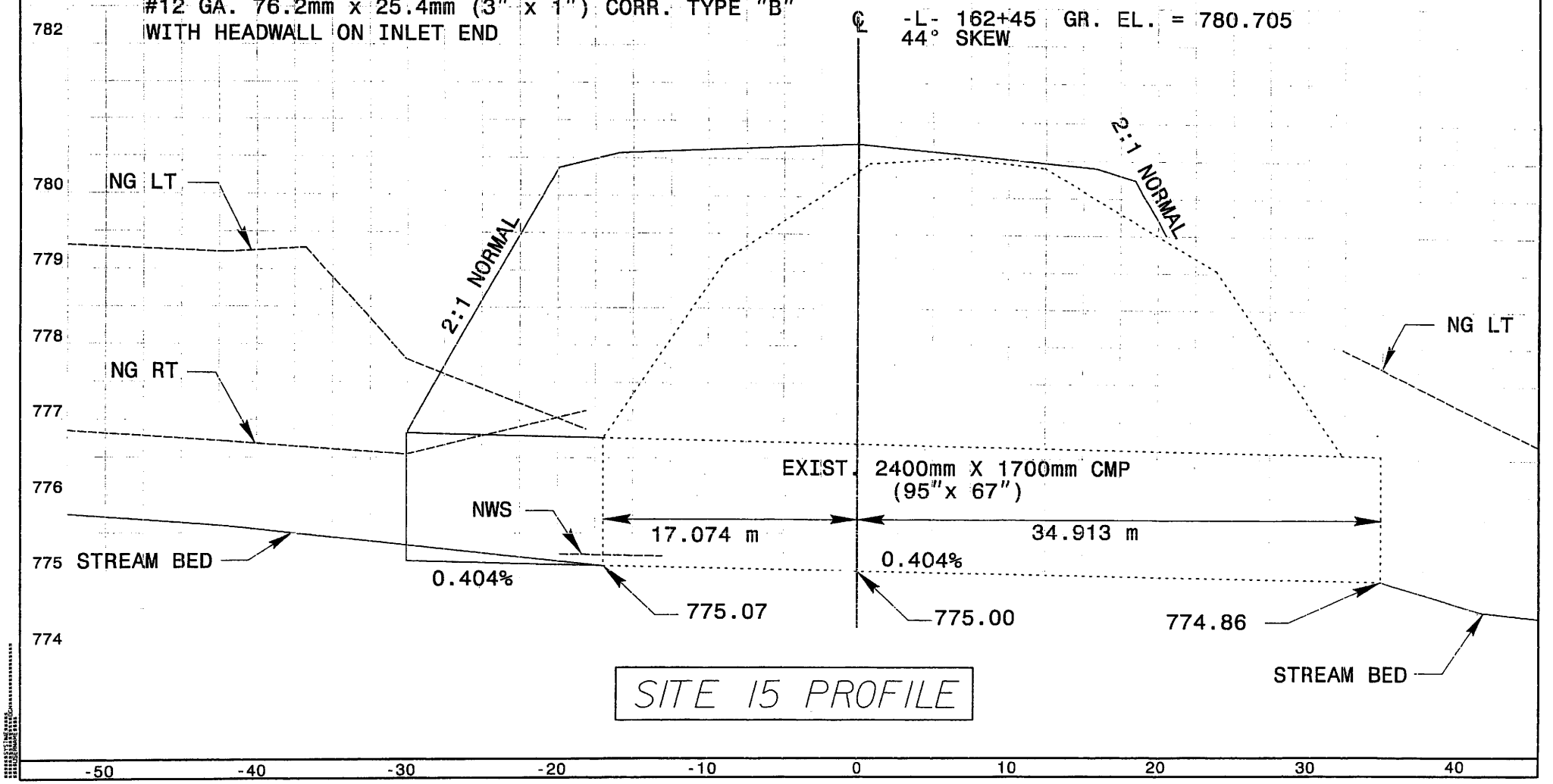
SITE IA CROSS SECTION

METRIC

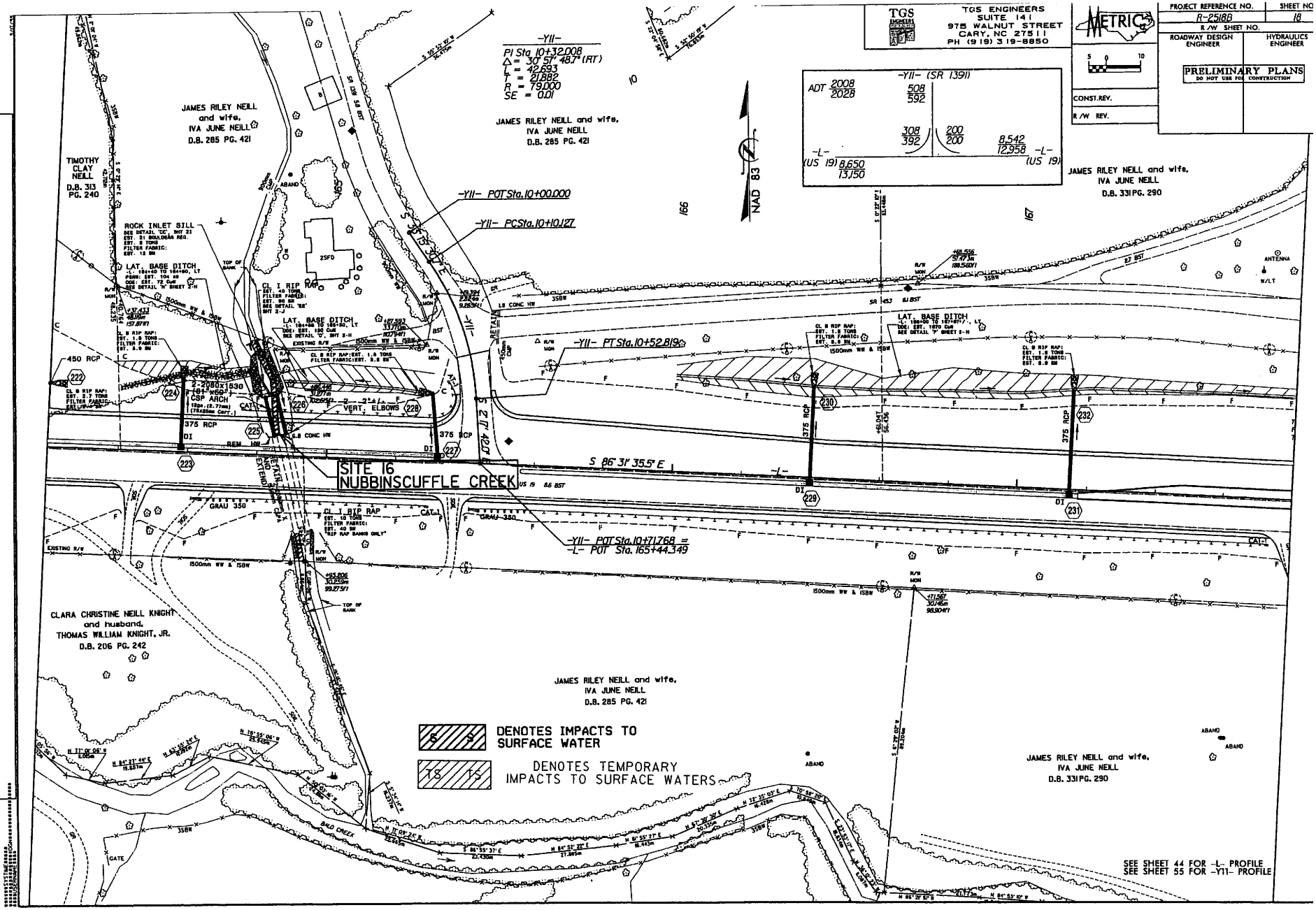
R-2518B	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R /W REV.	

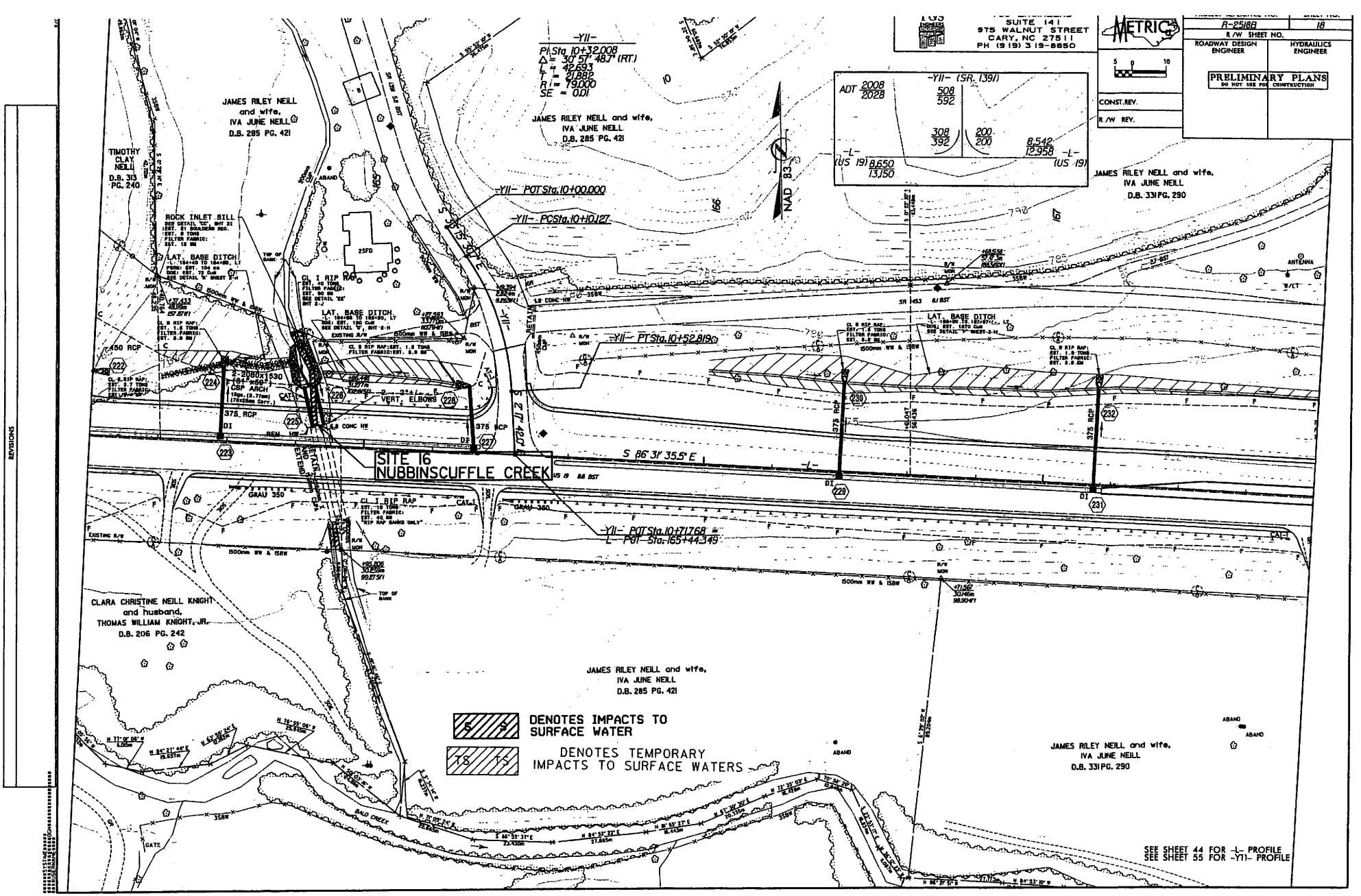
RETAIN AND EXTEND AS REQUIRED.
2400mm x 1700mm (95" x 67") CSPA
#12 GA. 76.2mm x 25.4mm (3" x 1") CORR. TYPE "B"
WITH HEADWALL ON INLET END

℄ -L- 162+45 GR. EL. = 780.705
44° SKEW



SITE 15 PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
-Y11-
PI Sta. 10+32.008
Δ = 30° 57' 48.7" (RT)
L = 42.693
T = 21.882
R = 79.000
SE = 0.01
-Y11- (SR 1391)
ADT 2008 / 2028
508 / 592
308 / 392
200 / 200
-L- (US 19) 8,650 / 13,150
8,542 / 12,958 -L- (US 19)
NAD 83
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 285 PG. 421
TIMOTHY CLAY NEILL D.B. 313 PG. 240
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 331 PG. 290
-Y11- POT Sta. 10+00.000
-Y11- PCS Sta. 10+10.127
-Y11- PT Sta. 10+52.819
-Y11- POT Sta. 10+71.768 = -L- POT Sta. 165+44.349
ROCK INLET SILL
LAT. BASE DITCH
CL I RIP RAP
CL B RIP RAP
2-2080x1530 CSP ARCH
450 RCP
375 RCP
VERT. ELBOWS
SITE 16
NUBBINSCUFFLE CREEK
S 86° 31' 35.5" E
GRAU 350
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR. D.B. 206 PG. 242
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
BALD CREEK
SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 55 FOR -Y11- PROFILE

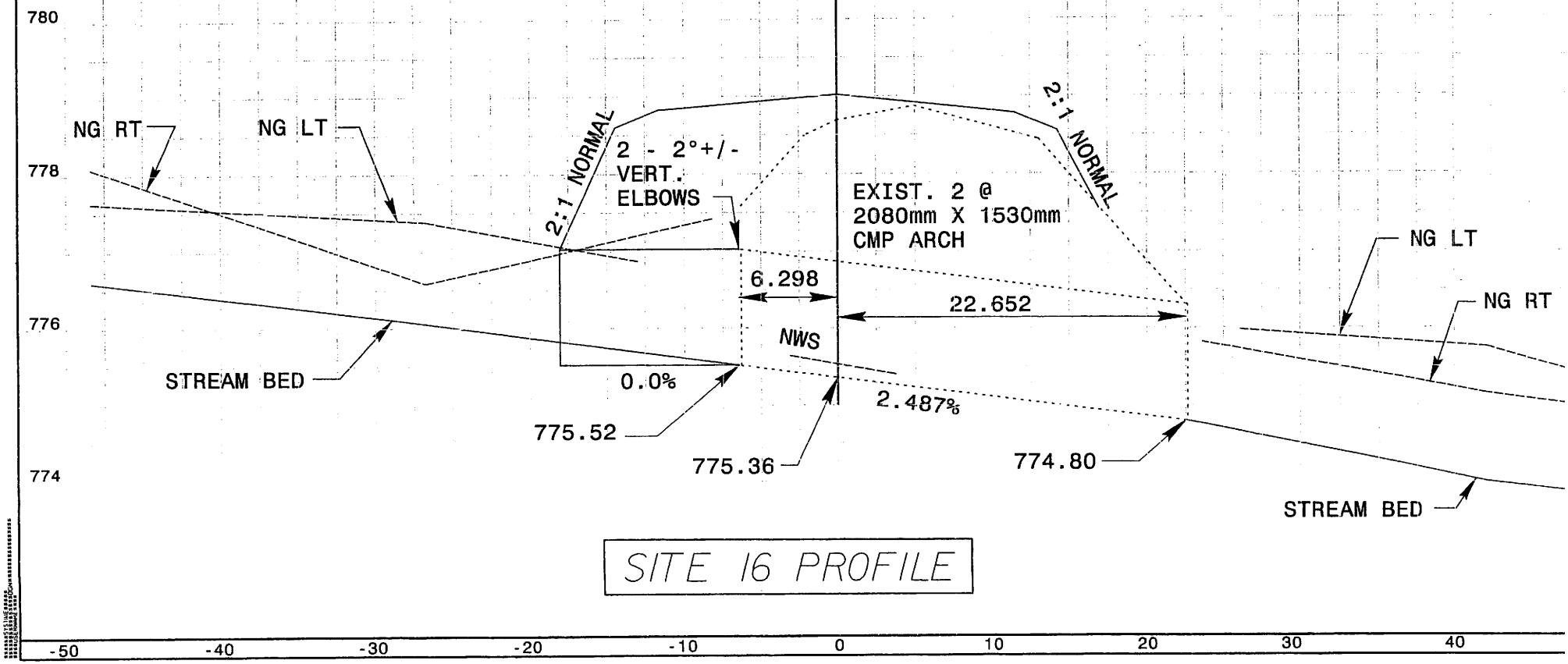

SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8650
METRIC
R-2518B
18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
-Y11-
PI Sta. 10+32.008
Δ = 30° 57' 48.7" (RT.)
D = 42.593
T = 21.882
R = 79.000
SE = 0.01
-Y11- (SR. 1391)
ADT 2008 / 2028
508 / 592
308 / 392
200 / 200
-L- (US 19) 8,650 / 13,150
6,542 / 12,958
-L- (US 19)
NAD 83
-Y11- POT Sta. 10+00.000
-Y11- PC Sta. 10+10.127
-Y11- PT Sta. 10+52.819
-Y11- POT Sta. 10+71.768 = -L- POT Sta. 165+44.349
S 86° 31' 35.5" E
SITE 16
NUBBINSCUFFLE CREEK
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 285 PG. 421
TIMOTHY CLAY NEILL D.B. 313 PG. 240
CLARA CHRISTINE NEILL KNIGHT and husband, THOMAS WILLIAM KNIGHT, JR. D.B. 206 PG. 242
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 331 PG. 290
ROCK INLET SILL
LAT. BASE DITCH
CL I RIP RAP
2-2080x1530 (82"x60") CSP ARCH
VERT. ELBOWS
450 RCP
375 RCP
GRAU 350
1500mm RW & 158W
ANTENNA
BALD CREEK
GATE
ABAND
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 55 FOR -Y11- PROFILE

METRIC	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

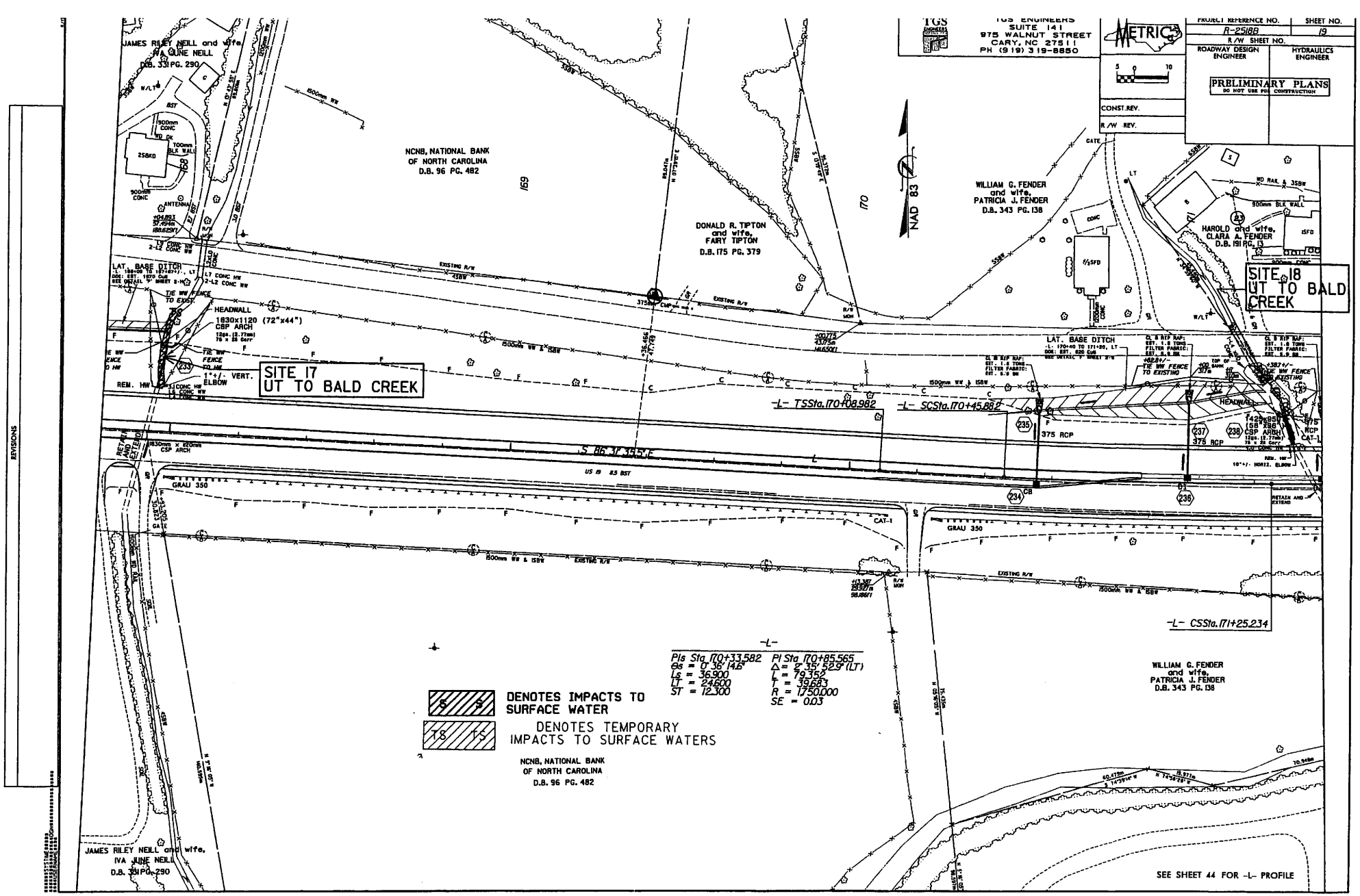
RETAIN AND EXTEND AS REQUIRED.
2- 2080mm x 1530mm (81" x 59") CSP ARCHES,
#12 GA. 76.2mm x 25.4mm (3" x 1") CORR. TYPE "B"
WITH HEADWALL ON INLET END
2 - 2°+/- VERTICAL ELBOWS REQUIRED

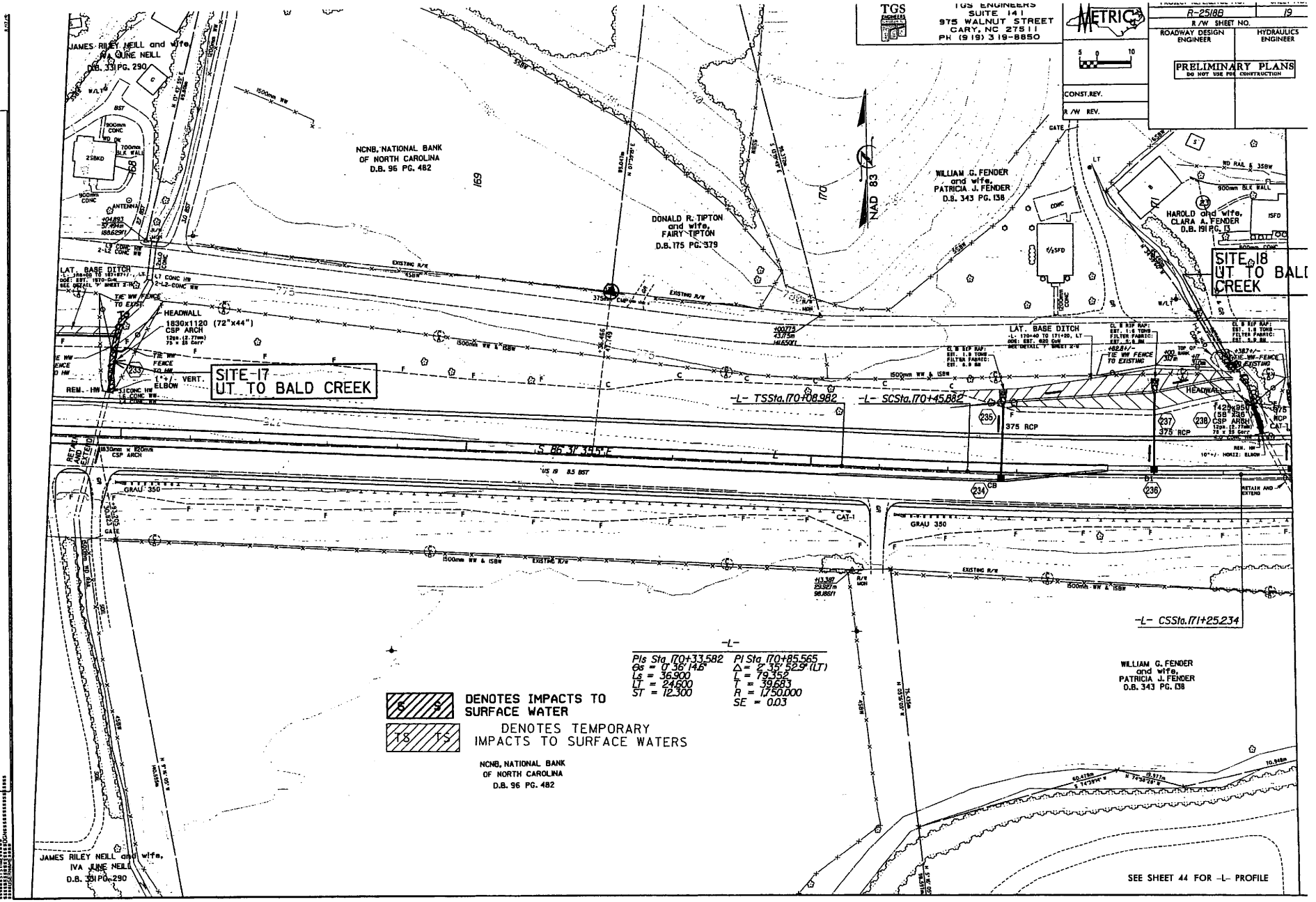
TS TS DENOTES TEMPORARY IMPACTS TO SURFACE WATERS

℄ -L- 164+88 GR. EL. = 779.02
75° SKEW



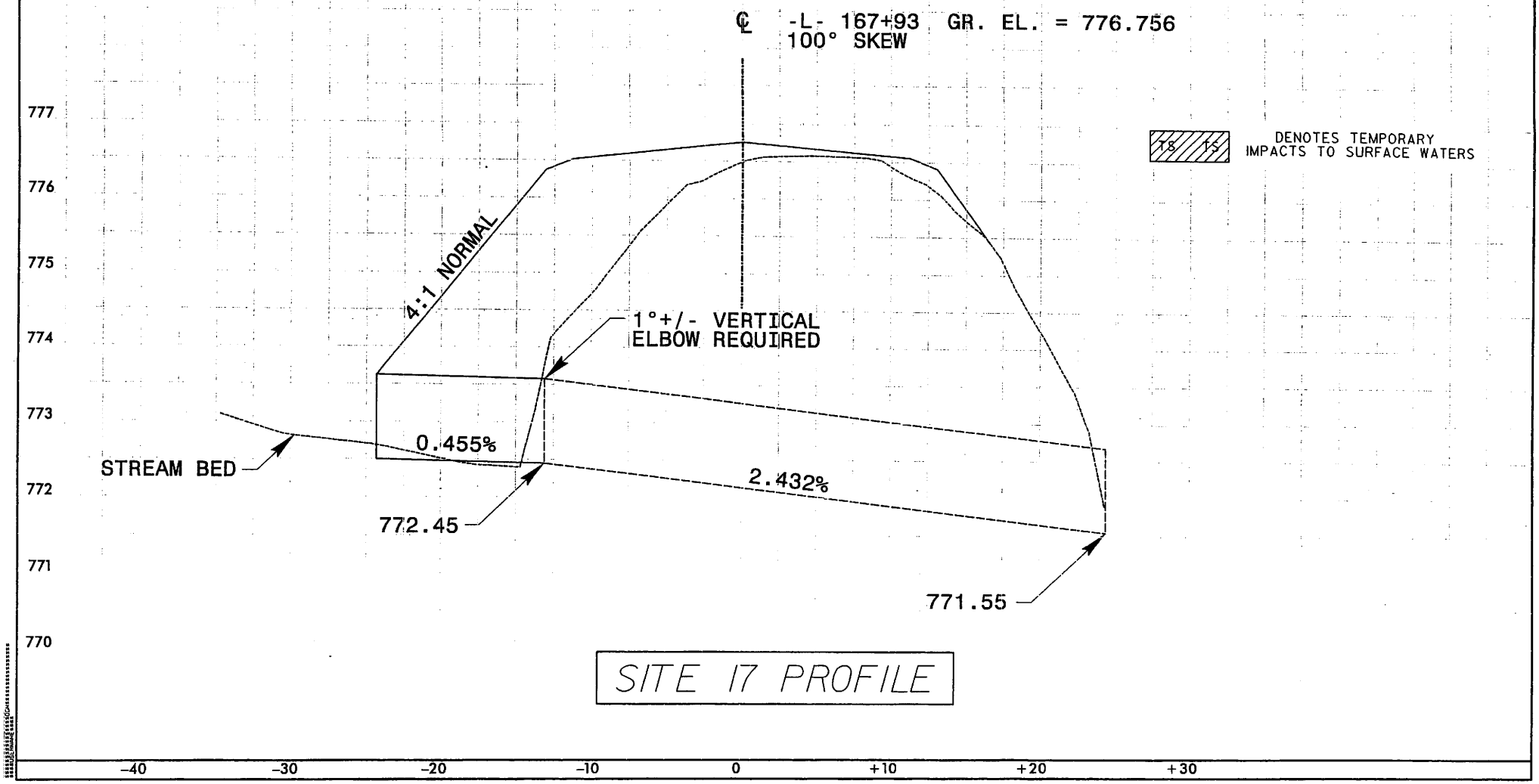
SITE 16 PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2588
SHEET NO. 19
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
NAD 83
JAMES RILEY NEILL and wife IVA JUNE NEILL D.B. 331 PG. 290
NCNB, NATIONAL BANK OF NORTH CAROLINA D.B. 96 PG. 482
DONALD R. TIPTON and wife, FAIRY TIPTON D.B. 175 PG. 379
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 138
HAROLD and wife, CLARA A. FENDER D.B. 191 PG. 13
SITE 17 UT TO BALD CREEK
SITE 18 UT TO BALD CREEK
LAT. BASE DITCH
HEADWALL
1830x1120 (72"x44") CSP ARCH
1*+/- VERT. ELBOW
TIE WW FENCE TO EXIST.
REM. HW
-L- TSSta. 170+08.982
-L- SCSta. 170+45.882
-L- CSSta. 171+25.234
375 RCP
S 86°31'35.5"E
US 19 #5 BST
GRAU 350
CAT-1
500mm WW & 1SBW
EXISTING R/W
Pls Sta 170+33.582
Ls = 36.900
LT = 24.600
ST = 12.300
Pl Sta 170+85.565
Δ = 2°35'52.9" (LT)
L = 79.352
T = 39.683
R = 1750.000
SE = 0.03
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 44 FOR -L- PROFILE

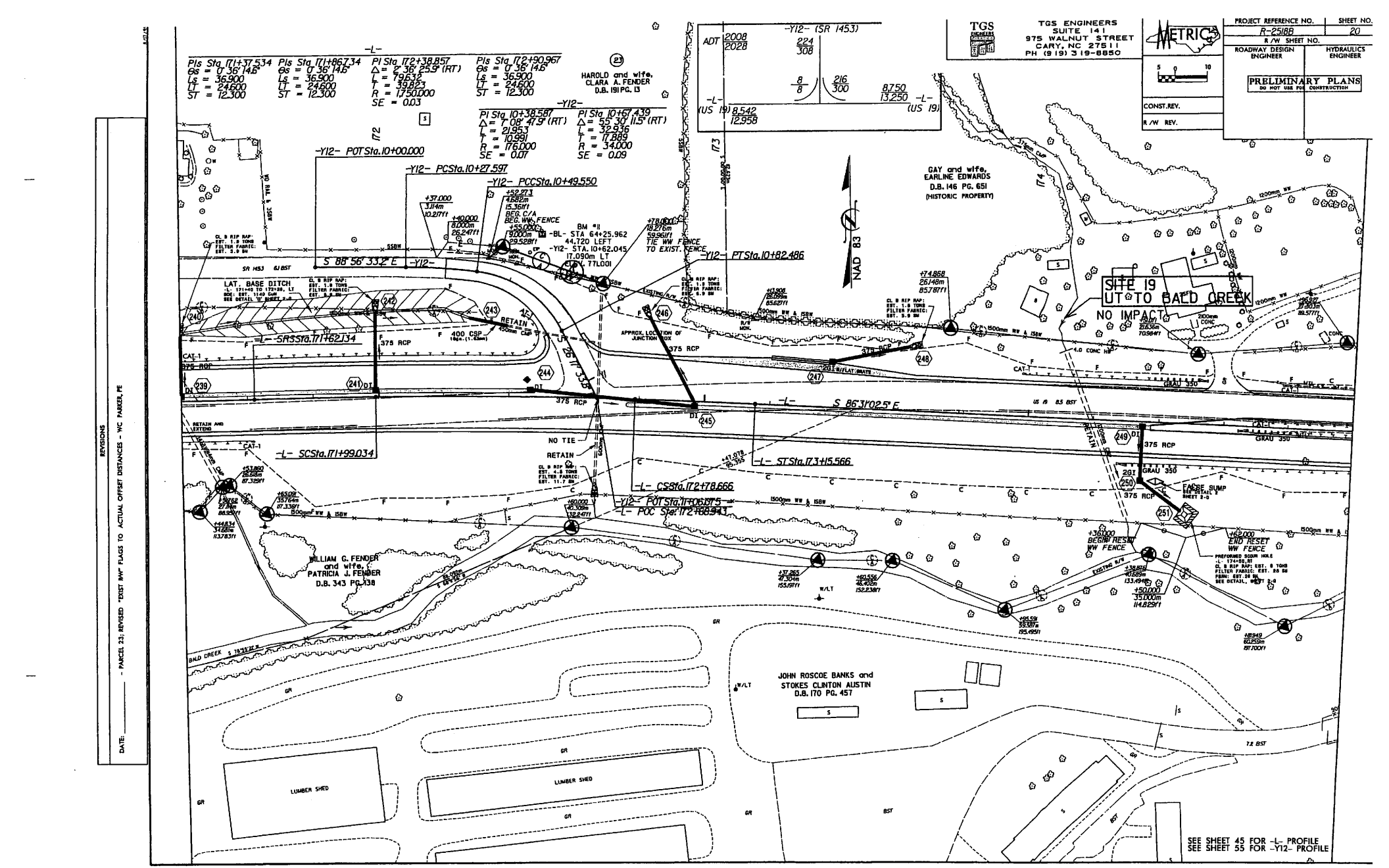

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
19
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 331 PG. 290
NCNB, NATIONAL BANK OF NORTH CAROLINA D.B. 96 PG. 482
DONALD R. TIPTON and wife, FAIRY TIPTON D.B. 175 PG. 379
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 138
HAROLD and wife, CLARA A. FENDER D.B. 191 PG. 13
SITE-17 UT TO BALD CREEK
SITE-18 UT TO BALD CREEK
-L- TS Sta. 170+08.982
-L- SC Sta. 170+45.882
-L- CS Sta. 171+25.234
S 86° 31' 39" E
NAD 83
HEADWALL
1830x1120 (72"x44") CSP ARCH
375 RCP
GRAU 350
LAT. BASE DITCH
TIE WW FENCE TO EXIST.
-L-
PI's Sta 170+33.582
Gs = 0° 36' 14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
PI Sta 170+85.565
Δ = 2° 35' 52.9" (LT)
L = 79.352
T = 39.683
R = 1750.000
SE = 0.03
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
NCNB, NATIONAL BANK OF NORTH CAROLINA D.B. 96 PG. 482
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 138
JAMES RILEY NEILL and wife, IVA JUNE NEILL D.B. 331 PG. 290
SEE SHEET 44 FOR -L- PROFILE

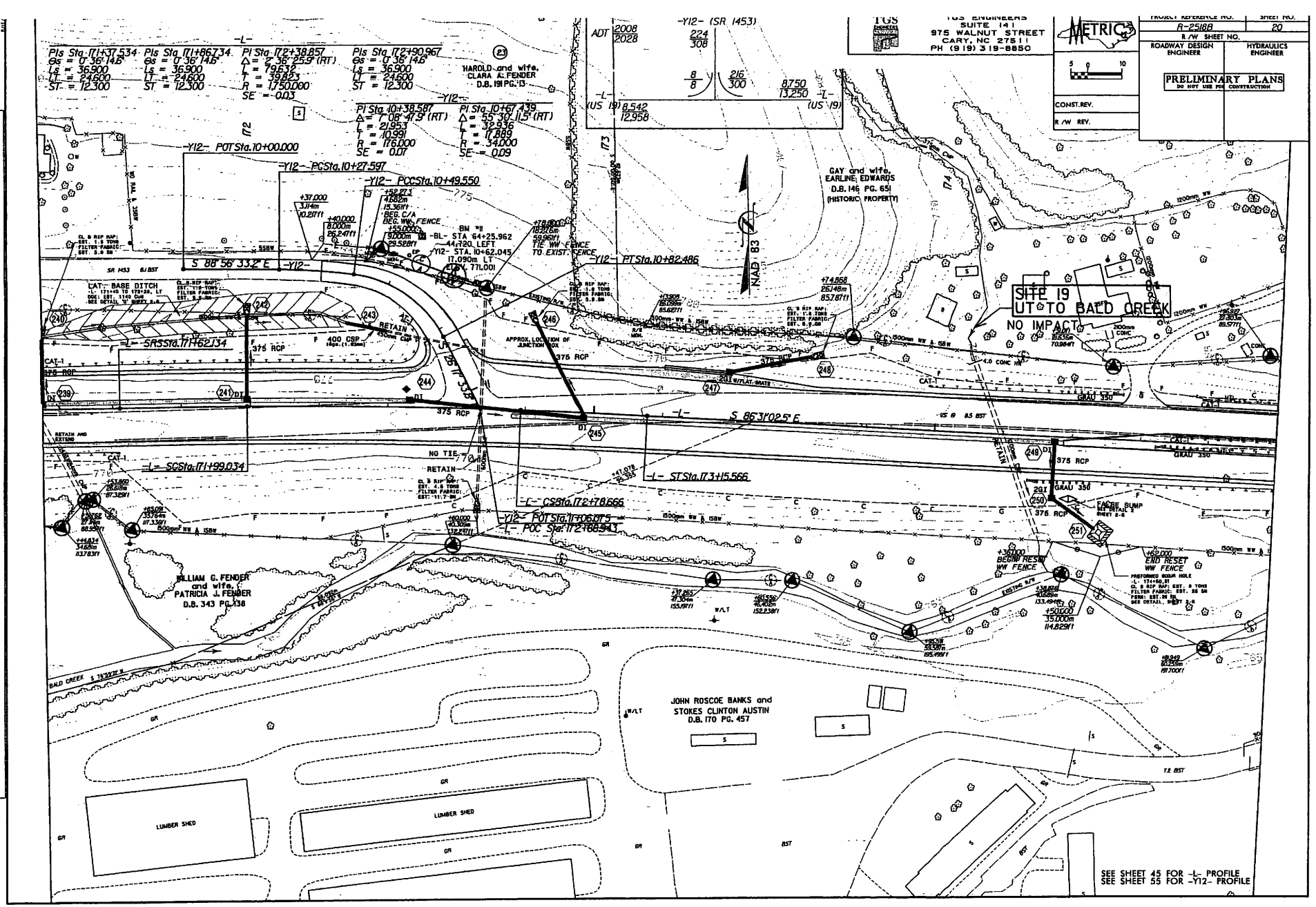
RETAIN AND EXTEND AS REQUIRED.
1830mm x 1120mm (72" x 44") CSPA
#12 GA. 76.2mm x 25.4mm (3" x 1") CORR. TYPE "B"
WITH HEADWALL ON INLET END

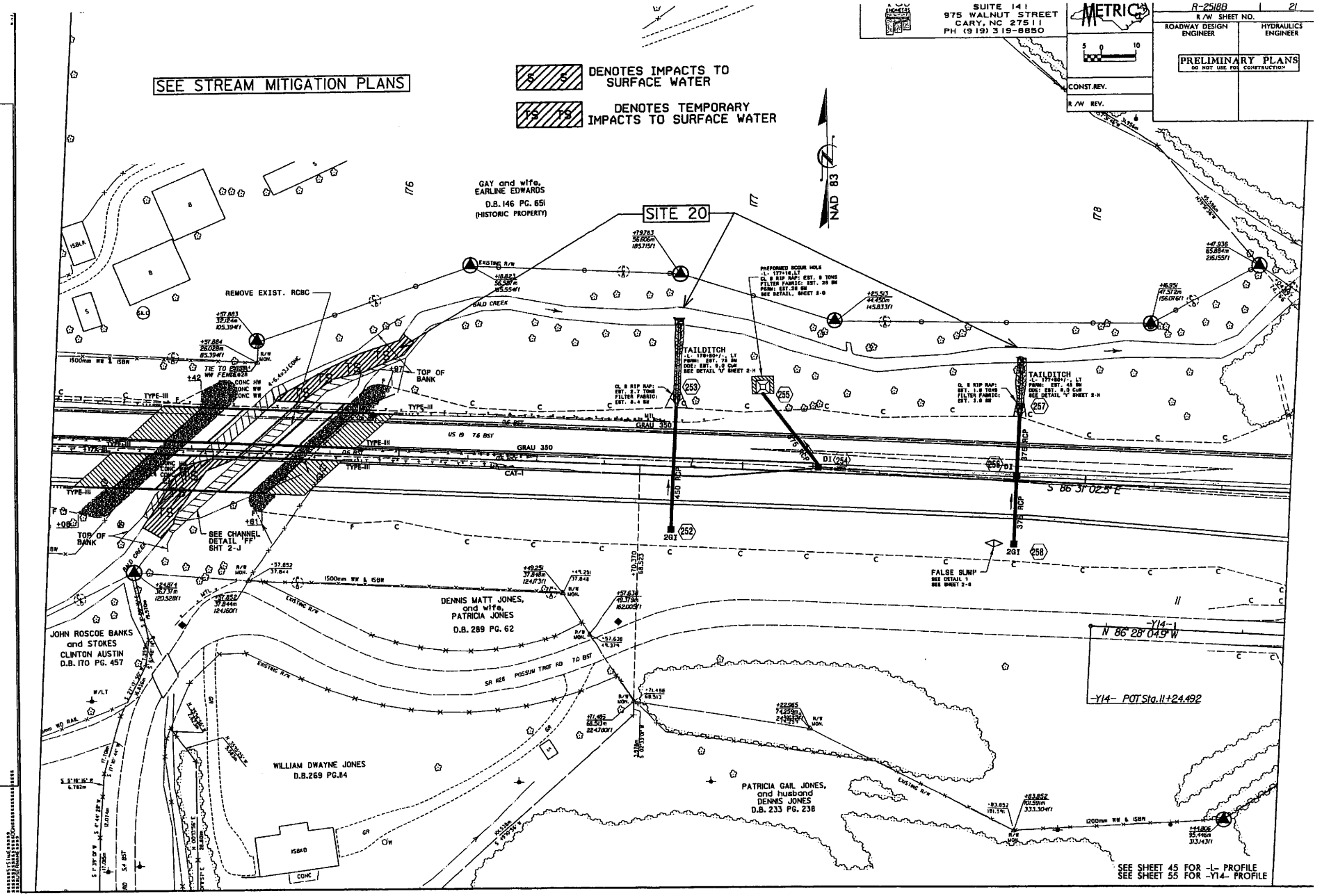
METRIC	0-7300 ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

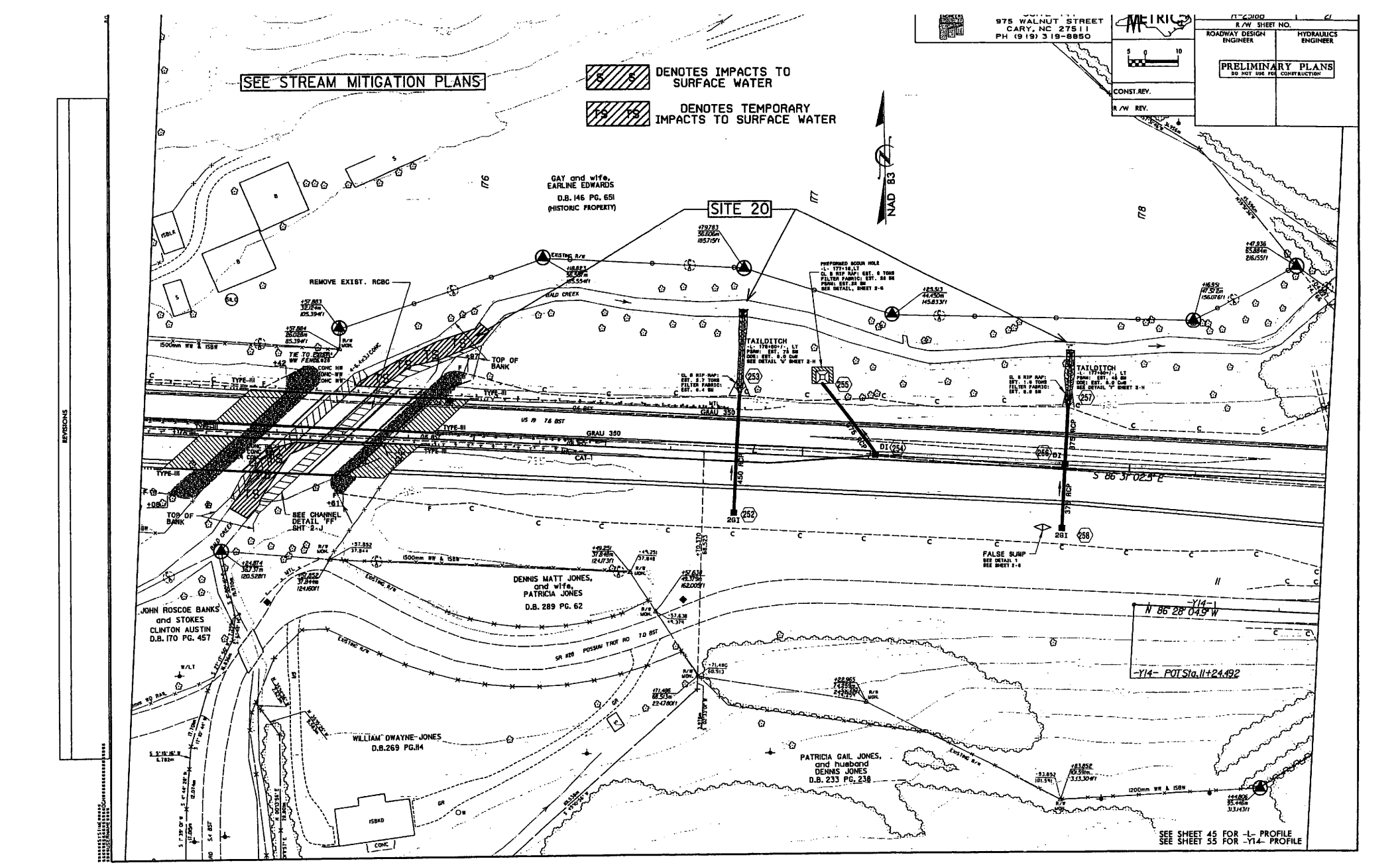


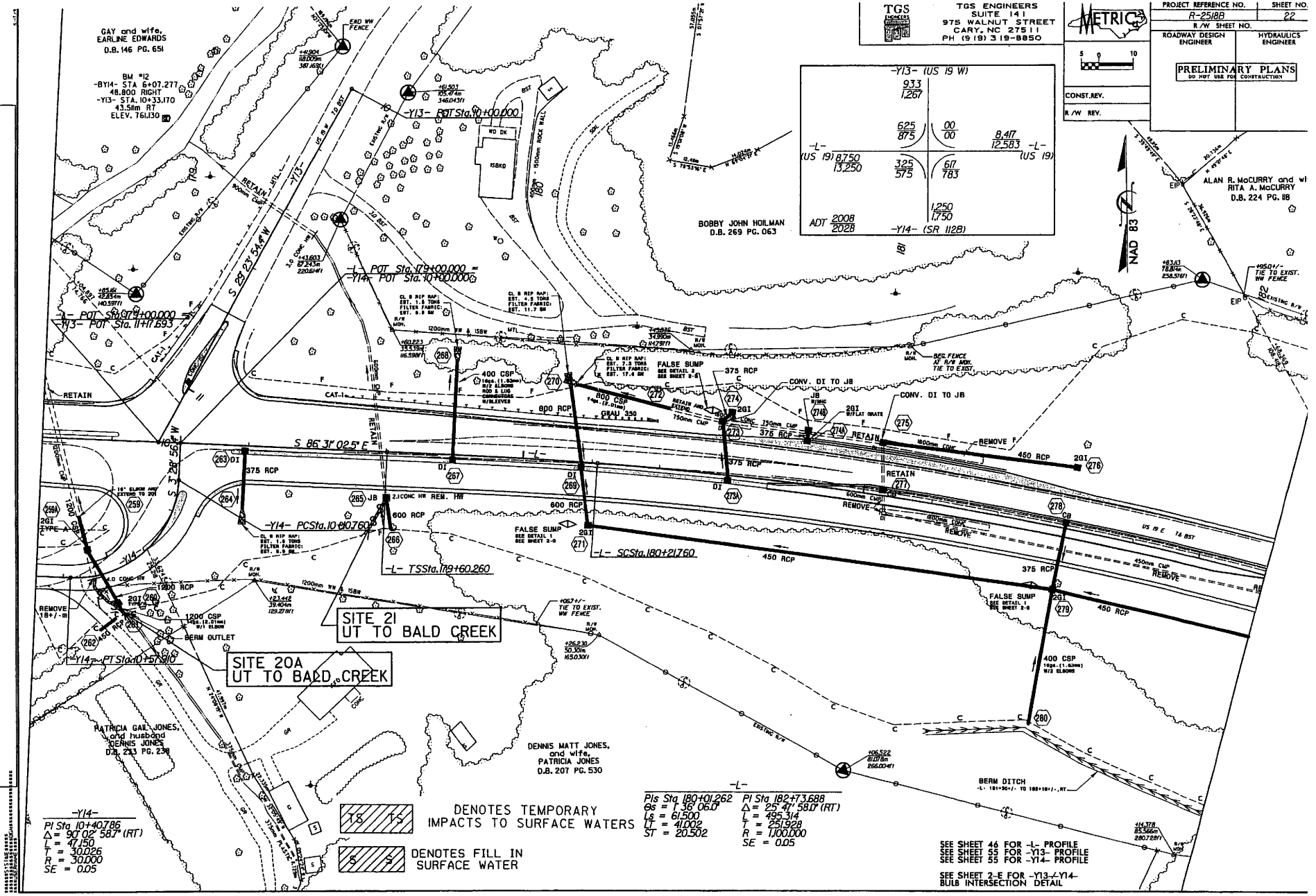
SITE 17 PROFILE

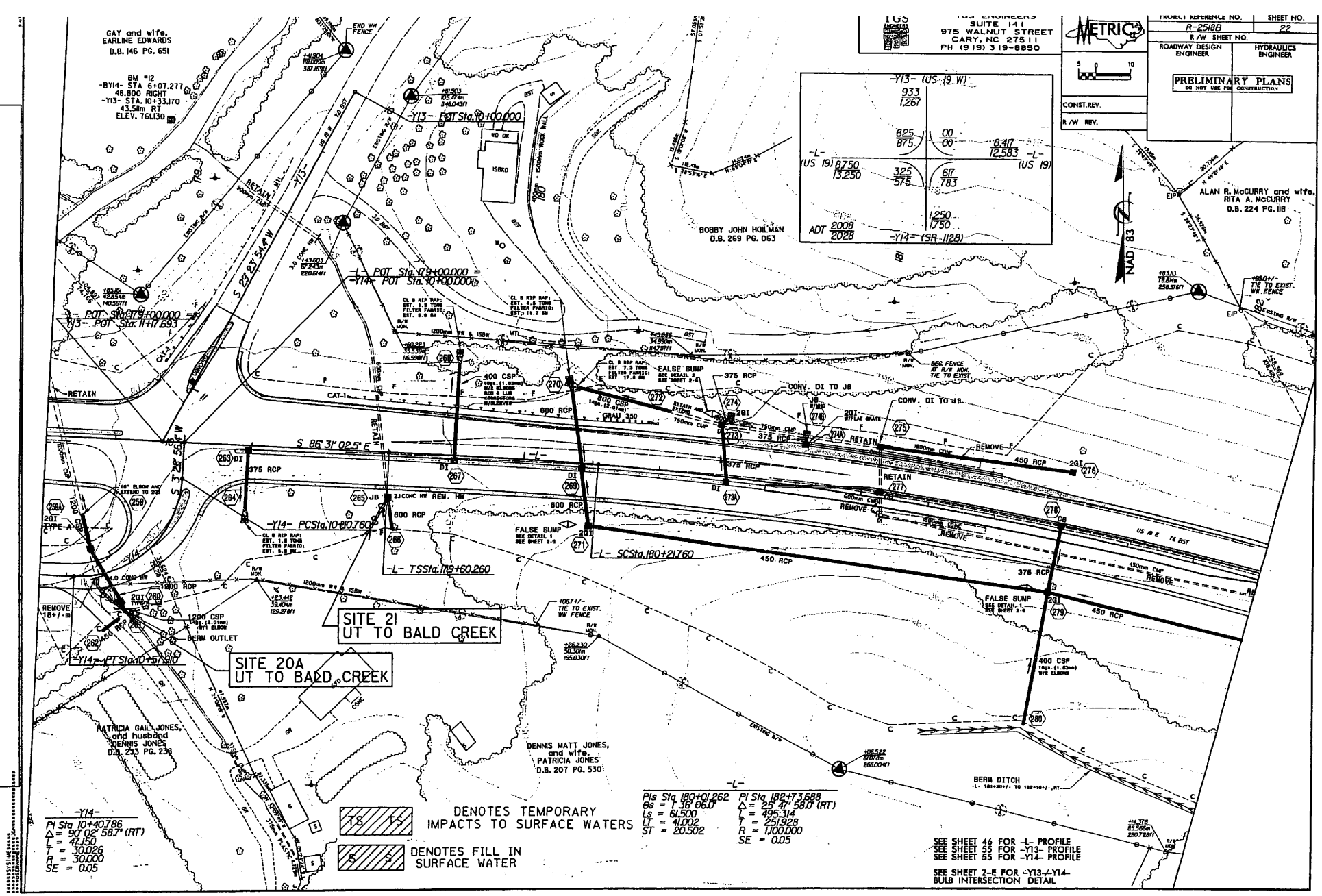

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
- PARCEL 23; REVISED "EXIST RWF" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
DATE:
-L- Pls Sta 171+37.534
Gs = 0°36'14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
-L- Pls Sta 171+867.34
Gs = 0°36'14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
-L- Pl Sta 172+38.857
Δ = 2°36'25.9" (RT)
L = 79.632
T = 39.823
R = 1750.000
SE = 0.03
-L- Pls Sta 172+90.967
Gs = 0°36'14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
-Y12- Pl Sta 10+38.587
Δ = 1°08'47.9" (RT)
L = 21.953
T = 10.991
R = 1760.000
SE = 0.07
-Y12- Pl Sta 10+67.439
Δ = 55°30'11.5" (RT)
L = 32.936
T = 17.889
R = 34.000
SE = 0.09
HAROLD and wife, CLARA A. FENDER D.B. 191 PG. 13
-Y12- (SR 1453)
ADT 2008 2028
-L- (US 19)
-Y12- POT Sta. 10+00.000
-Y12- PCS Sta. 10+27.597
-Y12- PCC Sta. 10+49.550
-Y12- PT Sta. 10+82.486
BM #11 -BL- STA 64+25.962 44.720 LEFT 17.090m LT ELEV. 771.001
-Y12- STA. 10+62.045 TIE WW FENCE TO EXIST. FENCE
GAY and wife, EARLINE EDWARDS D.B. 146 PG. 651 (HISTORIC PROPERTY)
NAD 83
S 88°56'33.2" E
-L- SRS Sta. 171+62.134
-L- SC Sta. 171+99.034
-L- ST Sta. 173+15.566
-L- CS Sta. 172+78.666
-Y12- POT Sta. 11+06.075
-L- POC Sta. 172+88.943
S 86°31'02.5" E
SITE 19
UT TO BALD CREEK
NO IMPACT
LAT. BASE DITCH
RETAIN
NO TIE
APPROX. LOCATION OF JUNCTION BOX
375 RCP
400 CSP
1500mm WW & ISBW
1200mm WW
GRAU 350
FACSE SUMP
BEGIN RESET WW FENCE
END RESET WW FENCE
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 138
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN D.B. 170 PG. 457
BALD CREEK
LUMBER SHED
LUMBER SHED
SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -Y12- PROFILE

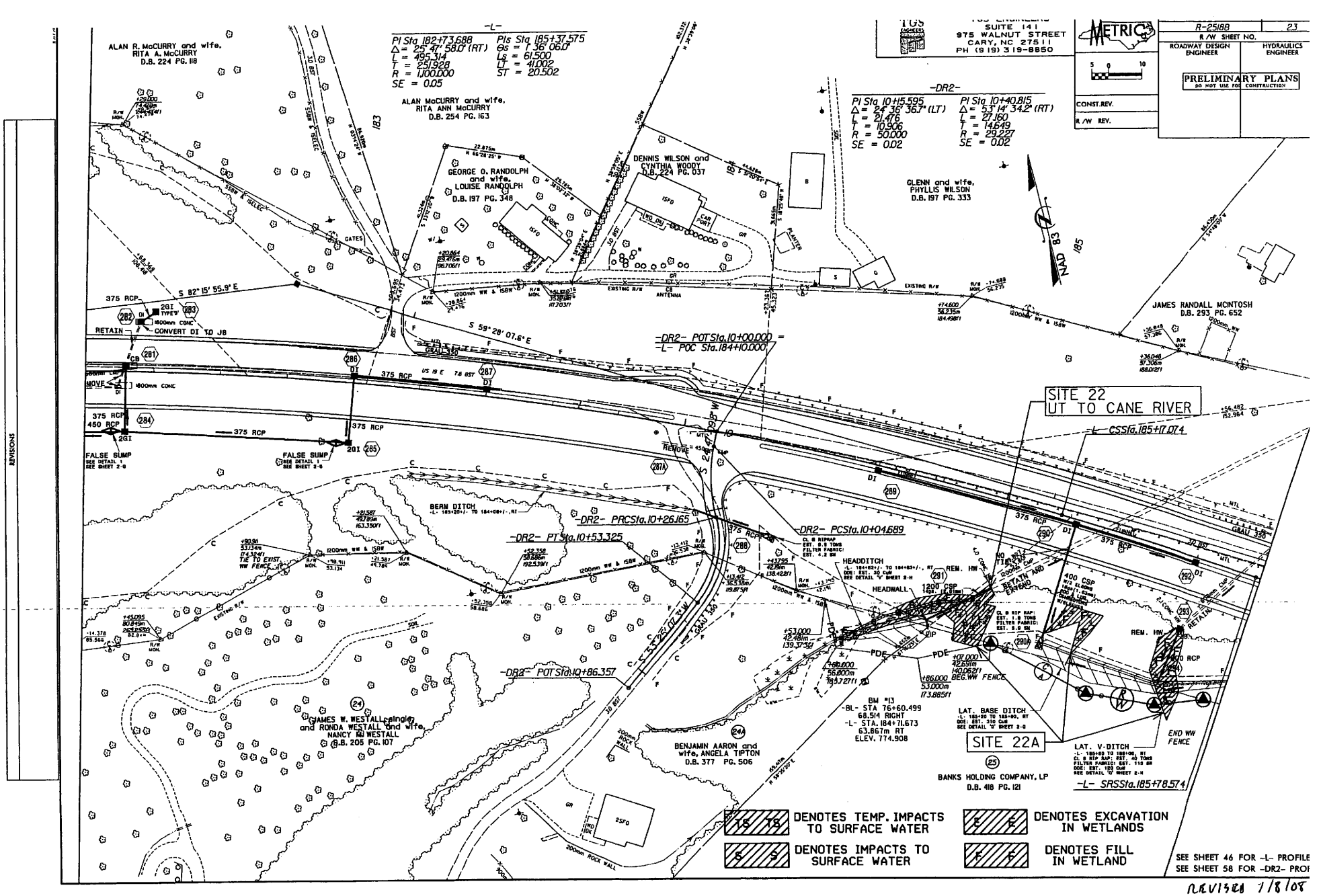

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
- PARCEL 23; REVISED "EXIST R/W" FLAGS TO ACTUAL OFFSET DISTANCES - WC PARKER, PE
DATE:
-L-
PI Sta 171+37.534
Δs = 0° 36' 14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
PI Sta 171+86.734
Δs = 0° 36' 14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
PI Sta 172+38.857
Δ = 2° 36' 25.9" (RT)
L = 79.639
T = 39.823
R = 1,750.000
SE = -0.03
PI Sta 172+90.967
Δs = 0° 36' 14.6"
Ls = 36.900
LT = 24.600
ST = 12.300
-Y12-
PI Sta 10+38.587
Δ = 7° 08' 41.9" (RT)
L = 21.953
T = 10.991
R = 176.000
SE = 0.07
PI Sta 10+67.439
Δ = 55° 30' 11.5" (RT)
L = 32.936
T = 17.889
R = 34.000
SE = 0.09
-Y12- POT Sta.10+00.000
-Y12- PCS Sta.10+27.597
-Y12- PCC Sta.10+49.550
-Y12- PT Sta.10+82.486
-Y12- (SR 1453)
ADT 2008 2028
224 308
8 8
216 300
8,750 13,250
(US 19) 8,542 12,958
HAROLD and wife, CLARA A. FENDER D.B. 191 PG. 13
GAY and wife, EARLINE, EDWARDS D.B. 146 PG. 651 (HISTORIC PROPERTY)
NAD 83
SITE 19
UT TO BALD CREEK
NO IMPACTS
-L- SR Sta.171+62.134
-L- SC Sta.171+99.034
-L- ST Sta.173+15.566
-L- CS Sta.172+78.666
-L- POC Sta.172+88.943
-Y12- POT Sta.11+06.875
S 88°56'33.2" E
S 86°31'02.5" E
BL- STA 64+25.962
44.720 LEFT
-Y12- STA. 10+62.045
17.090m LT
ELEV. 771.001
TIE WW FENCE TO EXIST. FENCE
APPROX. LOCATION OF JUNCTION BOX
CAT-1 BASE DITCH
-L- 172+40 TO 172+88, LT
DOE: EST. 1140 CuM
SEE DETAIL "B" SHEET 8-B
RETAIN
NO TIE, RETAIN
WILLIAM G. FENDER and wife, PATRICIA J. FENDER D.B. 343 PG. 138
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN D.B. 170 PG. 457
BALD CREEK S 78°33'27" W
LUMBER SHED
LUMBER SHED
FACING BUMP
SEE DETAIL 2 SHEET 8-B
BEGIN RESET WW FENCE
END RESET WW FENCE
PREFORMED SCOUR HOLE
-L- 174+50, RT
CL. B RIP RAP; EST. 8 TONS
FILTER FABRIC; EST. 88 SM
FBRM; EST. 88 TON
SEE DETAIL, SHEET 8-B
SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -Y12- PROFILE

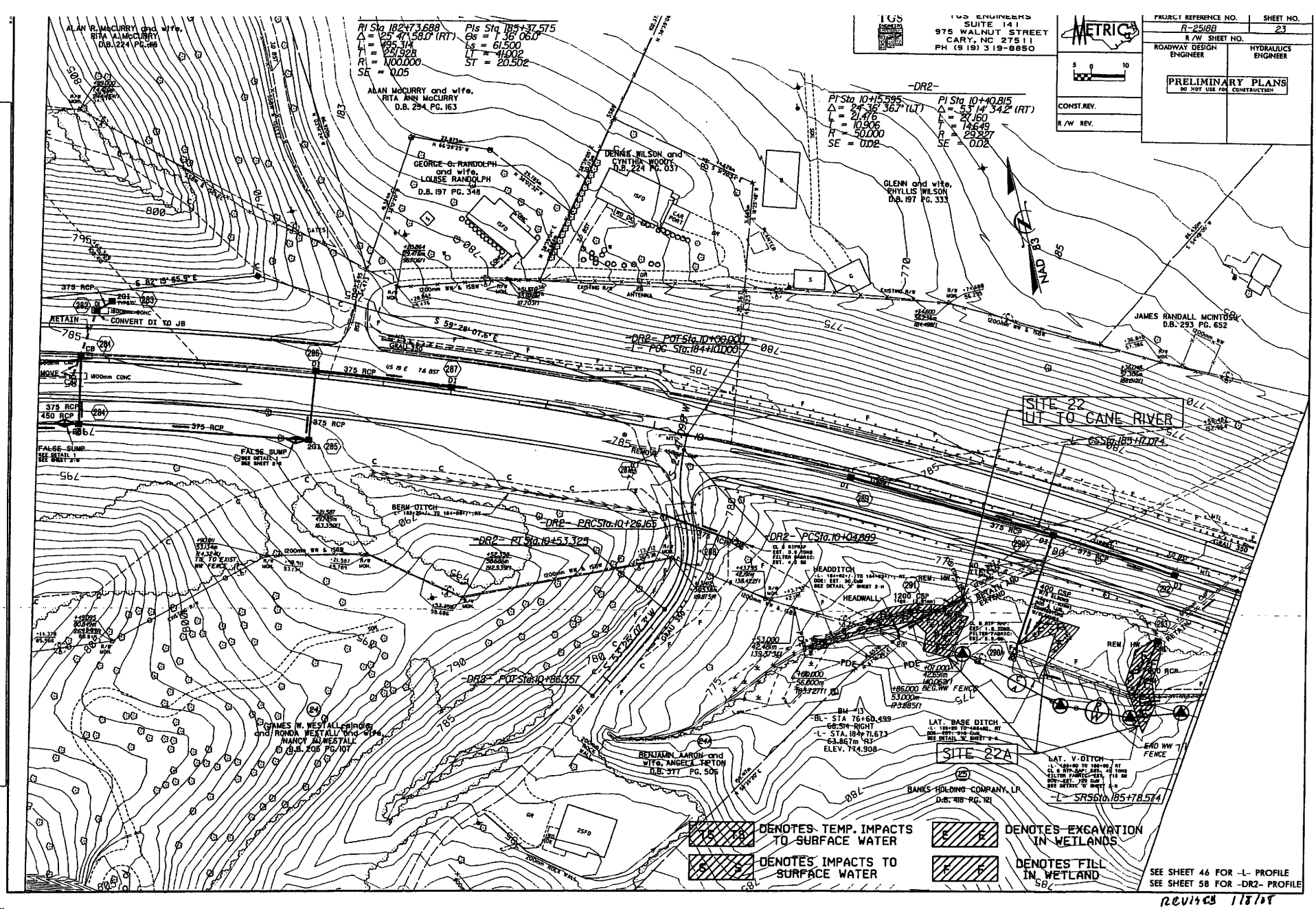

SEE STREAM MITIGATION PLANS
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATER
SITE 20
GAY and wife, EARLINE EDWARDS
D.B. 146 PG. 651
(HISTORIC PROPERTY)
REMOVE EXIST. RCBC
BALD CREEK
TOP OF BANK
TAILDITCH
SEE CHANNEL DETAIL "FF" SHT 2-J
DENNIS MATT JONES, and wife, PATRICIA JONES
D.B. 289 PG. 62
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN
D.B. 170 PG. 457
WILLIAM DWAYNE JONES
D.B.269 PG.84
PATRICIA GAIL JONES, and husband DENNIS JONES
D.B. 233 PG. 238
FALSE SUMP
SR 1828 POSSUM TROT RD TO BST
N 86° 28' 04.9" W
-Y14- POT Sta.11+24.492
S 86° 31' 02.5" E
SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -Y14- PROFILE
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS


SEE STREAM MITIGATION PLANS
S S DENOTES IMPACTS TO SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS TO SURFACE WATER
NAD 83
SITE 20
GAY and wife, EARLINE EDWARDS
D.B. 146 PG. 651
(HISTORIC PROPERTY)
REMOVE EXIST. RCBC
GALD CREEK
TOP OF BANK
TAILDITCH
SEE CHANNEL DETAIL "FF" SHT 2-J
DENNIS MATT JONES, and wife, PATRICIA JONES
D.B. 289 PG. 62
JOHN ROSCOE BANKS and STOKES CLINTON AUSTIN
D.B. 170 PG. 457
SR 1128 POSSUM TROT RD
WILLIAM DWAYNE JONES
D.B.269 PG.114
PATRICIA GAIL JONES, and husband DENNIS JONES
D.B. 233 PG. 238
FALSE SUMP
-Y14-
N 86 28 04.9" W
-Y14- POT Sta. 11+24.492
S 86 31 02.5" E
SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -Y14- PROFILE
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS

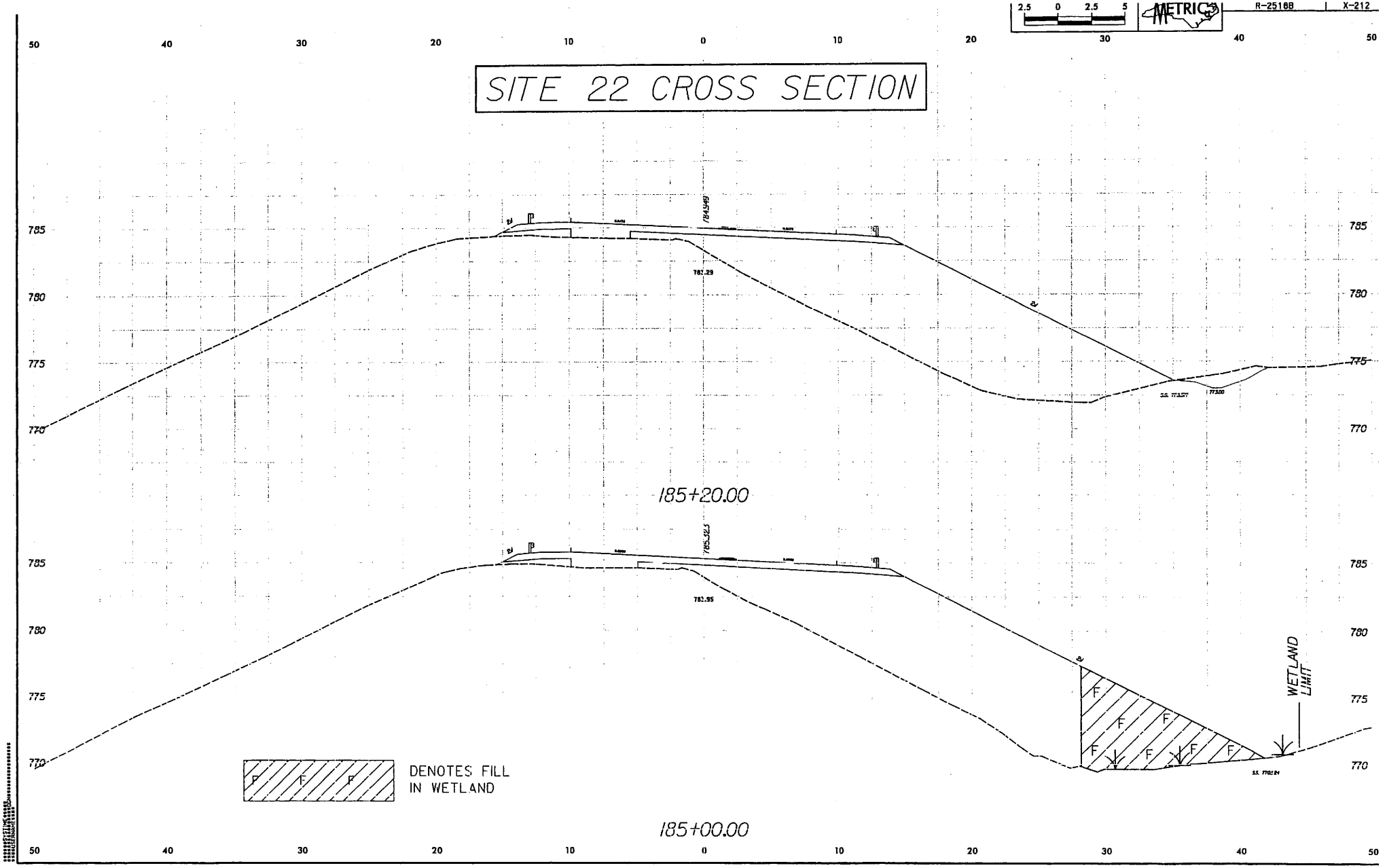

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 22
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
-Y13- (US 19 W)
ADT 2008 933 2028 1,267
-L- (US 19) 625 875 8,417 12,583 -L- (US 19)
00 00
8,750 13,250
325 575
617 783
1,250 1,750
-Y14- (SR 1128)
NAD 83
GAY and wife, EARLINE EDWARDS D.B. 146 PG. 651
BM #12 -BY14- STA 6+07.277 48.800 RIGHT -Y13- STA. 10+33.170 43.58m RT ELEV. 761.130
BOBBY JOHN HOILMAN D.B. 269 PG. 063
ALAN R. McCURRY and wife RITA A. McCURRY D.B. 224 PG. 118
-L- POT Sta. 179+00.000 -Y14- POT Sta. 10+00.000
-Y13- POT Sta. 11+11.893
-L- PCSta. 179+00.000
-Y13- POT Sta. 10+00.000
-Y14- PCSta. 10+00.760
-L- TSSta. 179+60.260
-Y14- PTSta. 10+57.910
-L- SCSta. 180+21.760
SITE 21 UT TO BALD CREEK
SITE 20A UT TO BALD CREEK
PATRICIA GAIL JONES, and husband DENNIS JONES D.B. 233 PG. 238
DENNIS MATT JONES, and wife, PATRICIA JONES D.B. 207 PG. 530
-Y14-
PI Sta. 10+40.786
Δ = 90° 02' 58.7" (RT)
L = 47.150
T = 30.026
R = 30.000
SE = 0.05
-L-
PIs Sta. 180+01.262
θs = 1° 36' 06.0"
Ls = 61.500
LT = 41.002
ST = 20.502
PI Sta. 182+73.688
Δ = 25° 47' 58.0" (RT)
L = 495.314
T = 251.928
R = 1,100.000
SE = 0.05
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
DENOTES FILL IN SURFACE WATER
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 55 FOR -Y13- PROFILE
SEE SHEET 55 FOR -Y14- PROFILE
SEE SHEET 2-E FOR -Y13-/-Y14- BULB INTERSECTION DETAIL
RETAIN
REMOVE
CONV. DI TO JB
FALSE SUMP
BERM OUTLET
BERM DITCH
EXISTING R/W
BEG. FENCE AT R/W APPX. TIE TO EXIST.
END WW FENCE
TIE TO EXIST. WW FENCE
375 RCP
450 RCP
600 RCP
800 RCP
1200 RCP
400 CSP
1200 CSP
2GI
JB
DI
CB


GAY and wife, EARLINE EDWARDS D.B. 146 PG. 651
BM #12 -BY14- STA 6+07.277 48.800 RIGHT -Y13- STA. 10+33.170 43.51m RT ELEV. 761.130
-Y13- BST Sta.10+00.000
-L- POT Sta.179+00.000 = -Y13- POT Sta.11+17.693
-L- POT Sta.179+00.000 = -Y14- POT Sta.10+00.000
S 29° 23' 54" W
S 86° 31' 02.5" E
S 3° 28' 56" W
-Y14- PCSta.10+10.760
-L- TSSta.179+60.260
-L- SCSta.180+21.760
-Y14- PTSta.10+57.310
SITE 21 UT TO BALD CREEK
SITE 20A UT TO BALD CREEK
BERM OUTLET
BOBBY JOHN HOILMAN D.B. 269 PG. 063
ALAN R. McCURRY and wife, RITA A. McCURRY D.B. 224 PG. 118
PATRICIA GAIL JONES, and husband DENNIS JONES D.B. 233 PG. 236
DENNIS MATT JONES, and wife, PATRICIA JONES D.B. 207 PG. 530
-Y13- (US 19 W)
-L- (US 19)
-Y14- (SR 1128)
ADT 2008 2028
933 1,267
625 875
8,750 13,250
325 575
617 783
1,250 1,750
8,417 12,583
00 00
FALSE SUMP
CONV. DI TO JB
REMOVE
RETAIN
TIE TO EXIST. WW FENCE
EXISTING R/W
BERM DITCH
-Y14- PI Sta 10+40.786 Δ = 90° 02' 58.7" (RT) L = 47.150 T = 30.026 R = 30.000 SE = 0.05
PIs Sta 180+01.262 Δs = 1° 36' 06.0" Ls = 61.500 LT = 41.002 ST = 20.502
PI Sta 182+73.688 Δ = 25° 47' 58.0" (RT) L = 495.314 T = 251.928 R = 1,100.000 SE = 0.05
TS TS DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
S S DENOTES FILL IN SURFACE WATER
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 55 FOR -Y13- PROFILE
SEE SHEET 55 FOR -Y14- PROFILE
SEE SHEET 2-E FOR -Y13-/-Y14- BULB INTERSECTION DETAIL
NAD 83
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 22
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
SUITE 141 975 WALNUT STREET CARY, NC 27511 PH (919) 319-8850

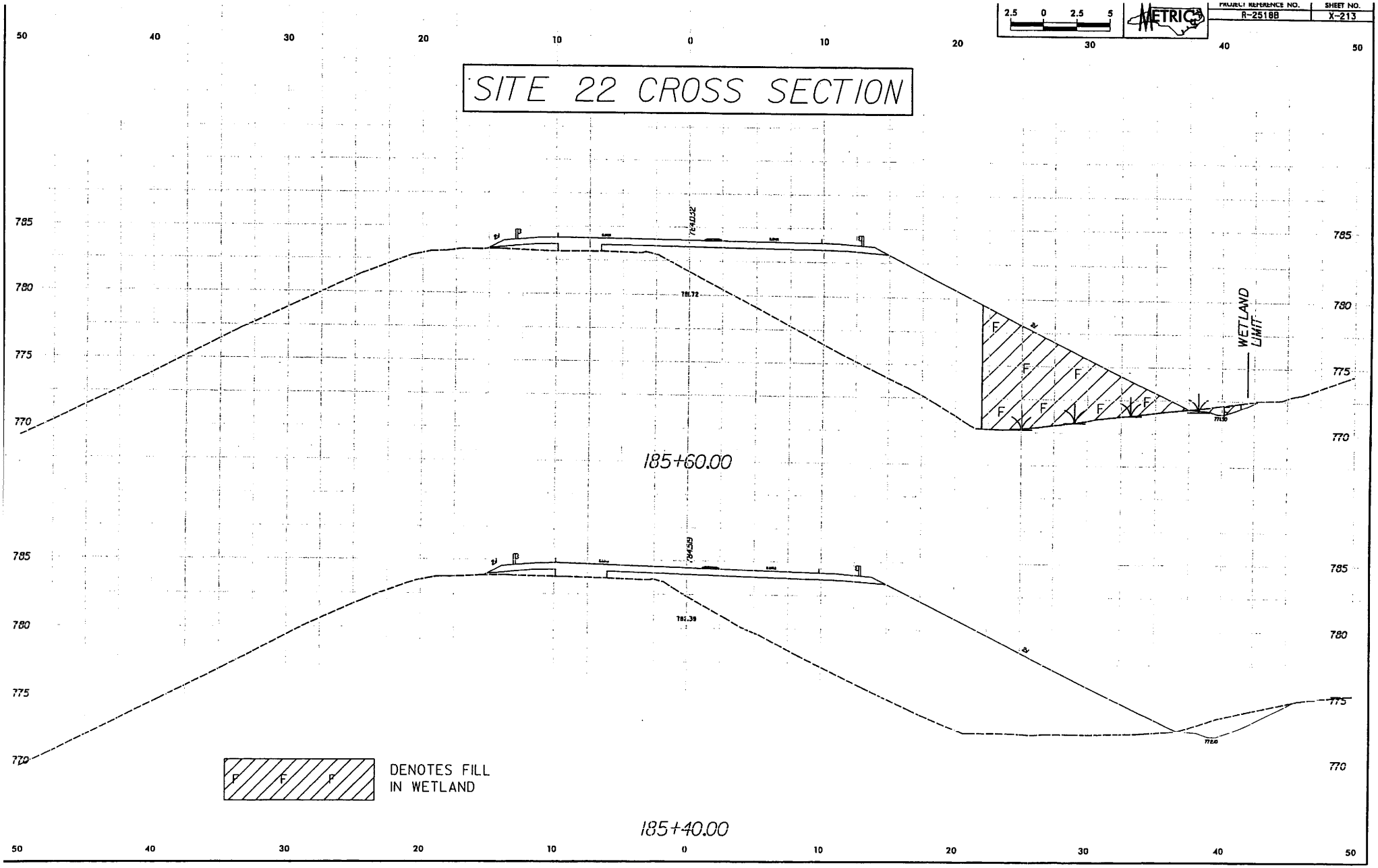

SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
R/W SHEET NO. 23
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
-L-
PI Sta 182+73.688
Δ = 25° 47' 58.0" (RT)
L = 495.314
T = 251.928
R = 1,100.000
SE = 0.05
PIs Sta 185+37.575
θs = 1° 36' 06.0"
Ls = 61.500
LT = 41.002
ST = 20.502
-DR2-
PI Sta 10+15.595
Δ = 24° 36' 36.7" (LT)
L = 21.476
T = 10.906
R = 50.000
SE = 0.02
PI Sta 10+40.815
Δ = 5° 31' 34.2" (RT)
L = 27.160
T = 14.649
R = 29.227
SE = 0.02
ALAN R. McCURRY and wife, RITA A. McCURRY D.B. 224 PG. 118
ALAN McCURRY and wife, RITA ANN McCURRY D.B. 254 PG. 163
GEORGE O. RANDOLPH and wife, LOUISE RANDOLPH D.B. 197 PG. 348
DENNIS WILSON and CYNTHIA WOODY D.B. 224 PG. 037
GLENN and wife, PHYLLIS WILSON D.B. 197 PG. 333
JAMES RANDALL McINTOSH D.B. 293 PG. 652
S 82° 15' 55.9" E
S 59° 28' 07.6" E
CONVERT DI TO JB
RETAIN
MOVE
FALSE SUMP
SEE DETAIL 1
SEE SHEET 2-B
-DR2- POT Sta.10+00.000 = -L- POC Sta.184+10.000
-DR2- PRC Sta.10+26.165
-DR2- PT Sta.10+53.325
-DR2- PC Sta.10+04.689
-DR2- POT Sta.10+86.357
SITE 22
UT TO CANE RIVER
-L- CSSta.185+17.074
SITE 22A
-L- SRSSta.185+78.574
HEADDITCH
HEADWALL
BEAM DITCH
LAT. BASE DITCH
LAT. V-DITCH
END WW FENCE
BEG. WW FENCE
BM #13
-BL- STA 76+60.499
68.514 RIGHT
-L- STA. 184+71.673
63.867m RT
ELEV. 774.908
JAMES W. WESTALL (single) and RONDA WESTALL and wife, NANCY M. WESTALL D.B. 205 PG. 107
BENJAMIN AARON and wife, ANGELA TIPTON D.B. 377 PG. 506
BANKS HOLDING COMPANY, LP D.B. 418 PG. 121
DENOTES TEMP. IMPACTS TO SURFACE WATER
DENOTES EXCAVATION IN WETLANDS
DENOTES IMPACTS TO SURFACE WATER
DENOTES FILL IN WETLAND
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 58 FOR -DR2- PROF
REVISIONS
REVISED 7/8/08

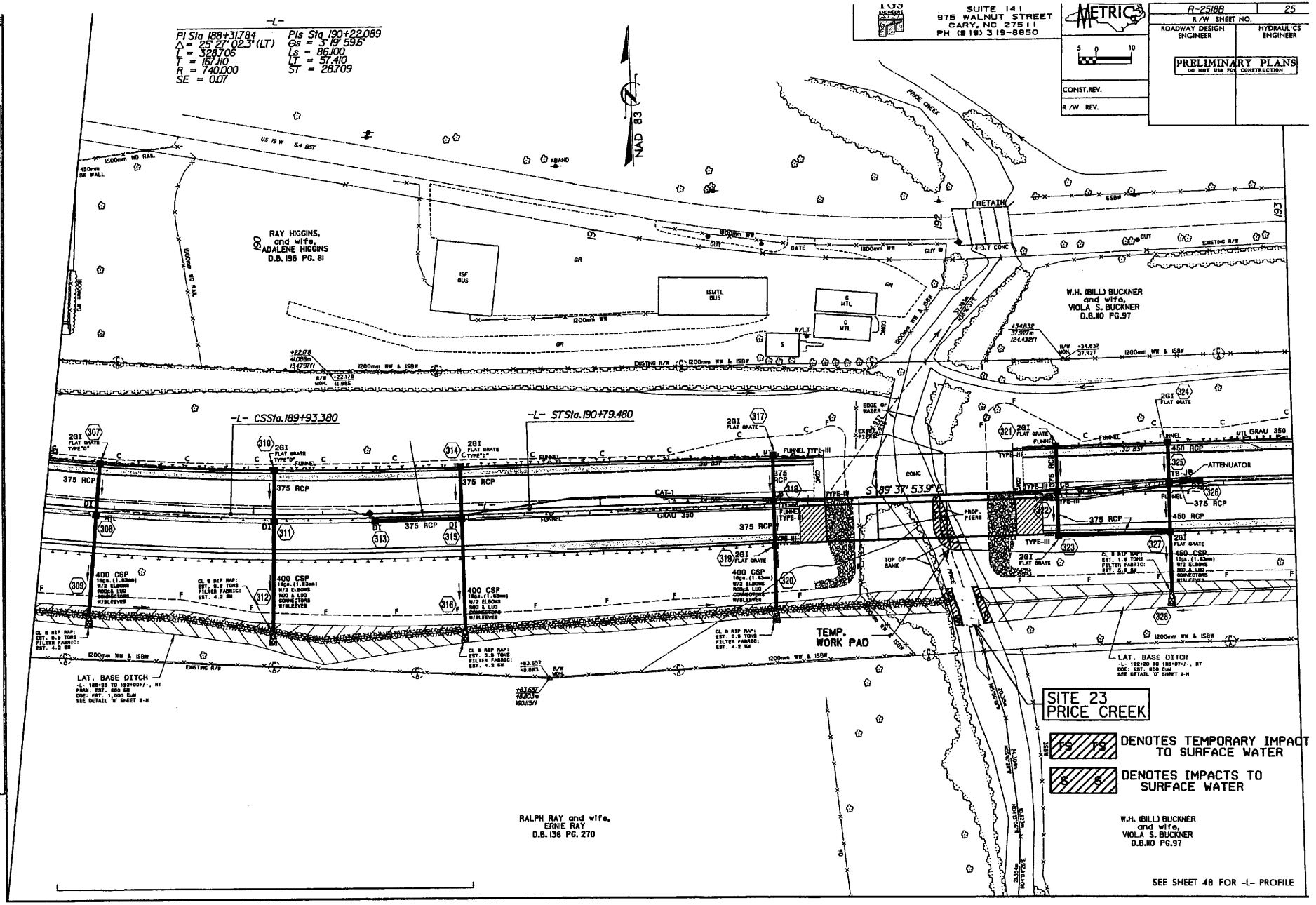

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2588
SHEET NO. 23
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
PI Sta 182+73.688
Δ = 25°47'58.0" (RT)
L = 495.314
T = 251.928
R = 1100.000
SE = 0.05
Pls Sta 185+37.575
Θs = 1°36'06.0"
Ls = 61.500
LT = 41.002
ST = 20.502
PI Sta 10+15.595
Δ = 24°36'36.7" (LT)
L = 21.476
T = 10.906
R = 50.000
SE = 0.02
PI Sta 10+40.815
Δ = 53°14'34.2" (RT)
L = 27.160
T = 14.649
R = 29.227
SE = 0.02
ALAN R. McCURRY and wife, RITA A. McCURRY D.B. 224 PG. 118
ALAN McCURRY and wife, RITA ANN McCURRY D.B. 294 PG. 163
GEORGE G. RANDOLPH and wife, LOUISE RANDOLPH D.B. 197 PG. 348
DENNIS WILSON and CYNTHIA WOODS D.B. 224 PG. 037
GLENN and wife, PHYLLIS WILSON D.B. 197 PG. 333
JAMES RANDALL MCINTOSH D.B. 293 PG. 652
GAMES W. WESTALL, JR. and RONDA WESTALL and wife, NANCY M. WESTALL D.B. 205 PG. 107
BENJAMIN AARON and wife, ANGELA TIPTON D.B. 377 PG. 506
BANKS HOLDING COMPANY, LP D.B. 418 PG. 121
-DR2- POT Sta 10+00.000
POC Sta 184+10.000
-DR2- PRC Sta 10+26.165
-DR2- RT Sta 10+53.325
-DR2- PC Sta 10+04.869
-DR2- POT Sta 10+86.357
SITE 22
UT TO CANE RIVER
-L- CS Sta 183+17.074
SITE 22A
-L- SR Sta 185+78.574
BERM DITCH
HEADDITCH
HEADWALL
LAT. BASE DITCH
LAT. V-DITCH
END WW FENCE
RETAIN
CONVERT DI TO JB
FALSE SUMP
375 RCP
450 RCP
1800mm CONC
1200mm RCP
1200mm WW & 158W
200mm WW & 158W
CATES
ANTENNA
GRAU 350
BM #3
-BL- STA 76+60.499
66.514m RIGHT
-L- STA. 184+71.673
63.667m RT
ELEV. 714.908
DENOTES TEMP. IMPACTS TO SURFACE WATER
DENOTES IMPACTS TO SURFACE WATER
DENOTES EXCAVATION IN WETLANDS
DENOTES FILL IN WETLAND
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 58 FOR -DR2- PROFILE
REVISED 1/18/08

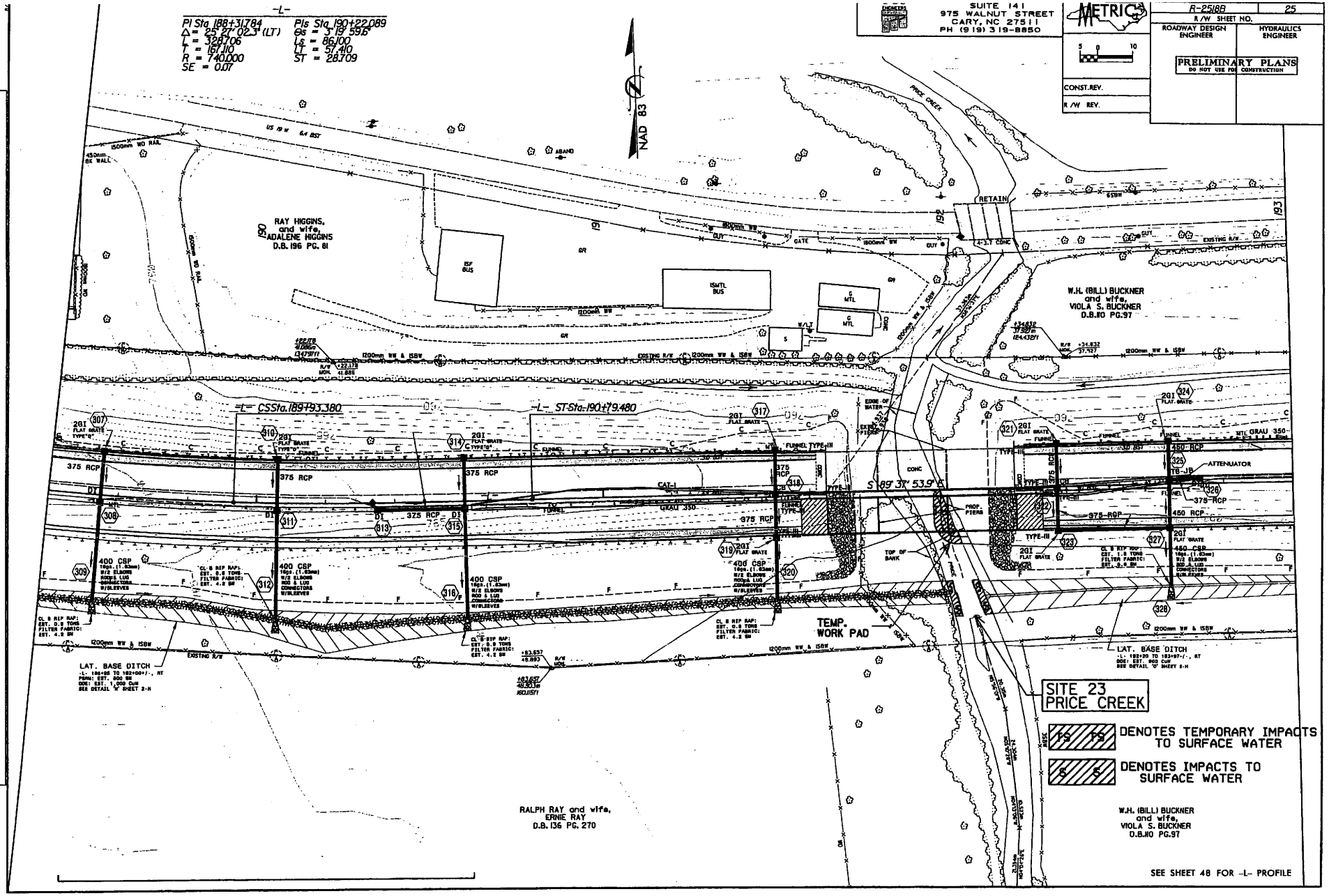
SITE 22 CROSS SECTION



SITE 22 CROSS SECTION

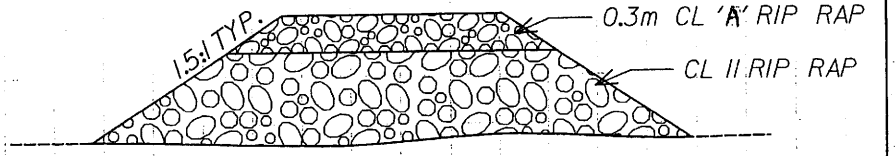



SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
25
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
PI Sta 188+31.784
Δ = 25° 27' 02.3" (LT)
L = 328.706
T = 167.110
R = 740.000
SE = 0.07
PIs Sta 190+22.089
Θs = 3° 19' 59.6"
Ls = 86.100
LT = 57.410
ST = 28.709
NAD 83
-L- CSSta. 189+93.380
-L- STSta. 190+79.480
RAY HIGGINS, and wife, ADALENE HIGGINS D.B. 196 PG. 81
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.110 PG.97
RALPH RAY and wife, ERNIE RAY D.B. 136 PG. 270
TEMP. WORK PAD
PROP. PIERS
TOP OF BANK
EDGE OF WATER
PRICE CREEK
LAT. BASE DITCH
SITE 23
PRICE CREEK
DENOTES TEMPORARY IMPACT TO SURFACE WATER
DENOTES IMPACTS TO SURFACE WATER
SEE SHEET 4B FOR -L- PROFILE

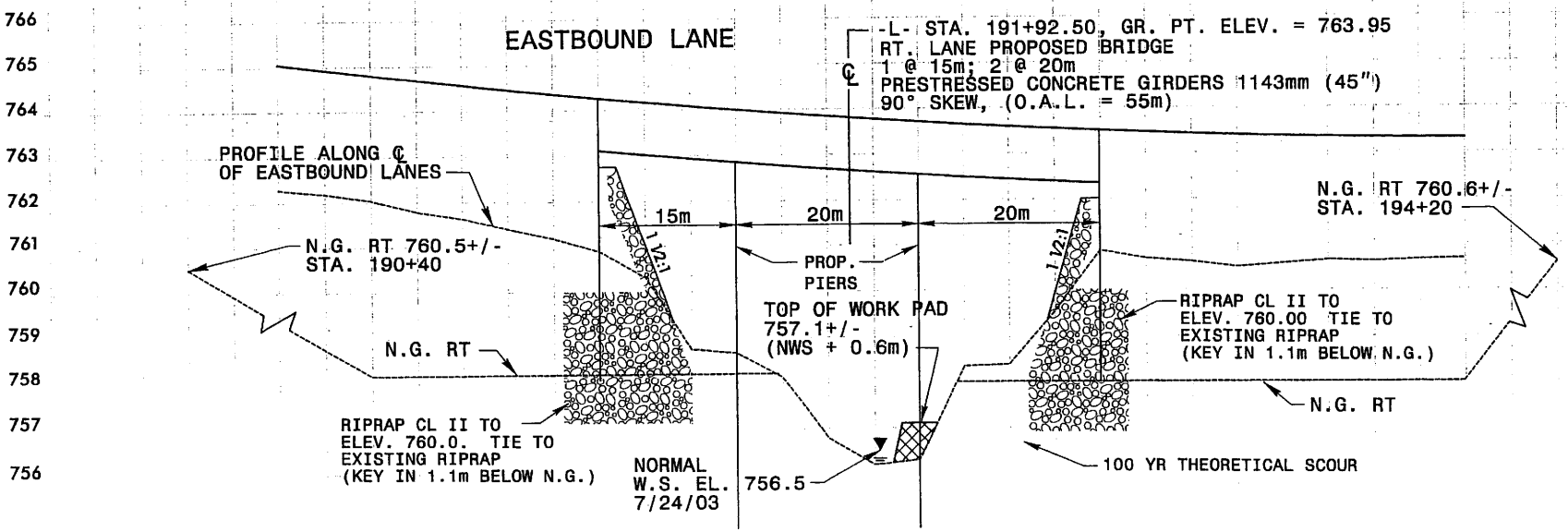

-L-
PI Sta. 188+31.784
Δ = 25° 27' 02.3" (LT)
D = 3°28'06"
T = 167.10
R = 740.000
SE = 0.07
PIs Sta. 190+22.089
θs = 5° 19' 55.6"
Ls = 86.00
LT = 57.40
ST = 28.709
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R-2518B
R/W SHEET NO.
25
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
NAD 83
PRICE CREEK
RAY HIGGINS, and wife, ADALENE HIGGINS D.B. 196 PG. 81
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.110 PG.97
-L- CSSta. 189+93.380
-L- STSta. 190+79.480
S 89° 37' 53.9" E
RALPH RAY and wife, ERNIE RAY D.B. 136 PG. 270
TEMP. WORK PAD
LAT. BASE DITCH
SITE 23 PRICE CREEK
DENOTES TEMPORARY IMPACTS TO SURFACE WATER
DENOTES IMPACTS TO SURFACE WATER
SEE SHEET 4B FOR -L- PROFILE
REVISIONS

METRIC	R-2518B	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

TEMPORARY CAUSEWAY
(NOT TO SCALE)



ESTIMATED QUANTITIES:
CL 'A' RIP RAP: 30 TONS
CL II RIP RAP: 100 TONS



SITE 23 PROFILE

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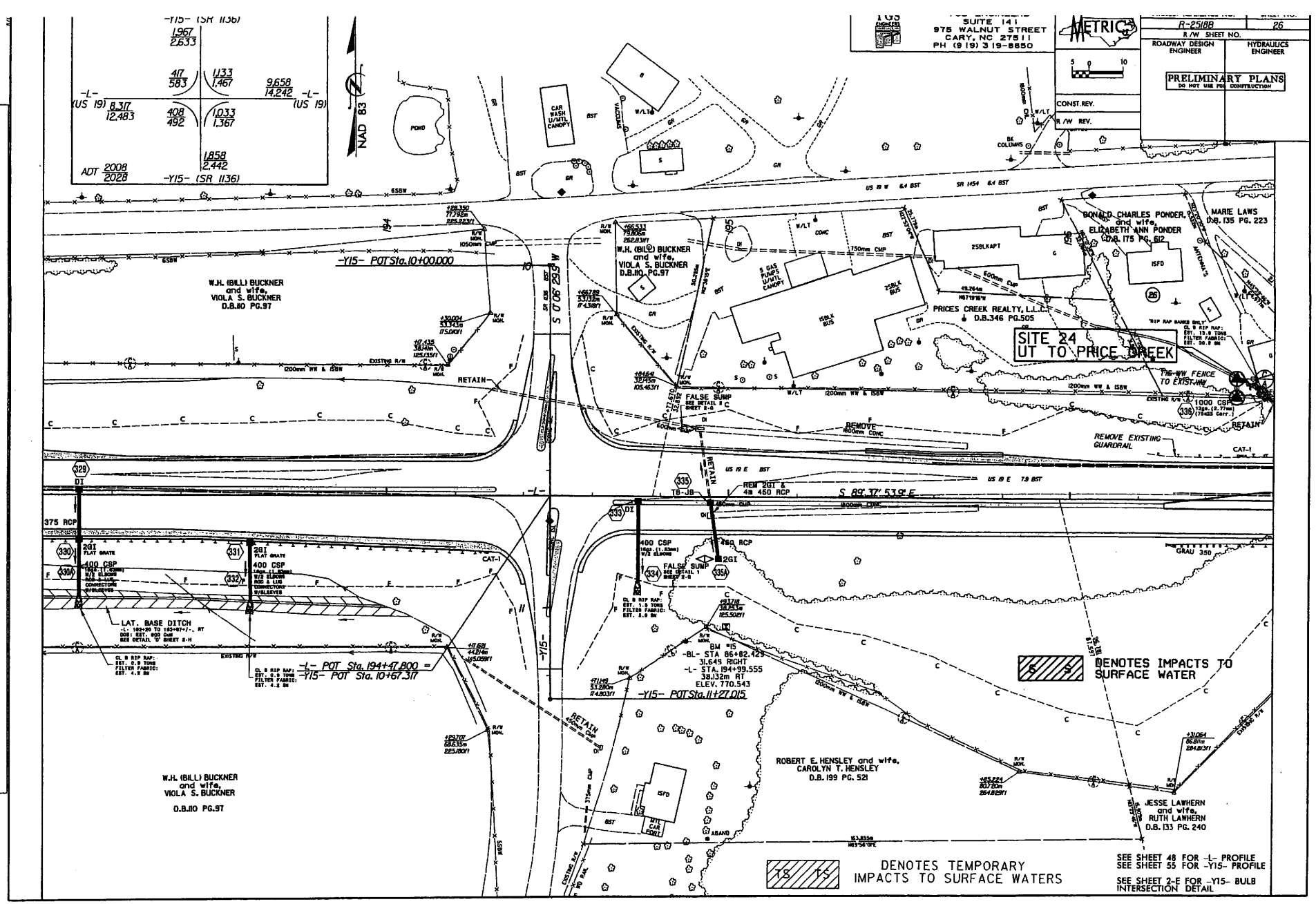
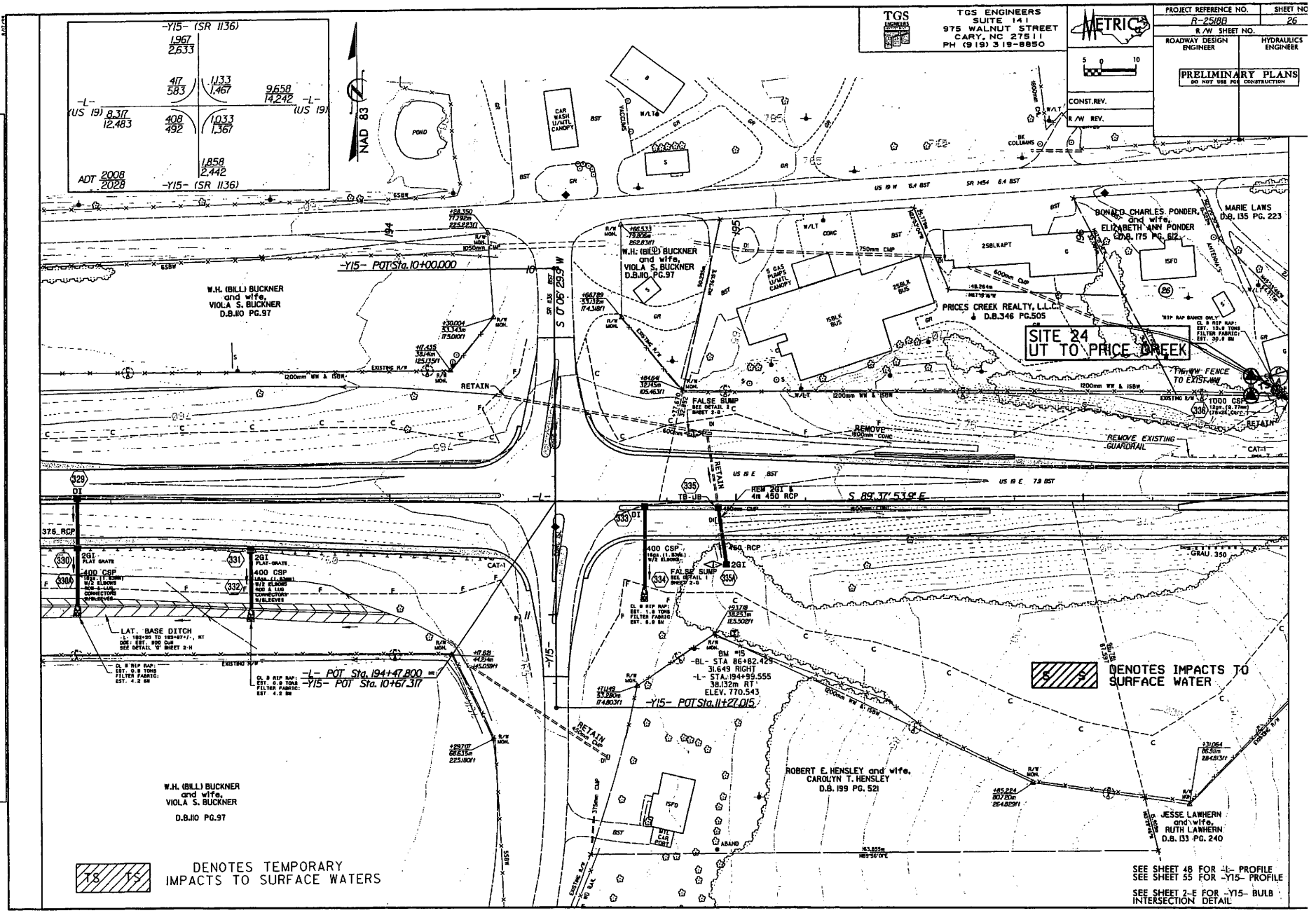
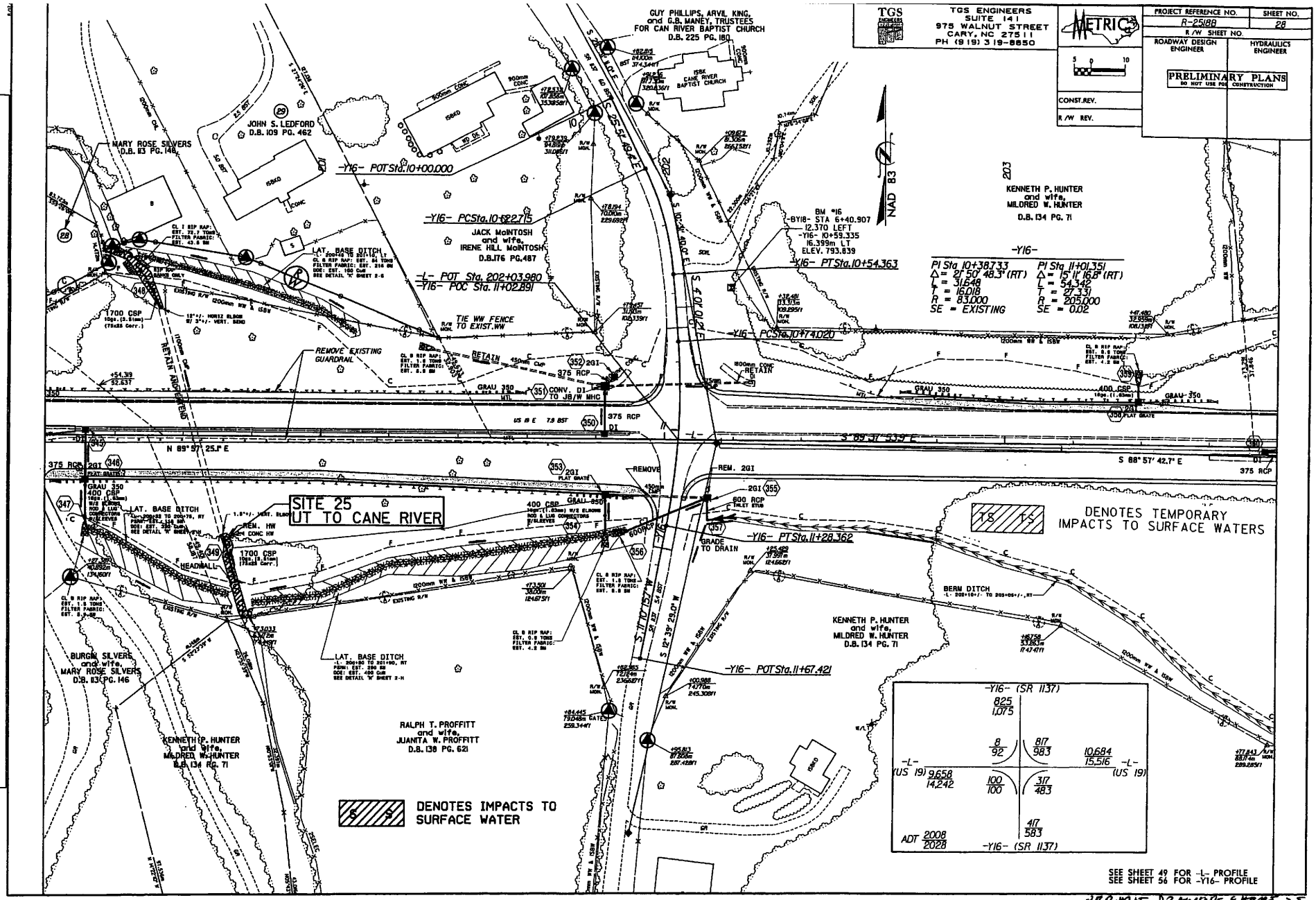
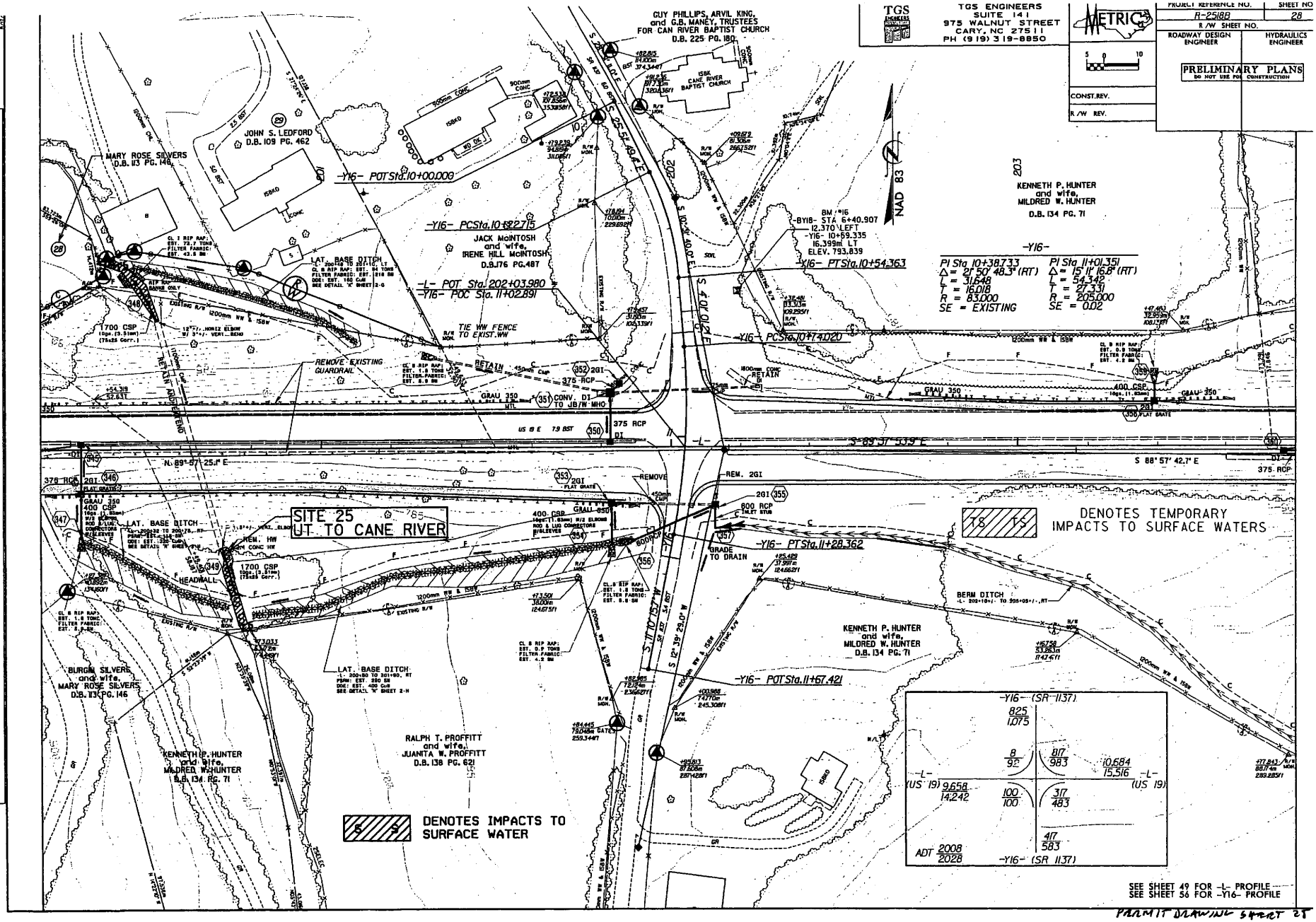

-Y15- (SR 1136)
1,967
2,633
417
583
1133
1,467
9,658
14,242
-L-
(US 19)
8,317
12,483
408
492
1033
1,367
1858
2,442
ADT 2008
2028
-Y15- (SR 1136)
NAD 83
POND
CAR WASH U/MTL CANOPY
SPRINKLER
W/L TK
GR
BST
US 19 W 6.4 BST
SR 1454 6.4 BST
BK COLUMNS
-Y15- POT Sta. 10+00.000
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.80 PG.97
S 0°06'29" W
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.80 PG.97
RETAIN
EXISTING R/W
1200mm WW & ISBW
FALSE SUMP
SEE DETAIL 5 C SHEET 5-D
REMOVE 600mm CONC
RETAIN
US 19 E BST
US 19 E 7.9 BST
REM 2GI & 4R 460 RCP
S 89°37'53.9" E
375 RCP
400 CSP
FLAT GRATE
CAT-1
LAT. BASE DITCH
-L- 182+20 TO 183+87+/-, RT
DCB: EST. #20 Curb
SEE DETAIL 'D' SHEET 8-H
CL B RIP RAP: EST.: 0.9 TONS FILTER FABRIC: EST. 4.9 SY
CL B RIP RAP: EST.: 0.5 TONS FILTER FABRIC: EST. 4.2 SY
-L- POT Sta. 194+47.800 =
-Y15- POT Sta. 10+67.317
-Y15- POT Sta. 11+27.015
BM #15
-BL- STA 86+82.423
31.649 RIGHT
-L- STA. 194+99.555
38.132m RT
ELEV. 770.543
RETAIN
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.80 PG.97
ROBERT E. HENSLEY and wife, CAROLYN T. HENSLEY D.B. 199 PG. 521
ISFD
MH CAR CONT
ABAND
JESSE LAWHERN and wife, RUTH LAWHERN D.B. 133 PG. 240
BONALD CHARLES PONDER, and wife, ELIZABETH ANN PONDER D.B. 175 PG. 612
MARIE LAWS D.B. 135 PG. 223
PRICES CREEK REALTY, L.L.C. D.B.346 PG.505
SITE 24
UT TO PRICE CREEK
RIP RAP BANKS ONLY
CL B RIP RAP: EST. 13.6 TONS FILTER FABRIC: EST. 30.0 SY
THE WW FENCE TO EXIST WW
1000 CSP
REMOVE EXISTING GUARDRAIL
CAT-1
RETAIN
GRAU 350
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 48 FOR -L- PROFILE
SEE SHEET 55 FOR -Y15- PROFILE
SEE SHEET 2-E FOR -Y15- BULB INTERSECTION DETAIL
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
CONST.REV.
R/W REV.
R-2518B
26
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
DATE: MARCH , 2004 - PARCELS 26 & 27; PROPERTY LINES REVISED; TAKE ON PARCEL 27 ELIMINATED - WC PARKER
DATE: - PARCEL 26; REMOVED "EXIST. IMP" FLAG; REVISED NAME ON "LAWS" PROPERTY - WC PARKER, PE

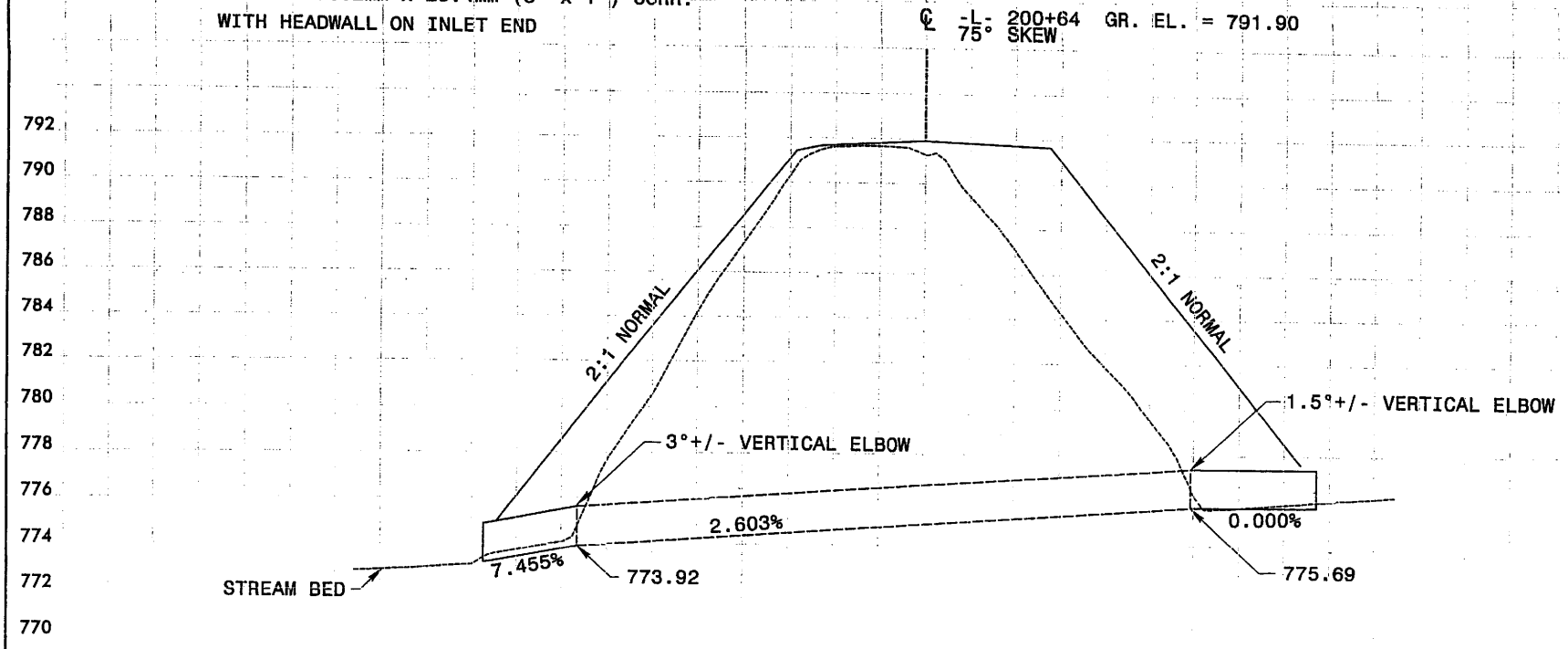

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
26
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
DATE: MARCH , 2006 - PARCELS 26 & 27; PROPERTY LINES REVISED; TAKE ON PARCEL 27 ELIMINATED - WC PARKER
DATE: _____ - PARCEL 26; REMOVED "EXIST. R/W" FLAG; REVISED NAME ON "LAWS" PROPERTY - WC PARKER, PE
-Y15- (SR 1136)
1,967
2,633
417
583
1,133
1,467
9,658
14,242
-L-
(US 19)
8,317
12,483
408
492
1,033
1,367
1,858
2,442
ADT 2008
2028
NAD 83
POND
CAR WASH W/UTIL CANOPY
BST
GR
SR
W/LT
VACUUM
BE COLUMNS
US 19 W 6.4 BST
SR 1154 6.4 BST
US 19 E 7.9 BST
-Y15- POT Sta. 10+00.000
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.110 PG.97
S 0°06'29.9" W
RETAIN
EXISTING R/W
1200mm RW & ISBW
FALSE SUMP SEE DETAIL 1 SHEET 2-B
REMOVE 1800mm CONC
REMOVE EXISTING GUARDRAIL
PRICES CREEK REALTY, L.L.C. D.B.346 PG.505
DONALD CHARLES PONDER, and wife, ELIZABETH ANN PONDER D.B. 175 PG. 512
MARIE LAWS D.B. 135 PG. 223
25BLK APT
25BLK BUS
15BLK BUS
ISFD
SITE 24
UT TO PRICE CREEK
NEW FENCE TO EXIST. R/W
TODD GSP
CL B RIP RAP; EST. 13.8 TONS FILTER FABRIC; EST. 39.8 SY
CAT-1
375 RCP
400 CSP
2GI FLAT GRATE
LAT. BASE DITCH
-L- 182+20 TO 183+87+/-, RT
DOE; EST. 800 CuM
SEE DETAIL 'G' SHEET 2-H
CL B RIP RAP; EST. 0.8 TONS FILTER FABRIC; EST. 4.2 SY
-L- POT Sta. 194+47.800 =
-Y15- POT Sta. 10+67.317
REM 2GI & 418 450 RCP
S 89°37'53.9" E
TB-UB
-Y15-
-Y15- POT Sta. 11+27.015
BM #15
-BL- STA 86+82.429
31.649 RIGHT
-L- STA. 194+99.555
38.132m RT
ELEV. 770.543
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
W.H. (BILL) BUCKNER and wife, VIOLA S. BUCKNER D.B.110 PG.97
ROBERT E. HENSLEY and wife, CAROLYN T. HENSLEY D.B. 199 PG. 521
JESSE LAWHERN and wife, RUTH LAWHERN D.B. 133 PG. 240
SEE SHEET 4B FOR -L- PROFILE
SEE SHEET 5S FOR -Y15- PROFILE
SEE SHEET 2-E FOR -Y15- BULB INTERSECTION DETAIL


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NO RIGHT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
GUY PHILLIPS, ARVIL KING, and G.B. MANEY, TRUSTEES FOR CAN RIVER BAPTIST CHURCH D.B. 225 PG. 180
ISBK CANE RIVER BAPTIST CHURCH
JOHN S. LEDFORD D.B. 109 PG. 462
MARY ROSE SILVERS D.B. 83 PG. 146
-Y16- POT Sta. 10+00.000
-Y16- PCSta. 10+62.715
JACK McINTOSH and wife, IRENE HILL McINTOSH D.B. 176 PG. 487
-L- POT Sta. 202+03.980
-Y16- POC Sta. 11+02.891
TIE WW FENCE TO EXIST. WW
REMOVE EXISTING GUARDRAIL
RETAIN
LAT. BASE DITCH
1700 CSP
375 RCP
GRAU 350
CONV. DI TO JB/W MHC
2GI
PLAT GRATE
400 CSP
GRAU-350
FLAT GRATE
N 89° 57' 25.1" E
S 89° 57' 53.9" E
S 88° 57' 42.7" E
SITE 25
UT TO CANE RIVER
REMOVE
REM. 2GI
600 RCP
TILEY STUB
GRADE TO DRAIN
-Y16- PT Sta. 11+28.362
HEADWALL
REM. HW
BERM DITCH
-Y16- POT Sta. 11+67.421
BURGIN SILVERS and wife, MARY ROSE SILVERS D.B. 83 PG. 146
KENNETH P. HUNTER and wife, MILDRED W. HUNTER D.B. 134 PG. 71
RALPH T. PROFFITT and wife, JUANITA W. PROFFITT D.B. 138 PG. 621
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
-Y16- PI Sta. 10+38.733
Δ = 2° 50' 48.3" (RT)
L = 31.648
T = 16.018
R = 83.000
SE = EXISTING
-Y16- PI Sta. 11+01.351
Δ = 15° 11' 16.8" (RT)
L = 54.342
T = 27.331
R = 205.000
SE = 0.02
-Y16- PC Sta. 10+74.020
-Y16- PT Sta. 10+54.363
-BY18- STA 6+40.907
12.370 LEFT
-Y16- 10+59.335
16.399m LT
ELEV. 793.839
BM #16
-Y16- (SR 1137)
825 / 1,075
8 / 92
817 / 983
10,684 / 15,516
-L- (US 19)
9,658 / 14,242
100 / 100
317 / 483
417 / 583
ADT 2008 / 2028
SEE SHEET 49 FOR -L- PROFILE
SEE SHEET 56 FOR -Y16- PROFILE
PERMIT DRAWING SHEET 25


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
GUY PHILLIPS, ARVIL KING, and G.B. MANEY, TRUSTEES FOR CANE RIVER BAPTIST CHURCH D.B. 225 PG. 180
CANE RIVER BAPTIST CHURCH
JOHN S. LEDFORD D.B. 109 PG. 462
MARY ROSE SILVERS D.B. 113 PG. 146
-Y16- POT Sta. 10+00.000
-Y16- PCSta. 10+22.715
JACK McINTOSH and wife, IRENE HILL McINTOSH D.B. 176 PG. 487
-L- POT Sta. 202+03.980
-Y16- POC Sta. 11+02.891
TIE WW FENCE TO EXIST. WW
REMOVE EXISTING GUARDRAIL
RETAIN
CONV. DI TO JB/W MH
SITE 25
UT TO CANE RIVER
REM. HW
HEADWALL
LAT. BASE DITCH
BURGIN SILVERS and wife, MARY ROSE SILVERS D.B. 113 PG. 146
KENNETH P. HUNTER and wife, MILDRED W. HUNTER D.B. 134 PG. 71
RALPH T. PROFFITT and wife, JUANITA W. PROFFITT D.B. 138 PG. 621
BM #16
-BY18- STA 6+40.907
12.370' LEFT
-Y16- 10+59.335
16.399m LT
ELEV. 793.839
-Y16- PT Sta. 10+54.363
-Y16-
PI Sta 10+38.733
Δ = 21° 50' 48.3" (RT)
L = 31.648
T = 16.018
R = 83.000
SE = EXISTING
PI Sta 11+01.351
Δ = 15° 11' 16.8" (RT)
L = 54.342
T = 27.331
R = 205.000
SE = 0.02
-Y16- PC Sta. 10+74.020
-Y16- PT Sta. 11+28.362
GRADE TO DRAIN
REMOVE
REM. 2GI
800 RCP INLET STUB
BERM DITCH
-L- 202+18+/- TO 205+05+/-, RT
-Y16- POT Sta. 11+67.421
KENNETH P. HUNTER and wife, MILDRED W. HUNTER D.B. 134 PG. 71
KENNETH P. HUNTER and wife, MILDRED W. HUNTER D.B. 134 PG. 71
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
DENOTES IMPACTS TO SURFACE WATER
-Y16- (SR 1137)
825
1,075
8
92
817
983
10,684
15,516
-L- (US 19)
9,658
14,242
100
100
317
483
417
583
ADT 2008
2028
-Y16- (SR 1137)
SEE SHEET 49 FOR -L- PROFILE
SEE SHEET 56 FOR -Y16- PROFILE
PERMIT DRAWING SHEET 28
DATED JAN. 2005

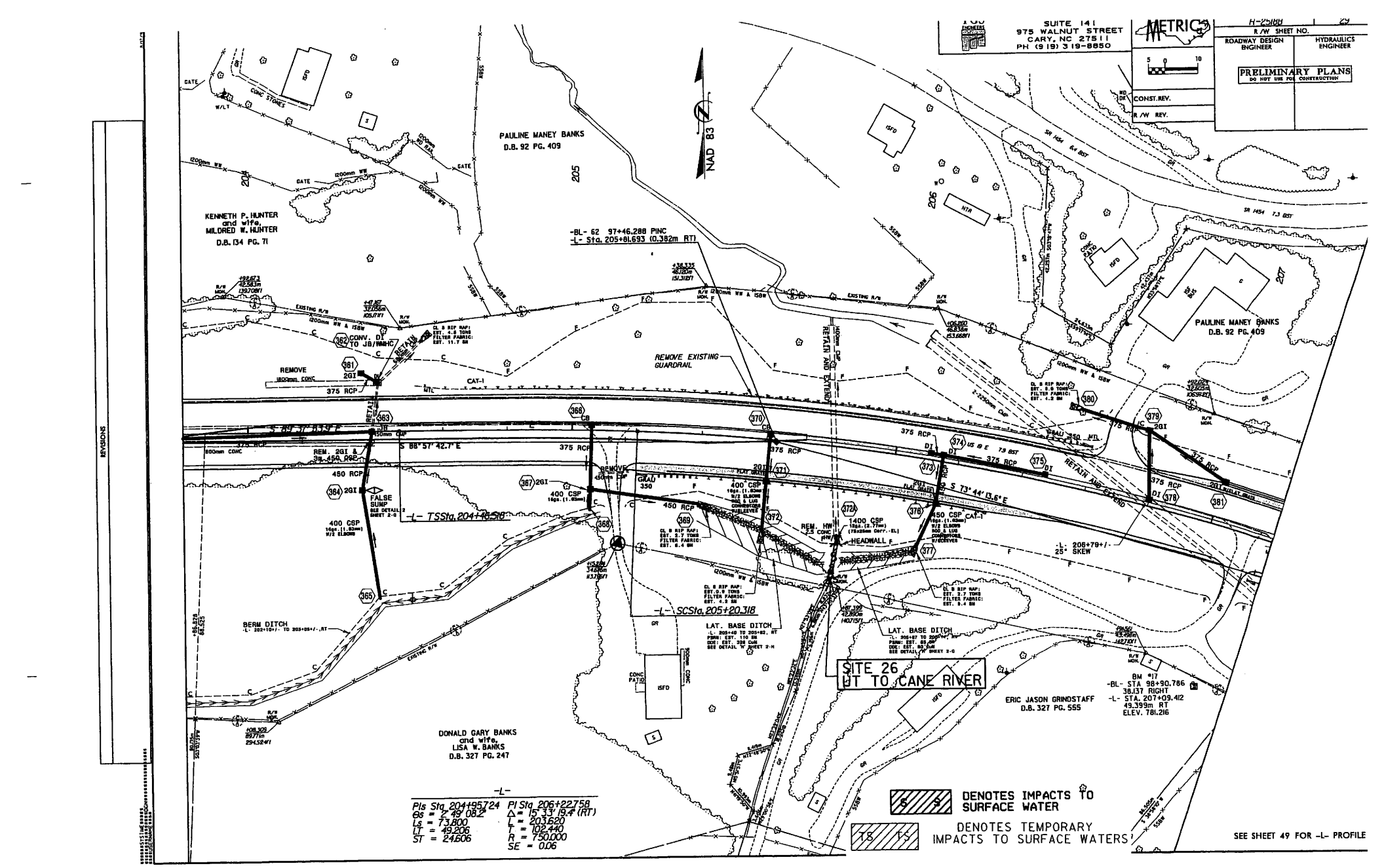
METRIC	PROJECT REFERENCE NO. R-2518B	SHEET NO.
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

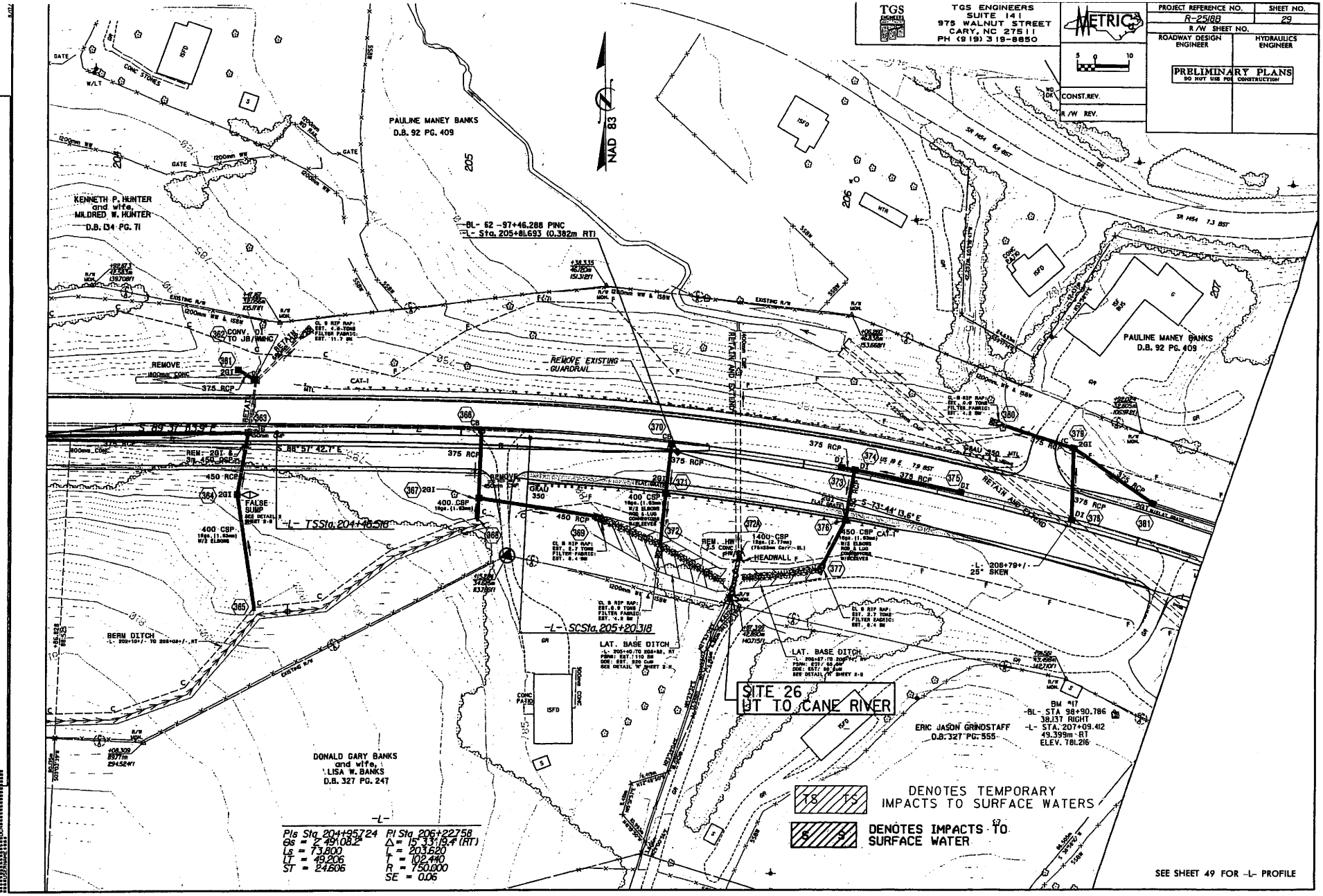
RETAIN AND EXTEND AS REQUIRED.
1700mm (66") CSP
#10 GA. 76.2mm x 25.4mm (3" x 1") CORR.
WITH HEADWALL ON INLET END

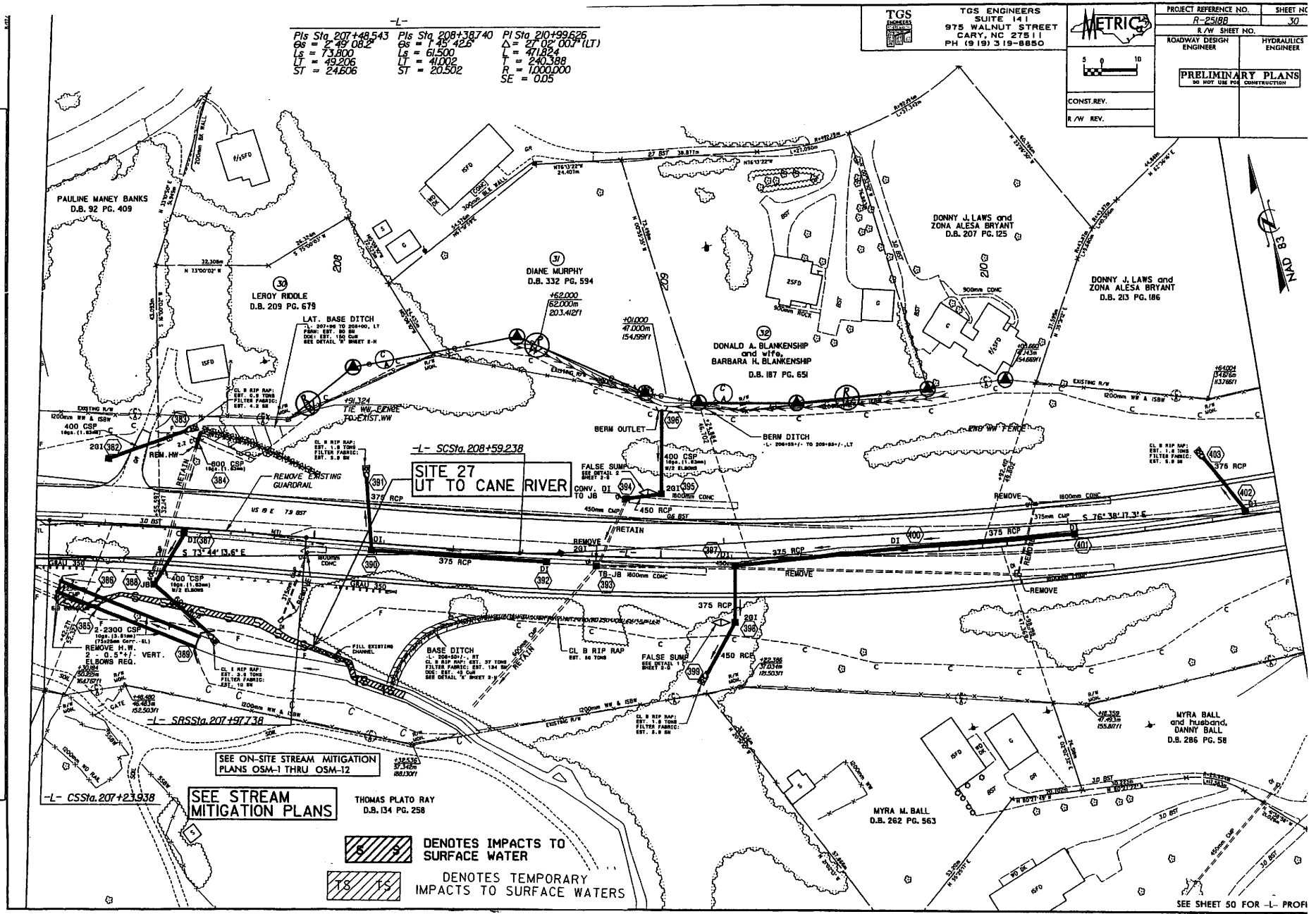


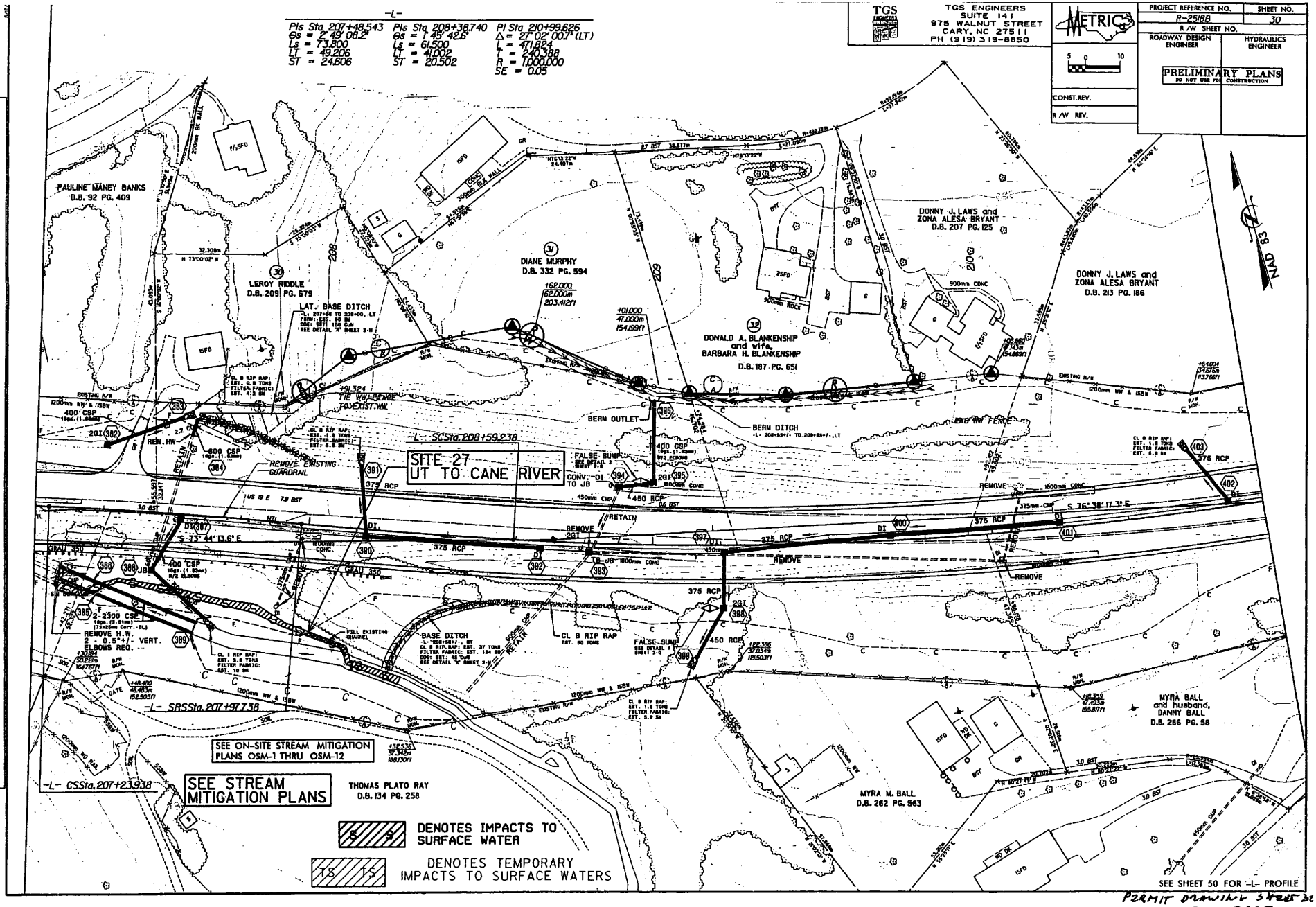
SITE 25 PROFILE

-60 -40 -20 0 +20 +40 +60 +80

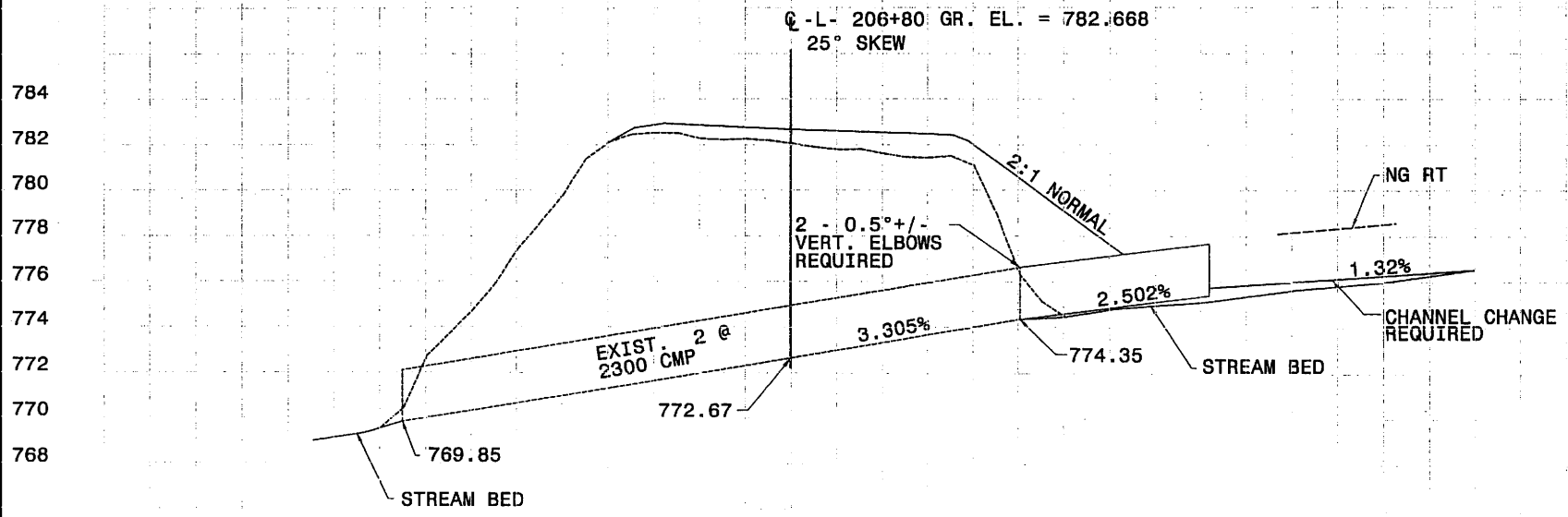

SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
NAD 83
PAULINE MANEY BANKS
D.B. 92 PG. 409
KENNETH P. HUNTER and wife, MILDRED W. HUNTER
D.B. 134 PG. 71
-BL- 62 97+46.288 PINC
-L- Sta. 205+81.693 (0.382m RT)
REMOVE EXISTING GUARDRAIL
RETAIN AND EXTEND
REMOVE 180.0mm CONC
CONV. DI TO JB/MH
REM. 2GI & 3m 450 RCP
FALSE SUMP
-L- TS Sta. 204+48.518
-L- SC Sta. 205+20.318
400 CSP
1400 CSP
HEADWALL
-L- 206+79+/- 25° SKEW
BERM DITCH
LAT. BASE DITCH
SITE 26
UT TO CANE RIVER
BM #17
-BL- STA 98+90.786
38.137 RIGHT
-L- STA. 207+09.412
49.399m RT
ELEV. 781.216
ERIC JASON GRINDSTAFF
D.B. 327 PG. 555
DONALD GARY BANKS and wife, LISA W. BANKS
D.B. 327 PG. 247
-L-
PI Sta 204+95.724
θs = 2° 49' 08.2"
Ls = 73.800
LT = 49.206
ST = 24.606
PI Sta 206+22.758
Δ = 15° 33' 19.4" (RT)
L = 203.620
T = 102.440
R = 750.000
SE = 0.06
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 49 FOR -L- PROFILE


TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO. R-2518B
SHEET NO. 29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
NAD 83
PAULINE MANEY BANKS
D.B. 92 PG. 409
KENNETH P. HUNTER
and wife,
MILDRED W. HUNTER
D.B. 134 PG. 71
-BL- 52 -97+46.288 PINC
-L- Sta. 205+81.693 (0.382m RT)
REMOVE EXISTING GUARDRAIL
RETAIN AND EXTEND
CONV. DT TO JB/MH/C
REMOVE 180mm CONC
375 RCP
450 RCP
400 CSP
1400 CSP
FALSE SUMP
-L- TS Sta. 204+48.518
-L- SCS Sta. 205+20.318
S 89°57'43.9"E
S 88°57'42.1"E
S 73°44'13.6"E
-L- 206+79+/- 25° SKEW
HEADWALL
LAT. BASE DITCH
BERM DITCH
SITE 26
UT TO CANE RIVER
BM #17
-BL- STA 98+90.786
38.137 RIGHT
-L- STA. 207+09.412
49.399m RT
ELEV. 781.216
ERIC JASON GRINDSTAFF
D.B. 327 PG. 555
DONALD GARY BANKS
and wife,
LISA W. BANKS
D.B. 327 PG. 247
-L-
PIs Sta 204+95.724
Θs = 2°49'08.2"
Ls = 73.800
LT = 49.206
ST = 24.606
PI Sta 206+22.758
Δ = 15°33'19.4" (RT)
L = 203.620
T = 102.440
R = 750.000
SE = 0.06
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
DENOTES IMPACTS TO SURFACE WATER
SEE SHEET 49 FOR -L- PROFILE


-L-
Pls Sta 207+48.543
θs = 2° 49' 08.2"
Ls = 73.800
LT = 49.206
ST = 24.606
Pls Sta 208+38.740
θs = 1° 45' 42.6"
Ls = 61.500
LT = 41.002
ST = 20.502
Pl Sta 210+99.626
Δ = 27° 02' 00.7" (LT)
L = 471.824
T = 240.388
R = 1,000.000
SE = 0.05
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
30
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
PAULINE MANEY BANKS
D.B. 92 PG. 409
LEROY RIDDLE
D.B. 209 PG. 679
DIANE MURPHY
D.B. 332 PG. 594
DONALD A. BLANKENSHIP and wife, BARBARA H. BLANKENSHIP
D.B. 187 PG. 651
DONNY J. LAWS and ZONA ALESA BRYANT
D.B. 207 PG. 125
DONNY J. LAWS and ZONA ALESA BRYANT
D.B. 213 PG. 186
MYRA BALL and husband, DANNY BALL
D.B. 286 PG. 58
MYRA M. BALL
D.B. 262 PG. 563
THOMAS PLATO RAY
D.B. 134 PG. 258
-L- SCSta. 208+59.238
SITE 27
UT TO CANE RIVER
-L- SRSSta. 207+97.738
-L- CSSta. 207+23.938
SEE ON-SITE STREAM MITIGATION PLANS OSM-1 THRU OSM-12
SEE STREAM MITIGATION PLANS
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
TIE WW FENCE TO EXIST. WW
REMOVE EXISTING GUARDRAIL
BERM OUTLET
BERM DITCH
END WW FENCE
LAT. BASE DITCH
BASE DITCH
FALSE SUMP
CL B RIP RAP
FILL EXISTING CHANNEL
REMOVE H.W. 2 - 0.5"+/- VERT. ELBOWS REQ.
REMOVE
RETAIN
CONV. DI TO JB
TS-JB
S 73° 44' 13.6" E
S 76° 38' 17.3" E
NAD 83
SEE SHEET 50 FOR -L- PROFI
PERMIT DRAWING SHEET

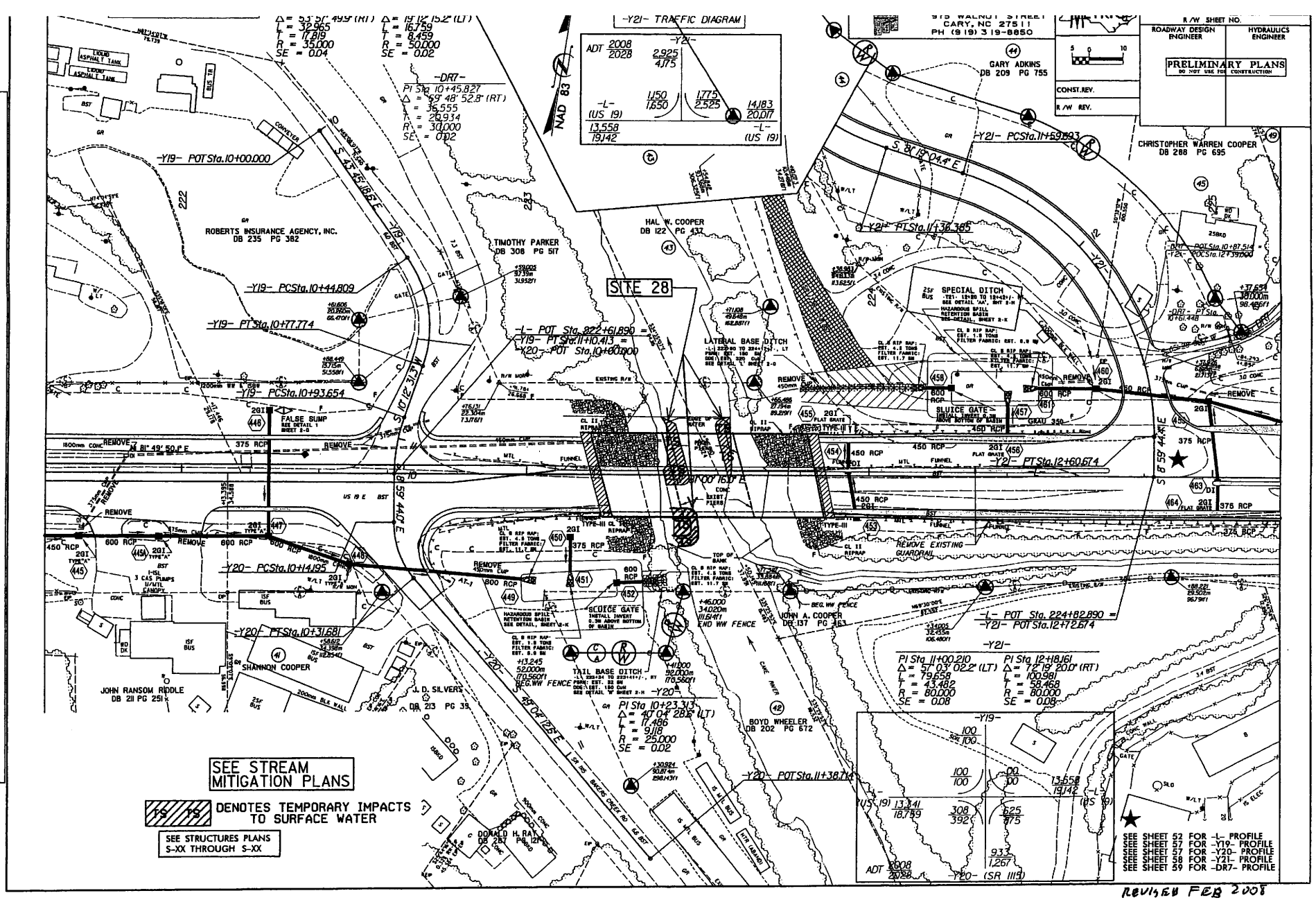

-L-
Pls Sta 207+48.543
Es = 2.49.062"
Ls = 73.800
LT = 49.206
ST = 24.606
Pls Sta 208+38.740
Es = 1.45.426"
Ls = 61.500
LT = 41.002
ST = 20.502
Pl Sta 210+99.626
Δ = 27.02.007" (LT)
L = 471.824
T = 240.388
R = 1,000.000
SE = 0.05
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850
METRIC
PROJECT REFERENCE NO.
R-2518B
SHEET NO.
30
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
NAD 83
PAULINE MANEY BANKS
D.B. 92 PG. 409
LEROY RIDDLE
D.B. 209 PG. 679
DIANE MURPHY
D.B. 332 PG. 594
DONNY J. LAWS and
ZONA ALESA BRYANT
D.B. 207 PG. 125
DONNY J. LAWS and
ZONA ALESA BRYANT
D.B. 213 PG. 186
DONALD A. BLANKENSHIP
and wife,
BARBARA H. BLANKENSHIP
D.B. 187 PG. 651
MYRA BALL
and husband,
DANNY BALL
D.B. 286 PG. 58
MYRA M. BALL
D.B. 262 PG. 563
THOMAS PLATO RAY
D.B. 134 PG. 258
LAT. BASE DITCH
SITE 27
UT TO CANE RIVER
-L- SCSta. 208+59.238
-L- SRSSta. 207+97.38
-L- CSSta. 207+23.938
REMOVE EXISTING GUARDRAIL
BERM OUTLET
BERM DITCH
FALSE SUMP
CONV. DI TO JB
TIE WIRE FENCE TO EXIST. WW
END WW FENCE
REMOVE H.W. 2 - 0.5°+/- VERT. ELBOWS REQ.
FILL EXISTING CHANNEL
BASE DITCH
CL B RIP RAP
SEE ON-SITE STREAM MITIGATION PLANS OSM-1 THRU OSM-12
SEE STREAM MITIGATION PLANS
DENOTES IMPACTS TO SURFACE WATER
DENOTES TEMPORARY IMPACTS TO SURFACE WATERS
SEE SHEET 50 FOR -L- PROFILE
PERMIT DRAWING SHEET 3

IN PLACE - 2- 2300mm (90") CSP, 10 GA., ELONGATED
76.2mm x 25.4mm (3" x 1") CORR.
WITH HEADWALL ON INLET END



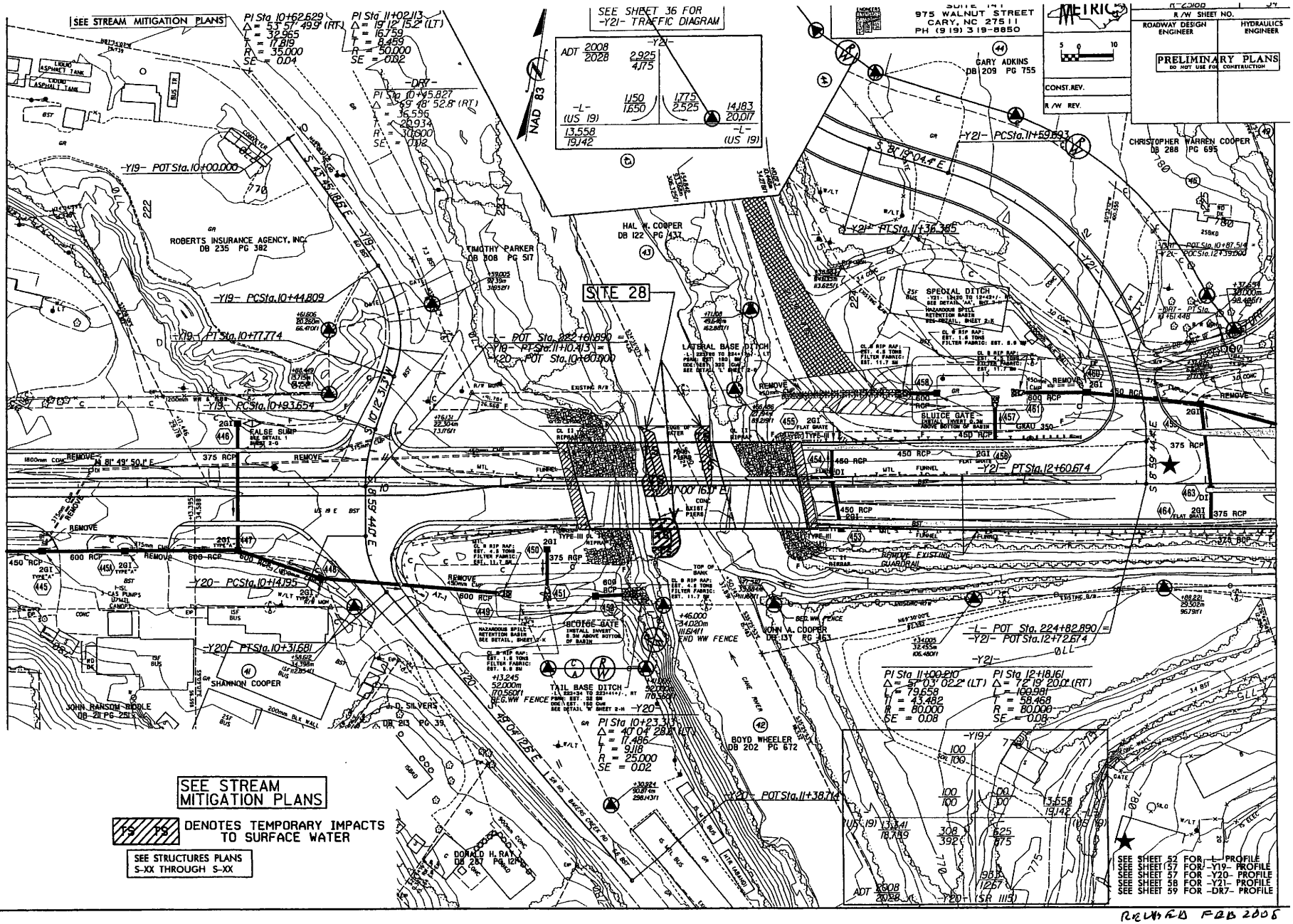
SITE 27 PROFILE

-80 -60 -40 -20 0 +20 +40 +60 +80 +100 +120



REVISED FEB 2008

PERMIT DRAWING SHEET 34

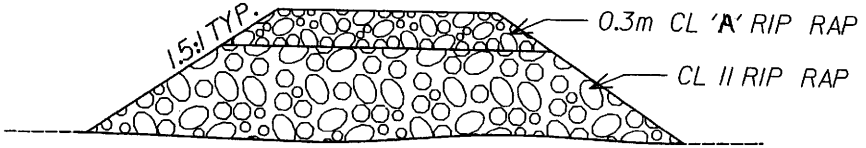


REVISED FEB 2006

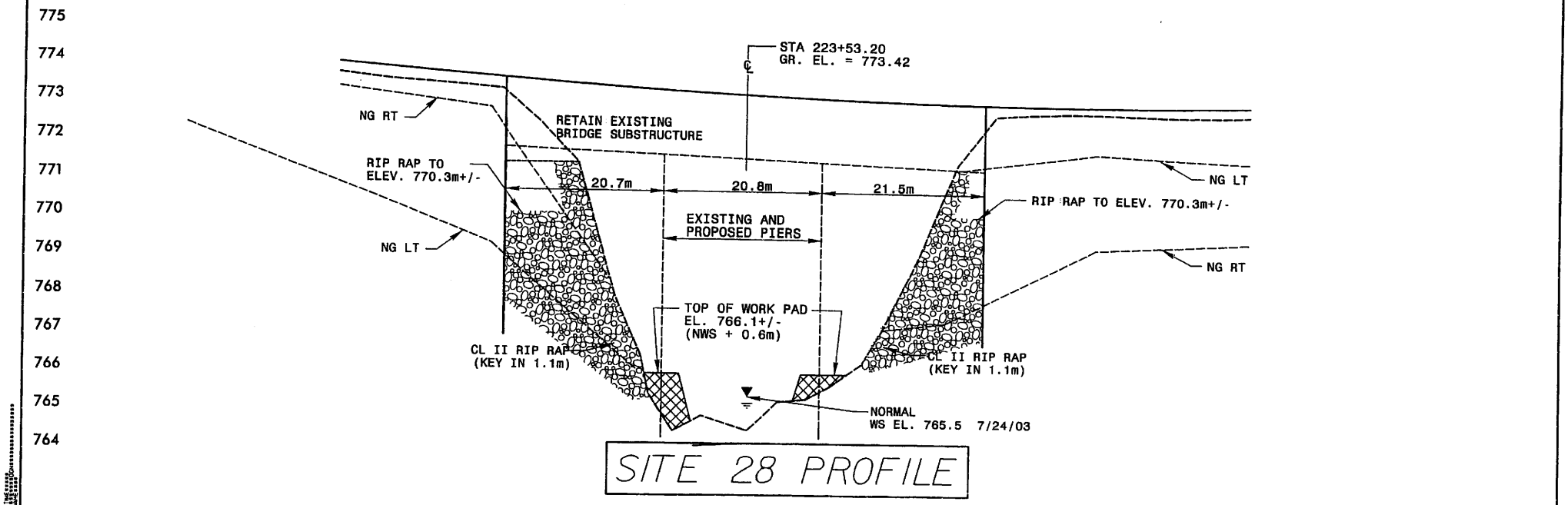
DRAFT DRAWING SHEET 3

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2518B	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R /W REV.		

TEMPORARY CAUSEWAY
(NOT TO SCALE)

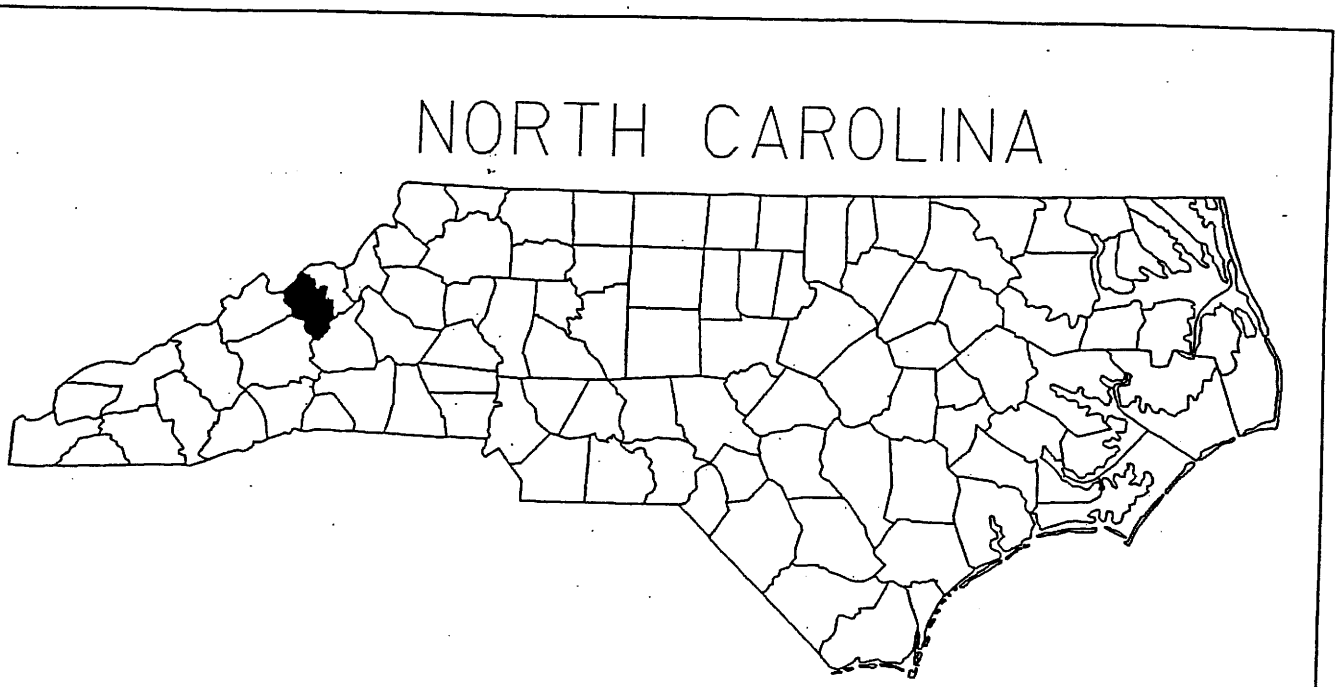


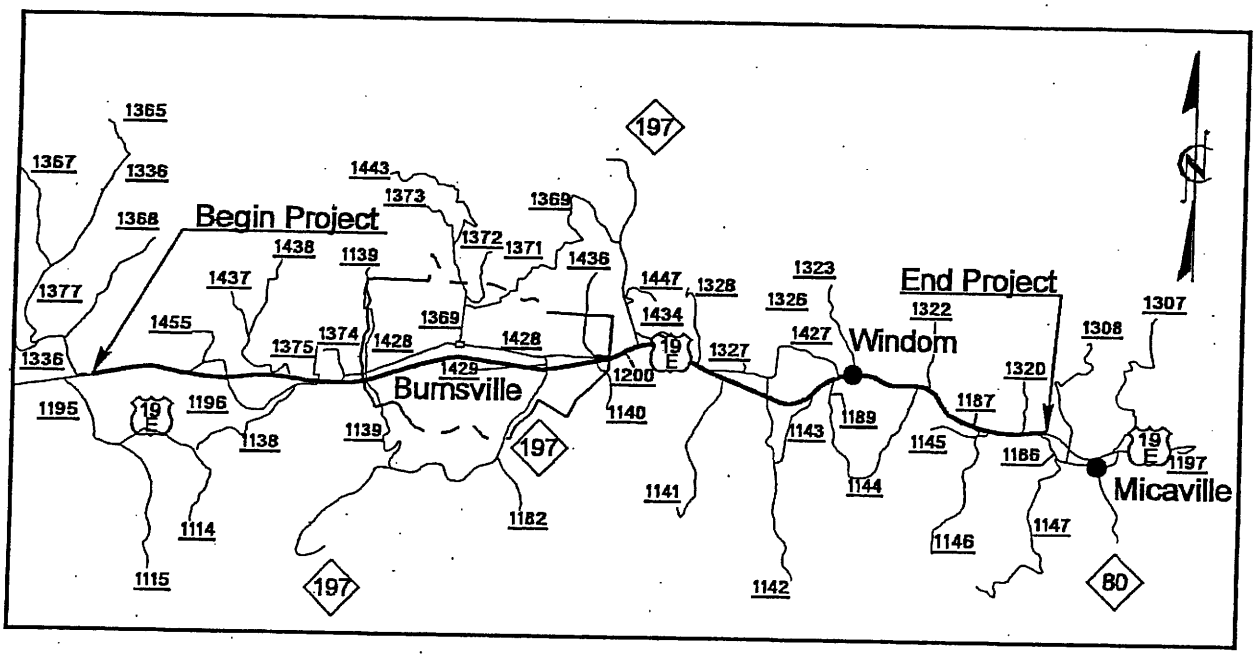
ESTIMATED QUANTITIES:
CL 'A' RIP RAP: 25 TONS
CL II RIP RAP: 250 TONS



SITE 28 PROFILE

h_Sec28_Profile.dgn 5/18/2007 7:40:56 AM TGS





VICINITY MAPS

NCDOT

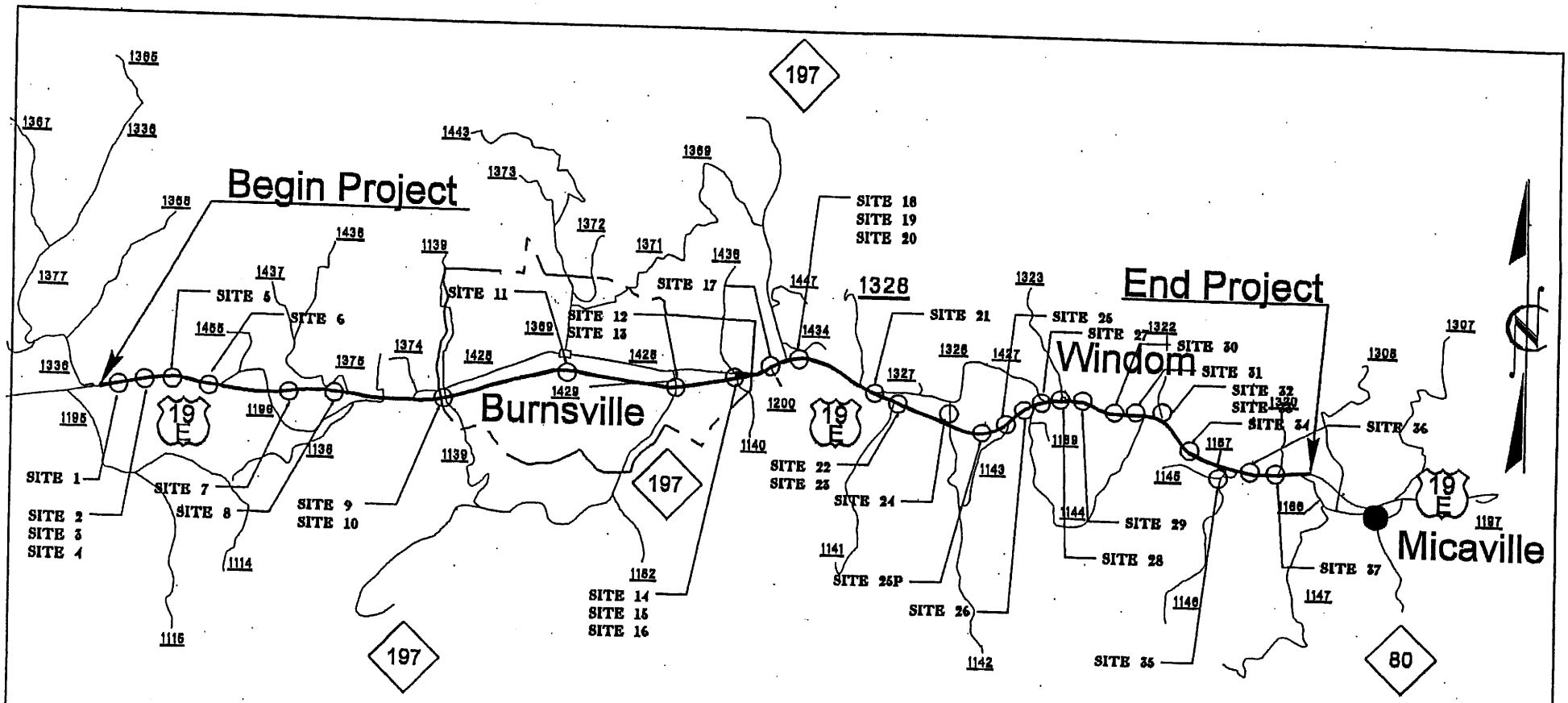
DIVISION OF HIGHWAYS

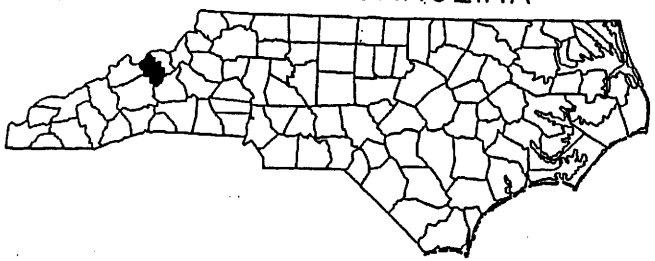
YANCEY COUNTY

PROJECT: WBS 35609.1.1 (R-2519A)

US 19 E EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19)

SHEET OF 11/15/06





VICINITY MAP

NCDOT

DIVISION OF HIGHWAYS

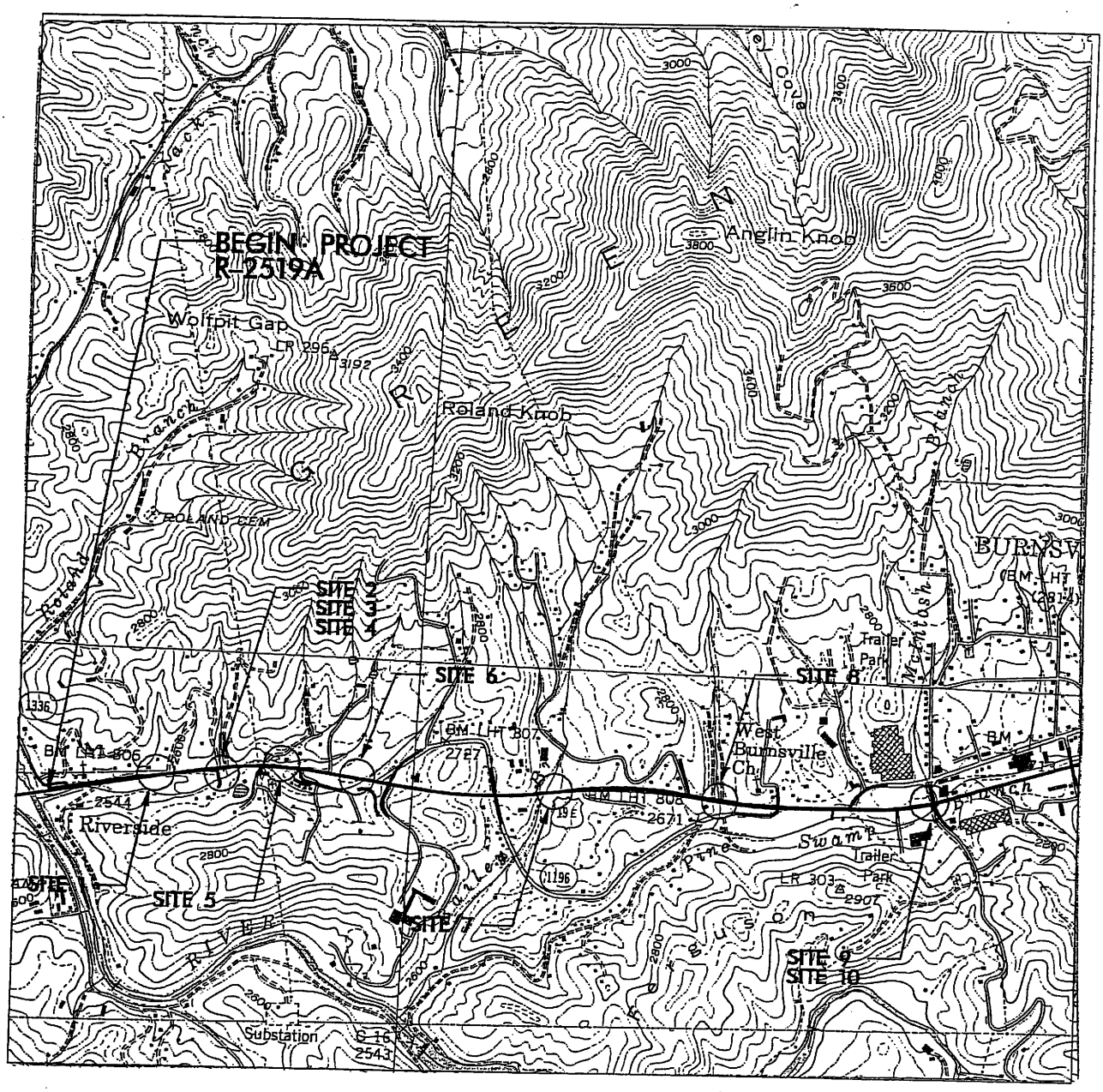
YANCEY COUNTY

PROJECT: WBS 35609.1.1 (R-2519A)

US 19 E EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19)

SHEET OF

11/15/06

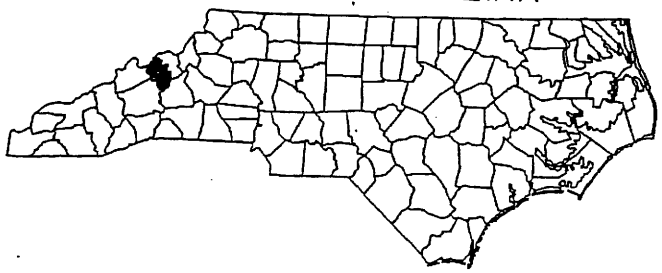


VICINITY MAP

0 ½ 1.0 mi

BURNSVILLE, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS

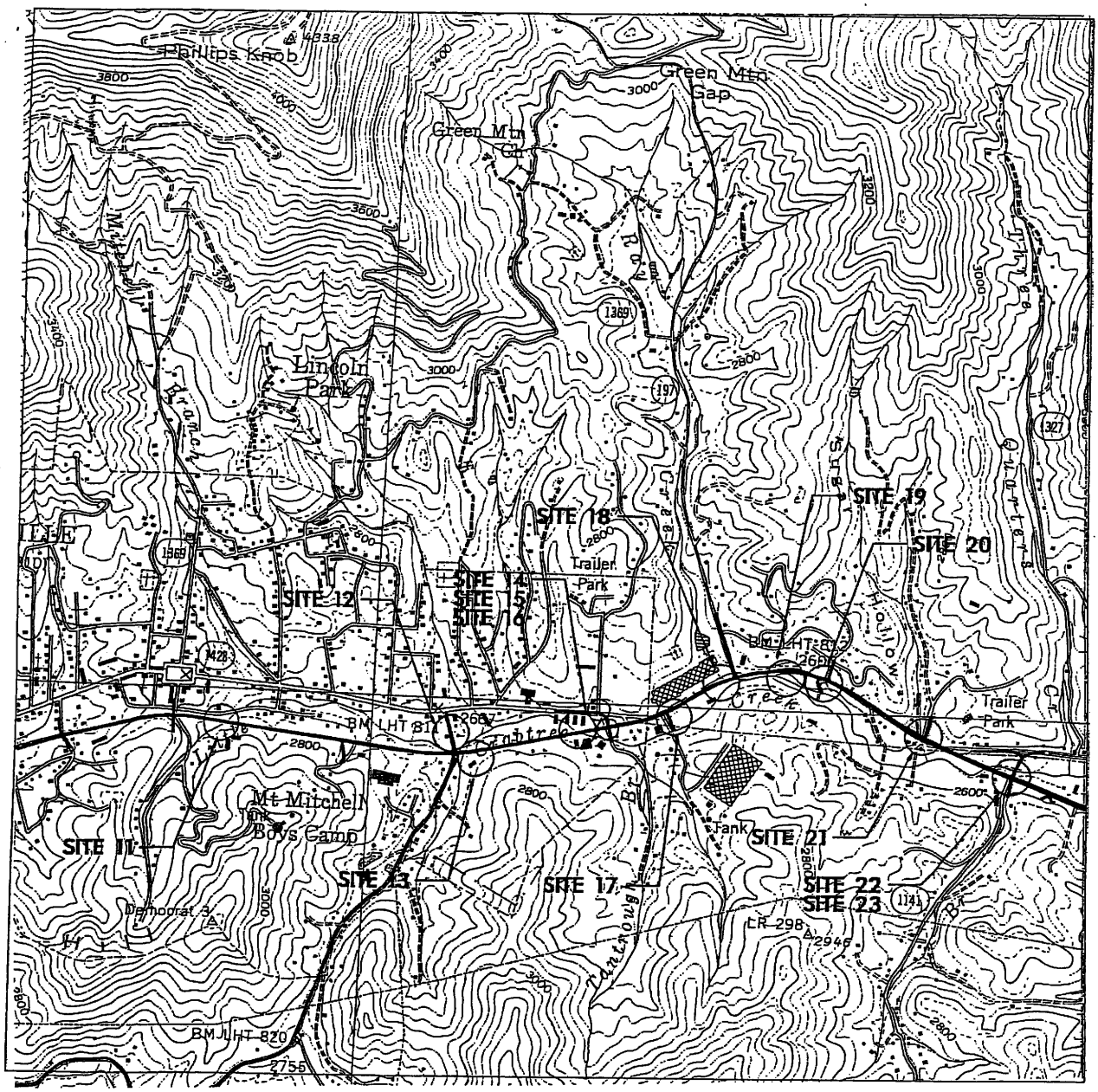
YANCEY COUNTY

PROJECT: WBS 35609.1.1 (R-2519A)

US 19 E EAST OF

SR 1336 (JACKS CREEK ROAD) TO

SR 1186 (OLD US 19)

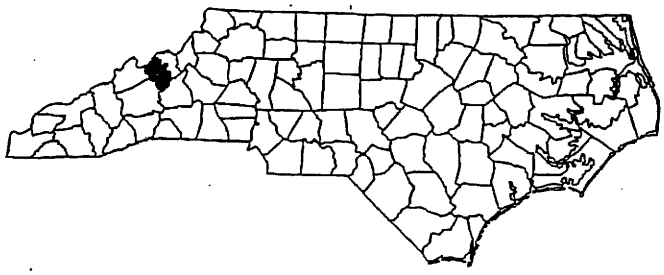


VICINITY MAP

0 ½ 1.0 mi

BURNSVILLE, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS

YANCEY COUNTY

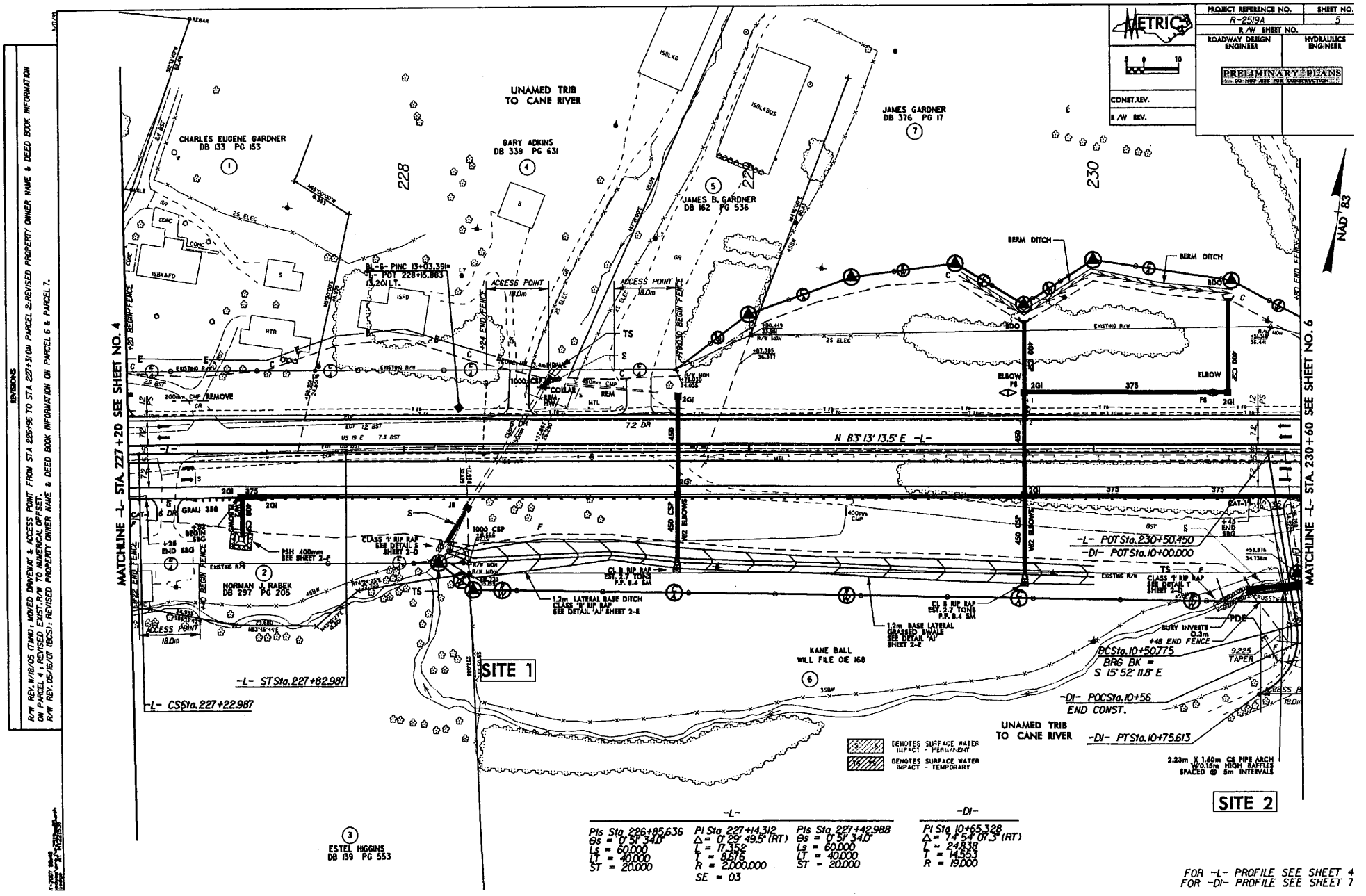
PROJECT: WBS 35609.1.1 (R-2519A)

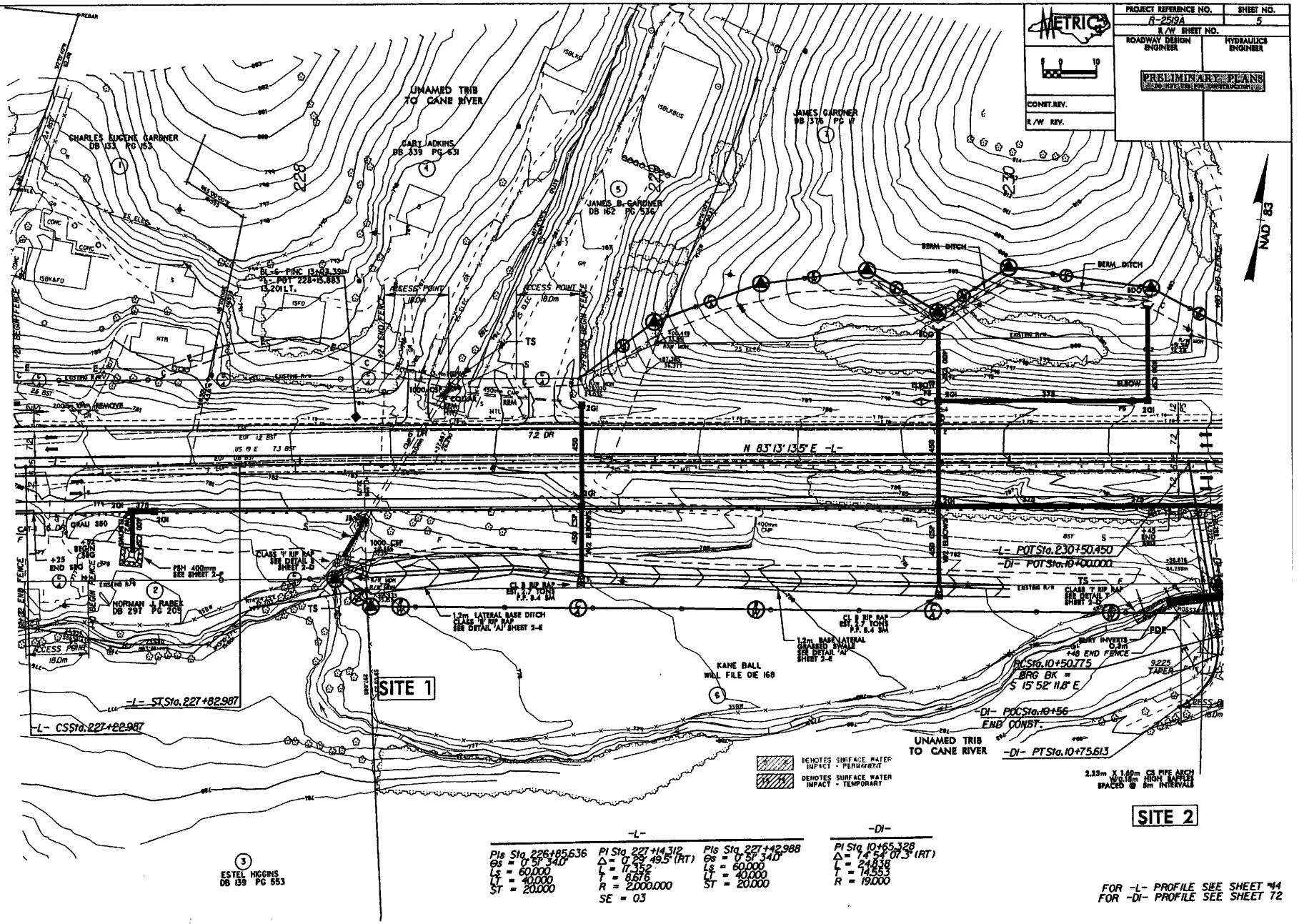
US 19 E EAST OF

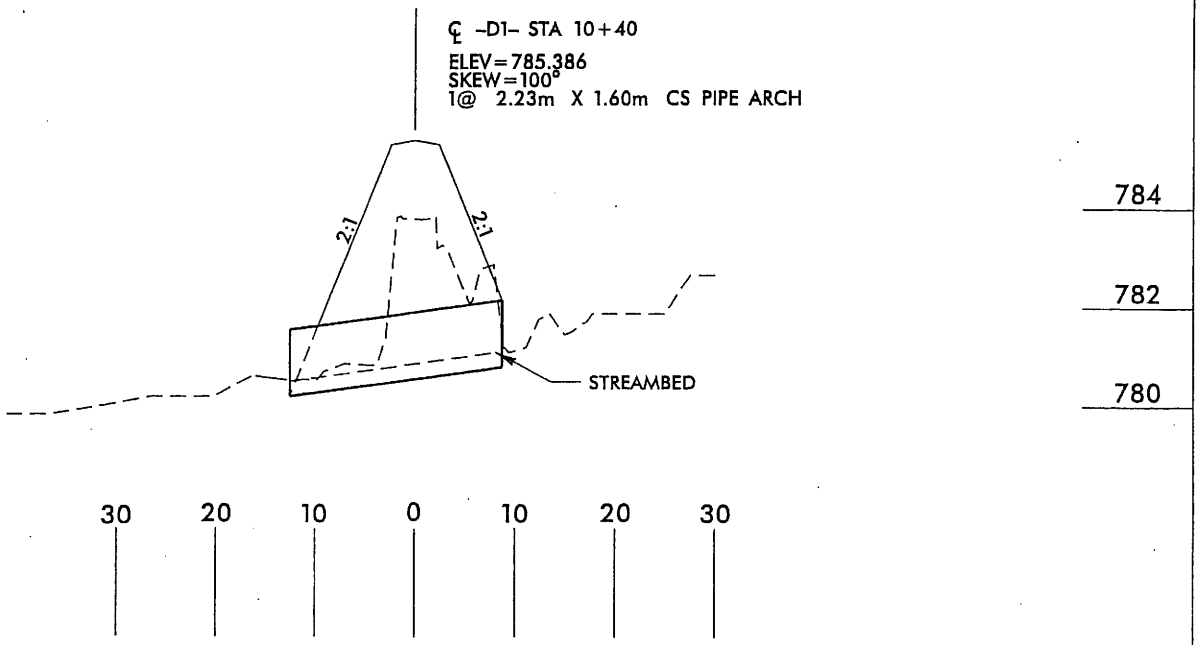
SR 1336 (JACKS CREEK ROAD) TO

SR 1186 (OLD US 19)

SHEET OF 11/17/06


METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 8/18/05 (TMB): MOVED DRIVEWAY & ACCESS POINT FROM STA 225+96 TO STA 227+31 ON PARCEL 2; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 4; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 6 & PARCEL 7.
NAD 83
MATCHLINE -L- STA. 227+20 SEE SHEET NO. 4
MATCHLINE -L- STA. 230+60 SEE SHEET NO. 6
CHARLES EUGENE GARDNER DB 153 PG 153
GARY ADKINS DB 339 PG 631
JAMES B. GARDNER DB 162 PG 536
JAMES GARDNER DB 376 PG 17
NORMAN J. RABEK DB 297 PG 205
ESTEL HIGGINS DB 139 PG 553
KANE BALL WILL FILE OE 168
UNAMED TRIB TO CANE RIVER
UNAMED TRIB TO CANE RIVER
BERM DITCH
BERM DITCH
ACCESS POINT 18.0m
ACCESS POINT 18.0m
ACCESS POINT 18.0m
BL-S- PINC 13+03.391m
S- POT 228+15.883
13.201 LT.
N 83° 13' 13.5" E -L-
-L- POT Sta. 230+50.450
-DI- POT Sta. 10+00.000
-L- ST Sta. 227+82.987
-L- CS Sta. 227+22.987
-DI- POC Sta. 10+50.775
BRG BK = S 15° 52' 11.8" E
-DI- PT Sta. 10+75.613
END CONST.
SITE 1
SITE 2
1.2m LATERAL BASE DITCH CLASS 'A' RIP RAP SEE DETAIL 'A1' SHEET 2-E
1.2m BASE LATERAL GRASSED SWALE SEE DETAIL 'A1' SHEET 2-E
CLASS 'A' RIP RAP SEE DETAIL 3 SHEET 2-D
CLASS 'I' RIP RAP SEE DETAIL 'I' SHEET 2-D
Cl B RIP RAP EST. 2.7 TONS P.Y. 8.4 SM
PSH 400mm SEE SHEET 2-E
1000 CSP
400mm CMP
ELBOW
BURY INVERTS 0.3m
+48 END FENCE
9.225 TAPER
PDE
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
2.23m X 1.60m CS PIPE ARCH W/0.15m HIGH BAFFLES SPACED @ 5m INTERVALS
-L-
Pls Sta. 226+85.636
Gs = 0° 51' 34.0"
Ls = 60.000
LT = 40.000
ST = 20.000
PI Sta. 227+14.312
Δ = 0° 29' 49.5" (RT)
L = 17.352
T = 8.676
R = 2,000.000
SE = 03
Pls Sta. 227+42.988
Gs = 0° 51' 34.0"
Ls = 60.000
LT = 40.000
ST = 20.000
-DI-
PI Sta. 10+65.328
Δ = 74° 54' 07.3" (RT)
L = 24.838
T = 14.553
R = 19.000
FOR -L- PROFILE SEE SHEET 4
FOR -DI- PROFILE SEE SHEET 7


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TNM): MOVED DRIVEWAY & ACCESS POINT FROM STA 226+96 TO STA 227+30 ON PARCEL 2; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 4; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 6 & PARCEL 7.
NAD 83
UNAMED TRIB TO CANE RIVER
CHARLES EUGENE GARDNER DB 133 PG 153
GARY ADKINS DB 339 PG 631
JAMES GARDNER DB 376 PG 17
JAMES B. GARDNER DB 162 PG 536
NORMAN L RABER DB 291 PG 205
ESTEL HIGGINS DB 139 PG 553
KANE BALL WELL FILE DE 168
SITE 1
SITE 2
-L- CS Sta. 227+22.987
-L- ST Sta. 227+82.987
-L- POT Sta. 230+50.450
-DI- POT Sta. 10+00.000
-DI- POC Sta. 10+50.775
BRG BK = S 15° 52' 11.8" E
-DI- POC Sta. 10+56 END CONST.
-DI- PT Sta. 10+75.613
N 83° 13' 13.5" E -L-
ACCESS POINT 18.0m
1.2m LATERAL BASE DITCH CLASS 'I' RIP RAP SEE DETAIL 'A1' SHEET 2-E
1.2m BASE LATERAL GRASSED SWALE SEE DETAIL 'A2' SHEET 2-E
CL B RIP RAP EST. 2.7 TONS P.Y. 8.4 SM
CLASS 'I' RIP RAP SEE DETAIL 'B' SHEET 2-D
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
2.23m X 1.60m CS PIPE ARCH W/ 0.18m HIGH BAFFLES SPACED @ 8m INTERVALS
-L-
Pis Sta. 226+85.636
Gs = 0° 5' 34.0"
Ls = 60.000
LT = 40.000
ST = 20.000
PI Sta. 227+14.312
Δ = 0° 29' 49.5" (RT)
L = 17.352
T = 8.676
R = 2,000.000
SE = 03
Pis Sta. 227+42.988
Gs = 0° 5' 34.0"
Ls = 60.000
LT = 40.000
ST = 20.000
-DI-
PI Sta. 10+65.328
Δ = 7° 54' 07.3" (RT)
L = 24.838
T = 14.553
R = 19.000
FOR -L- PROFILE SEE SHEET #14
FOR -DI- PROFILE SEE SHEET 72

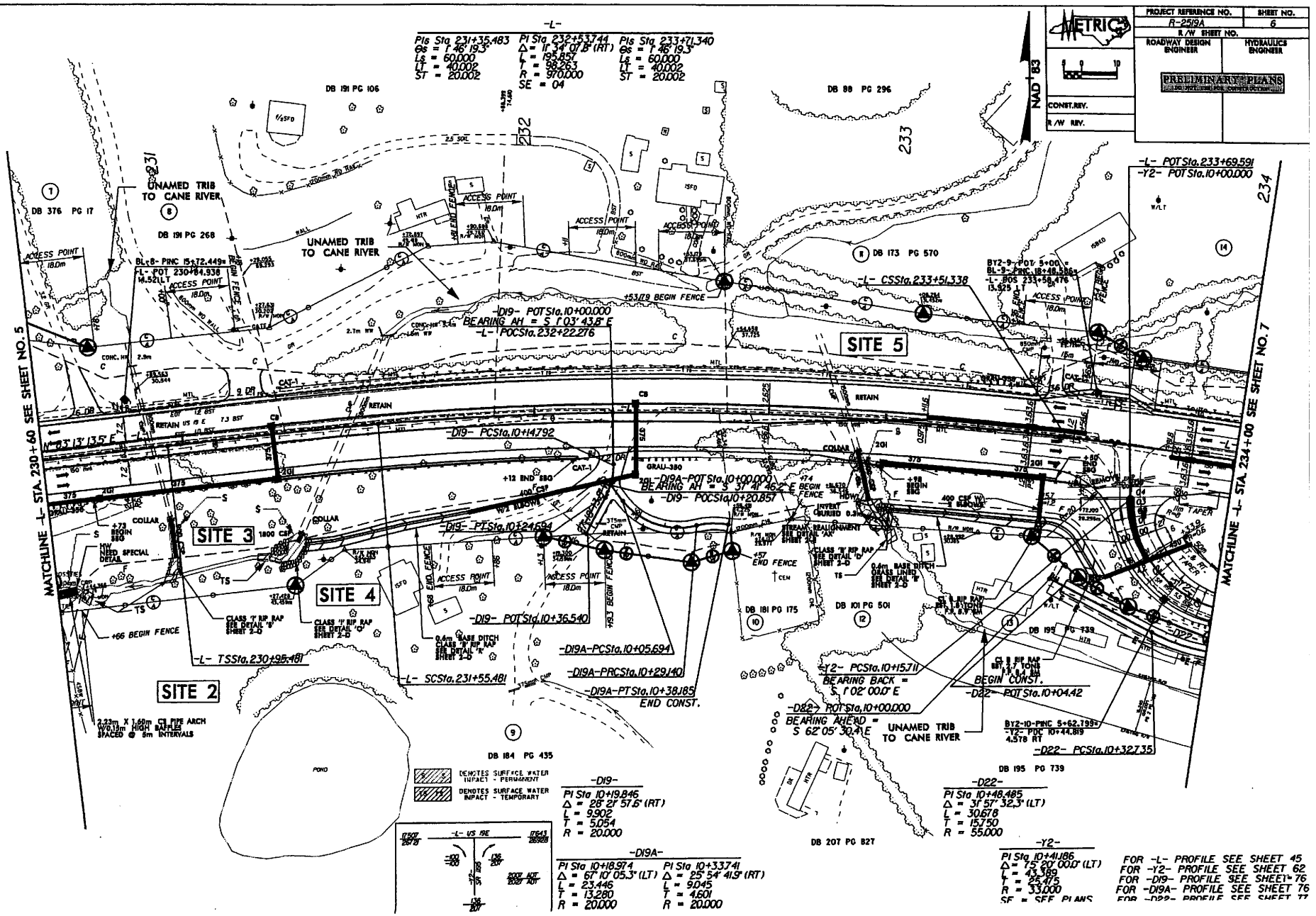


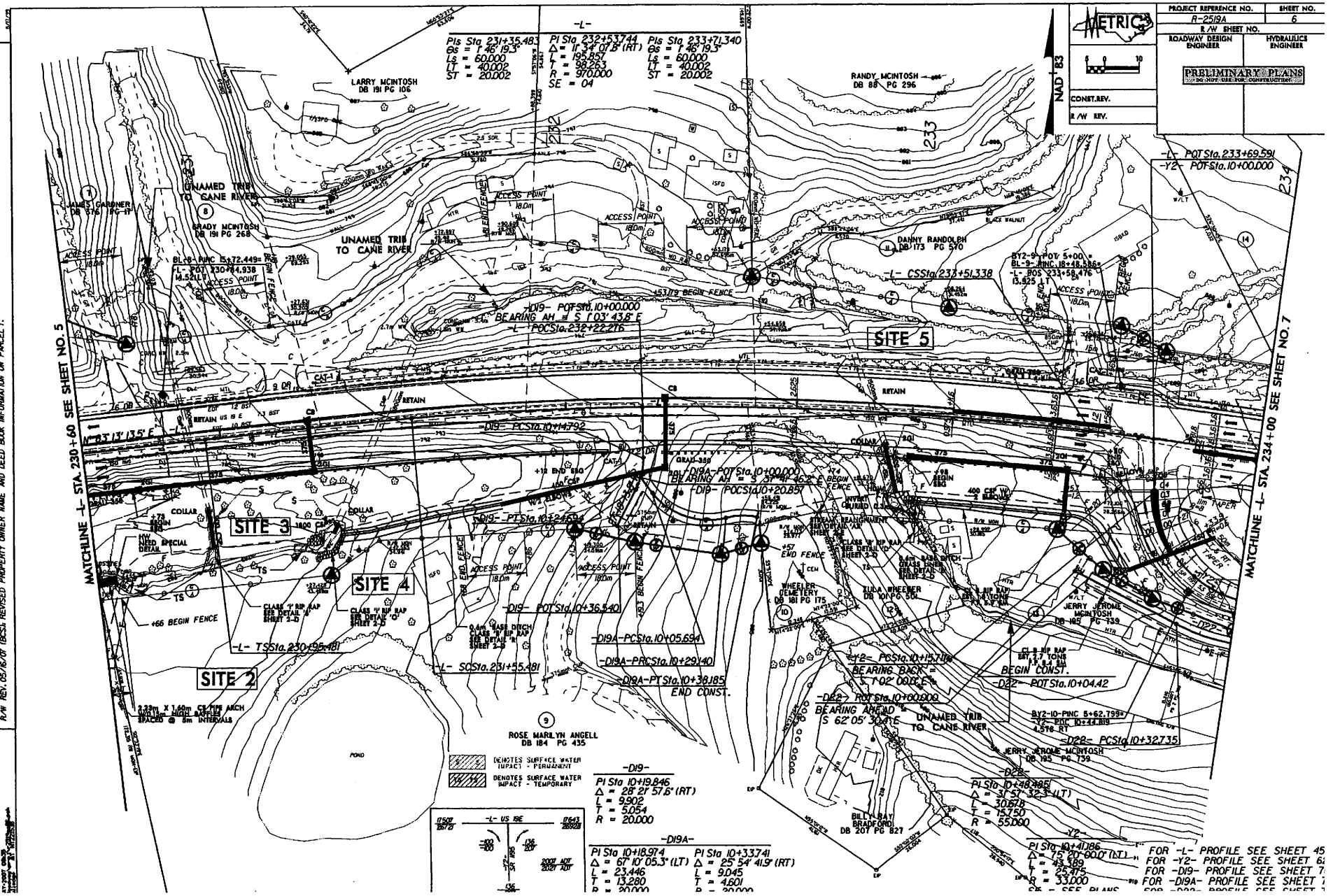
-D1- STATION 10+40
2.8m X 1.9m CS PIPE ARCH

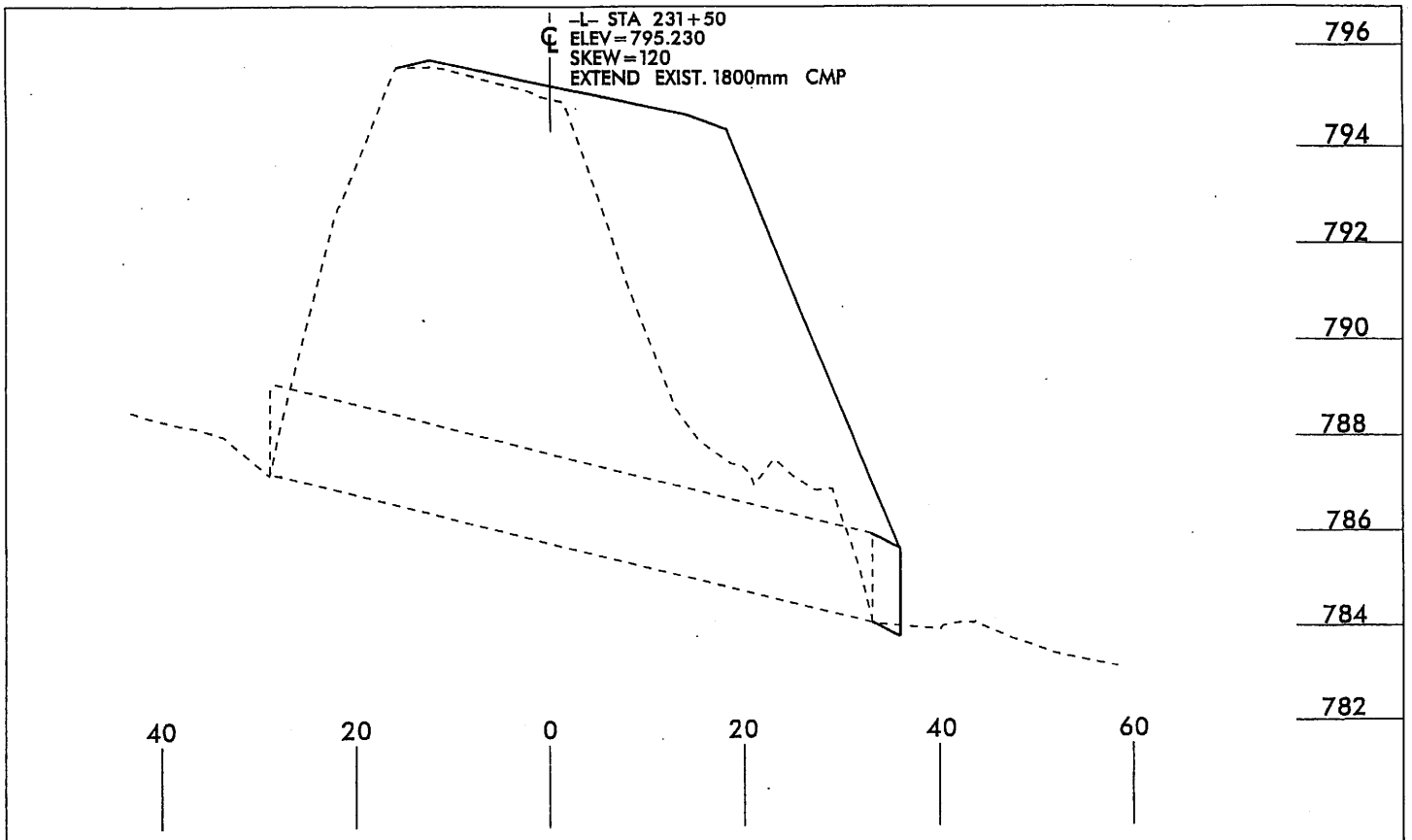
SITE 2
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2419A)
US 19 E FROM EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


-L-
Pis Sta 231+35.483
Ge = 1° 46' 19.3"
Le = 60.000
LT = 40.002
ST = 20.002
PI Sta 232+53.744
Δ = 11° 34' 07.8" (RT)
T = 195.857
L = 388.263
R = 970.000
SE = 04
Pis Sta 233+71.340
Ge = 1° 46' 19.3"
Le = 60.000
LT = 40.002
ST = 20.002
NAD 83
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (RVP)- ADDED DRIVEWAY -D9- AND -D9A- FOR PARCEL 10, ADDED PROPOSED R/W ON PARCEL 9, ADDED DRIVEWAY -D22- FOR PARCEL 13, REVISED PROPOSED R/W AND CONSTRUCTION EASEMENTS ON PARCEL 13, REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS)- REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 7.
MATCHLINE -L- STA. 230+60 SEE SHEET NO. 5
MATCHLINE -L- STA. 234+00 SEE SHEET NO. 7
UNAMED TRIB TO CANE RIVER
UNAMED TRIB TO CANE RIVER
UNAMED TRIB TO CANE RIVER
DB 191 PG 106
DB 376 PG 17
DB 191 PG 268
DB 88 PG 296
DB 173 PG 570
DB 181 PG 175
DB 101 PG 501
DB 195 PG 739
DB 184 PG 435
DB 207 PG 827
SITE 2
SITE 3
SITE 4
SITE 5
-L- TSSta.230+95.481
-L- SCSta.231+55.481
-L- POTSta.230+84.936
14.52 LT
-L- CSSta.233+51.338
-L- POTSta.233+69.591
-Y2- POTSta.10+00.000
-D19- POTSta.10+00.000
BEARING AH = S 10° 03' 43.8" E
-L- POCSta.232+22.276
-D19- PCSta.10+14.792
-D19- PTSta.10+24.694
-D19- POTSta.10+36.540
-D19A-POTSta.10+00.000
BEARING AH = S 31° 41' 46.2" E
-D19- POCSta.10+20.857
-D19A-PCSta.10+05.694
-D19A-PRCSta.10+29.140
-D19A-PTSta.10+38.185
END CONST.
-Y2- PCSta.10+15.711
BEARING BACK = S 10° 02' 00.0" E
-D22- POTSta.10+00.000
BEARING AHEAD = S 62° 05' 30.4" E
-D22- POTSta.10+04.42
BEGIN CONST.
-D22- PCSta.10+32.735
BY2-9-POT 5+00.+
BL-9-PNC 18+48.586
-L- POS 233+58.476
13.525 LT
BY2-10-PNC 5+62.795+
-Y2- POT 10+44.819
4.578 RT
+53.19 BEGIN FENCE
+66 BEGIN FENCE
+43.3 BEGIN FENCE
+57 END FENCE
+13 END BBG
+73 BEGIN BBG
+74 BEGIN BBG
+98 BEGIN BBG
2.23m X 1.68m CS PIPE ARCH W/0.13m HIGH BAFFLES SPACED @ 6m INTERVALS
1800 CSP
400 CSP W/ REDUCER
0.4m BASE DITCH CLASS "B" RIP RAP SEE DETAIL "B" SHEET 2-D
CLASS "I" RIP RAP SEE DETAIL "C" SHEET 2-D
CLASS "B" RIP RAP SEE DETAIL "A" SHEET 2-D
CLASS "B" RIP RAP W/ FILTER FABRIC P.Y. 8.9 SM
CLASS "B" RIP RAP W/ FILTER FABRIC P.Y. 8.1 TONS
STREAM REALIGNMENT SEE DETAIL "A" SHEET 2-D
INVERT BURIED 0.3m
NEED SPECIAL DETAIL
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-D19-
PI Sta 10+19.846
Δ = 28° 21' 57.6" (RT)
L = 9.902
T = 5.054
R = 20.000
-D19A-
PI Sta 10+18.974
Δ = 67° 10' 05.3" (LT)
L = 23.446
T = 13.280
R = 20.000
PI Sta 10+33.741
Δ = 25° 54' 41.9" (RT)
L = 9.045
T = 4.601
R = 20.000
-D22-
PI Sta 10+48.485
Δ = 31° 57' 32.3" (LT)
L = 30.678
T = 15.750
R = 55.000
-Y2-
PI Sta 10+41.186
Δ = 15° 20' 00.0" (LT)
L = 43.389
T = 22.475
R = 33.000
SE = SEE PLANS
FOR -L- PROFILE SEE SHEET 45
FOR -Y2- PROFILE SEE SHEET 62
FOR -D19- PROFILE SEE SHEET 76
FOR -D19A- PROFILE SEE SHEET 76
FOR -D22- PROFILE SEE SHEET 77


PROJECT REFERENCE NO.
R-2519A
SHEET NO.
6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
METRIC
PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION
CONST.REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (RVPs) ADDED DRIVEWAY -D19- AND -D19A- FOR PARCEL 6; ADDED PROPOSED R/W ON PARCEL 5; ADDED DRIVEWAY -D22- FOR PARCEL 15; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENTS ON PARCEL 15; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS) REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 7.
-L-
PI Sta 231+35.483
Es = T 46' 19.5"
Ls = 60.000
LT = 40.002
ST = 20.002
PI Sta 232+53.744
Δ = 11° 34' 07.8" (RT)
L = 195.857
T = 98.263
R = 970.000
SE = 04
PI Sta 233+71.340
Es = T 46' 19.5"
Ls = 60.000
LT = 40.002
ST = 20.002
LARRY MCINTOSH DB 191 PG 106
RANDY MCINTOSH DB 88 PG 296
UNAMED TRIB TO CANE RIVER
JAMES GARDNER DB 576 PG 17
8
GRADY MCINTOSH DB 191 PG 268
UNAMED TRIB TO CANE RIVER
DANNY RANDOLPH DB 173 PG 570
-L- CSSta 233+51.338
-L- POT Sta 233+69.591
-Y2- POT Sta 10+00.000
BL-8-PINC 15+72.449=
-L- POT 230+84.938
16.521 LT
BY2-9-POT 5+00 =
BL-9-PINC 18+48.586=
-L- POS 233+58.476
13.925 LT
-D19- POT Sta 10+00.000
BEARING AH = S 1°03' 43.8" E
-L- POC Sta 232+22.216
SITE 5
MATCHLINE -L- STA. 230+60 SEE SHEET NO. 5
MATCHLINE -L- STA. 234+00 SEE SHEET NO. 7
N 03° 13' 35" E
-D19- PCS Sta 10+14.792
SITE 3
SITE 4
SITE 2
-D19- PT Sta 10+24.694
-D19- POT Sta 10+36.540
-D19A- POT Sta 10+00.000
BEARING AH = S 37° 46' 46" E
-D19- POC Sta 10+20.857
-D19A- PCS Sta 10+05.694
-D19A- PRC Sta 10+29.140
-D19A- PT Sta 10+36.185
END CONST.
-L- TS Sta 230+95.481
-L- SCS Sta 231+55.481
-Y2- PCS Sta 10+15.706
BEARING BACK = S 7° 02' 00" E
BEGIN CONST.
-D22- POT Sta 10+00.000
BEARING AHEAD = S 62° 05' 30.3" E
-D22- POT Sta 10+04.42
-D22- PCS Sta 10+32.735
BY2-10-PINC 5+62.799=
-Y2- PRC 10+44.819
4.516 RT
ROSE MARILYN ANGELL DB 184 PG 435
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-D19-
PI Sta 10+19.846
Δ = 28° 21' 57.6" (RT)
L = 9.902
T = 5.054
R = 20.000
-D19A-
PI Sta 10+18.974
Δ = 61° 10' 05.3" (LT)
L = 23.446
T = 13.280
R = 20.000
PI Sta 10+33.741
Δ = 25° 54' 41.9" (RT)
L = 9.045
T = 4.601
R = 20.000
-L- US 19E
BILLY RAY BRADFORD DB 207 PG 827
JERRY JEROME MCINTOSH DB 185 PG 739
TULA SHEEHER DB 101 PG 501
WHEELER CEMETERY DB 181 PG 175
-D26-
PI Sta 10+48.485
Δ = 31° 57' 32.3" (LT)
L = 30.678
T = 15.750
R = 55.000
-Y2-
PI Sta 10+41.186
Δ = 75° 20' 60.0" (LT)
L = 43.199
T = 25.975
R = 33.000
FOR -L- PROFILE SEE SHEET 45
FOR -Y2- PROFILE SEE SHEET 6
FOR -D19- PROFILE SEE SHEET 7
FOR -D19A- PROFILE SEE SHEET 7



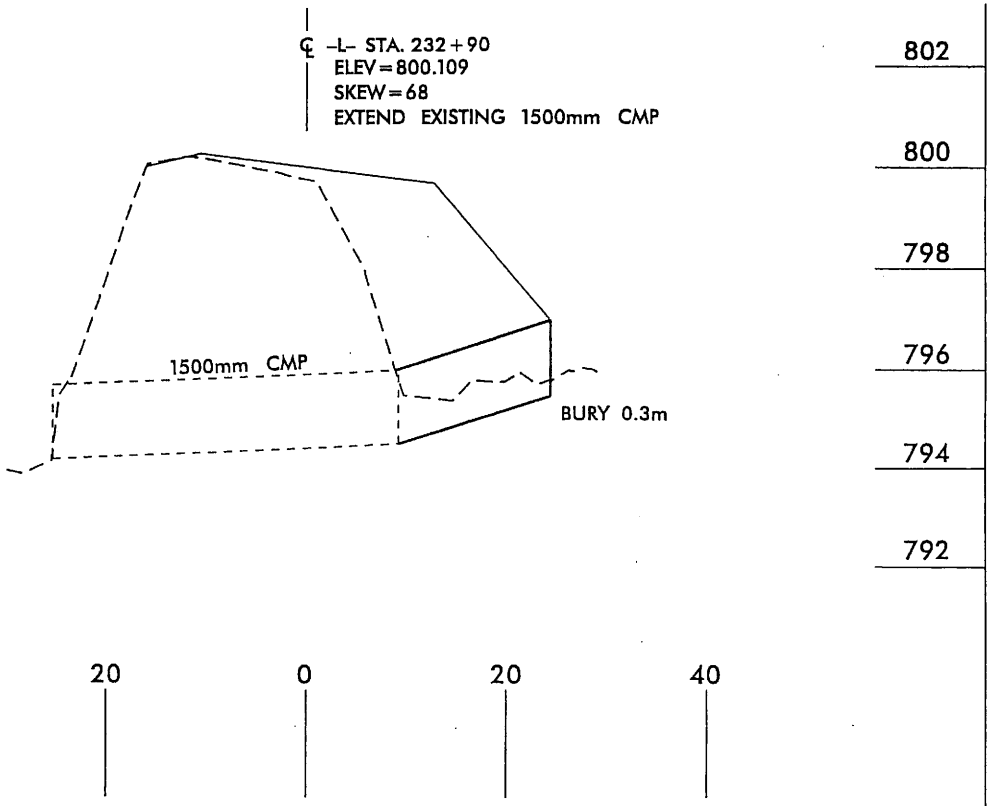
-L- STATION 231+50
EXTEND EXISTING 1800 CMP

SITE 4
PROFILE VIEW

NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

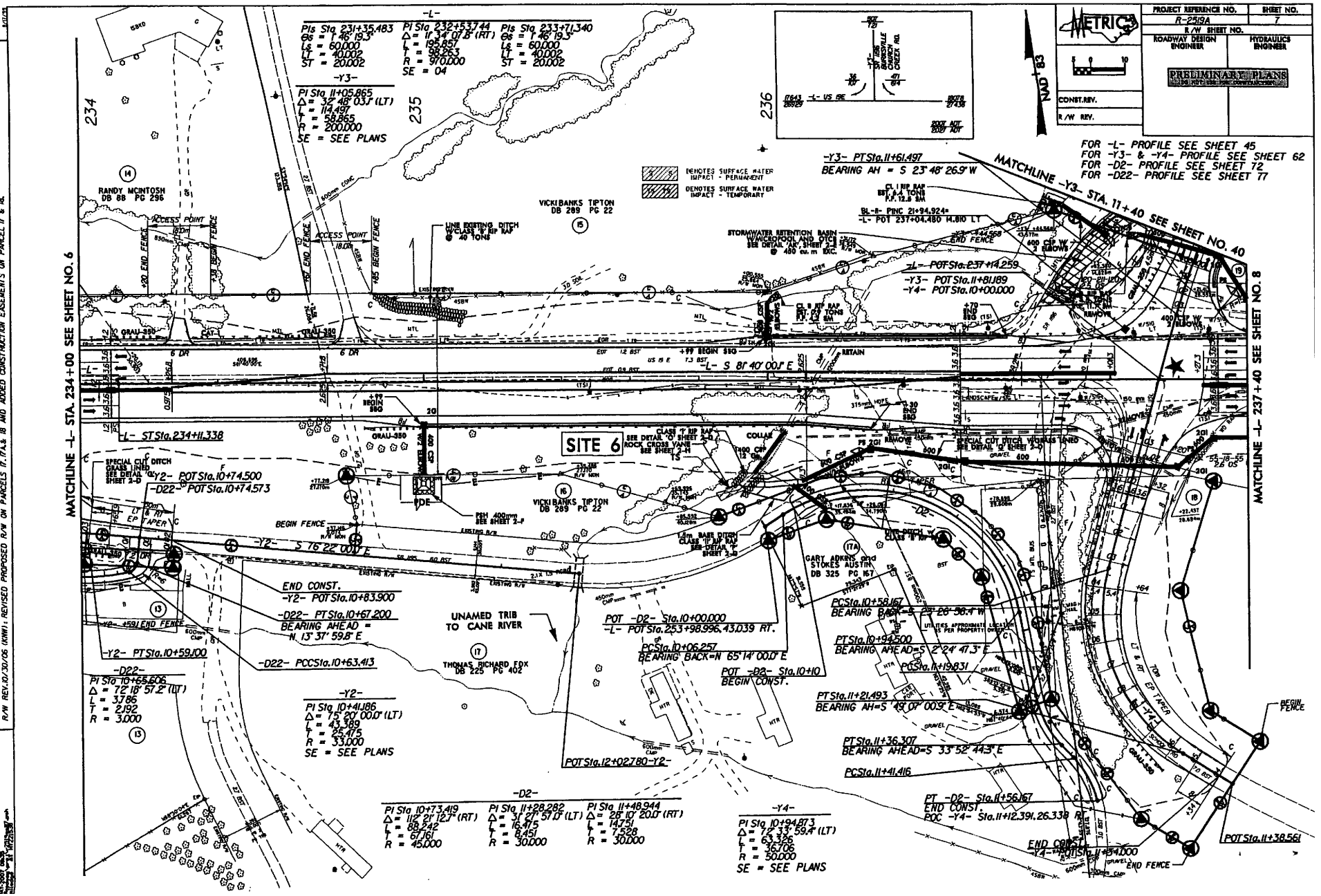


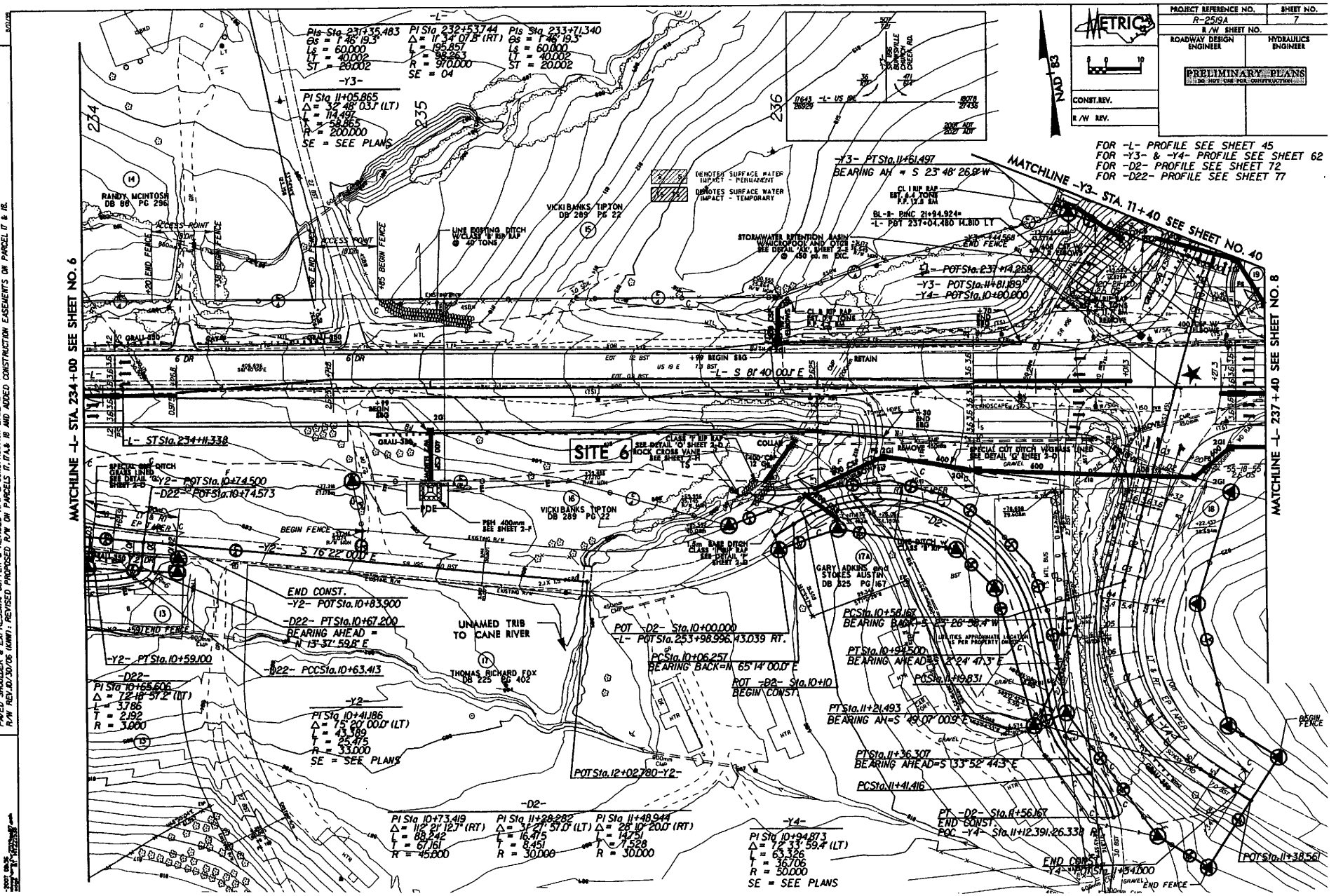
-L- STATION 232+90
EXTEND w/1500mm CMP

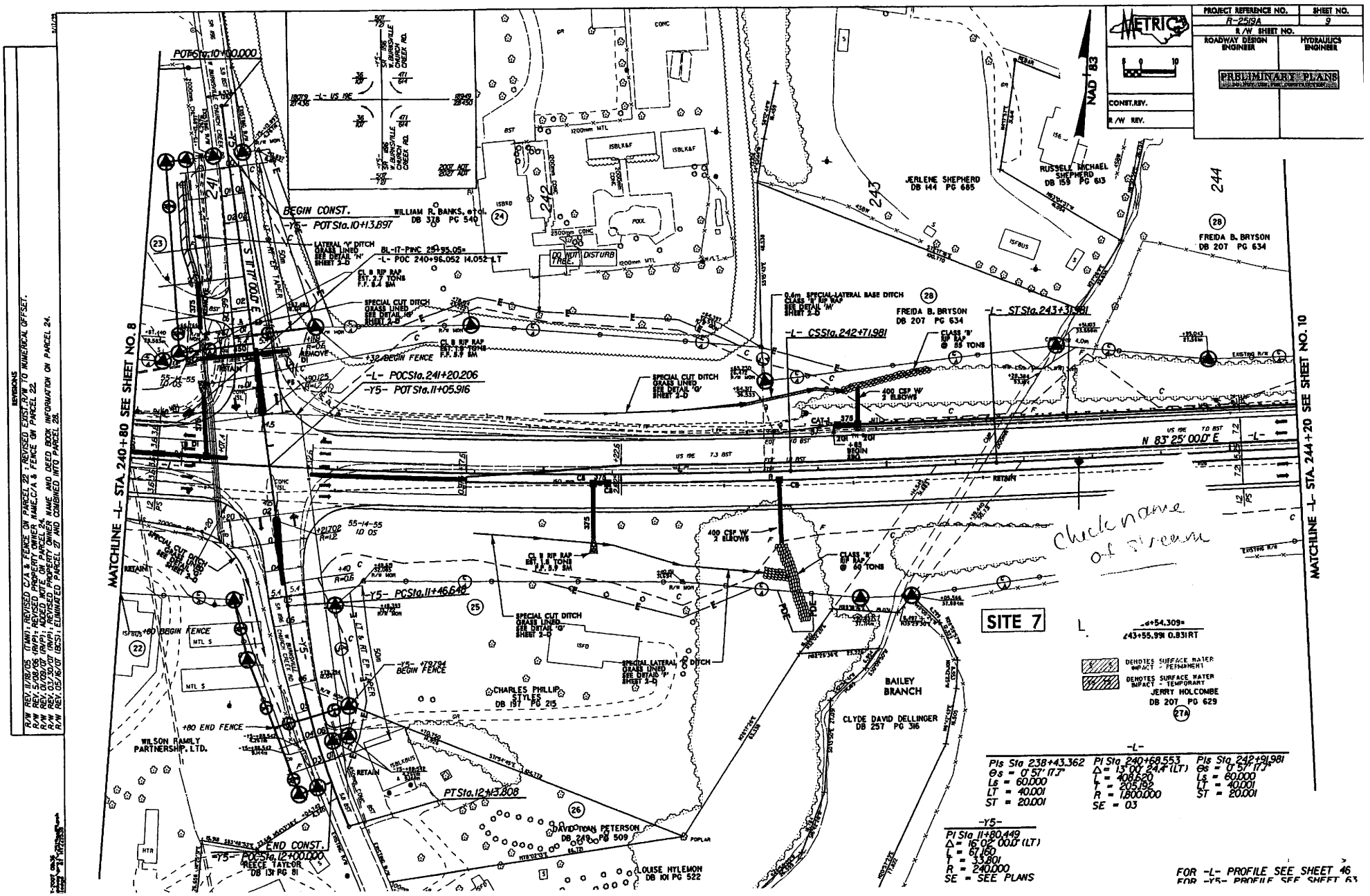
SITE 5
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


REVISIONS
R/W REV. 11/18/05 (TMH): ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W & CONSTRUCTION EASEMENTS ON PARCEL 13; ADDED PARCEL NUMBER 17A ; ADDED DRIVEWAY -D2- FOR PARCEL 17A & 18; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV.02/27/06 (TMH): ADDED PAVEMENT -D2- FOR PARCEL 19 REVISED R/W & CONSTRUCTION EASEMENT ON PARCEL 19 .
R/W REV.04/19/06 (TMH): REVISED C/A & FENCE ON PARCEL 15 . REVISED SHOULDER & R/W ON PARCEL 17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18.
R/W REV.10/30/06 (KMW): REVISED PROPOSED R/W ON PARCELS 17, 17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18.
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST.REV.
R/W REV.
NAD 83
FOR -L- PROFILE SEE SHEET 45
FOR -Y3- & -Y4- PROFILE SEE SHEET 62
FOR -D2- PROFILE SEE SHEET 72
FOR -D22- PROFILE SEE SHEET 77
MATCHLINE -L- STA. 234+00 SEE SHEET NO. 6
MATCHLINE -L- 237+40 SEE SHEET NO. 8
MATCHLINE -Y3- STA. 11+40 SEE SHEET NO. 40
SITE 6
-L- PI Sta 231+35.483
Θs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002
-L- PI Sta 232+53.744
Δ = 11° 34' 07.8" (RT)
L = 195.857
T = 98.263
R = 970.000
SE = 04
-L- PI Sta 233+71.340
Θs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002
-Y3- PI Sta 11+05.865
Δ = 32° 48' 03.1" (LT)
L = 114.497
T = 58.865
R = 200.000
SE = SEE PLANS
-Y3- PT Sta 11+61.497
BEARING AH = S 23° 48' 26.9" W
-L- POT Sta 237+04.480 11.810 LT
-L- POT Sta 237+14.259
-Y3- POT Sta 11+81.189
-Y4- POT Sta 10+00.000
-L- S 81° 40' 00.0" E
-L- ST Sta 234+11.338
-Y2- POT Sta 10+74.500
-D22- POT Sta 10+74.573
-Y2- S 76° 22' 00.0" E
END CONST.
-Y2- POT Sta 10+83.900
-D22- PT Sta 10+67.200
BEARING AHEAD = N 13° 37' 59.8" E
-Y2- PT Sta 10+59.100
-D22- PCC Sta 10+63.413
UNAMED TRIB TO CANE RIVER
POT -D2- Sta 10+00.000
-L- POT Sta 253+98.996, 43.039 RT.
PC Sta 10+06.257
BEARING BACK = N 65° 14' 00.0" E
POT -D2- Sta 10+10
BEGIN CONST.
PC Sta 10+56.167
BEARING BACK = S 25° 26' 56.4" W
PT Sta 10+94.500
BEARING AHEAD = S 2° 24' 47.3" E
PC Sta 11+19.831
PT Sta 11+21.493
BEARING AH = S 19° 07' 00.9" E
PT Sta 11+36.307
BEARING AHEAD = S 33° 52' 44.3" E
PC Sta 11+41.416
POT Sta 12+02.780 -Y2-
PT -D2- Sta 11+56.167
END CONST.
POC -Y4- Sta 11+12.391, 26.338 RT.
END CONST.
-Y4- Sta 11+34.000
POT Sta 11+38.561
-D22- PI Sta 10+65.606
Δ = 72° 18' 57.2" (LT)
L = 3.786
T = 2.192
R = 3.000
-Y2- PI Sta 10+41.186
Δ = 75° 20' 00.0" (LT)
L = 43.389
T = 25.475
R = 33.000
SE = SEE PLANS
-D2- PI Sta 10+73.419
Δ = 112° 21' 12.7" (RT)
L = 88.242
T = 67.161
R = 45.000
PI Sta 11+28.282
Δ = 31° 27' 51.0" (LT)
L = 16.475
T = 8.451
R = 30.000
PI Sta 11+48.944
Δ = 28° 10' 20.0" (RT)
L = 14.751
T = 7.528
R = 30.000
-Y4- PI Sta 10+94.873
Δ = 72° 33' 59.4" (LT)
L = 63.326
T = 36.706
R = 50.000
SE = SEE PLANS
RANDY MCINTOSH DB 88 PG 296
VICKI BANKS TIPTON DB 289 PG 22
THOMAS RICHARD FOX DB 225 PG 402
GARY ADKINS AND STOKES AUSTIN DB 325 PG 167
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
STORMWATER RETENTION BASIN W/MICROPOOL AND DTC SEE DETAIL 'AR' SHEET 2-J
CLASS II RIP RAP @ 40 TONS
CLASS I RIP RAP @ 4.4 TONS
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'D' SHEET 2-D
ROCK CROSS VANE SEE SHEET 2-H
CLASS 1 RIP RAP SEE DETAIL 'C' SHEET 2-D
LINE DIVERTING DITCH
BEGIN FENCE
END FENCE
ACCESS POINT
GRAU-350
EXISTING R/W
PROPOSED R/W
CONSTRUCTION EASEMENT
TEMPORARY CONSTRUCTION EASEMENT
UTILITIES APPROXIMATE LOCATION AS PER PROPERTY MAP


METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 8/18/05 (TMW) ; ADDED DRIVEWAY -D22- FOR PARCEL 15. REVISED PROPOSED R/W & CONSTRUCTION EASEMENTS ON PARCEL 13. ADDED PARCEL NUMBER 17A ; ADDED R/W REV. 11/28/05 (TMW) ; REVISED PROPOSED R/W ON PARCELS 17, 17A & 18 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/27/06 (TMW) ; ADDED PAVED SHOULDER & EXPRESSWAY GUTTER & REVISED R/W & CONSTRUCTION EASEMENT ON PARCEL 15 . R/W REV. 04/19/06 (TMW) ; REVISED C/A & FENCE ON PARCEL 15 . R/W REV. 10/30/06 (KMW) ; REVISED PROPOSED R/W ON PARCELS 17, 17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18.
FOR -L- PROFILE SEE SHEET 45
FOR -Y3- & -Y4- PROFILE SEE SHEET 62
FOR -D2- PROFILE SEE SHEET 72
FOR -D22- PROFILE SEE SHEET 77
MATCHLINE -L- STA. 234+00 SEE SHEET NO. 6
MATCHLINE -Y3- STA. 11+40 SEE SHEET NO. 40
MATCHLINE -L- STA. 237+40 SEE SHEET NO. 8
SITE 6
-L- PI Sta 237+35.483
Δs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002
PI Sta 232+53.744
Δ = 11° 34' 07.8" (RT)
L = 195.857
T = 98.263
R = 970.000
SE = 04
PI Sta 233+71.340
Δs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002
-Y3-
PI Sta 11+05.865
Δ = 32° 48' 03.1" (LT)
L = 114.497
T = 58.865
R = 200.000
SE = SEE PLANS
-Y3- PT Sta. 11+61.497
BEARING AH = S 23° 48' 26.8" W
-Y3- POT Sta. 11+81.889
-Y4- POT Sta. 10+80.000
-L- POT 237+04.480 14.810 LT
-L- POT Sta. 237+14.259
-L- S 81° 40' 00.0" E
-L- ST Sta. 234+11.338
-Y2- POT Sta. 10+74.500
-D22- POT Sta. 10+74.573
-Y2- S 76° 22' 00.0" E
END CONST.
-Y2- POT Sta. 10+83.900
-D22- PT Sta. 10+67.200
BEARING AHEAD = N 13° 37' 59.8" E
-D22- PCC Sta. 10+63.413
-Y2- PT Sta. 10+59.100
-D22-
PI Sta 10+65.606
Δ = 72° 18' 57.2" (LT)
L = 3.786
T = 2.192
R = 3.000
-Y2-
PI Sta 10+41.186
Δ = 75° 00' 00.0" (LT)
L = 43.189
T = 25.475
R = 33.000
SE = SEE PLANS
UNNAMED TRIB TO CANE RIVER
POT -D2- Sta. 10+00.000
-L- POT Sta. 253+98.996, 43.039 RT.
PC Sta. 10+06.257
BEARING BACK = N 65° 14' 00.0" E
POT -D2- Sta. 10+10
BEGIN CONST.
POT Sta. 12+02.780 -Y2-
PI Sta 10+73.419
Δ = 112° 21' 12.7" (RT)
L = 88.242
T = 67.161
R = 45.000
PI Sta 11+28.282
Δ = 3° 27' 57.0" (LT)
L = 16.475
T = 8.451
R = 30.000
PI Sta 11+48.944
Δ = 28° 10' 20.0" (RT)
L = 14.751
T = 7.528
R = 30.000
-Y4-
PI Sta 10+94.873
Δ = 72° 33' 59.4" (LT)
L = 63.326
T = 36.706
R = 50.000
SE = SEE PLANS
PC Sta. 10+58.167
BEARING BACK = S 26° 58.4' W
PT Sta. 10+97.500
BEARING AHEAD = S 3° 24' 47.3" E
PC Sta. 11+19.831
PT Sta. 11+21.493
BEARING AH = S 49° 07' 00.9" E
PT Sta. 11+36.307
BEARING AHEAD = S 33° 52' 44.3" E
PC Sta. 11+41.416
PT -D2- Sta. 11+56.167
END CONST.
POC -Y4- Sta. 11+12.391, 26.338 RT
END CONST. -Y4- PT Sta. 11+54.000
POT Sta. 11+38.561
RANDY MCINTOSH DB 88 PG 296
VICKI BANKS TIPTON DB 289 PG 22
THOMAS RICHARD FOX DB 225 PG 402
GARY ADKINS AND STOKES AUSTIN DB 325 PG 167
LINE ROPING DITCH W/CLASS 'A' RIP RAP @ 40 TONS
STORMWATER RETENTION BASIN W/MICROPOOL AND OTOE SEE DETAIL 'AB', SHEET 2-F @ 450 cu. m EXC.
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
CL A RIP RAP EST. 4.4 TONS P.Y. 17.8 SM
CL I RIP RAP EST. 4.4 TONS P.Y. 17.8 SM
BL -B- PINC 21+94.924 = -L- POT 237+04.480 14.810 LT
SPECIAL DITCH GRASS LINED SEE DETAIL SHEET 2-D
SPECIAL CUT DITCH W/GRASS LINED SEE DETAIL 'G' SHEET 2-D
CLASS 'A' RIP RAP SEE DETAIL 'O' SHEET 2-D
ROCK CROSS VANE SEE SHEET 2-F
BEGIN FENCE
END FENCE
ACCESS POINT
PBM 400mm SEE SHEET 2-F
EXISTING R/W
PROPOSED R/W
CONSTRUCTION EASEMENT
TEMP. EASEMENT
LT & RT TAPER
UTILITIES APPROXIMATE LOCATION (IS PER PROPERTY OWNER)
RETAIN
REMOVE
SEE SHEET 1-B


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW): REVISED C/A & FENCE ON PARCEL 22 & REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 5/08/06 (RVP): REVISED ATTY. NAME, C/A & FENCE ON PARCEL 22.
R/W REV. 01/30/07 (RVP): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 24.
R/W REV. 05/16/07 (BCS): ELIMINATED PARCEL 27 AND COMBINED INTO PARCEL 28.
POT Sta. 10+00.000
BEGIN CONST.
-Y5- POT Sta. 10+13.897
WILLIAM R. BANKS, et ux.
DB 378 PG 540
-L- POC 240+96.052 14.052 LT
-L- POT Sta. 241+20.206
-Y5- POT Sta. 11+05.916
-L- POC Sta. 241+20.206
-Y5- POC Sta. 11+46.648
-Y5- PT Sta. 12+13.808
-Y5- END CONST. Sta. 12+00.000
-L- CS Sta. 242+71.981
-L- ST Sta. 243+31.981
JERLENE SHEPHERD
DB 144 PG 685
RUSSELL MICHAEL SHEPHERD
DB 159 PG 613
FREIDA B. BRYSON
DB 207 PG 634
CHARLES PHILLIP STYLES
DB 197 PG 215
WILSON RAMLY PARTNERSHIP, LTD.
DAVID TOAN PETERSON
DB 248 PG 509
LOUISE HYLEMON
DB 101 PG 522
BAILEY BRANCH
CLYDE DAVID DELLINGER
DB 257 PG 316
JERRY HOLCOMBE
DB 207 PG 629
SITE 7
Check name of stream
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
MATCHLINE -L- STA. 240+80 SEE SHEET NO. 8
MATCHLINE -L- STA. 244+20 SEE SHEET NO. 10
-L-
PI Sta 238+43.362
Θs = 0°57'17.7"
Ls = 60.000
LT = 40.001
ST = 20.001
PI Sta 240+68.553
Δ = 13°00'24.4" (LT)
T = 408.620
L = 205.192
R = 1,800.000
SE = 03
PI Sta 242+91.981
Θs = 0°57'17.7"
Ls = 60.000
LT = 40.001
ST = 20.001
-Y5-
PI Sta 11+80.449
Δ = 16°02'00.0" (LT)
L = 67.160
T = 33.801
R = 240.000
SE = SEE PLANS
FOR -L- PROFILE SEE SHEET 46
FOR -Y5- PROFILE SEE SHEET 63

REVISIONS
R/W REV. 11/18/05 (TMH) ; REVISED C/A & FENCE ON PARCEL 22 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 5/08/06 (RVP) ; REVISED PROPERTY OWNER NAME,C/A & FENCE ON PARCEL 22.
R/W REV. 01/09/07 (RVP) ; ADDED NOTE ON PARCEL 24.
R/W REV. 03/30/07 (RVP) ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 24.
R/W REV. 05/16/07 (BCS) ; ELIMINATED PARCEL 27 AND COMBINED INTO PARCEL 28.

MATCHLINE -L- STA. 240+80 SEE SHEET NO. 8

MATCHLINE -L- STA. 244+20 SEE SHEET NO. 10

FOR -L- PROFILE SEE SHEET 46

SITE 7

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2529A	9

R/W SHEET NO.

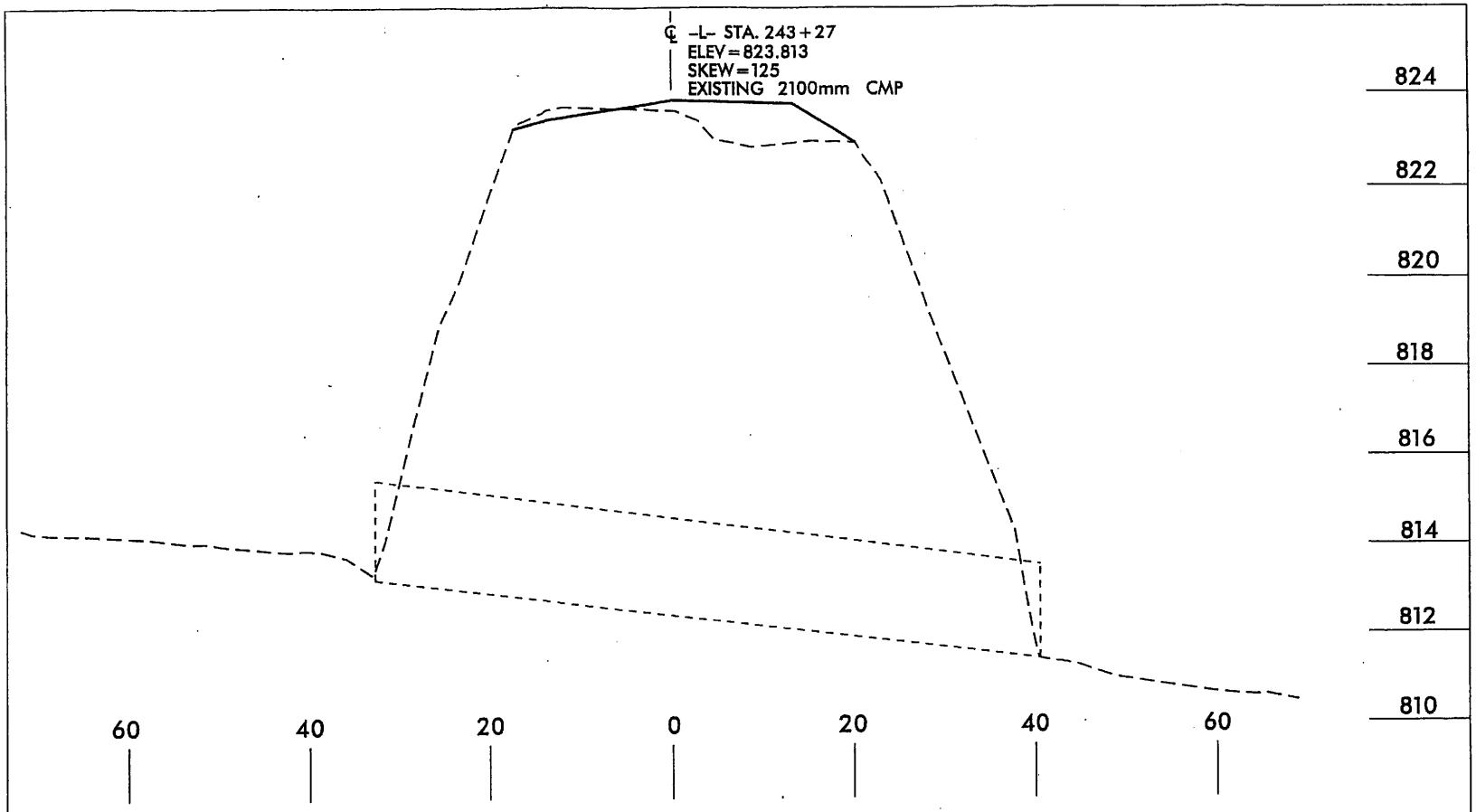
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY RIGHT OF WAY PLANS NOT FOR CONSTRUCTION

CONST. LEV.

R/W REV.

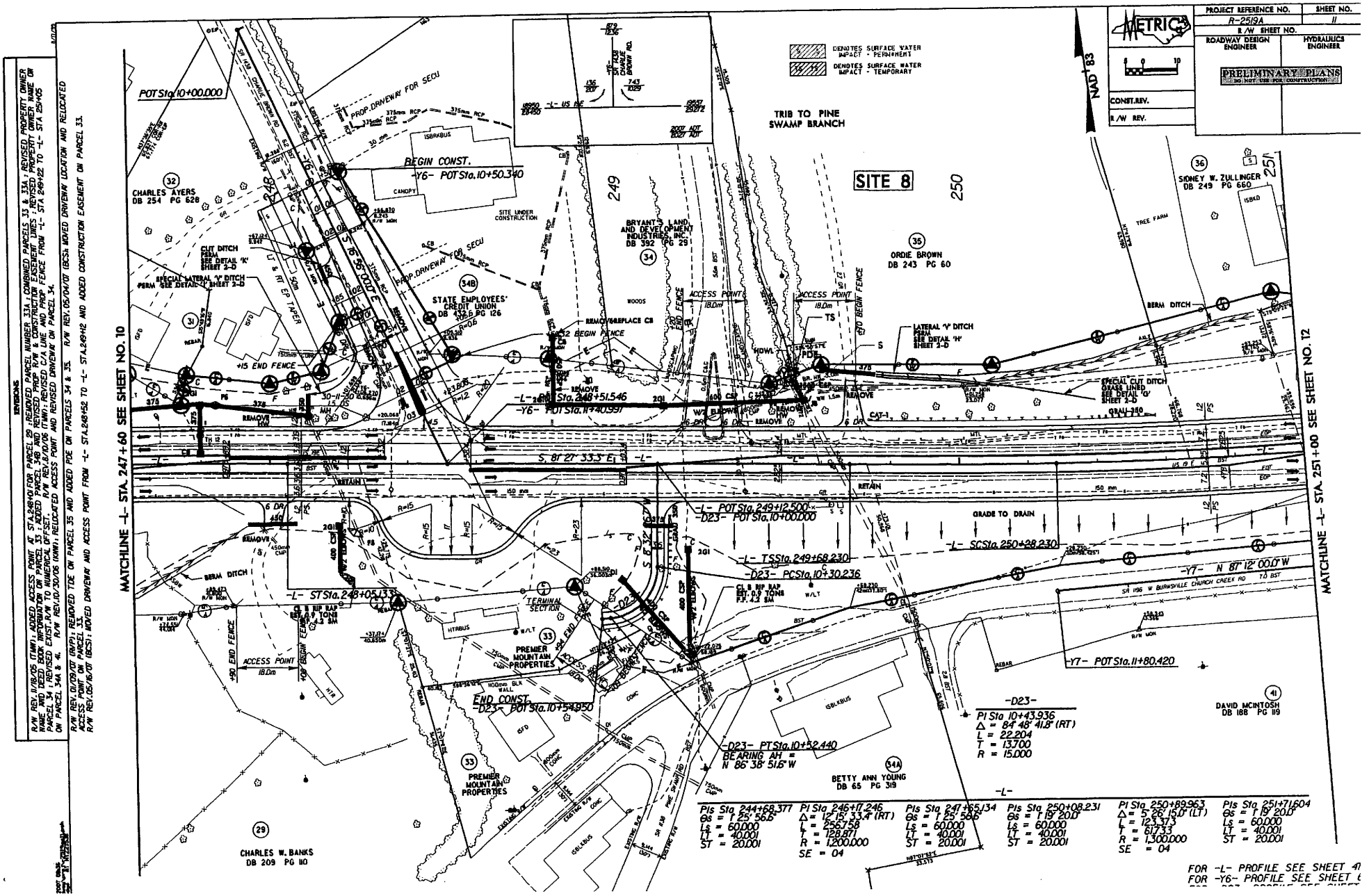


–L– STATION 243+27
RETAIN EXISTING 2100mm CMP

SITE 7
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


REVISIONS
R/W REV. 1/18/05 (TMT); ADDED ACCESS POINT AT STA.248+10 FOR PARCEL 29; REMOVED PARCEL NUMBER 33A, COMBINED PARCELS 33 & 33A; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 33; ADDED PARCEL 34B AND REVISED PROPERTY OWNER NAME ON PARCEL 34; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 10/30/06 (MW); RELOCATED ACCESS POINT AND REVISED DRIVEWAY ON PARCEL 34.
R/W REV. 01/09/07 (RVP); REMOVED TIE ON PARCEL 35 AND ADDED PDE ON PARCELS 34 & 35.
R/W REV. 05/04/07 (BCS); MOVED DRIVEWAY LOCATION AND RELOCATED ACCESS POINT ON PARCEL 33.
R/W REV. 05/16/07 (BCS); MOVED DRIVEWAY AND ACCESS POINT FROM -L- STA.248+52 TO -L- STA.248+42 AND ADDED CONSTRUCTION EASEMENT ON PARCEL 33.
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NO RIGHT OF WAY OR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
MATCHLINE -L- STA. 247+60 SEE SHEET NO. 10
MATCHLINE -L- STA. 251+00 SEE SHEET NO. 12
SITE 8
TRIB TO PINE SWAMP BRANCH
POT Sta. 10+00.000
BEGIN CONST. -Y6- POT Sta. 10+50.340
END CONST. -D23- POT Sta. 10+54.950
-L- Sta. 248+51.546
-Y6- POT Sta. 11+40.991
-L- POT Sta. 249+12.500
-D23- POT Sta. 10+00.000
-L- TS Sta. 249+68.230
-D23- PCS Sta. 10+30.236
-L- SC Sta. 250+28.230
-Y7- N 87° 12' 00.0" W
-Y7- POT Sta. 11+80.420
-L- ST Sta. 248+05.133
-D23- PT Sta. 10+52.440
BEARING AH = N 86° 38' 51.6" W
-D23-
PI Sta 10+43.936
Δ = 84° 48' 41.8" (RT)
L = 22.204
T = 13.700
R = 15.000
S. 81° 27' 33.3" E -L-
PROP. DRIVEWAY FOR SECU
CHARLES AYERS DB 254 PG 628
STATE EMPLOYEES' CREDIT UNION DB 432.6 PG 126
BRYANT'S LAND AND DEVELOPMENT INDUSTRIES, INC. DB 392 PG 29
ORDIE BROWN DB 243 PG 60
SIDNEY W. ZULLINGER DB 249 PG 660
PREMIER MOUNTAIN PROPERTIES
CHARLES W. BANKS DB 209 PG 110
BETTY ANN YOUNG DB 65 PG 319
DAVID MCINTOSH DB 188 PG 119
SITE UNDER CONSTRUCTION
CLIT DITCH PERM SEE DETAIL 'K' SHEET 2-D
SPECIAL LATERAL 'A' DITCH PERM SEE DETAIL 'J' SHEET 2-D
LATERAL 'A' DITCH PERM SEE DETAIL 'H' SHEET 2-D
BERM DITCH
SPECIAL CUT DITCH OWNER LINED SEE DETAIL 'G' SHEET 2-D
+15 END FENCE
-90 END FENCE
ACCESS POINT 18.0m
REMOVE/REPLACE CB
REMOVE
RETAIN
GRADE TO DRAIN
TERMINAL SECTION
CL B RIP RAP EST. 0.9 TONS F.F. 4.3 SM
TREE FARM
WOODS
SR 1196 W BURNSVILLE CHURCH CREEK RD
Pl Sta 244+68.377 Gs = T 25' 56.6 Ls = 60.000 LT = 40.001 ST = 20.001
Pl Sta 246+17.246 Δ = 12° 15' 33.4" (RT) L = 256.758 T = 128.871 R = 1,200.000 SE = 04
Pl Sta 247+65.134 Gs = T 25' 56.6 Ls = 60.000 LT = 40.001 ST = 20.001
Pl Sta 250+08.231 Gs = T 19' 20.0 Ls = 60.000 LT = 40.001 ST = 20.001
Pl Sta 250+89.963 Δ = 5° 26' 15.0" (LT) L = 123.373 T = 61.733 R = 1,300.000 SE = 04
Pl Sta 251+71.604 Gs = T 19' 20.0 Ls = 60.000 LT = 40.001 ST = 20.001
FOR -L- PROFILE SEE SHEET 4
FOR -Y6- PROFILE SEE SHEET 6

PROJECT REFERENCE NO. R-2514
SHEET NO. 11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION, RIGHT OF WAY OR UTILITY PURPOSES
METRIC
CONST./REV.
R/W REV.
REVISIONS
R/W REV. 11/19/05 (TWM): ADDED ACCESS POINT AT STA.248+01 FOR PARCEL 29; REMOVED PARCEL NUMBER 33A; COMBINED PARCELS 33 & 33A; REVISED PROPERTY OWNER NAME ON ACCESS POINT ON PARCEL 33.
NAME AND DEED BOOK INFORMATION ON PARCEL 33; ADDED PARCEL 34B AND REVISED PROP R/W & CONSTRUCTION EASEMENT LINES; REVISED PROPERTY OWNER NAME ON PARCEL 34; REVISED EXIST R/W TO MUMERICAL OFFSET. R/W REV.8/10/06 (TWM): REVISED C/A LINE AND PROP FENCE FROM -L- STA 249+22 TO -L- STA 251+05
ON PARCEL 34A & 41. R/W REV.10/30/06 (KWM): RELOCATED ACCESS POINT AND REVISED DRIVEWAY ON PARCEL 34.
R/W REV. 01/09/07 (RAP): REVISED TOE ON PARCEL 35 AND ADDED POE ON PARCELS 35 & 35A. R/W REV. 05/04/07 (BCS): MOVED DRIVEWAY LOCATION AND RELOCATED ACCESS POINT ON PARCEL 33.
R/W REV.05/16/07 (BCS): MOVED DRIVEWAY AND ACCESS POINT FROM -L- STA.248+52 TO -L- STA.249+12 AND ADDED CONSTRUCTION EASEMENT ON PARCEL 33.
MATCHLINE -L- STA. 251+00 SEE SHEET NO. 12
MATCHLINE -L- STA. 247+60 SEE SHEET NO. 10
FOR -L- PROFILE SEE SHEET 4T
FOR -Y6- PROFILE SEE SHEET 6
FOR -D23- PROFILE SEE SHEET 7
NAD '83
SITE 8
TRIB TO PINE SWAMP BRANCH
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-L- PI Sta 250+89.963 Δ = 5°26'15.0" (LT) D = 2.67333 L = 60.000 Ls = 60.000 R = 1,300.000 SE = 04
-Y7- PI Sta 11+80.420 Δ = 87°12'00.0" (RT) D = 21.7333 L = 60.000 Ls = 40.000 R = 1,300.000 SE = 04
-D23- PI Sta 10+43.936 Δ = 64°46'41.8" (RT) L = 22.204 T = 13.000 R = 15.000
-L- PI Sta 247+65.134 D = 1°25'00" L = 60.000 Ls = 60.000 R = 2,020.000 SE = 04
-L- PI Sta 246+11.246 D = 2°50'58" L = 60.000 Ls = 40.000 R = 1,200.000 SE = 04
-L- PI Sta 244+56.377 D = 1°25'00" L = 60.000 Ls = 40.000 R = 2,020.000 SE = 04
-D23- PI Sta 10+52.440 BEARING AH = N 86°38'51.6"W
-L- POT Sta 249+12.500
-D23- POT Sta 10+60.000
-L- POT Sta 248+51.546
-Y6- POT Sta 10+40.091
-L- POT Sta 247+33.230
-D23- POT Sta 10+30.236
-Y6- POT Sta 10+50.340
-Y6- POT Sta 10+50.950
-D23- POT Sta 10+48.950
POT Sta 10+00.000
BEGIN CONST.
END CONST.
S 16°39'00.0" E
S 81°27'33.5" E
N 87°12'00.0" W
-Y7- POT Sta 11+80.420
-D23- POT Sta 10+52.440
-L- POT Sta 247+65.134
-L- POT Sta 246+11.246
-L- POT Sta 244+56.377
SIDNEY W. CULLINGER DB 249 PG 660
DAVID MONTGOMERY DB 188 PG 119
ORDIE BROWN DB 243 PG 60
BRYANT D. LAMB AND WIFE, MARY E. LAMB DB 192 PG 291
STATE EMPLOYEES' CREDIT UNION DB 432 PG 126
CHARLES ALFORD DB 254 PG 628
BETTY ANN YOUNG DB 65 PG 319
PREMIER MOUNTAIN PROPERTIES
CHARLES/ W/BANKS DB 209 PG 110
CHARLIE BROWN RD
ACCESS POINT
BEGIN FENCE
END FENCE
GRADE TO DRAIN
CANAL 'A' DITCH
MINK DITCH
CUT DITCH
SITE WATER CONTAINMENT
RETAIN
RAMP/SWALE/CURB
SEDU
TEMPORARY SECTION
PERMANENT SECTION
CONCRETE SLOPE PROTECTION
ROCK SLOPE PROTECTION
SEE SHEET 10 FOR DETAIL
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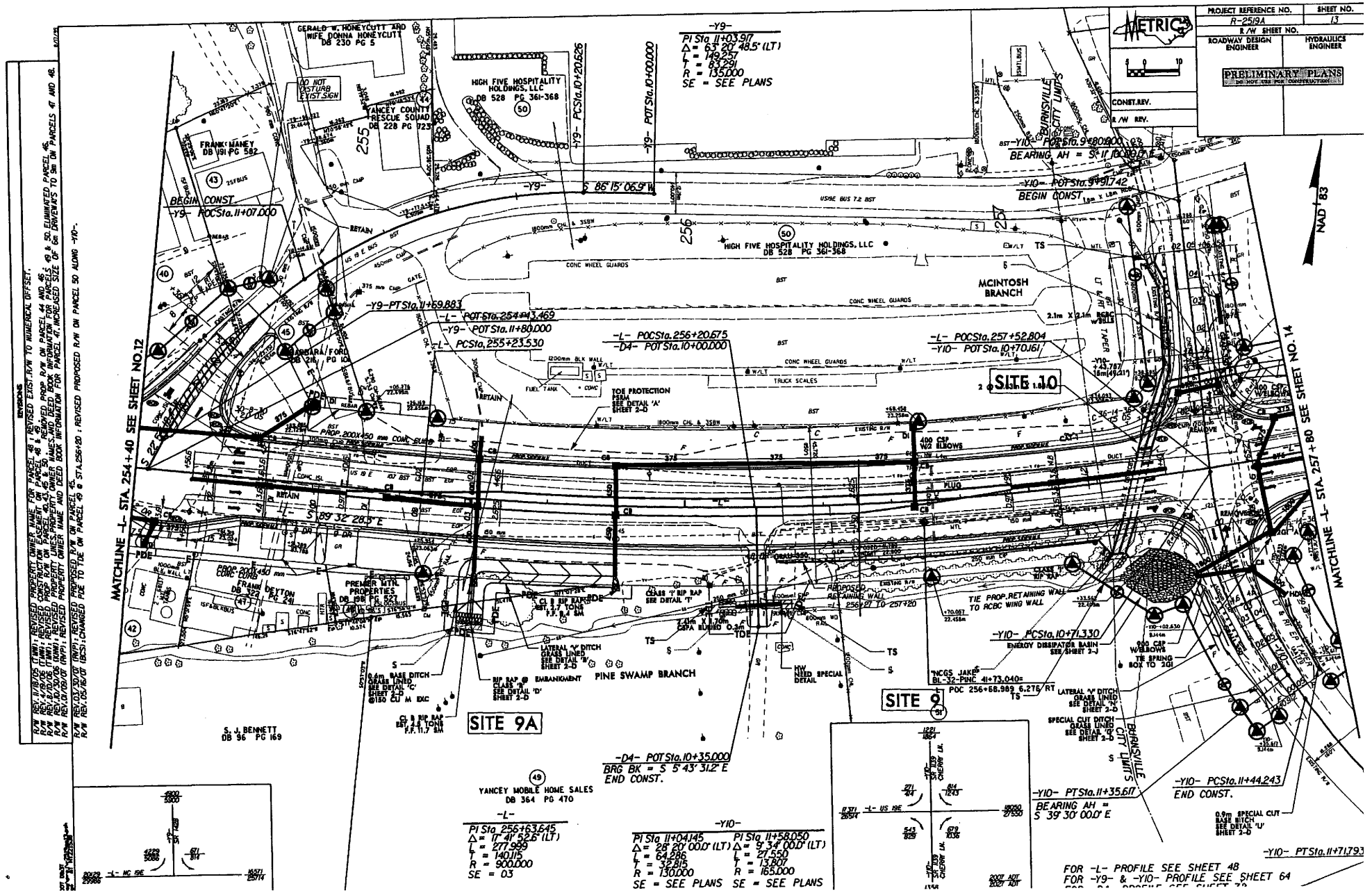
SEE SHEET 11Z


PROJECT REFERENCE NO. R-2519A
SHEET NO. 13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
METRIC
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW) : REVISED PROPERTY OWNER NAME FOR PARCEL 48 & REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 4/18/06 (TMW) : REVISED PROP. R/W ON PARCEL 44 AND 46.
R/W REV. 4/18/06 (TMW) : REVISED PROP. R/W ON PARCEL 43, 45 & 50. REMOVED PROP. R/W ON PARCEL 49 & 50. ELIMINATED PARCEL 46.
R/W REV. 4/18/06 (TMW) : REVISED PROPERTY OWNER NAMES AND DEED BOOK INFORMATION FOR PARCEL 47. INCREASED SIZE OF 6m DRIVEWAYS TO 9m ON PARCELS 47 AND 48.
R/W REV. 10/30/06 (RMW) : REVISED PROPERTY LINES, PROPERTY OWNER NAMES AND DEED BOOK INFORMATION FOR PARCEL 47.
R/W REV. 01/09/07 (RAVP) : REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 45.
R/W REV. 03/30/07 (RAVP) : REVISED PROPOSED R/W ON PARCEL 45.
R/W REV. 05/16/07 (BCS) : CHANGED PDE TO TDE ON PARCEL 49 & STA.256+20 ; REVISED PROPOSED R/W ON PARCEL 50 ALONG -Y10-.
MATCHLINE -L- STA. 254+40 SEE SHEET NO.12
MATCHLINE -L- STA. 257+80 SEE SHEET NO. 14
BURNSVILLE CITY LIMITS
-Y9- PI Sta 11+03.917 Δ = 63° 20' 48.5" (LT) L = 149.257 T = 83.291 R = 135.000 SE = SEE PLANS
-Y9- PCSta.10+20.626
-Y9- POTSta.10+00.000
-Y10- POTSta.9+80.900 BEARING AH = S 4° 11' 00.00" E
-Y10- POTSta.9+91.742
BEGIN CONST
-Y9- POCSta.11+07.000
-Y9- S 86° 15' 06.9" W
-Y9-PTSta.11+69.883
-L- POTSta.254+43.469
-Y9- POTSta.11+80.000
-L- PCSta.255+23.530
-L- POCSta.256+20.675
-D4- POTSta.10+00.000
-L- POCSta.257+52.804
-Y10- POTSta.10+70.161
-Y10- PCSta.10+71.330
-Y10- PTSta.11+35.611
BEARING AH = S 39° 30' 00.0" E
-Y10- PCSta.11+44.243
END CONST.
-Y10- PTSta.11+71.793
-D4- POTSta.10+35.000
BRG BK = S 5° 43' 31.2" E
END CONST.
-L- PI Sta 256+63.645 Δ = 11° 41' 52.6" (LT) L = 277.999 T = 140.115 R = 900.000 SE = 03
-Y10- PI Sta 11+04.145 Δ = 28° 20' 00.0" (LT) L = 64.286 T = 32.815 R = 130.000 SE = SEE PLANS
-Y10- PI Sta 11+58.050 Δ = 9° 34' 00.0" (LT) L = 27.550 T = 13.807 R = 165.000 SE = SEE PLANS
FOR -L- PROFILE SEE SHEET 48
FOR -Y9- & -Y10- PROFILE SEE SHEET 64
SITE 9
SITE 9A
SITE 10
PINE SWAMP BRANCH
MCINTOSH BRANCH
TIE PROP. RETAINING WALL TO RCBC WING WALL
TIE PROP. RETAINING WALL TO RCBC WING WALL
TIE SPRING BOX TO 2GI
FRANK MANEY DB 191 PG 582
GERALD W. HONEYCUTT AND WIFE DONNA HONEYCUTT DB 230 PG 5
YANCEY COUNTY RESCUE SQUAD DB 228 PG 725
HIGH FIVE HOSPITALITY HOLDINGS, LLC DB 528 PG 361-368
HIGH FIVE HOSPITALITY HOLDINGS, LLC DB 528 PG 361-368
SAMARA FORD DB 218 PG 10
FRANK BEXTON DB 329 PG 241
PREMIER MTN. PROPERTIES DB 198 PG 827
S. J. BENNETT DB 96 PG 169
YANCEY MOBILE HOME SALES DB 364 PG 470
DO NOT DISTURB EXIST. SIGN
CONC WHEEL GUARDS
TRUCK SCALES
FUEL TANK
TOE PROTECTION SEE DETAIL 'A' SHEET 2-D
PROP. 200X450 mm CONC GUARD
PROP. 200X450 mm CONC GUARD
1200mm BLK WALL
1800mm CHL & 358W
US 19 E BUS
US/SE BUS 7.2 BST
CLASS 'I' RIP RAP SEE DETAIL 'I' SHEET 2-D
CL B RIP RAP EST. 2.7 TONS F.F. 8.4 SM
CL B RIP RAP EST. 3.4 TONS F.F. 11.7 SM
RIP RAP @ EMBANKMENT SEE DETAIL 'R' SHEET 2-D
LATERAL 'V' DITCH GRASS LINED SEE DETAIL 'N' SHEET 2-D
0.6m BASE DITCH GRASS LINED SEE DETAIL 'C' SHEET 2-D @150 CU M EXC
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'Q' SHEET 2-D
0.9m SPECIAL CUT BASE DITCH SEE DETAIL 'U' SHEET 2-D
PROPOSED RETAINING WALL -L- 256+27 TO 257+20
ENERGY DISSIPATOR BASIN SEE SHEET 2-J
400 CSP W/2 ELBOWS
900 CSP W/ELBOWS
REMOVE
PLUG
HW NEED SPECIAL DETAIL
TDE
PDE
PDE
TS
S
-L- US 19E
-L- NC 19E
CHERRY LN.
BURNSVILLE CITY LIMITS

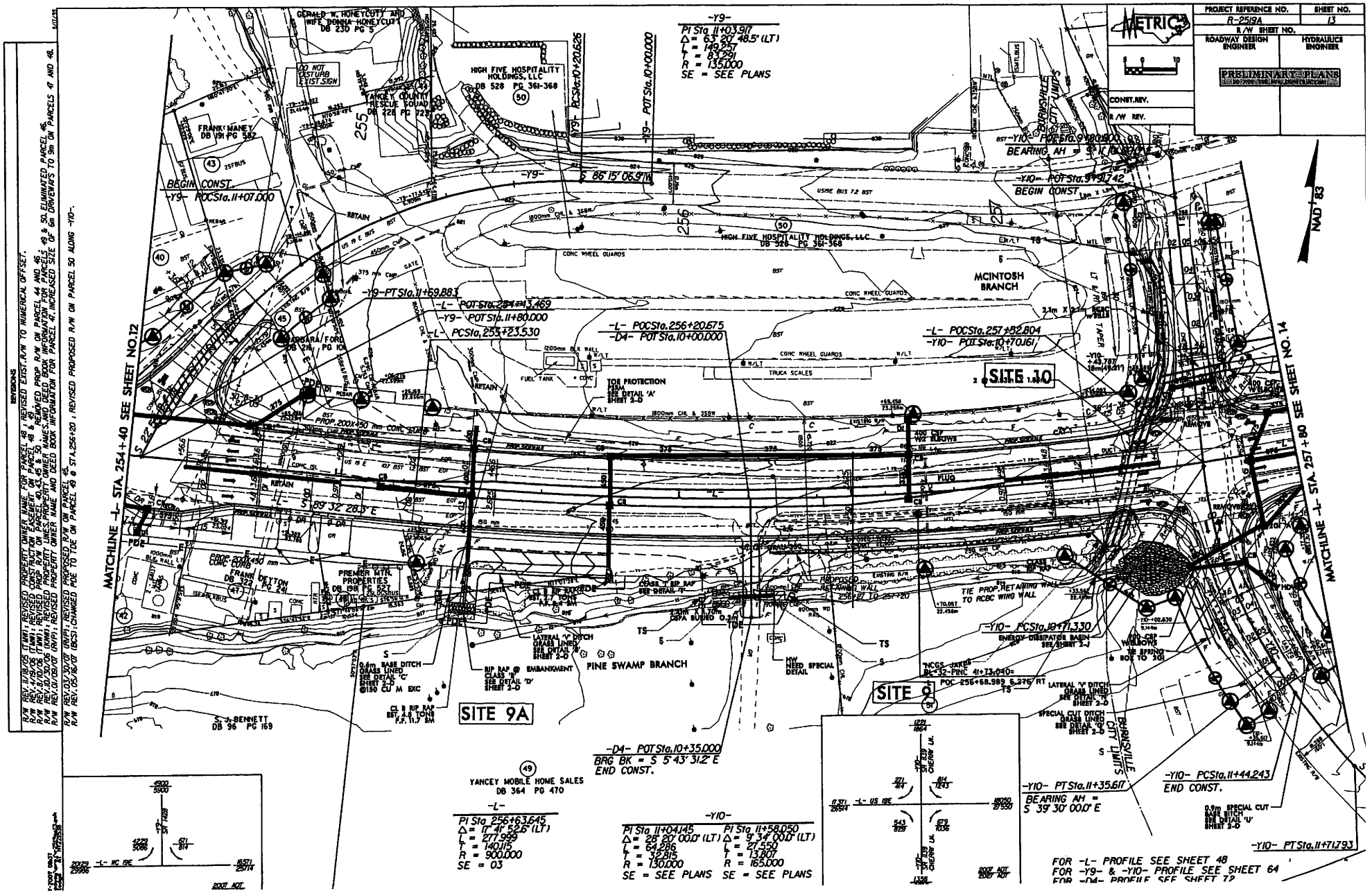
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-Y9-
PI Sta 11+03.917
Δ = 63°20'48.5" (LT)
L = 149.257
T = 83.291
R = 135.000
SE = SEE PLANS

-L-
PI Sta 256+63.645
Δ = 17°41'52.6" (LT)
L = 277.999
T = 140.115
R = 900.000
SE = 03

-Y10-
PI Sta 11+04.145
Δ = 28°20'00.0" (LT)
L = 64.286
T = 32.815
R = 130.000
SE = SEE PLANS

PI Sta 11+58.050
Δ = 9°34'00.0" (LT)
L = 27.550
T = 13.807
R = 165.000
SE = SEE PLANS

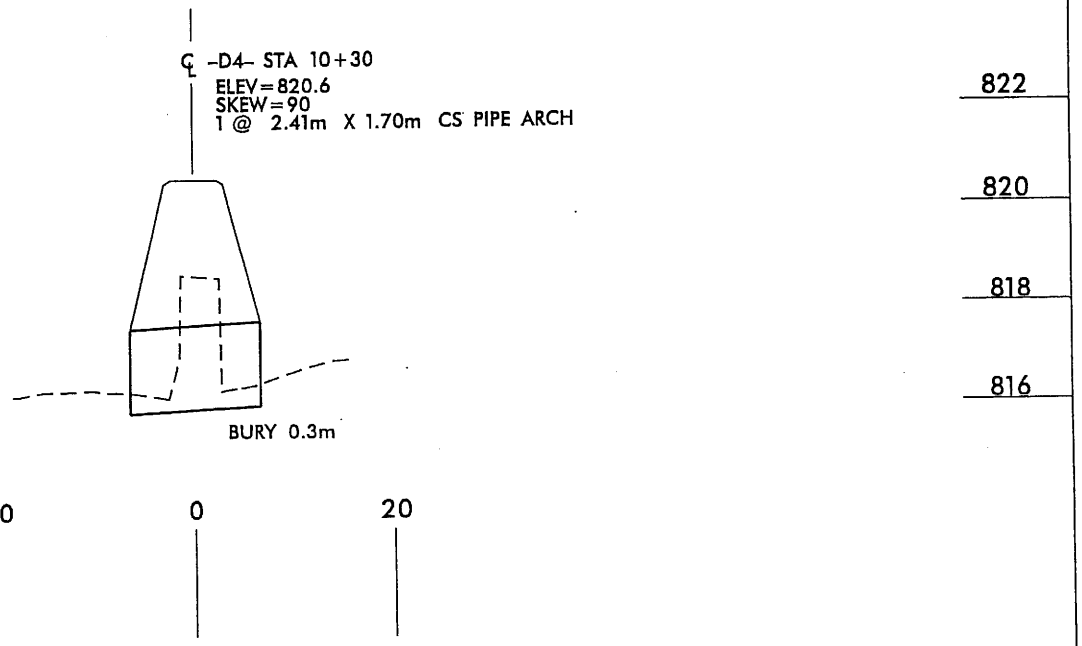
FOR -L- PROFILE SEE SHEET 48
FOR -Y9- & -Y10- PROFILE SEE SHEET 64
FOR -D4- PROFILE SEE SHEET 72

2007 ADT

REVISIONS

R/W REV.11/18/05 (TMM): REVISED PROPERTY OWNER NAME FOR PARCEL 48 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV.4/19/06 (TMM): REVISED CONSTRUCTION EASEMENT ON PARCEL 48 & 49.
R/W REV.8/10/06 (TMM): REVISED PROP R/W ON PARCEL 40,43,45 & 50 . REMOVED PROP R/W ON PARCEL 44 AND 46.
R/W REV.10/30/06 (KNM): REVISED PROPERTY LINES,PROPERTY OWNER NAMES,AND DEED BOOK INFORMATION FOR PARCELS 49 & 50. ELIMINATED PARCEL 46.
R/W REV.01/09/07 (RVP): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 47. INCREASED SIZE OF 6m DRIVEWAYS TO 9m ON PARCELS 47 AND 48.

R/W REV.03/30/07 (RVP): REVISED PROPOSED R/W ON PARCEL 45.
R/W REV.05/16/07 (BCS): CHANGED PDE TO TDE ON PARCEL 49 @ STA.256+20 ; REVISED PROPOSED R/W ON PARCEL 50 ALONG -Y10-.

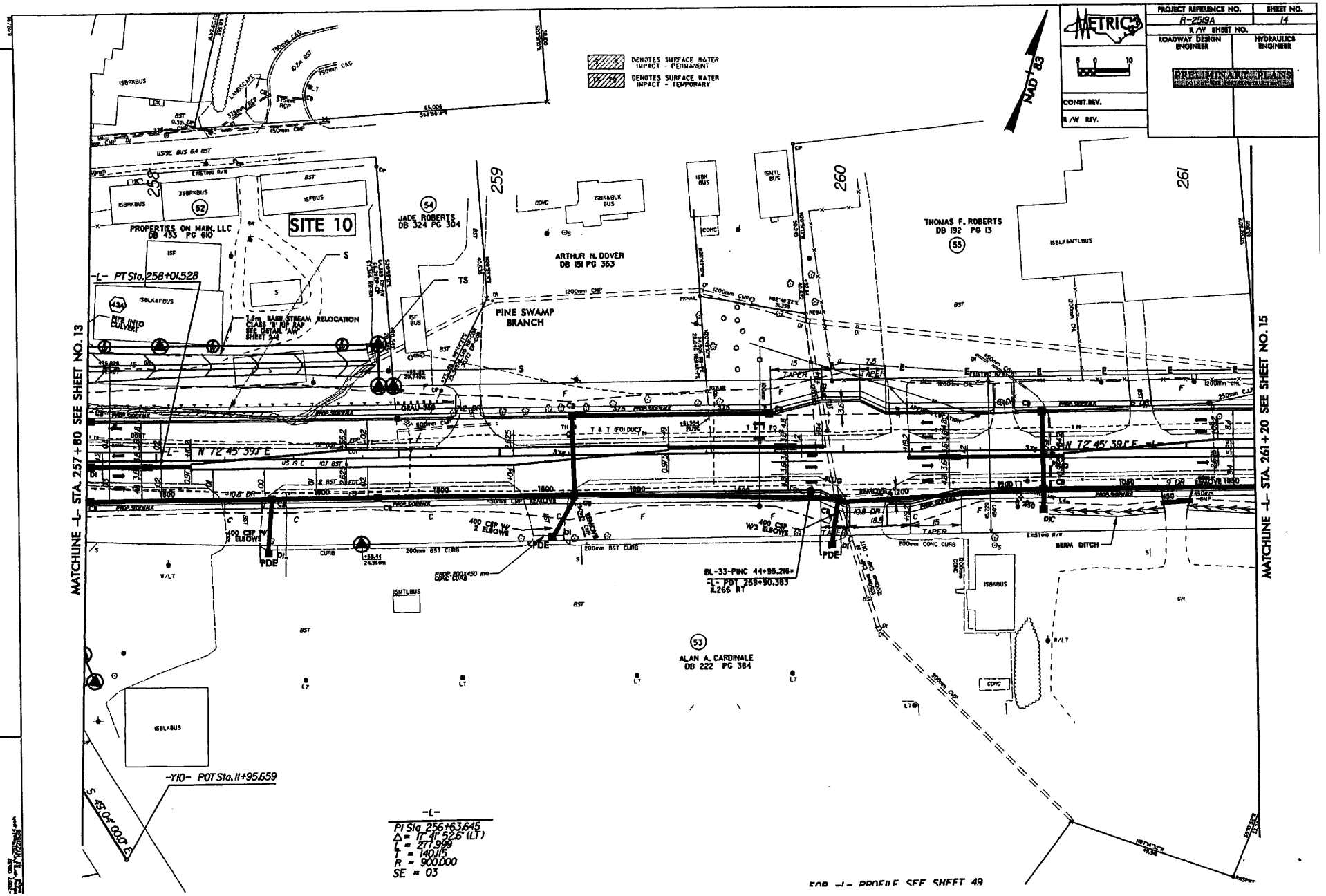


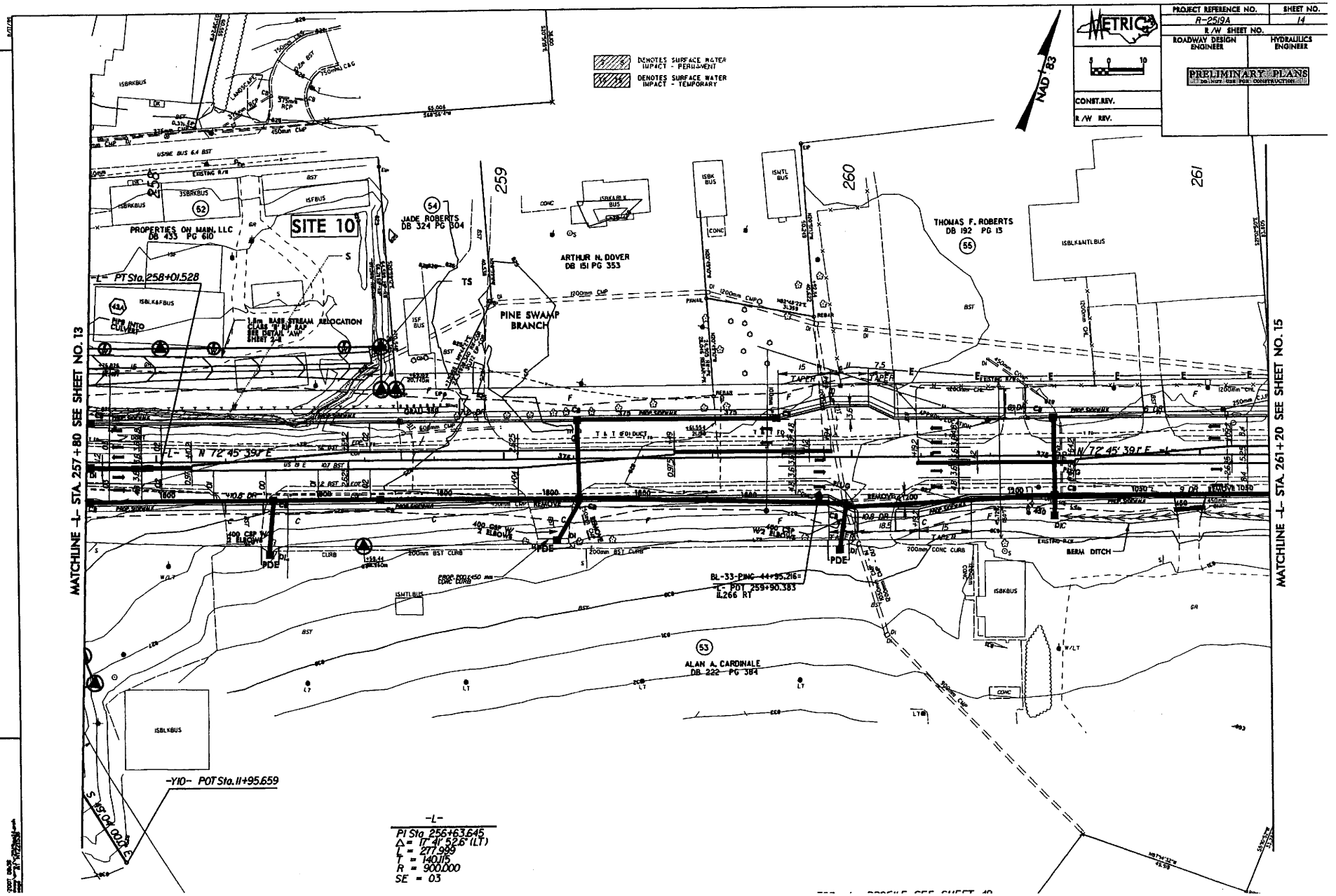
-D4- STATION 10+30
2.41m X 1.70m CS PIPE ARCH

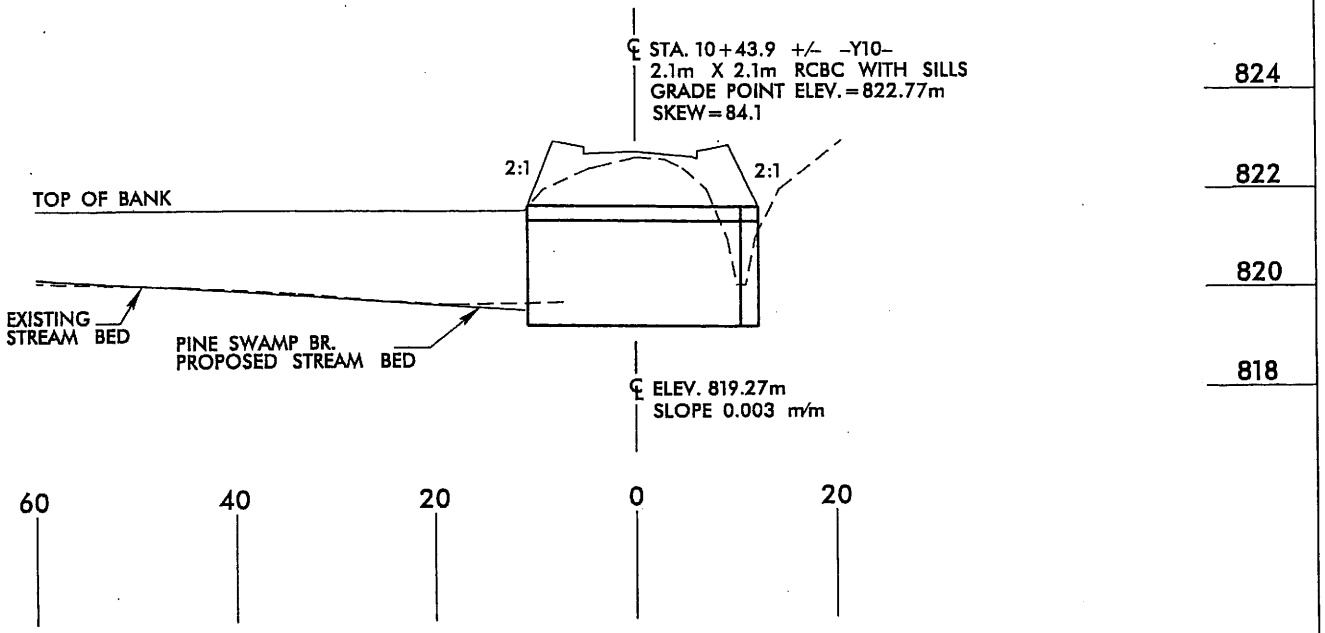
SITE 9
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST.REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW) ; REVISED PROPERTY OWNER NAME FOR PARCEL 52 ; ADDED DRIVEWAY TO PARCEL 55 AT STA.260+90 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/06 (RVP) ; REVISED PDE ON PARCEL 53.
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 10
PROPERTIES ON MAIN, LLC
DB 433 PG 610
JADE ROBERTS
DB 324 PG 304
ARTHUR N. DOVER
DB 151 PG 353
THOMAS F. ROBERTS
DB 192 PG 13
ALAN A. CARDINALE
DB 222 PG 384
PINE SWAMP BRANCH
-L- PT Sta. 258+01.528
-L- N 72° 45' 39" E
-Y10- POT Sta. 11+95.659
S 43° 04' 00" E
BL-33-PINC 44+95.216
-L- POT 259+90.383
11.266 RT
-L-
PI Sta. 256+63.645
Δ = 17° 41' 52.6" (LT)
T = 27.959
L = 140.115
R = 900.000
SE = 03
MATCHLINE -L- STA. 257+80 SEE SHEET NO. 13
MATCHLINE -L- STA. 261+20 SEE SHEET NO. 15
FOR -L- PROFILE SEE SHEET 49


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME FOR PARCEL 52 ; ADDED DRIVEWAY TO PARCEL 55 AT STA.260+90 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RWP); REVISED PDE ON PARCEL 53.
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 10
PROPERTIES ON MAIN, LLC DB 433 PG 610
JADE ROBERTS DB 324 PG 304
ARTHUR N. DOVER DB 151 PG 353
THOMAS F. ROBERTS DB 192 PG 13
ALAN A. CARDINALE DB 222 PG 384
PINE SWAMP BRANCH
-L- PI Sta. 258+01.528
1.5m BASE STREAM RELOCATION CLASS "B" RIP RAP SEE DETAIL "AW" SHEET 2A
PIPE INTO CULVERT
MATCHLINE -L- STA. 257+80 SEE SHEET NO. 13
MATCHLINE -L- STA. 261+20 SEE SHEET NO. 15
-L- N 72° 45' 39" E
-Y10- POT Sta. 11+95.659
S 43° 04' 02" E
-L-
PI Sta. 256+63.645
Δ = 17° 41' 52.6" (LT)
L = 277.999
T = 140.115
R = 900.000
SE = 03
BL-33-PNC 44+95.216=
-L- POT 259+90.383
11.266 RT
PDE
BERM DITCH
REMOVE TREE
TAPER
200mm BST CURB
200mm CONC CURB
1200mm CMP
375mm RCP
600mm CMP
ISBKBUS
ISFBUS
ISBLK&FBUS
ISBLK&NTLBUS
ISMTLBUS
ISBLKBUS
ISNTLBUS
ISBK BUS
ISF BUS
ISBLK BUS
ISNTL BUS
CONC
BST
GR
W/LT
LT

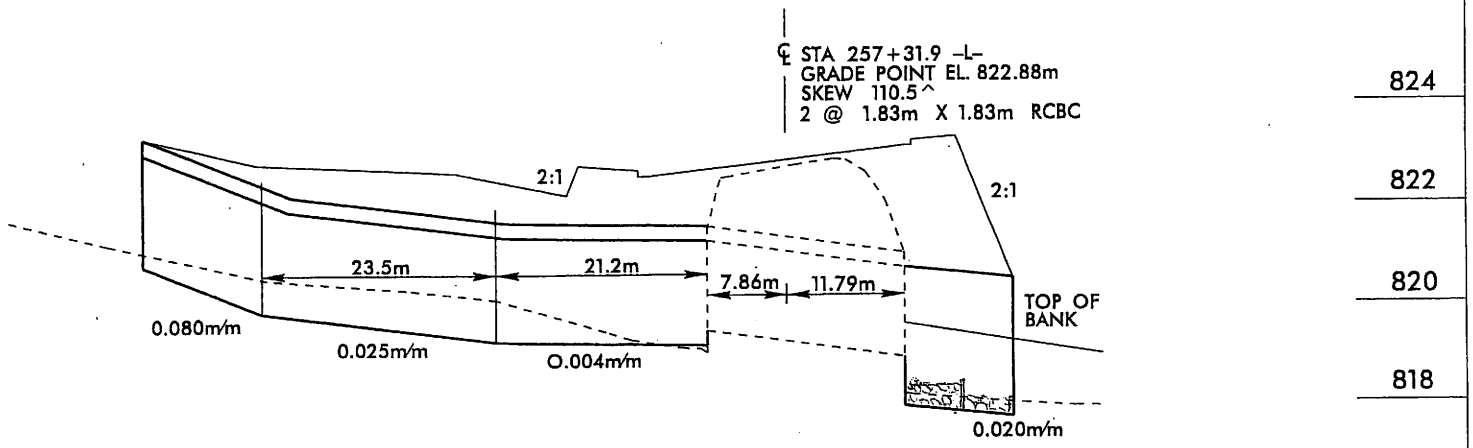


-Y10- STATION 10+44
2.1m X 2.1m RCBC WITH SILLS

SITE 10
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

SHEET OF 10/25/06



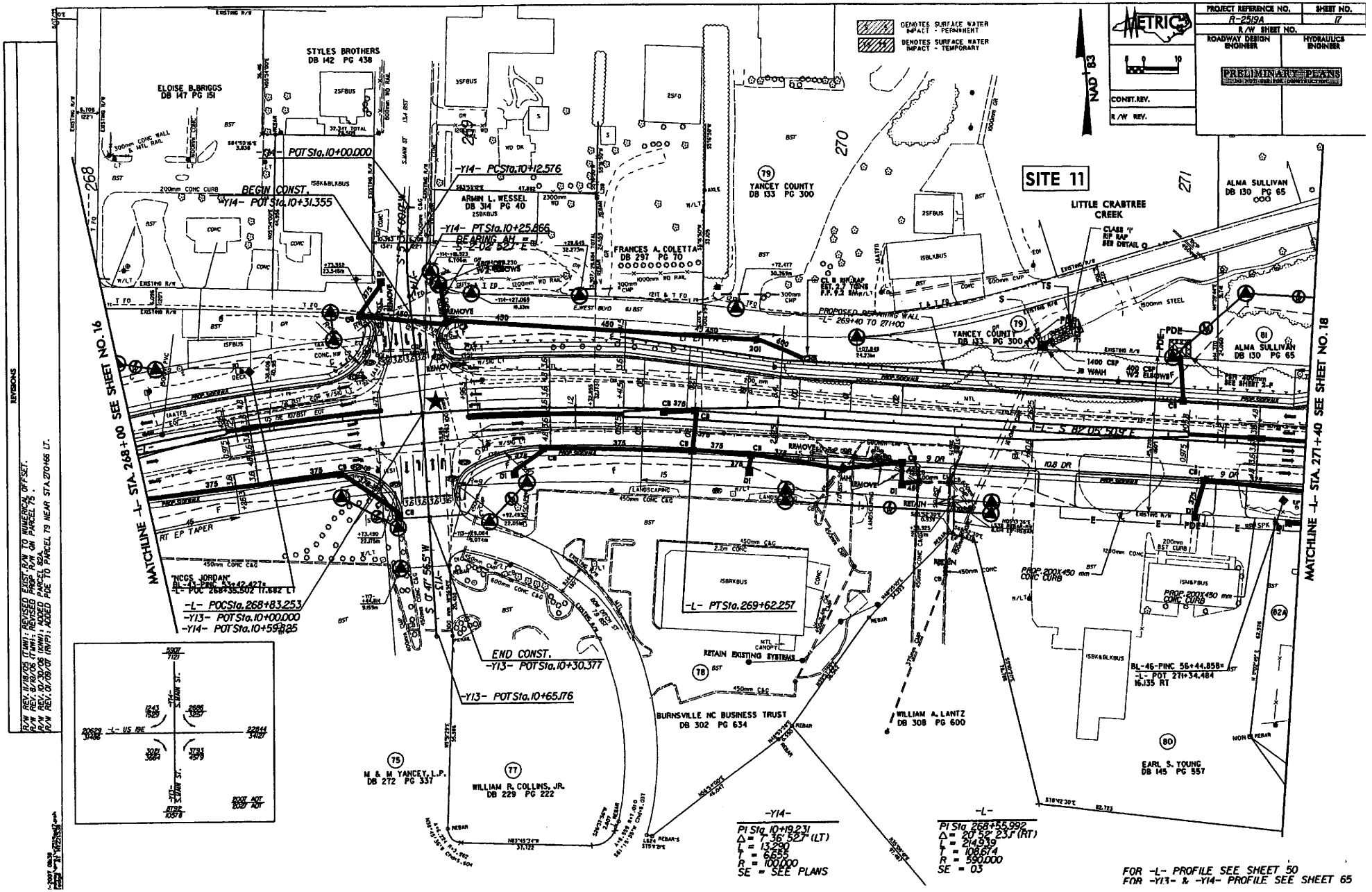
–L– STATION 257+32
2 @ 1.83m X 1.83m RCBC

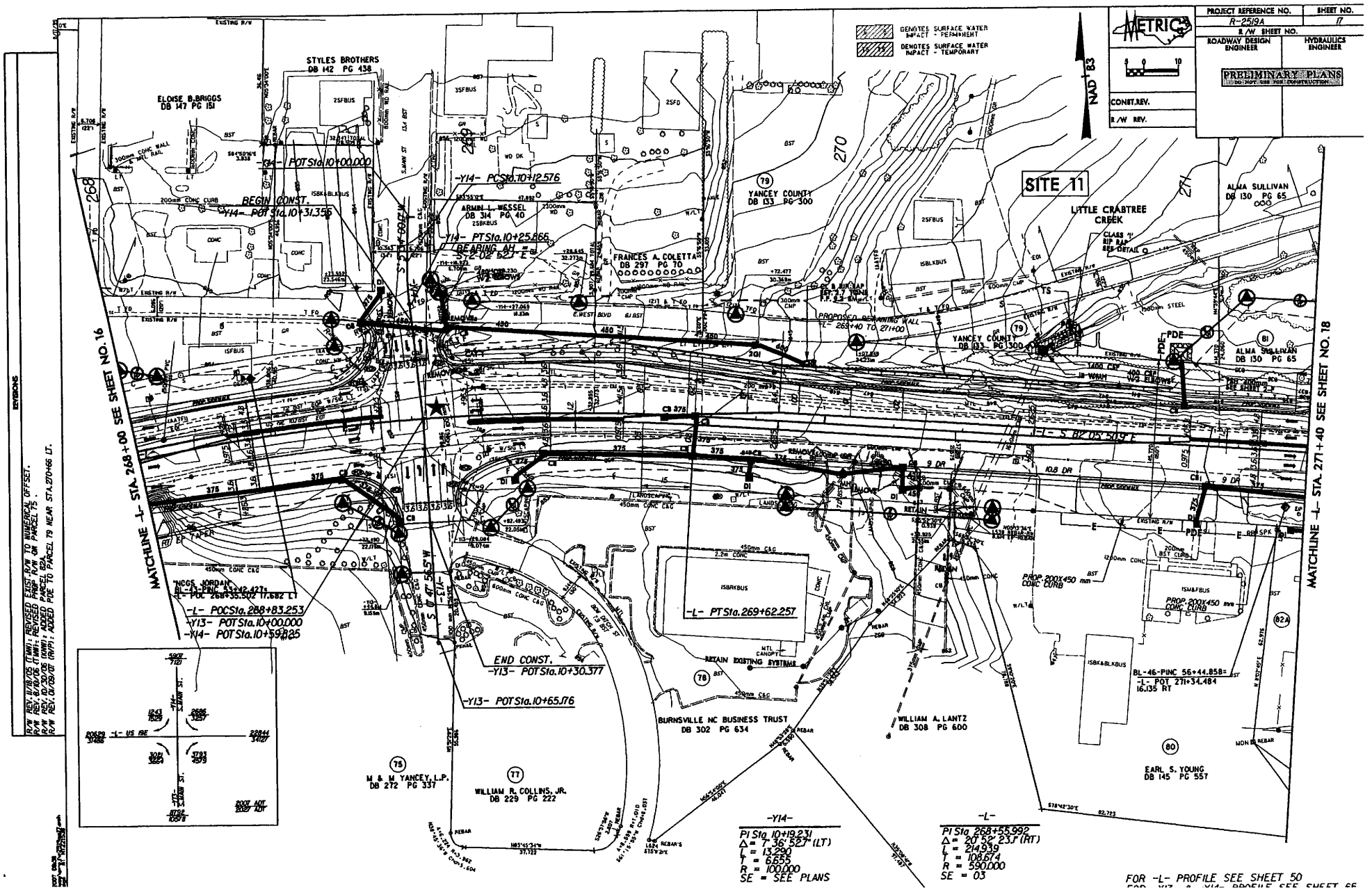
0.3m HIGH SILLS ARE TO BE PLACED IN THE PROPOSED RCBC EXTENSIONS. SPACING SHALL BE AS FOLLOWS: McINTOSH BRANCH AND PINE SWAMP BRANCH AT INLET EXTENSIONS 8m +/–; AT OUTLET EXTENSIONS 5.5m +/– WITH THE INTERIOR SILL BEING 0.6m HIGH.

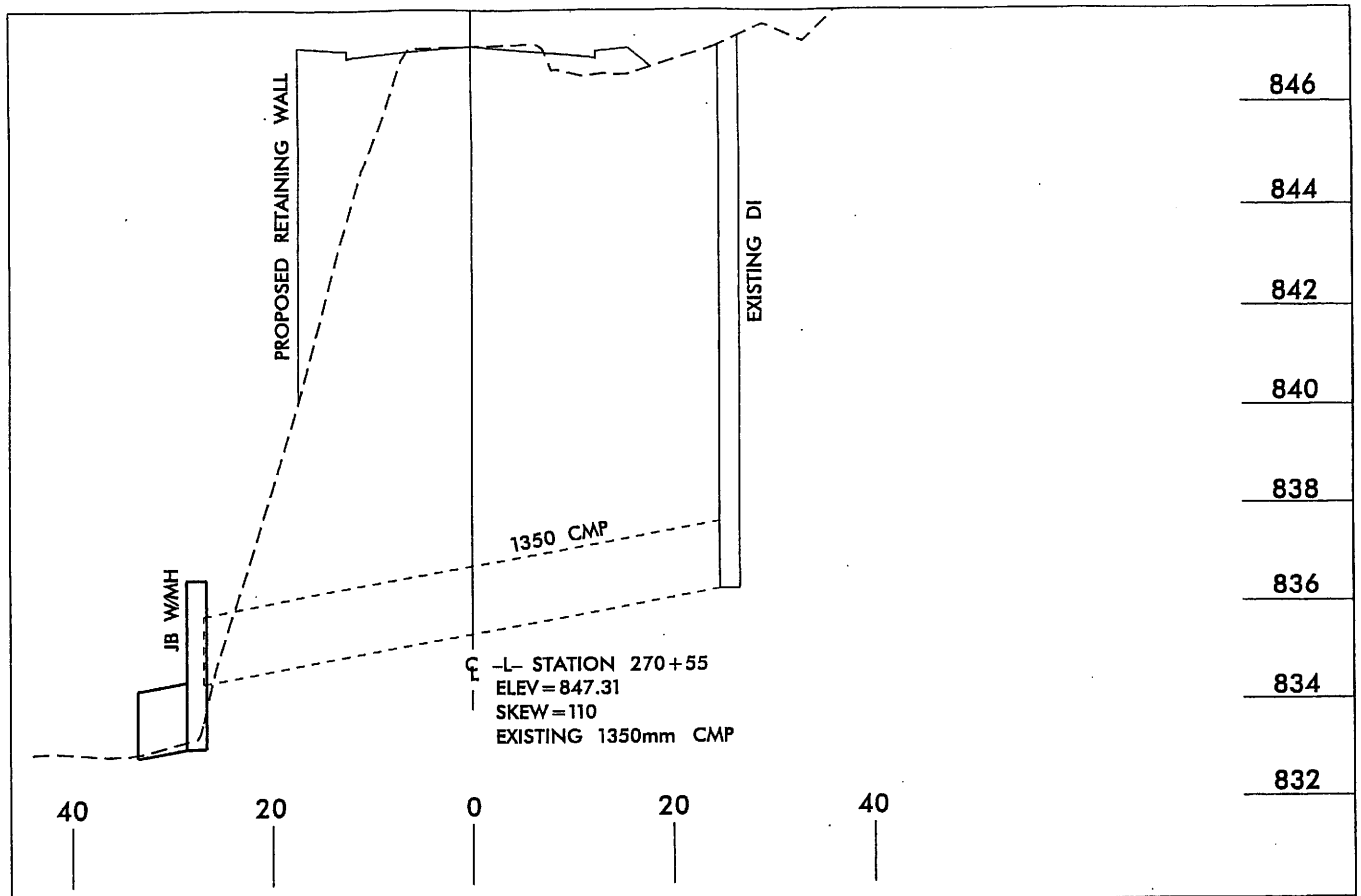
SITE 10
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E FROM EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
NAD 83
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 11
LITTLE CRABTREE CREEK
STYLES BROTHERS
DB 142 PG 438
ELOISE B. BRIGGS
DB 147 PG 151
ARMIN L. WESSEL
DB 314 PG 40
FRANCES A. COLETTA
DB 297 PG 70
YANCEY COUNTY
DB 133 PG 300
ALMA SULLIVAN
DB 130 PG 65
BURNSVILLE NC BUSINESS TRUST
DB 302 PG 634
WILLIAM A. LANTZ
DB 308 PG 600
M & M YANCEY, L.P.
DB 272 PG 337
WILLIAM R. COLLINS, JR.
DB 229 PG 222
EARL S. YOUNG
DB 145 PG 557
-Y14- POT Sta. 10+00.000
BEGIN CONST.
-Y14- POT Sta. 10+31.355
-Y14- PC Sta. 10+12.576
-Y14- PT Sta. 10+25.866
BEARING AH = S 2°02'52" E
-L- POC Sta. 268+83.253
-Y13- POT Sta. 10+00.000
-Y14- POT Sta. 10+59.825
END CONST.
-Y13- POT Sta. 10+30.377
-Y13- POT Sta. 10+65.176
-L- PT Sta. 269+62.257
PROPOSED RETAINING WALL
-L- 269+40 TO 271+00
-L- S 82°05'50" E
MATCHLINE -L- STA. 268+00 SEE SHEET NO. 16
MATCHLINE -L- STA. 271+40 SEE SHEET NO. 18
"NCGS JORDAN"
BL-45-PINC N 34°42'42"E
-L- POC 268+35.502 17.682 LT
BL-46-PINC 56+44.858 RT
-L- POT 271+34.484
16.135 RT
-Y14-
PI Sta. 10+19.23
Δ = 7°36'52" (LT)
D = 13.290
T = 6.655
R = 100.000
SE = SEE PLANS
-L-
PI Sta. 268+55.992
Δ = 20°52'23" (RT)
D = 2.149.39
T = 108.674
R = 590.000
SE = 03
FOR -L- PROFILE SEE SHEET 50
FOR -Y13- & -Y14- PROFILE SEE SHEET 65
REVISIONS
R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 12/06/06 (TMW): REVISED PARCEL 82A ON PARCEL 75.
R/W REV. 02/08/07 (TMW): REVISED PARCEL 82A
R/W REV. 03/09/07 (RVP): ADDED PDE TO PARCEL 79 NEAR STA. 270+66 LT.


PROJECT REFERENCE NO. R-2519A
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
METRIC
CONST. REV.
R/W REV.
NAD 83
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
REVISIONS
R/W REV. 1/19/05 (TMH); REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 8/16/05 (TMH); REVISED PROP R/W ON PARCEL 75.
R/W REV. 10/30/06 (MW); ADDED PARCEL 82A
R/W REV. 04/09/07 (RVP); ADDED PDE TO PARCEL 79 NEAR STA.270+66 LT.
MATCHLINE -L- STA. 268+00 SEE SHEET NO. 16
MATCHLINE -L- STA. 271+40 SEE SHEET NO. 18
SITE 11
LITTLE CRABTREE CREEK
STYLES BROTHERS DB 142 PG 438
ELOISE B.BRIGGS DB 147 PG 151
ARMIN L. WESSEL DB 314 PG 40
FRANCES A. COLETTA DB 297 PG 70
YANCEY COUNTY DB 133 PG 300
ALMA SULLIVAN DB 130 PG 65
BURNSVILLE NC BUSINESS TRUST DB 302 PG 634
WILLIAM A. LANTZ DB 308 PG 600
M & M YANCEY, L.P. DB 272 PG 337
WILLIAM R. COLLINS, JR. DB 229 PG 222
EARL S. YOUNG DB 145 PG 557
-Y14- POT Sta.10+00.000
-Y14- PC Sta.10+12.576
BEGIN CONST.
-Y14- POT Sta.10+31.356
-Y14- PT Sta.10+25.866
BEARING AH = S 12-02-52 E
-L- POC Sta.268+83.253
-Y13- POT Sta.10+00.000
-Y14- POT Sta.10+59.825
END CONST.
-Y13- POT Sta.10+30.377
-Y13- POT Sta.10+65.176
-L- PT Sta.269+62.257
-L- S 82-05-50 E
PROPOSED RETAINING WALL -L- 269+40 TO 271+00
PROP. 200X450 mm CONC CURB
-Y14-
PI Sta 10+19.231
Δ = 7°36'52" (LT)
L = 13.290
T = 6.655
R = 100.000
SE = SEE PLANS
-L-
PI Sta 268+55.992
Δ = 20°52'23" (RT)
L = 214.939
T = 108.674
R = 590.000
SE = 03
FOR -L- PROFILE SEE SHEET 50

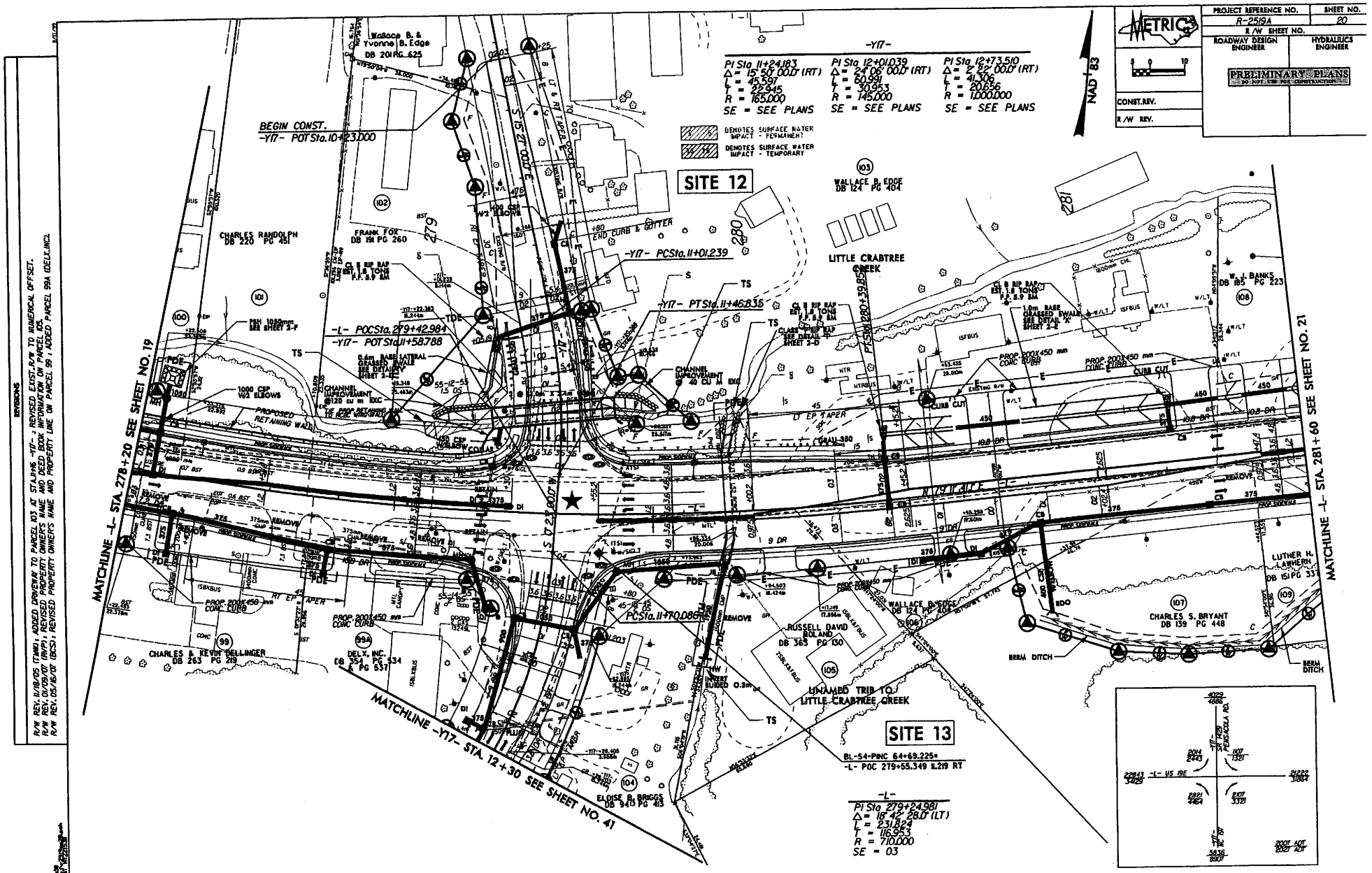


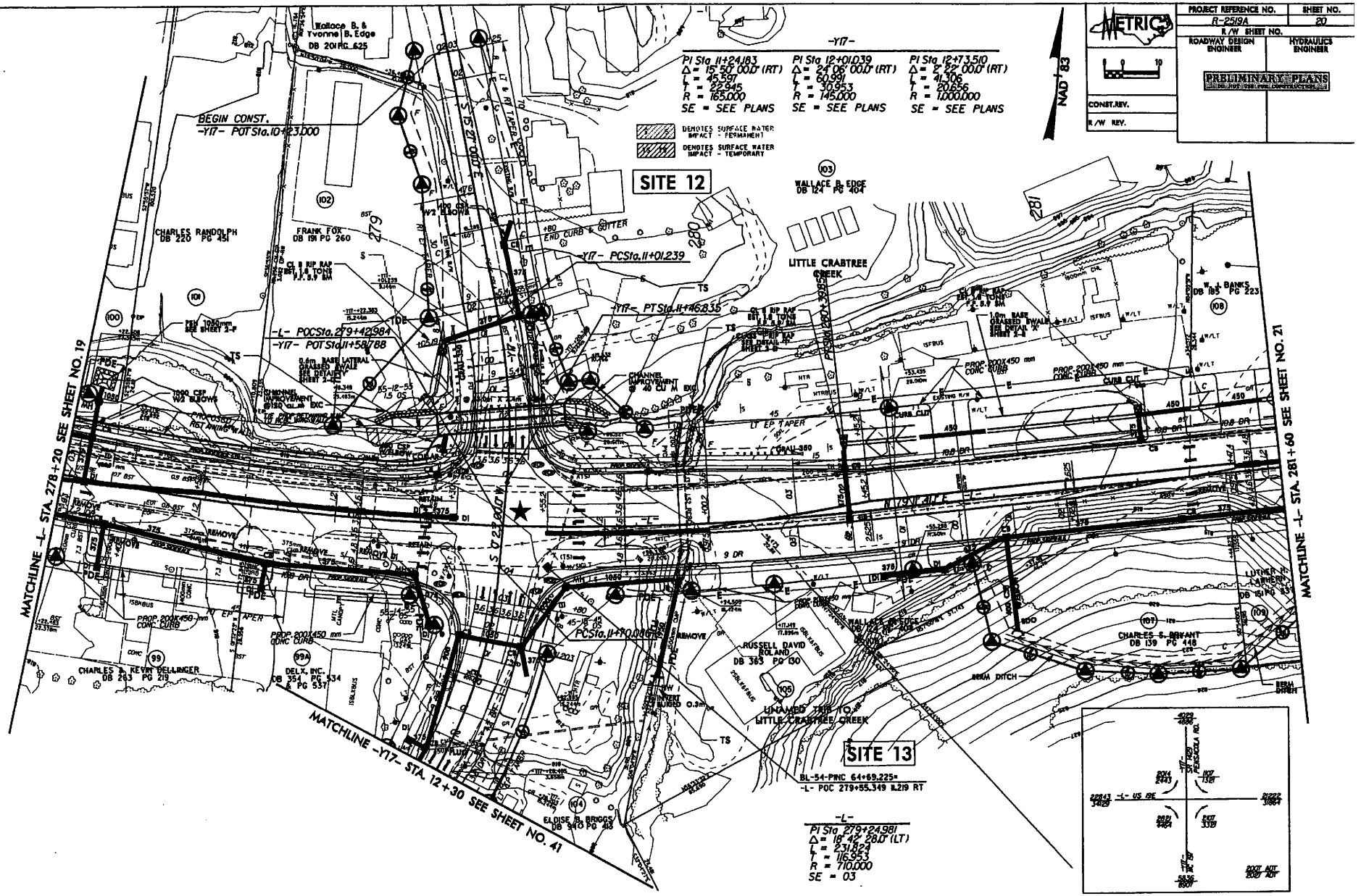
-L- STATION 270+55
RETAIN EXISTING 1350mm CMP
EXTEND W/1350mm CMP

SITE 11
PROFILE VIEW

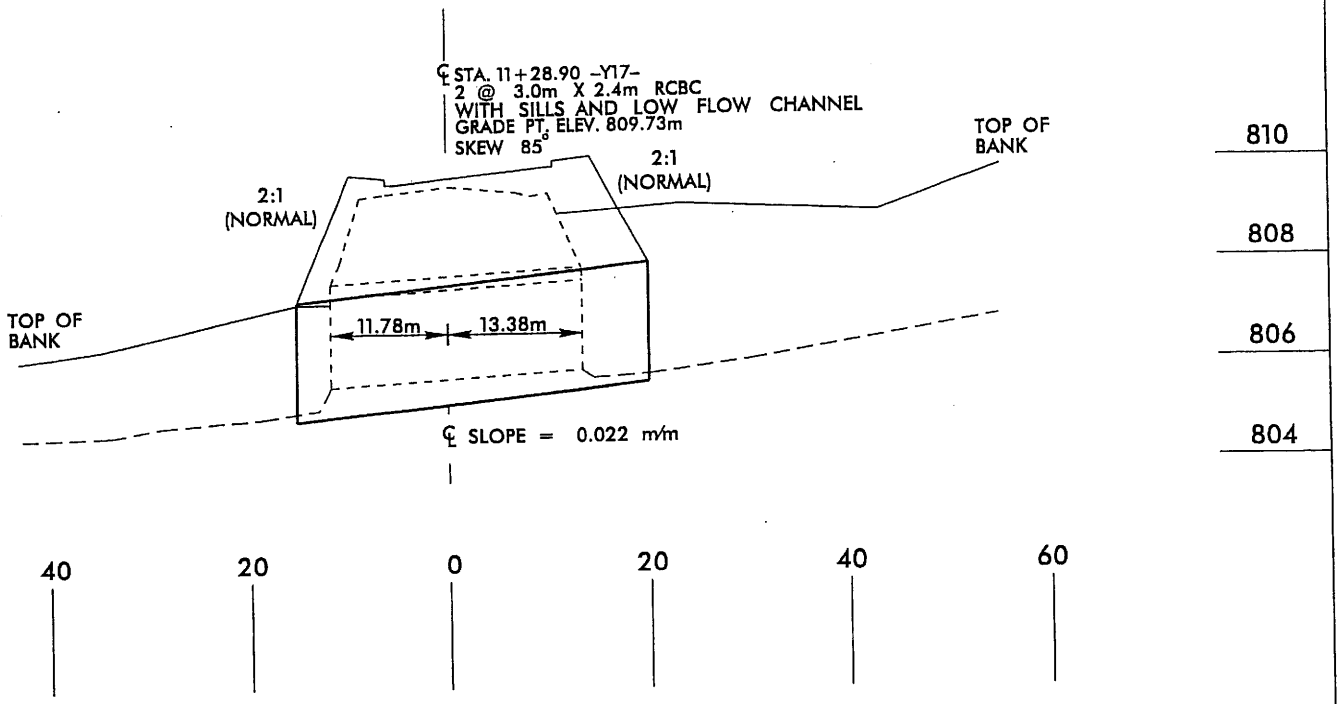
NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TJW): ADDED DRIVEWAY TO PARCEL 103 AT STA.H45 -Y17- ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/06 (TJW): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 105.
R/W REV. 05/16/06 (BCS): REVISED PROPERTY OWNER'S NAME AND PROPERTY LINE ON PARCEL 99 ; ADDED PARCEL 99A (DELV.INC).
-Y17-
PI Sta 11+24.183
Δ = 15° 50' 00.0" (RT)
L = 45.597
T = 22.945
R = 165.000
SE = SEE PLANS
PI Sta 12+01.039
Δ = 24° 06' 00.0" (RT)
L = 60.991
T = 30.953
R = 145.000
SE = SEE PLANS
PI Sta 12+73.510
Δ = 2° 22' 00.0" (RT)
L = 41.306
T = 20.656
R = 1,000.000
SE = SEE PLANS
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 12
SITE 13
BEGIN CONST. -Y17- POT Sta. 10+23.000
-Y17- PCSta. 11+01.239
-Y17- PTSta. 11+46.835
-L- POCSta. 279+42.984
-Y17- POTSta. 11+58.788
-Y17- PCSta. 11+70.086
MATCHLINE -L- STA. 278+20 SEE SHEET NO. 19
MATCHLINE -L- STA. 281+60 SEE SHEET NO. 21
MATCHLINE -Y17- STA. 12+30 SEE SHEET NO. 41
Wallace B. & Yvonne B. Edge DB 201 PG 625
CHARLES RANDOLPH DB 220 PG 451
FRANK FOX DB 191 PG 260
WALLACE B. EDGE DB 124 PG 404
LITTLE CRABTREE CREEK
W. L. BANKS DB 185 PG 223
LUTHER H. LAWHERN DB 151 PG 331
CHARLES S. BRYANT DB 139 PG 448
RUSSELL DAVID ROLAND DB 363 PG 150
CHARLES & KEVIN DELLINGER DB 263 PG 219
DELV, INC. DB 354 PG 534 & PG 537
ELOISE B. BRIGGS DB 940 PG 413
UNAMED TRIB TO LITTLE CRABTREE CREEK
BL-54-PINC 64+69.225±
-L- POC 279+55.349 ℄ 219 RT
-L-
PI Sta 279+24.981
Δ = 18° 42' 28.0" (LT)
L = 231.824
T = 116.953
R = 710.000
SE = 03
PROP. 200X450 mm CONC CURB
PROP. SIDEWALK
CHANNEL IMPROVEMENT @ 40 CU M EXC
CHANNEL IMPROVEMENT @120 cu m EXC
PROPOSED RETAINING WALL
1000 CSP W/2 ELBOWS
0.6m BASE LATERAL GRASSED SWALE SEE DITAIL "Y" SHEET 2-H
1.0m BASE GRASSED SWALE SEE DETAIL "X" SHEET 2-G
CLASS A RIP RAP SEE DETAIL "R" SHEET 2-D
CL B RIP RAP EST. 1.8 TONS F.F. 6.9 SM
CUBB CUT
BERM DITCH
FOR -L- PROFILE SEE SHEET 52



FOR -L- PROFILE SEE SHEET 52
FOR -Y17- PROFILE SEE SHEET 66



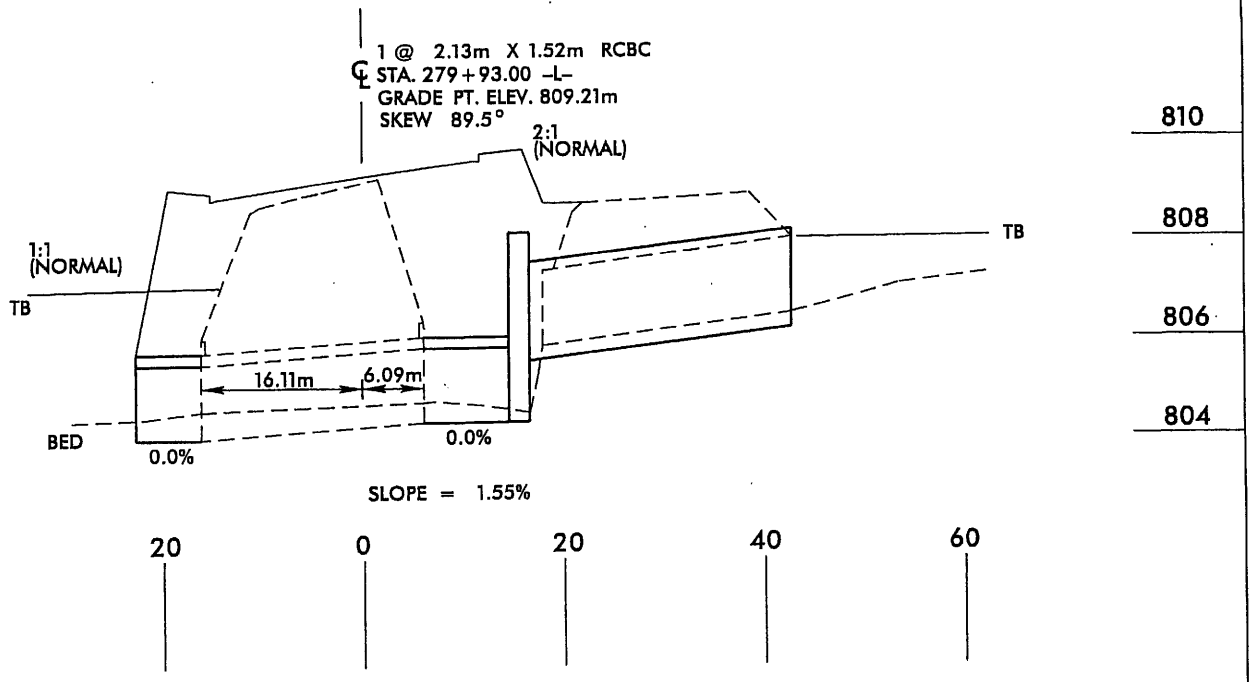
-Y17- STATION 11+28.90
2 @ 3.0m X 2.4M RCBC

SITE 12
PROFILE VIEW

NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10 / 25 / 06



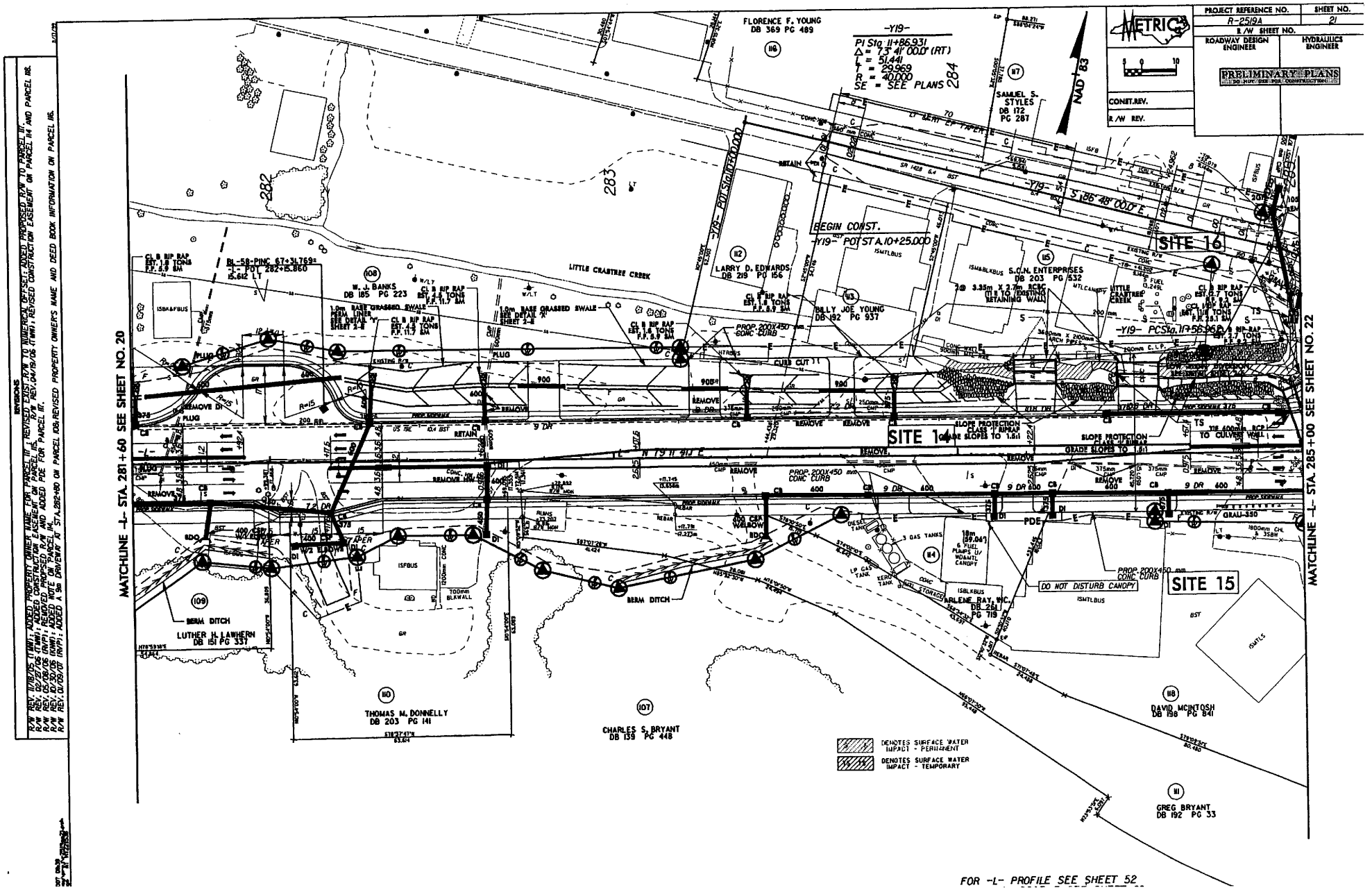
-L- STATION 279+93
1 @ 2.13m X 1.52m RCBC

SITE 13
PROFILE VIEW

NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10 / 25 / 06



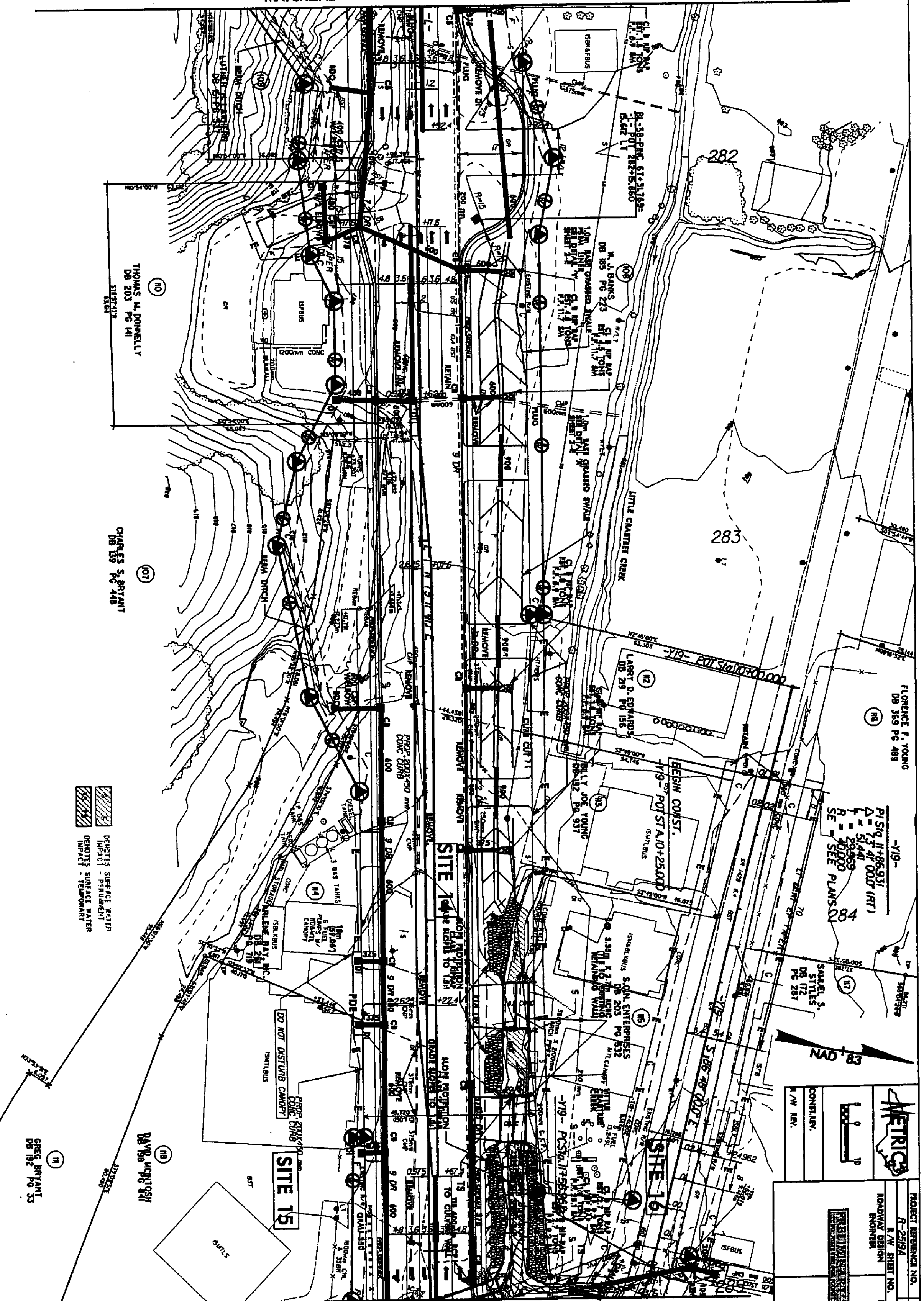
REVISIONS

R/W REV. 1/18/05 (TBW); ADDED PROPERTY OWNER NAME FOR PARCEL 111; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W TO PARCEL 111.
R/W REV. 02/27/06 (TBW); ADDED CONSTRUCTION EASEMENT ON PARCEL 115; REVISED EXIST. R/W REV. 04/19/06 (TBW); ADDED CONSTRUCTION EASEMENT ON PARCEL 114 AND PARCEL 116.
R/W REV. 05/08/06 (RVP); REMOVED PROPOSED R/W AND ADDED PIPE FOR PARCEL 111.
R/W REV. 07/30/06 (RVP); REVISED WORK TO PARCEL 111.
R/W REV. 10/09/07 (RVP); ADDED A 36' DRIVEWAY AT STA.282+80 ON PARCEL 109; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 116.

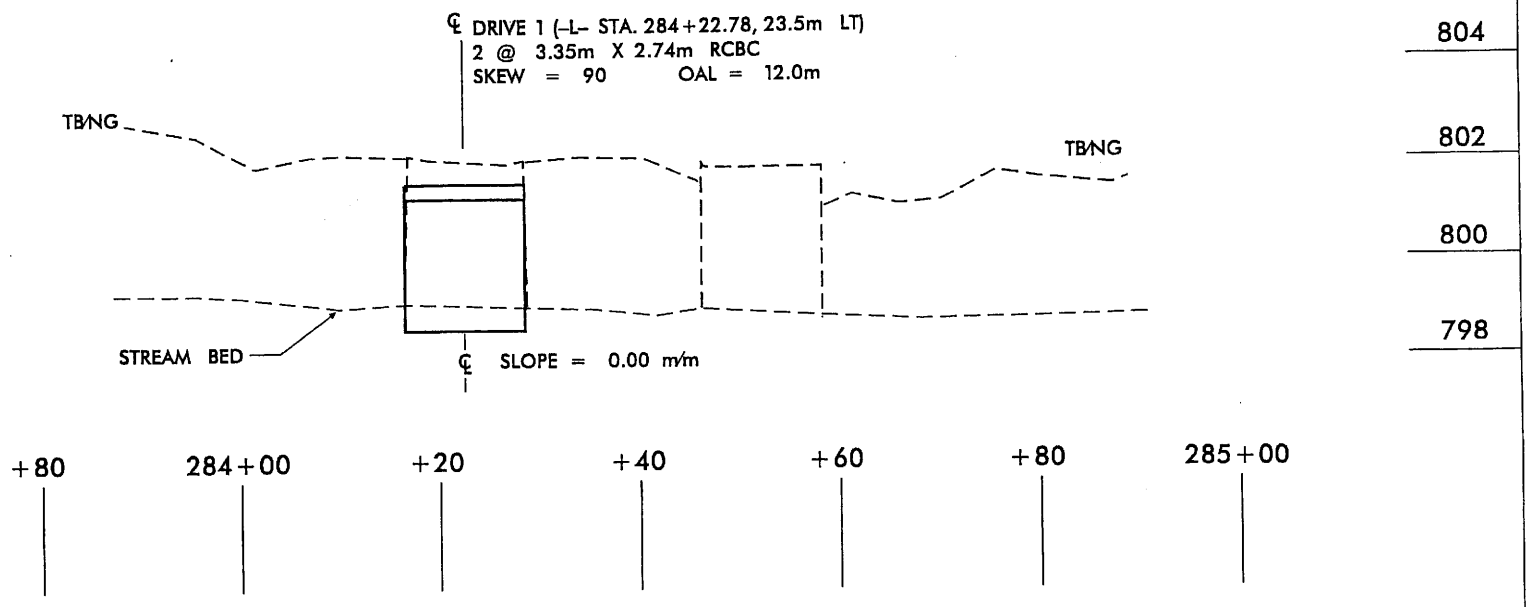
REVISIONS

R/W REV. 11/18/05 (TMW): ADDED PROPERTY OWNER NAME FOR PARCEL 117 ; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W TO PARCEL 117.
R/W REV. 02/27/06 (TMW): ADDED CONSTRUCTION EASEMENT ON PARCEL 115. R/W REV. 04/19/06 (TMW): REVISED CONSTRUCTION EASEMENT ON PARCEL 114 AND PARCEL 118.
R/W REV. 05/08/06 (RVP): REMOVED PROPSED R/W AND ADDED PDE FOR PARCEL 117.
R/W REV. 10/30/06 (KNW): ADDED NOTE ON PARCEL 114.
R/W REV. 01/09/07 (RVP): ADDED A 9m DRIVEWAY AT STA. 282+80 ON PARCEL 108; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 116.

MATCHLINE -L- STA. 281+60 SEE SHEET NO. 20



MATCHLINE -L- STA. 285+00 SEE SHEET NO. 22

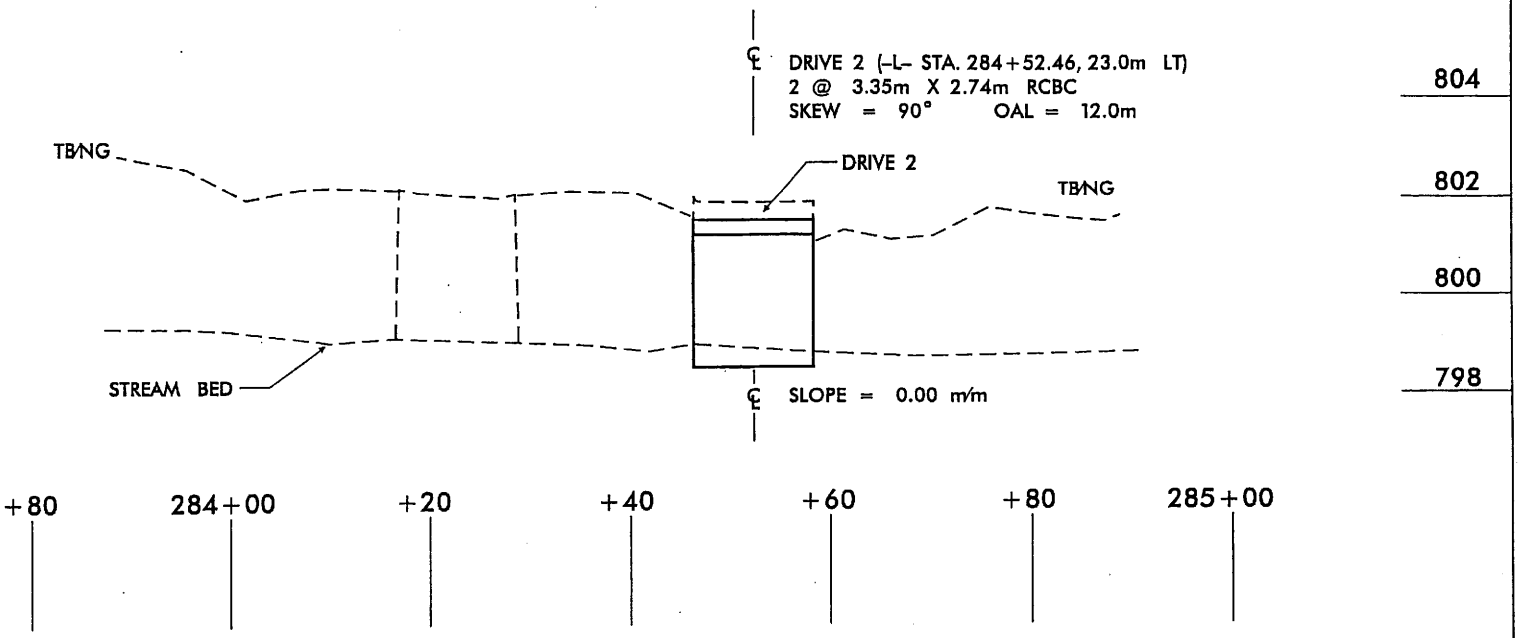


-L- STATION 284+22.78
2-2 @ 3.35m X 2.71m RCBC

SITE 14
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06



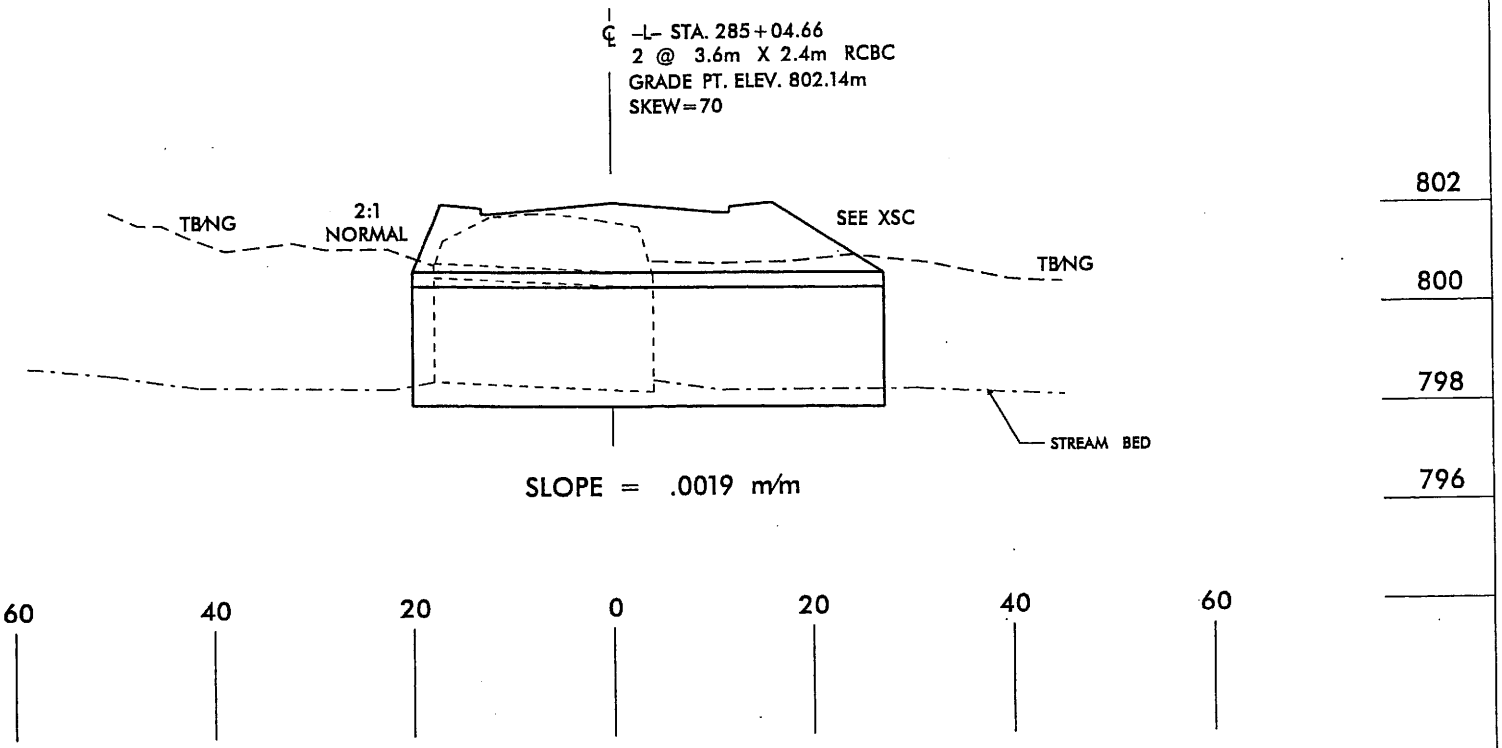
-L- STATION 284+52.46 (23m LT)
2 @ 3.35m X 2.74m RCBC

NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

SITE 14
PROFILE VIEW



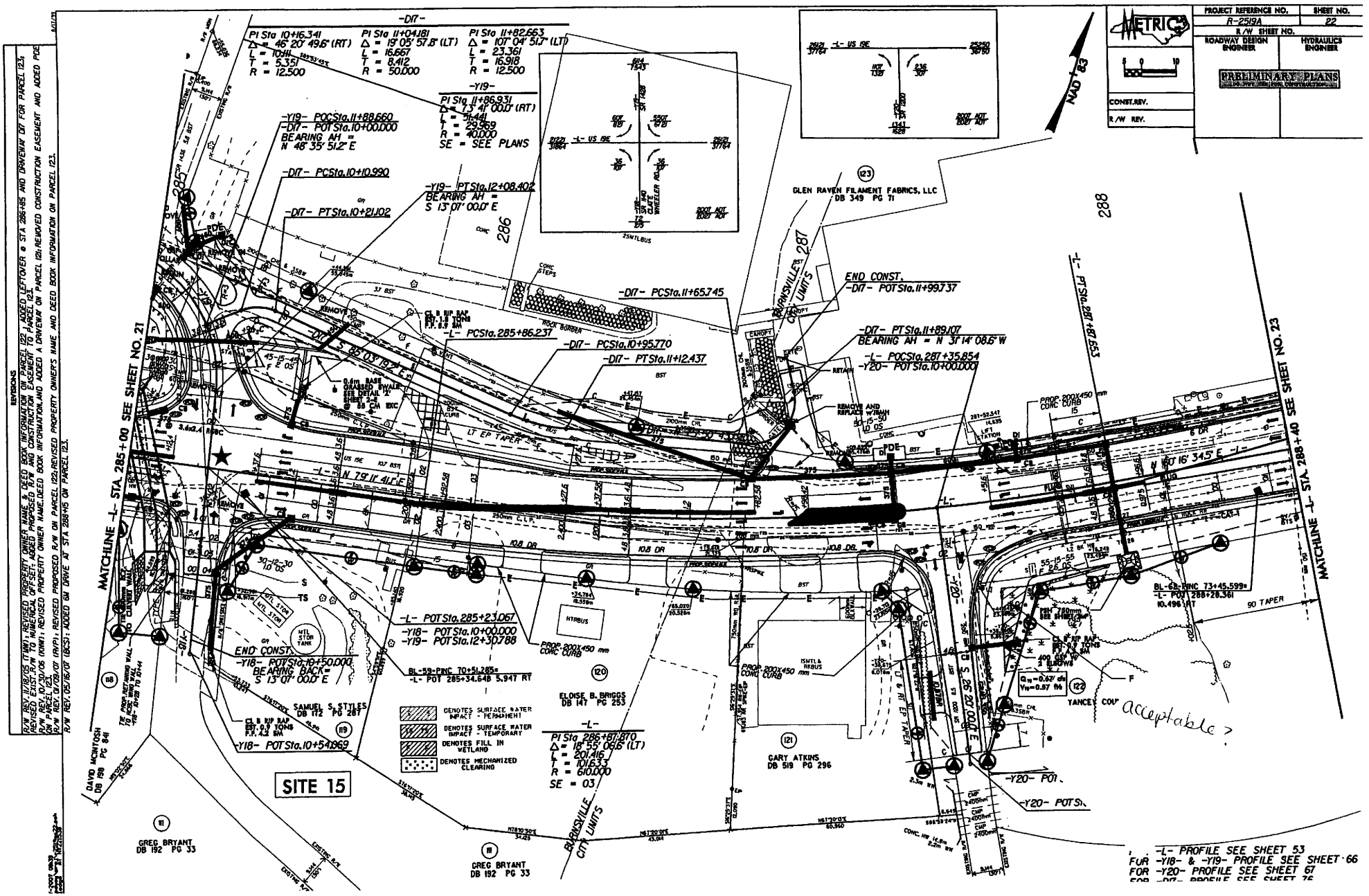
–L– STATION 285+04.66
2 @ 3.6m X 2.4m RCBC

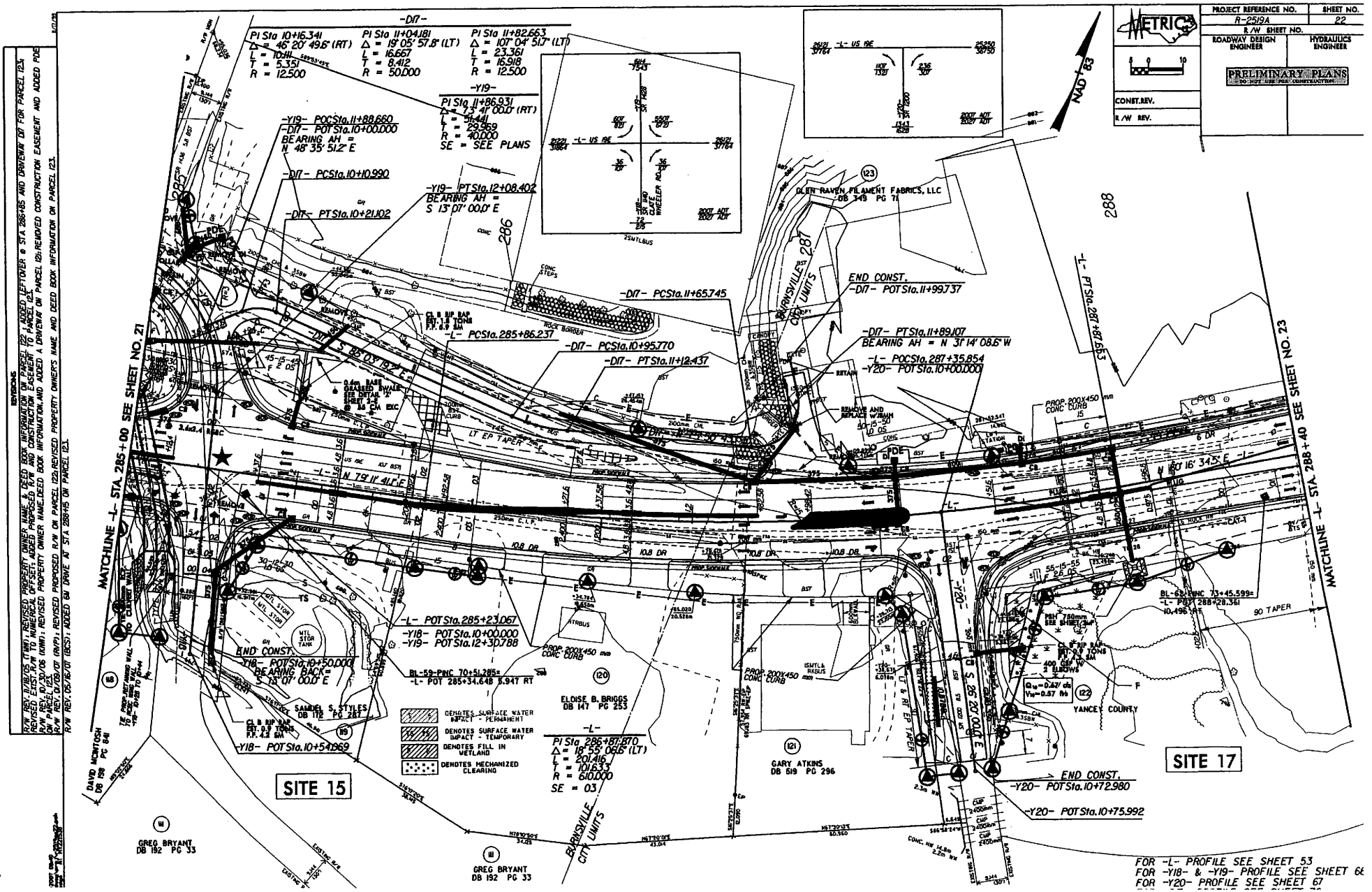
SITE 15
PROFILE VIEW

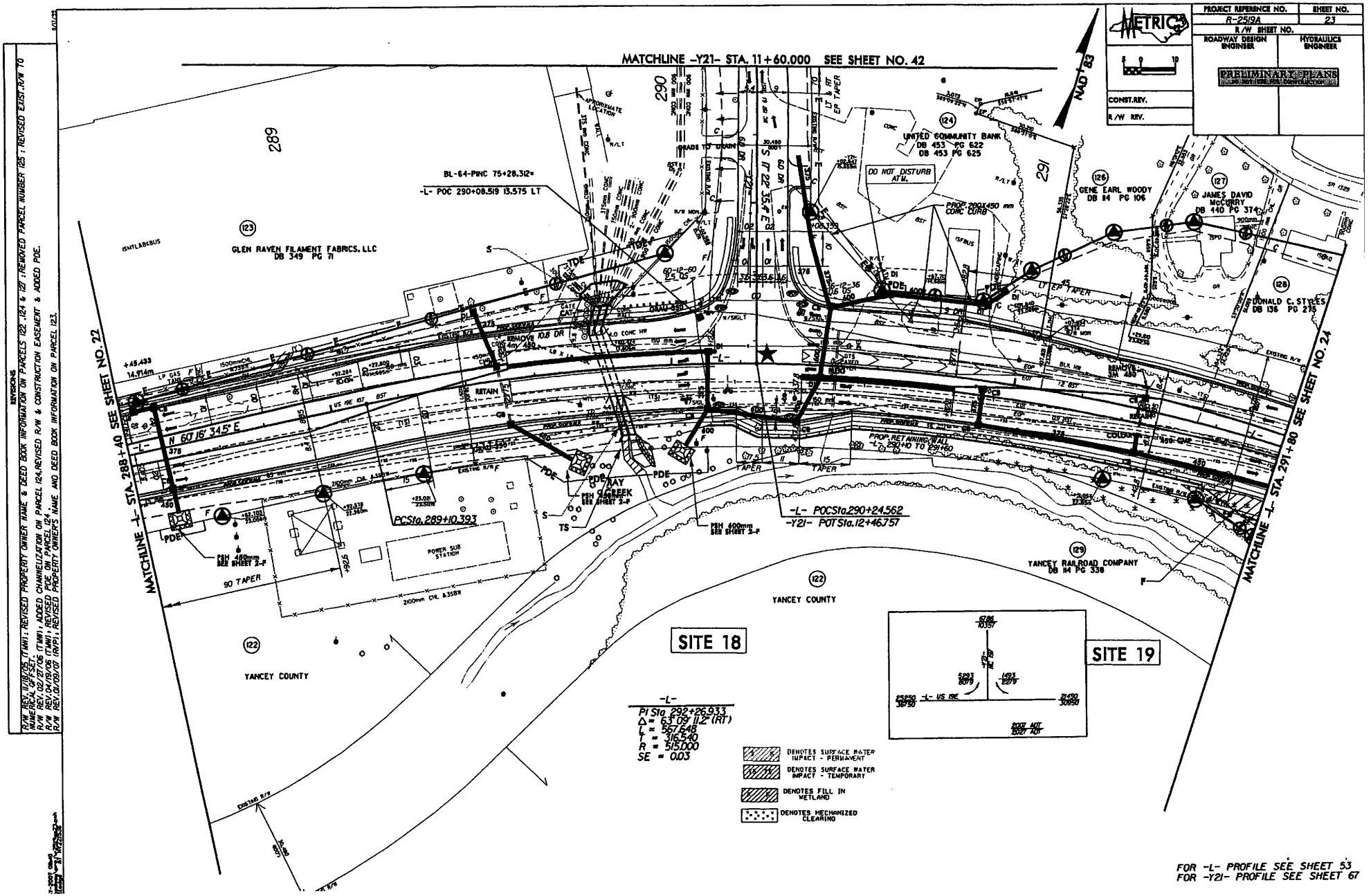
NCDOT

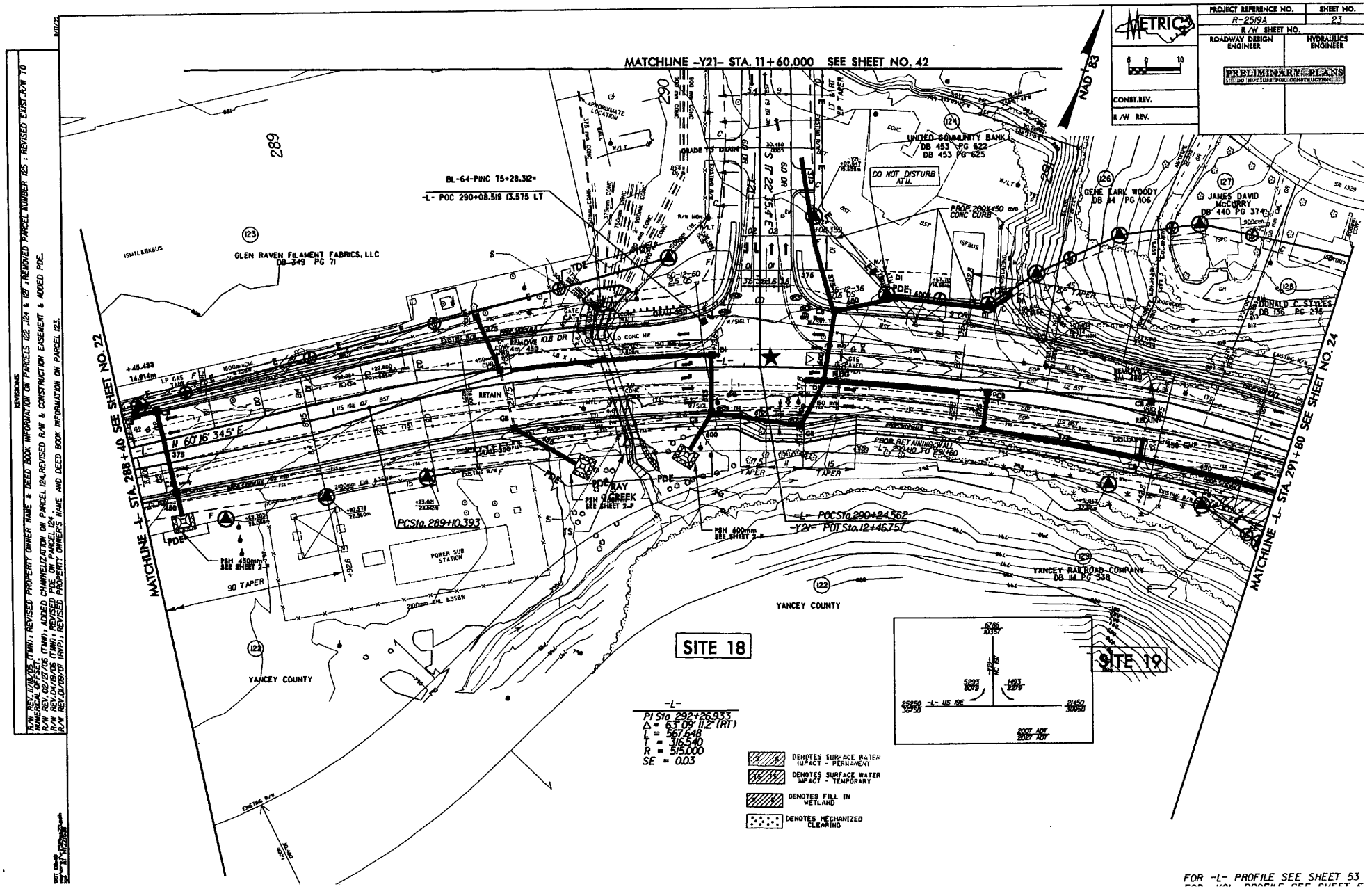
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

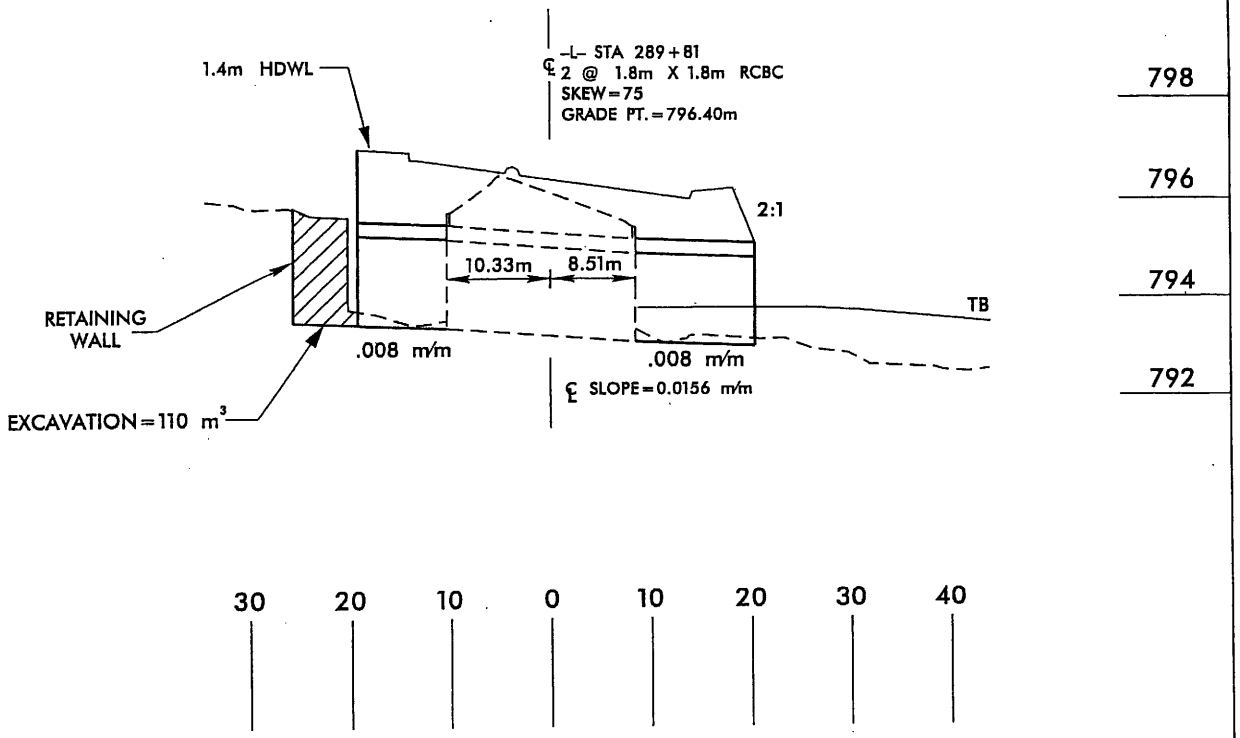
10/25/06


PROJECT REFERENCE NO. R-2519A
SHEET NO. 22
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
METRIC
REVISIONS
R/W REV. 11/16/05 (TWO); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122; ADDED LEFTOVER @ STA 286+85 AND DRIVEWAY DIT FOR PARCEL 123; REVISED EXIST. R/W TO NUMERICAL OFFSET; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 122; ADDED A DRIVEWAY ON PARCEL 121; REMOVED CONSTRUCTION EASEMENT AND ADDED PDE ON PARCEL 122; 03/08/07 (NWH); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION, AND ADDED A DRIVEWAY ON PARCEL 123; REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
R/W REV. 04/09/07 (NVP); REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
R/W REV. 05/16/07 (BCS); ADDED GW DRIVE AT STA 288+45 ON PARCEL 123.
-D17-
PI Sta 10+16.341
Δ = 46° 20' 49.6" (RT)
L = 10.411
T = 5.351
R = 12.500
PI Sta 11+04.181
Δ = 19° 05' 57.8" (LT)
L = 16.667
T = 8.412
R = 50.000
PI Sta 11+82.663
Δ = 107° 04' 51.7" (LT)
L = 23.361
T = 16.918
R = 12.500
-Y19-
PI Sta 11+86.931
Δ = 7° 31' 00.0" (RT)
L = 26.441
T = 29.569
R = 400.000
SE = SEE PLANS
-Y19- POC Sta. 11+88.660
-D17- POT Sta. 10+00.000
BEARING AH = N 48° 35' 51.2" E
-D17- PC Sta. 10+10.990
-Y19- PT Sta. 12+08.402
BEARING AH = S 13° 01' 00.0" E
-D17- PT Sta. 10+21.102
-D17- PC Sta. 11+65.745
-L- PC Sta. 285+86.237
-D17- PC Sta. 10+95.770
-D17- PT Sta. 11+12.437
-D17- S 85° 03' 19.2" E
-L- N 79° 11' 41.1" E
MATCHLINE -L- STA. 285+00 SEE SHEET NO. 21
MATCHLINE -L- STA. 288+40 SEE SHEET NO. 23
BURNSVILLE CITY LIMITS
END CONST.
-D17- POT Sta. 11+99.737
-D17- PT Sta. 11+89.107
BEARING AH = N 31° 14' 08.6" W
-L- POC Sta. 287+35.854
-Y20- POT Sta. 10+00.000
-L- PT Sta. 287+67.653
-L- N 60° 16' 34.5" E
-L- POT Sta. 285+23.067
-Y18- POT Sta. 10+00.000
-Y19- POT Sta. 12+30.788
END CONST.
-Y18- POT Sta. 10+50.000
BEARING BACK = S 13° 07' 00.0" E
-Y18- POT Sta. 10+54.969
-L-
PI Sta 286+87.870
Δ = 18° 55' 06.6" (LT)
L = 201.416
T = 101.633
R = 610.000
SE = 03
-Y20- POT Sta.
-Y20- POT St.
BL-58-RINC 70+51.285=
-L- POT 285+34.648 5.947 RT
BL-62-RINC 73+45.599=
-L- POT 288+28.361
10.496 LT
90 TAPER
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 15
GLEN RAVEN FILAMENT FABRICS, LLC DB 349 PG 71
DAVID MCINTOSH DB 198 PG 841
SAMUEL S. STYLES DB 172 PG 287
ELOISE B. BRIGGS DB 147 PG 253
CARY ATKINS DB 519 PG 296
GREG BRYANT DB 192 PG 33
GREG BRYANT DB 192 PG 33
YANCEY COV
acceptable ?
-L- PROFILE SEE SHEET 53
FOR -Y18- & -Y19- PROFILE SEE SHEET 66
FOR -Y20- PROFILE SEE SHEET 67


PROJECT REFERENCE NO. R-2519A
SHEET NO. 22
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
METRIC
NAD '83
REVISIONS
R/W REV. 8/18/06 (TW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; ADDED LEFTOVER @ STA 286+85 AND DRIVEWAY D17 FOR PARCEL 123.
REVISED ALIGNMENT, OFFSET, ADDED PROPOSED R/W AND CONSTRUCTION EASEMENT TO PARCEL 123.
REVISED 01/30/08 (KMM): REVISED PROPERTY OWNER NAME,DEED BOOK INFORMATION,AND ADDED A DRIVEWAY ON PARCEL 121; REMOVED CONSTRUCTION EASEMENT AND ADDED POE ON PARCEL 123.
R/W REV. 04/09/07 (MVP): REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
R/W REV. 05/16/07 (BCS): ADDED 6M DRIVE AT STA 288+15 ON PARCEL 123.
-D17-
PI Sta 10+16.341
Δ = 46° 20' 49.6" (RT)
L = 10.141
T = 5.351
R = 12.500
PI Sta 11+04.181
Δ = 19° 05' 57.8" (LT)
L = 16.667
T = 8.412
R = 50.000
PI Sta 11+82.663
Δ = 107° 04' 51.7" (LT)
L = 23.361
T = 16.918
R = 12.500
-Y19-
PI Sta 11+86.931
Δ = 7.3° 41' 00.0" (RT)
L = 51.441
T = 29.969
R = 40.000
SE = SEE PLANS
-Y19- POC Sta. 11+88.660
-D17- POT Sta. 10+00.000
BEARING AH = N 48° 35' 51.2" E
-D17- PC Sta. 10+10.990
-D17- PT Sta. 10+21.102
-Y19- PT Sta. 12+08.402
BEARING AH = S 13° 07' 00.0" E
-D17- PC Sta. 11+65.745
-L- PC Sta. 285+86.237
-D17- PC Sta. 10+95.770
-D17- PT Sta. 11+12.437
-D17- S 85° 03' 19.2" E
-L- N 79° 11' 41.1" E
-L- PC Sta. 285+23.067
-Y18- POT Sta. 10+00.000
-Y19- POT Sta. 12+30.788
END CONST.
-Y18- POT Sta. 10+50.000
BEARING BACK = S 13° 07' 00.0" E
-Y18- POT Sta. 10+54.069
-L-
PI Sta 286+87.870
Δ = 18° 55' 06.6" (LT)
L = 201.46
T = 101.63
R = 610.000
SE = 03
END CONST.
-D17- POT Sta. 11+99.737
-D17- PT Sta. 11+89.107
BEARING AH = N 31° 14' 08.6" W
-L- POC Sta. 287+35.854
-Y20- POT Sta. 10+00.000
-L- PT Sta. 287+87.653
-L- S 86° 20' 00.0" E
END CONST.
-Y20- POT Sta. 10+72.980
-Y20- POT Sta. 10+75.992
-L- N 80° 16' 34.5" E
MATCHLINE -L- STA. 285+00 SEE SHEET NO. 21
MATCHLINE -L- STA. 288+40 SEE SHEET NO. 23
BARNSVILLE CITY LIMITS
GLEN RAVEN FILAMENT FABRICS, LLC DB 349 PG 71
ELOISE B. BRIGGS DB 147 PG 253
GARY ATKINS DB 519 PG 296
SAMUEL S. STYLES DB 172 PG 287
DAVID MCINTOSH DB 358 PG 841
GREG BRYANT DB 192 PG 33
YANCEY COUNTY
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 15
SITE 17
FOR -L- PROFILE SEE SHEET 53
FOR -Y18- & -Y19- PROFILE SEE SHEET 66
FOR -Y20- PROFILE SEE SHEET 67


MATCHLINE -Y21- STA. 11+60.000 SEE SHEET NO. 42
MATCHLINE -L- STA. 288+40 SEE SHEET NO. 22
MATCHLINE -L- STA. 291+80 SEE SHEET NO. 24
NAD '83
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
23
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 122, 124 & 127; REVISED PARCEL NUMBER 125; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/27/06 (TMW); ADDED CHANNELIZATION ON PARCEL 124, REVISED R/W & CONSTRUCTION EASEMENT & ADDED PDE.
R/W REV. 04/19/06 (TMW); REVISED PDE ON PARCEL 124.
R/W REV. 01/09/07 (RPS); REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
(123) GLEN RAVEN FILAMENT FABRICS, LLC DB 349 PG 71
(124) UNITED COMMUNITY BANK DB 453 PG 622 DB 453 PG 625
(126) GENE EARL WOODY DB 114 PG 106
(127) JAMES DAVID MCCURRY DB 440 PG 374
(128) DONALD C. STYERS DB 136 PG 215
(129) YANCEY RAILROAD COMPANY DB 114 PG 338
(122) YANCEY COUNTY
BL-64-PINC 75+28.32*
-L- POC 290+08.519 13.575 LT
PCSta. 289+10.393
-L- POCSta.290+24.562
-Y21- POTSta.12+46.757
PROP. RETAINING WALL -L- 290+10 TO 291+50
PROP. 200X450 mm CONC CURB
DO NOT DISTURB ATM.
REMOVE 10.8 DR
RETAIN
POWER SUB STATION
PDE
TS
SITE 18
SITE 19
-L-
PI Sta. 292+26.933
Δ = 63°02'12" (RT)
D = 567.648
T = 316.540
R = 515.000
SE = 0.03
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
FOR -L- PROFILE SEE SHEET 53
FOR -Y21- PROFILE SEE SHEET 67


MATCHLINE -Y21- STA. 11+60.000 SEE SHEET NO. 42
MATCHLINE -L- STA. 288+40 SEE SHEET NO. 22
MATCHLINE -L- STA. 291+80 SEE SHEET NO. 24
NAD 83
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
23
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/7/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 122, 124 & 127; REMOVED PARCEL NUMBER 125; REVISED EXIST. R/W TO NUMEROUS PROPERTIES.
R/W REV. 02/27/06 (TMW); ADDED CHANNELIZATION ON PARCEL 124, REVISED R/W & CONSTRUCTION EASEMENT & ADDED PDE.
R/W REV. 04/19/06 (TMW); REVISED PDE ON PARCEL 124.
R/W REV. 06/05/07 (RPP); REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
BL-64-PINC 75+28.312=
-L- POC 290+08.519 13.575 LT
GLEN RAVEN FILAMENT FABRICS, LLC
DB 349 PG 71
UNITED COMMUNITY BANK
DB 453 PG 622
DB 453 PG 625
DO NOT DISTURB ATM.
PROP. 200X450 mm CONC. CURB
GENE EARL WOODY
DB 14 PG 106
JAMES DAVID McCURRY
DB 440 PG 374
RONALD C. STYLES
DB 136 PG 235
N 60° 16' 34.5" E
378.
RETAIN
PCS to 289+10.393
POWER SUB STATION
90 TAPER
PDE
BAY CREEK
-L- POCS to 290+24.562
-Y21- POT S to 12+46.75
PROP. RETAINING WALL
-L- 290+10.70 291+60
YANCEY RAILROAD COMPANY
DB 14 PG 338
YANCEY COUNTY
SITE 18
SITE 19
-L-
PI Sta 292+26.933
Δ = 6°09' 12" (RT)
L = 567.648
T = 316.540
R = 5,150.000
SE = 0.03
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
FOR -L- PROFILE SEE SHEET 53

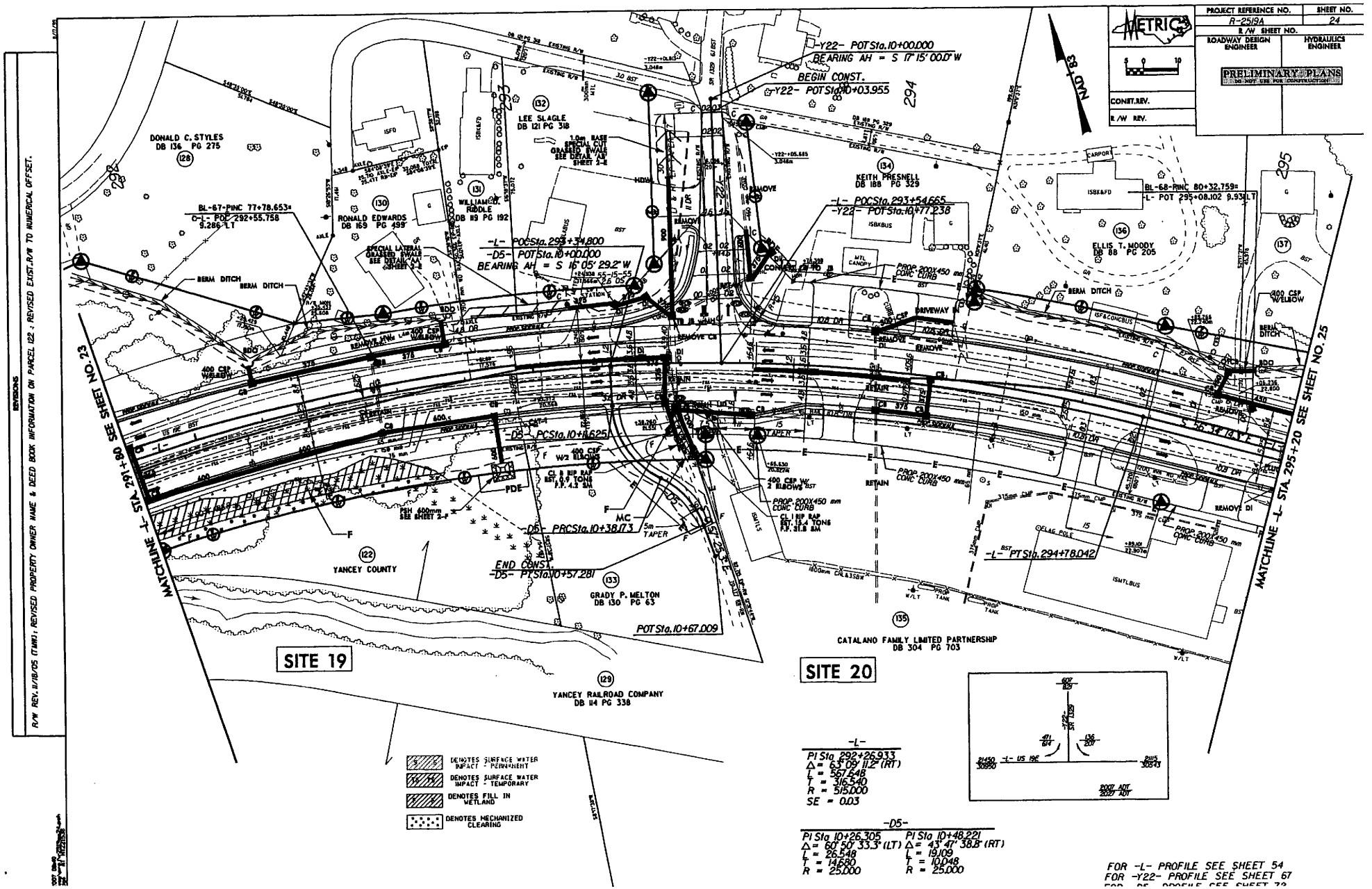


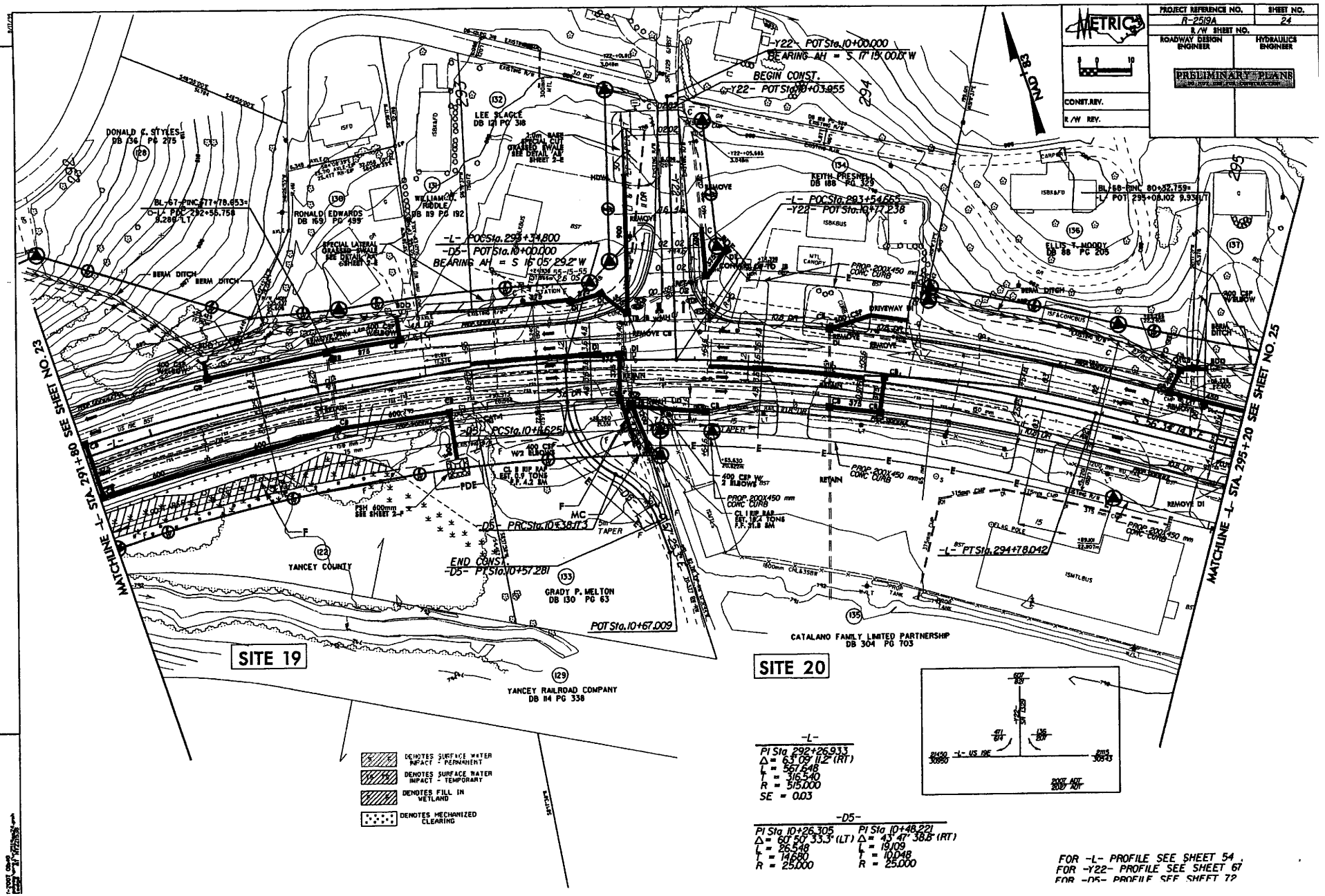
-L- STATION 289+81
2 @ 1.8m X 1.8m RCBC

SITE 18
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


PROJECT REFERENCE NO. R-2519A
SHEET NO. 24
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TMM); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
Y22- POT Sta. 10+00.000
BEARING AH = S 17° 15' 00.0" W
BEGIN CONST.
Y22- POT Sta. 10+03.955
-L- POC Sta. 293+54.665
-Y22- POT Sta. 10+77.238
-L- POC Sta. 293+34.800
-D5- POT Sta. 10+00.000
BEARING AH = S 16° 05' 29.2" W
-D5- PC Sta. 10+11.625
-D5- PRC Sta. 10+38.73
END CONST.
-D5- PT Sta. 10+57.281
POT Sta. 10+67.009
-L- PT Sta. 294+78.042
BL-67-PINC 77+78.653
-L- POC 292+55.758
9.286 LT
BL-68-PINC 80+32.759
-L- POT 295+08.102 9.93 LT
MATCHLINE -L- STA. 291+00 SEE SHEET NO. 23
MATCHLINE -L- STA. 295+20 SEE SHEET NO. 25
SITE 19
SITE 20
DONALD C. STYLES DB 136 PG 275
RONALD EDWARDS DB 169 PG 499
WILLIAM C. RIDDLE DB 119 PG 192
LEE SLAGLE DB 121 PG 318
KEITH PRESNELL DB 188 PG 329
ELLIS T. MOODY DB 88 PG 205
YANCEY COUNTY
GRADY P. MELTON DB 130 PG 65
CATALANO FAMILY LIMITED PARTNERSHIP DB 304 PG 703
YANCEY RAILROAD COMPANY DB 114 PG 338
BERM DITCH
SPECIAL LATERAL GRASSED SWALE SEE DETAIL ON SHEET 3-E
1.0m BASE SPECIAL CUT GRASSED SWALE SEE DETAIL ON SHEET 3-E
400 CSP W/ELBOW
PROP. 200X450 mm CONC CURB
DRIVEWAY
CARPORT
ISBK&FD
ISBKBUS
MTL CANOPY
ISF&CONCBUS
ISMTLBUS
PROP TANK
RETAIN
REMOVE
PDE
PEH 400mm SEE SHEET 2-F
CL II RIP RAP EST. 0.9 TONS F.F. 4.3 SM
CL I RIP RAP EST. 13.4 TONS F.F. 31.8 SM
5m TAPER
15 TAPER
UTILITY POLE
-L-
PI Sta. 292+26.933
Δ = 63° 09' 11.2" (RT)
L = 567.648
T = 316.540
R = 515.000
SE = 0.03
-D5-
PI Sta. 10+26.305
Δ = 60° 50' 33.3" (LT)
L = 26.548
T = 14.680
R = 25.000
PI Sta. 10+48.221
Δ = 43° 47' 38.8" (RT)
L = 19.109
T = 10.048
R = 25.000
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
FOR -L- PROFILE SEE SHEET 54
FOR -Y22- PROFILE SEE SHEET 67


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
24
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TNM); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
-Y22- POT Sta. 10+00.000
BEARING AH = S 17° 15' 00.0" W
BEGIN CONST.
-Y22- POT Sta. 10+03.955
38.4m
294
295
MATCHLINE -L- STA. 291+80 SEE SHEET NO. 23
MATCHLINE -L- STA. 295+20 SEE SHEET NO. 25
DONALD C. STYLES DB 136 PG 275
LEE SLAGLE DB 121 PG 318
WILLIAM C. PADDLE DB 119 PG 192
RONALD EDWARDS DB 169 PG 499
KEITH PRESNELL DB 188 PG 329
ELLIS T. NOODY DB 88 PG 205
BERM DITCH
SPECIAL LATERAL GRASSED SWALE SEE DETAIL ON SHEET 2-A
GRASSED SWALE SEE DETAIL ON SHEET 2-A
-L- POC Sta. 293+34.800
-D5- POT Sta. 10+00.000
BEARING AH = S 16° 05' 29.2" W
-L- POC Sta. 293+54.665
-Y22- POT Sta. 10+17.238
BL-67-PINC 277+78.653
-L- PCC 292+56.758
9.286' LT
BL-68-PINC 80+52.759
-L- POT 295+08.102 9.934' LT
PROP. 200X450 mm CONC CURB
DRIVEWAY
REMOVE
RETAIN
TAPER
-D5- PC Sta. 10+11.625
-D5- PRC Sta. 10+38.113
END CONST.
-D5- PT Sta. 10+57.281
POT Sta. 10+67.009
-L- PT Sta. 294+78.042
YANCEY COUNTY
GRADY P. MELTON DB 130 PG 63
YANCEY RAILROAD COMPANY DB 114 PG 338
CATALANO FAMILY LIMITED PARTNERSHIP DB 304 PG 703
SITE 19
SITE 20
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
-L-
PI Sta 292+26.933
Δ = 63° 05' 11.2" (RT)
L = 567.648
T = 316.540
R = 515.000
SE = 0.03
-D5-
PI Sta 10+26.305
Δ = 60° 50' 33.3" (LT)
L = 26.548
T = 14.680
R = 25.000
PI Sta 10+48.221
Δ = 43° 41' 38.8" (RT)
L = 19.109
T = 10.048
R = 25.000
FOR -L- PROFILE SEE SHEET 54 ,
FOR -Y22- PROFILE SEE SHEET 67
FOR -D5- PROFILE SEE SHEET 72

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KMW): REVISED R/W & EASEMENT ON PARCEL NO.144.
R/W REV. 6/10/06 (TMW): REVISED CONST. EASEMENT, REMOVED PROP. R/W & MOVED DRIVEWAY FROM STA 295+60 TO STA 295+45 ON PARCEL 140. INCREASED SIZE OF 6M DRIVEWAY TO 10.0M ON PARCEL 145.
R/W REV. 01/09/07 (RVP): MOVED DRIVEWAY FROM -Y23- STA 10+45 TO -Y23- STA 10+50 ON PARCEL 145.
R/W REV. 03/30/07 (RVP): REVISED A DRIVEWAY TO MATCH EXISTING PAVEMENT ON PARCEL 145.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 146.

MATCHLINE -L- STA. 295+20 SEE SHEET NO. 24

-L- PCSta.296+25.645

-Y23-
PI Sta. 10+21.672
Δ = 2°26'30.5" (LT)
D = 11.141
R = 514.648
T = 12.000
L = 24.000
SE = SEE PLANS

-L-
PI Sta. 297+14.72
Δ = 11°08'49.4" (LT)
D = 2.907.40
R = 1.458.27
T = 142.000
L = 283.000
SE = 0.02

-L- POC 297+61.139 RAD BK

-Y23- POTSta.10+00.000
BRG AH = S 16° 04' 30.5" W

-Y23- PCSta.10+13.147

-Y23- PTSta.10+30.194
BRG AH = S 13° 38' 00.0" W
END CONST.

-L- PCCSta.297+71.045
-Y23- POTSta.10+88.792

MATCHLINE -L- STA. 298+60 SEE SHEET NO. 26

SITE 21

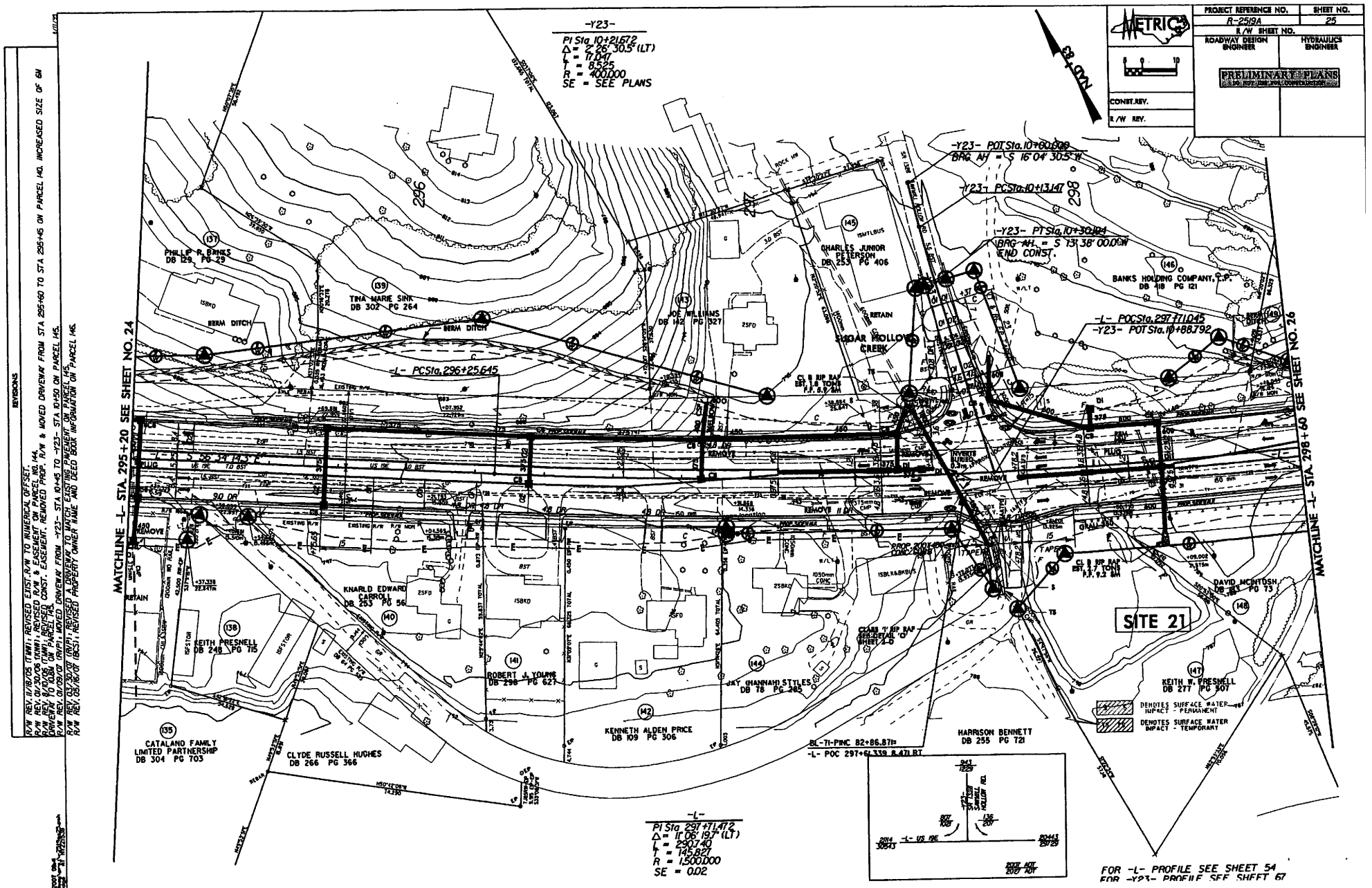
NAD '83

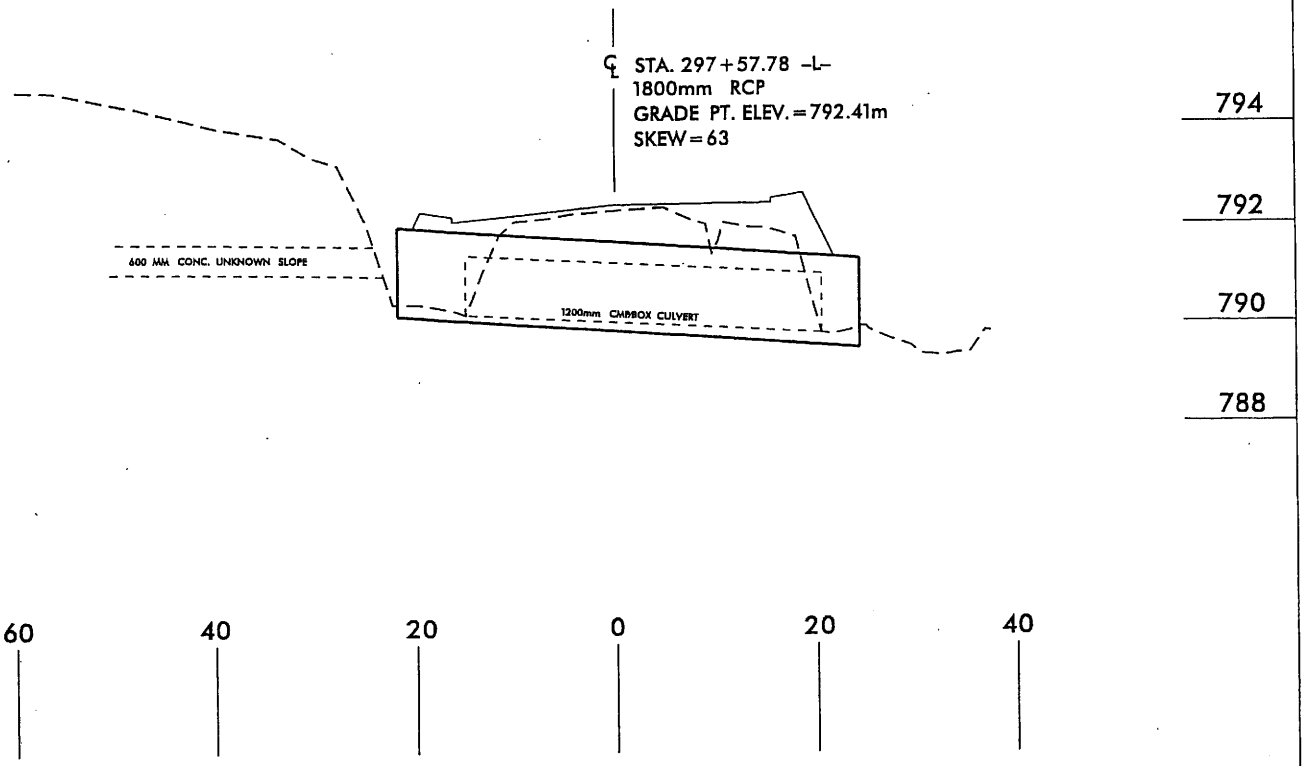
FOR -L- PROFILE SEE SHEET 54

PROJECT REFERENCE NO.	R-2594
R/W SHEET NO.	25
ROADWAY DESIGN ENGINEER	
HYDRAULICS ENGINEER	
SHEET NO.	

PRELIMINARY PLANS
NOT FOR CONSTRUCTION OR RIGHT OF WAY PURPOSES

CONST.REV.
R/W REV.


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
25
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TJW); REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 04/30/06 (TJW); REVISED CONST. & EASEMENT ON PARCEL NO. 144.
R/W REV. 04/30/06 (TJW); REVISED CONST. EASEMENT, REMOVED PROP. R/W & MOVED DRIVEWAY FROM STA 295+60 TO STA 295+45 ON PARCEL NO. 145.
DRIVEWAY TO 10' ON PARCEL 145.
R/W REV. 01/09/07 (RVP); MOVED DRIVEWAY FROM -Y23- STA 10+45 TO -Y23- STA 10+50 ON PARCEL 145.
R/W REV. 03/30/07 (RVP); REVISED A DRIVEWAY TO MATCH EXIST. REVISED PROPERTY OWNER NAME ON PARCEL 146.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 146.
-Y23-
PI Sta. 10+21.672
Δ = 2°26'30.5" (LT)
L = 17.047
T = 8.525
R = 400.000
SE = SEE PLANS
-Y23- POT Sta. 10+00.000
BRG AH = S 16°04'30.5" W
-Y23- PCS Sta. 10+13.147
-Y23- PT Sta. 10+30.194
BRG AH = S 13°38'00.0" W
END CONST.
-L- PCS Sta. 296+25.645
-L- PCS Sta. 297+11.045
-Y23- POT Sta. 10+88.792
MATCHLINE -L- STA. 295+20 SEE SHEET NO. 24
MATCHLINE -L- STA. 298+60 SEE SHEET NO. 26
SIGNAL HOLLOW CREEK
PHILLIP R. BANKS DB 129 PG 29
TINA MARIE SINK DB 302 PG 264
JOE WILLIAMS DB 112 PG 527
CHARLES JUNIOR PETERSON DB 253 PG 406
BANKS HOLDING COMPANY, L.P. DB 418 PG 121
KNARLD EDWARD CARROLL DB 253 PG 56
KEITH PRESNELL DB 249 PG 715
ROBERT J. YOUNG DB 296 PG 627
JAY GHANNAM STILES DB 78 PG 283
KENNETH ALDEN PRICE DB 109 PG 306
CATALANO FAMILY LIMITED PARTNERSHIP DB 304 PG 703
CLYDE RUSSELL HUGHES DB 266 PG 366
HARRISON BENNETT DB 255 PG 721
DAVID MCINTOSH DB 183 PG 73
KEITH W. PRESNELL DB 277 PG 307
SITE 21
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-L-
PI Sta. 297+11.412
Δ = 11°06'19.7" (LT)
L = 290.740
T = 145.827
R = 1,500.000
SE = 0.02
BL-71-PINC 82+86.87ft
-L- POC 297+61.339 R 471 RT
FOR -L- PROFILE SEE SHEET 54
FOR -Y23- PROFILE SEE SHEET 67



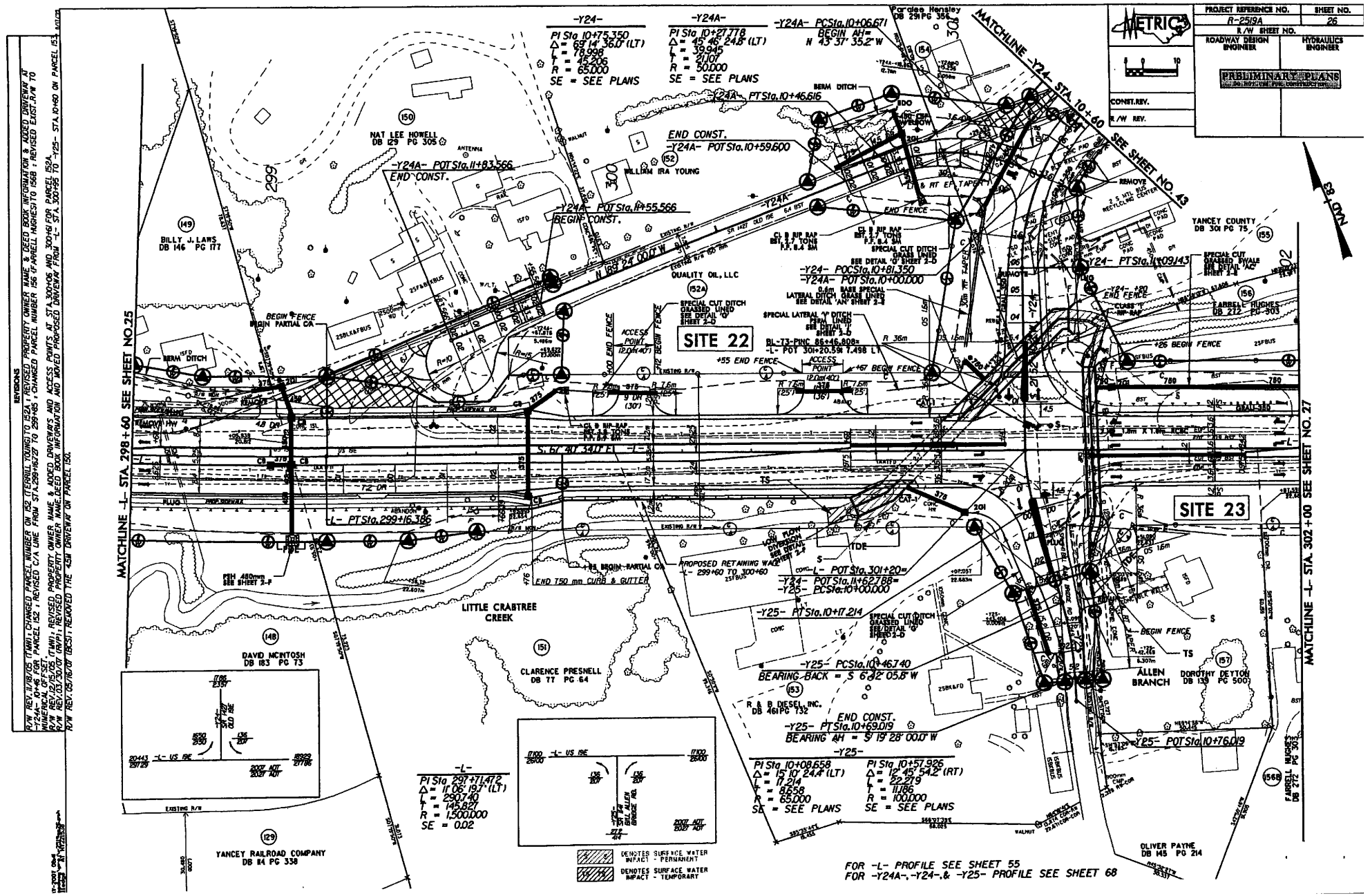
-L- STATION 297+57.78
1800mm RCP

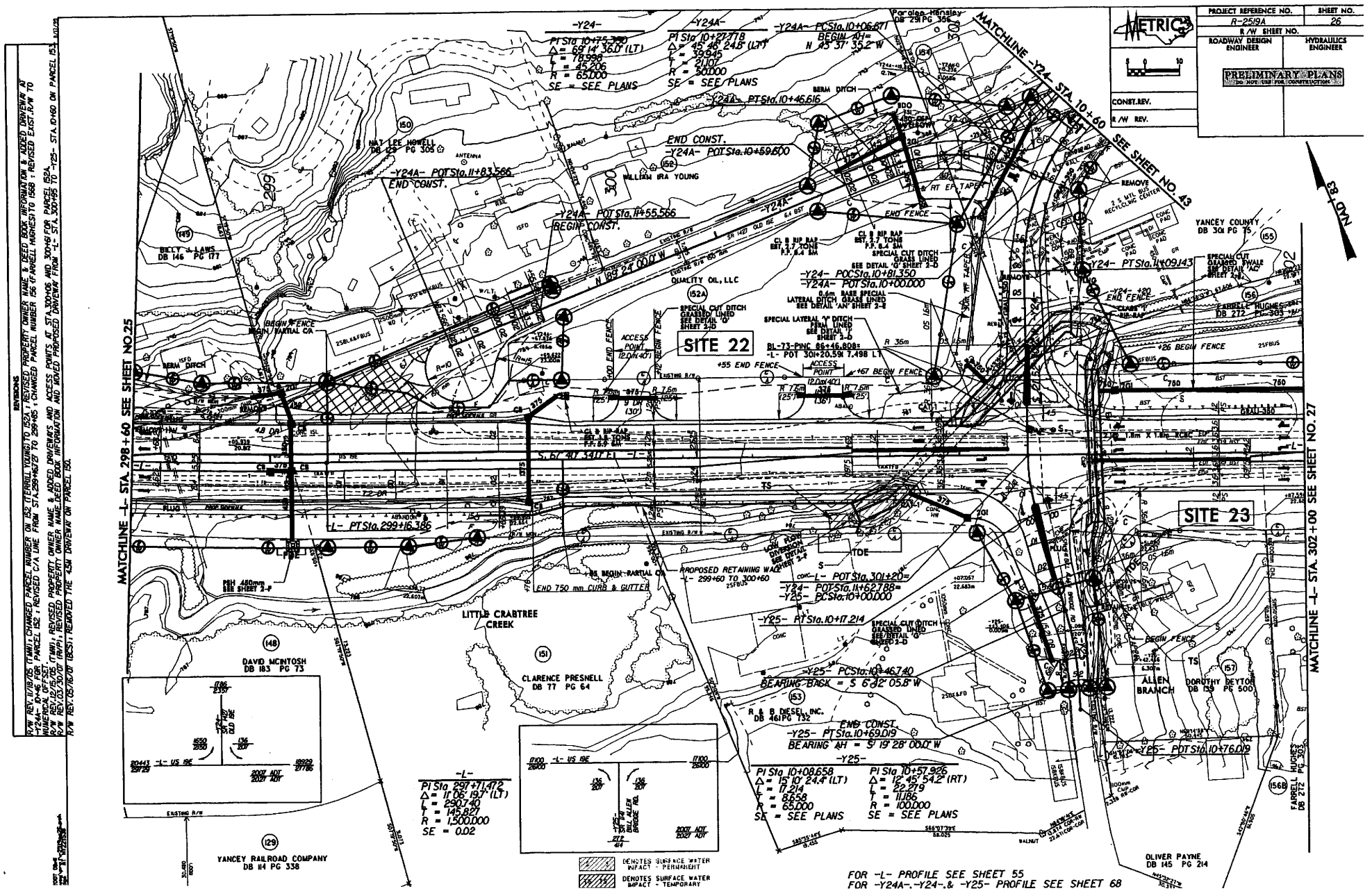
SITE 21
PROFILE VIEW

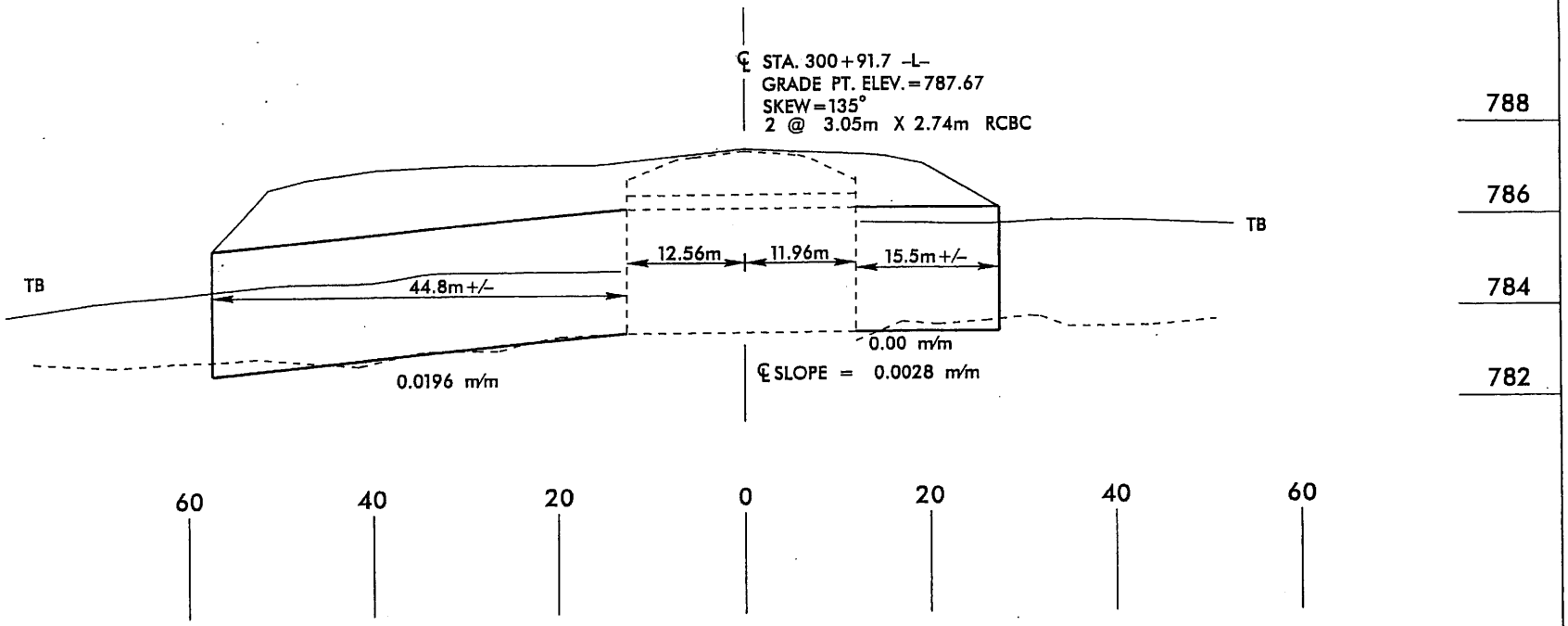
NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
26
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TMW); CHANGED PARCEL NUMBER ON 152 TO FARRELL TOWNES TO 152A ; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION & ADDED DRIVEWAY AT -L- STA. 10+46 FOR PARCEL 152 ; REVISED C/A LINE FROM STA.299+16.27 TO 299+65 ; CHANGED PARCEL NUMBER 156 TO FARRELL HIGHESMITH 156B ; REVISED EXIST. R/W TO MATCH NEW R/W FOR PARCEL 152A
R/W REV. 12/15/05 (TMW); REVISED PROPERTY OWNER NAME & ADDED DRIVEWAYS AND ACCESS POINTS AT -STA.300+06 AND 300+61 FOR PARCEL 152A
R/W REV. 03/30/07 (MVP); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA. 10+60 ON PARCEL 153
R/W REV. 05/16/08 (BCST); REMOVED THE 45M DRIVEWAY ON PARCEL 150.
-Y24-
PI Sta 10+75.350
Δ = 69° 14' 36.0" (LT)
L = 78.998
T = 45.206
R = 65.000
SE = SEE PLANS
-Y24A-
PI Sta 10+27.778
Δ = 45° 46' 24.8" (LT)
L = 39.945
T = 21.107
R = 50.000
SE = SEE PLANS
-Y24A- PCSta.10+06.671
BEGIN AH=
N 43° 37' 35.2" W
Parales Hensley
DB 291 PG 356
MATCHLINE -Y24- STA. 10+60 SEE SHEET NO. 43
NAT LEE HOWELL
DB 129 PG 305
WILLIAM IRA YOUNG
BILLY J. LAWS
DB 146 PG 177
-Y24A- POT Sta.11+83.566
END CONST.
-Y24A- POT Sta.10+55.566
BEGIN CONST.
END CONST.
-Y24A- POT Sta.10+59.600
-Y24A- POT Sta.10+46.616
BERM DITCH
END FENCE
QUALITY OIL, LLC
SITE 22
SITE 23
-Y24- POC Sta.10+81.350
-Y24A- POT Sta.10+00.000
-Y24- PT Sta.11+09.143
YANCEY COUNTY
DB 301 PG 75
FARRELL HUGHES
DB 272 PG 303
-L- PT Sta.299+16.386
-L- POT Sta.301+20.598 T.498 Lt
-L- POT Sta.301+20=
-Y24- POT Sta.11+62.788=
-Y25- PCS Sta.10+00.000
-Y25- PT Sta.10+17.214
-Y25- PCS Sta.10+46.740
BEARING BACK = S 6° 32' 05.8" W
R & B DIESEL, INC.
DB 461 PG 132
END CONST.
-Y25- PT Sta.10+69.019
BEARING AH = S 19° 28' 00.0" W
-Y25- POT Sta.10+76.019
-Y25-
PI Sta 10+08.658
Δ = 15° 10' 24.4" (LT)
L = 17.214
T = 8.658
R = 65.000
SE = SEE PLANS
PI Sta 10+57.926
Δ = 12° 45' 54.2" (RT)
L = 22.279
T = 11.186
R = 100.000
SE = SEE PLANS
-L-
PI Sta 297+71.472
Δ = 11° 08' 19.7" (LT)
L = 290.740
T = 145.827
R = 1,500.000
SE = 0.02
MATCHLINE -L- STA. 298+60 SEE SHEET NO. 25
MATCHLINE -L- STA. 302+00 SEE SHEET NO. 27
LITTLE CRABTREE CREEK
DAVID MCINTOSH
DB 183 PG 73
CLARENCE PRESNELL
DB 77 PG 64
YANCEY RAILROAD COMPANY
DB 114 PG 338
ALLEN BRANCH
DOROTHY DEYTON
DB 139 PG 500
OLIVER PAYNE
DB 145 PG 214
PROPOSED RETAINING WALL
-L- 299+60 TO 300+60
END 750 mm CURB & GUTTER
BEGIN FENCE
BEGIN PARTIAL CA
ACCESS POINT (12.0m 40')
SPECIAL CUT DITCH GRASSED LINED SEE DETAIL 'G' SHEET 2-G
SPECIAL LATERAL 'A' DITCH PAVED LINED SEE DETAIL 'J' SHEET 2-J
SPECIAL CUT DITCH GRASSED LINED SEE DETAIL 'D' SHEET 2-D
CL B RIP RAP EST. 2.7 TONS P.F. 0.4 SM
0.6m BASE SPECIAL LATERAL DITCH GRASS LINED SEE DETAIL 'AN' SHEET 2-E
LOW FLOW DIVERSION SEE DETAIL SHEET 2-F
CONST. ENTRANCE
REMOVE
REMOVE HW
ABANDON
PLUG
PROP. SIDEWALK
EXISTING R/W
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
FOR -L- PROFILE SEE SHEET 55
FOR -Y24A-, -Y24-, & -Y25- PROFILE SEE SHEET 68


METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 26
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TAW); CHANGED PARCEL NUMBER ON 152 (TERRILL YOUNG) TO 152A; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION & ADDED DRIVEWAY "A" -Y24A- 10+46 FOR PARCEL 152; REVISED C/A LINE FROM STA.299+16.27 TO 299+85; CHANGED PARCEL NUMBER 156 OF ARNELL HIGHSMITH TO 156B; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 12/15/05 (TAW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA. 10+60 ON PARCEL 153.
R/W REV. 05/16/07 (TAW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA. 10+60 ON PARCEL 153.
R/W REV. 05/16/07 (BCS); REMOVED THE -SW DRIVEWAY ON PARCEL 150.
MATCHLINE -L- STA. 298+60 SEE SHEET NO.25
MATCHLINE -Y24- STA. 10+60 SEE SHEET NO. 43
MATCHLINE -L- STA. 302+00 SEE SHEET NO. 27
NAD 83
-Y24- PI Sta 10+75.380 Δ = 69° 14' 36.0" (LT) L = 78.998 T = 45.206 R = 65.000 SE = SEE PLANS
-Y24A- PI Sta 10+27.718 Δ = 45° 46' 24.8" (LT) L = 39.945 T = 21.107 R = 50.000 SE = SEE PLANS
-Y24A- PCSta. 10+06.671 BEGIN AH= N 43° 37' 35.2" W
-Y24A- PI Sta. 10+46.616
END CONST. -Y24A- POT Sta. 10+59.800
-Y24A- POT Sta. 11+83.566 END CONST.
-Y24A- POT Sta. 11+55.566 BEGIN CONST.
-Y24- POC Sta. 10+81.350
-Y24A- POT Sta. 10+00.000
-Y24- PT Sta. 11+09.143
SITE 22
SITE 23
-L- PT Sta. 299+16.386
-L- PI Sta 297+71.472 Δ = 11° 06' 19.7" (LT) L = 290.740 T = 145.827 R = 1,500.000 SE = 0.02
-L- POT Sta. 301+20.=
-Y24- POT Sta. 11+62.788=
-Y25- PC Sta. 10+00.000
-Y25- PT Sta. 10+17.214
-Y25- PC Sta. 10+46.740
BEARING BACK = S 6° 02' 05.8" W
-Y25- PI Sta 10+08.658 Δ = 15° 10' 24.4" (LT) L = 17.214 T = 8.658 R = 65.000 SE = SEE PLANS
-Y25- PI Sta 10+57.926 Δ = 12° 45' 54.2" (RT) L = 22.219 T = 11.186 R = 100.000 SE = SEE PLANS
-Y25- PT Sta. 10+69.019
END CONST. BEARING AH = S 19° 28' 00.0" W
-Y25- PT Sta. 10+76.019
BEGIN CONST.
S. 67° 30' 34.1" E
BL-73-PINC 86+46.808± -L- POT 301+20.59 7.498 LT
PROPOSED RETAINING WALL -L- 299+60 TO 300+60
LITTLE CRABTREE CREEK
DAVID MCINTOSH DB 183 PG 73
CLARENCE PRESNELL DB 77 PG 64
YANCEY RAILROAD COMPANY DB 114 PG 338
R & B DIESEL INC. DB 461 PG 732
QUALITY OIL, LLC
BILLY J. LAWS DB 146 PG 177
NAT LEE HOWELL DB 129 PG 305
WILLIAM IRA YOUNG
Porcia Hensley DB 231 PG 304
YANCEY COUNTY DB 301 PG 75
FARRELL HUGHES DB 272 PG 303
DOROTHY DEYTON DB 139 PG 500
OLIVER PAYNE DB 145 PG 214
ALLEN BRANCH
BERM DITCH
REMOVE 2.5 MTL BUS RECYCLING CENTER
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D
SPECIAL LATERAL "A" DITCH FRM LINED SEE DETAIL 'I' SHEET 2-D
LATERAL DITCH, GRASS LINED SEE DETAIL 'AN' SHEET 2-E
SPECIAL CUT DITCH GRASSED LINED SEE DETAIL 'G' SHEET 2-D
LOW FLOW DIVERSION SEE DETAIL SHEET 2-F
ACCESS POINT 12.0m(40')
+26 BEGIN FENCE
+55 END FENCE
+67 BEGIN FENCE
END 750 mm CURB & GUTTER
BEGIN PARTIAL CA
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
FOR -L- PROFILE SEE SHEET 55
FOR -Y24A-, -Y24-, & -Y25- PROFILE SEE SHEET 68

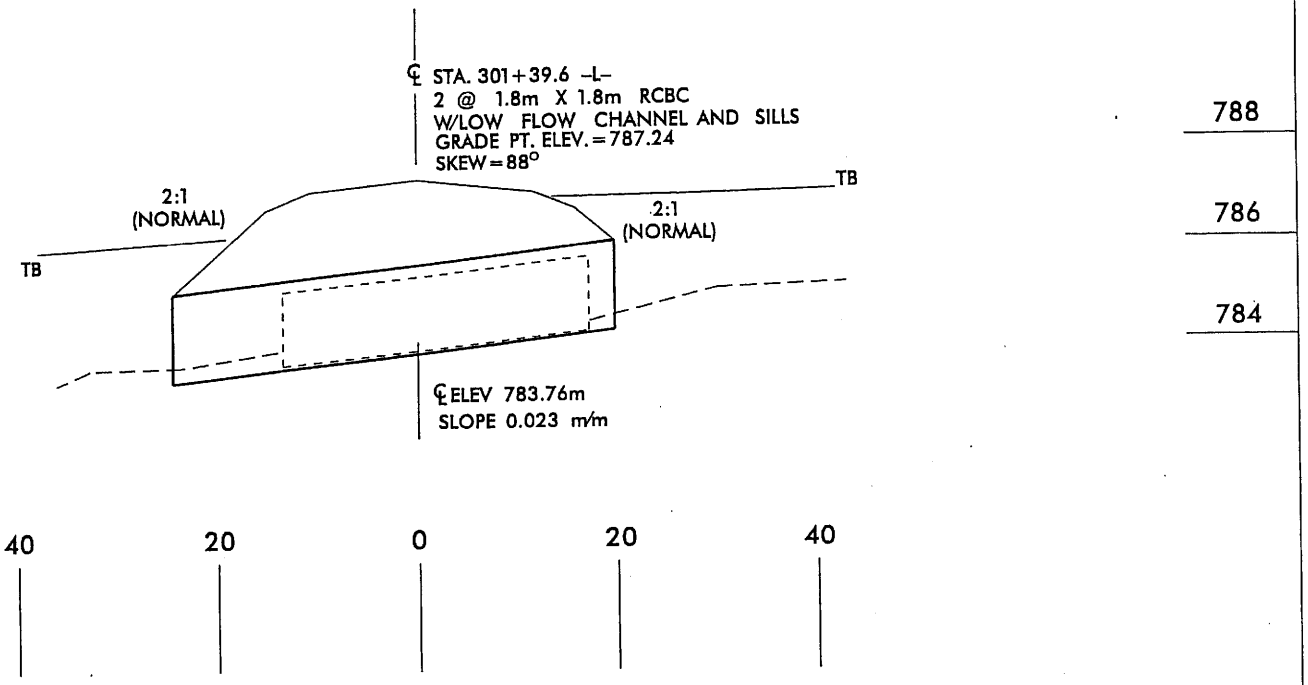


-L- STATION 300+91.7
2 @ 3.05m X 2.74m RCBC

SITE 22
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06



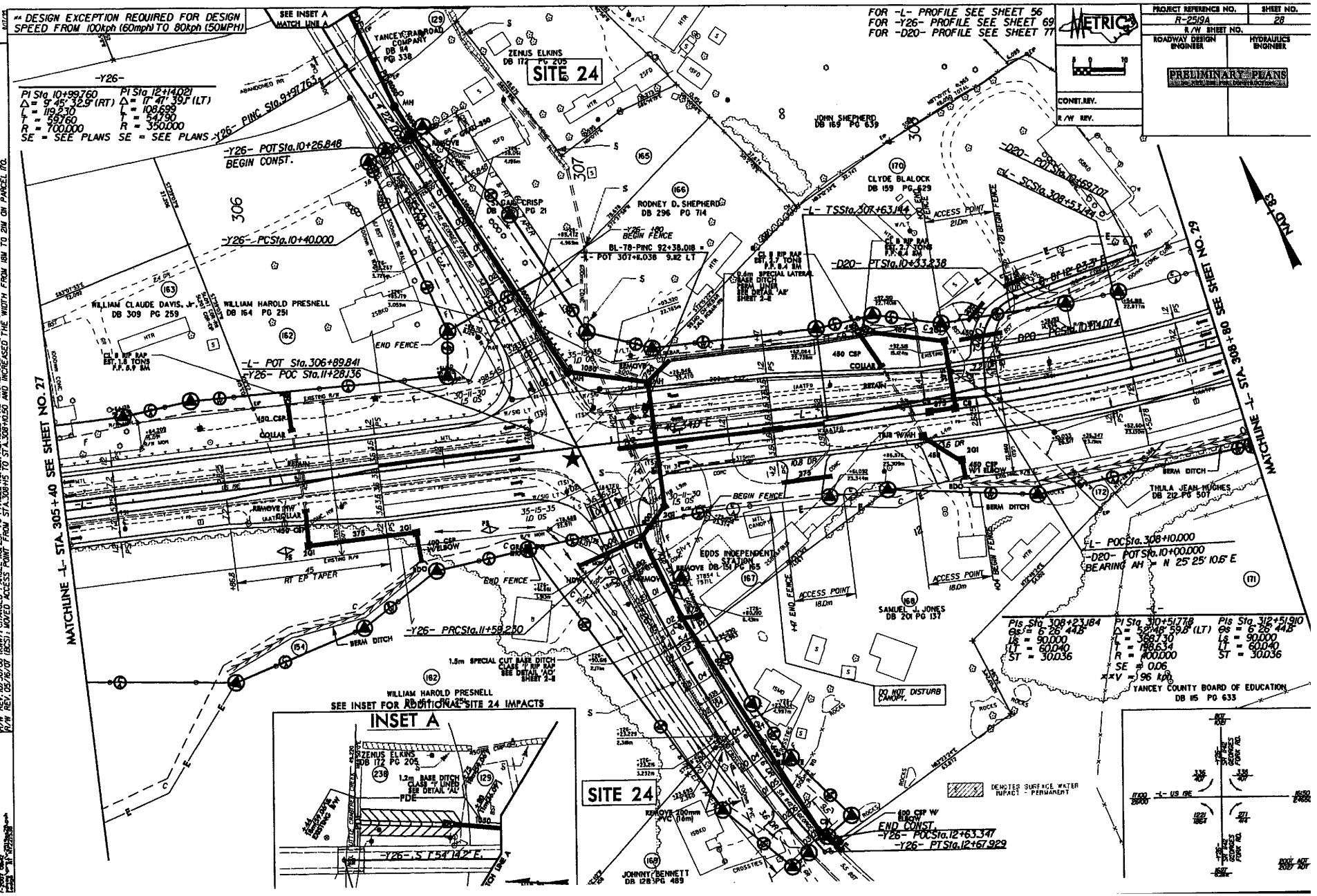
–L– STATION 301+39.6
2 @ 1.8m X 1.8m RCBC

SITE 23
PROFILE VIEW

NCDOT

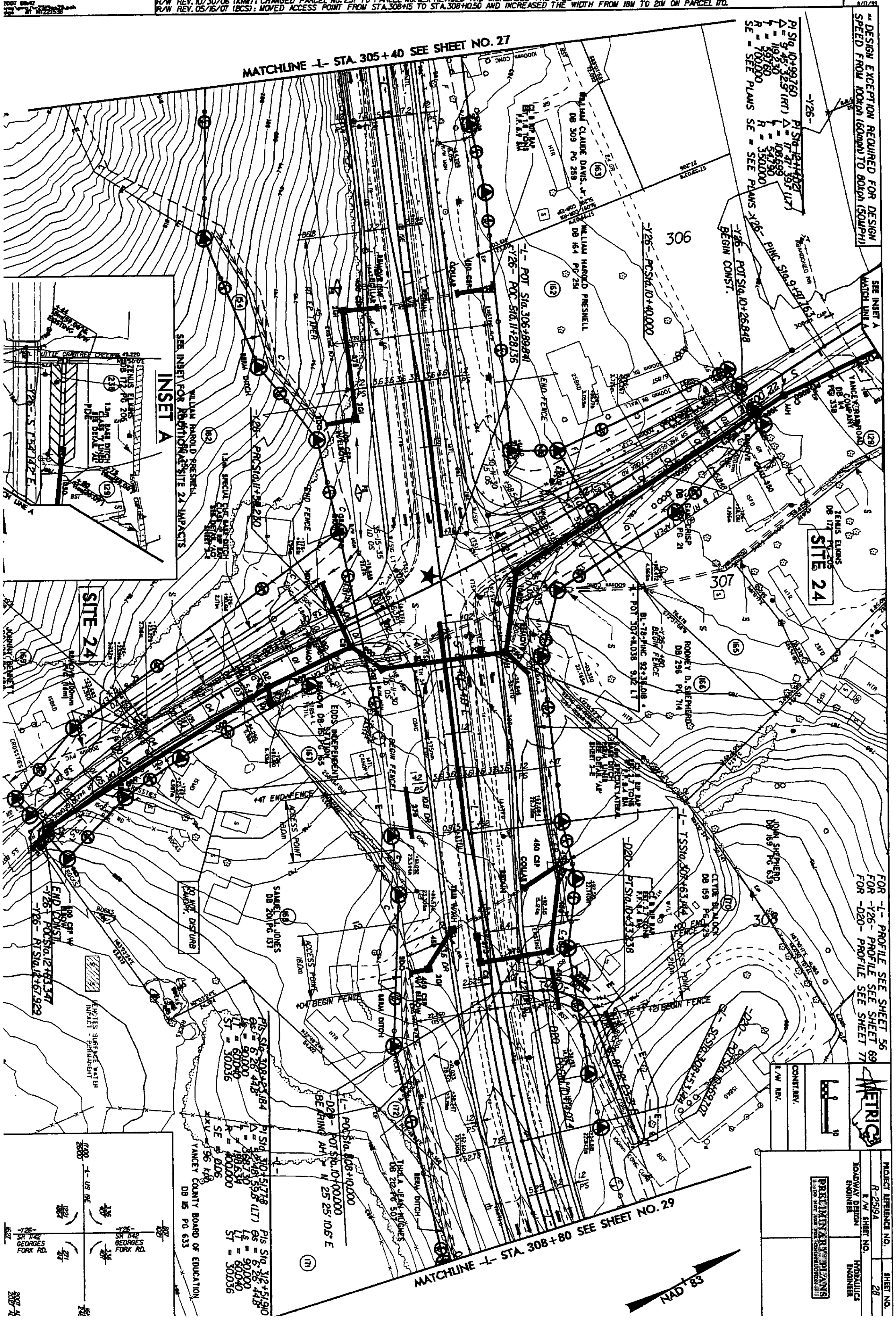
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50MPH)
SEE INSET A MATCH LINE A
FOR -L- PROFILE SEE SHEET 56
FOR -Y26- PROFILE SEE SHEET 69
FOR -D20- PROFILE SEE SHEET 77
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
-Y26-
PI Sta. 10+99.760
Δ = 9° 45' 32.9" (RT)
L = 119.230
T = 59.760
R = 700.000
SE = SEE PLANS
PI Sta. 12+14.021
Δ = 17° 47' 39.1" (LT)
L = 108.699
T = 54.790
R = 350.000
SE = SEE PLANS
-Y26- PINC Sta. 9+97.763
-Y26- POT Sta. 10+26.848
BEGIN CONST.
-Y26- PCS Sta. 10+40.000
-L- POT Sta. 306+89.841
-Y26- POC Sta. 11+28.136
-L- POT 307+11.038 9.82 LT
BL-78-PINC 92+38.018 =
-Y26- PRC Sta. 11+58.230
-Y26- S 15° 54' 42" E
-Y26- PT Sta. 12+63.347
-Y26- POC Sta. 12+67.929
END CONST.
-D20- POT Sta. 10+33.238
-D20- PT Sta. 10+69.707
-L- SCS Sta. 308+53.184
-L- TS Sta. 307+63.184
-L- POC Sta. 308+10.000
-D20- POT Sta. 10+00.000
BEARING AH = N 25° 25' 10.6" E
-L- PT Sta. 308+80.00
SEE SHEET NO. 27
MATCHLINE -L- STA. 305+40 SEE SHEET NO. 27
MATCHLINE -L- STA. 308+80 SEE SHEET NO. 29
SITE 24
INSET A
SEE INSET FOR ADDITIONAL SITE 24 IMPACTS
DENOTES SURFACE WATER IMPACT - PERMANENT
DO NOT DISTURB CANOPY.
ACCESS POINT
END FENCE
BEGIN FENCE
BERM DITCH
YANCE R.R. COMPANY DB 114 PG 338
ZENUS ELKINS DB 172 PG 205
JOHN SHEPHERD DB 169 PG 639
CLYDE BLALOCK DB 159 PG 629
CARL CRISP PG 21
RODNEY D. SHEPHERD DB 296 PG 714
WILLIAM CLAUDE DAVIS, JR. DB 309 PG 259
WILLIAM HAROLD PRESNELL DB 164 PG 251
EDDS INDEPENDENT STATION
SAMUEL J. JONES DB 201 PG 137
THURA JEAN HUGHES DB 212 PG 507
JOHNNY BENNETT DB 128 PG 489
YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633
Pls Sta. 308+23.184
Δs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
Pl Sta. 310+51.778
Δ = 58° 46' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
V = 96 kph
Pls Sta. 312+51.910
Δs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
RIGHT OF WAY
EXISTING R/W
PROPERTY LINE
1.5m SPECIAL CUT BASE DITCH CLASS "I" RIP RAP SEE DETAIL "AC" SHEET 2-E
1.2m BASE DITCH CLASS "I" LINED SEE DETAIL "AL"
0.4m SPECIAL LATERAL BASE DITCH CLASS "I" LINED SEE DETAIL "AR" SHEET 2-E
CL B RIP RAP EST. 1.5 TONS F.F. 0.9 SM
CL B RIP RAP EST. 2.7 TONS F.F. 0.4 SM
REMOVE 100mm PVC (16m)
REMOVE DB 151 PG 155
REMOVE (TYP.)
480 CSP
480 CSP W/ ELBOW
COLLAR
RETAIN
RT EP TAPER
LT EP TAPER
MATCHLINE -L- STA. 305+40 SEE SHEET NO. 27
REVISIONS
R/W REV. 11/18/05 (TJM): ADDED DRIVEWAY -D20- AND REVISED CONSTRUCTION EASEMENT AND ACCESS POINT FOR PARCEL 170; REVISED EXIST. R/W TO NUMERICAL OFFSET.
ADDED PDE TO PARCEL 171.
R/W REV. 02/30/06 (TJM): CHANGED PARCEL NO. 237 TO PARCEL NO. 239, REVISED AND INCREASED THE SIZE OF THE DRIVEWAY ON PARCEL 167.
R/W REV. 03/30/06 (TJM): CHANGED PARCEL NO. 237 TO PARCEL NO. 239, REVISED AND INCREASED THE SIZE OF THE DRIVEWAY ON PARCEL 167.
R/W REV. 05/16/07 (BCS): MOVED ACCESS POINT FROM STA. 308+15 TO STA. 308+10.50 AND INCREASED THE WIDTH FROM 18M TO 21M ON PARCEL 170.

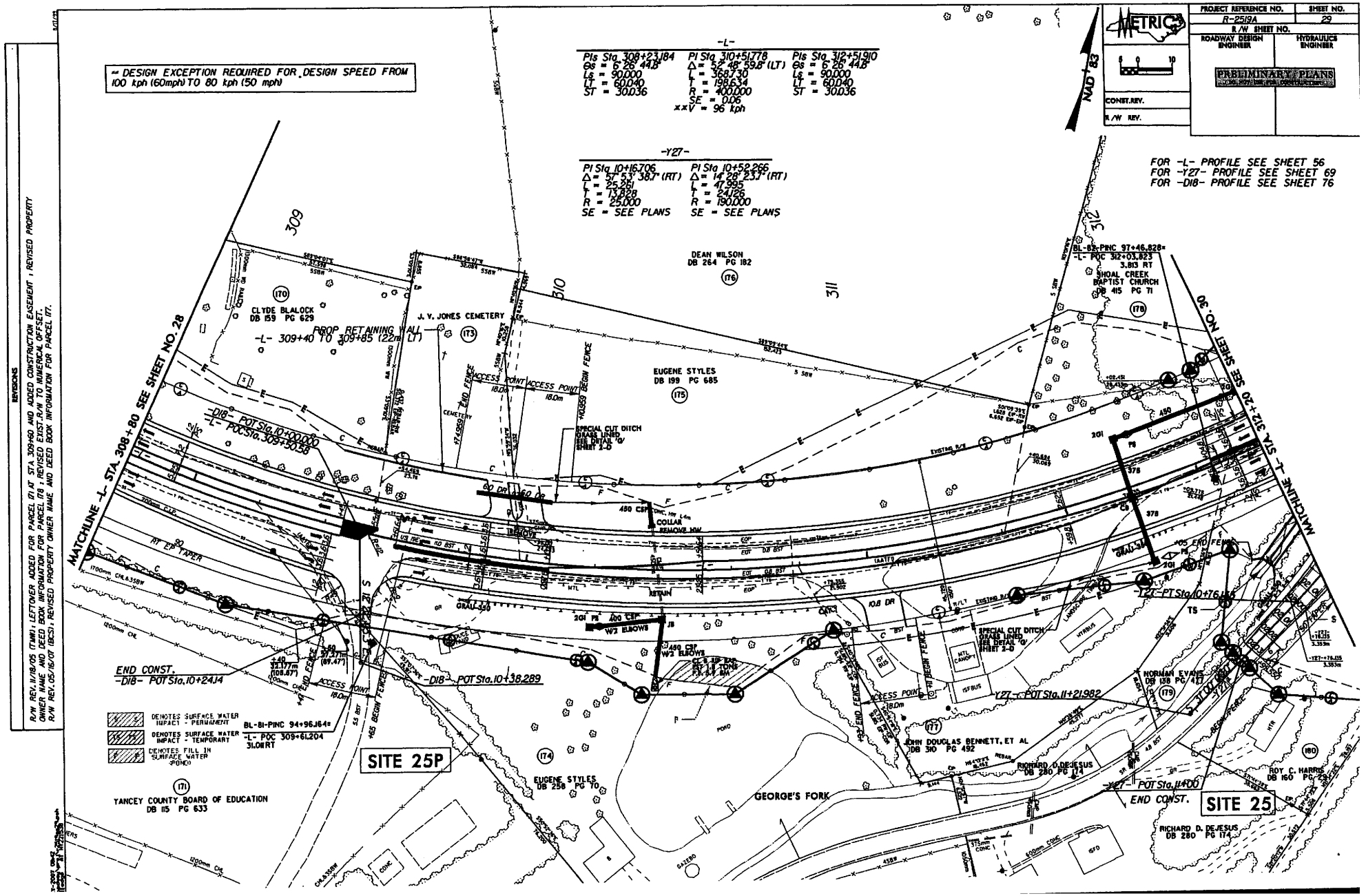
REVISIONS

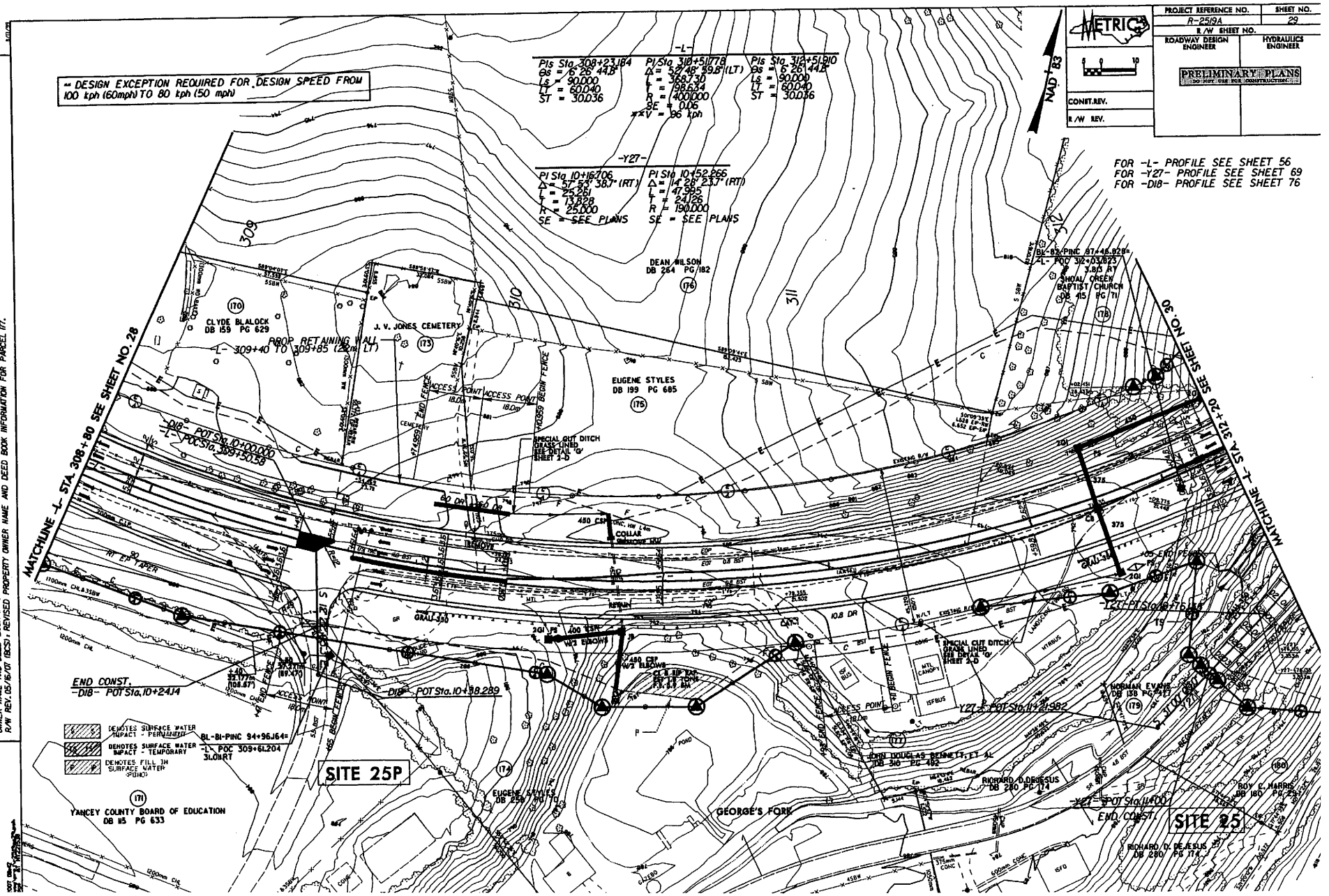
R/W REV. 11/18/05 (TMW): ADDED DRIVEWAY -D20- AND REVISED CONSTRUCTION EASEMENT AND ACCESS POINT FOR PARCEL 170 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. ADDED PDE TO PARCEL 171.
R/W REV. 2/27/06 (TMW): ADDED PDE TO PARCELS 165, 237, AND 238 .
R/W REV. 10/30/06 (KNW): CHANGED PARCEL NO. 237 TO PARCEL NO. 129; REVISED AND INCREASED THE SIZE OF THE DRIVEWAY ON PARCEL 167.
R/W REV. 05/16/07 (BCS): MOVED ACCESS POINT FROM STA. 308+15 TO STA. 308+10.50 AND INCREASED THE WIDTH FROM 18M TO 21M ON PARCEL 170.

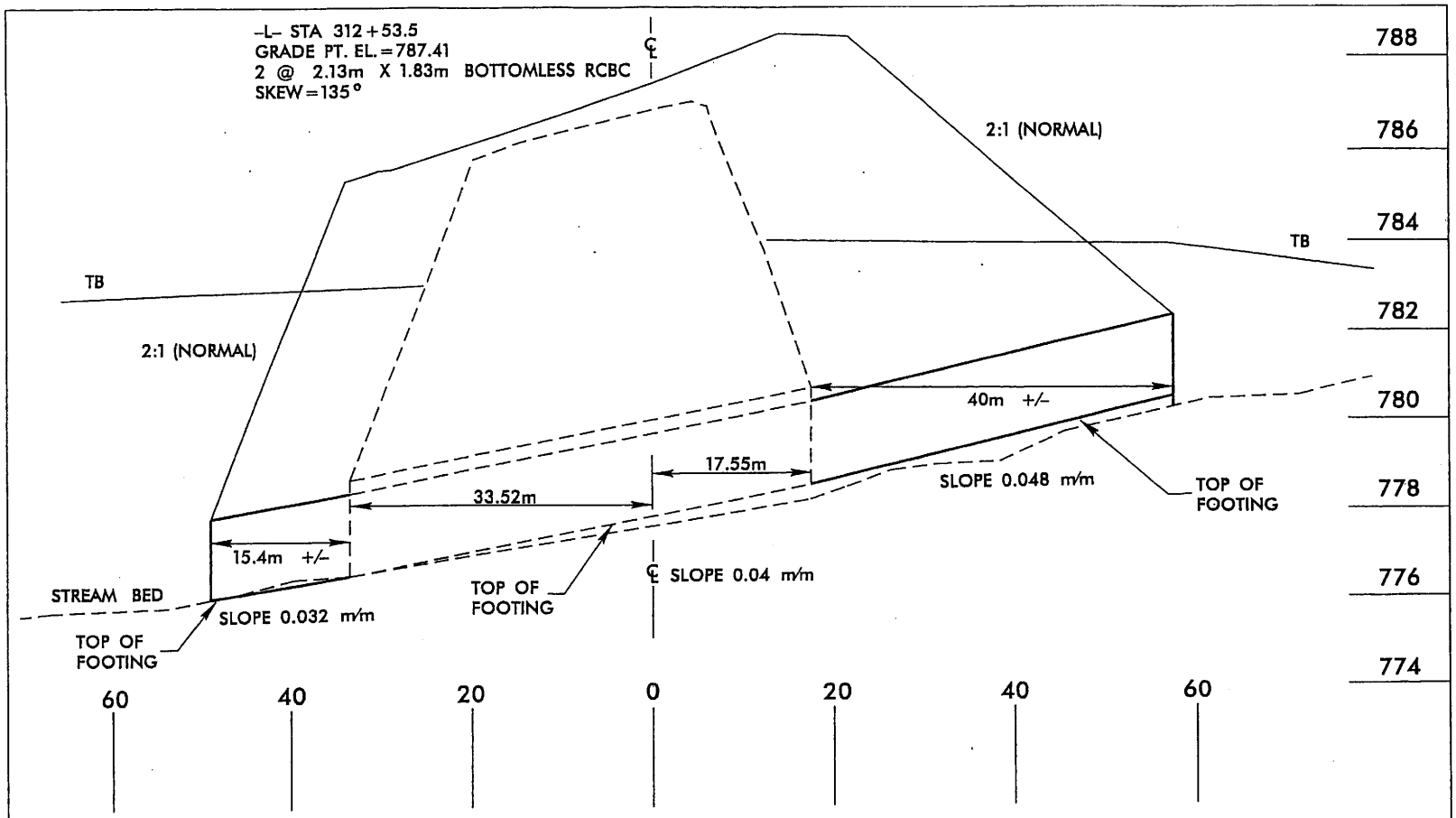


PROJECT REFERENCE NO.	SHEET NO.
R-2519A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100 kph (60mph) TO 80 kph (50 mph)
-L-
Pls Sta 308+23.184
GS = 6 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
Pl Sta 310+51.778
Δ = 52° 48' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
xxV = 96 kph
Pls Sta 312+51.910
GS = 6 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
-Y27-
Pl Sta 10+16.706
Δ = 57° 53' 38.7" (RT)
L = 25.261
T = 13.828
R = 25.000
SE = SEE PLANS
Pl Sta 10+52.266
Δ = 14° 28' 23.7" (RT)
L = 47.995
T = 24.126
R = 190.000
SE = SEE PLANS
FOR -L- PROFILE SEE SHEET 56
FOR -Y27- PROFILE SEE SHEET 69
FOR -D18- PROFILE SEE SHEET 76
METRIC
NAD '83
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TWH) ; LEFTOVER ADDED FOR PARCEL 171 AT STA 309+60 AND ADDED CONSTRUCTION EASEMENT ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS) ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 177.
MATCHLINE -L- STA. 308+80 SEE SHEET NO. 28
MATCHLINE -L- STA 312+20 SEE SHEET NO. 30
309
310
311
312
CLYDE BLALOCK DB 159 PG 629
J. V. JONES CEMETERY
PROP RETAINING WALL -L- 309+40 TO 309+85 (22m LT)
DEAN WILSON DB 264 PG 182
EUGENE STYLES DB 199 PG 685
SHOAL CREEK BAPTIST CHURCH DB 415 PG 71
BL-B3-PINC 97+46.828 -L- POC 312+03.823 3.813 RT
-D18- POT Sta.10+00.000 -L- POC Sta.309+50.58
-Y27- PT Sta.10+76.136
-Y27- POT Sta.11+21.982
-Y27- POT Sta.11+00
END CONST. -D18- POT Sta.10+24.14
-D18- POT Sta.10+38.289
END CONST.
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D
450 CSP CONC. HW
COLLAR REMOVE HW
W2 ELBOWS
ACCESS POINT
BEGIN FENCE
END FENCE
RT EP TAPER
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN SURFACE WATER
POND
BL-B1-PINC 94+96.164
-L- POC 309+61.204
31.08RT
SITE 25P
SITE 25
YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633
EUGENE STYLES DB 258 PG 70
JOHN DOUGLAS BENNETT, ET AL DB 310 PG 492
RICHARD D. DEJESUS DB 280 PG 174
NORMAN EVANS DB 188 PG 412
ROY C. HARRIS DB 160 PG 29
GEORGE'S FORK
ISF BLDG
MTL CANOPY
HYDRUS
HYTR
POND
GAZEBO
CONC
GRAVEL
ASPHALT
BST
EOP
EOT
TREE LINE
WOODS
BARBED WIRE FENCE
200mm CMP
1100mm CMP
600mm CONC
375mm CONC
450 CSP
60 DR
108 DR
201 P8
400 CSP
378
450 RCP
ISF BLDG
ISF/BUS


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW); LEFTOVER ADDED FOR PARCEL 61 AT STA 309+60 AND ADDED CONSTRUCTION EASEMENT ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 177.
= DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100 kph (60mph) TO 80 kph (50 mph)
-L-
PI Sta 308+23.184
Gs = 6 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
PI Sta 310+51.778
Δ = 52 48' 39.8" (LT)
T = 368.730
L = 398.634
R = 400.000
SE = 0.06
**V = 96 kph
PI Sta 312+51.910
Gs = 6 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036
-Y27-
PI Sta 10+16.706
Δ = 57 53' 38.7" (RT)
T = 25.261
L = 50.481
R = 25.000
SE = SEE PLANS
PI Sta 10+52.266
Δ = 14 28' 23.7" (RT)
T = 24.126
L = 47.395
R = 190.000
SE = SEE PLANS
FOR -L- PROFILE SEE SHEET 56
FOR -Y27- PROFILE SEE SHEET 69
FOR -D18- PROFILE SEE SHEET 76
MATCHLINE -L- STA. 308+80 SEE SHEET NO. 28
MATCHLINE -L- STA. 312+20 SEE SHEET NO. 30
CLYDE BLALOCK DB 159 PG 629
J. V. JONES CEMETERY
PROP. RETAINING WALL -L- 309+40 TO 309+85 (22m LT)
DEAN WILSON DB 264 PG 182
SHOAL CREEK BAPTIST CHURCH DB 415 PG 711
EUGENE STYLES DB 199 PG 685
-D18- POT Sta. 10+00.000
-L- POC Sta. 309+50.58
SPECIAL CUT DITCH GRASS LINED SEE DETAIL "G" SHEET 3-G
INSTALL 480 CSP CONC. HW 1.4m COLLAR
BL-BI-PINC 94+96.164=
-L- POC 309+61.204
SL.DIST
END CONST. -D18- POT Sta. 10+24.14
-D18- POT Sta. 10+38.289
-Y27- POT Sta. 11+27.982
-Y27- POT Sta. 11+40.01
END CONST.
SITE 25P
SITE 25
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN SURFACE WATER (FILL)
YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633
EUGENE STYLES DB 250 PG 70
GEORGE'S FORK
JOHN DOUGLAS BENNETT, ET AL DB 340 PG 482
RICHARD D. DE JESUS DB 280 PG 174
NORMAN EVANS DB 138 PG 417
ROY C. HARRIS DB 160 PG 280
RT EP TAPER
GRAU-3.50
GRAU-5.50
ACCESS POINT
ACCESS POINT
BEGIN FENCE
END FENCE
MTL CANOPY
ISFBUS
HYBRUS
10.8 DR
1100mm CMP
1200mm CMP
1500mm CMP
600mm CMP
480 CSP CONC. HW 1.4m COLLAR
CL B RIP RAP FOR 12 LONG 3.5 WIDE
W/2 ELBOWS
400 CSP
W/2 ELBOWS

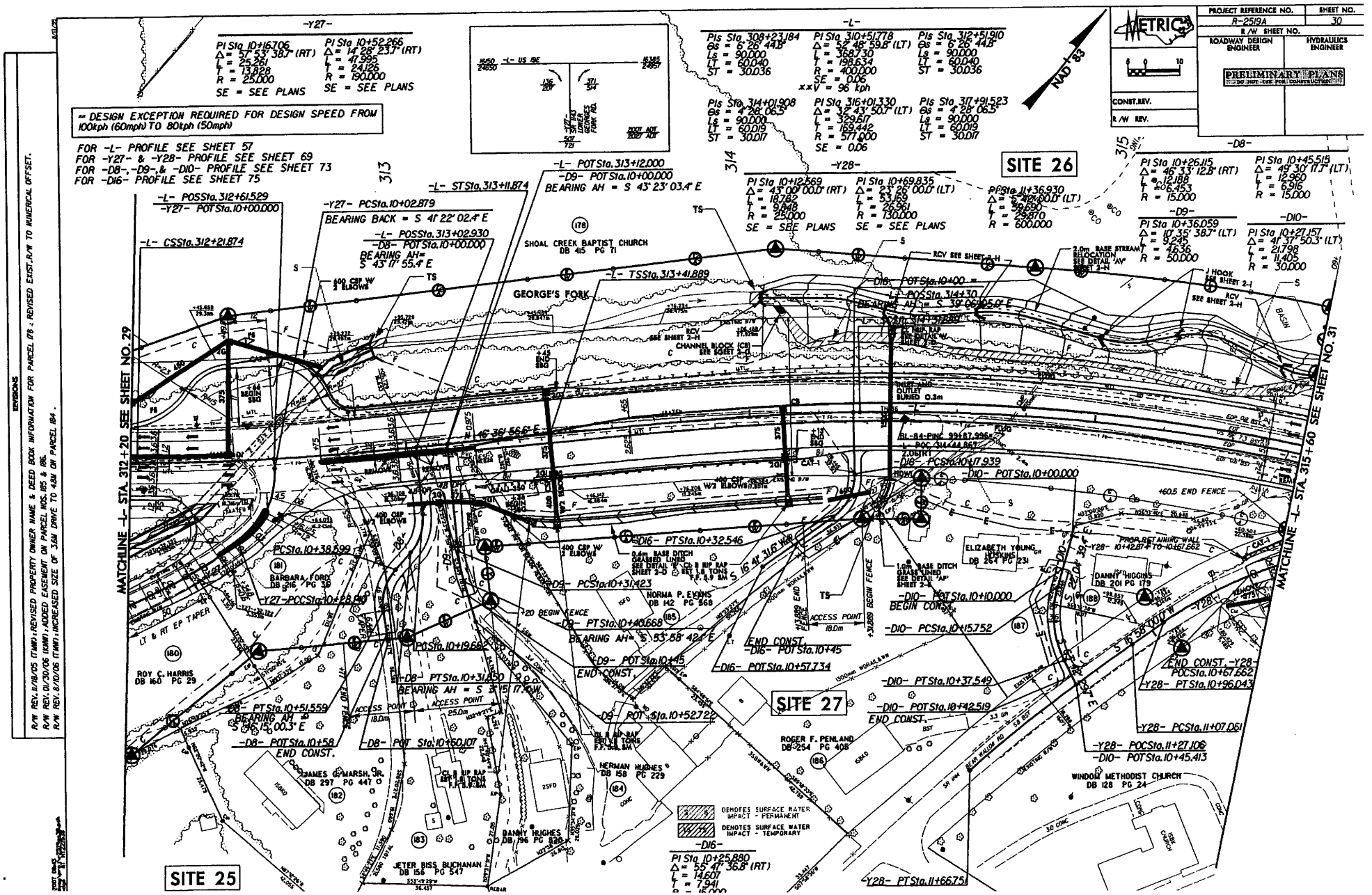


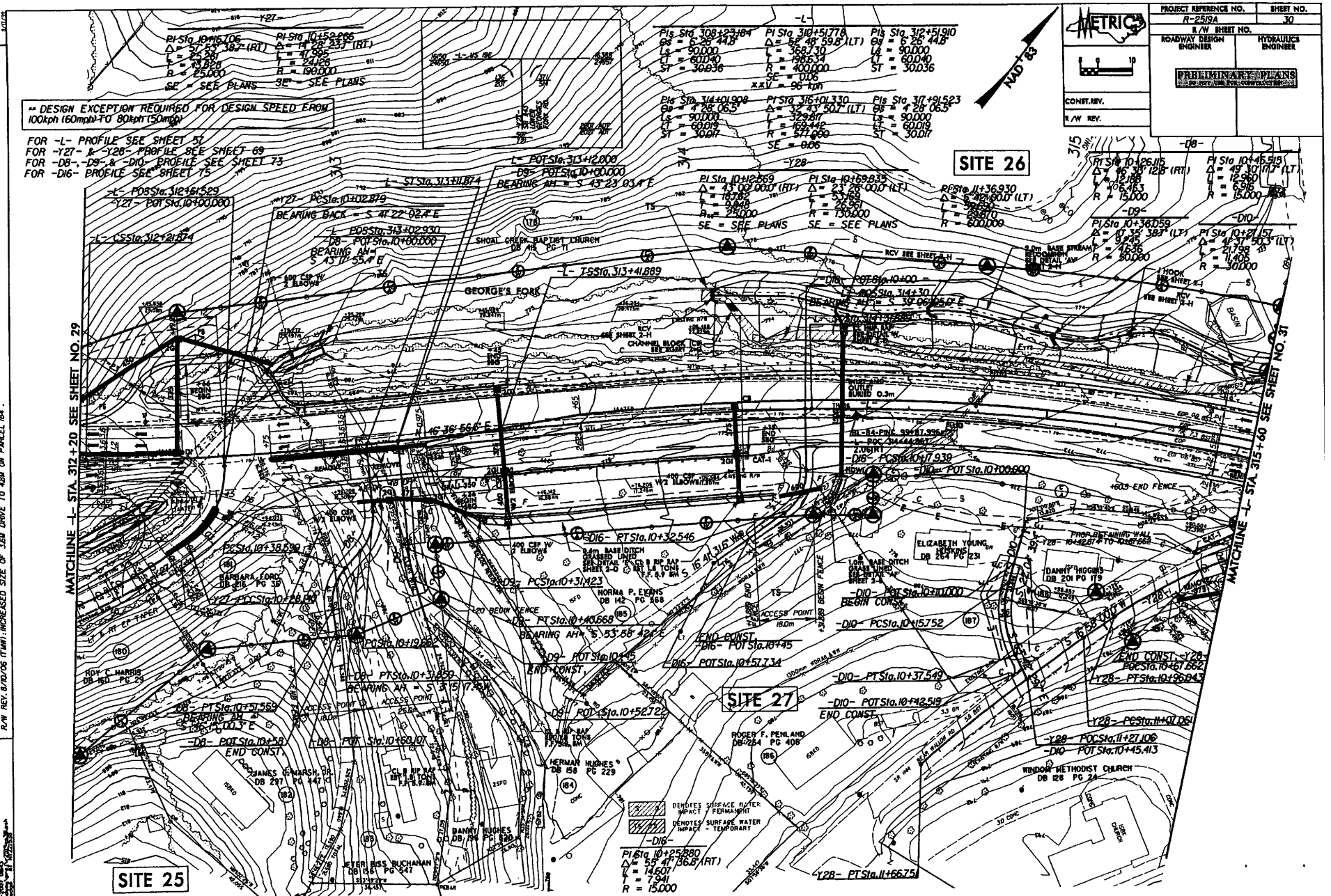
-L- STATION 312+53.5
2 @ 2.13m X 1.83m BOTTOMLESS RCBC

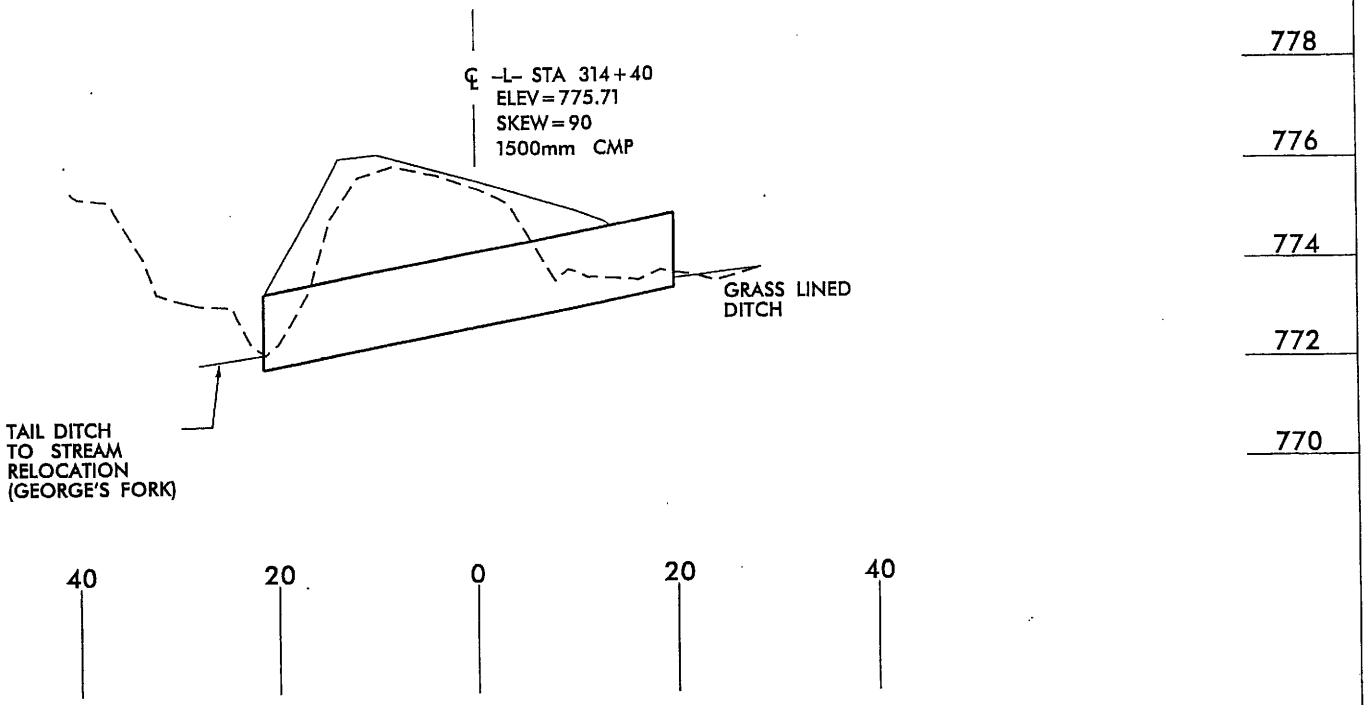
SITE 25
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 30
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 178; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KNM); ADDED EASEMENT ON PARCEL NOS. 185 & 186.
R/W REV. 8/10/06 (TMW); INCREASED SIZE OF 3.6M DRIVE TO 4.8M ON PARCEL 184.
-Y27-
PI Sta 10+16.706
Δ = 57° 53' 38.7" (RT)
L = 25.261
T = 13.828
R = 25.000
SE = SEE PLANS
PI Sta 10+52.266
Δ = 14° 28' 23.7" (RT)
L = 47.595
T = 24.126
R = 190.000
SE = SEE PLANS
-L- US 9E
* DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
FOR -L- PROFILE SEE SHEET 57
FOR -Y27- & -Y28- PROFILE SEE SHEET 69
FOR -D8-, -D9-, & -D10- PROFILE SEE SHEET 73
FOR -D16- PROFILE SEE SHEET 75
-L-
PIs Sta 308+23.184
Es = 6.26 44.8
Ls = 90.000
LT = 60.040
ST = 30.036
PI Sta 310+51.778
Δ = 52° 48' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
xxV = 96 kph
PIs Sta 312+51.910
Es = 6.26 44.8
Ls = 90.000
LT = 60.040
ST = 30.036
PIs Sta 314+01.908
Es = 4.26 06.5
Ls = 90.000
LT = 60.019
ST = 30.017
PI Sta 316+01.330
Δ = 32° 43' 50.7" (LT)
L = 329.617
T = 169.442
R = 577.000
SE = 0.06
PIs Sta 317+91.523
Es = 4.26 06.5
Ls = 90.000
LT = 60.019
ST = 30.017
-Y28-
PI Sta 10+12.569
Δ = 43° 09' 00.0" (RT)
L = 18.782
T = 9.848
R = 25.000
SE = SEE PLANS
PI Sta 10+69.835
Δ = 23° 26' 00.0" (LT)
L = 53.168
T = 26.961
R = 130.000
SE = SEE PLANS
PI Sta 11+36.930
Δ = 27° 21' 00.0" (LT)
L = 59.630
T = 29.870
R = 600.000
-D8-
PI Sta 10+26.115
Δ = 46° 33' 12.8" (RT)
L = 12.188
T = 6.453
R = 15.000
PI Sta 10+45.515
Δ = 49° 30' 17.7" (LT)
L = 12.960
T = 6.916
R = 15.000
-D9-
PI Sta 10+36.059
Δ = 10° 35' 38.7" (LT)
L = 9.245
T = 4.636
R = 50.000
-D10-
PI Sta 10+27.157
Δ = 41° 37' 50.3" (LT)
L = 21.798
T = 11.405
R = 30.000
SITE 26
SITE 27
SITE 25
-L- POSSta. 312+61.529
-Y27- POTSta. 10+00.000
-L- CSSta. 312+21.874
-Y27- PCSta. 10+02.879
BEARING BACK = S 41° 22' 02.4" E
-L- POSSta. 313+02.930
-D8- POTSta. 10+00.000
BEARING AH = S 43° 17' 55.4" E
-L- STSta. 313+11.874
-L- POTSta. 313+12.000
-D9- POTSta. 10+00.000
BEARING AH = S 43° 23' 03.4" E
-L- TSSta. 313+41.889
-D16- POTSta. 10+00 =
-L- POSSta. 314+30
BEARING AH = S 39° 06' 05.0" E
-L- STSta. 315+88.887
MATCHLINE -L- STA. 312+20 SEE SHEET NO. 29
MATCHLINE -L- STA. 315+60 SEE SHEET NO. 31
SHOAL CREEK BAPTIST CHURCH DB 415 PG 71
GEORGE'S FORK
CHANNEL BLOCK (CB) SEE SHEET 2-H
RCV SEE SHEET 2-H
1 HOOK SEE SHEET 2-I
2.0m BASE STREAM RELOCATION SEE DETAIL 'AN' SHEET 2-N
BL-84-PNC 9387.996m
-L- POC 314+44.867
-D16- PCSta. 10+17.939
-D10- POTSta. 10+00.000
-D16- PTSta. 10+32.546
-D9- PCSta. 10+31.423
-Y27-PCCSta. 10+28.140
-D8- PTSta. 10+40.668
BEARING AH = S 53° 58' 42.4" E
-D9- POTSta. 10+45
END CONST.
-D16- POTSta. 10+45
-D8- PTSta. 10+31.850
BEARING AH = S 3° 15' 17.0" W
-D8- PTSta. 10+51.559
BEARING AH = S 46° 15' 00.3" E
-D8- POTSta. 10+58
END CONST.
-D8- POTSta. 10+60.107
-D9- POTSta. 10+52.722
-D10- PCSta. 10+15.752
-D16- POTSta. 10+57.734
-D10- PTSta. 10+37.549
-D10- POTSta. 10+42.519
END CONST.
-Y28- PTSta. 10+96.043
-Y28- PCSta. 11+07.061
-Y28- POCSta. 11+27.106
-D10- POTSta. 10+45.413
-Y28- PTSta. 11+66.751
-D16-
PI Sta 10+25.880
Δ = 55° 41' 36.8" (RT)
L = 14.607
T = 7.941
R = 15.000
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
ROY C. HARRIS DB 160 PG 29
BARBARA FORD DB 216 PG 38
NORMA P. EVANS DB 142 PG 568
ELIZABETH YOUNG HOPKINS DB 264 PG 231
DANNY HIGGINS DB 201 PG 179
ROGER F. PENLAND DB 254 PG 408
WINDOW METHODIST CHURCH DB 128 PG 24
JAMES G. MARSH, SR. DB 297 PG 447
HERMAN HUGHES DB 158 PG 229
DANNY HUGHES DB 196 PG 820
JETER BISS BUCHANAN DB 156 PG 547
ACCESS POINT
END CONST.
BEGIN CONST.
BEGIN FENCE
END FENCE
+60.5 END FENCE
CB RIP RAP EST. 1.8 TONS F.F. 5.9 SM
1.0m BASE DITCH GRASS LINED SEE DETAIL 'AA' SHEET 2-K
0.6m BASE DITCH GRASS LINED SEE DETAIL 'AB' SHEET 2-K
PROP. RET. WING WALL
-Y28- 10+42.87 TO 10+67.662
-Y28- POCSta. 10+67.662
-Y28- PCSta. 11+07.061
-Y28- POCSta. 11+27.106
-D10- POTSta. 10+45.413
-Y28- PTSta. 11+66.751
-D16- PTSta. 10+25.880
-D16- POTSta. 10+57.734
-D10- PTSta. 10+37.549
-D10- POTSta. 10+42.519
-D10- POTSta. 10+10.000
-D10- PCSta. 10+15.752
-D9- POTSta. 10+52.722
-D8- POTSta. 10+60.107
-D8- PTSta. 10+31.850
-D9- POTSta. 10+45
-D16- POTSta. 10+57.734
-D16- PTSta. 10+32.546
-D9- PCSta. 10+31.423
-D8- PTSta. 10+40.668
-D8- PTSta. 10+51.559
-D8- POTSta. 10+58
-Y27-PCCSta. 10+28.140
PCSta. 10+38.599
PCSta. 10+19.662
-D16- PCSta. 10+17.939
-D10- POTSta. 10+00.000
-D16- POTSta. 10+00 =
-L- POSSta. 314+30
-L- STSta. 315+88.887
-L- POC 314+44.867
-L- POTSta. 313+12.000
-D9- POTSta. 10+00.000
-L- TSSta. 313+41.889
-L- STSta. 313+11.874
-L- POSSta. 313+02.930
-D8- POTSta. 10+00.000
-Y27- PCSta. 10+02.879
-L- CSSta. 312+21.874
-L- POSSta. 312+61.529
-Y27- POTSta. 10+00.000
-Y28- PCSta. 10+67.662
-Y28- PTSta. 10+96.043
-Y28- PCSta. 11+07.061
-Y28- POCSta. 11+27.106
-D10- POTSta. 10+45.413
-Y28- PTSta. 11+66.751


METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
30
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
NAD 83
SITE 26
SITE 27
SITE 25
MATCHLINE -L- STA. 312+20 SEE SHEET NO. 29
MATCHLINE -L- STA. 315+60 SEE SHEET NO. 31
** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
FOR -L- PROFILE SEE SHEET 5I
FOR -Y27- & -Y28- PROFILE SEE SHEET 69
FOR -D8-, -D9-, & -D10- PROFILE SEE SHEET 73
FOR -D16- PROFILE SEE SHEET 75
-L- POB Sta. 312+61.529
-Y27- POT Sta. 10+00.000
-L- CS Sta. 312+21.874
-Y27- PCS Sta. 10+02.879
BEARING BACK = S 41° 22' 02.4" E
-L- POS Sta. 313+02.930
-D8- POT Sta. 10+00.000
BEARING AH = S 43° 17' 55.4" E
-L- ST Sta. 313+11.874
-D9- POT Sta. 10+00.000
BEARING AH = S 43° 23' 03.4" E
-L- POT Sta. 313+12.000
-L- TS Sta. 313+41.889
-L- SC Sta. 313+61.874
-L- CS Sta. 314+01.908
-L- PI Sta. 308+23.184
-L- PI Sta. 310+51.778
-L- PI Sta. 312+51.910
-L- PI Sta. 314+01.908
-L- PI Sta. 315+01.330
-L- PI Sta. 317+91.523
-Y28- PI Sta. 10+12.669
-Y28- PI Sta. 10+69.835
-Y28- PI Sta. 11+36.930
-Y28- PI Sta. 10+26.115
-Y28- PI Sta. 10+45.513
-D9- PI Sta. 10+36.059
-D10- PI Sta. 10+27.157
-D16- PI Sta. 10+25.880
-D16- PCS Sta. 10+17.939
-D10- POT Sta. 10+09.800
-D10- PCS Sta. 10+15.752
-D10- PT Sta. 10+37.549
-D10- POT Sta. 10+42.519
-D10- POT Sta. 10+45.413
-Y28- PCS Sta. 10+67.862
-Y28- PT Sta. 10+96.847
-Y28- PCS Sta. 11+27.106
-Y28- PT Sta. 11+66.751
-D8- PT Sta. 10+51.559
-D8- POT Sta. 10+58.
-D8- PCS Sta. 10+38.590
-Y27- PCS Sta. 10+28.630
-D8- PT Sta. 10+40.668
-D9- PCS Sta. 10+31.423
-D9- PT Sta. 10+31.259
-D9- POT Sta. 10+52.722
-D9- POT Sta. 10+60.107
-D16- PT Sta. 10+32.546
-D16- POT Sta. 10+57.734
-D8- PCS Sta. 10+19.662
END CONST.
BEGIN CONST.
BEGIN FENCE
END FENCE
ACCESS POINT
SHOAL CHURCH BAPTIST CHURCH DB 415 PG 71
GEORGE'S FORK
CHANNEL BLOCK CB
SEE SHEET 2-H
RCV SEE SHEET 4-H
HOOK SEE SHEET 4-I
BASIN
ROY C. HARRIS DB 150 PG 29
BARBARA FORD DB 216 PG 38
JAMES O. MARSH, JR. DB 297 PG 447
HERMAN HUGHES DB 158 PG 229
DANNY HUGHES DB 154 PG 548
PETER BISS BUCHANAN DB 156 PG 547
NORMA P. EVANS DB 142 PG 368
ELIZABETH YOUNG HOPKINS DB 264 PG 231
DANNY HIGGINS DB 201 PG 179
ROGER F. PENLAND DB 264 PG 406
WINDOW METHODIST CHURCH DB 126 PG 24
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
REVISIONS
R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (MW): ADDED EASEMENT ON PARCEL NOS. 185 & 186.
R/W REV. 8/10/06 (TMW): INCREASED SIZE OF 3.6M DRIVE TO 4.8M ON PARCEL 184.

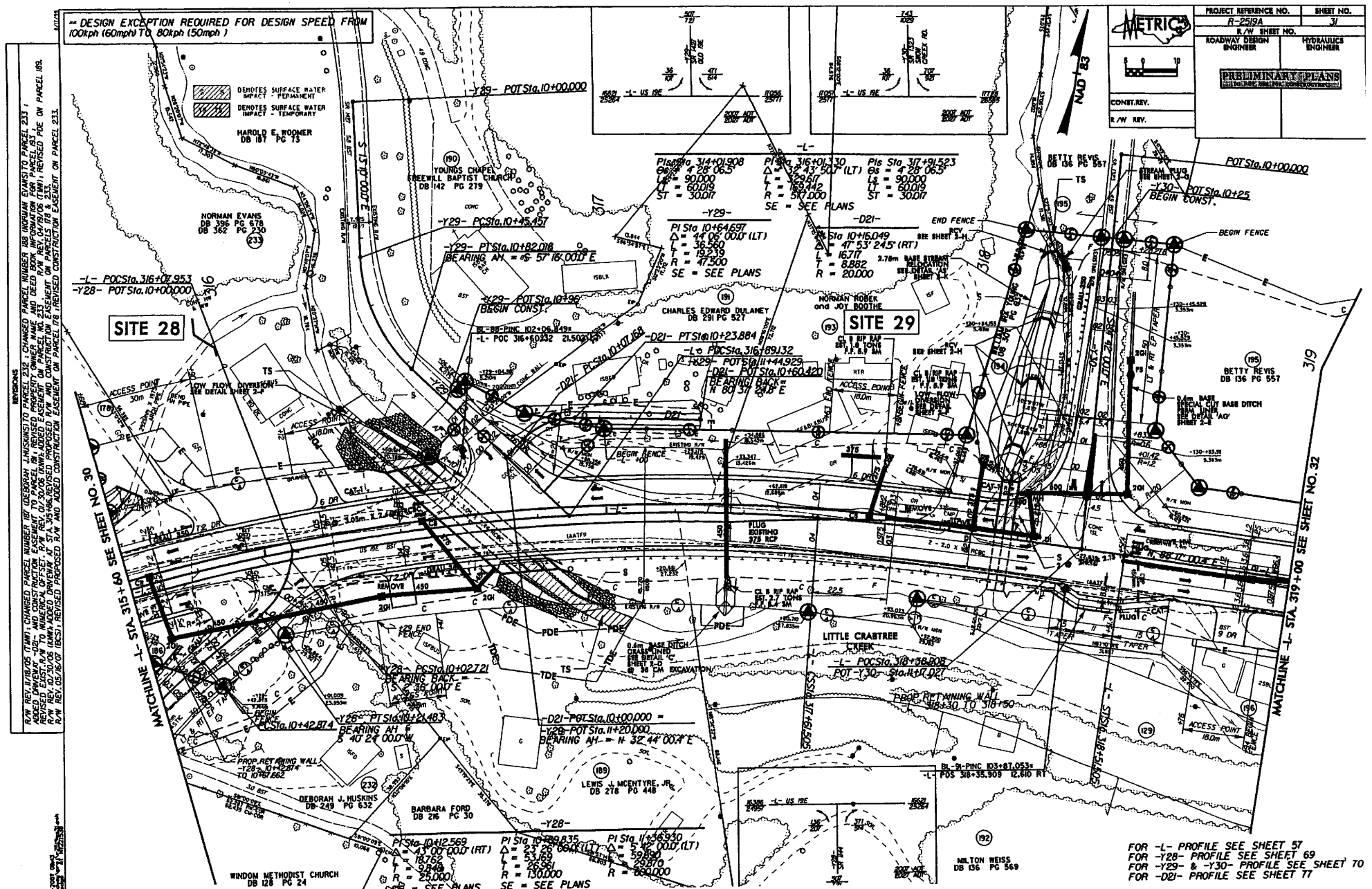


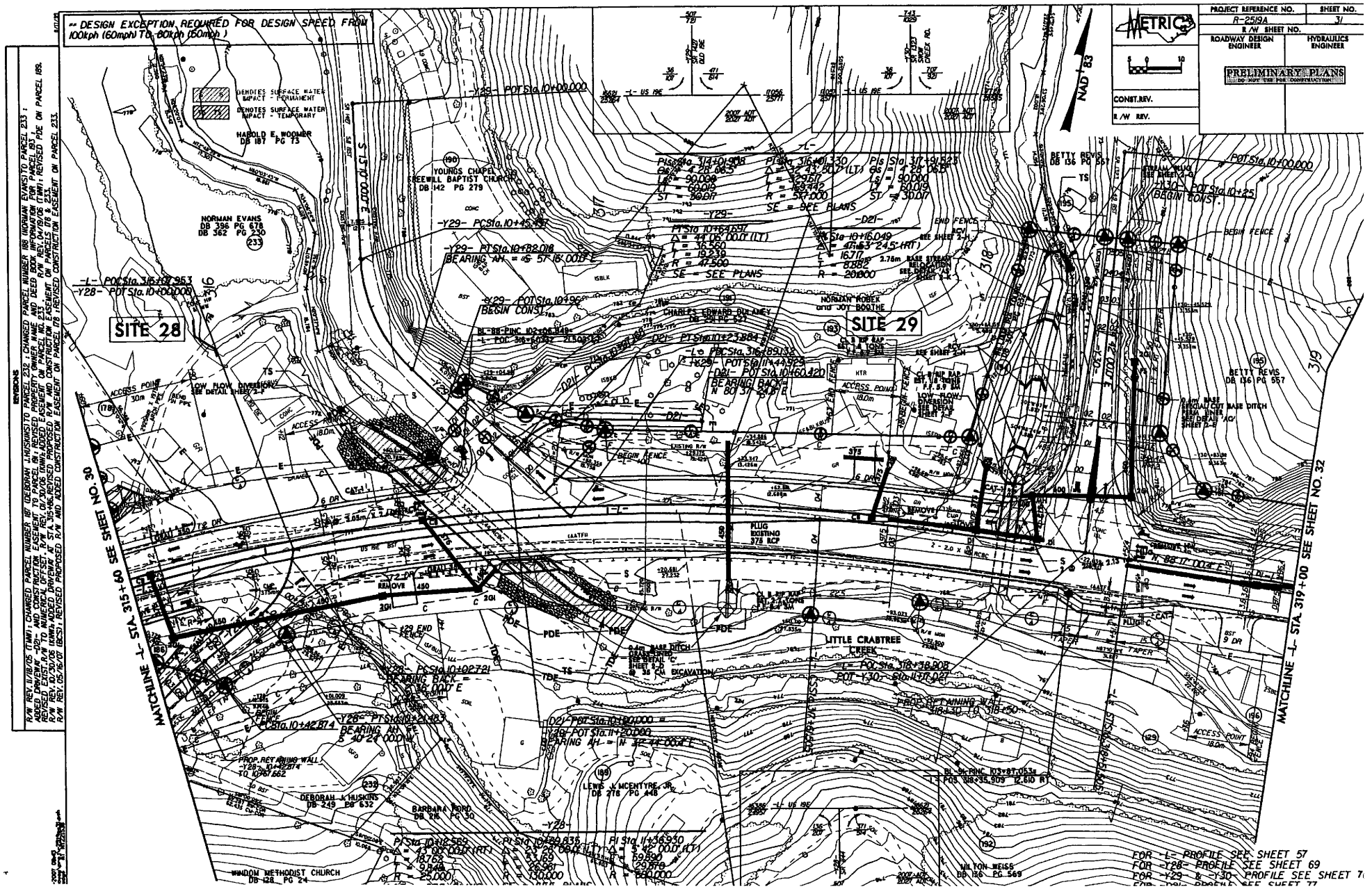
–L– STATION 314+40
1500mm CMP

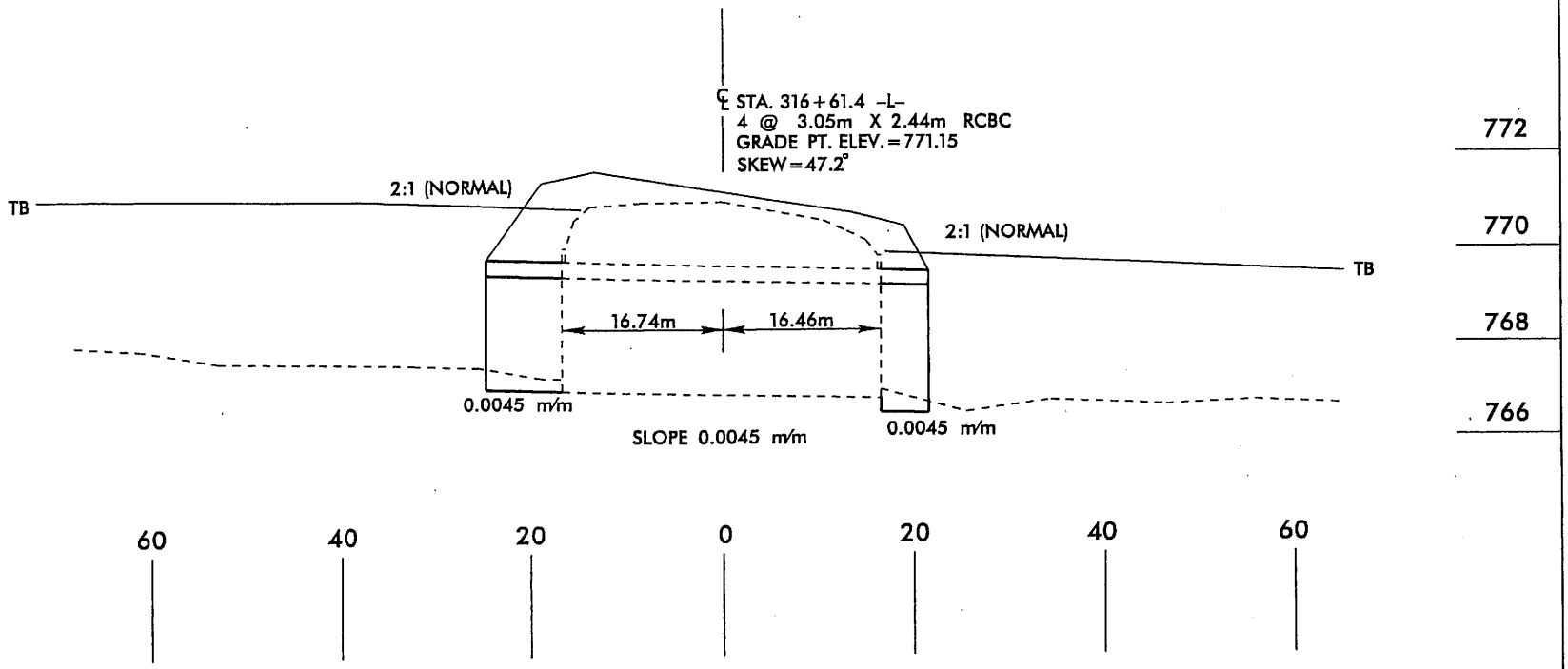
SITE 27
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 28
SITE 29
HAROLD E. WOOMER DB 187 PG 73
NORMAN EVANS DB 396 PG 678 DB 362 PG 230
YOUNDS CHAPEL FREEWILL BAPTIST CHURCH DB 142 PG 279
CHARLES EDWARD DULANEY DB 291 PG 527
NORMAN HOBER and JOY BOOTHE
BETTY REVIS DB 136 PG 557
DEBORAH J. HUSKINS DB 249 PG 632
BARBARA FORD DB 216 PG 30
LEWIS J. MCENTYRE, JR. DB 278 PG 448
MILTON WEISS DB 136 PG 569
WINDOM METHODIST CHURCH DB 128 PG 24
LITTLE CRABTREE CREEK
MATCHLINE -L- STA. 315+60 SEE SHEET NO. 30
MATCHLINE -L- STA. 319+00 SEE SHEET NO. 32
-L- POC Sta. 316+07.953
-Y28- POT Sta. 10+00.000
-Y29- POT Sta. 10+00.000
-Y29- PC Sta. 10+45.457
-Y29- PT Sta. 10+82.018
BEARING AH = S 57° 16' 00.0" E
-Y29- POT Sta. 10+96 BEGIN CONST.
-Y28- PC Sta. 10+02.721
BEARING BACK = S 35° 00.0" E
-Y28- PT Sta. 10+21.483
BEARING AH = S 40° 24' 00.0" W
-Y28- PI Sta. 10+12.569
Δ = 43° 00' 00.0" (RT)
D = 18.762
T = 9.848
R = 25.000
SE = SEE PLANS
-Y28- PI Sta. 10+39.835
Δ = 23° 26' 06.0" (LT)
D = 53.69
T = 26.561
R = 130.000
SE = SEE PLANS
-Y28- PI Sta. 11+36.930
Δ = 5° 42' 00.0" (LT)
D = 59.830
T = 29.870
R = 600.000
SE = SEE PLANS
-L- PI Sta. 314+01.908
Δ = 4° 28' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017
-L- PI Sta. 316+01.330
Δ = 12° 43' 50.0" (LT)
L = 129.617
T = 65.342
R = 547.000
SE = SEE PLANS
-L- PI Sta. 317+91.523
Δ = 4° 28' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017
-D21- PI Sta. 10+64.697
Δ = 44° 06' 00.0" (LT)
L = 36.560
T = 19.239
R = 47.500
SE = SEE PLANS
-D21- PI Sta. 10+16.049
Δ = 41° 53' 24.5" (RT)
L = 16.717
T = 8.882
R = 20.000
-D21- PT Sta. 10+23.884
-L- POC Sta. 316+89.132
-Y29- POT Sta. 11+44.929
-D21- POT Sta. 10+60.420
BEARING BACK = N 60° 37' 24.0" E
-D21- PC Sta. 10+00.000 =
-Y29- POT Sta. 11+20.000
BEARING AH = N 32° 44' 00.4" E
-L- POC Sta. 318+38.808
POT -Y30- Sta. 11+17.027
-L- POS 318+35.909 12.610 RT
PROP. RETAINING WALL -Y28- 10+42.874 TO 10+67.862
PROP. RETAINING WALL 318+30 TO 318+50
-Y30- POT Sta. 10+00.000
-Y30- POT Sta. 10+25 BEGIN CONST.
BEGIN FENCE
END FENCE
STREAM PLUG SEE SHEET 3-G
BASE STREAM RELOCATION SEE DETAIL 'A' SHEET 2-H
LOW FLOW DIVERSION SEE DETAIL SHEET 2-H
ACCESS POINT 18.0m
ACCESS POINT 30m
PLUG EXISTING 975 RCP
REMOVE 450
REMOVE 375
0.6m BASE DITCH GRASS LINED SEE DETAIL 'C' SHEET 2-D @ 30 CM EXCAVATION
0.4m BASE DITCH RIPRAP LINED SEE DETAIL 'AG' SHEET 2-E
CL B RIP RAP 1.5 TONS F.F. 0.9 SM
BL-PI-PINC 102+06.849
BL-PI-PINC 103+87.053
FOR -L- PROFILE SEE SHEET 57
FOR -Y28- PROFILE SEE SHEET 69
FOR -Y29- & -Y30- PROFILE SEE SHEET 70
FOR -D21- PROFILE SEE SHEET 77
PROJECT REFERENCE NO. R-2519A
SHEET NO. 31
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
METRIC
NAD '83
REVISIONS
R/W REV. 11/18/05 (TJW) ; CHANGED PARCEL NUMBER 187 (DEBORAH LINDSKINS) TO PARCEL 232 ; CHANGED PARCEL NUMBER 188 (NORMAN EVANS) TO PARCEL 233 ; ADDED CONSTRUCTION EASEMENT TO PARCEL 91 ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 183 ; REVISED EXIST. R/W TO NUMERICAL OFFSET, R/W REV. 01/30/06 (TJW) ; ADDED EASEMENT ON PARCEL NO. 233 ; R/W REV. 04/19/06 (TJW) ; REVISED POE ON PARCEL 189. R/W REV. 10/30/06 (TJW) ADDED DRIVEWAY AT STA 315+66, REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCELS 178 & 233. R/W REV. 05/16/07 (BCS) ; REVISED PROPOSED R/W AND ADDED CONSTRUCTION EASEMENT ON PARCEL 178 ; REVISED CONSTRUCTION EASEMENT ON PARCEL 233.


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
HAROLD E. WOOMER DB 187 PG 73
YOUNGS CHAPEL FREEWILL BAPTIST CHURCH DB 142 PG 279
NORMAN EVANS DB 396 PG 678 DB 362 PG 230
SITE 28
SITE 29
NORMAN ROBEX and JOY BOOTHE
CHARLES EDWARD DUNEY
BETTY REVIS DB 136 PG 557
DEBORAH A. HUSKINS DB 249 PG 632
BARBARA FORD DB 218 PG 30
LEWIS M. MCENTYRE JR. DB 278 PG 448
WINDOM METHODIST CHURCH DB 128 PG 24
LILTON WEISS DB 136 PG 569
LITTLE CRABTREE CREEK
MATCHLINE -L- STA. 315+00 SEE SHEET NO. 30
MATCHLINE -L- STA. 319+00 SEE SHEET NO. 32
NAD 83
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 31
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 6/18/05 (TMW) - CHANGED PARCEL NUMBER 187 (DEBORAH J. HUSKINS) TO PARCEL 232 ; CHANGED PARCEL NUMBER 188 NORMAN EVANS) TO PARCEL 233 ; ADDED DRIVEWAY -202- AND CONSTRUCTION EASEMENT TO PARCEL 69 ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 83 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 01/30/06 (TMW) - ADDED EASEMENT ON PARCEL NO. 233 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/15/06 (TMW) - ADDED EASEMENT ON PARCEL NO. 188 ; R/W REV. 10/30/06 (GMW) - ADDED DRIVEWAY -47- STA. 316+46 - REVISED PROPOSED EASEMENT ; REVISED CONSTRUCTION EASEMENT ON PARCEL 188 ; R/W REV. 05/16/07 (BCS) - REVISED PROPOSED R/W AND ADDED CONSTRUCTION EASEMENT ON PARCEL 178 - REVISED CONSTRUCTION EASEMENT ON PARCEL 233.
FOR -L- PROFILE SEE SHEET 57
FOR -Y28- PROFILE SEE SHEET 69
FOR -Y29- & -Y30- PROFILE SEE SHEET 7

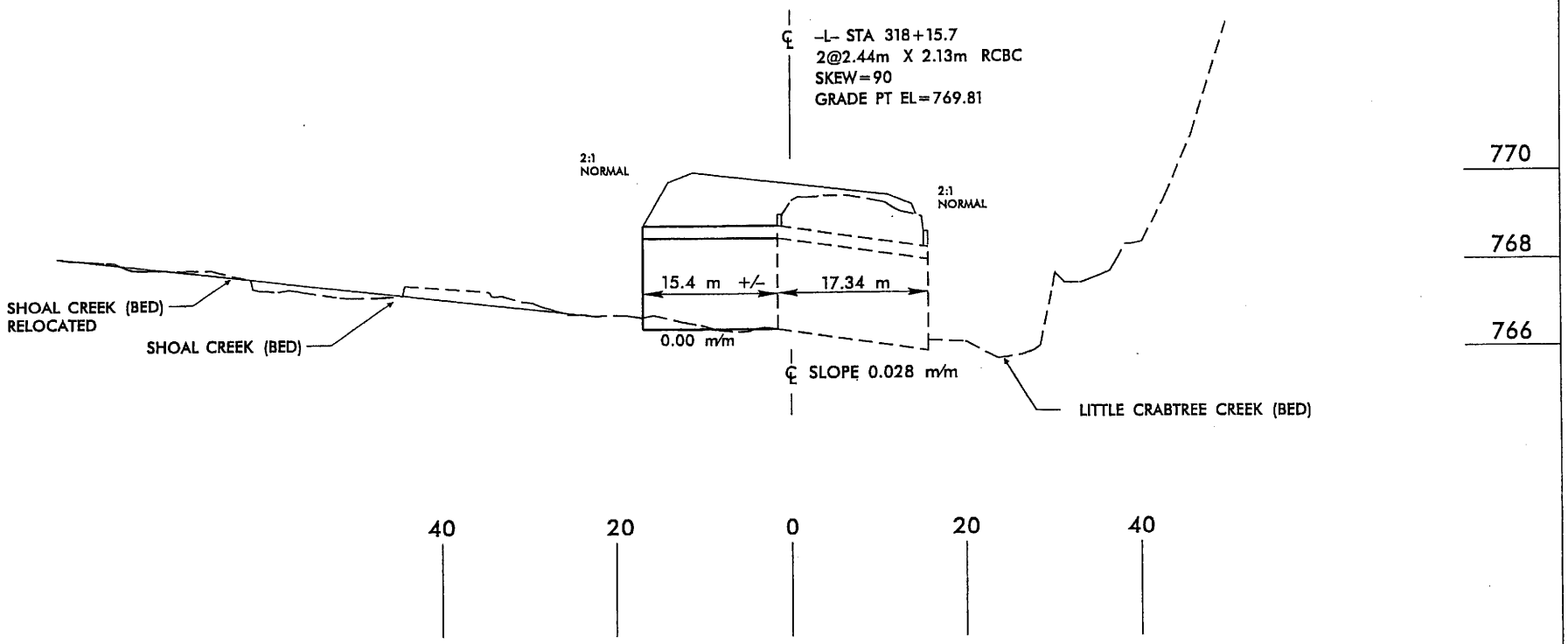


–L– STATION 316+61.4
4 @ 3.05m X 2.44m RCBC

SITE 28
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

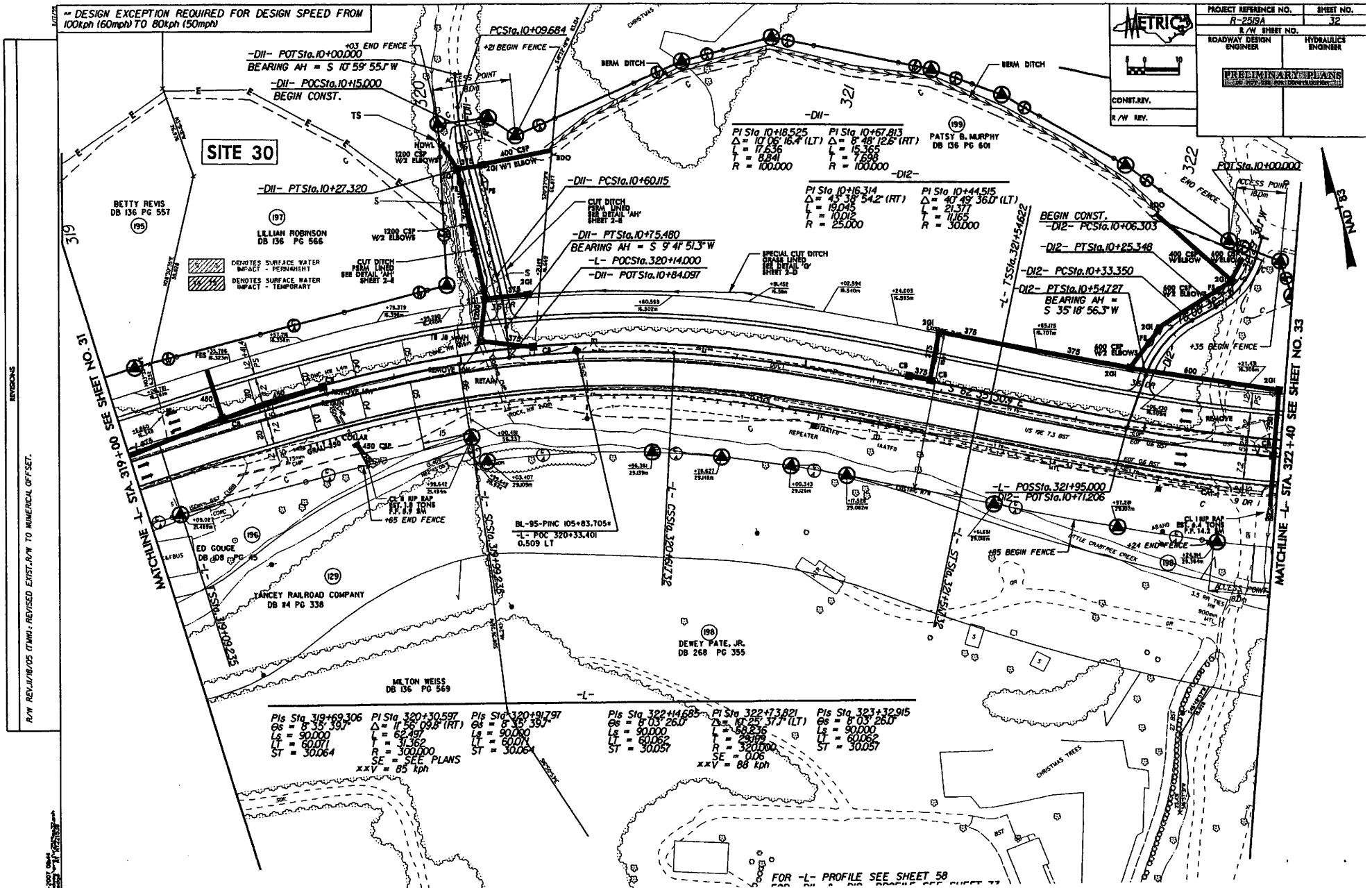


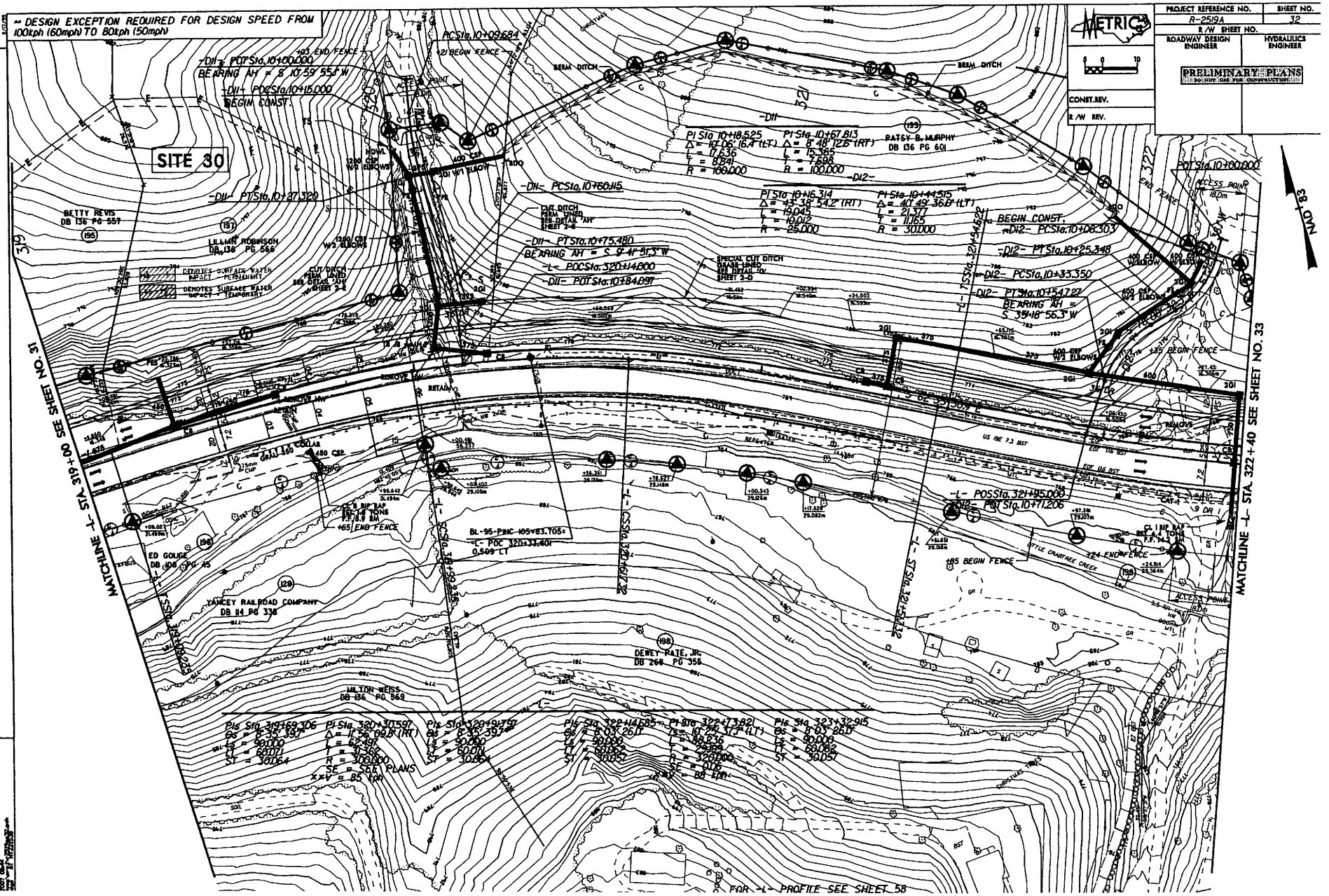
–L– STATION 318+15.7
2 @ 2.44m X 2.13m RCBC

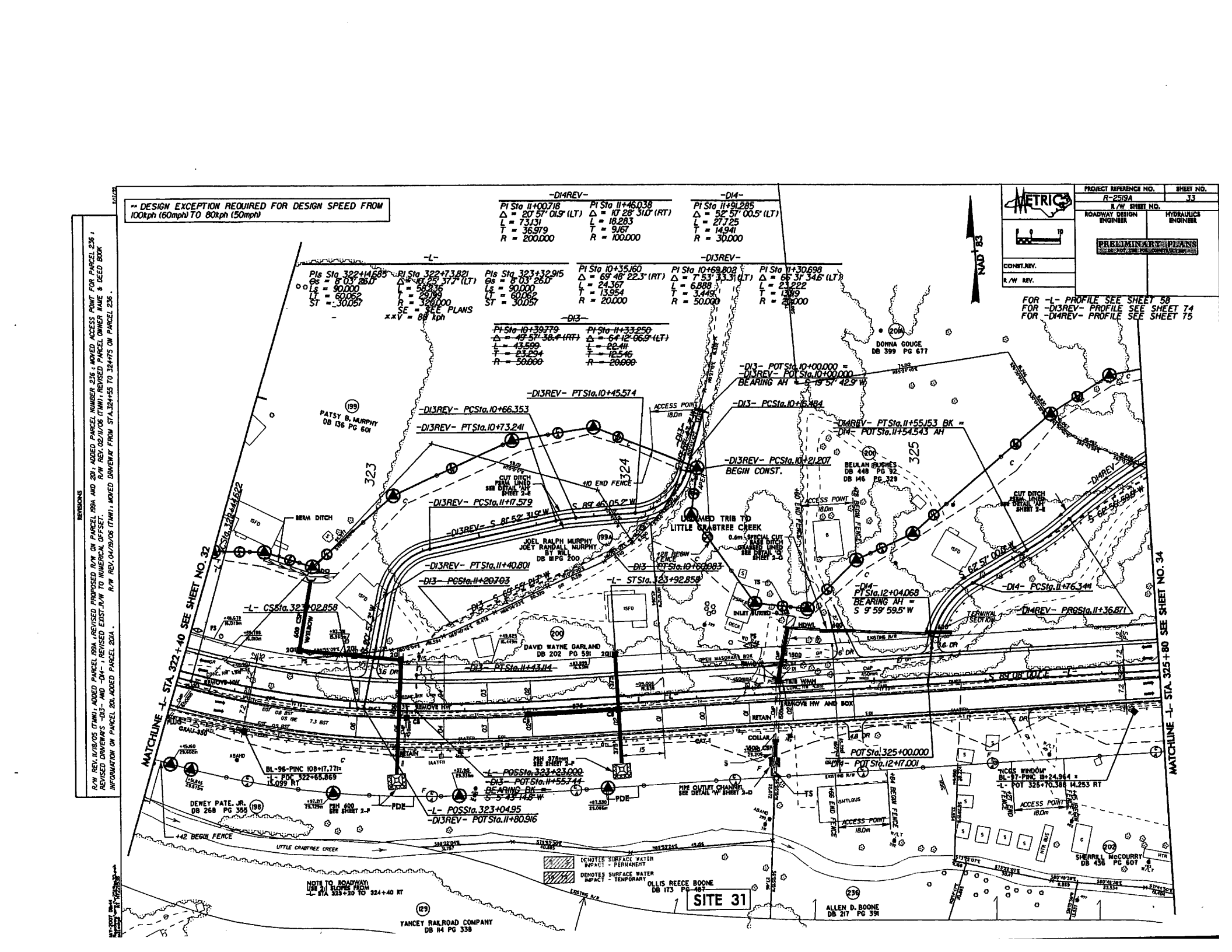
SITE 29
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 32
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV.-11/18/05 (TWH): REVISED EXIST. R/W TO NUMERICAL OFFSET.
SITE 30
-Dll- POT Sta. 10+00.000
BEARING AH = S 10° 59' 55.1" W
-Dll- POC Sta. 10+15.000
BEGIN CONST.
-Dll- PT Sta. 10+27.320
-Dll- PC Sta. 10+60.115
-Dll- PT Sta. 10+75.480
BEARING AH = S 9° 41' 51.3" W
-L- POC Sta. 320+14.000
-Dll- POT Sta. 10+84.097
PC Sta. 10+09.684
-Dll-
PI Sta 10+18.525
Δ = 10° 06' 16.4" (LT)
L = 17.636
T = 8.841
R = 100.000
PI Sta 10+67.813
Δ = 8° 48' 12.6" (RT)
L = 15.365
T = 7.698
R = 100.000
-Dl2-
PI Sta 10+16.314
Δ = 43° 38' 54.2" (RT)
L = 19.045
T = 10.012
R = 25.000
PI Sta 10+44.515
Δ = 40° 49' 36.0" (LT)
L = 21.377
T = 11.165
R = 30.000
-Dl2- POT Sta. 10+00.000
BEGIN CONST.
-Dl2- PC Sta. 10+06.303
-Dl2- PT Sta. 10+25.348
-Dl2- PC Sta. 10+33.350
-Dl2- PT Sta. 10+54.727
BEARING AH = S 35° 18' 56.3" W
-L- TS Sta. 321+54.622
-L- POS Sta. 321+95.000
-Dl2- POT Sta. 10+71.206
-L- SCS Sta. 321+54.32
-L- CSS Sta. 320+61.32
-L- SCS Sta. 319+99.235
-L- CSS Sta. 319+09.235
MATCHLINE -L- STA. 319+00 SEE SHEET NO. 31
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 33
BERM DITCH
ACCESS POINT
TS
HDWL
1200 CSP W/2 ELBOWS
400 CSP W/1 ELBOW
BDO
CUT DITCH PERM. LINED SEE DETAIL 'AH' SHEET 2-E
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 3-D
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
BETTY REVIS DB 136 PG 557
LILLIAN ROBINSON DB 136 PG 566
PATSY B. MURPHY DB 136 PG 601
ED GOUGE DB 108 PG 45
YANCEY RAILROAD COMPANY DB 84 PG 338
DEWEY PATE, JR. DB 268 PG 355
MILTON WEISS DB 136 PG 569
BL-95-PINC 105+83.705*
-L- POC 320+33.401
0.509 LT
+65 END FENCE
+03 END FENCE
+21 BEGIN FENCE
+24 END FENCE
+35 BEGIN FENCE
+85 BEGIN FENCE
ACCESS POINT
LITTLE CRABTREE CREEK
CHRISTMAS TREES
REMOVE
RETAIN
REPEATER
EOT US RTE 7.3 BST
CL LIMP RAP
GRADE 'A' 450 CSP
Pls Sta 319+69.306
Gs = 6° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pls Sta 320+30.597
Δ = 11° 56' 09.8" (RT)
L = 62.497
T = 31.362
R = 300.000
SE = SEE PLANS
xxV = 85 kph
Pls Sta 320+91.797
Gs = 6° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pls Sta 322+14.685
Gs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057
Pls Sta 322+73.821
Δ = 10° 25' 37.7" (LT)
L = 58.236
T = 29.199
R = 320.000
SE = 0.06
xxV = 88 kph
Pls Sta 323+32.915
Gs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057
FOR -L- PROFILE SEE SHEET 58
NAD 83


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
SITE 30
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
32
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/8/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
NAD 83
MATCHLINE -L- STA. 318+00 SEE SHEET NO. 31
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 33
-DII- POT Sta. 10+00.000
BEARING AH = S 10°59'55.5" W
-DII- POC Sta. 10+15.000
BEGIN CONST.
-DII- PT Sta. 10+27.320
-DII- PC Sta. 10+60.115
-DII- PT Sta. 10+75.480
BEARING AH = S 9°41'51.3" W
-L- POC Sta. 320+14.000
-DII- POT Sta. 10+84.097
PC Sta. 10+09.684
PI Sta. 10+18.525
Δ = 10°05'16.4" (LT)
D = 17.636
L = 8.841
R = 100.000
PI Sta. 10+67.813
Δ = 8°48'12.8" (RT)
D = 15.565
L = 7.698
R = 100.000
PI Sta. 10+16.314
Δ = 43°38'54.2" (RT)
D = 19.045
L = 10.012
R = 25.000
PI Sta. 10+44.515
Δ = 40°49'36.8" (LT)
D = 21.377
L = 11.165
R = 30.000
-DI2- BEGIN CONST.
-DI2- PC Sta. 10+08.303
-DI2- PT Sta. 10+25.348
-DI2- PC Sta. 10+33.350
-DI2- PT Sta. 10+54.727
BEARING AH = S 39°18'56.3" W
-L- POS Sta. 321+95.000
-DI2- POT Sta. 10+71.206
POT Sta. 10+00.000
-L- Sta. 321+54.32
-L- Sta. 320+49.32
-L- Sta. 321+51.32
PI Sta. 319+69.306
Δ = 1°56'09.8" (RT)
D = 6.249
L = 11.362
R = 300.000
SE = SEE PLANS
×××V = 85 (m)
PI Sta. 320+30.597
PI Sta. 320+91.797
PI Sta. 322+14.685
PI Sta. 322+73.821
Δ = 10°22'37" (LT)
D = 19.936
L = 29.198
R = 320.000
SE = 0.06
×××V = 88 (m)
PI Sta. 323+32.915
BETTY REVIS
DB 136 PG 557
LILLIAN ROBINSON
DB 136 PG 566
ED GOUGE
DB 108 PG 45
YANCEY RAILROAD COMPANY
DB 114 PG 336
MILTON WEISS
DB 136 PG 569
PATSY B. MURPHY
DB 136 PG 601
DEWEY PATE, JR.
DB 268 PG 355
SPECIAL CUT DITCH
SEE DETAIL "AH" SHEET 2-B
CUT DITCH RIPRAP LINED SEE DETAIL "AH" SHEET 2-B
BERM DITCH
CS II RIP RAP 150 TONS F.F. 11.0
CL III RIP RAP 4.4 TONS F.F. 14.3
ACCESS POINT
W=8.0m
DENOTES SURFACE WATER IMPACT = PERMANENT
DENOTES SURFACE WATER IMPACT = TEMPORARY
BEGIN FENCE
END FENCE
RETAIN
REMOVE
US 19E 7.3 BST
FOR 06 BST
MYTLE CRABTREE CREEK
FOR -L- PROFILE SEE SHEET 58


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
-DI4REV-
PI Sta 11+00.718
Δ = 20° 57' 01.9" (LT)
L = 73.131
T = 36.979
R = 200.000
PI Sta 11+46.038
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000
-DI4-
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000
-L-
PIs Sta 322+14.685
Gs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057
PI Sta 322+73.821
Δ = 10° 25' 37.7" (LT)
L = 58.236
T = 29.189
R = 320.000
SE = SEE PLANS
xxV = 80 kph
PIs Sta 323+32.915
Gs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057
-DI3REV-
PI Sta 10+35.160
Δ = 69° 48' 22.3" (RT)
L = 24.367
T = 13.954
R = 20.000
PI Sta 10+69.803
Δ = 7° 53' 33.3" (LT)
L = 6.888
T = 3.449
R = 50.000
PI Sta 11+30.698
Δ = 66° 31' 34.6" (LT)
L = 23.222
T = 13.319
R = 20.000
-DI3-
PI Sta 10+39.779
Δ = 49° 57' 38.4" (RT)
L = 43.599
T = 23.294
R = 50.000
PI Sta 11+33.250
Δ = 64° 12' 06.9" (LT)
L = 22.411
T = 12.546
R = 20.000
NAD 83
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
33
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
FOR -L- PROFILE SEE SHEET 58
FOR -DI3REV- PROFILE SEE SHEET 74
FOR -DI4REV- PROFILE SEE SHEET 75
REVISIONS
R/W REV. 11/18/05 (TMW) ; ADDED PARCEL 199A ; REVISED PROPOSED R/W ON PARCEL 199A AND 201 ; ADDED PARCEL NUMBER 236 ; MOVED ACCESS POINT FOR PARCEL 236 ; REVISED DRIVEWAYS -DI3- AND -DI4- ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/16/06 (TMW) ; REVISED PARCEL OWNER NAME & DEED BOOK INFORMATION ON PARCEL 201.
R/W REV. 04/19/06 (TMW) ; MOVED DRIVEWAY FROM STA. 324+55 TO 324+75 ON PARCEL 236 . ADDED PARCEL 201A .
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 32
MATCHLINE -L- STA. 325+80 SEE SHEET NO. 34
-L- STSta. 322+44.622
-DI3REV- PTSta.10+45.574
-DI3REV- PCSta.10+66.353
-DI3REV- PTSta.10+73.241
-DI3REV- PCSta.10+21.207
BEGIN CONST.
-DI3- PCSta.10+16.484
-DI3- POTSta.10+00.000 =
-DI3REV- POTSta.10+00.000
BEARING AH = S 19° 51' 42.9" W
-DI4REV- PTSta.11+55.153 BK =
-DI4- POTSta.11+54.543 AH
-DI3REV- PCSta.11+17.579
-DI3REV- S 89° 46' 05.2" W
-DI3REV- S 8° 52' 31.9" W
-DI3REV- PTSta.11+40.801
-DI3- PCSta.11+20.703
-DI3- S 6° 55' 52.2" W
-L- CSSta.323+02.858
-DI3- PTSta.11+43.114
-L- STSta.323+92.858
-DI3- PTSta.10+60.983
-DI4- PCSta.11+76.344
-DI4REV- PRCSta.11+36.871
-DI4- PTSta.12+04.068
BEARING AH =
S 9° 59' 59.5" W
-DI4REV-
S 62° 57' 00.0" W
S 62° 57' 59.9" W
-L- POSSta.323+23.000
-DI3- POTSta.11+55.744
BEARING BK =
S 5° 43' 14.2" W
-L- POSSta.323+04.95
-DI3REV- POTSta.11+80.916
-DI4- POTSta.12+17.001
POTSta.325+00.000
BL-96-PINC 108+17.77 =
-L- PDC 322+65.869
13.099 RT
BL-97-PINC 111+24.964 =
-L- POT 325+70.386 14.253 RT
DONNA GOUGE
DB 399 PG 677
PATSY B. MURPHY
DB 136 PG 601
JOEL RALPH MURPHY
JOEY RANDALL MURPHY
BY WILL
DB 111PG 200
DAVID WAYNE GARLAND
DB 202 PG 591
BEULAH HUGHES
DB 448 PG 92
DB 146 PG 329
UNNAMED TRIB TO
LITTLE CRABTREE CREEK
DEWEY PATE, JR.
DB 268 PG 359
OLLIS REECE BOONE
DB 173 PG 487
SHERRILL McCOURRY
DB 436 PG 507
ALLEN D. BOONE
DB 217 PG 391
YANCEY RAILROAD COMPANY
DB 114 PG 338
LITTLE CRABTREE CREEK
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
NOTE TO ROADWAY:
USE 2:1 SLOPES FROM
-L- STA 323+20 TO 324+40 RT
SITE 31
BERM DITCH
CUT DITCH
SEE DETAIL 'AA' SHEET 2-E
SPECIAL CUT
SEE DETAIL 'AA' SHEET 2-E
INLET BURIED
TERMINAL SECTION
REMOVE HW
REMOVE HW AND BOX
PIPE OUTLET CHANNEL
SEE DETAIL 'W' SHEET 2-D
PDE
PDE 600
SEE SHEET 2-F
PBH 377mm
SEE SHEET 2-F
ACCESS POINT
18.0m
+10 END FENCE
+42 BEGIN FENCE
+69 END FENCE
+84 BEGIN FENCE
"NCGS WINDOW"
-L- POT 325+70.386 14.253 RT
EXISTING R/W
TERRACE
SIDEWALK
CURB & GUTTER
DRIVE
DECK
HTR BUS
ABAND
RETAIN
COLLAR
CMP 450mm
CONC. HW 450mm
CONC. HW 1500mm
OPEN MASONARY BOX
TRUE WMH
MDWL
GRAIL-360
BERM
ISMTLBUS
ISMTLRUS
EAT-1
15FO
5FO
6 DR
7.2
7.3 BST
US 64
EOT
EOP
EOI
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TOP
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199A
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201A
202
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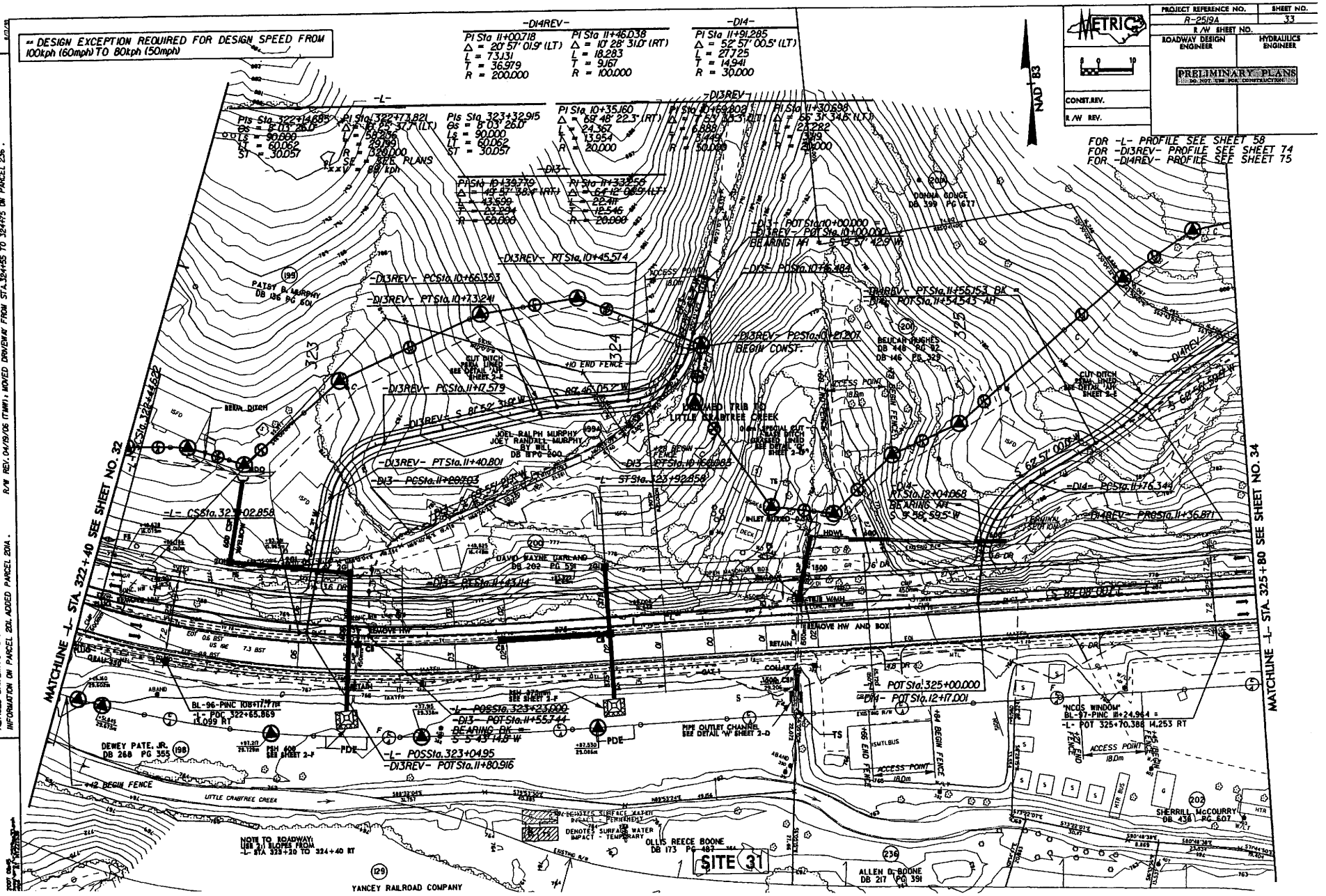
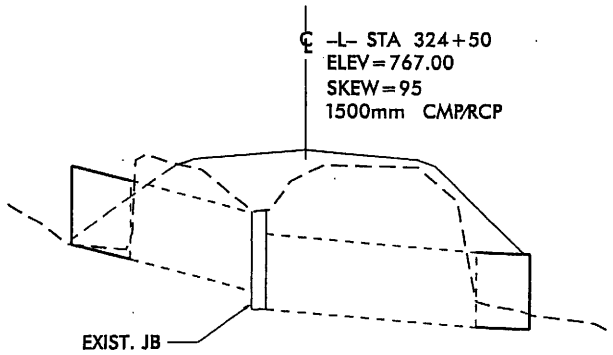

= DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
-DI4REV-
PI Sta 11+00.718
Δ = 20° 57' 01.9" (LT)
L = 73.131
T = 36.979
R = 200.000
PI Sta 11+46.038
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000
-DI4-
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000
-L-
PI Sta 322+73.821
Δ = 16° 55' 37.7" (LT)
L = 58.256
T = 29.399
R = 200.000
SE = SEE PLANS
xxV = 60 kph
PI Sta 323+32.915
Gs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057
PI Sta 10+35.160
Δ = 68° 48' 22.3" (RT)
L = 24.367
T = 13.954
R = 20.000
PI Sta 10+69.802
Δ = 7° 54' 39.3" (LT)
L = 6.888
T = 3.449
R = 50.000
PI Sta 11+30.698
Δ = 55° 31' 34.8" (LT)
L = 21.282
T = 11.393
R = 20.000
-DI3-
PI Sta 10+39.719
Δ = 49° 57' 38.4" (RT)
L = 43.599
T = 23.294
R = 50.000
PI Sta 11+33.256
Δ = 64° 12' 08.9" (LT)
L = 22.411
T = 12.546
R = 20.000
-DI3REV- RT Sta. 10+45.574
-DI3REV- PCSta. 10+66.353
-DI3REV- PT Sta. 10+73.241
-DI3REV- PCSta. 11+17.579
-DI3REV- PTSta. 11+40.801
-DI3- PCSta. 11+69.703
-DI3- PT Sta. 11+43.114
-L- CS Sta. 322+02.858
-L- ST Sta. 323+92.858
-L- POS Sta. 323+23.000
-DI3- POT Sta. 11+55.744
BEARING BK = S 5° 43' 14.8" W
-L- POS Sta. 323+04.95
-DI3REV- POT Sta. 11+80.916
-DI3- POT Sta. 10+00.000 =
-DI3REV- POT Sta. 10+00.000
BEARING AH = S 15° 57' 42.9" W
-DI3REV- PT Sta. 11+56.153 BK =
-DI3- POT Sta. 11+54.543 AH
-DI3REV- PCS Sta. 10+21.207
BEGIN CONST.
-DI4- PT Sta. 12+04.068
BEARING AH = S 9° 58' 59.5" W
-DI4- PCS Sta. 11+76.344
-DI4REV- PRO Sta. 11+36.871
POT Sta. 325+00.000
-DI4- POT Sta. 12+17.001
BL-96-PINC 10+17.778
-L- POC 322+65.869
13.099 RT
-L- POT 325+70.388 14.253 RT
"NCDS WINDOW" BL-97-PINC 11+24.964 =
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 32
MATCHLINE -L- STA. 325+80 SEE SHEET NO. 34
NAD 83
METRIC
CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
33
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FOR -L- PROFILE SEE SHEET 58
FOR -DI3REV- PROFILE SEE SHEET 74
FOR -DI4REV- PROFILE SEE SHEET 75
REVISIONS
R/W REV. 11/8/05 (TMW) ; ADDED PARCEL 199A ; REVISED PROPOSED R/W ON PARCEL 199A AND 201 ; ADDED PARCEL NUMBER 236 ; MOVED ACCESS POINT FOR PARCEL 236 ; REVISED DRIVEWAYS -DI3- AND -DI4- ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/10/06 (TMW) ; REVISED PARCEL OWNER NAME & DEED BOOK INFORMATION ON PARCEL 201. ADDED PARCEL 201A.
R/W REV. 04/19/06 (TMW) ; MOVED DRIVEWAY FROM STA. 324+55 TO 324+75 ON PARCEL 236 .
DEWEY PATE, JR. DB 268 PG 355
JOEL RALPH MURPHY JOEY RANDALL MURPHY ET AL DB WPC 200
DAVID WAYNE EARLAND DB 202 PG 539
DONNA GOUGE DB 399 PG 677
BEULAH HUGHES DB 446 PG 92 DB 146 PG 329
SHERRILL McCURRY DB 438 PG 607
ALLEN O. BOONE DB 217 PG 391
OLLIS REECE BOONE DB 173 PG 482
YANCEY RAILROAD COMPANY
UNNAMED TRIB TO LITTLE CRABTREE CREEK
LITTLE CRABTREE CREEK
BERM DITCH
CUT DITCH PERM. LINED SEE DETAIL 'AH' SHEET 2-E
INLET BURIED SEE DETAIL 'AG' SHEET 2-E
PIPE OUTLET CHANNEL SEE DETAIL 'W' SHEET 2-D
REMOVE HW AND BOX
RETAIN
ACCESS POINT 18.0m
+42 BEGIN FENCE
+84 BEGIN FENCE
+55 END FENCE
+10 END FENCE
NOTE TO ROADWAY: USE 3:1 SLOPES FROM -L- STA 323+20 TO 324+40 RT
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 31



768
766
764
762
760

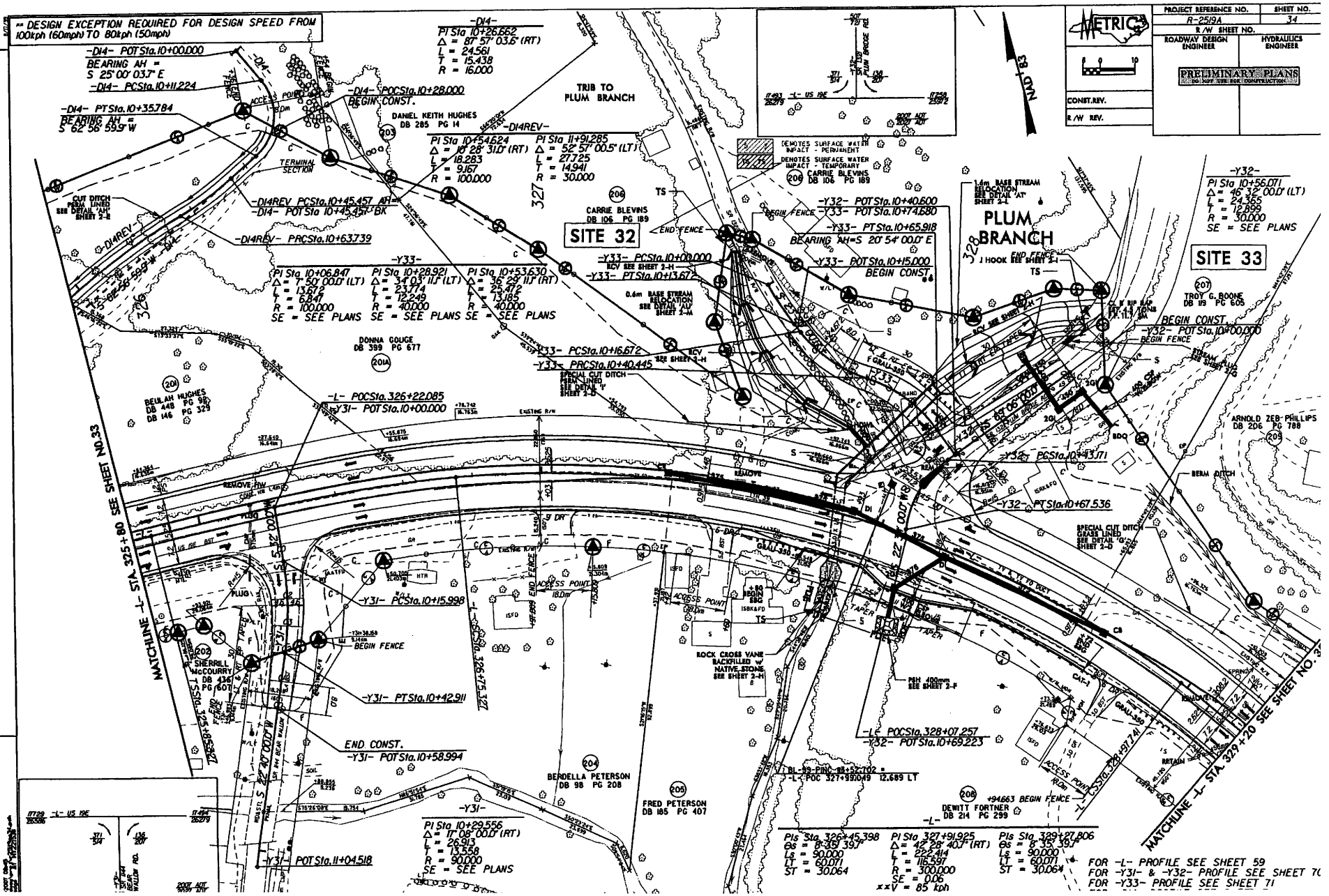
40 20 0 20 40

–L– STATION 324+50
EXTEND EXISTING 1500mm CMP
W/1500mm RCP

SITE 31
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
-D14- POT Sta. 10+00.000
BEARING AH = S 25° 00' 03.7" E
-D14- PC Sta. 10+11.224
-D14- PT Sta. 10+35.784
BEARING AH = S 62° 56' 59.9" W
-D14- PC Sta. 10+28.000 BEGIN CONST.
-D14- PI Sta 10+26.662 Δ = 87° 57' 03.6" (RT) L = 24.561 T = 15.438 R = 16.000
TRIB TO PLUM BRANCH
DANIEL KEITH HUGHES DB 285 PG 14
-D14REV- PI Sta 10+54.624 Δ = 10° 28' 31.0" (RT) L = 18.283 T = 9.167 R = 100.000
PI Sta 11+91.285 Δ = 52° 57' 00.5" (LT) L = 27.725 T = 14.941 R = 30.000
-D14REV- PC Sta. 10+45.457 AH= -D14- POT Sta 10+45.457 BK
-D14REV- PRC Sta. 10+63.739
CARRIE BLEVINS DB 106 PG 189
SITE 32
-Y33- PI Sta 10+06.847 Δ = 7° 50' 00.0" (LT) L = 13.672 T = 6.847 R = 100.000 SE = SEE PLANS
PI Sta 10+28.921 Δ = 34° 05' 11.1" (LT) L = 23.774 T = 12.249 R = 40.000 SE = SEE PLANS
PI Sta 10+53.630 Δ = 36° 29' 11.1" (RT) L = 25.472 T = 13.185 R = 40.000 SE = SEE PLANS
DONNA GOUGE DB 399 PG 677
-Y33- PC Sta. 10+16.672 RCV SEE SHEET 2-H
-Y33- PRC Sta. 10+40.445
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'F' SHEET 2-D
BEULAH HUGHES DB 448 PG 98 DB 146 PG 329
-L- POC Sta. 326+22.085
-Y31- POT Sta. 10+00.000
MATCHLINE -L- STA 325+80 SEE SHEET NO.33
REMOVE FLW
-Y31- PC Sta. 10+15.998
-Y31- PT Sta. 10+42.911
END CONST.
-Y31- POT Sta. 10+58.994
SHERRILL McCOURRY DB 436 PG 607
BEGIN FENCE
-Y31- PI Sta. 10+29.556 Δ = 17° 08' 00.0" (RT) L = 26.913 T = 13.558 R = 90.000 SE = SEE PLANS
-Y31- POT Sta. 11+04.518
BERDELLA PETERSON DB 98 PG 208
FRED PETERSON DB 185 PG 407
ROCK CROSS VANE BACKFILLED W/ NATIVE STONE SEE SHEET 2-H
-L- POC Sta. 326+75.327
-L- POC Sta. 328+07.257
-Y32- POT Sta. 10+69.223
-L- POC 327+493.049 12.689 LT
DEWITT FORTNER DB 214 PG 299
+94663 BEGIN FENCE
-L- PI Sta 326+45.398 Es = 8° 35' 39.7" Ls = 90.000 T = 60.071 ST = 30.064
PI Sta 327+91.925 Δ = 42° 28' 40.7" (RT) L = 222.414 T = 116.597 R = 300.000 SE = 0.06 xxV = 85 kph
PI Sta 329+27.806 Es = 8° 35' 39.7" Ls = 90.000 T = 60.071 ST = 30.064
FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 7
FOR -Y33- PROFILE SEE SHEET 71
MATCHLINE -L- STA. 329+20 SEE SHEET NO. 3
-Y32- PI Sta 10+56.071 Δ = 46° 32' 00.0" (LT) L = 24.356 T = 12.899 R = 30.000 SE = SEE PLANS
-Y32- POT Sta. 10+40.600
-Y33- POT Sta. 10+74.880
-Y33- PT Sta. 10+65.918
BEARING AH=S 20° 54' 00.0" E
-Y33- POT Sta. 10+15.000 BEGIN CONST.
-Y33- PT Sta. 10+13.672
1.6m BASE STREAM RELOCATION SEE DETAIL 'A1' SHEET 2-L
0.6m BASE STREAM RELOCATION SEE DETAIL 'A1/' SHEET 2-M
PLUM BRANCH
J HOOK SEE SHEET 2-I
SITE 33
TROY G. BOONE DB 119 PG 605
BEGIN CONST.
-Y32- POT Sta. 10+00.000
BEGIN FENCE
-Y32- PC Sta. 10+43.171
-Y32- PT Sta. 10+67.536
ARNOLD ZEB PHILLIPS DB 206 PG 788
BERM DITCH
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
CARRIE BLEVINS DB 106 PG 189
CUT DITCH PERM. LINED SEE DETAIL 'AA' SHEET 2-E
TERMINAL SECTION
ACCESS POINT
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201, REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A.
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 3A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS NOT FOR BID OR CONSTRUCTION
CONST. REV.
R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

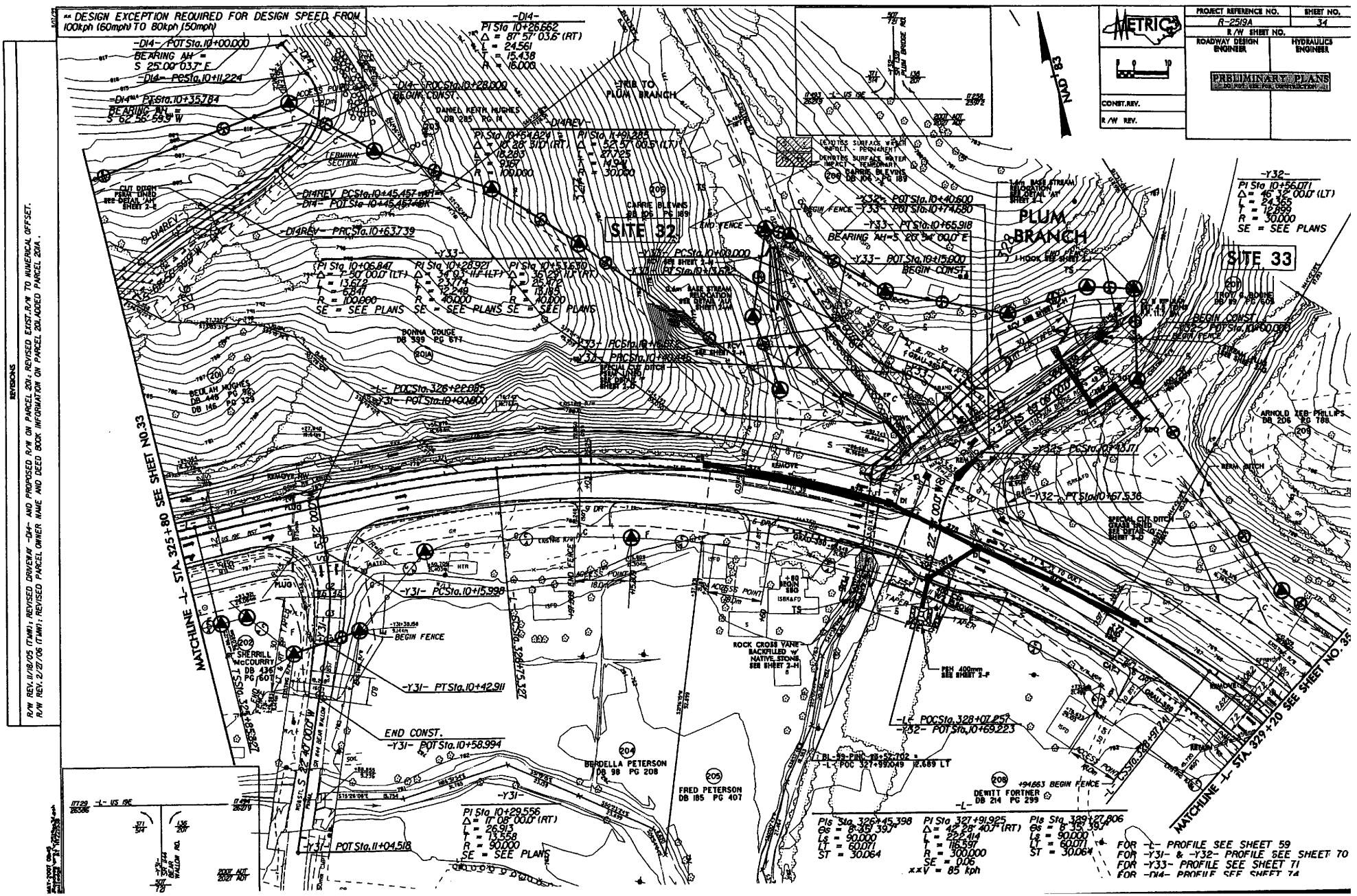
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC

CONST.REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)



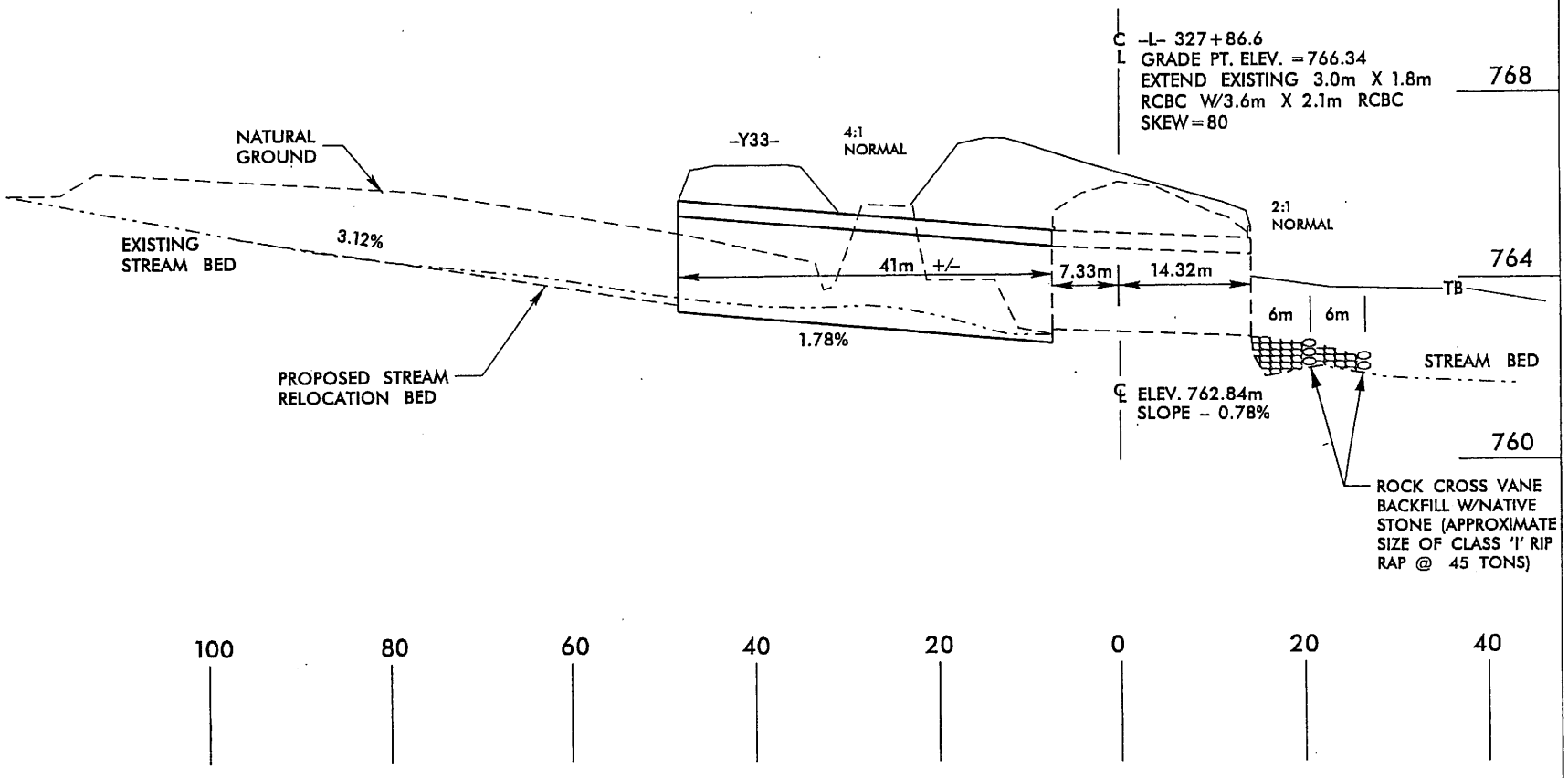
-L-

Pls Sta 326+45.398	PI Sta 327+91.925	Pls Sta 329+27.806
θs = 8°35'39.7"	Δ = 42°28'40.7" (RT)	θs = 8°35'39.7"
Ls = 90.000	L = 222.414	Ls = 90.000
LT = 60.071	T = 116.597	LT = 60.071
ST = 30.064	R = 300.000	ST = 30.064
	SE = 0.06	
	**V = 85 kph	

FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 70
FOR -Y33- PROFILE SEE SHEET 71
FOR -D14- PROFILE SEE SHEET 74

REVISIONS

R/W REV. 11/18/05 (TMM); REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMM); REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201; ADDED PARCEL 201A.



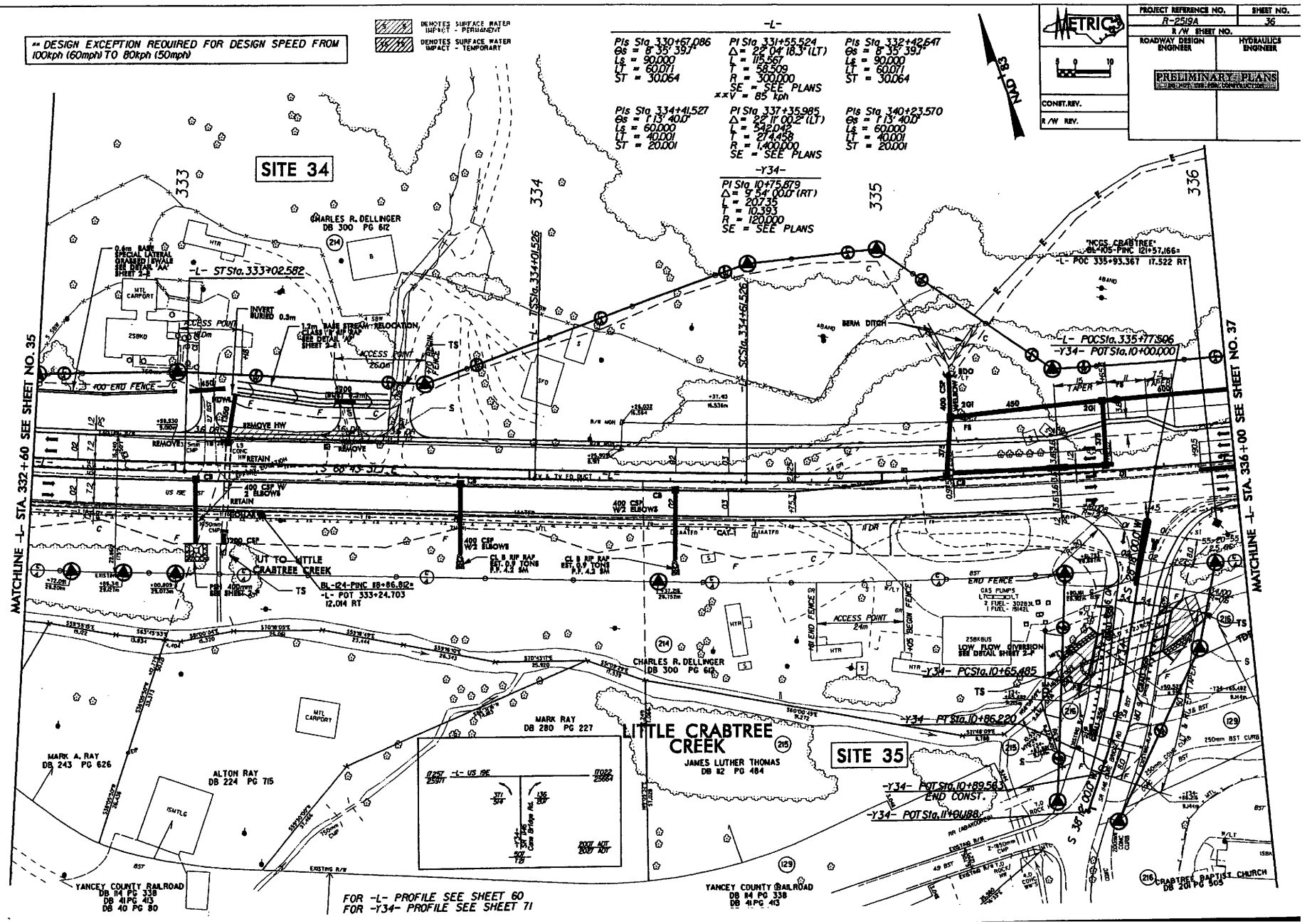
–L– STATION 327+86.6
EXTEND EXISTING 3.0m X 1.8m RCBC
W/3.6m X 2.1m RCBC WITH BAFFLES
AND LOW FLOW CHANNEL ON
EXTENSION AND IN EXISTING CULVERT

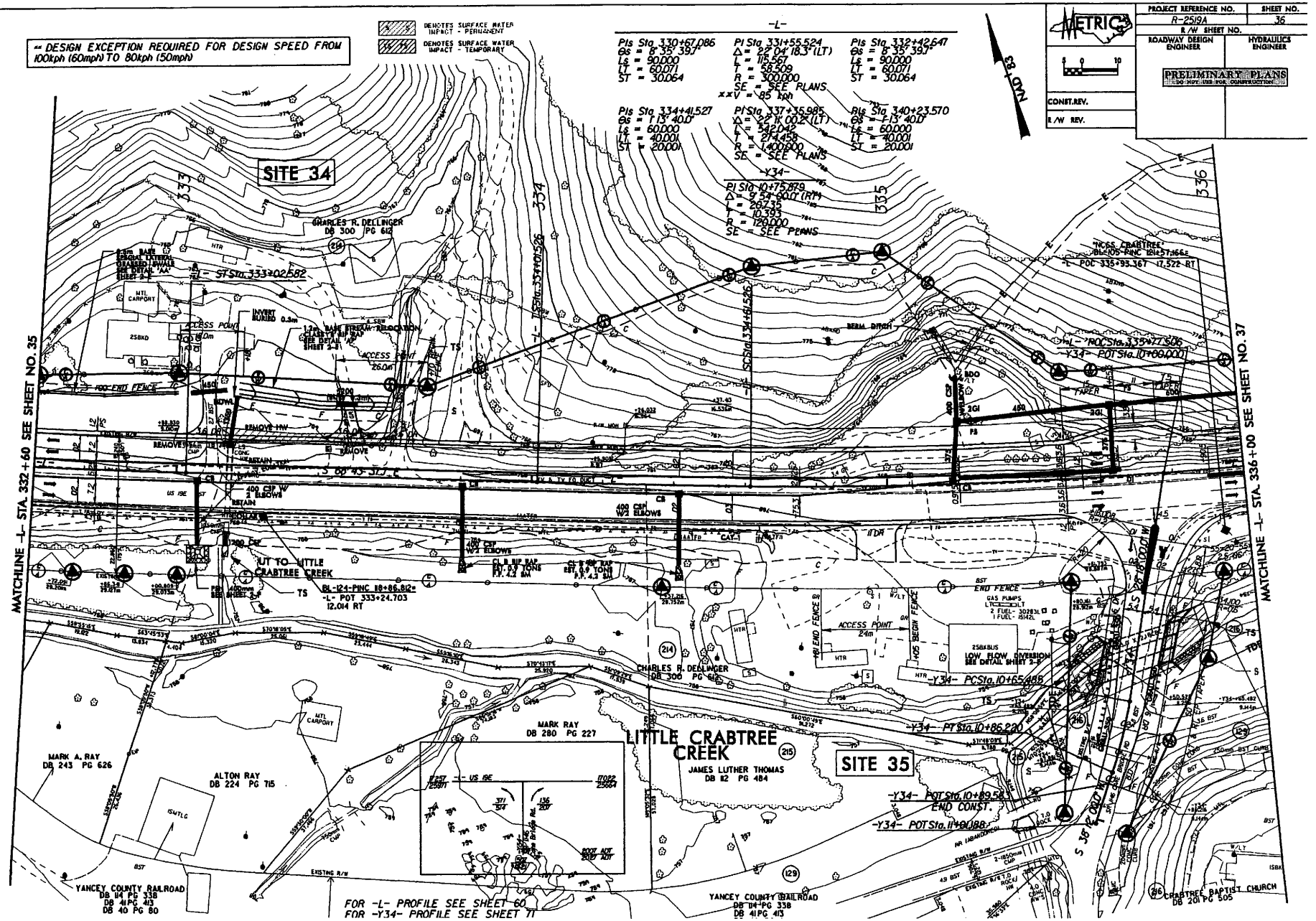
SITE 33
PROFILE VIEW

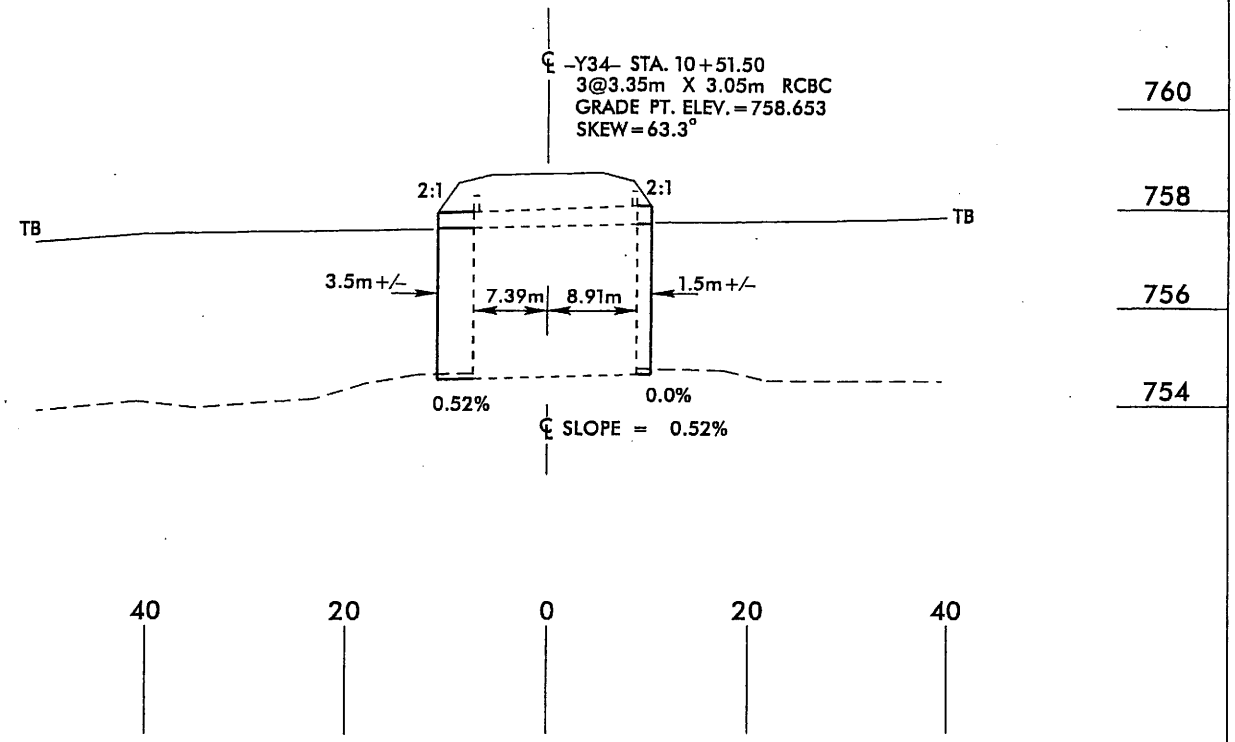
NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10 / 25 / 06


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-L-
Pls Sta 330+67.086
Os = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pl Sta 331+55.524
Δ = 22° 04' 18.3" (LT)
L = 115.567
T = 58.509
R = 300.000
SE = SEE PLANS
xxV = 85 kph
Pls Sta 332+42.647
Os = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pls Sta 334+41.527
Os = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
Pl Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 532.042
T = 274.458
R = 1,400.000
SE = SEE PLANS
Pls Sta 340+23.570
Os = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
-Y34-
Pl Sta 10+75.879
Δ = 9° 54' 00.0" (RT)
L = 207.35
T = 10.393
R = 120.000
SE = SEE PLANS
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 36
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
REVISIONS
R/W REV. 11/18/05 (TIW); REVISED DRIVEWAY & ACCESS POINT @ STA 334+93 FOR PARCEL 214 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/06 (TIW); REVISED PROPERTY LINE BETWEEN PARCELS 215 & 216 ; STA 333+50 AND 333+65 ON PARCEL 214.
R/W REV. 03/30/07 (RAP); ADDED ACCESS POINT AND TWO DRIVEWAYS AT -L- STA 333+50 ON PARCEL 214.
SITE 34
SITE 35
MATCHLINE -L- STA. 332+60 SEE SHEET NO. 35
MATCHLINE -L- STA. 336+00 SEE SHEET NO. 37
CHARLES R. DELLINGER DB 300 PG 612
-L- STSta.333+02.582
-L- TSSta.334+01.526
-L- SCSta.334+61.526
"NCGS CRABTREE" BL-105-PINC 121+57.166= -L- POC 335+93.367 17.522 RT
-L- POCSta.335+77.506
-Y34- POTSta.10+00.000
-Y34- PCSta.10+65.485
-Y34- PTSta.10+86.220
-Y34- POTSta.10+89.563 END CONST.
-Y34- POTSta.11+01.188
UT TO LITTLE CRABTREE CREEK
BL-124-PINC 88+86.82= -L- POT 333+24.703 12.014 RT
LITTLE CRABTREE CREEK
JAMES LUTHER THOMAS DB 82 PG 484
MARK RAY DB 280 PG 227
MARK A. RAY DB 243 PG 626
ALTON RAY DB 224 PG 715
YANCEY COUNTY RAILROAD DB 114 PG 338 DB 41 PG 413 DB 40 PG 80
YANCEY COUNTY RAILROAD DB 114 PG 338 DB 41 PG 413
CRABTREE BAPTIST CHURCH DB 201 PG 505
FOR -L- PROFILE SEE SHEET 60
FOR -Y34- PROFILE SEE SHEET 71


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-L-
Pls Sta 330+67.086
Es = 8 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pl Sta 331+55.524
Δ = 22 04' 18.3" (LT)
L = 115.567
T = 58.509
R = 300.000
SE = SEE PLANS
xxV = 85 kph
Pls Sta 332+42.647
Es = 8 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pls Sta 334+41.527
Es = 113' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
Pl Sta 337+35.985
Δ = 22 11' 00.2" (LT)
L = 342.042
T = 174.458
R = 1,400.000
SE = SEE PLANS
Pls Sta 340+23.570
Es = 113' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
-Y34-
Pl Sta 10+75.879
Δ = 9 59' 00.0" (RT)
L = 209.735
T = 104.993
R = 1200.000
SE = SEE PLANS
NAD 83
METRIC
CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
36
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
R/W REV. 1/18/05 (TJW) ; REVISED DRIVEWAY & ACCESS POINT @ STA.334+93 FOR PARCEL 214 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/05 (TJW) ; REVISED PROPERTY LINE BETWEEN PARCELS 215 & 216 .
R/W REV. 03/30/07 (RVP) ; ADDED ACCESS POINT AND TWO DRIVEWAYS AT -L- STA.333+50 AND 333+65 ON PARCEL 214.
SITE 34
SITE 35
MATCHLINE -L- STA. 332+60 SEE SHEET NO. 35
MATCHLINE -L- STA. 336+00 SEE SHEET NO. 37
-L- STSta.333+02.582
-L- TSSta.334+01.526
-L- SCSta.334+61.526
-L- POC 335+93.367 17.522 RT
-L- PRCSta.335+27.506
-Y34- POTSta.10+00.000
-Y34- PCSta.10+65.465
-Y34- PTSta.10+86.230
-Y34- POTSta.10+89.582
END CONST.
-Y34- POTSta.11+90.188
CHARLES R. DELLINGER DB 300 PG 612
MARK RAY DB 280 PG 227
MARK A. RAY DB 243 PG 626
ALTON RAY DB 224 PG 715
JAMES LUTHER THOMAS DB 82 PG 484
LITTLE CRABTREE CREEK
UT TO LITTLE CRABTREE CREEK
YANCEY COUNTY RAILROAD DB 14 PG 338 DB 41 PG 413 DB 40 PG 80
CRABTREE BAPTIST CHURCH DB 201 PG 505
BL-124-PINC 18+86.812+ -L- POT 333+24.703 12.014 RT
"HICKS CRABTREE" BL-105-PINC 18+57.366± -L- POC 335+93.367 17.522 RT
ACCESS POINT 26.0m
ACCESS POINT 24m
BERM DITCH
REMOVE HW
REMOVE W/L
REMOVE CONC
RETAIN
400 CSP W/ 2 ELBOWS
CB
DROP INLET
END FENCE
GAS PUMPS
2 FUEL- 3028L
1 FUEL- IS142L
250KBLIS LOW FLOW DIVERSION SEE DETAIL SHEET 2-F
MTL CARPORT
FOR -L- PROFILE SEE SHEET 60
FOR -Y34- PROFILE SEE SHEET 71

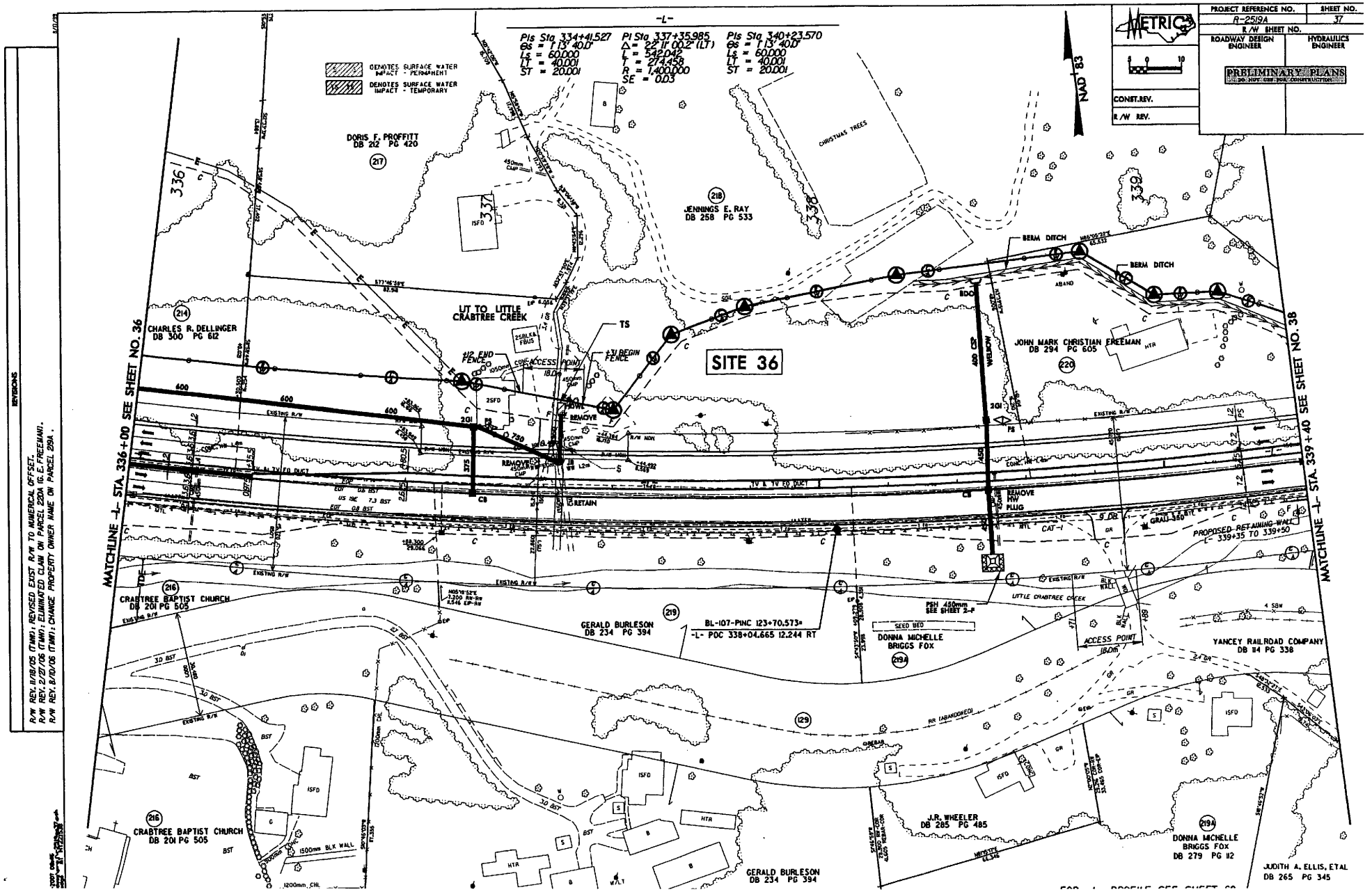


-Y34- STATION 10+51.50
3 @ 3.35m X 3.05m RCBC

SITE 35
PROFILE VIEW

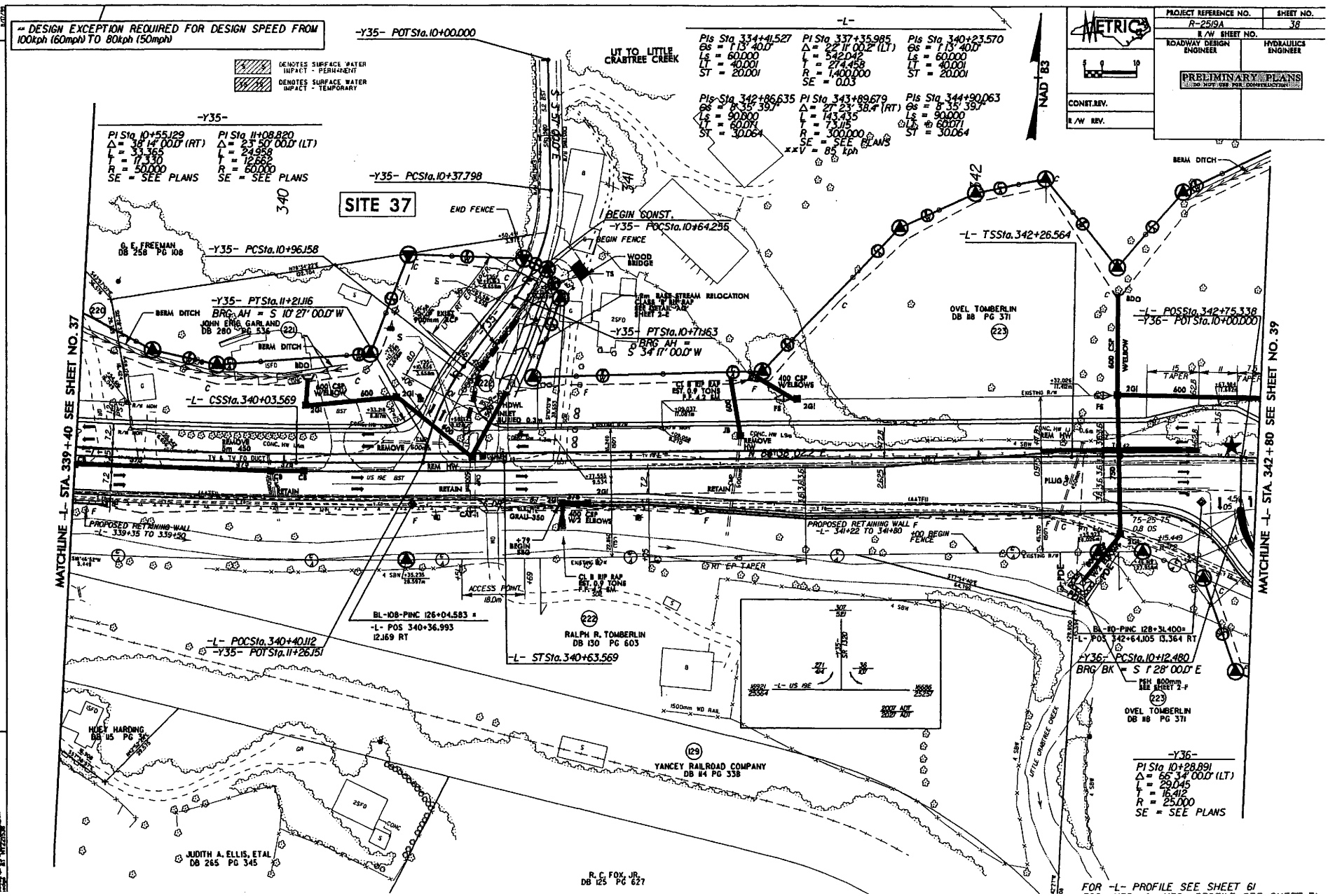
NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

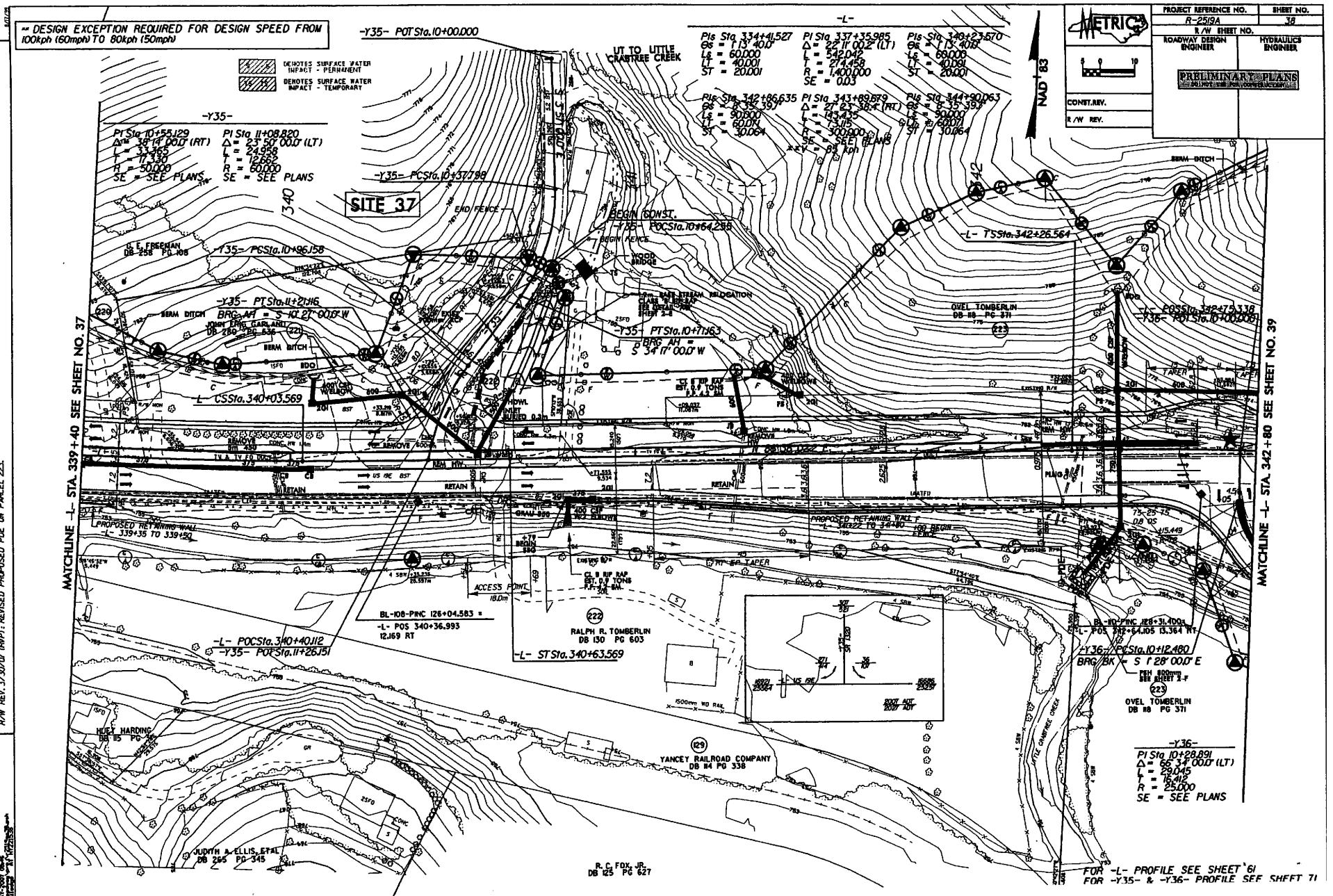
10 / 25 / 06

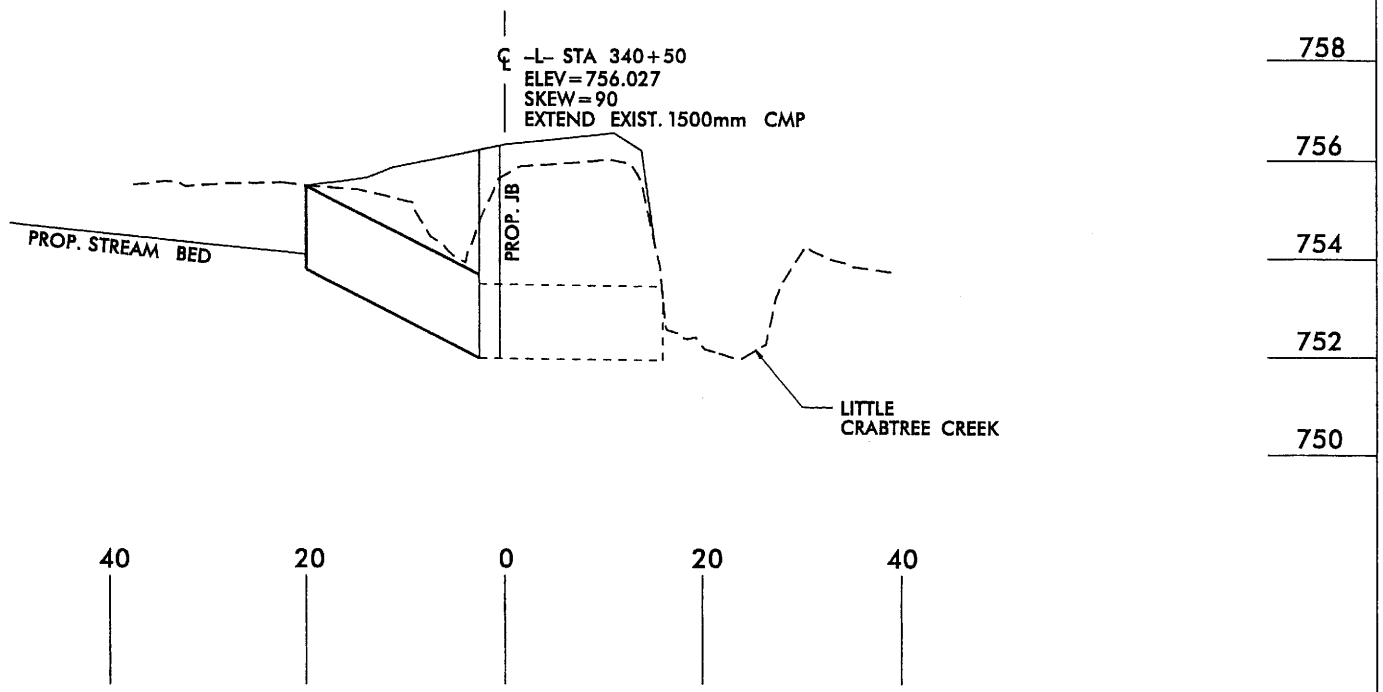

REVISIONS
R/W REV. 11/18/05 (TMH); REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMH); ELIMINATED CLAIM ON PARCEL 220A (G.E. FREEMAN).
R/W REV. 8/10/06 (TMH); CHANGE PROPERTY OWNER NAME ON PARCEL 218A.
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
37
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST.REV.
R/W REV.
NAD '83
-L-
Pls Sta 334+41.527
Gs = 1 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
PI Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = 0.03
Pls Sta 340+23.570
Gs = 1 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
SITE 36
MATCHLINE -L- STA. 336+00 SEE SHEET NO. 36
MATCHLINE -L- STA. 339+40 SEE SHEET NO. 38
DORIS F. PROFFITT DB 212 PG 420
JENNINGS E. RAY DB 258 PG 533
CHARLES R. DELLINGER DB 300 PG 612
JOHN MARK CHRISTIAN FREEMAN DB 294 PG 605
CRABTREE BAPTIST CHURCH DB 201 PG 505
GERALD BURLESON DB 234 PG 394
DONNA MICHELLE BRIGGS FOX
YANCEY RAILROAD COMPANY DB 114 PG 338
J.R. WHEELER DB 285 PG 485
DONNA MICHELLE BRIGGS FOX DB 279 PG 112
JUDITH A. ELLIS, ETAL DB 265 PG 345
UT TO LITTLE CRABTREE CREEK
LITTLE CRABTREE CREEK
BERM DITCH
PROPOSED RETAINING WALL L- 339+35 TO 339+50
BL-107-PINC 123+70.573
-L- POC 338+04.665 12.244 RT
CHRISTMAS TREES
RR (ABANDONED)
ACCESS POINT
REMOVE
REMOVE PIPE PLUG
RETAIN
TS
SC
CS
ST
336
337
338
339

REVISIONS

R/W REV. 11/18/05 (TWM): REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TWM): ELIMINATED CLAIM ON PARCEL 220A (G. E. FREEMAN).
R/W REV. 8/10/06 (TWM): CHANGE PROPERTY OWNER NAME ON PARCEL 219A.


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
-Y35- POT Sta. 10+00.000
-Y35-
PI Sta 10+55.129
Δ = 38° 14' 00.0" (RT)
L = 33.365
T = 17.330
R = 50.000
SE = SEE PLANS
PI Sta 11+08.820
Δ = 23° 50' 00.0" (LT)
L = 24.958
T = 12.682
R = 60.000
SE = SEE PLANS
-Y35- PC Sta. 10+37.798
-Y35- PC Sta. 10+96.158
-Y35- PT Sta. 11+21.116
BRG AH = S 10° 27' 00.0" W
-L- CS Sta. 340+03.569
-L- POC Sta. 340+40.112
-Y35- POT Sta. 11+26.151
-L- ST Sta. 340+63.569
-L-
PI Sta 334+41.527
Δs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
PI Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = 0.03
PI Sta 340+23.570
Δs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001
PI Sta 342+86.635
Δs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
PI Sta 343+89.679
Δ = 27° 23' 38.4" (RT)
L = 143.435
T = 73.115
R = 300.000
SE = SEE PLANS
xxV = 85 kph
PI Sta 344+90.063
Δs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
NAD 83
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
38
R /W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST. REV.
R /W REV.
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); ELIMINATED CLAIM AND PARCEL 220A (G.E. FREEMAN); REVISED R/W ON PARCEL 220.
R/W REV. 3/30/07 (RVP); REVISED PROPOSED PDE ON PARCEL 223.
SITE 37
340
341
342
END FENCE
BEGIN CONST.
BEGIN FENCE
WOOD BRIDGE
UT TO LITTLE CRABTREE CREEK
8m BASE-STREAM RELOCATION
CLASS 'B' RIP-RAP SEE DETAIL-A/D SHEET 2-E
G. E. FREEMAN DB 258 PG 108
JOHN ERIC GARLAND DB 280 PG 536
BERM DITCH
OVEL TOMBERLIN DB 118 PG 371
-L- TS Sta. 342+26.564
-L- POS Sta. 342+75.338
-Y36- POT Sta. 10+00.000
MATCHLINE -L- STA. 339+40 SEE SHEET NO. 37
MATCHLINE -L- STA. 342+80 SEE SHEET NO. 39
-L- CS Sta. 340+03.569
REMOVE 600mm
400 CSP W/ELBOW
CL B RIP RAP EST. 0.9 TONS P.F. 4.5 SY
HDWL MIST BURIED 0.3m
PROPOSED RETAINING WALL -L- 339+35 TO 339+50
PROPOSED RETAINING WALL F -L- 341+22 TO 341+80
+00 BEGIN FENCE
+70 BEGIN FENCE
ACCESS POINT
18.0m
BL-108-PINC 126+04.583 ±
-L- POS 340+36.993
12.69 RT
RALPH R. TOMBERLIN DB 130 PG 603
BL-80-PINC 128+34.400±
-L- POS 342+64.105 13.364 RT
-Y36- PC Sta. 10+12.480
BRG BK = S 1° 28' 00.0" E
-Y36-
PI Sta 10+28.891
Δ = 66° 34' 00.0" (LT)
L = 29.045
T = 16.412
R = 25.000
SE = SEE PLANS
-L- US 19E
2007 ADT
2030 ADT
YANCEY RAILROAD COMPANY DB 114 PG 338
HUEY HARDING DB 115 PG 74
JUDITH A. ELLIS, ETAL DB 265 PG 345
R. C. FOX, JR. DB 125 PG 627
LITTLE CRABTREE CREEK
FOR -L- PROFILE SEE SHEET 6I


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
METRIC
NAD '83
PROJECT REFERENCE NO. R-2519A
SHEET NO. 38
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
CONST. REV.
R/W REV.
-Y35- POT Sta. 10+00.000
-Y35- PCS Sta. 10+37.798
-Y35- PCS Sta. 10+64.295
-Y35- PCS Sta. 10+96.158
-Y35- PT Sta. 11+21.116
-Y35- PT Sta. 10+71.163
-L- CSS Sta. 340+03.569
-L- TSS Sta. 342+26.564
-L- SCS Sta. 342+75.338
-Y35- POT Sta. 10+00.000
-L- POC Sta. 340+40.112
-Y35- POT Sta. 11+26.151
-L- ST Sta. 340+63.569
-Y36- PCS Sta. 10+12.480
BRG BK = S 1° 28' 00.0" E
-Y36-
PI Sta 10+28.891
Δ = 66° 34' 00.0" (LT)
L = 29.045
T = 16.412
R = 25.000
SE = SEE PLANS
PI Sta 10+55.129
Δ = 38° 14' 00.0" (RT)
L = 33.365
T = 17.330
R = 50.000
SE = SEE PLANS
PI Sta 11+08.820
Δ = 23° 50' 00.0" (LT)
L = 24.958
T = 12.662
R = 60.000
SE = SEE PLANS
PI Sta 334+41.527
Δ = 13° 40.0' (LT)
Ls = 60.000
L = 40.001
ST = 20.001
PI Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = 0.03
PI Sta 339+23.570
Δ = 13° 40.0' (LT)
Ls = 60.000
L = 40.001
ST = 20.001
PI Sta 342+86.635
Δ = 8° 35' 39.7" (RT)
Ls = 90.000
L = 143.435
T = 71.915
R = 600.000
SE = SEE PLANS
PI Sta 343+89.879
Δ = 27° 23' 38.4" (RT)
Ls = 90.000
L = 143.435
T = 73.115
R = 300.000
SE = SEE PLANS
PI Sta 344+90.063
Δ = 8° 35' 39.7" (RT)
Ls = 90.000
L = 60.001
ST = 30.064
SITE 37
BEGIN CONST.
BEGIN FENCE
END FENCE
WOOD BRIDGE
BARE STREAM RELOCATION
BERM DITCH
MATCHLINE -L- STA. 339+40 SEE SHEET NO. 37
MATCHLINE -L- STA. 342+80 SEE SHEET NO. 39
PROPOSED RETAINING WALL E
-L- 339+35 TO 339+50
PROPOSED RETAINING WALL F
-L- 340+22 TO 341+80
ACCESS POINT
18.0m
BL-108-PINC 126+04.583
-L- POS 340+36.993
12.169 RT
BL-101-PINC 128+31.400
-L- POS 341+64.105 13.364 RT
RALPH R. TOMBERLIN DB 130 PG 603
OVEL TOMBERLIN DB 118 PG 371
YANCEY RAILROAD COMPANY DB 114 PG 338
G. E. FREEMAN DB 258 PG 108
JOHN EARL CARLAND DB 280 PG 536
HUEY HARDING DB 115 PG 76
JUDITH A. ELLIS, ETAL DB 255 PG 345
R. C. FOX, JR. DB 125 PG 627
TITLE CHAIRMEE CREEK
UT TO LITTLE CRABTREE CREEK
FOR -L- PROFILE SEE SHEET 6I
FOR -Y35- & -Y36- PROFILE SEE SHEET 7I
REVISIONS
R/W REV. 11/18/05 (TJW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TJW): ELIMINATED CLAIM AND PARCEL 220A (G. E. FREEMAN); REVISED R/W ON PARCEL 221.
R/W REV. 3/30/07 (RPP): REVISED PDE ON PARCEL 221.



–L– STATION 340+50
EXTEND EXISTING 1500mm CMP
W/1500mm RCP

SITE 37
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10 / 25 / 06