



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT. L. MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

August 28, 2014

MEMORANDUM TO: Mr. Jay Swain, P.E.  
Division 13 Engineer

FROM: *for* Philip S. Harris, III, P.E., Section Head *CAH*  
Natural Environment Section  
Project Development and Environmental Analysis Unit

SUBJECT: Yancey and Mitchell Counties; US19E Widening from SR 1186  
in Yancey County to multilane section west of Spruce Pine in  
Mitchell County; State Project 6.909001T; WBS No. 35609.1.1;  
**TIP No. R-2519B**

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

A copy of this permit package will be posted on the NCDOT website at:  
<https://connect.ncdot.gov/resources/Environmental>, under *Quick Links > Issued Permits*

cc: w/o attachment (see website for attachments):

Mr. Randy Garris, P.E. State Contract Officer  
Mr. Roger Bryan, Division Environmental Officer  
Dr. Majed Al-Ghandour, P.E., Programming and TIP  
Mr. Glenn Mumford, P.E., Roadway Design Unit  
Mr. Robert Memory, Utilities Unit  
Mr. Andrew Nottingham, P.E., Hydraulics Unit  
Mr. Tom Koch, P.E., Structure Design Unit  
Mr. Mark Staley, Roadside Environmental Unit  
Mr. Ron Hancock, P.E., State Roadway Construction Engineer  
Mr. Mike Robinson, P.E., State Bridge Construction Engineer  
Ms. Jennifer Harris, P.E., Project Development and Environmental Analysis  
Mr. Anthony Summitt, TVA  
Ms. Beth Harmon, EEP  
Mr. Phillip Ayscue, Office of Inspector General

## PROJECT COMMITMENTS

### US 19E Improvements

From SR 1186 in Micaville to the existing multilane section west of Spruce Pine  
Yancey and Mitchell Counties

WBS Element 35609.1.1      State Project Number 6.909001T

**TIP Project Number: R-2519B**

*Note: Updates for commitments during design appear in Italics below.*

## COMMITMENTS FROM PROJECT DEVELOPMENT AND DESIGN

### Project Development and Environmental Analysis Branch

- Additional surveys are needed for the federally protected Virginia Spiraea. The effect of the proposed action this species will be identified in the project final environmental document.
- Additional surveys for the Virginia Spiraea were performed in June 2006. No plants were found in the project vicinity. A biological conclusion of “No Effect” was rendered by NCDOT and concurred upon by the US Fish and Wildlife Service. This State Finding of No Significant Impact is the final environmental document on the proposed action.
- Virginia spiraea will be resurveyed in summer 2012.  
*A Virginia spiraea survey was conducted on July 3, 2012, with no specimens found.*
- The improvements to US 19E will have an adverse effect on archaeological sites 31YC31 and 31YC183. Data Recovery Plans to recover archaeological materials for analysis and interpretation of the occupation of the sites will be drawn-up by the Project Development and Environmental Analysis (PDEA) Branch. Additionally, the Human Environment Unit of PDEA will coordinate with the US Army Corps of Engineers to develop a Memorandum of Agreement (MOA) concerning mitigation for archaeological sites 31YC31 and 31YC183. The recovery plans and the MOA will be completed prior to project letting.
- *Data recovery on archaeological sites 31YC31 and 31YC183 will be completed prior to the project letting. No portion of the archaeological sites, 31YC31 or 31YC183, outside of the project APE (Area of Potential Effect), will be used for parking or for assembly areas during the construction of this project.*
- NCDOT-PDEA will also coordinate with the Tribal Historic Preservation Officer to develop a Memorandum of Agreement (MOA) concerning mitigation for archaeological sites 31YC31 and 31YC183. *This has been done. No MOA with the Eastern Band of the Cherokee Indians was necessary.*
- *Although no Native American burials heretofore have been identified at site 31CY31, consideration, study and excavation of any identified burials will be established in consultation with signatories to the MOA, at such time as they are encountered and will follow NCGS Chapter 70, Article 3, regarding “Unmarked Human Burial and Human Skeletal Remains Protection Act.”*

### Project Development and Environmental Analysis Branch

- The NCDOT will put forth its best effort to suppress the Japanese Knotweed population within the project limits, with the use of aquatic labeled glyphosate; but it cannot guarantee the eradication of the species using this method. Additionally, the construction contract(s) for this project will



stipulate that any knotweed material disturbed through construction activities at the two bridge sites, as well as in identified mitigation sites, will be buried within the project boundaries in fill or waste areas, below the depth of the topsoil.

### **Project Development and Environmental Analysis Branch, Right-of-Way Branch and Division 13**

- The Human Environment Unit will provide the Right-of-Way Branch with notification of the prepared archaeological Data Recovery Plans, so they may acquire parcels that contain eligible sites, as soon as possible after right-of-way authorization. Acquisition of these parcels will occur at least 12 months prior to the let date. No construction activities will be allowed within either site limits, until the data recovery investigations are completed.
- These parcels have been marked as “culturally sensitive” on the project roadway plans. Notify the PDEA Human Environment Unit Archaeology Group once the NCDOT Right-of-Way Office has acquired the parcels containing archaeological sites.  
*This has occurred.*

### **Roadway Design Unit**

- The improvements to US 19E will have an effect on the National Register eligible E. W. and Dollie Huskins House (Roadway Station 220+00). The proposed design will include a seeded slope that is feasible for mowing by the owner.
- The Roadway Design Unit will coordinate with the Human Environment Unit (HEU) – Archaeology to accurately depict archaeological sites on the final design plans. If design modifications are required, the Roadway Design Unit will contact and coordinate with the HEU – Archaeology.  
*This has occurred.*

### **Roadway Design Unit, Hydraulic Design Unit and Roadside Environmental Unit**

- The proposed project is located within a critical habitat area for the federally protected Appalachian Elktoe Mussel. Therefore, the NCDOT will implement erosion and sedimentation control measures, as specified by NCDOT’s “Design Standards in Sensitive Watersheds,” (15A NCAC 04B.0124 (a)-(e)). Detailed plans for the placement of appropriate hydraulic drainage structures will be determined during the final design of the project.
- Two Concurrence Point 4B Meetings (Hydraulic Design Review) were held with Merger Process Team Members on July 22, 2009, and on September 23, 2009, to review the layout of the proposed drainage structures and stormwater BMP designs for the project. A subsequent field meeting was held with Merger Process Team Members on June 28, 2011, to review bridge alternatives for the South Toe River bridge crossing. As a result of this meeting, the Merger Process Team agreed to investigate another bridge alternative at this location, to further minimize impacts to the federally protected Appalachian Elktoe Mussels. A follow-up meeting to discuss the additional proposed bridge design alternative and to concur on a final bridge design alternative is anticipated to occur in the fall or winter of 2011.

*Follow-up meetings occurred on June 20, 2012, and on August 22, 2012, at which time the Merger Process Project Team agreed on a concrete girder bridge arrangement, with three spans of 100, 140 and 75 feet in length. A follow-up merger process team meeting was held in the field on November 15, 2012, at the site of the South Toe River crossing, during which time the mussel habitat and the proposed bridge alignment were located. Mitigation efforts, constructability and erosion control issues were discussed and agreed upon.*

- On the previous sections of this corridor, (Projects R-2518A & R-2518B), for the commitment for “Design Standards in Sensitive Watersheds,” the North Carolina Department of the Environment and Natural Resources, Division of Water Quality (NCDENR-DWQ) has granted NCDOT an exemption from part (a) of the “Design Standards in Sensitive Watersheds,” referenced above. Part (a) restricts the amount of “uncovered acres” at any one time, to 20 acres. Due to the nature of our construction processes for a project of this magnitude, this restriction is impractical for NCDOT. NCDOT will apply for a similar exemption to part (a) on this project for construction.

### **Division 13**

- In-stream work and land disturbance within the 25-foot wide trout stream buffer zone should be prohibited during the trout spawning season of October 15-April 15, to protect the egg and fry stages of trout from off-site sedimentation during construction.

Updated trout moratoriums for this project include:

- Big Crabtree Creek (& UTs) – October 15 to April 15
- Brushy Creek (& UTs) – January 1 to April 15
- Long Branch (& UTs) - January 1 to April 15
- ~~South Toe River Mussel spawning moratorium April 1 to June 30~~
- Little Crabtree Creek (& UTs) – January 1 to April 15

*The South Toe River mussel spawning moratorium was rescinded by NCWRC via email on July 18, 2013 and by USFWS via email on July 9, 2013. (Both emails are attached)*

### **Hydraulic Design Unit**

- Coordinate with the Federal Emergency Management Agency and local authorities in the final design stage, to ensure compliance with applicable floodplain ordinances.
- The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), to determine status of project with regard to applicability of NCDOT’S Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

### **Division 13**

- This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

### **Structure Design Unit**

- A TVA Section 26a permit or wavier is required for all proposed obstructions involving streams or floodplains in the Tennessee River drainage basin. This permit or wavier will be obtained prior to project construction. The TVA is a cooperating agency for this project.

## **COMMITMENTS FROM PERMITTING**

### **Natural Environment Unit/Division 13**

From the 404 Individual Permit – Special Conditions

#### **WORK LIMITS**

- 1) All work authorized by this permit must be performed in strict compliance with the attached plans (Wetland/Surface Water Permit Drawings) titled “TIP Project: R-2519B,” Sheets 1-114, to include the revisions of October 2013, which are a part of this permit. Any modification to these plans must be approved by the U.S. Army Corps of Engineers (USACE) prior to implementation.
- 2) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- 3) Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.
- 4) The permittee shall schedule a pre-construction meeting between their representatives, the contractor, and the USACE, Wilmington District, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work in jurisdictional waters of the U.S. 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 (2) 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 USACE and the North Carolina Division of Water Resources (NCDWR) Project Managers can attend. The permittee shall notify the USACE and NCDWR Project Managers a minimum of thirty (30) days in advance of the meeting.
- 5) The permittee shall advise the USACE in writing at least two (2) weeks prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

## **RELATED LAWS**

6) The permittee shall fully implement and abide by all stipulations identified in the Memorandum of Agreement titled “Memorandum of Agreement Between the Department of the Army, Corps of Engineers and the State Historic Preservation Officer for US 19E Improvements to a Multilane Facility between Micaville and Spruce Pine Yancy (*sic*) and Mitchell Counties, North Carolina Transportation Improvement Project R-2519B,” signed June 2012, which is incorporated herein by reference.

7) NCDOT shall comply with its commitments regarding the National Register eligible E.W. and Dollie Huskins House. The final design shall include a seeded slope that is feasible for mowing/is maintainable by the property owner.

8) If the permittee discovers any previously unknown historic or archaeological sites while accomplishing the authorized work, he shall immediately stop work and notify the USACE, Asheville Regulatory Field Office NCDOT Regulatory Project Manager who will initiate the required State/Federal coordination.

9) This USACE permit does not authorize you to take an endangered species, in particular, the Appalachian elktoe mussel (*Alasmidonta raveneliana*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., a Biological Opinion under the ESA, Section 7, with “incidental take” provisions with which you must comply). The U.S. Fish and Wildlife Service’s (USFWS’s) Biological Opinion, dated March 14, 2008, and amended on January 9, 2009, and August 1, 2013 (collectively referred to hereinafter as BO), contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with “incidental take” that is specified in the BO. Your authorization under this USACE permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your USACE permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

### ***Biological Opinions are attached***

10) NCDOT will conduct winter tree cutting between August 15 and April 15 (of any year) as an avoidance measure for the Northern Long-eared Bat (*Myotis septentrionalis*). Any felled trees that are not part of an active work area during this time shall be left in place until clearing, grubbing and seeding can commence after April 15. Any winter tree cutting conducted in a trout buffer will be cut by hand only and the felled trees will be left in place until the trout moratorium has ended (after April 15 of any year). Within the trout buffer area, dropping trees into the stream must be avoided whenever possible. This condition is project specific and



applies only to the R-2519B, US 19E Widening Project in Yancey and Mitchell Counties of North Carolina.

11) All necessary precautions and measures will be implemented so that any activity will not kill, injure, capture, harass, or otherwise harm any protected federally listed species. While accomplishing the authorized work, if the permittee discovers or observes a damaged or hurt listed endangered or threatened species, the USACE Wilmington District Engineer will be immediately notified to initiate the required Federal coordination.

12) The permittee will comply with all conditions in the attached letter from the North Carolina Wildlife Resources Commission, dated September, 11, 2007, with the exceptions of the in-water work moratorium for the South Toe River and tree removal activities, as long as tree removal activities are conducted in accordance with Special Condition 10 of these conditions. Additionally, the permittee will comply with the moratoria detailed in the WRC letter dated July 19, 2007, for all streams in the R-2519B project corridor, with the exceptions of the in-water work moratorium for the South Toe River and tree removal activities, as long as tree removal activities are conducted in accordance with Special Condition 10 of these conditions. Within the trout buffer area, dropping trees into the stream must be avoided whenever possible.

13) The North Carolina Division of Water Resources has issued a conditioned Water Quality Certification for this project. The conditions of that certification are hereby incorporated as special conditions of this permit. A copy of this certification is attached.

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

### **PROJECT MAINTENANCE**

15) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act.

16) All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Resources at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

17) The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.

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

19) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit.

20) The permittee shall implement Design Standards in Sensitive Watersheds throughout the project corridor. 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. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

21) The permittee shall ensure that all excavation and/or construction areas in waters of the U.S. are temporarily dewatered during work.

22) Prior to commencing construction within jurisdictional waters of the U.S. for any portion of the project, the permittee shall forward the latest version of project construction drawings to the USACE, Asheville Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings will be acceptable.

23) 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 non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

24) The permittee shall take measures to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the

U.S. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

25) Unless otherwise requested in the application and depicted on the approved work plans, culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert must be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Destabilizing the channel and head cutting upstream should be considered in the placement of the culvert.

26) Measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

27) To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as the permittee has that information. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any streams or wetlands.

28) 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. 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.

29) The permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective

measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the USACE.

30) As noted in the Project Commitments for this project, the permittee will put forth its best effort to suppress the Japanese Knotweed population within the project limits, with the use of aquatic labeled glyphosate. Additionally, the construction contract(s) for this project will stipulate that any knotweed material disturbed through construction activities at the two bridge sites, as well as in identified mitigation sites, will be buried within the project boundaries in fill or waster areas, below the depth of topsoil.

31) Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

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

33) All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager (Division 13), 151 Patton Avenue, Room 208, Asheville, NC 28801-5006, and by telephone at: (828) 271-7980. The Permittee shall reference the following permit number, SAW-2004-9987181/ 2004-30631, TIP No. R-2519B, on all submittals.

### **COMPENSATORY MITIGATION**

34) The Permittee shall fully implement the compensatory mitigation plan titled "Mitigation Plan, US 19E Widening, Yancey & Mitchell Counties, North Carolina, T.I.P. Number R-2519, WBS No. 35609.1.1, May 6, 2013 (Revised November 4, 2013)," in order to compensate for a portion of the unavoidable impacts to waters of the U.S. associated with this project. Activities prescribed by this plan shall be initiated prior to, or concurrently with, commencement of any construction activities within jurisdictional areas authorized by this permit. The permittee shall conduct all mitigation and monitoring activities in accordance with the above referenced plan and with the following conditions:

- a) As the permittee, NCDOT is the party responsible for the implementation, performance and long term management of the on-site compensatory mitigation project.
- b) Any changes or modifications to the mitigation plan must be approved by the USACE.



- c) The permittee shall maintain the entire mitigation site in its natural condition, as altered by the work in the mitigation plan, in perpetuity. Prohibited activities within the mitigation site specifically include, but are not limited to: filling; grading; excavating; earth movement of any kind; construction of roads, walkways, buildings, signs, or any other structure; any activity that may alter the drainage patterns on the property; the destruction, cutting, removal, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage, trash, debris or other waste material; graze or water animals, or use for any agricultural or horticultural purpose; or any other activity which would result in the property being adversely impacted or destroyed, except as specifically authorized by this permit.

35) The permittee shall not sell or otherwise convey any interest in the mitigation property used to satisfy the mitigation requirements for this permit to any third party, without written approval from the Wilmington District USACE.

36) In order to compensate for a portion of the impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.

### **ENFORCEMENT**

37) A representative of the USACE will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the USACE.

38) Violation of these conditions or violation of Section 404 of the Clean Water Act of Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District USACE within 24 hours of the permittee's discovery of the violation.

### **Division 13**

Prosecution of work:

The Contractors attention is directed to the fact that there are specific Permit requirements included in this contract that sets specific time frames for the construction, demolition, and completion of the structures located over the South Toe River on US 19, station XX+XX. At the Preconstruction conference, the contractor shall submit a schedule for approval by the Engineer for the construction, demolition, and completion of these structures, including mile stone dates that will be used to determine if work is being pursued in a continuous manner and with sufficient effort to comply with permit requirements.

The Contractor shall prosecute the work in a continuous and uninterrupted manner from the time he begins the work until completion of each phase of structure construction, demolition and completion. The contractor will not be permitted to suspend his operations except for reasons beyond his control or except where the Engineer has authorized a suspension of the Contractors' operations in writing.

In the event that the Contractor's operations are suspended in violation of the above provisions or it is determined the Contractor is not deemed to be pursuing the work in a continuous manner in accordance with his submitted and approved schedule, the sum of \$800.00 will be charged the Contractor for each and every calendar day that such suspensions take place. The said amount is hereby agreed upon as liquidated damages due to extra engineering and maintenance costs and due to increased public hazard, and violation of contract permit requirements. Liquidated damages chargeable due to suspension of the work will be additional to any liquidated damages that may become chargeable due to failure to complete the work on time.

#### **Division 13/Natural Environment Section**

From the 401 Water Quality Certification – the following Condition of Certification:

1) The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation stream segments. Riparian area success shall be determined by conducting stem counts to ensure tree survival rate of 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWR to schedule a site visit to "close out" the mitigation site.

DEPARTMENT OF THE ARMY PERMIT

RECEIVED

AUG 18 2014

REG. WILLIAM M.D. CRO.

Permittee **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

Permit No. **2004-9987181 / 2004-30631 TIP NO. R-2519B**

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 conduct the following activities in waters of the U.S. for TIP No. R-2519B: permanently impact 7,256 linear feet (lf) of stream and 0.15 acre of wetland, and temporarily impact 1,360 lf of stream and <0.01 acre of surface waters (a pond) in order to widen approximately 7.5 miles of US Highway 19E from SR 1186, west of Micaville in Yancey County, to the existing multilane section west of Spruce Pine in Mitchell County, North Carolina.**

Project Location: **US Highway 19E from SR 1186, west of Micaville in Yancey County, to the existing multilane section west of Spruce Pine in Mitchell County, North Carolina.**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2019**. 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.

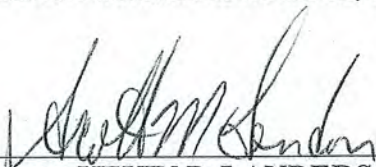
6. **Extensions.** General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give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

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

8-15-14  
(DATE)

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

  
(DISTRICT COMMANDER) **KEVIN P. LANDERS, SR.**  
**COLONEL, U.S. ARMY**

20 August 2014  
(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. ARMY CORPS OF ENGINEERS**  
**Wilmington District**  
**Compensatory Mitigation Responsibility Transfer Form**

Permittee: North Carolina Department of Transportation  
Project Name: TIP No. R-2519B (Yancey and Mitchell)

Action ID: SAW-2004-9987181/ 2004-30631  
County: Yancey

**Instructions to Permittee:** The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Ecosystem Enhancement Program (NCEEP), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

**Instructions to Sponsor:** The Sponsor must verify that the mitigation requirements (credits) shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated bank ledger to the Permittee, the USACE Project Manager, and the Wilmington District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

**Permitted Impacts and Compensatory Mitigation Requirements:**

Permitted Impacts Requiring Mitigation*			8-digit HUC and Basin: 06010108, French Broad River Basin			
Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		* see comments	0.15			

\*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

**Compensatory Mitigation Requirements:**

			8-digit HUC and Basin: 06010108, French Broad River Basin			
Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		11,250	0.26			

**Mitigation Site Debited:** NCEEP

(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCEEP, list NCEEP. If the NCEEP acceptance letter identifies a specific site, also list the specific site to be debited).

***Section to be completed by the Mitigation Sponsor***

**Statement of Mitigation Liability Acceptance:** I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCEEP), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

**Mitigation Sponsor Name:** \_\_\_\_\_

**Name of Sponsor's Authorized Representative:** \_\_\_\_\_

\_\_\_\_\_  
Signature of Sponsor's Authorized Representative

\_\_\_\_\_  
Date of Signature



**USACE Wilmington District  
Compensatory Mitigation Responsibility Transfer Form, Page 2**

**Conditions for Transfer of Compensatory Mitigation Credit:**

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

**Comments/Additional Conditions:**

Total permanent loss of stream for this project, including stream relocations, is 6,609 lf of cold water stream.

Of this 6,609 lf, mitigation at a 2:1 ratio is required for 6,140 lf and at a 1:1 ratio for 469 lf; as such, the total required amount of compensatory mitigation for stream losses is 12,749 lf of cold water stream credits.

On-site mitigation will generate 1,499 lf of stream credit and NCEEP will supply the remaining 11,250 lf of cold water stream credit.

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. *Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 11405 Falls of Neuse Road, Wake Forest, NC 27587 (email: [todd.tugwell@usace.army.mil](mailto:todd.tugwell@usace.army.mil)).* Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Lori Beckwith  
USACE Field Office: Asheville Regulatory Field Office  
US Army Corps of Engineers  
151 Patton Avenue, Room 208  
Asheville, North Carolina 28801-5006

Email: [loretta.a.beckwith@usace.army.mil](mailto:loretta.a.beckwith@usace.army.mil)

BECKWITH.LORETT  
A.ANN.1173452264  
Lori Beckwith

Digitally signed by  
BECKWITH.LORETTA.ANN.1173452264  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=USA,  
cn=BECKWITH.LORETTA.ANN.1173452264  
Date: 2013.12.13 16:16:36 -05'00'

**USACE Project Manager Signature**

December 13, 2013

**Date of Signature**

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at <http://ribits.usace.army.mil>.

Page 2 of 2

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at <http://regulatory.usacesurvey.com/> to complete the survey online.



**SPECIAL CONDITIONS**  
**Action ID # SAW-2004-9987181/ 2004-30631**  
**TIP No. R-2519B**

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 of the U.S. associated with the permitted project, or such other remedies and/or fine as the Wilmington District Engineer, or his authorized representatives, may seek.

**WORK LIMITS**

- 1) All work authorized by this permit must be performed in strict compliance with the Wetland/Surface Water Permit Drawings that were submitted with the application dated July 10, 2013, titled "TIP Project: R-2519B," Sheets 1-114, to include the revisions of October 2013, which are a part of this permit. Any modification to these plans must be approved by the U.S. Army Corps of Engineers (USACE) prior to implementation.
- 2) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- 3) Except as specified in the permit plans referenced in special condition number 1 above, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.
- 4) The permittee shall schedule a pre-construction meeting between their representatives, the contractor, and the USACE, Wilmington District, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work in jurisdictional waters of the U.S. 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 (2) 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 USACE and the North Carolina Division of Water Resources (NCDWR) Project Managers can attend. The permittee shall notify the USACE and NCDWR Project Managers a minimum of thirty (30) days in advance of the meeting.
- 5) The permittee shall advise the USACE in writing at least two (2) weeks prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.



## RELATED LAWS

- 6) The permittee shall fully implement and abide by all stipulations identified in the Memorandum of Agreement titled "Memorandum of Agreement Between the Department of the Army, Corps of Engineers and the State Historic Preservation Officer for US 19E Improvements to a Multilane Facility between Micaville and Spruce Pine Yancy (*sic*) and Mitchell Counties, North Carolina Transportation Improvement Project R-25198," signed June 2012, which is incorporated herein by reference.
- 7) NCDOT shall comply with its commitments regarding the National Register eligible E.W. and Dollie Huskins House. The final design shall include a seeded slope that is feasible for mowing/is maintainable by the property owner.
- 8) If the permittee discovers any previously unknown historic or archaeological sites while accomplishing the authorized work, he shall immediately stop work and notify the USACE, Asheville Regulatory Field Office NCDOT Regulatory Project Manager who will initiate the required State/Federal coordination.
- 9) This USACE permit does not authorize you to take an endangered species, in particular, the Appalachian elktoe mussel (*Alasmidonta raveneliana*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., a Biological Opinion under the ESA, Section 7, with "incidental take" provisions with which you must comply). The U.S. Fish and Wildlife Service's (USFWS's) Biological Opinion, dated March 14, 2008, and amended on January 9, 2009, and August 1, 2013 (collectively referred to hereinafter as BO), contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is specified in the BO. Your authorization under this USACE permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your USACE permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.
- 10) NCDOT will conduct winter tree cutting between August 15 and April 15 (of any year) as an avoidance measure for the Northern Long-eared Bat (*Myotis septentrionalis*). Any felled trees that are not part of an active work area during this time shall be left in place until clearing, grubbing and seeding can commence after April 15. Any winter tree cutting conducted in a trout buffer will be cut by hand only and the felled trees will be left in place until the trout moratorium has ended (after April 15 of any year). Within the trout buffer area, dropping trees into the stream must be avoided whenever possible. This condition is project specific and applies only to the R-2519B, US 19E Widening Project in Yancey and Mitchell Counties of North Carolina.



11) All necessary precautions and measures will be implemented so that any activity will not kill, injure, capture, harass, or otherwise harm any protected federally listed species. While accomplishing the authorized work, if the permittee discovers or observes a damaged or hurt listed endangered or threatened species, the USACE Wilmington District Engineer will be immediately notified to initiate the required Federal coordination.

12) The permittee will comply with all conditions in the attached letter from the North Carolina Wildlife Resources Commission (WRC), dated September, 11, 2007, with the exceptions of the in-water work moratorium for the South Toe River and tree removal activities, as long as tree removal activities are conducted in accordance with special condition number 10 of these conditions. Additionally, the permittee will comply with the moratoria detailed in the WRC letter dated July 19, 2007, for all streams in the R-2519B project corridor, with the exceptions of the in-water work moratorium for the South Toe River and tree removal activities, as long as tree removal activities are conducted in accordance with special condition number 10 of these conditions. Within the trout buffer area, dropping trees into the stream must be avoided whenever possible.

13) The North Carolina Division of Water Resources has issued a conditioned Water Quality Certification for this project. The conditions of that certification are hereby incorporated as special conditions of this permit. A copy of this certification is attached.

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

#### **PROJECT MAINTENANCE**

15) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act.

16) All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Resources at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

17) The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.



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

19) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit.

20) The permittee shall implement Design Standards in Sensitive Watersheds throughout the project corridor. 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. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

21) The permittee shall ensure that all excavation and/or construction areas in waters of the U.S. are temporarily dewatered during work.

22) Prior to commencing construction within jurisdictional waters of the U.S. for any portion of the project, the permittee shall forward the latest version of project construction drawings to the USACE, Asheville Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings will be acceptable.

23) 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 non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

24) The permittee shall take measures to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the U.S. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

25) Unless otherwise requested in the application and depicted on the approved work plans, culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be



made to maintain existing channel slope. The bottom of the culvert must be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Destabilizing the channel and head cutting upstream should be considered in the placement of the culvert.

26) Measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

27) To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as the permittee has that information. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any streams or wetlands.

28) 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. 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.

29) The permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the USACE.

30) As noted in the Project Commitments for this project, the permittee will put forth its best effort to suppress the Japanese Knotweed population within the project limits, with the use of aquatic labeled glycolphosate. Additionally, the construction contract(s) for this project will stipulate that any knotweed material disturbed through construction activities at the two bridge sites, as well as in identified mitigation sites, will be buried within the project boundaries in fill or waster areas, below the depth of topsoil.

31) Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.



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

33) All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager (Division 13), 151 Patton Avenue, Room 208, Asheville, NC 28801-5006, and by telephone at: (828) 271-7980. The Permittee shall reference the following permit number, SAW-2004-9987181/ 2004-30631, TIP No. R-2519B, on all submittals.

#### **COMPENSATORY MITIGATION**

34) The Permittee shall fully implement the compensatory mitigation plan titled "Mitigation Plan, US 19E Widening, Yancey & Mitchell Counties, North Carolina, T.I.P. Number R-2519, WBS No. 35609.1.1, May 6, 2013 (Revised November 4, 2013)," in order to compensate for a portion of the unavoidable impacts to waters of the U.S. associated with this project. Activities prescribed by this plan shall be initiated prior to, or concurrently with, commencement of any construction activities within jurisdictional areas authorized by this permit. The permittee shall conduct all mitigation and monitoring activities in accordance with the above referenced plan and with the following conditions:

- a) As the permittee, NCDOT is the party responsible for the implementation, performance and long term management of the on-site compensatory mitigation project.
- b) Any changes or modifications to the mitigation plan must be approved by the USACE.
- c) The permittee shall maintain the entire mitigation site in its natural condition, as altered by the work in the mitigation plan, in perpetuity. Prohibited activities within the mitigation site specifically include, but are not limited to: filling; grading; excavating; earth movement of any kind; construction of roads, walkways, buildings, signs, or any other structure; any activity that may alter the drainage patterns on the property; the destruction, cutting, removal, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage, trash, debris or other waste material; graze or water animals, or use for any agricultural or horticultural purpose; or any other activity which would result in the property being adversely impacted or destroyed, except as specifically authorized by this permit.

35) The permittee shall not sell or otherwise convey any interest in the mitigation property used to satisfy the mitigation requirements for this permit to any third party, without written approval from the Wilmington District USACE.



36) In order to compensate for a portion of the impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.

#### **ENFORCEMENT**

37) A representative of the USACE will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the USACE.

38) Violation of these conditions or violation of Section 404 of the Clean Water Act of Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District USACE within 24 hours of the permittee's discovery of the violation.



## ☒ 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.



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





## ☒ North Carolina Wildlife Resources Commission ☒

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TO: David Baker, NCDOT Coordinator  
Asheville Regulatory Field Office, USACE

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

DATE: September 11, 2007

SUBJECT: Review of NCDOT's application for a Section 404 Permit and 401 Water Quality Certification for the proposed improvements to US 19/US 19E from future I-26 (existing US 19-23) in Madison County to SR 1186 near Micaville in Yancey County. Madison and Yancey Counties. TIP No. R-2518A, R-2518B, and R-2519A.

North Carolina Department of Transportation (NCDOT) has submitted an application to obtain a Section 404 Individual Permit from the U.S. Army Corps of Engineers (USACE) and a 401 Water Quality Certification from the Division of Water Quality (NCDWQ). Staff biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the information provided and have participated in the Merger 01 process by attending field, concurrence and hydraulics meetings and submitting comments at various steps in the project development process. These comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

The subject project consists of NCDOT's proposal to widen US 19/US 19E from future I-26 (existing US 19-23) in Madison County to SR 1186 near Micaville in Yancey County to a four-lane divided highway with shoulder section outside the Burnsville Municipal Limits and a curb and gutter section within Burnsville. This project includes three segments (TIP Nos. R-2518A, R-2518B, and R-2519A) of a larger widening plan for this roadway that extends at least into Avery County. The permit application for this 21-mile long project is a "phased application" as final design plans and impact determinations have only been presented for the western most section of the project, R-2518A, and preliminary calculations were provided for R-2518B and R-



2519A. It is anticipated that construction will be authorized for the first section initially and NCDOT will apply for permit modifications for the latter two sections as designs are finalized. Some portions of the project are on new location to improve alignment. Final permanent impact calculations for the R-2518A section include 0.42 acres of wetland and 6,591 linear feet of stream. Preliminary calculations of permanent impacts for all three sections are 0.94 acres of wetland and 14,766 linear feet of stream.

Waters within the project area are located in the Nolichucky River system of the French Broad River basin. Streams in the Madison County portion of the project drain to Little Ivy Creek. In Yancey County, project streams west of Burnsville drain to the Cane River and those east of Burnsville drain to the South Toe River. All streams within the R-2518A section have a DWQ stream classification of WS II – HW (High Quality Waters) except Bald Creek, which is Class C water. The named streams include Middle Fork Creek, Bailey Branch, Turkey Branch, Polly Branch, Holland Creek and Ivy Gap Branch. In the Yancey County portion of the project, the Cane River has a significant smallmouth bass fishery and is inhabited by the Appalachian elktoe (*Alasmidonta raveneliana*), a federal and state Endangered (E) mussel, and the following listed fish species: striped shiner (*Luxilus chrysocephalus*), state Threatened (T); olive darter (*Percina squamata*), Federal Species of Concern (FSC) and state Special Concern (SC); sharphead darter (*Etheostoma acuticeps*), FSC and state T; and stonecat (*Noturus flavus*), state E. The remaining perennial streams crossing the project support reproducing trout populations.

The South Toe River, which crosses US 19 E a short distance east of this project (within the R-2519B section), is designated B Tr ORW (Outstanding Resource Waters). The following protected species have been found in the South Toe River in the US 19E project area: Appalachian elktoe, federal and state E; wavy-rayed lampmussel (*Lampsilis fasciola*), state SC; blotchside logperch (*Percina burtoni*), state E; olive darter, FSC and state SC; and hellbender (*Cryptobranchus alleganiensis*), FSC and state SC.

We sincerely appreciate the efforts of NCDOT to minimize and mitigate impacts to these important natural resources throughout the Merger process for this project. Sediment and erosion control measures will follow the Design Standards in Sensitive Watershed for the entire project. NCDOT plans to construct a bridge at the Bald Creek crossing, close off deck drains on the existing bridges, and incorporate a hazardous spill basin at the Cane River bridge. Efforts were made to provide stormwater treatment and aquatic life passage at stream crossings wherever feasible in the given terrain.

The "Detail" pages in the plan sheets provided clear, easy to read specifics on constructing various aspects of the project, including in-stream structures. This should help to ensure that plans are properly carried out in the field. We recommend that NCDOT review plans for all culvert installations and extensions to ensure alternating baffles were included where appropriate to improve aquatic life passage potential, such as at Site 24 in the R-2518A section. This is a site where baffles were indicated during a hydraulics meeting, but not on the current plans. NCDOT should also consider using enhanced sediment and erosion control measures due to the sensitive and high quality nature of the aquatic resources of the project area. NCDOT and NCSU recently studied such techniques on some mountain road projects with very encouraging results, showing



a considerable reduction in off-site sedimentation over standard practices. These new techniques also appear to cost less than the traditional methods.

We also commend NCDOT for their considerable efforts to provide on-site mitigation along the project corridor and protecting the mitigation sites by including them in the right-of-way. Approximately 4,341 linear feet (lf) of stream restoration/relocation, 640 lf of stream enhancement and 15,335 lf of stream preservation are proposed for R-2518A. An additional 279 lf of stream restoration and 5,131 lf of stream enhancement are proposed for R-2518B. No on-site mitigation is proposed for R-2519A, only stream relocations.

The Merger Team previously discussed supporting better mitigation credit ratios for the preservation component in order to encourage protection of these important natural resources, fish and wildlife habitat, and water quality from future impacts and development. NCDOT proposed a 3:1 credit ratio in the permit application cover letter, as opposed to the typical 5:1 ratio. Table 6 listed a buffer width, but no details as to the width on each side of the stream, how much of the site failed to meet buffer requirements, or why buffer requirements were not met. The stream mitigation plan for R-2518A indicated "narrow" buffers on many of the preservation sites, and no buffer at one site. These sites, their boundaries, and buffers were not clearly indicated on the plan sheets or any map. It appears additional details are needed to determine appropriate mitigation credit ratios.

During project field meetings, several locations were noted to have Japanese knotweed, an invasive plant of serious concern. Surveys should be conducted and any Japanese knotweed found within construction limits for the project or mitigation sites should be eradicated using proper techniques. Procedures should be developed for treatment and handling of the plant material and soils to prevent the spread of the plant and ensure eradication so that the mitigation sites and habitat along the project corridor are not diminished.

Our recommendations for work moratoria on this project and the section immediately east (R-2519B) have been provided to NCDOT and appropriate Team members previously. The most recent letter, dated July 19, 2007, indicated no work 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. Smallmouth bass, an important game fish, will also receive some reproduction protection with this moratorium. The remaining perennial streams 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.

We are concerned about cumulative and secondary impacts to the valuable and sensitive natural resources in the project vicinity as a result of this project. The US 19/19E widening project will



be the only four-lane road in Yancey and Mitchell Counties and is situated between Asheville and Boone. This and other projects in the area will improve regional accessibility throughout this part of western North Carolina. The area is becoming an important tourist destination, largely due to the scenic beauty and nature-based recreational opportunities, such as fishing, hiking, canoeing and site-seeing. Any induced growth has the potential to degrade water quality, scenic views, and recreational amenities, and the potential increases when development controls are not in place. Local communities have a desire to grow the manufacturing employment base and this project may influence intraregional land development location decisions.

NCDOT will provide partial control of access for the project, limiting the number of access points connecting to the highway. They also propose to place on-site mitigation sites in the right-of-way, effectively controlling access in these areas and protecting the sites from direct impacts from future development. We applaud these commitments! Local authorities, however, must provide appropriate protection for the remaining developable land in the project vicinity, not just the highway corridor, in order to protect the valuable natural resources that are key to the tourism that is vital to the area's economy. Strong stormwater management requirements, limits on impervious area, and protection of natural buffers along waterways are important measures to preserve the water quality, fish and wildlife habitats, and scenic beauty. Other measures to mitigate secondary and cumulative impacts can be found in the Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality (NCWRC 2002). We urge local authorities and NCDOT to adopt many of these measures and to use low impact development techniques (see [www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org) for information) to manage stormwater quantity and quality in developing areas. Additional information can be found at [www.ncstormwater.org](http://www.ncstormwater.org).

In addition, we can concur with the permit issuance if the following conditions are implemented:

1. Sediment and erosion control measures shall adhere to the Design Standards for Sensitive Watersheds and be strictly maintained until project completion to avoid impacts to downstream aquatic resources.
2. Temporary or permanent herbaceous vegetation should be planted on all bare soil **as soon as possible**, but within 21 calendar days of temporary or permanent grade establishment, to provide long-term erosion control.
3. Tall fescue should not be used in riparian areas. We encourage NCDOT to utilize onsite vegetation and materials for streambank stabilization when practicable. Erosion control matting should be used in riparian areas and steep slopes, instead of straw mulch, and well anchored with 12" staples, wooden survey stakes or live stakes.
4. The natural dimension, pattern, and profile of the streams above and below the culverts should not be modified by widening the stream channel or changing the depth of the stream.
5. Culverts that are less than 48-inch diameter should have the floor of the barrel installed 20% of the diameter of the culvert below the level of the stream bottom, as appropriate.



Culverts that are 48-inch diameter or larger should be placed with the floor of the barrel approximately 12 inches below the stream bottom to allow natural stream bottom materials to become established in the culvert following installation and to provide aquatic life passage during periods of low flow. This may require increasing the size of the culvert to meet flow conveyance requirements. These measurements must be based on natural thalweg depths. Any perched outlets should be corrected during construction, as appropriate.

6. Removal of vegetation in riparian areas should be minimized. Native trees and shrubs should be planted along the stream banks to reestablish the riparian zone and to provide long-term erosion control.
7. Grading and backfilling should be minimized, and tree and shrub growth should be retained, if possible. Backfill materials should be obtained from upland sites.
8. Rip rap should be minimized. Rip rap placed for bank stabilization should be limited to the stream bank below the high water mark, and vegetation should be used for stabilization above the high water elevation.
9. Excavation of the stream crossings should be conducted in the dry, if possible. Sandbags, cofferdams, flexible pipe, or other diversion structures should be used to minimize excavation in flowing water.
10. Rock check dams at culvert outlets should be removed at project completion. These structures could impede movement of aquatic life.
11. Stormwater should be directed to buffer areas or retention basins and should not be routed directly into streams whenever possible.
12. If concrete will be used during construction, work must be accomplished so that wet (uncured) concrete does not contact surface waters. This will lessen the chance of altering the water chemistry and causing a fish kill.
13. Discharging hydroseeding mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is strictly prohibited.
14. Heavy equipment should be operated from the bank rather than in the stream channel whenever possible in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into the stream. All mechanized equipment operated near surface waters should be inspected and maintained regularly to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids or other toxic materials.

Thank you for the opportunity to review and comment on this project. If you have any questions regarding these comments, please contact me at (704) 984-1070.

Literature Cited:

NCWRC (North Carolina Wildlife Resources Commission). 2002. Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality. NCWRC, Raleigh. Available: [http://www.ncwildlife.org/pg07\\_WildlifeSpeciesCon/pg7c3\\_impacts.pdf](http://www.ncwildlife.org/pg07_WildlifeSpeciesCon/pg7c3_impacts.pdf). (February 2003).

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

**From:** Chambers, Marla J  
**Sent:** Wednesday, July 18, 2013 4:43 PM  
**To:** Dagnino, Carla S  
**Cc:** Hemphill, Jeffrey L; Wallace, Heather L  
**Subject:** RE: R-2519B, Yancey and Mitchell Counties, Moratorium

I've heard back from our staff and we agree to drop the listed species moratorium for the South Toe River crossing of this project. No moratoria will be requested for this crossing.

Marla Chambers

Marla J. Chambers  
Western NCDOT Permit Coordinator  
North Carolina Wildlife Resources Commission  
12275 Swift Road  
Oakboro, NC 28129  
Office & Fax: 704-485-8291  
Work cell: 704-984-1070  
[marla.chambers@ncwildlife.org](mailto:marla.chambers@ncwildlife.org)  
[ncwildlife.org](http://ncwildlife.org)



**From:** Buncick, Marella [[mailto:marella\\_buncick@fws.gov](mailto:marella_buncick@fws.gov)]  
**Sent:** Tuesday, July 09, 2013 3:33 PM  
**To:** Wallace, Heather L  
**Cc:** Beckwith, Loretta A SAW; [john\\_fridell@fws.gov](mailto:john_fridell@fws.gov); Ratzlaff, Allen  
**Subject:** Re: draft amendment to US 19 BO (UNCLASSIFIED)

According to the plans and also our discussions in the field, during Phase 2 that causeway is just to the edge and there was thought that even that could be eliminated. So, yes, I am looking for added protection during phases 1 and 2 while any remaining animals could be protected (minimizing take) since that is a year and a half.

John also said there really isn't a need for the moratorium on pg 2, particularly if that means the construction could be shortened if it is not in place.

thanks marella



North Carolina Department of Environment and Natural Resources

Division of Water Resources  
Water Quality Programs  
Thomas A. Reeder  
Director

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

December 2, 2013

Mr. Richard W. Hancock, P.E., Manager  
Project Development and Environmental Analysis  
North Carolina Department of Transportation  
1598 Mail Service Center  
Raleigh, North Carolina, 27699-1598

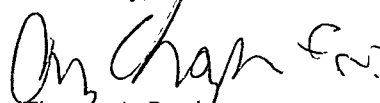
Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with  
ADDITIONAL CONDITIONS for Proposed improvements to US 19E from SR 1186 in Yancey County  
to multilane section west of Spruce Pine in Mitchell County, State Project No. 6.909001T, WBS Element  
No. 35609.1.1, TIP R-2519B. NCDWR Project No. 2013-0743v.2.

Dear Mr. Hancock:

Attached hereto is a copy of Certification No. 3977 issued to The North Carolina Department of Transportation  
(NCDOT) dated December 2, 2013.

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

Sincerely,



Thomas A. Reeder

Attachments

cc: Lori Beckwith, US Army Corps of Engineers, Asheville Field Office (electronic copy only)  
Mark Davis, Division 14 Engineer  
Chris Militscher, Environmental Protection Agency (electronic copy only)  
Marla Chambers, NC Wildlife Resources Commission (electronic copy only)  
Jason Elliott, NCDOT, Roadside Environmental Unit  
Marella Buncick, US Fish and Wildlife Services (electronic copy only)  
Beth Harmon, Ecosystem Enhancement Program  
NCDWR Asheville Regional Office  
File Copy

Transportation and Permitting Unit  
1650 Mail Service Center, Raleigh, North Carolina 27699-1650  
Location: 512 N Salisbury St. Raleigh, North Carolina 27604  
Phone: 919-807-6300 \ FAX 919-733-1290  
Internet: [www.ncwaterquality.org](http://www.ncwaterquality.org)

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**401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS**

**THIS CERTIFICATION** is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (NCDWQ) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact 0.088 acres of jurisdictional wetlands, 8579 linear feet of jurisdictional streams in Yancey and Mitchell County. The project shall be constructed pursuant to the application dated received November 7, 2013. The authorized impacts are as described below:

**Stream Impacts in the French Broad River Basin**

Site	Permanent Fill in perennial (linear ft)	Rip rap stabilization (linear ft)	Temp. impact (linear ft)	Total Stream Impacts (linear ft)	Natural Channel Design (linear ft)	Stream Impacts Requiring Mitigation-DWR (linear ft)
1	43	0	0	43	0	0
2	235	0	97	332	0	235
2A	65	0	44	109	0	0
3	311	12	21	344	0	315
4	97	44	15	156	0	0
4A	18	16	0	34	0	0
5	0	0	160	160	0	0
5A	148	0	0	148	148	0
6	28	0	57	85	144	0
7	358	0	15	373	0	358
7A	24	0	0	24	0	0
7 B	131	0	0	131	0	0
7C	70	0	15	85	0	0
8	432	0	0	432	449	0
8A	79	15	11	105	0	0
8B	58	0	0	58	0	58
8C	69	0	11	80	0	69
9	0	37	10	10	40	0
10	96	87	15	198	0	183
11	0	50	0	50	0	50
12	79	0	25	104	0	0
13	110	0	0	110	0	110
14	220	0	0	220	0	220
15	78	0	15	93	0	78
16	32	50	0	82	0	0
17	33	20	0	53	0	0
18	152	0	8	160	70	0
19	132	12	0	144	0	144
21	412	0	0	412	396	0
22	0	23	177	200	0	0
23	27	20	34	81	0	47
24	175	0	12	187	0	175
25	174	0	15	189	94	0
26	129	10	15	154	0	0
27	56	10	10	76	0	0
28	80	40	0	120	0	0
28A	141	0	0	141	0	0
29	89	62	30	181	0	0
29A	149	0	0	149	0	149



30	321	0	10	331	635	321
31	59	32	31	122	0	91
32	52	0	10	62	0	0
33	444	0	0	444	300	144
34	33	23	118	174	0	0
35	88	10	8	106	46	0
37	247	10	0	257	0	250
38	22	10	5	37	0	0
39	0	58	15	73	0	0
40	258	11	15	284	0	269
41	103	10	15	128	0	0
42	244	10	18	272	0	254
43	16	10	15	41	0	0
44	147	0	0	147	0	0
45	0	0	288	288	0	0
<b>TOTAL</b>	<b>6564</b>	<b>692</b>	<b>1352</b>	<b>8579</b>	<b>2252</b>	<b>3520</b>

**Total Stream Impact for Project: 8579 linear feet**

**Wetland Impacts 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)
8	0	0	0.014	0.037	0	0	0.051
13	0.06	0	0	0	0		0.06
20	0	0	0.037	0	0	0	0.037
<b>Total</b>	<b>0.06</b>	<b>0</b>	<b>0.051</b>	<b>0.037</b>	<b>0</b>	<b>0</b>	<b>0.148</b>

**Total Wetland Impact for Project: 0.148 acres.**

**Open Water (Pond) Impacts in the French Broad River Basin**

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
R-2519B	0	0.01	0.01
<b>Total</b>	<b>0</b>	<b>0.01</b>	<b>0.01</b>

**Total Open Water Impact for Project: 0.01 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 application dated received November 12, 2013. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state

or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

**Conditions of Certification:**

1. The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation stream segments. Riparian area success shall be determined by conducting stem counts to ensure a tree survival rate of 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWR in a final report within sixty (60) days after completing monitoring. After 3 years the NCDOT shall contact NCDWR to schedule a site visit to "close out" the mitigation site.
2. Compensatory mitigation for impacts to streams at a replacement ratio of 1:1 is required. Compensatory mitigation for impacts to jurisdictional streams shall be provided by natural channel design of 2252 linear feet of Stream in French Broad basin. The onsite stream restoration shall be constructed in accordance with the design submitted in your November 7, 2013 application. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Resources 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 impacts. All channel relocations will be constructed in a dry work area, will be completed and stabilized, and must be approved on site by NCDWR 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 a 50-foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.
3. Off-site Compensatory mitigation for 3520 linear feet of impact to streams is required by DWR. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated November 5, 2013 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the EEP Mitigation Banking Instrument signed July 28, 2010.
4. Two copies of the final construction drawings shall be furnished to the NCDWR Central Office prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated November 7, 2013. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Resources.
5. All channel relocations will be constructed in a dry work area and stabilized before stream flows are diverted. Channel relocations will be completed and stabilized, and must be approved on site by NCDWR staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30 foot wide wooded and an adjacent 20 foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. All stream banks shall be matted with coir fiber matting. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested. Once the stream has been turned into the new channel, it may be necessary to relocate stranded fish to the new channel to prevent fish kills.
6. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.
7. Strict adherence to the most recent version of NCDOT's Best Management Practices For Bridge Demolition and Removal approved by the US Army Corps of Engineers is a condition of the 401 Water Quality Certification.



8. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*.
9. Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited without prior written approval from the NCDWR first.
10. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly.
11. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank. This condition can be waived with prior approval from the NCDWR.
12. All bridge construction shall be performed from the existing bridge, temporary work bridges, temporary causeways, or floating or sunken barges. If work conditions require barges, they shall be floated into position and then sunk. The barges shall not be sunk and then dragged into position. Under no circumstances should barges be dragged along the bottom of the surface water.
13. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required.
14. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
15. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.
16. For all streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species.
17. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species.
18. The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission. In addition, the permittee shall conform to the NCDOT policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times. In-stream work and land disturbance within the 25-foot buffer zone are prohibited during the trout-spawning season of October 15 through April 15 to protect the egg and fry stages of trout.
19. For projects impacting waters classified by the NC Environmental Management Commission as Trout (Tr), 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.
20. The permittee shall use /Design Standards in Sensitive Watersheds/(15A NCAC 4B.0124[a]-[e]) in areas draining to ORW or Trout waters. However, due to the size of the project, the NCDOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres. Temporary cover (wheat, millet, or similar annual grain) or permanent herbaceous cover shall be planted on all bare soil within 15 business days of ground disturbing activities to provide erosion control.

21. NCDOT shall be in compliance with the NCS00250 issued to the NCDOT, including the applicable requirements of the NCG01000. Please note the extra protections for the sensitive watersheds.
22. Tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with an appropriate native seed mix on disturbed soils within the riparian area and on disturbed steep slopes with the following exception. Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain a nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied from a fertilizer- and limestone-free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters is prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

### **General Conditions**

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required.
2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
3. 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.
4. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.
5. 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.
6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.
7. Prior to commencing ground disturbing activities, an acceptable monitoring and mitigation plan for the presence of sulfide-bearing rock must be approved by the NCDWR.
8. 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.
9. 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.
10. 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.
11. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.
12. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
13. 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 the NCDWR 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, the NCDWR may reevaluate and modify this certification.
14. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification.
  15. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
  16. 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.
  17. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.
  18. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery.
  19. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWR when all work included in the 401 Certification has been completed.
  20. Native riparian vegetation (**ex. list herbaceous, trees, and shrubs native to your geographic region**) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.
  21. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
  22. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:
    - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
    - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
    - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
    - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
  23. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

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

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.  
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings  
6714 Mail Service Center  
Raleigh, NC 27699-6714  
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel  
Department of Environment and Natural Resources  
1601 Mail Service Center

This the 2nd day of December 2013

DIVISION OF WATER RESOURCES

A handwritten signature in black ink, appearing to read "Th. A. Reeder".

Thomas A. Reeder

WQC No. 3977





North Carolina Department of Environment and Natural Resources

Division of Water Resources  
Water Quality Programs  
Thomas A. Reeder  
Director

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

NCDWR 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 Transportation Permitting Unit, North Carolina Division of Water Resources, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to NCDWR 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 and Permitting Unit  
1650 Mail Service Center, Raleigh, North Carolina 27699-1650  
Location: 512 N Salisbury St Raleigh, North Carolina 27604  
Phone: 919-807-6300 \ FAX: 919-733-1290  
Internet: [www.ncwaterquality.org](http://www.ncwaterquality.org)

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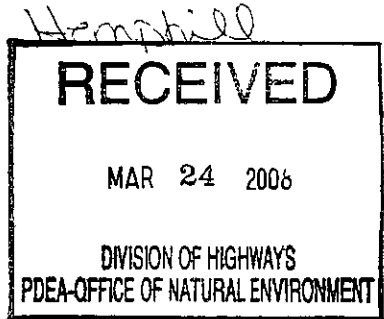
# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Asheville Field Office  
160 Zillicoa Street  
Asheville, North Carolina 28801

March 14, 2008

E. Lusk



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 (*Alasmidonita 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 spithamea*), 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.<sup>1</sup> 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.<sup>2</sup>

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<sup>1</sup>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).

<sup>2</sup>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

## Action Area Map

Appalachian Elktoe  
Biological Opinion

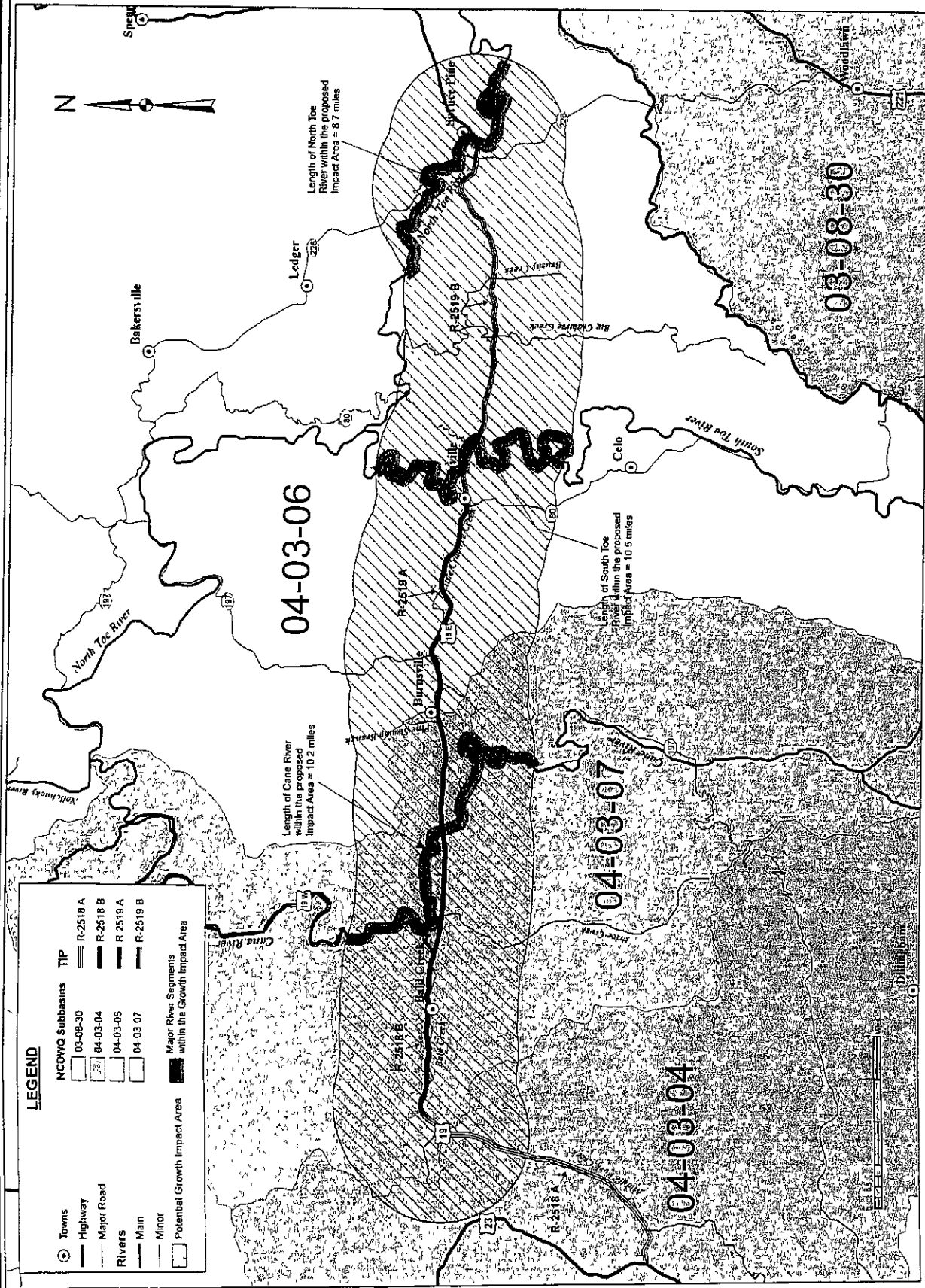
US 19 Widening  
R-2518 & R-2519

Mitchell and Yancey  
Counties  
North Carolina

**Client**

NCDOT

**Figure**



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 Hunt Dale. 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 Hunt Dale 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
<b>Mussels:</b>			
<i>Alasmidonta raveneliana</i>	Appalachian elktoe	Endangered	Endangered
<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel	Special Concern	None
<b>Amphibians:</b>			
<i>Cryptobranchus alleganiensis</i>	Hellbender	Special Concern	Federal Species of Concern
<b>Fishes:</b>			
<i>Etheostoma acuticeps</i>	Sharphead darter	Threatened	Federal Species of Concern
<i>Etheostoma vulneratum</i>	Wounded darter	Special Concern	Federal Species of Concern
<i>Percina squamata</i>	Olive darter	Special Concern	Federal Species of Concern
<i>Noturus flavus</i>	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).<sup>3</sup>**

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."

<sup>3</sup>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 coarse 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<sup>2</sup> 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<sup>2</sup> 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<sup>2</sup> and 9,600 ft<sup>2</sup> 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<sup>2</sup>. 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<sup>2</sup> 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<sup>2</sup>) per bridge foundation. Two foundations would be needed for the work bridge. Total streambed impacts for the work bridge foundations would be 200 ft<sup>2</sup>.

The proposed structure will result in 50 ft<sup>2</sup> of permanent impacts to the streambed as a result of bent placement in the river. Additionally, 500 ft<sup>2</sup> of streambed will be impacted by a causeway needed to construct the west interior bent, and 200 ft<sup>2</sup> 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<sup>2</sup>, 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<sup>2</sup> 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 mi



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 Rivers, 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 mi of the Cane River, 6.5 mi of the South Toe River, and 3.5 mi 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 region's 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 Hunt Dale, 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<sup>2</sup> 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<sup>2</sup> 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<sup>2</sup>. 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<sup>2</sup> at the Cane River crossing and 9,600 ft<sup>2</sup> 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 its 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.

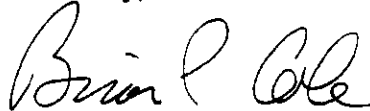
In order for the Service to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

## 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  
Field Supervisor

cc:

Dr. Gregory J. Thorpe, Manager, Project Development and Environmental Analysis Branch,  
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27699-1548

Dr. Charles P. Nicholson, NEPA Policy Program Manager, Tennessee Valley Authority,  
400 West Summit Hill Drive, WT 11B, Knoxville, TN 37902-1499

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

Mr. Brian Wrenn, North Carolina Division of Water Quality, Central Office, 2321 Crabtree  
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Regional Director, FWS, Atlanta, GA (ES/TE, Attention: Mr. Ken Graham)

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# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Asheville Field Office  
160 Zillicoa Street  
Asheville, North Carolina 28801

August 1, 2013

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

Dear Mr. Jones:

Subject: Amendment to the Biological Opinion for the 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 (USFWS) Amended Biological Opinion (Opinion) based on our review of updated information regarding the construction of a new bridge and replacement of the existing bridge over the South Toe River and the impacts to the federally endangered Appalachian elktoe (*Alasmidonta raveneliana*) and its designated critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). We received your March 29, 2013, request for reinitiation of formal consultation on April 2, 2013. This amendment is based on information provided in the March 29, 2013, amendment package and addresses specific changes from the 2008 Biological Opinion.

The reinitiation of consultation was requested for the following reasons: (1) 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 the 2008 Biological Opinion and (2) the agency action has been modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the 2008 Biological Opinion. More than 5 years have elapsed since the 2008 Biological Opinion was rendered, and greatly refined project plans and updated surveys have changed the impacts previously considered. The following document updates and clarifies the activities associated with constructing the new bridges over the South Toe River and reassesses the impact on the Appalachian elktoe and its designated critical habitat. No significant changes



have occurred with the design or construction of the roadway. Therefore, this amendment is applicable only to the bridges and crossing of the South Toe River.

## **AMENDMENT TO THE 2008 BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

The North Carolina Department of Transportation (NCDOT) proposes to replace the two-lane bridge crossing the South Toe River on US 19 with a new structure and add another parallel bridge to provide two new travel lanes. The existing structure will be replaced in its current location and become the west-bound lanes of the widened US 19, and a new structure will be built immediately upstream to accommodate east-bound traffic. The new structures will have three spans of reinforced concrete deck on prestressed girders. The end bents will be concrete cap on piles; interior bents will be 4-foot concrete columns on 54-inch drilled shafts. In addition to the bridge structures, hazardous spill basins will be constructed for both structures.

### **CONSERVATION MEASURES SPECIFIC TO CONSTRUCTION**

The NCDOT has committed to demolition and construction techniques which minimize impacts to the Appalachian elktoe and the South Toe River. Specifically, the time frame for demolition and construction will be compressed to roughly 2 years and 8 months. This will allow time for construction of the new bridge, demolition of the existing bridge, and construction of the replacement bridge while limiting the duration of exposure to the river from construction. In particular, demolition of the old bridge and construction of the new replacement bridge will be compressed to an 18-month period. Construction and demolition may or may not occur in a continuous manner; there may be periods of inactivity between each phase. If each phase is not completed within the designated time frame, there would be a financial penalty levied for each day of overrun. It may be necessary to have causeways in place, simultaneously, on both sides of the river if a spanning work bridge is needed to prevent dropping material in the river during demolition or to set the center span during construction of the new bridges. If this is necessary, the causeways will be small enough to allow 50 percent of the river channel to remain open.

***Construction Phasing*** - Bridge construction and demolition will occur in three phases (Appendix A). Each phase is described in detail below. Language outlining the phased construction/demolition will also be included in the construction contract.

**Phase 1** - A new bridge will be constructed south of the existing bridge. Small causeways will be necessary to allow equipment to set the girders and spans for the new bridge.

Long Branch will be relocated to its historic position, tying in to the South Toe River slightly north of its existing location. Construction of the new channel will occur just prior to or during Phase 1. Construction and seeding will be completed at least one growing season prior to turning water into the channel. (A note to this effect will be placed on the plan sheets.) This will allow newly planted vegetation to establish itself on the banks and

provide stabilization. Relocating this stream will allow room for construction equipment to access the area without having to pipe a section of the stream. It will also improve the long-term stability of the stream and may reduce sediment input to the river. Native seed mixes and/or planting materials will be utilized to vegetate the relocated channel.

Access roads and construction staging areas will be minimized to the maximum extent practicable. The access roads and construction staging areas will be established from the start of the project and designed with erosion-control measures. Access roads are shown on designs included in Appendix A.

This phase of the construction will be limited to 14 months.

**Phase 2** – The existing bridge will be demolished. During this phase, causeways will be required on both sides of the river but at least 50 percent of the channel will always remain open.

In an attempt to maintain the flow of well-oxygenated water over the existing mussel bed just downstream of the causeway planned for the west side of the river during Phase 2, the NCODT will investigate the use of one pipe near the edge of the riverbank. If a pipe can be located far enough from the crane lift area, it will be installed in the causeway. Given the size of the equipment needed to perform the work and concerns for the stability of the causeway, multiple pipes throughout the causeway will not be possible.

There are two types of footings possible on the existing bridge; they are: (1) "Spread footing," which is a concrete slab that supports the weight of the columns, and (2) "Pile footing," which is a concrete slab that supports the weight of the column but with piles underneath. During demolition, removal of the bents will be accomplished by tipping them over and removing the entire bent or by cutting/chipping off the bent 1 to 2 feet below the streambed or ground. Exposed steel will be cut off, and the remaining portion of the bent will be covered in natural material. The method of removal will be dependent on which type of bent is actually present on site. According to existing bridge plans, there should only be a spread footing (no piles underneath) on existing Bents 1, 2, and 4 (upstream side only). For the west-bound lane, the proposed Bent 1 will be situated in nearly the identical location of the existing bents. No portion of this existing bent can remain in the streambed. A spread footing is presumably associated with the existing Bent 2; however, if this is not the case, and piles are actually present underneath the footing, then more excavation will be necessary. If material is needed to backfill the areas excavated during bent removal, substrate immediately downstream from the existing Bent 2 will NOT be used, as this portion of the river is preferred habitat for mussels.

A containment system will be developed and installed prior to the removal of the bridge deck and piers. The system will be of sufficient strength to capture material that falls. No pieces of the existing bridge will be dropped into the water during bridge removal. If bridge material inadvertently ends up in the river, it will be removed.

The USFWS will review the demolition plans and provide comments prior to the finalization of the plans. The USFWS will also be notified prior to the start of bridge demolition, so they may have a representative onsite during that phase of the project.

This phase of the construction will be limited to 2 months.

**Phase 3** - A new bridge will be constructed to replace the demolished structure, creating the west-bound lanes. All construction techniques discussed previously also will be applied to construction of this bridge.

This phase of the construction will be limited to 16 months.

**Rock Causeways** - Rock causeways will be used as work pads for the construction cranes. The permit drawings depict the maximum size of the proposed work pads. Causeway size will be minimized as much as possible during each phase of the construction. The NCDOT will:

- Require the contractor to use washed rock for the construction of the causeways. This will minimize unnecessary sediment input into the river.
- Require all of the stone to be removed and disposed of off-site or be used in areas that require permanent stone protection after project completion. The NCDOT also will require that concrete barriers be placed along the downstream edge of each causeway in order to limit the downstream movement of causeway material during high flow events.
- Limit moving of causeways to minimize streambed disturbance. Individual causeways will be left in place for the duration of the construction/demolition phase where each is required.
- Remove equipment from the causeways anytime during a work day if 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.

Construction fabric will not be used under the causeway material. This was a provision in the 2008 Biological Opinion in order to help with causeway stone removal. Experience at the Cane River construction site showed that regardless of the care taken, the fabric tears and ends up in pieces in the river. Therefore, the original intent of helping with stone removal was not met.

## **CONSERVATION MEASURES IN THE AFFECTED AREA**

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

All construction equipment should be refueled outside the 100-year floodplain or at least 200 feet 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 feet 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.

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

***Hazardous Spill Basins*** - Two hazardous spill basins will be constructed south of the bridges, one on each side of the river.

1. Station 111+50 to station 119+00-L - right side. Lateral base grassed swale/hazardous spill basin. Capacity=2,509 cubic yards, Storage required=236.2 cubic yards.
2. Station 124+50 to station 127+00-L - right side. Grassed swale/hazardous spill basin/dry detention basin. Capacity=532 cubic yards, Storage required=81 cubic yards. This basin also doubles as a dry detention basin.

***Stormwater Controls*** - The Stormwater Management Plan (Appendix B) for R-2519B outlines many of the stormwater controls for the roadway section and gives detailed information on each structure. Measures specific to the South Toe River crossing are included in the overall plan.

***Erosion Control*** - 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 conjunction with a stilling basin) will be used to ensure that the most protective measures are being implemented.

At this project site, the NCDOT will use erosion-control measures that exceed the standard Best Management Practices and will incorporate the Design Standards in Sensitive Watersheds [15A NCAC 04B.0124 (b)-(e)]. The areas adjacent to jurisdictional water bodies in the South Toe River watersheds will be identified as "Environmentally Sensitive Areas" on the Sedimentation and Erosion Control Plans for this project. By definition, the Environmentally Sensitive Areas will be identified as 50-foot buffer zones on both sides of the stream, measured from the top of



the streambank. Within the identified 50-foot Environmentally Sensitive Areas, the following shall apply:

1. The contractor may perform clearing operations, but not grubbing operations, until immediately prior to beginning grading operations.
2. Once grading operations begin, work shall progress in a continuous manner until complete.
3. Erosion-control devices shall be installed immediately following the clearing operation.
4. Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment.
5. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet (6.1 meters) in height, measured along the slope, or greater than 2 acres (0.81 hectares) in area, whichever is less.
6. Throughout the project limits, all sedimentation- and erosion-control measures, must be cleaned out when half full with sediment in order to ensure proper function of the measures.

**Bridge Deck Drainage** - Drainage from the deck of the existing structure currently flows directly into the river. The design for the bridge over the South Toe River eliminates deck drain discharge into the river by directing runoff into the grassed swales/hazardous spill basins/dry detention basins adjacent to the bridge on either side of the river. The amount of direct discharge from the roadway entering the river will be significantly reduced with the new structure. This commitment has been incorporated in the Structure Design Plan.

**Preconstruction Surveys and Mussel Relocations** - The NCDOT conducts final surveys (just prior to construction) in the vicinity of projects that impact waters known to contain protected mussel species. The NCDOT typically relocates mussels found within or near the project footprint, per guidance from the USFWS. The Appalachian elktoe is known to occur at the South Toe River crossing, and the NCDOT has already begun to relocate mussels to appropriate upstream habitat. A final preconstruction survey will be performed and any additional mussels will be relocated following the guidelines presented in the relocation plan (included in the original Biological Assessment). 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.

**Agency Coordination** - The NCDOT will invite representatives from the USFWS and the North Carolina Wildlife Resources Commission to the preconstruction meeting for this project as well as to all subsequent field inspections prior to construction in order to ensure compliance with all special project commitments.

## CONSERVATION MEASURES FROM 2008 BIOLOGICAL OPINION

**Stream Channel Monitoring** - As detailed in the original Biological Assessment, the NCDOT will monitor the river channel and banks at upstream sites, at the bridge construction site, and downstream to determine changes in habitat resulting from bridge construction activities. If any problems with regard to stream stability are detected during the monitoring, the NCDOT will, in cooperation with the USFWS, develop a plan to address the problems. Analysis will include mapping of the channel bed, cross sections, longitudinal profiles, bed material analyses, bank erosion hazard index estimates, and photographs. On-site surveys will be conducted to document existing channel conditions at the two bridge relocation sites. The results of the surveys will be compiled into a report.

**Japanese Knotweed Control** - Due to concerns of the USFWS, the NCDOT has identified the existence of Japanese knotweed (*Reynoutria japonica*) within the project limits of R-2519. To minimize the potential spread of Japanese knotweed from construction-related activities, the NCDOT proposes to attempt to suppress the Japanese knotweed within the NCDOT right-of-way at the South Toe River bridge with the application of a glyphosate herbicide, according to the product label. Treatment will only occur prior to disturbance of the area since the application of the herbicide will create the potential for erosion to occur. Once the grading operations are complete and a stabilized vegetative cover has been established, an annual spot treatment will occur at the bridge locations to suppress the Japanese knotweed until traffic is allowed to travel the new roadway.

The NCDOT will put forth its best effort to suppress the Japanese knotweed population with the use of aquatic labeled glyphosate but cannot guarantee the eradication of the species using this method. Additionally, the contract for this project will stipulate that any knotweed material disturbed through construction activities at the bridge will be buried within the project boundaries in fill or waste areas below the depth of the topsoil. The NCDOT prefers this action to allowing the contractor to haul it offsite because this would result in a loss of control over proper disposal.

**Sediment- and Erosion-Control Inspections** - The NCDOT has developed erosion-control measures for this project specifically to protect the Appalachian elktoe and its habitat. Inspections of erosion-control devices are done on a daily basis by the Construction Project Inspector. The NCDOT's Roadside Environmental Unit also has Field Operations Engineers who perform compliance inspections of the erosion-control devices weekly or within 24 hours of a  $\geq 0.5$ -inch rainfall event during construction of the project.

**Other Measures** - A USFWS 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 USFWS biologist will review and provide comments on the plans and will attend any meetings to discuss implementation of the plans.

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.

When constructing drilled piers, 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.

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

## **EFFECTS OF THE ACTION**

In 2008, the total impacts to the Appalachian elktoe and its designated critical habitat at this crossing of the South Toe River were estimated to be 9,600 square feet of temporary impact from construction causeways. There were no anticipated permanent impacts because it was thought that a bridge could be built to completely span the River in this location. After numerous field meetings and structure design changes, it was determined that building a structure to completely span the river was not possible. The current design will permanently impact 31.8 square feet of the river by placing one pier and a part of another pier in the water. The location of these structures is as far out of the active channel as possible. The refined plans allowed the temporary impacts to be reduced from 9,600 square feet to 6,534 square feet, or about 30 percent. Although there will be some permanent impact, there is an overall reduction in permanent impact by removing several existing piers. Given that the total negative impacts in the action area have been reduced and the commitments to construction timing will further reduce exposure to the river from construction, the overall change from the 2008 Biological Opinion is positive.

After reviewing the current status of the Appalachian elktoe, the environmental baseline for the action area, the effects of the proposed bridge construction, the cumulative effects, and the proposed conservation measures, it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of the Appalachian elktoe or adversely modify its designated critical habitat.

## **REINITIATION/CLOSING STATEMENT**

This concludes formal consultation on the action outlined in your March 29, 2013, request for reinitiation of formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an 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 that was not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If you have any questions concerning this Opinion, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237.

Sincerely

A handwritten signature in black ink, appearing to read "Gary E. Peebles". The signature is fluid and cursive, with the first name "Gary" being more prominent.

Gary E. Peebles  
Acting Field Supervisor

Electronic copies to:

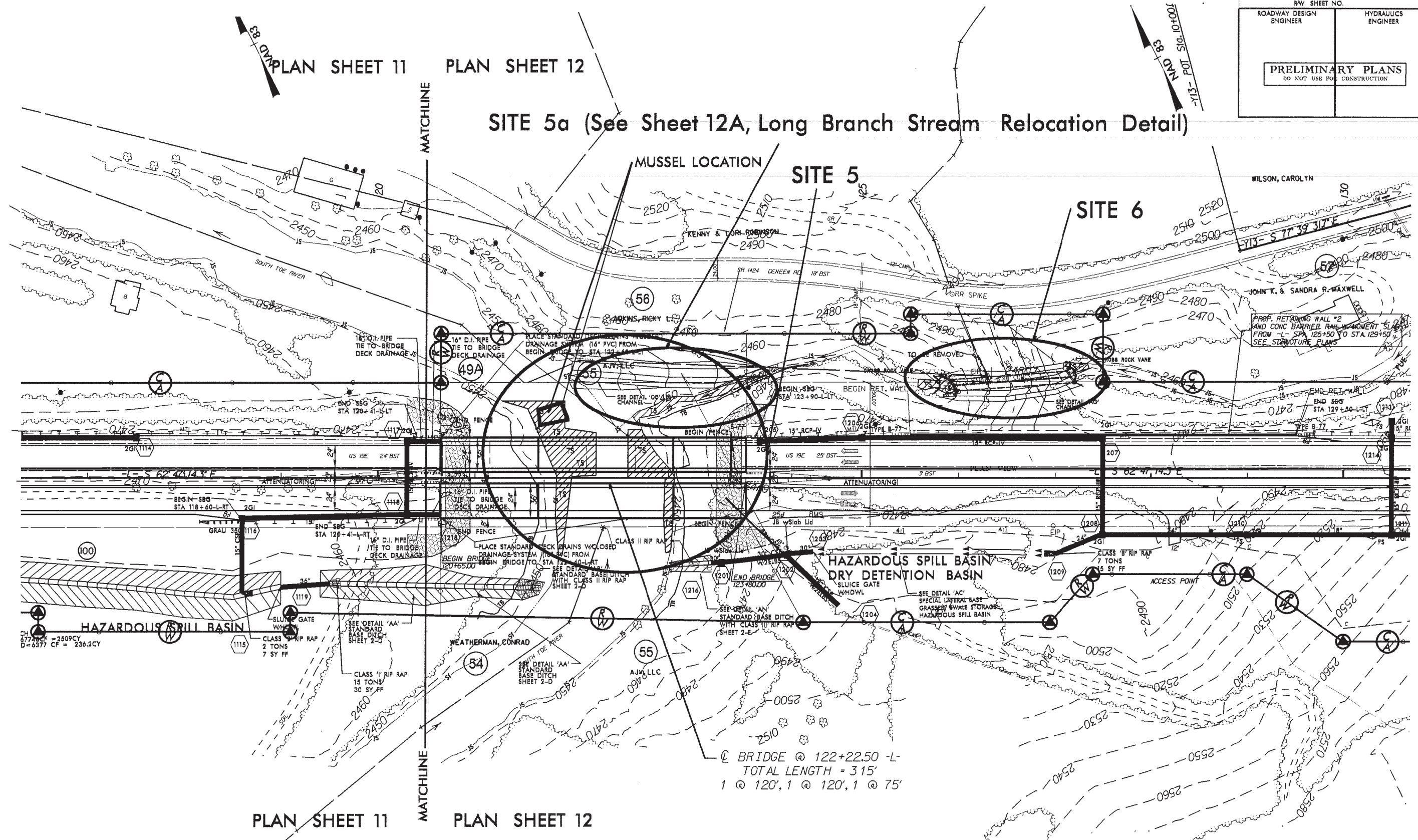
Ms. Marla J. Chambers, North Carolina Wildlife Resources Commission  
Mr. Chris Militscher, Environmental Protection Agency  
Ms. Heather Wallace, North Carolina Department of Transportation  
Ms. Amy Euliss, North Carolina Division of Water Quality

# APPENDIX A

## DETAILED DRAWINGS FOR BRIDGE CONSTRUCTION

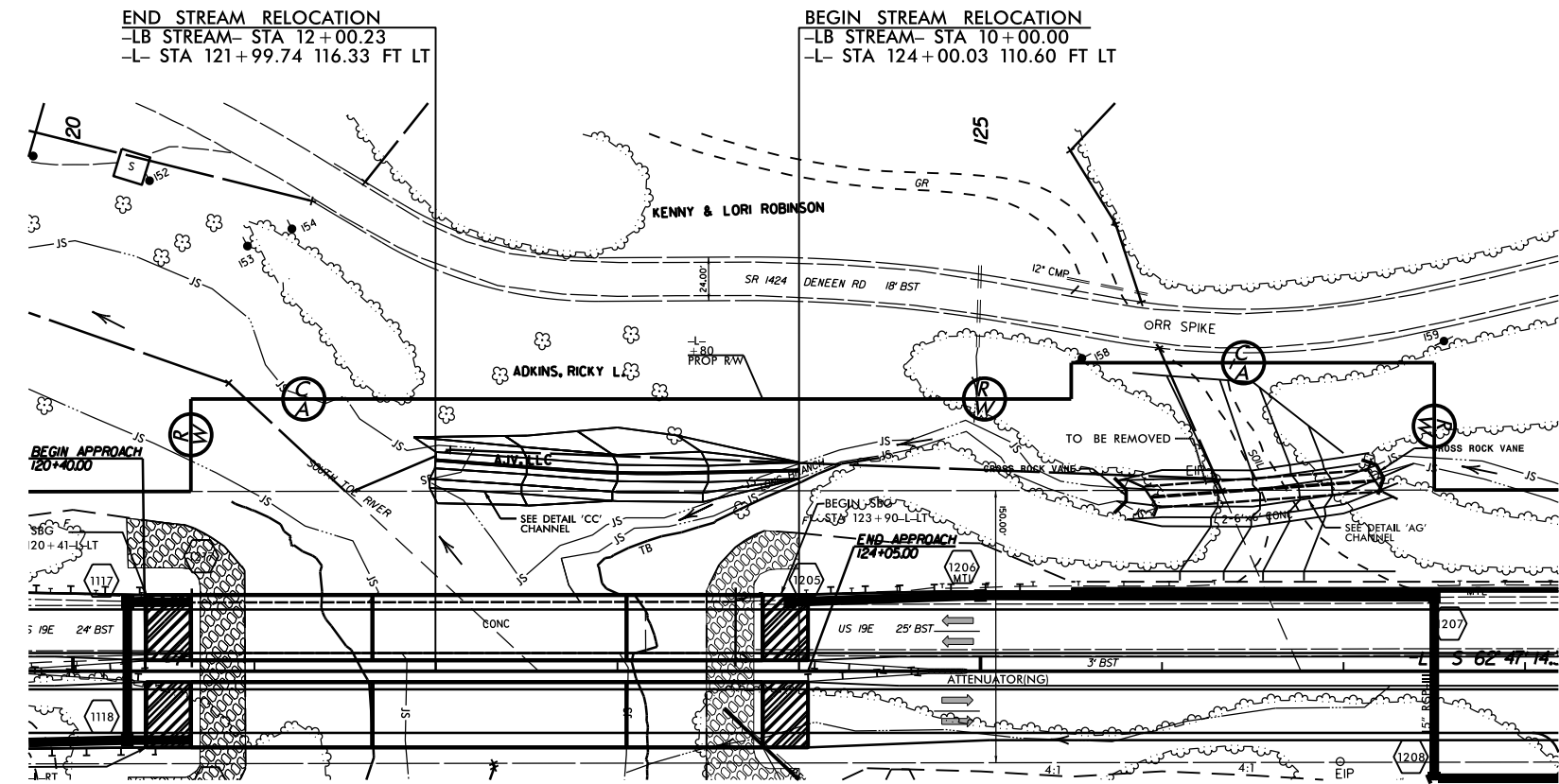


PROJECT REFERENCE NO.	SHEET NO.
	1112
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



TS TS  
DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

LONG BRANCH STREAM RELOCATION  
SITE 5a



PROJECT REFERENCE NO.  
**R-2519B**

SHEET NO.

ROADWAY DESIGN ENGINEER

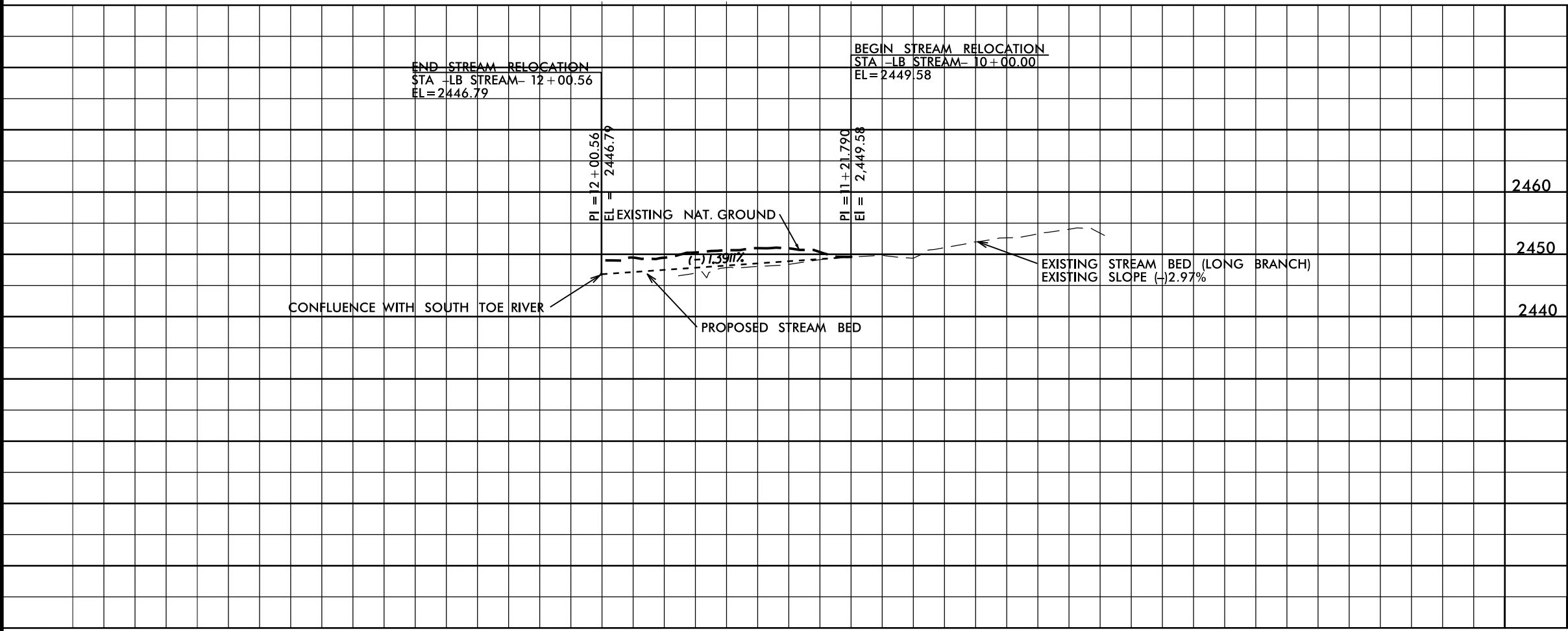
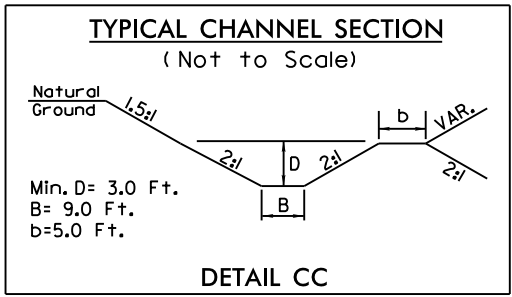
HYDRAULICS ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

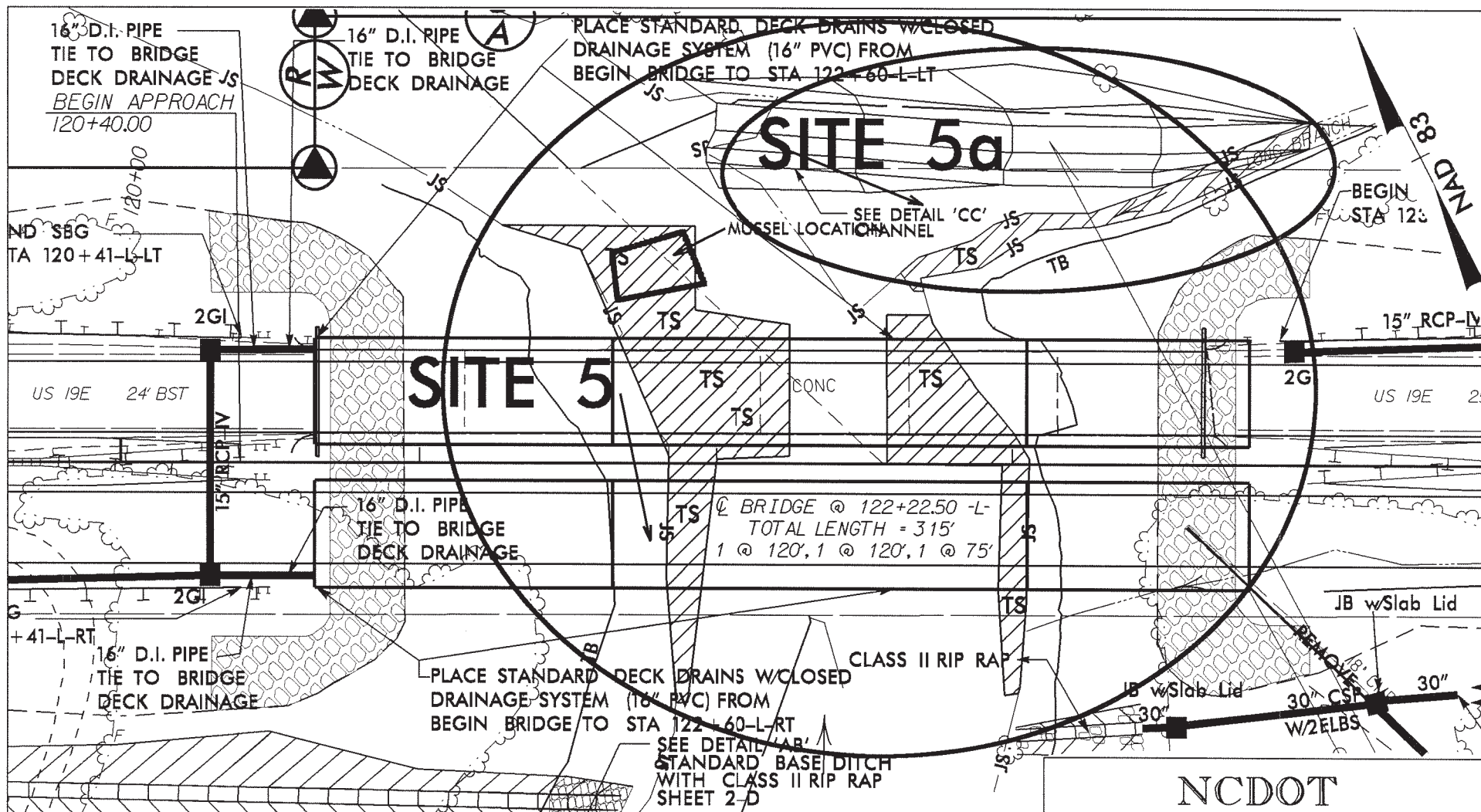
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100'

GRAPHIC SCALE



PROPOSED LONG BRANCH  
HORIZONTAL ALIGNMENT  
PI -LP STREAM- Sta 10+97.20  
 $\Delta = 5' 35' 17.0''$  (RT)  
 $D = 8' 46' 14.7''$   
 $L = 63.71'$   
 $T = 31.88'$   
 $R = 653.26'$



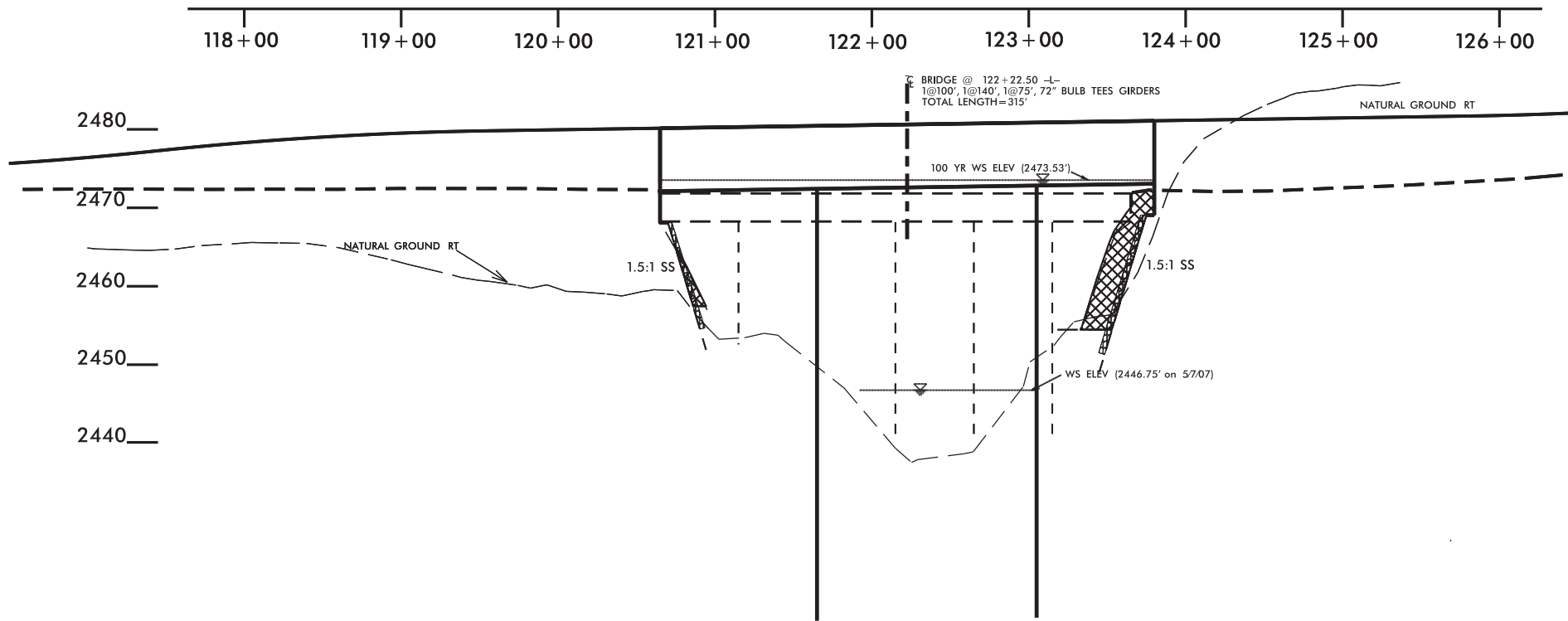
# IMPACT ENLARGEMENT



TS TS  
DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL



A DECK DRAINAGE SYSTEM  
WILL BE REQUIRED

CRANE PAD AND CAUSEWAY WILL BE NEEDED TO  
INSTALL THE PIERS AND SET GIRDER.

ACCESS SHOWN FOR DEMOLITION OF THE EXISTING  
STRUCTURE.

EACH CAUSEWAY CAN BE INSTALLED AT DIFFERENT  
TIMES TO MAINTAIN 50% RIVER FLOW.

CAUSEWAY WILL BE NEEDED FOR DRILLING THE  
PIERS AND GIRDER ERECTION.

LONG BRANCH CREEK WILL BE REALIGNED TO  
ALLOW MIN. OF 1 GROWING SEASON PRIOR TO  
PROJECT COMPLETION.

# PROFILE

## SITE 5

### SCALE

1:100' HORIZONTAL

1:20' VERTICAL

## NCDOT

**DIVISION OF HIGHWAYS**  
**YANCEY/MITCHELL COUNTY**  
**PROJECT: 35609.1.1 (R2519B)**  
**US 19 EAST FROM NC 80**  
**IN YANCEY TO WEST OF**  
**SPRUCE PINES IN MITCHELL**

**SHEET**

**OF**

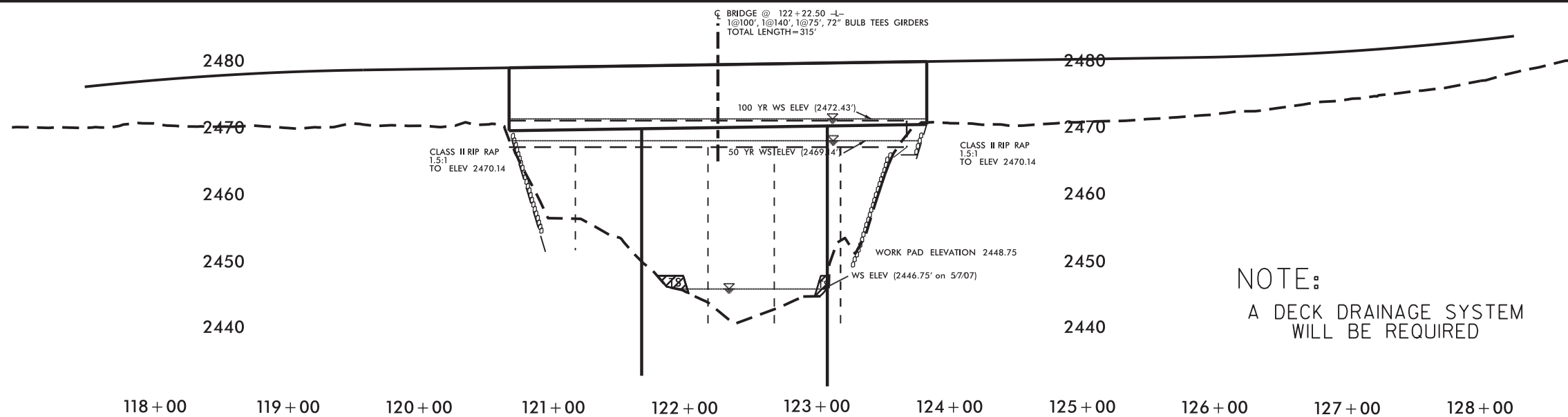
**01 / 16 / 13**



8/17/99

REVISIONS

SYTIME  
DESIGN  
LAW  
FIRM



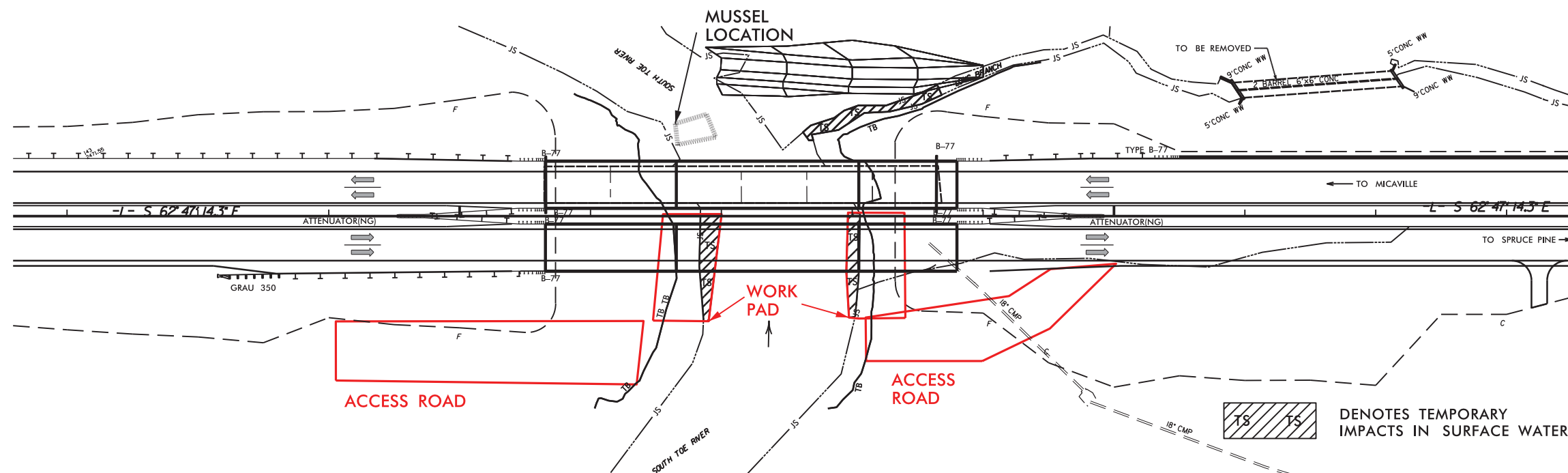
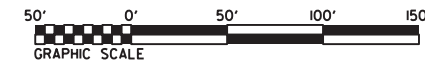
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NOTE:  
A DECK DRAINAGE SYSTEM  
WILL BE REQUIRED

3 SPANS-1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE  
RELOCATE LONG BRANCH CREEK TO ALLOW MIN. OF 1 GROWING SEASON  
PRIOR TO PROJECT COMPLETION. WORK PAD WILL BE NEEDED TO INSTALL THE PIERS  
AND SET GIRDERS (EASTBOUND).

## PHASE 1 – SITE 5

118+00 119+00 120+00 121+00 122+00 123+00 124+00 125+00 126+00 127+00

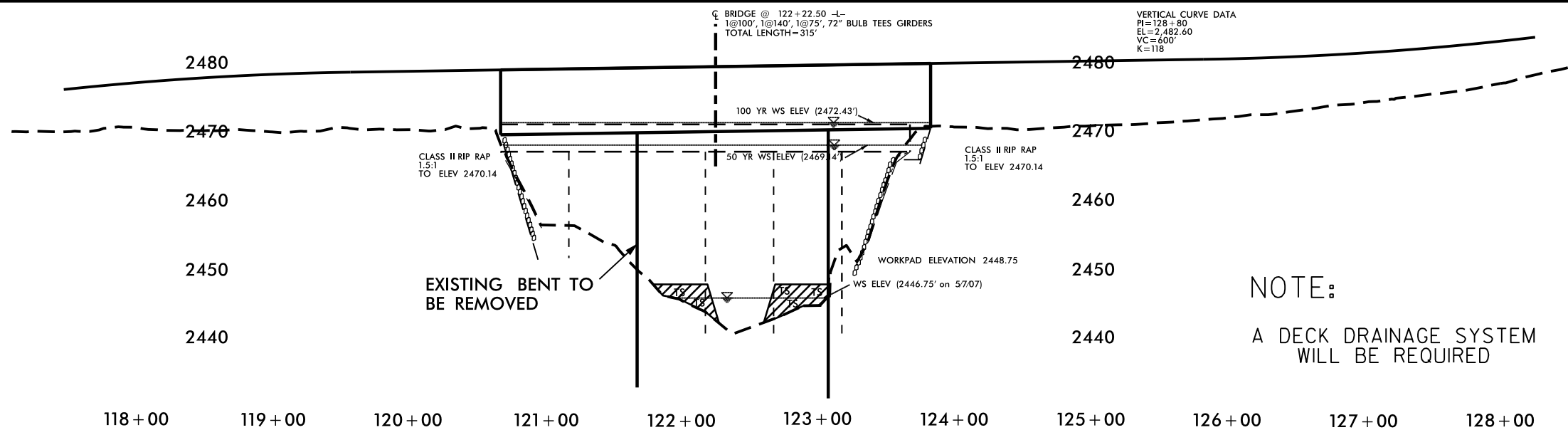




8/17/99

REVISIONS

SYTIME  
DESIGN  
LAW  
FIRM



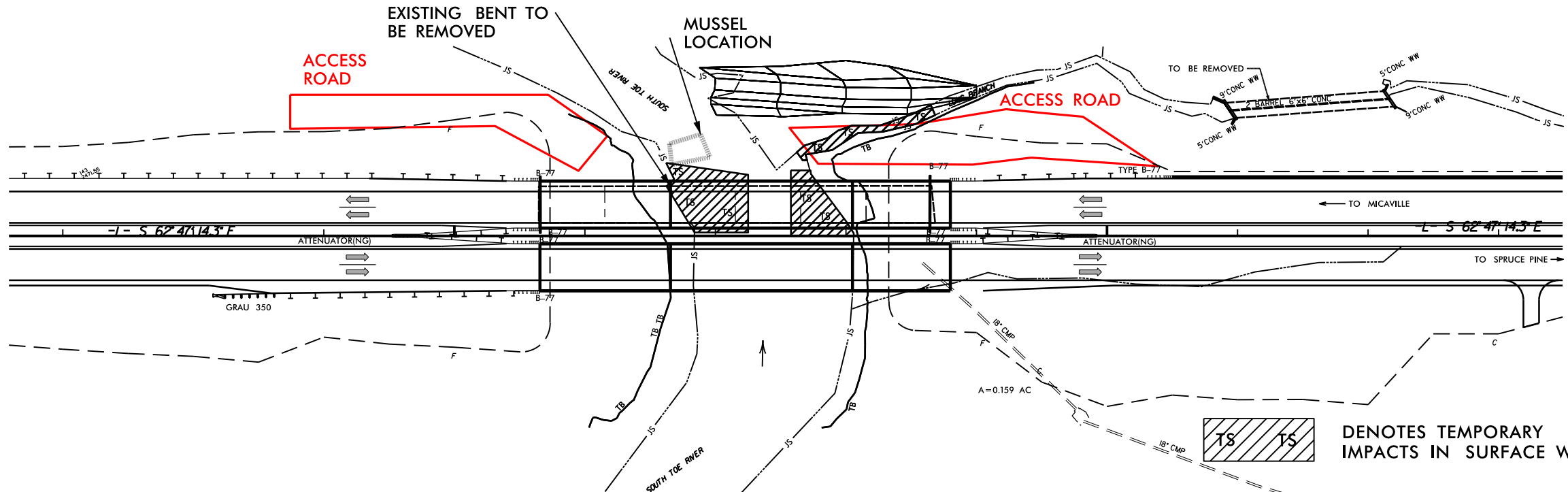
PROJECT REFERENCE NO.	SHEET NO.
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

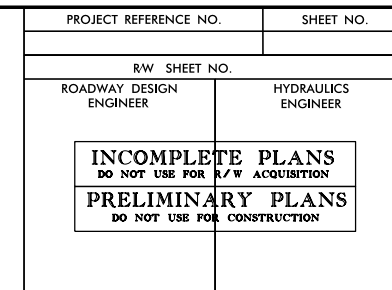
NOTE:  
A DECK DRAINAGE SYSTEM  
WILL BE REQUIRED

3 SPANS-1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE  
ACCESS SHOWN FOR DEMOLITION OF THE EXISTING STRUCTURE (WESTBOUND).  
EACH WORK PAD CAN BE INSTALLED AT DIFFERENT TIMES TO MAINTAIN 50% RIVER FLOW.

# PHASE 2 – SITE 5

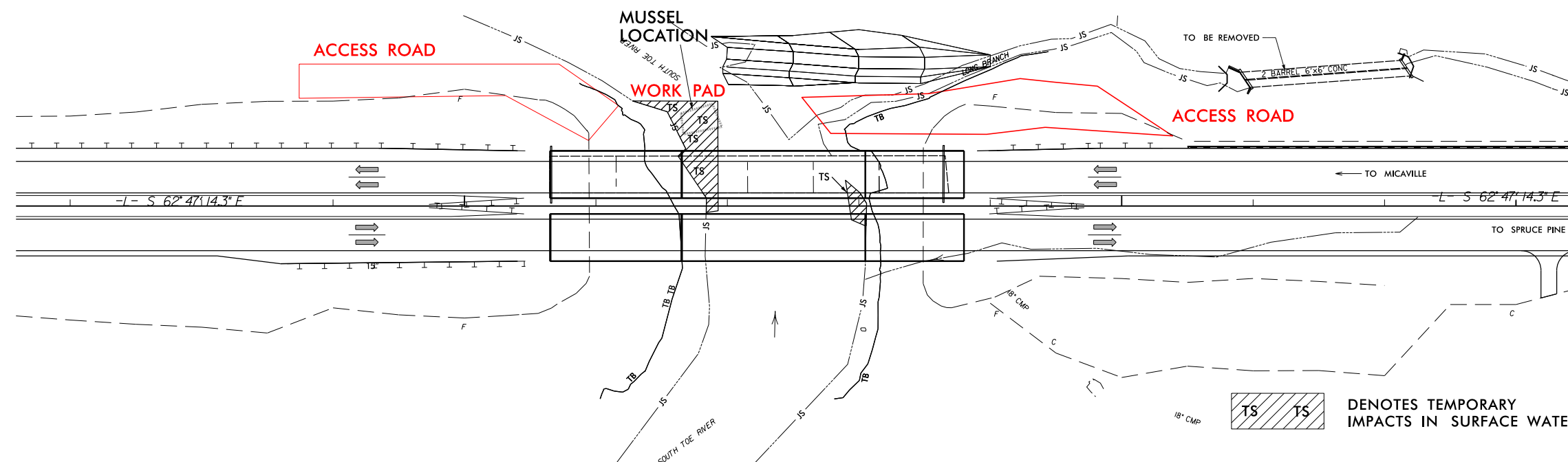
118+00 119+00 120+00 121+00 122+00 123+00 124+00 125+00 126+00 127+00





WORK PADS WILL BE NEEDED FOR DRILLING THE PIERS AND GIRDER ERECTION.  
LONG BRANCH CREEK WILL HAVE ALREADY BEEN RELOCATED.

## PHASE 3 – SITE 5



# APPENDIX B

## STORMWATER MANAGEMENT PLAN

# STORMWATER MANAGEMENT PLAN

R-2519B, State Project: 35609.1.1

March 6, 2013

County: Yancey/Mitchell

Hydraulics Project Manager: Stephen Morgan, PE

## **ROADWAY DESCRIPTION**

The project involves the widening of US 19E from SR 1186 (Old US 19) on the west side of Micaville in Yancey County to Multi-Lane section west of Spruce Pine in Mitchell County. The proposed typical section is a four lane divided shoulder and ditch section with a 20 ft. raised median.

## **ENVIRONMENTAL DESCRIPTION**

*(State Environmental Assessment, NRTR; NCDOT)*

The study area is located in the Blue Ridge physiographic province of western North Carolina. The topography in the project study area is generally characterized as rolling hills with steeply sloping, deeply cut drainage ways. Elevations in the study area range from 2,600 to 3,000 feet above mean sea level (USGS 1978, 1994). The project study area consists of existing maintained right-of-way including fill slopes, rural residential, commercial, agricultural, and forested areas.

The project study area is located within the French Broad River Basin. All streams in the study area classified by NCDWQ have been assigned a Best Usage Classification of B, C, and may contain Tr and/or ORW supplemental classifications (NCDENR 2003). The unnamed tributaries (UT) present within the project area have not been individually classified by NCDWQ; therefore, they carry the same classification as their receiving streams. The major streams are shown in Table 1, along with identifications, indexes and best usage classifications. The physical characteristics of all the streams within the project study area are shown in Table 2 and Table 3.

Table 1: NCDWQ Stream Identification, Index Numbers, and Best Usage Classification for the Major Drainages within the R-2519B Study Area. *(NCDOT NRTR, 2004)*

<b>NCDWQ Stream Identification</b>	<b>Stream Identification and Map Code</b>	<b>NCDWQ Stream Index Number (SIN)</b>	<b>DWQ Best Usage Classification</b>
South Toe River	STR	7-2-52-(30.5)	B; Tr, ORW
Little Crabtree Creek	2A	7-2-52-33	C; Tr
Big Crabtree Creek	1CC	7-2-48	C; Tr
Long Branch	2D, 6UT2D	7-2-48-52-31	C; Tr
Mine Branch	UT STR	7-2-52-32	C; Tr
Brushy Creek	2BC	7-2-48-4	C; Tr
English Creek	1F, 2UT1F	7-2-42	C; Tr
Ayles Creek	3UT2A	7-2-52-33-11	C; Tr

Table 2. Physical Characteristics of Surface Water within the R-2519B Study Area. (NCDOT NRTR, 2004)

Stream ID and Map Code*	Bank Height (feet)	Bankfull Width (feet)	Bank Stability	Sinuosity	Substrate	Water Clarity	USACE Stream Quality Assessment Score	Stream Determination**
UT2A	3-6	3	Stable	None	Gravel/sand	Clear	45.5	Perennial
2A	18-20	15	Stable	Low	Sand/gravel/cobble	Clear	74.5	Perennial
2UT2A	3	2.5	Stable	None	Sand/gravel/cobble	Clear	48.5	Perennial
3UT2A	10	15	Stable	Low	Sand/cobble	Clear	63	Perennial
2B	5-10	3	Stable	Low	Sand/cobble	Clear	60	Perennial
UT2B	0.5	2	Stable	Low	Sand/cobble	Clear	51	Perennial
2C	3-40	3	Stable	Moderate	Sand/cobble	Clear	65	Perennial
STR	10-30	60-100	Stable	Moderate	Sand/gravel/cobble	Clear	83	Perennial
2UT STR	5	3	Stable	Low	Sand/cobble	Clear	41	Perennial
UT STR	5	3	Stable	Low	Sand/cobble	Clear	63	Perennial
3UT STR	0.5-10	2	Stable	Low	Sand/gravel/cobble	Clear	34	Perennial
2D Upstream	3-4	5-6	Stable	Moderate	Sand/gravel/cobble	Clear	60	Perennial
2D Midstream	3-40	10	Stable	Low	Sand/gravel/cobble	Clear	88	Perennial
2D Downstream	2-8	12	Stable	Low	Sand/gravel/cobble	Clear	75	Perennial
UT2D Upstream	2	4	Stable	Low	Sand/gravel	Clear	32	Intermittent
UT2D Downstream	1-3	0.5-1	Stable	Low	Sand/gravel	Clear	55	Perennial
2UT2D	4	2-3	Stable	Moderate	Sand	Clear	62	Perennial
3UT2D	3	3-15	Stable	Low	Sand	Clear	59	Perennial
4UT2D	0.5-10	2-20	Stable	Moderate	Sand/gravel/cobble	Clear	61	Perennial
UT4UT2D	0.5-6	2-3	Stable	Low	Sand/gravel/cobble	Clear	62	Perennial
5UT2D	1-3	1-3	Stable	Low	Sand/gravel/cobble	Clear	51	Perennial
6UT2D	1-3	1-3	Stable	Low	Sand/gravel/cobble	Clear	43	Perennial
7UT2D	2-3	2-3	Stable	Low	Sand/gravel/cobble	Clear	25	Perennial
8UT2D	1-3	2-6	Stable	Low	Sand/gravel/cobble	Clear	25	Perennial
9UT2D	1-2	1-4	Stable	Low	Sand/gravel/cobble	Clear	35	Perennial
10UT2D	0.5	1	Stable	Low	Sand/gravel/cobble	Clear	42	Perennial
11UT2D	3-5	1.5-3	Stable	Moderate	Sand/gravel/cobble	Clear	50	Perennial
12UT2D	3-18	2-3	Stable	Moderate	Sand/gravel/cobble	Clear	35	Perennial
14UT2D	1-3	1-1.5	Stable	Moderate	Sand/gravel/cobble	Clear	45	Perennial
13UT2D	1-3	1-1.5	Stable	Low	Sand/gravel/cobble	Clear	54	Perennial
1H	2-30	3-40	Stable	High	Sand/gravel/cobble	Clear	72	Perennial
4UT1H	2	1-3	Stable	Low	Cobble/gravel/silt	Clear	64	Perennial
UT1H	1-3	1-2	Stable	Low	Cobble/gravel/silt	Clear	77	Perennial
2UT1H	2-10	2-6	Stable	Moderate	Cobble/gravel/silt	Clear	54	Perennial
1I Upstream	1-3	1-3	Stable	Low	Gravel/sand/mud	Clear	75	Perennial
1I Downstream	0.5-10	0.5-6	Stable	Low	Cobble/sand	Clear	60	Perennial
UT1I	0.5	1	Stable	Low	Sand/gravel/cobble	Clear	47	Perennial
1CC	5-20	25	Stable	Moderate	Sand/gravel/cobble	Clear	77	Perennial
UT1CC	5-20	1-5	Stable	Moderate	Sand/gravel/cobble	Clear	67	Perennial
UTUT1CC	1	1	Stable	Low	Silt/cobble	Clear	57	Perennial



Table 2 Continued... Physical Characteristics of Surface Water within the R-2519B Study Area. (NCDOT NRTR, 2004)

Stream ID and Map Code*	Bank Height (feet)	Bankfull Width (feet)	Bank Stability	Sinuosity	Substrate	Water Clarity	USACE Stream Quality Assessment Score	Stream Determination**
2UTUT1CC	1-20	1	Stable	Low	Silt/cobble	Clear	54	Perennial
2UT1CC	1	2	Stable	Moderate	Silt/cobble	Clear	78	Perennial
3UTUT1CC	0.5-5	1-5	Stable	Moderate	Silt/cobble	Clear	72	Perennial
UT3UTUT1CC	0.5-5	1-2	Stable	Moderate	Silt/cobble	Clear	69	Perennial
UTUT3UTUT1CC	0.5-3	1-5	Stable	Low	Silt/cobble	Clear	67	Perennial
2E	2-4	6	Stable	Moderate	Cobble/gravel/sand	Clear	69	Perennial
UT2E	1	4	Stable	Moderate	Cobble/gravel/sand	Clear	54	Perennial
2UT2E	2	5	Stable	Moderate	Silt/cobble	Clear	50	Perennial
3UT2E	2	3	Stable	Moderate	Silt/sand/gravel	Clear	69	Perennial
UT3UT2E	2	0.5	Stable	Low	Sand/gravel	Clear	37	Perennial
2BC	2-4	15	Stable	Moderate	Cobble/gravel/sand	Clear	21	Perennial
UT2BC	1	3	Stable	Low	Gravel/sand	Clear	55	Perennial
11UT1G	3-5	3-6	Stable	Low	Gravel/cobble/sand	Clear	68	Perennial
1G Upstream	0.5-1.5	2-8	Stable	Low	Gravel/cobble/sand	Clear	73	Perennial
1G Downstream	1-4	4-10	Stable	Moderate	Silt/sand/gravel/cobble	Clear	58	Perennial
UT1G	0.5-29	2-4	Stable	Low	Sand/cobble	Clear	50	Perennial
2UT1G	1-2	3-6	Stable	Moderate	Sand/cobble	Clear	66	Perennial
3UT1G	2-6	2-4	Stable	Low	Sand/cobble	Clear	12	Perennial
4UT1G	0-2	1-4	Stable	Low	Sand/cobble	Clear	51	Perennial
5UT1G	2	5	Stable	Low	Sand/silt/gravel	Clear	40	Perennial
6UT1G	1	2	Stable	Low	Sand/gravel	Clear	18	Perennial
7UT1G	0.5	1-2	Stable	Low	Silt/sand	Clear	6	Perennial
8UT1G	0.5	1	Stable	Low	Silt/gravel	Clear	53	Perennial
9UT1G	4	1	Stable	Low	Gravel/sand	Clear	52	Perennial
10UT1G	0.5	1	Stable	Low	Silt	Clear	72	Perennial
1D	0.5-2	1-8	Stable	Low	Gravel/Sand	Clear	52	Perennial
1B	2-8	2-4	Stable	Moderate	Sand/clay	Clear	60	Perennial
1C	0.5-3	2-8	Stable	Moderate	Sand/clay	Clear	64	Perennial
1F	0.5-2	1-3	Stable	Moderate	Sand/clay	Clear	70	Perennial
UT1F	0.5-2	0.5-2	Stable	Moderate	Sand/clay	Clear	60	Perennial
2UT1F	3-15	1-2	Stable	Moderate	Sand/clay	Clear	57	Perennial
1A	4-8	1.5-2	Stable	Low	Clay/sand	Clear	59	Perennial
1Z	2-18	1-2	Stable	Moderate	Sand/clay	Clear	51	Perennial

\*UT = Unnamed tributary  
\*\* Stream Determination is derived from information gathered during the completion of USACE Stream Quality Assessment Worksheets and NCDWQ Stream Classification Forms

Table 3: Updated 2012 Change Summary from 2004 Verification (NCDOT Natural Environment Section)

Resource Type	Map Id.	Status	Size in Study Area	Project Location	Comments
Stream	SA	Added	468 lf x 5 lf	Figures 2 & 3	Perennial stream connected to Little Crabtree Creek
Stream	SB	Added	449 lf x 3 lf	Figure 5	Perennial stream connected to the South Toe River
Stream	3UTSTR	Removed	346 lf x 5 lf	Figure 6	Stream no longer exists – original survey prior to drought
Wetland	5UT2D	Removed	0.2 ac	Figure 7	Wetland filled by property owner
Wetland	2DO	Partially removed	0.1 ac/0.06 ac remaining	Figure 10	Wetland partially filled by property owner
Wetland	WA	Added	0.01 ac	Figure 10	Wetland connected to stream 1H
Wetland	1IC	Partially disturbed	0.03 ac	Figure 12	Wetland partially disturbed by property owner (Horse corral) though wetland function remains
Wetland	UT1CC-B	Removed	0.1 ac	Figure 13	Wetland filled by property owner
Stream	SC	Removed	303 lf x 2 lf	Figure 14	Stream SC was added for the 2012 Re-Verification by NCDOT but was thrown out by DWQ & USACE
Stream	UT1CC	Extended	3,368 lf x 320 lf	Figure 14	Perennial stream extended 320 lf from original endpoint just past Wetland UT1CC-C
Stream	SD	Added	235 lf x 2 lf	Figure 15	Perennial stream that connects to Stream 2E
Wetland	WB	Added	0.03 ac	Figure 15	Wetland connected to Stream SD
Stream	2UT2E	Removed	171	Figure 15	Couldn’t find this channel – possibly combined with flow of main channel – 2E
Stream	SE	Added	565 lf x 2 lf	Figure 16	Stream SE connects to Brushy Creek
Wetland	UT2BC	Removed	0.3 ac	Figure 16	Hydrology has been apparently changed not sure if natural or intentional
Stream	SL	Added	149 x 2 lf	Figure 16	Perennial Stream emerges from a spring and is connected to Stream SE
Stream	SF	Added	620 lf x 3 lf	Figure 18	Perennial stream that connects to stream 1G
Stream	SG	Added	478 lf x 2 lf	Figure 18	Perennial stream that connects to stream 1G
Stream	SH	Added	176 lf x 1 lf	Figure 19	Perennial stream that may connect to Pond H
Stream	SI	Added	547 lf x 2 lf	Figures 19 & 20	Perennial stream that emerges from a spring
Stream	1B	Removed	208 lf x 5 lf	Figure 20	Perennial tributary to stream 1C that existed prior to the drought
Stream	SJ	Added	248 lf x 2 lf	Figure 21	Perennial tributary to stream to English Creek
Stream	SK	Added	238 lf x 4 lf	Figure 21	Perennial tributary to the North Toe River
Stream	SKA	Added	645 lf x 1 lf	Figure 21	Perennial stream SKA emerges from a spring and runs in a pipe and concrete ditch to Stream SK
Stream	SKB	Added	107 lf x 3 lf	Figure 21	Perennial tributary to SK

**ENVIRONMENTAL DESCRIPTION, continued***(State Environmental Assessment, NCDOT)*

The South Toe River and nearly all its tributaries are classified as ORW. The endangered Appalachian Elktoe Mussel has been found in the South Toe River. No streams within the study area are designated as North Carolina Natural and Scenic Rivers, or as National Wild and Scenic Rivers. Furthermore, the French Broad River Basin is not currently subject to riparian buffer protection rules by the NCDWQ. None of the water resources within the project vicinity are designated as biologically impaired water bodies regulated under the provisions of CWA §303(d) (NCDWQ 2002).

**PROJECT IMPACTS**

To accommodate road widening, existing drainage structures and waterway conveyances will need to be extended, replaced, or relocated. There are 9 Reinforced Concrete Box Culverts (RCBC) on this project. The following streams are conveyed with RCBC's: Little Crabtree Creek, Long Branch Creek (2), Tributary to Long Branch Creek, Brushy Creek, and Unnamed Tributary to Brushy Creek (4). There are 2 bridges on the project, one over South Toe River and one over Big Crabtree Creek. Six sites will require stream relocations. A summary of project impacts is listed in Table 4.

Table 4 Summary of Project Impacts

	Permanent Fill In Wetlands	Temp. Fill In Wetlands	Excavation in Wetlands	Mechanized Clearing in Wetlands	Hand Clearing in Wetlands	Permanent SW impacts	Temp. SW impacts	Exist. Channel Impacts Permanent	Exist. Channel Impacts Temp.	Natural Stream Design
	ac	ac	ac	ac	ac	ac	ac	ft	ft	ft
Total Impacts	0.07		0.05	0.04		1.08	0.46	7646	1052	2231

Short-term impacts to water quality, such as sedimentation and turbidity, may result from construction-related activities. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of NCDOT's "Design Standards in Sensitive Watersheds" (15A NCAC 04B.0024).

**BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES**

Best Management Practices (BMPs) and measures used on the project are an attempt to reduce the stormwater impacts to the receiving streams due to erosion and runoff. The primary BMP on this project is the grass swale. Grass swales were used to reduce velocities and promote infiltration. Grass swales remove suspended solids, metals, and nutrients through sedimentation, vegetative filtration, infiltration, and biological uptake. The use of grassed roadway ditches (which meet grass swale criteria) and shoulders also aids in pollutant removal through vegetative filtration and infiltration.

Preformed scour holes (PSHs) and energy dissipaters will be used to attenuate and disperse flow. Preformed scour holes promote runoff infiltration and reduce downgrade erosion. Rip rapped ditches and riprap along stream banks were used where warranted to control erosion. Where possible, piped drainage systems were designed to outlet away

from surface waters to allow time for infiltration in ditches or natural areas. Ditches were ended in flat floodplain areas where possible to allow dispersal and infiltration.

Hazardous Spill Basins will be used at the South Toe River crossing. Dry detention, where practicable, will be used on the project. A dry detention basin is a stormwater runoff quantity control BMP that attenuates stormwater flows, promotes settlement of suspended solids and reduces erosive velocities downstream of the outlet structure. The dry detention basin is a permanent BMP device that will be maintained under NCDOT's Inspection and Maintenance program.

The inverts of new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter up to 1 ft. deep. Culverts were designed to protect stream stability and provide fish passage where possible. Low flow sills with low flow channels were used on new culverts and culvert extensions where enough hydraulic conveyance exists.

#### **Hazardous Spill Basins**

- Station 111+50 to station 119+00 –L- right side. South Toe River. Capacity=2509 cy, Storage required=236.2 cy.
- Station 124+50 to station 127+00 –L- right side. South Toe River. Capacity=532 cy, Storage required=81 cy. This basin also doubles as a Dry Detention Basin.

#### **Dry Detention Basins**

- Station 83+00 to station 84+50 –L- right side. Capacity required=326 cy, capacity provided=426 cy.
- Station 155+00 to station 157+00 –L- right side. Capacity required=208 cy., capacity provided=197 cy.
- Station 250+75 to station 252+00 –L- Capacity required=545 cy, capacity provided= 678 cy.

#### **Preformed Scour Holes (PSH)**

- Station 246+30 –L- LT
- Station 324+70 –L- LT
- Station 337+90 –L- RT

#### **Culverts (9 Total)**

- Station 44+12 –L-. (Site 2) Little Crabtree Creek (Stream 2A). Retain existing 4@12'x9' RCBC and extend up and downstream with a 4@ 12'x9' RCBC. The culvert extensions are buried 1' below the stream bed. The downstream extension has 1' high baffles spaced at 35 ft. intervals. Floodplain benches are used up and downstream in the outer barrels of the culvert. Class II riprap is used for bank stabilization at the inlet and outlet.
- Station 134+80 –L-. (Site 7) Long Branch Creek. (Stream 2D) Extend 2 @ 6'x6' RCBC on US 19 upstream and connect to existing 2 @ 6'x6' RCBC on –Y14\_ and extend 2 @ 6'x6' RCBC on –Y14- upstream. The upstream culvert extension is buried 1' below the streambed.

- Station 155+45 –L- (Site 8B) Tributary to Long Branch Creek. (Stream 2D) Retain existing 7'x5' RCBC and extend with 1 @ 7'x5' RCBC upstream and extend with 1 @ 7'x7' RCBC downstream with sills at outlet. Use rock cross vanes at outlet backfilled with native stone to bring stream grade up to culvert outlet elevation. Rock cross vanes are used at the outlet stream. Natural stream design is not used due to the limited right of way.
- Station 158+00 –L- (Site 8C) Tributary to Long Branch Creek. (Stream 2D) Replace existing 1@10'x5' stone culvert (w/concrete top slab) with 1 @ 8'x6' RCBC with alternating 0.5' and 1.0' sills @ 20' intervals. There will be a low flow meandering channel inside the culvert. Downstream of this culvert is a stream relocation with 2 rock cross vanes. Class I rip rap is used downstream for bank stabilization. Construct floodplain bench at outlet of culvert. Natural stream design is not used due to the limited right of way
- Station 320+00 –L-. (Site 29) Brushy Creek. (Stream 2BC) Extend existing 3@8'x8' RCBC upstream and extend at 3@8'x11' RCBC downstream with fish ladder. Include 1' high sill in 2 outer barrels of culvert at entrance only. Include 6" high sill in middle barrel @12' spacing in existing culvert and at entrance of proposed culvert extension. Existing culvert outlet is perched. Bank stabilization is used up and downstream.
- Station 324+00 –L-. (Site 30) Unnamed Tributary to Brushy Creek. (Stream 1G) Install a new 2 @ 8'x8' RCBC with low flow meandering channel and sills. Place alternating 0.5' and 1.0' high sills @ 20' intervals in western most barrel. Upstream is a stream relocation and downstream there is bank stabilization and natural stream design, placing the tributary back in its historical location.
- Station 327+50 –L-. (Site 31) Unnamed Tributary to Brushy Creek. (Stream 1G) Extend existing 2 @ 7'x7' RCBC downstream. Culvert extension is buried 1'. Bank stabilization is used downstream.
- Station 346+50 –L-. (Site 33) Unnamed Tributary to Brushy Creek. (Stream 1G) Extend existing 2@7'x6' RCBC upstream. The upstream extension is buried 0.5'. There is stream relocation on the upstream side with natural stream design. The design includes a low flow bench at the upstream side of the culvert extension.
- Station 11+00 –Y34-. (Site 34) Unnamed Tributary to Brushy Creek. (Stream 5UT1G) Replace 1 @ 6'x6' concrete culvert with concrete wing walls with 1@6'x7' RCBC with alternating 0.5' and 1.0' sills @ 15' intervals. Channel improvements will be done upstream and 20' of channel transition will be done downstream. The culvert is buried 1' upstream and 0.5' downstream.



**STORMWATER OUTFALLS**

(Permit sites referenced)

(BMP's noted where used)

**Plan sheet 4 (Site 1)**

- **(Site 1)** Station 23+45 –L- (11+88 –Y1-). (Stream 2UT2A) Part of existing 30" CMP is replaced with a junction box and 30" RCP outlet to Class 'I' rip rap. This will dissipate the energy and help reduce the outlet velocities.
- Station 25+50 –L- Lt. (Stream 2UT2A) A small drainage system drains to standard 'V' ditch for 115 ft. and then to standard 'V' ditch with PSRM for 240 ft. before entering stream 17' away.

**Plan sheet 5 (No Site, Non JS)**

- Station 32+70 –L- Rt. (Non JS) Existing 15" CMP has a 7' vertical drop at outlet. The existing 18" CMP downstream is perched 1'. The new drainage system includes a grass ditch into a drainage system with a junction box to dissipate the energy and another open throat catch basin (where there is currently a large 4' deep x8' wide scour hole) to dissipate the energy again before discharging onto a rip rap pad reducing outlet velocities before entering Little Crabtree Creek (Stream 2A).

**Plan sheet 6 (Site 2/2A)**

- **(Site 2)** Station 44+50 –L- (Stream 2A) Little Crabtree Creek. Retain existing 4@12'x9' RCBC and extend up and downstream with a 4@ 12'x9' RCBC. The culvert extensions are buried 1' below the stream bed. The downstream extension has 1' high baffles spaced at 35 ft. intervals. Floodplain benches are used up and downstream in the outer barrels of the culvert. Class II riprap is used for bank stabilization at the inlet and outlet. During construction, erosion control devices, such as stilling basin and impervious dikes may be used.  
There is also an existing 18" CMP cross pipe that will be removed. This drainage is now in a system that outlets further away from Little Crabtree Creek in a standard base ditch lined with rip rap.
- **(Site 2A)** Station 9+70 –Y4- (Stream SA) Replace existing 15" PVC pipe with 2 @ 30". Place Class I Rip Rap on banks at outlet for bank stabilization.
- Along –Y4- on the right side is a long lateral base grassed swale approximately 450' long (see detail 'T' on plan sheet 2-D of the roadway plans). This minimizes impacts to stream SA.

**Plan sheet 7 (site 3)**

- **(Site 3)** Station 55+00 –L- (Stream 2B) Drainage system outlets into stream with rip rap stream bank protection at the outlet. Several drop structures will be used to dissipate the energy in the drainage system and reduce outlet velocities.
- Station 57+60 to 58+50 –L- Rt. (Non JS) Use lateral grassed swale before flow goes over rip rap toe protection Station 58+50 to 59+00 -L-Rt. and enters stream. Toe protection also used upstream from Station 59+05 to 60+00 –L- Rt. before flow enters stream.

#### Plan sheet 9 (Site 4)

- **(Site 4)** Station 79+00 –L- Lt. (Stream 2C) (Phipps Ck) Existing 4'x4' RCBC has a large scour hole at the outlet. The existing outlet is perched 2.6'. The new drainage system will have several deep junction boxes to dissipate the energy and reduce the outlet velocities. Use Class 'II' rip rap at outlet on bank only. (Stream 2C)
- Station 83+00 to 84+50 –L- Rt. Hazardous Spill Basin/Dry Detention Basin before drainage system to South Toe River (STR)

#### Plan sheet 10 (Site 4A)

- **(Site 4A)** Station 99+65 –L-. (Stream SB) Replace existing 36" (labeled 42") CMP with 36" welded steel pipe. Existing outlet is perched 2.3'. In lieu of rock cross vanes, the proposed drainage system will include several junction boxes to dissipate the energy and reduce outlet velocities. Use Class 'I' rip rap at outlet before entering stream. Rip rap only on the bank is not practicable at this location.

#### Plan sheet 11/12 (Site 5,5A,6) South Toe River

- **(Site 5) South Toe River Bridge** This bridge design includes 2 hazardous spill basins on either side of the bridge. The proposed bridge design minimizes piers in the water (as described in the BO). The design is going from a 6 span bridge to a 3 span bridge. Two piers in the main channel are being eliminated. Phase 1 of the bridge construction will involve temporary impacts due to work pad needed to install the piers and set girder of the south side of the proposed bridge (eastbound). Phase 2 of the bridge construction includes work pads installed on either side of the South Toe River at different times to maintain 50% river flow. The temporary work pads are used to remove the existing bridge on the north side (westbound). Phase 3 of the bridge construction includes work pads needed for drilling the piers and girder erection. Note: Mussels will be relocated prior to any work on this bridge. A deck drainage system is included in the proposed design to further minimize the impacts to the stream. The proposed work pads are minimized to a temporary impact of 0.15 ac=6,534 sf versus the preliminary estimate of 9,600 sf. included in the BO. Permanent impacts are not totally avoided due to piers at the bank on the east side of the bridge (31.8 sf.)
- **(Site 5A)** Station 122+00 to Station 124+00 –L- (Lt) Stream relocation of Long Branch Creek. As an alternative to having impacts to Long Branch Creek during

construction, the stream will be relocated within the floodplain away from the work zone using similar dimension and profile. The relocated stream will be stabilized with native vegetation. The preference is for the stream to be relocated prior to bridge construction, with a minimum of one growing season prior to project completion.

- From Station 111+50 to 119+00 –L- (Rt.) Lateral base grassed swale/ Hazardous Spill Basin. From station 119+50 to 121+50 –L- (Rt.) Standard base ditch. (Excavation 67,740 cf.=2509 cy., storage required=6377 cf=236.2 cy.) From Station 121+50 to 121+75 –L- (Rt.) Standard Base ditch with Class ‘II’ rip rap before entering stream (South Toe River).
- Grassed Swale/Hazardous Spill Basin/Dry Detention Basin to small drainage system then to standard base ditch with Class ‘II’ rip rap from Station 123+00 to 123+50 –L- Rt. (Stream 3UTSTR) to South Toe River. (STR)
- Hazardous Spill Basin volume required=2,208 cf=81 cy
- Dry Detention Basin water quality volume required=3,009 cf=111 cy
- Basin capacity =14,355 cf=532 cy
- **(Site 6)** Station 125+75 to 127+20 -L- Lt. (Stream 2D) Long Branch Creek. Remove existing 2 @ 6’x6’ RCBC and replace with channel between US 19 and SR 1424 (Deneen Rd.)

#### Plan sheet 13 (Site 7) Long Branch Creek

- **(Site 7)** Station 135+00 to Station 138+00 –L- Long Branch Creek (Stream 2D) Extend existing 2 @ 6’x6’ RCBC upstream. Continue existing 2 @ 6’x6’ RCBC between 2 culverts (2 @ 6’x6’).
- **(Site 7A)** Station 136+00 (Stream UT2D) Tie in stream to culvert with 30” CSP.
- **(Site 7B)** Station 137+50 –L- Rt. (Stream 2UT2D) Replace existing 24” CMP drive pipe with 30” alternate pipe storm drainage system near SR 1151 Black Jack Rd. An extra depth 2GI is used near the outlet to dissipate the energy and reduce outlet velocities.
- **(Site 7C)** Station 139+50 –L- (Stream 3UT2D) Replace existing 54” CMP cross pipe with 54” CSP and 54” RCP near SR 1431 (Silver Springs Rd.).

#### Plan sheet 14 (Site 8)

- **(Site 8)** Station 152+00 to 155+00 -L- Rt. and 156+00 to 157+50 –L- Lt. (Stream 2D) The stream was filled over with roadway fill and relocated further away from the –L- line. The dimensions are similar to those of the existing stream. Rock cross vanes are used in the design to maintain a stable slope.
- **(Site 8A)** Station 150+90 –L- Existing 30” CMP is replaced with 36” RCP and 36” CSP. A junction box is used in the system to reduce outlet velocities.
- (Non JS) Station 155+40 to 157+00 –L- Rt. (Stream 2D) Dry Detention Basin is used at the end of a drainage system before outlet to culvert for energy dissipation.
- **(Site 8B)** Station 155+00 –L- (Site 8) Tributary to Long Branch Creek. (Stream 2D) Retain existing 7’x5’ RCBC and extend with 1 @ 7’x5’ RCBC upstream and extend

with 1 @ 7'x7' RCBC downstream with sills at outlet. Rock cross vanes at outlet backfilled with native stone to bring stream grade up to culvert outlet elevation.

- **(Site 8C)** Station 158+00 –L- (14+90 –Y17-) (Stream 2D) Tributary to Long Branch Creek. Replace existing 1 @ 10'x5' stone culvert (w/concrete top slab) with 1 @ 8'x6' RCBC with alternating 0.5' and 1.0' sills @ 20' intervals. There will be a low flow meandering channel inside the culvert. Downstream of this culvert is a stream relocation with 2 rock cross vanes. Class I rip rap is used downstream for bank stabilization. Construct floodplain bench at outlet of culvert.
- Note: Wetland 5UT2D is no longer present.

#### Plan sheet 15

- Avoided wetlands with roadway design.

#### Plan sheet 16 (Site 9,10,11)

- **(Site 9)** Station 179+80 –L- (Stream 2D) Remove existing 36" CMP and replace with Special Lateral Base Ditch.
- **(Site 10)** Station 182+80 –L- (Stream 12UT2C) Plug existing 36" CMP and replace with drainage system. Outlet lined with rip rap. Inlet standard base ditch lined with rip rap.
- **(Site 11)** Station 186+50 –L- (Stream 2D) Bank Stabilization used at outlet of drainage system.

#### Plan sheet 17 (Sites 12-15)

- **(Site 12)** Station 191+50 –L- (Stream 13UT2D) Stream replaced with 42" RCP in drainage system. Outlet of system has bank stabilization.
- **(Site 13)** Station 195+00 –L- (Wet 2DM) Fill in wetlands (0.05 ac.) Replace portion of stream (Stream 2D) with drainage system. Outlet of drainage system has bank stabilization.
- **(Site 14)** Station 197+00 –L- (Stream 2D) Fill in portion of stream and replace with drainage system.
- **(Site 15)** Station 198+50 –L- (Stream 2D) Fill in portion of stream and replace with drainage system.

#### Plan sheet 18 (Site 16-18)

- **(Site 16)** Station 205+66 –L- Lt. (Stream 1H) Remove existing 36" CMP and remove 18" HDPE and replace with 36" RCP and 60' of bank stabilization (where 18" HDPE was existing).
- **(Site 17)** Station 206+55 –L- Lt. (Stream UT1H) Remove existing 12" CMP and replace with 18" RCP and 18" CSP and bank stabilization.
- **(Site 18)** Station 214+00 –L- (Stream 2UT1H) Plug existing 54" CMP and replace with 54" Welded Steel Pipe and 54" RCP. Near the outlet, place a junction box to dissipate the energy and outlet with 60" RCP and standard base ditch with rip rap.

Plan sheet 20 -21 (Sites 19-23) Big Crabtree Creek

- **(Site 19)** Station 12+00 –Y21- (Stream 1I) Replace existing 42” RCP with 48” alternate pipe and Class “T” rip rap at outlet.
- **(Site 20)** Station 244+50 –L- Rt. (Wetland 1IC) Standard base ditch through wetland. All of wetland is being taken.
- **(Site 21)** Station 246+00 –L- Rt. (Stream 1I) Fill over existing stream due to road being widened. Stream is replaced parallel to the roadway with standard base ditch. Natural stream design is not used due to limited right of way.
- **(Site 22)** Station 247+85 –L- **(Big Crabtree Creek)** (Stream 1CC) 4@ 12’x12’ RCBC replaced with bridge. (Single span 185’ long, 96” steel girders) One alternative reviewed at this location was to extend the culvert and use retaining walls. This alternative was not acceptable to several agencies, therefore the culvert is being replaced by a bridge. Due to the bridge design, the grade had to be raised at this location. This pushed out the location of the slope stakes. This is a single span bridge, therefore there will be no piers in the channel. Existing Big Crabtree Creek channel dimensions will be matched for the day-lighted stream.
- **(Site 23)** Station 15+00 –Y23A- (Stream UT1CC) Replace 48” CMP with 60” RCP due to extending the limits of –Y23A-.
- Station 251+50 –L- (Rt) Dry detention basin used to minimize stormwater effects. Best management practice.

Plan sheet 22

- (Non JS) Three existing outlets are heavily eroded (some have 10’ deep holes) on the south side of the project. These outlets will no longer be used. Pipe drainage system will convey storm drainage past these outlets to the basin

Plan sheet 23 (Site 24)

- **(Site 24)** Station 281+50 –L- (Stream UT1CC) Plug existing 24” CMP and replace with a drainage system. Outlet of drainage system has standard ‘V’ ditch with Class ‘T’ rip rap as requested in a previous 4B meeting.

Plan sheet 24 (Site 25)

- **(Site 25)** Station 300+00 –L- (Stream 2E) Replace stream with drainage system. Existing 60” CMP is lined with 54” welded steel pipe. Standard base ditch is used at outlet of system.

Plan sheet 25 (Site 26-27)

- **(Site 26)** Station 302+50 –L- Lt. (Stream 2E) Portion of stream has bank stabilization at outlet. Portion of stream has 60” CSP replacing stream. At the outlet of the storm drain system is a 4’ base ditch lined with rip rap.



- **(Site 27)** Station 305+50 –L- Lt. (Stream SD) Existing 18” CMP is replaced with storm drain system. Bank stabilization is used at outlet of system.

Plan sheet 26 (Site 28-31) Brushy Creek

- **(Site 28)** Station 317+00 –L- (Stream SE) Existing 30” CMP is plugged and filled with flowable material. A new 30” welded steel pipe is installed using trenchless installation. The proposed drainage system has Class ‘I’ rip rap at the outlet. The inlet side has a standard base ditch lined with Class “I” rip rap.
- **(Site 29)** Station 320+00 –L- (Stream 2BC/1G) **Brushy Creek.** Extend existing 3@8’x8’ RCBC with 3@8’x8’ RCBC (buried 0.5’) upstream. Place 1’ high sill in 2 outer barrels at entrance only with 6” high sill in middle barrel @ 12’ spacing in existing culvert and at entrance of proposed culvert extension. Extend existing 3@8’x11’ RCBC downstream with fish ladder. During construction, erosion control devices, such as stilling basins and impervious dikes may be used. Due to the widening of the road, Stream 1G is filled in. (see next)
- **(Site 30)** Station 324+00 –L- (Stream 1G) Remove existing RCBC on SR 1235 Old US 19E (-Y30 -) Remove 2 each 72” CMP from driveways, Fill over stream and replace with new stream relocation. Install new 2@8’x8’ RCBC. Space alternating 0.5’ and 1.0’ high sills @ 20’ intervals in western most barrel. Natural stream design is used downstream of new culvert. (See UT to Brushy Creek Stream Relocation sheet.) There was a remnant stream located where the new natural stream will be placed. Station 324+70 –L- (Rt) preformed scour hole (PSH) at outlet of storm drainage system.
- **(Site 31)** Station 327+50 –L- (Stream 1G) Extend existing 2@ 7’x6’ RCBC with 2@7’x7’ RCBC downstream. Low flow is in western barrel only. Bank stabilization is used downstream for flood plain benching. Downstream extension is buried 1.5’. Temporary impacts are designated upstream to be used during construction.

Plan sheet 28 (Site 32-34)

- **(Site 32)** Station 345+00 –L- Rt. (Stream 8UT1G) Stream is replaced with junction box and 24” RCP. The junction box will dissipate the energy and reduce outlet velocities.
- **(Site 33)** Station 346+50 –L- Rt. (Stream 1G) Extend existing 2@ 7’x6’ RCBC with 2@ 7’x6’ RCBC upstream. Bury culvert 0.5’. Channel improvement upstream of proposed culvert extension. Proposed 24” CSP in the vicinity of -DR13- outlets into a standard base ditch with rip rap as requested in previous 4B meeting.
- **(Site 34)** Station 11+00 –Y34- (Stream 5UT1G) Replace existing 1@ 6’x6’ RCBC with 1@ 6’x7’ RCBC with 0.5’ and 1.0’ alternating sills. Bank stabilization is used downstream of the culvert. Channel improvements upstream of the culvert extend for 120 ft. Culvert is buried 1.0’.

Plan sheet 29 (Site 35 and Site 37) (No Site 36)

- **(Site 35)** Station 358+50 –L- (Stream SF) Site 35 Replace 30” CMP with 30” welded steel pipe and junction boxes. Bank stabilization is used downstream of the drainage system. Standard ‘V’ ditch is used upstream of the system.
- NOTE: There is no Site 36.
- **(Site 37)** Station 368+50 –L- (Stream SG) Site 37 Replace existing 42” CMP with 42” welded steel pipe. Replace stream with 42” RCP upstream. Junction boxes are used in the system to dissipate the energy and reduce outlet velocities. Bank stabilization is used downstream of the system.

Plan sheet 30 (Site 38)

- **(Site 38)** Station 384+00 –L- (Stream 1D) Replace 24” CMP with 24” alternate pipe and junction box. The JB will dissipate the energy and reduce outlet velocities. Bank stabilization is used downstream of the system.

Plan sheet 31 (Site 39-40)

- **(Site 39)** Station 388+00 –L- (Stream SH) Existing 18” CMP is replaced with 18” CSP with elbows. Class I rip rap is used downstream of drainage system.
- **(Site 40)** Station 397+75 –L- (Stream SI) Replace stream with drainage system. 24” CSP with elbows and rod and lug connectors are used. Use several junction boxes to dissipate energy and reduce outlet velocities. Class I rip rap is used at outlet of system.

Plan sheet 32 (Site 41-42)

- **(Site 41)** Station 404+50 –L- Rt. (Stream 1C) Existing 18” CMP cross pipe is plugged and filled with flowable material. Stream is replaced with drainage system including 24” CSP with elbows and junction box near outlet to dissipate energy and reduce outlet velocities. Bank stabilization is used downstream of the system.
- **(Site 42)** Station 409+00 –L- Rt. (Stream 1Z) Existing 18” CMP cross pipe is plugged and filled with flowable material. Existing Stream is replaced with drainage system including 15” CSP with elbows and 24” CSP with elbows and junction box near outlet to dissipate energy and reduce outlet velocities. Bank stabilization is used downstream of the system. Toe protection is also used on the fill slope.

Plan sheet 33 (Site 43)

- **(Site 43)** Station 419+75 –L- Rt. (Stream SJ) Existing 18” CMP and 24” CMP cross pipes are plugged and filled with flowable material. Existing Stream is replaced with drainage system including 24” CSP with elbows and junction boxes near outlet to dissipate energy and reduce outlet velocities. Class ‘B’ rip rap is used downstream of the system.

Plan sheet 34 (Site 44-45)

- **(Site 44)** Station 428+50 –L- Lt. (Stream SKA) Remove existing concrete lined ditch and replace with drainage system including 30” CSP and open throat catch basin near outlet.
- **(Site 45)** Station 431+00 –L- Rt. (Stream SK) Remove concrete lined ditch and replace with Class ‘I’ rip rap lined standard base ditch. No net loss.

### **STREAM RELOCATIONS**

- **(Site 5A)** Station 122+00 to station 124+00 –L-( Lt.) Long Branch Creek (Stream 2D) Relocate 148 ft. of existing stream where Long Branch Creek ties into the South Toe River due to the construction of the new bridge over the South Toe River. Currently there are beaver dams in this stream. The new stream will have similar dimensions and profile as that of the existing stream. The new stream will be contained inside the right of way. Further upstream **(Site 6)** from Station 125+95 to station 127+17, approximately 144’ of Long Branch Creek (Stream 2D) is reclaimed after removing an existing 2@ 6’x6’ RCBC. With this stream design, 2 rock cross vanes are used for grade control. The new stream will have similar dimensions and profile as that of the existing stream. The new stream will be contained inside the right of way.
- **(Site 8)** Station 152+50 to station 155+00 –L- (Rt.) Long Branch Creek (Stream 2D) 257 feet of stream relocation proposed downstream. The existing stream flows along the toe of fill and crosses under the road with a 7’x5’ RCBC. The culvert is extended upstream and downstream due to widening of the road. The stream is relocated parallel to the road with similar dimensions and profile. Rock cross vanes are used for grade control. On the downstream side, rip rap is used along the toe of fill. Bank stabilization is also used in the vicinity of the culvert extensions. On the upstream side from Station 155+98 to 157+80 –L- (Lt.) 192 feet of stream relocation is proposed. The stream is relocated parallel to the road with similar dimensions and profile. Rock cross vanes are used for grade control. The culvert on Newdale Church Way is being replaced due to the widening on – Y17-.
- **(Site 19)** -Y21-Hemlock Rd is being widened and an existing 42” RCP will be replaced with a new 48” pipe. (Stream 1I) From Station 244+10 to station 247+88 –L- (Rt.) 396 feet of stream is being relocated. The existing stream is stable. The proposed stream is parallel to the road similar to the existing stream. Due to the widening, the stream will be relocated further south. The proposed stream has similar channel dimensions and profile. The proposed stream is inside the right of way.
- **(Site 25)** Station 299+30 to station 300+31 –L- (Rt.) 94 feet of stream is being relocated. The stream is being relocated due to the road being widened. A standard base ditch with similar channel dimensions and profile will replace the

stream. The proposed stream is parallel to the road and contained within the right of way.

- **(Site 30)** Station 320+00 to station 323+00 –L- (Lt.) (Stream 1G) 660 feet of new stream is proposed. It appears during original construction of US 19, the unnamed tributary to Brushy Creek was realigned to fall along the south side of US 19/Old US 19/ Penland Rd. and then travel through the triple 8’x8’ RCBC at Brushy Creek. The new double 8’x8’ RCBC will convey water across the widened US 19 and outlet into a newly constructed stream that ties in with Brushy Creek at the same location as that of the remnant channel. The project will reestablish the original flow path of the tributary in the new double barrel culvert. At this time, the remnant channel is visible at the same location as that of the new stream. The existing triple 8’x8’ RCBC will be extended on both sides. Bank stabilization will be used both upstream and downstream along Brushy Creek. The new stream will be fully contained within the right of way. On the upstream side, an old culvert will be removed and the new channel dimensions will mimic the old stream.
- **(Site 33)** Station 346+42 to station 348+50 –L- (Rt.) (Stream 1G) Due to the widening of the road, 275 feet of stream realignment is proposed. The new stream will run parallel to the toe of fill. The existing double 7’x6’ RCBC will be extended upstream. The new stream will be contained within the right of way. Natural stream design techniques will be used in the design to mimic the existing stream dimensions and profile.

### **CONCRETE DITCH REMOVAL**

- **(Site 45)** Station 429+67 to 432+94 –L- Rt. (Stream SK) Existing concrete ditch will be removed and replaced with rip rap.

### **STRUCTURE REMOVAL**

- **(Site 6)** Station 126+50 –L- (Lt) Remove existing 2@6’x6’ RCBC and replace with channel. (Total length=144’)
- **(Non Site)** Station 27+550 –Y16- Remove existing bridge structure.
- **(Site 22)** Big Crabtree Creek. Remove 4 barrel culvert and replace with bridge.
- **(Site 30)** Remove existing RCBC on –Y30- (Old US 19) near Station 324+70 –L- (Rt).

### **RETAINING WALLS**

- Wall #1 Station 78+50 to 87+50 –L- (Lt) reduced the impacts to the South Toe River.
- Wall #2 Station 125+50 to 129+50 –L- (Lt) reduced the impacts to Long Branch Creek.

- Wall #4 Station 226+50 to 229+50 –L- (Rt) reduced the impacts to JS (Stream 1I) and wetland (Wet 1IB).
- Wall #11 Station 360+72 to 363+50 –L- (Rt) reduced the impacts to JS (Stream 1G) and wetland (Wet1G-B).



**Mitigation Plan  
US 19E Widening  
Yancey & Mitchell Counties, North Carolina  
T.I.P. Number R-2519B  
WBS No. 35609.1.1  
May 6, 2013 (Revised November 4, 2013)**

**1.0 BASELINE INFORMATION**

Transportation Improvement Project (TIP) R-2519B involves improvements to existing US 19 from SR 1186 (Old US 19) on the west side of Micaville in Yancey County to multi-lane sections west of Spruce Pine in Mitchell County. The proposed construction of R-2519B involves unavoidable impacts to jurisdictional resources within USGS hydrologic unit 06010108, the Nolichucky River Sub basin.

The R-2519B study area is located in the Blue Ridge physiographic province of western North Carolina. The topography in the project study area is generally characterized as rolling hills with steeply sloping, deeply cut drainage ways. Elevations in the study area range from 2,600 to 3,000 feet above mean sea level (USGS 1978, 1994). The project study area consists of existing maintained right-of-way including fill slopes, rural, residential, commercial, agricultural, and forested areas. Surrounding land uses include agricultural, residential, commercial, and forested lands.

The R-2519B Natural Resources Technical Report (NRTR) dated October 2004 provides further details concerning existing roadway/project study area conditions and jurisdictional resources. The mitigation site selection and mitigation work plan sections of this plan will refer to the identification labels given the affected jurisdictional resources in that NRTR. However, the site names match the associated permit impact site number. Additional information about the Nolichucky Sub basin can also be found in the NCDWR French Broad River Basinwide Water Quality Plan dated 2011.

**2.0 OBJECTIVES**

NCDOT proposes to provide a portion of its mitigation requirements associated with the unavoidable impacts of this project, as allowable per the Federal Mitigation Rule, 33 CFR 332.3 with on-site and in-kind mitigation while acquiring the remainder through the North Carolina Ecosystem Enhancement Program's in-lieu fee program.

NCDOT has been providing mitigation for road projects for more than 20 years and has established a record of acquiring, designing, and constructing successful mitigation sites with over 225 closed out sites protected in perpetuity either through fee-simple ownership or conservation easements throughout the state.

Through in-kind stream relocations, removal of in-stream structures, and the use of natural channel

design, NCDOT proposes to offset and mitigate for a portion of its impacts adjacent to the R-2519B corridor. These mitigation sites are located within the same USGS hydrologic unit and watershed, as well as on the same reach of channel as the associated, permitted impact where it is most likely that the mitigation will replace the lost aquatic resource functions and services incurred by both the associated impact and the project as a whole. This will be achieved by: improving floodplain functions; establishing protected riparian buffers; improving water quality within the watershed by reducing sediment, nutrient, and pollutant inputs; and increasing channel stability while reducing bank erosion. The removal of perched structures at several sites will improved channel stability as well as increase habitat connectivity through improved access and passage. Additionally, many of the sites occur on multiple sections or unnamed tributaries of the same streams (Long Branch, Brushy Creek) which will provide improvements to habitat connectivity within the South Toe-North Toe and Headwater North Toe watersheds respectively as well as within the Nolichucky Sub basin as a whole and more specifically within designated trout waters.

The mitigation will be performed on ten individual sites described below on a total of 2322 linear feet of relocated or adjacent streams of the R-2519B project.

### **3.0 SITE SELECTION**

Each site was evaluated both internally as well as discussed and reviewed with regulatory personnel during concurrence meetings and field visits. Many involve either the removal of perched structures or stream channel relocations due to the road project. All sites are located either within the existing or the proposed NCDOT Right-of-Way for US 19.

#### **Site 5A - Long Branch**

##### **ONE ID# 100-013**

This site is located on plan sheet 12 from Station 122+00 to 124+00 Lt and involves the relocation of 148 feet of Long Branch (2D). Long Branch is a tributary of the South Toe River and has a NCDWQ Best Use Classification of C and Tr. Long Branch has an USACE Stream Quality Assessment Worksheet score of 53.5 at this location where it flows between US 19 and SR 1424, Deneen Road. Relocating this portion of Long Branch prior to construction of the South Toe Bridge will avoid impacts directly to the channel as well as result in an improved tie-in further downstream from the existing confluence. The new tie-in will prevent Long Branch from discharging directly into the existing Appalachian Elktoe habitat located in the South Toe River. Existing conditions on Long Branch include a bankfull width of 12 feet, eroding banks ranging from two to eight feet in height, beaver dams, and lack of a wooded buffer. There is currently an overhead utility line with a 30 foot easement that crosses Long Branch near the beginning of the relocation and runs parallel to Long Branch at this site.

#### **Site 6 – Long Branch**

##### **ONE ID# 100-014**

Located on plan sheet 12 from station 125+95 to 127+17 Lt, this site involves the removal of a perched, two-barrel, six foot by six foot, reinforced concrete box culvert (RCBC) on Long Branch (2D). NCDOT will restore 144 linear feet of Long Branch through the removal of the existing RCBC and soil path. The stress of the existing structure is evident by the presence of flow behind

one of the wing walls at the inlet as well as a blowhole at the outlet that is causing channel instability and increased sedimentation through erosion. Removal of the perched structure will prevent future sedimentation issues that could be negatively impacting the existing Appalachian elktoe habitat located 400 feet downstream in the South Toe River. Long Branch has an USACE Stream Quality Assessment Worksheet score of 62.5 at this location where it flows between US 19 and SR 1424, Deneen Road. The US19 utility plans indicate that there are no existing utility easements at this location.

#### **Site 8 – Long Branch**

##### **ONE ID# 100-015**

NCDOT plans to relocate a total of 449 feet of Long Branch (2D) from station 152+50 to 155+00 Rt. and 155+98 to 157+80 Lt. to avoid additional impacts to the channel due to the road widening and associated fill slopes. Long Branch has an USACE Stream Quality Assessment Worksheet score of 59 at this location. Existing conditions include a scarcely vegetated buffer on the upstream portion, adjacent fill slope and cutover buffer conditions downstream, and a perched culvert. The upstream portion has fairly stable stream conditions, but the downstream portion has eroding, collapsing, and undercut banks. Removing the perched structure, restoring more stable channel dimensions, and planting a protected wooded riparian buffer will establish a stable channel and reduce erosion and sedimentation downstream in the watershed while improving water quality and in-stream habitat throughout this reach. Utility plans show an existing overhead utility just south of Long Branch from station 152+00 to 155+00 Rt. The current buffer is affected by mowing of this utility easement.

#### **Site 9 – Long Branch**

##### **ONE ID# 100-016**

NCDOT will remove a perched 36 inch corrugated metal pipe and restore 40 feet of Long Branch at this site which is located on plan sheet 15 at station 179+80. Existing channel conditions include a bankfull width of five to six feet, bank heights of two to three feet, and a narrow scrubby vegetated buffer approximately 10-15 feet wide. Long Branch at this location has an USACE Stream Quality Assessment Worksheet score of 60.5. Existing adjacent conditions include an agricultural field and a cutover. The utility plans indicate that there are no existing utility easements at this location. Removal of the perched pipe and establishment of a protected, wooded, riparian buffer will improve channel stability and reduce erosion, sedimentation and nutrient input into the channel.

#### **Site 18 – Parsnip Branch**

##### **ONE ID# 100-017**

Due to the installation of a new 54" pipe, NCDOT plans to relocate 70 feet of Parsnip branch instead of extending the new pipe structure at this site which is located on plan sheet 18 at station 214+00 Lt. Existing channel conditions include a varying bankfull width from two to six feet, bank heights ranging from two to ten feet and an existing 54" pipe that is perched 12-18". Parsnip Branch has a sparsely vegetated buffer on one side, a grass buffer on the other, and scored 60.5 on the USACE Stream Quality Assessment Worksheet at this location. The utility plans indicate that there are no existing utilities at this location. Removing the perched structure, restoring more stable channel dimensions, reconnecting the channel with the floodplain, and planting a protected wooded riparian buffer will establish a stable reach and reduce erosion and sedimentation

downstream in the watershed while improving water quality and in-stream habitat throughout this reach

#### **Site 21 – UT Big Crabtree Creek**

##### **ONE ID# 100-018**

This site involves the relocation of 396 feet of UT Crabtree Creek (1I) due to the widening of the roadway. This site is located on plan sheets 20 and 21 from station 244+10 to 247+94 Rt. Existing conditions include a very narrow buffer with a few trees on the north side due to the proximity of the existing US 19 fill slope and a narrow buffer on the southern side due to the adjacent pasture. UT Big Crabtree Creek has an USACE Stream Quality Assessment Worksheet score of 59.5 at this location. The utility plans indicate an existing overhead utility that crosses UT Big Crabtree Creek near the confluence with Big Crabtree Creek. Through the acquisition of additional right-of-way at this site; wider, protected, riparian buffer areas can be planted with native, woody species which will decrease sedimentation and nutrient inputs from adjacent land uses while improving in-stream habitat and water quality along this reach as well as downstream in the watershed.

#### **Site 25 – Fox Hollow Creek**

##### **ONE ID# 061-003**

Located on plan sheet 24 at station 299+30 to 300+31 Rt., this site involves the relocation of 94 feet of Fox Hollow Creek (stream 2E) due to the road widening and a new 54 inch reinforced concrete pipe at this location. Existing conditions of Fox Hollow Creek include a bankfull width of six feet, bank heights of two to four feet (some of which are unstable), a slight head cut in the channel, and a wooded buffer on both sides greater than 50 feet. The stream has an USACE Stream Quality Assessment Worksheet score of 67. No current utility easements exist that neither cross nor run adjacent to the stream at this location. The stream relocation will increase channel stability through improved channel dimensions as well as the removal of the head cut feature.

#### **Site 30 – UT Brushy Creek**

##### **ONE ID# 061-004**

This site involves the relocation and restoration of 635 feet of an unnamed tributary to Brushy Creek (stream 1G) into the historic, relic channel location. It is located on plan sheet 26 at station 325+00. The existing channel currently runs parallel between US 19 and a gas station/repair shop and parking lot. The channel has a narrow, maintained, grass buffer and receives direct storm water runoff from the parking lot and road. There are several areas exhibiting severe erosion problems. Existing channel conditions include a bankfull width of four to six feet, bank heights between one and two feet, and an USACE Stream Quality Assessment Worksheet score of 22.5. There are no existing utility easements at this location. More stable channel dimensions will reduce erosion and sedimentation while a protected, planted, riparian buffer will provide for improved in-stream habitat and water quality both along the reach and downstream within the watershed.

#### **Site 33 – UT Brushy Creek**

##### **ONE ID# 061-005**

This site is located on plan sheet 28 at station 346+50 Rt. and involves the relocation of 300 feet of an unnamed tributary to Brushy Creek (stream 1G). The existing channel runs parallel to US 19

with a narrow, fifteen foot wide, wooded buffer on both sides of the channel. It has an existing bankfull width of six feet, two foot bank heights, and an USACE Stream Quality Assessment Worksheet score of 60.5. Adjacent land uses include agricultural fields and livestock pastures. Currently, there is an overhead transmission line that both crosses as well as runs parallel to the stream at this location. There is also an existing gas line that crosses the stream at this location. Planting a protected, riparian, buffer on the relocated channel will decrease pollutant and nutrient inputs from adjacent land uses and improve in-stream habitat and water quality along the reach and downstream in the watershed.

### **Site 35 – UT Brushy Creek**

#### **ONE ID# 061-006**

On plan sheet 29 at station 358+50, NCDOT plans to relocate 46 feet of UT Brushy Creek to establish a better alignment with the new structure. An existing 24 inch reinforced concrete pipe and a 30 inch corrugated metal pipe are being removed and replaced with a 30 inch welded steel pipe which UT Brushy Creek will flow through under US 19. The existing channel has a bankfull width of two to three feet, one foot bank heights, and an USACE Stream Quality Assessment Worksheet score of 65. There are no existing utility easements at this location. Planting a protected, wooded buffer on the relocated channel will reduce nutrient and pollutant inputs from the adjacent land uses and improve in-stream habitat and water quality along the reach and downstream in the watershed.

## **4.0 SITE PROTECTION INSTRUMENT**

The mitigation areas are within the NCDOT Right-of-Way for the project. They will be managed to prohibit all use inconsistent with their use as mitigation properties, including any activity that would materially alter the biological integrity or functional and educational value of the sites, consistent with the mitigation plan.

The sites will be placed on the NCDOT-Natural Environment Section (NES) Mitigation GeoDatabase. This database is provided to all NCDOT personnel as a record of mitigation sites and their attributes, including prohibited activities. NCDOT is held by virtue of the permit associated with these mitigation sites and the associated roadway impacts to protect the sites in perpetuity.

## **5.0 MITIGATION WORK PLAN**

Each mitigation site will be constructed in conjunction with the construction of the roadway project. Following the successful completion of site grading and stabilization, each site will be reforested with a mix of bare-root tree species and live stakes as described in the Streambank Reforestation Detail in Appendix A. The stream channels will be stabilized by planting live stakes on three foot centers and matting with coir fiber on the banks as necessary.

In accordance with the guidance and standard procedures of NCDOT's Roadside Environmental Unit (REU), seeding and mulching will be performed on all disturbed areas within the mitigation sites for stabilization purposes. An as-built report will be submitted within 60 days of completion of the project.



The Natural Environment Section shall be contacted to provide construction assistance to ensure that each mitigation area is constructed appropriately.

For all the proposed mitigation sites with either existing or proposed utility line relocations that will affect the site, Appendix C contains the MOA signed between NCDOT and Duke Energy. This MOA addresses vegetation maintenance in NCDOT Right-of-Way areas. Duke Energy has also been provided the link to NCDOT-NES Mitigation Geodatabase.

#### **Site 5A - Long Branch**

##### **ONE ID# 100-013**

This site involves the relocation of 148 feet of Long Branch at the confluence with the South Toe River. The proposed stream channel will be nine feet wide with a three foot bankfull depth and a 21 foot bankfull width. A five foot wide bankfull bench will be constructed along the southern bank for the entire length of the relocation. The new channel will have a 25 ft. buffer on the north bank and a 30 ft. buffer on the south bank. The utility plans show that the existing utility will remain unchanged along this section therefore utility maintenance will continue to affect the buffer along Long Branch at this location. Twenty feet from top of bank on left side will be impacted by utility line maintenance along the entire relocated channel length as shown in Appendix B.

#### **Site 6 - Long Branch**

##### **ONE ID# 100-014**

The proposed removal of two, existing, six foot by six foot barrel RCBCs and a soil path at this location will restore 144 feet of Long Branch. The proposed stream channel design will be nine feet wide with a three foot bankfull depth and a 21 foot bankfull width. A five foot wide bankfull bench will be constructed on both sides of the new channel. A 50 foot buffer will be planted on the north side and a 30 foot buffer will be planted on the south side (Appendix A). A small section of the buffer will be impacted by a proposed overhead utility. As shown in Appendix B, the last 15 feet of the stream will have the buffer reduced from 30 feet to 25 feet on the left bank.

#### **Site 8 - Long Branch**

##### **ONE ID# 100-015**

NCDOT will relocate two sections of Long Branch for a total of 449 feet. The new channel will be six feet wide and two feet deep with a bankfull width of 14 feet. A five foot bankfull bench will be constructed on the south bank for the entire 449 feet. Also, six cross vanes will be installed for grade control. Additionally, installation of an extension structure at the outlet of the culvert in conjunction with the channel relocation will correct the perched culvert condition. The new stream channel will have a total forested buffer width of 35 feet on the upstream section and approximately 20 feet wide on the downstream section (Appendix A). Proposed utility plans indicate that the existing overhead utility will remain in place until approximately Sta. 153+75 Rt and then shift slightly south until Sta. 155+00 Rt. The proposed overhead utility will reduce the buffer to between 0 and 10 feet on the left hand side for 130 feet downstream of the culvert under US 19 (Appendix B).

#### **Site 9 - Long Branch**

##### **ONE ID# 100-016**

This site involves removal of a 36 inch corrugated metal pipe and associated daylighting and

restoration of 40 feet of Long Branch. The restored channel will be three feet deep with a three foot wide base resulting in a bankfull width of 13.5 feet. The stream bank adjacent to the new roadway fill slope will be lined with Class II rip rap to provide stability while the other bank will have a 20 foot reforested buffer (Appendix A). No proposed utility easements will affect this mitigation area.

#### **Site 18 - Parsnip Branch**

##### **ONE ID# 100-017**

Proposed conditions for the relocation of 70 feet of Parsnip Branch include a constructed channel base of five feet with a two foot depth resulting in a 13 foot bankfull width. The channel will be lined with Class I rip rap from the channel toe up the side slopes to a height of 1.5 feet. A 50 foot buffer will be planted on the eastern bank and a 40-50 foot wide buffer will be planted on the western side (Appendix A). The utility plans indicate a new overhead utility will be installed just west of Arbuckle Road. The utility will affect the last 15 feet of stream on the right hand side by reducing the buffer to between 25 and 30 feet.

#### **Site 21 - UT Big Crabtree Creek**

##### **ONE ID# 100-018**

Proposed channel design for the relocation of 396 feet of UT Crabtree Creek includes a channel base of four feet with a two foot depth. A buffer ranging in width from 18 to 45 feet will be planted along the southern bank and a buffer 12 feet wide will be planted along the northern bank between the stream restoration and US 19 (Appendix A). The utility plans indicate an existing overhead utility that crosses UT Big Crabtree Creek near the confluence with Big Crabtree Creek will be removed.

#### **Site 25 – Fox Hollow Creek**

##### **ONE ID# 061-002**

NCDOT will relocate 94 feet of Fox Hollow Creek due to the road widening and new 54 inch reinforced concrete pipe at this location. Proposed channel design for Fox Hollow Creek include a five foot wide base with a depth of two and a half feet resulting in a bankfull width of 15 feet. The stream will have a 50 foot buffer on the northern bank and a 10-25 foot buffer on the southern bank (Appendix A). The US 19 utility plans show no proposed utility easements that would affect the mitigation area.

#### **Site 30 – UT Brushy Creek**

##### **ONE ID# 061-003**

This site involves the proposed relocation and restoration of 635 feet of an unnamed tributary to Brushy Creek to its historic, relic channel location. The stream will run under US 19 through two, new, 8x8, reinforced concrete box culverts and will flow into an adjacent field reestablishing the original flow path. The proposed channel design includes a six foot wide base with a two foot depth in the riffle sections resulting in a bankfull width of 14 feet. The proposed design also includes construction of a 10 foot wide bankfull bench. The new stream channel will have a wooded buffer greater than 50 feet on both sides (Appendix A). There are no proposed utility easements at this location.

### **Site 33 – UT Brushy Creek**

#### **ONE ID# 061-004**

Due to the roadway fill, the existing UT to Brushy Creek culvert under US 19 will be extending with two, new, 7x7 reinforced concrete box culverts on the inlet side. Also, the existing stream channel will be filled. Therefore, NCDOT plans to relocate 300 feet of UT to Brushy Creek at this location. The proposed channel design has an eight foot base and a two foot depth resulting in a bankfull width of 16 feet. A five feet wide bench on the northern bank and a 10 feet wide bench on the southern bank will also be constructed. The existing transmission line, proposed overhead utility line and gas line will not be moved per the utility plans for this project and will continue to impact the buffer for the entire relocated length.

### **Site 35 – UT Brushy Creek**

#### **ONE ID# 061-005**

Due to the installation of a new location structure, NCDOT will daylight and relocate portions of UT Brushy Creek for 46 feet at the inlet end of the stream to provide a better alignment and tie-in. The proposed design includes a “v” shaped channel with a bankfull width of seven feet. The channel will be lined with a permanent soil reinforcement matting and a wooded buffer of 10 feet will be planted on each side of the stream (Appendix A). There are no utility easements proposed per the utility plans at this location.

## **6.0 PERFORMANCE STANDARDS**

Performance standards are based on the April 2003 Stream Mitigation Guidelines. Success for vegetation monitoring within the riparian buffer areas will be based on the survival of at least 260 stems of five year old trees at year five. Assessment of channel stability will be based on the survival of riparian vegetation and lack of significant bank erosion, channel widening or down-cutting.

## **7.0 MONITORING REQUIREMENTS**

Each site will be monitored for five (5) years with no less than two bankfull events, which must occur in separate monitoring years and be documented. If less than two bankfull events occur during the first five years, monitoring will continue until the second bankfull event is documented. The following components of Level 1 monitoring will be performed annually for the monitoring period: reference photos, plant survival monitoring (identification of specific problem areas and remedial action), and visual inspection of channel stability. Vegetation stem counts will be conducted on Sites 8, 21 and 30 only. Physical measurements of channel stability/morphology will only be performed on Site 30. An as-built will be submitted for each site and will include stream channel profile and cross-section surveys which will provide a baseline for comparison if it is determined at any time during the monitoring period that a problem has occurred. Annual monitoring reports will be made available on the NCDOT website.

## **8.0 OTHER INFORMATION**

No additional information to provide.

## **9.0 DETERMINATION OF CREDITS**

NCDOT plans to relocate, restore, and enhance approximately 2,322 feet of streams associated with the R-2519B project to fulfill a portion of its mitigation requirements. The streams and associated riparian buffer areas are being acquired as right-of-way for the roadway project. These sites will have controlled access to ensure they are protected from local landowner encroachment. Acquiring these streams and riparian buffer areas fee simple assists in ensuring that no future impacts will occur directly to these channels due to commercial or residential development along the corridor.

Based on field and meeting discussions with agency personal pre-401/404 permit applications as well as follow up discussions (phone conversation on October 9, 2013), emails, and an ACOE letter dated October 15, 2013, NCDOT proposes the follow mitigation credits:

<b>Site/Impact #</b>	<b>ONE ID #</b>	<b>Mitigation (ft.)</b>	<b>Credit (ft.)</b>
<b>5A</b>	100-013	148	148
<b>6</b>	100-014	144	144
<b>8</b>	100-015	449	113
<b>9</b>	100-016	40	40
<b>18</b>	100-017	70	35
<b>21</b>	100-018	396	198
<b>25</b>	061-002	94	24
<b>30</b>	061-003	635	635
<b>33</b>	061-004	300	150
<b>35</b>	061-005	46	12
<b>Totals:</b>		<b>2322</b>	<b>1499</b>

An as-built report will be submitted within 60 days of completion of the each mitigation site to verify actual mitigation lengths and areas constructed and planted. The success of the mitigation sites and determination of final credits will be based upon successful completion and closeout of the monitoring period at each site.

## **9.1 CREDIT RELEASE SCHEDULE**

NCDOT proposes immediate, full release of the proposed mitigation to offset the unavoidable impacts associated with R-2519B.

## **10.0 GEOGRAPHIC SERVICE AREA**

The proposed Geographic Service Area (GSA) for the mitigation sites is composed of the 8-digit Hydrologic Cataloging Unit (HUC) 06010108.

## **11.0 MAINTENANCE PLAN**

The mitigation sites will be held by NCDOT and placed on the NCDOT-NES Mitigation Geodatabase. Once the monitoring period is completed and the sites are closed out, they will be placed in the NCDOT Stewardship Program for long term maintenance and protection. Stewardship Inspection Reports will be made available through the NCDOT website.

If an appropriate third party recipient is identified in the future, then the transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

## **12.0 LONG TERM ADAPTIVE MANAGEMENT PLAN**

The sites will be managed by NCDOT according to the mitigation plan. Encroachments into the areas will be investigated and appropriate measures taken to minimize any negative effects. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT in coordination with the Interagency Review Team.

## **13.0 FINANCIAL ASSURANCES**

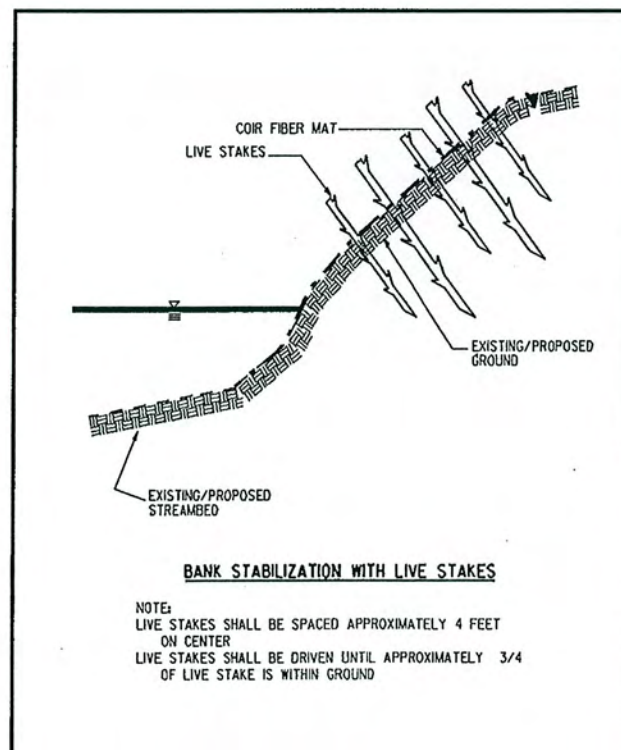
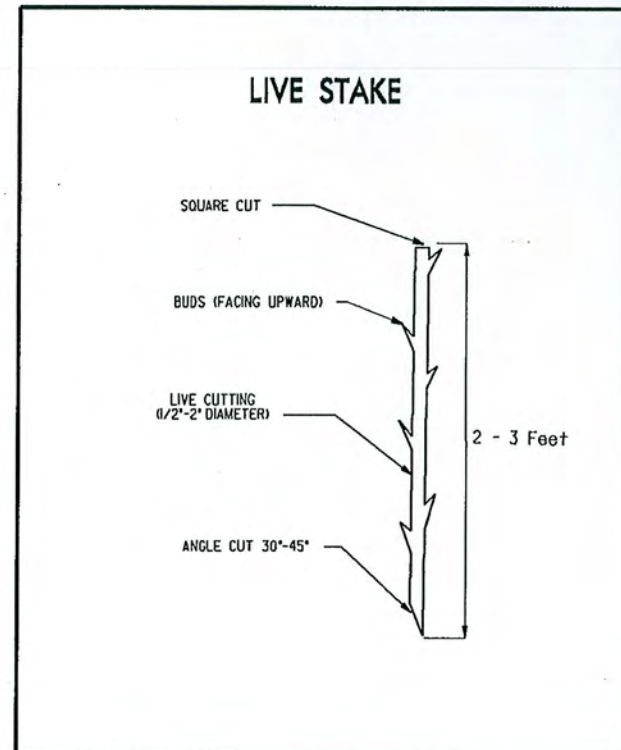
NCDOT is held by permit conditions associated with R-2519B to construct, monitor, and steward the mitigation sites. NCDOT has established funds for each project and within each Division to monitor mitigation sites and protect them in perpetuity.



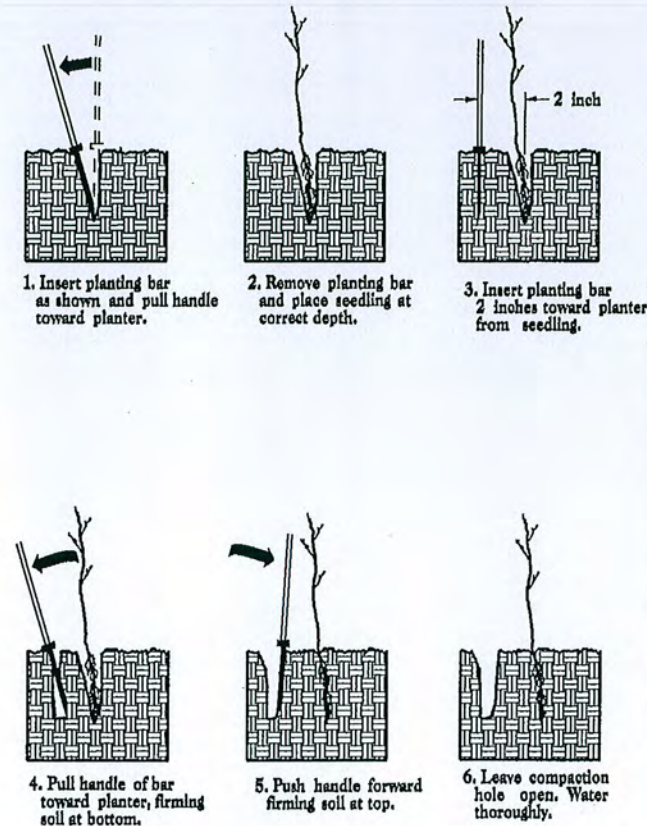
## **APPENDIX A.**

# PLANTING DETAILS

## LIVE STAKES PLANTING DETAIL



## BAREROOT PLANTING DETAIL DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



## PLANTING NOTES:

**PLANTING BAG**  
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



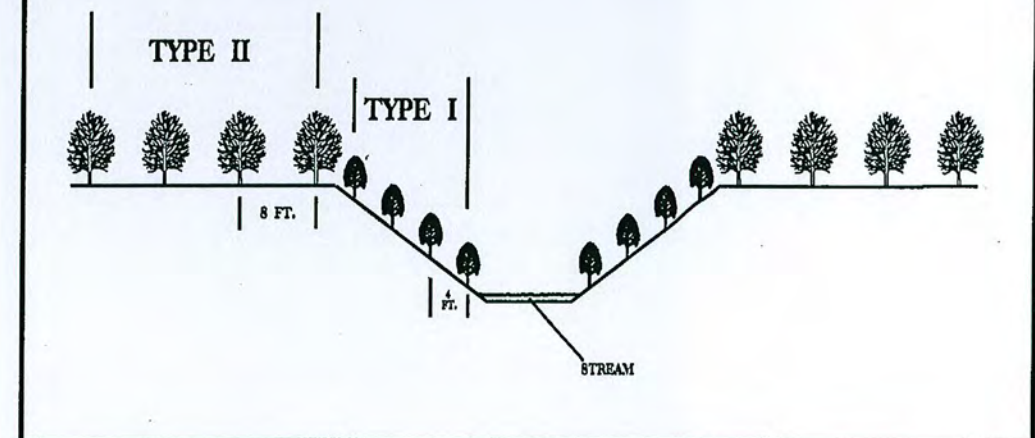
**KBC PLANTING BAR**  
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



**ROOT PRUNING**  
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- ☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- ☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- ☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

## STREAMBANK REFORESTATION TYPICAL



## STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

### TYPE 1

50% SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50% CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES

### TYPE 2

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% QUERCUS ALBA	WHITE OAK	12 in - 18 in BR

- ☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

## STREAMBANK REFORESTATION DETAIL SHEET 1 OF 2

N.C.DOT - ROADSIDE ENVIRONMENTAL UNIT

R-2519B		RF-2
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



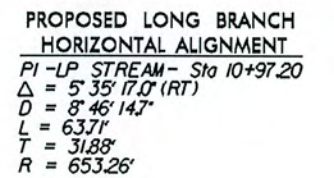
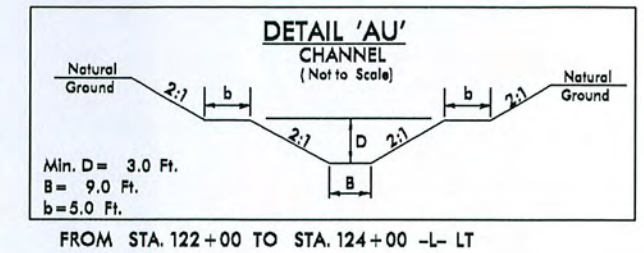
PROJECT REFERENCE NO.	SHEET NO.
R-25198	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DO NOT USE FOR A/CQUISITION

PRELIMINARY PLANS

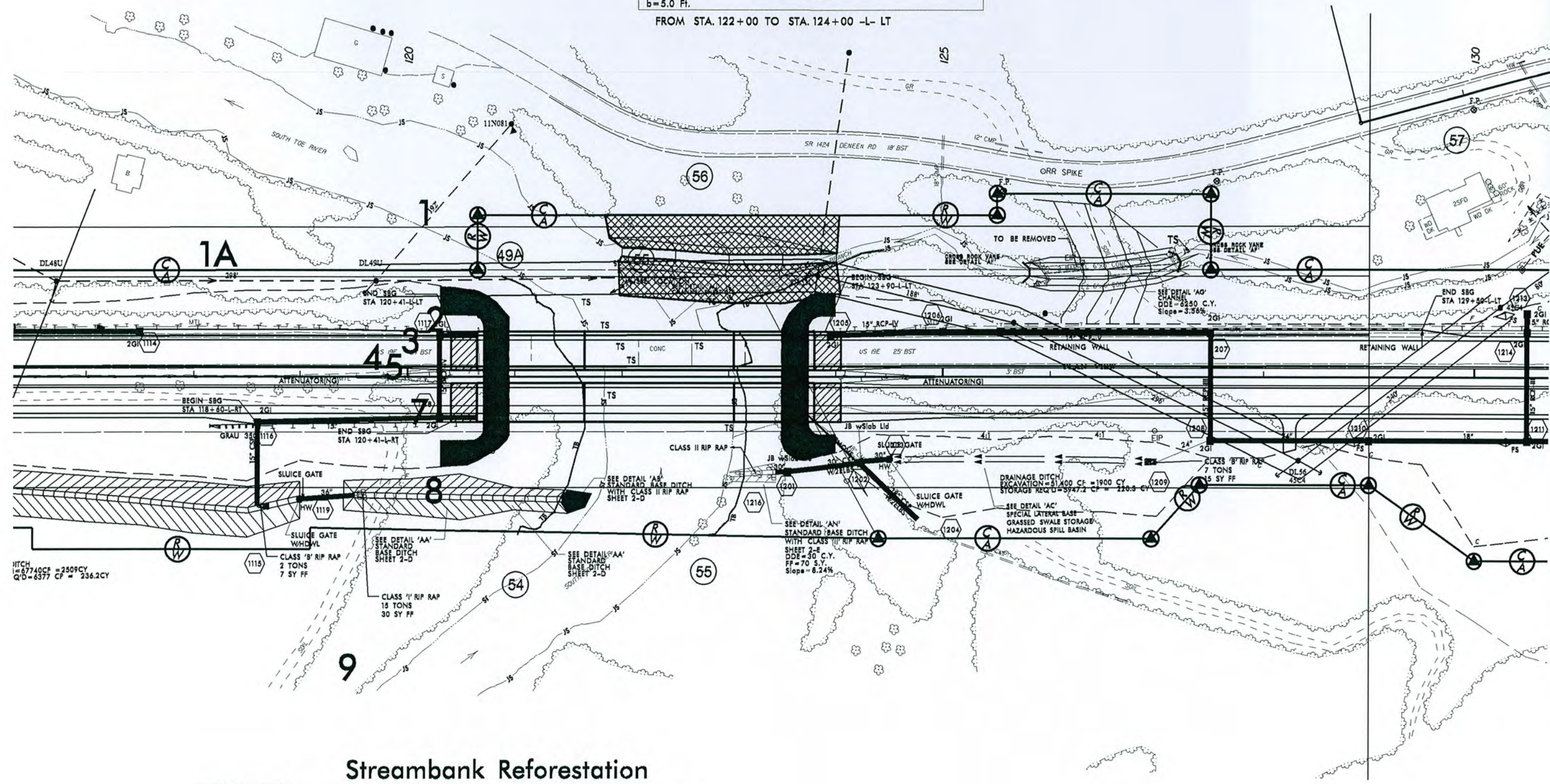
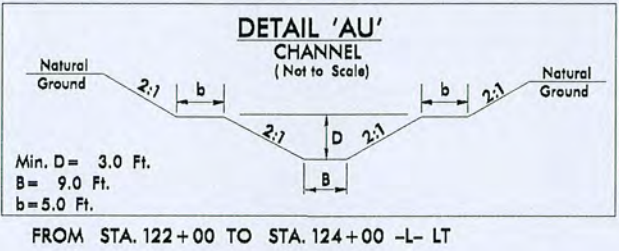
DO NOT USE FOR CONSTRUCTION



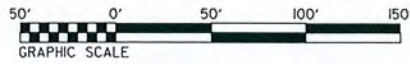


SITE 5a Stream Relocation  
Streambank Reforestation

PROJECT REFERENCE NO.	SHEET NO.
	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



Streambank Reforestation  
Buffer widths looking downstream  
Right side - 25 feet  
Left side - 30 feet

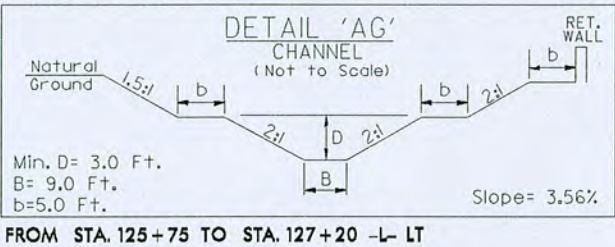


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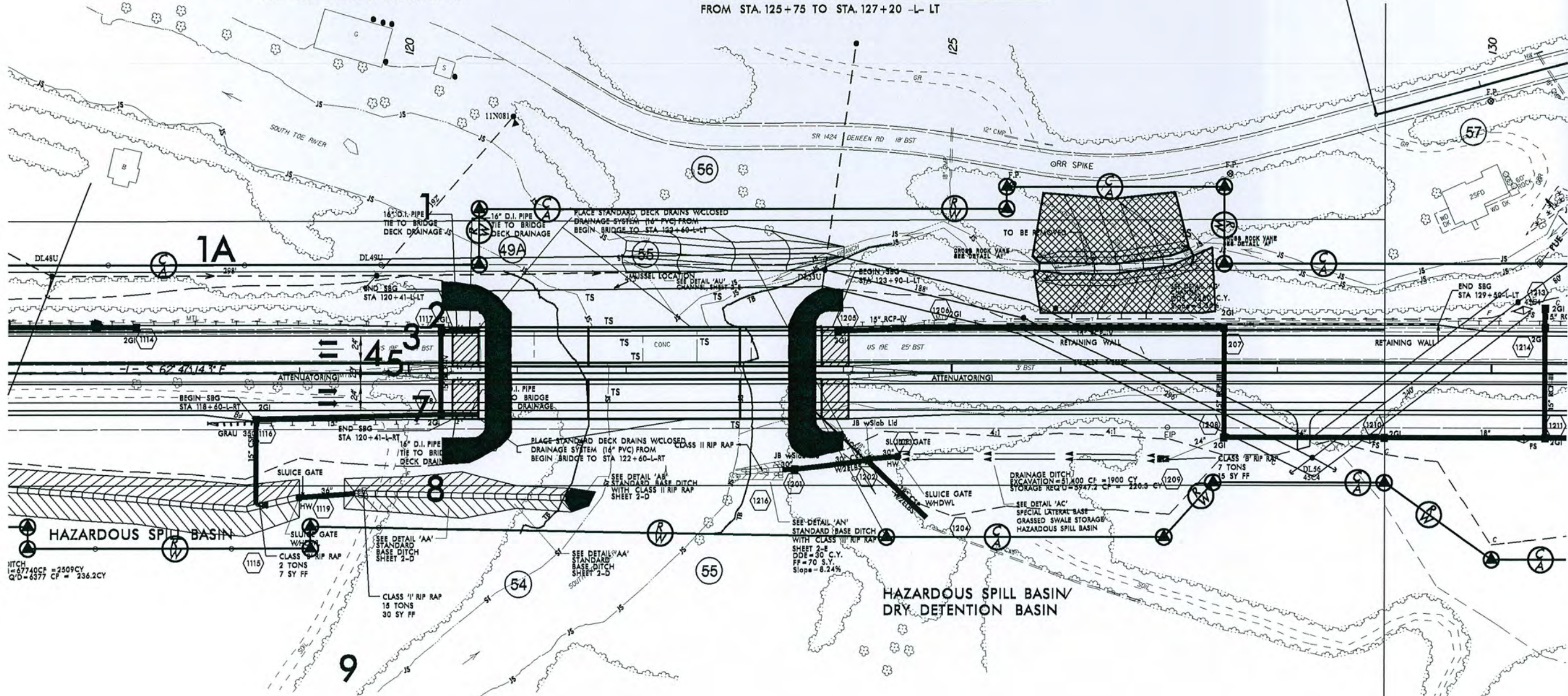


Site 6 Stream Relocation  
Streambank Reforestation

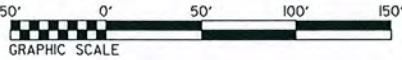
PROJECT REFERENCE NO.	SHEET NO.
	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



FOR -L- PROFILE SEE SHEET 38  
FOR -Y11-, -Y12- PROFILE SEE SHEET 57  
FOR -DR4- PROFILE SEE SHEET 66



Streambank Reforestation  
Buffer widths looking downstream  
Right side - 50 feet  
Left side - 30 feet



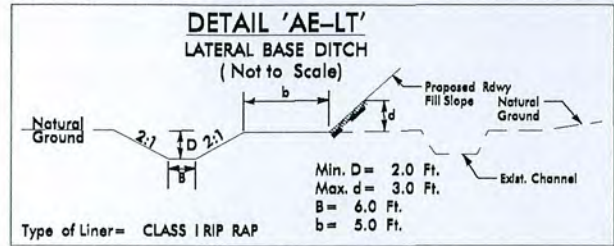


8/17/99

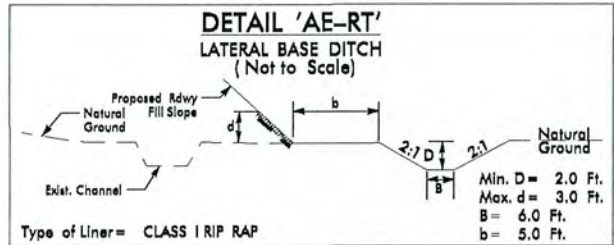
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MATCH LINE -L- STA. 148+50 SEE SHEET 13

MATCH LINE -L- STA. 162+50 SEE SHEET 15

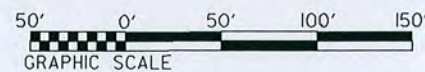


FROM STA. 156+00 TO STA. 157+65 -L- LT

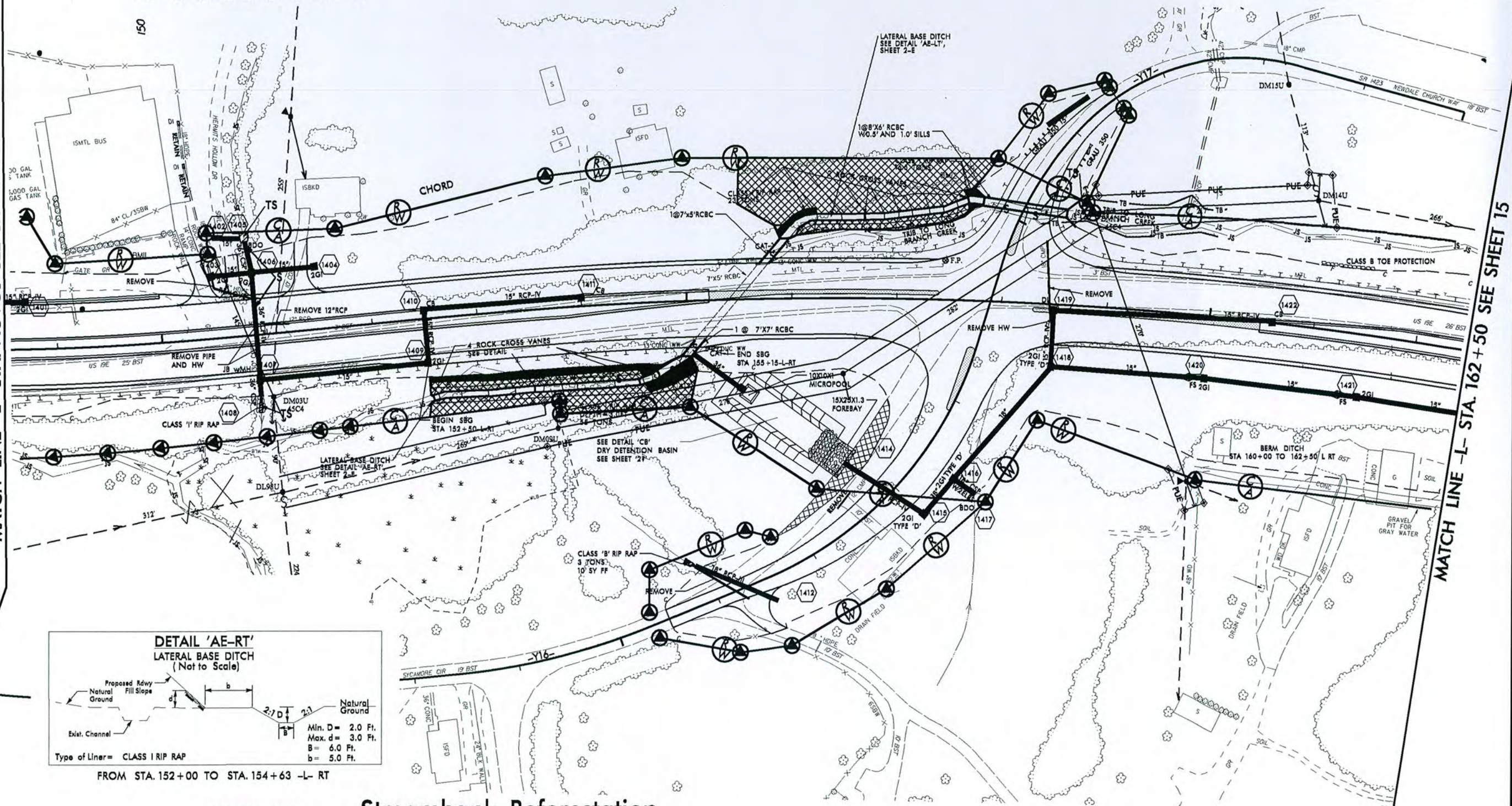



FROM STA. 152+00 TO STA. 154+63 -L- RT

# SITE 8 STREAMBANK REFORESTATION



PROJECT REFERENCE NO. R-25198	SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

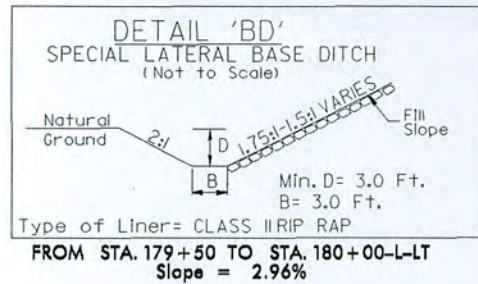


 Streambank Reforestation  
Buffer widths looking downstream  
Right side - up stream > 30 feet, down stream - 5 feet  
Left side - up stream - 5 feet, down stream - 5 to 15 feet

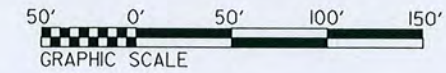
Rev. 9-3-13



8/17/99

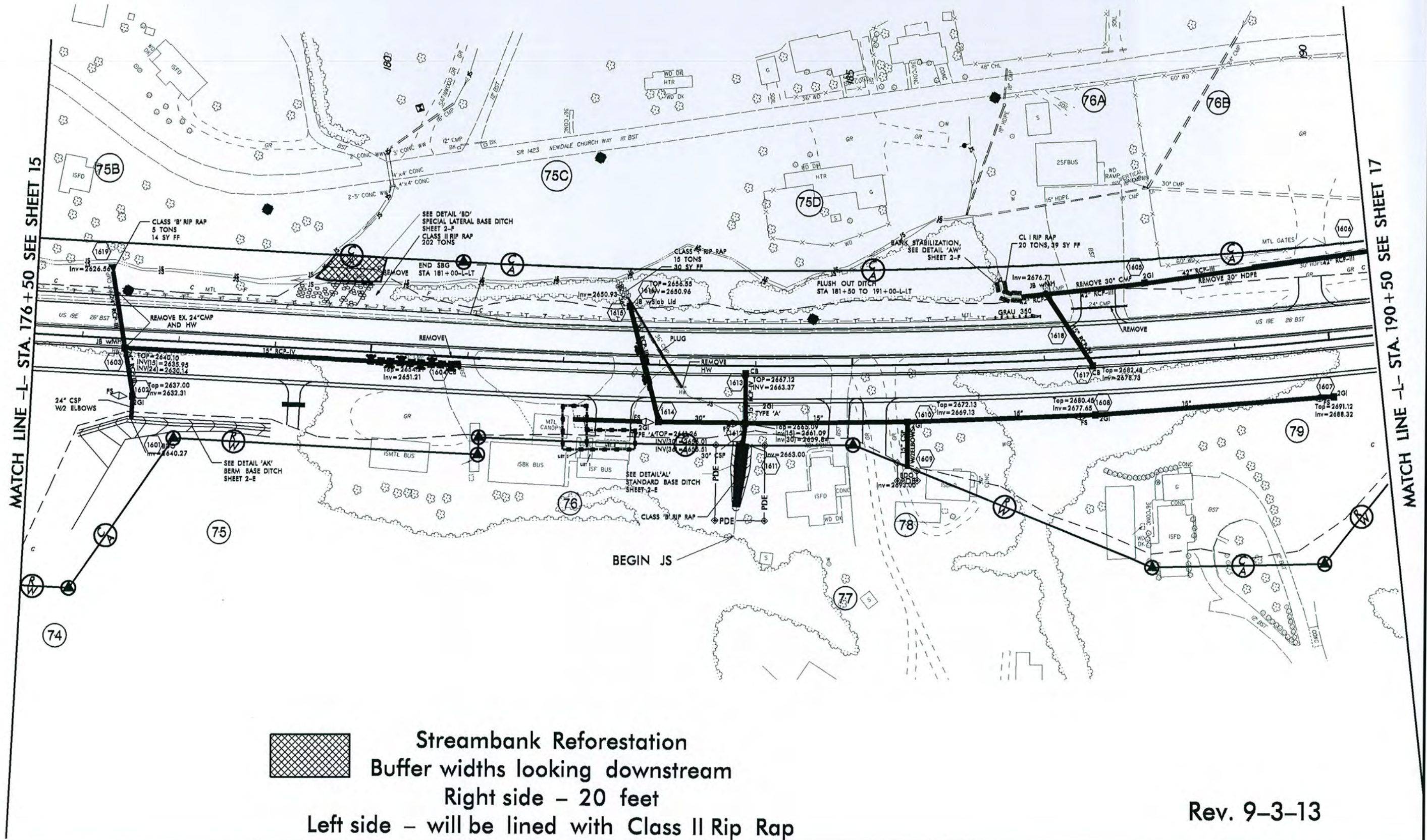


# SITE 9 STREAMBANK REFORESTATION



PROJECT REFERENCE NO.	SHEET NO.
R-2519B	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

FOR -L- PROFILE SEE SHEET 42



05-SEP-2013 12:33  
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S:\Engineering\AT\BFE255835

Rev. 9-3-13



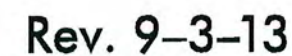




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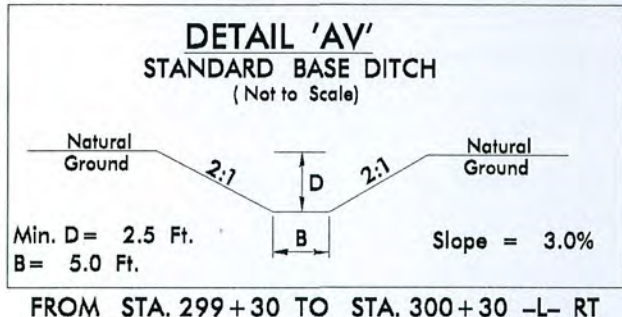
FROM STA. 244+00 TO STA. 248+10 -L- RT  
SLOPE = X.XX %

## 245

550



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8/17/99

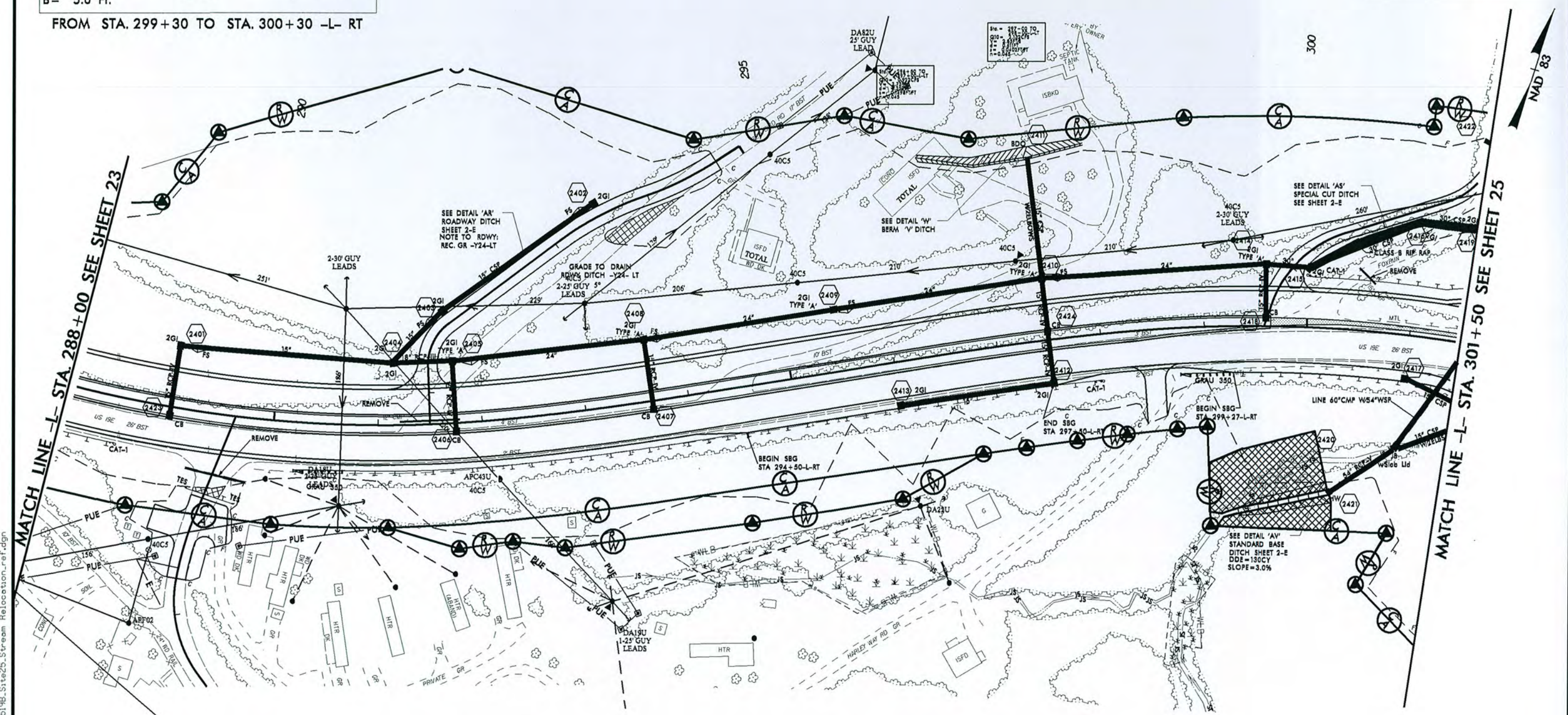


# SITE 25

## STREAMBANK REFORESTATION

NOTE:  
EXISTING POLE TO BE REMOVED DURING GRADING PROCESS.  
NEW POLES WILL BE SET AND THEN REMOVE OLD POLES.  
NCDOT CONTRACTOR WILL GRADE AROUND.

PROJECT REFERENCE NO.		SHEET NO.
R-2519B		24
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

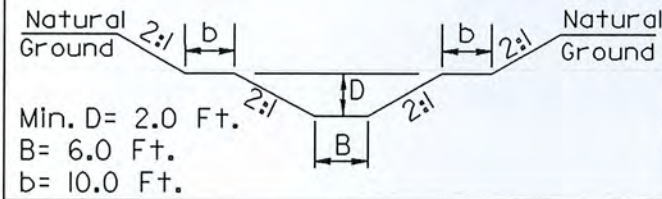




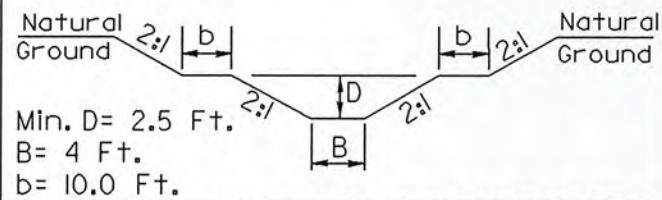
BEGIN STREAM RELOCATION  
STA 10+00.00 UT TO BRUSHY CREEK  
-L- STA 323+03.10 63.67 FT LT

BEGIN STREAM RELOCATION  
STA 10+00.00 UT TO BRUSHY CREEK  
-L- STA 323+03.10 63.67 FT LT

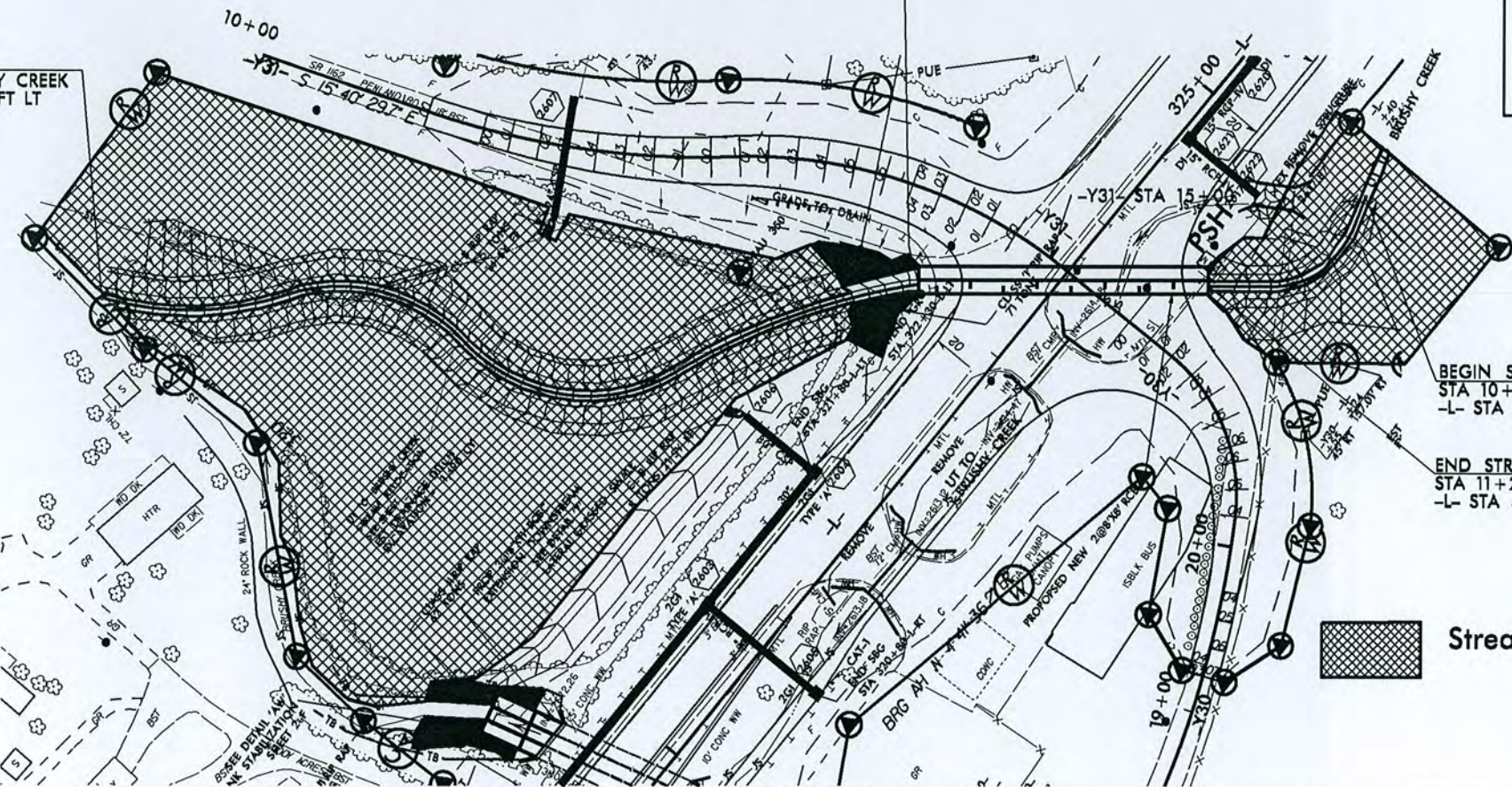
**TYPICAL CHANNEL SECTION**  
(Not to Scale)



**TYPICAL POOL SECTION**  
(Not to Scale)



FROM	UT	TO	BRUSHY CREEK STA 12+01.39	TO	STA 12+34.96
FROM	UT	TO	BRUSHY CREEK STA 13+30.59	TO	STA 13+59.00
FROM	UT	TO	BRUSHY CREEK STA 14+33.50	TO	STA 14+65.5

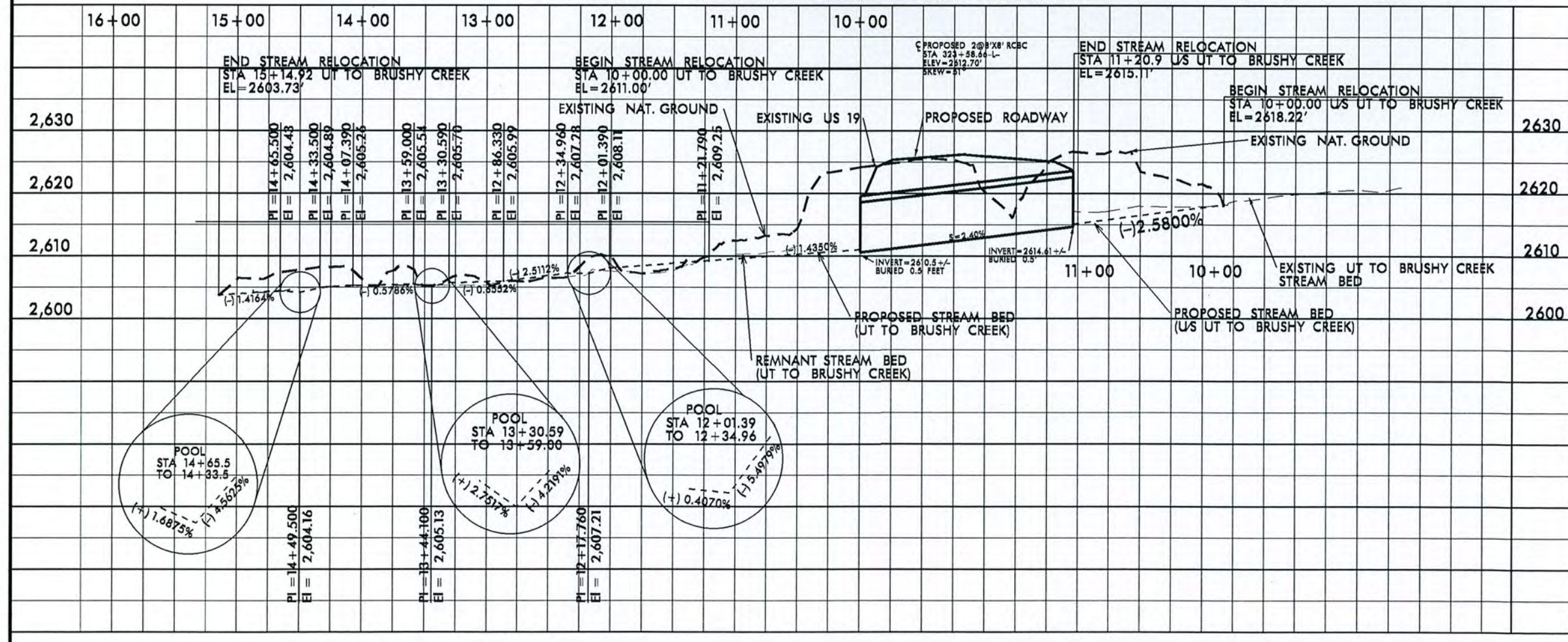


BEGIN STREAM RELOCATION  
STA 10+00.00 US UT TO BRUSHY CREEK  
-L- STA 325+10.93 110.14 FT RT

END STREAM RELOCATION  
STA 11+20.9 US UT TO BRUSHY CREEK  
-L- STA 324+10.51 69.42 FT RT

**Streambank Reforestation  
Buffer 30 foot  
or greater**

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UT TO BRUSHY CREEK CURVE DATA

PI-UT TO BRUSHY CREEK - Sta 14+60.89  
 $\Delta = 33^{\circ} 55' 04.9''$  (RT)  
 $D = 30^{\circ} 35' 31.4''$   
 $L = 110.87'$   
 $T = 57.11'$   
 $R = 187.29'$

PI-UT TO BRUSHY CREEK - Sta 13+53.94  
 $\Delta = 65^{\circ} 09' 50.4''$  (LT)  
 $D = 57^{\circ} 17' 22.7''$   
 $L = 113.74'$   
 $T = 63.92'$   
 $R = 100.01'$

PI-UT TO BRUSHY CREEK - Sta 12+34.37  
 $\Delta = 78^{\circ} 23' 23.4''$  (RT)  
 $D = 56^{\circ} 53' 52.5''$   
 $L = 137.77'$   
 $T = 82.11'$   
 $R = 100.70'$

PI-UT TO BRUSHY CREEK- Sta 10+77.09  
 $\Delta = 22^{\circ} 06' 20.9''$  (LT)  
 $D = 14^{\circ} 31' 07.6''$   
 $L = 152.26'$   
 $T = 77.09'$   
 $R = 394.63'$

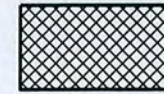
US UT TO BRUSHY CREEK CURVE DATA

PI-U/S UT TO BRUSHY CREEK-Sta 10+56.69  
 $\Delta = 66^{\circ} 50' 16.2''$  (RT)  
 $D = 107^{\circ} 32' 58.1''$   
 $L = 62.15'$   
 $T = 35.15'$   
 $R = 53.27'$



8/17/99

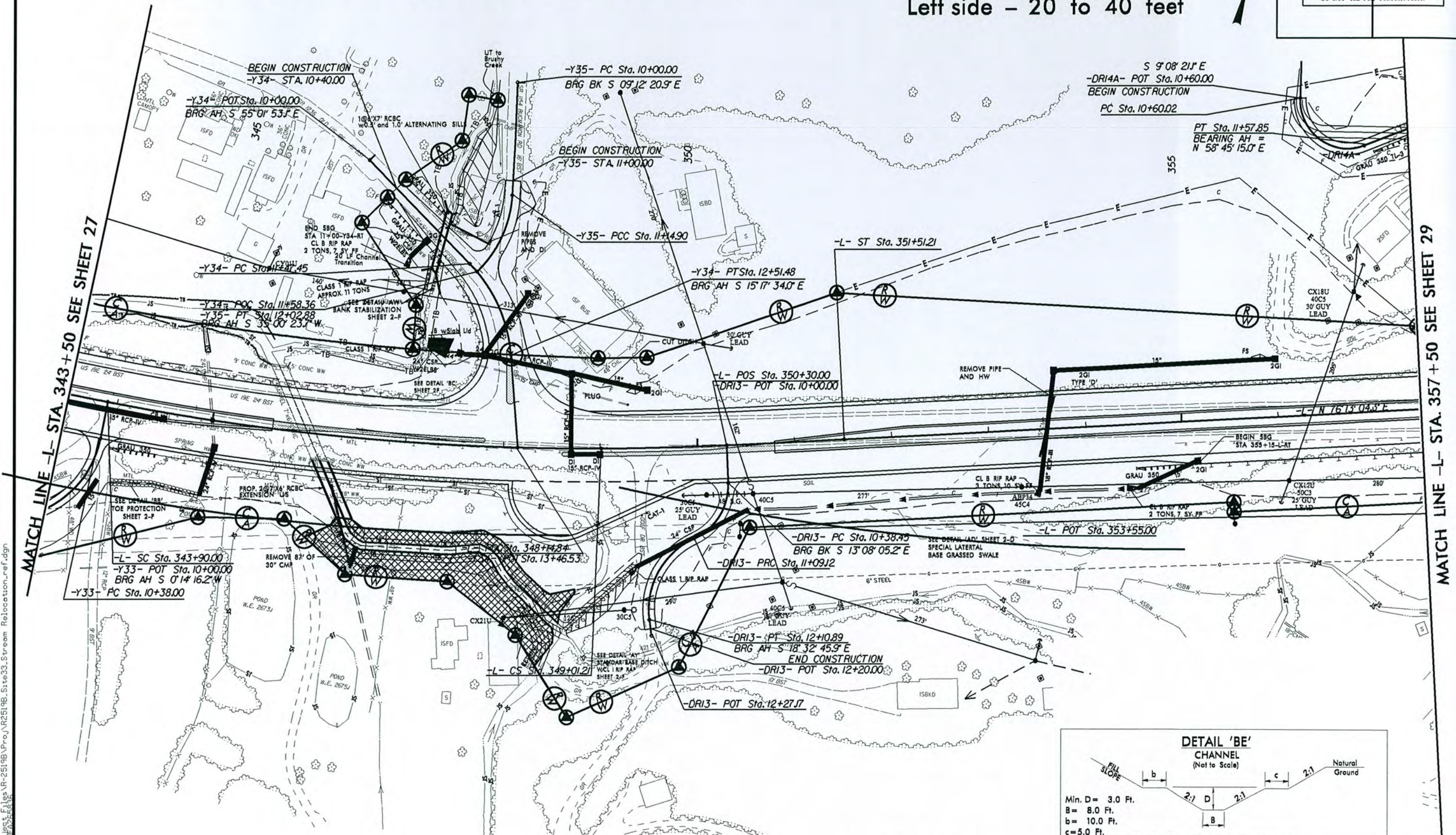
# SITE 33 STREAMBANK REFORESTATION



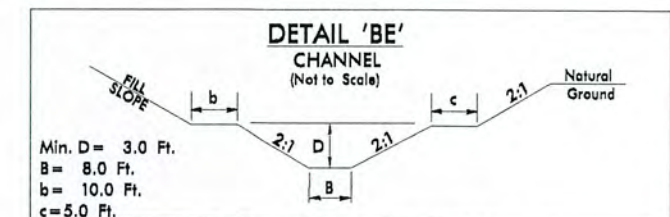
Streambank Reforestation  
Buffer widths looking downstream  
Right side - 10 feet  
Left side - 20 to 40 feet



PROJECT REFERENCE NO.		SHEET NO.
R-2519B		28
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		



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FROM STA. 346+35 TO STA. 348+35 -L- RT  
SLOPE = 4.11%

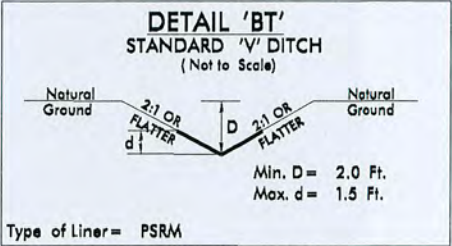
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MATCH LINE -L- STA. 357+50 SEE SHEET 29

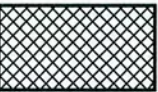
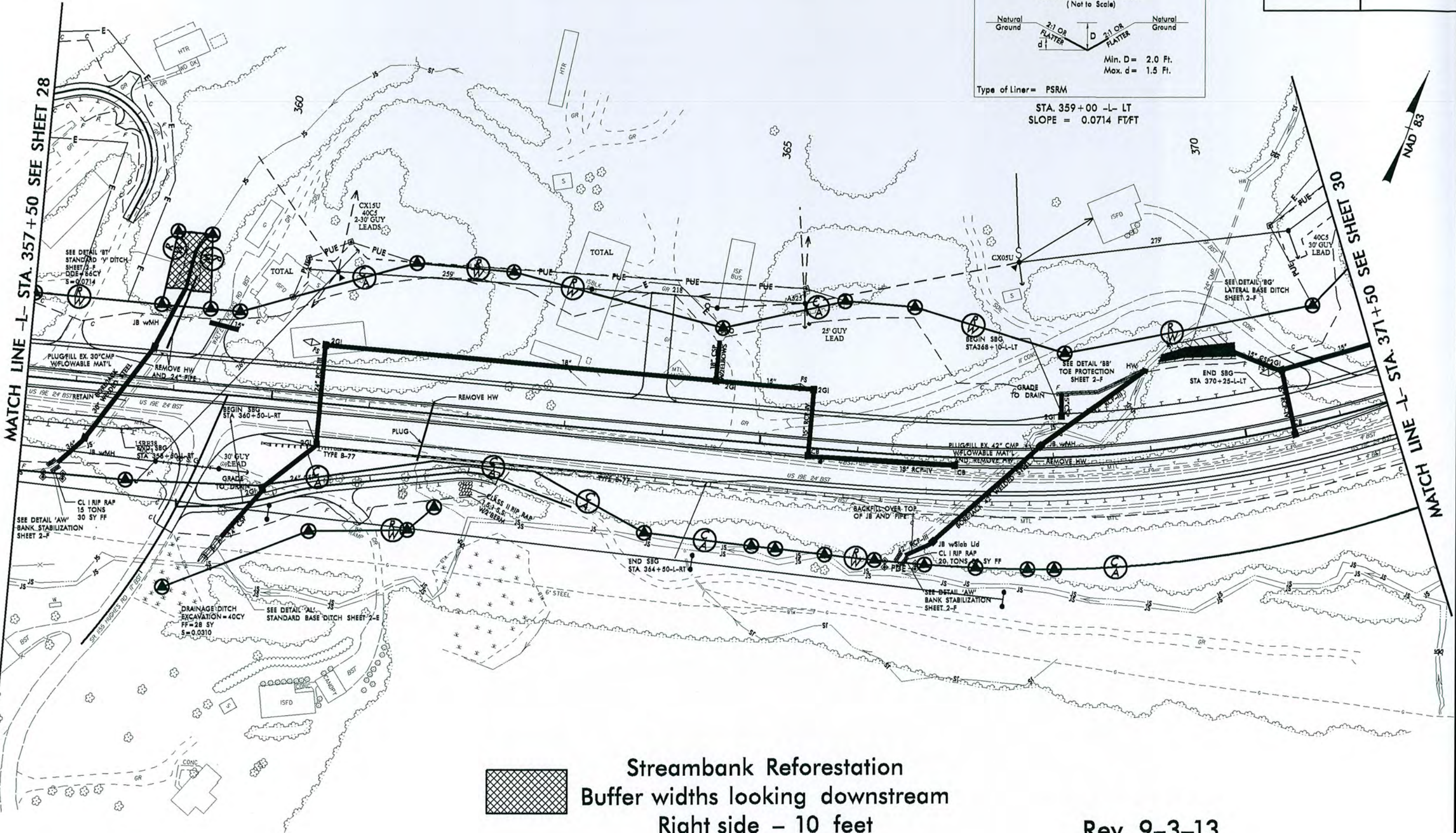


# SITE 35 STREAMBANK REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	29
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



STA. 359+00 -L- LT  
SLOPE = 0.0714 FT/FT



Streambank Reforestation  
Buffer widths looking downstream  
Right side - 10 feet  
Left side - 10 feet

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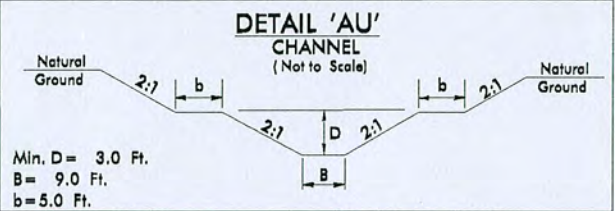
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11/17/09



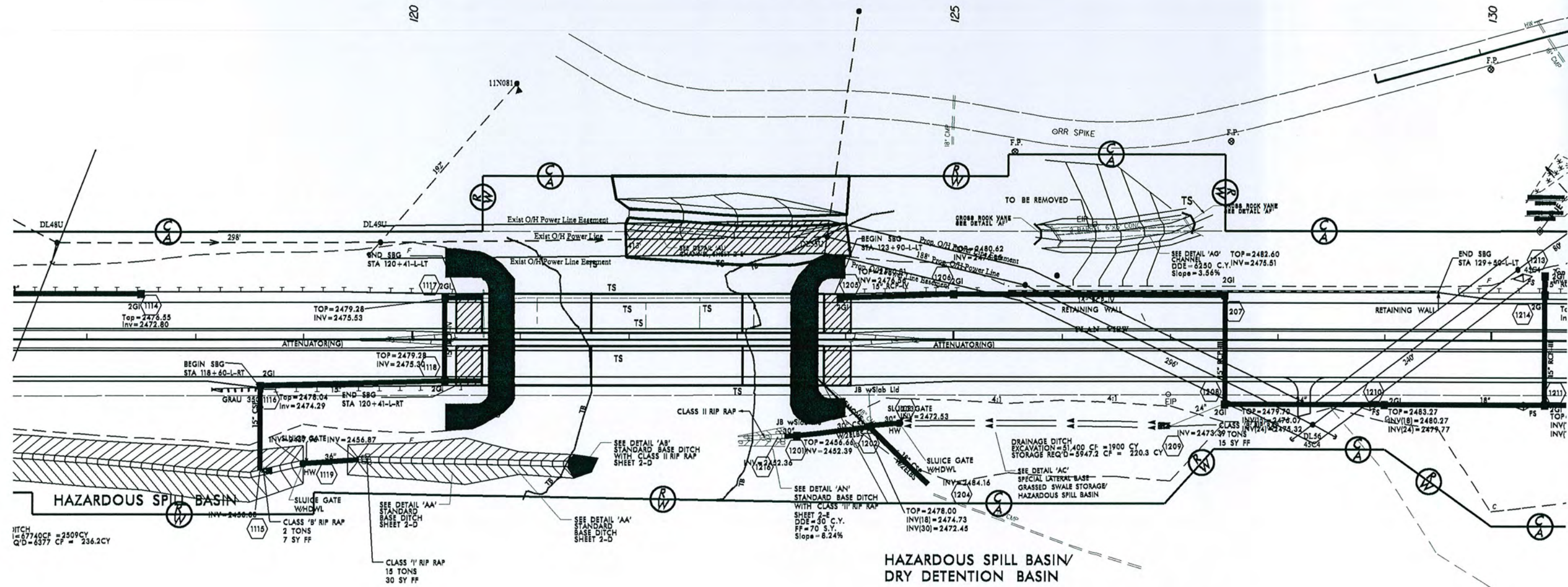
## **APPENDIX B.**

SITE 5a STREAM RELOCATION  
UTILITY IMPACTS TO MITIGATION SITE

PROJECT REFERENCE NO.	SHEET NO.
	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

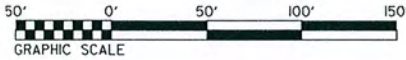


FROM STA. 122+00 TO STA. 124+00 -L- LT



Utility Impacts to Buffer  
20 feet from Top of Bank on Left Side  
Impacted by Utility Easement for the entire  
relocated length (148 feet)

Streambank Reforestation  
Buffer widths looking downstream  
Right side - 25 feet  
Left side - 30 feet

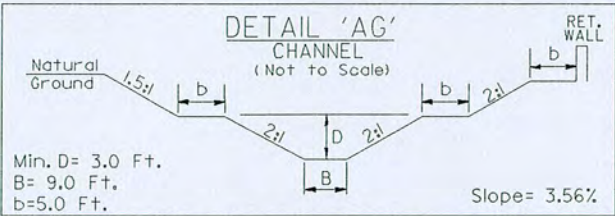




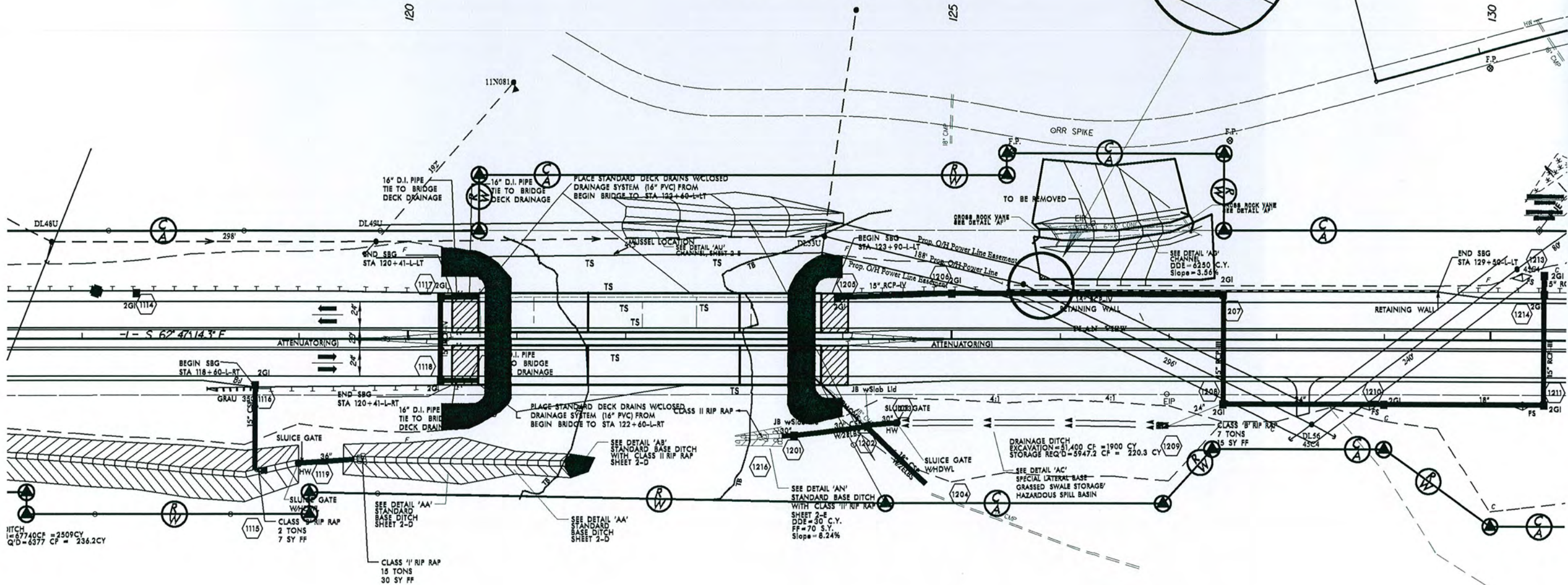
SITE 6 STREAM RELOCATION  
UTILITY IMPACTS TO MITIGATION SITE

PROJECT REFERENCE NO.	SHEET NO.
	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

FOR -L- PROFILE SEE SHEET 38  
FOR -Y11-, -Y12- PROFILE SEE SHEET 57  
FOR -DR4- PROFILE SEE SHEET 66

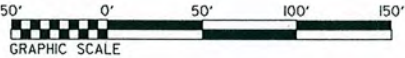


FROM STA. 125+75 TO STA. 127+20 -L- LT



Utility Impacts to Buffer  
Last 15 feet of stream has buffer widths  
between 25 to 30 feet on the left hand side  
Remainder of buffer is 30 feet.

Streambank Reforestation  
Buffer widths looking downstream  
Right side - 50 feet  
Left side - 30 feet

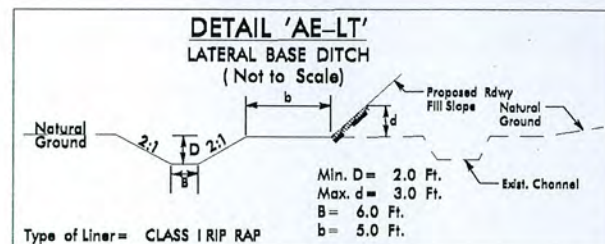




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Author: [illegible]

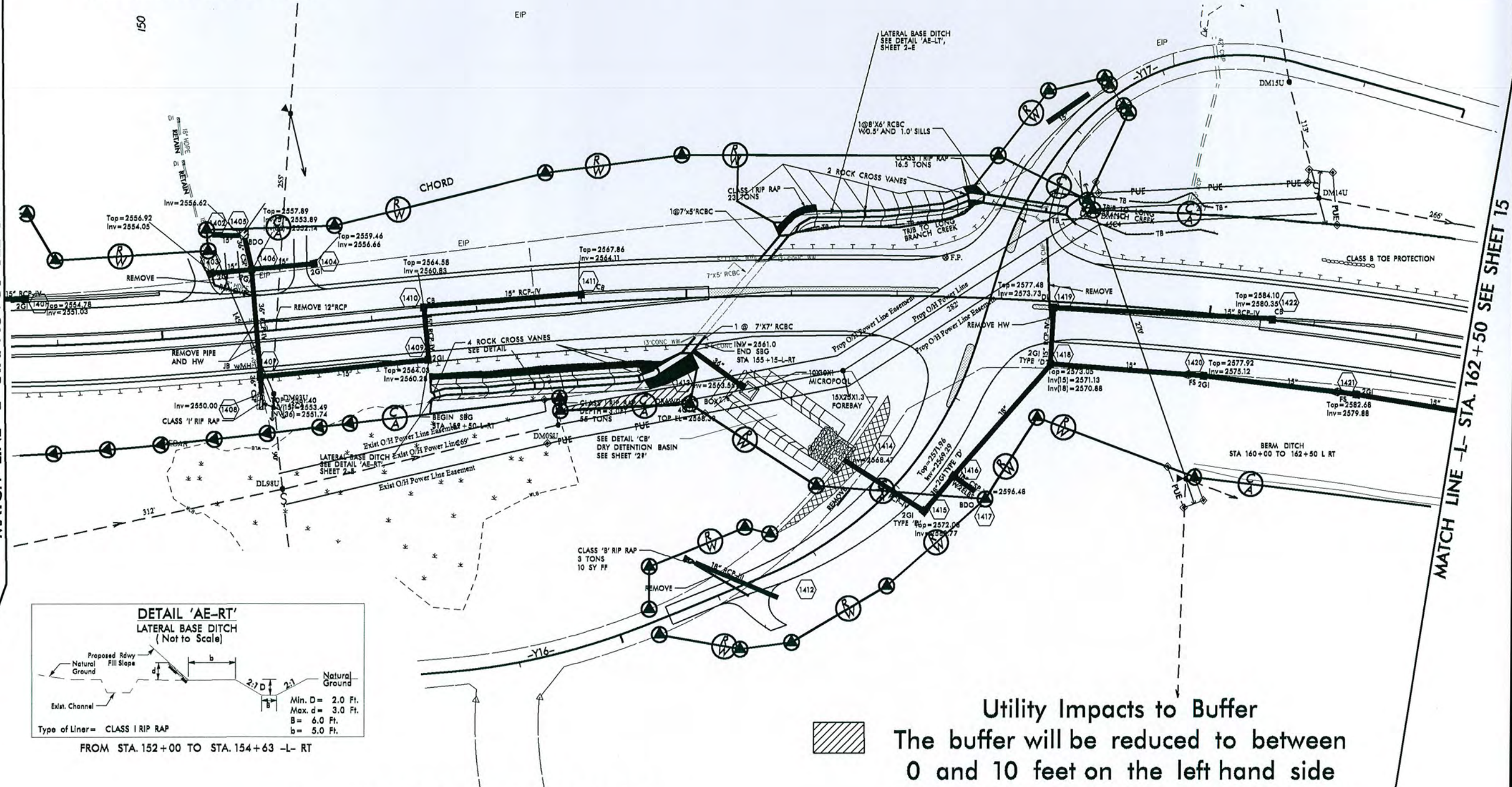
# SITE 8 STREAM RELOCATION UTILITY IMPACTS TO MITIGATION SITE

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

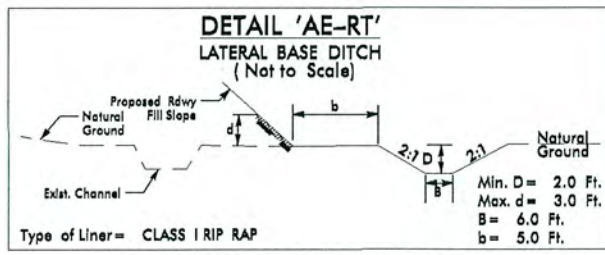


FROM STA. 156+00 TO STA. 157+65 -L- LT

MATCH LINE -L- STA. 148+50 SEE SHEET 13



MATCH LINE -L- STA. 162+50 SEE SHEET 15



FROM STA. 152+00 TO STA. 154+63 -L- RT

**Streambank Reforestation**

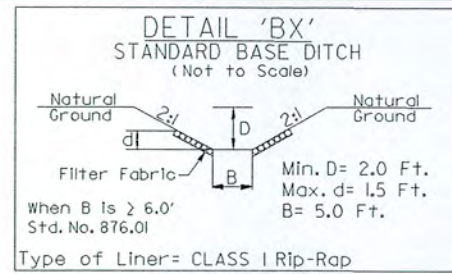
Buffer widths looking downstream

Right side - up stream > 30 feet, down stream - 5 feet  
Left side - up stream - 5 feet, down stream - 5 to 15 feet

**Utility Impacts to Buffer**

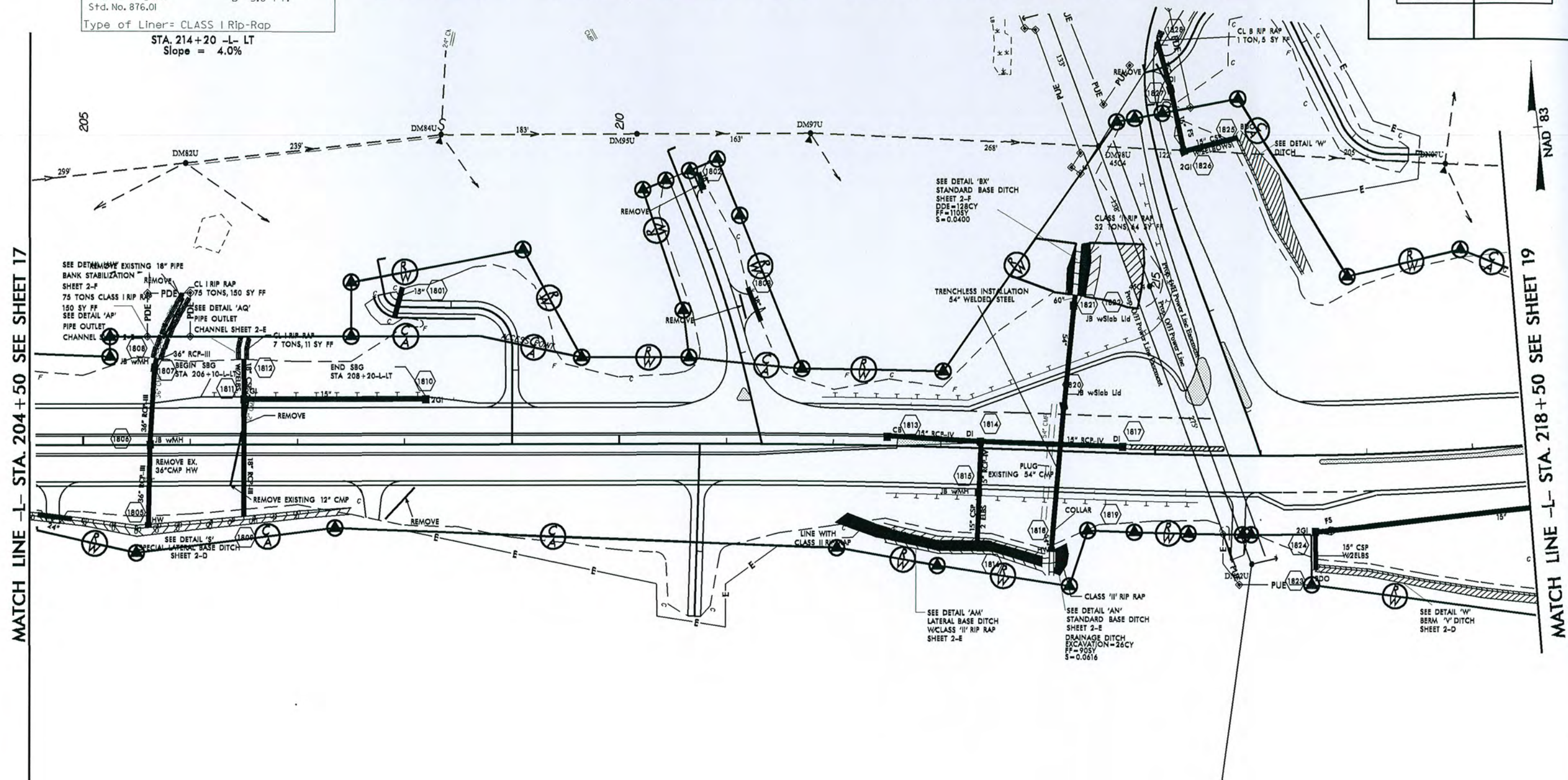
The buffer will be reduced to between 0 and 10 feet on the left hand side downstream of the culvert for 130 feet





# SITE 18 STREAM RELOCATION UTILITY IMPACTS TO MITIGATION SITE

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	18
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <b>PRELIMINARY PLANS</b>              DO NOT USE FOR CONSTRUCTION           </div>	



### Utility Impacts to Buffer

The last 15 foot of stream will have between a 25 to 30 foot buffer on the right side. The remaining portion of stream up to the culvert will have between a 30 to 50 foot buffer.

**Streambank Reforestation**  
**Buffer widths looking downstream**  
**Right side – 50 feet**  
**Left side – 40 to 50 feet**



8/17/99

05-SEP-2003 14:46  
S:\Engineering\Site33-Stream Relocation\Utility\_Impacts.dgn  
R-2519B Site33-Stream Relocation\Utility\_Impacts.dgn

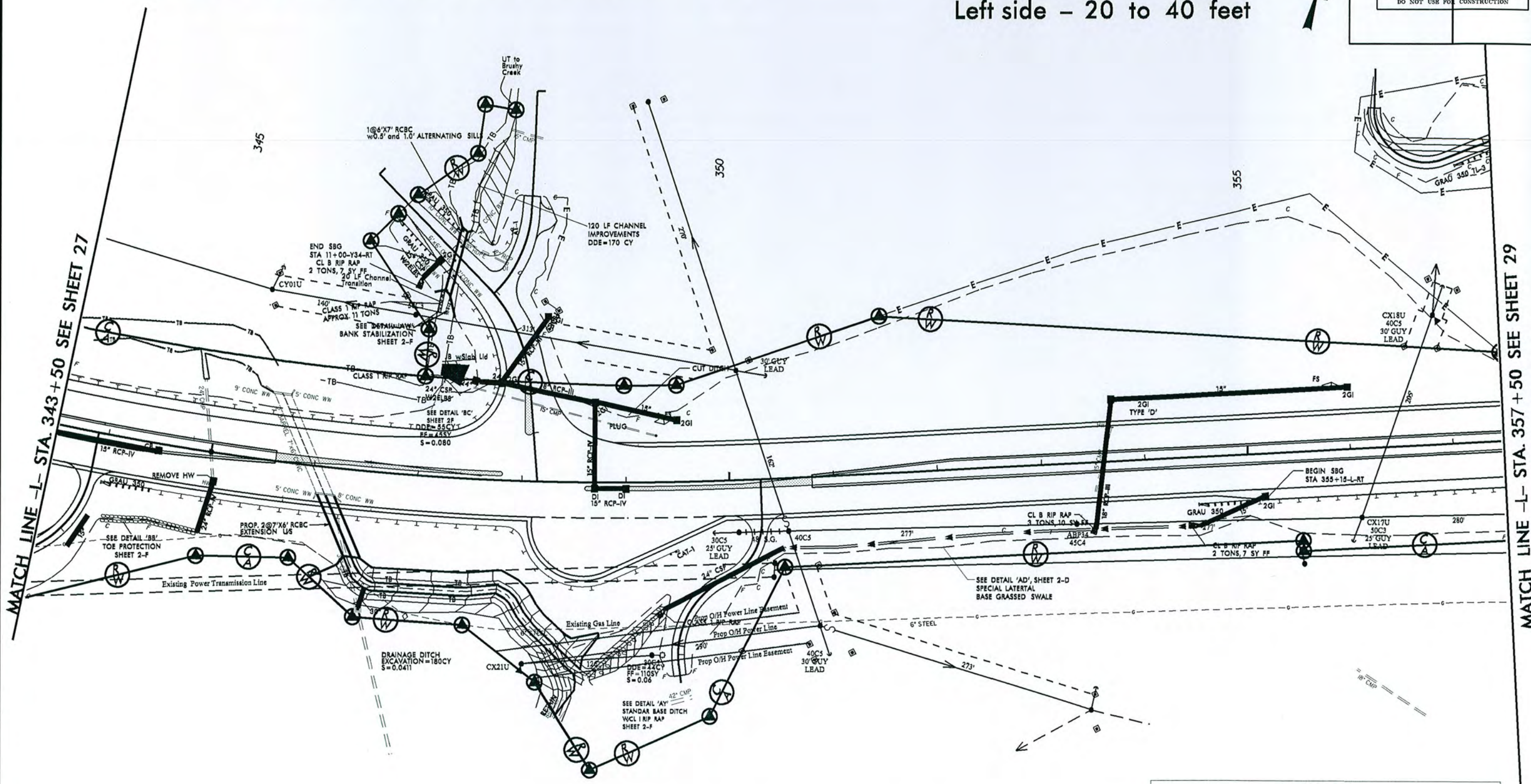
# SITE 33 STREAM RELOCATION UTILITY IMPACTS TO MITIGATION SITE



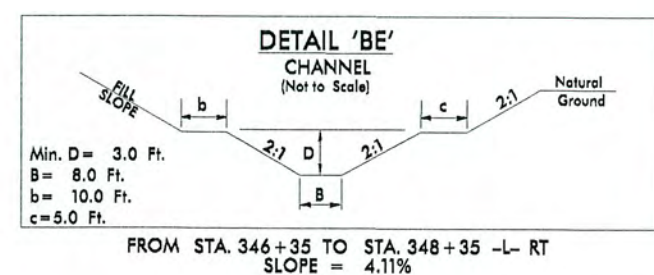
Streambank Reforestation  
Buffer widths looking downstream  
Right side - 10 feet  
Left side - 20 to 40 feet



PROJECT REFERENCE NO. R-2519B		SHEET NO. 28
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		



Entire Buffer is affected by Overhead Transmission Line,  
Overhead Utility Line and Gas Line Easements





## **APPENDIX C.**

**MEMORANDUM OF AGREEMENT (MOA)**  
**BETWEEN**  
**THE NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**  
**AND**  
**DUKE ENERGY CAROLINAS, LLC**  
**AND**  
**DUKE ENERGY PROGRESS, INC**  
**REGARDING**  
**VEGETATION MANAGEMENT PRACTICES ALONG UTILITY ENCROACHMENTS**  
**IN NCDOT DIVISION 13.**

This AGREEMENT is entered into by and between the North Carolina Department of Transportation (NCDOT) Division of Highways, hereinafter referred to as "NCDOT", and Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc, hereinafter referred to as the "Company".

WHEREAS, the Company and NCDOT have a mutually beneficial history of managing utility encroachment vegetation along the State's rights of way in NCDOT Division 13; and

WHEREAS, because the Company and NCDOT agree that streamlining the application process for vegetation management activities along utility encroachments is mutually beneficial, this Agreement is developed; and

WHEREAS, the project entered into by means of this Agreement is of mutual interest and benefit to NCDOT and to the Company.

**NOW, THEREFORE, the parties hereto agree as follows:**

1. To calibrate activities and expectations, an annual meeting between the Company and NCDOT shall be held at a mutually agreeable time and location prior to each year's application season. The agenda at this annual meeting should include but not be limited to: specific herbicides, rates, surfactants, dyes, and application techniques the Company wishes to utilize or cause to be utilized by its contractors along the subject rights of way.
2. The Company may rely on in-house staff to undertake project assignments; however, the Company retains the right to subcontract specific tasks to outside parties. Should the Company elect to subcontract specific tasks, subcontractors will be subject to the same contractual terms as the Company. The Company will be fully responsible for the quality of



all work products and agrees to be responsible for damages caused by its contractors. Furthermore, the Company agrees to be responsible for assuring that its contractors adhere to all pesticide laws; including but not limited to conducting operations under the direct supervision of a licensed N.C. Pesticide Applicator. Only products approved for use in North Carolina by the North Carolina Department of Agriculture's Pesticide Section may be used in compliance with this Agreement.

3. In the event that said vegetation management activities results in damage to NCDOT property such as overkill, erosion, right-of-way fence damage, etc., the Company will be responsible for all repair and replacement costs. If the Company causes sufficient loss of groundcover to potentially cause erosion, the Company must at its own expense reseed the right-of-way according to NCDOT specifications. NCDOT will not tolerate loss of understory.

4. In keeping with Environmental Stewardship Policies of both parties, the loss of understory vegetation will not be tolerated. Eastern Redbud (*Cercis canadensis*) and Flowering Dogwood (*Cornus florida*), along the State owned right of way, shall be protected, when mature heights are compatible with lines and replacement of species (size and kind) will be required if damage occurs. Vegetation Management treatments (mowing and herbicides) are limited in sensitive areas such as endangered species sites, and other areas deemed appropriate. The Company shall make every attempt to verify the location of State and/or Federally Threatened and/or Endangered plant species along the State owned right of way and protect these species from damage due to Company activities or from work performed by contractors of the Company. NCDOT will supply an initial list of known sites upon signing this Agreement and update this list as known sites are discovered. A revised list of plant sites will be supplied prior to each spray season along with the corresponding MOA:

5. The Company will be responsible for any claims from third parties directly resulting from the Company's operations. To the extent of the Company's or the Company's contractor's negligence, the Company will indemnify and hold NCDOT harmless against any and all third party claims or causes of action, and all losses therefrom, arising out of or in any way related to the Company's operations or those of its contractors under this Agreement.

6. The Company agrees to abide by the latest edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways*. Contractors performing operations for the Company will erect necessary signs and/or barriers for the protection of the public.

7. Both parties consent to make themselves available within a 48-hour notice; as a result field situations that may arise will be handled in a time-efficient manner.

8. Other non-vegetation management activities will be conducted in accordance with provisions of the *Policies and Procedures for Accommodating Utilities on Highway Right-of-Way* manual.



9. The Company and the NCDOT reserve the right, at their own discretion and for any reason deemed by them to be sufficient, to cancel or modify this Agreement after the date of signature

10. Work may commence on the date this Agreement is signed by both parties. This initial Agreement will be in effect until December 31, 2013. At that time, a new Agreement or revisions to this Agreement may be implemented for the succeeding calendar year.

IN WITNESS WHEREOF, the parties have caused these presents to be executed.

DUKE ENERGY CAROLINAS, LLC

Signature - Catherine Hepa  
Title - Director, Transmission Ve  
Management  
Date - 5-31-13

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

Division 13

Signature - J. A. Wilson  
Title - Division Operations Engineer  
Date - May 22, 2013

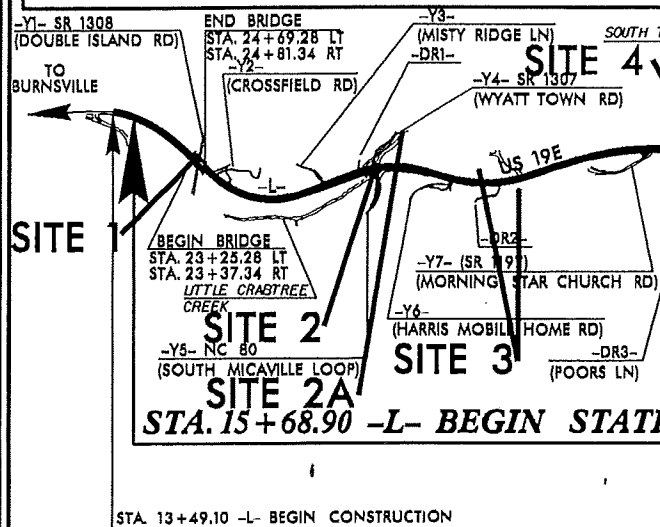
DUKE ENERGY PROGRESS, INC.

Signature - Mark T. Hunt  
Title - Manager, Vegetation Management  
Date - 5-29-13

Distribution: (1.) Division Engineer (2.) DREE (3.) Field Coordinator (4.) Division Maintenance Engineer or Division Operations Engineer (5.) Division Roadside Environmental Engineer (6.) Don G. Lee (7.) Field Operations Engineer (8.) Derek Smith.

09/08/99

## CONTRACT:

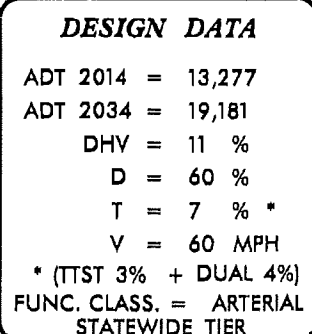


**LOCATION: US 19E FROM SR 1186 (OLD US 19) IN  
YANCEY COUNTY TO MULTI-LANE SECTION WEST  
OF SPRUCE PINE IN MITCHELL COUNTY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2519B	1	
STATE PRBLM NO.	F. A. PRBLM NO.	DESCRIPTION	
35609.1.1		PE	
35609.2.2		RW, UTIL	



**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



<p>Prepared In the Office of:</p> <p><b><i>DIVISION OF HIGHWAYS</i></b></p> <p>1000 Birch Ridge Dr., Raleigh NC, 27610</p>	
<p>2012 STANDARD SPECIFICATIONS</p>	<p><b><u>G. E. BREW, PE</u></b></p> <p><b><i>PROJECT ENGINEER</i></b></p>
<p><b><i>RIGHT OF WAY DATE:</i></b></p> <p><b><u>JANUARY 27, 2012</u></b></p>	<p><b><u>THAD F. DUNCAN, PE</u></b></p> <p><b><i>PROJECT DESIGN ENGINEER</i></b></p>
<p><b><i>LETTING DATE:</i></b></p> <p><b><u>FEBRUARY 18, 2014</u></b></p>	

**HYDRAULICS ENGINEER**

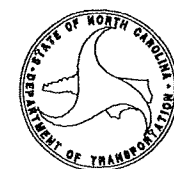
\_\_\_\_\_  
**P.E.**

**SIGNATURE:** \_\_\_\_\_

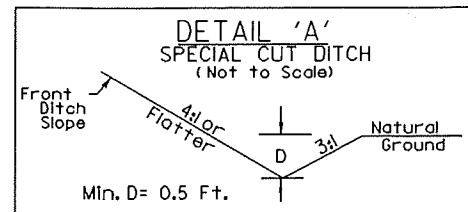
**ROADWAY DESIGN ENGINEER**

\_\_\_\_\_  
**P.E.**

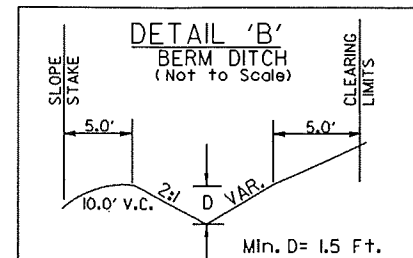
**SIGNATURE:** \_\_\_\_\_



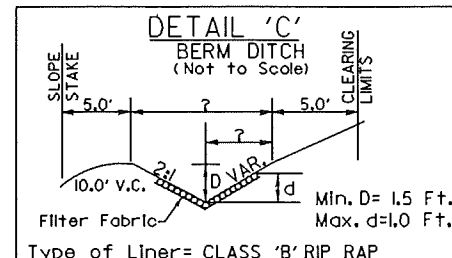




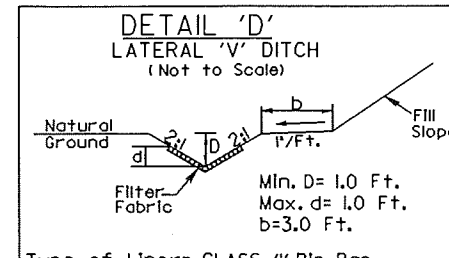
FROM STA. 19+00 TO STA. 21+00 -L- RT



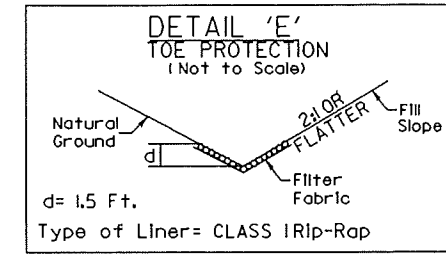
FROM STA. 18+00 TO STA. 18+50 -L- LT



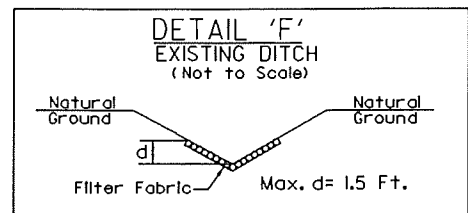
FROM STA. 18+50 TO STA. 19+50 -L- LT



FROM STA. 21+50 TO STA. 23+25 -L- LT

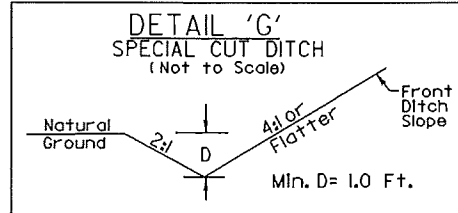


FROM STA. 22+10 TO STA. 22+70 -L- RT

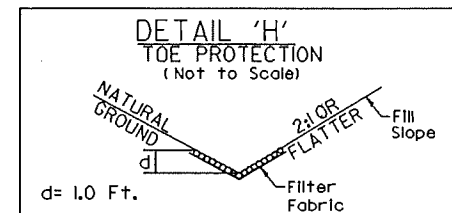


Type of Liner = CLASS 'I' Rip-Rap

FROM STA. 22+70 TO STA. 23+80 -L- RT

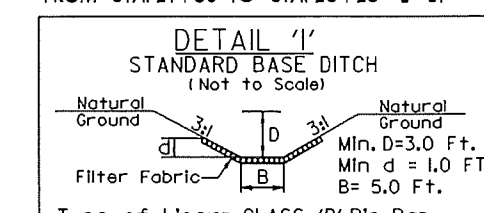


FROM STA. 71+20 TO STA. 71+60 -L- LT  
FROM STA. 12+50 TO STA. 12+75 -Y38- RT  
FROM STA. 13+70 TO STA. 14+30 -DR3- RT  
FROM STA. 12+00 TO STA. 12+50 -Y31- LT

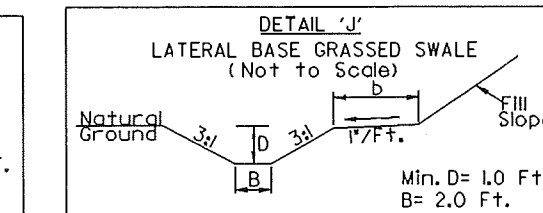


Type of Liner = Class 'B' Rip-Rap

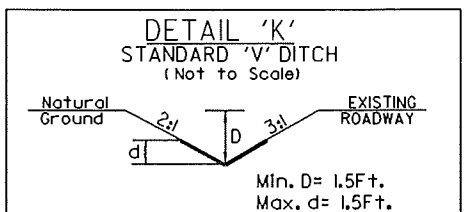
FROM STA. 52+80 TO STA. 53+50 -L- RT  
FROM STA. 58+50 TO STA. 59+00 -L- RT  
FROM STA. 91+50 TO STA. 92+00 -L- LT  
FROM STA. 139+00 TO STA. 140+50 -L- RT  
FROM STA. 276+00 TO STA. 276+50 -L- LT  
FROM STA. 283+50 TO STA. 284+00 -L- LT  
FROM STA. 282+00 TO STA. 284+50 -L- RT  
FROM STA. 10+80 TO STA. 11+80 -Y23A- LT



Type of Liner = CLASS 'B' Rip-Rap  
FROM STA. 46+10 TO STA. 46+50 -L- LT

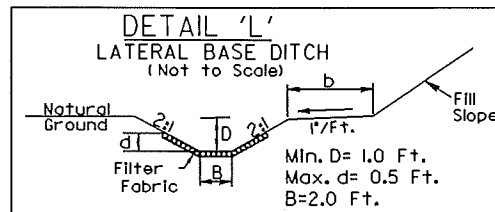


FROM STA. 46+50 TO STA. 49+50 -L- LT  
FROM STA. 237+00 TO STA. 241+00 -L- RT

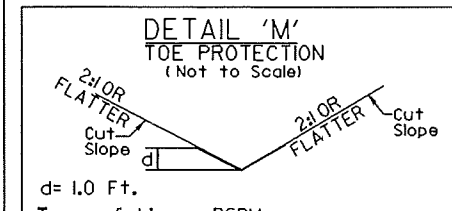


Type of Liner = PSRM

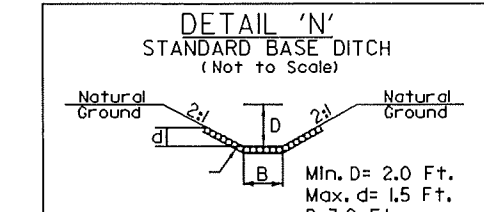
FROM STA. 12+92 TO STA. 15+20 -Y1- LT



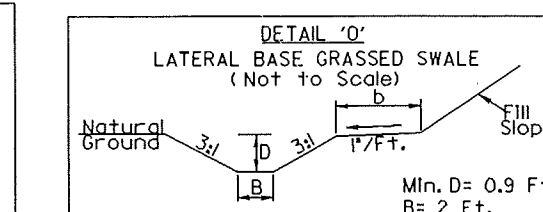
\*When B is < 6.0'  
Type of Liner = CLASS 'B' Rip-Rap  
FROM STA. 49+50 TO STA. 50+50 -L- LT



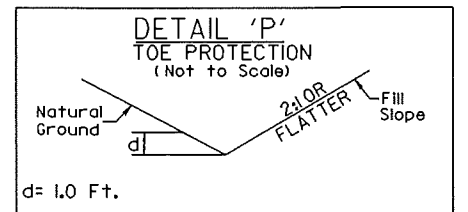
Type of Liner = PSRM  
FROM STA. 48+00 TO STA. 51+50 -L- RT



Type of Liner = Class 'B' Rip-Rap  
STA. 52+80 -L- LT

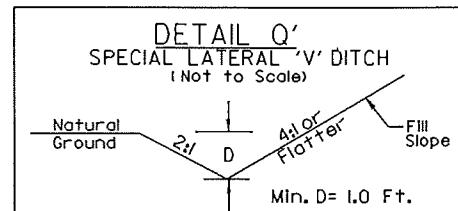


FROM STA. 52+80 TO STA. 54+50 -L- LT

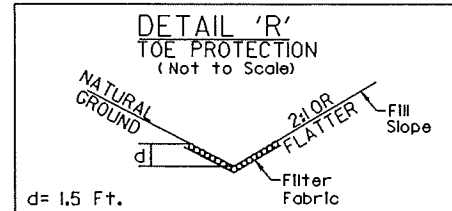


Type of Liner = PSRM

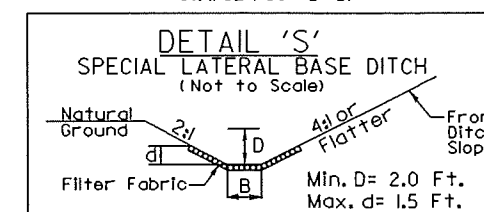
FROM STA. 10+50 TO STA. 13+00 -DR2- RT  
FROM STA. 10+50 TO STA. 13+50 -DR2- LT



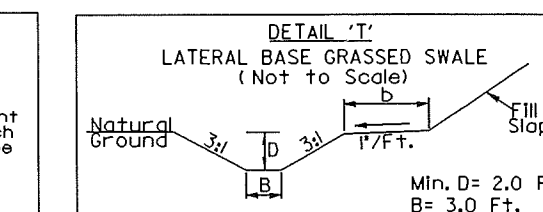
FROM STA. 224+00 TO STA. 225+50 -L- LT



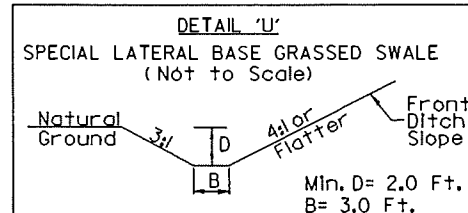
Type of Liner = Class 'I' Rip-Rap  
FROM STA. 59+05 TO STA. 60+00 -L- RT



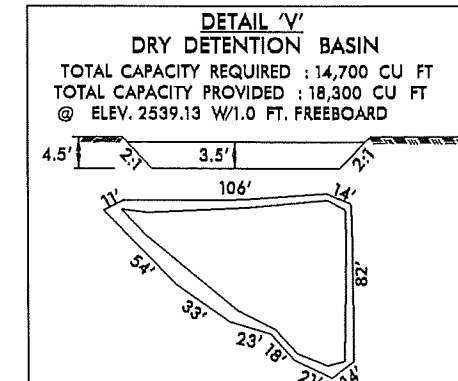
Type of Liner = CLASS 'B' Rip-Rap  
FROM STA. 43+00 TO STA. 43+50 -L- LT  
FROM STA. 204+50 TO STA. 207+00 -L- RT



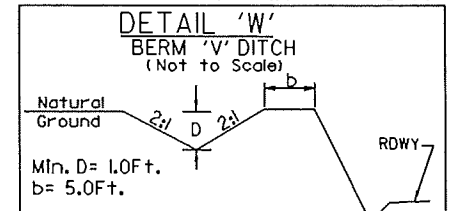
FROM STA. 13+00 TO STA. 13+72 -Y4- RT



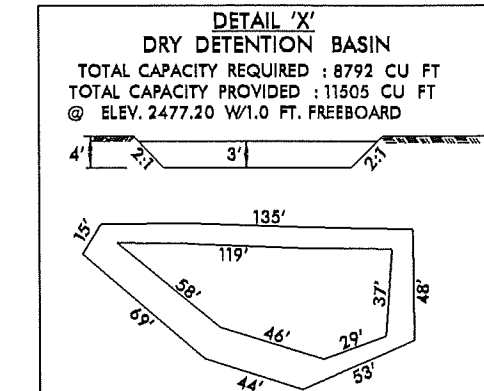
FROM STA. 9+85 TO STA. 13+00 -Y4- RT



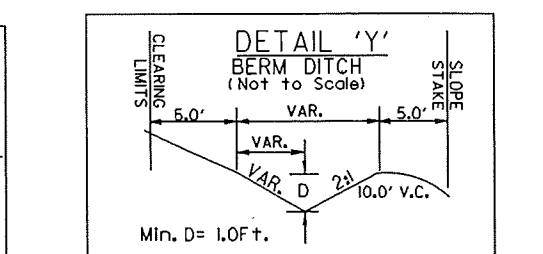
FROM STA. 250+75 TO STA. 252+01 -L- RT



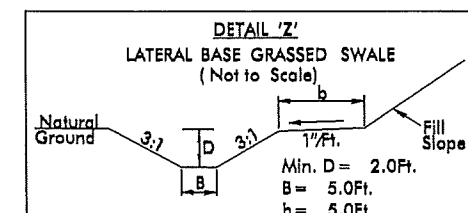
FROM STA. 194+50 TO STA. 195+80 -L- RT  
FROM STA. 216+50 TO STA. 219+00 -L- RT  
FROM STA. 227+50 TO STA. 232+50 -L- LT  
FROM STA. 235+57 TO STA. 240+00 -L- LT  
FROM STA. 296+50 TO STA. 298+00 -L- LT  
FROM STA. 10+50 TO STA. 12+00 -Y20- LT  
FROM STA. 258+00 TO STA. 259+00 -L- LT  
FROM STA. 284+40 TO STA. 285+20 -L- LT



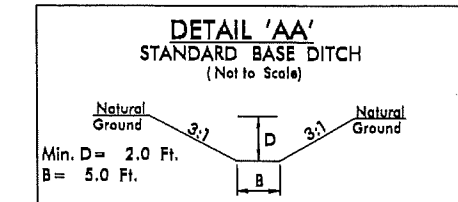
FROM STA. 83+00 TO STA. 84+50 -L- RT



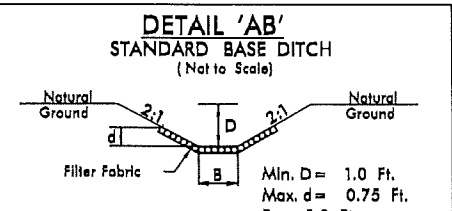
FROM STA. 91+50 TO STA. 95+00 -L- RT  
FROM STA. 410+00 TO STA. 412+50 -L- LT  
FROM STA. 11+50 TO STA. 12+00 -Y8- LT



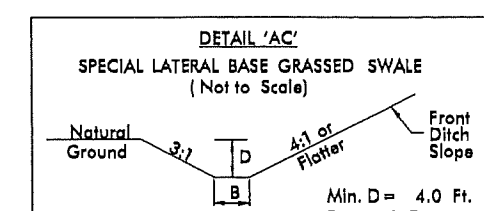
FROM STA. 111+50-L- TO STA. 119+00 -L- RT  
FROM STA. 319+62-L- TO STA. 321+84 -L- LT



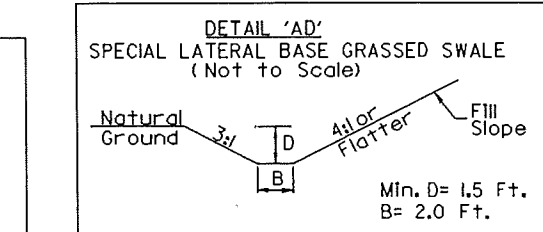
FROM STA. 119+50 TO STA. 121+50 -L- RT



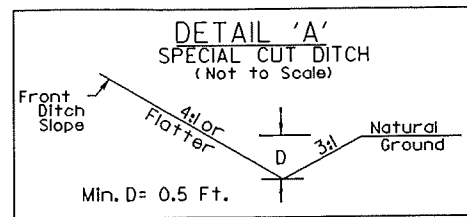
Type of Liner = CLASS II Rip-Rap  
FROM STA. 121+50 TO STA. 121+75 -L- RT



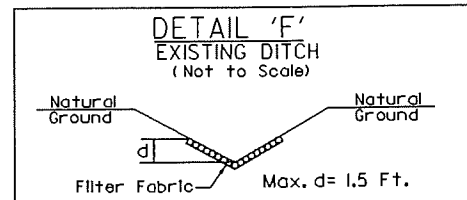
FROM STA. 124+50 TO STA. 127+00 -L- RT



FROM STA. 135+75 TO STA. 139+00 -L- LT  
FROM STA. 350+50 TO STA. 354+50 -L- RT

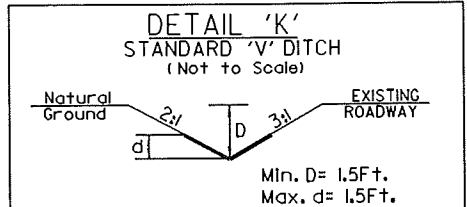


FROM STA. 19+00 TO STA. 21+00 -L- RT



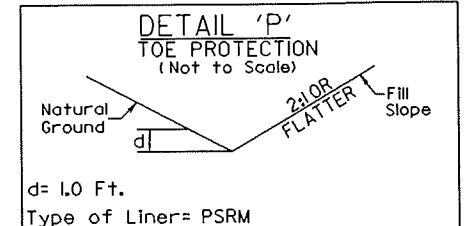
Type of Liner = CLASS 'I' Rip-Rap

FROM STA. 22+70 TO STA. 23+80 -L- RT

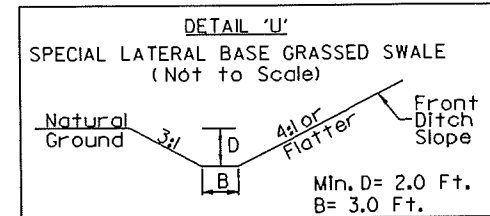


Type of Liner = PSRM

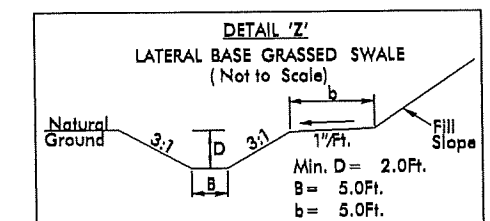
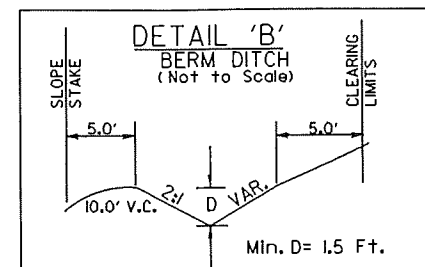
FROM STA. 12+92 TO STA. 15+20 -Y1- LT



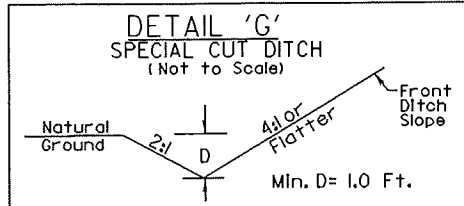
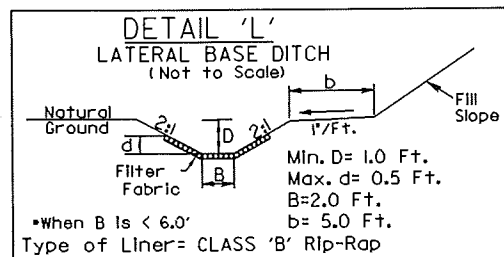
Type of Liner = PSRM

FROM STA. 10+50 TO STA. 13+00 -DR2- RT  
FROM STA. 10+50 TO STA. 13+50 -DR2- LT

FROM STA. 9+85 TO STA. 13+00 -Y4- RT

FROM STA. 111+50-L- TO STA. 119+00 -L- RT  
FROM STA. 319+80-L- TO STA. 321+80 -L- RT

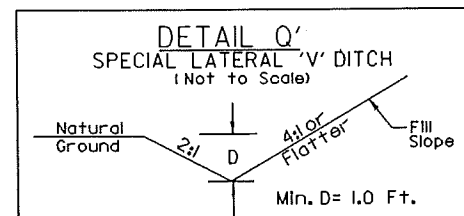
FROM STA. 18+00 TO STA. 18+50 -L- LT

FROM STA. 57+50 TO STA. 59+00 -L- RT  
FROM STA. 71+00 TO STA. 71+50 -L- LT  
FROM STA. 12+50 TO STA. 12+75 -Y38- RT  
FROM STA. 13+70 TO STA. 14+30 -DR3- RT  
STA. 12+00 -Y31- LT

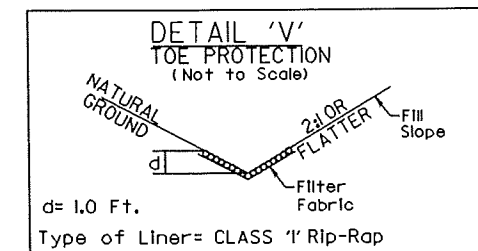
\*When B is &lt; 6.0'

Type of Liner = CLASS 'B' Rip-Rap

FROM STA. 49+50 TO STA. 50+50 -L- LT

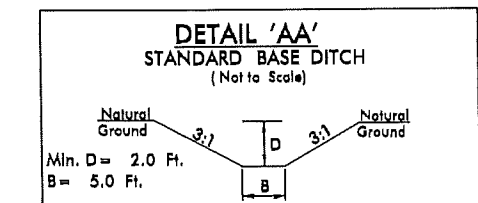


FROM STA. 224+00 TO STA. 225+50 -L- LT

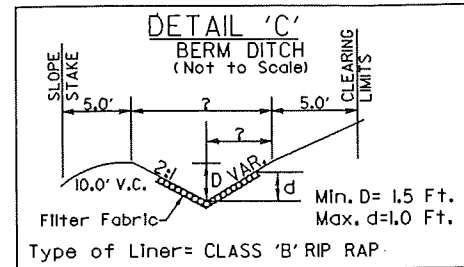


Type of Liner = CLASS 'I' Rip-Rap

FROM STA. 71+50 TO STA. 72+60 -L- LT

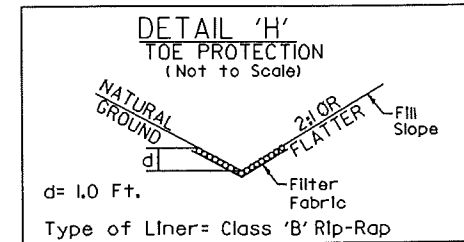


FROM STA. 119+50 TO STA. 121+50 -L- RT

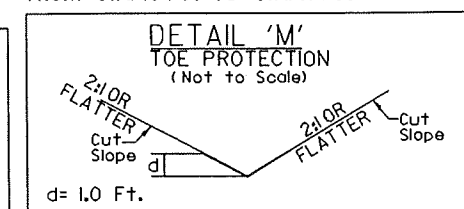


Type of Liner = CLASS 'B' Rip-Rap

FROM STA. 18+50 TO STA. 19+50 -L- LT

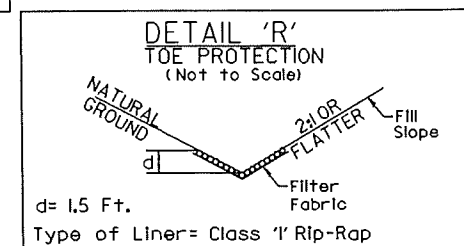


Type of Liner = Class 'B' Rip-Rap

FROM STA. 32+50 TO STA. 32+80 -L- RT  
FROM STA. 52+80 TO STA. 53+50 -L- RT  
FROM STA. 84+65 TO STA. 85+00 -L- RT  
FROM STA. 91+50 TO STA. 92+00 -L- LT  
FROM STA. 276+00 TO STA. 276+50 -L- LT  
FROM STA. 283+50 TO STA. 284+00 -L- LT  
FROM STA. 282+00 TO STA. 284+50 -L- RT  
FROM STA. 10+80 TO STA. 11+80 -Y23A- LT

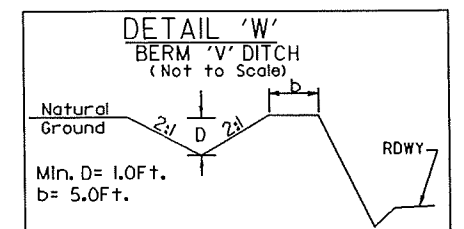
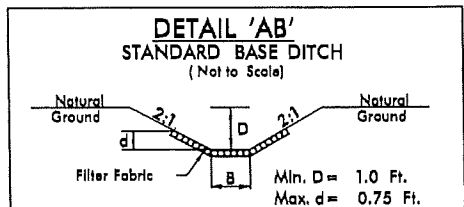
Type of Liner = PSRM

FROM STA. 48+00 TO STA. 51+50 -L- RT



Type of Liner = CLASS 'I' Rip-Rap

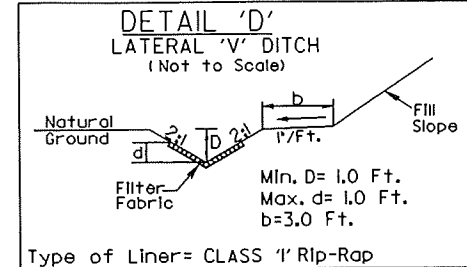
FROM STA. 59+00 TO STA. 60+00 -L- RT

FROM STA. 194+50 TO STA. 195+80 -L- RT  
FROM STA. 216+50 TO STA. 219+00 -L- RT  
FROM STA. 227+50 TO STA. 232+50 -L- LT  
FROM STA. 235+57 TO STA. 240+00 -L- LT  
FROM STA. 296+50 TO STA. 298+00 -L- LT  
FROM STA. 10+50 TO STA. 12+00 -Y20- LT

\*When B is &lt; 6.0'

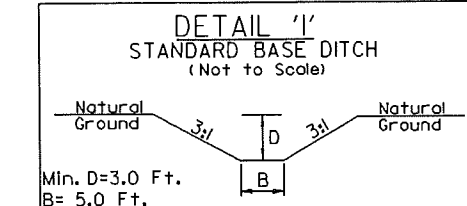
Type of Liner = CLASS II Rip-Rap

FROM STA. 121+50 TO STA. 121+75 -L- RT

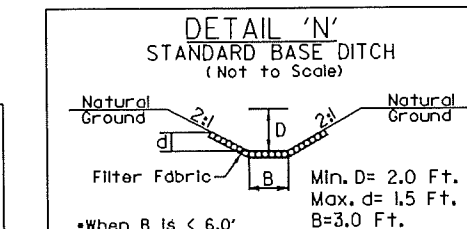


Type of Liner = CLASS 'I' Rip-Rap

FROM STA. 21+50 TO STA. 23+25 -L- LT



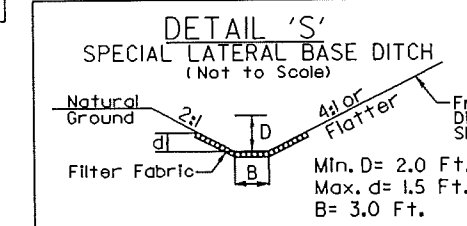
FROM STA. 46+10 TO STA. 46+50 -L- LT



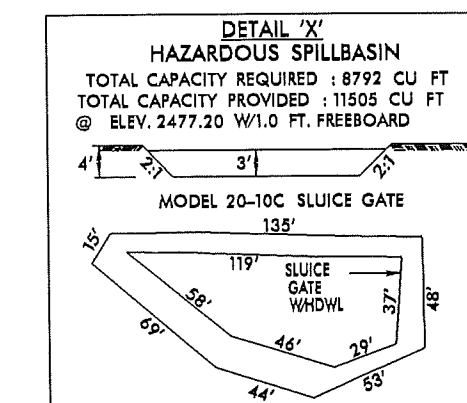
\*When B is &lt; 6.0'

Type of Liner = Class 'B' Rip-Rap

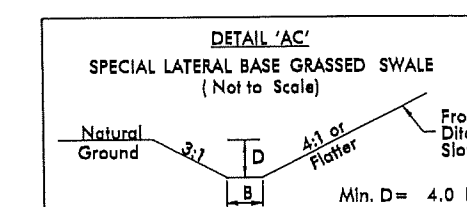
FROM STA. 52+80 -L- LT



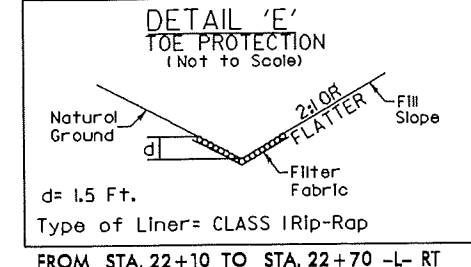
Type of Liner = CLASS 'B' Rip-Rap

FROM STA. 43+00 TO STA. 43+50 -L- LT  
FROM STA. 204+50 TO STA. 207+00 -L- RT

FROM STA. 83+00 TO STA. 84+50 -L- RT

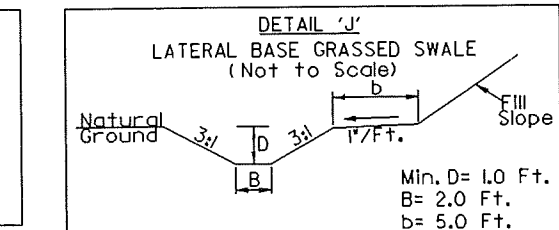
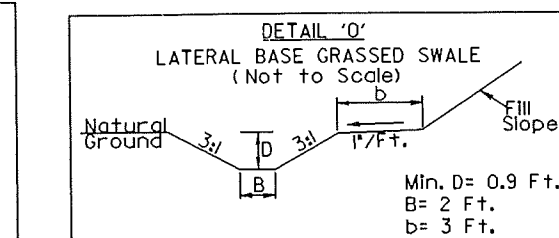


FROM STA. 124+50 TO STA. 127+00 -L- RT

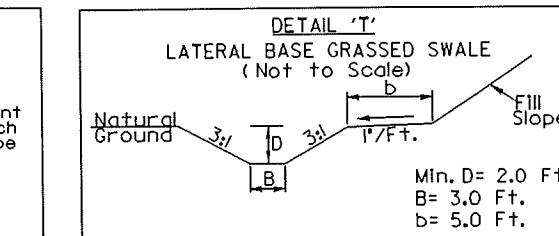


Type of Liner = CLASS I Rip-Rap

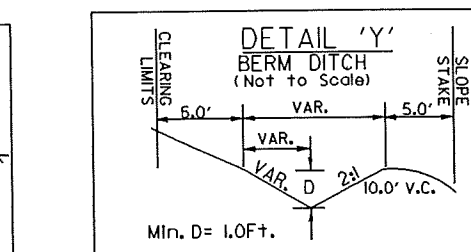
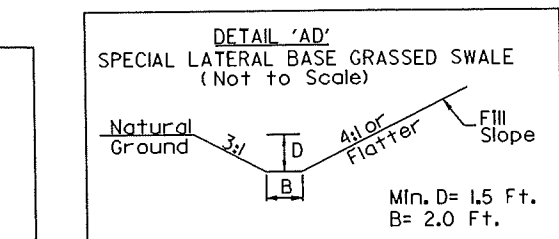
FROM STA. 22+10 TO STA. 22+70 -L- RT

FROM STA. 46+50 TO STA. 49+50 -L- LT  
FROM STA. 237+00 TO STA. 241+00 -L- RT

FROM STA. 52+80 TO STA. 54+50 -L- LT



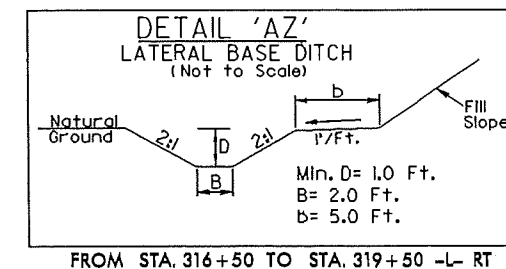
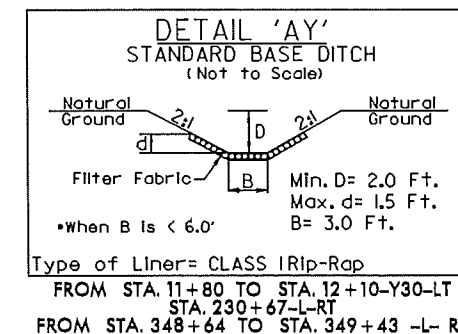
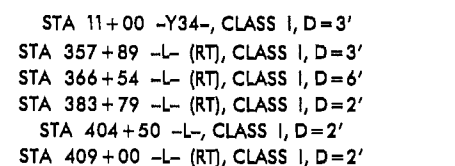
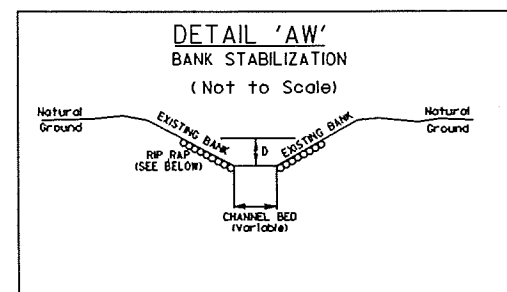
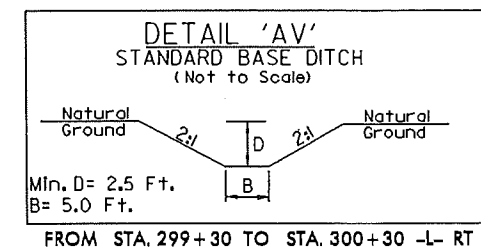
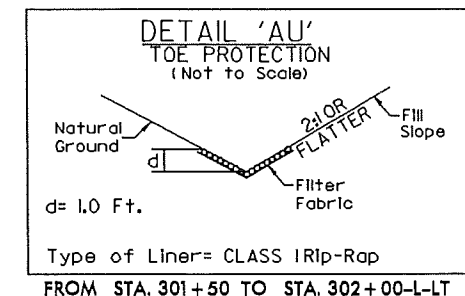
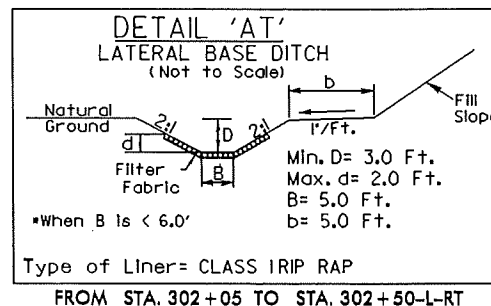
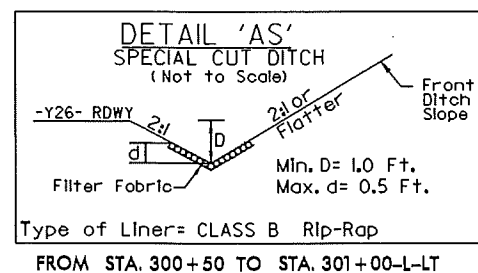
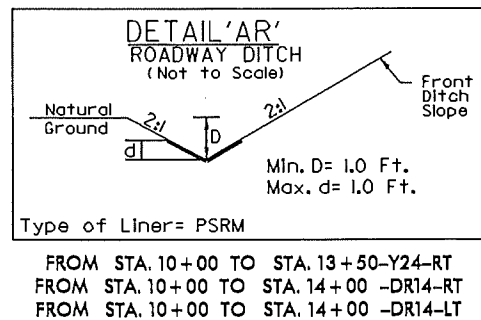
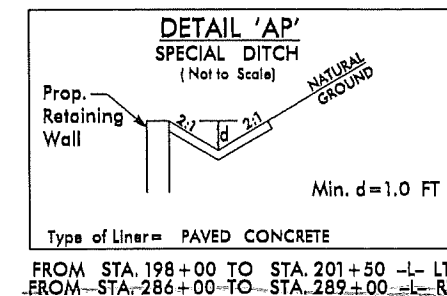
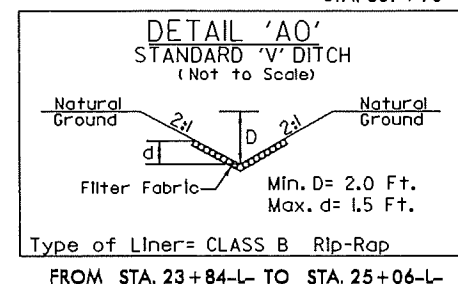
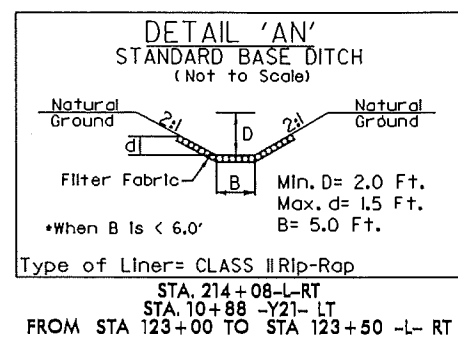
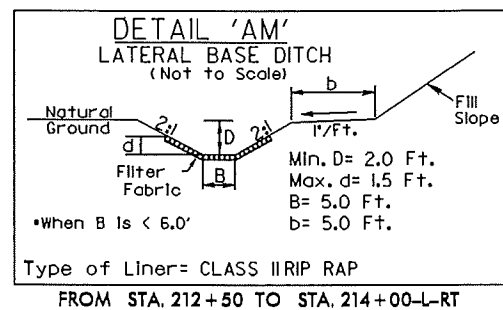
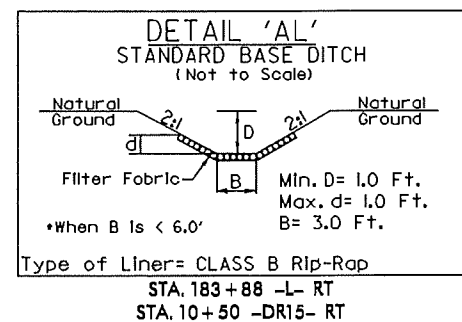
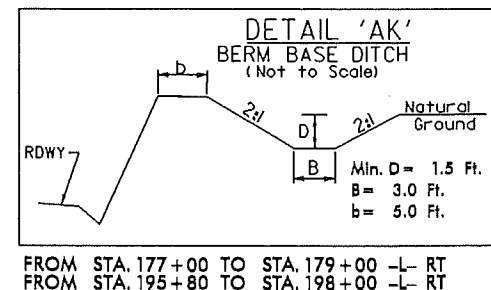
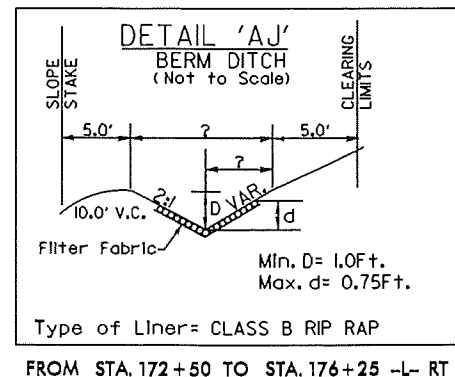
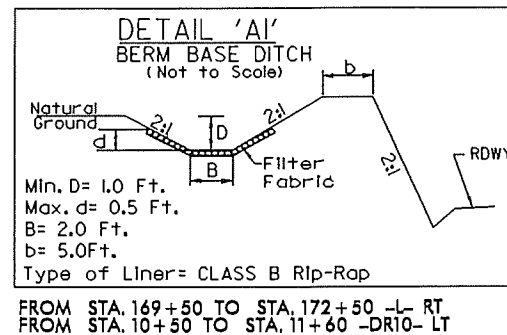
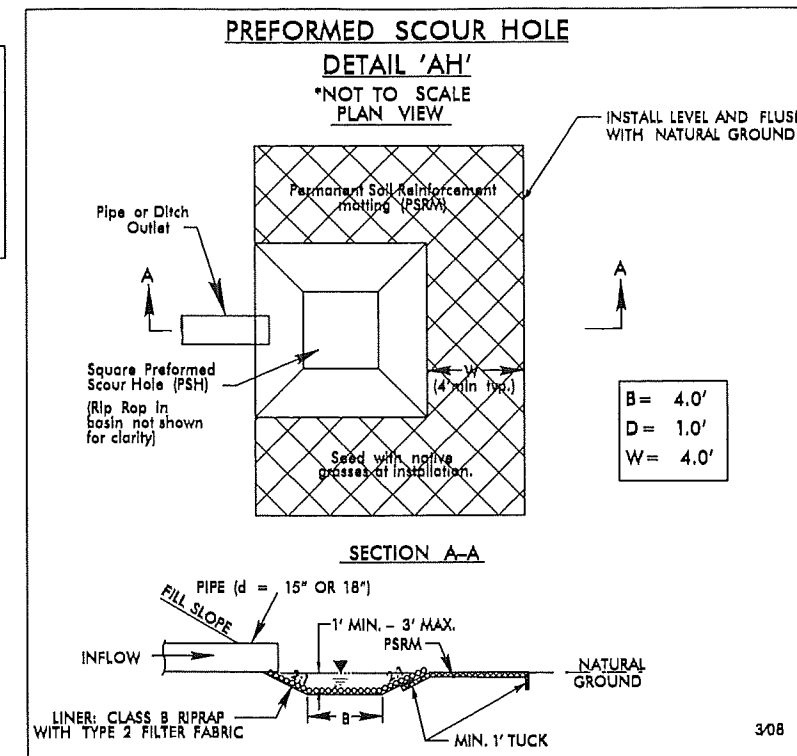
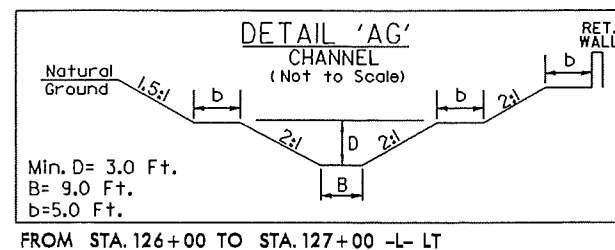
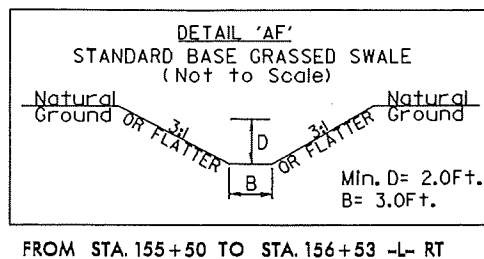
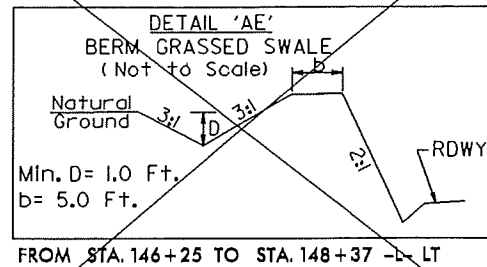
FROM STA. 13+00 TO STA. 13+72 -Y4- RT

FROM STA. 91+50 TO STA. 96+50 -L- RT  
FROM STA. 410+00 TO STA. 412+50 -L- LT  
FROM STA. 11+50 TO STA. 12+00 -Y8- LTFROM STA. 135+75 TO STA. 139+00 -L- LT  
FROM STA. 350+50 TO STA. 354+50 -L- RT

PROJECT REFERENCE NO.	R-2519B	SHEET NO.	2E
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

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PROJECT REFERENCE NO. R-2519B	SHEET NO. 2F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div>INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div> <div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>	

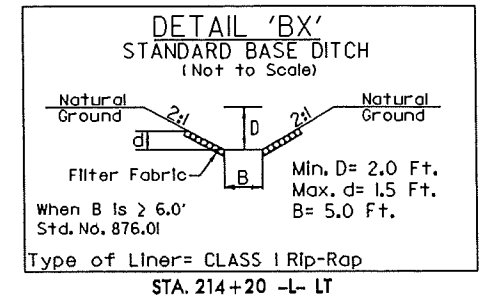
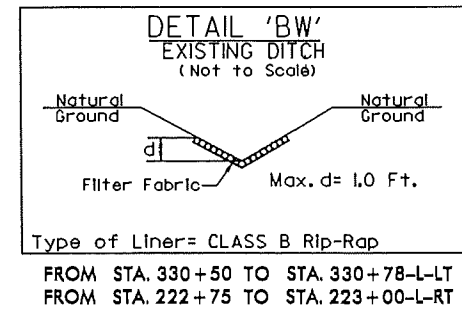
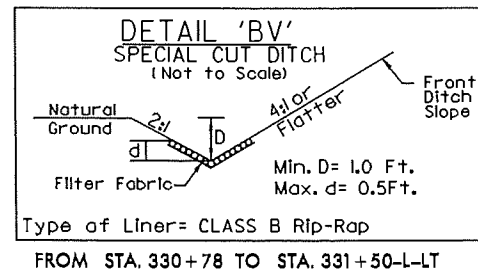
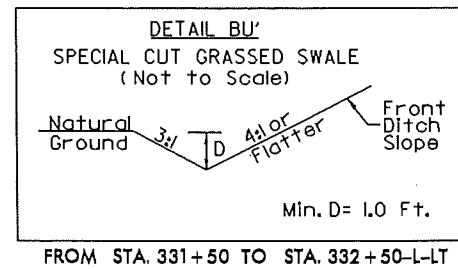
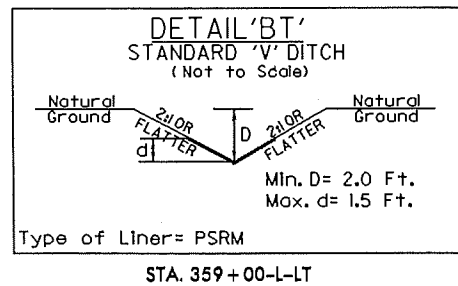
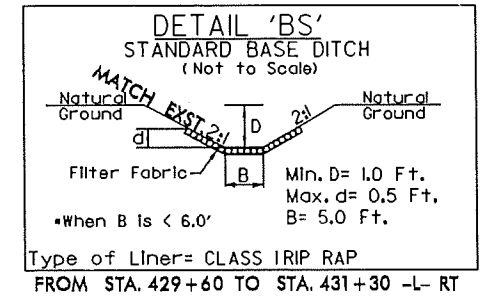
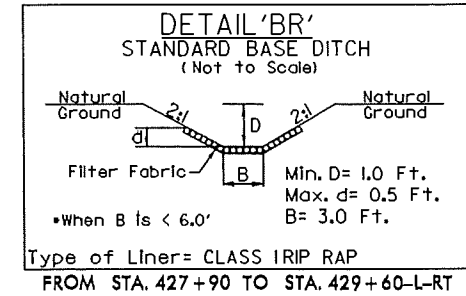
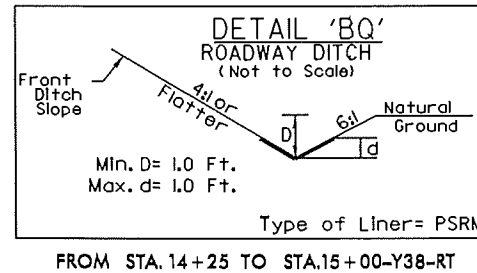
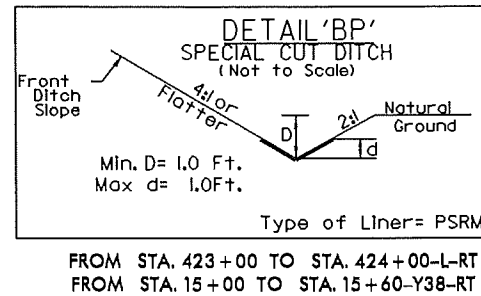
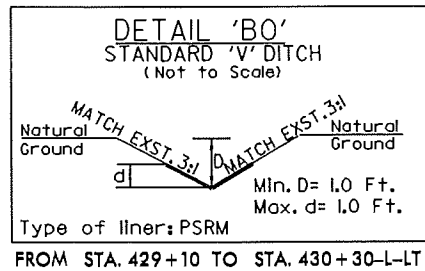
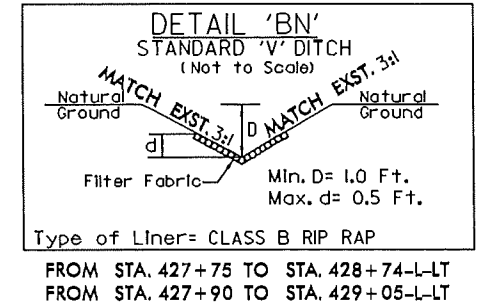
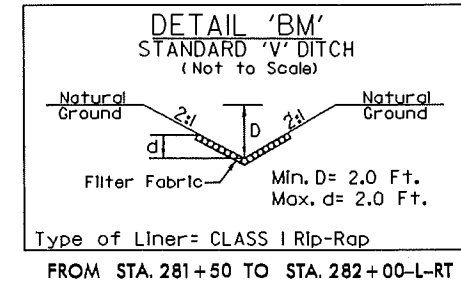
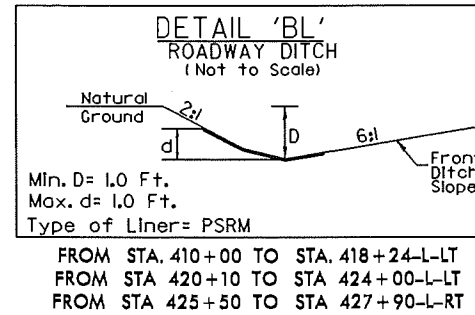
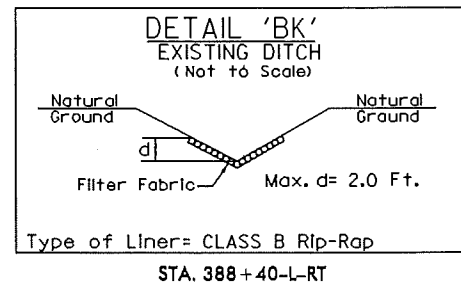
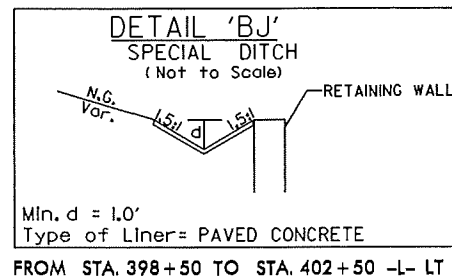
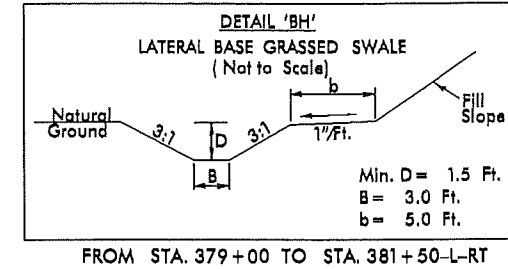
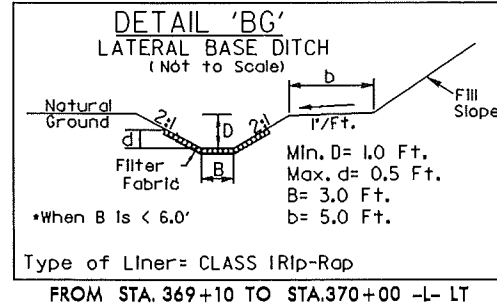
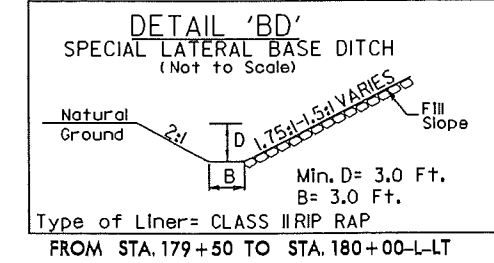
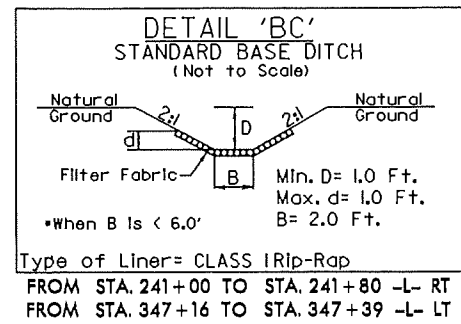
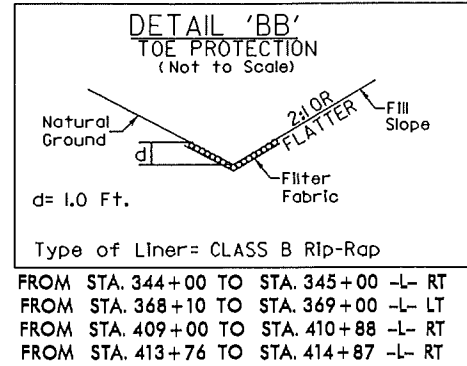
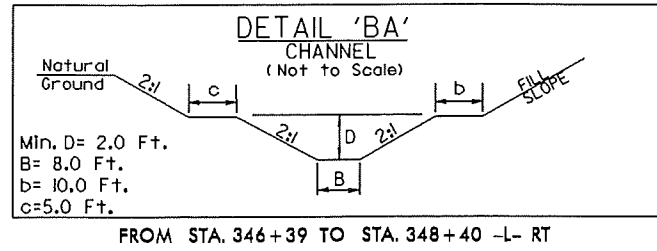


STA 55+00 -L- (LT), CLASS I, D=4'  
STA 79+36 -L- (LT), CLASS II, D=8'  
STA 179+80 -L- (LT), CLASS II, D=3' (RIGHT SIDE ONLY)  
STA 186+50 -L- (LT), CLASS I, D=4'  
STA 205+66 -L- (LT), CLASS I, D=2'  
STA 206+55 -L- (LT), CLASS I, D=2'  
STA 247+85 -L- , CLASS II, D=4' TO 5'  
STA 15+00 -Y23A-, CLASS I, D=5'  
STA 302+50 -L-, CLASS II, D=5'  
STA 305+50 -L-, CLASS I, D=2'  
STA 320+00 -L-, CLASS II, D=8' TO 13'  
STA 327+50 -L- (RT), CLASS B, D=1.5' TO 2.5'

STA 11+00 -Y34-, CLASS I, D=3'  
STA 357+89 -L- (RT), CLASS I, D=3'  
STA 366+54 -L- (RT), CLASS I, D=6'  
STA 383+79 -L- (RT), CLASS I, D=2'  
STA 404+50 -L-, CLASS I, D=2'  
STA 409+00 -L- (RT), CLASS I, D=2'

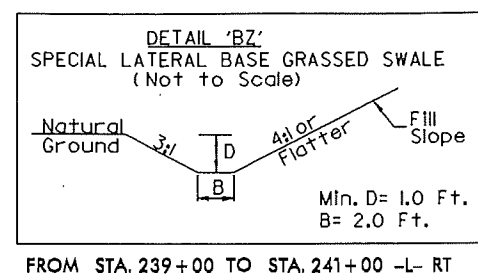
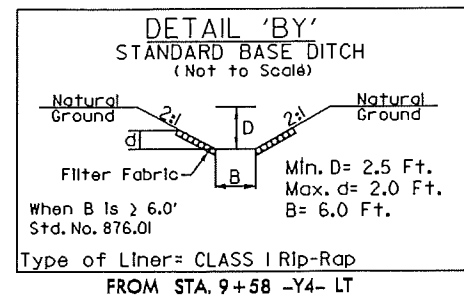


PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
BW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



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REVISIONS

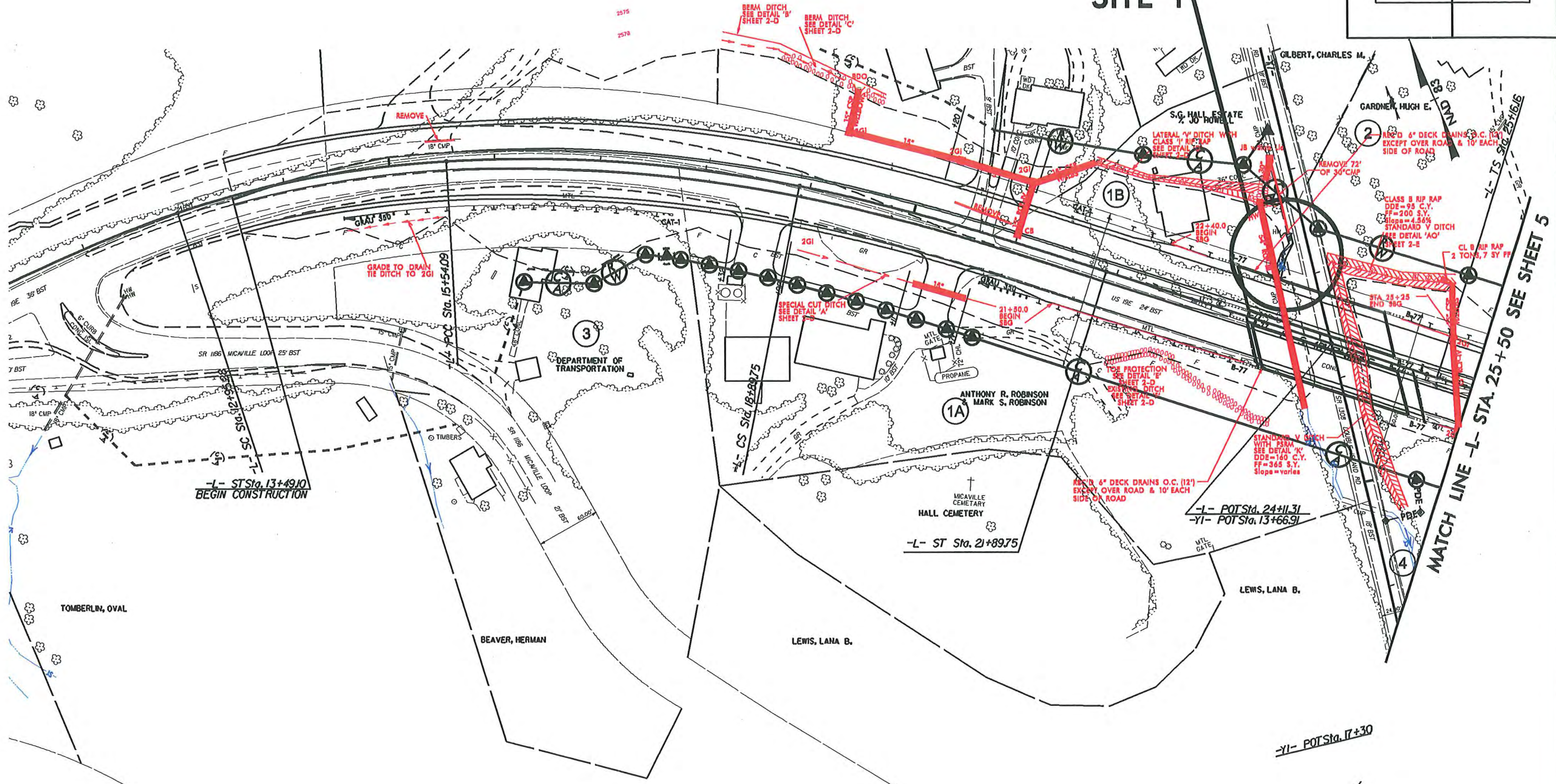


PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2H
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

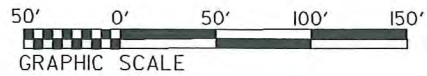


PROJECT REFERENCE NO.	SHEET NO.
R-2519B	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

# SITE 1



 DENOTES IMPACTS IN SURFACE WATER



MATCH LINE -L- STA. 25+50 SEE SHEET 5

-YI- POT Sta. 17+30

8/17/99

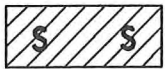
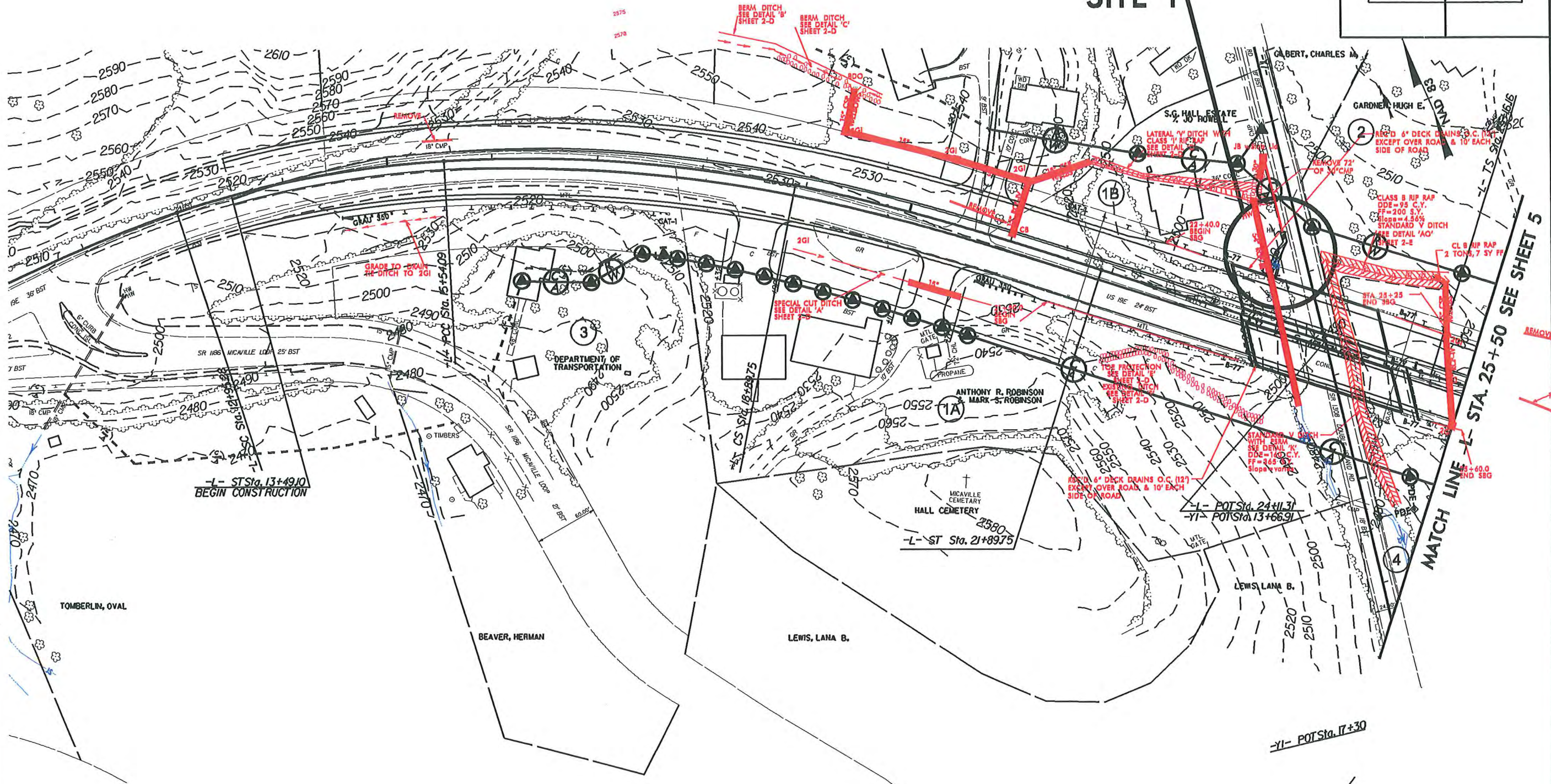
REVISIONS

STATIONING

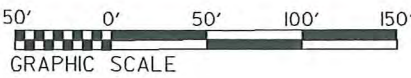


PROJECT REFERENCE NO.	SHEET NO.
R-2519B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

# SITE 1

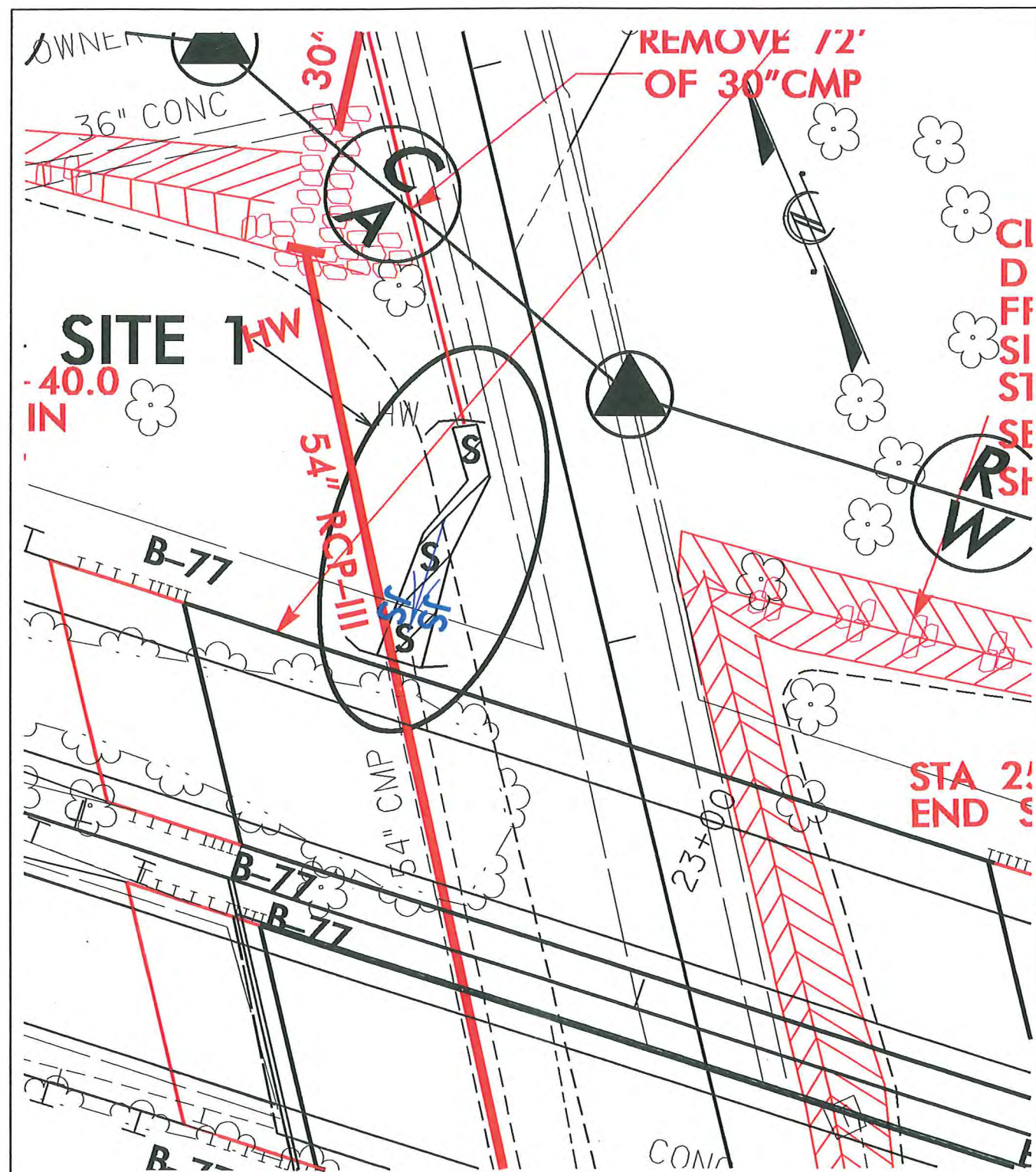


DENOTES IMPACTS IN  
SURFACE WATER

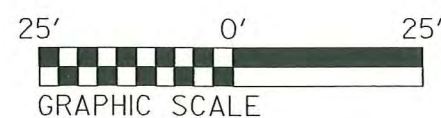


GRAPHIC SCALE





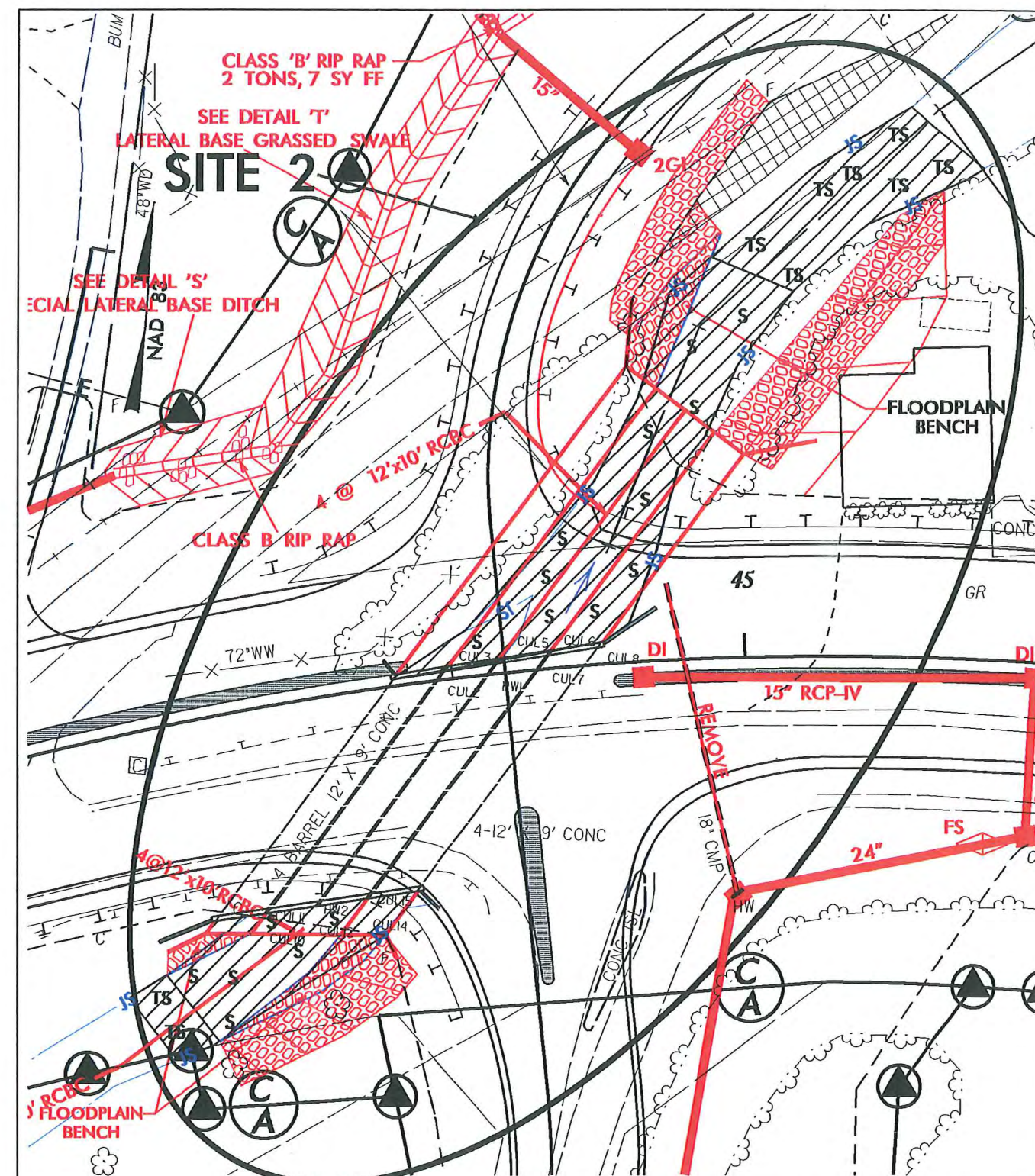
# IMPACT ENLARGEMENT



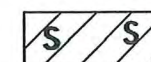
DENOTES IMPACTS IN SURFACE WATER

**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



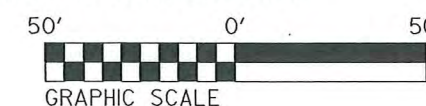
# IMPACT ENLARGEMENT



DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER



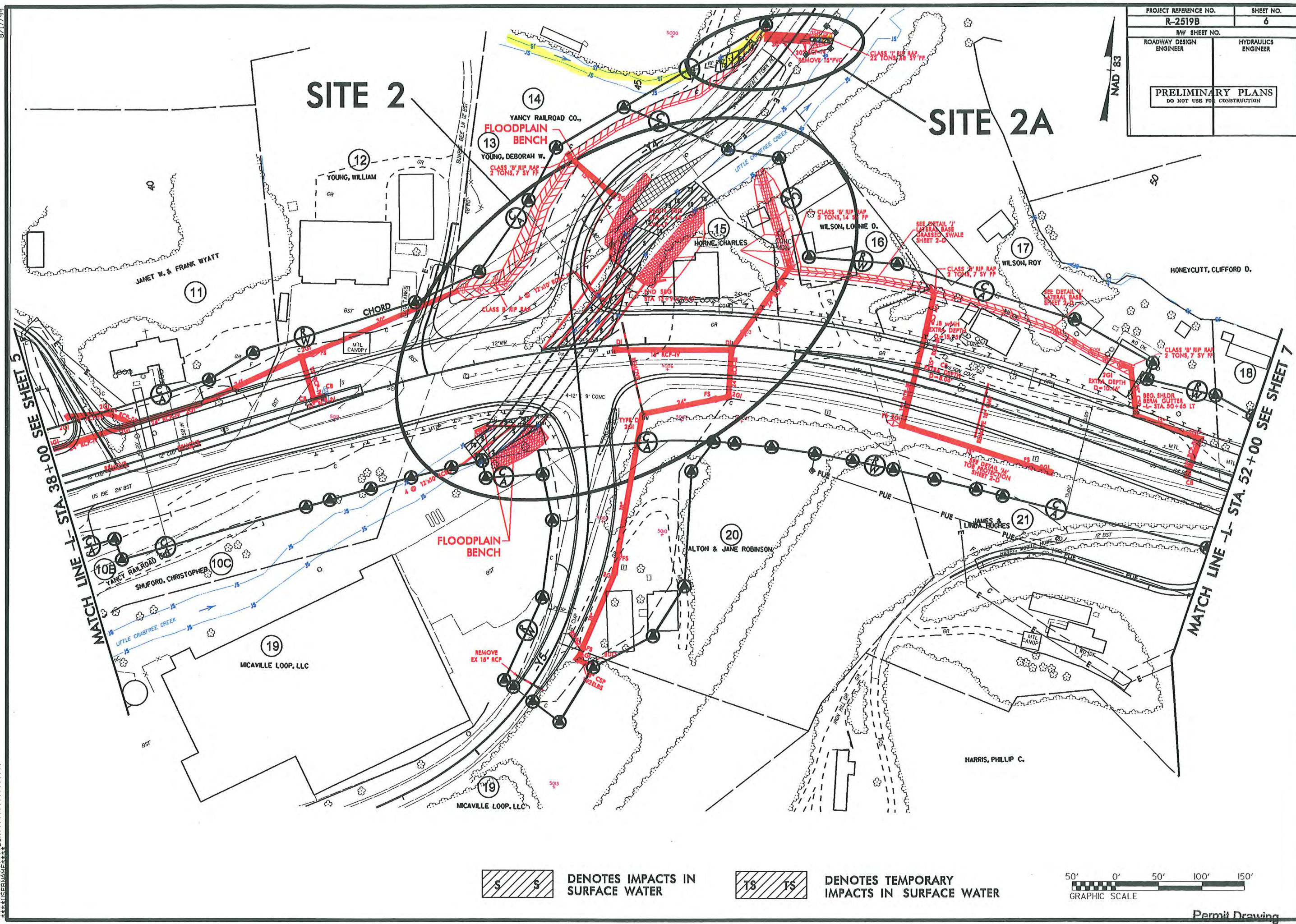
**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



8/17/99

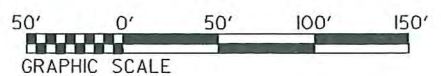
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



DENOTES IMPACTS IN SURFACE WATER



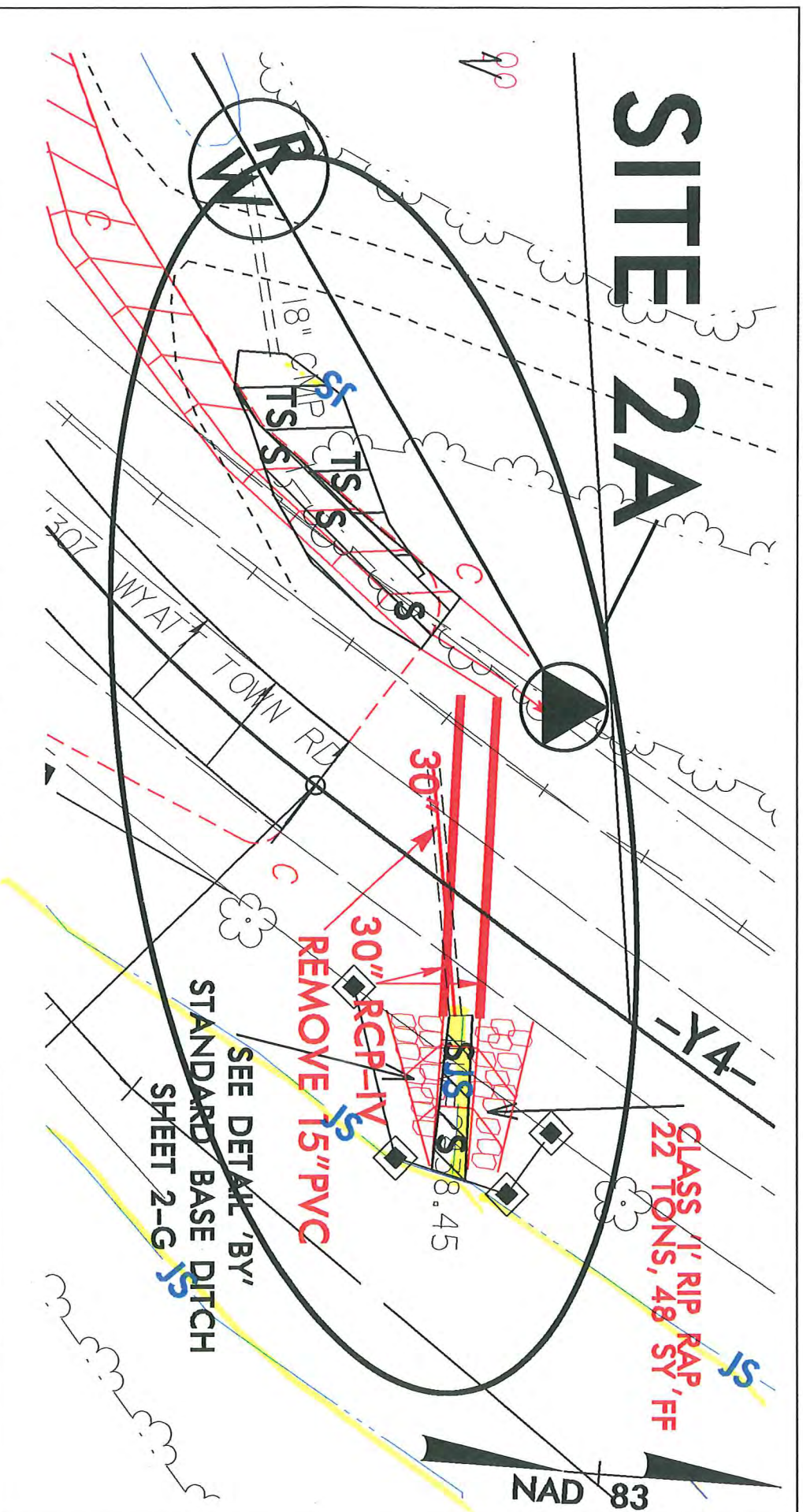
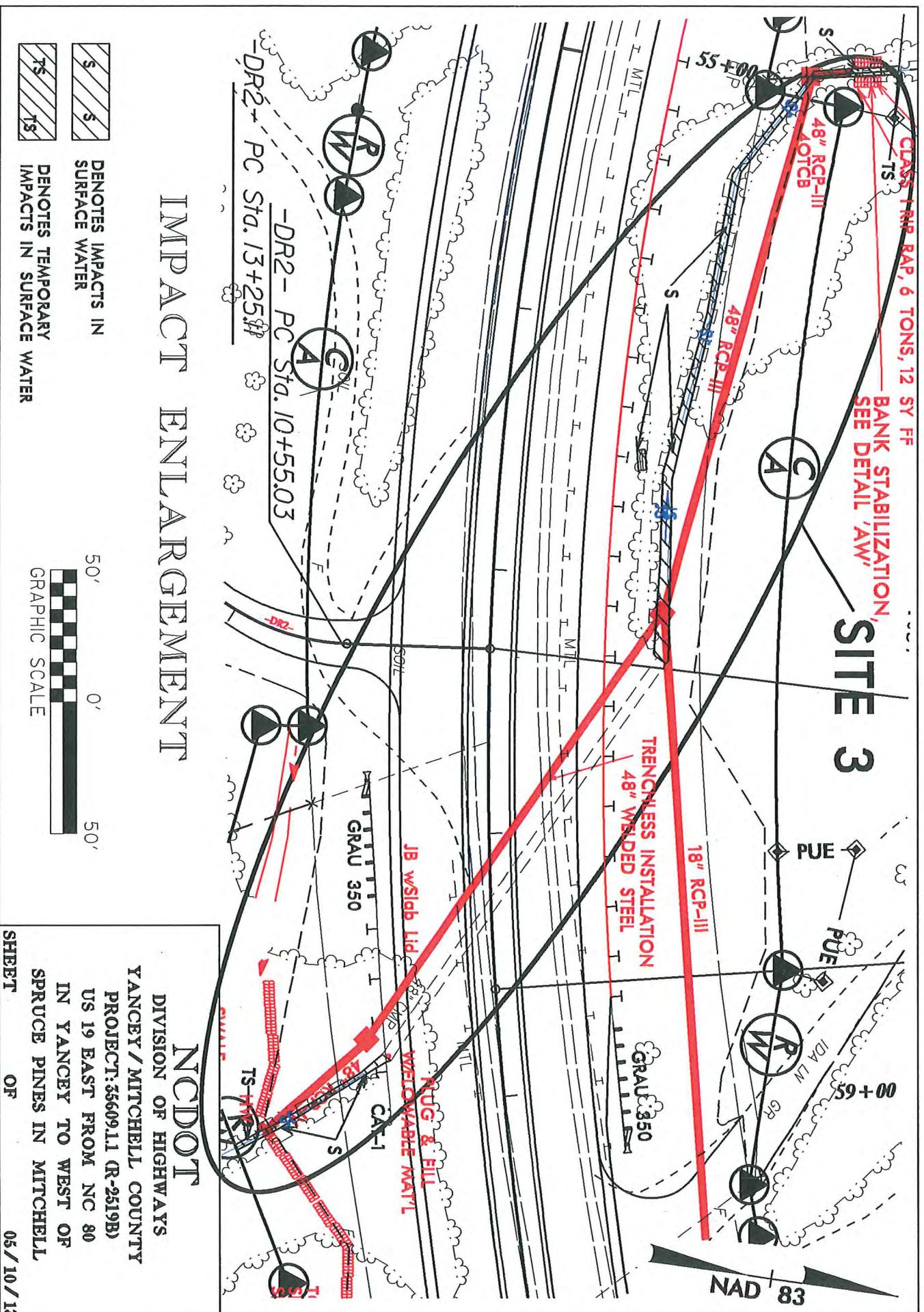
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



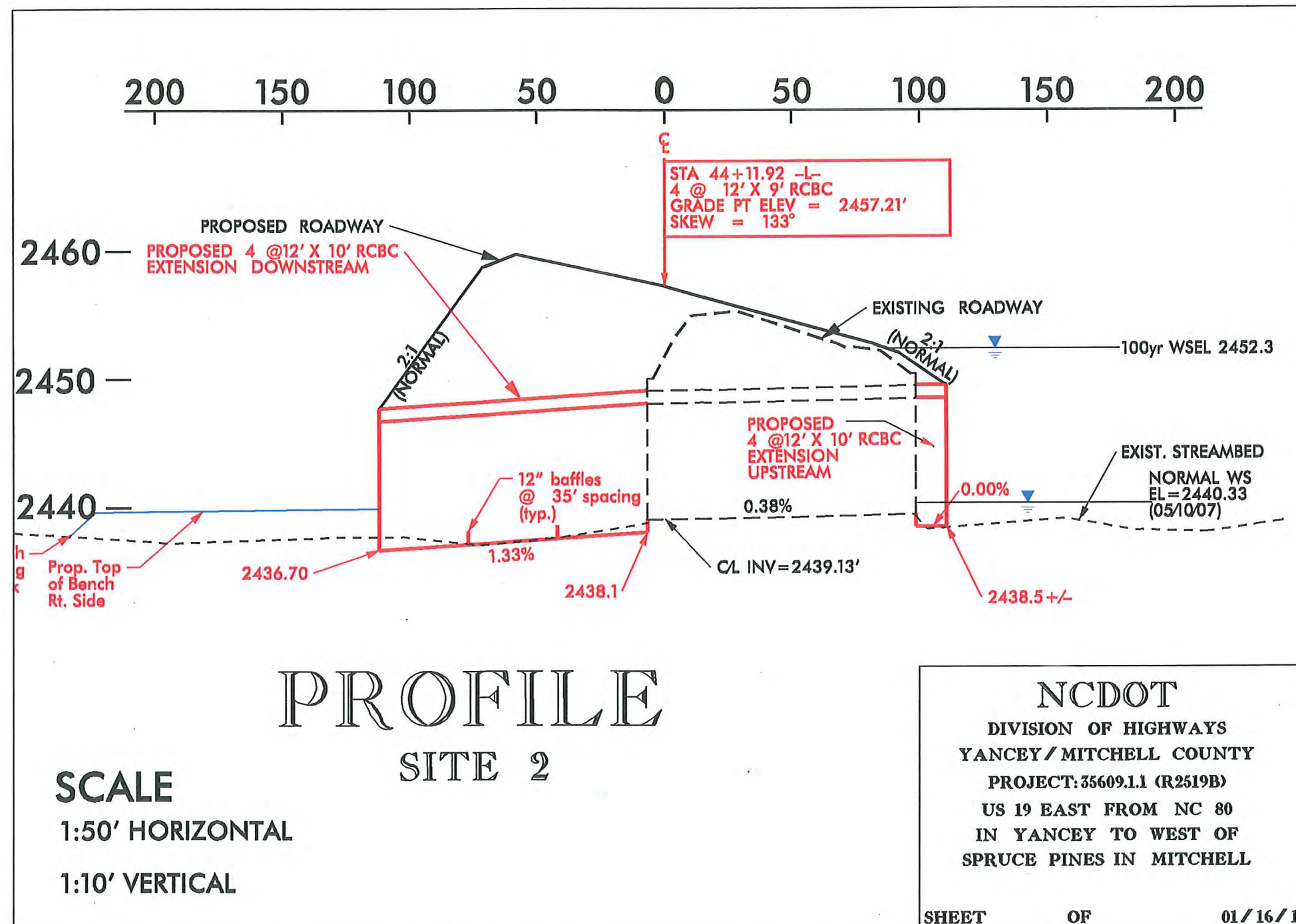




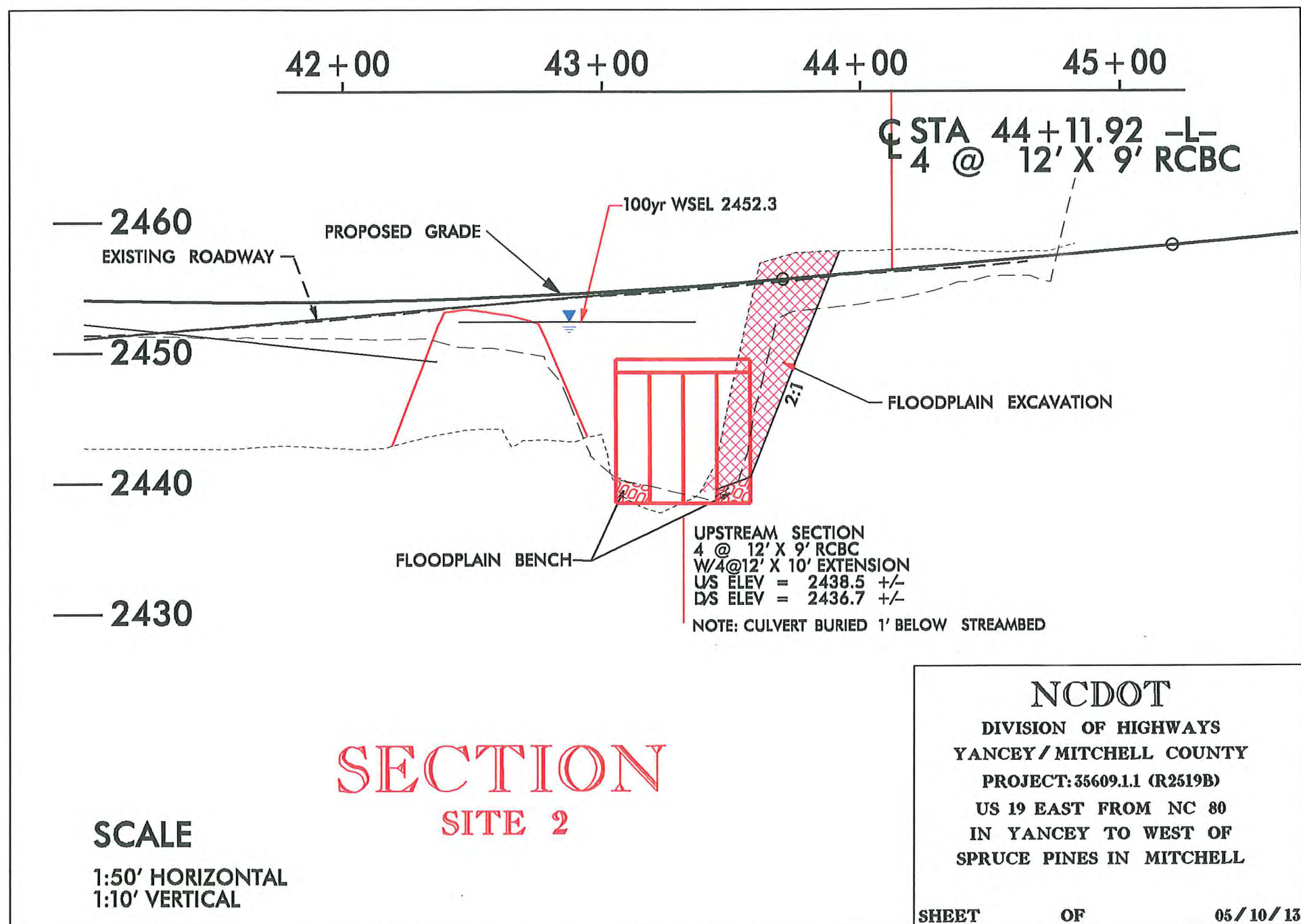




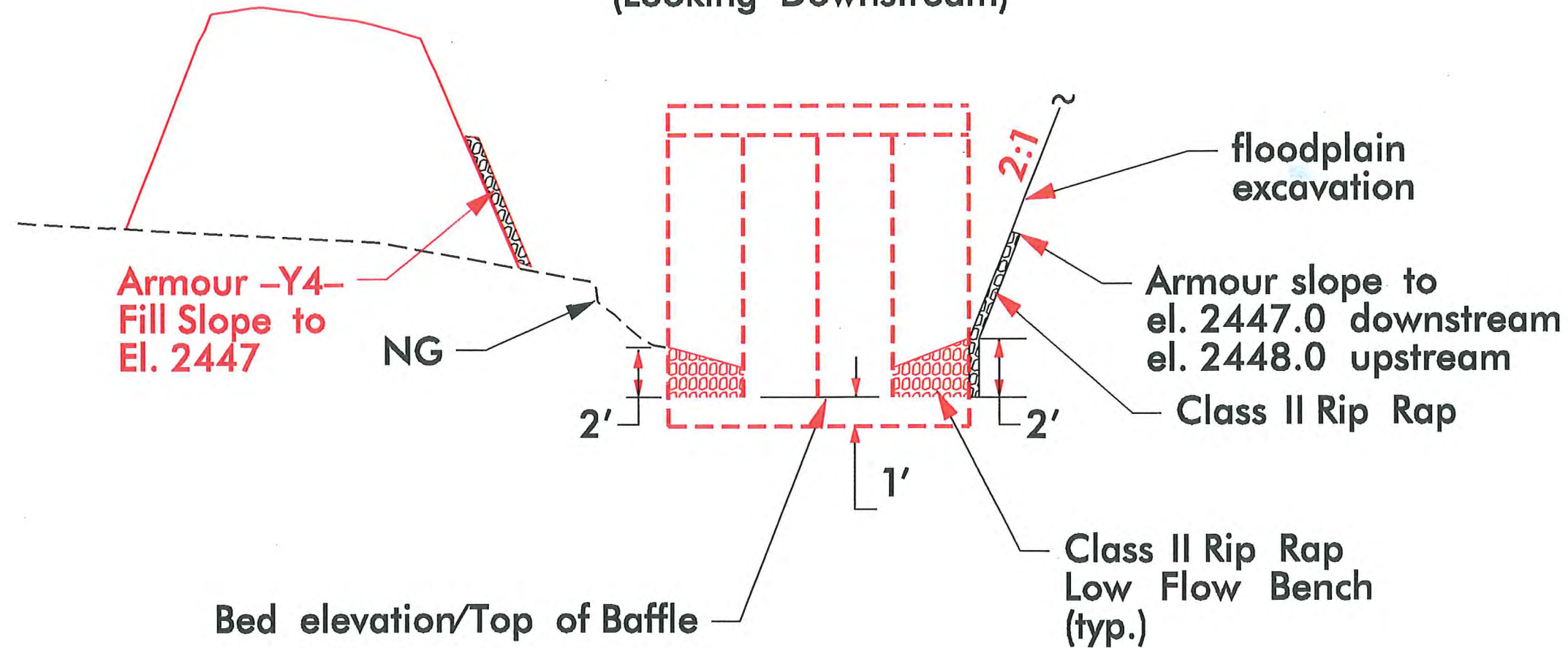








Detail of Low Flow Benching,  
Excavation, and Armouring  
(Looking Downstream)



DETAIL  
(NOT TO SCALE)  
SITE 2

NCDOT  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL


SHEET

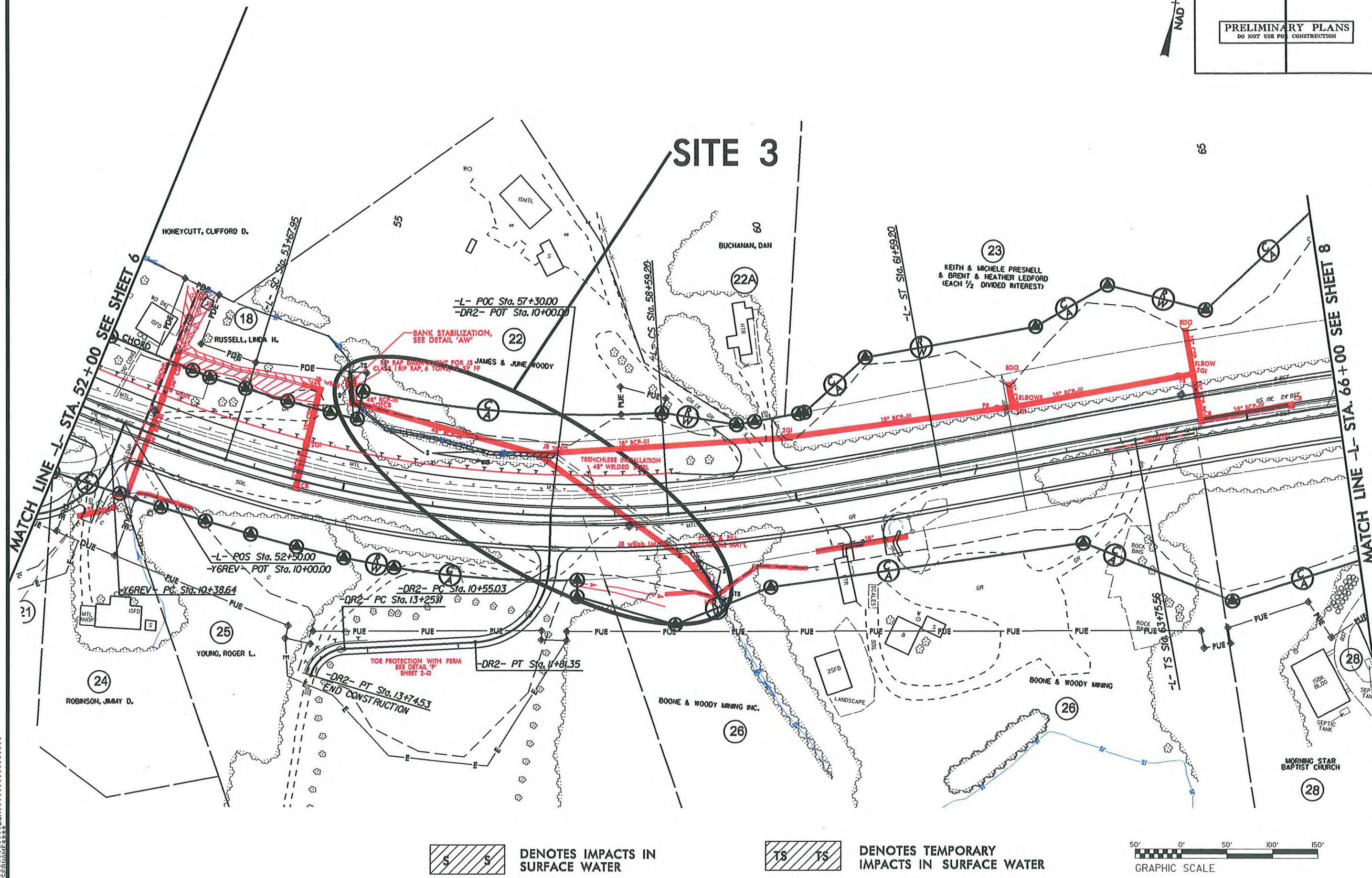
OF

01 / 16 / 13



8/17/99

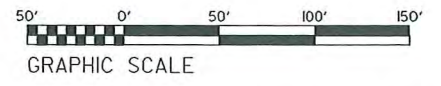
	PROJECT REFERENCE NO.		SHEET NO.
	R-2519B		7
	RW SHEET NO.		
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
	<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		



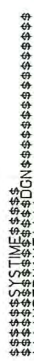
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER









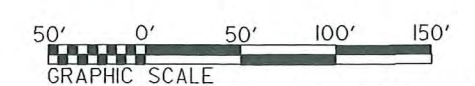
## 3/17/99



**MATCH LINE -L- STA. 92 + 50 SEE SHEET 10**

DENOTES IMPACTS IN  
SURFACE WATER

**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**





## 8/17/99

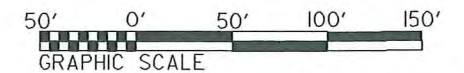


## REVISIONS

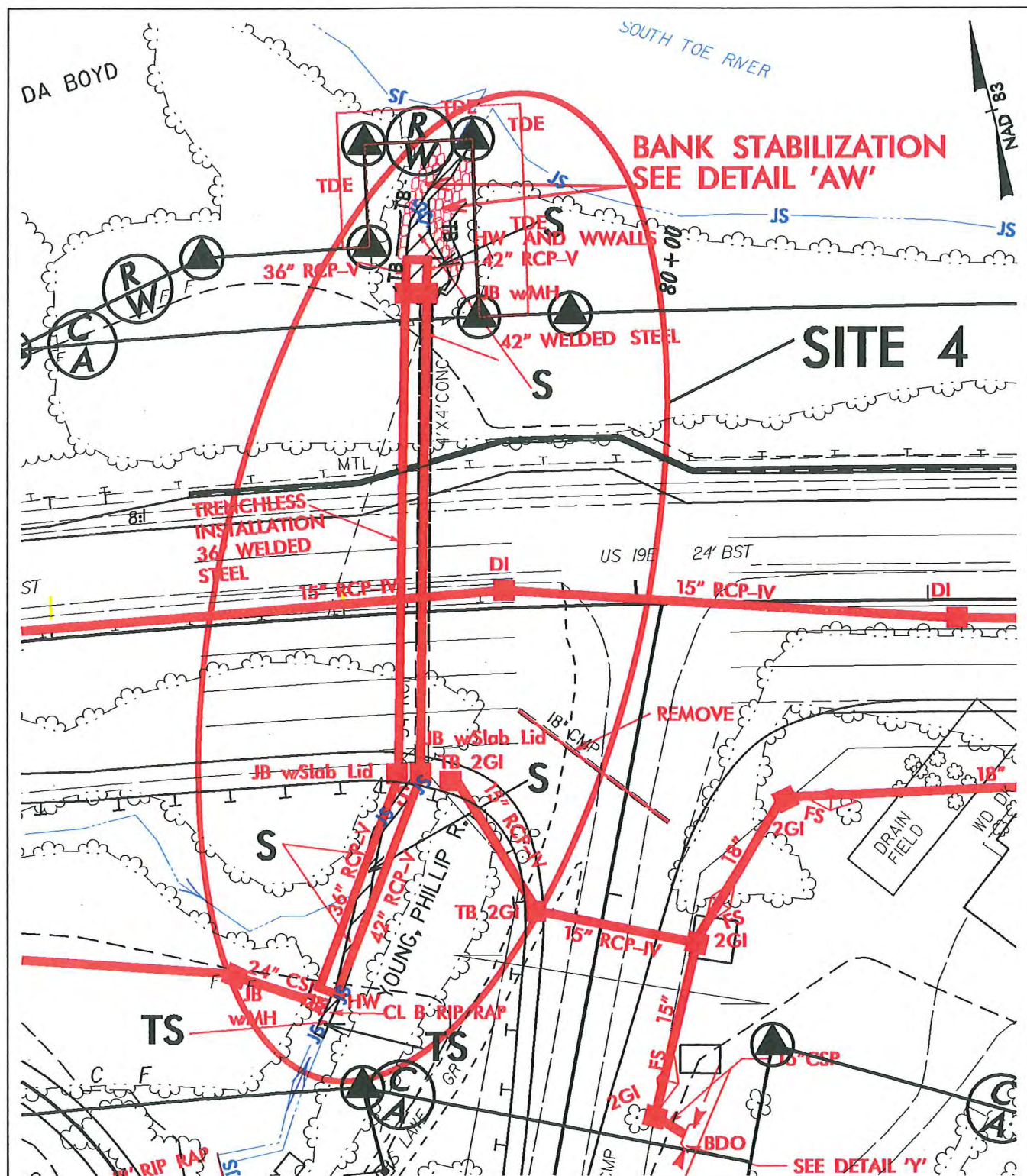
**MATCH LINE -L- STA. 92 + 50 SEE SHEET 10**

DENOTES IMPACTS IN  
SURFACE WATER

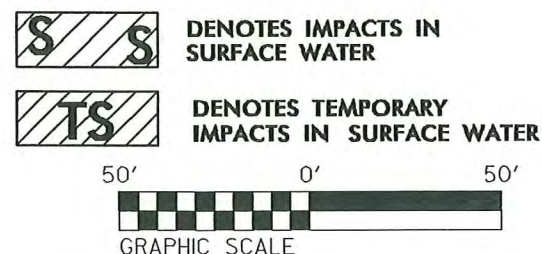
**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**





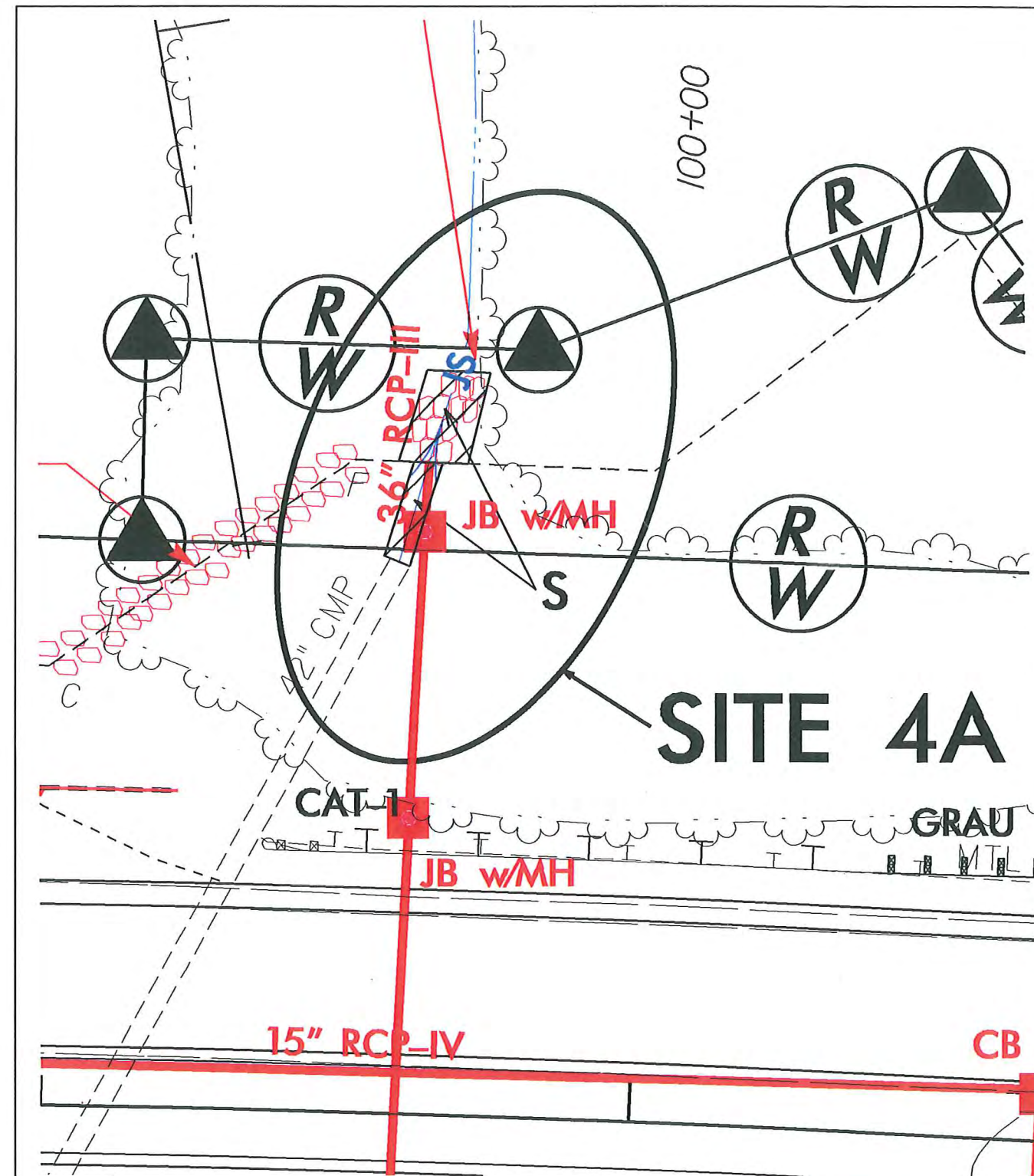


# IMPACT ENLARGEMENT

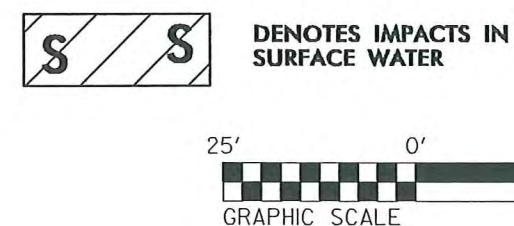


**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY/MITCHELL COUNTRY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



# IMPACT ENLARGEMENT



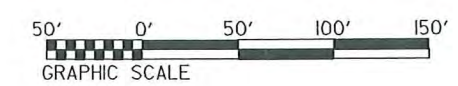
**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY/MITCHELL COUNTRY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13

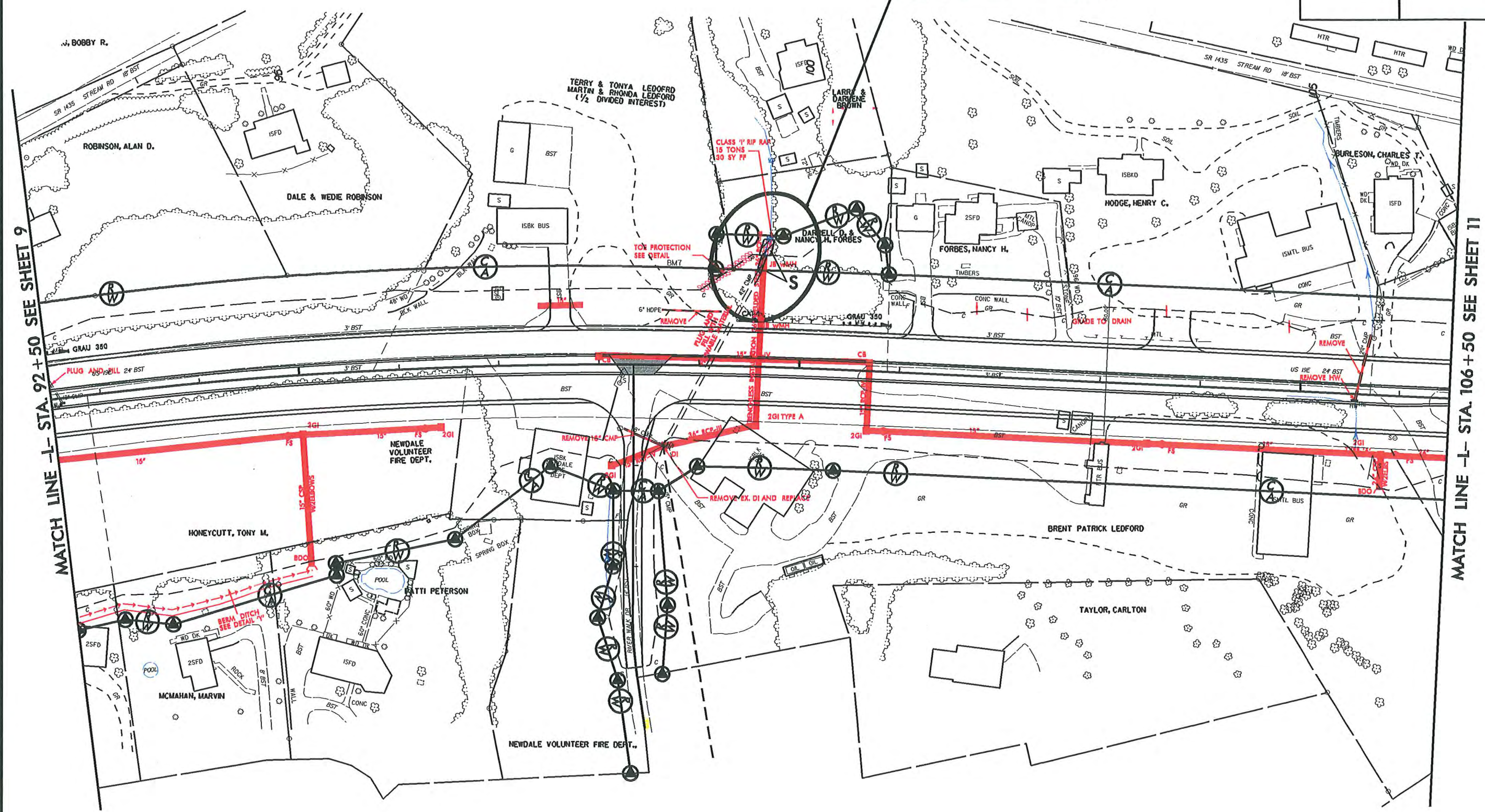




**DENOTES IMPACTS IN  
SURFACE WATER**



# /SITE 4A



MATCH LINE -L- STA. 92 + 50 SEE SHEET 9

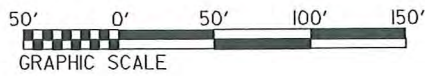
**MATCH LINE -L- STA. 106 + 50 SEE SHEET 11**



9/17/98

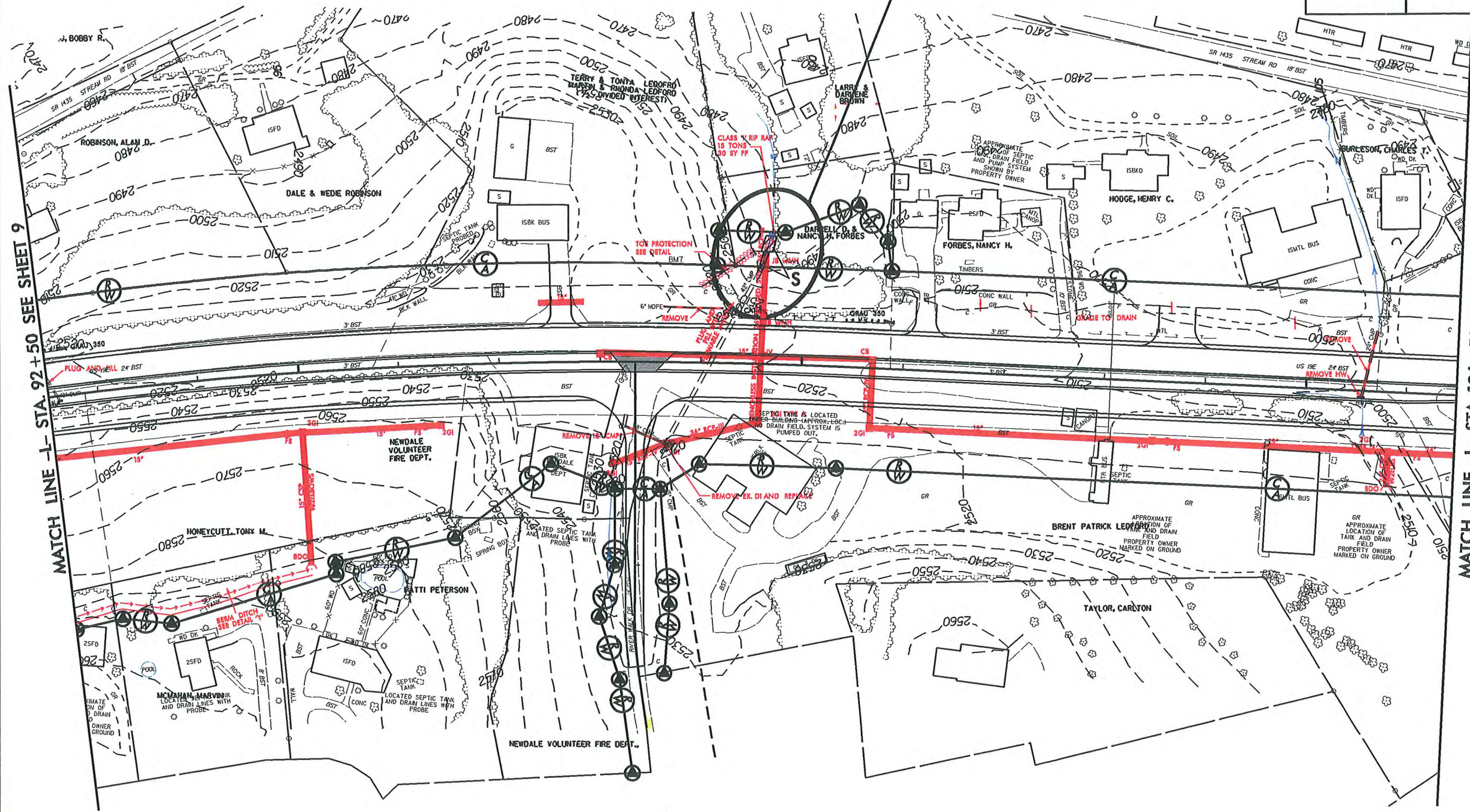


DENOTES IMPACTS IN  
SURFACE WATER



# SITE 4A

PROJECT REFERENCE NO.		SHEET NO.	
R-2519B		10	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			



MATCH LINE L-1 STA. 92+50 SEE SHEET 9

MATCH LINE L-1 STA. 106+50 SEE SHEET 11



PLAN SHEET 11 PLAN SHEET 12

**SITE 5, / / MUSSEL LOCATION / SITE 5a**



Diagram of a rectangular block with diagonal hatching and two 'TS' labels inside.

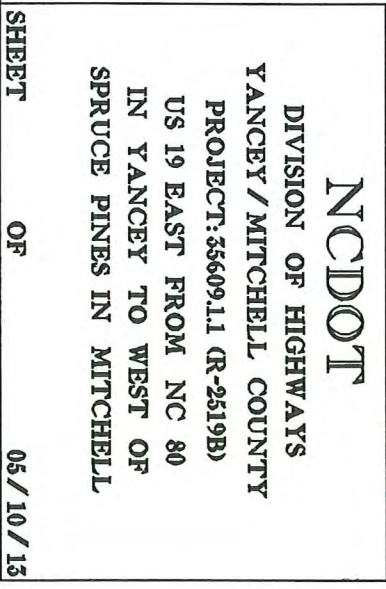
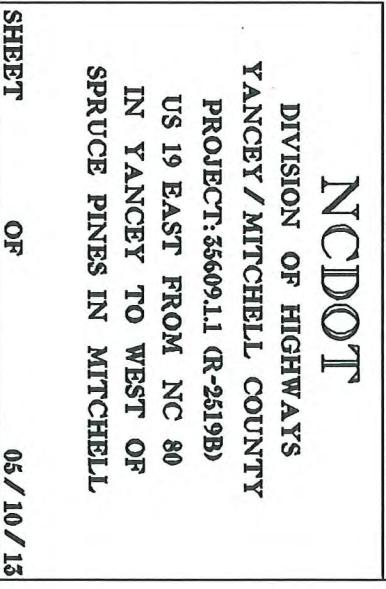
50' 0' 50' 100' 150'

GRAPHIC SCALE





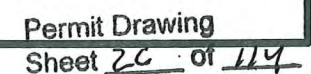








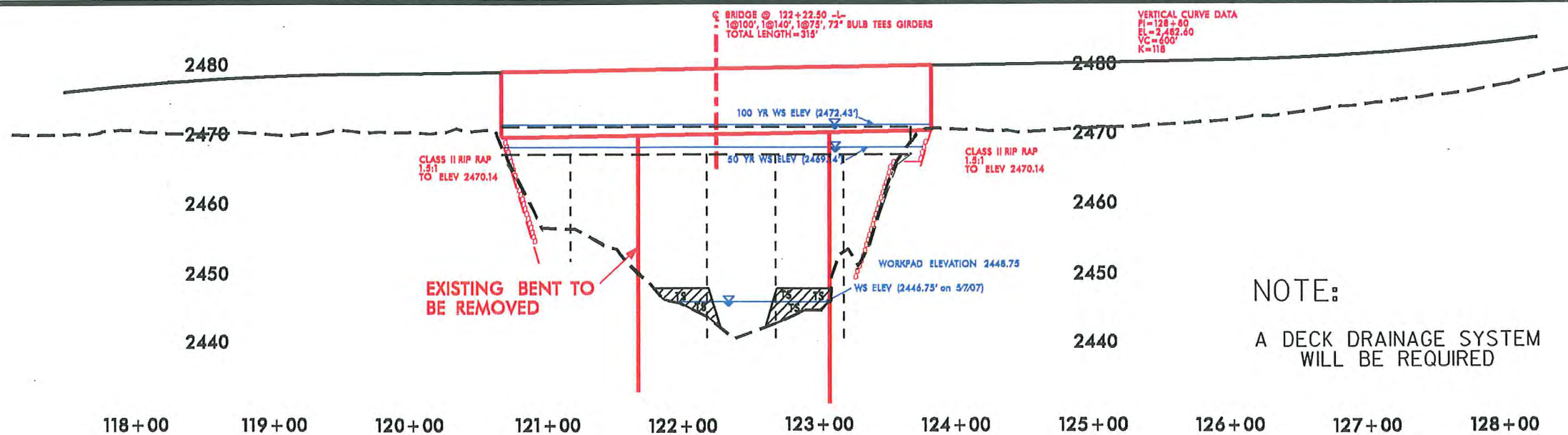
## PHASE 1 – SITE 5





8/17/99

REVISIONS

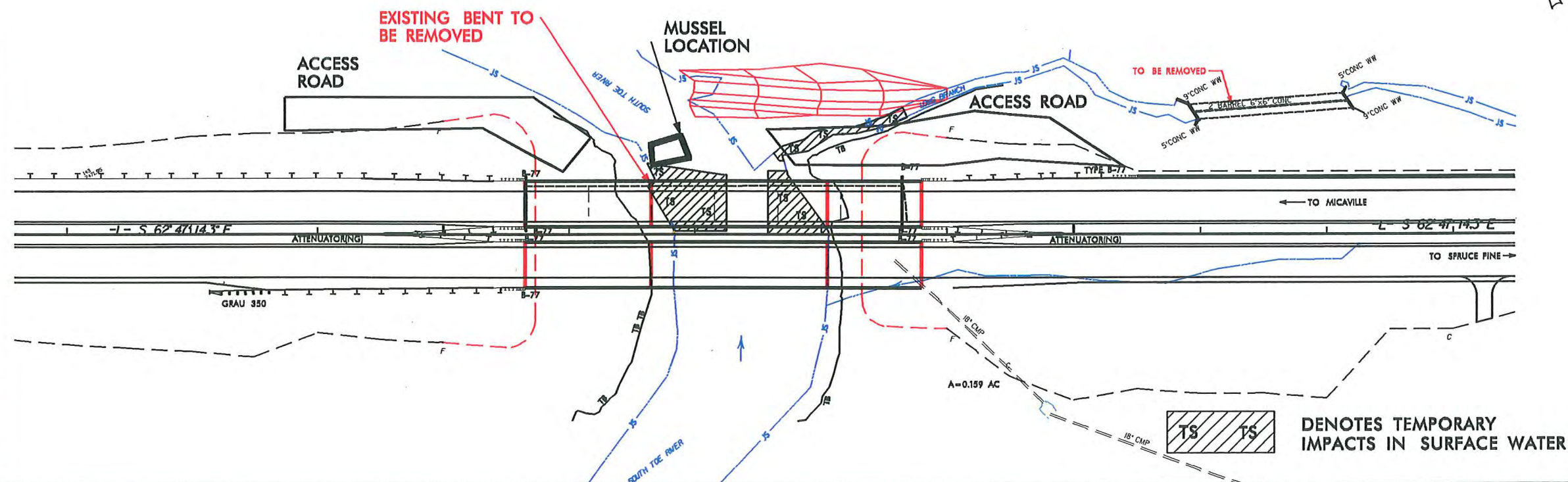
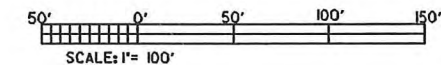


3 SPANS-1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE

ACCESS SHOWN FOR DEMOLITION OF THE EXISTING STRUCTURE (WESTBOUND).  
EACH WORK PAD CAN BE INSTALLED AT DIFFERENT TIMES TO MAINTAIN 50% RIVER FLOW.

## PHASE 2 - SITE 5

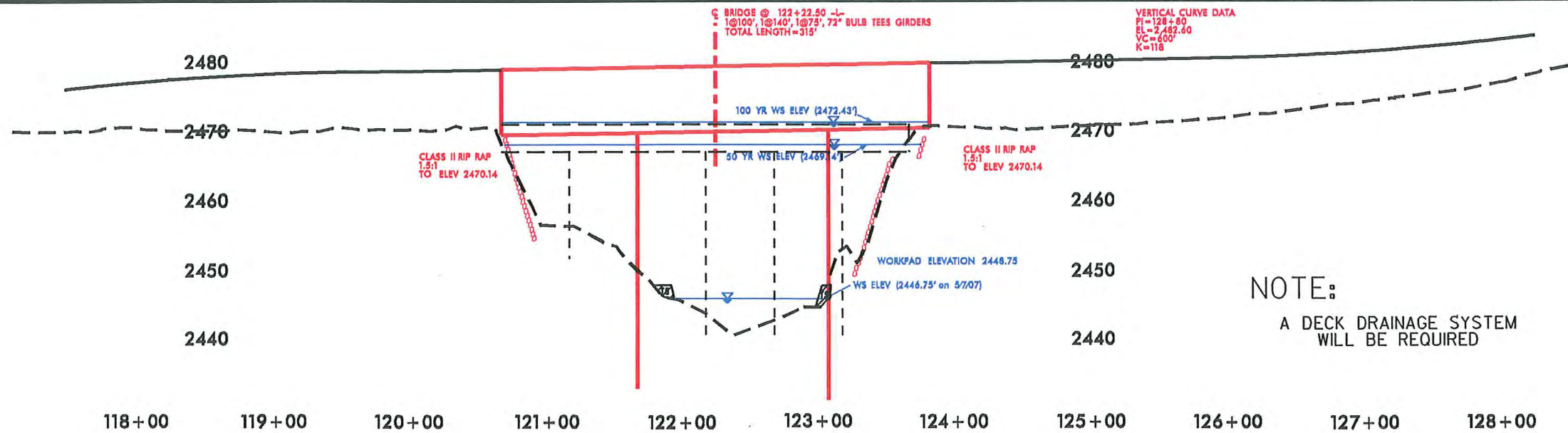
118+00 119+00 120+00 121+00 122+00 123+00 124+00 125+00 126+00 127+00





8/17/99

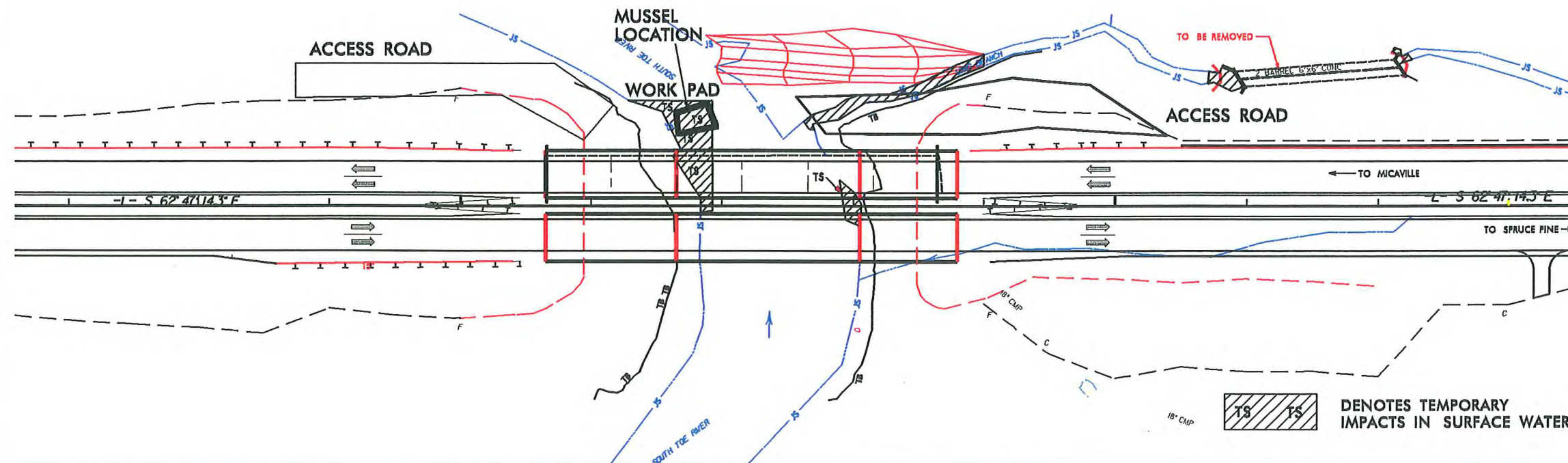
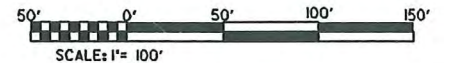
PROJECT REFERENCE NO.		SHEET NO.	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



3 SPANS-1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE  
WORK PADS WILL BE NEEDED FOR DRILLING THE PIERS AND GIRDER ERECTION.  
LONG BRANCH CREEK WILL HAVE ALREADY BEEN RELOCATED.

## PHASE 3 – SITE 5

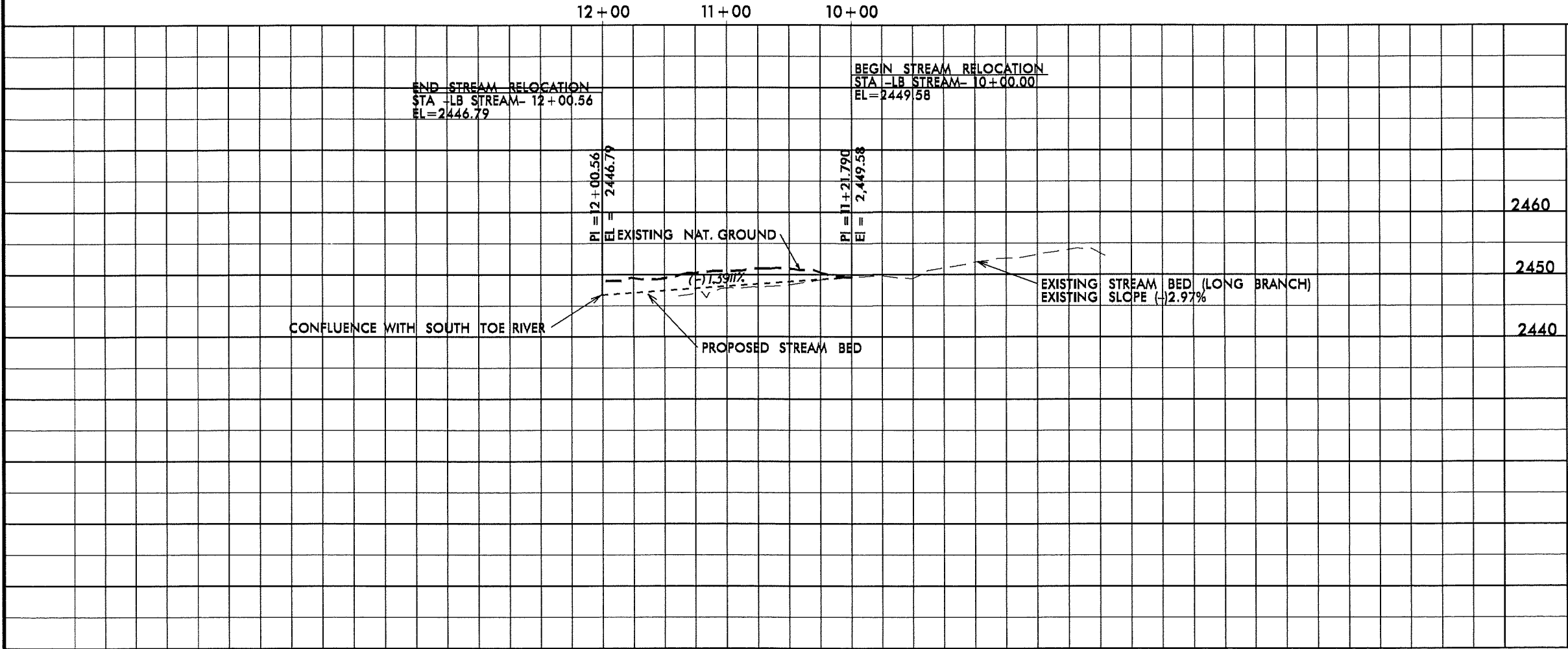
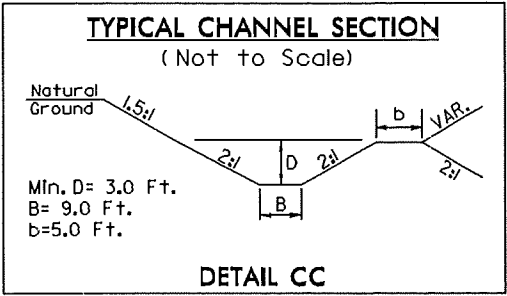
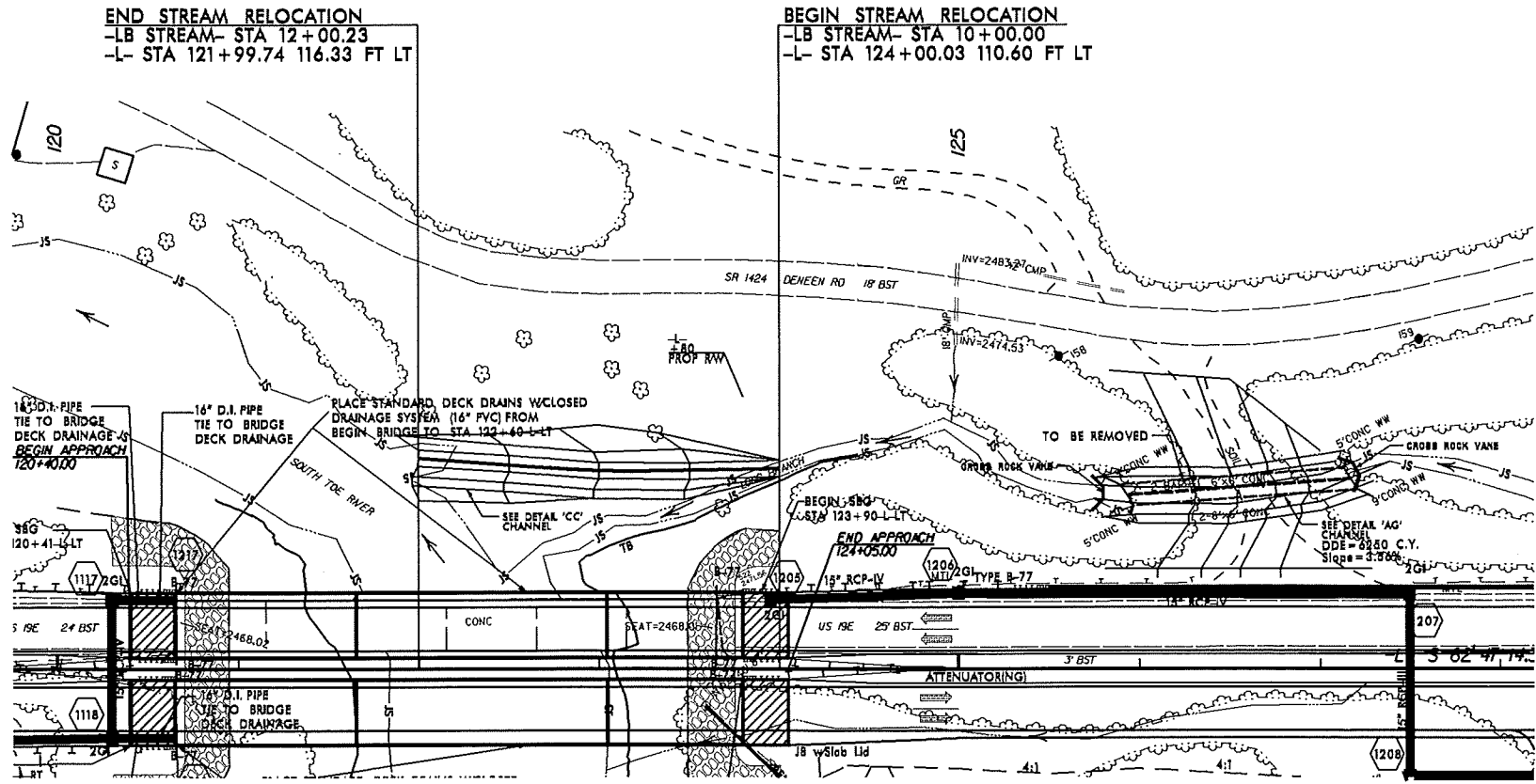
118+00 119+00 120+00 121+00 122+00 123+00 124+00 125+00 126+00 127+00



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LONG BRANCH STREAM RELOCATION  
SITE 5a

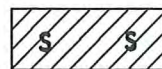
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PROPOSED LONG BRANCH  
HORIZONTAL ALIGNMENT  
PI -LP STREAM- Sta 10+97.20  
 $\Delta = 5^{\circ} 35' 17.0''$  (RT)  
 $D = 8^{\circ} 46' 14.7''$   
 $L = 63.71'$   
 $T = 31.88'$   
 $R = 653.26'$



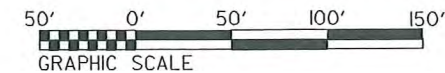
8/17/99



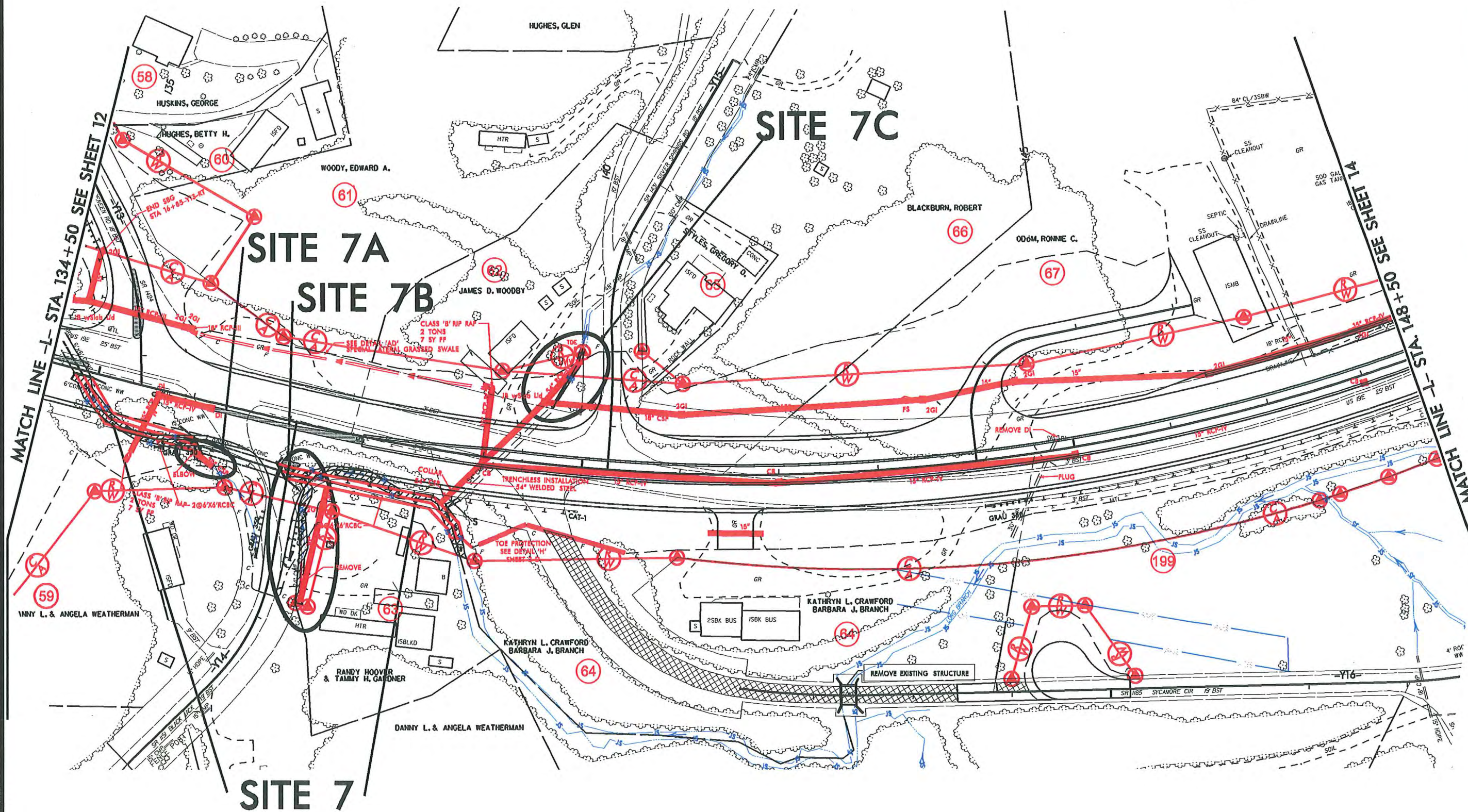
DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO.	SHEET NO.
R-2519B	13
RDW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	





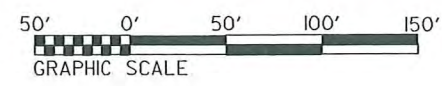
8/17/99



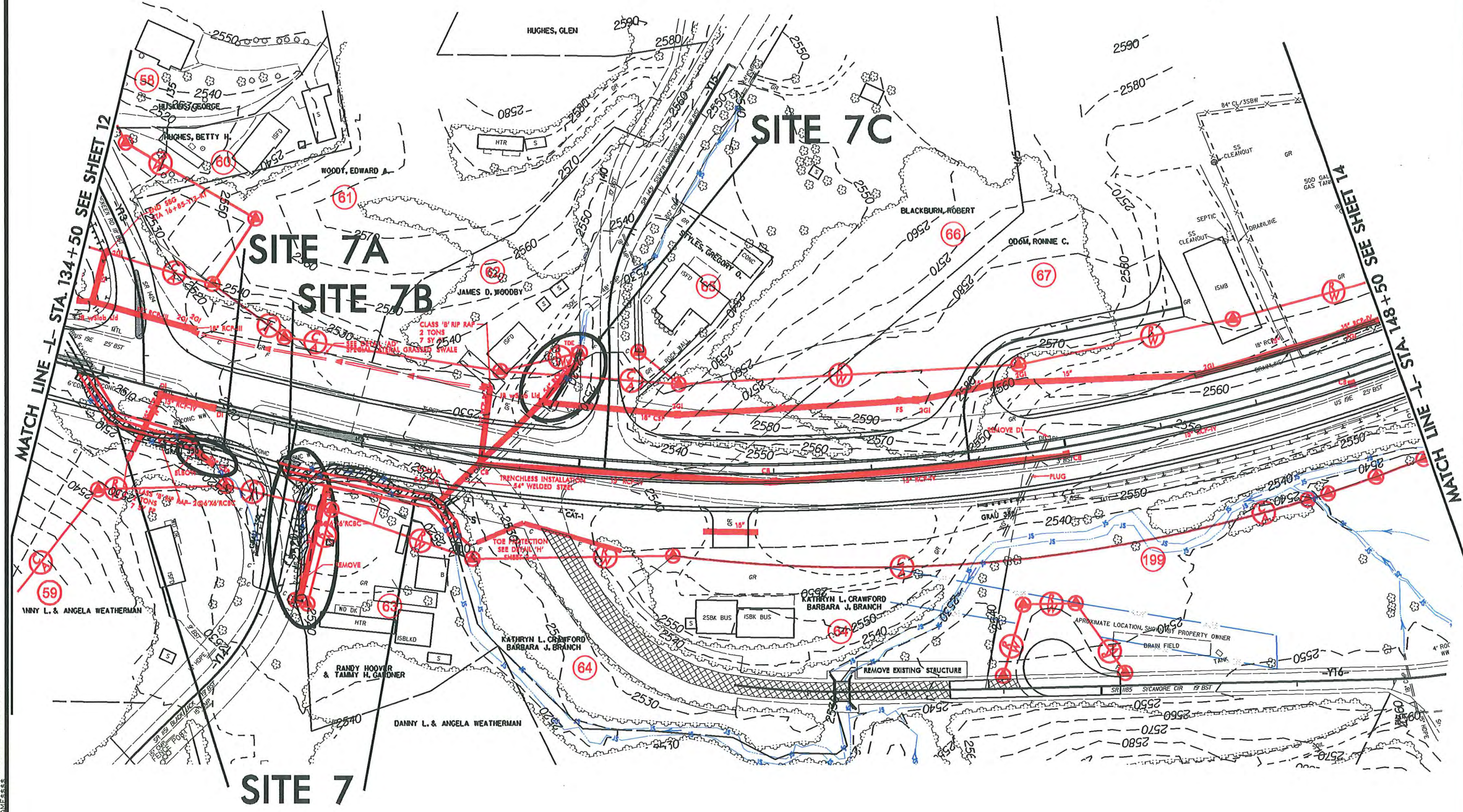
DENOTES IMPACTS IN SURFACE WATER



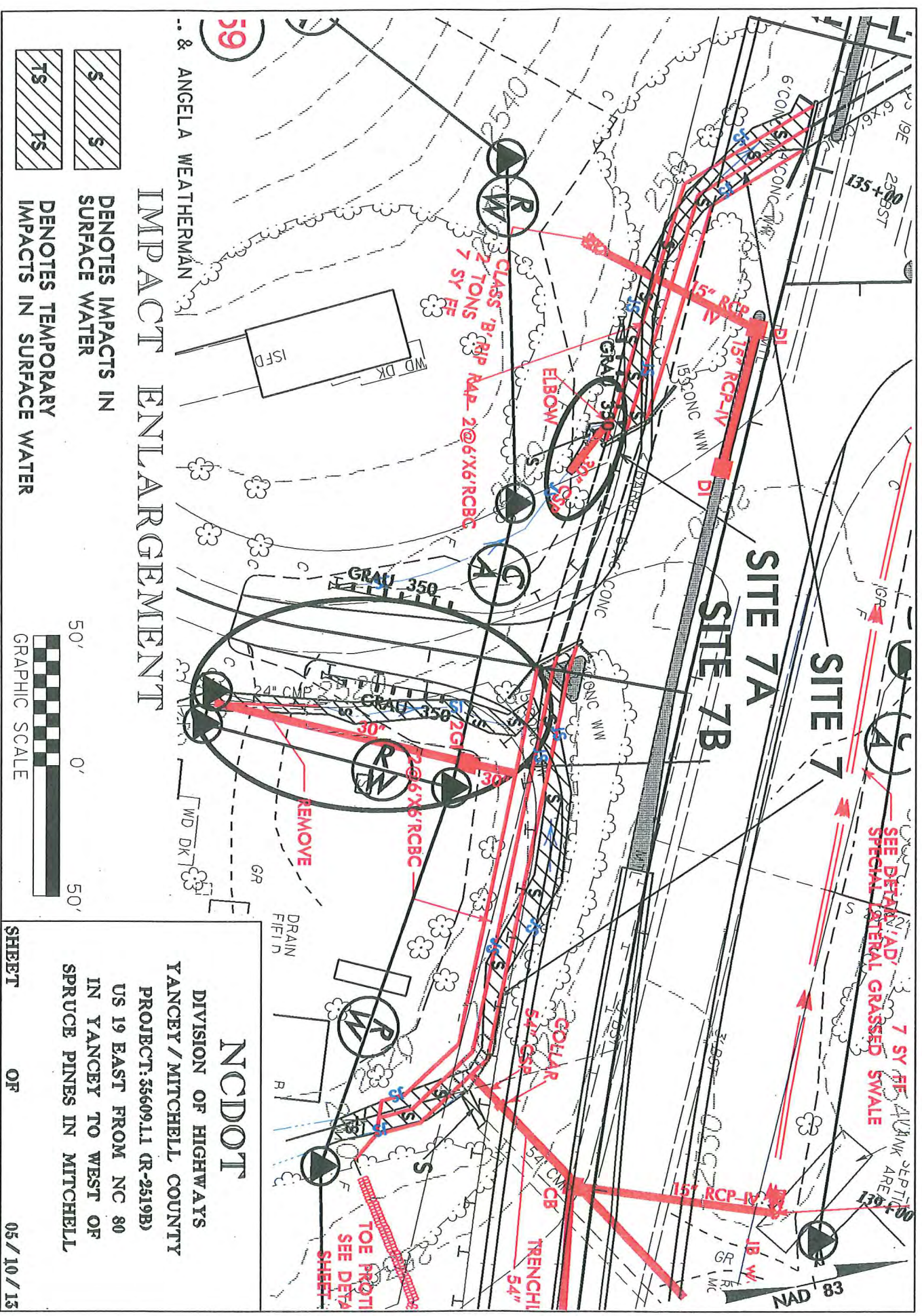
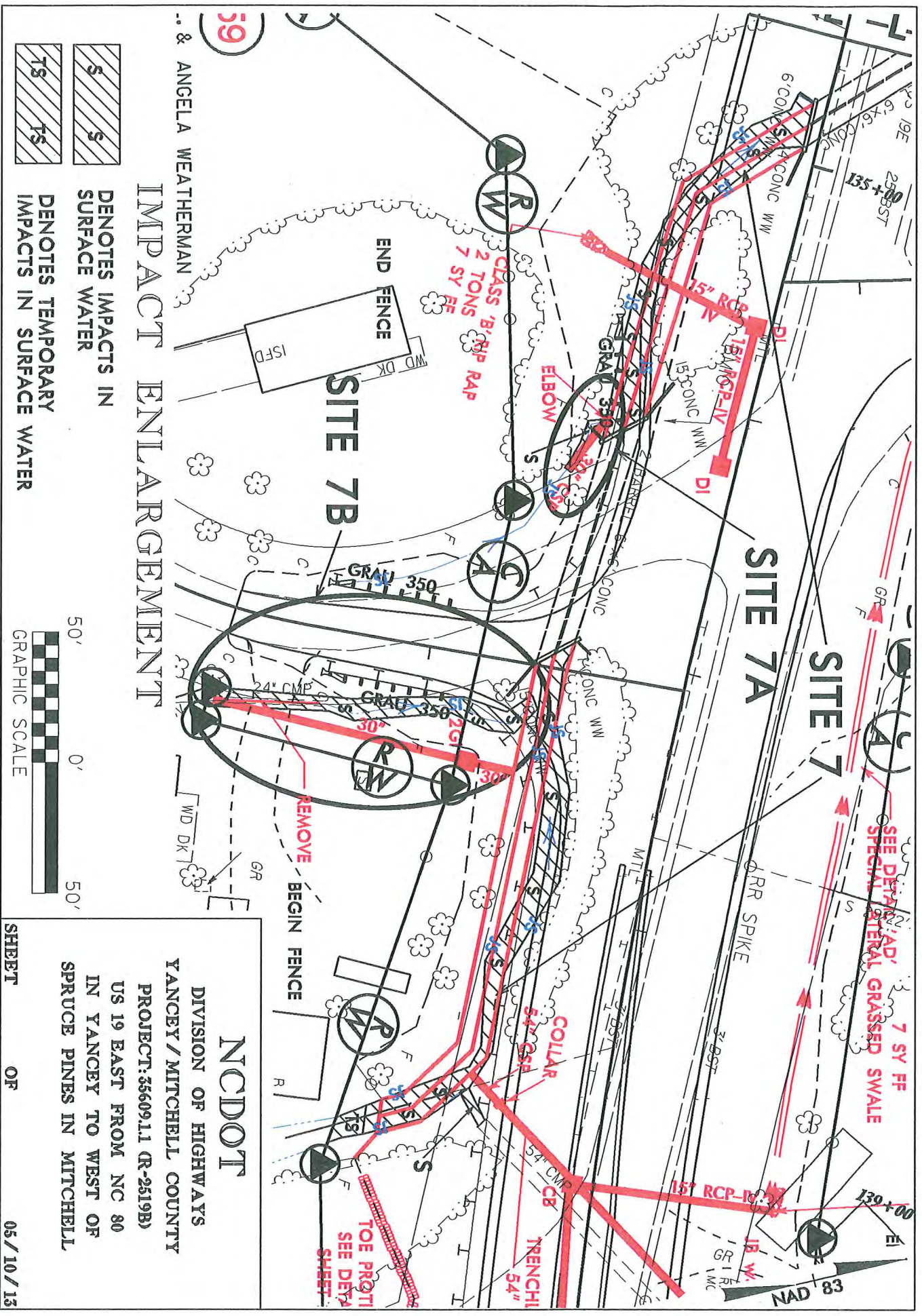
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



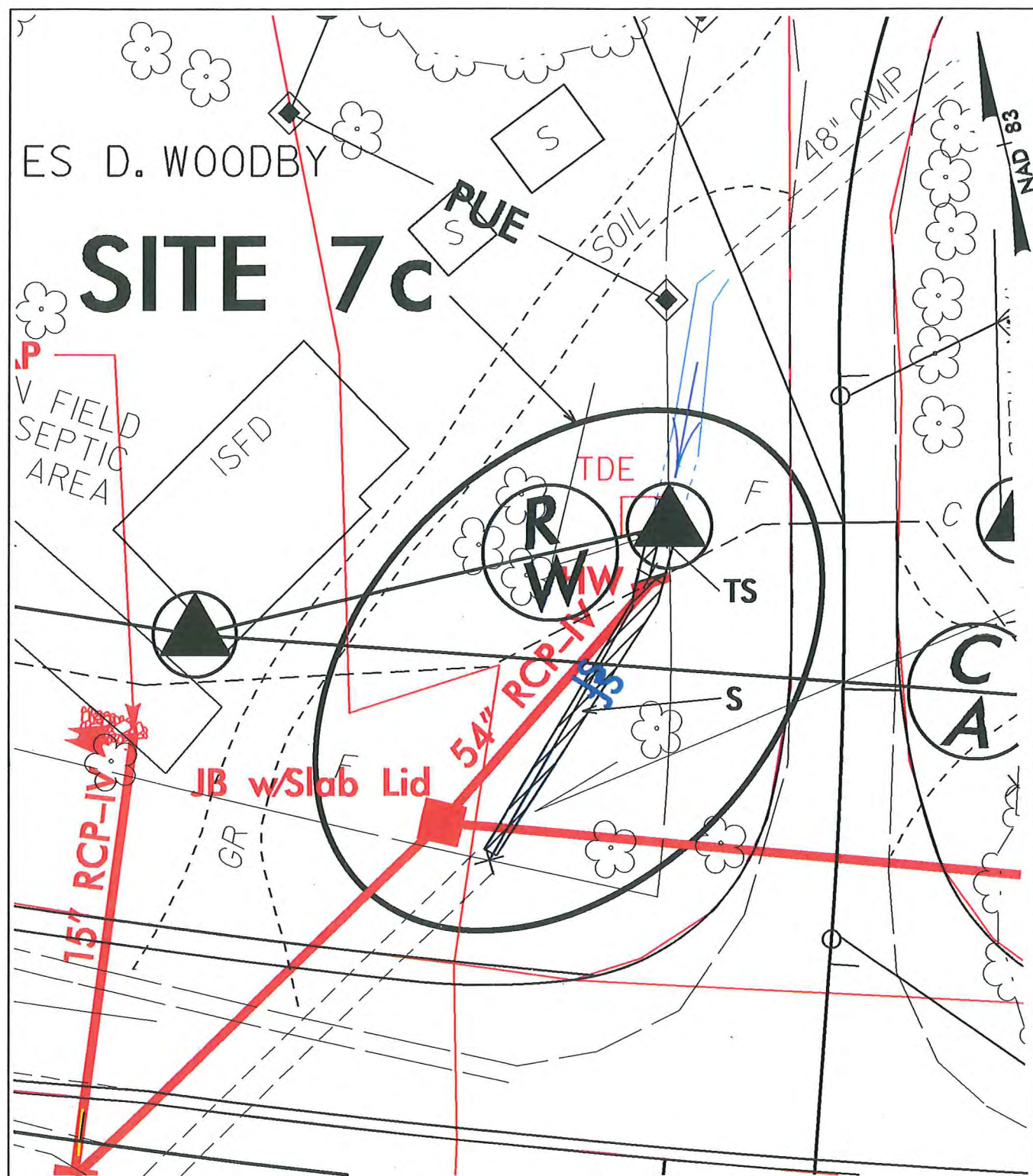
PROJECT REFERENCE NO. R-2519B		SHEET NO. 13	
RDW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			











## IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

25' 0' 25'



GRAPHIC SCALE

## NCDOT

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY

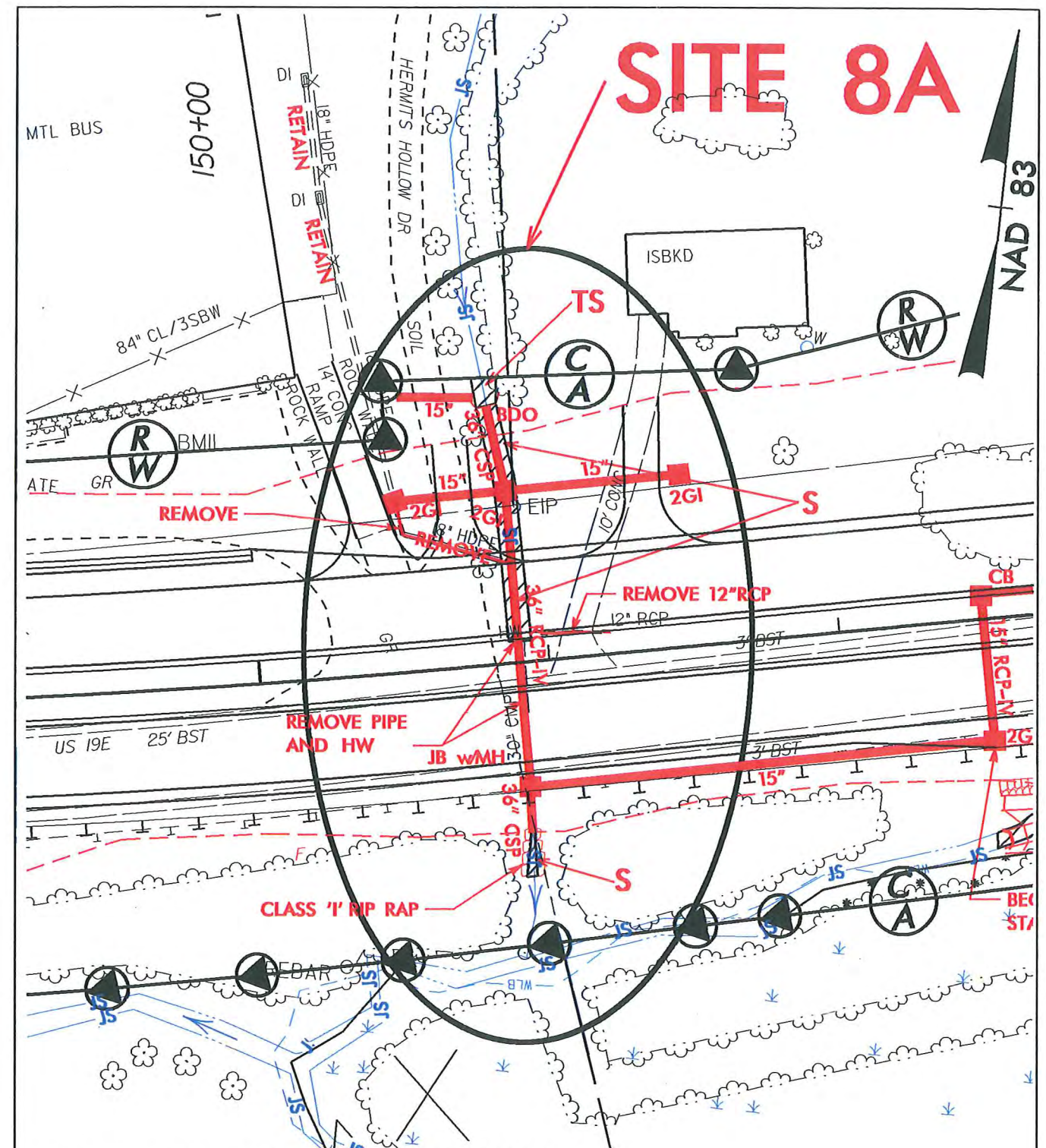
PROJECT: 35609.1.1 (R-2519B)

US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

05/10/13



## IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

50' 0' 50'



GRAPHIC SCALE

## NCDOT

DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R-2519B)

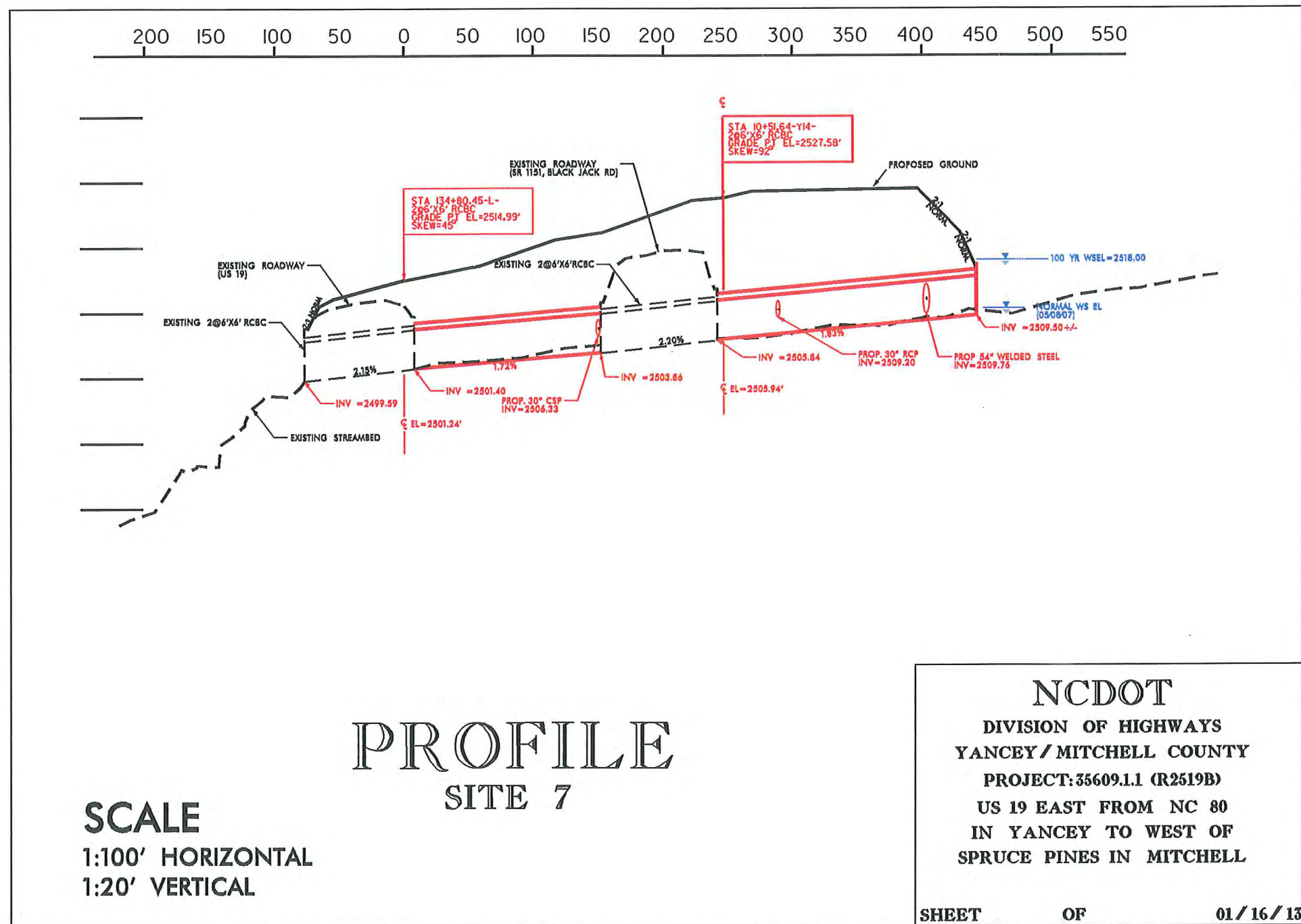
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

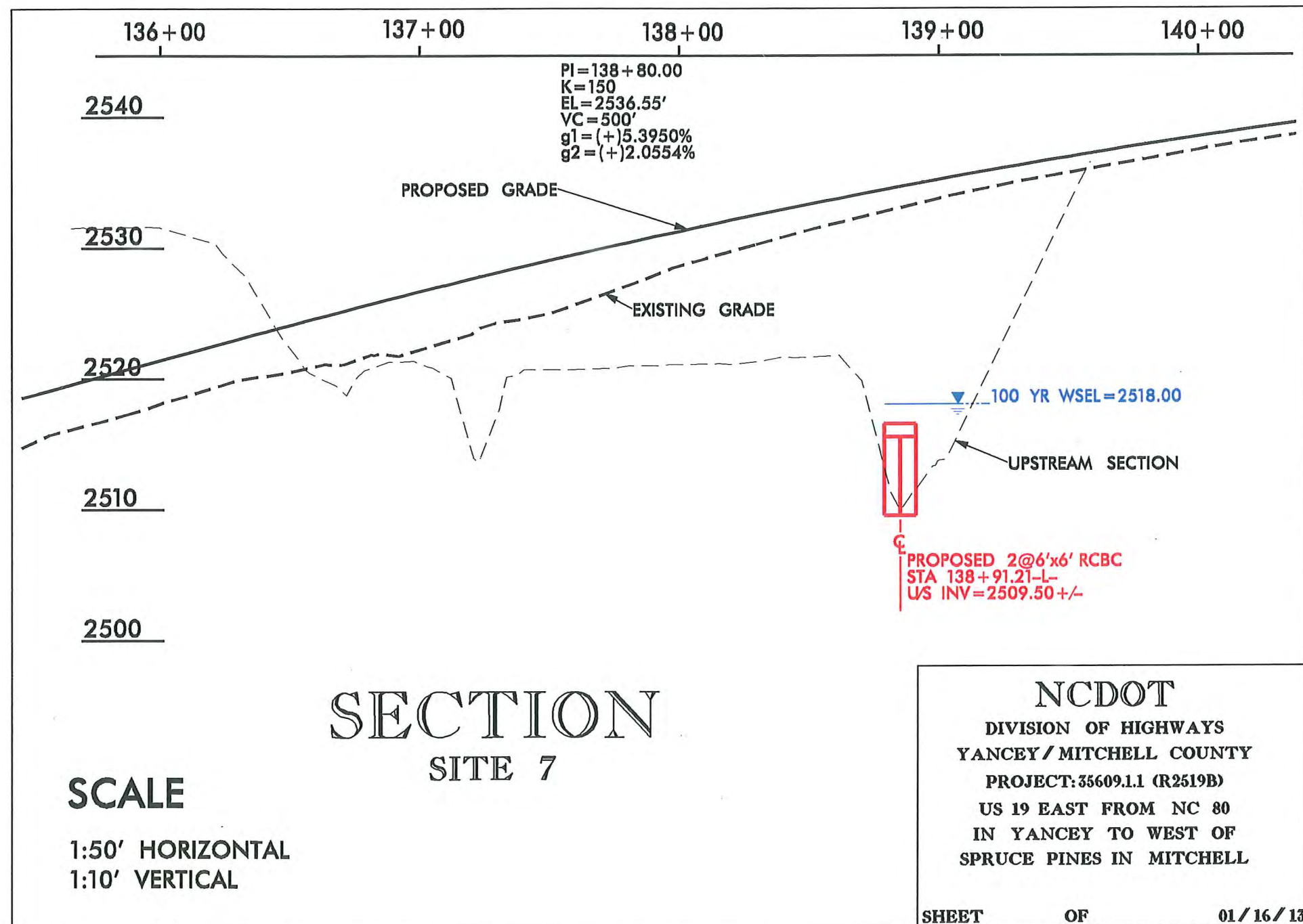
SHEET

OF

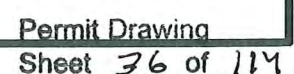
05/10/13













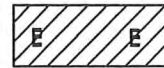
8/17/99



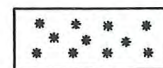
DENOTES IMPACTS IN  
SURFACE WATER



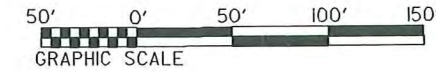
DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



DENOTES EXCAVATION  
IN WETLAND



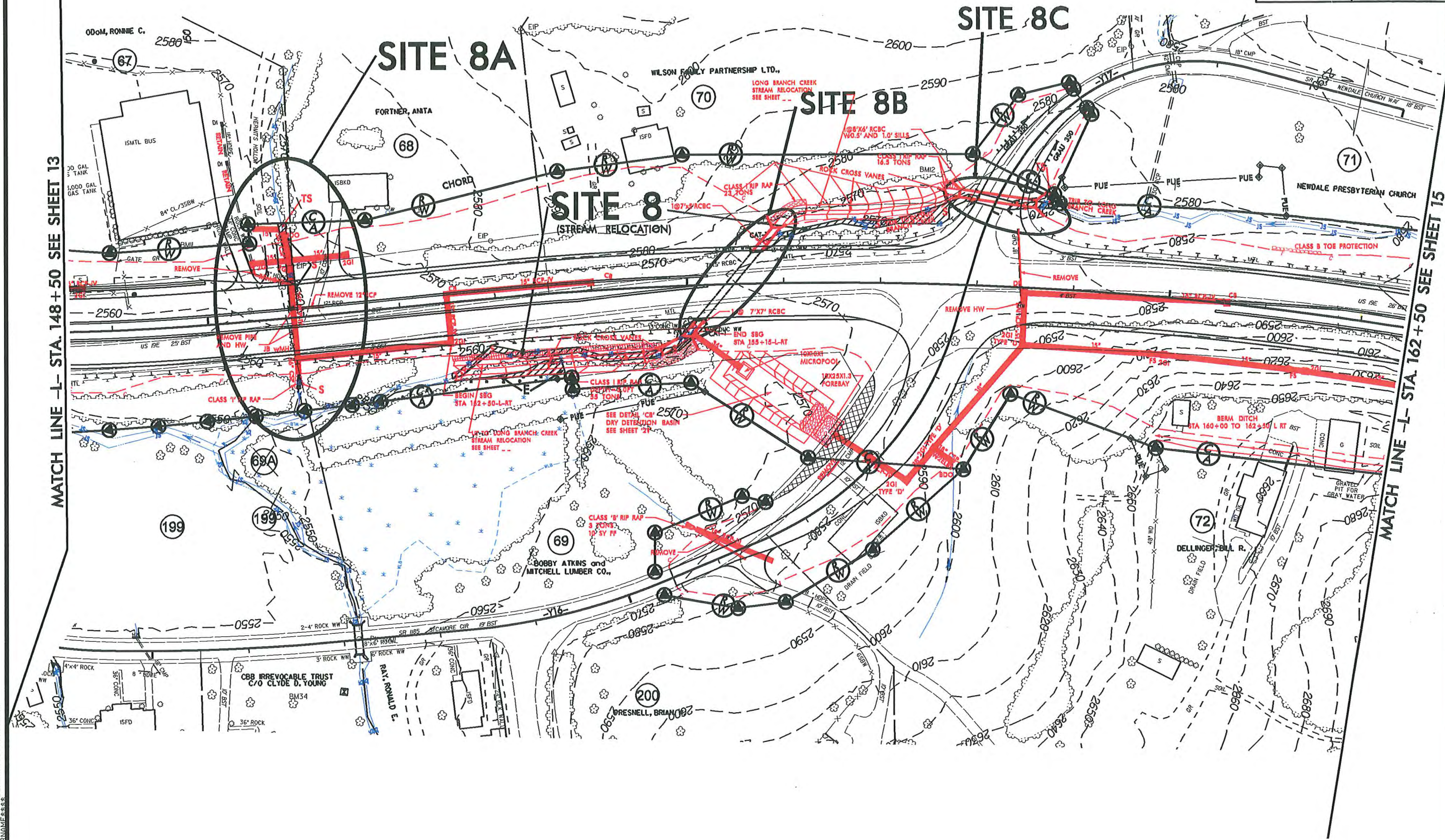
DENOTES MECHANIZED  
CLEARING



NAD 83

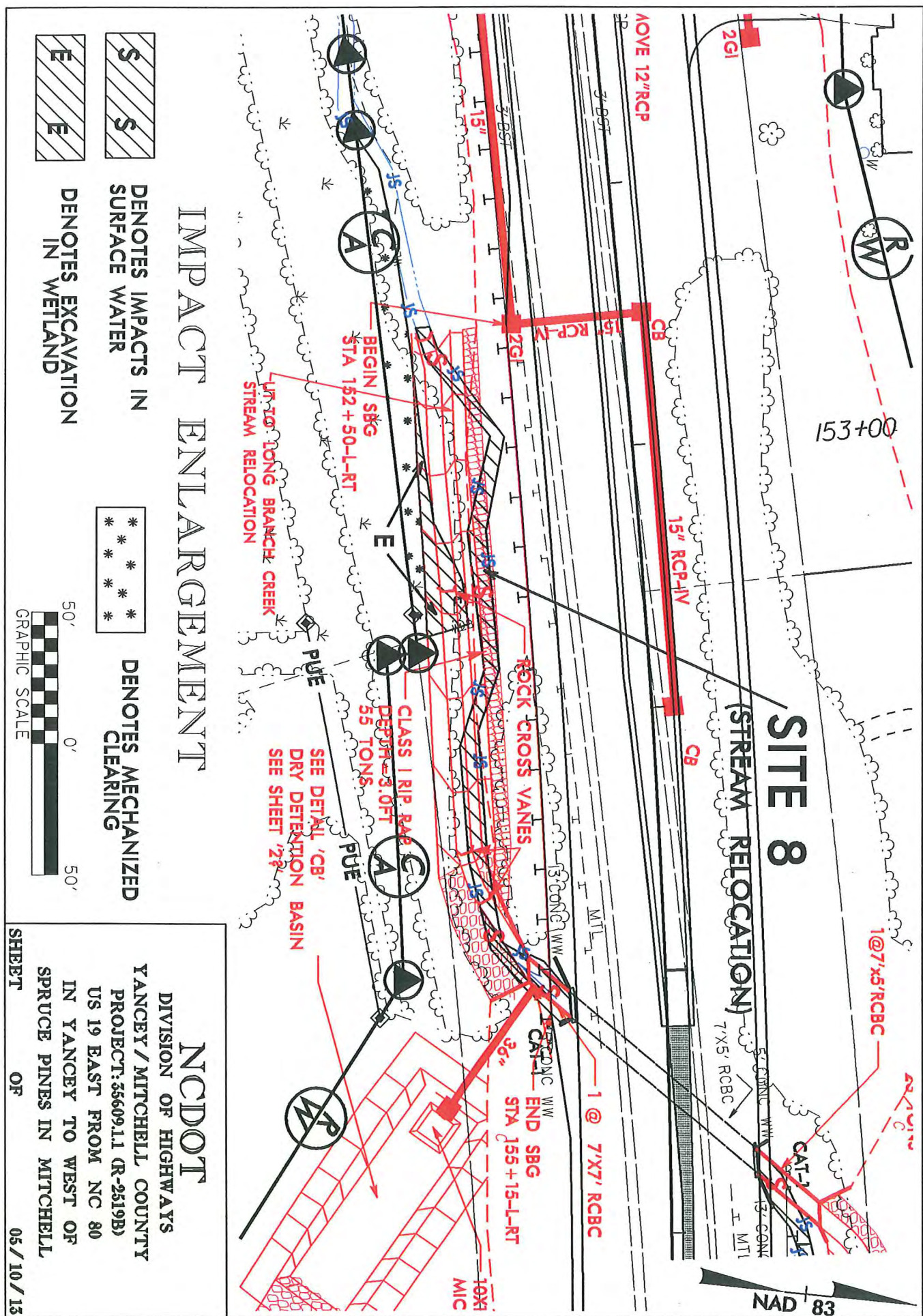
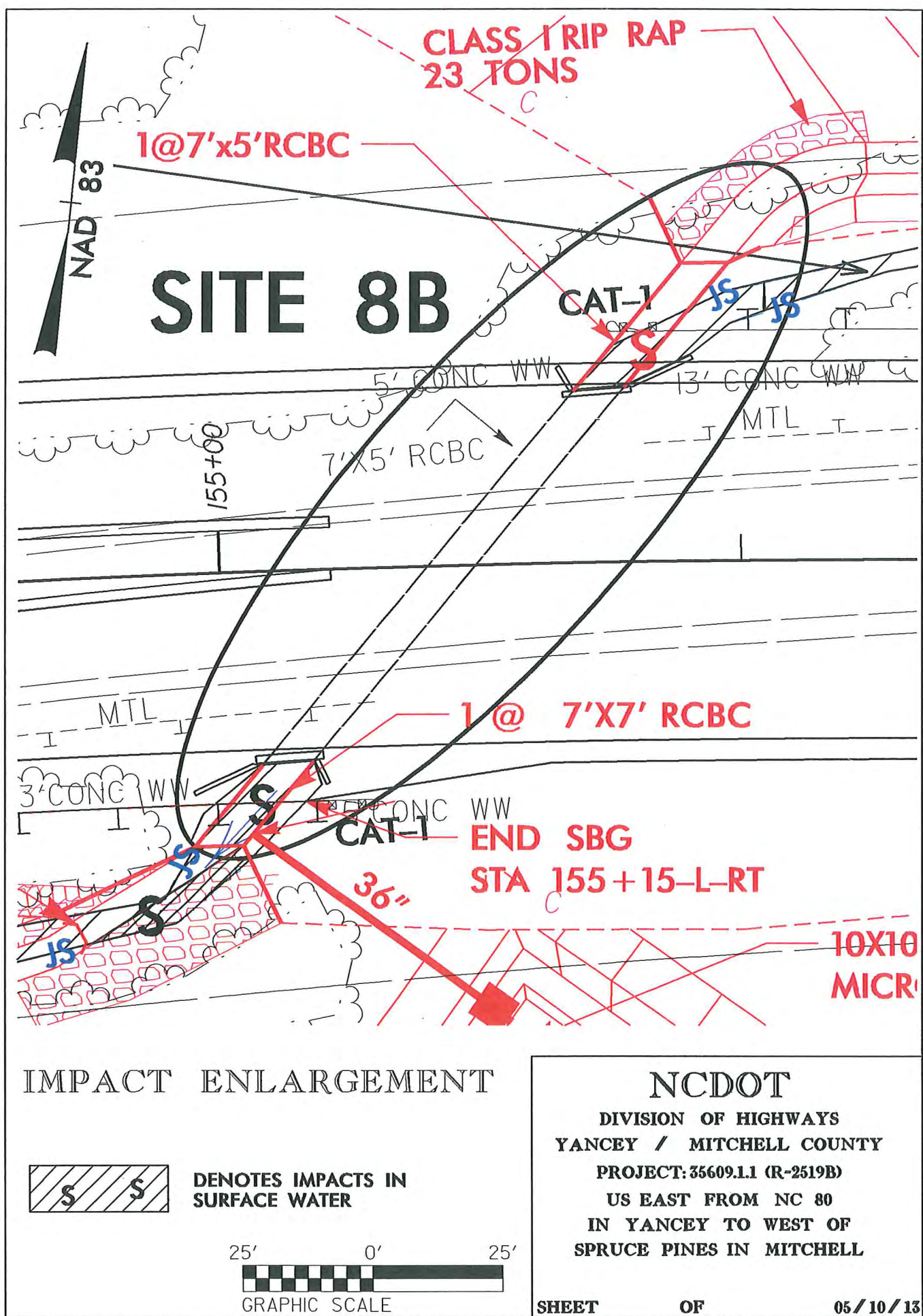
PROJECT REFERENCE NO. R-2519B		SHEET NO. 14	
RDV SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

MATCH LINE -L- STA. 148+50 SEE SHEET 13

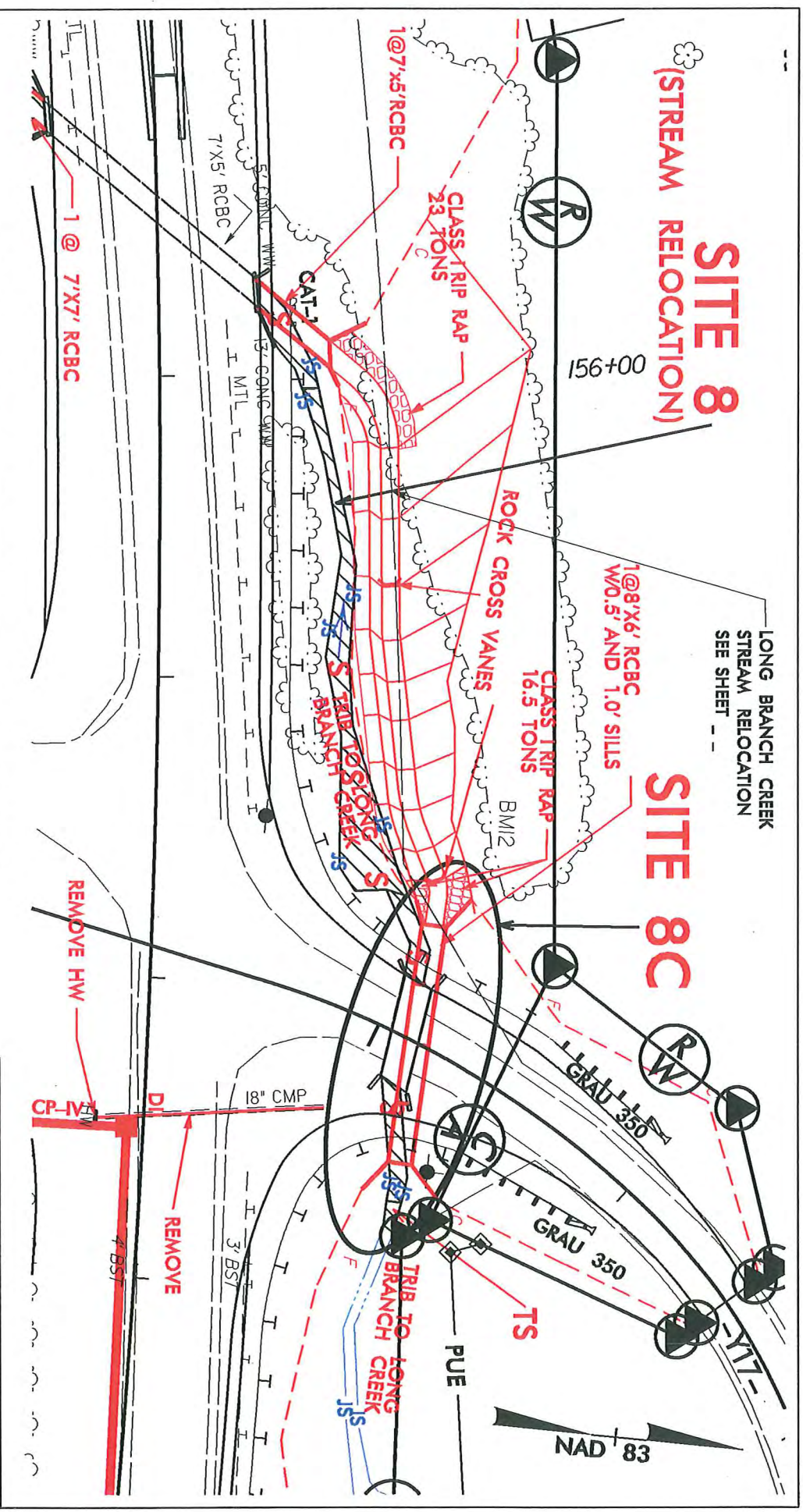
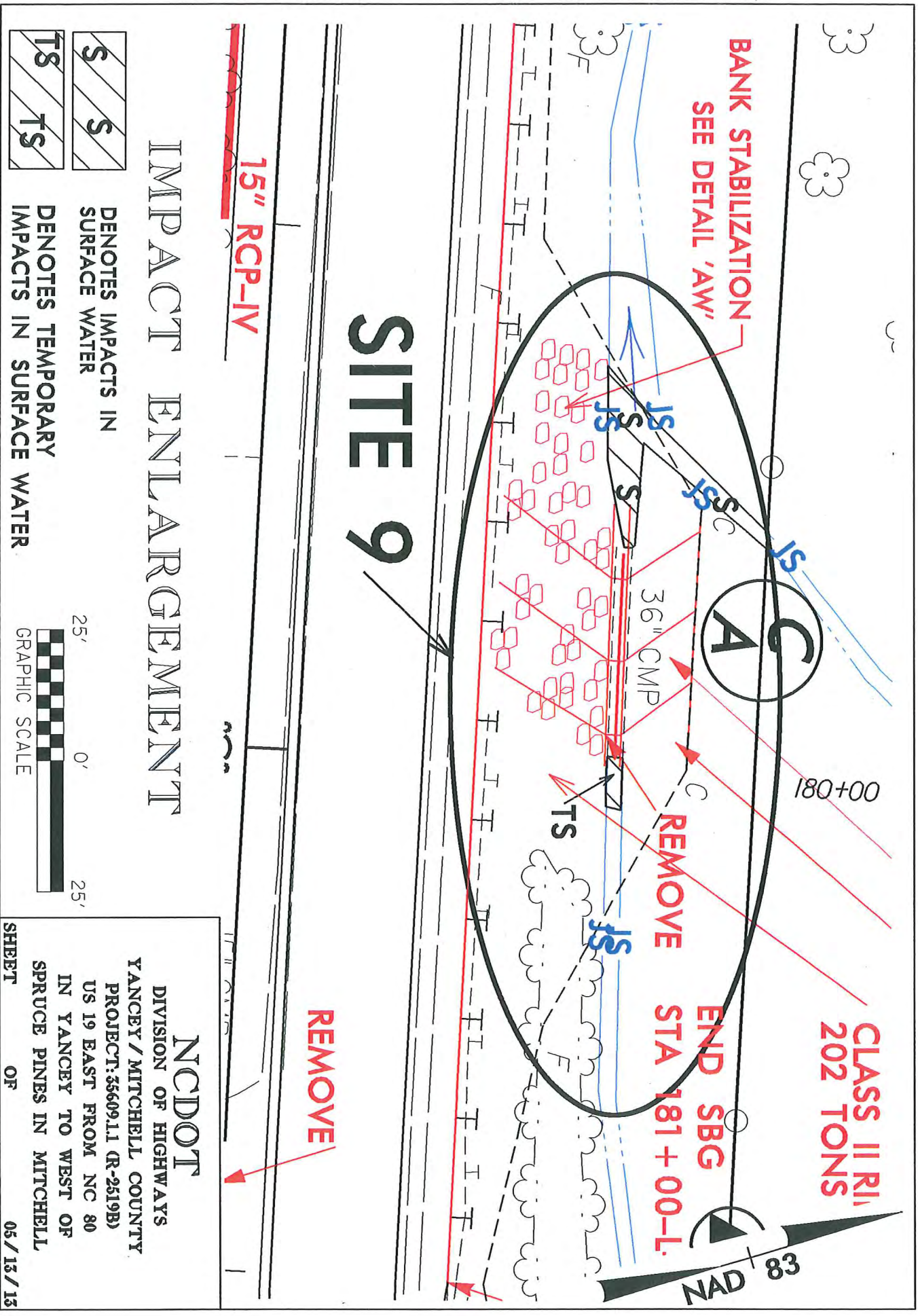


MATCH LINE -L- STA. 162+50 SEE SHEET 15











200 150 100 50 0 50 100 150 200

2580

2570

2560

2550

100YR WSEL=2568.75

EXISTING ROADWAY  
EXISTING 1@7'X5' RCBC

PROPOSED 1@7'X5' RCBC  
EXTENSION US

STA 155+44.57 -L-  
1@7'X5' RCBC  
LENGTH=145 FT  
GRADE PT. EL=2570.76'  
SKEW=131°

PROPOSED ROADWAY

PROPOSED 1@7'X7' RCBC  
EXTENSION D/S  
CLASS 1 RIP RAP  
2' HEIGHT SILL  
1' HEIGHT SILL

ROCK CROSS VANES

PROP. TB LT.

PROP. STREAMBED

PROP. TB RT.

INV=2561.5+/-

EXISTING CL INV=2559.40

INV=2557.6+/-

# PROFILE

SITE 8B

SCALE

1:50' HORIZONTAL

1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

05 / 10 / 13

158+00      157+00      156+00      155+00      154+00

2580

PI=157+95.00  
K=179  
EL=2575.91  
VC=200'  
g1=(+)2.00554%  
g2=(+)3.1754%

PROPOSED 1@7'X5'RCBC  
STA 155+44.57-L-

2570

100YR WSEL=2568.75

2560

EXISTING NAT. GROUND

FLOODPLAN BENCH  
AT INLET

U/S INV=2561.50' +/-

# SECTION SITE 8B

**SCALE**

1:50' HORIZONTAL

1:10' VERTICAL

**NCDOT**

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

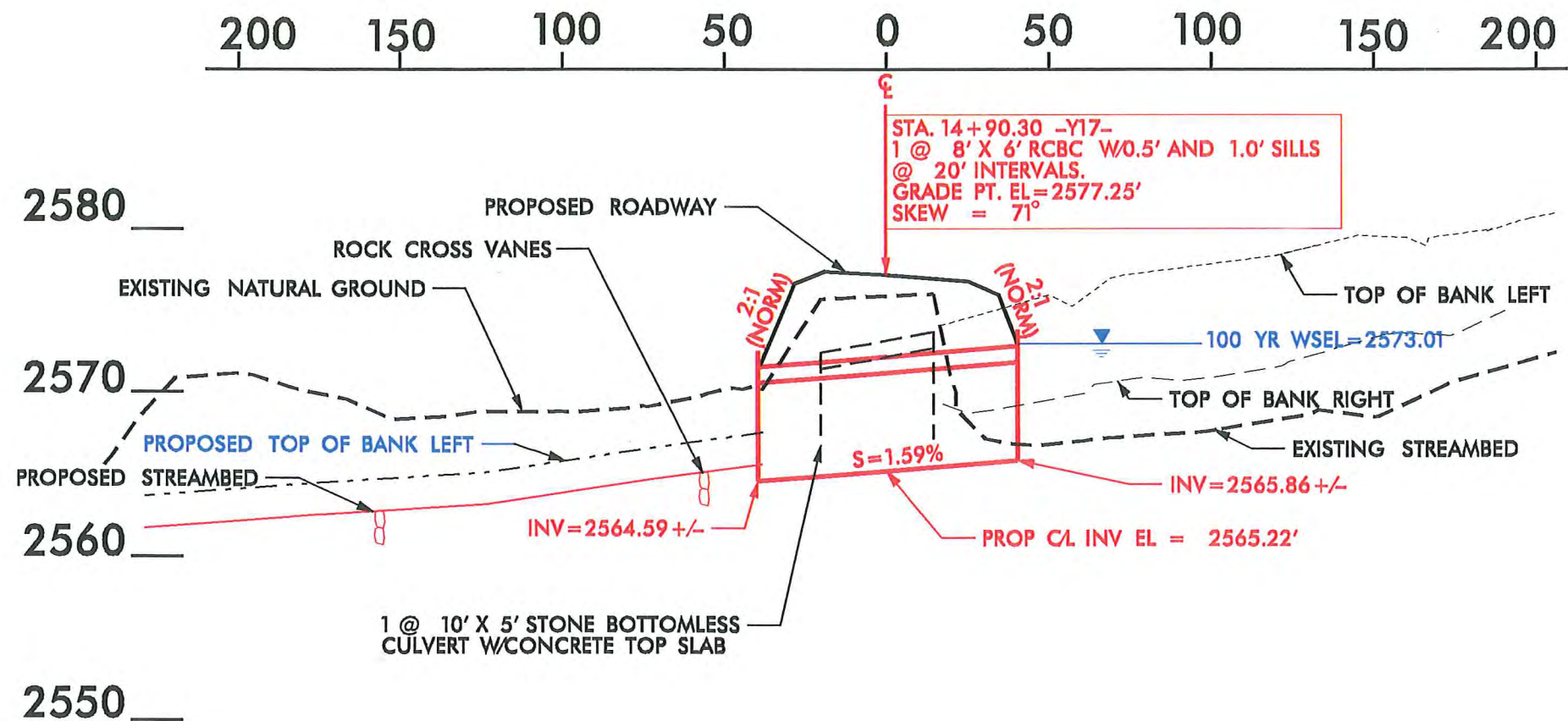
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

05 / 10 / 13





# PROFILE SITE 8C

## SCALE

1:50' HORIZONTAL

1:10' VERTICAL

## NCDOT

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY

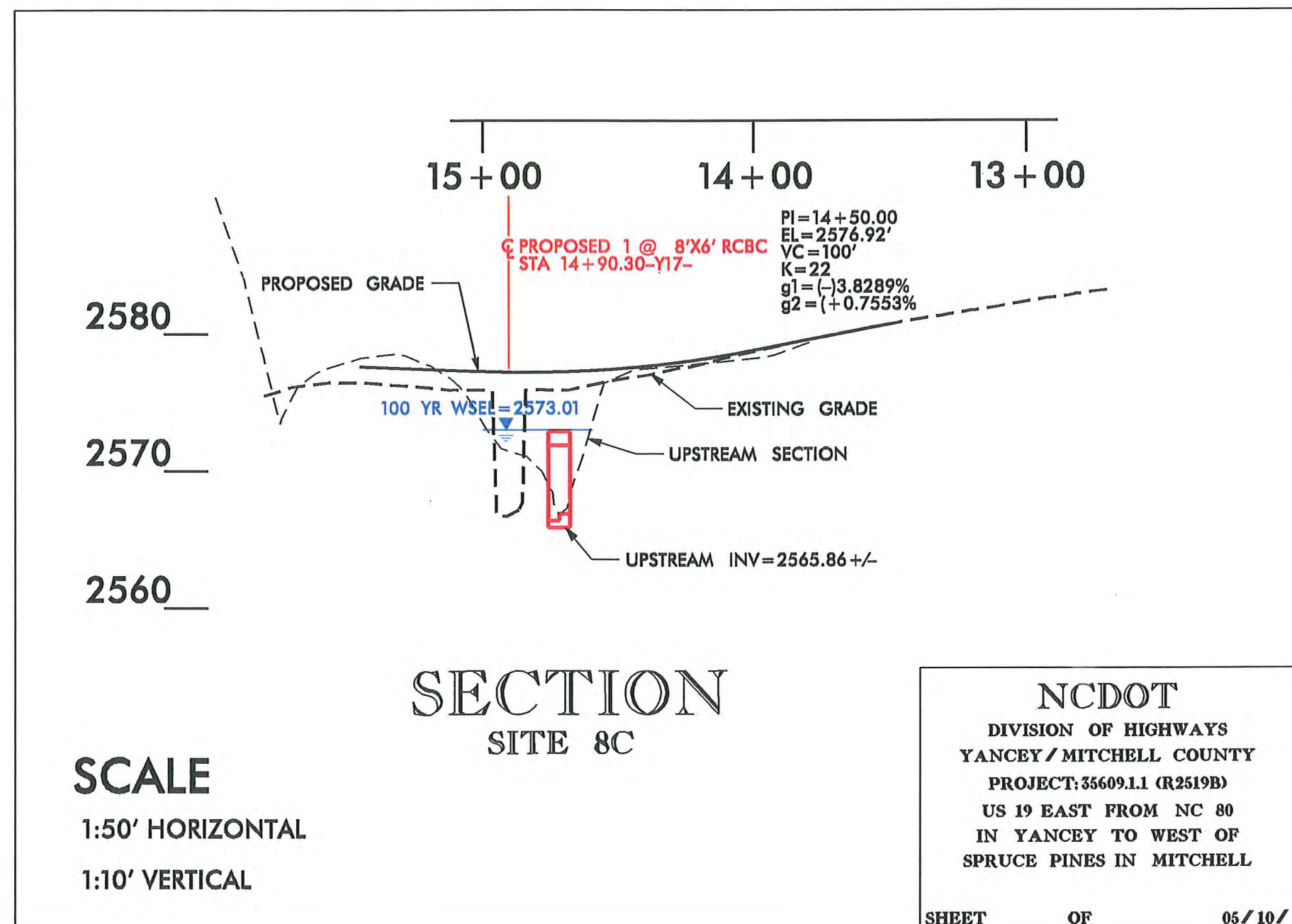
PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

05 / 10 / 13



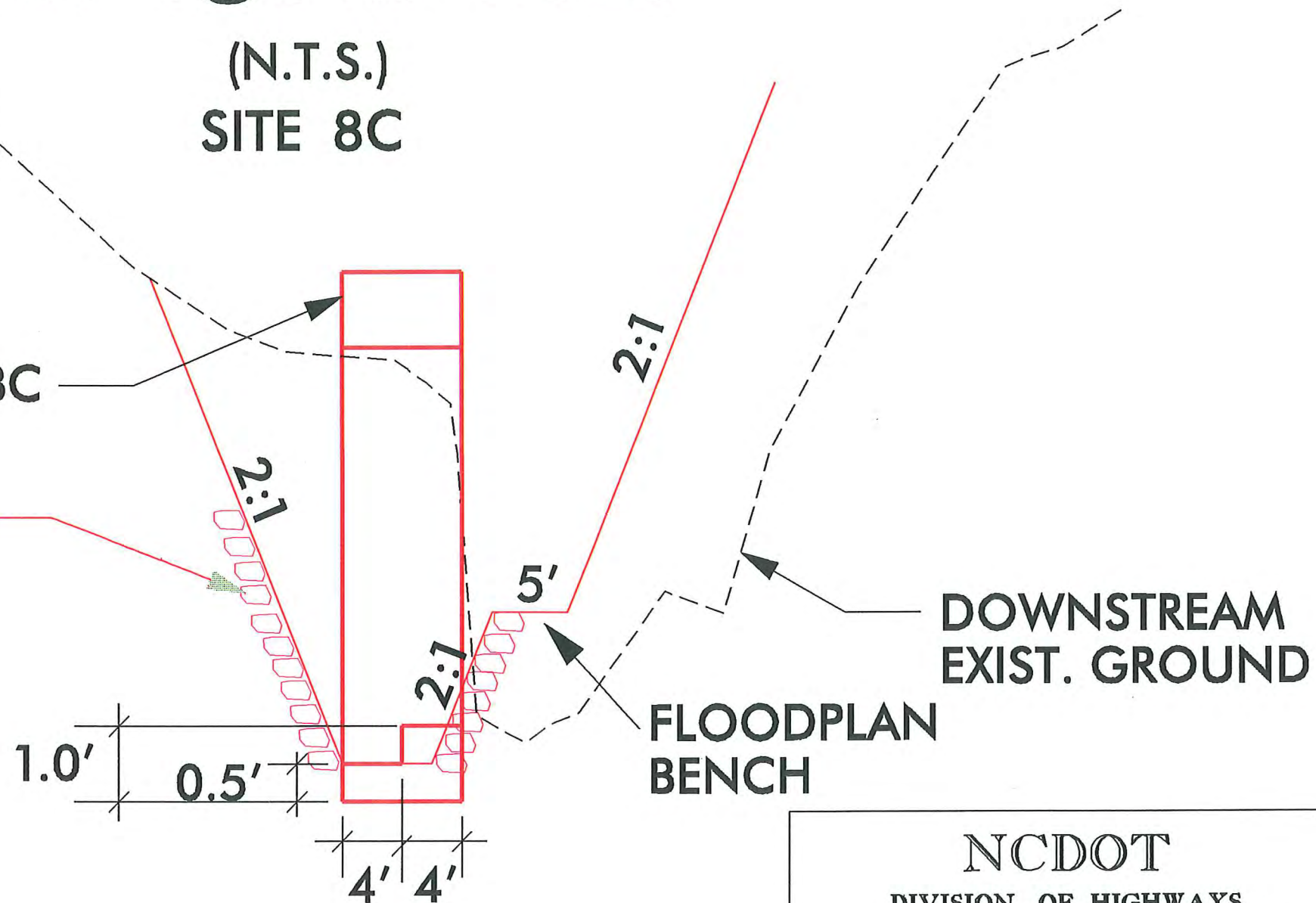


# DETAIL OF SILLS AT DOWNSTREAM FACE OF 1@8'X6' RCBC

(N.T.S.)  
SITE 8C

PROP. 1@8'X6' RCBC

CLASS I RIP RAP



NOTE: SPACE ALTERNATING  
0.5' AND 1.0' HIGH SILLS @  
20' INTERVALS.

NCDOT  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

05 / 10 / 13



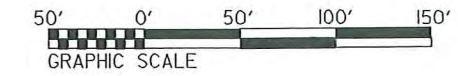
8/17/99



DENOTES IMPACTS IN SURFACE WATER

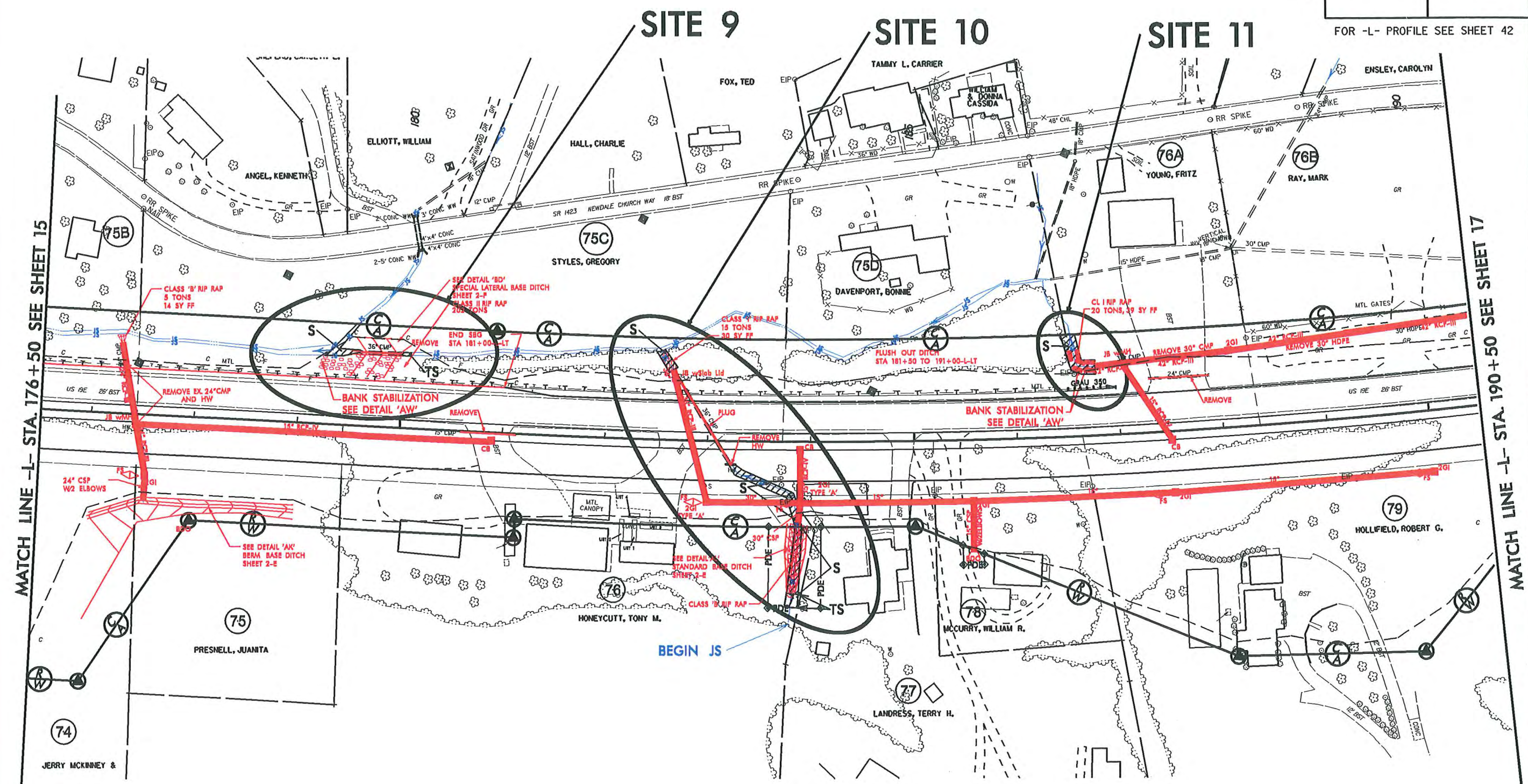


DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. <b>R-2519B</b>		SHEET NO. <b>16</b>
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		

FOR -L- PROFILE SEE SHEET 42



STATIONING CONDITIONS



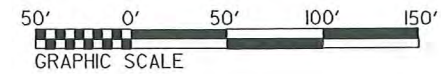
8/17/99



DENOTES IMPACTS IN SURFACE WATER

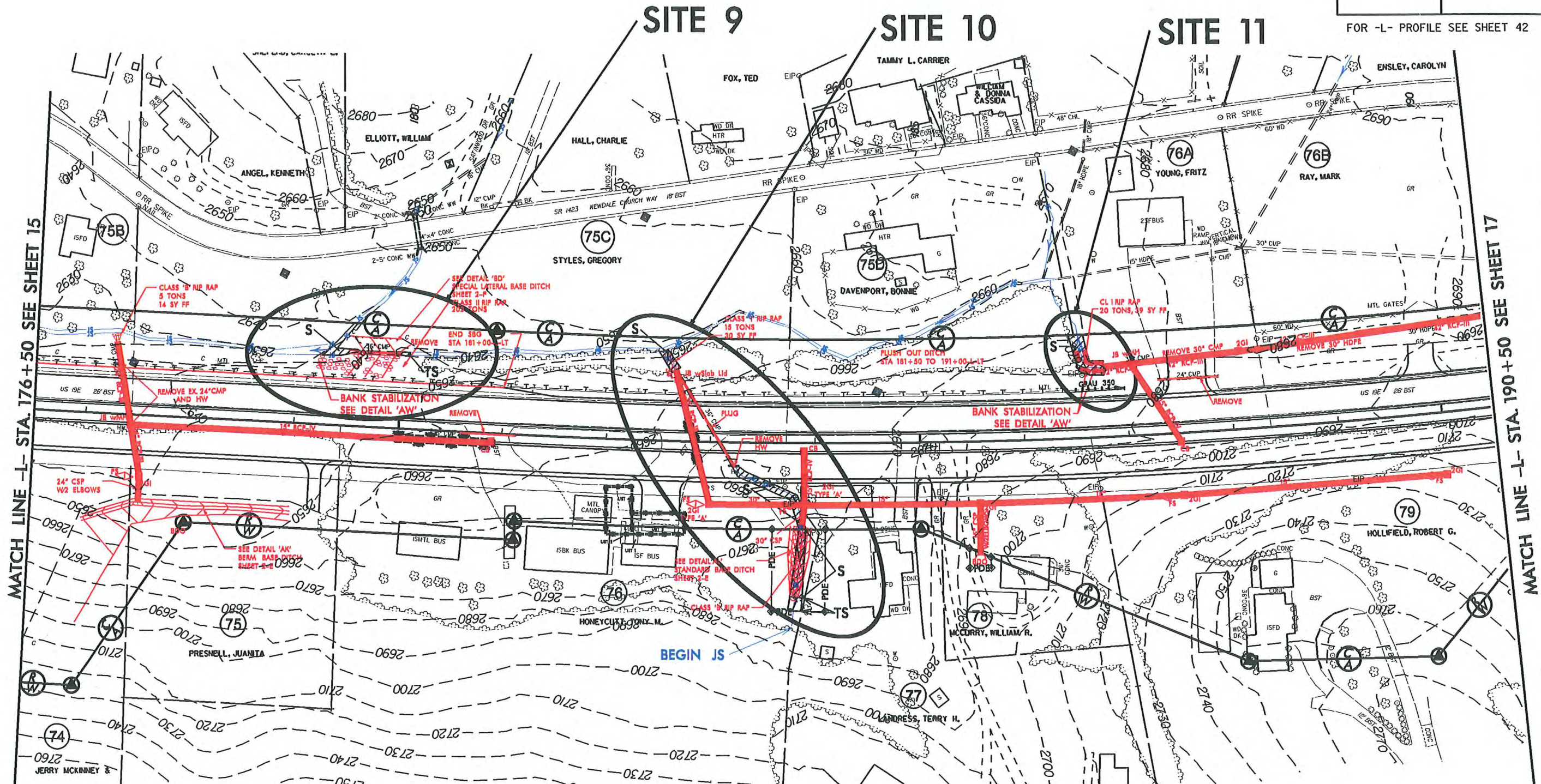


DENOTES TEMPORARY IMPACTS IN SURFACE WATER

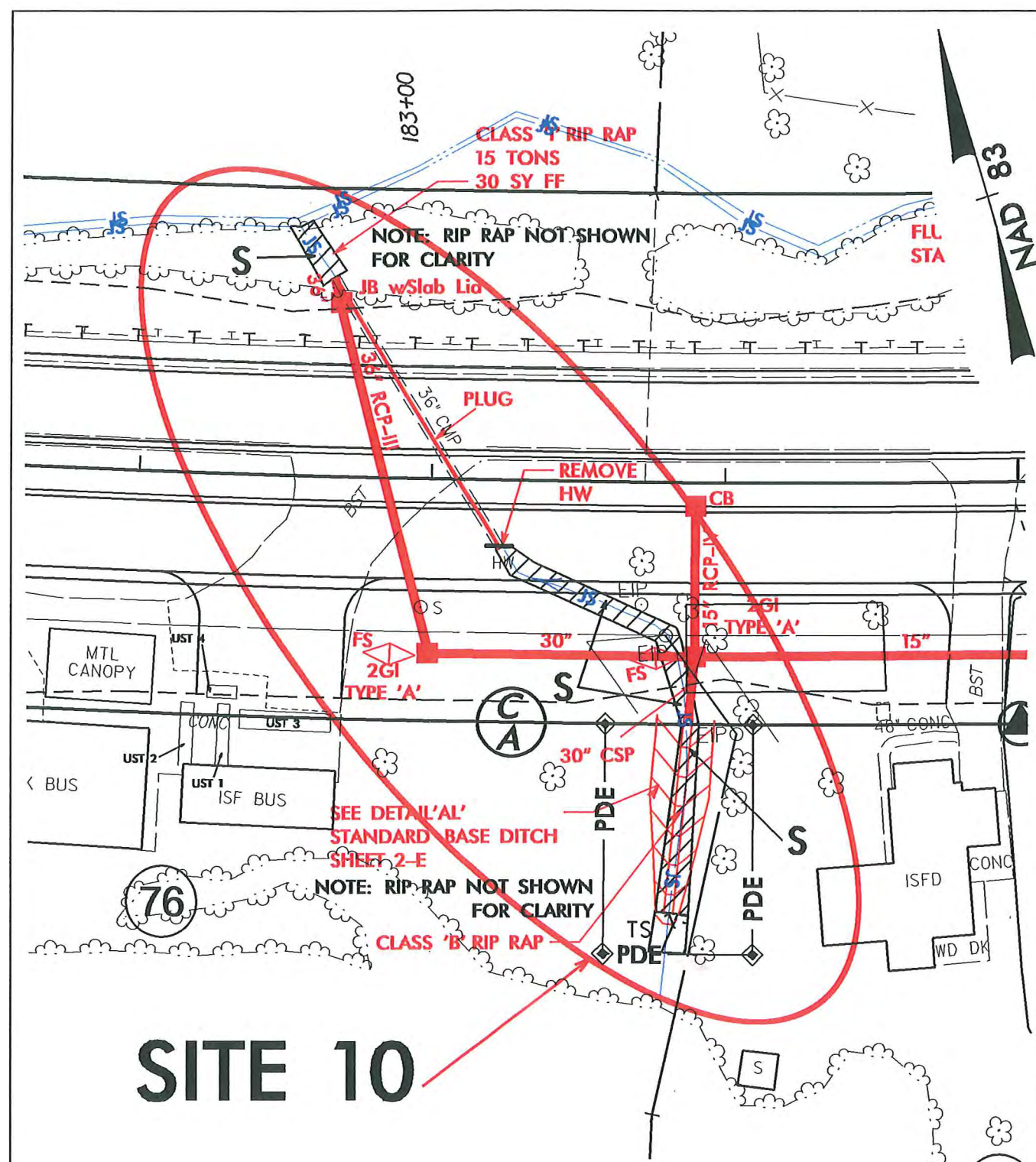


PROJECT REFERENCE NO. R-2519B		SHEET NO. 16	
RDV SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

FOR -L- PROFILE SEE SHEET 42



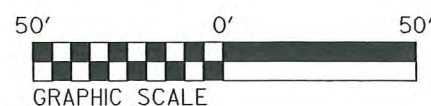




## IMPACT ENLARGEMENT

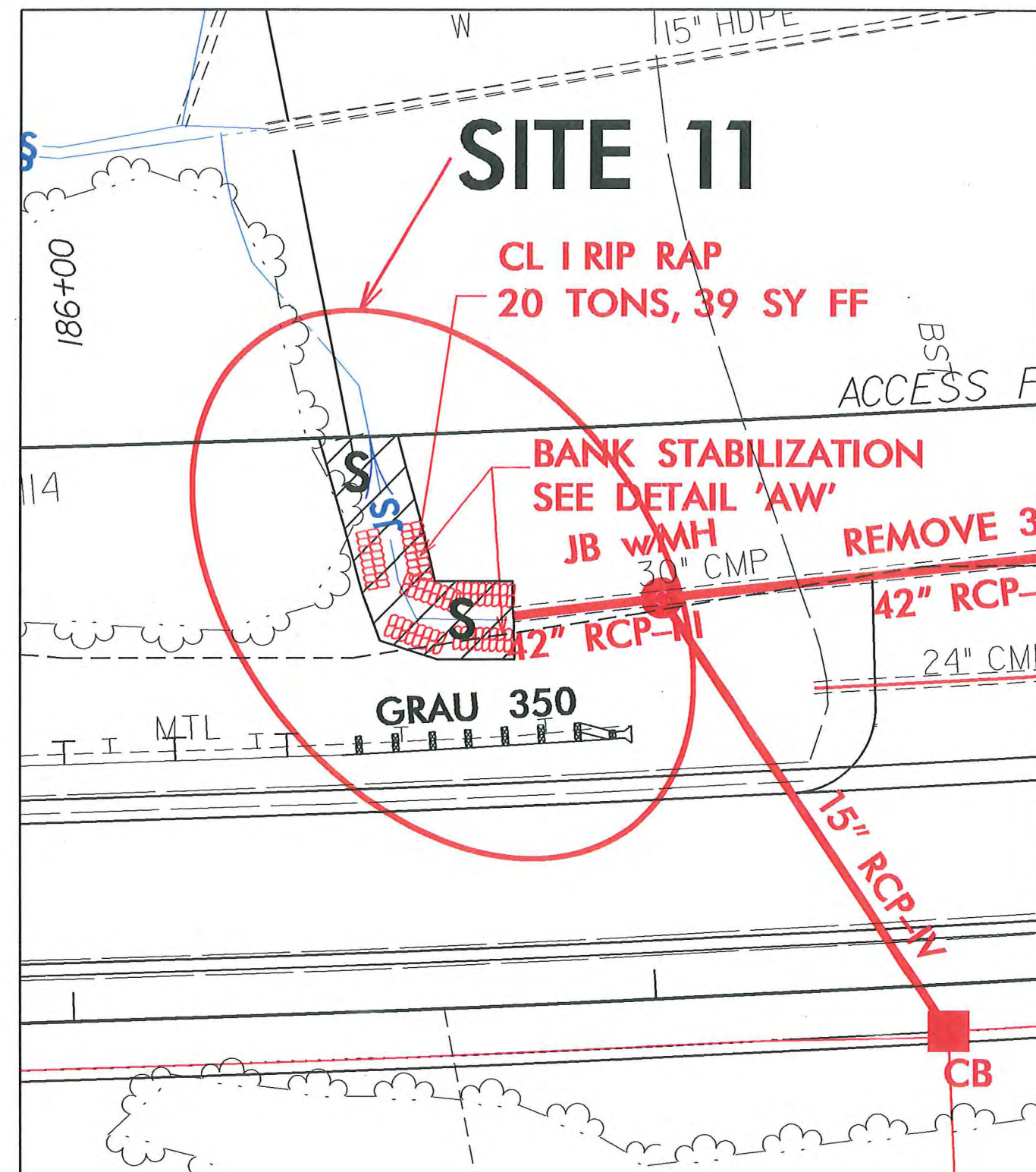


**DENOTES IMPACTS IN  
SURFACE WATER**



**NCDOT**  
**DIVISION OF HIGHWAYS**  
**YANCEY/MITCHELL COUNTRY**  
**PROJECT: 35609.1.1 (R-2519B)**  
**US 19 EAST FROM NC 80**  
**IN YANCEY TO WEST OF**  
**SPRUCE PINES IN MITCHELL**

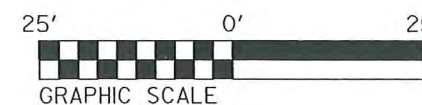
**SHEET**                      **OF**                      **05 / 13 / 13**



IMPACT ENLARGEMENT



**DENOTES IMPACTS IN  
SURFACE WATER**



**NCDOT**  
**DIVISION OF HIGHWAYS**  
**YANCEY / MITCHELL COUNTRY**  
**PROJECT: 35609.1.1 (R-2519B)**  
**US 19 EAST FROM NC 80**  
**IN YANCEY TO WEST OF**  
**SPRUCE PINES IN MITCHELL**

**SHEET**                      **OF**                      **05 / 13 / 13**



**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**

# SITE 15

# SITE 12

**MATCH LINE -L- STA. 204+50 SEE SHEET 18**

Permit Drawing  
Sheet 48 of 114



50' 0' 50' 100' 150'

GRAPHIC SCALE

**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**

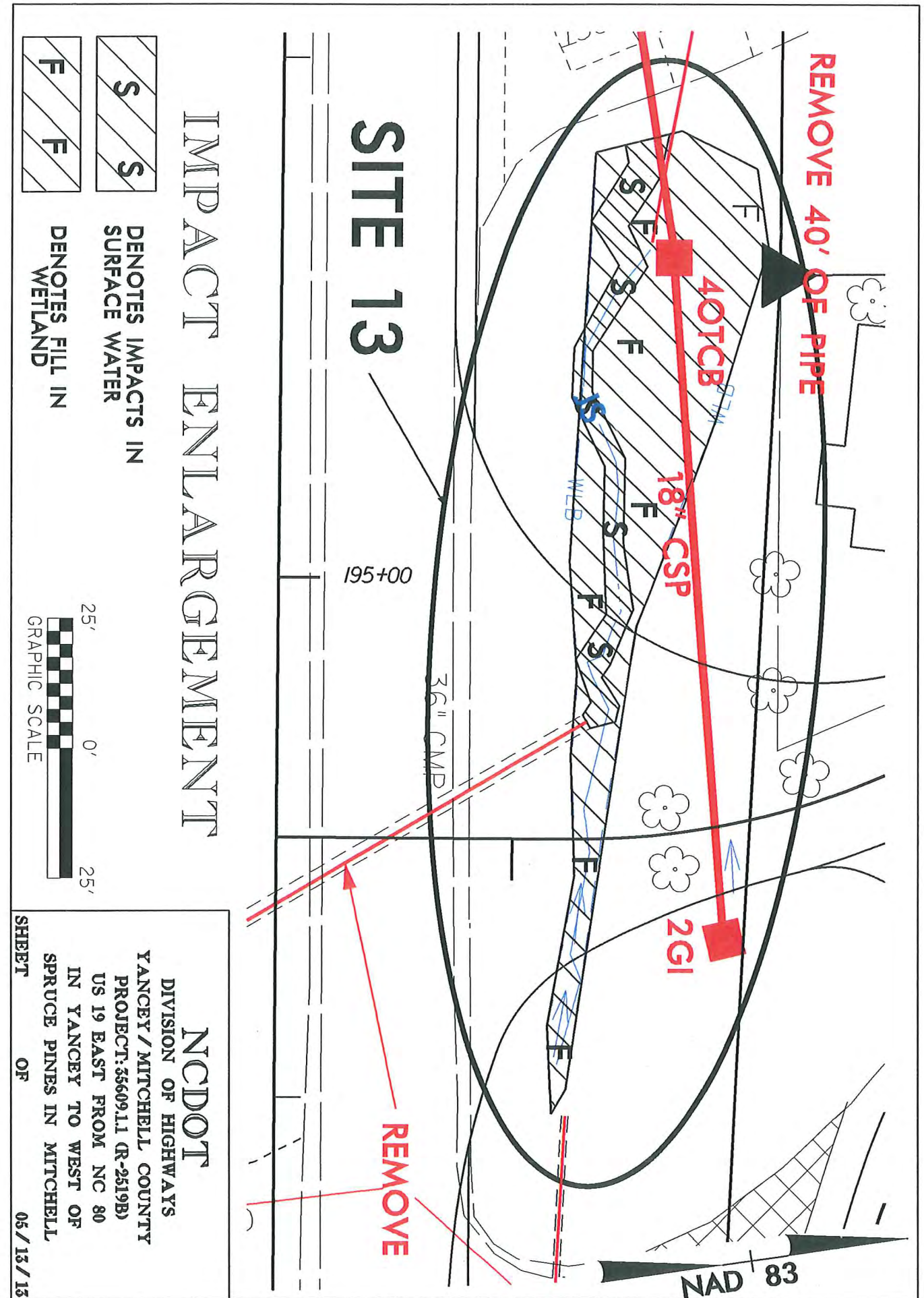
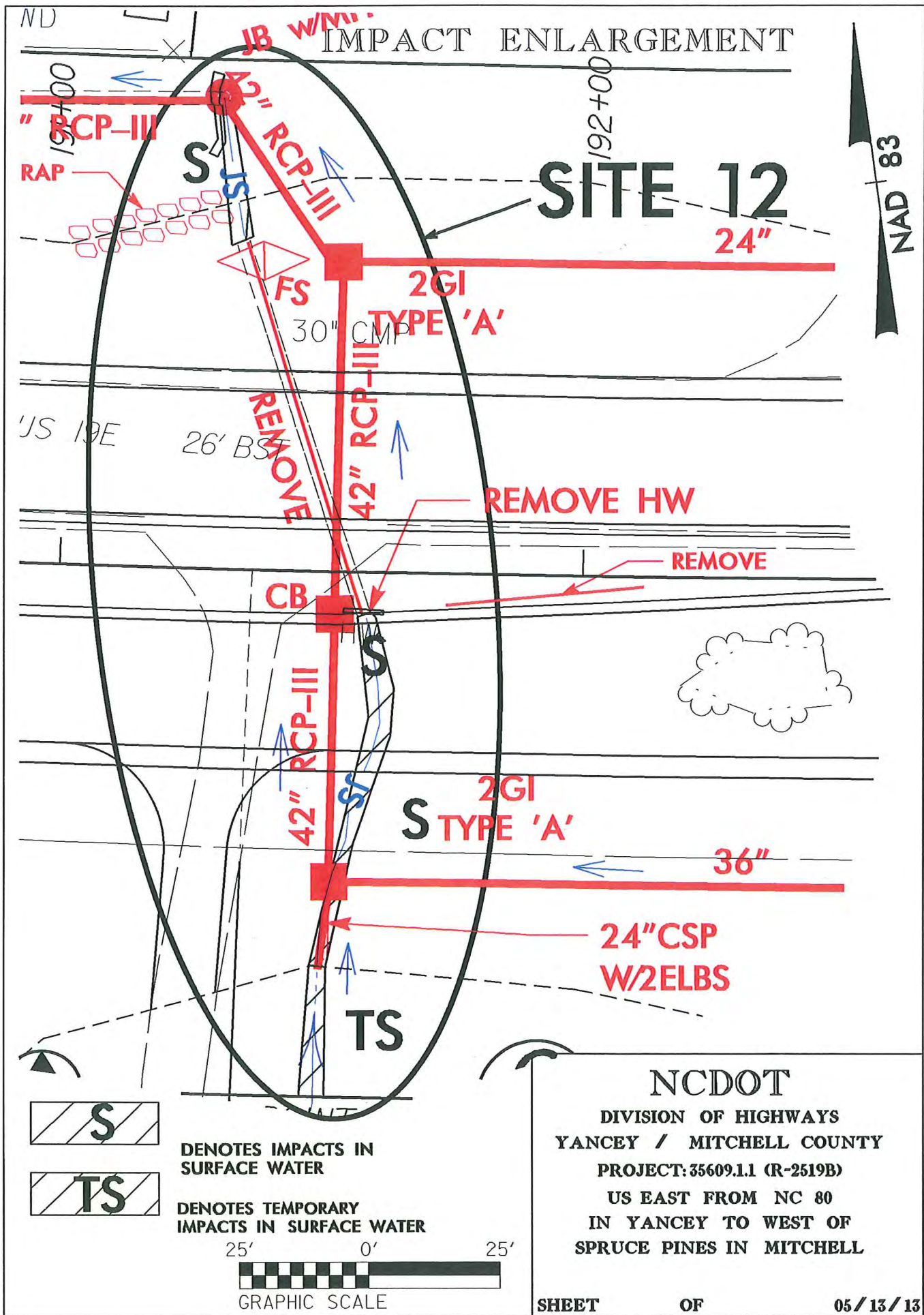
# SITE 15

## SITE 12

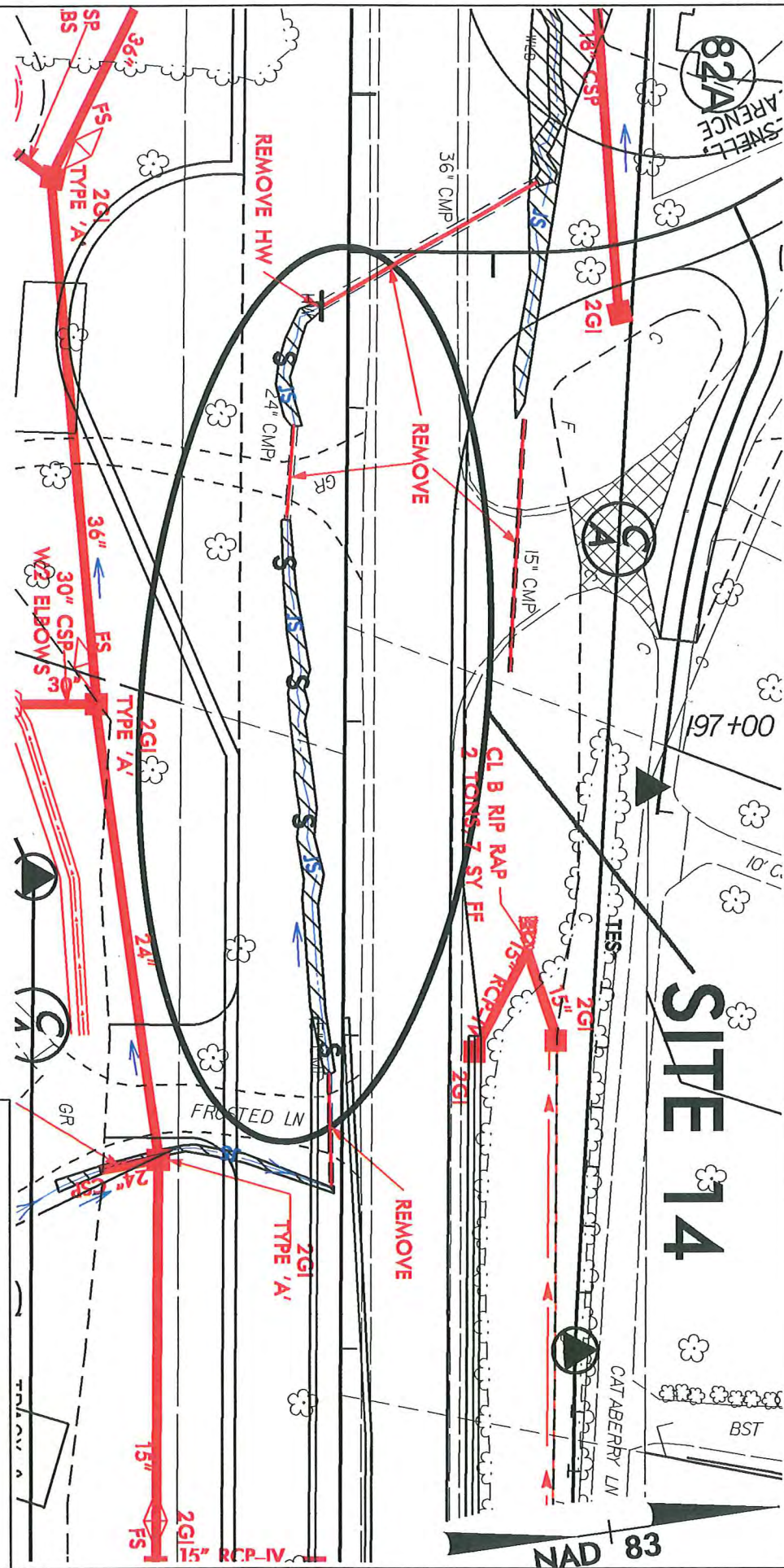
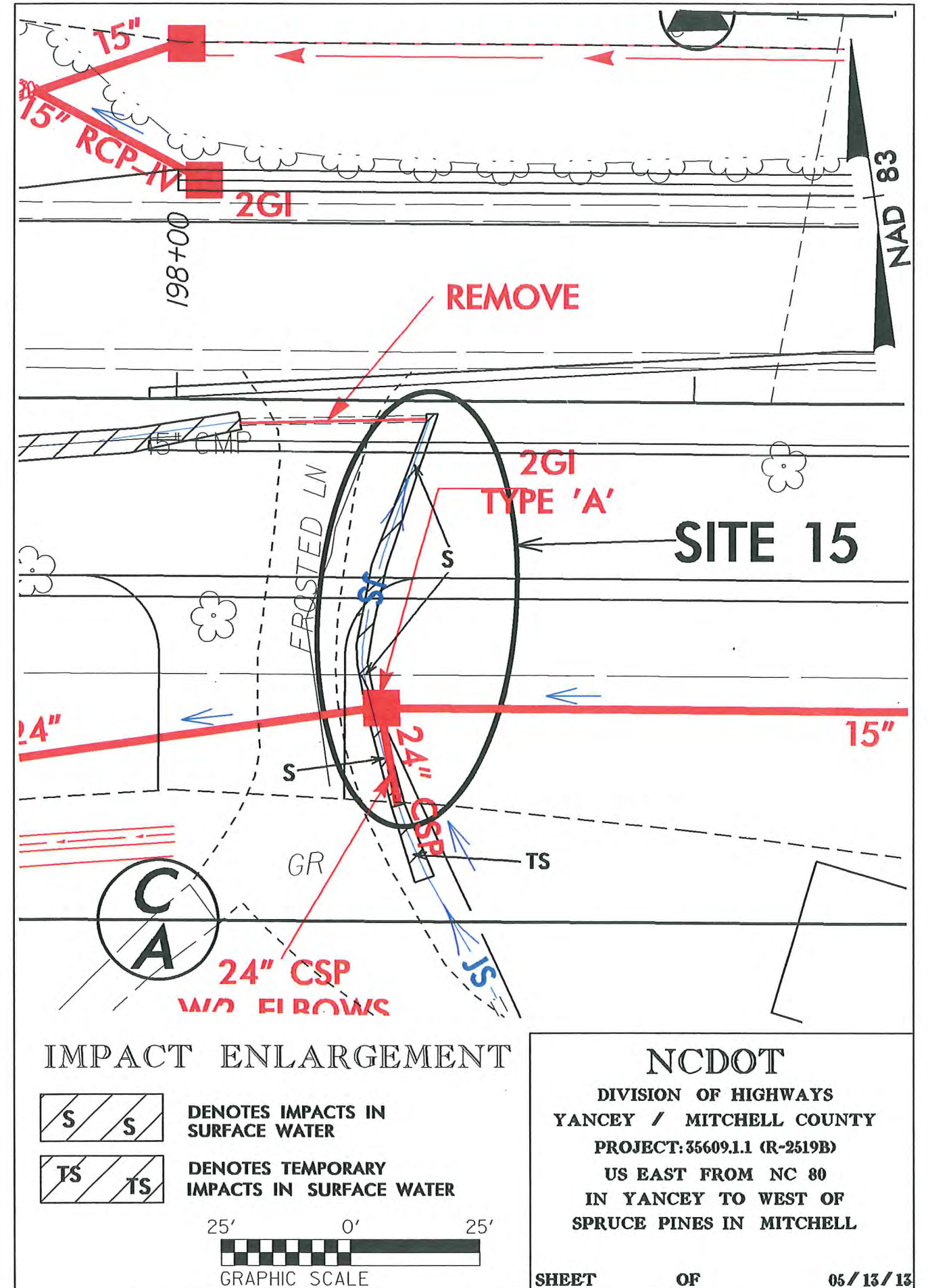
**MATCH LINE -L- STA. 204+50 SEE SHEET 18**

Permit Drawing  
Sheet 49 of 114









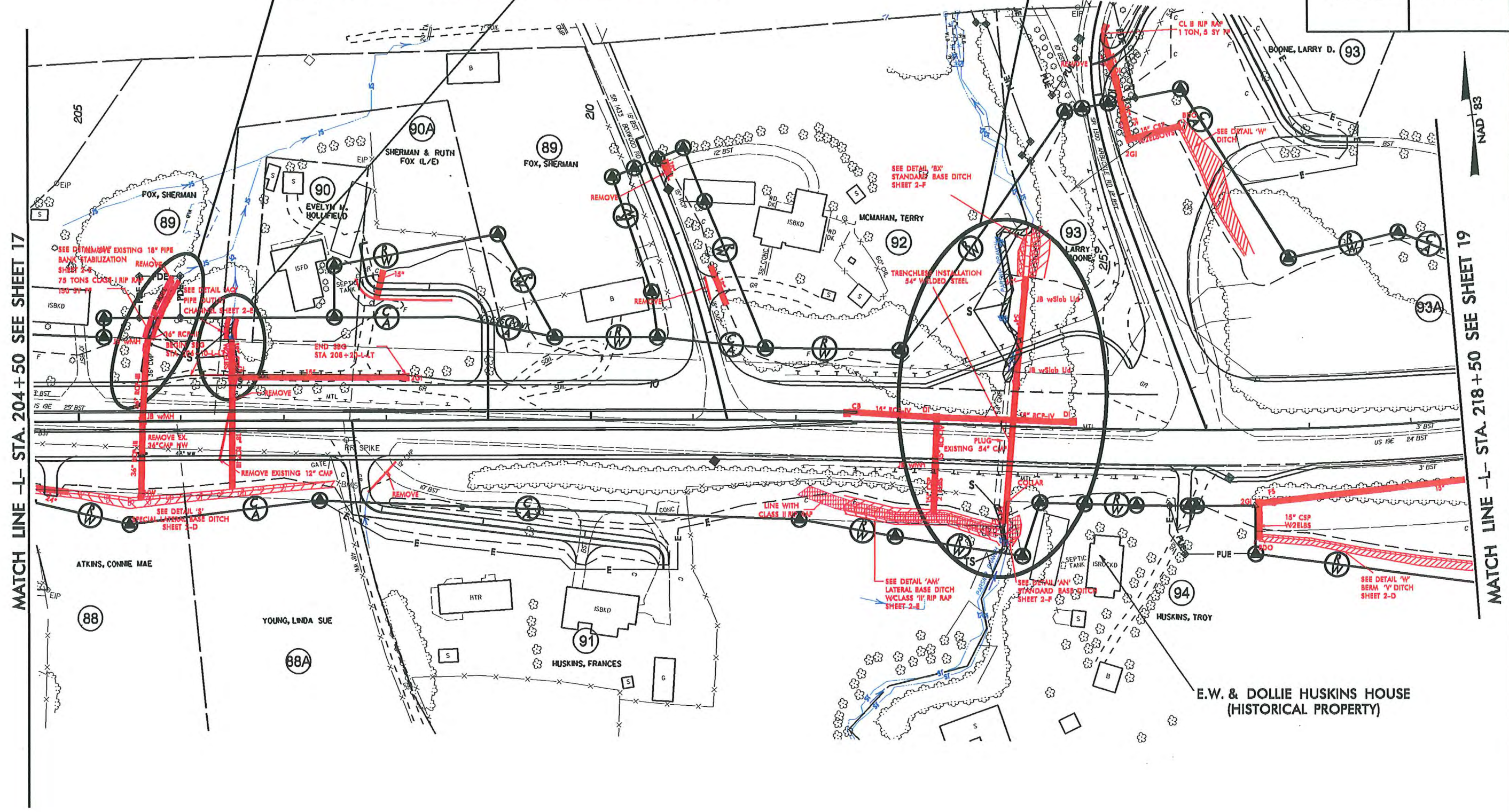


8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
R-2519B		18	
RWY SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS			
DO NOT USE FOR CONSTRUCTION			

# SITE 16 SITE 17

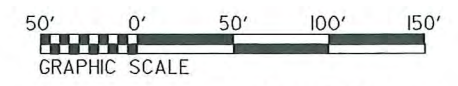
# SITE 18



DENOTES IMPACTS IN SURFACE WATER



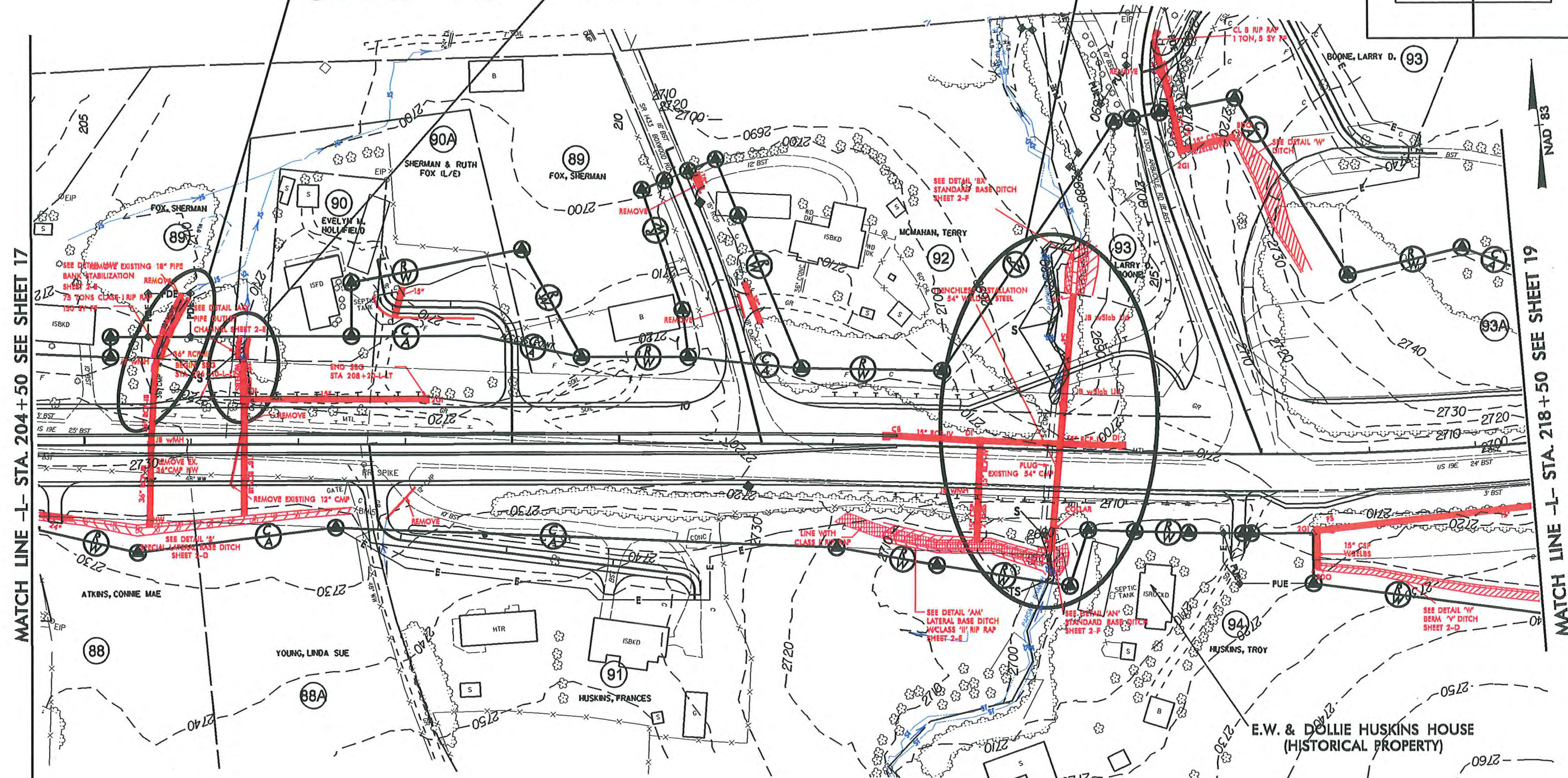
DENOTES TEMPORARY IMPACTS IN SURFACE WATER





## SITE 16 / SITE 17

## SITE 18

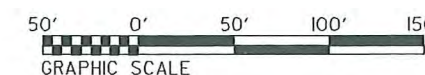


**MATCH LINE -L- STA. 204+50 SEE SHEET 17**

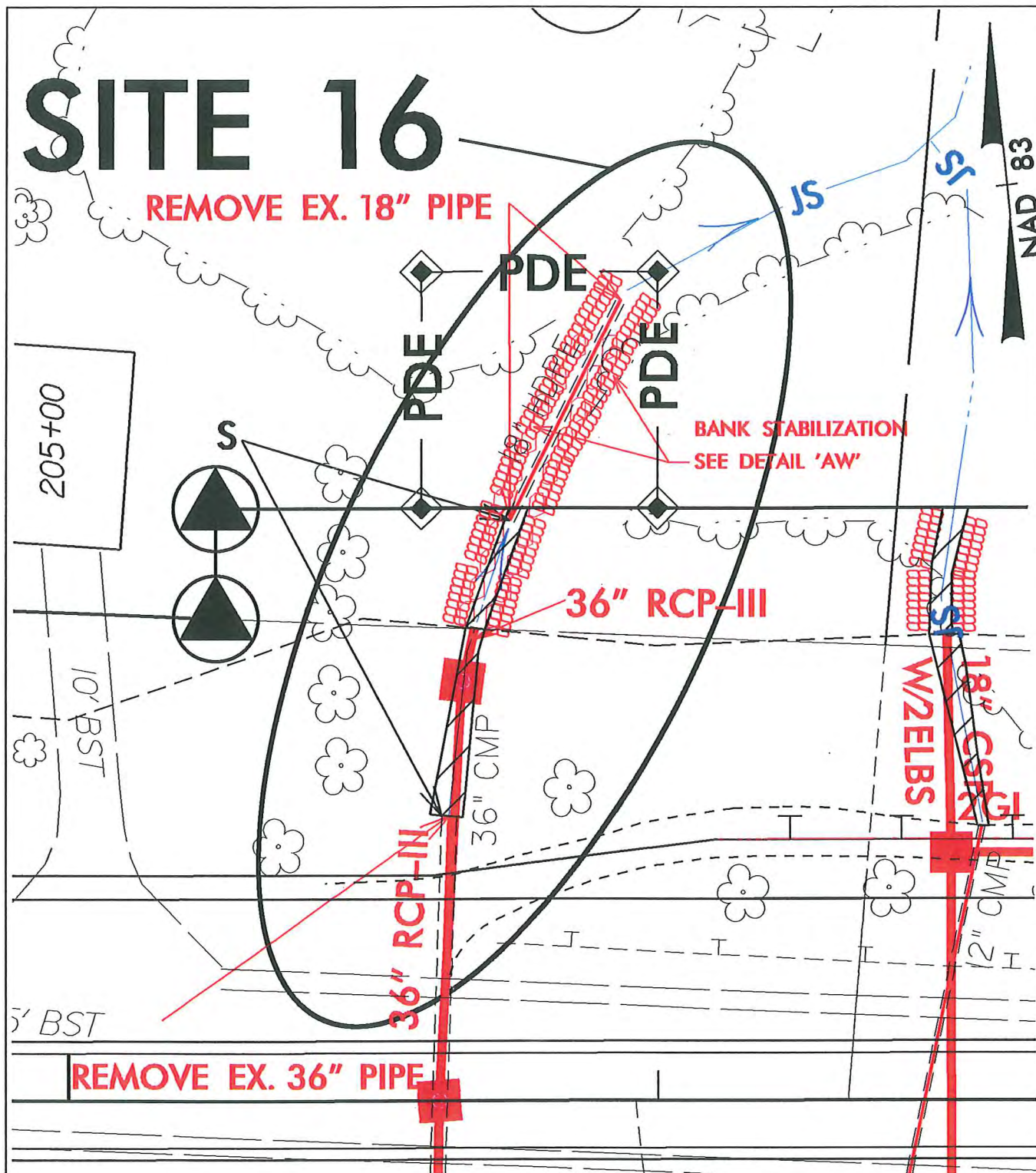
WATCH LINE -L- STA. 218+50 SEE SHEET 19

**DENOTES IMPACTS IN  
SURFACE WATER**

Diagram of a rectangular block with diagonal hatching. The block contains two labels 'TS' separated by a space.

DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

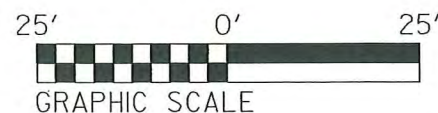




# IMPACT ENLARGEMENT

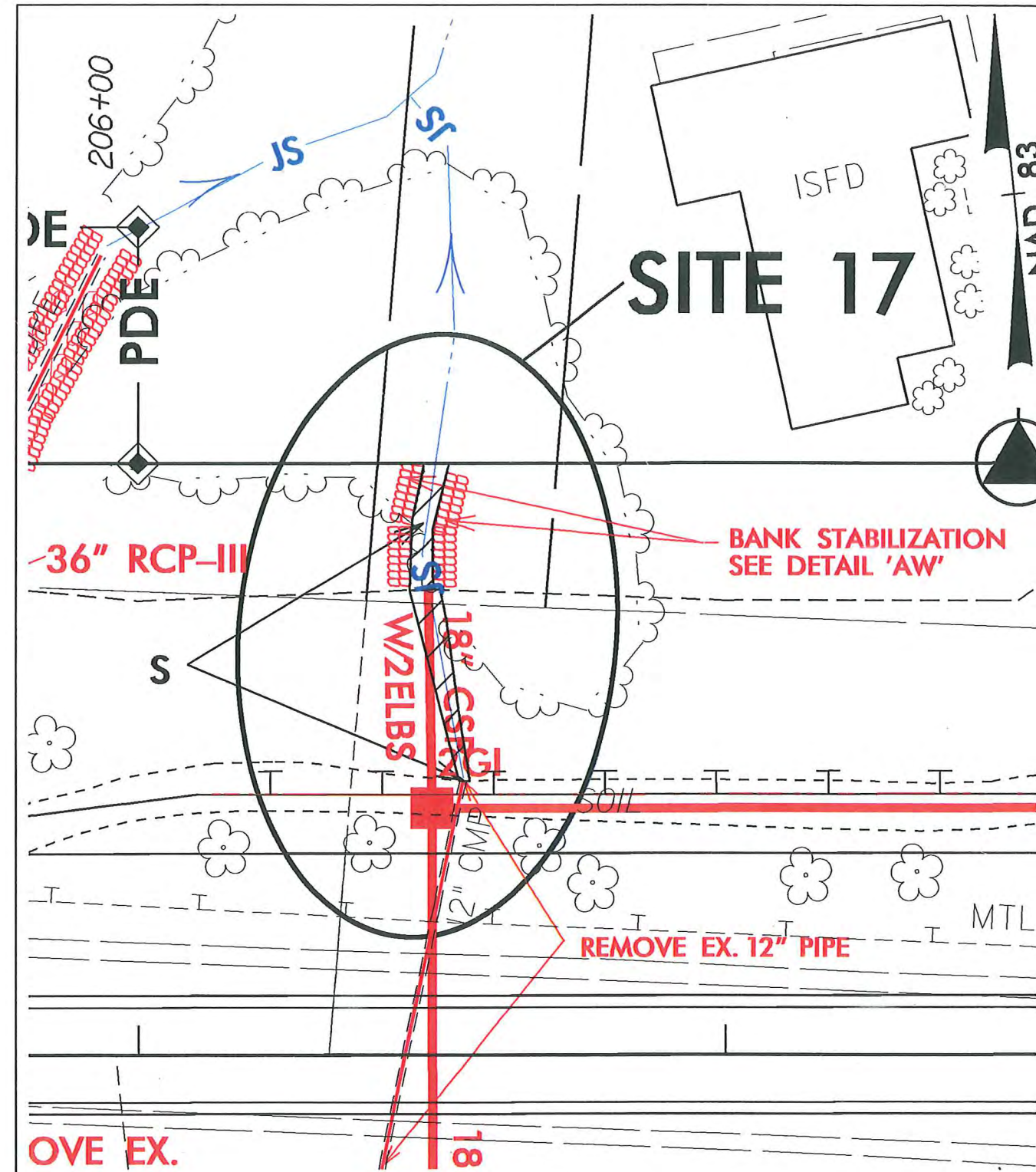


DENOTES IMPACTS IN  
SURFACE WATER



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

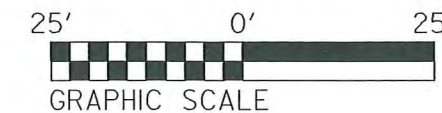
SHEET OF 05 / 13 / 13



# IMPACT ENLARGEMENT



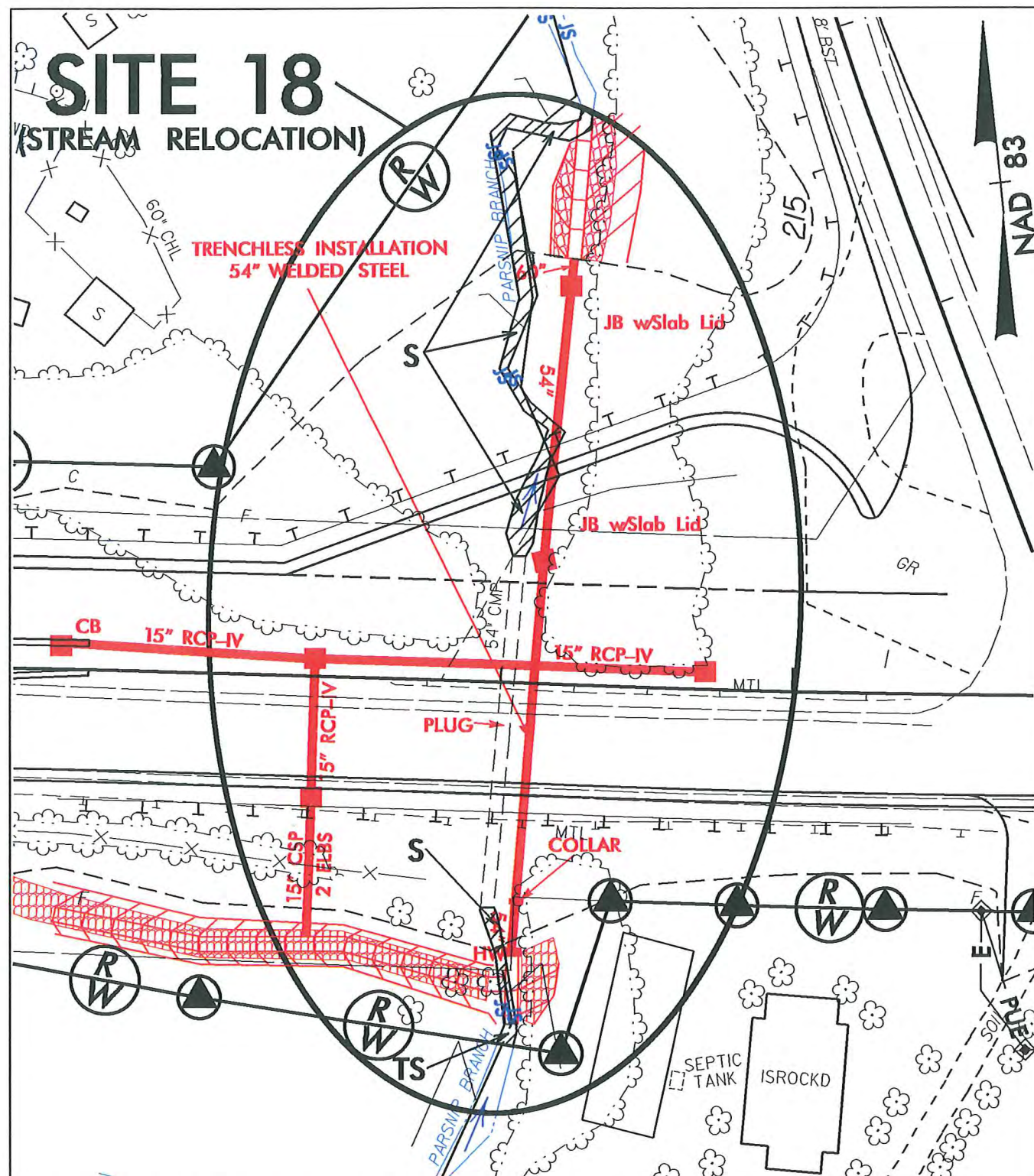
DENOTES IMPACTS IN  
SURFACE WATER



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13

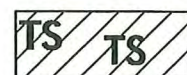




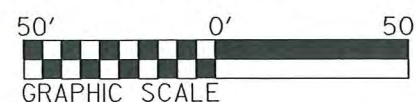
## IMPACT ENLARGEMENT



**DENOTES IMPACTS IN  
SURFACE WATER**

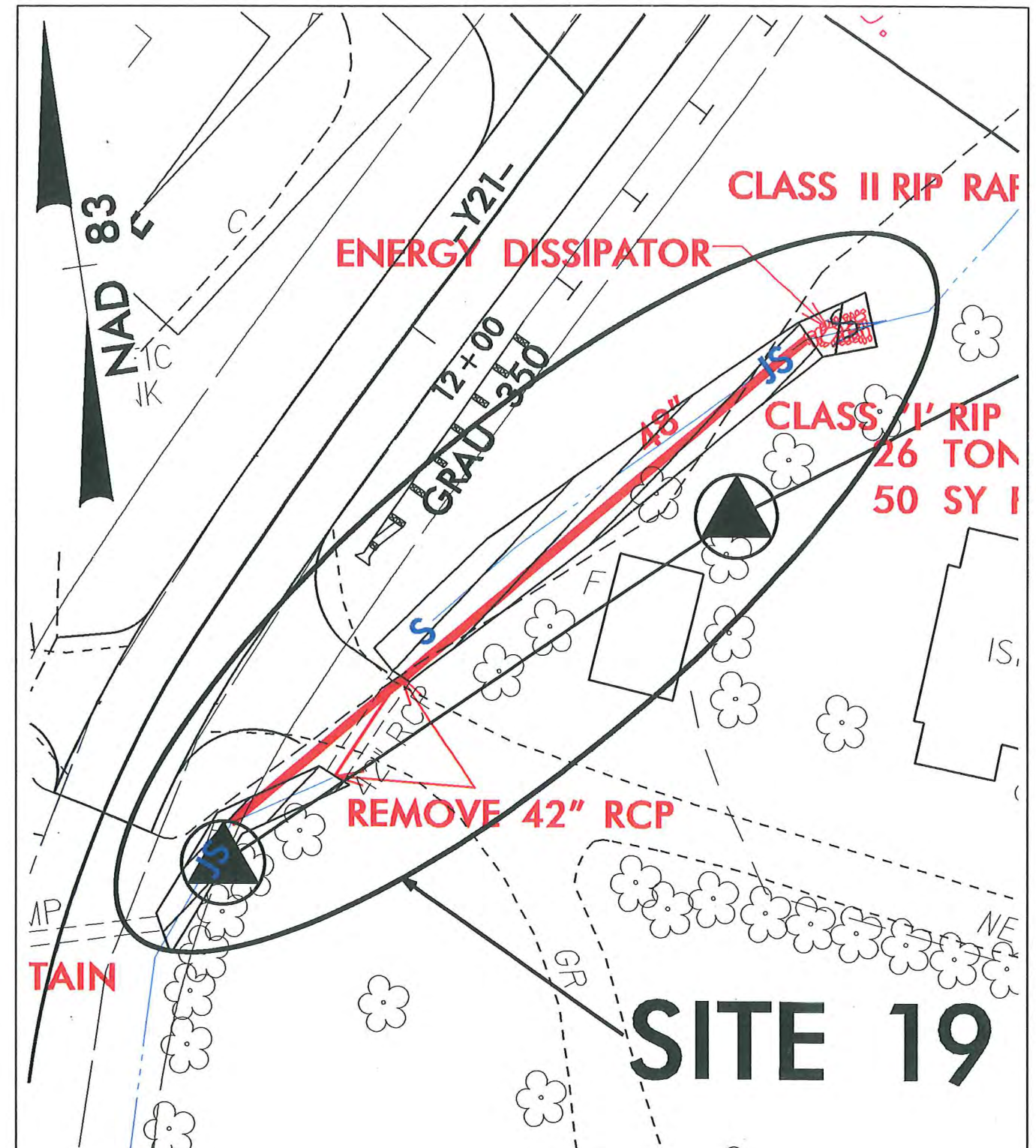


**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**

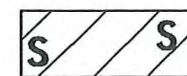


**NCDOT**  
**DIVISION OF HIGHWAYS**  
**YANCEY / MITCHELL COUNTY**  
**PROJECT: 35609.1.1 (R-2519B)**  
**US EAST FROM NC 80**  
**IN YANCEY TO WEST OF**  
**SPRUCE PINES IN MITCHELL**

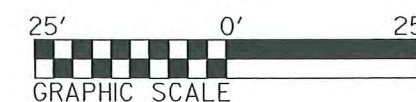
SHEET OF 05 / 13 / 13



## IMPACT ENLARGEMENT



**DENOTES IMPACTS IN  
SURFACE WATER**



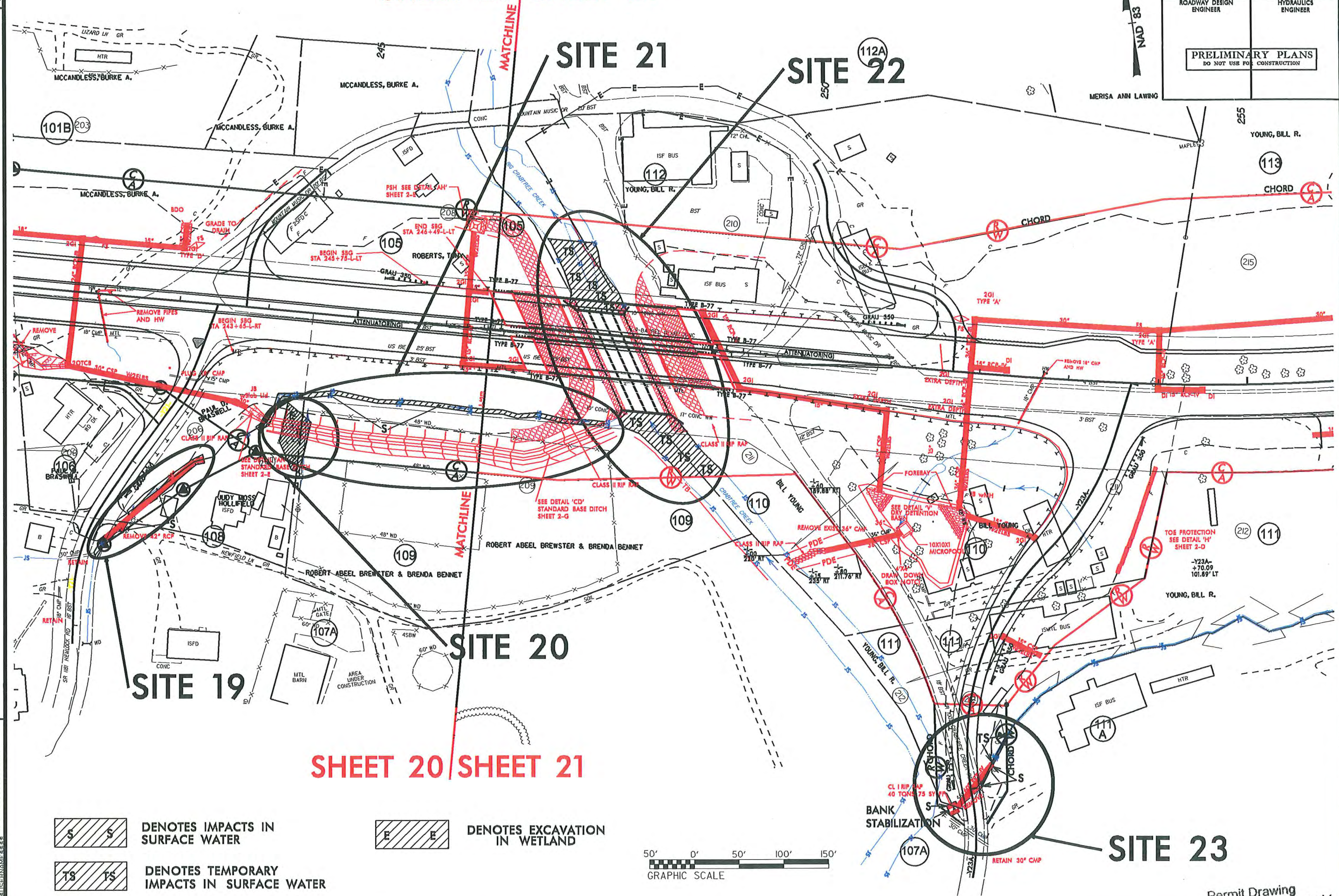
**NCDOT**  
**DIVISION OF HIGHWAYS**  
**YANCEY / MITCHELL COUNTY**  
**PROJECT: 35609.1.1 (R-2519B)**  
**US EAST FROM NC 80**  
**IN YANCEY TO WEST OF**  
**SPRUCE PINES IN MITCHELL**

SHEET OF 05 / 13 / 13

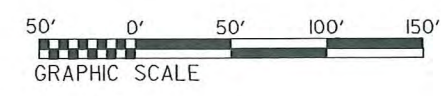


# SHEET 20 SHEET 21

PROJECT REFERENCE NO. R-2519B	SHEET NO. 20 & 21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES EXCAVATION IN WETLAND
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SITE 23



# SHEET 20 SHEET 21

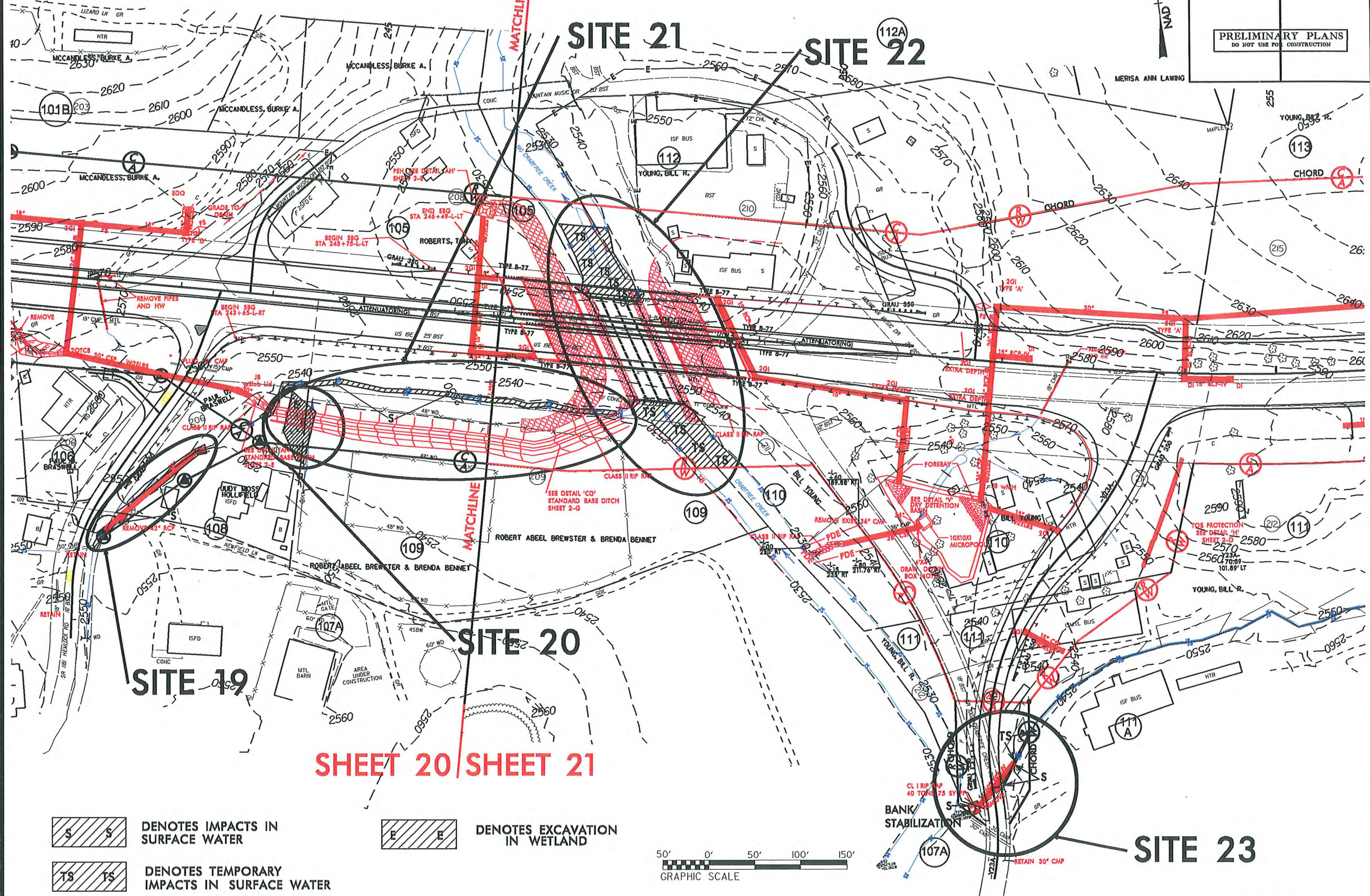
SITE 21

SITE 22

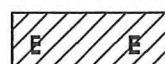
SITE 20

# SHEET 20 SHEET 21

PROJECT REFERENCE NO. R-2519B	SHEET NO. 20 & 21
RW SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



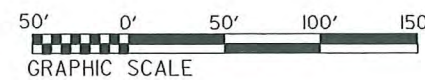
DENOTES IMPACTS IN SURFACE WATER



DENOTES EXCAVATION IN WETLAND

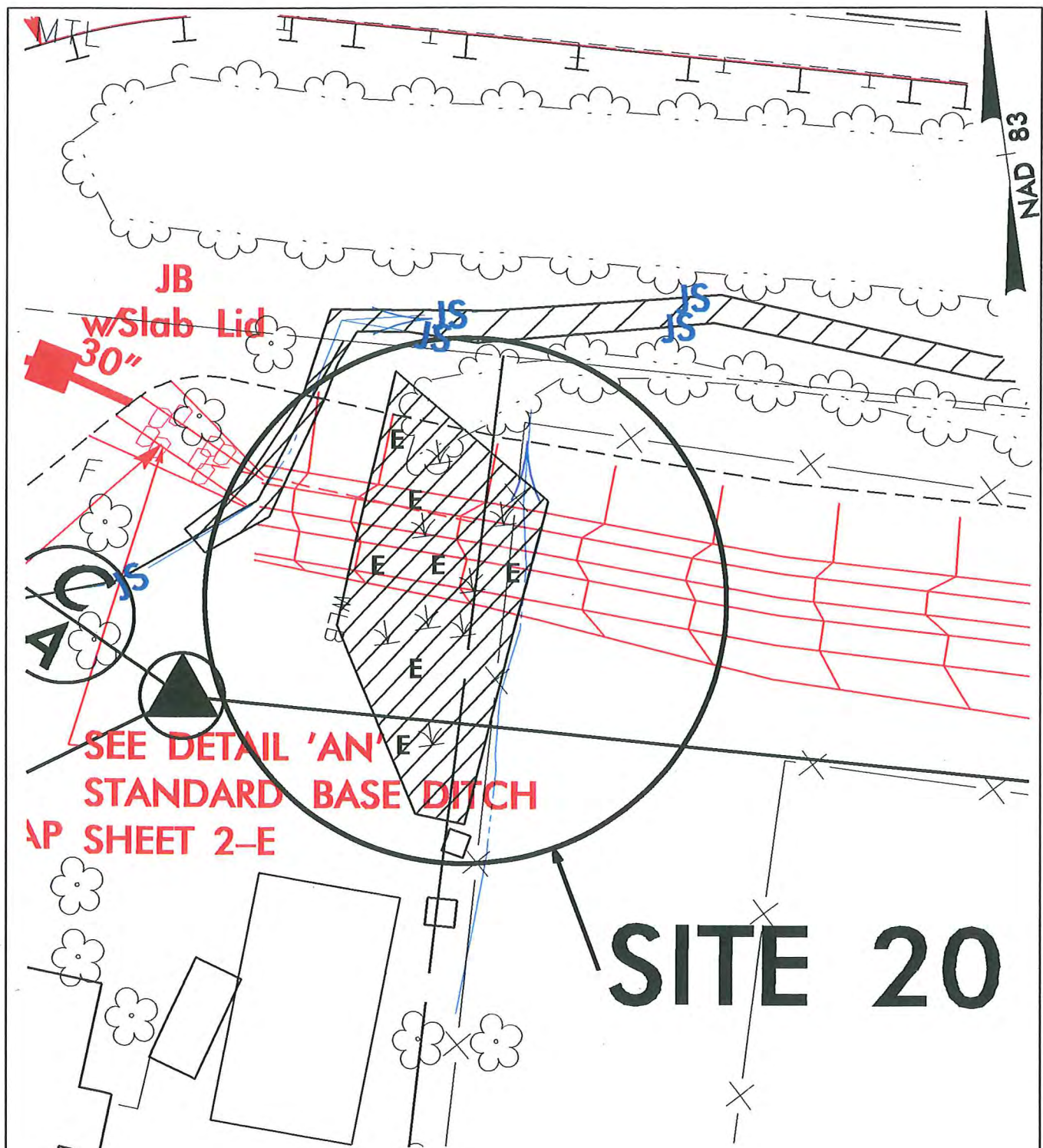


DENOTES TEMPORARY IMPACTS IN SURFACE WATER



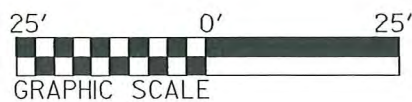
SITE 23





IMPACT ENLARGEMENT

**E** DENOTES EXCAVATION  
IN WETLAND



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13

**S**

DENOTES IMPACTS IN  
SURFACE WATER



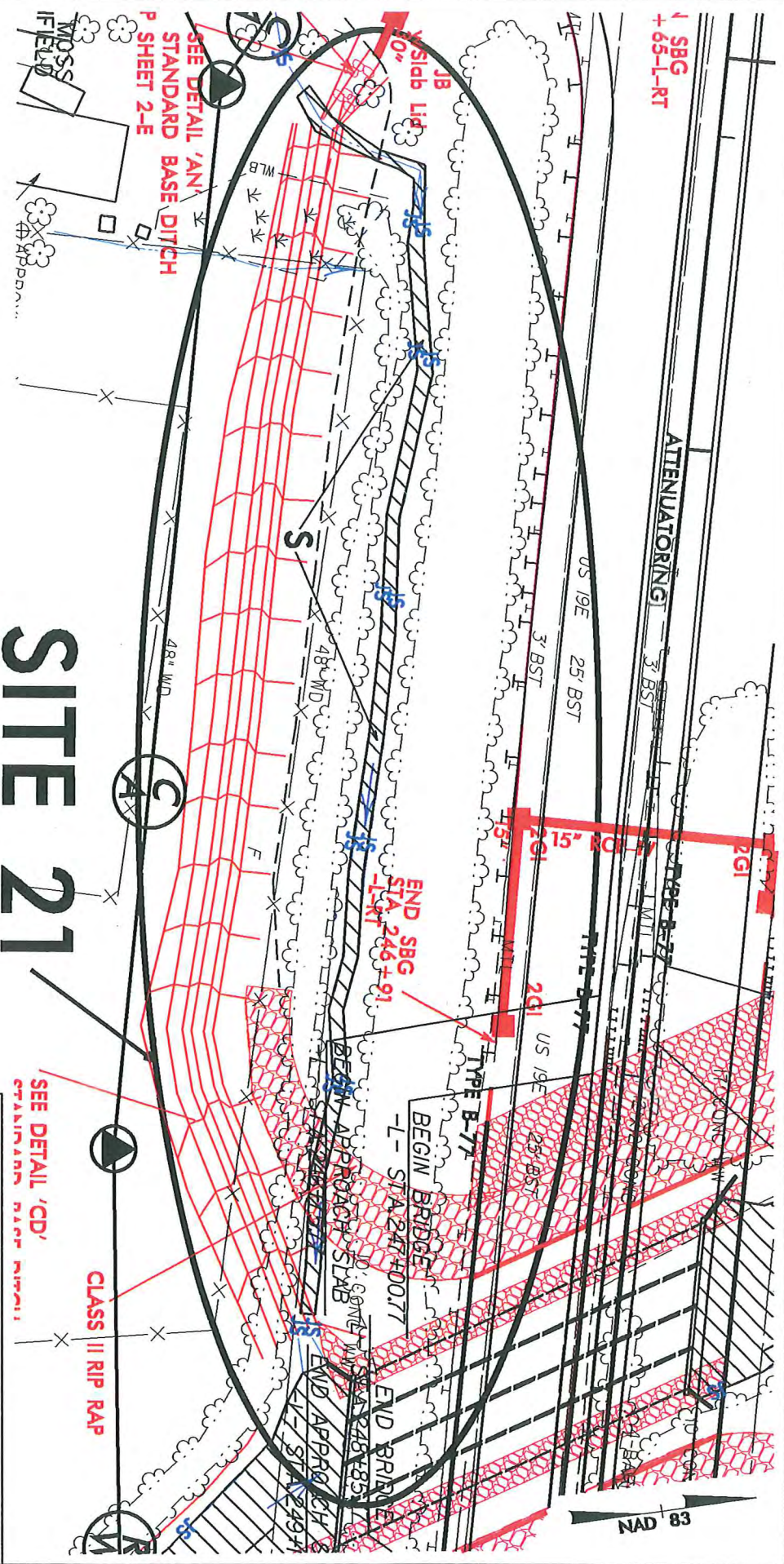
SHEET

OF

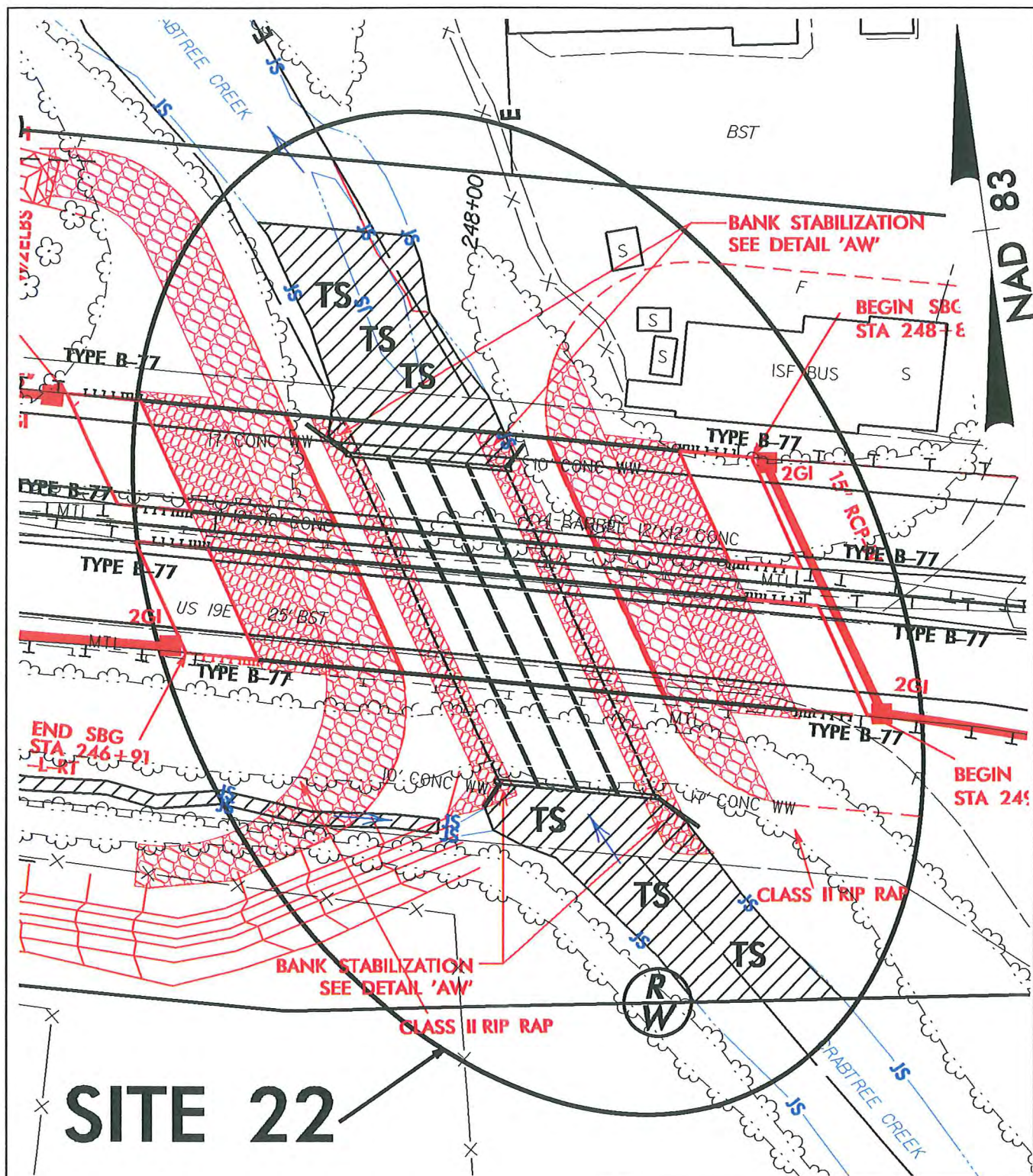
05 / 13 / 13

# IMPACT ENLARGEMENT (STREAM RELOCATION)

## SITE 21

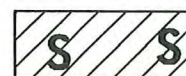






**SITE 22**

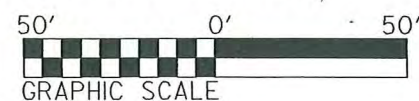
### IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER

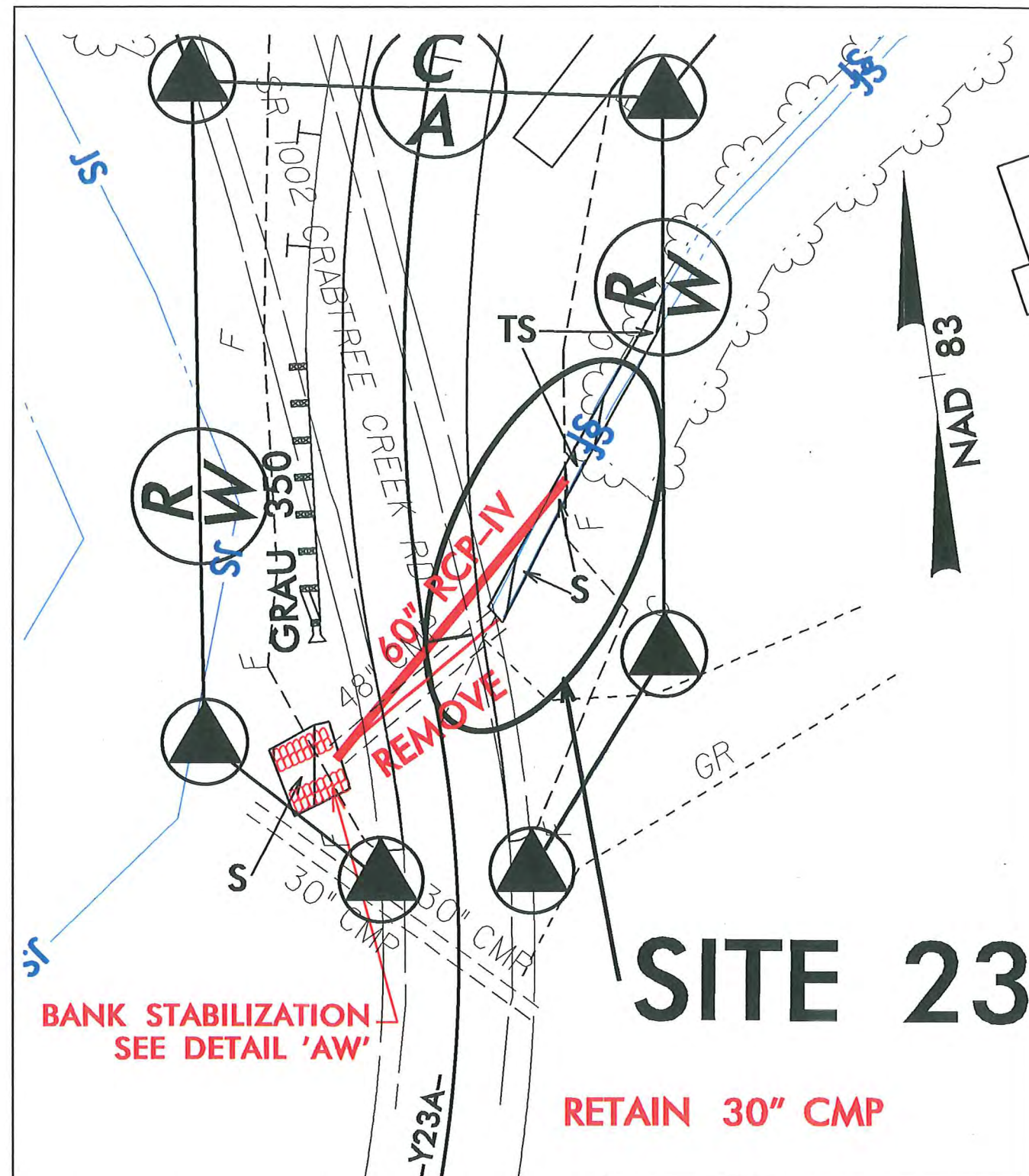


DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13



**SITE 23**

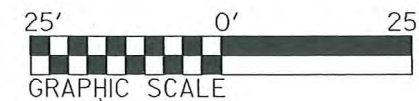
### IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



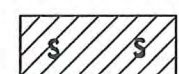
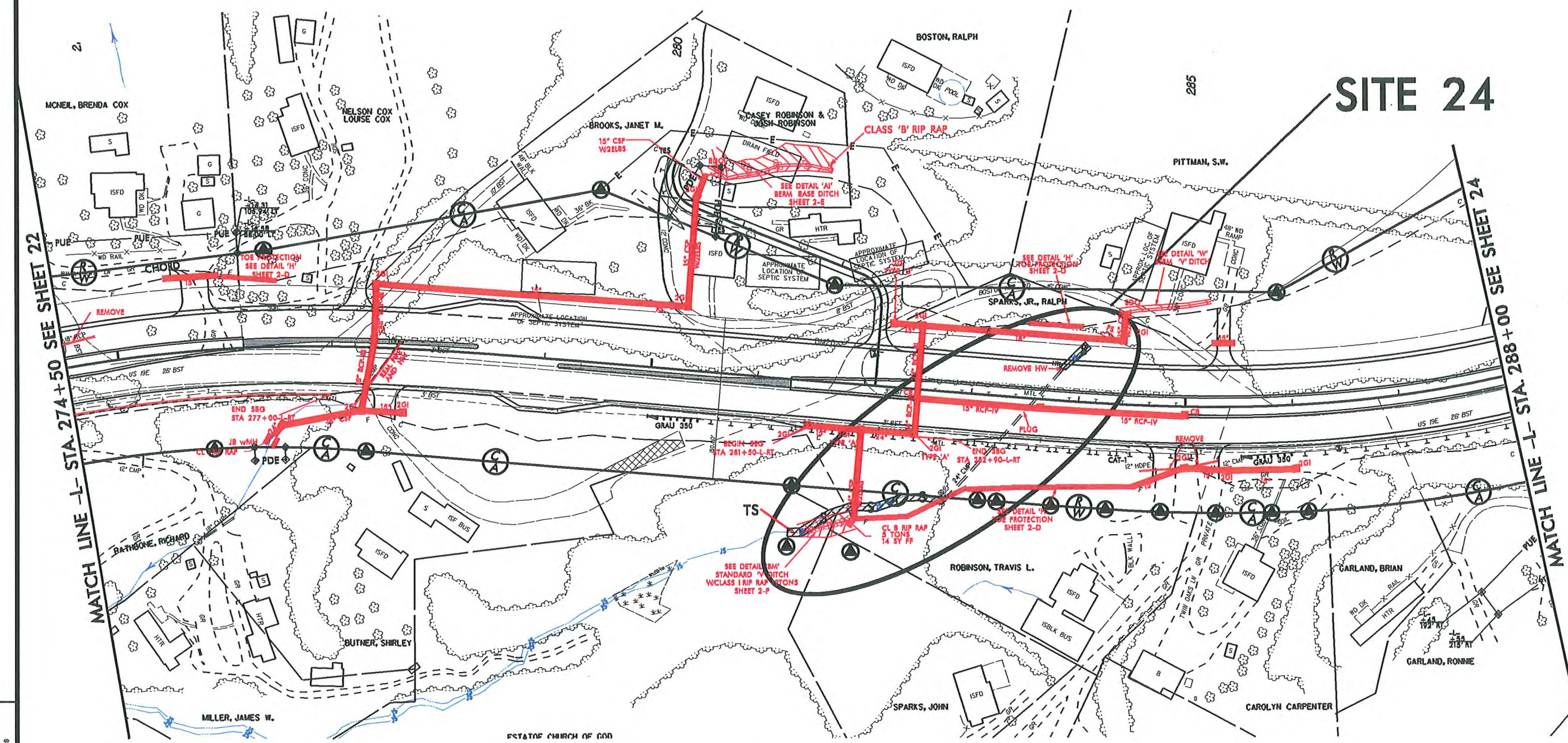
**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13



PROJECT REFERENCE NO. R-2519B	SHEET NO. 23
HW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

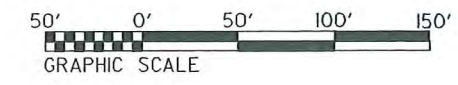
# SITE 24



DENOTES IMPACTS IN SURFACE WATER



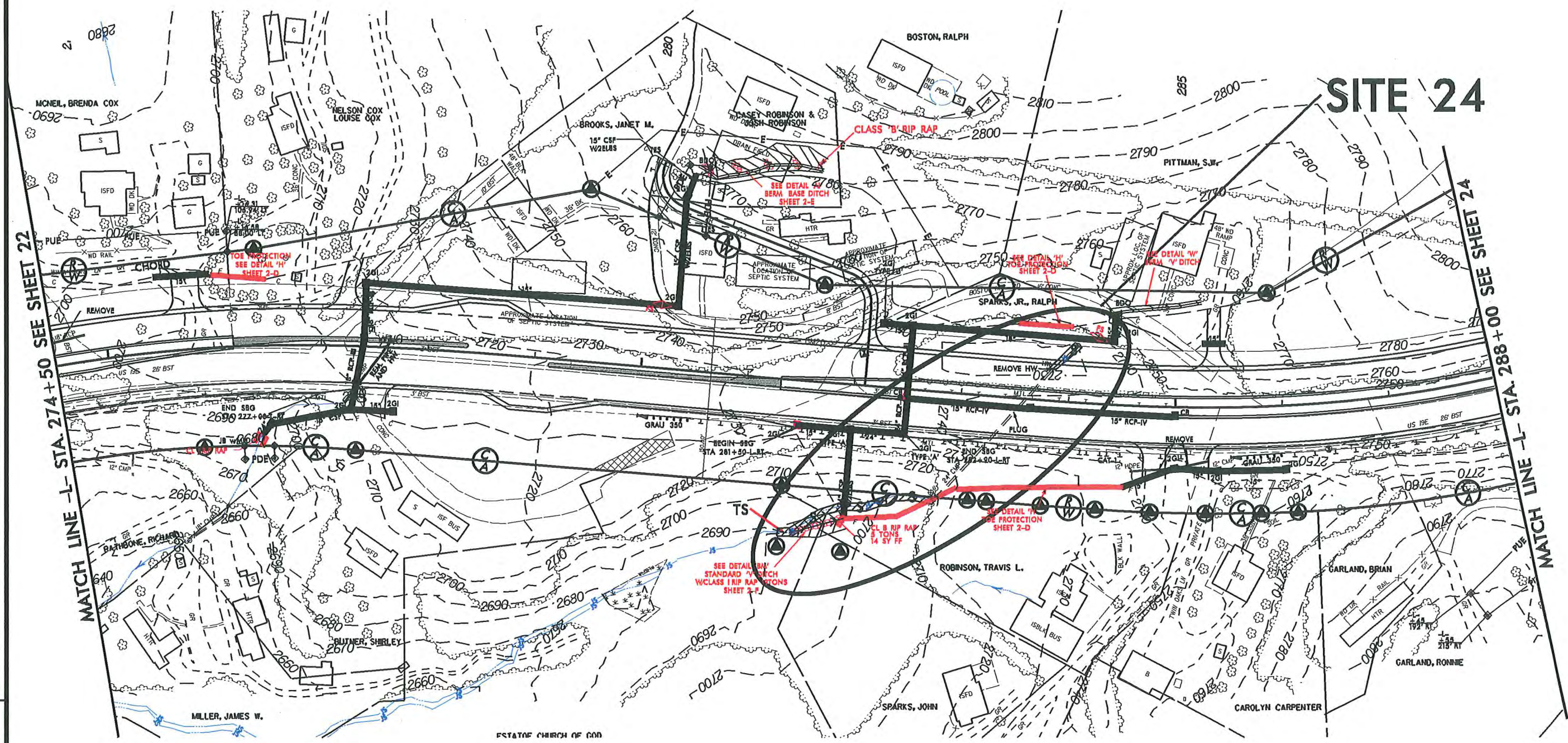
DENOTES TEMPORARY IMPACTS IN SURFACE WATER





PROJECT REFERENCE NO.	SHEET NO.
R-25198	23
HW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NAD 83



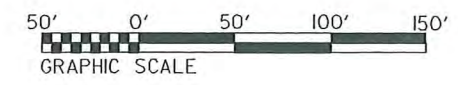
REVISIONS



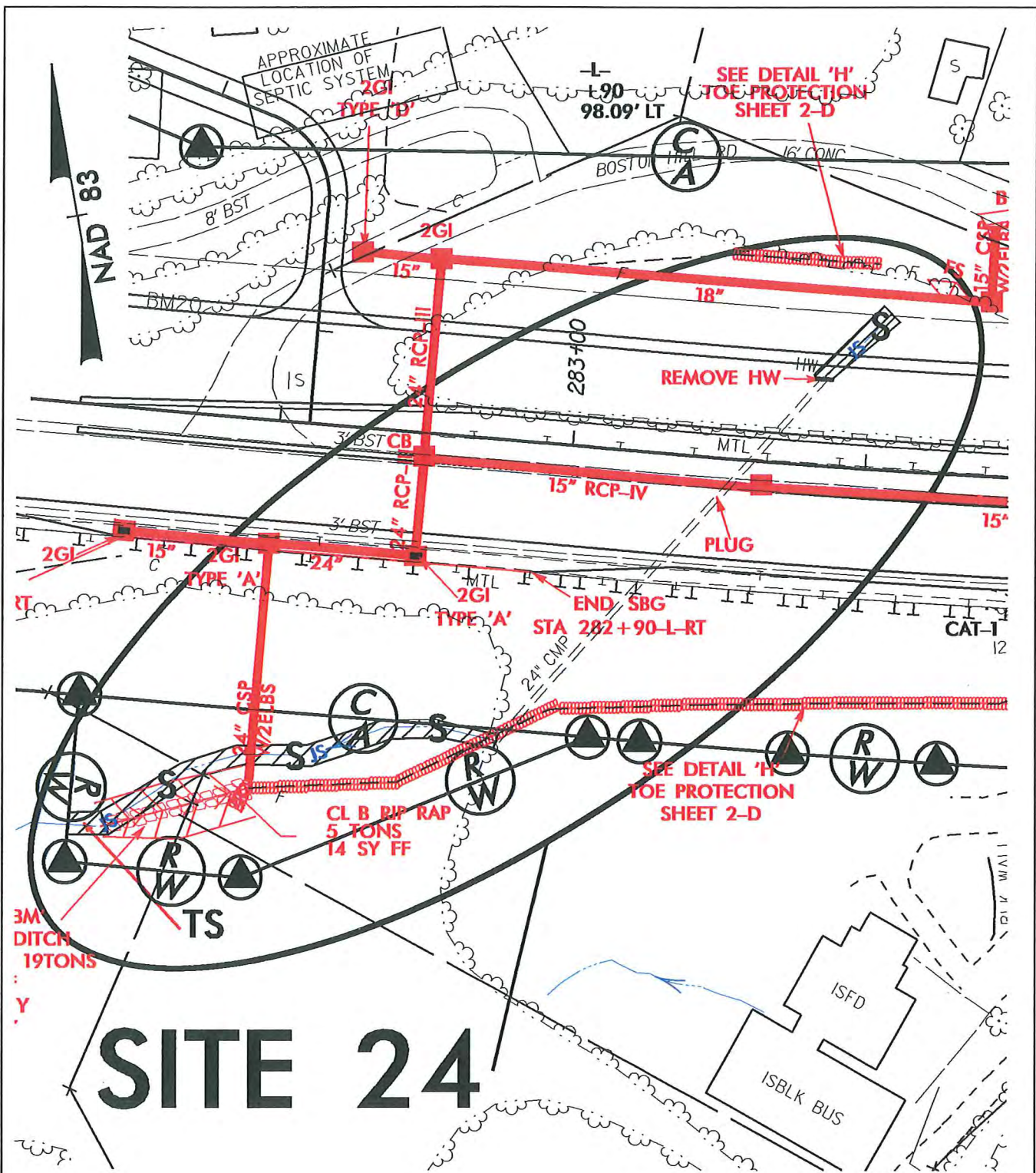
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER







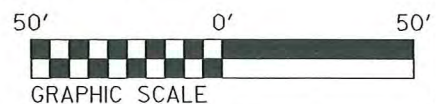
# IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



## NCDOT

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



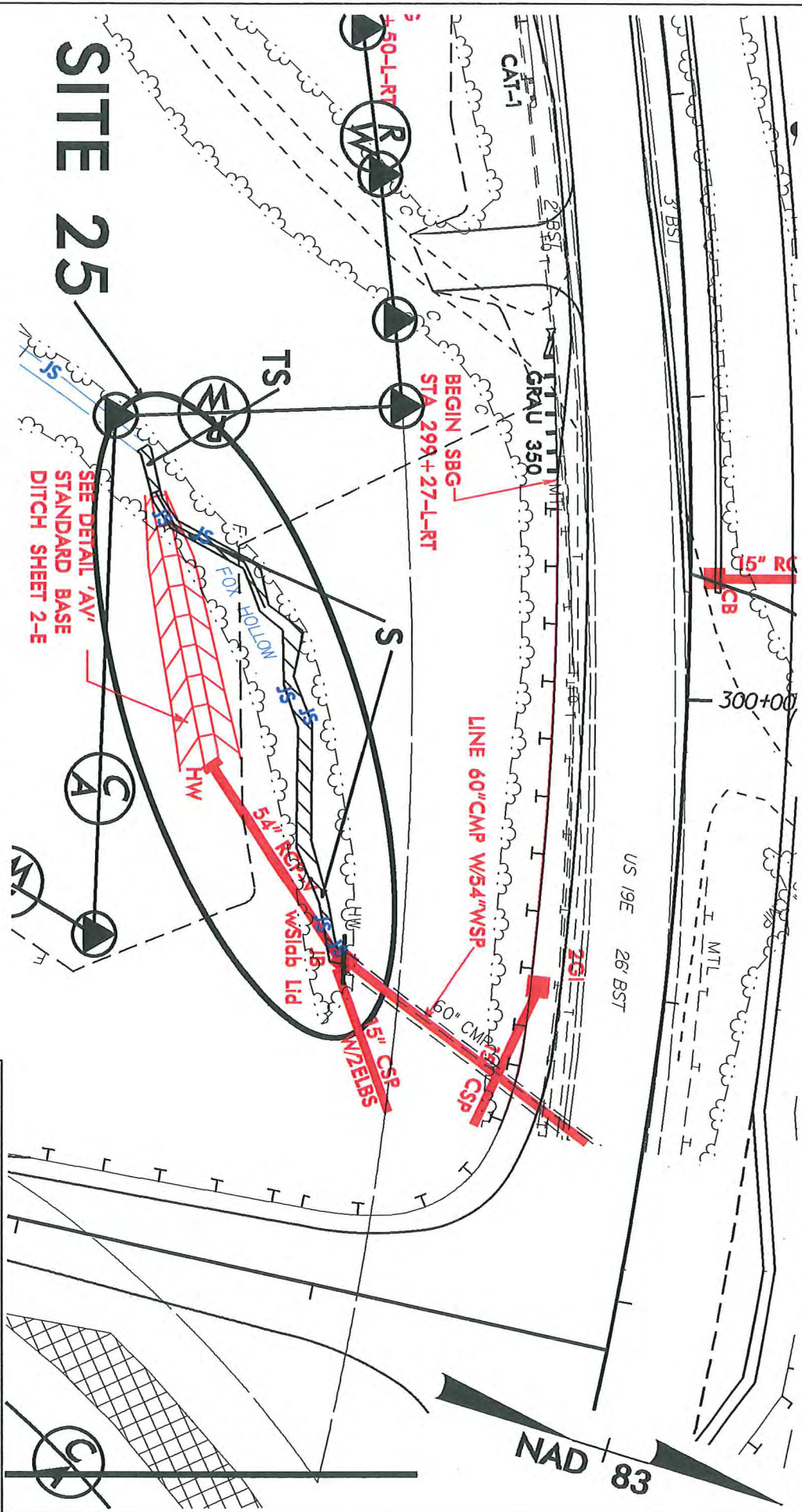
DENOTES TEMPORARY  
IMPACTS IN WATER SURFACE



DENOTES IMPACTS IN  
SURFACE WATER



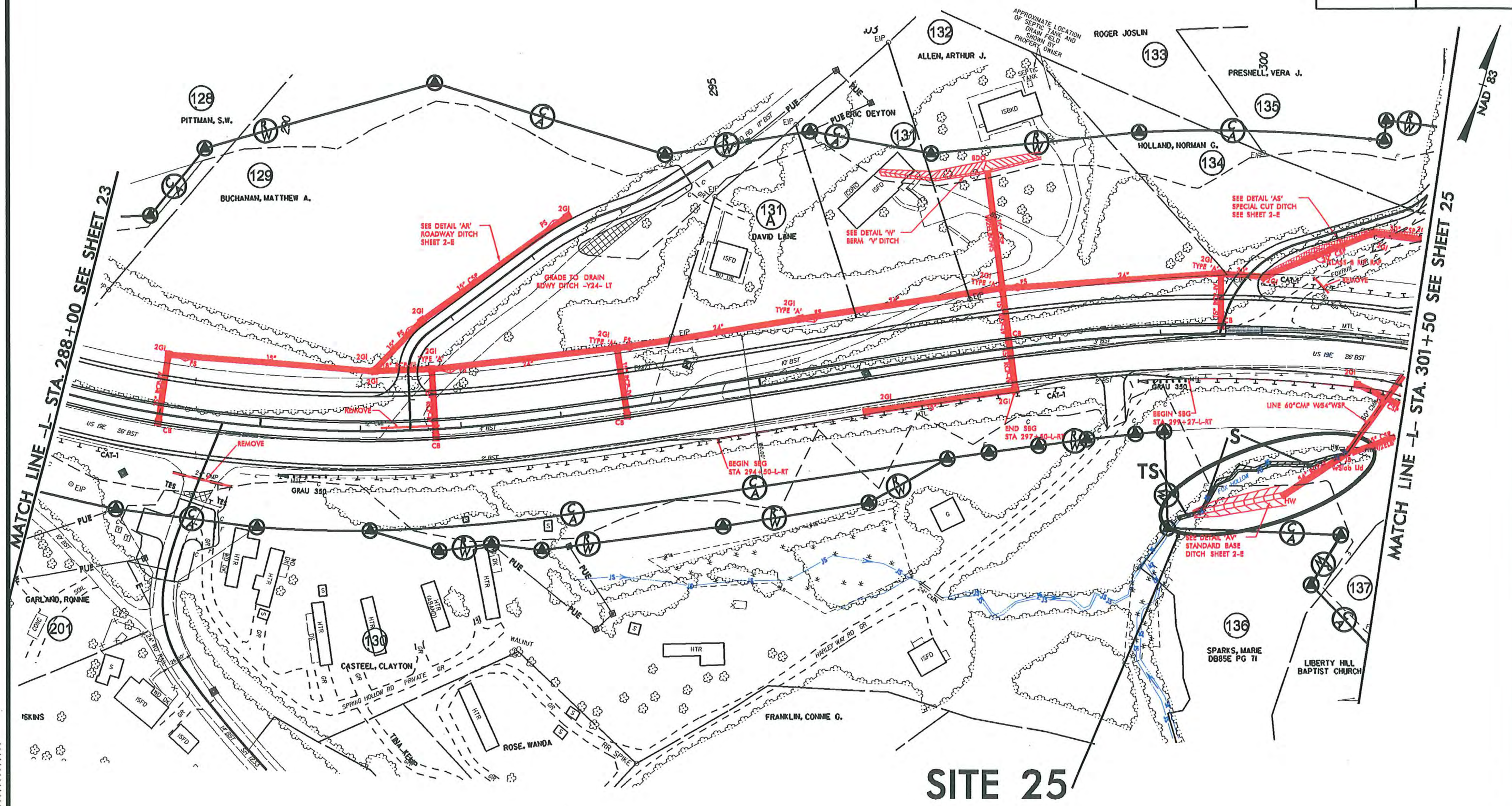
NCDOT  
DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL  
SHEET OF 05/13/13





8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2519B		24
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		



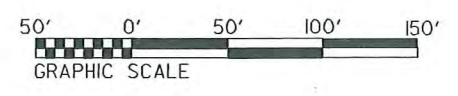
SITE 25



DENOTES IMPACTS IN SURFACE WATER



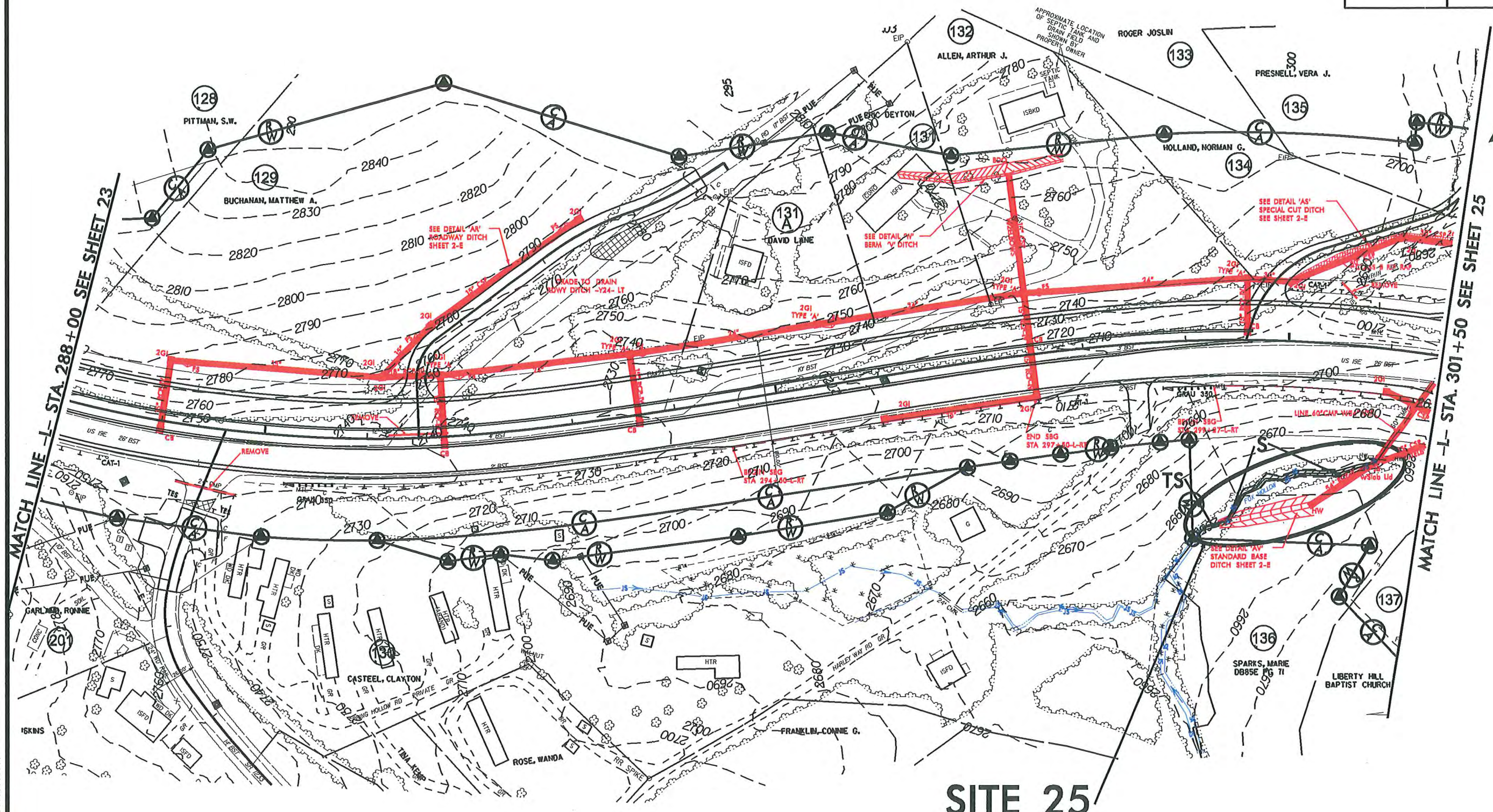
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



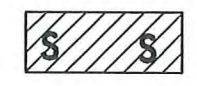


8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



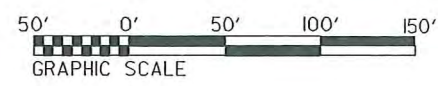
# SITE 25



DENOTES IMPACTS IN SURFACE WATER

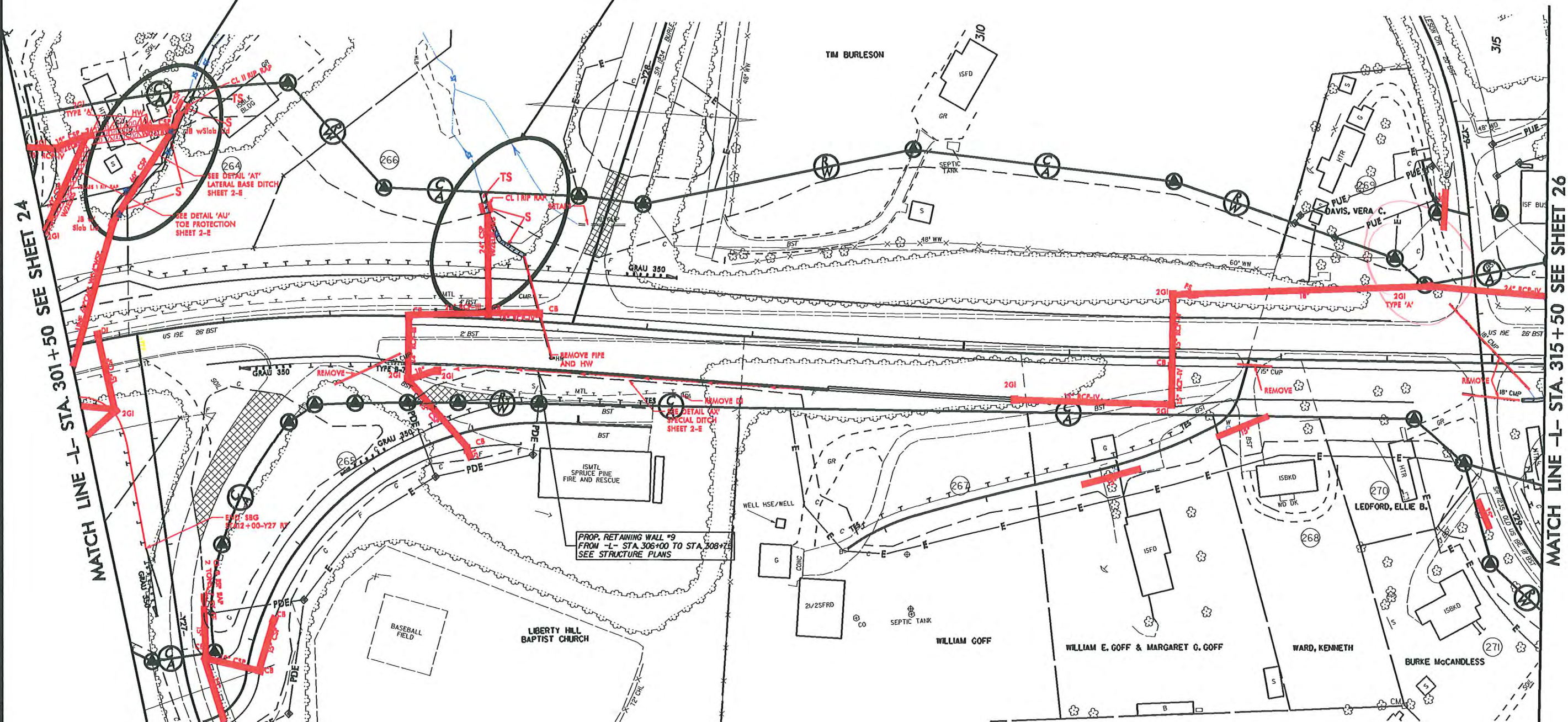


DENOTES TEMPORARY IMPACTS IN SURFACE WATER





NAD 83

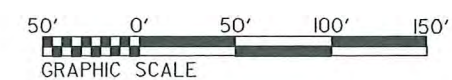


SEE SHEET 24

**MATCH LINE -L- STA. 315+50 SEE SHEET 26**

 DENOTES IMPACTS IN SURFACE WATER

 **DENOTES TEMPORARY IMPACTS IN SURFACE WATER**





# SITE 27



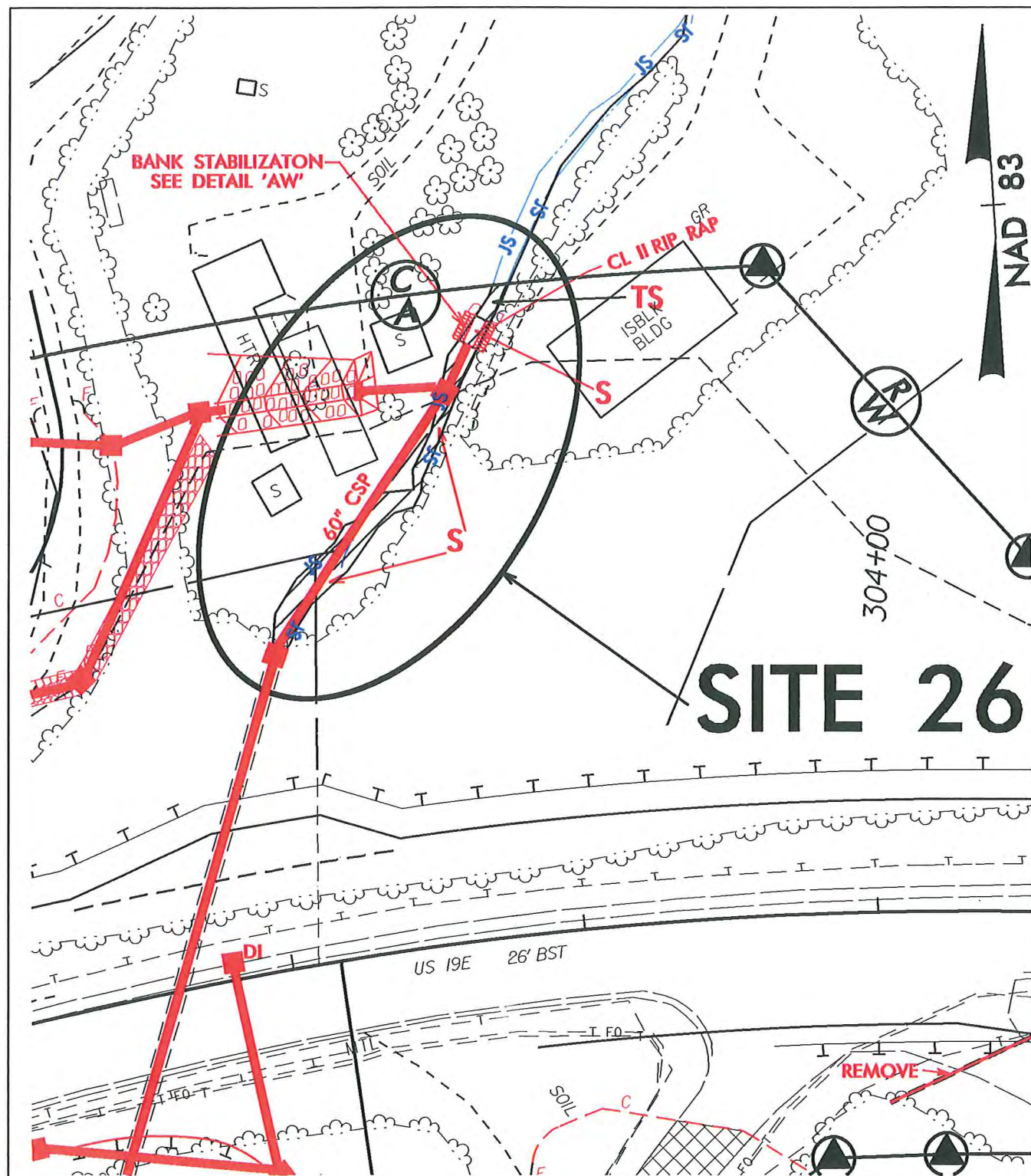
MATCH LINE -L- STA. 315+50 SEE SHEET 26

**DENOTES IMPACTS IN  
SURFACE WATER**

**DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER**







# IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

50' 0' 50'



GRAPHIC SCALE

# NCDOT

DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R-2519B)

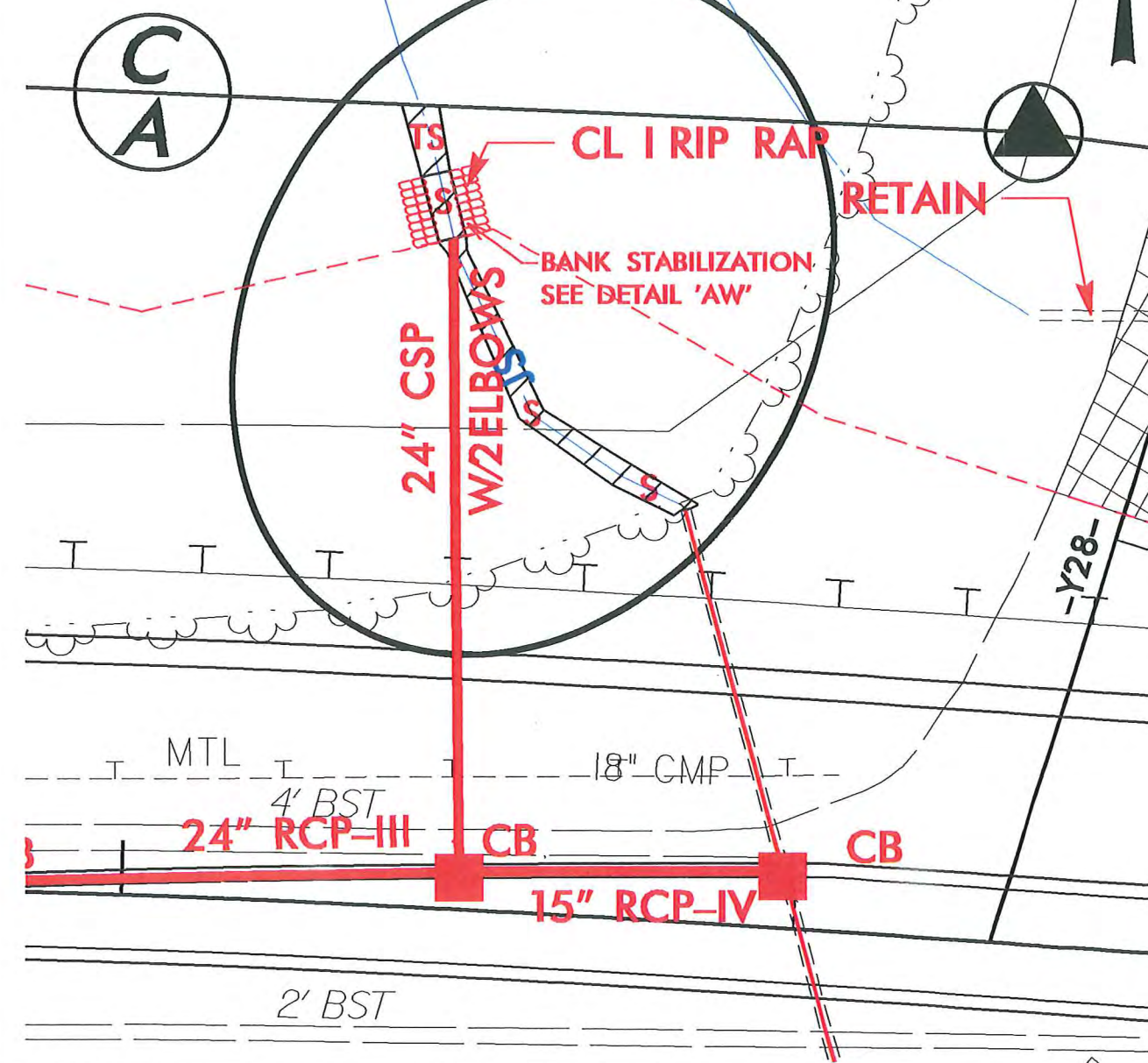
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

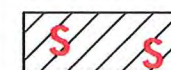
OF

05 / 13 / 13

# SITE 27



# IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

25' 0' 25'



GRAPHIC SCALE

# NCDOT

DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R-2519B)

US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

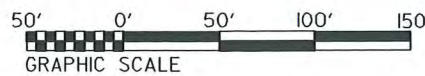
05 / 13 / 13





**MATCH LINE -L- STA. 315+50 SEE SHEET 25**

**DENOTES IMPACTS IN  
SURFACE WATER**

DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER

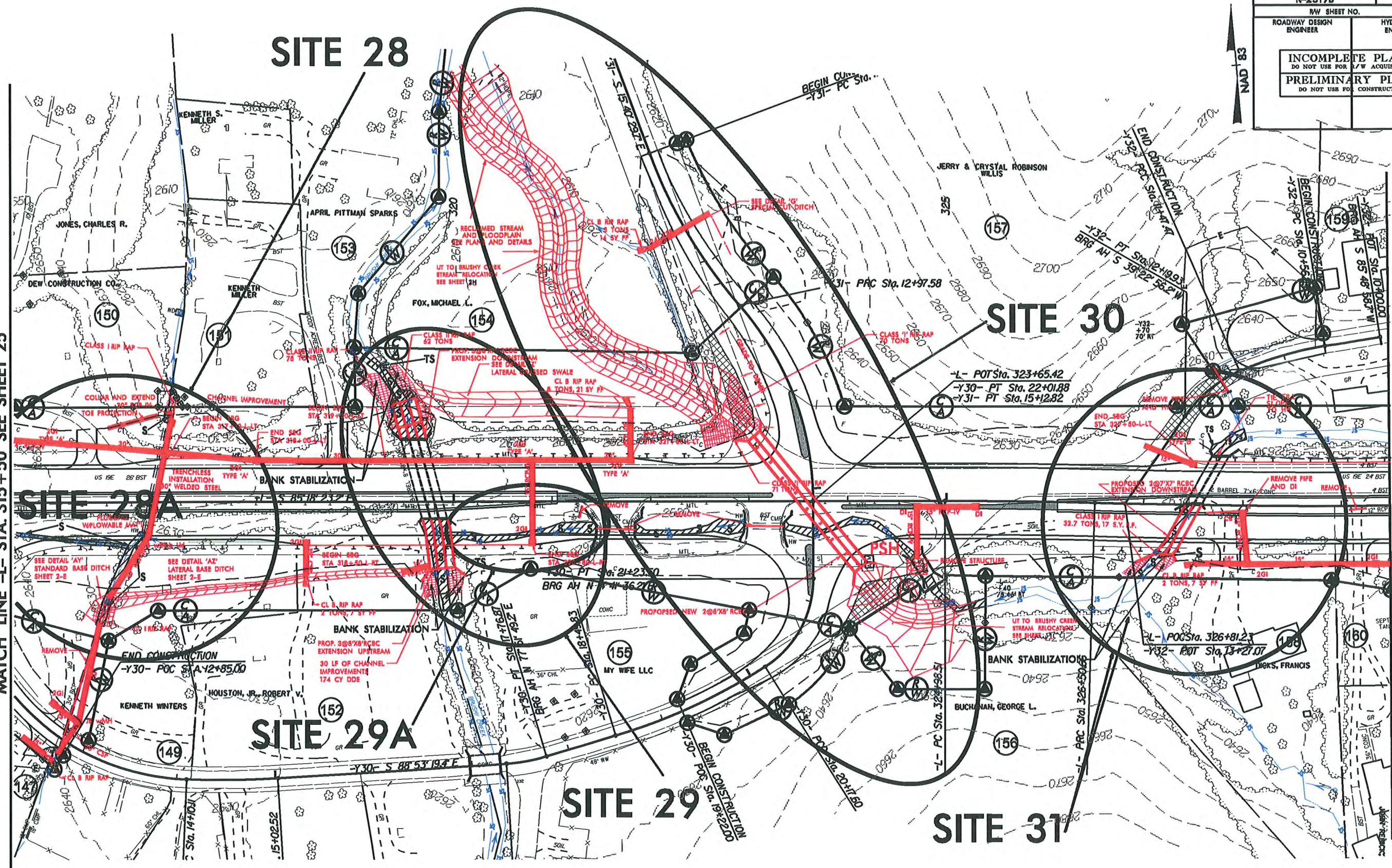


8/17/99

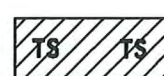
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

MATCH LINE -L- STA. 315+50 SEE SHEET 25

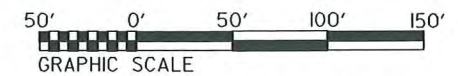
MATCH LINE -L- STA. 329+50 SEE SHEET 27



DENOTES IMPACTS IN SURFACE WATER

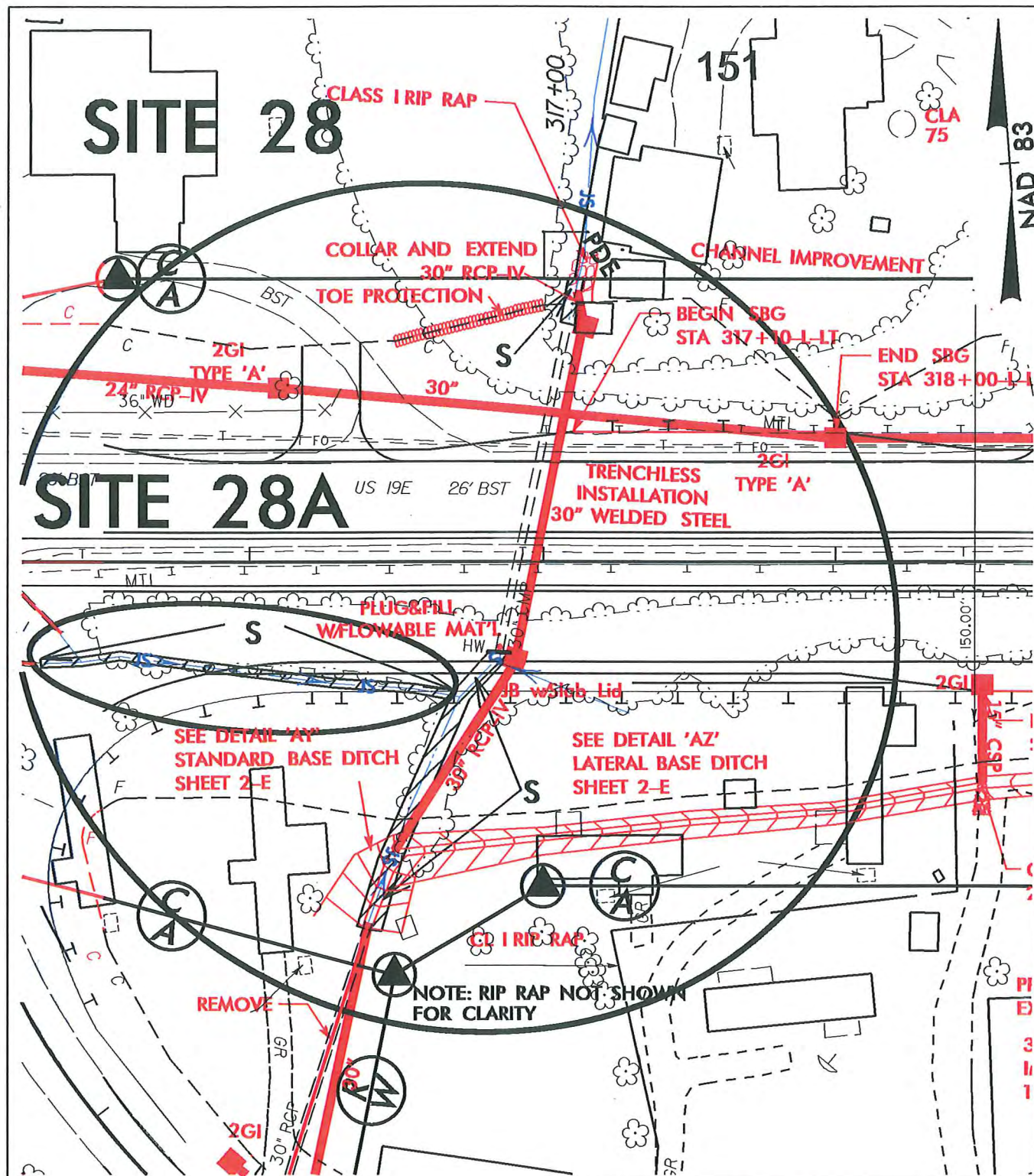


DENOTES TEMPORARY IMPACTS IN SURFACE WATER



GRAPHIC SCALE

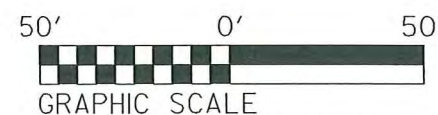




## IMPACT ENLARGEMENT

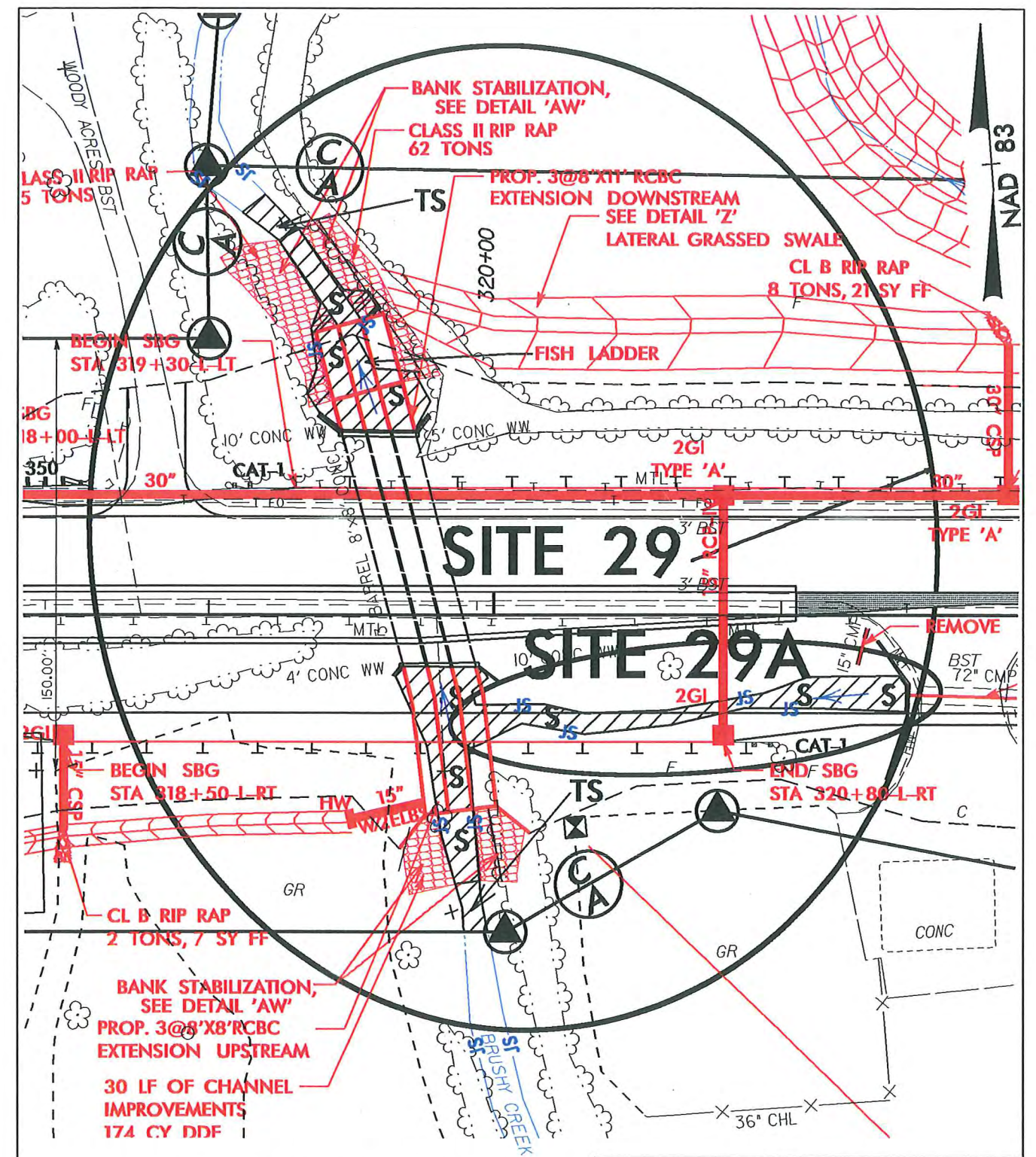


DENOTES IMPACTS IN SURFACE WATER



**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



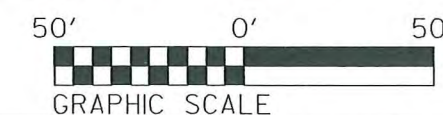
## IMPACT ENLARGEMENT



DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER



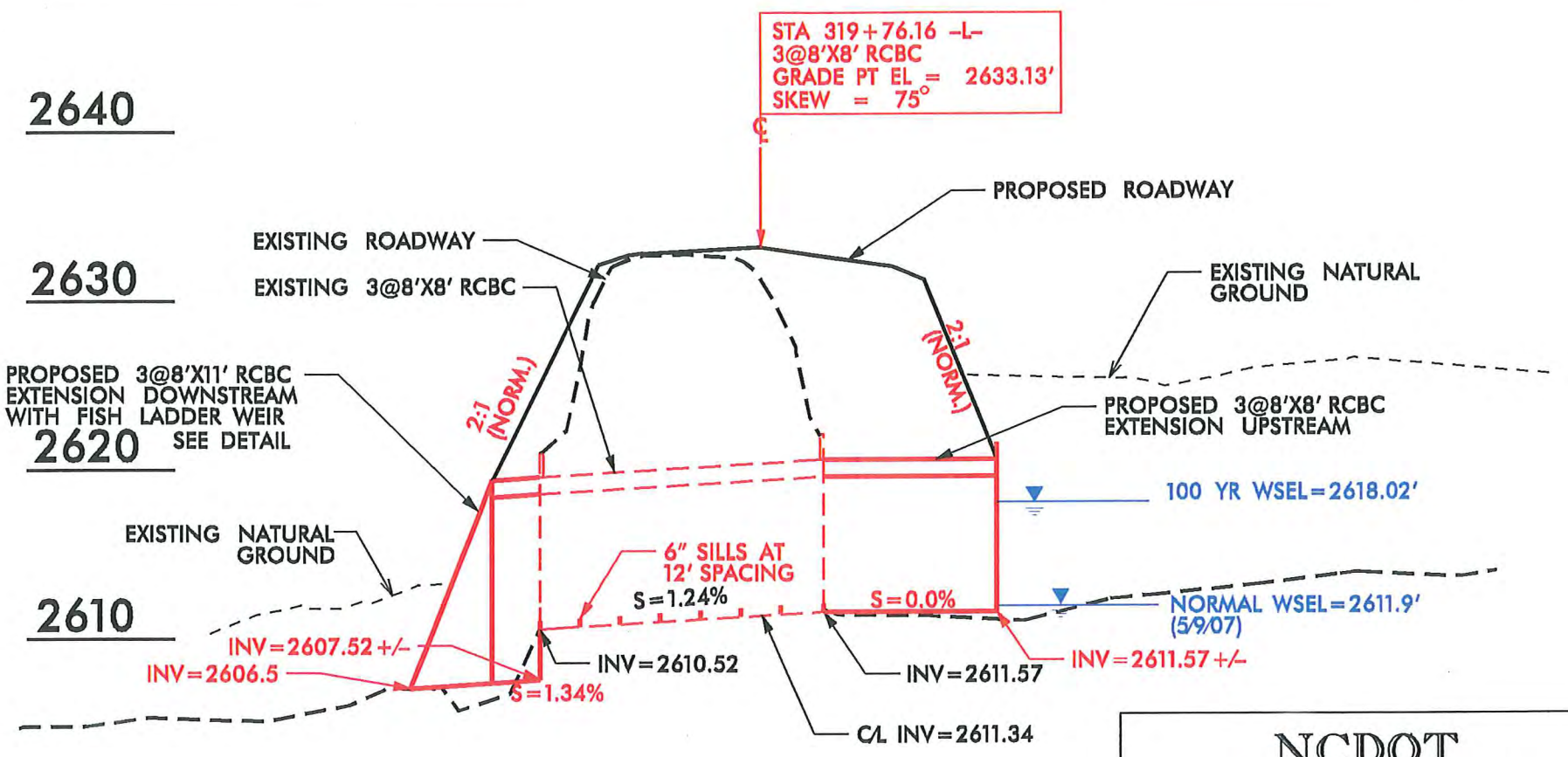
**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R-2519B)  
US EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13









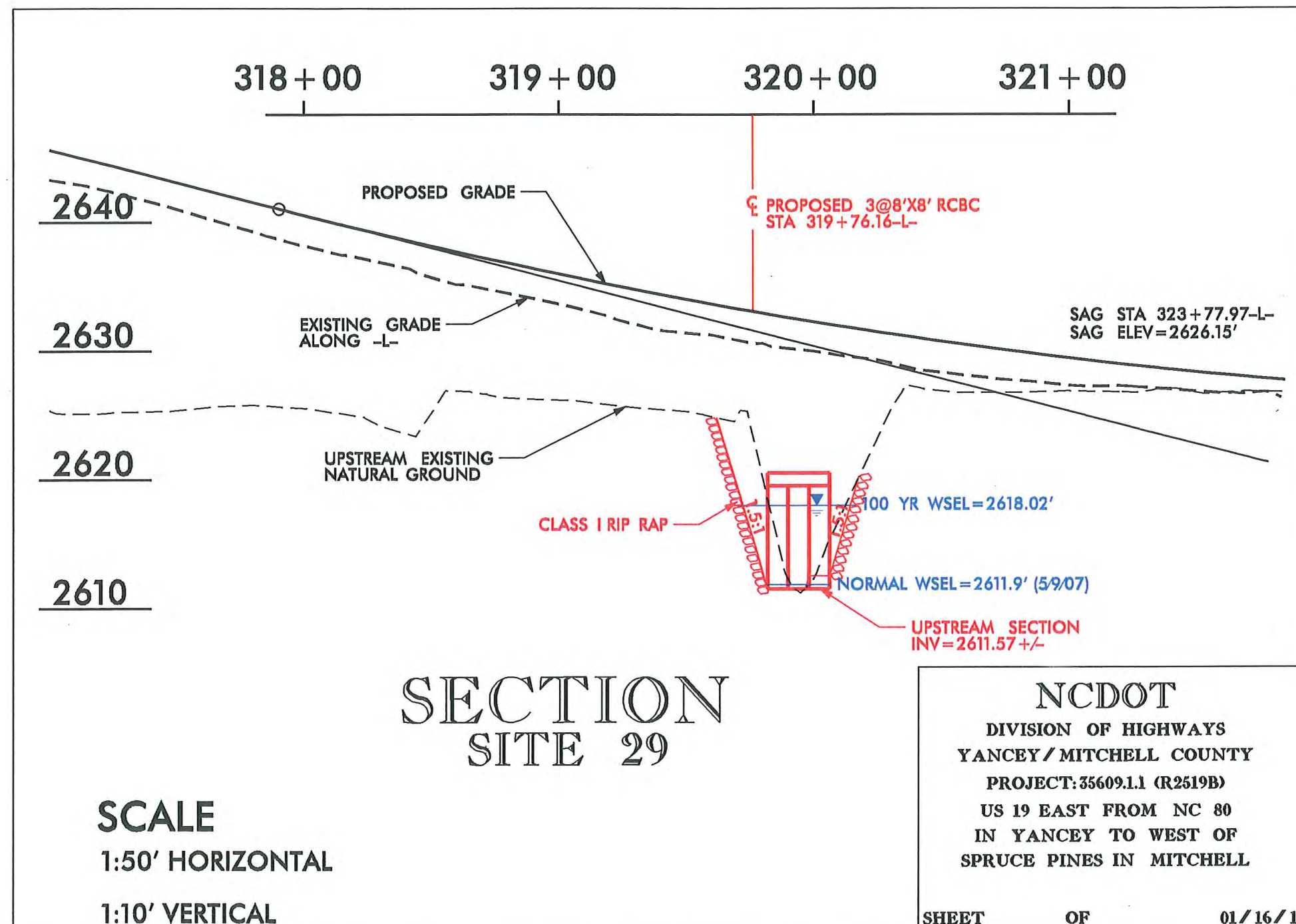
# PROFILE

SITE 29

SCALE  
1:50' HORIZONTAL  
1:10' VERTICAL

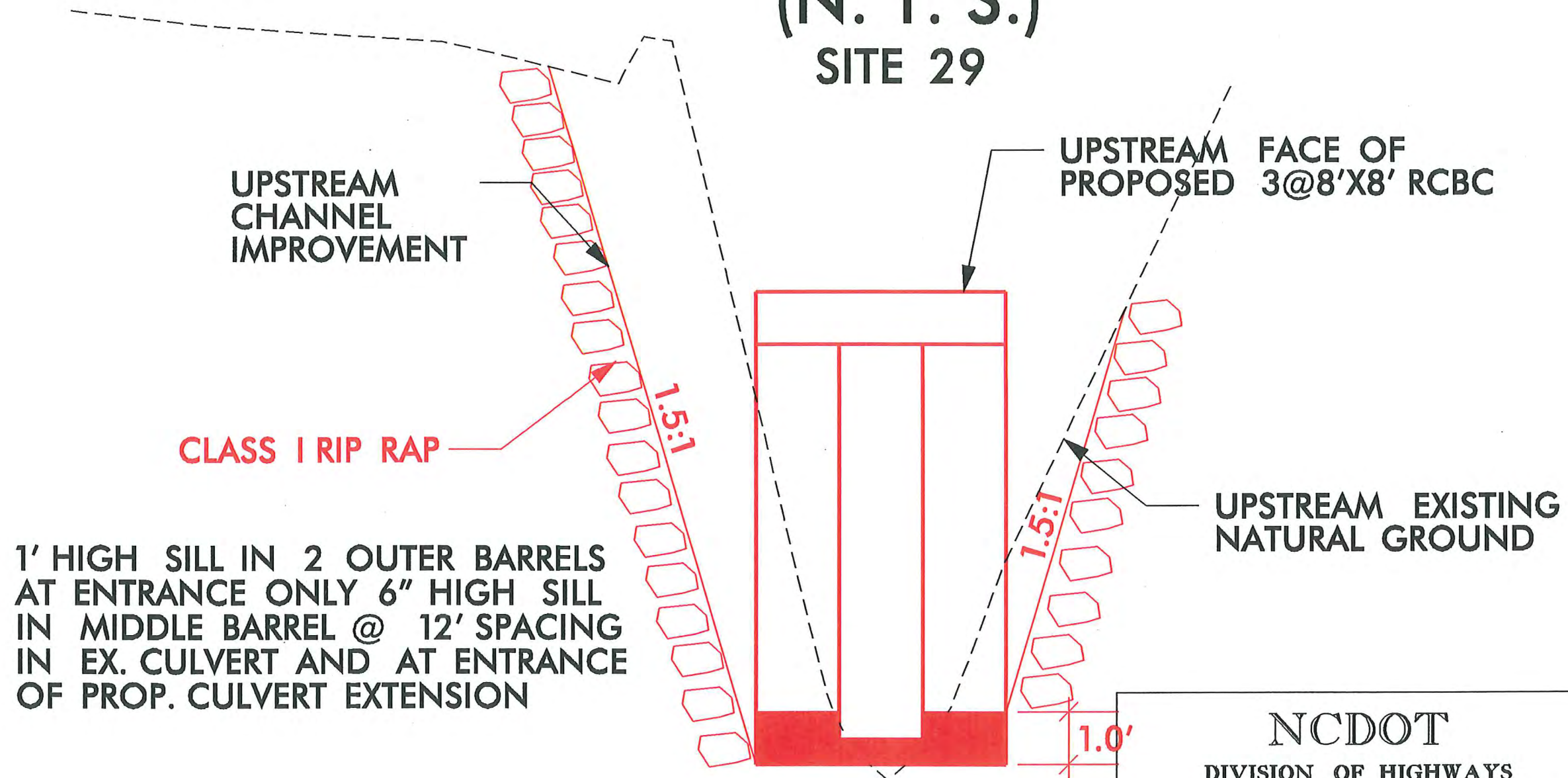
NCDOT  
DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13





# DETAIL OF UPSTREAM RCBC (N. T. S.) SITE 29

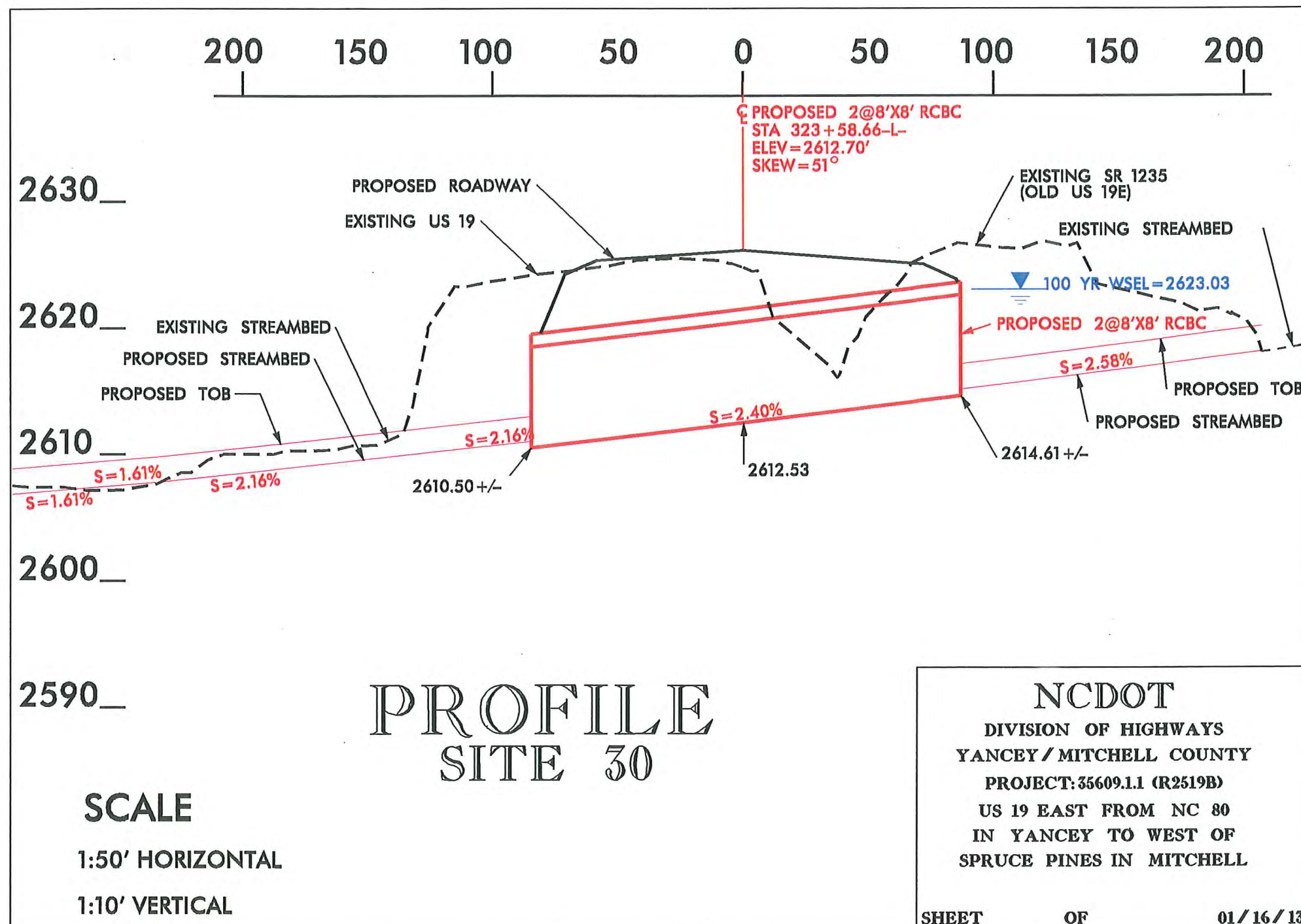


**NCDOT**  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

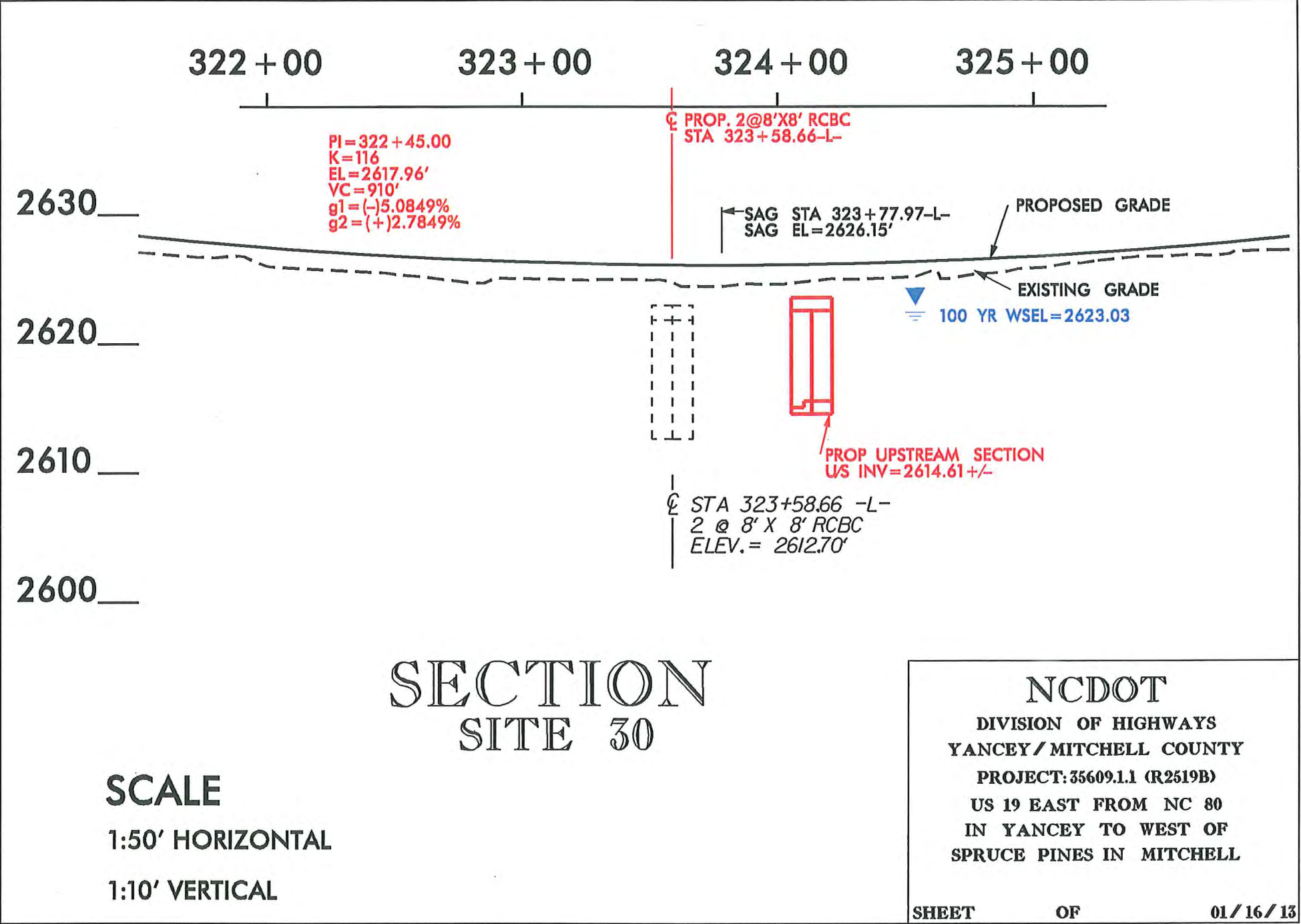
SHEET

OF

01 / 16 / 13

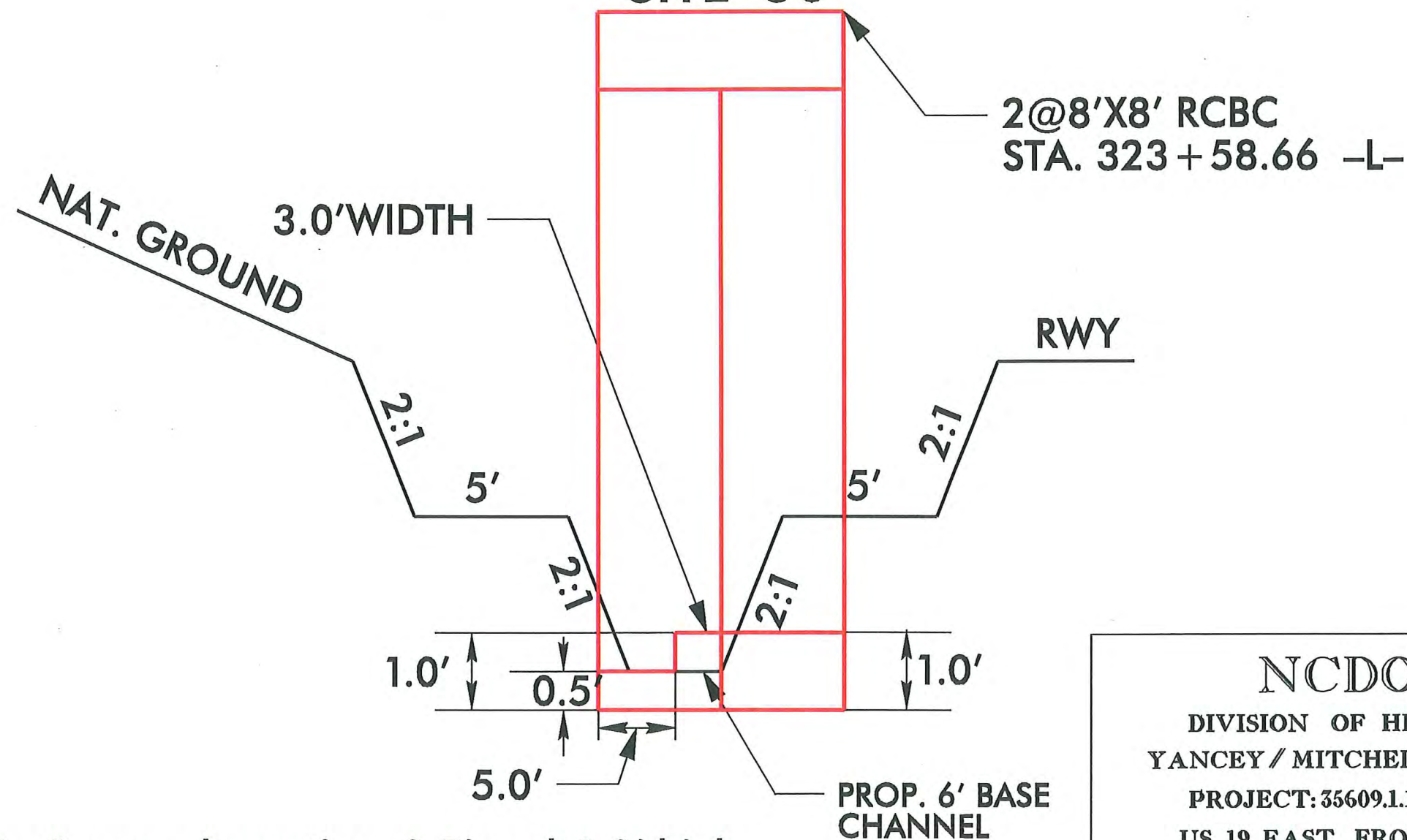






# DETAIL OF SILLS AT UPSTREAM OF RCBC (N.T.S.)

SITE 30



NOTE: Space alternating 0.5' and 1.0' high sills @ 20' intervals in western most barrel.

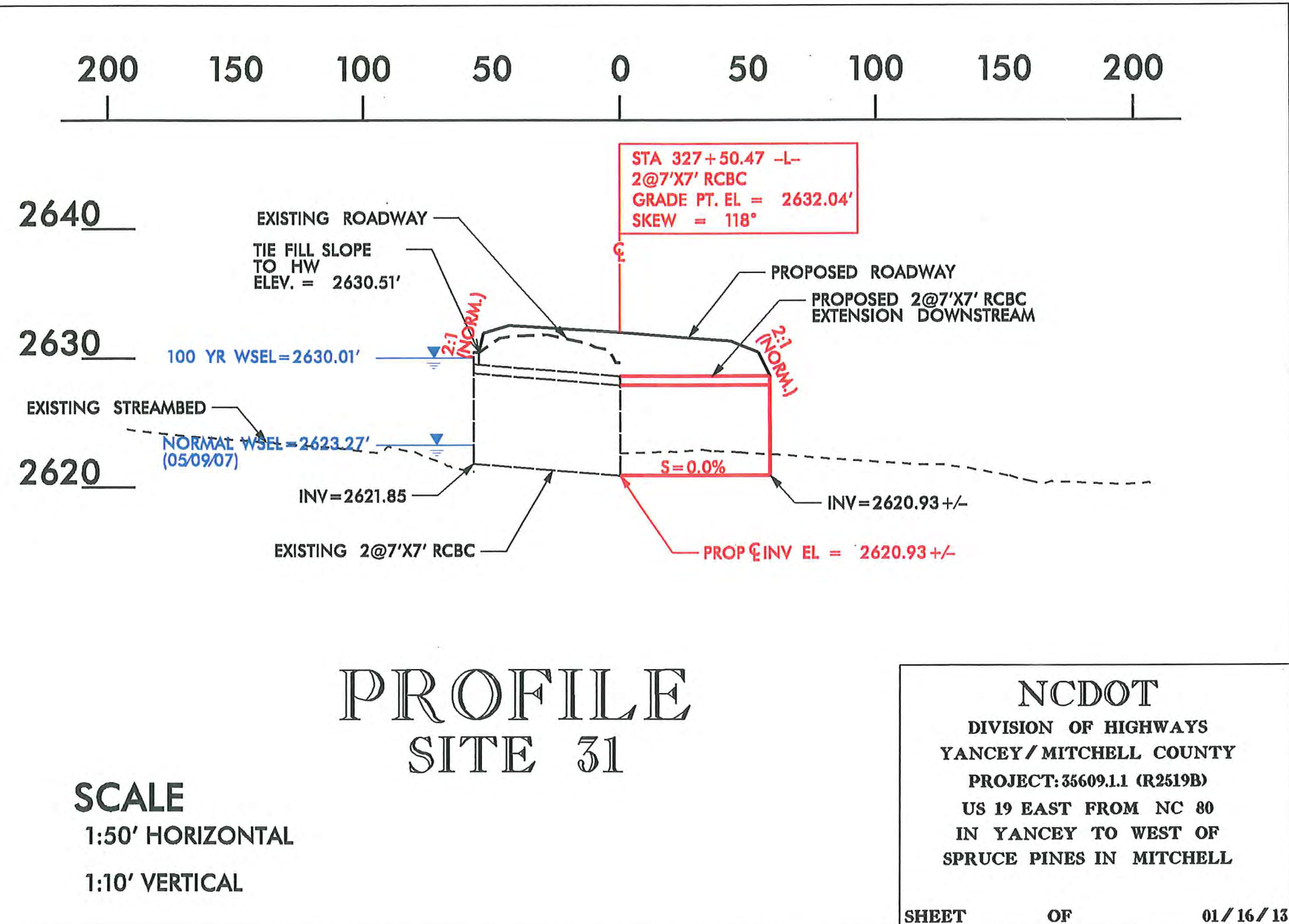
NCDOT  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

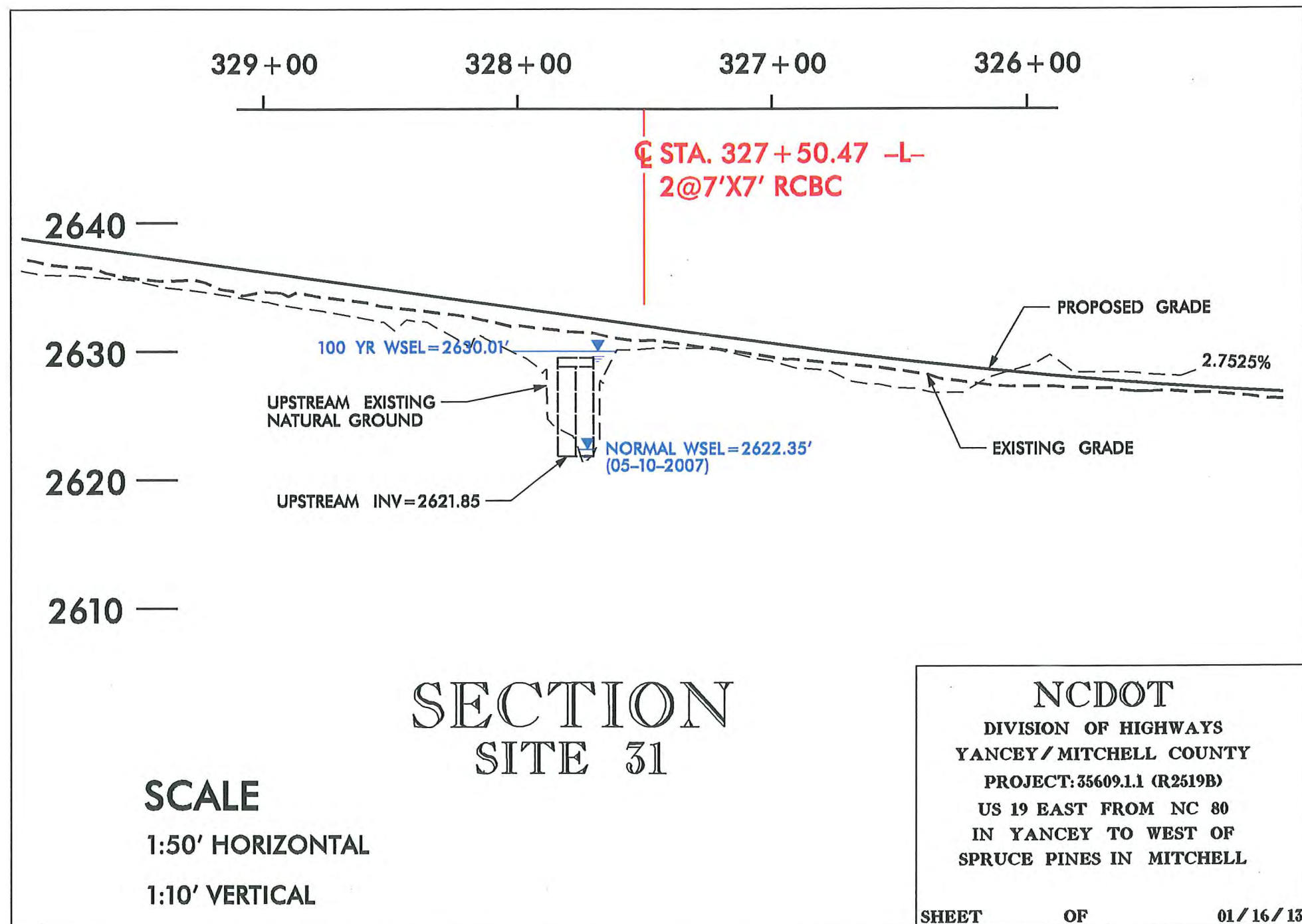
SHEET

OF

01 / 16 / 13







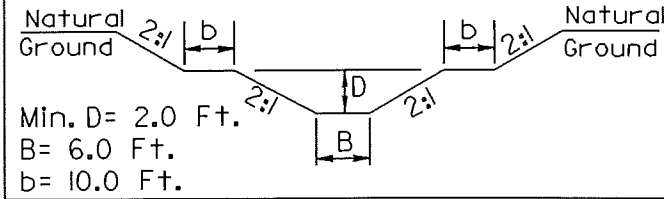


# UT TO BRUSHY CREEK STREAM RELOCATION

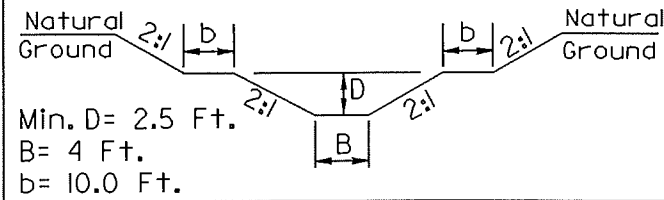
BEGIN STREAM RELOCATION  
STA 10+00.00 UT TO BRUSHY CREEK  
-L- STA 323+03.10 63.67 FT LT

END STREAM RELOCATION  
STA 15+14.4 UT TO BRUSHY CREEK  
-L- STA 319+92.70 432.68 FT LT

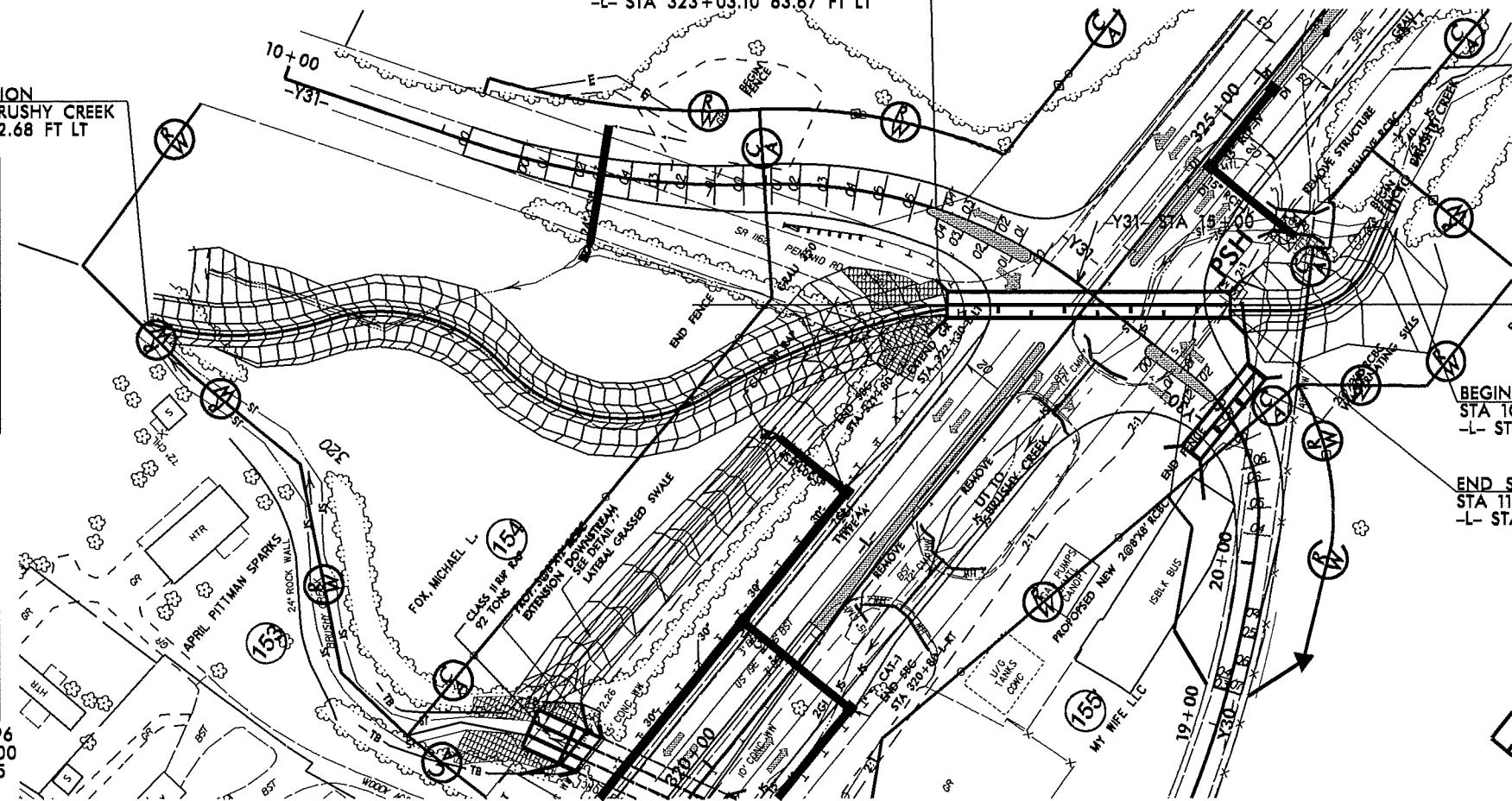
## TYPICAL CHANNEL SECTION (Not to Scale)



## TYPICAL POOL SECTION (Not to Scale)

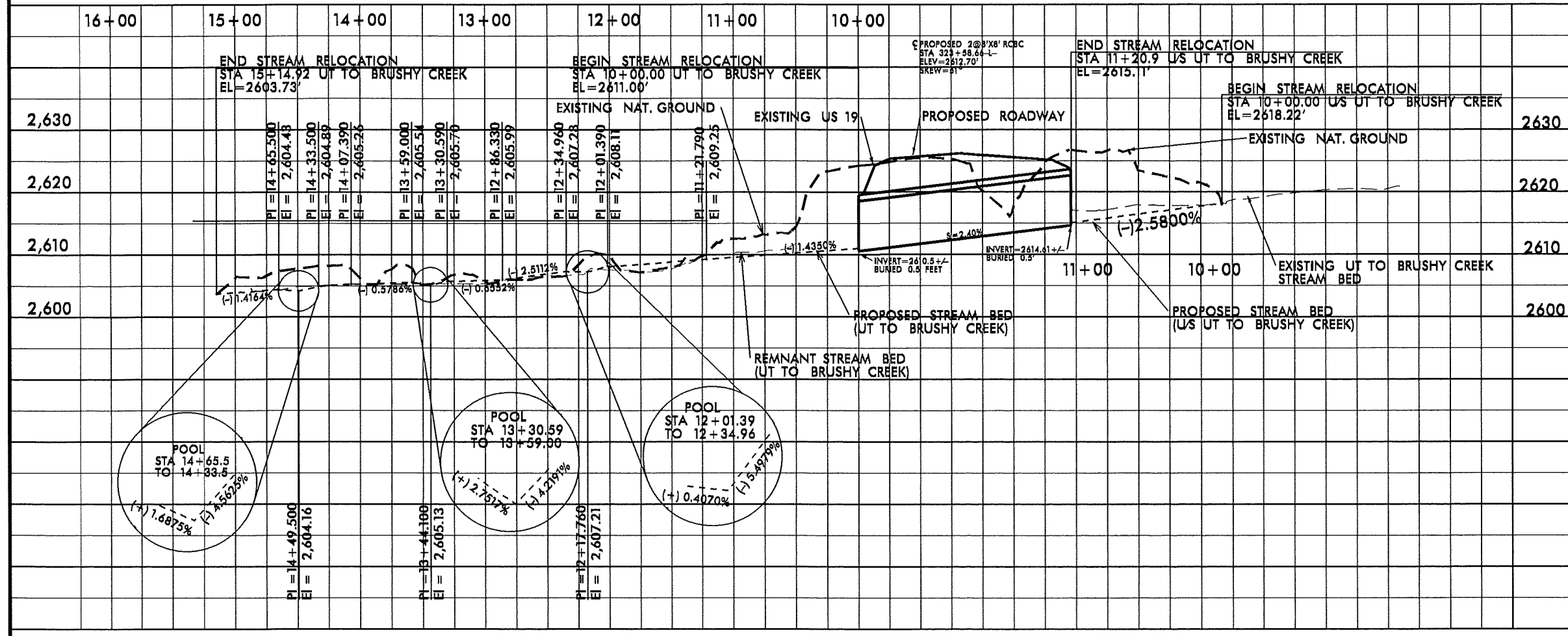


FROM UT TO BRUSHY CREEK STA 12+01.39 TO STA 12+34.96  
FROM UT TO BRUSHY CREEK STA 13+30.59 TO STA 13+59.00  
FROM UT TO BRUSHY CREEK STA 14+33.50 TO STA 14+65.5



BEGIN STREAM RELOCATION  
STA 10+00.00 US UT TO BRUSHY CREEK  
-L- STA 325+10.93 110.14 FT RT

END STREAM RELOCATION  
STA 11+20.9 US UT TO BRUSHY CREEK  
-L- STA 324+10.51 69.42 FT RT



## UT TO BRUSHY CREEK CURVE DATA

PI-UT TO BRUSHY CREEK- Sta 14+60.89  
 $\Delta = 33^\circ 55' 04.9''$  (RT)  
D = 30' 35' 31.4"  
L = 110.87'  
T = 57.11'  
R = 187.29'

PI-UT TO BRUSHY CREEK- Sta 13+53.94  
 $\Delta = 65^\circ 09' 50.4''$  (LT)  
D = 57' 17' 22.7"  
L = 113.74'  
T = 63.92'  
R = 100.01'

PI-UT TO BRUSHY CREEK- Sta 12+34.37  
 $\Delta = 78^\circ 23' 23.4''$  (RT)  
D = 56' 53' 52.5"  
L = 137.77'  
T = 82.11'  
R = 100.70'

PI-UT TO BRUSHY CREEK- Sta 10+77.09  
 $\Delta = 22^\circ 06' 20.9''$  (LT)  
D = 14' 31' 07.6"  
L = 152.26'  
T = 77.09'  
R = 394.63'

## US UT TO BRUSHY CREEK CURVE DATA

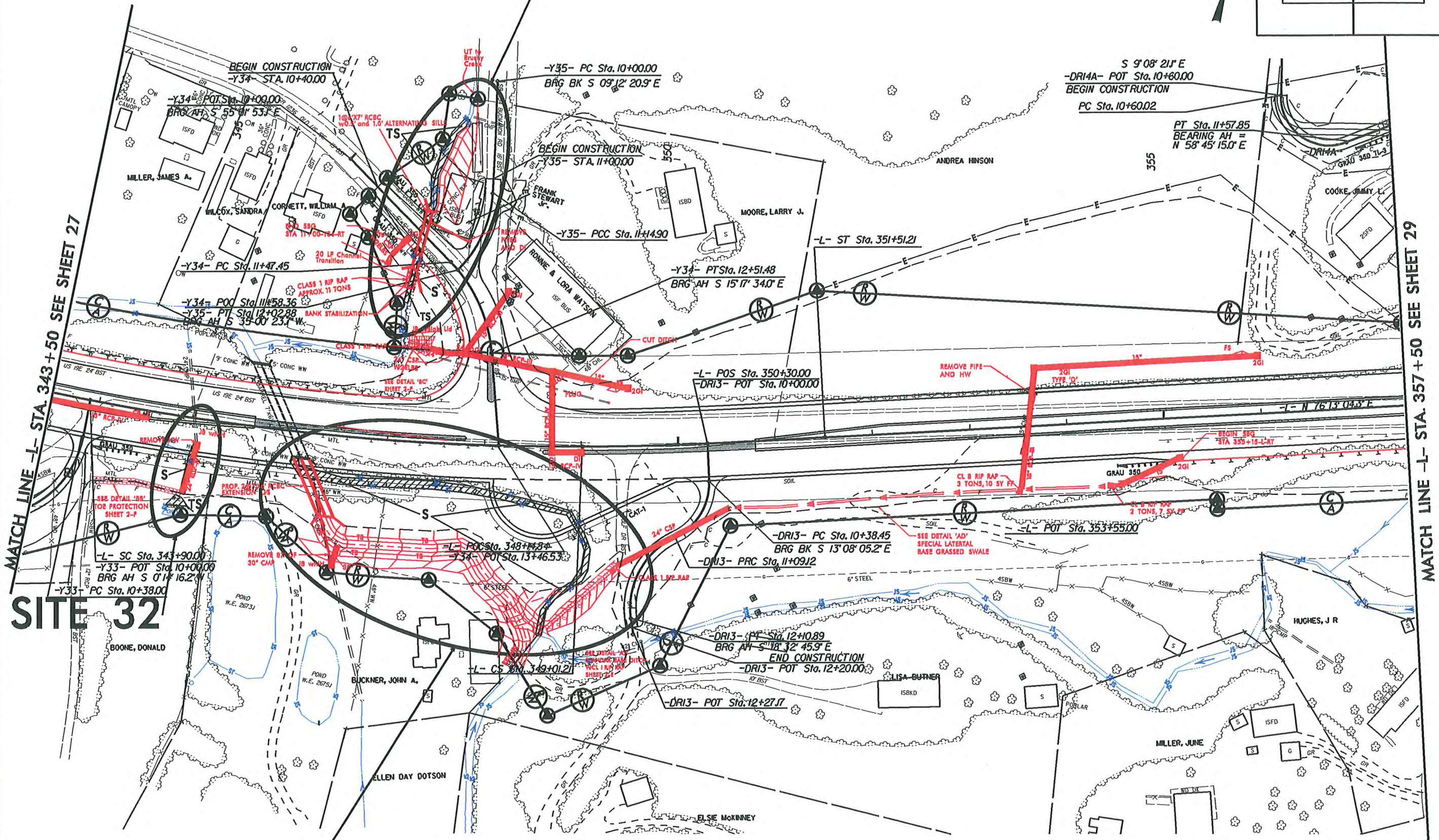
PI-U/S UT TO BRUSHY CREEK- Sta 10+56.69  
 $\Delta = 66^\circ 50' 16.2''$  (RT)  
D = 107' 32' 58.1"  
L = 62.15'  
T = 35.15'  
R = 53.27'



8/17/99  
SYSTEMS ENGINEERING  
DESIGN  
CONSTRUCTION  
PERMIT  
DRAWING

# SITE 34

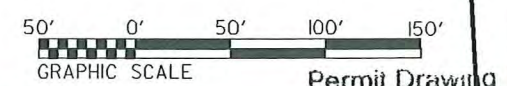
PROJECT REFERENCE NO. R-2519B		SHEET NO. 28	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			



## SITE 32

## SITE 33

DENOTES IMPACTS IN SURFACE WATER  
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

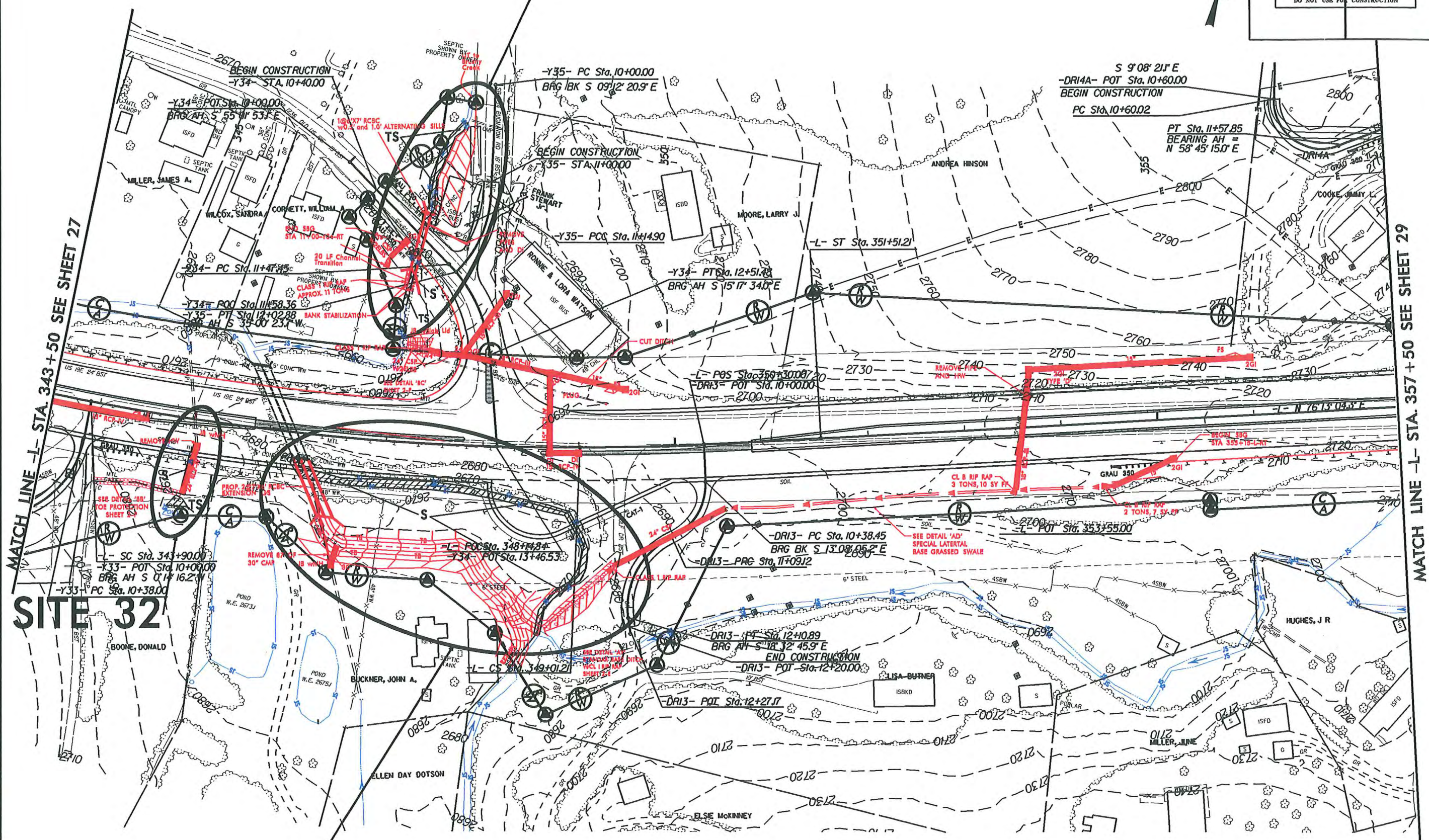




8/17/99

# SITE 34

PROJECT REFERENCE NO. R-2519B		SHEET NO. 28	
RDW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

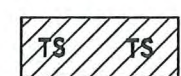


## SITE 32

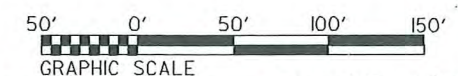
## SITE 33



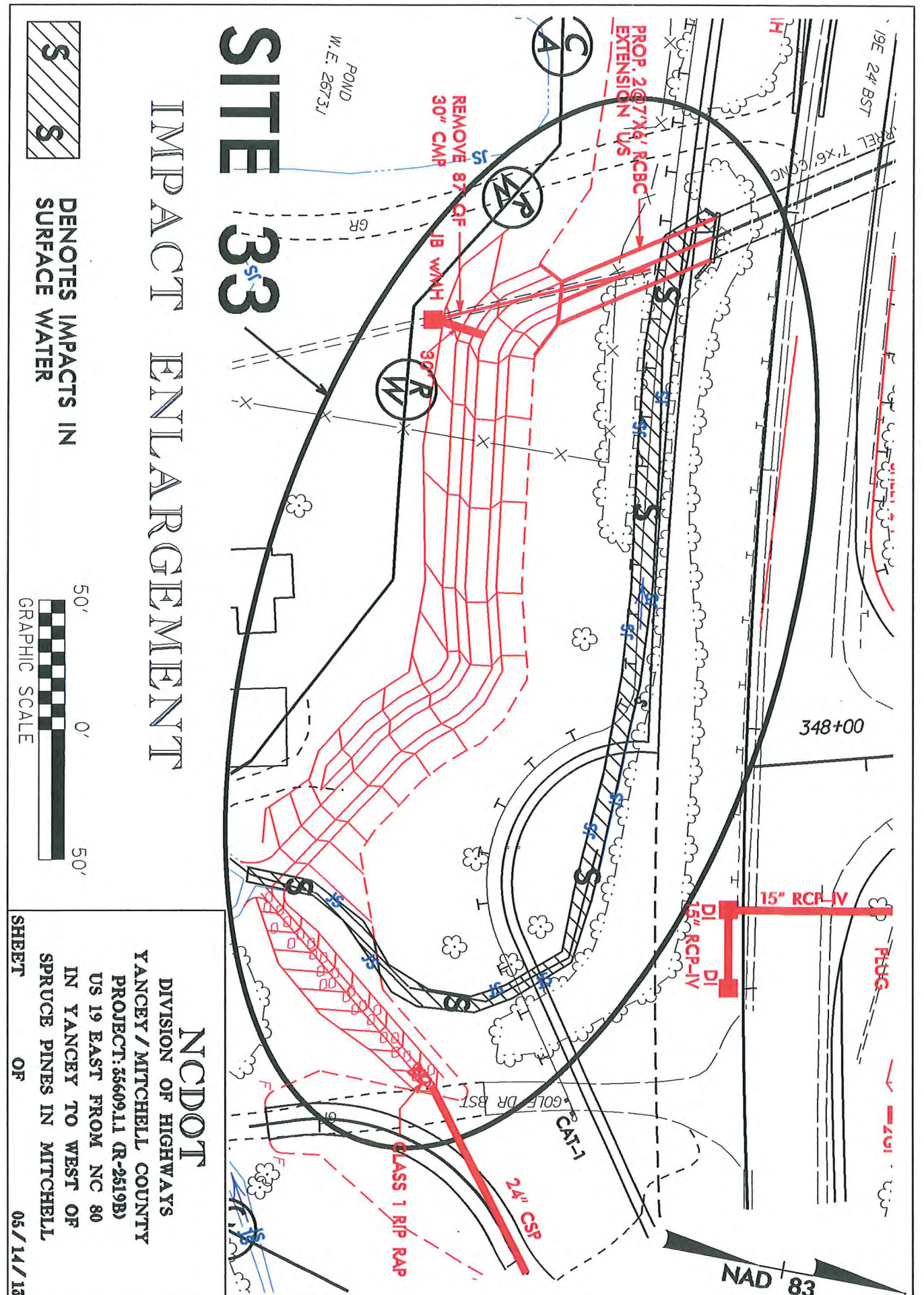
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER







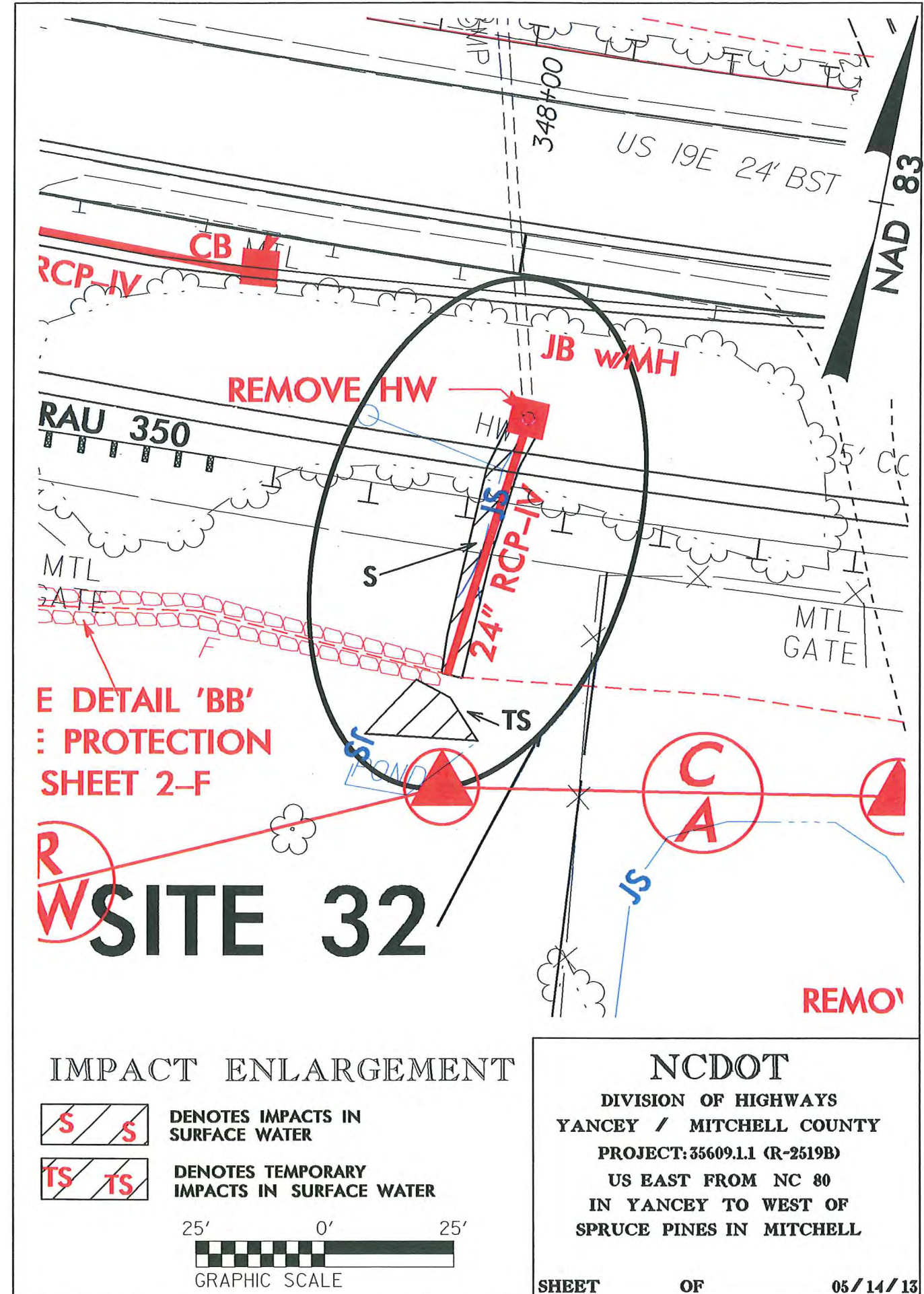
NCDOT  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL  
 SHEET 05 / 14 / 13

S  
 S  
 DENOTES IMPACTS IN  
 SURFACE WATER



# IMPACT ENLARGEMENT

SITE 33



NCDOT  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL  
 SHEET 05 / 14 / 13

IMPACT ENLARGEMENT  
 S S DENOTES IMPACTS IN  
 SURFACE WATER  
 TS TS DENOTES TEMPORARY  
 IMPACTS IN SURFACE WATER  
 25' 0' 25'  
 GRAPHIC SCALE

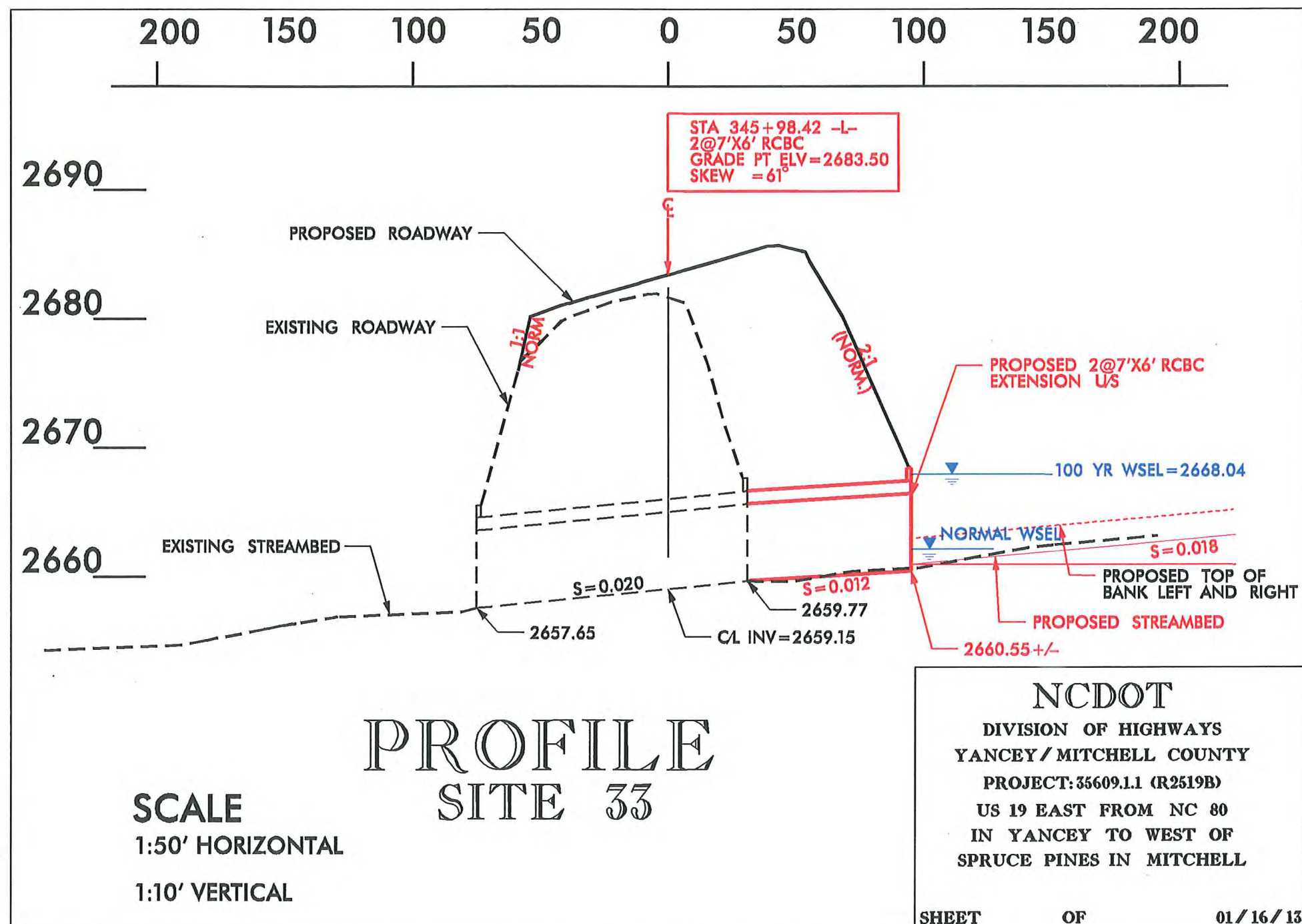
E DETAIL 'BB'  
 PROTECTION  
 SHEET 2-F

SITE 32

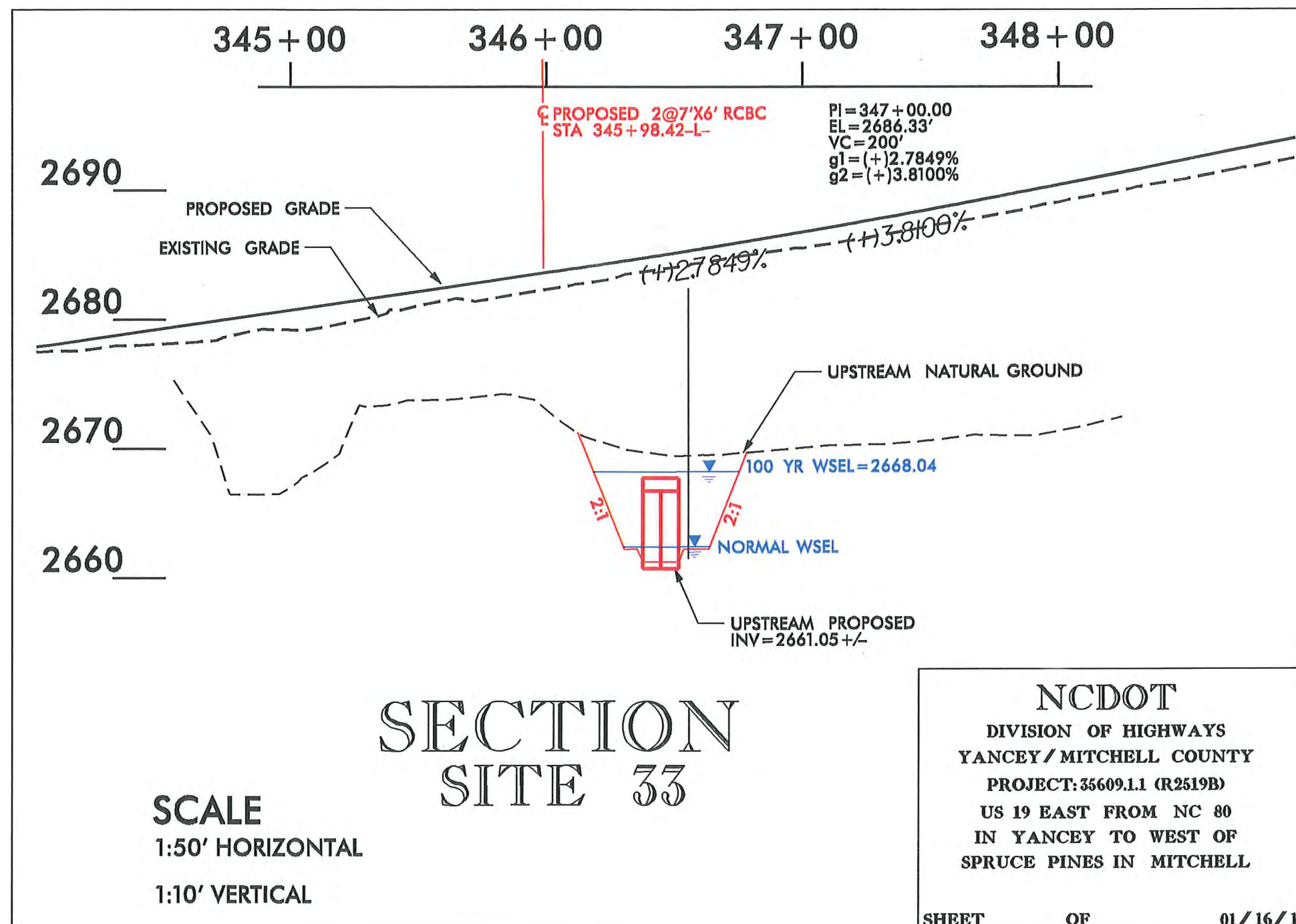














DETAIL OF UPSTREAM FACE  
OF PROPOSED 2@7'X6' RCBC  
(N.T.S.)  
SITE 33

EXISTING  
NATURAL GROUND

PROPOSED CHANNEL  
IMPROVEMENT

PROPOSED 2@7'X6' RCBC

2:1

5'

2:1

10'

2:1

2:1

2'

0.5'

NCDOT

DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

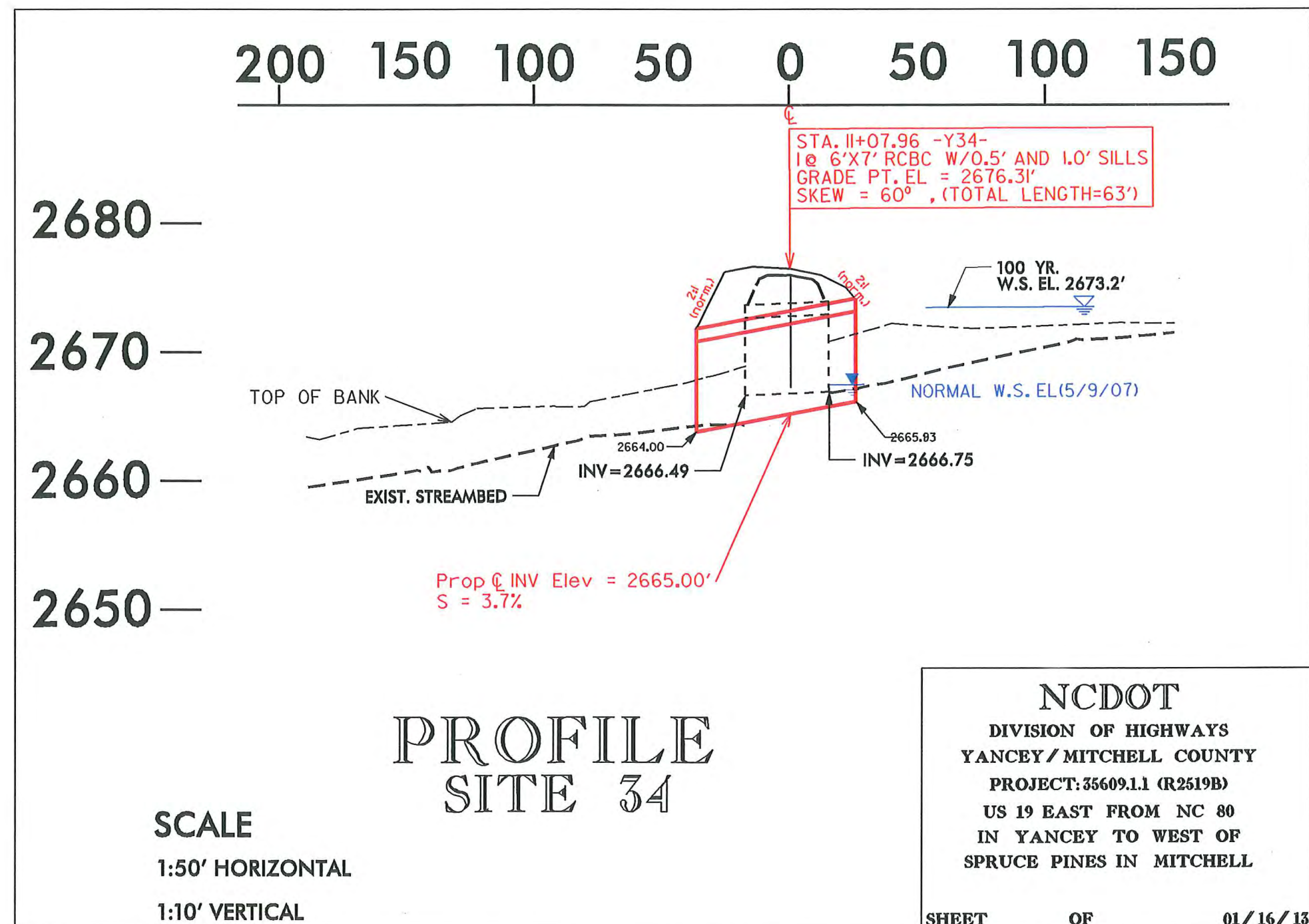
US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

01 / 16 / 13







10+00 11+00 12+00 13+00

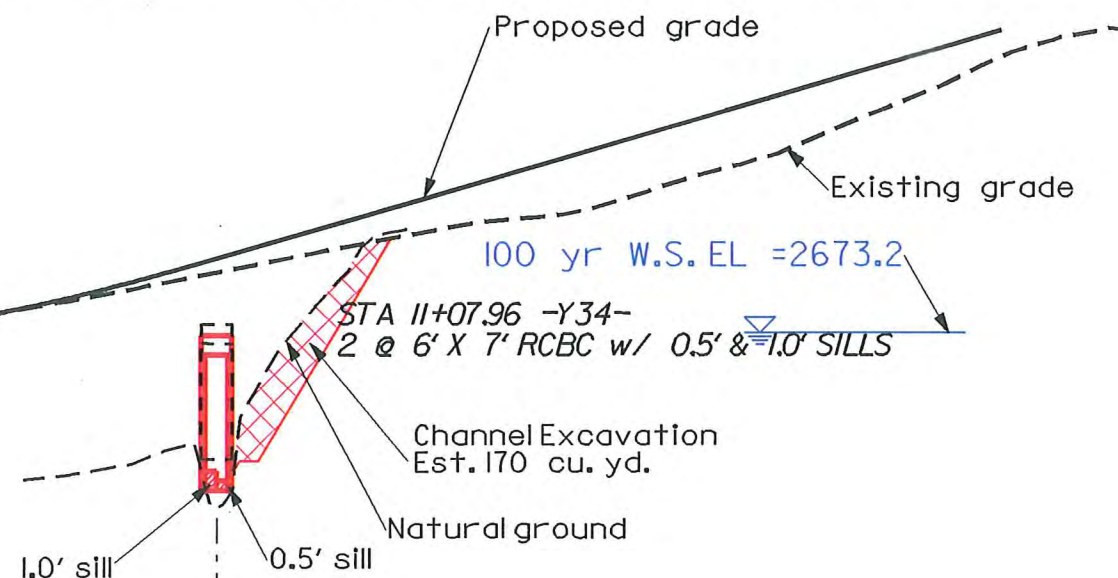
STA 11+07.96 -Y34-  
6' x 7' RCBC WITH ALTERNATING SILLS

2690—

2680—

2670—

2660—



STA 11+07.96 -Y34-  
1 @ 6'x7' RCBC  
US INV EL = 2665.93' +/-  
DS INV EL = 2663.65' +/-

SECTION  
SITE 34

SCALE

1:50' HORIZONTAL

1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS  
YANCEY/MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80  
IN YANCEY TO WEST OF  
SPRUCE PINES IN MITCHELL

SHEET

OF

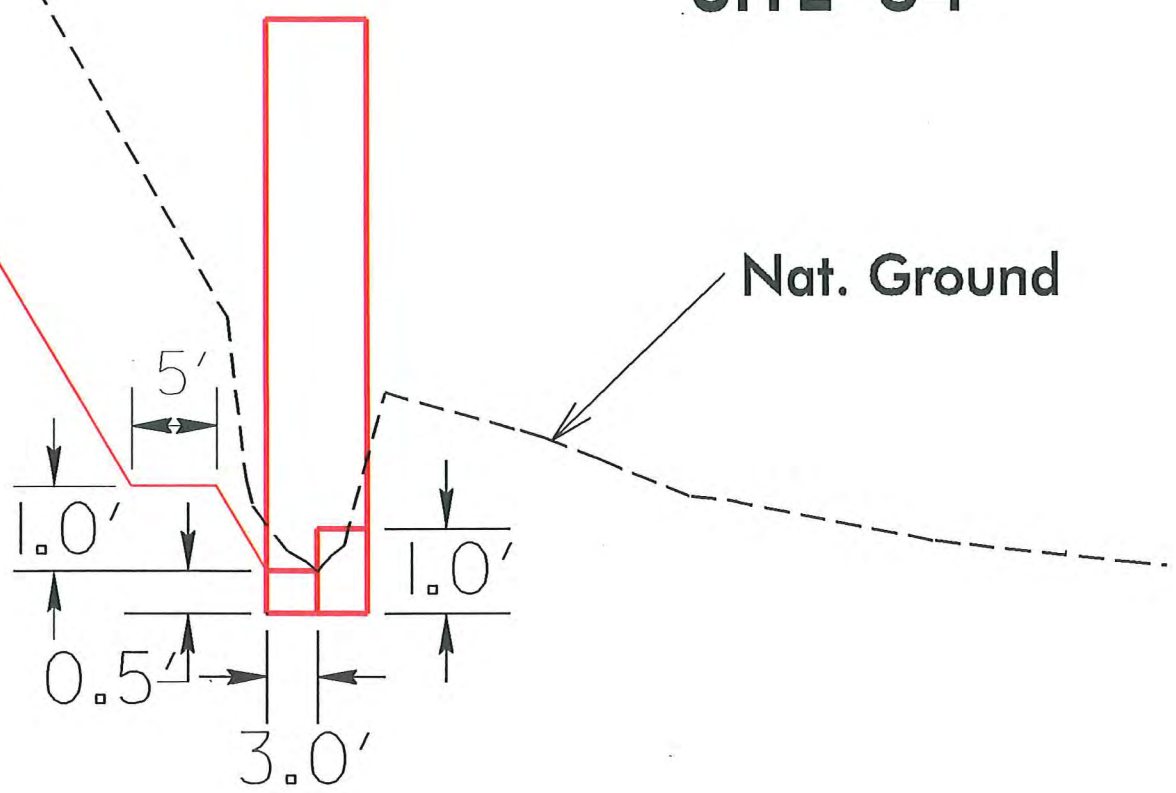
01/16/13



Upstream  
channel  
improvements

# DETAIL OF SILLS AT RCBC (NOT TO SCALE) SITE 34

NOTE: SPACE ALTERNATING  
0.5' AND 1.0' HIGH SILLS  
@ 15' INTERVALS



NCDOT  
DIVISION OF HIGHWAYS  
YANCEY / MITCHELL COUNTY  
PROJECT: 35609.1.1 (R2519B)  
US 19 EAST FROM NC 80  
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SPRUCE PINES IN MITCHELL

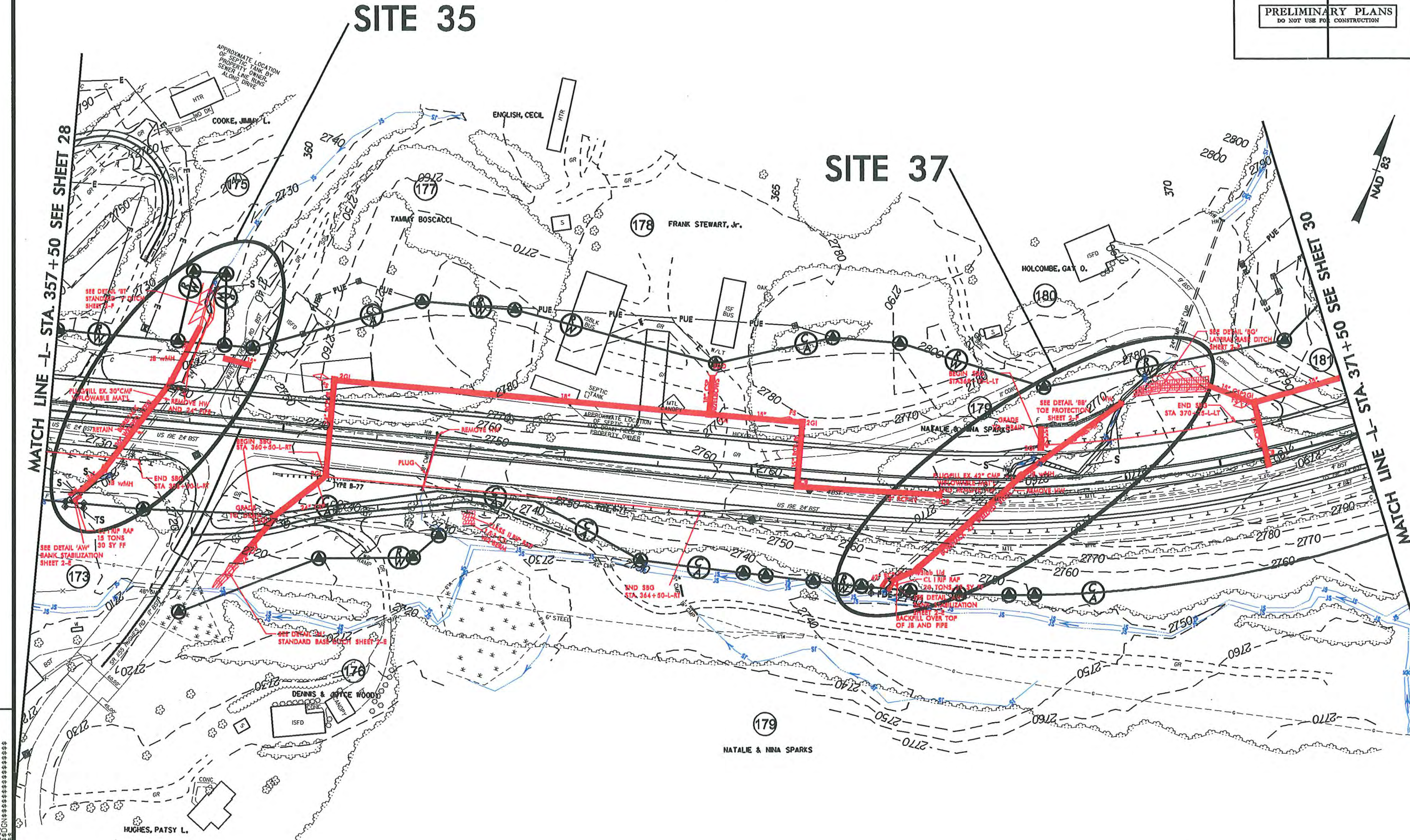
SHEET OF 01 / 16 / 13





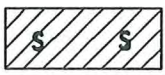


PROJECT REFERENCE NO. R-2519B	SHEET NO. 29
R/W SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCH LINE - L- STA. 357+50 SEE SHEET 28

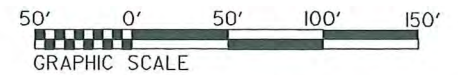
MATCH LINE - L- STA. 371+50 SEE SHEET 30



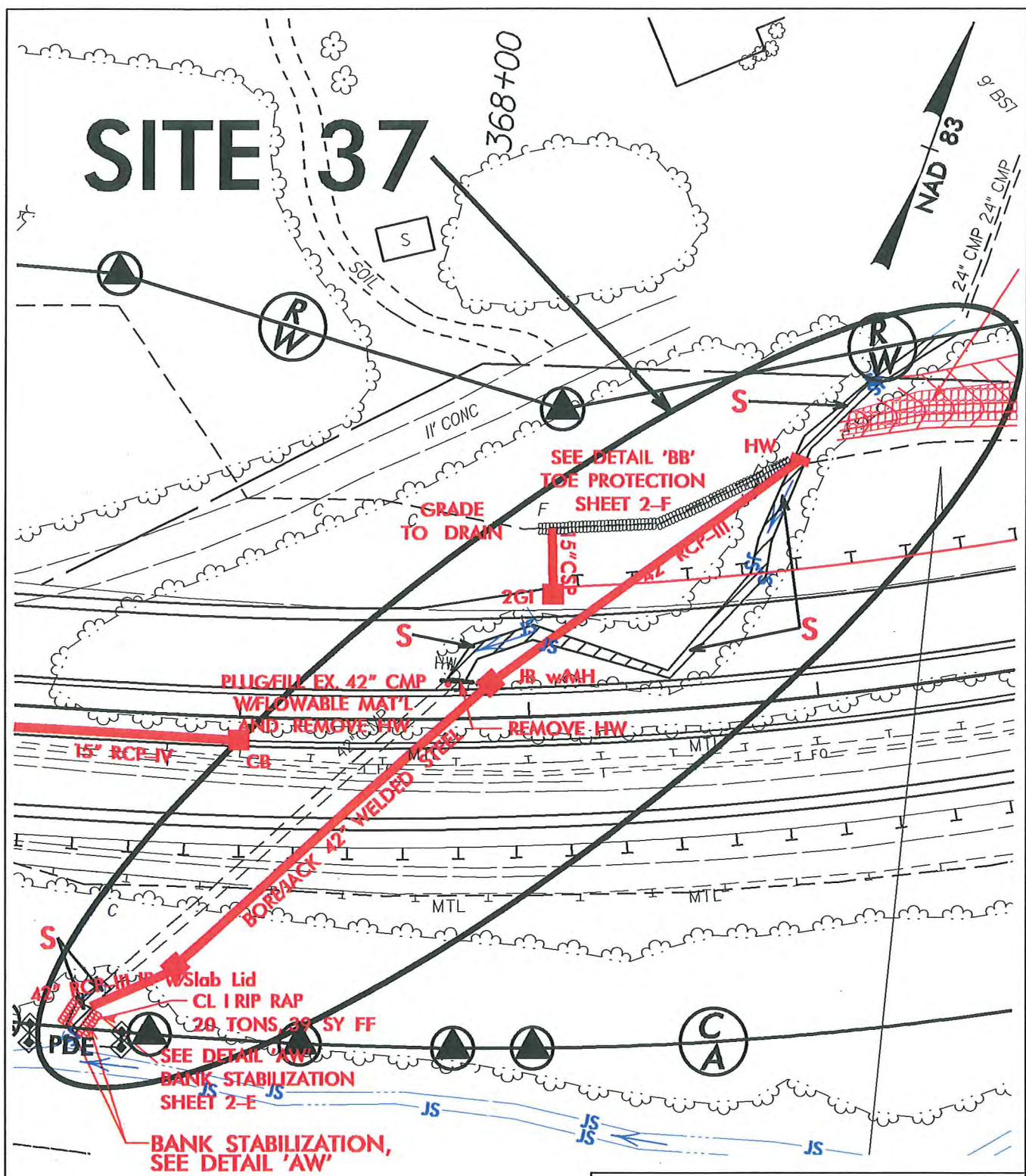
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

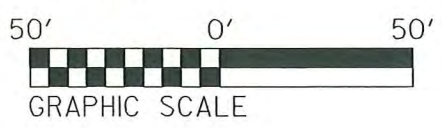




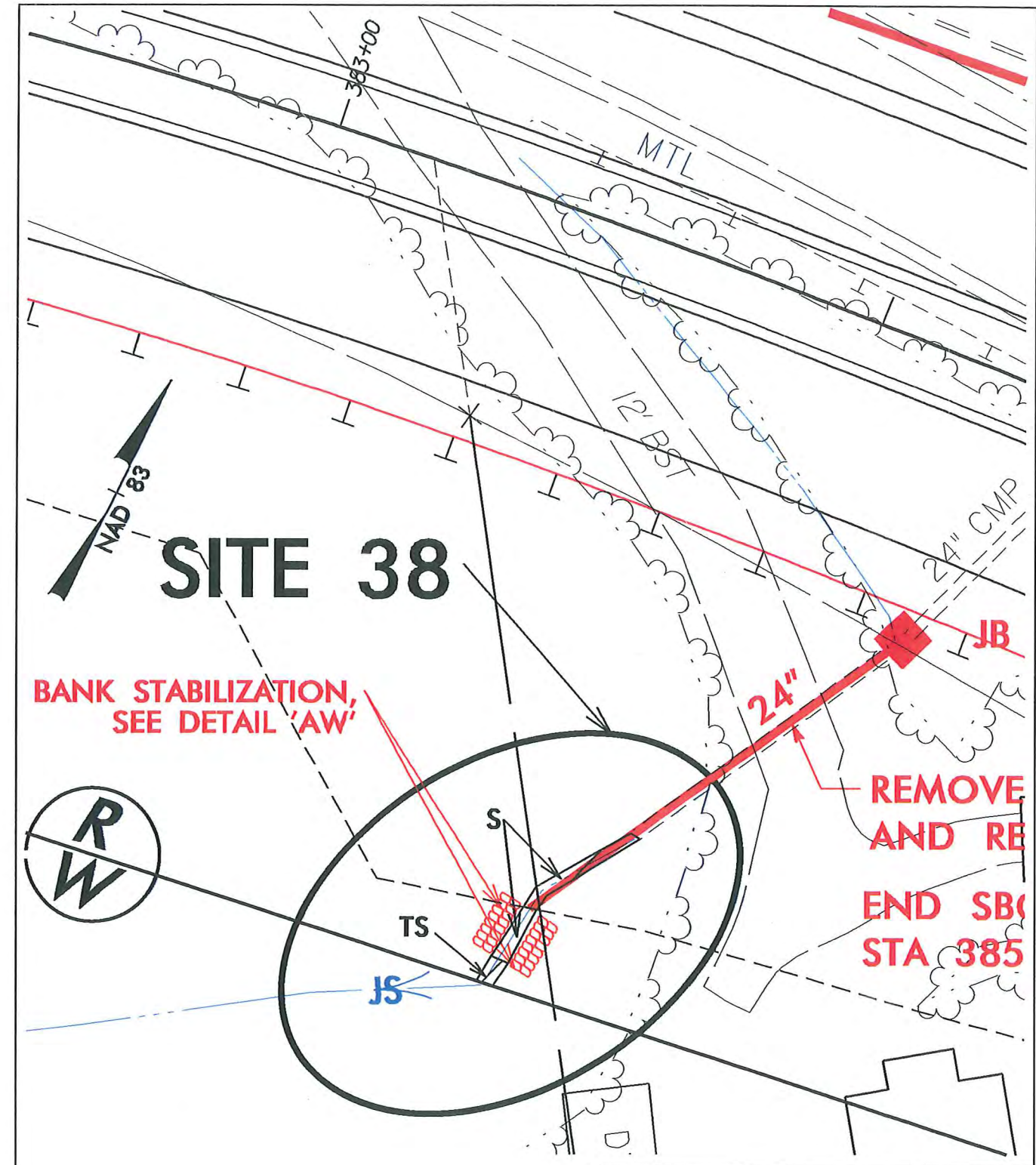


### IMPACT ENLARGEMENT

DENOTES IMPACTS IN SURFACE WATER

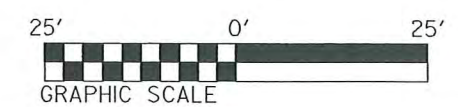


**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL



### IMPACT ENLARGEMENT

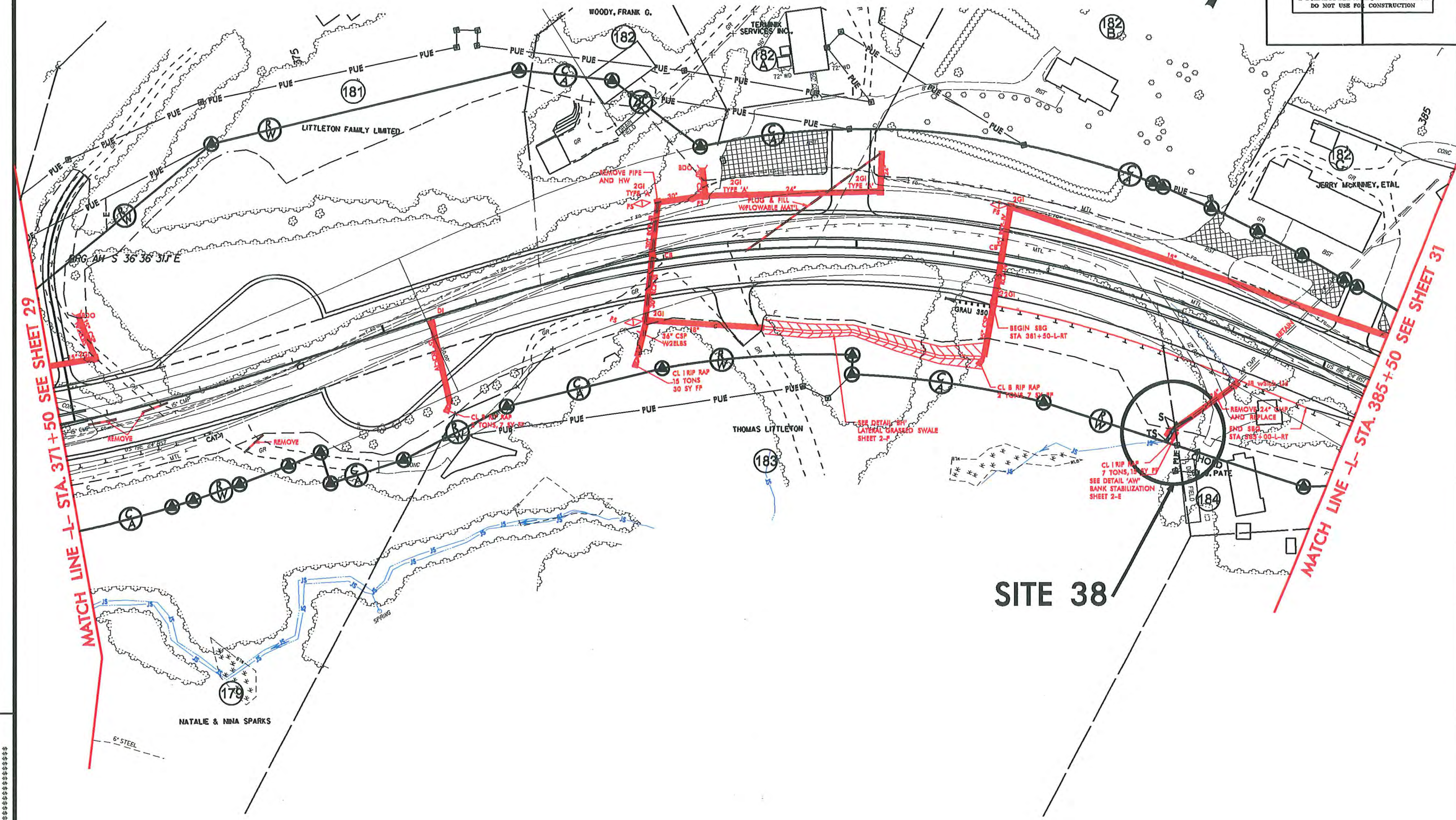
DENOTES IMPACTS IN SURFACE WATER  
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL



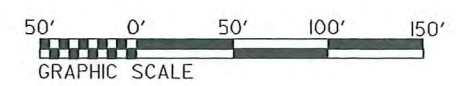
PROJECT REFERENCE NO. R-2519B	SHEET NO. 30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



DENOTES IMPACTS IN  
 SURFACE WATER



DENOTES TEMPORARY  
 IMPACTS IN SURFACE WATER





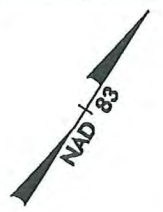


SYTIME DGN

50' 0' 50' 100' 150'

GRAPHIC SCALE







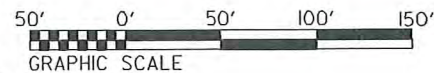
8/17/99



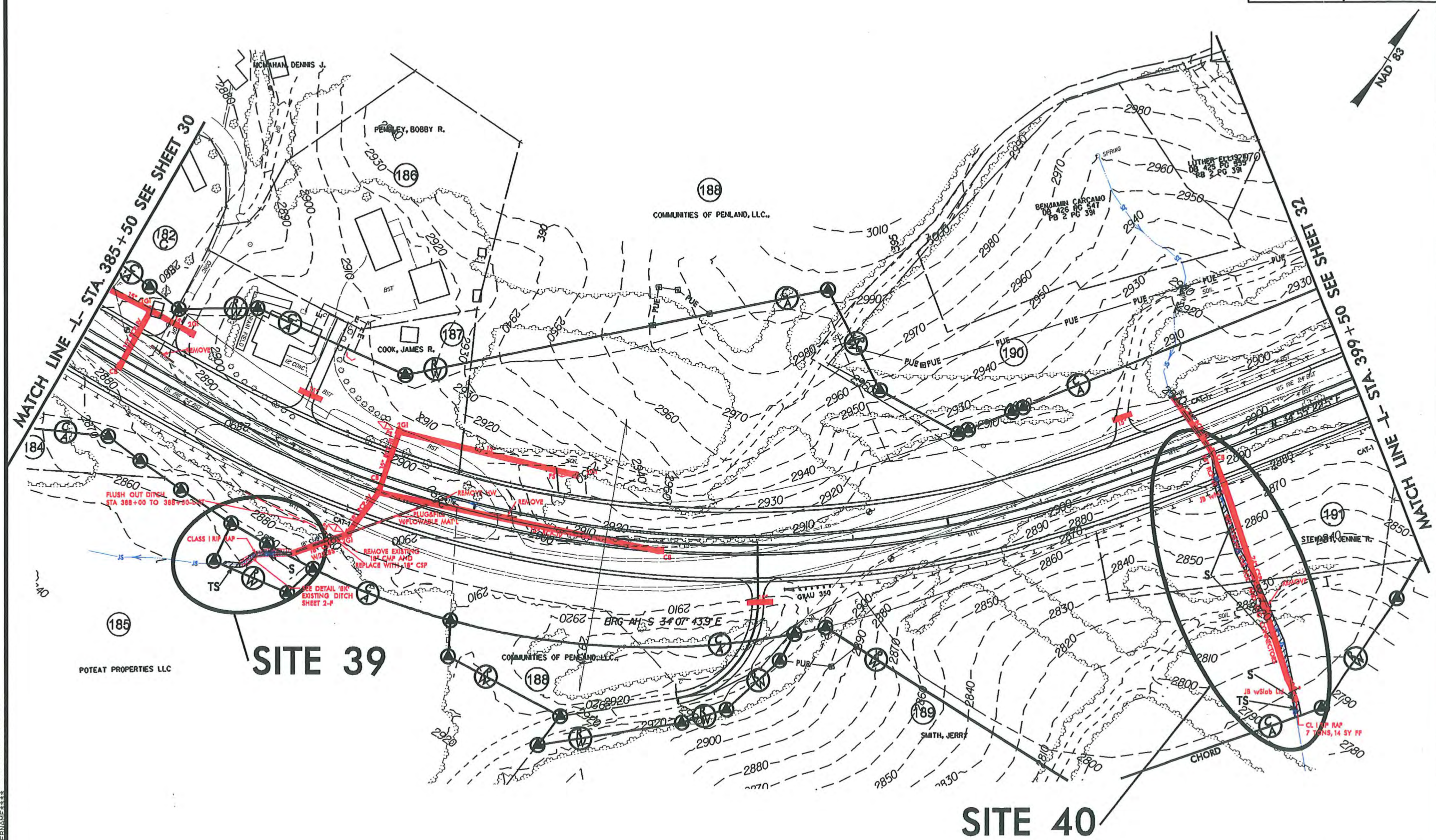
DENOTES IMPACTS IN SURFACE WATER



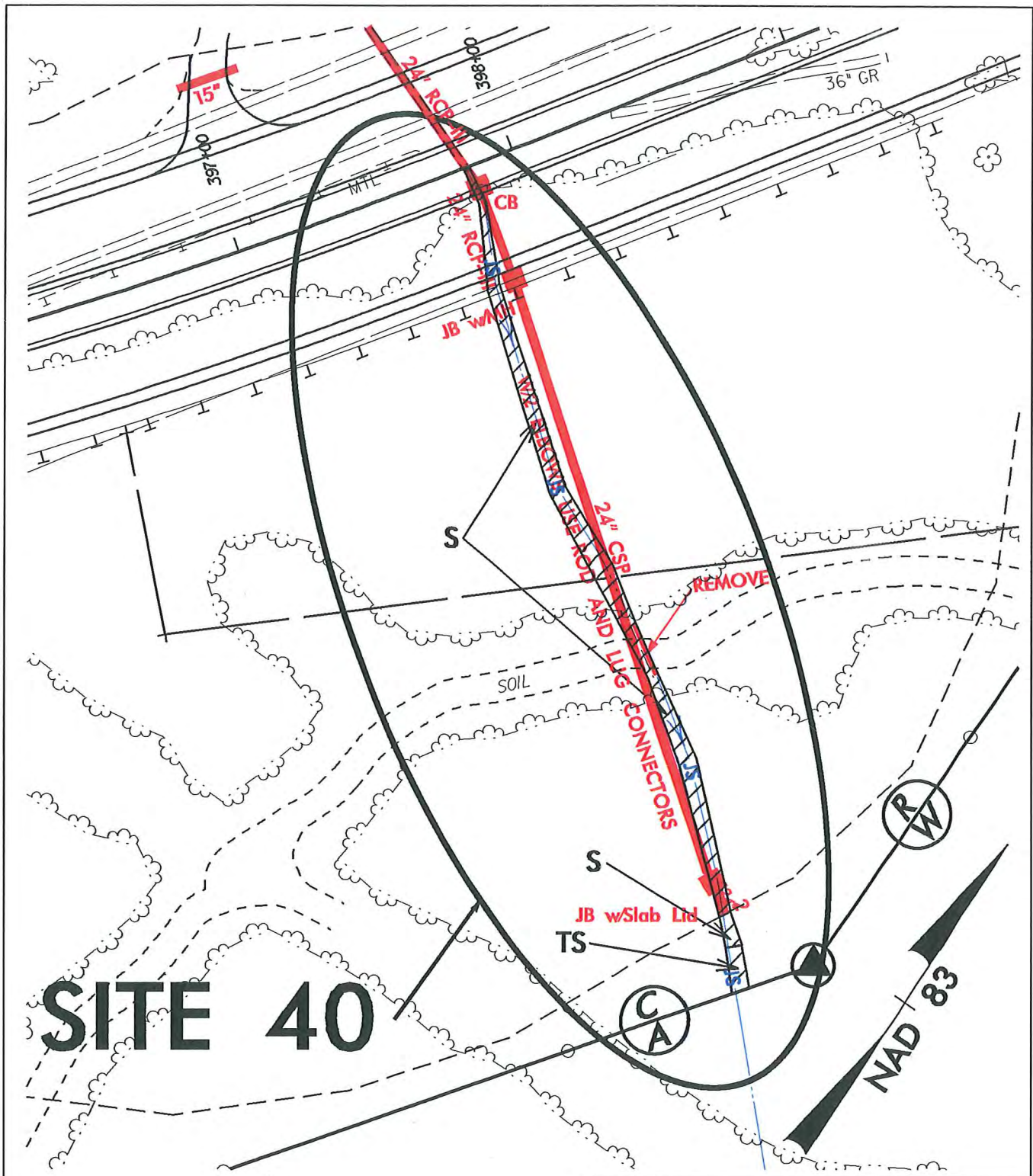
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. R-2519B		SHEET NO. 31
RDV SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		







# SITE 40

## IMPACT ENLARGEMENT

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

**NCDOT**

DIVISION OF HIGHWAYS

YANCEY / MITCHELL COUNTY

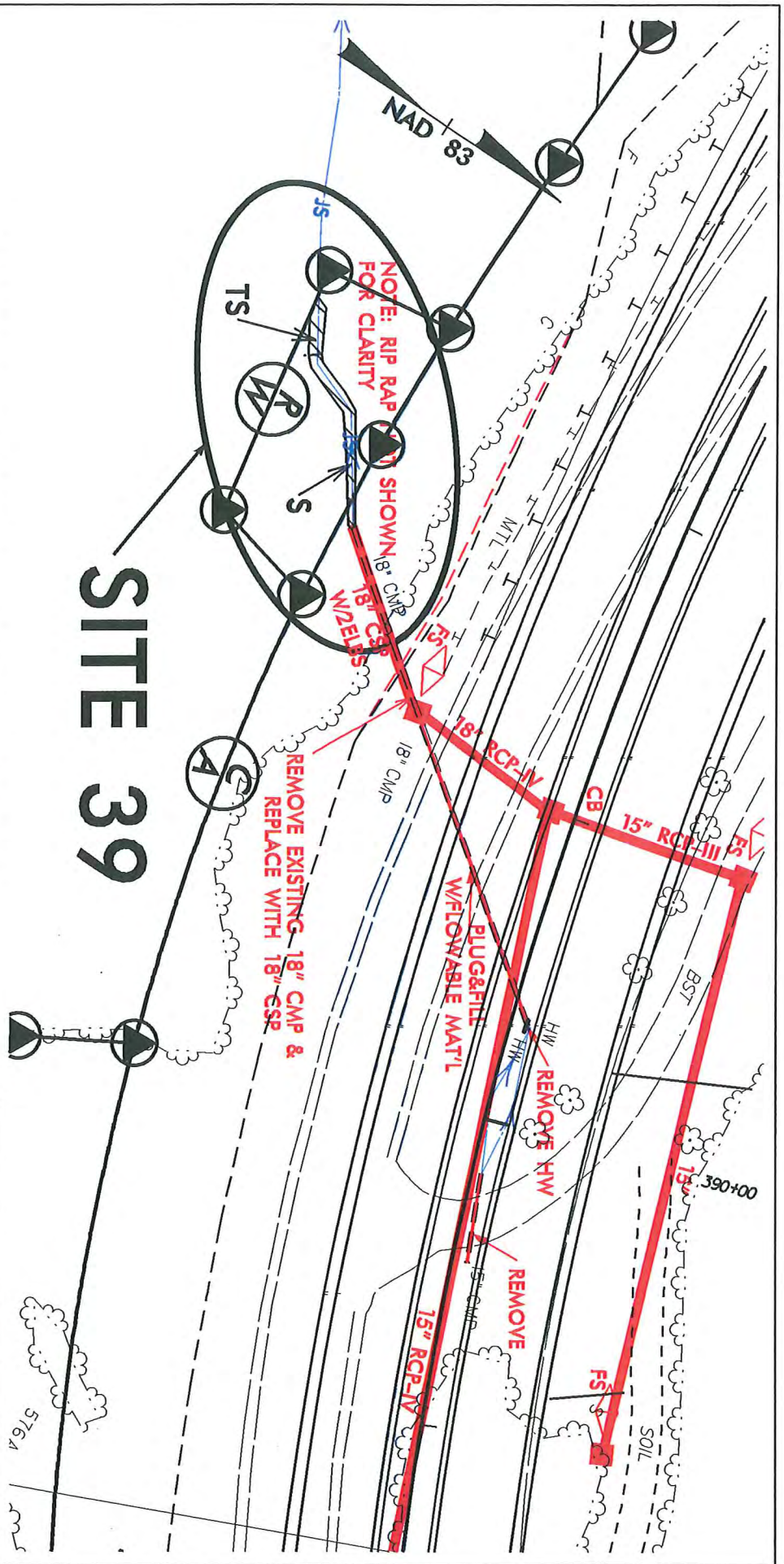
PROJECT: 35609.1.1 (R-2519B)

US EAST FROM NC 80

IN YANCEY TO WEST OF

SPRUCE PINES IN MITCHELL

SHEET      OF      05/14/13

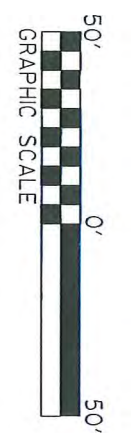


# SITE 39

## IMPACT ENLARGEMENT

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



**NCDOT**

DIVISION OF HIGHWAYS

YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R-2519B)

US EAST FROM NC 80

IN YANCEY TO WEST OF

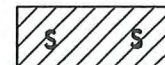
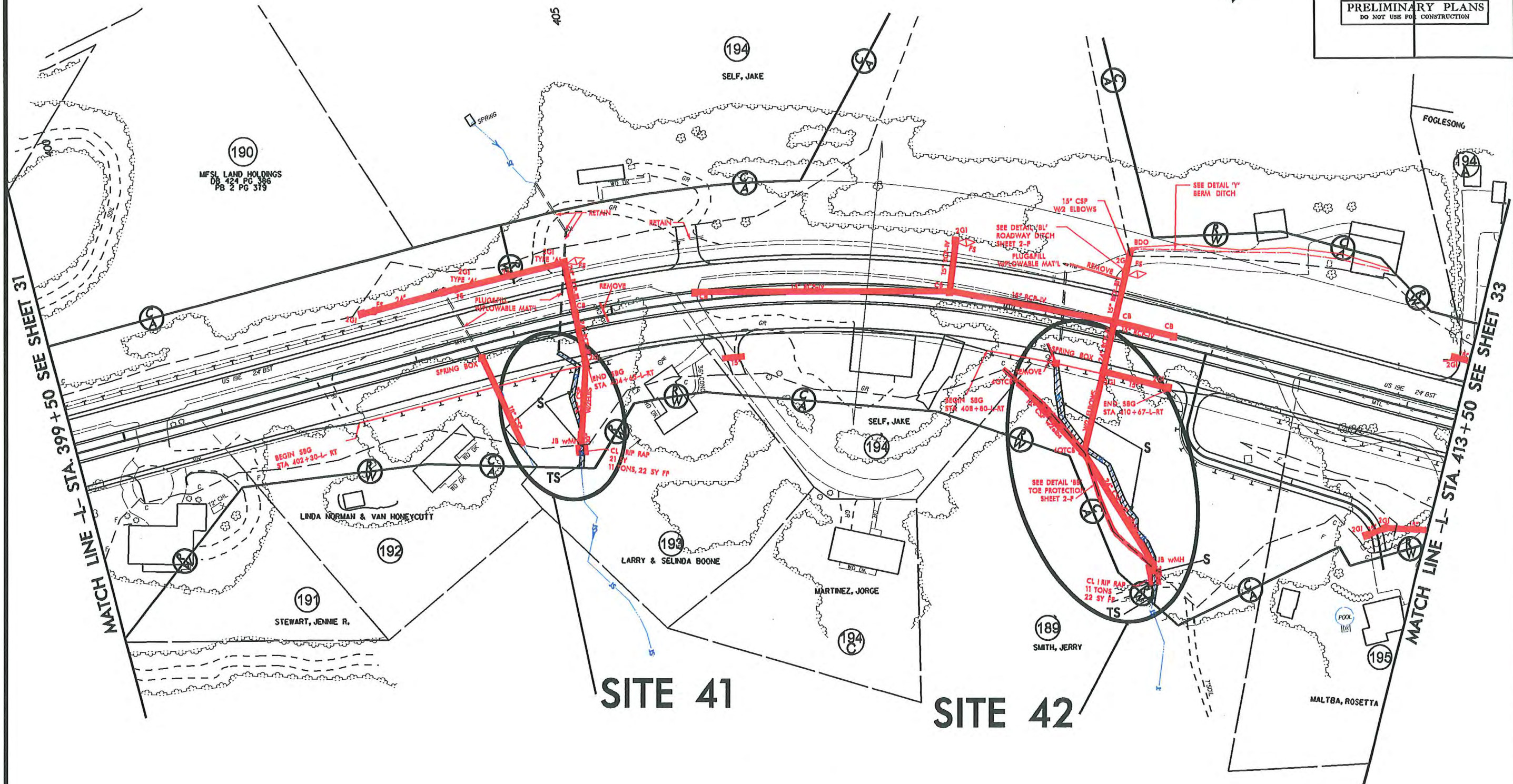
SPRUCE PINES IN MITCHELL

SHEET      OF      05/14/13



8/17/99

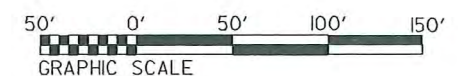
PROJECT REFERENCE NO.		SHEET NO.	
R-2519B		32	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			



DENOTES IMPACTS IN SURFACE WATER



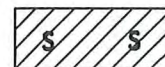
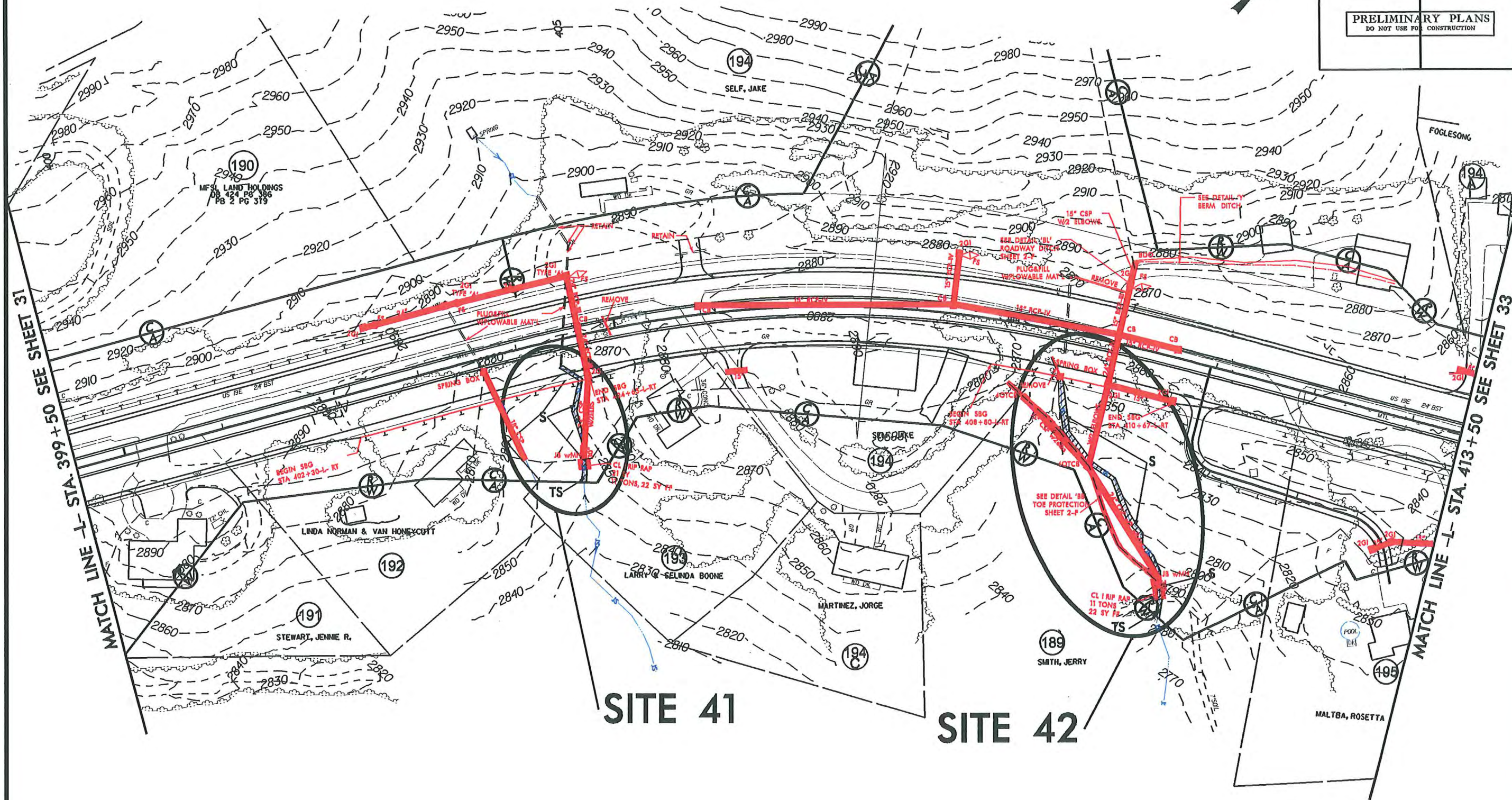
DENOTES TEMPORARY IMPACTS IN SURFACE WATER





8/17/99

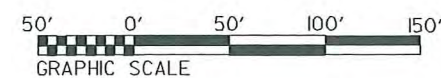
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



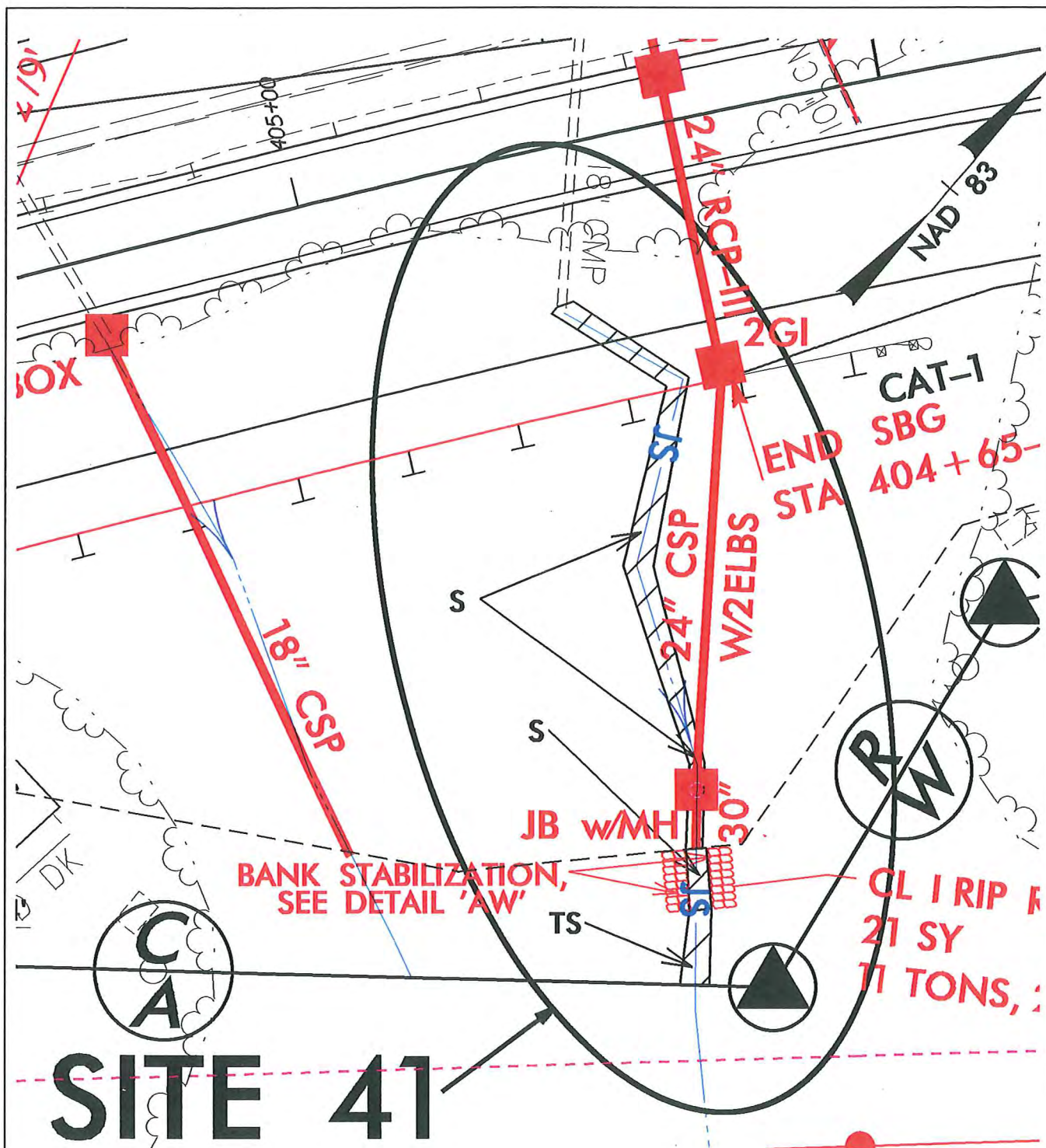
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

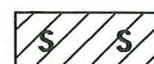




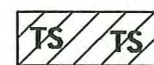


# SITE 41

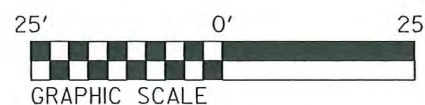
## IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER

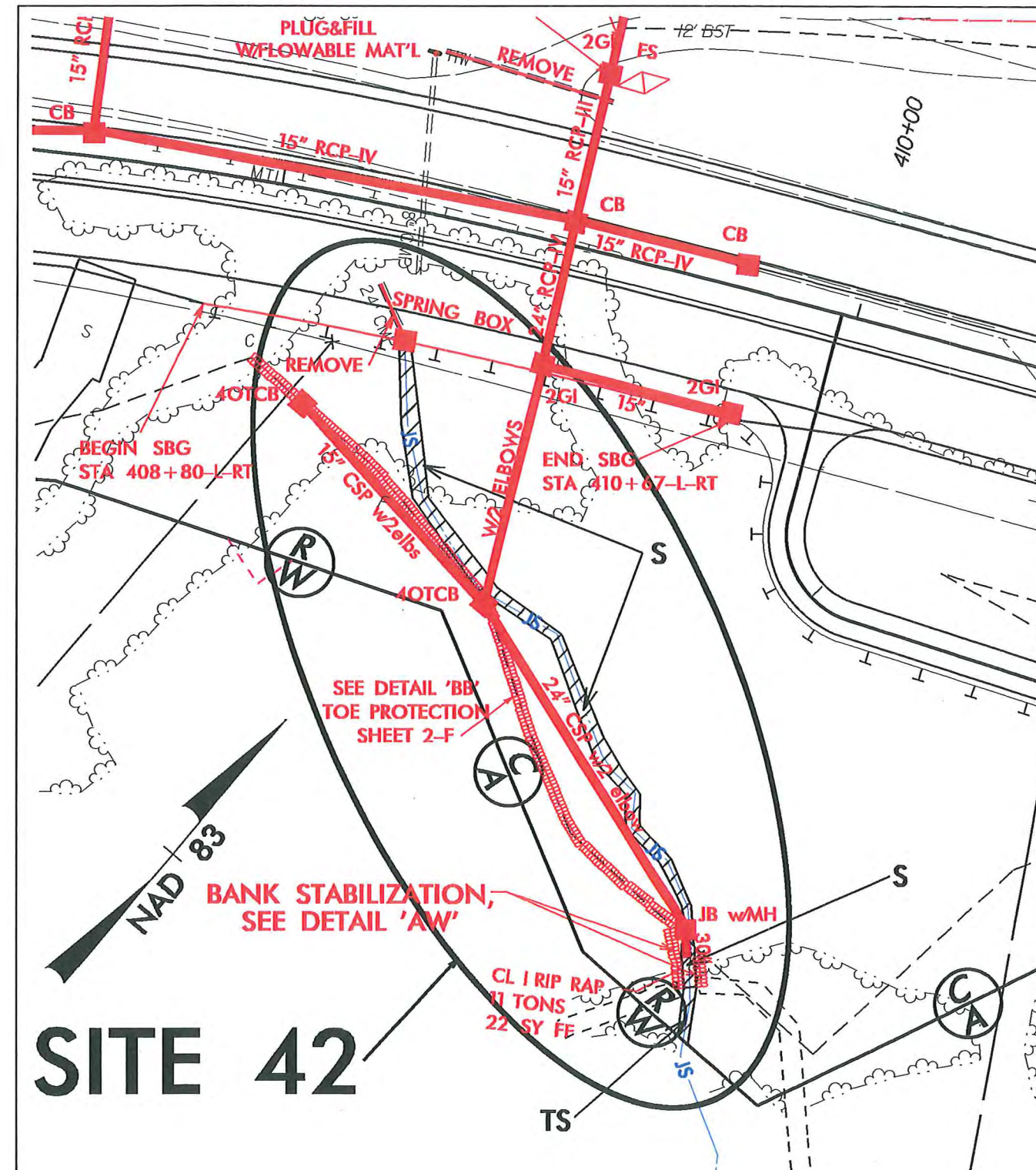


DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY/MITCHELL COUNTRY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



# SITE 42

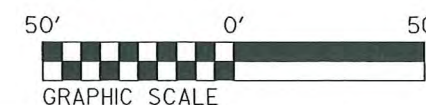
## IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



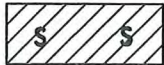
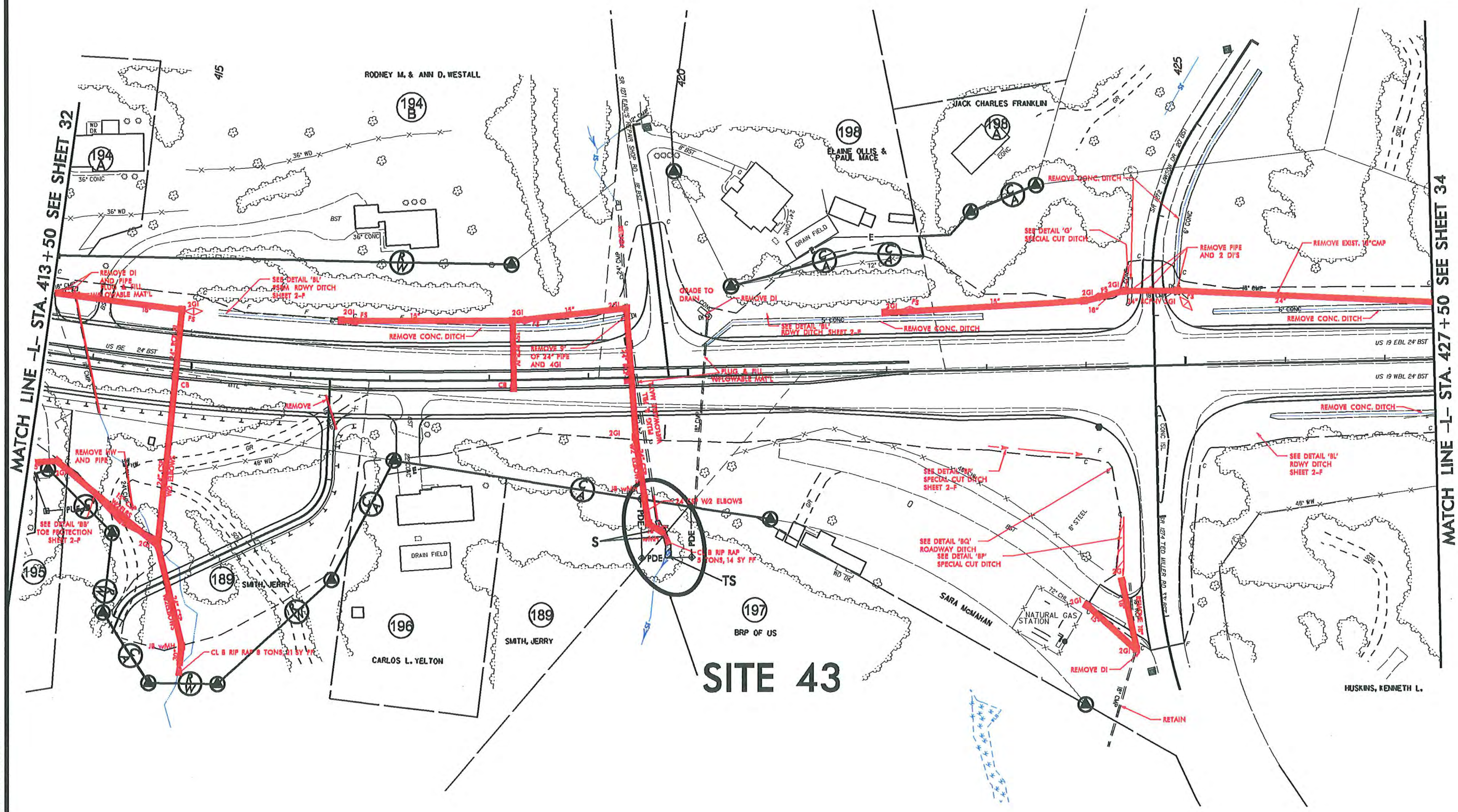
**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY/MITCHELL COUNTRY  
 PROJECT: 35609.1.1 (R-2519B)  
 US 19 EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



8/17/99

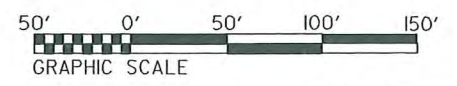
PROJECT REFERENCE NO.		SHEET NO.
R-2519B		33
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
PRELIMINARY PLANS		
DO NOT USE FOR CONSTRUCTION		



DENOTES IMPACTS IN SURFACE WATER



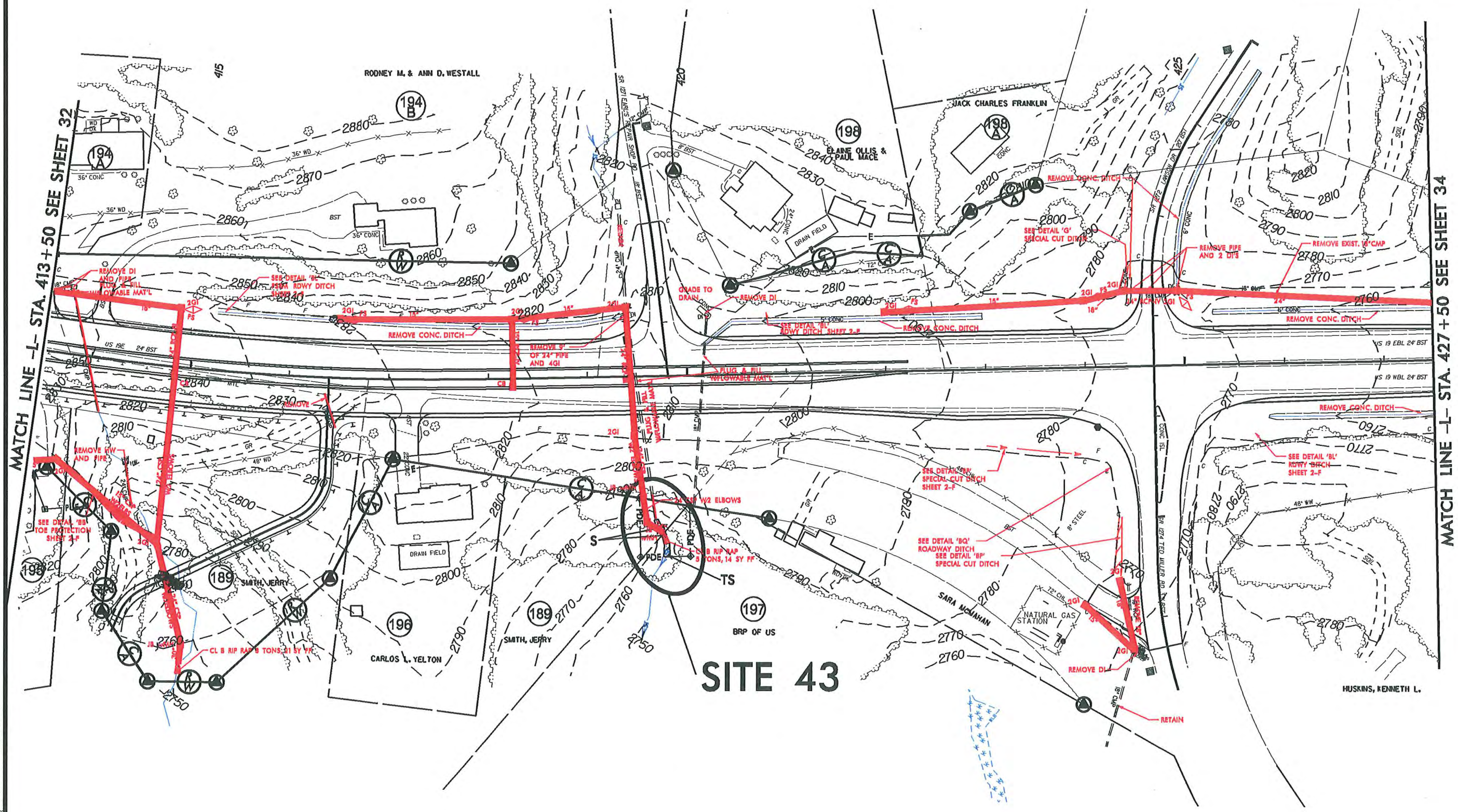
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



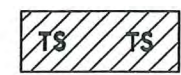


8/17/95

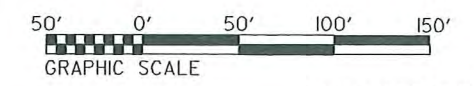
PROJECT REFERENCE NO.		SHEET NO.
R-2519B		33
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
PRELIMINARY PLANS		
DO NOT USE FOR CONSTRUCTION		



DENOTES IMPACTS IN SURFACE WATER

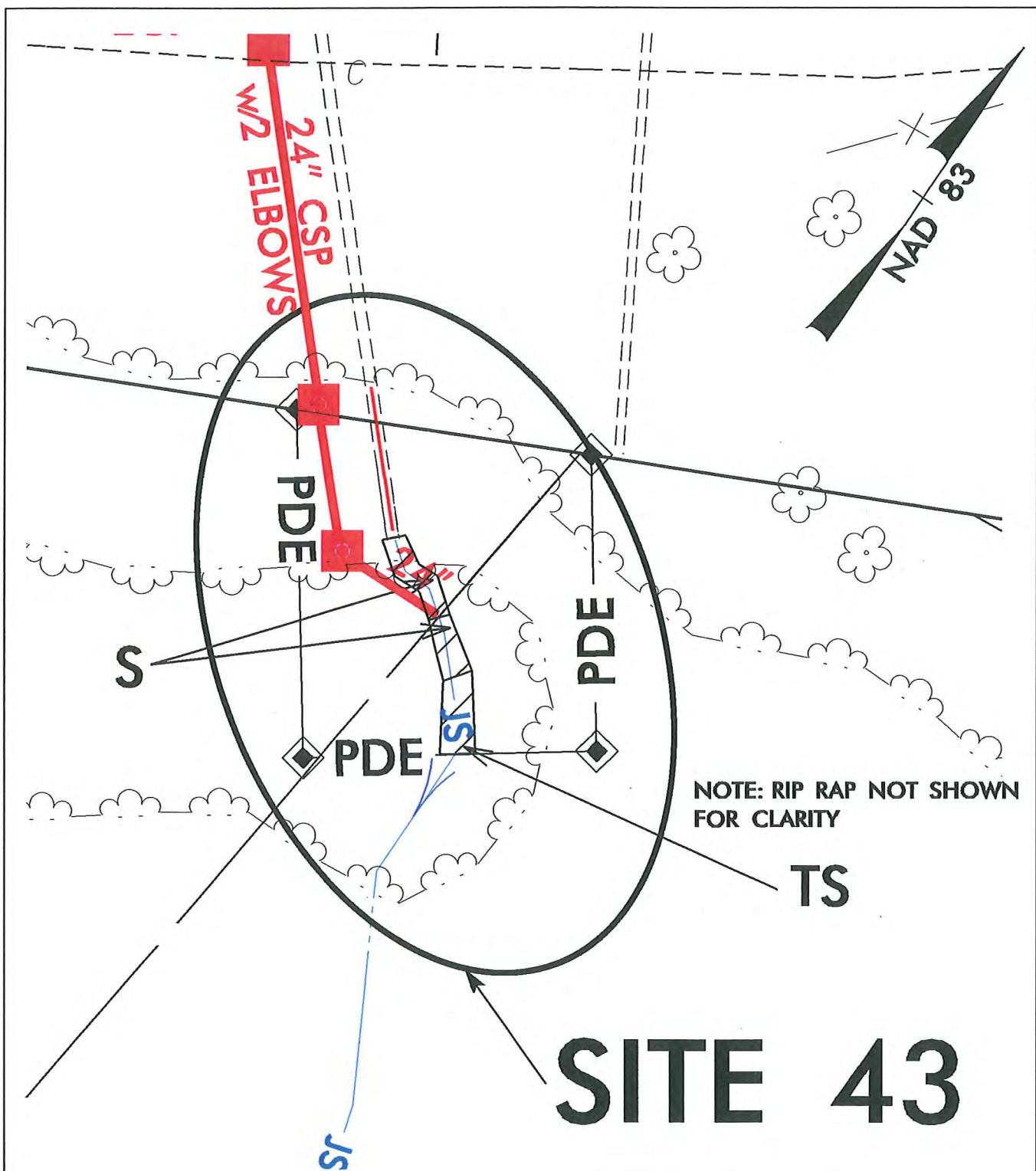


DENOTES TEMPORARY IMPACTS IN SURFACE WATER

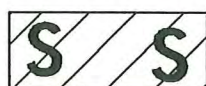


GRAPHIC SCALE





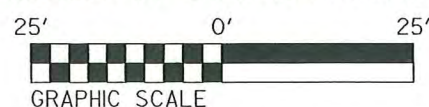
# IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER

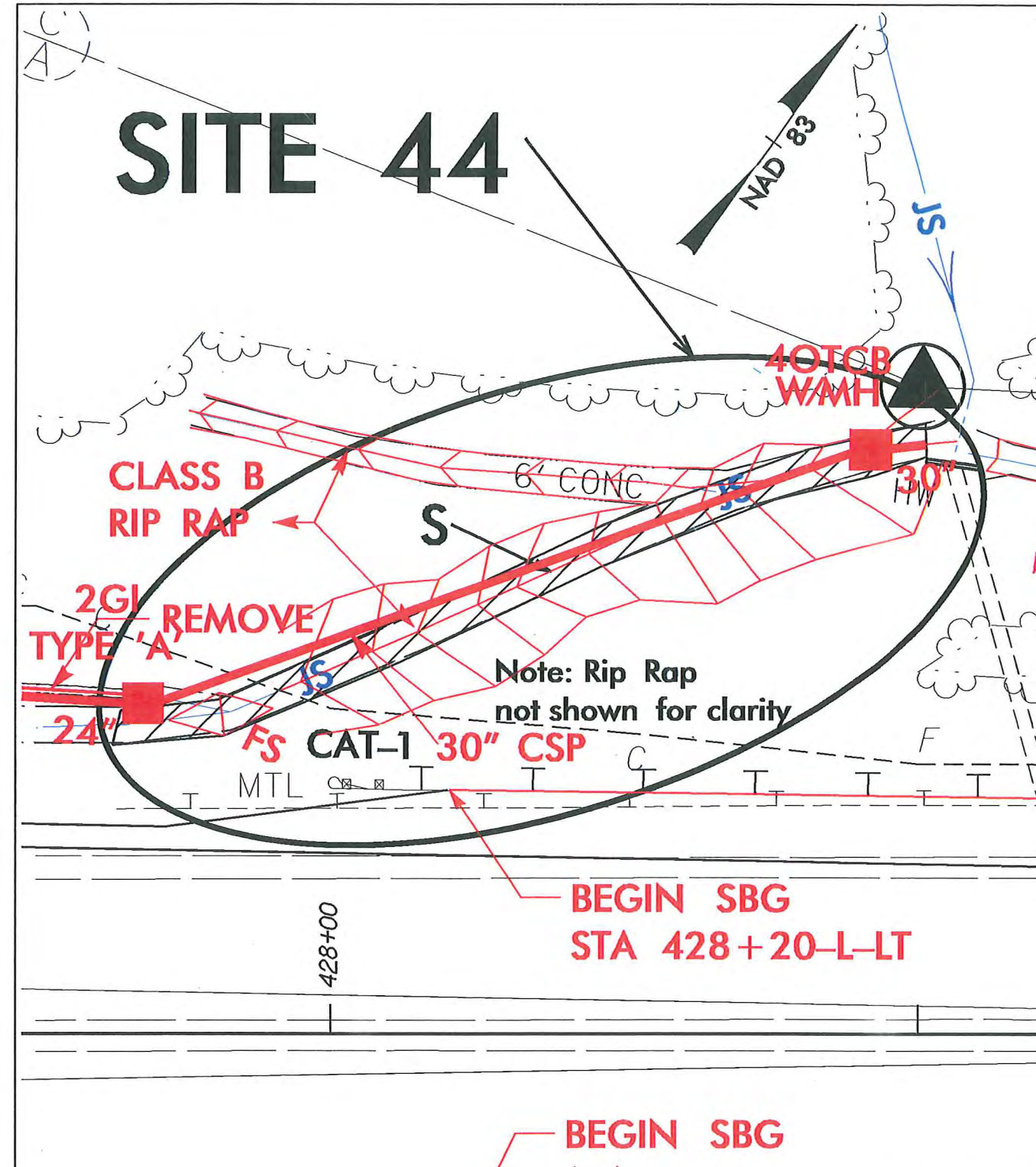


DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

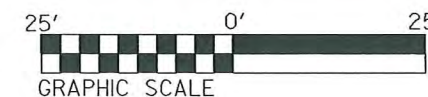
SHEET OF 05/14/13



# IMPACT ENLARGEMENT



DENOTES IMPACTS IN  
SURFACE WATER



**NCDOT**  
 DIVISION OF HIGHWAYS  
 YANCEY / MITCHELL COUNTY  
 PROJECT: 35609.1.1 (R-2519B)  
 US EAST FROM NC 80  
 IN YANCEY TO WEST OF  
 SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



8/17/99

REVISIONS

MATCH LINE -L- STA. 427+50 SEE SHEET 33

SITE 44

RAY HOWELL FAMILY TRUST

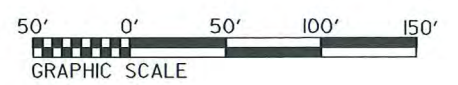
-L- POT Sta. 433+28.45

SITE 45

PRESBYTERIAN CHURCH OF SPRUCE PINE, INC.,

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO.		SHEET NO.	
R-2519B		34	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



8/17/99

REVISIONS

MATCH LINE -L- STA. 427+50 SEE SHEET 33

SITE 44

SITE 45

RAY HOWELL FAMILY TRUST

PRESBYTERIAN CHURCH OF SPRUCE PINE, INC.,

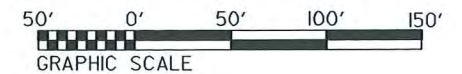
-L- POT Sta. 433+28.65



DENOTES TEMPORARY  
IMPACTS IN SURFACE WATER



DENOTES IMPACTS IN  
SURFACE WATER



PROJECT REFERENCE NO.	SHEET NO.
R-2519B	34
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	







WETLAND PERMIT IMPACT SUMMARY SHEET 1 OF 7															
				WETLAND IMPACTS					SURFACE WATER IMPACTS						
Feature	Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	Notes	
2UT2A	1	23+45 -L-	54" RCP						0.01		43				
2A	2	44+50 -L-	4 @ 12'X10' RCBC						0.09		117				
		Little Crabtree Ck.	Floodplain Bench						0.07		118				
			Temp. Const.							0.06		97			
SA	2A	9+70 -Y4-	Base Ditch								27				
			Lateral Base Grass Swale								38				
			Temp. Const. (Inlet side)							0.01		44			
2B	3	55+00 -L-	48" RCP						0.02		303				
			Temp. Const.							<0.01		21			
			Bank Stabilization						<0.01		12				
UT2B	3	55+00 -L- LT	Roadway Fill						<0.01		8				
2C	4	79+00 -L-	36" RCP & 42" RCP						0.02		97				
		Phipps Ck.	Bank Stabilization								44				
			Temp. Const.							<0.01		15			
SB	4A	99+65 -L-	36" RCP						0.01		18				
			Rip Rap						0.01		16				
STR	5	122+50 -L-	315' BRIDGE						<0.01	0.15		160		Perm. surface water imp. due to piers = 31.8 SQ. FT., (0.15ac=6,534 sf)	
2D	5A	123+00 -L-	STREAM RELOC.*								148		148	Site 5A is an in-kind stream relocation of Long Branch (See Sht 12A)	
														Length of NSD equals length of culvert - 148 LF of stream mitigation credit	
2D	6	126+50 -L-	2 @ 6'X6' RCBC Removal							0.01		57	144	Site will generate 144 LF of stream mitigation credit	
			Rock Cross Vanes							<0.01	28				
2D	7	135+00 -L-	2 @ 6'X6' RCBC						0.04		144				
		138+00 -L-	2 @ 6'X6' RCBC						0.04		214				
		Long Branch Ck.	Temp. Const.							<0.01		15			
UT2D	7A	136+00 -L-	Roadway Fill						<0.01		24				
2UT2D	7B	137+50 -L-	30" Alternate Pipe						0.02		131				
3UT2D	7C	139+50 -L-	54" RCP						<0.01		70				
			Temp. Const.							<0.01		15			
TOTAL SHEET 1:									0.33	0.25	1600	424	292	292 LF of stream mitigation credit for the Natural Stream Design	

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WETLAND PERMIT IMPACT SUMMARY SHEET 2 OF 7														
Feature	Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					Notes
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
2D	8	152+00/157+50-L-	Stream Relocation			0.014	0.037		0.07		432		449	Site will generate 113 LF of stream mitigation credit
7UT2D	8A	150+90 -L-	36"CSP/36" RCP						0.05		79			
			Rip Rap Outlet						<0.01		15			
			Pipe Installation							<0.01		11		
2D	8B	155+00 -L-	7'X7' & 7'X5' RCBC ext.						0.01		58			
2D	8C	158+00 -L-	8'X6' RCBC						0.01		69			
			Temp. Const.							0.01		11		
11UT2D/2D	9	179+80 -L-	36" CMP Removal							<0.01		10	40	Includes 40' of stream that will be restored due to pipe removal.
			Bank Stabilization						0.01		37			Site will generate 40 LF of stream mitigation credit
12UT2D	10	182+80 -L-	36" RCP						0.02	<0.01	96	15		
			Rip Rap/Base Ditch						0.02		87			
2D	11	186+50 -L-	Bank Stabilization						0.01		50			
13UT2D	12	191+50 -L-	42" RCP						0.01		79			
			Temp. Const.							<0.01		25		
2DM	13	195+00 -L-	Roadway Fill	0.06					0.01		110			
2D	13													
2D	14	197+00 -L-	Roadway Fill						0.02		220			
2D	15	198+50 -L-	Roadway Fill						<0.01		59			
			24" CSP						<0.01		19			
			Temp. Const.							<0.01		15		
TOTAL SHEET 2:				0.06		0.01	0.04		0.25	0.02	1410	87	489	153 LF of stream mitigation credit for the 489 LF of Natural Stream Design

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WETLAND PERMIT IMPACT SUMMARY SHEET 3 OF 7														
Feature	Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					Notes
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1H	16	205+66 -L-	36" RCP						<0.01		32			Includes 40' of pipe removal
			Bank Stabilization						<0.01		50			
UT1H	17	206+55 -L-	18" CSP						<0.01		33			
			Bank Stabilization						<0.01		20			
2UT1H	18	214+00 -L-	Stream Relocation						0.02	<0.01	152	8		
			New Channel										70	Site will generate 35 LF of stream mitigation credit
1I	19	12+00 -Y21-	48" Pipe						0.03		132			
			Rip Rap Energy Dissipator								12			
1IC	20	244+50 -L-	Excavation			0.037								
1I	21	246+00 -L-	Stream Relocation						0.04		412		396	Site will generate 198 LF of stream mitigation credit
1CC	22	247+85 -L-	Culvert Removal/Replace with Bridge							0.17		177		Includes 123' of culvert removal, 40' of daylighting
			Bank Stabilization						0.01		23			
UT1CC	23	15+00 -Y23A-	60" RCP						<0.01	<0.01	27	34		
			Bank Stabilization								20			
TOTAL SHEET 3:						0.04			0.12	0.17	913	219	466	233 LF of stream mitigation credit for the 466 LF of Natural Stream Design

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WETLAND PERMIT IMPACT SUMMARY SHEET 4 OF 7														
Feature	Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					Notes
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
UT1CC	24	281+50 -L-	Stream Relocation						0.03	<0.01	175	12		
2E	25	300+00 -L-	Stream Relocation						0.02	<0.01	174	15	94	Includes 94' of stream relocation that will generate 24 LF of stream mitigation credit
2E	26	302+50 -L-	60"CSP						0.02		129			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		15		
SD	27	305+50 -L-	24" CSP						<0.01		56			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		10		
SE	28	317+00 -L-	30" RCP						<0.01		80			
			Rip Rap						0.01		40			
SL	28A	316+00 -L-	Roadway Fill						0.01		141			
2BC	29	320+00 -L-	3 @ 8'X8' RCBC						0.03		64			
		BRUSHY CREEK	Fish Ladder						0.01		25			
		320+50 -L-	Bank Stabilization						0.02		62			
			Temp. Const.							0.01		30		
1G	29A	320+00 -L-	Roadway Fill/St. Reloc.						0.03		149			
TOTAL SHEET 4:									0.18	0.01	1115	82	94	24 LF of stream mitigation credit for the 94 LF of Natural Stream Design

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WETLAND PERMIT IMPACT SUMMARY SHEET 5 OF 7														
Feature	Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					Notes
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1G	30	324+00 -L-	Stream Relocation						0.05		321		635	Stream Relocation see details.
			Temp. Const.							<0.01		10		Site will generate 635 LF of stream mitigation credit
1G	31	327+50 -L-	2 @ 7'X7' RCBC						0.01	0.01	59	31		
			Bank Stabilization						0.01		32			
8UT1G	32	345+00 -L-	24" RCP						0.01	<0.01	52	10		
1G	33	346+50 -L-	2 @ 7'X6' RCBC /						0.07		444			
			Stream Relocation										300	Site will generate 150 LF of stream mitigation credit
5UT1G	34	11+00 -Y34-	6'X7' RCBC						<0.01		33			
			Bank Stabilization								23			
			Temp. Const.							0.02		118		
SF	35	358+50 -L-	Stream Realignment						0.01		46		46	Includes 46' of stream realignment
			30" Welded Steel						<0.01		42			Site will generate 12 LF of stream mitigation credit
		357+89 -L- (RT)	Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		8		
	36	N/A												
SG	37	368+50 -L-	42" RCP/ Stream Reloc.						0.02		247			
		366+54 -L- (RT)	Bank Stabilization						<0.01		10			
TOTAL SHEET 5:									0.18	0.03	1319	177	981	797 LF of stream mitigation credit for the 981 LF of Natural Stream Design

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WETLAND PERMIT IMPACT SUMMARY SHEET 6 OF 7														
				WETLAND IMPACTS					SURFACE WATER IMPACTS					Notes
Feature	Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1D	38	384+00 -L-	24"						<0.01		22			
		383+79 -L- (RT)	Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		5		
SH	39	388+00 -L-	Rip Rap						<0.01		58			
			Temp. Const.							<0.01		15		
SI	40	397+75 -L-	24" CSP						0.03		258			
			Rip Rap						<0.01		11			
			Temp. Const.							<0.01		15		
1C	41	404+50 -L-	24" CSP						0.01		103			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		15		
1Z	42	409+00 -L-	15" CSP & 24" CSP						0.03		244			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		18		
SJ	43	419+75 -L-	24" CSP						<0.01		16			
			Rip Rap						<0.01		10			
			Temp. Const.							<0.01		15		
SKA	44	428+50 -L-	30" CSP						0.02		147			
SK	45	431+00 -L-	Ditch Lined /							0.03		288		(288') Existing concrete ditch replaced with (288') rip rap
			Class I Rip Rap											No Net Loss
TOTAL SHEET 6:									0.10	0.04	899	371		

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